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D.T.E. 98-99

Petition of The Berkshire Gas Company for Approval of its Long-Range Forecast and Supply Plan for the Period 1998-1999 to 2002-2003.

APPEARANCES: James M. Avery, Esq.

K. Jill Rizzotti, Esq.

Rich, May, Bilodeau & Flaherty, P.C.

294 Washington Street

Boston, Massachusetts 02108

FOR: THE BERKSHIRE GAS COMPANY

Petitioner

Vincent DeVito, Esq.

Deputy General Counsel

Commonwealth of Massachusetts

Division of Energy Resources

100 Cambridge Street, Room 1500

Boston, Massachusetts 02202

FOR: DIVISION OF ENERGY RESOURCES

Intervenor

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I. INTRODUCTION AND PROCEDURAL HISTORY

On October 1, 1998, pursuant to G.L. c. 164, § 69I, The Berkshire Gas Company ("Berkshire" or the "Company") filed with the Department of Telecommunications and Energy ("Department")[(1)]

a petition for approval of its long-range forecast and resource plan for the split years[(2)] 1998-1999 through 2002-2003. The petition was docketed as D.T.E. 98-99.

Berkshire is a regulated natural gas distribution utility headquartered in Pittsfield, Massachusetts. The Company serves utility customers in 19 Massachusetts municipalities located in Western Massachusetts. The population of the Company's service area is approximately 190,000. The Company has identified three separate divisions within its service area that maintain distinct points of interconnection with the interstate pipeline that serves the Company. The Pittsfield Division and the North Adams Division are contiguous areas in Berkshire County. The Greenfield Division includes portions of Franklin and Hampshire Counties.

On February 16, 1999, the Massachusetts Division of Energy Resources ("DOER") filed a Petition for Leave to Intervene. Pursuant to notice duly issued, the Department conducted a public hearing and procedural conference in Boston on February 22, 1999.

An evidentiary hearing was held at the Department's offices on April 5, 1999. Berkshire sponsored the testimony of four witnesses: Robert M. Allessio, Vice President of Utility

Operations; Karen L. Zink, Director of Rates, Regulation and Resource Planning; Michael J. Doolan, Manager of Transportation Services; and William L. Barschdorf, Jr., Supervisor of Gas Supply Planning. The evidentiary record includes seven Company exhibits, 50 Department exhibits and 19 Company responses to record requests. On May 5, 1999, the Company filed a brief supporting its petition.

II. ANALYSIS OF THE LONG-RANGE FORECAST

A. Standard of Review

Pursuant to G.L. c. 164, § 69I, the Department is required to ensure "a necessary energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost." In accordance with this mandate, the Department reviews the long range forecast of each gas utility to ensure that the forecast accurately projects the gas sendout requirements of the utility's market area. G.L. c. 164, § 69I. A forecast must reflect accurate and complete historical data, and reasonable statistical projection methods. G.L. c. 164, § 69I; 980 C.M.R. § 7.02 (9)(b). Such a forecast should provide a sound basis for resource planning decisions. Colonial Gas Company, D.P.U. 96-18, at 4 (1996); Bay State Gas Company, D.P.U. 93-129, at 5 (1996); Holyoke Gas and Electric Department, D.P.U. 93-191, at 2 (1996); Berkshire Gas Company, 16 DOMSC 53, at 56 (1987).

In its review of a forecast, the Department determines if a projection method is reasonable based on whether the methodology is: (a) reviewable, that is, contains enough information to allow a full understanding of the forecast methodology; (b) appropriate, that is, technically suitable to the size and nature of the particular gas company; and (c) reliable, that is, provides a measure of confidence that the gas company's assumptions, judgments, and data will forecast what is most likely to occur. D.P.U. 96-18, at 5; D.P.U. 93-129, at 5; D.P.U. 93-191, at 2; Haverhill Gas Company, 8 DOMSC 48, at 50-51 (1982). Specifically, the Department examines a gas company's: (1) planning standards, including its weather data;

(2) forecast method, including the forecast results; and (3) derivation and results of its design and normal sendout forecasts. See D.P.U. 96-18, at 5 and D.P.U. 93-129, at 5-6; D.P.U. 93-13, at 6; see also, Boston Gas Company, D.P.U. 94-109 (Phase 1), at 9 (1996). As part of the review of the forecast, the Department also examines the company's scenario analysis, which is used for evaluating the flexibility of the company's planning process, including any cold-snap analysis[(3)] and sensitivity analysis. Boston Gas Company, 25 DOMSC 116, at 200 (1992) ("1992 Boston Gas Decision"); see D.P.U. 93-129, at 23-25 and D.P.U. 94-109 (Phase 1), at 61-66.

B. Previous Sendout Forecast Review

In Berkshire Gas Company, D.P.U. 94-168 (1995), the Department approved Berkshire's sendout forecast pursuant to a settlement agreement between Berkshire and the Attorney General of the Commonwealth ("Attorney General") wherein the Company's Forecast and Resource plan submitted on October 1, 1994 was approved or accepted for all

purposes.[4] In that decision, Berkshire was directed to file its next Forecast and Supply Plan on October 1, 1996.

In an order dated December 20, 1996, the Department approved a separate settlement agreement executed by Berkshire and the Attorney General that provided for (1) the extension of the preapproval period for Berkshire's conservation and load management ("C&LM") programs, subject to certain modifications, from October 1, 1996 through September 30, 1998, and (2) the deferral of the requirement that Berkshire file its next forecast and supply plan from October 1, 1996 to October 1, 1998. In approving the settlement agreement, the Department noted that it was "appropriate for Berkshire to defer filing its F&SP" because Berkshire was considering filing a petition with the Siting Board for the approval, pursuant to G.L. c. 164, §69J, of the construction and operation of a "jurisdictional facility." Berkshire Gas Company, D.P.U. 96-92, p. 11 (1996). The Department, however, noted its concern with the statutory requirement within G.L. c. 164, §69I for gas companies to file a forecast and supply plan every two years and the Department's lack of authority to take actions that conflict with its governing statutes. Id. Accordingly, the Department ordered that the docket in D.P.U. 96-92 remain open to enable Berkshire to file a forecast and supply plan in connection with any petition for authority to construct and operate a new "jurisdictional facility." Id.

In November 1997, the Massachusetts Legislature enacted a comprehensive revision of G.L. c. 164. See Acts of 1997, c. 164 ("Restructuring Act"). Section 208 of the Restructuring Act amended G.L. c. 164, § 69I by adding the following language:

The department is authorized to exempt any electric or gas company

from any or all provisions of this section upon a determination by

the department and the siting board, after notice and hearing, that

an alternative process is in the public interest.

On April 23, 1998, Berkshire filed a petition with the Department and the Siting Board seeking an exemption from the requirements of G.L. c. 164, § 69I in connection with a proposal that an alternative review process be allowed. Berkshire proposed an alternative process be pursued in connection with a then planned filing for approval of a liquefied natural gas ("LNG") vaporization and storage facility to serve the Company's Greenfield Division. The Company suggested that such an alternative approach was appropriate in light of the planned facility filing and the ongoing "statewide" gas collaborative process being pursued under the direction of the Department. See, Notice of Inquiry Unbundling of Natural Gas Local Distribution Company Services, D.T.E. 98-32.

In a letter decision dated June 15, 1998, the Department denied Berkshire's request for such an alternative process and directed the Company to submit a complete forecast and supply plan filing by October 1, 1998, which the Company did. On February 2, 1999, the Company filed its petition for approval of the construction and operation of the aforementioned LNG facility and a related zoning exemption with a request for a consolidated review. These petitions were docketed and consolidated pursuant to a Consolidation Order dated February 24, 1999, as EFSB 99- 2/D.T.E. 99-17.

C. Planning Standards

1. Weather Data

a. Description

Berkshire described its efforts to develop a substantial weather data base. Berkshire receives and maintains weather data for degree days ("DDs") and effective degree days ("EDDs") from two sources: the

Company's weather stations located at its Pittsfield headquarters and at its Greenfield Service Center (Exh. BG-1, at 13). The Company has maintained reliable weather data from Pittsfield since 1970 (Exh. BG-2, Tab 1, at 4).[5] Berkshire explained that the weather data from the Pittsfield weather station were appropriate to use, particularly for the Company's Pittsfield Division and North Adams Division that are relatively close together and share similar weather patterns (Exh. BG-1, at 13). The Company noted that it has long recognized the need to conduct a separate analysis of the weather patterns in its Greenfield Division that is located to the east of the Berkshire Mountains in the Connecticut River Valley (Exh. BG-1, at 14). The Company installed its Greenfield weather station in November 1989 (id. at 14). The Company had installed the weather station based upon the recommendation of an earlier weather study, which was reviewed in a previous decision of the Siting Council (Berkshire Gas Company, EFSC 89-29, 19 DOMSC 258-259 (1990)). The study recommended that the Company secure an adequate weather data base and then evaluate the merits of division-specific planning standards and the use of EDDs for planning purposes (Exh. BG-1, at 14).

Berkshire retained Management Applications Consulting ("MAC") to perform a comprehensive weather analysis and to develop specific design standards (id. at 13). The Company stated that MAC sought to collect the greatest amount of relevant weather data that were available (id. at 14). The Company noted that MAC analyzed weather data from Company stations and other weather stations in Massachusetts as well as locations in other nearby states (Exh. BG-1, at 14 and Exh. BG-2, at 4).[6] Berkshire stated that MAC made specific adjustments for any missing information and other anomalies in the various data bases (Exh. BG-1, at 14). The study concluded that the Company's entire service area can be contained within a 30-mile radius (id. at 14) and that little, if any, gains in accuracy would be achieved if weather analyses were concluded on an individual Division rather than a Company-wide basis (id. at 12). The Company thus adopted the 30-year historical weather data base in estimating its design weather sendout based on data from its weather stations (id. at 13).

In its filing, however, Berkshire noted that it now has nearly nine years of weather data from its Greenfield weather station and that, consistent with the recommendation of an earlier weather study, the Company intends to perform a comprehensive weather analysis prior to its next F&SP to analyze the use of division-specific planning standards and the potential increase in accuracy that might be derived from the use of EDDs in forecasting (id. at 14).

b. Analysis and Findings

The Department determines that the 30 years is an acceptable length of time over which to collect weather data and that the Company's 30 year weather data base is appropriate for input into its planning standards. Therefore, the Department finds that the weather data in this filing are appropriate, reviewable and reliable. Also, based on the recommendations of the MAC study, the Department finds that it is not necessary for the Company to continue collecting division-specific weather data.

2. Normal Year Standard

a. Description

Berkshire stated that it developed its normal year standard using 20 years of weather data (id. at 15).[7] The Company indicated that it updates this standard annually by using the

most recent 20-year average of the weather data and then calculates an arithmetic average for a normal year (id. at 15). Based on this method, the Company calculated its normal year standard of 7,240 DD (id. at Table DD). The Company estimates that the normal year winter will experience 5,466 DD (id.).

b. Analysis and Findings

The Department has previously accepted the use of the arithmetic average of historical degree day data to establish a normal year standard. 1995 Colonial Gas Decision at 10; 1992 Boston Gas Decision at 136; 1991 Colonial Gas Decision, 23 DOMSC 351, at 363-364 (1991). Because Berkshire bases its normal year standard on an historical average of the up-to-date weather data base and its planning standards on this data base, the Department finds that Berkshire's method for determining its normal year standard is reviewable, appropriate, and reliable.

3. Design Year Standard

a. Description

The Company stated that it initially developed its design year planning standard pursuant to a probabilistic analysis that was confirmed by a comparison to standards developed by other utilities and pursuant to a cost/benefit analysis.[(8)] The Company selected a one-in-30 year standard of 8,194 DD (Exhs. BG-1, at 20; BG-2, Tab 1, at 8).

In terms of a cost/benefit analysis, Berkshire concluded that there would be no justification for the additional cost to support greater reliability by planning for an extremely high level of DD or cost savings by planning for an extremely low level of DD (id. at 20-21).[(9)] The Company determined that the flexibility of its resource plan, particularly in terms of peaking resources and the lack of demand charges associated with substantial Company peaking resources, supports the proposed standard (id. at 17).

In conducting a cost/benefit analysis of planning to different levels of probability, Berkshire stated that such an analysis should be performed in an appropriate and cost-effective manner (id. at 17). Berkshire recognized that any cost/benefit analysis should reflect the previously adopted flexibility benefits associated with the Company's resource portfolio (id. at 17). Berkshire had previously revised its resource portfolio so that it maintained substantial flexibility to serve higher demand without incurring incremental costs other than those associated with the necessary commodity (Exhs. BG-1, at 17; DTE 2-4; DTE 2-5).

b. Analysis and Findings

In its Gas Generic Order, 14 DOMSC 95, at 97 (1986), the Siting Council notified gas companies that renewed emphasis would be placed on design criteria "to ensure that those criteria bear a reasonable relationship to design conditions that are likely to be encountered." The Siting Council required each company, in each forecast filing, to

include a detailed discussion of the basis upon which it selected the design weather criteria, with particular attention to the frequency with which design conditions are expected to occur, and to the effect of the design standard on the reliability of the company's forecast and the cost of its supply plan. Gas Generic Order, 14 DOMSC 95, at 96-97, 104-105 (1986).

Berkshire did not perform an extensive analysis of the costs associated with "unserved demand" related to a cost/benefit analysis because Berkshire concluded that the cost of such an analysis could not be justified (Exh. BG-1, at 19-20). The Company maintained that Berkshire's resource plan enables it to meet different levels of demand subject only to additional cost associated with incremental commodity requirements (id. at 18).

The Company has developed its design year standard based upon a one-in-30 year probability. The Department finds that Berkshire has complied with Department precedent in terms of the use of probabilistic analysis. The Department also finds that the Company's probabilistic standard is consistent with the design year standard of similar LDCs in Massachusetts. Therefore, the Department finds Berkshire's method for determining its design year standard is reviewable, appropriate, and reliable.

4. Design Day Standard

a. Description

The Company determined its design day standard in a manner similar to its design year standard.[(10)] Berkshire noted that in prior years it had assumed a design day of 74 DD (id. at 16). Berkshire stated that in this forecast it relied upon a probabilistic analysis based on the available weather data described above (id.). Berkshire explained that the probabilistic analysis indicated that a design day of 75 DD was suggested by a 20-year probability (id.). The Company also determined that a one-in-30 year standard suggested a design day of 75.7 DD (id.; see also, Exhs. BG-2, Tab 1, Exh.11; DTE 2-1). The Company decided to adapt a design day standard of 75 DD and apply a 76 DD for potential contingency analysis (Exh. BG-1, at 16). The Company stated that it experienced a design day of 76 DD on January 19, 1994 and was able to provide reliable service to its customers (id.).

Berkshire explained that its ability to provide reliable service was in large part due to enhancements and refinements to the Company's resource portfolio. Berkshire explained that it had restructured certain firm gas supply contracts to reduce or eliminate demand charges (id. at 16; Tr. 73). These contracts did not contain additional charges other than that necessary for the commodity that Berkshire could purchase at market-based prices (Exh. BG-1, at 18). The Company states that it also enjoys the benefits of a contract with the operator of a cogeneration facility located in Pittsfield (id. at 16). The contract provides Berkshire with, among other things, capacity in a pipeline serving the Company's Pittsfield distribution center, as well as the right to purchase the plant's gas entitlement at a price essentially equivalent to the cost of the plant's alternative fuel (id. at 65; Exhs. DTE 1-15; DTE 1-17).

Berkshire explained that its choice of design day standard was cost-effective given the changing regulatory background and the numerous enhancements to its resource portfolio that had already been implemented (Exh. BG-1, at 17). Berkshire took into consideration such costs as lost production by commercial and industrial customers, property damage to heating customers, the extensive costs of restoring service and the more general costs associated with the public health and safety (id.). Berkshire noted that other gas companies had addressed similar factors in their cost/benefit analyses (Exh. DTE 2-4).

Berkshire indicated that given the Company's actual experience, the outcome of its own probabilistic analysis, the comparative analysis of other utilities, and the consideration of the substantial costs of unserved demand, the Company concluded that it was not prudent to plan for a design day below the "statistically-derived one-in-20 year probability standard" (Exh. BG-1, at 18). Berkshire noted that a design day of 76 DD was probable based upon the Company's analyses (id.).

Berkshire next considered the flexibility benefits that have been incorporated into the Company's resource plan. Berkshire recognized that it was able to serve demand at a design day of 76 DD or even higher without any additional cost other than necessary commodity-related expenses that could be procured at market-based prices (id.). Berkshire indicated that even under extreme weather conditions, the Company would be able to maintain service to the Pittsfield and North Adams Divisions (Exhs. RR-DTE-8; RR-DTE-9; RR-DTE-12). The Company noted that Berkshire's plan to address its need in the Greenfield Division through the addition of the proposed LNG facility would facilitate reliable service at peak demand (See e.g., Exh. BG-1, at 79). Berkshire claimed that any potential service curtailments in the Greenfield Division were not driven by the Company's supply portfolio (Exh. BG-1, at 19).

In sum, Berkshire concluded that it could not justify any additional savings by planning for a lower design standard (id. at 18). Berkshire also reiterated that it has an appropriate cushion for the most severe weather that does not require the incurrence of additional costs (id. at 20).

b. Analysis and Findings

Berkshire's method for developing a design standard is similar to the Company's development of design year standard. The Department notes that Berkshire has neither performed a comprehensive analysis of the cost of unserved demand nor has it quantified with precision the actual effects associated with planning to different standards. The Company has developed its design day standard of 75 DD which corresponds to a one-in-20 year probability with a 76 DD being applied for possible contingency analyses.[(11)]

The Department finds that Berkshire has complied with Department precedent in terms of the use of probabilistic analysis (see Section C.3.b., above). Therefore, the Department finds that Berkshire's methodology for determining its design day standard is reviewable, appropriate, and reliable.

5. Conclusions on Planning Standards

The Department has found that the Company provided a reliable weather data base for use in the development of its planning standards. Further, the Department has found that Berkshire used the arithmetic average of historical degree day data to establish a normal year standard, a method which has been accepted previously by the Department. The Department has also found that the Company employed a reasonable statistical analysis of the recurrence probabilities of its normal year, design year and design day standards. Accordingly, the Department finds that Berkshire's overall planning standards are reviewable, appropriate and reliable.

D. Forecasting Methods

1. Berkshire's Forecasting Model

a. Description

Berkshire argued that its forecast was based upon a comprehensive analysis that accounted for market area conditions, alternative fuel availability and prices, reliable and appropriate weather data and the best available demographic projections (Exh. BG-1, at 24-33) by each customer class and aims to forecast changes in each demand class. Berkshire opined that its forecasting process appropriately reflected the particular circumstances of the Company and the regulatory environment (Exh. DTE 2-8). The Company explained that the forecasting process is based largely upon historical trends but does specifically account for changed circumstances, such as plant closings involving larger commercial or industrial customers and population movements throughout its service territory (Exh. BG-1, at 24-26). The Company stated that it employed such data to develop class-specific forecasts for each of its three operating divisions.

Berkshire stated that its forecasting process has produced forecasts that were accurate and reliable and the end results of the internal forecast and the econometric forecasts were very similar at the end of the five-year forecast period 1994-1998 (see RR-DTE-2; RR-DTE-3).[(12)] Berkshire explained that in preparing its filing in this proceeding it had considered the preparation of an updated econometric forecast (Exh. BG-1, at 24). Further, Berkshire acknowledged certain of the strengths and benefits associated with econometric forecasting and the concerns raised in the course of the preparation of the earlier econometric forecast. However, Berkshire also stated that (1) it was aware that certain of its data availability concerns could not be fully addressed so that it was unlikely that a useful and accurate econometric forecast could be completed,[(13)] (2) it recognized that the ongoing regulatory changes affecting the natural gas market would be difficult, if not impossible, to reflect in an econometric model,[(14)] (3) the Company expected that any econometric model prepared at the time of its filing would have very limited utility in the aftermath of the ongoing regulatory changes (Exh. DTE 2-3; Tr. 9-10), and (4) it was not practical to prepare an econometric forecast on other than a quarterly basis (Exhs. BG-1, at 24;DTE 2-6; RR-DTE-2).

Berkshire argued that following these considerations and the resulting accuracy of its internal forecasting process, the Company elected not to incur the substantial expense of preparing and submitting a new econometric forecast in this proceeding (Tr. 40; Exh. DTE 2-6). Berkshire indicated its willingness to undertake a new econometric forecasting effort when the ongoing regulatory changes have been completed (Exh. DTE 2-6).

Berkshire argued that its internal forecast was reviewable, appropriate and reliable, as well as consistent with Department precedent. The Company further argued that it was appropriate to rely upon historic demand and judgment to forecast sendout (Company Brief, at 20 citing Fitchburg Gas and Electric Light Company, D.P.U. 94-140 (1994), at 17; 1992 Boston Gas Decision at 184; Boston Gas Company, 19 DOMSC 332, at 372 (1990)).

Berkshire described population and employment trends within the counties served by the Company (Exh. BG-1, at 25-26). Berkshire noted the effect of plant closings relative to larger customers (id. at 26). Berkshire also explained that the population in its Pittsfield and North Adams Divisions was continuing to decline and that this trend was expected to continue with the loss of manufacturing jobs (id. at 26). Population growth in the Greenfield Division has continued at modest rates (id.). Berkshire also presented the results of a study on the natural gas saturation levels within its service area (id. at 27-29; see also Exh. BG-3, Tab 1). The Company prepared specific analyses for each town served by the Company. Berkshire developed specific analyses for the percentage of residences that are located along Company mains as well as the percentage of unserved housing units located on such mains. Berkshire explained the nature of the potential market for residential gas customers and suggested that its assumption of modest growth in residential demand was reasonable and appropriate (Exh. BG-1, at 29).

Berkshire analyzed the availability and cost of alternative fuels (Tr. 22-23; Exh. BG-1 at 30). The Company recognized the cost and non-cost factors that affect natural gas as a competitive fuel (Tr. 24). In addition, the Company described the various marketing programs sponsored by Berkshire to promote customer growth (Exh. BG-1, at 32-34). Berkshire stated that the marketing programs had been successful in attracting new load to the Company's system and that it was confident that such results would continue during the forecast period (Exh. BG-1, at 34). The Company described how it took into account conservation programs and initiatives and described its existing Load Management Rate that permits the Company to interrupt its largest industrial customer (Tr. 62; Exh. BG-1, at 67-69).

The Company also accounted for its expected capital investments. These costs would include main expansion and other enhancements intended to increase system efficiency (Exh. BG-1, at 36-37). The Company pointed to its extremely low levels of unaccounted-for- gas as an indicator of the success of its construction program (id. at 38). The Company described the recent completion of its Automated Meter Reading Program (id. at 37). Berkshire explained that enhanced billing information will provide numerous benefits, particularly in terms of the Company's forecasting process (id.).

The Company then explained its class specific application of this information. The Company's initial step was to estimate number of billings (customers) during the forecast period (id. at 41). The Company stated that it employed three to five years of historical data to "smooth" customer trends (Exh. BG-1, at 42; Tr. 27). The Company then adjusted this estimate based upon market information and demographic trends (Exh. BG-1, at 42).

The Company next developed usage factors. For most classes, the Company developed base or non-temperature-sensitive usage using normalized sendout in August (id. at 46). Berkshire determined the base use factor by taking the normalized sendout in August and dividing it by the number of customers billed (id. at 46-47). The Company also analyzed "heat-sensitive" sales by first subtracting the base use per customer factor times the number of customers each month from the total monthly sales for a class.[(15)] The remainder, or "heat-sensitive" sales, was divided by the number of customers and then the actual billing degree days[(16)] to determine a use per customer degree day factor (id. at 47). Monthly sales were then developed by multiplying the number of customers by the use per customer per DD and then multiplying such product by monthly DDs (id.). Heat sensitive load was added to base usage to produce total demand. The Company adjusted total demand for each class to reflect ongoing and expected conservation programs (id. at 48).[(17)]

Berkshire next summarized its forecast for each rate class and each of its divisions. Specific projections of number of customers and usage were developed. Actual dispatched sendout was calculated after total customer demand was determined by adjusting for Company use and unaccounted for volumes. The Company presented specific forecasts for each class for both normal and design weather (Exhs. BG-1, at 50-52;BG-1, Tab V).

Berkshire also presented an analysis of the accuracy of recent iterations of its internal forecasting method as well as a detailed comparison of the accuracy of the econometric forecast prepared in 1994 with the accompanying iteration of the Company's internal forecast. (Exh. BG-1, Tab V). The Company argued that the accuracy of the internal forecasting method was confirmed by the fact that the econometric model had produced a generally comparable forecast (Exh. BG-1, at Table FA; RR-DTE-3). The Company further asserted that in general, its internal forecast performed better than the econometric model over the full five-year forecast period (RR-DTE-3). Nevertheless, Berkshire reaffirmed its commitment to analyzing the merits of an econometric process in its next forecast filing (Exh. BG-1, at 23).

b. Analysis and Findings

The Department notes that Berkshire, did not use any demographic or economic variables in developing its long-range demand model. Instead, the Company used historical averages for the variables it included, and assumed that they will exhibit the same behavior in the future. This approach differs from the standard forecasting techniques and sets Berkshire apart from other Massachusetts LDCs (see Bay State Gas Company, D.T.E. 98-96 and Commonwealth Gas Company, D.P.U. 96-117). The

Department notes there are two commonly used forecasting approaches available to LDCs in Massachusetts, econometric modeling or time-series analysis. In the case of econometric modeling, a dependent variable such as demand for gas can be modeled (or explained) by some predetermined variables (that affect gas consumption) such as population, income and temperature. The second approach, time-series analysis, attempts to forecast future values of a dependent variable based on its past values by applying some assumptions, but more specifically by employing certain procedures.

Berkshire's approach resembles a time-series analysis. The Company takes the value of the last three to five years' historical average of the concerned variable (for example, the number of the billings) and accepts that average as the forecast value. In its forecast analysis, the Company projects the number of billings and the degree days and calculates the usage factors which are then treated as constants. In the case of use factors, Berkshire disaggregated the base and the heat sensitive usage factors.

The Department is concerned that the use of a simple historical average does not necessarily provide an accurate forecast. Also, the Company did not take into account the factor known as "bend-over" effect, which suggests that the relationship between load and the temperature may not hold for periods of severe weather because the fuel intake for gas heating equipment may peak and level-off at extremely cold temperature. The Department notes that the exclusion of this factor in demand analysis may have resulted in overestimation of the heat sensitive gas demand at extremely high DD levels.

The Department acknowledges that the Company argued that the lack of available relevant data prevented Berkshire from developing an appropriate econometric forecast. However, there is a plethora of private and public sources of regional economic and demographic data which are used by other Massachusetts LDCs in their long-range demand forecasts (see Commonwealth Gas Company, D.P.U. 96-117 and Colonial Gas Company D.T.E. 98-90).

The Department is concerned that the Company's internal forecast in its current filing lacks a sound theoretical basis. However, the Department recognizes that the results of the Berkshire's internal forecast are consistent with the results of the econometric model developed by the Company in the settlement agreement in D.P.U. 94-168. The Department finds that the forecast figures for the number of billings are suitable to use. For these reasons, the Department accepts the Company's forecast results.

While the Department remains concerned about the forecast method employed by the Company in its analysis, the Department notes that the Company appropriately developed customer class-based divisional demand figures and adjusted total sales numbers for unaccounted-for-gas and company use to obtain its sendout forecast. Thus, for the reasons indicated above, the Department finds Berkshire's forecast of sendout to be reviewable and reliable, but not appropriate.

2. Transportation Forecasts

a. Description

The Company did not develop a forecast of sales customers migrating to transportation services or new transportation customers over the forecast period.

b. Analysis and Findings

In Boston Gas Company, D.P.U. 92-259, at 10 (1993), the Department expressed

its preference that Massachusetts LDCs offer a full menu of services that reflect the restructuring of the natural gas industry under FERC Order 636, and allow gas consumers to reap the benefits of increased competition in the natural gas marketplace. This point gains additional importance when it is considered in the context of ongoing Department efforts to open the Massachusetts gas market to competition. The Department directs Berkshire, in its next filing, to provide a forecast of customers migrating from sales service to transportation service.

3. Normal and Design Year Sendout Forecast

a. Description

To derive normal year and design year sendout for the Pittsfield, North Adams and Greenfield Divisions, the Company stated that the sales forecasts are developed for each division and each rate class and adjusted for company use and unaccounted-for-gas (Exh. BG-1, at 23,41,52 and Tab 4).

Berkshire stated that its normal year sendout for the heating season increases from 4,411 MMcf for the 1998-1999 split year to 4,569 MMcf for the 2002-2003 split year, for an average growth rate of 0.9 percent per year (Exh. BG-5). Berkshire stated that its design year sendout for the heating season increases from 4,760 MMcf in the 1998-1999 split year to 4,944 MMcf in the 2002-2003 split year, also for an average growth rate of 0.9 percent per year (id.). Berkshire indicated that its design year sendout for the non-heating season increases from 2,530 MMcf in the 1998-1999 split year to 2,609 MMcf in the 2002-2003 split year, for an average growth rate of 0.74 percent per year (id.).

b. Analysis and Findings

The Company appropriately adjusted total sales numbers for unaccounted-for-gas and company use to obtain its sendout forecast. Berkshire also prepared separate forecasts for heating and non-heating sales for the planning period both for normal and design conditions developed in Section II.C. Consistent with the analysis and findings in section II.D.1.b., the Department finds that the normal and design year sendout forecasts are reviewable and reliable, but not appropriate.

4. Design Day Sendout Forecast

a. Description

Berkshire stated that its design day sendout forecast is based on the design day standard described in Section II.C. Berkshire indicated that its design day sendout increases from 51.182 MMcf for the 1998-1999 split year to 53.180 MMcf for the 2002-2003 split year, for an average growth rate of 1.0 percent per year (id.).

b. Analysis and Findings

The Company used an analysis for its design day similar to that for normal and design year. Accordingly, the Department finds that the Company's design day sendout forecast is reviewable and reliable, but not appropriate.

E. Conclusions on the Sendout Forecast

In its current filing, Berkshire used neither an econometric modeling nor a time-series analysis for its sales (demand) forecast. Instead, the Company used historical averages for the projected variables assuming they will repeat themselves in the future. Although the Company's results seemed to be consistent with those obtained from the previous filing's econometric results, the Company's choice of forecasting technique rendered the figures forecasted in this analysis reliable, but not appropriate. For this reason, the Department directs Berkshire, in its next filing, to use a more sophisticated and theoretically well-founded forecasting technique which is technically suitable to the size and nature of the Company. The Department notes that Berkshire previously developed appropriate forecasts in The Berkshire Gas Company, D.P.U. 94-168.

The Company generated customer class level divisional forecasts together with non-heat and heating class separation. The Department acknowledges that this information is reliable. However, the Department directs the Company to employ a more sophisticated forecasting technique.

For the reasons indicated above, the Department finds Berkshire's forecast of total sendout to be reviewable and reliable, but not appropriate.

III. ANALYSIS OF THE SUPPLY PLAN

- Standard of Review

The Department is required to ensure "a necessary energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost." G.L. c. 164, § 69I. In fulfilling this mandate, the Department reviews a gas company's supply planning process and the two major aspects of every utility's supply plan -- adequacy and cost.[(18)] Commonwealth Gas Company, D.P.U. 92-159, at 53; Colonial Gas Company, D.P.U. 93-13, at 49-50; 1992 Boston Gas Decision, 25 DOMSC at 201.

The Department reviews a gas company's five-year supply plan to determine whether the plan is adequate to meet projected normal year, design year, design day, and cold-snap firm sendout requirements (see Section III. D., below).[19] In order to establish adequacy, a gas company must demonstrate that it has an identified set of resources that meet its projected sendout under a reasonable range of contingencies. If a company cannot establish that it has an identified set of resources which meet sendout requirements under a reasonable set of contingencies, the company must then demonstrate that it has an action plan which meets projected sendout in the event that the identified resources will not be available when expected.

Colonial Gas Company, D.P.U. 96-18, at 31; Commonwealth Gas Company, D.P.U. 92-159, at 54; Colonial Gas Company, D.P.U. 93-13, at 50.

In its review of a gas company's supply plan, the Department reviews a company's overall supply planning process (see Section III. E., below). An appropriate supply planning process is essential to the development of an adequate, low-cost, and low environmental impact resource plan. Pursuant to this standard, a gas company must establish that its supply planning process enables it to (1) identify and evaluate a full range of supply options, and (2) compare all options -- including C&LM -- on an equal footing. Colonial Gas Company, D.P.U. 96-18, at 31; Commonwealth Gas Company, D.P.U. 92-159, at 54; Colonial Gas Company, D.P.U. 93-13, at 51; 1992 Boston Gas Decision, 25 DOMSC at 202.[20]

Finally, the Department reviews whether a gas company's five year supply plan minimizes cost (see Section III. F., below). A least-cost supply plan is one that minimizes costs subject to trade-offs with adequacy and environmental impact. Commonwealth Gas Company, D.P.U. 92-159, at 55; Colonial Gas Company, D.P.U. 93-13, at 51-52; 1992 Boston Gas Decision, 25 DOMSC at 203. Here, a gas company must establish that application of its supply planning process has resulted in the addition of resource options that contribute to a least-cost plan.

B. Base Case Supply Plan

In this section, the Department reviews the Company's supply plan and identifies elements which represent potential contingencies affecting the adequacy of supply or which potentially affect the cost of the supply plan. The Department reviews the adequacy of the Company's supply plan, the Company's supply planning process, and the cost of the Company's supply plan.

1. Supply-Side Resources

The Company stated that its portfolio of firm pipeline-transported gas supply at the time of its filing consists principally of four purchase contracts for domestically-produced gas and one purchase contract for Canadian-produced gas (Exh. BG-1, at 74; Exh. DTE 1-24). The Company indicated that these contracts provide for up to 19,407 MMBtus per day of firm supply (Exh. BG-1, at 74). Most of the supplies may be delivered to any take

station serving the Company's service area. Specifically, Berkshire has contracts with: El Paso Energy Marketing for 7,797 dekatherms ("DTH") per day; Aquila Energy Marketing for 2,753 DTH per day; and two separate contracts with Dynegy, one for 2,752 DTH per day and a second for 5,048 DTH per day (Exh. DTE 1-24). The Company's Canadian supply contract provides up to 1,057 MMBtus per day (Exh. BG-1, at 74). The Company also pursues the purchase of spot gas to lower its commodity cost, purchasing gas from marketers, cogenerators and gas companies (Exh. DTE 1-31; Exh. DTE 1-32). Approximately 58% of the Company's long-term contractual gas entitlement is based upon index price mechanisms (Exh. DTE 1-33). Finally, the Company stated that it has sought to maximize interruptible sales and transportation transactions for the benefit of firm customers (Exh. Tr. 55-56; RR-DTE-6).

Berkshire stated that it also has capacity entitlements on the Tennessee Gas Pipeline Company ("Tennessee") system that provide access to gas production fields and upstream storage (Exh. BG-1, at 69). Berkshire stated that its interstate pipeline capacity may logically be separated into three segments (id.). First, the Company maintains "long-haul" capacity from the gas producing regions of 18,350 MMBtus per day (id.). The second component is the "short haul" capacity used to transport gas from underground storage fields in Pennsylvania, New York and West Virginia. The Company has 12,255 MMBtus per day of such capacity (id.). The third component is the 1,057 MMBtus per day capacity between the Company's service area and the Canadian border (id.).

The Company also described the measures taken over the last decade to increase its capacity at the various Tennessee meter stations serving the Company (Exhs. BG-1; at 67; DTE 1-22). Among the measures taken to increase capacity over the past ten years is an increase in capacity at the North Adams and Stockbridge meter stations by 1,057 DTH and 1,827 DTH respectively, the construction of a new city gate station with 10,000 DTH of capacity in West Pittsfield, and the NOREX expansion which added 4,712 DTH to the Greenfield meter station (Exh. BG-1, at 67). These changes have increased the Company's flexibility in terms of delivering pipeline supplies into its distribution system (Exh. DTE 1-22).

The Company stated that it also maintains three separate contracts for storage services. These contracts are with Tennessee, Penn York Energy Corporation and CNG Transmission Corporation (Exh. BG-1, at 71-73). The maximum daily withdrawal quantity for these resources is approximately 19,000 MMBtus per day (id.).

The Company also maintains certain firm and interruptible transportation rights pursuant to a contract with the Altresco cogeneration plant in Pittsfield. The Company may purchase up to 7,500 MMBtus per day of the plant's gas supply during the heating season (Exh. BG-1, at 75; Exh. DTE 1-15). The Company stated that it may purchase up to 24,000 MMBtus of the plant's firm gas supply as a "surge protection service" in the event that the Company's supplies are prorated or curtailed (Exhs. BG-1, at 75; DTE 1-15). These rights do not involve any demand charges (Exh. DTE 1-16). The Company also stated that during the heating season, its supply and storage volumes are supplemented by LNG vaporized from a temporary facility in the northern portion of the Company's

Greenfield Division (Exh. BG-1, at 76-77)[21] and several propane air facilities located throughout the Company's service area. The Company's use of propane air is limited by on-site storage capacity, trucking restrictions and the necessary "flow by" of natural gas (Exh. BG-1, at 76). The Company explained several beneficial features of its propane arrangements, including the shared allocation of the cost of certain facilities, the "parking" arrangement whereby the Company may charge suppliers for storage of propane in Berkshire facilities and the flexibility and pricing benefits of purchasing propane jointly with the Company's related retail propane operation (Exh. DTE

1- 6; Tr. 97-98).

The Company maintains a contract with Distrigas of Massachusetts Corporation ("DOMAC") for the delivery of up to 2,400 MMBtus per day of LNG (Exh. BG-1, at 74-75). The LNG can be taken as liquid to vaporize at the Company's Greenfield facilities to maintain system pressures or as displacement gas from the interstate pipeline delivered to the Company's city gate (Exh. BG-1, at 75). The Company noted that such peak service rights have secured substantial cost savings for the benefit of the Company's customers (Tr. 78-79).

The Company maintains rates for firm transportation pursuant to the Company's recent establishment of unbundled rates (Tr. 11). The Company noted that commercial and industrial customers have migrated to transportation service since the Company submitted its filing in this proceeding (id.). This process has been facilitated by the Department and reflected in the decisions in docket D.T.E. 98-32 whereby the Department is seeking to promote greater competition and customer choice in the Massachusetts natural gas industry (Exh. BG-1, at 56).

Berkshire indicates that in developing its resource acquisition plan, the Company considered the effect of uncertainty regarding the regulatory environment in Massachusetts (id. at 57). Berkshire states that despite the progress that has been made toward unbundling in Massachusetts thus far, there are some unresolved issues that will have an effect on the level of transportation migration the Company will experience over this planning period and the rate at which such migration will occur (id.).

2. Conservation and Load Management

Berkshire notes that its existing C&LM programs were established in 1992 (Berkshire Gas Company; D.P.U. 91-154 (1994)). The Company maintains that its C&LM programs have saved approximately 335 MMcf as of June 30, 1998 (Exh. BG-1, at 68). The Company further notes that its C&LM programs have been designed in a collaborative process with the Attorney General and the Department in a process that has now resulted in four separate settlement agreements (D.P.U. 91-154; D.P.U. 94-168; D.P.U. 96-92; D.T.E. 98-93).

Berkshire stated that its residential C&LM program is coordinated with local Community Action Program ("CAP") agencies and includes a substantial low income component

(Exh. BG-1, at 68). The Company explained that the residential program is prescriptive and consists of three steps (1) energy assessment, (2) installation of selected prescriptive measures, and (3) quality control inspection (Exh. DTE 1-14). The Company stated that seven insulation and heating system control measures and two water conservation measures are offered through the residential program (id.). Low income residential customers receive a greater level of subsidies. The Company asserts that is has achieved substantial penetration in the low income market sector. The Company stated that it also offers C&LM programs to its small and medium C&I customers (id.). The Company explained that the small C&I program is prescriptive and consists of three steps (1) energy assessment, (2) installation of selected measures, and (3) quality control inspection (id.). The Company added that twelve gas saving measures are offered through the program and one water conservation measure.

The Company also stated that it has maintained a Load Management Rate (Rate Schedule MDPU #212, Rate G-80)(Exh. BG-1, at 68). The Company's largest customer, the University of Massachusetts at Amherst, is served pursuant to this rate schedule (id. at

68-69). Berkshire explained that the Company may interrupt service to customers served pursuant to the Load Management Rate up to 15 days during peak periods (id. at 69). The Company stated that this rate schedule has enabled the Company to defer the need for a new energy facility to serve the Greenfield Division for a number of years (id. at 68-69).

C. Adequacy of the Supply Plan

In reviewing the adequacy of a gas company's five-year supply plan, the Department first examines whether the company's base-case resource plan is adequate to meet its projected normal year, design year, design day, and cold-snap firm sendout requirements and, if so, whether the company's plan is adequate to meet its sendout requirements if certain supplies become unavailable. D.P.U. 93-13, at 62; 1992 Boston Gas Decision at 212-213; 1987 Berkshire Decision at 76. If the supply plan is not adequate under the base-case resource plan or not adequate under the contingency of existing or new supplies becoming available, then the company must establish that it has an action plan that will ensure that supplies will be obtained to meet its projected firm sendout requirements. D.P.U. 93-13, at 62; 1992 Boston Gas Decision at 212-213; 1987 Berkshire Decision at 76.

1. Normal and Design Year Adequacy

a. Description

In normal and design year planning, Berkshire must have adequate supplies to meet several types of requirements. Commonwealth Gas Company, D.P.U. 92-159, at 69. Berkshire presented supply plans for meeting its forecasted normal year and design year sendout requirements throughout the forecast period (Exhs. BG-5; BG-1, Tables G-22NH and G-22DH). Berkshire explained that it plans to meet its normal year and design year heating season needs through existing firm pipeline supplies, underground storage,

C&LM, LNG vapor and liquid from DOMAC, propane air injections and volumes purchased pursuant to the Company's contract with the Altresco co-generation plant (Exh. BG-6). Berkshire forecasts that normal year firm sendout requirements will increase from 3,961 MMcf in the 1998-1999 heating season to 4,122 MMcf in the 2002-2003 heating season (Exh. BG-1, Table G-22NH). Berkshire forecasts that design year firm sendout requirements will increase from 4,325 MMcf in the 1998-1999 heating season to 4,501 MMcf in the 2002-2003 heating season (Exh. BG-1, Table G-22DH).

Berkshire's analyses demonstrate that its resource portfolio would enable the Company to meet firm requirements in a normal and a design year throughout the forecast period.[(22)] Berkshire stated that the ability to meet such requirements is due to the flexibility of the Company's resource plan. Berkshire stated that these flexible resources are not associated with any demand charges. The Company noted that its system dispatch requires the dispatch of LNG from the Company's temporary facility on approximately 30 days in a normal winter and 46 days in a design winter with multiple deliveries required on 10 and 21 days, respectively (Exh. BG-1, at 77-78).

b. Analysis and Findings

As noted previously, the Department has found that Berkshire's normal and design year sendout forecast is reviewable and reliable, but not appropriate. Based on Berkshire's sendout and supply tables, the Company has demonstrated that it has adequate supplies to meet its forecast sendout requirements under normal and design conditions throughout the forecast period. Accordingly, the Department finds that Berkshire has established that the Company has adequate supplies to meet its normal year and design year forecast sendout requirements throughout the forecast period.

2. Design Day Adequacy

a. Description

Berkshire must have an adequate supply capability to meet its firm customers' normal and design day requirements. While the total supply capability necessary for meeting normal and design year requirements is a function of the aggregate volumes of gas available over some contract period, design day supply capability is determined by the maximum daily deliveries of pipeline gas, the maximum rate at which supplemental fuels can be dispatched, and the quantity of reliable LNG available on a design day.

Berkshire presented supply plans for meeting its forecast design day sendout requirements throughout the forecast period (Exh. BG-6). Berkshire plans to meet its design day needs through existing firm pipeline supplies, underground storage, C&LM including load management, LNG from DOMAC, the Company's peaking service rights with the operator of the Altresco cogeneration plant and propane air injections (id.). Berkshire forecasts that design day firm sendout requirements will increase from 51 MMcf in the 1998-1999 heating season to 53 MMcf in the 2002-2003 heating season (id.). Berkshire noted that the existing LNG facility is dispatched predominantly to

maintain system pressures in the Greenfield Division and that the proposed LNG facility would also serve a similar purpose. (id.).

The Company's supply plan recognized the need to evaluate the resource plan under scenarios reflecting different levels of sendout (Exh. BG-1, at 79). The Company determined that with generally stagnant economic conditions within the Company's service area and the prospect for substantial migration to transportation service, a lower sendout scenario was more appropriate for analysis (id.). However, the Company stated that it was unlikely to experience substantial migration to transportation service across all customer classes until later in the forecast period (id. at 80). The Company notes that C&I customers are expected to and have migrated at a greater rate than retail customers (id.). Berkshire stated that the mandatory capacity release program proposed by Berkshire and the other Massachusetts gas companies (and since accepted by the Department in D.T.E. 98-32-B) would provide migrating customers "with the necessary capacity rights for such customers to continue to obtain reliable gas service regardless of the customers' choice of commodity supplier" (id.). Berkshire noted that under the mandatory capacity system, the Company's sendout requirements and upstream pipeline capacity would decline proportionately throughout the forecast period (id. at 81). The Company's forecast also stated that the Company would review its upstream capacity contracts consistent with Department directives (id.). The Company stated that it had terminated certain contracts and extended others to facilitate the orderly transition contemplated in the Department's directives (Tr. 12-13). The Company also stated that it has incorporated flexibility into its resource portfolio to enable the Company to "manage its resources under different transportation migration and economic condition scenarios…" (Exh. BG-1, at 81).

b. Analysis and Findings

As noted previously, the Department has found that Berkshire's design day sendout forecast is reviewable and reliable, but not appropriate. Based on this subsidiary finding and Berkshire's sendout and supply tables containing design day data, the Company has demonstrated that it has adequate supplies and facilities to meet forecasted sendout requirements under design day conditions throughout the forecasted period. Accordingly the Department finds that Berkshire has established that its design day supply plan is adequate to meet the Company's forecasted sendout requirements throughout the forecast period.

3. Cold-snap Adequacy

a. Description

A cold-snap is a prolonged series of days at or near design conditions. D.P.U. 93-13, at 66; 1992 Boston Gas Decision at 217; Commonwealth Gas, 17 DOMSC 71, at 137 (1998) ("1998 Commonwealth Gas Decision"). A gas company must demonstrate that the aggregate resources available to it are adequate to meet this near maximum level of sendout over a sustained period of time, and that it has and can sustain the ability to

deliver such resources to its customers. D.P.U. 93-13, at 66; 1992 Boston Gas Decision at 217; 1998 Commonwealth Gas Decision, 17 DOMSC at 137.

The Company stated that it adopted a cold-snap of 620 DDs over a ten-day period (Exh. BG-1, at 78). The Company explained that it evaluated a rolling 10-day average of DDs from its synthesized weather data. For each month and year, averages and standard derivations for each 10-day period were calculated (Exh. BG-2, Tab 1, at 10). The Company noted that a one-in-30 year standard for a cold-snap would be 620 DDs. The Company also determined that a one-in-20 year standard would be only 613 DDs (id.). Given the Company's reliance upon its temporary LNG facility, the Company elected to employ a 620 DD cold-snap standard (id.).

The Company explained that in order to meet this extended period of peak demand, the Company could dispatch its full portfolio of pipeline supplies, storage volumes, Altresco peaking gas, and LNG vaporized at the temporary facility and received from Tennessee by "back haul" and propane air at its production facilities (Exh. BG-1, at 78). Berkshire stated that its ample propane storage and production facilities together with the Altresco contractual rights have provided adequate cold-snap volumes for its firm customers to date (id. at 79). The Company noted that, absent the proposed LNG storage and vaporization facility, the Company could require as many as 30 LNG transport deliveries over a ten day cold-snap and up to four transport deliveries on a near peak day to maintain adequate pressure and supply the requirements of the Greenfield Division (id.). The Company noted that the probability that inclement weather could cause transport deliveries to be canceled or delayed or for the Company's compressor station to suffer a mechanical breakdown over a period of extended operation is reasonably likely. Indeed, this type of contingency has actually been experienced by the Company (Tr. 68-69). The Company stated that the development of the proposed LNG facility with on-site storage capacity would address these concerns throughout the forecast period (Exh. BG-1, at 79).

b. Analysis and Findings

The Department finds that Berkshire has employed an appropriate cold-snap standard for a company of its size and resources. The Company employed a statistically derived standard based on recurrence probabilities in this filing. Based on Berkshire's analysis, the Department finds that the Company has demonstrated that it has adequate supplies, particularly with the inclusion of the proposed LNG facility in the second year of the forecast, to meet its firm sendout requirements during a prolonged cold-snap. Accordingly, the Department finds that Berkshire has established that its cold-snap supply plan is adequate to meet the Company's forecast sendout requirements throughout the forecast period.

4. Conclusions on the Adequacy of the Supply Plan

The Department finds that the Company has established that its normal year and design year supply plans are adequate to meet the Company's forecast sendout requirements and storage refill requirements throughout the forecast period. The Department also finds that

the Company has established that it has adequate supplies to meet the Company's design sendout requirements for the forecast period. Accordingly, the Department finds that Berkshire has established that it has adequate resources to meet its firm sendout requirements throughout the forecast period.

C. Supply Planning Process

1. Identification and Evaluation of Resource Options

a. Supply-Side Resources

i. Description

Berkshire stated that the supply planning process for natural gas companies has become increasingly complex as the market and regulatory environments are evolving (Exh. BG-1, at 10). Berkshire stated that it actively monitors and evaluates its existing gas resources within the context of the ongoing industry changes (id. at 55). Berkshire explains that it employs sophisticated and comprehensive resource planning techniques to ensure the development of safe and reliable service with a minimum impact upon the environment at the lowest possible cost under normal and design conditions (id. at 54).

Berkshire explained that it employs its forecast of firm sendout as the basis for designing its portfolio of resources (id.). The Company then employs its Gas Supply Dispatch Optimization Model (Exhs. BG-1; BG-3; BG-4) to evaluate the particular mix of resources that should be included in the least-cost portfolio (Exh. BG-1, at 54).

The Company explained that it analyzes its longer term resource requirements at least twice per year (id. at 55). The first analysis is typically performed during the yearly fiscal budgeting process while the second and more substantial analysis is performed for the Company's internal five-year long-range planning process. The Company indicated that additional analyses will be performed "when mandated by particular circumstances" (Exhs. DTE 1-35; BG-1, at 55). The process highlights the need for and appropriate timing of resource requirement adjustments.

Berkshire stated that it also seeks to minimize short-term costs while maintaining long-term supply security (Exh. BG-2, at 2). The Company stated that it monitors daily gas index prices in order to change its supply mix when cost savings will result. The Company regularly evaluates its resource requirements and has released those assets not required to serve its market and returns any value received for such assets to firm customers (Exh. BG-1, at 55). The Company stated that it has also enjoyed considerable success in generating margins from the provision of interruptible sales and transportation service (Tr. 54-56; RR-DTE-5).

Berkshire stated that once a resource need arises, the Company attempts to identify all of the possible resource options that may be able to meet that need.[23] Berkshire also described its participation in the Mansfield Consortium (Exh. BG-1, at 62). In addition, the Company has sought to issue Requests for Proposals ("RFPs") to assess the competitive market, preparing and issuing a targeted solicitation of interest in the course of securing a recent contract with DOMAC (id.). Berkshire stated that once it receives responses to the RFP it performs a preliminary review to narrow the list of proposals for further analysis (id.).

Berkshire explained that it negotiates proposals based on cost and non-price factors

(id. at 63-64). The Company stated that cost is the most readily quantifiable criterion that the Company applies in evaluating resource options (id.). Berkshire employs its dispatch optimization model to measure the change in total cost that each resource option would produce if incorporated into the Company's portfolio (Exh's. BG-3; BG-4). The Company stated that its analyses and RFP's have considered non-price factors, including reliability, diversity, and flexibility (Exh's. BG-3; BG-4).

ii. Analysis and Findings

The Department previously has endorsed LDC acquisition processes that involve the solicitation of competitive bids from alternative suppliers. Colonial Gas Company, D.P.U. 96-48, at 49 (1996); Holyoke Gas and Electric Department, D.P.U. 93-191, at 30 (1996); Blackstone Gas Company, D.P.U. 95-15, at 7 (1996); Fall River Gas Company, D.P.U.

94-38, at 10 (1995). Here also, the Department determines whether the RFP process employed by Berkshire to identify alternative suppliers is appropriate. Berkshire has utilized price and non-price criteria to determine which options to pursue and has considered both short-term and long-term options. Further, Berkshire's process for evaluating supply options was reviewed by the Department in earlier decisions involving gas supply contracts (D.T.E. 98-129; D.P.U. 93-187; D.P.U. 93-187; D.P.U. 92-155). Accordingly, the Department finds that Berkshire has developed appropriate criteria for screening and comparing supply options.

b. Conservation and Load Management

i. Description

Berkshire indicated that its C&LM programs are an integral component of its "least cost planning process" (Exh. BG-1, at 67). As a resource, the Company acknowledges that C&LM measures have different characteristics than supply options. The Company explained that for these reasons and others, the Company models its C&LM programs as a reduction in demand applied to specifically targeted customer groups (id. at 68).

The Company reported that C&LM measures have been installed in about 19 percent of the Company's eligible residential customers (RR-DTE-4). Further, the Company has sponsored energy audits for over 10,500 residential customers, and approximately 95 percent of the audited customers chose to install at least one measure as a result of the energy audit (id.). The Company is now continuing the transition originally approved in D.P.U. 96-92 whereby the Company is shifting its C&LM efforts to "market-driven" activities in a manner consistent with the Department's directives in D.P.U. 96-50 (Exh. BG-1, at 68). The Company's most recent settlement reflects this continuing effort and the Company's ongoing participation in the market transformation collaborative process.

Berkshire stated that its current C&LM proposal is projected to secure 421 MMcf of savings during the 1999-2000 preapproval period (Exh's. DTE 1-13; DTE 1-14). The Company's residential programs were projected to have a benefit/cost ratio of 1.32 while the commercial/industrial programs were projected to have a benefit/cost ratio of 1.45 (Exh. DTE 1-13, at Sch.-A1, A2). The Company estimated that its total investments (not counting customers contributions) would be approximately $1.7 million with estimated avoided costs of over $2.8 million (The Berkshire Gas Company, D.T.E. 98-93, at Schedule A-1).

The Company stated that it performed cost-effectiveness screening consistent with the Department's precedent, employing a combination of GEMS[(24)] savings figures, where applicable, and discounted engineering estimates for other classes (Exh. DTE 1-13). The Company's measures were compared to the avoided cost of supply (id.). The Company also indicated that it would continue to screen new measures (id.).[(25)]

ii. Analysis and Findings

The record shows that Berkshire provides residential and C&I customers with C&LM programs. Further, the Company has an established process to identify and evaluate the cost-effectiveness of these programs. Accordingly, the Department finds that Berkshire has formulated an appropriate process for identifying a comprehensive set of C&LM options.

2. Consideration of All Resources on an Equal Basis

a. Description

Berkshire stated that its resource planning process considers a wide range of resources, including: pipelines, supply options, storage options, supplemental supply options, C&LM options (including load management), the arrangement with the operator of a co-generation plant, and distribution system options (Exh. BG-1, at 54-56). The Company's dispatch modeling reflects the merits of each resource during the course of the Company's planning analysis.

The Company stated that when evaluating dissimilar resource options, such as C&LM and supply, it strives to apply analytical methods which have been approved in regulatory proceedings or endorsed by industry authorities (Exh's. DTE 1-13; DTE 1-14).

b. Analysis and Findings

The Department has held that in order for a gas company's planning process to minimize cost, that process must adequately consider alternative resource additions, including C&LM, on an equal basis. D.P.U. 93-13, at 83; Boston Gas Company, 25 DOMSC at 223; Fall River Gas Company, 15 DOMSC at 115. The record shows that the Company has a method in place to evaluate resources within a single resource group, and that it evaluates options across resource groups using industry-accepted standards. Accordingly, the Department finds that the Company has incorporated both supply-side and demand-side options in its resource mix and has compared all resources, including C&LM options initiatives, on an equal basis.

3. Conclusions on the Supply Planning Process

The Department has found that (1) Berkshire formulated an appropriate process for identifying a comprehensive array of supply options and has developed appropriate criteria for screening and comparing supply resources, (2) Berkshire has formulated an appropriate process for identifying a comprehensive array of C&LM programs and has developed appropriate criteria for screening and comparing C&LM resources, and (3) Berkshire incorporated both supply-side and demand-side options in its resource mix, and the Company has compared all resources, including C&LM, on an equal basis. Accordingly, the Department finds that Berkshire developed an appropriate supply planning process.

D. Least-Cost Supply

1. Berkshire's Least-Cost Analysis

a. Description

Berkshire indicated that the Company also expects a need to upgrade its Greenfield Division distribution system (Exh. BG-1, at 78-79). The Company has identified three alternatives for meeting this operational need: (1) reinforcing the distribution system with more than 13 miles of twelve-inch pipe, (2) constructing a new propane air facility, approximately ten miles of 12-inch pipeline and securing substantial upstream capacity, and (3) siting a LNG facility in the northern portion of the system (see EFSB 99-2/ D.T.E. 99-17).[(26)]

Once the three alternatives were identified, the Company evaluated each option (see EFSB 99-2/ D.T.E. 99-17) . With the application of financial analysis tools, network analysis models and expert consultants, the Company performed cost analyses and

assessed the non-price impacts for each option. The Company's analysis indicated that the option of siting a LNG facility was preferable because it had the lowest cost and best meets Company long-term planning needs (id.).

The Company provided the table below presenting an historical perspective of the cost of peaking supplies (Exh. DTE 1-7). The table illustrated that substituting LNG and other peaking sources for propane for peaking use would reduce overall cost.

PEAKING SUPPLY COMPARISON

DELIVERED COST PER MMBtu

($/MMBtu)	**1994**	**1995**	**1996**	**1997**	**1998**
Propane	9.50	10.19	6.39	7.14	7.39
Altresco	5.68	5.07	5.60	6.66	4.64
LNG Vapor	3.30	3.30	3.20	3.25	4.56
Storage	4.05	3.50	3.28	3.90	4.18

Additionally, the Company indicated that two older propane plants, located at Greenfield and Hatfield, will no longer be dedicated for utility use if the permanent LNG vaporization facility is constructed (Exh. DTE 1-9).

b. Analysis and Findings

The Department finds that Berkshire has developed a planning process that results in the identification of a resource that would contribute to a least-cost supply plan. The cost of peaking resources is likely to fluctuate in the future as it has in the past. Given price uncertainty, the substitution of LNG and other peaking resources for propane is likely to reduce costs and help achieve the goal of least cost planning.

E. Conclusions on the Least-Cost Analysis

The Department has found that Berkshire has established a mechanism that has allowed it to identify adequate resources to meet its firm sendout requirement throughout the forecast period. The Department has also found that Berkshire has developed an appropriate supply planning process. Further, the Department notes that the Company's continued effort to reduce propane use is likely to continue to contribute to the goal of least cost planning. Finally, the Department has found that Berkshire has developed a planning process that would contribute to a least-cost supply plan. Accordingly, the

Department approves Berkshire's supply plan for the split years 1998-1999 through 2002-2003.

F. Conclusions on the Supply Plan

The Department has found that Berkshire has established that it has adequate resources to meet firm sendout requirements throughout the forecast period. The Department has also found that the Company's supply planning process enables it to identify a reasonable range of resource options and to perform an adequate evaluation of such options. Further, the Department has found that Berkshire has established that its supply planning process is sufficient to enable it to make least-cost supply decisions. In addition the Department has found that the Company's decisions contribute to a least-cost supply plan. Accordingly, the Department approves the 1998 supply plan of Berkshire Gas Company.

IV. ORDER

Accordingly, after due notice, hearing and consideration it is:

ORDERED: That The Berkshire Gas Company's petition for approval of its sendout

forecast and supply plan be and hereby is approved; and it is

FURTHER ORDERED: That The Berkshire Gas Company follow all directives

contained herein.

FURTHER ORDERED: That The Berkshire Gas Company file a long-range

forecast and supply plan with the Department within two years of the date of issuance of this order.

By Order of the Department,

_____

Janet Gail Besser, Chair

James Connelly, Commissioner

W. Robert Keating, Commissioner

Paul B. Vasington, Commissioner

Eugene J. Sullivan, Jr., Commissioner

Appeal as to matters of law from any final decision, order or ruling of the Commission may be taken to the Supreme Judicial Court by an aggrieved party in interest by the filing of a written petition praying that the Order of the Commission be modified or set aside in whole or in part.

Such petition for appeal shall be filed with the Secretary of the Commission within twenty days after the date of service of the decision, order or ruling of the Commission, or within such further time as the Commission may allow upon request filed prior to the expiration of twenty days after the date of service of said decision, order or ruling. Within ten days after such petition has been filed, the appealing party shall enter the appeal in the Supreme Judicial Court sitting in Suffolk County by filing a copy thereof with the Clerk of said Court. (Sec. 5, Chapter 25, G.L. Ter. Ed., as most recently amended by Chapter 485 of the Acts of 1971).

1. [1] Pursuant to the Acts of 1992, c. 141 ("Reorganization Act"), the Energy Facilities Siting Council ("Siting Council") was merged with the Department, and an Energy Facilities Siting Board ("Siting Board") was created within the Department, effective September 1, 1992. Reorganization Act, § 55. As a result of the merger, the Department was given jurisdiction to review utility forecast and supply plans, a function previously performed by the Siting Council. G.L. c. 164, § 69I. The terms Siting Council and Siting Board will be used in this decision as appropriate to the discussion.

2. [2] The Siting Council defined a split year as November 1 through October 31. The heating season is defined as November 1 through March 31, and the non-heating season is defined as April 1 through October 31. Energy Facilities Siting Council Administrative Bulletin 86-1, at 5.

3. A cold-snap is a prolonged series of days at or near design conditions. D.P.U. 93-13, at 66; 1992 Boston Gas Decision at 217; Commonwealth Gas, 17 DOMSC 71, at 137 (1998) ("1998 Commonwealth Gas Decision").

4. [4] The settlement agreement approved in D.P.U. 94-168 also provided for the pre-approval of Berkshire's C&LM programs through September 30, 1996. The Department noted that "the interests of ratepayers are served by a forecast and supply planning process that is flexible with respect to the means employed to establish the need for and the cost of additional resources." Id. at 10.

5. [5] Berkshire has maintained a weather station since 1951. Berkshire noted that prior to 1970 the data was gathered at another location that was somewhat sheltered (Exh. BG-2, Tab 1, at 4). Berkshire believes such older data was "questionable" (Exh. BG-2, Tab 1, at 4).

6. [6] The Company's analysis included weather data from the Company's weather stations as well as from Bradley Field in Hartford, Connecticut, Lebanon Valley Airport in New Hampshire and independent weather stations in Pittsfield, North Adams and Tully Lake (Exh. BG-2, at 4).

7. A normal year is a typical year for which a company plans.

8. A design year is the coldest year for which a company plans.

9. [9] In 1978, Berkshire experienced 8,336 DDs, approximately 150 DDs above the one-in-30 year standard (Exh. BG-1, at 20).

10. A design day is the coldest day for which a company plans.

11. The Company stated that a 30 year probability suggested a design day of 75.7 DD.

12. Berkshire submitted an econometric forecast for 1994-1998 in Berkshire Gas Company, D.P.U. 94-168 and the accuracy tests were made with respect to actual realizations for the period above.

13. Berkshire explained that one of the limitations was the lack of sufficient data subsequent to the Company's adoption of the load factor rates for C&I customers (see RR-DTE-2).

14. The Company noted a particular difficulty in modeling customer migration to transportation at an early point in the D.T.E. 98-32 process (Tr. 34-36, 71-72).

15. All of the Company's rate classes with the exception of its extra-large industrial class were found to be heat sensitive pursuant to established weather normalization techniques (Exh. DTE 2-10; Fall River Gas Company, D.P.U. 750).

16. The Company explained that it applied some averaging of historic variables to reflect its necessary use of billing data and the inherent "lags" in such data (Exh. DTE 2-9). The Company explained that its recently completed automated meter reading program should enhance the Company's data base and eliminate the need for certain averaging techniques (Exh. DTE 2-9).

17. The Company noted that it had been unable to discern any trend in terms of "non-programmatic" conservation. Berkshire noted that such factor may be reflected in the determination of usage factors (Exh. BG-1, at 48). Berkshire committed to analyze this factor in future analyses and expected to benefit from its enhanced electronic meter reading capabilities that will eliminate monthly estimates, and data from industry initiatives.

18. G.L. c.164, § 69I also directs the Department to balance cost considerations with environmental impacts in ensuring that the Commonwealth has a necessary supply of energy. Colonial Gas Company, D.P.U. 96-18, at 31; Commonwealth Gas Company, D.P.U. 92-159, at 53; Colonial Gas Company, D.P.U. 93-13, at 50.

19. The Department's review of reliability, another necessary element of a gas company's supply plan, is included within the Department's consideration of adequacy. See Colonial Gas Company, D.P.U. 93-13, at 50, n. 22; 1992 Boston Gas Decision, 25 DOMSC at 201, n. 87; Boston Gas Company, 16 DOMSC 173, at 214 (1987).

20. G.L. c. 164, § 69I, requires a utility company to demonstrate that its long-range forecast "include[s] an adequate consideration of conservation and load management." Initially, the Siting Council reviewed gas C&LM efforts in terms of cost minimization issues. In the 1988 Commonwealth Gas Decision, 17 DOMSC at 122-126, the Siting Council expanded its review to require a gas company to demonstrate that it has reasonably considered C&LM programs as resource options to help ensure that it has adequate supplies to meet projected sendout requirements.

21. The temporary LNG facility does not include any storage capacity (Exh. BG-1, at 76). According to Berkshire, this limitation was part of the reason that the Company has proposed the construction of a permanent LNG storage and vaporization facility to serve the Greenfield Division (Exh. DTE 1-10; Exh. DTE 1-12).

22. [22] The Company's forecast assumed that all deliveries were served by the Company (Exhs. DTE 1-25; DTE 1-40). The Company based this assumption on the uncertainties associated with the planning and regulatory processes related to gas unbundling at the time of the filing of the forecast and supply plan (Tr. 73-74; Exhs. DTE 1-27; DTE 1-40; RR-DTE-8).

23. Berkshire explained that it maintains continuous contact with suppliers, pipeline operators and other service providers either independently or via the Mansfield Consortium. The Mansfield Consortium was formed by LDCs for the purpose of negotiating natural gas commodity contract.

24. The term "GEMS" refers to the jointly sponsored Gas Evaluation and Monitoring Study, originally approved in Boston Gas Company, D.P.U. 90-320 (1992).

25. [25] The Company noted that it considered the prospect of increased C&LM resources as a means of addressing the need for a new resource in the Greenfield Division and determined that such resources could not address the identified reliability need (Exh. DTE 1-13).

26. [26] The Company also evaluated increased conservation and load management resources but suggests that such resources would not address the identified need.