COMMONWEALTH OF MASSACHUSETTS

BEFORE THE DEPARTMENT OF PUBLIC UTILITIES

Fall River Gas Company	Docket No. DPU 96-60

DIRECT TESTIMONY OF PAUL CHERNICK ON BEHALF OF THE ATTORNEY GENERAL

Resource Insight, Inc.

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EXHIBITS

I. Identification and Qualifications

Q: Mr. Chernick, please state your name, occupation, and business address.

A: I am Paul L. Chernick. I am president of Resource Insight, Inc., 18 Tremont Street, Suite 1000, Boston, Massachusetts.

Q: Summarize your professional education and experience.

A: I received a SB degree from the Massachusetts Institute of Technology in June 1974 from the Civil Engineering Department, and a SM degree from the Massachusetts Institute of Technology in February 1978 in Technology and Policy. I have been elected to membership in the civil engineering honorary society Chi Epsilon, and the engineering honor society Tau Beta Pi, and to associate membership in the research honorary society Sigma Xi.

I was a Utility Analyst for the Massachusetts Attorney General for more than three years, and was involved in numerous aspects of utility rate design, costing, load forecasting, and the evaluation of power supply options. Since 1981, I have been a consultant in utility regulation and planning: first as a Research Associate at Analysis and Inference, after 1986 as President of PLC, Inc., and since August 1990 in my current position at Resource Insight. In those capacities, I have advised a variety of clients on utility matters, including, among other things, the need for, cost of, and cost-effectiveness of prospective new generation plants and transmission lines; retrospective review of generation planning decisions; ratemaking for plant under construction; ratemaking for excess and/or uneconomical plant entering service; conservation program design; cost recovery for utility efficiency programs; and the valuation of environmental externalities from energy production and use. My resume is attached as Exhibit AG-PLC-1.

Q: Have you testified previously in utility proceedings?

A: Yes. I have testified over one hundred times on utility issues before various regulatory, legislative, and judicial bodies, including numerous appearances before this Department. A detailed list of my previous testimony is contained in my resume.

Q: Have you been involved in rate design and cost allocation?

A: Yes. As listed in my resume, I have testified on electric and gas utility rate design and cost allocation many times, before this Commission and elsewhere.

II. Introduction

Q: What is the purpose of your testimony?

A: The major purpose of my testimony is to review the structure of the Market Based Allocator (MBA) for gas supply costs, and the application of the MBA by Fall River Gas Company (the Company).

Q: Please summarize your conclusions.

A: The MBA, and the Company's application of that allocator, have a number of fundamental problems, including:

- The "coloring" of baseload gas supplies for different purposes, ignoring excess capacity, planning errors, the value of diversity, and the need for back-up supplies.

- Errors in identification of baseload supplies, including errors in modeling dispatch, and the use of perfect hindsight in selecting resources.
- Underpricing "baseload" pipeline supplies by treating average monthly consumption of gas as though it were used at 100% load factor.
- Underpricing of LNG boil-off assigned to baseload.
- Allocation of interruptible margin to "baseload" consumption that could not serve interruptible sales.

III. Description of the MBA

Q: Please briefly describe the MBA allocator.

A: The MBA allocator has been proposed as a way to separate the assignment of costs to high load factor use from the calculation of the Proportional Responsibility allocator. The first step in the derivation of the MBA is to determine the portion of the system load curve that can be characterized as "base load." Conceptually, this base load is the minimum load on the system that can be served by a supply at a 100% load factor. In practice (at least in the case of Bay State, Fall River and Essex Gas Companies), the base load is defined as the average load in July and August. The Company refers to the remainder of the system load as "supplemental load." This terminology gives the impression that this load is a relatively minor portion of the Company's total sales. In fact, the non-base load constitutes the bulk of the load and I will refer to it as "bulk load" in my testimony.

In the MBA, costs are generally assigned to base load in the following steps:

- dispatch the Company's supplies on a daily basis to determine the total quantity needed and the cost for each supply;
- rank the gas supplies by total average cost, including both commodity and demand charges;
- assign the supplies with lowest total average cost to the base load; and
- allocate the base load costs among rate classes based on class contribution to monthly base load.

The remainder of the gas costs determined in the gas dispatch simulation are assigned to the bulk load. These costs are allocated among rate classes based on their contribution to the system bulk load (that is, total load net of base load) using the Proportional Responsibility allocator.

Q: Is the Market Based Allocation method properly named?

A: No. The MBA does not reflect the operation of the competitive *market*, since it charges uneconomic or excess resources to bulk loads, rather than shareholders, and several features of the MBA arbitrarily understate the costs of serving baseload. It is not even really a distinct *method*, since different utilities propose to implement the approach in vastly different ways, as shown below:

Computational Issue	**Bay State** DPU 95-104	**Essex** DPU 96-70	**Fall River** DPU 96-60
dispatch to storage refill	after base	before base	before base
pre-allocation dispatch	variable cost	total cost	variable cost; some resources at actual
detail on class allocations	daily	monthly	monthly
load for non-base capacity allocator	design	design	normal
LNG pricing	average of base	average of base	incremental base
load factor for base allocation	includes interruptible	100+%	includes interruptible

IV. The "Coloring" of Base Gas Supplies

A. Problems with Assigning Base Gas Supplies to Uses

Q: Why is assigning particular base gas supplies to particular uses problematic?

A: One basic problem is that real gas utilities plan for the total of their loads, not for a series of separate loads. The totality of the utility's supply mix provides diversity (by contract pricing and delivery terms, supply area, and delivery pipeline) and back-up supplies to all customers. Even when firm loads can be met with just base supplies (i.e., those nominally available 365 days per year and economic for high load-factor dispatch), a storage supply may be used to work around a pipeline maintenance outage, absorb load swings, or take advantage of price fluctuations. Especially *within* the group of base supplies, it is generally impossible to say that particular supplies serve particular loads, unless those supplies were actually acquired to match a contract sales load. Most LDC sales are not tied to specific supplies.

Q: In pricing gas for a firm load with no weather sensitivity, would a marketer simply flow through the costs of one or a couple base supplies?

A: Not generally. For the reasons discussed above, the marketer would need a variety of supplies, probably including storage, to meet fluctuations in availability, demand, and price.

Q: Does it make sense to assign lower-cost base gas to baseload customers than to weather-sensitive customers?

A: No. Much of the variation in gas costs arises from the history embedded in current gas supplies. One base purchase obligation undertaken in 1988, with a specific split of commodity and capacity costs, and a particular escalation formula, may be well below market cost in 1996. A second base contract may be above market cost. Both were undertaken to meet same type of load, and both should be allocated in the same manner.[1] The utility might wish that it were not obligated to pay for second contract at all, but neither contract is more closely associated with a particular load shape than is the other.

In addition to contracts that are simply uneconomic due to changed conditions, contracts using lagged price indices may be bargains in some years and over-priced in others. For example, a contract with prices pegged

[1] This is particularly true where the two supplies are used similarly.

to spot prices the previous year would have been above market price in 1994-95, but well below market in 1995-96, and would probably be above market again in 1996-97. This is the same contract, undertaken to meet the same loads, regardless of its price position in a particular year.

Similarly, the utility may find itself in 1996 with some capacity obligations that are in excess of planning requirements, either for total capacity or for particular types of capacity, due to uncertainty and planning errors. This excess is as likely to be due to base loads as weather-sensitive loads.

Q: Are the same resources low-cost at all times?

A: No. Due to differences in contract prices, quantities, and durations (as contracts initiated and canceled), the low-cost resource varies over years, months, and even days. In general, the resource would not be available in the low-cost periods if it were not also under contract in the periods in which it is more expensive. The MBA does not recognize the variability over years, opportunistically assigning the lowest-cost resource in each year to base load. Depending on how a utility chooses to perform the initial hypothetical dispatch and subsequent allocation steps in the MBA, low-cost resources may be assigned to baseload on a monthly or even daily basis, ignoring the need to contract for resources on a longer-term basis.

Q: How would a marketer recover costs of uneconomic or excess contracts?

A: The marketer may not be able to recover these above-market costs at all, if it depends on short-term contract sales. However, reliability-sensitive customers, especially those most concerned with price fluctuations, may sign relatively long-term contracts that reserve more capacity than they wind up needing, and agree to price formulae that may not match short-term fluctuations. There is no reason to suppose that high-load-factor customers would be more or less receptive to these long-term contracts than low-load-factor customers. Thus, if the marketer recovered these costs at all, it would likely do so equally from customers of all load shapes.

Q: Does the Company have excess capacity?

A: This is not totally clear. The Company asserts that its current resources will "with few exceptions, ...meet any additional load growth with its existing resources" (Normand, p. 27).

B. Specific Problems in the Company's Identification of Baseload Supplies

Q: How has the Company erred in matching base supplies with base loads?

A: Even if base supplies could be meaningfully divided into portions serving baseload and intermediate loads, the Company's analysis identifying those supplies is fatally flawed in at least three respects:

- arbitrary assignment of the lowest-cost supplies to baseload
- errors in modeling dispatch
- the use of perfect hindsight in selecting resources

Q: How has the Company arbitrarily assigned the lowest-cost supplies to baseload?

A: As discussed above, this is a central part of the MBA approach. The Company assigns base resources to baseload on the basis of minimum *total* cost, rather than the *incremental* cost that actually determines the usage of the resource. Furthermore, the Company allocates different resources to base load in different months.

Q: How has the Company erred in modeling dispatch?

A: Gas supplies are actually dispatched based in order of increasing variable (commodity) cost, subject to constraints on availability. The Company chose instead to allocate gas supplies as if they were dispatched in order of increasing total cost.[2] This modeling error would cause an expensive base resource, with high fixed costs and low variable costs, to be treated as a peaking resource. No allocation model that uses full-cost dispatch can be considered reliable.

Q: What is the effect of the Company's errors in modeling dispatch?

A: It is difficult to determine what Fall River's base supplies really would be in a normal test year, due to its peculiar supply situation in 1995. One Distrigas contract was terminated after July, and another was initiated in November; in the meantime, Fall River received no gas from Distrigas, but paid demand charges. This situation illustrates a fundamental problem with the MBA approach: the allocation is very sensitive to accidents of history.

With that caveat, Distrigas appears to be the resource that would be economically dispatched first, since it has the lowest commodity cost, and should have been allocated first to base load. Fall River Gas recognizes that Distrigas is the lowest commodity-cost base supply, and reports that Distrigas was dispatched at or above MDQ in 1995. However, the Company assigns CNG to baseload as if it were dispatched first.

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[2] Essex: The Company's definition of total cost assumed that fixed costs were divided by the maximum take, rather than the actual take, or the take modeled in the analysis. The consequences of this additional error will be discussed below.

Q: How has the Company used perfect hindsight in selecting resources?

A: The Company used actual loads and prices, rather than dispatching resources based on the loads and prices anticipated when it entered into the contracts. Thus, resources acquired for base supply could be allocated to peaking service.

C. Underpricing of supplies assigned to baseload

Q: How has the Company underpriced supplies assigned to baseload?

A: The Company understated the following allocations to base load:

- Total base pipeline capacity and commodity cost, by arbitrarily selecting the lowest-cost supplies, even if those were not the most baseload resources.
- Pipeline capacity cost, by understating the capacity cost per Dekatherm (Dt) of sendout.
- LNG boil-off costs, by ignoring the capacity value of this firm supply.

1. Base Pipeline Total Cost

Q: How did the Company understate the costs of the base pipeline supplies assigned to baseload?

A: The Company arbitrarily assigned the lowest-cost supplies to baseload. This is incorrect for several reasons:

- The lowest-total-cost resources are not necessarily the most base-type resources. Real dispatch order is determined by variable cost, not total cost.

- As discussed above, utilities obtain a mix of base pipeline supplies for diversity. Utilities do not acquire low-cost base resources for some classes and high-cost base resources for other classes.
- Differences in base-supply costs are partially the result of historical accidents (such as the cancellation of the Distrigas contract).

2. Base Pipeline Capacity

Q: How else did the Company understate the costs of the base pipeline capacity assigned to baseload?

A: The Company computed the cost of these portion of these contracts assigned to baseload by dividing the annual capacity cost by the total take, including gas used for interruptible sales. This convention spreads the demand costs for each supply over more Dekatherms than actually pay for demand charges.

Q: Did the Company treat the costs of the base pipeline supplies assigned to bulk supplies in the same way as those it assigned to baseload?

A: No. While Fall River assigned capacity costs to baseload by spreading the capacity cost over all commodity taken, it charged all the remaining demand costs to the firm bulk load. As a result, bulk load is charged $1.54/Dt for CNG and baseload only $1.36/Dt, while bulk load is charged $1.92/Dt for Distrigas and baseload only $1.67/Dt.

This is a terribly perverse methodology, in which an increase in interruptible sales would increase the allocation of demand costs to the bulk load. Higher interruptible sales would result in lower demand charges being allocated to baseload, and hence more demand charge being assigned to bulk load. For example, if the 82% load factor for CNG sendout reported in IR AG 3-33 were increased to 100% through interruptible sales, the Fall River methodology would reduce the capacity charge allocated to baseload by 18%, or from $1.36/Dt to $1.11/Dt, shifting about $400,000 from baseload to bulk load. As noted below, Fall River would also allocate interruptible margin to baseload, even though baseload does not support interruptible sales. Increased interruptible sales would thus reduce allocations to baseload, and may increase bills for the bulk load that makes possible the interruptible sales.

Q: How serious is the understatement of demand charges to base loads?

A: Fall River Gas data indicate that baseload sendout is highly variable. The Company defines baseload as the July-August average load, and assumes that this average daily sendout can be used by the firm load every day and can serve the entire load for July (the lower-load of the two months). These assumptions are simply incorrect. For various load measures (1995 actual firm, design firm, and transport, which may best reflect the loads of the types of customers whose sales the Company is concerned):

- maximum July firm sendout is 18-27% higher than the July-August average
- minimum loads in July are just 11-32% of the July-August average
- minimum loads in August are 41-88% of the July-August average

These wide load swings are probably due to vacation schedules and variation in weekly operation at the high-load-factor industrial and large commercial facilities. The residential loads that operate in July and August (pilot lights, stoves, dryers and water heaters) are unlikely to exhibit these large simultaneous changes.

Fall River: This variability would require additional capacity beyond the high load factor assumed by the Company, either as additional baseload capacity (at a higher average commodity cost) to meet the upward swings, or as storage injection and withdrawal capacity (plus additional delivery capacity from storage, and higher commodity costs for storage) to balance the wide variability in "base" load.

3. *LNG boil-off*

Q: How did the Company understate the costs of LNG boil-off allocated to baseload?

A: LNG storage is acquired to meet short-duration variable loads. Boil-off of LNG is a by-product of LNG storage. The boil-off is only available if storage is acquired, but it is not reasonable to allocate the full cost of LNG commodity and capacity to boil-off. Quite reasonably, the Company uses a proxy of market price for the value of the boil-off. Specifically, the Company uses the average cost of the other resources assigned to baseload. Since those resources are already assigned to baseload, this approach somewhat understates the costs of resources that would be available to replace the LNG boil-off if it were not provided by the storage operation.[3] But the general concept of pricing the LNG at some measure of base supply costs is appropriate.

The far more important problem with the Company's computation of LNG boil-off costs is that it used only the *commodity* value of a base resource, and failed to include the capacity needed to deliver that resource. In the absence of the boil-off, MBA would have allocated the *total* cost of additional pipeline. Alternatively, if it were not used to serve firm load, the

[3] Of course, as discussed above, any effort to stratify base supplies is inherently flawed.

boil-off could be sold in the competitive market as a total resource, delivered at city gate. The Company's allocation requires bulk load to subsidize baseload, delivering boil-off at commodity-only prices, with no delivery charge.

Adding base capacity value to the pricing of the imputed LNG boil-off would increase the cost of the boil-off assigned to baseload by 80%.

V. Other Problems in the MBA Allocation

Q: What other problems have you identified in the Company's application of the MBA allocation?

A: Other than the assignment of costs to baseload, I have identified problems in the following areas:

- allocation of interruptible margin
- the definition of normal supply conditions
- level of bulk costs

A. Allocation of Interruptible Margin

Q: How does the Company allocate interruptible margin?

A: The Company allocates interruptible margin to all firm sales classes, in proportion to the proportional responsibility allocator on total load.

Q: Is this allocation consistent with the MBA allocation for gas supply costs?

A: No. Interruptible sales are made possible by capacity that is excess to firm requirements, including unused storage capacity in normal weather, and pipeline capacity that is not fully utilized in low-load months. The Company allocates a share of interruptible margin to "baseload" consumption, even though baseload is not allocated the resources that could serve interruptible sales. The Company does not even allocate enough capacity to the base load to serve that load, let alone make interruptible sales. The base load is assigned no excess capacity and no storage, and has no spare capacity in shoulder months, in which interruptible sales might be made.

Q: How should interruptible margin be allocated if the MBA is used to allocate supply costs?

A: Interruptible margins should be allocated on a measure of class contribution to allowing such sales, such as the difference between the annual supply capability of the capacity allocated to each class and the class's own load. The classes with the highest allocations of the bulk supply would thus receive the highest allocations of interruptible margin.

B. The Problem of Defining Normal Supply Conditions

Q: Why is the definition of normal supply conditions important in the MBA allocation?

A: The results of the MBA allocation are quite sensitive to the dispatch assumed for a "normal" year at the beginning of the allocation process. The normal year for cost allocation purposes should be one in which

- sales reflect normal weather in the test year,
- storage injections and withdrawals are balanced, reflecting normal weather in the test year and the preceding year, and
- supply levels and contracts exclude extraordinary and atypical events.

Q: Has the Company modeled a normal year for the MBA computation?

A: No. The Company

- includes Distrigas capacity costs for the entire year, as if it were one continuing contract, even though two separate contracts were in effect during various parts of the year and no contract was in effect for at least three months,
- includes Distrigas commodity at rates above MDQ in some months, and
- dispatches Distrigas and BayState supplies in the normal year at the same monthly rates as in the non-normal actual 1995 dispatch.

None of these features appears to represent normal dispatch.

C. Level of Bulk Supply Costs

Q: How do the level of costs assigned to bulk supply affect the results of the MBA allocation process?

A: The MBA produces an allocator vector, a set of percentages of gas supply costs to be allocated to various classes, adding to 100%. Any understatement of the base-load costs, or overstatement of the total quantity of bulk-load costs, will result in overstated allocators for low load-factor classes (those that comprise more of the bulk load).

Q: How does the Company overstate the total amount of supply costs for the bulk load?

A: The inclusion of demand charges for Distrigas, for months in which there was no contract in effect, appears to produce anomalously high costs to be allocated to bulk load.

VI. Conclusions and Recommendations

Q: Please summarize your conclusions.

A: The MBA, and the Company's application of it, are fatally flawed. The resulting allocations are heavily biased against weather-sensitive loads. Correcting the unrealistic and inconsistent modeling assumptions, arbitrary assignment and pricing of resources, under-assignment of capacity costs to base load, misallocation of interruptible margin, are beyond what is possible in this proceeding. Indeed, the current proceeding may not be sufficient to fully review the Company's hypothetical dispatch and analysis, let alone correct it.

Application of the MBA in the lightly-reviewed cost of gas adjustment (CGA) would be even more impractical and inappropriate. Changes in supply and demand conditions would require substantial revisions in the MBA allocators. Given the many arbitrary, unrealistic, variable and inconsistent decisions utilities make in implementing the MBA, allowing utilities to apply this approach in the CGA would allow the Company to allocate gas supply costs in virtually any manner it desires.

Q: What are your recommendations?

A: The Commission should reject the use of the MBA in this case, and in the CGA. The Company should not change its allocation of gas supply costs until it can construct a realistic and reasonable load-shape-based allocator.

Any adjustment to the CGA that varies between rate classes should either be a constant $/Dekatherm or a constant percentage change across classes.

Q: Does this conclude your testimony?

A: Yes.