

**Appendix C**  
**Method of Sale Regulation:**  
**Automatic Temperature Compensation – Letters**  
(Items 232-1 and 232-2)

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**NOTE:** Due to the amount of content in Appendix C, the content has been broken into three separate files. To view the content, click on the item in the “table of content” and the document should become visible for viewing or printing.

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## Overview of Alaska's Permissive ATC State

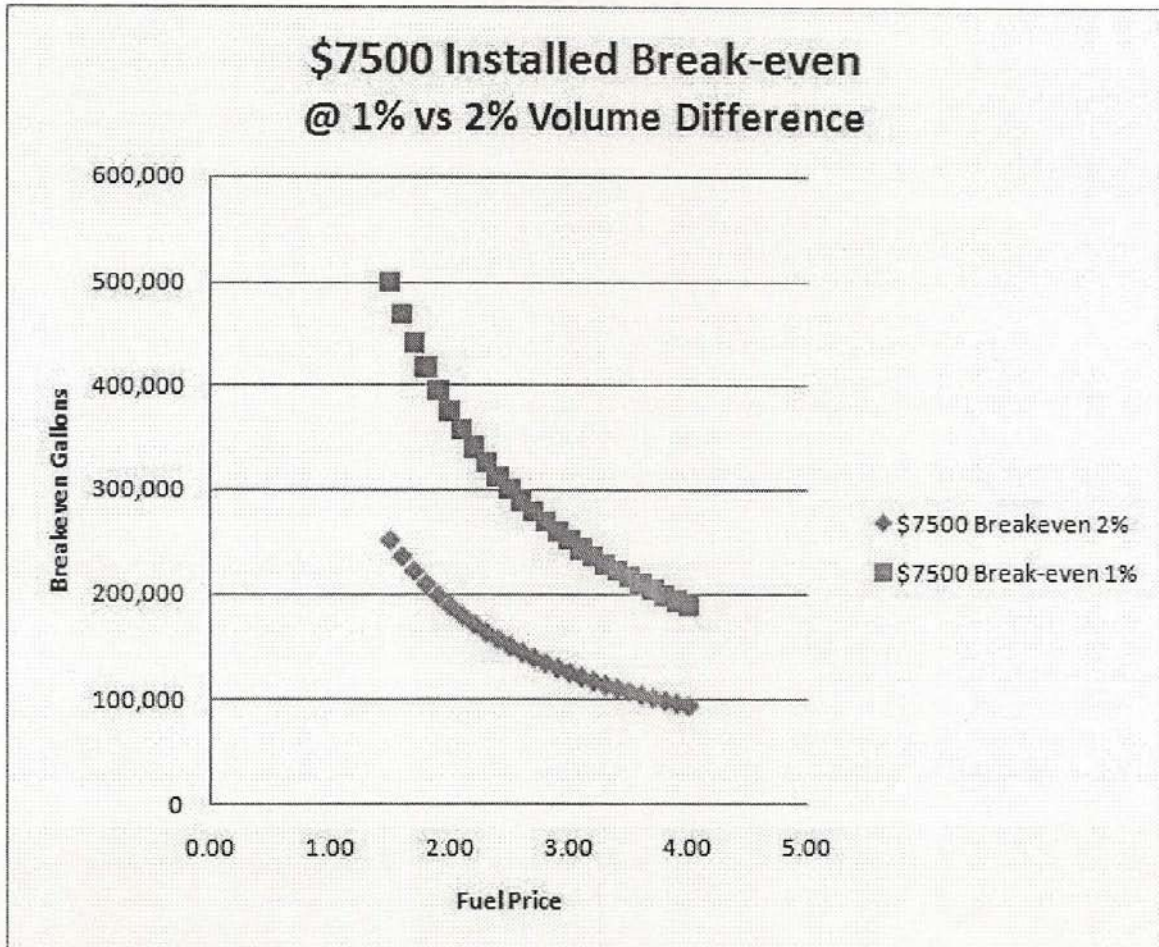
For vehicle tank meters, Automatic Temperature Compensation (ATC) is permissive in Alaska. This is not so for devices dispensing motor fuels, as there remains no national approval. Alaska, like many states, adopts the National Institute of Standards and Technology (NIST) Handbook 44 as law unless contrary regulations are established. There are no contrary regulations in Alaska on ATC so Handbook 44 is state law with respect to ATC. In 2008 regulation that effectively eliminated ATC at retail was proposed and led to this independent study.

The debate over ATC at retail has largely been about which standard should prevail based on equity and transparency. The National Conference on Weights and Measures (NCWM) has not taken a position "pro" or "con" except to say that if ATC is adopted it should be mandatory and with a reasonable transition period. Alaska's concern is that it has, and remains in a continuous state of permissive status in the vehicle tank meter market.

## ATC Devices are Economic in Alaska

The economics of ATC devices in Alaska are compelling and are the greatest incentive to use them. Alaska is an extreme cold state. As a practical matter, net gallons are smaller than gross gallons, as will be demonstrated.

In high-volume, high priced markets one "can't afford not to" install ATC technology, as it has been aptly put by industry representatives. In figure 39 of page 92 the report uses an example of a \$7500 installation on a fuel truck with retail fuel prices ranging from \$1.50 per gallon to \$4.00 per gallon. The break-even quantity of fuel (necessary to have the ATC device to pay for itself) is shown for a 1% vs. 2% volume difference net vs. gross.



At \$4.00 a gallon a brand new temperature compensating vehicle tank meter of 1.5 inches, 60 gpm, will pay for itself at 100,000 gallons when the volume difference is 2%. But at \$1.50 fuel and 1% volume difference, it would take 500,000 gallons to pay for itself.

Figure 39 – Breakeven for ATC Devices

\$4.00 fuel and 2% volumetric difference, ATC pays for itself in 100,000 gallons. One is to pose an extreme situation – such as \$1.50 fuel and 1% volumetric difference to make ATC start to look less attractive. If we double installation costs in consideration of remote application of new equipment then reasonable price and volume scenarios certainly still justify the expense.

## Consumer Ignorance

The study conducted two small surveys that were conclusive in addition to a number of revealing interviews in the course of the study. In one small survey of 20 random home heating oil customers, not one in that twenty was familiar with net gallons. There is no point in a larger survey with a response this overwhelming. Consumers are ignorant and there is no question about that. The survey was conducted after media coverage of the study.

The second survey was earlier, prior to any media coverage. Home heating oil retailers were surveyed in exactly this manner: Firms were called to establish the price per gallon for deliveries on that day. After the price quote was given the respondent was asked which gallon was being delivered – gross vs. net – and none knew the answer save one. In that case the call was to a cell phone operated by the owner/driver dispensing the fuel. The most common response by the position assigned to quote prices was that they had never heard the question before.

In interviews with numerous people who “ought to know” – an owner of a regional airline, the chief of flight operations for another, purchasing agents for school districts, etc. – they had either gone years before discovering the difference despite seeing delivery tickets or invoices - or still did not know the difference.

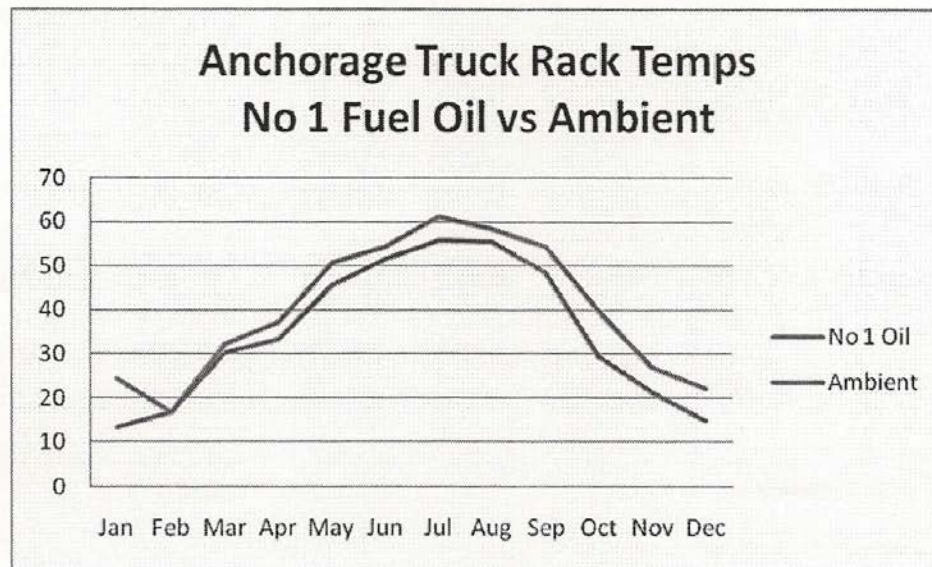
So there is a lack of transparency in pricing that gives the competitive advantage to the net gallon because it is smaller. It has been suggested that it is inflammatory to use the term “smaller”, but that is exactly why the ATC math “works” as illustrated in figure 39.

There are no intentions of suggesting impropriety or nefarious motives on the part of those who have a rightful property interest in the ATC devices purchased. They have also offered other reasons they have an incentive to invest in them: greater accuracy in tracking inventory for example.

But in the long run just as with Canada the advantage to ATC will prevail and the industry will adopt it universally wherever it pays for itself. Product labeling thus far has failed to convey to consumers what net gallons are because the concept itself is far too complex to convey in a label. “Volume corrected to 15<sup>o</sup>C” appears on Canadian motor fuel dispensers. But explaining what that means requires a baffling discussion of fuel-expansion physics.

## Net vs. Gross Volumes in Alaska

In the analysis of temperature data collected by the study it is clear how quickly fuel adjusts to ambient air temperatures. We reproduce figure 10 from page 21 of the temperature study appendix first to show how closely fuel temperatures follow ambient once distant from the refinery. The data is from the Anchorage truck rack for the Flint Hills refinery. The truck rack is located several hundred miles by rail from the North Pole refining facility. All retail fuel in the major population center of Alaska must be transported from refineries distant from Anchorage by barge, railroad, truck, or pipeline.



**Figure 10: Anchorage Truck Rack Temperatures - No 1 vs. Ambient**

It is quite clear from this diagram that in such a circumstance the difference in volumes of delivered fuels for retailers under either a mandatory gross or net standard will be far less than the variation between retailers under a permissive standard with some delivering gross and some delivering net.

Delivering ATC fuel is equivalent to delivering gross gallons at 60 degrees. So if one puts it in these terms it is equivalent to one retailer delivering fuel thirty or forty degrees warmer than another for about half the year at this location.

Stored fuel will not match ambient on a real-time basis. The speed of adjustment depends on a lot of factors. But generally speaking a below-ground tank is following a monthly average cycle and above-ground a weekly average cycle. Below ground tank cycles are more moderated compared with above-ground.

Under a gross gallon standard the largest potential differences between retail supply distant from refineries in Alaska would depend on the method of storage – above vs below ground. But retailers generally store their fuel in the same way. One can propose a maximum difference between two fuel oil retailers based on one having fuel left overnight in a delivery truck parked outside vs. one parked inside. But the great bulk of deliveries are occurring the same way between retailers similarly situated.

Fuel temperatures at the refinery tell a similar but more complicated story. We reproduce minimum, maximum, and average ambient vs. fuel temperatures below the Flint Hills refinery North Pole truck rack facility.

One can see fuel temperatures at the rack in the -20 F to +30 F ranges, as with the lowest ambient temperatures. But the maximum truck rack temperatures are much greater than maximum ambient in the deepest winter months. So clearly, recent refinery runs placed into storage are much warmer than ambient in those months.

This is at least one step removed from retail. If you ask what is the maximum potential difference between one retailer and another on any given day in the vehicle tank meter market, it will be in the coldest months. When one retailer is taking delivery of warm refinery run and another is closer to ambient. But whatever that difference is, much less than the difference between a net gallon and gross gallon retailer can be the same winter day.

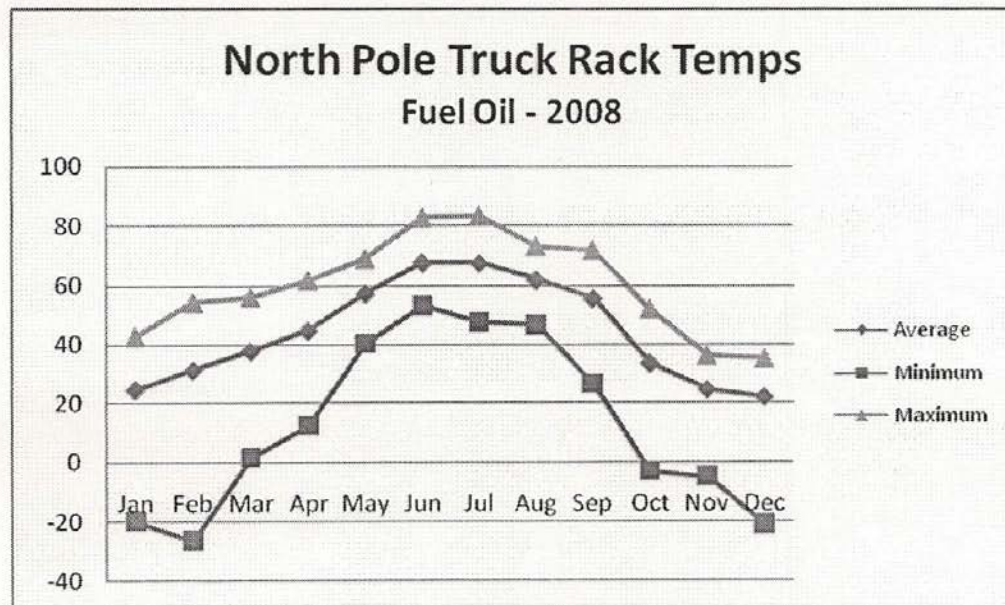


Figure 2: North Pole Truck Rack Temperatures - No. 1 Fuel Oil

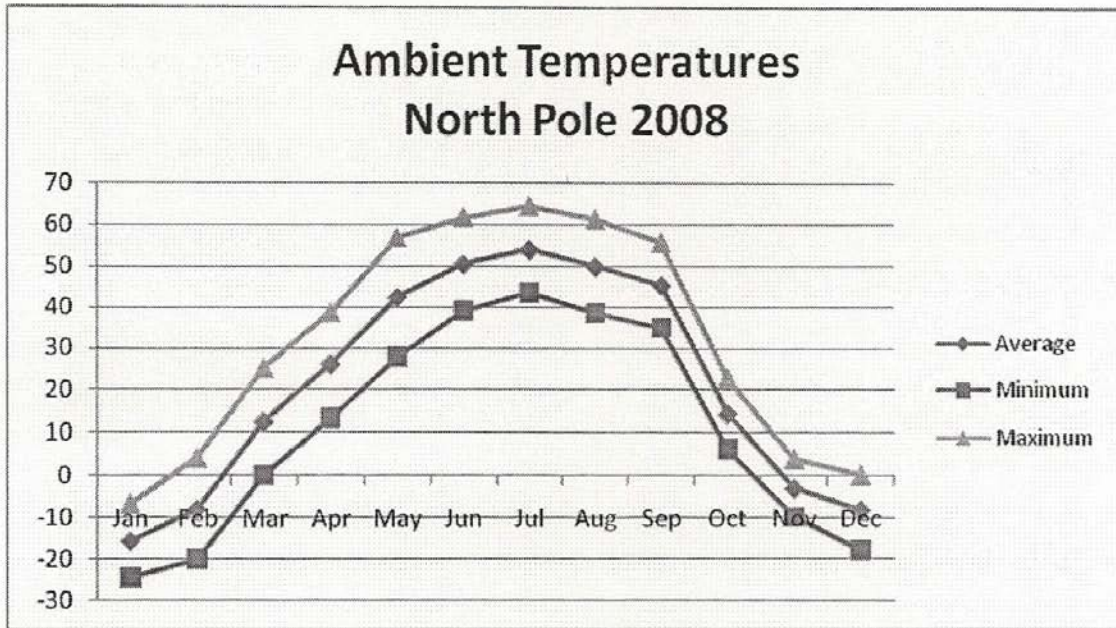


Figure 3: Ambient Air Temperatures: North Pole

temperature extremes in Alaska make for considerable difference between net vs. gross gallon volumes. Figures 24 and 25 from pages 71 and 72 of the report are shown here. Differences of around 5% or 6% are possible for the case of fuel oil vs. gasoline. The charts have "price differential" on the vertical axis. That is, two suppliers quoting the same "price per gallon" are actually 5%-6% different on an equivalent basis if one is quoting net and the other is quoting gross. That is a reasonable worst case scenario



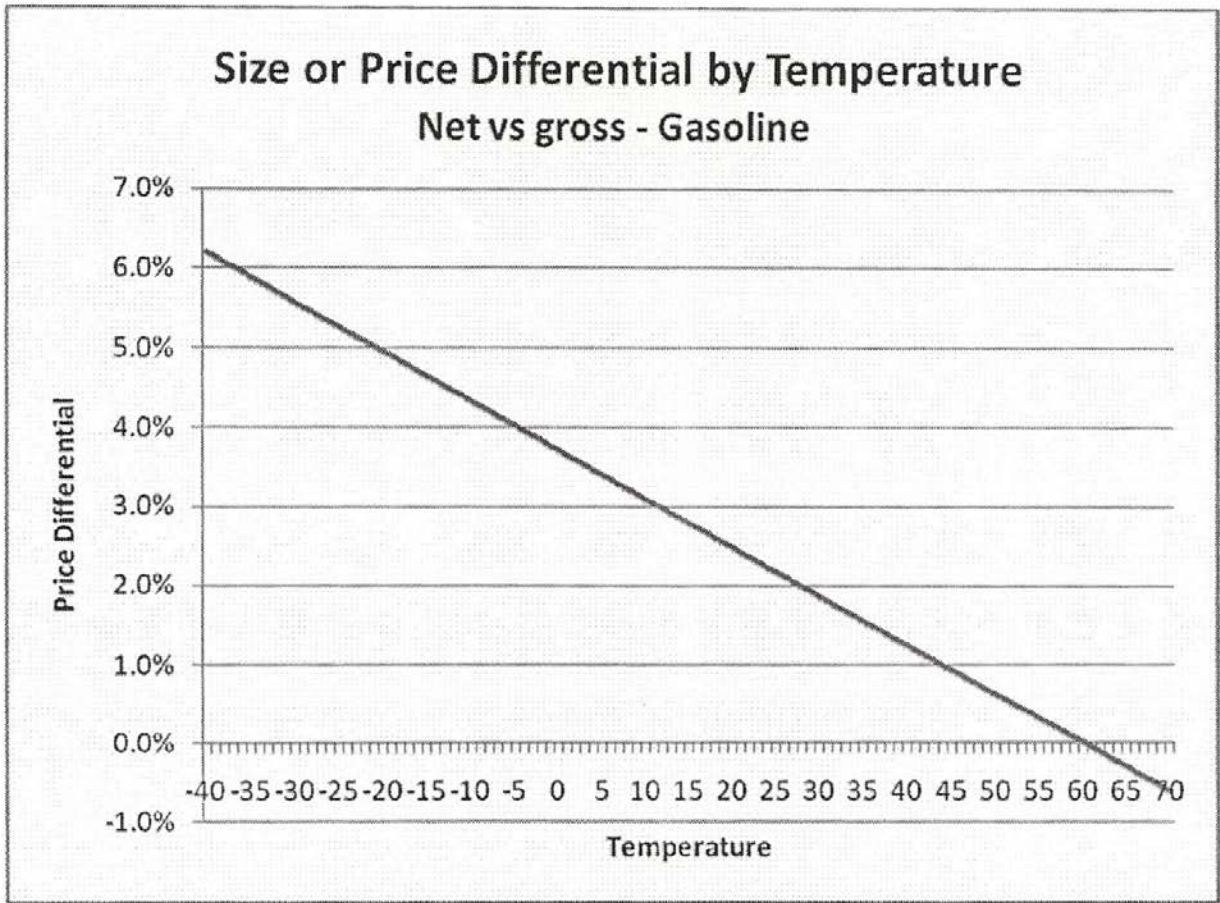


Figure 4

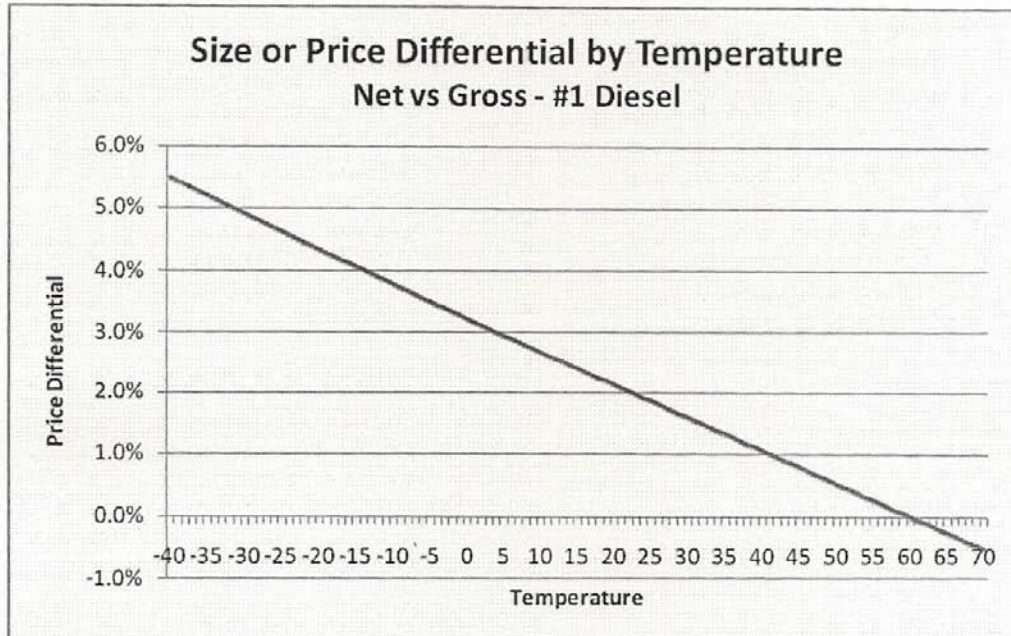


Figure 5

### Comparing Net Gallon vs. Gross Gallon Standards

The greatest disparity between retailer volumes occurs under the permissive standard. Eliminating one or the other establishes a more level retail playing field. Deciding between the two requires evaluating the comparative benefits and the costs. In Alaska, converting to mandatory ATC would require conversion costs where ATC is not being practiced.

Benefits of a net gallon standard vs. gross gallon standard were estimated using the method applied in the recent California Report on ATC. Chicago economists Murphy and Topel provided the estimated benefits in that report termed “vanishingly small” in comparison to the costs. It should come as no surprise that the results are similar for Alaska.

These kinds of analytical computations are not perfect, and it is orders of magnitude that matter in this case. For California the costs were on the order of “hundred million” vs. benefits on the order of “hundred thousand”. Alaska is a far smaller fuel market but with similar proportion in cost/benefit. Costs of fully converting to ATC are in the millions whereas the benefits are in the thousands.

It was pointed out in testimony during the study that if minimizing consumer cost were the objective, then ATC will lose by construction. (Because it costs more than

dispensing by gross gallons). But the issue is not whether ATC costs more. It is whether those costs produce benefits that exceed them.

ATC's economics in the diagram above are not based on the consumer placing a higher value on net gallons vs. gross gallon. It is based upon an ignorance between the two. Generally when a product has higher value to the consumer, firms market the product based on that higher value. We do not see that in Alaska markets where net gallons are sold.

### A Note on Inventory Accounting

Generally the issue of ATC at retail has been brought to any kind of public attention by those alleging a nefarious "hot fuel" inventory accounting switch perpetrated by fuel retailers in warm fuel states. Net gallons have greater volume than gross gallons in warm fuel states. So the allegation is that the retailers are buying larger gallons, and selling smaller gallons thereby profiting from the difference.

This is sort of an "inventory fraud" myth where consumers are "shorted" product relative to what the firm buys. The study is the first time, as far as we know, that inventory and financial accounting has been used to clarify the ATC debate. In this case, it is shown that the allegation is a mythical view of how inventory accounting is actually performed, as well as the financial accounting of profits and losses.

The Hot Fuel Inventory Fraud Myth		
Initial Inventory	0	
Receipts	10,000	gallons (net)
Disbursement	10,200	gallons (gross)
Ending Inventory	-200	

Figure 6

Figure 27 of Page 82 in the report shows that if firms actually did "net in gross out" inventory in warm states then they would be reporting ever larger and absurdly negative inventories to state and federal agencies. If one starts with no inventory and buys 10,000 net gallons, but sells 10,200 gross gallons, then the firm has an ending inventory of -200 gallons.

Alaska is a cold state, setting consumers and retailers in the opposite direction vis-à-vis a warm fuel state. It is tempting to make the argument as a retailer that if fuel is

purchased on a net gallon basis but sold on a gross gallon basis that there is an inventory loss. But it is not true, and for the same reasons.