1.0 Executive Summary

In the spring of 2001, the Government of Newfoundland and Labrador enacted legislation to regulate prices of petroleum products to retail consumers in the province. By the fall of 2001, base prices and a mechanism for their monthly adjustment had been established and the Petroleum Products Pricing Commission (PPPC) published the first set of maximum prices for retail automotive fuels and home heating fuels. At the same time, the PPPC established a number of pricing zones designed to account for cost differences in distributing petroleum products to various geographic areas of the province.

Since the fall of 2001, there has been little change in the boundaries of the established pricing zones or in the price differentials between them.

To ensure that the pricing zone structure continues to be fair to all stakeholders, the Commission issued a Request for Proposals for consultants to conduct a detailed review of pricing zone boundaries and their price differentials. In response to this public request, David M. French and Associates Inc. submitted a proposal and was subsequently engaged to undertake a Storage and Distribution Cost Study for all regulated petroleum products throughout Newfoundland and Labrador.

The consultant was to review all supply chains and distribution networks around the entire province and develop models as necessary to estimate costs of moving regulated products from initial arrival by marine tanker through storage, handling and final delivery to the end consumer. In this process, the consultant would examine the existing zone boundaries, the zone pricing differentials for each class of product, and recommend any changes that might be considered necessary to ensure a greater degree of fairness to all stakeholders. As part of the Study, the consultant was also requested to identify and report on all storage facilities around the province.

Confidentiality and Non-Disclosure Agreements were signed with some major oil companies and others players in the industry in order to gather as much information as possible. However, some operators would not agree to sign agreements nor supply relevant information on their operations. This lack of participation and cooperation, which was particularly relevant in the case of sole operators in certain areas, detrimentally impacted progress on the assignment. As a result, the consulting team had to undertake and develop extensive ‘cost modelling’ processes to arrive at realistic cost estimates and conclusions.

Field visitations were made to essentially all storage facilities in Newfoundland and Labrador. Cost schedules for marine freight into marine terminals and marine depots were constructed using proprietary figures normalized with information developed by the consulting team. The cost of storing and handling products at marine terminal locations was determined in a similar manner. In the case of the smaller marine depots along the Labrador Coast, little proprietary information was available. An operating costing model had first to be constructed for bulk storage plants and then extrapolated to estimate capital replacement and operating costs for these facilities.

Each class of product including automotive fuels, distillate heating fuels, and propane used for home heating purposes was then addressed in turn for delivery, either directly from marine terminals, through intermediate storage plants, or by other means to the end consumer. In some cases, the costs involved in the transportation of fuel in drums to remote communities had to be calculated to encompass the full product supply network.

The costs of each step in the process were then added to arrive at laid-in cost figures for each product for each zone and sub-zone. Laid-in costs for automotive fuels were determined to the 'wholesale point of sale' whereas for heating fuels, laid-in costs were determined to the consumer's storage tank or the 'retail point of sale'. Individual cost diagrams were also constructed for each product by zone to more clearly illustrate how the various cost calculations were applied to each link in the supply chain.

Zone boundaries were studied in detail for each class of product. It was concluded that existing zone configurations for automotive and propane home heating are appropriate as confirmed by the study data. However, three new home heat zones for furnace/ stove oil are recommended to address current inequities in costs primarily related to the necessity of local area bulk plants. In addition, some minor changes in zone designations for Pricing Zones 10, 10a and 11 are recommended to streamline pricing structures for these areas for all products.

The total costs to the wholesale point of sale determined for automotive fuels in each zone were compared with existing differentials from the Avalon base zone. Adjustments in existing differentials are recommended and range from a reduction of 1.9 cents per litre (cpl) to an increase of 5.9 cpl.

Total costs for furnace and stove home heating fuels were determined to their retail points of sale and compared with existing differentials from the Avalon base zone. In addition to zone differentials developed for the recommended three new zones, the remaining adjustments to existing differentials range from –1.3 cpl to +7.6 cpl.

Recommended adjustments in zone differentials for propane used as a heating fuel are confined to a single zone where a 1.0 cpl increase is considered appropriate.

Through the visitation process, a listing of a total of 78 operational and non-operational storage terminals, depots and bulk plants was developed. Photos of these facilities are included in Appendix L to this report.

2.0 Background

2.1 The Petroleum Products Act

In 2001, the Government of Newfoundland and Labrador responded to consumer concerns with respect to prices charged for automotive and home heating fuels through the introduction of the Petroleum Products Act and accompanying Regulations.

The Act was proclaimed into law on May 24, 2001 with the primary objectives of establishing a process that would enable:

- *Pricing stability.*
- *Predictability of price changes.*
- *Transparency as to how maximum prices are determined and changed.*

Copies of the Act and Regulations are available through the provincial government website or from the Office of the Queen's Printer.

To administer the Act, a Petroleum Products Pricing Commission office directed by a Petroleum Products Pricing Commissioner was established in Grand Falls - Windsor.

In the spring of 2004, during the 45th General Session of the House of Assembly of Newfoundland and Labrador, *AN ACT TO AMEND THE PETROLEUM PRODUCTS ACT* was introduced, passed and became law on June 8, 2004. One of the amendments to the Act was to remove reference to the Commissioner and transfer the authority, duties and functions of the Commissioner to the 'Board' where the 'Board' means the Board of Commissioners of Public Utilities established under the *Public Utilities Act* of Newfoundland and Labrador. The Petroleum Products Pricing Commission office in Grand Falls – Windsor became the 'Petroleum Pricing Office' of the Public Utilities Board.

Because this Study was commissioned prior to the above amendment to the Act, and for the sake of clarity, where the ***Petroleum Products Pricing Commissioner*** *is referenced in this Report, it should be taken to mean the* ***Board of Commissioners of Public Utilities****, and where the* ***Petroleum Products Pricing Commission (PPPC)*** *is referenced it will mean the* ***Petroleum Pricing Office (PPO) of the Public Utilities Board of Newfoundland and Labrador (PUB)****.*

2.2 Petroleum Products Pricing Commission and Price Regulation

Under the Act, the Commissioner is empowered to set, and shall set, maximum wholesale and retail prices for automotive and home heating fuels sold directly to the consuming public throughout the province. The Commissioner also has the authority to determine the minimum and maximum mark-up between the wholesale prices and retail prices to consumers for these regulated products.

The consultant's understanding of the overall objective of the PPPC is to enable consumers to purchase petroleum products at fair and reasonable prices while at the same time help foster a competitive marketplace and, to the extent possible, ensure security of supply. Price regulation of consumer products is a complex matter and needs to be implemented and administered in an informed manner. The regulatory process must recognize the delicate balance between fairness in consumer pricing and reasonable financial returns to major oil companies and to local product supply chain participants.

2.3 Establishment of Base Prices

In order to set maximum wholesale and retail prices, it was first necessary to set 'base prices' for each product. The establishment of initial base prices for each regulated petroleum product required the identification and selection of industry recognized 'benchmark' prices to which base prices could be referenced. Benchmark prices are regularly posted market prices recognized by all stakeholders and readily available as standard reference prices. Once chosen, benchmark prices first provide a basis to establish initial base prices, and then provide a reference for an adjustment mechanism by which subsequent changes in base prices can be made on a periodic basis. For gasolines, diesel fuel, and furnace oil, the benchmark prices chosen were the industry recognized New York Harbour Cargo Prices as published at the close of each business day by Platts – Oilgram Report (Platts). For propane, the benchmark price chosen was the average weekly contract price at Sarnia, Ontario as published by Bloomberg Oil Buyer's Guide (OBG).

The initial base price for regular unleaded gasoline was established by comparing the average differential between New York Harbour Cargo prices to that of the ex-tax price of self-serve regular unleaded gasoline in St. John's, Newfoundland tracked daily over a two and one-half year period from April 1999 to September 2001. The average daily Platts prices, which are quoted in US Cents per US Gallon, were converted to Canadian Dollar Cents per Litre (CPL) using the noon Bank of Canada exchange rate for each business day.

This gave an average differential which, when added to the posted Platts price, gave an ex-tax self serve retail pump price for regular unleaded gasoline in St. John's based on historical numbers over the selected period. A similar exercise was completed for the other grades of gasoline, automotive diesel fuel, and No. 2 heating oil (furnace fuel) to establish initial base prices for these products at St. John's. The base price for stove oil was established by a reference differential of 1.8 cents per litre above the furnace oil price, which had been the traditional difference in wholesale or rack pickup prices for these products in Halifax as published by the OBG.

The base price for propane as a heating fuel was established by comparing the historic price of propane at the Sarnia rack with the corresponding delivered ex-tax retail price in St. John's. No base price was established for propane used as motor fuel due to its negligible use in the province as a retail product.

2.4 Establishment of Pricing Zones

The next step in the process was to establish initial base prices for defined geographic pricing zones throughout the province. These zones were established based on historic pricing differentials from the St. John's area with some adjustments made to reflect more current storage and transportation cost structures. One of the guiding factors in establishing pricing zones was to keep their number to a minimum, albeit still consistent with a rational delineation of geographic areas and population. Fourteen primary pricing zones were initially established. In addition, based on identified unique circumstances (such as transportation cost to various islands and remote communities), a number of pricing sub-zones were, or have since been, added within some of the primary zones.

Since the PPPC established its initial maximum prices in the fall of 2001, the Commissioner received representations from a number of stakeholders concerning the pricing differentials

used between certain zones and /or sub-zones. The Avalon Peninsula, which includes the capital city of St. John's and encompasses close to half of the province's population, was designated as Zone 1. In the main, differentials established for other areas were referenced to that Zone. Since that time, some consumers have argued that differentials between certain zones are too high while conversely some suppliers maintain they are not sufficient to cover the additional costs involved, particularly in servicing the more remote areas of the province.

3.0 A Study of Storage and Distribution Costs for Petroleum Products

3.1 Study Impetus

The Petroleum Products Pricing Commission has to date undertaken considerable affirmative action and measures to understand the dynamics of the market place, and to quantify factors affecting maximum prices established for regulated products in the province. Detailed implementation work has been undertaken to give effect to the legislation as prescribed.

In past dialogue with the PPPC, oil companies have made representations that the market for regulated products was competitive prior to regulation and the relatively high consumer prices were attributable to the higher costs of doing business in the province. Companies have pointed to factors such as high marine freight rates, expensive storage facilities (with increased operation costs due in large part to more stringent environmental requirements and insurance costs), and high distribution costs exacerbated by low volume throughputs in many areas due to a widely dispersed population.

Oil companies have continued to argue that the regulation process and high operating costs are having significant negative impacts on the level of financial returns that would sustain long term viability of their operations. As a result, and in a effort to be fair to all stakeholders, the PPPC determined that its affirmative action agenda required a closer examination of identified cost factors that are involved in transporting, storing and distributing regulated products to consumers. These costs include marine tanker freight; marine terminal storage and handling; distance truck haulage; bulk plant storage and handling; tank-wagon delivery and other direct costs associated with getting product to the point of sale for the end consumer.

Pricing zones and the relative pricing differentials between them are an integral part of the regulatory process and their re-examination built on sound and detailed cost analyses provided the impetus for this Study.

3.2 Study - Request for Proposals

The PPPC released a *Request for Proposals*, which outlined the purpose and scope of the Study as follows:

(1) Review of Number of Zones and Zone Boundaries:

Using the information collected for this study, the consultant will review, analyze and confirm existing pricing zone boundaries or recommend revised boundaries for existing, additional, or fewer zones that more accurately reflect the current mode(s) of supplying regulated petroleum products to each area.

(2) Review of Zone Price Differentials:

Using the information collected for this study, the consultant will review, analyze and confirm the existing zone pricing differentials or recommend revised differentials that more accurately reflect the current cost differences in providing products to different zones or areas as defined and recommended in (1) above

While completing (1) and (2), the consultant should be cognizant of natural geographical separations between areas and the desire to keep the number of pricing zones as low as reasonably and realistically possible.

(3) Information for Storage and Distribution Database:

The work will include the gathering of physical and product 'thruput' information on all marine terminals, bulk plants, and other storage depots that are operated throughout the province for holding petroleum products for sale to wholesalers or retailers. This would include those in active operation as well as those that have been "mothballed" but that are still standing and could be re-commissioned in the future.

3.3 Consultant's Undertakings

In its proposal submission, the consultant undertook to provide the following information:

1. Costs of Shipping Products to Marine Terminals and Depots

   Estimates of the direct cost of delivering 'clean' petroleum products via marine tanker into secondary marine terminals operating in the province from normal supply sources. These costs will include the cost of supplying product to small marine depots along the Labrador Coast and possibly to some depots along the south coast of the Island portion of the province. The costs of delivering products to primary marine terminals were addressed in a study undertaken in 2002, and although referenced, their determination will not be part of this Study.

2. Costs of Product Storage and Terminal Operations

   Estimates of the costs associated with operating primary and secondary marine terminals and marine depots expressed in annual dollar amounts as well as on a cent per litre throughput basis of all products through each terminal.

3. Costs of Land Transportation

   Estimates of costs to transport regulated petroleum products to retail outlets, bulk storage plants, and the direct delivery of product to customer storage tanks on an area averaged basis.

4. Costs of Operating Bulk Storage Plants

   Identify each Bulk Plant in the province and determine estimated total costs of operation expressed in annual dollar amounts as well as on a cent per litre throughput basis.

5. Costs of Delivery from Bulk Storage Plants

Estimates of average costs to deliver regulated products from each bulk plant to retailers and consumers.

6. Identification of Storage Terminals, Bulk plants and Depots

Identify each active bulk storage facility in the province and where possible provide a physical description of each with digital pictures, plan layout sketches with approximate tank sizes / capacities, with total product throughput volumes. Inactive or mothballed bulk storage facilities will also be identified as may be evident during the consultant's visitation process throughout the province.

Study Conclusions and Recommendations

1. Recommendations on Zone Boundaries

The consulting team will use all information collected to draw conclusions and make recommendations for potential changes to existing pricing zone boundaries. Included will be commentary as to the appropriateness of continuing with the same zone structure for both retail automotive fuels and home heating products with recommendations, as the consultant may feel necessary.

2. Recommendations on Zone Pricing Differentials

The consulting team will use all cost information collected to draw conclusions and make recommendations for potential changes to existing pricing zone price differentials. The cost of providing products will be complied individually by zone and sub-zone and will reflect as accurately as possible the cost of the current methods of supply in each case.

3. Identification of Bulk Storage Facilities

The consulting team will identify and provide information on all bulk storage facilities around the province, noting those facilities that are currently inactive or mothballed.

4.0 Supply and Storage of Petroleum Products

4.1 Product Supply Chains

The existing pricing zones established throughout the province are presented in Appendix A together with geographic descriptions for each. As they now exist, Pricing Zones are the same for automotive fuels and home heating fuels.

In order to judge the appropriateness of existing zonal boundaries and price differentials, all identified costs involved in getting product to the point of sale for the end consumer in each zone or sub-zonal area had to be calculated with as much accuracy as possible.

To identify all cost elements, product flow or Supply Chain Configuration Diagrams were developed for each product group. Figures 1 and 2 on the following page depict basic supply chain configuration diagrams for retail automotive fuels and home heating fuels respectively. These diagrams show the primary methods of product supply and distribution for each of these product groups.

The main difference between the two diagrams is that the majority of automotive fuel volume is delivered directly from marine terminals via tractor trailer to retail outlets, whereas home heating fuels are delivered to consumers' household storage tanks via tank wagon vehicles, which operate direct from marine terminals or from local areas bulk plants.

Because many variations of these supply and delivery modes are used in the province depending on the product and the particular zone in question, Supply Chain Diagrams for each individual zone and sub-zone and for each product group are included in this Study.

In some cases, complicating factors affect cost determinations because different petroleum marketers sometimes use different methods of product supply to the same area. The Consulting Team had to be cognizant of these differences and decide on the inclusion of a chosen supply chain consistent with that of primary suppliers to certain areas without giving preference to any particular supplier.

In all but a few instances, the supply chain chosen was that identified to be the one on which the majority of consumers depend as the primary method of product supply to their particular areas.

It should be noted that cost calculations in this Study do not reflect, nor include, the inventory carrying costs for product held in marine terminals, bulk plants, storage depots, retail outlets, or tank trucks. The main reason for not attempting to include these costs is the wide and indeterminate variations in inventory levels that exist in storage locations at any point in time. This is particularly significant for inventories in the large primary marine terminals. The difficulty in quantifying inventory costs does not allay the fact that they are real costs and therefore must be considered when looking at total margins available to supply chain participants.

FIGURE 1

BASIC SUPPLY CHAIN CONFIGURATION DIAGRAM

Retail Automotive Fuels

Newfoundland and Labrador

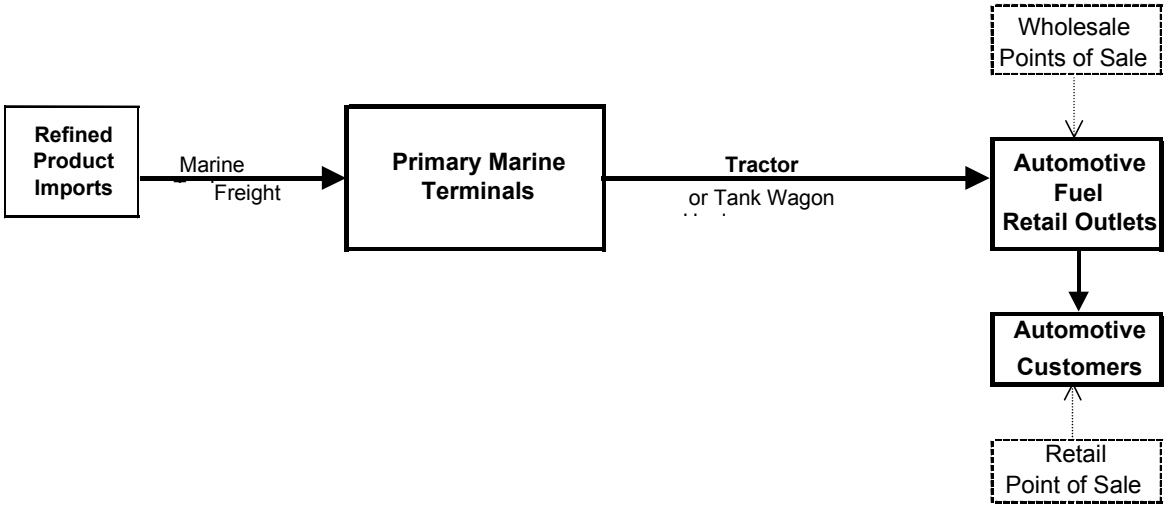
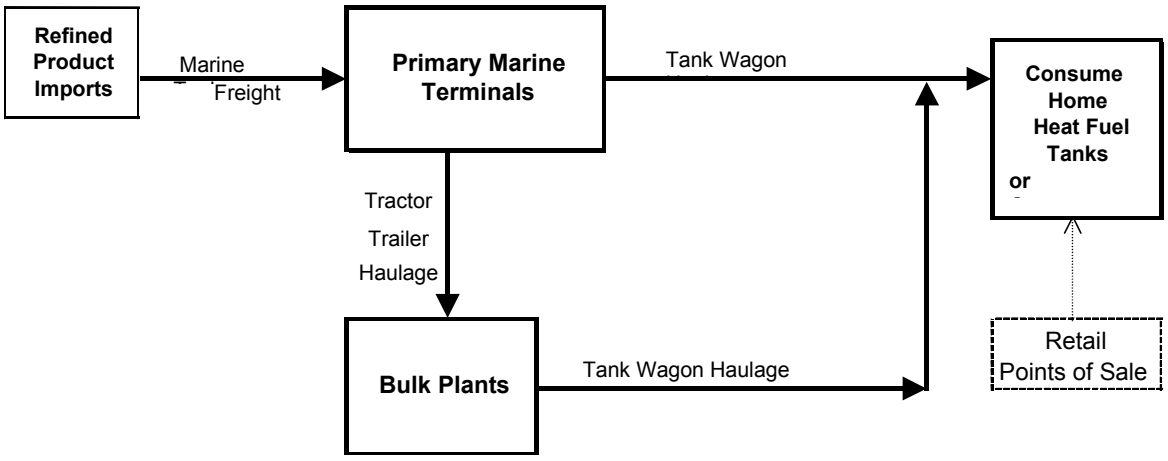


FIGURE 2

BASIC SUPPLY CHAIN CONFIGURATION DIAGRAM

Home Heating Fuels (Excluding Propane)

Newfoundland and Labrador



4.2 Costs of Shipping Products to Marine Terminals and Marine Depots

The costing models developed in this Study for specific modes of storage and transportation use a combination of proprietary costs supplied in confidence by some petroleum and transportation companies, together with cost estimates developed by the Consulting Team through data collection, its analysis and application.

The determination of marine freight costs to primary marine terminals was not to be part of this Study because they were already identified in a Marine Tanker Freight Cost Study undertaken by the Petroleum Products Pricing Commission in 2002. However, the Consulting Team had the advantage of additional information presumably not available to those who carried out the referenced Marine Tanker Freight Study. This resulted in some revisions to estimated average marine freight numbers to specific marine terminals.

A summary of the estimated average laid-in marine freight costs for currently operating Primary Marine Terminals, Secondary Marine Terminals and Marine Depots is presented in Table 1 below:

Storage and Distribution Study

Table 1

Estimated Average Laid-in Marine Freight Costs*Note 1

Existing PPPC Zone	Existing PPPC Sub-Zone	Area Serviced	Notes	Average Marine Freight Estimate CPL
1		Avalon Peninsula	Average Freight to St. John's / Holyrood Primary Marine Terminals	0.85
3		Central Newfoundland	Average Freight to Lewisporte Primary Marine Terminal	1.24
6		Corner Brook Area	Average Freight Corner Brook Primary Marine Terminals	1.19
9		Northern Peninsula North	Average Freight to St. Barbe Secondary Marine Terminal	2.19
10		Labrador-The Straits	Average Freight to Marine Depots	4.42
10	a	Labrador Coast - South	Average Freight to Marine Depots	6.64
12		Central Labrador	Average Freight to Goose Bay Primary Marine Terminals	1.80
14		Labrador Coast - North	Average Freight to Marine Depots	6.64

*Note 1: See next page for glossary of terms.

Some of the marine freight rates include calculated shipping costs via coastal tankers to secondary marine terminals and marine depots. These reflect 2004 estimated costs of product deliveries to these specific locations from identified source terminals. Some of this data is proprietary and was provided under Confidentiality and Non-Disclosure Agreements with the Consultant Team. Detailed calculations are therefore not included in this report.

A glossary of terms used in Table 1 follows:

Laid-in Cost

The landed cost of product pumped into receiving storage tanks.

Primary Marine Terminals

Large storage terminals supplied with refined products via marine tanker from Canadian refineries or from offshore sources. These terminals have the capacity to supply large geographic areas either by direct delivery or by trans-shipment through local bulk plants. The North Atlantic Petroleum refinery at Come by Chance is considered to be a primary marine terminal for the purposes of this Study.

Secondary Marine Terminals

Smaller marine terminals having sufficient storage capacity to supply a particular area where supply from primary terminals is, or has in the past, been impractical. These terminals are generally supplied with product by trans-shipment via coastal tankers from primary terminals, but sometimes receive product direct from other sources.

Marine Depots

These facilities are small capacity storage plants generally supplied by coastal tankers from the larger marine terminals. These depots are usually associated with isolated communities such as those that exist along the Labrador Coast. Due to the short shipping season, particularly in northern Labrador, the capacity of many of these depots is often sufficient to hold enough product inventory for an entire year.

Bulk Plants

These are intermediate 'drop-off' storage facilities supplied by tractor-trailers from marine terminals by road. They are often essential to properly service home heat consumers in a local geographic area but in some cases also contain gasoline storage necessary to service small local area retail outlets where product delivery by tractor-trailer direct from marine terminals is not practical.

4.3 Operating Costs of Marine Terminals, Marine Depots and Bulk Plants

The next link in the product supply chain is the operation of storage terminals. Some of the costs for the operation of primary and secondary marine terminals were obtained under Confidentiality and Non-Disclosure Agreements. Using these figures, normalized with other available and developed costing information, the Consulting Team was able to calculate costs on a cents per litre basis for the operation of these storage facilities including allowances for depreciation and stock losses. These estimates are presented in Table 2 below:

Storage and Distribution Study

Table 2

Estimated Average Operating Costs - Marine Terminals

Area Serviced	Terminal Identification and Location	Operating Cost Estimates 2004 CPL
Avalon / Burin / Bonavista-Peninsulas -and Central Newfoundland	St. John's / Holyrood Primary Marine Terminals	0.81
Central Newfoundland	Lewisporte Primary Marine Terminal	1.57
Corner Brook Area	Corner Brook Primary Marine Terminals	1.22
Northern Peninsula North	St. Barbe Secondary Marine Terminal	1.76
Central Labrador	Goose Bay Primary Marine Terminals	2.71

Accurate total annual operating costs for terminals were not available in a form that could be used on a consistent basis in comparing one terminal with another so they are not included in this report.

Marine depots are identified in Table 1 in zones along the coast of Labrador. However, very little reliable information was available with respect to their costs of operation. Whereas these depots receive product via smaller marine tankers, they are not otherwise greatly different in configuration from that of many bulk plants in operation around the province. Thus, one approach in developing a costing model for marine depots was to extrapolate costs based on the cost of operating bulk plants. First, however, it was necessary to develop a model with associated capital replacement costs estimated for environmentally sound and insurable bulk plants. Once the capital costs were established, operating costs could then be addressed.

Capital Replacement costs of Bulk Plants and Marine Depots

The approach used in this process was to categorize bulk plants and marine storage depots in the following classifications:

Case A. Bulk Plant - Intermediate tractor-trailer drop-off storage for subsequent delivery of furnace oil to local area home heat customers. (Construction on Island portion of province) Tank capacities are sized according to product turnover so that no more than four tractor-trailer deliveries per week were required during the peak demand winter months leaving a buffer of at least one working day per week spare capacity.

Case B: Bulk Plant - Intermediate tractor-trailer drop-off storage for subsequent delivery of furnace oil to local area home heat customers and gasoline storage for local distribution. Gasoline is held for deliveries to small local retail outlets where delivery via tractor-trailer is impractical. Operating costs for these particular bulk plants on the island portion of the province were obtained via proprietary information from owner/ operators with adjustments applied for consistency following information gathered during field visitations.

Case C. Bulk Plants on the Labrador Coast - Bulk storage facilities along the Labrador Coast supplied via tank wagon from connected marine depots. Storage for both gasoline and stove oil is assumed. Gasoline can be redelivered to small retail outlets in the local area or can be dispensed directly at the bulk plant. Stove oil (the only petroleum product used throughout Labrador for home heating) is stored for subsequent delivery to local area home heat customers by tank-wagon. Stove oil used for diesel fuel is also available.

Case D. Marine Depots - Bulk Storage facilities along the South Labrador Coast supplied via Coastal Tanker- sometimes via floating hose discharge. These storage depots are connected by road to adjacent communities. As with Case C bulk plants, gasoline and diesel fuel is provided for local deliveries to retail outlets via tank-wagon or in some cases dispensed directly to retail customers at the depot. Stove oil is stored for subsequent delivery to local area home heat customers via tank-wagon.

Case E. Marine Depots (Isolated) - Bulk Storage facilities located in isolated Labrador Coastal communities and supplied via coastal tanker - often via floating hose discharge. Stove oil/ diesel fuel distillate storage is available for subsequent delivery, or for pickup at the depots by customers via drums or other containers. These depots also have storage for gasoline, which is generally dispensed directly to retail customers via an onsite retail pump.

Appendix B includes capital cost estimates for each of the above storage facilities as follows:

Table B -1 Cost estimate versus volume for Class A Bulk Plants
Table B -2 Cost estimate for Class B Bulk Plant (nominal storage only)
Table B- 3 Cost estimate for a specific Class C Bulk Plant in Charlottetown, Labrador
Table B- 4 Cost estimate for a specific Class D Marine Depot in the Port Hope Simpson / Cartwright area of Labrador.
Table B -5 Cost estimate for a specific Class E Marine Depot in Rigolet
Table B -6 Cost estimate for a specific Class E Marine Depot in Makkovik
Table B -7 Cost estimate for a specific Class E Marine Depot in Postville
Table B -8 Cost estimate for a specific Class E Marine Depot in Hopedale
Table B -9 Cost estimate for a specific Class E Marine Depot in Nain

The capital cost estimates for these storage facilities take into account only the product volumes estimated for individual consumer use. No provision is made for automotive or heating fuels for commercial customers, nor for other fuels such as Jet Fuel or Diesel used for non-regulated product consumption. These volumes were unavailable to the Consulting Team and no estimates of their quantities were made.

Due to specific storage requirements for bulk plants and marine depots along the Labrador coast, each facility was addressed separately. Estimated seasonal demand in a particular section or area of the coast dictated how much storage capacity was required in each case.

Since the north coast of Labrador is inaccessible due to local ice or arctic ice flows for eight to nine months of the year (November to June), the storage capacity for these communities was sized to accommodate a full year's demand to provide a buffer in case of extended access problems or unusually high demand during the closed shipping season.

The south Labrador coast generally has a larger window of accessibility by marine tanker so depots were sized to hold less than the estimated demand for a full year, but sufficient to satisfy demand for about ten months. The bulk plant in Charlottetown was sized to store more than sufficient product for the winter months when the road to a larger feeder depot in the Labrador Straits area could be blocked by snowdrifts or otherwise become impassable.

In these capital cost estimates, provision for higher transportation and construction costs is made for bulk plants and depots along the Labrador Coast. Approximately 20% is added to certain costs for road-connected plants and some costs are increased up to 50% for construction in isolated communities.

It could be argued that this approach to estimating a capital replacement cost for these bulk storage facilities is not realistic in view the fact that the existing plants have been in place in the subject locations for a number of years. It is felt, however, that this is a necessary approach given the possibility that an existing supplier could withdraw or that a competitor may wish to enter the market place.

Operating Costs for Bulk Plants and Marine Depots

Case A - Bulk Plants with Home Heating Fuels only:

Proprietary information obtained from companies operating 'home heat distillates only' bulk plants was sporadic and inconsistent making general comparisons difficult and cost standardization impossible. It was therefore decided to construct a costing model for home heat bulk plants based on storage volume - versus thruput - versus operating costs. Given estimated sales volumes, one could then project the capital and operating cost of a bulk plant on the Island of Newfoundland with some consistency. Capital cost estimates for Case A Bulk Plants having three thruput ranges are presented in Appendix B, Table B-1. Operating cost estimates versus volume could therefore be calculated and are presented in Appendix B, Table B-10.

Case B - Bulk Plants with Home Heating Fuels and Gasoline:

The nominal capital replacement cost for a combination Case B Bulk Plant for local storage of home heat fuels, gasoline and diesel fuel is given in Table B-2 of Appendix B. In the case of the four identified combination bulk plants currently in use, proprietary operating costs were obtained and by normalizing stock losses and some other expense items, the final cents per litre thruput costs for gasoline and diesel fuel through these plants are estimated as follows:

Gander Bulk Plant	-	Automotive Fuels	-	0.67 cpl
Fogo Island Bulk Plant	-	Automotive Fuels	-	1.51 cpl
Pool's Cove Bulk Pant	-	Automotive Fuels	-	1.03 cpl
Springdale Bulk Plant	-	Automotive Fuels	-	0.71 cpl

Case C Bulk Plants on the South Labrador Coast:

To date, this specifically includes a single bulk storage plant at Charlottetown, which is normally filled via tank-wagon from the marine depot in L'Anse au Loup.

Case D Marine Depots on the South Labrador Coast - connected by road to communities from L'Anse au Clair to Cartwright:

These currently include the storage depots at L'Anse au Clair, L'Anse au Loup, Port Hope Simpson, Cartwright and possibly others. The Port Hope Simpson Marine Depot is reportedly being upgraded to become the central distribution depot for the section of the south Labrador Coast from Lodge Bay to Cartwright for one supplier. The average operating cost for the marine depots at L'Anse au Clair and L'Anse au Loup is estimated at 2.45 cpl.

The estimated annual operating costs for the plants identified in Case C (Charlottetown) and Case D (Port Hope Simpson) are calculated in Table B-11. Average costs for gasoline and distillate fuels are shown separately to accommodate a relatively higher stock loss provision for gasolines, which is traditionally experienced in these plants in Labrador. These stock losses are partly due to wide day/ night temperature variances, but are otherwise unexplained shortages.

Case E Isolated Marine Depots along the Labrador Coast:

Separate operating cost estimates are given for each of five North Labrador Coast communities based on capital costs and annual volumes. These are shown in Appendix B, Tables B-12 through B-14. Table B-15 summarizes and averages the costs of operating these depots separately for gasoline and distillates (stove oil and diesel fuel).

The Innu community of Natuashish is not directly considered in these analyses and was not visited during the Consulting Team field trips. It is understood that the Innu Band Council is responsible for operating the fuel depot in that community and no details on supply or other costs were acquired. It is, however, expected that the costs of supplying fuels at Natuashish would be similar to that for the five other communities on the North Labrador Coast.

Black Tickle, an isolated island community located on the South Coast of Labrador, also has a Marine Storage Depot. The cost of fuel supply to that location is also considered to be the same as the average costs calculated for the five North Coast communities.

<u>Thruput costs for Automotive Fuels through Bulk Plants and Marine Depots</u>

Table 3 below summarizes the average estimated costs for the thruput of gasolines and diesel fuel through bulk plants and marine depots around the province. The costs for both products are considered to be the same for plants on the island portion of the province and for the Straits section of Labrador. For the rest of the Labrador Coast with generally smaller facilities, stock loss allowances for gasolines and distillates are higher, as is the difference between them. Therefore, where indicated in the Tables in Appendix B as well as in Table 3, plant-operating costs for each of these products are shown separately.

Storage and Distribution Study

Table 3

Automotive Fuels

Estimated Operating Costs for Bulk Plants / Marine Depots

Area Serviced	Type of Facility	Location of Storage Facility	Approximate Average Annual Thruput Kilolitres	**Estimated Average Operating Cost CPL**
Central Newfoundland	Bulk Plant	Gander	10,000	**0.67**
Fogo Island	Bulk Plant	Fogo Island	1,500+	**1.51**
Connaigre Peninsula	Bulk Plant	Pool's Cove Crossroads	3,200+	**1.03**
Triton/ Springdale/ Baie Verte	Bulk Plant	Springdale	3,000+	**0.71**
Labrador Straits	Marine Depots	L'Anse au Clair / L'Anse au Loup	5,000	**2.45**
Labrador South – Lodge Bay to Cartwright	Bulk Plant / Marine Depot	Port Hope Simpson/ Charlottetown / Other (Gasoline)	2,000	**7.77**
Labrador South – Lodge Bay to Cartwright	Bulk Plant / Marine Depots	Port Hope Simpson/ Charlottetown / Other (Diesel)	N/A	**7.39**
Labrador South - Black Tickle	Marine Depot	Black Tickle – Isolated Community (Gasoline)	270	**15.59**
Labrador South - Black Tickle	Marine Depot	Black Tickle – Isolated Community (Diesel)	N/A	**14.09**
Western Labrador	Bulk Plant	Labrador City	N/A	N/A
Northern Labrador Coastal Communities	Marine Depots	Isolated Communities (Gasoline)	263	**15.59**
Northern Labrador Coastal Communities	Marine Depots	Isolated Communities (Diesel)	N/A	**14.09**

Thruput costs for Heating Fuels through Bulk Plants and Marine Depots

Table 4 below summarizes the estimated costs for thruputting home heating fuels (furnace and stove oil) through bulk plants and marine depots around the province. Costs in cents per litre have been calculated using the costing model as previously explained and shown in detail in the Tables of Appendix B. In the majority of cases, the calculations have been made for bulk plants that already exist in the locations indicated. The sole exception is for Bell Island where a small bulk plant is included in the list because one has reportedly been proposed by at least one company in order to properly service the Island's home heat customers.

The operating or thruput costs for bulk plants in some adjacent areas are sufficiently close numerically that they have been combined and averaged as shown in the Table.

Storage and Distribution Study

Table 4

Home Heating Fuels

Estimated Thruput Costs for Bulk Plants / Marine Depots

Area Serviced	Location of Bulk Plant / Marine Depot	Estimated Home Heat Fuel Volume for Area Kls	Estimated Number Heating Fuel Storage Plants in Area	Estimated Average Operating Cost per Plant CPL	Combined Area Average Operating Cost per Plant CPL
North West Avalon	Bay Roberts/ Harbour Grace/Carbonear	22,000	4	1.19	**1.19**
South West Avalon	Placentia / Dunville Area	6,500	2	1.47	**1.46**
South East Avalon	Aquaforte / Trepassey/ St. Mary's	6,600	2	1.46	
Bell Island	*Bell Island*	*2,500*	*1*	*1.86*	***1.86***
Burin Peninsula	Marystown / Grand Bank / Burin	14,900	3 to 4	1.30	
Clarenville Area	Clarenville / Musgravetown/ Lethbridge	7,500	2	1.40	**1.36**
Bonavista Peninsula	Catalina / Trinity/ Bonavista Area	9,500	2 to 3	1.40	
Central Newfoundland	Gander / Lewisporte/ Grand Falls	42,000	4 to 5	0.84	**0.84**
Fogo Island	Fogo Island	2,000	1	1.23	**1.23**
Connaigre Peninsula	Milltown/ Pool's Cove / Harbour Breton	5,000	1	1.17	**1.17**
Triton/ Springdale/ Baie Verte Peninsula	South Brook/ Springdale/ Baie Verte	10,000	2	1.17	**1.17**
Deer Lake / Corner Brook/ Humber Arm	Deer Lake/ Pasadena / Corner Brook	21,000	1	1.37	**1.37**
Stephenville/ Port au Port Peninsula	Stephenville/ Stephenville Crossing	12,000	3	1.30	**1.34**
Port aux Basques Area	Port aux Basques	3,700	1	1.41	
Burgeo	Burgeo/ Ramea/ Coastal Communities	1,900	1	2.35	**2.35**
Northern Peninsula North	Port au Choix/ Plum Point/ Roddickton	8,800	2	1.40	**1.40**
Labrador Straits	L'Anse au Clair/ L'Anse au Loup	1,200	2	2.45	**2.45**
Labrador South – Lodge Bay to Cartwright	Port Hope Simpson/ Charlottetown	450	2	7.39	**7.39**
Western Labrador	Labrador City / Wabush	N/A	1	N/A	N/A
Northern & Isolated Labrador Coastal Communities	Various - Each Isolated Community	980	5	14.09	**14.09**

Table 5 on the following page combines all marine freight and storage terminal / depot operating cost estimates as indicated in this section of the report into a single table, which has been expanded to include all existing zones as designated by the PPPC in Appendix A. Some of the cost numbers have been reallocated to more realistically reflect the method by which much of the product is supplied to certain areas. For instance, the cost of product to secondary terminals has been dropped in favour of using the cost through primary terminals and subsequent direct trucking. Also, due to supply logistics, some major suppliers truck

product from marine terminals on the Avalon Peninsula to bulk plants and / or directly to retail outlets in central Newfoundland. The figures in Table 5 will be used as cost inputs for zone differential calculations later in this report.

Storage and Distribution Study

Table 5

Summary – Automotive and Home Heat Fuels

Estimated Average Marine Freight and Marine Terminal / Marine Depot - Operating Costs used for Calculations			Marine Freight to Terminals/ Depots 2004 (Table 1)	Estimated Terminal / Depot Operating Cost (Tables 2, 3, & 4)	Total Estimated Freight and Terminal Operating Cost
Zone		**Zone Description**	**CPL**	**CPL**	**CPL**
1		Avalon	0.85	0.81	1.66
1	a	Bell Island	0.85	0.81	1.66
2		Burin-Bonavista Peninsulas	0.85	0.81	1.66
3		Central Newfoundland – Avalon Terminals	0.85	0.81	1.66
3	a	St. Brendan's Island	0.85	0.81	1.66
3	b	Fogo Island	0.85	0.81	1.66
3	c	Change Islands	0.85	0.81	1.66
4		Connaigre Peninsula	0.85	0.81	1.66
4	a	Gaultois-Francois	0.85	0.81	1.66
5		Springdale-Baie Verte (Ex Corner Brook)	1.19	1.22	2.41
5	a	Long Island	1.19	1.22	2.41
5	b	Little Bay Islands	1.19	1.22	2.41
6		Corner Brook Area	1.19	1.22	2.41
7		Stephenville-Port aux Basque-Burgeo	1.19	1.22	2.41
7	a	Ramea	1.19	1.22	2.41
7	b	Grey River/La Poile	1.19	1.22	2.41
8		Northern Peninsula South	1.19	1.22	2.41
9		Northern Peninsula North	1.19	1.22	2.41
10		Labrador - The Straits (Averaged)	4.42	2.45	6.87
10	a	Mary's Harbour to Cartwright – Gasoline	6.64	7.77	14.41
10	a	Mary's Harbour to Cartwright – Stove Oil / Diesel	6.64	7.39	14.03
11		Isolated Communities with Marine Depots Labrador Coast- South – Gasoline	6.64	15.59	22.23
11		Isolated Communities with Marine Depots Labrador Coast- South – Stove Oil / Diesel	6.64	14.09	20.73
12		Central Labrador (Goose Bay)	1.80	2.71	4.51
13		Western Labrador – Gasoline & Diesel	N/A	N/A	6.50
13	a	Churchill Falls – Gasoline & Diesel	N/A	N/A	6.50
14		Labrador Coast – North – Gasoline	6.64	15.59	22.23
14		Labrador Coast – North - Stove Oil / Diesel	6.64	14.09	20.73

5.0 Automotive Fuels – Distribution

With the expansion and improvement in the highway system throughout Newfoundland and Labrador during the past three decades, the distribution of petroleum products has evolved from a network of marine terminals into one where imported product is stored in larger primary terminals and then trucked throughout the province. This has resulted in the closure of a number of smaller marine terminals, which had previously been the lifeline supply of petroleum products in many regions. Whereas it may first appear that using tractor-trailers to haul over long distances compared with delivery from local marine terminals is a more costly proposition, mitigating factors include:

- Higher thruputs at primary marine 'mother' terminals, which reduce costs on a CPL thruput basis.

- More centralized control and efficiencies in scheduling deliveries to retail gasoline outlets.

- Cost reductions in closing lower thruput marine terminals, including all operating costs and the high cost of insurance and liability claims and potential remediation operations.

Moreover, the major oil companies have gradually moved from operating their own tractor-trailer fleets to contract carriers, a process that is now practically universal in the province.

5.1 Costs of Land Transportation

The development of an accurate but flexible tractor-trailer costing model is therefore one of the more important elements in quantifying the costs of distribution of petroleum products throughout the province.

Costing Model for Tractor Trailer Transport of Petroleum Products

Some of the input factors considered in constructing a cost model for tractor-trailers (T/Ts) are:

- Total Load (litres) per T/T
- Loading and discharge times
- Distance travelled from the source terminal to the destination location including:
    - Distance travelled on Class A paved highways (TCH standard built and maintained highways)
    - Distance travelled on Class B paved highways (paved highways - good condition)
    - Distance travelled on Class C Roads (paved highways - fair condition)
    - Distance travelled on Class City/Town local roads
- Average speed attained on each road class
- Number of drops made per load
- Driver break-time and other delays
- T/T positioning cost at loading terminal
- Ferry crossing charges, where applicable
- Overnight accommodations for driver if applicable
- Other non-travel costs and idle time for T/T and driver, where applicable
- Diesel Fuel Surcharge* (DFS) applied as % of CPL haulage rate

  * See Table C-1, Appendix C for description of Diesel Fuel Surcharge

5.2 Tractor Trailer Deliveries of Gasolines to Bulk Plants

A basic costing model for full load tractor-trailer deliveries from specific marine terminals to specific bulk plants for gasolines was first developed. Proprietary T/T transportation rates were obtained from several of the prominent contract haulers operating in the province. A tractor-trailer costing model was then developed through a process of iteration using the input variables listed above in various formula structures. Known proprietary rates were used as reference markers, however, the nominal proprietary rates obtained did not always agree with each other and therefore a degree of judgement had to be employed in fine-tuning the costing model. The final model was applied to each instance where tractor-trailer transfers of gasolines from marine terminals to bulk plants would logically occur. These are summarized in Appendix C Table C-1. Sample detail calculation sheets using the developed costing model for three representative deliveries are also included in Appendix C as Tables C-2 and C-3. These rates compare favourably with proprietary rates obtained. Table 6 below gives a summary of the T/T rates to bulk plants where trucking operations for automotive fuels are currently in use.

Storage and Distribution Study

Table 6

Tractor Trailer Costs - Gasoline to Bulk Plants where Applicable

Zone	Sub	Zone Description	Originating Storage Terminal	Bulk Plant Location	T/T Freight To Bulk Plants (See Appendix C, for details) CPL
3	a	St. Brendan's from Avalon Peninsula	Avalon Marine Terminals	Gander	1.98
3	b	Fogo Island from Avalon Peninsula	Avalon Marine Terminals	Fogo Island	4.61
3	c	Change Islands - from Fogo BP via TW	Avalon Marine Terminals	Fogo Island	4.61
4		Connaigre Peninsula from Avalon	Avalon Marine Terminals	Pool's Cove Crossroads	3.56
4	a	Gaultois-McCallum-Rencontre East from BP (Drums)	Avalon Marine Terminals	Pool's Cove Crossroads	3.56
5		Springdale-Baie Verte from Corner Brook via BP	Corner Brook Marine Terminal	Springdale	1.44
5	a	Long Island via T/W Ex Springdale Bulk Plant	Corner Brook Marine Terminal	Springdale	1.44
5	b	Little Bay Islands via T/W ex Springdale BP	Corner Brook Marine Terminal	Springdale	1.44

5.3 Tractor Trailer Deliveries of Gasolines Direct to Retail Outlets

This was the most significant part of the Study with respect to evaluating automotive fuel zone boundaries and the pricing differentials between them.

The initial methodology employed was to use the T/T costing model to determine the cost of T/T deliveries to specific cities or towns and then to compare these rates with the cost of deliveries to adjacent communities. If these differences were not significant, and/or if there was no sparsely inhabited area or natural geographic boundaries between them, then the adjacent communities and areas would be annexed in turn to the hypothetically developing 'Pricing Zone'. In the case of the Avalon Peninsula, currently designated as Zone 1 by the PPPC, this procedure was incrementally advanced to the conclusion that except for Zone 1a (Bell Island) there was no reasonable or easily recognized intra-dividing geography between populated areas within the entire zone. The pricing of automotive fuels in a relatively continuously populated area means that there are usually no differences between pricing at

outlets in adjacent communities because the consumer can easily drive to the area of lower pricing for fuel purchases.

Each existing zone and sub-zone for automotive fuels within the province was subsequently analysed and tested in a similar manner with similar results.

An analysis was undertaken on an alternative-costing model for retail gasoline on the Avalon Peninsula whereby the larger centres were linked by a high population density 'geographic ribbon' that comprised the vast majority of high volume retail outlets throughout the zone. Whereas it made some sense to test the technical validity of this approach, it was eventually abandoned due to the perennial problem of deciding where a pricing zone or sub-zone boundary could reasonably be established in an area of adjoining and continuously populated geography.

It was finally concluded that the existing automotive fuel pricing zone boundaries were established as reasonably as they could be around the entire province. Another practical reason for not recommending any changes to these boundaries was that information gathered through field trips by the Consulting Team demonstrated that there were no negative comments or problems with the current boundaries and the existing zonal structure for automotive fuels.

The next task was to examine price differentials between the automotive fuel zones. A method to determine an average cost of product delivery to and within a zone or sub-zone was first necessary. The approach used identified T/T delivery costs to a particular city, town, or cluster of smaller communities in contiguous areas within the zone. These delivery rates were weighted by product volume consumption applicable to the each cluster and a final average delivery rate was then calculated for the zone in question. The database listing of retail outlets created and supplied by the PPPC was helpful but no detailed volume information by outlet was available from that, nor any other source.

The latest Statistics Canada Census (2001) was obtained and broken down by census sub-division. The populations of the larger centres and of clusters of communities within contiguous areas were determined. The selected area or 'sub-region' was then compared with the retail outlet listing provided by the PPPC and the number of outlets was noted for each sub-region. This was also an iterative process since if an identified sub-region had no outlets, then it would be included with the adjacent one where outlets did exist.

The number of outlets was also compared against the population to calculate the population per outlet for the sub-region. While this was of no meaningful value to the zone delivery rate calculation process, it did highlight the difficulty some of the smaller rural outlets might have in maintaining their economic viability for fuel sales in servicing a relatively small population.

Overall provincial gasoline consumption, numbers of motor vehicles, kilometres of roads and other information was sourced through Statistics Canada and the Economics and Statistics Branch of the Newfoundland & Labrador Statistics Agency. An analysis of these data showed that there was a direct and quantifiable relation between the population of areas connected by roads and the average consumption of automotive gasoline. Thus, in lieu of product consumption by retail outlet or area, which was unavailable, one could alternately use populations of identified 'clusters' of communities in zonal sub-regions for the purpose of arriving at a weighted average T/T delivery rate for the zone.

Appendix D Table D-1 uses the existing PPPC Zone 6 [Deer Lake/ Corner Brook/ Bay of Islands/ Gros Morne] as an example of the process undertaken for all zones in the determination of population by cluster and also gives the important average distance from the source terminal for all communities (and outlets) in each cluster. Appendix D Table D-2 applies the tractor-trailer costing model to the sample Zone 6 by cluster and then weights the delivery rates according to the percentage of the zone population within each cluster. The resultant calculated average CPL delivery rate should therefore be appropriate for the zone being considered. The model was adjusted to provide for cases where there would normally be more than one drop per T/T load. In fact, two or three drops were used in each case for all tractor-trailer deliveries.

Using the above methodology, the weighted average T/T delivery rates were calculated for each automotive fuel zone throughout the Island portion of the province. A summary of truck delivery rates for all applicable zones and sub-zones is presented in Appendix D Table D-3. It is concluded that same zone rate differentials are also applicable for diesel fuel; notwithstanding that only a very small number of retail outlets in the province carry diesel fuel for sale. (The vast majority of diesel is sold through Cardlock / Keylock facilities as commercial transactions)

Gasoline delivery rates for many of the sub-zones and for the Labrador areas had to be calculated using rates developed for tank-wagons (either tandem or single axle). These rates are also included in Appendix D Table D-3 however the process for these calculations is described in the next section of this Report.

5.4 Tank Wagon Deliveries of Gasolines to Retail Outlets

The approach to developing a costing model for the delivery of products by tank-wagon (straight truck) vehicles was quite different than that used for tractor-trailers. No proprietary carrier rates for tank-wagon deliveries were available for reference or comparison. The approach used was one of building up a delivery cost model using capital replacement costs and operating cost variables, employing methodology similar to that previously used for bulk plants.

Capital replacement costs for both single axle and tandem axle tank-wagons (T/W) completely equipped with cab and chassis, tank, pumping equipment, meter, hose reel, etc were obtained from local vehicle suppliers. Current costs (2004) were averaged at $195,000 for a fully equipped tandem axle with a 20,000-litre tank and $160,000 for a single axle with an 11,500 litre-tank.

Operating costs for each or these vehicles were then estimated using data from truck suppliers, some of the smaller petroleum companies in the province, and delivery agent owner/ operators. A summary of these costs is presented In Appendix E as Table E-1.

Each identified case where tank wagons are used to deliver gasoline or diesel fuel to retail outlets was addressed individually. Each tank-wagon delivery cost is calculated and included in separate sheets in Appendix E. In a few cases with confined geography, such in Zone 10 (Labrador Straits), there is insufficient retail outlet gasoline volume demand for the full time operation of even a dedicated single axle tank wagon. In such cases the dedicated vehicle is considered to be on a standby basis at a reduced cost during the periods it is not in use. (The changeover of tank trucks in gasoline service to carry distillate fuels is an extremely dangerous practice and is discouraged in the industry due to the potential of an

explosion caused by static electricity). The standby or idle time cost is therefore calculated and factored into the average gasoline delivery cost for the specific area as detailed in Appendix E.

Table 7 below summarizes all cents per litre cost estimates for T/T and T/W deliveries of gasoline to retail outlets in the applicable zones.

Storage and Distribution Study

Table 7

Trucking Costs of Automotive Fuels to Retail Outlets

Zone	Sub	Zone Description	Originating Storage Facility	Estimated Average T/T Freight from Marine Terminals to Retail Outlets (See Appendix D for Details) CPL	Estimated Average T/W Freight from Bulk Plants to Retail Outlets (See Appendix E for details) CPL
1		Avalon	St. John's / Holyrood Terminals	0.68	-
1	a	Bell Island	St. John's / Holyrood Terminals	1.42	-
2		Burin-Bonavista Pens	St. John's / Holyrood Terminals	2.11	-
3		Central Newfoundland from Avalon Peninsula	St. John's / Holyrood Terminals	2.62	-
3	a	St. Brendan's from Avalon Peninsula & Gander	Holyrood Marine Terminal	-	3.88
3	b	Fogo Island from Avalon Peninsula (Existing)	Holyrood Marine Terminal	-	0.92
3	c	Change Islands - from Fogo BP via TW (Existing)	Holyrood Marine Terminal	-	4.96
4		Connaigre Peninsula from Avalon (Existing)	Holyrood Marine Terminal	-	0.81
5		Springdale-Baie Verte from Corner Brook via BP	Corner Brook Marine Terminals	-	1.05
5	a	Long Island via T/W from Springdale Bulk Plant	Corner Brook Marine Terminals	-	4.69
5	b	Little Bay Islands via T/W from Springdale BP	Corner Brook Marine Terminals	-	5.04
6		Corner Brook Area	Corner Brook Marine Terminals	0.56	-
7		Stephenville-Port aux Basque - Burgeo	Corner Brook Marine Terminals	1.25	-
7	a	Ramea	Corner Brook Marine Terminals	4.05	-
8		Northern Peninsula South	Corner Brook Marine Terminals	1.39	-
9		Northern Peninsula North	Corner Brook Marine Terminals	2.93	-
10		Labrador-The Straits - Gasoline	Area Marine Deports	-	2.18
10		Labrador-The Straits - Arctic Diesel	Area Marine Deports	-	0.88
11		Labrador Coast South - Gasoline	Area Marine Deports/ Bulk Plants	-	2.49
11		Labrador Coast South - Arctic Diesel	Area Marine Deports/ Bulk Plants	-	1.65
12		Central Labrador (Goose Bay) - Gasoline	Goose Bay Marine Terminal	-	0.98
12		Central Labrador (Goose Bay) - Arctic Diesel	Goose Bay Marine Terminal	-	0.85
13		Western Labrador - Gasoline & Arctic Diesel	Labrador City Rail Car Bulk Plant	-	0.63
13	a	Churchill Falls - Gssoline & Arctic Diesel	Labrador City Rail Car Bulk Plant	-	2.72

5.5 Drum Deliveries of Gasoline to Isolated Communities

Drum deliveries for retail sales take place in three areas of the Island part of the province and potentially one location in Labrador. On the south coast of the Island, drums of gasoline and furnace oil are delivered by freight ferry from ports on the Connaigre Peninsula; Pool's Cove to Rencontre East; and from Hermitage to Gaultois and McCallum. Drum deliveries are also made from Burgeo to Grey River and Francois and can be made from Burgeo to Grand Bruit and La Poile. Alternately, drums can be shipped via freight ferry from Rose Blanche to supply Grand Bruit and La Poile.

There is also a freight ferry service that could supply fuel in drums from Petite Forte on the Burin Peninsula to the small community of South East Bight in Placentia Bay. It is understood, however, that petroleum product supply to South East Bight is provided by a

commercial enterprise to consumers there who, in turn, supply raw material for the enterprise and these particular transactions are not currently part of the petroleum pricing regulatory system.

With respect to drums delivered from ports on the Connaigre Peninsula, they are filled via tank-wagon at dockside either at Pool's Cove or Hermitage. When they arrive at the destination port and are unloaded, this is considered to be the 'Wholesale Point of Sale' for gasoline (or diesel fuel) in the community. From there, the distribution and sale by drum or other means to the end consumer would comprise the retail margin for the transaction. Appendix E, Table E-13 details the calculations involved in arriving at the cost of drums delivered to dockside in the destination communities from the bulk storage plant on the Connaigre Peninsula. This calculation generates part of the supply chain cost to arrive at a wholesale price for gasoline at the ports of delivery. The currently established retail margin for drums from dockside to the dispensing point of gasoline consumers is 10.0 cpl or $20.50 per drum. This margin is considered to be reasonable in all cases where drums must be handled. The same filling, handling and shipping costs would apply to diesel fuel supplied in drums to these communities, and therefore the landed cost for diesel in drums would be the same as that for gasoline.

With respect to drums of gasoline delivered to Grey River and other isolated south coast (western) ports, it is understood that these are currently loaded on an open truck and filled at a service station outlet in Burgeo. (There is no tank-wagon delivery of gasoline available in Burgeo on an ongoing basis, nor at Rose Blanche) The cost at the Burgeo retail outlet for the drums supplier is therefore the first link in the remaining supply chain to Grey River, Francois and the other communities. Appendix E, Table E-14 details the calculations involved in arriving at an average cost for drums of gasoline delivered to the destination communities via freight ferry from Burgeo. Dockside at the receiving communities would again be the 'Wholesale Point of Sale' for drums of gasoline. Diesel fuel delivered by drums to these communities would have the same freight ferry and handling cost as is calculated for heating fuel later in this report. (Appendix H, Table H-7b gives the calculation for furnace oil, and the same numbers would apply for diesel since the bulk plant at Burgeo would have storage for diesel).

An available freight ferry delivery service in Labrador could potentially service the small communities of Williams Harbour and Norman Bay on the South Labrador Coast. For some years up until 2002, it is understood that these communities were serviced via coastal marine tanker with small marine depots located in each. However, low sales volumes and the high cost of marine freight made continued operations uneconomical. Since deliveries ceased, the residents have apparently managed to service themselves by shipping fuel in drums or in other containers from Charlottetown or Port Hope Simpson. The freight ferry does, however, provide an alternate means to service these locations via drums. The calculation of the freight cost involved is quite different and much more expensive than that for the ferries on the south coast of the Island. For palletized freight such as drums the transportation cost is based on the actual weight or the cubic weight, whichever is greater. For full drums, the actual weight is used; while for empty drums returned, the cubic weight would be greater and thus would be used in the freight calculation. The landed costs in cents per litre is summarized in Appendix E, Table E-15, while the detailed calculation of freight for drums shipments to these communities is outlined in the Table E-15 Supplement. Separate Tables are presented for gasoline and for diesel fuel, since the ferry freight for diesel is higher. If the freight rates for drums on this ferry service were calculated the same as that for the ferries on the south coast of the Island, the shipping rates would be approximately 9.5 cpl lower than that those shown in these Tables.

5.6 Summary of Automotive Fuel Costs to the Wholesale Point of Sale

Table 8 below presents a summarized format of each identified cost in the supply chain to the wholesale point of sale for gasolines in each pricing zone. The ex-tax wholesale point of sale price to the retailer is taken as the standard reference price for automotive fuels. The retail margin add-on differs by the grade of gasoline and whether it is a self-serve or full-serve sale to the consumer. Unless otherwise noted in Table 8, the laid-in zone costs for diesel fuel can be taken to be the same as those for gasolines.

In Appendix F, supply chain diagrams depict more clearly how each element of the laid-in cost figures are applied for each zone and sub-zone as listed in Table 8.

Storage and Distribution Study

Table 8

Laid-in Cost of Automotive Fuels to Wholesale point of Sale

Zone	Sub	Automotive Fuels Calculated Laid-In Cost to Retail Outlet or Wholesale Point of Sale by Zone Zone Description	Estimated Marine Freight & Terminal / Depot Operating Cost (Table 5)	T/T Freight To Bulk Plants where Applicable (Table 6 & Table 9)	Associated Average Bulk Plant Operating Costs (Table 3 & Table 4)	Average T/T Freight to Retail Outlets (Table 7)	Average T/W Freight from BP to Retail Outlets where Applicable (Table 7)	Cost of Handling and Filling Drums at Loading Port (Appendix E)	Freight Cost Drums Delivered to Dockside Destination Port (Appendix E)	Total Laid-in Cost to Retail Outlets or Wholesale Point of Sale
			CPL	CPL	CPL	CPL	CPL	CPL	CPL	CPL
1		Avalon	1.66	-	-	0.68	-			**2.34**
1	a	Bell Island	1.66	-	-	1.42	-			**3.08**
2		Burin-Bonavista Pens	1.66	-	-	2.11	-			**3.77**
3		Central Newfoundland from Avalon Peninsula	1.66	-	-	2.62	-			**4.28**
3	a	St. Brendan's from Avalon Peninsula (Existing)	1.66	1.98	0.67	-	3.80			**8.11**
3	b	Fogo Island from Avalon Peninsula (Existing)	1.66	4.61	1.51	-	0.92			**8.70**
3	c	Change Islands - from Fogo BP via TW (Existing)	1.66	4.61	1.51	-	4.96			**12.74**
4		Connaigre Peninsula from Avalon (Existing)	1.66	3.56	1.03	-	0.81			**7.06**
4	a	Gaultois-McCallum-Rencontre East from Zone 4 (Drums)	1.66	3.56	1.03	-	-	2.97	0.97	**10.19**
5		Springdale-Baie Verte from Corner Brook via BP	2.41	1.44	0.71	-	1.05			**5.61**
5	a	Long Island via T/W Ex Springdale Bulk Plant	2.41	1.44	0.71	-	4.69			**9.25**
5	b	Little Bay Islands via T/W from Springdale BP	2.41	1.44	0.71	-	5.04			**9.60**
6		Corner Brook Area	2.41	-	-	0.56	-			**2.97**
7		Stephenville-Port aux Basque - Burgeo	2.41	-	-	1.25	-			**3.66**
7	a	Ramea	2.41	-	-	4.05	-			**6.46**
7	b	Grey River/La Poile/Grand Bruit/Francois - Gasoline (Drums)	2.41	-	-	1.25	-	8.98	1.37	**14.01**
7	b	Grey River/La Poile/Grand Bruit/Francois - Diesel (Drums)	2.41	2.05	2.35			2.75	1.52	**11.08**
8		Northern Peninsula South	2.41	-	-	1.39	-			**3.80**
9		Northern Peninsula North	2.41	-	-	2.93	-			**5.34**
10		Labrador-The Straits - Gasoline	6.87	-	-	-	2.18			**9.05**
10		Labrador-The Straits - Arctic Diesel	6.87	-	-	-	0.88			**7.75**
11		Labrador South - Lodge Bay to Cartwright - Gasoline	14.41	-	-	-	2.49			**16.90**
11		Labrador South - Lodge Bay to Cartwright - Arctic Diesel	14.03	-	-	-	1.65			**15.68**
11	a	Labrador Coast- South (Isolated Communities) - Gasoline	22.23	-	-	-	-			**22.23**
11	a	Labrador Coast- South (Isolated Communities) - Arctic Diesel	20.73	-	-	-	-			**20.73**
11	b	*Labrador Coast- South - (Drums- Freight Ferry) - Gasoline*	14.41	-	-	-	-	3.06	10.80	**28.27**
11	b	*Labrador Coast- South - (Drums- Freight Ferry) - Arctic Diesel*	14.03	-	-	-	-	3.06	11.48	**28.57**
12		Central Labrador (Goose Bay Area) - Gasoline	4.51	-	-	-	0.98			**5.49**
12		Central Labrador (Goose Bay Area) - Arctic Diesel	4.51	-	-	-	0.85			**5.36**
13		Western Labrador (Labrador City) - Gasoline & Artic Diesel	6.50	-	-	-	0.63			**7.13**
13	a	Churchill Falls - Gasoline & Arctic Diesel	6.50	-	-	-	2.72			**9.22**
14		Labrador Coast-North (Isolated Communities) - Gasoline	22.23	-	-	-	-			**22.23**
14		Labrador Coast- North (Isolated Communities) - Arctic Diesel	20.73	-	-	-	-			**20.73**

Note: The laid in cost for drums at dockside is used as the wholesale price to retailers at the destination community.

6.0 Distillate Heating Fuels – Distribution

Whereas the reduction in the number and consolidation of marine terminals around the province has also impacted heating fuel, the logistics of delivering these fuels directly via tank-wagon to consumers' home fuel tanks has not significantly changed. The storage facility from which home heat trucks obtain their supply must be within a reasonable distance to enable the area to be properly serviced, particularly during the high volume winter months when deliveries are often necessary under treacherous road conditions. Hence, the need for local area bulk plants has, in essence, increased as marine terminals have been closed. Generally, the major oil companies have not responded to fill this need. In fact, they have tended to reduce the number of local bulk plants they operate and in recent years have withdrawn completely from certain areas. This rationalization has occurred primarily in rural areas of the province where there has been a significant reduction in the population base and where any new or replacement homes being built generally install cheaper electric heating systems, thereby further reducing the demand for home heating fuel. Local 'resellers' either carrying a major oil company brand, or their own brand, have stepped in to fill this void. A notable exception to this general trend has been the expansion of North Atlantic Petroleum (with the only operating refinery in the province at Come by Chance) in the marketplace with the construction of several new bulk plants throughout the province over the past few years.

Some resellers have bought bulk plants previously owned by major oil companies, while others have constructed their own. In a growing number of instances, they now provide the only source of home heating fuels in a particular rural area.

6.1 Tractor Trailer Deliveries of Heating Fuels to Bulk Plants:

The same costing model that was used for gasoline has also been utilized for distillate deliveries to bulk plants. The only modification necessary was to integrate the volume difference of full loads in the calculations. A typical tractor-trailer carries 43,000 litres of gasoline but only approximately 38,000 litres of stove, furnace or diesel, because these fuels are heavier per unit volume and a full load must be reduced to conform to highway weight restrictions. The resultant rates in CPL for each known or probable delivery of distillate from marine terminals to bulk plants are summarized in Appendix G, Table G-1. (Probable or hypothetical delivery locations are included in italics in Table G-1. They represent delivery rates to bulk plants that may be under consideration, but do not currently exist). Three representative sample calculation sheets detailing how the costing model was adapted to arrive at these figures are also included in Appendix G.

These are:

Table G-2	Source Terminal: St. John's	Receiving Bulk Plant: Harbour Grace
Table G-3	Source Terminal: Holyrood	Receiving Bulk Plant: Fogo Island
Table G-4	Source Terminal: Corner Brook	Receiving Bulk Plant: Springdale

Table 9 below summarizes the T/T estimated haulage rates for all identified deliveries of home heating fuels from marine terminals to bulk plants around the province.

Storage and Distribution Study

Table 9

Tractor Trailer Costs - Heating Fuel Deliveries to Bulk Plants where Applicable

Zone	Sub	Zone Description	Originating Storage Terminal	Bulk Plant Location	T/T Freight To Bulk Plants (See Appendix G for details) CPL
1	ANW	Avalon North West	St. John's/ Holyrood/ Come by Chance	Bay Roberts / Harbour Grace Area	0.98
1	AS	Avalon South	St. John's/ Holyrood/ Come by Chance	Aquaforte/ Trepassey/ St Mary's/ Dunville Areas	1.09
1	a	Bell Island	St. John's/ Holyrood/ Come by Chance	Bell Island	2.11
2		Burin-Bonavista Peninsulas	St. John's/ Holyrood/ Come by Chance	Marystown/ Clarenville/ Bonavista areas	1.94
3		Central Newfoundland from Avalon Peninsula	St. John's/ Holyrood/ Come by Chance	Gander/ Lewisporte/ Grand Falls areas	1.95
3	a	St. Brendan's from Avalon Peninsula (Existing)	Holyrood	Gander	2.24
3	b	Fogo Island from Avalon Peninsula (Existing)	Holyrood	Fogo Island	4.82
3	c	Change Islands - from Fogo BP via TW (Existing)	Holyrood	Fogo Island	4.82
4		Connaigre Peninsula from Avalon (Existing)	Holyrood	Pool's Cove Crossroads	3.99
4	a	Gaultois-McCallum-Rencontre East (Drums)	Holyrood	Pool's Cove Crossroads	3.99
5		Springdale-Baie Verte from Springdale BP	Corner Brook	Springdale	1.63
5	a	Long Island via T/W Ex Springdale Bulk Plant	Corner Brook	Springdale	1.63
5	b	Little bay Islands via T/W ex Springdale BP	Corner Brook	Springdale	1.63
7	W	Stephenville and Port aux Basques	Corner Brook	Stephenville/ Port aux Basques	1.45
7	SW	Burgeo	Corner Brook	Burgeo	2.05
7	a	Ramea	Corner Brook	Burgeo	2.05
7	b	Grey River/La Poile/Grand Bruit/Francois (Drums)	Corner Brook	Burgeo	2.05
9		Northern Peninsula North	Corner Brook	Plum Point/ Other areas	2.64

6.2 Tank Wagon Deliveries of Heating Fuel to Homes:

The approach to developing a costing model for the delivery of home heating fuels by tank wagon was much different than that for tank wagon deliveries of gasoline to retail outlets. The estimated operating costs of both tandem and single axle tank wagon vehicles are the same in most respects and are presented in Appendix H, Table H-1. The operating days per year are also assumed at 300, which provides for one day off per week and 13 days per year for statutory holidays and / or other non-operating days.

However, the method of operation for a tank wagon vehicle delivering home heat fuel to consumer household storage tanks is much more intricate and demanding than the relatively large volume drops at a retail gasoline outlet. In developing a costing model, firstly, the number of households in a specific area that used oil as a heating medium had to be estimated followed by an estimate of the average annual consumption of each household. Wood stoves used for supplementary heating had to be considered as one of the factors affecting oil consumption.

Other relevant data and sources were identified for input in the costing model. These are listed in Table 10 below.

Storage and Distribution Study

TABLE 10

Variables considered for Home Heat Fuel Deliveries

Item	Sources for Information
Population of specific geographic sub-areas	Statistics Canada
Number of households located in a specific area	Statistics Canada
Average population per household	Calculated
Number of homes with electric heat	Newfoundland Power – where available – otherwise estimated.
% of Homes with oil / other heating methods	By difference
Annual volume for households using oil	Industry Sources
Average T/W drop per household – winter/ summer	Industry Sources
Loading time per vehicle	Industry Sources
Distance between communities	Road Distance Database - Newfoundland & Labrador Statistics Agency
Estimated kilometres travelled per load	Calculated
Drop time for each delivery	Industry Sources
Average speed attained during travel times per load	Estimated
Average delivery time for each load	Calculated
Volume delivered over a period of months	Calculated
Average volume delivered litres per hour	Calculated
Required trips per day for period	Calculated
Ferry rates where applicable	NL Government Services Website (2004 Rates)

The identification of each specific geographic home-heat area or zone and an overview of how existing home heat businesses service particular areas was ascertained by field visits and follow-up contact with key personnel. These areas were then further delineated using population profiles, natural geographic boundaries, and estimated demand for home heating fuels. Considerable effort was made in keeping the final model structure practical and understandable, yet universally applicable and as accurate as possible.

The first area to be studied was the Avalon Peninsula, all of which is now included in one Home Heat Pricing Zone. A close examination of this zone with its highly populated urban section around St. John's, contrasted with sparsely populated sections in its south western portion and other large and small towns spread around the rest of the area, resulted in some interesting anomalies. Nevertheless, through a methodical application of the costing model, it became apparent, as explained below, that the Avalon Peninsula should be divided into three Home Heat Zones in addition to the existing Sub-Zone, Bell Island.

The North East Avalon, supplied from marine terminals at St. John's and Holyrood and from a large bulk plant at Donovans, Mount Pearl, would become Home Heat Pricing Zone 1 – Avalon North East (HH-1 ANE) and would include all communities from Georgetown/ Marysvale in Conception Bay, to Holyrood, north to Pouch Cove and then south to Maddox Cove and Petty Harbour, including the town of Conception Bay South and the cities of Mount Pearl and St. John's. (See Map portion Appendix I Figure I -1) All this area can be serviced via tank-wagon deliveries directly from storage facilities in St. John's, Mount Pearl and Holyrood.

The costing model as applied to this Avalon North East Base Zone is presented in Appendix H as Table H1-ANE. The cost calculations are based on the equipment and manpower needed to deliver the estimated demand volumes during the peak demand winter months (December through March - about 61% of annual volume). For the remaining months of the year, fewer tank-wagons and lower operating hours per day are needed, however fixed costs such as insurance, depreciation, etc. must still be covered so the unit cost (in cents per litre delivered) will not necessarily be lower. In the peak period, costs for required full time vehicles, part time vehicles, and the idle time for the part time vehicles (except in special circumstances) are all included in the total cost calculation. In the off-season months, the idle time for any part time vehicles required is not included since it is assumed that these vehicles would not be on 'stand-by' status. They would most likely be laid up or involved in other delivery work such as commercial fuel deliveries. This logic is applied consistently in the calculation tables for all identified zones with annual volumes in excess of one million litres. For total annual volumes less than a million litres, only one part time vehicle is required for the entire volume and the cost of the idle time for the vehicle is not applied since it would, in most cases, distort the CPL delivery rates unnecessarily. Since home heat deliveries are generally made by owner/ operator type businesses, no provision was included for overtime for drivers when the standard eight hours per day is exceeded during the peak demand months.

The proposed HH- Zone 1- Avalon North East was 'backed into' upon testing the pricing model for other areas of the Avalon Peninsula. For example, it was concluded that to properly service the Bay de Verde (Conception Bay North) Peninsula, a bulk fuel storage plant was required somewhere in, or near, the Bay Roberts – Carbonear area. In fact, it was determined by field trips that there was one bulk plant in Bay Roberts and two fuel storage facilities in Harbour Grace from which tank-wagons currently pick up heating fuels for most of the peninsula. The costing model sheet for this area is presented in Appendix H, Table H1-ANW. Whereas the cents per litre delivery cost calculated at 4.19 cpl is not dramatically more than that for Zone 1 – NE at 3.42 cpl, the main difference between the two proposed home heat zones would be the added cost of an area bulk plant and tractor-trailer deliveries to keep it supplied. The HH Zone 1 – Avalon North West would encompass the area from Brigus in the south, north along the Conception Bay North coastline to Grates Cove, then south along the Trinity Shore side of the peninsula to Old Shop and then to the Trans Canada Highway (TCH). The outline of this HH Zone 1 - Avalon North West is shown in Appendix-I as Figure I-2.

The costing model calculations for each of the Avalon South West and Avalon South East peninsulas are given in Tables H1-ASW and H1-ASE of Appendix H. Notwithstanding that separate bulk storage plants are assumed to be located in each of these areas, the average delivery costs of 4.95 cpl and 5.21 cpl are sufficiently close to regard the entire area as one home heat zone. This also alleviates the difficulty of determining a geographic dividing point between the two areas around St. Mary's Bay. When taken as one zone, the average delivery cost for this proposed HH Zone 1 - Avalon South is 5.06 cpl as calculated in Appendix H Table H1-AS. This proposed new zone would include the balance of the existing Zone 1 of the Avalon Peninsula as shown by the map portion included in Appendix I as Figure 1-3.

Where applicable, in each of the costing model calculation sheets, delivery costs for both single and tandem axle tank-wagon units are considered and the average of each mode is taken as the final CPL estimated cost. The tandem axle units generally become more

economically feasible as the size of the area and the average distance travelled per delivered load increases.

The developed home heat costing model was applied to all areas, irrespective of existing zonal boundaries. Nevertheless, this extensive iterative process resulted in a mix of recommended home heat zones for the province, the majority of which did align with existing boundaries. For clarity and completeness, a detailed cost model calculation sheet for every home heat pricing zone is included in Appendix H.

Besides the recommended increase of two additional zones for the Avalon Peninsula, the only other additional zone would be for Burgeo, which would separate that area from the current Zone 7, which includes Stephenville, the Port au Port Peninsula and Port aux Basques areas, as well as Burgeo. This results in a recommended Zone 7 - West and a Zone 7 - South East as is indicated in Appendix H, Tables H-7W and H-7SE. The main reason for designating Burgeo as a separate home heat zone was the higher CPL cost of operating the bulk plant and the delivery tank wagons therein due to its relatively lower volume thruput.

6.3 Drum Deliveries of Heating Fuels to Isolated Communities:

The same areas where drum deliveries are necessary for gasoline also apply to home heating fuels. Drum delivery calculation sheets are not separated but are included in turn by sub-zone in the tables of Appendix H. Particular note should be made of the proposed new Zone 11b where drum delivery costs are calculated for Williams Harbour and Norman Bay on a different ferry freight basis than for the south coast of the Island. If the same rates applied in the case of Zone 11b, the calculated freight rate would be reduced by approximately 9.5 CPL.

In areas where drum delivery to households is required from dockside, the cost to handle and deliver the drums and return the empties for refilling is maintained at 10.0 CPL, which is the existing retail margin established for this service, both for heating and automotive fuels.

6.4 Heating Fuels Dispensing Fees at Isolated Marine Depots:

In areas that have isolated marine depots such as coastal Labrador, the householder generally brings the drum or other container to the depot for filling. A similar situation exists for the distribution of automotive fuels in these communities. The retail margin or filling fee in these instances, is also 10.0 CPL, however, included in this fee is a portion of the depot's operating labour cost. In the case of gasoline sold at full serve retail outlets around the province, the maximum retail margin has been established at 7.61 cpl. before taxes. The portion of the filling fee attributable to depot operation can therefore be taken as 10.0 – 7.61 or 2.39 cpl. A similar expense can also be allocated to heating fuels. Hence in the operating cost calculations for isolated marine depots per Appendix B, Table B-15, 2.39 cpl has been deducted from the operating cost of these marine depots and applied to the retail margin as part of the dispensing fee.

6.5 Summary of Heating Fuel Delivery Costs

Table 11 below presents a summarized format of each identified cost in the supply chain that adds up to the total cost at the 'Retail Point of Sale' for heating fuels in each pricing zone.

Storage and Distribution Study

Table 11

Home Heating Fuels Calculated Costs of delivery to Customer Tanks (Retail Point of Sale) by Zone				Estimated Marine Freight & Terminal / Depot Operating Cost (Table 5)	Average T/T Freight To Intermed-iate Bulk Plants (Table 9)	Average Bulk Plant Operating Cost where Applicable (Table 4)	Average Cost T/W Delivery to Homes in Area	Average Cost Filling of Drums at Dockside and Shipping	Average Freight & Handling or Filling Cost for Drums for Customers in Remote Com-munities	Average Delivered Cost to Households for Area (Point of Retail Sale)
Zone	**Sub**	**Supply Point and Methods**			**CPL**	**CPL**	**CPL**	**CPL**	**CPL**	**CPL**
1	**ANE**	**Avalon -North East**	Ex Marine Terminals 75%	1.66	-	-	3.42			(Weighted Average)
			From Come by Chance 25%	N/A	1.32	0.50	3.42			**5.12**
1	**ANW**	Avalon North West		1.66	0.98	1.19	4.19			**8.02**
1	**AS**	Avalon South		1.66	1.09	1.46	5.06			**9.26**
1	**a**	Bell Island		*1.66*	*2.11*	*1.86*	*3.82*			***9.45***
2		Burin and Bonavista Peninsulas		1.66	1.94	1.36	4.25			**9.21**
3		Central Newfoundland from Avalon Peninsula		1.66	1.95	0.84	4.41			**8.86**
3	**a**	St. Brendan's from Avalon Peninsula (Existing)		1.66	2.24	0.84	7.49			**12.23**
3	**b**	Fogo Island from Avalon Peninsula (Existing)		1.66	4.82	1.23	3.93			**11.64**
3	**c**	Change Islands - from Fogo BP via TW (Existing)		1.66	4.82	1.23	6.71			**14.42**
4		Connaigre Peninsula from Avalon (Existing)		1.66	3.99	1.17	4.97			**11.79**
4	**a**	Gaultois-McCallum-Rencontre East (Drums)		1.66	3.99	1.17	-	4.85	10.00	**21.67**
5		Springdale-Baie Verte from Springdale BP		2.41	1.63	1.17	4.22			**9.43**
5	**a**	Long Island via T/W from Springdale Bulk Plant		2.41	1.63	1.17	4.94			**10.15**
5	**b**	Little Bay Islands via T/W from Springdale BP		2.41	1.63	1.17	5.38			**10.59**
6		Corner Brook Area		2.41	-	-	3.62			**6.03**
7	**W**	Stephenville and Port aux Basques		2.41	1.45	1.34	3.98			**9.18**
7	**SE**	Burgeo		2.41	2.05	2.35	4.80			**11.61**
7	**a**	Ramea		2.41	2.05	2.35	8.58			**15.39**
7	**b**	Grey River/La Poile/Grand Bruit/Francois (Drums)		2.41	2.05	2.35	-	4.27	10.00	**21.08**
8		Northern Peninsula South		2.41	-	-	4.64			**7.05**
9		Northern Peninsula North		2.41	2.64	1.40	4.84			**11.29**
10		Labrador-The Straits		6.87	-	-	5.79			**12.66**
11		Mary's Harbour-Cartwright area		14.03	-	-	6.35			**20.38**
11	**a**	Labrador Coast- South (Isolated Marine Depots)[1]		20.73	-	-	-	-	10.00	**30.73**
11	**b**	Labrador Coast- South (Drum Deliveries via Coastal Freight Ferry)		*14.03*	-	-	-	*16.29*	*10.00*	***40.32***
12		Central Labrador (Goose Bay and Area)		4.51	-	-	3.84			**8.35**
13		Western Labrador (Labrador City / Wabush)		6.50	-	-	3.88			**10.38**
13	**a**	Churchill Falls		6.50			*5.94*			***12.44***
14		Labrador Coast- Norht (Isolated Marine Depots)[1]		20.73	-	-	-	-	10.00	**30.73**

Notes: 1. For Isolated Marine Depots - Product is dispensed at the depot into consumer drums or other containers.

In Appendix K, supply chain cost diagrams for each zone and sub-zone are presented to show more clearly how the laid-in costs to households or to the 'Retail Point of Sale' are built up by each cost element identified in Table 11.

7.0 Propane Heating Fuel – Supply and Distribution

7.1 Propane Supply and Usage as a Heating Fuel

Propane use for home heating in Newfoundland and Labrador is fairly limited. Of the total annual consumption of propane in the province, only an estimated 15% to 18% is delivered to residences for various uses. Very few homes utilize propane as a primary heating source. However, a number have auxiliary propane space heaters or fireplaces equipped with heat blower fans to supplement the primary means of heating the residence. The PPPC sets the maximum retail price of propane by zone (where propane is available to be delivered via tank-wagon) when it is used as a primary or auxiliary home heating fuel. Propane used for home appliances such as stoves and refrigerators as well as its use in fireplaces and other equipment for 'atmosphere' or 'ambiance' is not intended to be included in the regulated price.

The PPPC uses the following definition for price regulation of propane used in the home[1]:

> 'Propane that is delivered to a consumer's household by tank-truck into fixed storage and which is used by an appliance designed and intended to generate heat for the residence. Such appliances are furnaces, space heaters, and fireplaces equipped with heat blower fans. Fixed storage is defined as one, or an interconnected number of storage tanks approved and certified for propane use, with a total capacity of at least 178 litres. (2 x 100 pound cylinders or greater)'

[1] Source: News Release- Department of Government Services and Lands – December 14-2001

There are three main suppliers of propane in the province: Superior Propane, North Atlantic Petroleum and Irving Oil. Superior has four propane bulk storage depots throughout the Island part of the province at St. John's, Clarenville, Grand Falls-Windsor and Pasadena. North Atlantic produces propane at its Come by Chance Refinery and has a storage depot for redistribution in Donovans near St. John's. Irving has bulk storage depots at St.John's, Grand Falls-Windsor and Corner Brook. All three suppliers obtain the majority of their supply from North Atlantic's Refinery. However, both Superior and Irving maintain supply links for propane from mainland sources and import product via the North Sydney to Port aux Basques Ferry when it is more economical for them to do so, or when the fuel is not readily available from the refinery. Unscheduled shutdowns and other disruptions at the refinery have caused some serious problems with propane supply in the past, which has necessitated the import of propane from mainland sources at higher laid-in costs, particularly to the eastern parts of the province.

7.2 Cost of Tractor Trailer Deliveries to Bulk Storage Depots

The cost of overland transport of propane to all redistribution depots is based on tractor-trailer supply from the primary supply source, the Come by Chance Refinery. The model previously developed and used in calculating tractor-trailer delivery rates for gasolines is still applicable for propane transport notwithstanding the design and structure of pressurized tanks required to keep that product in a liquid state. The shell of the propane tanks is much thicker and hence heavier in order to withstand this pressure and the tanks are only filled to 80% liquid volume. A standard propane trailer with a total volume capacity of about 55,000 litres would therefore only carry approximately 44,000 litres of liquid propane. Liquid propane has a lower density and is therefore lighter than gasoline, however, the additional weight of the tank shell and other equipment limits the highway scale weight accordingly.

The estimated T/T costs for propane shipped from the Come by Chance Refinery to the various storage depots identified around the province have been calculated as follows using the modified tractor-trailer costing model for 44,000 litres of liquid propane:

Come by Chance	to	St. John's	**1.37** cpl
Come by Chance	to	Grand Falls	**2.10** cpl
Come by Chance	to	Pasadena/ Corner Brook	**3.66** cpl

The above figures are taken from Table J-1, Appendix J.

7.3 Cost of Operating Bulk Storage Depots – Propane

Because the vast majority of propane is used for commercial purposes, any attempt to break out the cost of storing and handling the relatively small volume thruput at a bulk storage depot for residential heating purposes is not feasible. The operation's economics are largely dependent on the commercial volume and without that volume the depot would not be viable. The estimated cost of operating a propane storage depot as an industry norm is reported to be about 0.5 cents per litre. This figure is used in cost calculations for each depot in the province.

7.4 Tank Wagon Deliveries of Propane to Households

The average costs of tank wagon delivery of propane to individual homes in major centres, and in defined pricing zones where the depots are located, are assumed to be quite similar in each case. However, the incremental extra costs of delivering propane to households in adjacent zones without a depot must be calculated to ascertain pricing differentials from the supplying zone.

As was the case with home heating distillate fuels, firstly the operating costs of propane tank-wagon delivery vehicles had to be estimated. These calculations for both tandem and single axle vehicles are included in Appendix J as Table J-2. The capital cost of a propane tank-wagon is greater than that of a normal unit due to the pressurized tank construction and specialized pumping and metering equipment. It is assumed that since home heat deliveries are not a scheduling priority in the sense of peak vehicle usage, the cost per hour of operation is based on a standard 8 hour day, 5 days per week. The average cost per hour for a tandem axle propane tank-wagon is calculated at $64.50 per hour, while a single axle unit is estimated at $60.00 per hour. The costs of the units when idle (with driver) and when idle (without driver) are also calculated in Table J-2.

The PPPC publishes maximum delivered propane prices for only 10 out of the 25 listed zones due to the non-availability of tank-wagon delivered propane to households in the remaining zones or sub-zones. For reference, the published table of propane prices effective October 15, 2004 is included as Table J-3 in Appendix J.

The extra tank-wagon delivery costs to zones or sub-zones, which do not have storage depots, are calculated in Appendix J, Tables J-4 through J-10. These costs are then added to the delivered cost in the supplying zones to arrive at a realistic cost for the areas without storage depots.

7.5 Summary of Propane Heating Fuel Delivery Costs

Table 12 below gives the total delivered cost of propane to households above that of Zone 2, which is the base zone for propane with supply originating at the Come by Chance refinery.

Storage and Distribution Study

Table 12

Calculated Delivery Costs of Propane Heating Fuels to Households

By Zone where Tank Wagon Delivery is Available

Zone	Geographic Area for Zone	T/T Costs from Come By Chance to nearest Bulk Depot CPL	Estimated Operating Cost of Bulk Storage Depot CPL	Extra Delivery Costs to Zones without Depots CPL	Total Delivered Cost to Households Above Base Zone CPL
1	St. John's & Avalon	1.4	0.5	0	1.9
1a	Bell Island	1.4	0.5	1.1	3
2	**Clarenville/ Burin-Bonavista Peninsulas (Base Zone)**	**0**	**0**	**0**	**0**
3	Central Newfoundland - Glovertown to Buchans	2.1	0.5	0	2.6
3a	St. Brendan's (Island)	N/A	N/A	N/A	N/A
3b	Fogo Island	N/A	N/A	N/A	N/A
3c	Change Islands	N/A	N/A	N/A	N/A
4	Connaigre Peninsula	2.1	0.5	0.8	3.4
4a	Gaultois to Francois / Rencontre East	N/A	N/A	N/A	N/A
5	Springdale & Baie Verte Peninsula	2.1	0.5	0.6	3.2
5a	Long Island	N/A	N/A	N/A	N/A
5b	Little Bay Islands	N/A	N/A	N/A	N/A
6	Deer Lake - Corner Brook Areas	3.7	0.5	0	4.2
7	Gallants to Port aux Basques / Burgeo	3.7	0.5	1.2	5.4
7a	Ramea (Island)	N/A	N/A	N/A	N/A
7b	Grey River/ Grand Bruit / La Poile	N/A	N/A	N/A	N/A
8	Northern Peninsula - Gros Morne to Belburns	3.7	0.5	1.1	5.2
9	Northern Peninsula - to Englee and St. Anthony	3.7	0.5	2.9	7.1
10	Labrador Straits - L'Anse au Clair to Red Bay	N/A	N/A	N/A	N/A
11	Mary's Harbour to Cartwright (road access)	N/A	N/A	N/A	N/A
11a	Coastal Labrador – South	N/A	N/A	N/A	N/A
12	Central Labrador - Goose Bay Area	N/A	N/A	N/A	N/A
13	Western Labrador - Labrador City / Wabush	N/A	N/A	N/A	N/A
13a	Churchill Falls	N/A	N/A	N/A	N/A
14	Coastal Labrador – North	N/A	N/A	N/A	N/A

8.0 Identification of Storage Facilities around Newfoundland and Labrador

During this Study, the Consulting Team visited essentially all storage terminals, bulk plants and depots around the province. Due to the non-cooperation of several companies, many of these storage facilities could be seen only from outside their perimeters, enabling only a few photos to be taken and rough estimates of storage tank capacities made.

Some of the companies were quite cooperative and under Confidentiality and Non-Disclosure Agreements provided significant information on their storage plants, including tank sizes, product service, annual throughputs, and in some cases annual operating cost estimates. Whereas these proprietary figures were a substantial help in providing reference numbers used to test the developed costing models, they were provided in confidence and therefore will not be included in this report. Information on each storage facility is therefore limited to a photo or two with captions indicating ownership and location.

A listing of all identified petroleum products storage facilities in Newfoundland and Labrador are given in Appendix L, Table-1, with notes on each. A total of 69 facilities were identified with 52 of these currently in operation. Where available, photos of each storage facility with their locations noted are presented sequentially in Appendix L with the corresponding ID Number as indicated in Table-1. Included in the listing are terminals or bulk plants that have been decommissioned but are still standing and could potentially be re-commissioned in future.

Propane storage depots are listed separately in Appendix L Table-2. Photos, locations and owners are also included following the sequence of photos for the Table-1 listed facilities.

9.0 Study Conclusions and Recommendations

9.1 Zone Boundaries

All zone and sub-zone boundaries were examined in detail during the study process. Using all information, provided and uncovered, the following conclusions were reached with recommendations in each case:

A. Zone Boundaries for Automotive Fuels

No changes in existing boundaries for automotive fuels are recommended. Except for the zone and sub-zone designation change from Sub-Zone 10a to become Zone 11, 11a and 11b in southern Labrador, it is recommended that all existing zones for automotive fuels retain their existing boundaries and designations.

B. Zone Boundaries for Distillate Home Heating Fuels

There are two changes recommended for zone boundaries for distillate home heating fuels. As described in Section 6 of this Report, three zones have been proposed for the existing Zone 1 – Avalon Peninsula, with boundaries as described and shown on the map portions in Appendix I. A second change in boundaries is recommended for the west coast of the Island part of the province where the town of Burgeo has been separated within the existing Zone 7 to become Zone 7-SE (South East). It is proposed that the balance of the existing Zone 7 be designated Zone 7–W (West)

These changes in heating zone boundaries come primarily as a result of cost differences in operating bulk plants in the identified areas as indicated in Table 4.

As is the case with automotive fuels, the same changes in designations for Zones 10a and 11 are being recommended for distillate heating fuels.

C. Zone Boundaries for Propane Home Heating Fuel

A survey of the areas where propane is available for delivery via tank wagon trucks to households for heating purposes resulted in no recommendations for additions or deletions to the zones or zone boundaries currently designated for propane. It is recommended that the ten zones / sub-zones wherein propane is available should therefore remain the same as they now exist and as they are described for automotive fuels.

9.2 Zone Pricing Differentials

A. Pricing Differentials for Automotive Fuel Zones

The first column of figures in Table 13 on the following page gives the total estimated cost to provide automotive fuels to the wholesale point of sale for each zone and sub-zone throughout the province as was derived in Table 8. Table 13 next shows the indicated differential for each zone from that of the Avalon – (Base Zone). The Table then compares the existing cost differentials for each zone with those that are indicated and recommended through the cost analyses as calculated in this Study. The final column shows the change in the recommended pricing differential for each zone/ sub-zone.

The following points should be noted for Table 13:

a. The laid-in cost for diesel fuel in Zone 7b differs from that for gasoline in Zone 7b. This is because of the differing methods of supply for each product used to fill drums at dockside in Burgeo. The supply chain diagrams, Figures 7b1 and 7b2 in Appendix F, clearly show the differences in methods and costs.

b. In all areas of Labrador a diesel fuel product that can be stored and used in very cold temperatures is supplied year round. In the Table, this product is termed 'Arctic Diesel' to differentiate it from the 'heavier' diesel used throughout the Island part of the province. Due to product storage limitations and in order to prevent mixing problems during the colder months, no attempt is made to segregate the two grades of diesel in Labrador on a seasonal basis.

c. When the PPPC first instituted price regulation in the fall of 2001, the difference in the 'refinery rack' prices between furnace and stove oil in eastern Canada was 1.8 cpl. This differential was added to the base price of diesel fuel in all areas of Labrador before the normal distribution cost differential from the base zone was applied. (The 'refinery rack' prices are posted prices by each refiner at a number of major centres, and represent the nominal wholesale prices charged to 'resellers' who buy large amounts of product at suppliers' truck loading racks. One recognized source for these rack prices is the Bloomberg Oil Buyer's Guide, which posts them on a weekly basis) The indicated differentials in the second column of figures in Table 13 do not include this built-in 1.8 cpl premium for diesel fuel in Labrador. The premium would be applied to the base price before the differentials are added to be consistent with the current practice of the PPPC in setting maximum prices. This practice was adopted by the PPPC in order that the location differentials for both gasolines and diesel fuels are the same in each zone.

   Although not specifically intended to be addressed in this Study, it should be noted that the differential between furnace and stove oil or between 'light' and 'heavy' distillate has now increased to approximately 3.0 cpl as noted by current postings in the OBG. Should this current differential be applied to diesel fuel in Labrador, the resultant ex-tax prices would increase by 1.2 cpl accordingly.

d. As previously mentioned in this report, because stock losses incurred at the smaller marine depots in Labrador are notably higher for gasoline than for diesel fuel, laid-in costs for these products are shown separately in the affected zones.

Storage and Distribution Study

Table 13

Recommended Adjustments to Zone Differentials for Automotive Fuels (Wholesale Prices)

Zone	Sub	Zone Description and Supply Method	Total Laid-in Cost to Wholesale Point of Sale (Table 8)	Indicated Total Differential From Base Zone (Ex-Tax)	Existing Differential From Base Zone (Ex-Tax)	Recommended Differential from Base Zone (Ex-Tax)	Indicated Change in Wholesale Differential for Zone
			CPL	CPL	CPL	CPL	CPL
1		Avalon (Base Zone) T/T from Terminals	**2.34**	0.00	0.0	**0.0**	**0.0**
1	a	Bell Island - T/T from Avalon Terminals	**3.08**	0.74	0.5	**0.7**	**0.2**
2		Burin-Bonavista Pens - T/T from Avalon Terminals	**3.77**	1.43	1.0	**1.4**	**0.4**
3		Central Newfoundland - T/T from Avalon Terminals	**4.28**	1.94	1.5	**1.9**	**0.4**
3	a	St. Brendan's - T/T from Avalon Peninsula via Gander Bulk Plant and Tank Wagon	**8.11**	5.77	5.0	**5.8**	**0.8**
3	b	Fogo Island from Avalon Peninsula via T/T / Ferry / Bulk Plant and Tank Wagon	**8.70**	6.36	2.5	**6.4**	**3.9**
3	c	Change Islands - from Fogo Bulk Plant via T/W and Ferry	**12.74**	10.40	4.5	**10.4**	**5.9**
4		Connaigre Peninsula - T/T from Avalon via Bulk Plant via T/W	**7.06**	4.72	3.0	**4.7**	**1.7**
4	a	Gaultois-McCallum-Rencontre East via Bulk Plant - T/W and Drums - **Gasoline**	**10.19**	7.85	6.6	**7.9**	**1.2**
4	a	Gaultois-McCallum-Rencontre East via Bulk Plant -T/W and Drums - **Diesel**	**10.19**	7.85	9.0	**7.9**	**-1.1**
5		Springdale Areas from Corner Brook via Springdale Bulk Plant and Tank-Wagon	**5.61**	3.27	2.0	**3.3**	**1.3**
5	a	Long Island via T/W from Springdale Bulk Plant	**9.25**	6.91	4.0	**6.9**	**2.9**
5	b	Little Bay Islands via T/W from Springdale Bulk Plant	**9.60**	7.26	4.5	**7.3**	**2.8**
6		Corner Brook Area - T/T from Marine Terminals	**2.97**	0.63	0.0	**0.6**	**0.6**
7		Stephenville - Port aux Basque - Burgeo - T/T from Corner Brook Terminals	**3.66**	1.32	2.0	**1.3**	**-0.7**
7	a	Ramea - T/T from Corner Brook Terminal and Ferry from Burgeo	**6.46**	4.12	6.0	**4.1**	**-1.9**
7	b	Grey River/Francois -/Grand Bruit/La Poile - via Burgeo Retail Outlet and Drums via Freight Ferry - **Gasoline**	**14.01**	11.67	6.6	**11.7**	**5.1**
7	b	Grey River/Francois -/Grand Bruit/La Poile - via Burgeo Retail Outlet and Drums via Freight Ferry - **Diesel**	**11.08**	8.74	9.0	**8.7**	**-0.3**
8		Northern Peninsula South - T/T from Corner Brook Terminals	**3.80**	1.46	1.5	**1.5**	**0.0**
9		Northern Peninsula North - T/T from Corner Brook Terminals	**5.34**	3.00	3.0	**3.0**	**0.0**
10		Labrador-The Straits- T/W Via Marine Terminal and Marine Depot - **Gasoline**	**9.05**	6.71	7.5	**6.7**	**-0.8**
10		Labrador-The Straits- T/W Via Marine Terminal and Marine Depot - **Artic Diesel**	**7.75**	5.41	7.5	**5.4**	**-2.1**
11		Lodge Bay-Cartwright- T/W Via Bulk Plant and Marine Depot (Cost Averaged) - **Gasoline**	**16.90**	14.56	12.5	**14.6**	**2.1**
11		Lodge Bay-Cartwright- T/W Via Bulk Plant and Marine Depot (Cost Averaged) - **Artic Diesel**	**15.68**	13.34	12.5	**13.3**	**0.8**
11	a	Labrador Coast - South - Isolated Communities via Marine Tanker and Depots - **Gasoline**	**22.23**	19.89	19.6	**19.9**	**0.3**
11	a	Labrador Coast - South - Isolated Communities via Marine Tanker and Depots - **Artic Diesel**	**20.73**	18.39	18.0	**18.4**	**0.4**
11	b	*Labrador Coast- South - Drums via Freight Ferry - **Gasoline***	***28.27***	*25.93*	*N/A*	***25.9***	***N/A***
11	b	*Labrador Coast- South - Drums v ia Freight Ferry - **Artic Diesel***	***28.57***	*26.23*	*N/A*	***26.2***	***N/A***
12		Central Labrador (Goose Bay Area) - T/W from Marine Terminals - **Gasoline**	**5.49**	3.15	4.5	**3.2**	**-1.3**
12		Central Labrador (Goose Bay Area) - T/W from Marine Terminals - **Artic Diesel**	**5.36**	3.02	4.5	**3.0**	**-1.5**
13		Western Labrador (Labrador City - T/W from Rail Car Bulk Plant - **Gasoline & Arctic Diesel**	**7.13**	4.79	4.0	**4.8**	**0.8**
13	a	Churchill Falls - T/W from Labrador City Rail Car Bulk Plant - **Gasoline & Arctic Diesel**	**9.22**	6.88	6.0	**6.9**	**0.9**
14		Labrador Coast - North - Isolated Communities via Marine Tankers and Depots - **Gasoline**	**22.23**	19.89	19.6	**19.9**	**0.3**
14		Labrador Coast - North - Isolated Communities via Marine Tankers and Depots - **Artic Diesel**	**20.73**	18.39	18.0	**18.4**	**0.4**

Note: The laid-in cost for drums at dockside is used as the wholesale price to retailers at the destination community.

Automotive Fuels - Notes on recommended price changes greater than 1.0 cpl:

Zone 3b – Fogo Island: - Whereas some of the gasoline delivered to retail outlets on Fogo Island may come via tank wagon from the primary marine terminal in Lewisporte, the main source for automotive fuels for the Island is via tractor-trailer from the Avalon terminals and then redelivery from Fogo bulk plants via tank wagon. The increased pricing differential of 3.9 cpl accommodates this reality.

Zone 3c – Change Islands: - It was determined through field visitations that the gasoline for Change Islands is redelivered from the bulk plant on Fogo Island via tank wagon and ferry. The recommended price differential recognizes the costs involved with this supply chain. (See Figure 3c, Appendix F)

Zone 4 – Connaigre Peninsula: - A significant volume of automotive fuels supplied to retail outlets on this peninsula comes from the bulk plant at the Pool's Cove crossroads This plant is supplied via tractor trailer from the Avalon Peninsula. The fuel is then redelivered via tank wagon from the bulk plant to small retail outlets in the area. The recommended differential takes into account all costs elements for this process. (See Figure 4, Appendix F)

Zone 4a – Drums to remote communities from the Connaigre Peninsula: - The effective wholesale differential for regular gasoline between these remote locations and the base zone is currently 6.61 cpl. A wholesale differential of 7.85 from Zone 1 is calculated as being required prior to the retail margin of 10.0 cpl being applied to gasoline. (See Figure 4a, Appendix F for supply chain details) In the case of diesel fuel, however, the effective wholesale differential is currently 9.0 cpl and therefore a reduction of 1.1 cpl is proposed.

Zone 5 – Springdale /Triton/ Baie Verte Peninsula: - The rationale for the 1.3 cpl increase in differential in this zone is due to the fact that much of the automotive fuel volume now goes through the bulk plant in Springdale for redelivery to the retail outlets in the area by tank wagon.

Zone 5a – Long Island and Zone 5b: Little Bay Islands: - Both these sub-zones are supplied from the bulk plant at Springdale. The detailed calculations for the supply chain cost elements, in particular the ferry crossings to these Islands, are shown in Figures 5a and 5b, Appendix F and justify the increased differentials recommended.

Zone 7a – Ramea: - From field visits, the Consulting team learned than the single retail outlet in Ramea is supplied via a light loaded tractor trailer via ferry from Burgeo. This method assumes that part of the full tractor-trailer load can be dropped at an outlet in Burgeo prior to the ferry crossing. The detailed calculation for the tractor-trailer haulage cost is shown Table D-4 Appendix D, while the costs resulting in a reduced differential is depicted by Figure 7a, Appendix F.

Zone 7b – Drums to remote communities from Burgeo: - The recommended differentials for gasoline and diesel differ significantly due to the different methods used in enabling product supply to fill the drums at dockside. The supply chain cost diagrams for both gasoline and diesel is depicted in Figures 7b1 and 7b2 of Appendix F. The gasoline wholesale differential increases by 5.1 cpl while there is a slight decrease in the recommended diesel fuel differential.

Zone 10 – Labrador Straits: - By averaging of the marine freight and the operation costs of the marine depots in this area, the total cost of product delivered to retail outlets is calculated at 2.1 cpl less than the existing differentials for both gasoline and diesel fuel. However, the use of a dedicated vehicle for gasoline deliveries is the reason the cost for gasoline is reduced by only 0.8 cpl.

Zone 11 – Lodge Bay to Cartwright: - The increase in differential of 2.1 cpl for gasoline is primarily due to the required use of a dedicated tank wagon vehicle to deliver gasoline to the small volume retail outlets throughout the area.

Zone 12 – Central Labrador – The decrease in the recommended gasoline and diesel differentials in this zone is primarily due to a reduction in marine freight as determined in this Study.

B. Pricing Differentials for Distillate Home Heating Fuels Zones

Table 14 on the following page recaps the total estimated cost for the delivery of distillate home heating fuels to households in each of the recommended zones and sub-zones for the province. The cost of delivering furnace oil to customers in Zone 1 – Avalon North East, (the Base Zone) from marine tanker freight through to tank-wagon delivery to households is calculated to be an average of 5.12 cents per litre. This number, and all delivered costs for each Zone shown in the first column of figures in Table 14 are taken from the last column of Table 11, previously presented.

The next column of figures in Table 14 gives the indicated price differentials from the base zone as calculated through the processes used in this Study. The third column of figures shows the price differentials between each zone and the base zone as they currently exist in the PPPC maximum allowable price tables.

The fourth column of figures gives the rounded price zone differentials that this cost Study indicates should be applied in each case. These are the revised differentials recommended by the Consulting Team based on the cost differences of providing product in each zone. The final column in Table 14 indicates the resultant changes from the existing differentials for each zone and sub-zone. With but two exceptions, the recommended zone price differential changes are higher than they have been.

The costs calculated for home heating fuels (furnace and stove oil), are those at the retail level, i.e. to the consumer's storage tank, as opposed to the numbers for gasoline, which are the laid-in wholesale costs to the retailer before the retail margin is added.

The high differential cited for Zone 11b is that for a new zone that does not now exist, and where drum deliveries, as suggested, may never be implemented. The cost figures indicate that if the drum deliveries were put in place for these communities, this would be the differential necessary to cover the costs incurred in providing the service.

The supply of home heating fuels to households is a very detailed, time consuming, and demanding business. It has become even more so with each passing year with out migration from rural parts of the province, and the installation of electric heat in almost every new home that is being built or replaced. Volumes of oil consumed per household have also decreased with supplemental heat provided by wood stoves. This is not a new phenomenon in the province, but as household incomes in many cases remain static at best, any increases in the costs of heating fuels will also tend to further cut back consumption.

The costs calculated for home heat deliveries are therefore bare minimums and do not provide for inflation, contribution to overhead, nor return on investment for the supply chain participants in the business. All these elements are supposedly covered in the base fuel price. There is general concern that, given all the downsides of the home heat business, notwithstanding the increased differentials recommended by this report, unless other measures are taken, specifically an increase in the maximum base price, many home heating businesses in the province may well cease to exist over the next few years. Specifically, a detailed analysis of the margins that resellers have between their rack pick-up price, and the maximum allowable retail price to consumers, should be undertaken to evaluate and quantify all costs and the economic viability of their operations.

Storage and Distribution

Table 14

Recommended Adjustments to Home Heating Fuels - Zone Definitions and Zone Differentials to Retail Points of Sale

Home Heating Fuels (Distillates)				Average Delivered Cost to Households for Area (Retail Point of Sale)	Indicated Total Differential from Retail Price Base Zone	Existing Differential from Base Zone Retail Price Fuel	Recommended Differential from Avalon North East Base Zone	Recommended Change In Differential for Zone
Zone	**Sub**	**Supply Point and Methods**		**CPL**	**CPL**	**CPL**	**CPL**	**CPL**
1	**ANE**	**Avalon North East (Base Zone)**	Ex Marine Terminals	(Weighted Average)				
			From Come by Chance	**5.12**	**N/A**	**0.00**		
1	**ANW**	Avalon North West		**8.02**	**2.91**	**0.0**	**2.9**	**2.9**
1	**AS**	Avalon South		**9.26**	**4.15**	**0.0**	**4.1**	**4.1**
1	**a**	*Bell Island*		*9.45*	*4.33*	*2.0*	*4.3*	*2.3*
2		Burin and Bonavista Peninsulas		**9.21**	**4.09**	**2.0**	**4.1**	**2.1**
3		Central Newfoundland from Avalon Peninsula		**8.86**	**3.74**	**2.5**	**3.7**	**1.2**
3	**a**	St. Brendan's from Avalon Peninsula (Existing)		**12.23**	**7.11**	**6.0**	**7.1**	**1.1**
3	**b**	Fogo Island from Avalon Peninsula (Existing)		**11.64**	**6.52**	**3.5**	**6.5**	**3.0**
3	**c**	Change Islands - from Fogo BP via TW (Existing)		**14.42**	**9.30**	**5.5**	**9.3**	**3.8**
4		Connaigre Peninsula from Avalon (Existing)		**11.79**	**6.67**	**4.0**	**6.7**	**2.7**
4	**a**	Gaultois-McCallum-Rencontre East (Drums)		**21.67**	**16.55**	**9.0**	**16.6**	**7.6**
5		Springdale-Baie Verte from Springdale BP		**9.43**	**4.31**	**3.0**	**4.3**	**1.3**
5	**a**	Long Island via T/W Ex Springdale Bulk Plant		**10.15**	**5.03**	**4.5**	**5.0**	**0.5**
5	**b**	Little Bay Islands via T/W ex Springdale BP		**10.59**	**5.47**	**5.0**	**5.5**	**0.5**
6		Corner Brook Area		**6.03**	**0.91**	**0.0**	**0.9**	**0.9**
7	**W**	Stephenville and Port aux Basques		**9.18**	**4.06**	**3.0**	**4.1**	**1.1**
7	**SE**	Burgeo		**11.61**	**6.49**	**3.0**	**6.5**	**3.5**
7	**a**	Ramea		**15.39**	**10.27**	**7.0**	**10.3**	**3.3**
7	**b**	Grey River/La Poile/Grand Bruit/Francois (Drums)		**21.08**	**15.96**	**9.0**	**16.0**	**7.0**
8		Northern Peninsula South		**7.05**	**1.93**	**1.5**	**1.9**	**0.4**
9		Northern Peninsula North		**11.29**	**6.17**	**4.0**	**6.2**	**2.2**
10		Labrador-The Straits (Stove Oil Only)		**12.66**	**7.54**	**7.5**	**7.5**	**0.0**
11		Mary's Harbour-Cartwright Area (Stove Oil Only)		**20.38**	**15.26**	**12.5**	**15.3**	**2.8**
11	**a**	Labrador Coast- South (Isolated Marine Depots[1]) Stove Oil Only		**30.73**	**25.61**	**18.0**	**25.6**	**7.6**
11	**b**	*Labrador Coast- South (Isolated Communities -Drum Deliveries via Coastal Freight Ferry) Stove Oil Only*		*40.32*	*35.20*	*N/A*	*35.2*	*N/A*
12		Central Labrador (Goose Bay and Area) Stove Oil Only		**8.35**	**3.23**	**4.5**	**3.2**	**-1.3**
13		Western Labrador (Labrador City / Wabush) Stove Oil Only		**N/A**	**N/A**	**4.0**	**4.0**	**0.0**
13	**a**	*Churchill Falls - Stove Oil only*		*N/A*	*N/A*	*7.0*	*7.0.*	*0.0*
14		Labrador Coast - North (Isolated Marine Depots[1]) Stove Oil Only		**30.73**	**25.61**	**18.0**	**25.6**	**7.6**

Notes: 1. Cost does not include delivery to households, only filling customer's drums or other containers at depot.

2. Italicised entries are calculations for deliveries that would be made if the delivery methods indicted were adopted.

With respect to the delivered cost of stove oil to consumers in Labrador, the existing differential from the base zone is a 4.5 cpl differential added to the base price of furnace oil plus the location differential calculated in this Study. It is understood that the 4.5 cpl retail differential between furnace and stove oil was initially established to accommodate both the

basic differential between the products, plus provide an appropriate allowance to cover product segregation and the cost of small deliveries of stove oil to more remote customers. Since stove oil is the only distillate heating fuel product used in Labrador, it could be justifiably argued that the portion of the cost allowance for segregation and small deliveries should be removed from the delivered price. If this practice were implemented, the product cost difference of 4.5 cpl would be reduced to 3.0 cpl, being the current rack price difference between the products. This would reduce the price of stove oil by 1.5 cpl throughout Labrador.

Heating Fuels - Notes on recommended price changes greater than 2.0 cpl:

Zone 1ANW – Avalon North West - This newly recommended pricing zone recognizes the necessity of having a local bulk storage plant in the area in order to properly service the heating fuel market. There are now three existing bulk plants in the proposed zone. (See Figure 1-ANW in Appendix K for costing details)

Zone 1AS – Avalon South - This newly recommended zone also recognizes the necessity of having a local bulk storage plants in the area in order to properly service the heating fuel market. While some of the additional differential for Zone 1- Avalon North East of 4.1 cpl is due to bulk plant operations, a significant portion is due to the higher cost of tank wagon delivery throughout this dispersed area. (See Figure H1-AS of Appendix K)

Zone 1a – Bell Island - To ensure security of supply during the winter months, a bulk plant is necessary for this sub-zone. The recommended pricing differential increase of 2.3 cpl provides for a small bulk plant.

Zone 2 – Burin and Bonavista Peninsulas – The requirement of local area bulk plants for the majority of supply in this Zone and relatively high local delivery costs account for the recommended increase of 2.1 cpl in the existing differentials.

Zone 3b – Fogo Island: - Heating fuels for this market are primarily delivered to local bulk plants via tractor trailer from the Avalon and Come by Chance terminals. They are then delivered to local households by tank wagons. As detailed in Figure H3b of Appendix K, the cost of both these trucking operations dictate that the pricing differential be increased by 3.0 cpl.

Zone 3c – Change Islands: - Heating fuel for Change Islands is delivered by tank wagon via ferry from the Fogo Island bulk plants. The recommended price differential of an additional 3.8 cpl recognizes the costs involved with this supply method. (See Figure H 3c, Appendix K).

Zone 4 – Connaigre Peninsula: - A significant volume of the home heat supply for this market comes from the bulk plant at the Pool's Cove crossroads This plant is supplied via tractor trailer from the Avalon Peninsula. The fuels are then delivered to households via tank wagon. The recommended differential takes into account all costs elements for this supply chain, which is depicted in Figure H4, Appendix K.

Zone 4a – Drums to remote communities from the Connaigre Peninsula: - The cost of delivering drums of heating fuel to remote communities via freight ferry plus a suggested 10.0 cpl retail margin allowance for handling the drums at the destination community adds up to significantly more than the existing differential. Suppliers in these communities have complained that the existing margin does not allow them to break even, but they continue supply as a service to the people in their community. The Consulting Team agrees that the total allowable margin should be increased to that indicated, albeit it is, in the case of this Zone 4a, an increase in the maximum retail price of 7.6 cpl. (See Figure H4a, Appendix K for supply chain details)

Zone 7SE – Burgeo: - This newly proposed zone is separated from the existing Zone 7 due to the higher cost of bulk plant operation and tank wagon delivery operations on a cents per litre basis due to the lower volume involved. As can be seen from Figures H7-W and H7-SE in Appendix K, the laid-in cost to consumer household tanks is 11.61 in the Burgeo zone versus 9.18 in the balance of area of Zone 7. This is the reason the separate zones are being recommended with an increased differential for the Burgeo Zone of 3.5 cpl.

Zone 7a – Ramea: - Heating fuel for the Island of Ramea has to be delivery by tank wagon and ferry from the bulk plant in Burgeo. As shown in Table H-7a of Appendix H, to make all household deliveries requires that the truck and driver overnight in Ramea in order to finish deliveries the following day before boarding the return ferry. This increases the cost of supplying heating fuel substantially and justifies the 3.3 cpl increase in the existing differential.

Zone 7b – Drums to remote communities from Burgeo: - The recommended differentials for these drum deliveries are calculated in Table H-7b of Appendix H and all cost elements of the supply chain are depicted in Figure H7-b of Appendix K. As was the case described for drum deliveries from the Connaigre Peninsula, here too a significant additional differential of 7.0 cpl is being recommended to cover all costs involved.

Zone 9 - Northern Peninsula North: - The requirement of local area bulk plants for heating fuel supply throughout this Zone and the relatively high local delivery costs account for the recommended increase of 2.2 cpl in the existing differentials.

Zone 11 – Lodge Bay to Cartwright: - The increase in differential of 2.8 cpl for stove oil reflects the recalculated increased operating costs for bulk plants and marine depots in this area.

Zones 11a and 14 – Labrador South and Labrador North – Isolated Communities – The current 18.0 cpl differential allowed for these zones is insufficient to cover the operating costs of these relatively low volume depots. In order to provide a 10.0 cpl dispensing fee to cover the operator's wages, an overall increase in the allowable differential of 7.6 cpl is required.

C. Pricing Differentials for Propane Heating Fuels Zones

A summary of the calculated costs of propane deliveries to each zone was presented in Table 12. These figures are the basis for the various price differentials for propane used for home heating purposes where tank wagon delivery is available throughout the province.

In Table 15 below, these costs are compared with current zone differentials. As indicated, the only significant variance is that for Zone 9, resulting in a recommended increase of 1.0 cpl for that zone. No change in zone boundaries is recommended for propane.

Storage and Distribution Study

Table 15

Recommended Changes to Zone Price Differentials for Propane Heating Fuel

Heating Fuels - Residential Propane		Current Zone Price Differentials from Base Zone 2	Total Estimated Delivered Cost to Households Above Base Zone Delivered Cost	Recommended Revised Zone Price Differentials	Recommended Change From Current Differential
Zone	Zone Geographic Area	CPL	CPL	CPL	CPL
1	St. John's & Avalon	2.0	1.9	**2.0**	**0.0**
1a	Bell Island	3.0	3.0	**3.0**	**0.0**
2	Clarenville/ Burin-Bonavista Peninsulas **(Base Zone)**	**0.0**	**0.0**	**0.0**	**0.0**
3	Central Newfoundland - Glovertown to Buchans	2.5	2.6	**2.5**	**0.0**
3a	St. Brendan's (Island)	N/A	N/A	N/A	N/A
3b	Fogo Island	N/A	N/A	N/A	N/A
3c	Change Islands	N/A	N/A	N/A	N/A
4	Connaigre Peninsula	3.5	3.4	**3.5**	**0.0**
4a	Gaultois to Francois / Rencontre East	N/A	N/A	N/A	N/A
5	Springdale & Baie Verte Peninsula	3.5	3.2	**3.5**	**0.0**
5a	Long Island	N/A	N/A	N/A	N/A
5b	Little Bay Island	N/A	N/A	N/A	N/A
6	Deer Lake - Corner Brook Areas	4.0	4.2	**4.0**	**0.0**
7	Gallants to Port aux Basques / Burgeo	5.0	5.4	**5.0**	**0.0**
7a	Ramea	N/A	N/A	N/A	N/A
7b	Grey River/ Grand Bruit / La Poile	N/A	N/A	N/A	N/A
8	Northern Peninsula - Gros Morne to Belburns	5.0	5.2	**5.0**	**0.0**
9	Northern Peninsula - to Englee and St. Anthony	6.0	7.1	**7.0**	**1.0**
10	Labrador Straits - L'Anse au Clair to Red Bay	N/A	N/A	N/A	N/A
11	Mary's Harbour to Cartwright (Road Access)	N/A	N/A	N/A	N/A
11a	Coastal Labrador – South (Isolated Marine Depots)	N/A	N/A	N/A	N/A
11b	Coastal Labrador – South (No Marine Depots)	N/A	N/A	N/A	N/A
12	Central Labrador - Goose Bay Area	N/A	N/A	N/A	N/A
13	Western Labrador - Labrador City / Wabush	N/A	N/A	N/A	N/A
13a	Churchill Falls	N/A	N/A	N/A	N/A
14	Coastal Labrador – North (Isolated Marine Depots)	N/A	N/A	N/A	N/A