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THE CANADIAN ARCTIC GAS PIPELINE Prudhoe '81 Cross Delta Route

ARCTIC OCEAN TRANSPORTATION PLAN for The Carriage of Line Pipe and Construction and Related Materials to Arctic Coast and MacKenzie Delta Sites

Calgary, Alberta: October 1, 1975

UNIVERSITY OF ALASKA



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PREAMBLE AND SUMMARY

The ensuing Transportation Plan has been prepared in response to a request to ATL by Canadian Arctic Gas Study Limited to examine the relevant factors relating to the ocean tug and barge transportation of approximately 990,000 tons of pipeline, construction and related materials to five Arctic coast and six MacKenzie Delta staging sites over a three year period beginning in 1978. This tonnage represents the total material requirements for those portions of the Canadian Arctic Gas Pipeline — Prudhoe '81 Cross Delta Route, which run from Prudhoe Bay to the Tununuk junction and from Richard's Island to Inuvik.

It is understood that the purpose of this Transportation Plan is to aid CAGSL in determining if it is operationally feasible and economically effective to plan on carrying significant quantities of CAGPL cargo by ocean barges via "the Northern Gateway" (around the "top" of Alaska) and, if so, to what extent.

By way of introduction, Arctic Transportation Ltd. (ATL) is a Canadian marine transportation company owned by Seaspan International of Vancouver, Federal Commerce and Navigation of Montreal and Crowley Maritime Corp. — Offshore Division of Seattle; each of the "parent" companies hold equal one-third interests in ATL. Seaspan is the largest tug and barge operator in Canada; Federal Commerce is a major international deep sea shipping company, and Crowley Maritime is a large international tug and barge company based in the United States. All three companies have extensive Arctic experience; and in particular, Crowley Maritime through a subsidiary, Arctic Marine Freighters, has many years of experience in carrying large volumes of cargo from the West Coast and Japan to Arctic coast discharge sites.

ATL has put together a Transportation Plan, which is described in the ensuing sections of this Report, based upon the parameters provided by CAGSL. In it, ATL suggests that it is operationally feasible and cost effective to carry the specified tonnages to the various Arctic coast and MacKenzie Delta sites, via "the Northern Gateway", utilizing ocean tugs and barges.

The operations, as described in Section II of this Report, are based on the use of ocean barges (to 400' x 100') and large ocean tugs (to 9,000 h.p.) for the carriage of the cargo from the Vancouver-Seattle area and from Japan to the various Arctic staging areas. The operations plan is based upon providing a complete "door-to-door" Arctic transportation service including receiving, storing and loading cargo at the various ports of origin, ocean transportation, discharging at Arctic locations and trucking and placing cargo at specific staging sites according to CAGPL instructions. Included in the operations plan is a complete description of the Arctic discharge operations which, in most cases, involve a lightering operation using small shallow draft barges to carry the cargo from the huge ocean barges to portable docks at shoreside.

The ocean tug and barge method of carrying large quantities of cargo to the Arctic via "the Northern Gateway" is well established. From 1958 until 1967 general cargo and bulk petroleum was delivered to points along the Arctic coast, principally in support of DEW line construction and other military requirements. From 1968, Arctic Marine Freighters and, since 1972, Arctic Transportation Ltd. have delivered large quantities of cargo to Prudhoe Bay and other Arctic sites, including Tuktoyaktuk. These operations have been principally in support of oil and gas exploration and development programs. However, it is of interest to note that in 1970, 115,000 tons of 48" O.D. pipe were delivered to Prudhoe Bay for what is now the Alyeska Pipeline. In each year of operation from 1958 through 1974, all cargoes carried to the Arctic have been delivered safely and on time, i.e. 17 consecutive years of successful operations.

Within this historical context, Section III of this report outlines some of the advantages inherent in the "Northern Gateway" Tug and Barge method, such as:

1. This method is well proven — similar cargo categories and quantities per discharge site have been carried to the Arctic coast in previous years.
2. This method provides a "door-to-door" service from load port to Arctic staging pad.
3. This method can handle all cargo categories, including large O.D. line pipe, bulk petroleum and prefabricated compressor stations and gas plants.
4. This method does not require coordination between various transportation modes, such as ocean shipping, railroads, river barging and trucking.

5. This method is supported by the fact that ATL and its "parent" companies are rapidly expanding their respective tug and barge fleets and, further, that ATL has the experience, the financial strength, and the equipment and personnel resources to undertake successfully this massive project.

ATL, as the carrier, undertakes all functions in providing this "door-to-door" Arctic transportation service. The freight rates, which are summarized hereunder, reflect the all-inclusive price for the full service of carrying cargo to the CAGPL staging pad.

**Per Short Ton of 2,000 Pounds of Deadweight Cargo
Basis 1975 Costs and Conditions**

Seattle Cargo	Cdn \$254.00
Vancouver Cargo	Cdn \$259.00
Japan Cargo	Cdn \$274.00

Deadweight cargo is heavy in terms of the cubic volume required to stow the cargo aboard a barge. This type of cargo enables the carrier to utilize fully the carrying capacity of ocean barge equipment; examples of deadweight cargo are pipe and bulk fuel, which incidentally accounts for 846,500 tons of the total tonnage (as identified by CAGSL for this Transportation Plan) of 990,000 tons.

Non-deadweight cargoes, such as mobile camps, construction equipment and insulation, do not enable the carrier to utilize fully the total lifting capacity of ocean barge equipment. Therefore, in the interest of assigning proper value to the cost of carrying "high cubic" cargoes, the freight cost for non-deadweight cargoes is calculated on the basis of multiplying the deadweight cargo freight rate by 90% of the deadweight capacity of the barge which is being occupied by the cargo.

With respect to lead time, it is suggested that CAGSL use 18 months as a reasonable period to allow ATL to gear up for the CAGPL requirement.

ATL is ready to discuss contractual arrangements with CAGSL at the earliest opportunity; further, ATL is willing to contract with CAGSL on a firm basis subject only to CAGPL receiving the necessary regulatory approvals.

It is respectfully suggested that ATL's "Northern Gateway" Tug and Barge transportation method, which is described in the subsequent sections of this Report, is worthy of consideration as the primary method for carriage of the cargo specified by CAGSL in the parameters for this Transportation Plan. It is well recognized that transportation considerations respecting the Canadian Arctic Gas Pipeline could change markedly during the next few months; accordingly, ATL stands ready to alter or amend this Transportation Plan as required.

MARINE TRANSPORT OPERATIONS — SUMMARY

As mentioned previously, ATL is in the business of providing a “door-to-door” Arctic marine transportation service for the carriage of pipeline and oilfield materials to Arctic coast and MacKenzie Delta destinations.

The essential elements of the ocean transportation or linehaul function, are the large ocean going tugs and mammoth ocean barges (some of the largest in the world). The barges are capable of carrying large quantities of line pipe, bulk petroleum, general cargo of all descriptions and large modules, such as complete pre-fabricated gas plants. Typically, cargo is loaded during the months of March through June of each year at ports on the west coast of North America, in countries on the Pacific Rim and in some cases, in the U.S. Gulf.

Once loaded, the barges are towed by the ocean tugs, in a convoy, via the Bering Sea to Point Barrow. The polar ice cap usually moves offshore from this point on the Arctic coast around August 1 and normally remains offshore for approximately six weeks. Once the ice has moved sufficiently offshore, the shallow draft tug and barge armada travels eastward to the various Arctic coast and MacKenzie Delta sites.

The barges are discharged, the cargo is placed in storage at each staging site and the convoy returns past Point Barrow on its way to the home ports of Seattle and Vancouver.

Normally the cargo on large barges is discharged to shallow draft lighter barges, which in turn carry the cargo through the shallow waters of the Arctic coast to ATL's own portable docks. At this point the cargo is lifted from the lighter barges and placed on trucks for the trip to the storage/staging site.

The foregoing is a very brief summary of the method which ATL suggests is the most effective available for ensuring the safe and timely carriage of the cargo, as described on the subsequent page, to the specified Arctic staging sites. The remainder of Section II, **Marine Transport Operations**, provides a detailed description of how this method would be applied to the particular Canadian Arctic Gas project at hand.

While the ensuing description is by necessity an overview, it is, nevertheless, sufficient to explain all major operational functions and to identify, fairly precisely, the manpower and equipment requirements necessary to undertake this project.

Please see the following page for a breakdown of the cargo tonnages which, for the purposes of this Transportation Plan, have been identified for carriage by ocean going barges.

**CANADIAN ARCTIC GAS STUDY LTD.
Prudhoe '81 Cross Delta Route**

Cargo Tonnages Identified for Carriage by Ocean
Going Barges Via Point Barrow
(short tons)

<u>Cargo Category</u>	<u>Year 1 1978</u>	<u>Year 2 1979</u>	<u>Year 3 1980</u>	<u>Totals by Category</u>
Pipe	213,559.2	191,638.2	144,378.0	549,575.4
Permanent Station Equip.	—	12,386.0	1,158.0	13,544.0
Diesel Fuel	69,987.0	92,515.5	63,412.5	225,915.0
Gasoline	10,782.0	12,608.0	12,428.5	35,818.5
Aviation Fuel	760.0	4,665.0	1,775.0	7,200.0
Heating Fuel	7,656.0	10,504.0	9,864.0	28,024.0
Sub total — Fuel Cargo	89,185.0	120,292.5	87,480.0	296,957.5
Propane	3,588.3	4,361.7	3,379.5	11,329.5
Lubricants, Methanol and Replacement Parts	5,205.95	5,584.85	1,349.6	12,140.4
Construction Materials	18,894.25	21,399.05	21,550.2	61,843.5
Construction Equipment	14,500.0	14,500.0	—	29,000.0
Food	468.75	441.25	780.0	1,690.0
Camp	6,294.7	7,881.20	—	14,175.9
TOTALS BY YEAR	351,696.15	378,484.75	260,075.3	990,256.2

For a Breakdown of the above tonnages, by staging site, please see Appendix I.

LOADING OPERATIONS

It has been assumed that the primary loading berths will be located in the Vancouver-Seattle area and in Japanese ports. Notwithstanding this assumption, it is well recognized that in the final course of events, other load ports may come into the picture.

Both Vancouver and Seattle have excellent facilities and adequate cargo marshalling areas for receiving the specified cargo and for loading the mammoth barges.

Two of the ATL partners, Crowley Maritime Corporation and Seaspan International Ltd., are among the largest tug and barge operators in North America and are based in Seattle and Vancouver respectively. Therefore, it is significant to note that the ATL personnel resources, which are available for Vancouver-Seattle barge loading operations for this project, are substantial.

With regard to load ports in Japan, the third ATL partner, Federal Commerce and Navigation of Montreal, maintains a fully staffed office in Tokyo to handle the local day-to-day affairs of this large international deep sea shipping company. The resources provided by this office are normally augmented by cargo superintendents from Canada and the U.S., during the time in which actual barge loading takes place.

Cargo stowage planning is an essential function upon which the success of the entire Arctic sealift is dependent. Each individual piece of cargo is accounted for and included in the stowage plans with a view to achieving maximum cargo weight per barge and, perhaps most important of all, to achieving a cargo pattern on each barge which allows for the most rapid Arctic discharge possible.

Due to the substantial cargo quantities involved and the painstaking detail which is inherent in the loading operations, approximately four months of each year are set aside for the loading function. Typically, these months are March through June and, accordingly, all cargo which is destined for Arctic delivery in a given year should be delivered to the load port fairly evenly over the period mid-February through mid-June. Further, the cargo mix (i.e. high weight-low volume together with low weight-high volume) must be such that it allows for optimizing the loading sequence of the entire barge fleet.

Each category of cargo has certain characteristics which are particularly germane to stowage considerations. For example, line pipe and bulk petroleum are generally deadweight cargoes, i.e. barges can be loaded with these cargoes, which have high weight to volume ratios, to their maximum weight carrying capacities. On the other hand, camp units, construction equipment and large modules are considered cubic cargoes; i.e. barges can be loaded with these deck cargoes, which have high volume to weight ratios, to an extent limited by cargo safety and barge stability. Wherever possible, cubic cargoes are augmented with deadweight cargoes in order to maximize each barge's lifting capacity.

For a visual impression, and thereby a better understanding, of how each category of cargo is stowed on a barge, please refer to the following six photographic illustrations which are captioned:

- Full Cargoes of 48" Line Pipe.
- A Cargo of ATCO Camp Units.
- A Full Deck Cargo of Heavy Construction Equipment.
- Loading of a Power Station Module with Crawler Transporters.
- Loading of General Cargo in Seattle.
- A 400' Barge Being Loaded at Crowley Maritime's Pier 128.



Full Cargoes of 48" Line Pipe.



A Cargo of ATCO Camp Units.



A Full Deck Cargo of Heavy Construction Equipment.



Loading of a Power Station Module with Crawler Transporters.



Loading of General Cargo in Seattle.



A 400' Barge Being Loaded at Crowley Maritime's Pier 128.

**OCEAN LINEHAUL TUG AND
BARGE OPERATIONS**

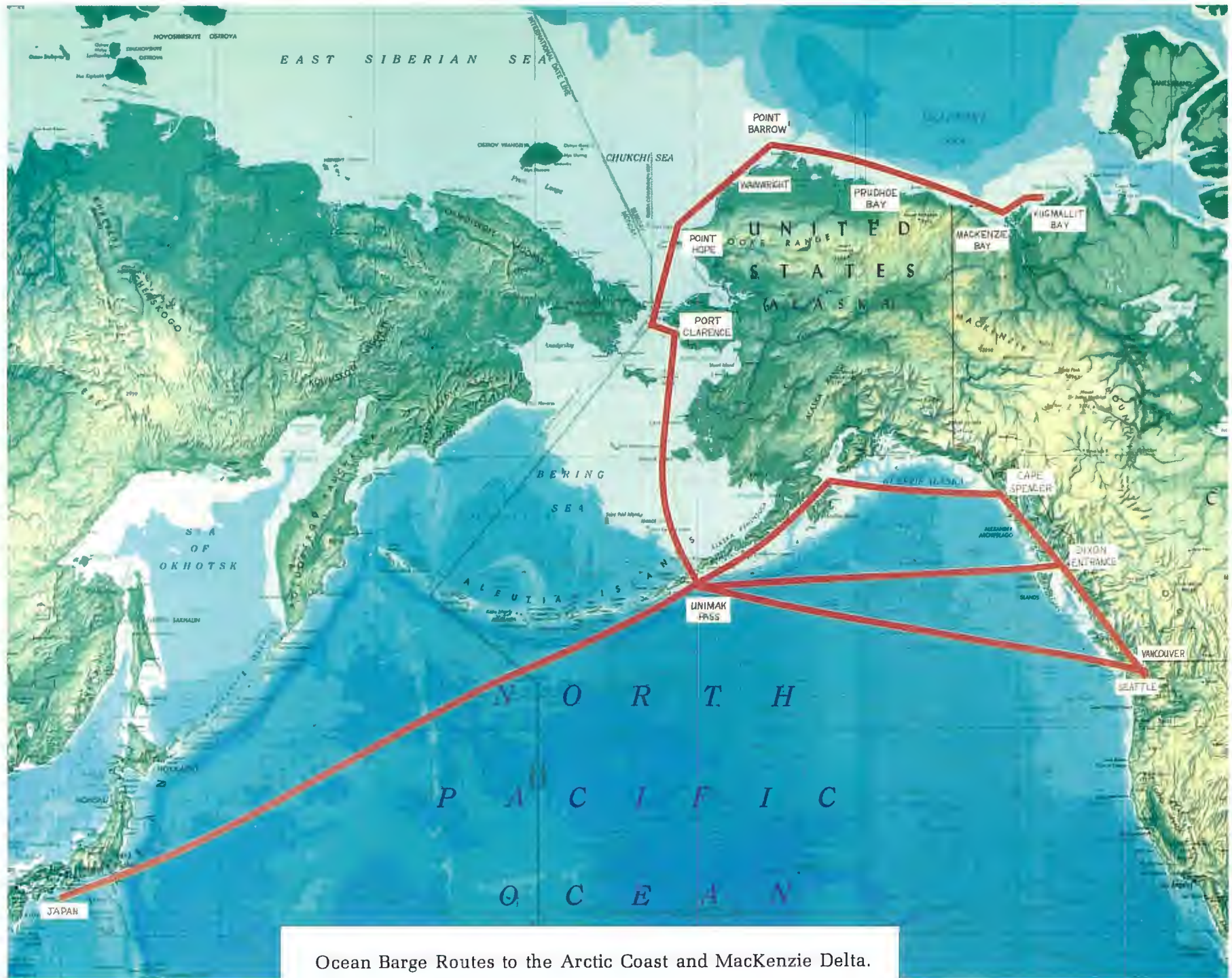
The ocean transportation operating season in the Western Arctic typically begins around August 1 and extends through to approximately September 15 (about six weeks); however, these dates can vary from year to year. As mentioned earlier, the controlling factor which causes such a short season is the polar ice cap which is moved offshore from Point Barrow each year by favourable temperatures and winds.

It is essential that the convoy be in a position to enter the Arctic Ocean east of Point Barrow at first sight of the ice cap's movement. Accordingly, the linehaul operations plan is directed to ensuring the entire floating equipment fleet is as close to Point Barrow, as ice conditions will permit, by July 25.

Normally, linehaul tugs and barges sail from West Coast and Japanese ports during the latter part of May and through the full month of June.

In the case of West Coast load ports, the tugs and barges sail northwest along the British Columbia coast to Cape Spencer, then proceed west across the Gulf of Alaska to the north end of Kodiak Island in the Aleutian chain and from there follow these islands to Unimak Pass. In some cases, depending upon cargo type and weather conditions, the tugs and barges may sail directly from Vancouver-Seattle to Unimak Pass, or follow the British Columbia coast to Dixon Entrance off Prince Rupert and from there travel across the Gulf of Alaska to Unimak Pass. Once at Unimak Pass the tugs and barges sail into the Bering Sea and proceed north toward the Bering Strait to Port Clarence, Alaska. In the case of Japanese load ports, the tugs and barges sail northeast to the western portion of the Aleutian Islands, and follow this chain east northeast to Unimak Pass; at this point, the convoy turns north and proceeds to Port Clarence.

At Port Clarence the majority of the linehaul tugs and barges are marshalled into an armada between July 10 and July 20. The armada then departs Port Clarence and proceeds north through the Bering Strait past Port Hope, Alaska to a location as close to Point Barrow as permitted by ice conditions; this location is usually Wainwright, Alaska. Here the armada waits until it can sail through the shallow coastal waters, past the polar ice pack and into the Arctic Ocean to reach the coastal and MacKenzie Delta discharge sites. Please see the following photographic illustration, which is captioned "Ocean Barge Routes to the Arctic Coast and MacKenzie Delta".



Ocean Barge Routes to the Arctic Coast and MacKenzie Delta.

As a general rule, cargo destined for the most easterly staging sites is discharged first. The discharging operations tend to move westward, i.e. MacKenzie Delta Sites — Shingle Point — Komakuk Beach — Demarcation Bay — Camden Bay — Prudhoe Bay, in order to be as close to Point Barrow as practicable when the departure date nears. This modus operandi is, of course, highly subject to ice conditions and can vary a great deal from year to year.

It is important to note that as soon as a linehaul barge has completed discharging it is towed out of the Arctic Ocean, west past Point Barrow, to a safe anchorage. This procedure simply increases the margin of safety built into an ATL sealift; for as a standard practice, discharging plans are made and sufficient resources are marshalled to ensure that all discharging is completed within a 20 day working period. Within the context of a normal operating season of 6 weeks, a 20 day working period is sufficient to ensure that the linehaul tug and barge equipment is able to sail westward past Point Barrow before the polar ice cap becomes fast against the Arctic shoreline. Once the fleet is past Point Barrow, it retraces the sea route to the West Coast ports where service and maintenance is effected and plans are made in preparation for next year's sealift.

After reading the foregoing, it may seem that allowances for ice conditions are somewhat excessive but the risks associated with Arctic operations are great. The risk of ice damage is ever-present, but the risk of having even a part of the floating equipment fleet caught east of Point Barrow after the ice cap has moved back to the shore — thereby effectively precluding use of that equipment in the subsequent year's sealift — is much more significant in terms of potential losses. In the 17 consecutive years (through 1974) that the tug and barge method has been utilized in the carriage of cargo to Arctic coast destinations via the "Northern Gateway", all cargoes have been delivered and there has not been a single case where equipment was caught in the Arctic for the winter. This excellent record is, in part, attributable to the equipment and personnel allowances which are built in, as a standard practice, to Arctic Ocean operations.

The linehaul tug and barge unit configuration is generally one tug towing two barges. The ocean going tugs range up to 9,000 horsepower, making them some of the most powerful in the world. The linehaul ocean barges range up to 17,000 tons deadweight capacity (12,000 tons when used for Arctic operations due to draft limitations along the Arctic Coast) and are 400 feet long (longer than a football field) by 100 feet wide. For a visual illustration of ocean linehaul equipment, please refer to the photographic illustrations, which are captioned:

- "Navigator" — A 9,000 h.p. Ocean Tug.
- An Ocean Tug Towing a Barge (336' x 98') Loaded with General Cargo and a Barge (400' x 76') Loaded with Line Pipe.
- A Tandem Tow Proceeding Through Ice Floes off the Arctic Coast.
- The West Coast Departure of a 400' Barge Loaded with Light Vehicles and Gas Facility Modules, Two of which are 97' High. Harbour Assistance is Being Provided by a 1,500 h.p. Lighter Tug.



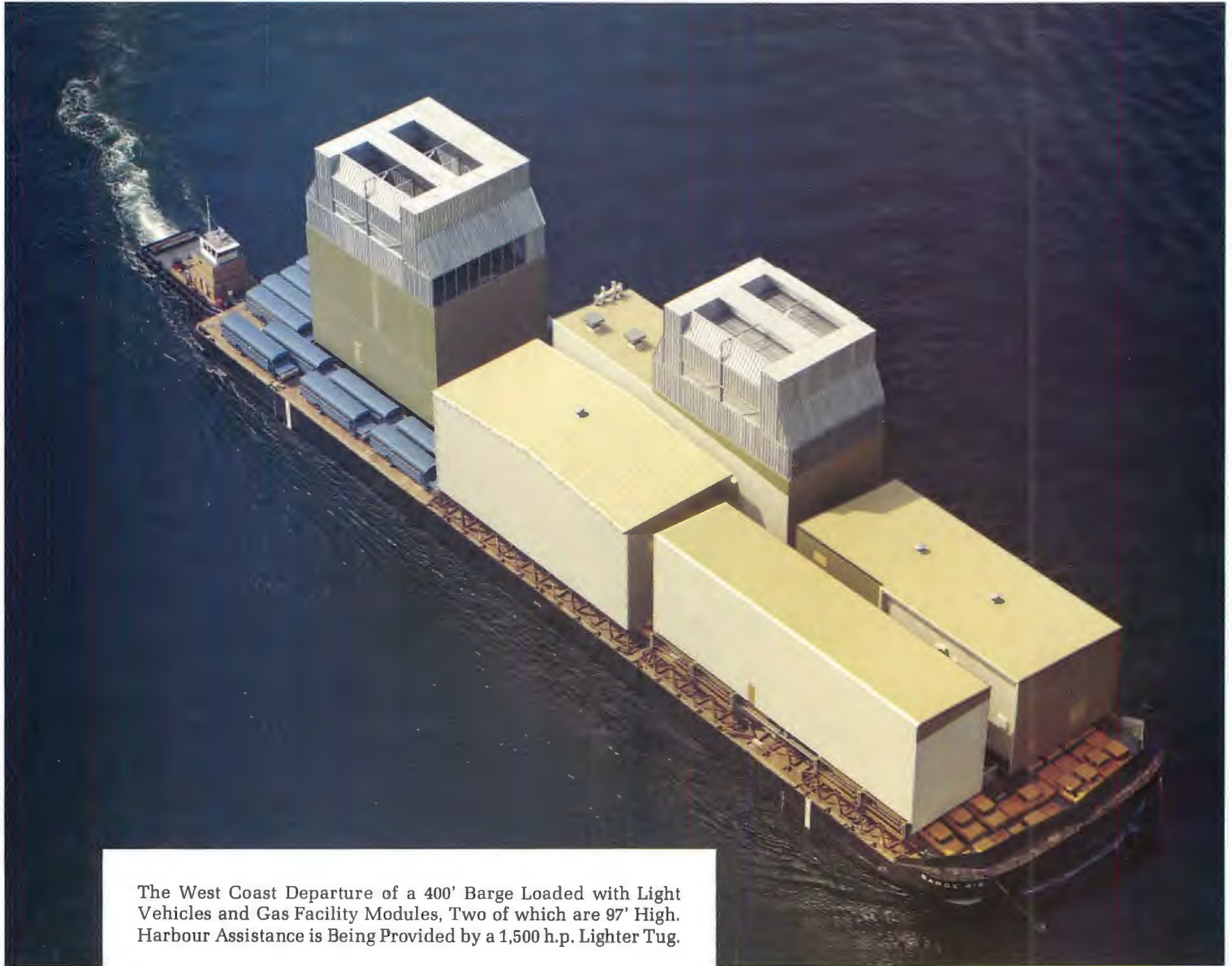
"Navigator" — A 9,000 h.p. Ocean Tug.



An Ocean Tug Towing a Barge (336' x 98') Loaded with General Cargo and a Barge (400' x 76') Loaded with Line Pipe.



A Tandem Tow Proceeding Through Ice Floes off the Arctic Coast.



The West Coast Departure of a 400' Barge Loaded with Light Vehicles and Gas Facility Modules, Two of which are 97' High. Harbour Assistance is Being Provided by a 1,500 h.p. Lighter Tug.

An integral part of this Arctic Ocean Transportation Plan is, of course, the assessment of the total annual requirements for ocean going tugs and barges needed to perform the linehaul function of carrying the specified tonnage to the Arctic coast and MacKenzie Delta discharge sites.

However, before the ocean tug and barge requirement can be assessed, it is necessary to identify the total number of lighter barges required for the Arctic discharge operations. The lighter barges, in their first year of operation, serve the dual role of linehaul (ocean) carrier and lighterage vessel. While the lighter barges are small, with a total deadweight capacity of approximately 2,750 tons (2,000 tons when being used in an ocean linehaul configuration), it makes good sense to utilize their available capacity. They must be towed to the Arctic in any case and using their available capacity effectively maximizes the total cargo capability of the floating equipment fleet.

The subsequent Section IIC **Arctic Discharge and Staging Operations**, identifies the total number of lighter barges required by year. In the interest of simplicity and clarity, these lighter barges will be referred to in the following subsection **Linehaul Tug and Barge Requirements** as 2,000 ton linehaul barges.

LINEHAUL TUG AND BARGE REQUIREMENT

1978 (Year 1): Total Cargo 351,696 Tons

It has been estimated that the following tug and barge equipment will be required to effect carriage of this 1978 cargo:

- 34 Large Ocean Linehaul Barges with 12,000 Tons Deadweight
- 30 Linehaul Barges with 2,000 Tons Deadweight
- 64 Total Linehaul Barges
- 34 Ocean Linehaul Tugs up to 9,000 hp.

A total of 30 tugs will tandem tow 30 large 12,000 ton barges and 30 smaller 2,000 ton barges. The remaining 4 tugs will tandem tow the remaining 4 large 12,000 ton barges together with 4 Offshore Crane/Camp barges which will be utilized in offshore discharge operations.

It is apparent that the 64 linehaul barges have an aggregate deadweight capacity of 468,000 tons. The reason that this aggregate capacity is required for the carriage of 351,696 weight tons of cargo is primarily attributable to the large tonnages that are represented by the high cubic cargoes — camp units and construction equipment.

1979 (Year 2): Total Cargo 378,485 Tons

It has been estimated that the following tug and barge equipment will be required to effect carriage of this 1979 cargo:

- 37 Large Ocean Linehaul Barges with 12,000 Tons Deadweight
- 37 Linehaul Barges with 2,000 Tons Deadweight
- 74 Total Linehaul Barges
- 38 Ocean Linehaul Tugs up to 9,000 hp.

A total of 36 tugs will tandem tow 36 large 12,000 ton barges and 36 smaller 2,000 ton barges. A single tug will tandem tow the 1 smaller 2,000 ton barge and 1 Offshore Crane/Camp barge which is in addition to the four taken to the Arctic in 1978. The remaining tug will single tow 1 large 12,000 ton barge.

It is apparent that the 74 linehaul barges have an aggregate deadweight capacity of 518,000 tons. The reason that this aggregate capacity is required for the carriage of 378,485 weight tons of cargo is primarily attributable to the particularly large tonnages that are represented by the high cubic cargoes — camp units and construction equipment.

1980 (Year 3): Total Cargo 260,075 Tons

It has been estimated that the following tug and barge equipment will be required to effect carriage of this 1979 cargo:

- 24 Large Ocean Linehaul Barges with 12,000 Tons Deadweight
- 24 Total Linehaul Barges
- 12 Ocean Linehaul Tugs up to 9,000 hp

The 12 tugs will tandem tow the 24 12,000 ton barges.

It is apparent that the 24 linehaul barges have an aggregate deadweight capacity of 288,000 tons. This aggregate capacity is much nearer the cargo weight tonnage of 260,075 tons primarily due to the fact that the high cubic cargoes — camp units and construction equipment are not present in the Year 3 cargo.

For a summary of the total linehaul equipment necessary for ATL to undertake the operations as outlined in this Transportation Plan, please refer to Appendix II **Total Equipment Fleet Requirements**.

**ARCTIC DISCHARGE AND
STAGING OPERATIONS**

The offshore discharge, lightering, ice reconnaissance, shore discharge, trucking and staging area operations are essential elements in the “door-to-door” Arctic Transportation service which ATL offers. It is important that ATL customers receive a complete service from the time when the cargo is delivered to ATL at the load port until the cargo is re-delivered to the customer in storage at the specified Arctic staging site. It is essential that ATL, as the carrier, has absolute control over every facet of Arctic operations; for each operational element is inter-dependent. If one element does not keep pace or comes to a standstill, the entire operation is affected; and as a result, the risk of cargoes not being delivered and/or equipment being caught in the Arctic for the winter is greatly increased.

During the period from when the linehaul armada is waiting off Point Barrow through the full period of discharge, ending with the departure of the fleet past Point Barrow, a highly experienced ice reconnaissance team is in action, weather permitting, on a daily basis. The team employs two twin-engined aircraft and has the primary responsibility of guiding tug masters through the broken ice fields in a manner which will afford maximum safety to the tug and barge equipment. Once the armada is past the difficult ice area surrounding Point Barrow, the ice reconnaissance team maintains constant surveillance of broken ice field conditions and, of course, of changes in the position of the polar ice cap. Once east of Point Barrow, the linehaul tug and barge equipment proceeds directly to the offshore discharge area adjacent to the specified staging site. It is here that discharging begins in earnest.

A portable dock is constructed at the end of a jetty which has been built prior to the arrival of the linehaul armada. Generally, such a dock is quickly constructed by sinking a number of smaller barges to form a stable operating surface with a smooth vertical facing wall at the end of the jetty. These barges can be moved quickly by simply pumping out the water and towing them away. An example of this portable dock system is the present dock at Prudhoe Bay which consists of four barges sunk at the end of a 1,000 foot jetty; it has handled up to 187,000 tons of cargo in one Arctic season, i.e. this method is well proven.

Jetty requirements are fairly straightforward. Each must have a 30 foot wide roadtop and be sufficiently high to ensure that the roadbed remains dry and stable during periods of high tides which are sometimes pushed to higher-than-normal levels by unfavourable winds. This usually means that the top of the roadbed needs to be 5 to 6 feet above the normal high water level. In addition, a truck turning area is required at the offshore end of the jetty; this area is usually 80 feet by 100 feet. The length of the jetty will vary greatly from one discharge site to the next. However, as a general rule, the length will be between a few hundred feet and a third of a mile.

While the portable dock is being set in place, the offshore crane/camp barges are brought into position and the lighter tugs are discharged from the linehaul barges and made ready for the “round-the-clock” shuttle between the linehaul barges and the portable dock. As soon as the dock, crane barges and lighter tugs are ready for operations to begin, the lighter barges, which performed a linehaul function during the voyage into the Arctic, are discharged and the lighterage operation gets underway.

The normal lighterage rate for one spread of lighter equipment is approximately 5,000 tons per working day; however, single spreads have achieved rates as high as 10,000 tons per day with heavy unit cargoes — particularly pipe. The shore discharge rate for bulk petroleum averages 100,000 gallons per hour. One spread normally consists of:

- One Offshore Crane/Camp Barge with Quarters for 60 Men.
- Two Offshore Crawler Cranes.
- Lighter Tugs and Barges (the number of which is determined by distance and limiting water depth considerations).
- Two to Four Dock Barges (included in equipment requirements as lighter barges).
- One Dock-Side Crawler Crane.

As the cargo is brought ashore by the lighter spread, it is placed on large oilfield tractor-trailer units by cranes located on the portable dock, and taken directly to the staging area where two cranes or large fork lifts unload the tractor-trailer units and store the cargo according to CAGPL instructions.

At the completion of the discharge program all lighterage vessels, cranes, handling equipment and tractor-trailer units are, as a general rule, left behind in the Arctic for the subsequent year's discharge program. It should be noted that this equipment, when not required for ATL operations, is available for use by CAGPL; for example, lighter barges could serve as fuel storage facilities.

For a visual impression of the above-described discharging and staging operations, please refer to the following photographic illustrations which are captioned.

- Offshore Discharge of 48" O.D. Pipe from Large Ocean Barges to Lighter Barges.
- An Offshore Crane/Camp Barge Discharging a 250' Ocean Barge to Lighterage Vessels off Prudhoe Bay.
- A Lighter Tug and Two Lighter Barges at the Prudhoe Bay Dock.
- Crawler Transporters Travelling Jetty at Prudhoe Bay in Preparation for Discharging a Large Station Module.
- Oilfield Tractor-Trailer Units Being Loaded with 48" O.D. Pipe at the Prudhoe Bay Dock.
- Oilfield Tractor-Trailer Units Loaded with 48" O.D. Pipe Ready for Transporting to an Arctic Staging Site.
- The Prudhoe Bay Staging Area for 48" O.D. Pipe.
- The Prudhoe Bay Staging Area for General Cargo with the Jetty and Dock in the Background.



Offshore Discharge of 48" O.D. Pipe from Large Ocean Barges to Lighter Barges.



An Offshore Crane/Camp Barge Discharging a 250' Ocean Barge to Lighterage vessels off Prudhoe Bay.



A Lighter Tug and Two Lighter Barges at the Prudhoe Bay Dock.



Crawler Transporters Travelling Jetty at Prudhoe Bay
in Preparation for Discharging a Large Station Module.



Oilfield Tractor-Trailer Units Being Loaded with 48" O.D. Pipe at the Prudhoe Bay Dock.



Oilfield Tractor-Trailer Units Loaded with 48" O.D. Pipe Ready for Transporting to an Arctic Staging Site.



The Prudhoe Bay Staging Area for 48" O.D. Pipe.



The Prudhoe Bay Staging Area for General Cargo
with the Jetty and Dock in the Background.

The discharge program, within this Arctic Ocean Transportation Plan, has been based on the following assumptions pertaining to each discharge site:

1. A suitable jetty must be constructed and ready for use prior to the arrival of the linehaul armada.
2. The necessary staging pads and roads, which are required for a continuous and efficient flow of trucks from the jetty to the staging area, must be constructed prior to the arrival of the linehaul armada. The staging pads and roads must be maintained throughout the discharge operations.
3. Adequate storage areas and facilities for all categories of cargo, including bulk petroleum, must be made available prior to the arrival of the linehaul armada.

For the purposes of this Transportation Plan, it has been assumed that the customer is responsible for ensuring that the above requirements are met in time and in a proper manner. However, notwithstanding this assumption, it is well recognized that this is a matter for further discussion.

ATL has a good working knowledge of the Arctic coast; this knowledge, together with the latest hydrographic charts, have formed the basis for the water depth limitations and lighterage distance factors which are outlined in the following **Discharge Operations Plan**. This notwithstanding, ATL is planning to conduct a thorough survey of each site, during the first few weeks of the 1976 operating season.

The objective of this survey is to acquire sufficient data to enable ATL to recommend to CAGSL, in a well defined manner, the precise location for the jetty at each discharge area. Accordingly, the survey of each site will entail a detailed location inspection covering beach conditions and available shelter for marine operations, as well as detailed water depth sounding work at each discharging area. Particular emphasis will be placed on the Shingle Point, Shallow Bay, Reindeer Channel and Langley Island discharge sites.

A full report covering the results of each site investigation will be assembled immediately following completion of the survey. This report, together with ATL recommendations, will then be presented to CAGSL.

DISCHARGE OPERATIONS PLAN

Due to the magnitude of the tonnages and the number of discharge sites involved in this project, it has been assumed that, within the context of weather and ice conditions, 20 working days will be available in which to perform the discharge function. This “working day” estimate is conservative but is considered prudent given the stated desirability of establishing the operational feasibility of this Transportation Plan. Accordingly, the lighter spread and related equipment requirements have been assessed on the basis of a 20 working day time-frame.

The 1978 (Year 1) Program: This program, which calls for a total of 351,696 tons to be discharged and placed in staging areas at Prudhoe Bay, Shingle Point and PLMP 340 (Shallow Bay), requires four lighter spreads.

Prudhoe Bay: Two spreads will deliver the Prudhoe Bay tonnage, which totals 158,695 tons. This operation involves a lighterage distance of approximately 7 miles and a limited water depth of approximately 3.5 feet.

Shingle Point and PLMP 340: Two spreads will deliver the Shingle Point tonnage, which totals 167,391 tons, together with the PLMP 340 tonnage, which totals 25,610 tons. The Shingle Point operation involves a lighterage distance of approximately 1 mile and a limiting water depth of approximately 8 feet. The PLMP 340 operation involves a lighterage distance of 35 miles and a limiting water depth of approximately 4 feet.

Total Equipment Requirements for The 1978 (Year 1) Discharge Program:

- 20 General Cargo and Pipe Lighter Barges
- 10 Bulk Petroleum Lighter Barges
- 4 Offshore Crane/Camp Barges
- 10 Lighter Tugs up to 1,500 h.p.
- 20 Crawler Cranes and/or Large Fork Lift Units for Staging Operations
- 56 Oilfield Tractor-Trailer Units
- 4 Offshore Camps — 60 Man
- 2 Onshore Camps — 210 Man

Plus miscellaneous equipment as dictated by general cargo requirements. This equipment will include small fork lifts, pickups, service vehicles, light plants, pumps, compressors, cargo handling gear, crew boats, communications centres, etc.

The 1979 (Year 2) Program: This program, which calls for a total of 378,485 tons to be discharged and placed in staging areas at Camden Bay, Komakuk Beach, PLMP 355 (North Reindeer Channel), PLMP 368 (Langley Island), Tununuk and Inuvik, requires 5 lighter spreads.

Camden Bay: One spread will deliver the Camden Bay tonnage, which totals 61,615 tons. This operation involves a lighterage distance of approximately 1 mile and a limiting water depth of 8 feet.

Komakuk Beach: One spread will deliver the Komakuk Beach tonnage, which totals 37,624 tons. This operation involves a lighterage distance of approximately 1 mile and a limiting water depth of 8 feet.

The offshore discharge for the PLMP 355 and PLMP 368 lighterage operations will take place at a point in MacKenzie Bay off Shingle Point. The offshore discharge for the Tununuk and Inuvik lighterage operations will take place at a point in Kugmallit Bay north of Tuktoyaktuk.

PLMP 355: One spread will deliver the PLMP 355 tonnage, which totals 92,788 tons. Once complete, this spread will move to augment the Tununuk and Inuvik discharge operations. The PLMP 355 operation involves a lighterage distance of approximately 50 miles and a limiting water depth of approximately 4 feet.

PLMP 368: One spread will deliver the PLMP 368 tonnage, which totals 34,707 tons. Once complete, this spread will move to augment the Tununuk and Inuvik discharge operation. The PLMP 368 operation involves a lightering distance of approximately 63 miles and a limiting water depth of approximately 4 feet.

Tununuk and Inuvik: One spread will deliver the Tununuk tonnage which totals 129,308 tons (including 1,224 tons of permanent station equipment for Parsons Lake), together with the Inuvik tonnage, which totals 22,444 tons, and will be augmented by the two spreads from PLMP 368 and PLMP 355 such that all tonnage will be discharged and placed in the respective staging areas within 20 days. The Tununuk operation involves a lightering distance of approximately 55 miles and a limiting water depth of approximately 6 feet. The Inuvik operation involves a lightering distance of approximately 135 miles and a limiting water depth of approximately 6 feet.

Total Equipment Requirements for The 1979 (Year 2) Discharge Program:

- 51 General Cargo and Pipe Lighter Barges
- 16 Bulk Petroleum Lighter Barges
 - 5 Offshore Crane/Camp Barges
- 15 Lighter Tugs up to 1,500 h.p.
- 24 Crawler Cranes and/or Large Fork Lift Units for Staging Operations
- 63 Oilfield Tractor-Trailer Units
 - 5 Offshore Camps — 60 Man
 - 5 Onshore Camps — 105 Man

Plus miscellaneous equipment as dictated by general cargo requirements. This equipment will include small fork lifts, pickups, service vehicles, light plants, pumps, compressors, cargo handling gear, crew boats, communications centres, etc.

The 1980 (Year 3) Program: This program, which calls for a total of 260,075 tons to be discharged and placed in staging areas at Camden Bay, Demarcation Bay, Prudhoe Bay, Komakuk Beach, PLMP 355, Inuvik and Richard's Island, requires 4 lighter spreads.

Camden Bay and Prudhoe Bay: One spread will deliver the Camden Bay tonnage, which totals 15,077 tons, together with the Prudhoe Bay tonnage, which totals 1,244 tons (permanent station equipment only). Once complete, this spread will move to augment the Demarcation Bay discharge operations. The Camden Bay operation involves a lightering distance of approximately 1 mile and a limiting water depth of approximately 8 feet. The Prudhoe Bay operation involves a lightering distance of approximately 7 miles and a limiting water depth of approximately 3.5 feet.

Demarcation Bay: One spread will deliver the Demarcation Bay tonnage, which totals 93,531 tons, and will be augmented by the Camden Bay/Prudhoe Bay spread such that all tonnage will be discharged and placed in the staging area within 20 days.

The Demarcation Bay operation involves a lightering distance of approximately 3 miles and a limiting water depth of approximately 10 feet.

Komakuk Beach: One spread will deliver the Komakuk Beach tonnage, which totals 43,548 tons. Once complete, this spread will move to augment the PLMP 355 and Inuvik discharge operations. The Komakuk Beach operation involves a lightering distance of approximately 1 mile and a water depth limitation of approximately 8 feet.

PLMP 355, Richard's Island and Inuvik: One spread, in conjunction with the spread from Komakuk Beach, will deliver the PLMP 355 tonnage, which totals 25,597 tons, the Richard's Island tonnage, which totals 1,224 tons (permanent station equipment only), and the Inuvik tonnage, which totals 79,874 tons, such that all tonnage will be discharged and placed in the respective staging areas within 20 working days.

The PLMP 355 operation involves a lightering distance, from an offshore location near Shingle Point, of approximately 50 miles, with a limiting water depth of approximately 4 feet. The Inuvik operation involves a lightering distance, from an offshore location north of Tuktoyaktuk, of approximately 135 miles, with a limiting water depth of approximately 6 feet.

The Richard's Island operation will involve two to three lightering trips north following the channels on Richard's Island to a location in close proximity to Taglu. From this location, the cargo will be taken overland to the staging site.

Total Equipment Requirements for The 1980 (Year 3) Discharge Program:

- 40 General Cargo and Pipe Lighter Barges
- 13 Bulk Petroleum Lighter Barges
- 4 Offshore Crane/Camp Barges
- 15 Lighter Tugs up to 1,500 h.p.
- 19 Crawler Cranes and/or Large Fork Lift Units for Staging Operations
- 56 Oilfield Tractor-Trailer Units
- 4 Offshore Camps — 60 Man
- 3 Onshore Camps — 75 Man
- 2 Onshore Camps — 105 Man

Plus miscellaneous equipment as dictated by general cargo requirements. This equipment will include small fork lifts, pickups, service vehicles, light plants, pumps, compressors, cargo handling gear, crew boats, communications centres, etc.

Please refer to Appendix II **Total Equipment Fleet Requirements** for a quantitative summary of the total requirements for lightering vessels, discharging and staging equipment, and linehaul tug and barge requirements.

PERSONNEL REQUIREMENTS



The following section on personnel requirements will be confined to those requirements associated with the Arctic discharge and staging operations. However, for the sake of clarity and continuity, it should be noted that the loading function is, for the most part, supervised by those who later travel to the Arctic to manage discharging and staging operations; and that ocean tugs, which generally require an 8-10 man crew, are self-contained operational units.

The personnel requirements inherent in the discharge and staging operations of this Transportation Plan, and which are specified on subsequent pages, have been based upon the following premises:

- a) Each man works 12 hours on and has 12 hours off, each 24 hour day for the full duration of the Arctic operation.
- b) Each offshore discharge crane operation requires approximately 10 men per shift.
- c) Each dock discharge crane operation requires approximately 10 men per shift.
- d) Each staging area crane/fork lift operation requires approximately 6 men per shift.
- e) Each lighter tug requires 5 men.

1978 (Year 1) Personnel Requirements — Discharge and Staging Operations

8 Offshore Discharge Cranes	}	Total Manning	336 Men
4 Dock Discharge Cranes			
8 Staging Area Cranes/Forklifts			
56 Trucks	}	Total Manning	112 Men
10 Lighter Tugs	}	Total Manning	50 Men
4 Offshore Camps — 60 Man	}	Total Manning	48 Men
2 Onshore Camps — 210 Man			
Supervision	}	Total Manning	109 Men
Ice Reconnaissance			
Service and Maintenance			
Engineering Services			
Arctic Site Administration			
TOTAL 1978 (YEAR 1) PERSONNEL REQUIREMENT:			655 Men



1979 (Year 2) Personnel Requirements — Discharge and Staging Operations

9 Offshore Discharge Cranes	}	Total Manning	400 Men
5 Dock Discharge Cranes			
10 Staging Area Cranes/Forklifts			
63 Trucks	}	Total Manning	126 Men
15 Lighter Tugs	}	Total Manning	75 Men
5 Offshore Camps — 60 Man	}	Total Manning	70 Men
5 Onshore Camps — 105 Man			
Supervision	}	Total Manning	134 Men
Ice Reconnaissance			
Service and Maintenance			
Engineering Services			
Arctic Site Administration			
TOTAL 1979 (YEAR 2) PERSONNEL REQUIREMENT:			805 Men

1980 (Year 3) Personnel Requirements — Discharge and Staging Operations

7 Offshore Discharge Cranes	}	Total Manning	316 Men
4 Dock Discharge Cranes			
8 Staging Area Cranes/Forklifts			
56 Trucks	}	Total Manning	112 Men
15 Lighter Tugs	}	Total Manning	75 Men
4 Offshore Camps — 60 Man	}	Total Manning	54 Men
3 Onshore Camps — 75 Man			
2 Onshore Camps — 105 Man			
Supervision	}	Total Manning	109 Men
Ice Reconnaissance			
Service and Maintenance			
Engineering Services			
Arctic Site Administration			
TOTAL 1980 (YEAR 3) PERSONNEL REQUIREMENT:			666 Men

It is apparent from the foregoing that the personnel requirements associated with this Transportation Plan for the Canadian Arctic Gas project are in excess of 1,000 men for each year of operation, including ocean tug crews. While such a requirement is substantial, it is well within ATL's capability which is derived from the combined resources of Seaspac International, Federal Commerce and Crowley Maritime. ATL's "parent" companies have within their combined control:

- More than 175 tugs.
- More than 500 barges.
- A deep sea fleet that ranges from 60 to 80 ocean going ships.
- A shipbuilding yard located in Vancouver.
- Four major marine terminals which handle large volumes of international cargo.

**ADVANTAGES OF THE ATL OCEAN TUG AND
BARGE METHOD AS IT RELATES TO
THE CANADIAN ARCTIC GAS PROJECT**

It is perhaps best to begin this Section, which describes some of the advantages associated with the ATL method, by addressing the one major risk, and thereby potential disadvantage, of carrying cargoes via the "Northern Gateway". The risk which is referred to is, of course, the risk of ice blockage.

The possibility of not being able to sail into the Arctic Ocean past Point Barrow due to ice conditions always exists. However, through the 1974 operating season, only one occurrence of such a situation is on record.

The more significant risk associated with ice conditions is the risk of not being able to remove the tug and barge equipment from the Arctic Ocean prior to the ice cap becoming fast against the shoreline until the following year's season. However, ATL is confident that sufficient personnel and equipment allowances have been made to ensure that the fleet does not become caught in the Arctic through the winter months. As mentioned in Section II, ATL is planning a 20 "working day" season; not once in the 17 consecutive years (1958 through 1974) that the tug and barge method has been servicing the Arctic coast, has the operating season been that short.

The following are some advantages of the ATL Tug and Barge method as it relates to the Canadian Arctic Gas project.

1. The ATL Tug and Barge method is well proven. All categories of cargo, with identical or near-identical characteristics to those categories which are required to be carried for the CAGPL project, have been carried previously in large quantities by ATL or one of its "parent" companies. In addition, high tonnage quantities per discharge site, comparable to those required for the CAGPL project, have already been handled over a single portable dock in Prudhoe Bay, e.g. 187,000 tons of pipe and pipeline related cargo during the 1970 sealift. The point is, the ATL Tug and Barge method of Arctic transportation has been utilized in a successful and timely manner for projects which are comparable, in the critical operational areas, to the Canadian Arctic Gas project.
2. The ATL Tug and Barge method offers a complete "door-to-door" transportation service; from port of origin to Arctic staging site. This, in effect, means that CAGPL has only to concern itself with getting the cargo to the load port, which many times is a concern shouldered by the supplier; and then does not have to worry about the cargo until it is deposited at each Arctic staging site, according to CAGPL instructions. Coordination of separate transportation modes, such as ocean shipping, railways, river barging and trucking, is not required.
3. The ATL Tug and Barge method provides for the carriage of all categories of cargo including:
 - Large O.D. line pipe
 - Bulk petroleum products
 - Heavy construction equipment and mobile camps
 - Construction materials of all descriptions
 - Large compressor station modules and other prefabricated buildings

Such carriage is effected with a minimum of handling; consequently, the risk of damage in transit is greatly minimized, e.g. of 115,000 tons of 48" O.D. pipe delivered to Prudhoe Bay (1970) in 18 days, less than 1% of the joints were damaged and all were subsequently repaired and accepted by the owner.

4. ATL and its "parent" companies are currently gearing up for projects like Canadian Arctic Gas. Substantial tug and barge building programs are in progress; e.g. Seaspan is actively adding to its already large tug and barge fleet, Federal Commerce is building a series of 400' x 100' barges and Crowley Maritime is building a series of 9,000 h.p. tugs and additional barges for an already sizable 400' x 100' barge fleet. This notwithstanding, however, it is well recognized that substantial new barge buildings will be required for a project of the magnitude of CAGPL. ATL is prepared to undertake such new buildings for its own account and at its own risk.
5. Three very large companies, which are totally committed to the development of Arctic Transportation, stand squarely behind ATL. Thus ATL has available to it operating experience, a floating fleet, and financial resources which are second to none in the Arctic transportation field. ATL has the total capability to complete successfully the Transportation Plan as outlined in this Report.



COST ESTIMATES AND FINANCIAL FACTORS

The ATL tug and barge transportation method is predicated on the philosophy that the most effective and operationally reliable Arctic transportation system is one which provides a complete “door-to-door” service, i.e. carriage of cargo from ports of origin such as Seattle, Vancouver and Japan, directly to the specified Arctic staging pads.

ATL, as the carrier, undertakes all functions required in providing this “door-to-door” service. Accordingly, the ATL freight rates, which are outlined below, reflect the all-inclusive price for the carriage of cargo to the CAGPL staging sites. In the interest of clarity and good order, the following list outlines those elements which are included in the ATL freight rate, as well as those elements which are not:

1. The provision of the following services at the barge loading ports of Vancouver and Seattle:
 - a) Receiving cargo at specified locations within the ports, after it has been discharged from ocean vessels, rail cars and trucks.
 - b) Cargo handling and storage at these locations.
 - c) Loading and securing cargo onto the ocean barges to the satisfaction of the surveyors representing the cargo and vessel insurance underwriters.

NOTE: In the case of Japanese load ports the Japanese pipe mills, as is their custom, provide these services; accordingly, the cost of such services is not included in the ATL freight rate for cargo loaded in Japan.

2. The carriage of cargo by ocean barges from Seattle, Vancouver and Japan. In the case of cargo originating in other locations, such as the U.S. Gulf, additional freight costs are involved. In addition, ATL has the capability and desire to handle those cargoes which must be carried by deep sea ships to West Coast and southern Alaskan ports. Please refer to Appendix IV for a summary of ocean ship rates from Japan.
3. The provision of the following services at the specified Arctic coast and MacKenzie Delta discharge/staging sites:
 - a) Discharging cargo from the ocean barges to the lighter barges.
 - b) Carrying cargo on the lighter barges to the portable dock.
 - c) Providing the portable dock.
 - d) Discharging the cargo at the portable dock from the lighter barges and placing same on truck equipment.
 - e) Trucking cargo from the dock to the staging area up to a distance of 3 miles.
 - f) Discharging cargo from the truck equipment and placing same at the staging site according to CAGPL instructions.
4. Other elements:
 - a) All insurance costs associated with vessel equipment are included in the ATL rates. While cargo insurance costs are not included, ATL is willing to undertake this matter if requested to do so.
 - b) In the event of ice blockage, or other “acts of God”, ATL will carry the cargo to alternate ports of discharge in Alaska or the Canadian west coast, as specified by CAGPL, and deposit same at a staging area in close proximity to the alternate ports of discharge.
 - c) The cost of heavy-lift crawler transporters, which may be required for the handling of modules and other heavy cargo items, is not included in the ATL rates. However, ATL will include the provision of such service, at additional cost to CAGPL, if requested to do so.
 - d) All equipment items required for the ATL discharging operations (lighter tugs, cranes, camps, trucks etc.) are to be carried to the Arctic, at no cost to ATL, aboard barges which have been assigned to the CAGPL project.

The ATL freight rates for the carriage of the specified Canadian Arctic Gas cargoes to the five Arctic coast and six MacKenzie Delta staging sites are as follows:

**Per Short Ton of 2,000 Pounds of Deadweight Cargo
Basis 1975 Costs and Conditions**

For cargo loaded on barge in Seattle	Cdn \$254.00
For cargo loaded on barge in Vancouver	Cdn \$259.00
For cargo loaded on barge in Japan	Cdn \$274.00

- NOTES:
1. Deadweight cargo means pipe, fuel and other heavy cargo with similar stowage characteristics.
 2. The higher Vancouver rate vis. the Seattle rate reflects the generally higher over-all effective cost of cargo operations associated with the Port of Vancouver.
 3. The higher Japan rate vis. the Vancouver and Seattle rates, reflects the additional cost of positioning tugs and barges to Japan from the West Coast.
 4. With respect to the alternatives which Canadian Arctic Gas has requested ATL to examine in terms of freight rates only, please refer to page 23 where a freight rate summary is provided.

With respect to cargoes which are not deadweight in nature, e.g. camp units, construction equipment and insulation, the above-noted rates should be applied to the ATL 90% of barge deadweight formula. Briefly this formula is as follows:

For each barge load of cargo the freight cost is determined by multiplying the barge deadweight capacity by a factor of .9; the result is then multiplied by the appropriate deadweight cargo freight rate as above.

Example: The cost of a barge with 12,000 tons of deadweight capacity, carrying cargo from Seattle, would be:

$$12,000 \times .9 \times \$254 = \$2,743,200, \text{ irrespective of the total cargo weight.}$$

This formula represents a practical method of assigning proper value to the cost of carrying cargoes with high cubic characteristics, i.e. cargo which does not utilize fully the carrying capacity of a particular ocean barge.

In the interest of attempting to quantify the total cost of carrying the specified 990,000 tons of cargo, it has been assumed that only pipe and bulk fuel are deadweight cargoes; and all other categories are general cargoes with varying cubic factors.

The pipe and bulk fuel cargoes total 846,532 tons; they require a barge deadweight capacity of the same magnitude. The remaining general cargo categories total 143,723 tons; ATL has estimated that a barge deadweight capacity of 427,468 tons is required to carry this cargo. This estimate is conservative and is, of course, predicated on the fact that specific knowledge of the weight and cubic characteristics of the general cargo categories is very limited at this time.

When the general cargo to be carried can be described in more detail, it will be possible to arrive at a more precise and, in all probability, a lower estimate of the barge deadweight capacity required to carry the general cargoes. However, in the interest of arriving at an estimate, albeit conservative, of the total transportation costs associated with moving 990,000 tons of cargo from Seattle, Vancouver and Japan to the various Arctic staging pads, it is suggested that CAGSL apply the ATL 90% formula to the deadweight barge capacity of 427,468 tons to arrive at the freight cost for the 143,723 tons of general cargo. The freight cost of pipe and bulk fuel is arrived at by multiplying a cargo tonnage figure by the appropriate freight rate. An estimate of the total transportation costs will be dependent upon the ports of origin for the various cargoes.

The lead time requirement, i.e. that period of time from contract signing to the start up of transport operations, for the ATL Tug and Barge method has been estimated to be 18 months. This estimate has been developed as a result of examining the requirements associated with the three critical equipment categories.

The lead time required for the acquisition of the necessary ocean tug fleet is virtually nil. Sufficient tugs could be marshalled from the existing fleets of Seaspan International, Federal Commerce and Crowley Maritime, as well as from charter sources.

The lead time requirement for barge equipment is, however, somewhat different. In the international shipbuilding market of today, ocean and lighter barges could be built and delivered within 12 months. Notwithstanding this however, it is difficult to estimate whether this situation will continue for sometime into the future. Therefore, it is suggested that the normal lead time requirement for barge construction and delivery, which is 18 months, be used for planning purposes.

With respect to the acquisition of handling and related equipment, a 6 to 18 month lead time, depending upon the equipment item, is sufficient.

The subject of escalation must be discussed in detail; however, it is perhaps not appropriate to do so within the text of this Report, for escalation of costs associated with ocean transportation is, at best, a complex and difficult matter. This notwithstanding, ATL stands ready to discuss the subject of escalation with CAGSL at anytime.

The following comments are made in conclusion to this Section on cost estimates and financial factors:

1. ATL stands ready to discuss contractual arrangements with Canadian Arctic Gas at the earliest opportunity; to this end, a copy of the ATL standard contract of private carriage form is herewith included as Appendix III.
2. ATL is willing to contract with CAGSL on a firm basis subject to CAGPL receiving the necessary regulatory approvals.
3. In the interest of attempting to maximize utilization of equipment dedicated to this massive pipeline project, it is suggested that CAGSL consider the idea that ATL owned lighter barge equipment (67 barges) could be made available for MacKenzie River use, under some form of charter arrangement, during that period of the summer season when the barges are not performing an ATL lighter function. This, presumably, would serve to reduce "front-end" capital requirements, as well as overall transportation costs, in that lesser amounts of additional river barges would be required.



ATL FREIGHT RATE SUMMARY

PER SHORT TON OF 2,000 POUNDS OF DEADWEIGHT CARGO
BASIS 1975 COSTS AND CONDITIONS
CANADIAN DOLLARS

	<u>Vancouver Cargo</u>	<u>Seattle Cargo</u>	<u>Japan Cargo</u>
THE BASIC REQUIREMENT UPON WHICH THIS TRANSPORTATION PLAN IS BASED			
Carriage of 990,256 tons of cargo over 3 years to the specified 5 Arctic coast and 6 MacKenzie Delta staging sites.	\$259.00	\$254.00	\$274.00
ALTERNATIVE			
With respect to MacKenzie Delta cargo only (PLMP 340 to Tununuk junction and Richard's Island to Inuvik), carriage of all the specified "Delta" cargo directly to Tuktoyaktuk by the large ocean barges. This alternative is based on the assumption that the channel into Tuk Harbour is dredged to a sufficient extent to ensure a minimum safe draft of 16 feet at all times.	\$234.00	\$229.00	\$249.00
ALTERNATIVE			
Carriage of the Alaska portion of the cargo (330,143 tons) only, over 3 years.	\$265.00	\$260.00	\$280.00
ALTERNATIVE			
Carriage of the full cargo over 3 years, as in the basic requirement, except that all discharging is done directly from the large ocean barges to the portable docks. This alternative is based on the assumption that long jetties are constructed out to a minimum water depth of 16 feet, thereby removing the need for lighterage operations.			This alternative is not operationally feasible for the Arctic coast discharge sites. Arctic storms and severe ice conditions, subsequent to construction, could damage the long jetties to an extent which would effectively prevent discharging operations.

**CANADIAN ARCTIC GAS STUDY LTD.
Prudhoe '81 Cross Delta Route**

**Cargo Tonnages Identified for Carriage by Ocean
Going Barges Via Point Barrow
(short tons)**

**CANADIAN ARCTIC GAS STUDY LTD.
Prudhoe '81 Cross Delta Route**

Cargo Tonnages Identified for Carriage by Ocean
Going Barges Via Point Barrow
(short tons)

<u>Cargo Category</u>	<u>Year 1 1978</u>	<u>Year 2 1979</u>	<u>Year 3 1980</u>	<u>Totals by Category</u>
Pipe	213,559.2	191,638.2	144,378.0	549,575.4
Permanent Station Equip.	—	12,386.0	1,158.0	13,544.0
Diesel Fuel	69,987.0	92,515.5	63,412.5	225,915.0
Gasoline	10,782.0	12,608.0	12,428.5	35,818.5
Aviation Fuel	760.0	4,665.0	1,775.0	7,200.0
Heating Fuel	7,656.0	10,504.0	9,864.0	28,024.0
Sub total — Fuel Cargo	89,185.0	120,292.5	87,480.0	296,957.5
Propane	3,588.3	4,361.7	3,379.5	11,329.5
Lubricants, Methanol and Replacement Parts	5,205.95	5,584.85	1,349.6	12,140.4
Construction Materials	18,894.25	21,399.05	21,550.2	61,843.5
Construction Equipment	14,500.0	14,500.0	—	29,000.0
Food	468.75	441.25	780.0	1,690.0
Camp	6,294.7	7,881.20	—	14,175.9
TOTALS BY YEAR	351,696.15	378,484.75	260,075.3	990,256.2

Year 1 (1978) — 351,696.15 Tons

<u>Cargo Category</u>	<u>Prudhoe Bay</u>	<u>Shingle Point</u>	<u>PLMP 340</u>	<u>Category Totals</u>
Pipe	96,120.0	107,829.2	9,610.0	213,559.2
Permanent Station Equip.	—	—	—	—
Diesel Fuel	28,155.0	25,832.0	16,000.0	69,987.0
Gasoline	5,123.5	5,568.5	—	10,782.0
Aviation Fuel	300.0	460.0	—	760.0
Heating Fuel	3,720.0	3,936.0	—	7,656.0
Sub total — Fuel Cargo	37,388.5	35,796.5	16,000.0	89,185.0
Propane	1,743.5	1,844.8	—	3,588.3
Lubricants, Methanol and Replacement Parts	2,603.75	2,602.2	—	5,205.95
Construction Materials	9,976.55	8,917.7	—	18,894.25
Construction Equipment	7,250.0	7,250.0	—	14,500.0
Food	281.25	187.5	—	468.75
Camp	3,331.2	2,963.5	—	6,294.7
TOTALS	158,694.75	167,391.4	25,610.0	351,696.15

Year 2 (1979) — 378,484.75 Tons

<u>Cargo Category</u>	<u>Camden Bay</u>	<u>Komakuk Beach</u>	<u>PLMP 355</u>	<u>PLMP 368</u>	<u>Tununuk</u>	<u>Inuvik</u>	<u>Category Totals</u>
Pipe	42,720.0	21,360.0	26,467.7	26,706.6	74,383.9	—	191,638.2
Permanent Station Equip.	—	4,000.0	4,000.0	—	386.0	4,000.0	12,386.0
Diesel Fuel	11,307.5	7,508.0	30,150.0	8,000.0	26,275.0	9,275.0	92,515.5
Gasoline	1,967.0	1,209.5	4,431.0	—	3,487.0	1,513.5	12,608.0
Aviation Fuel	285.0	140.0	2,400.0	—	640.0	1,200.0	4,665.0
Heating Fuel	1,530.0	1,620.0	3,396.0	—	2,958.0	1,000.0	10,504.0
Sub total — Fuel Cargo	15,089.5	10,477.5	40,377.0	8,000.0	33,360.0	12,988.5	120,292.5
Propane	681.5	721.2	1,300.0	—	949.0	710.0	4,361.7
Lubricants, Methanol and Replacement Parts	212.55	179.0	2,504.5	—	2,479.9	208.9	5,584.85
Construction Materials	2,818.05	810.8	7,850.4	—	6,970.1	2,949.7	21,399.05
Construction Equipment	—	—	7,250.0	—	7,250.0	—	14,500.0
Food	93.75	75.0	75.0	—	197.5	—	441.25
Camp	—	—	2,963.5	—	3,331.2	1,586.5	7,881.20
TOTALS	61,615.35	37,623.5	92,788.1	34,706.6	129,307.6	22,443.6	378,484.75

Year 3 (1980) — 260,075.3 Tons

<u>Cargo Category</u>	<u>Camden Bay</u>	<u>Demar- cation Bay</u>	<u>Prudhoe Bay</u>	<u>Komakuk Beach</u>	<u>PLMP 355</u>	<u>Inuvik</u>	<u>Richards Island</u>	<u>Category Totals</u>
Pipe	10,680.0	58,740.0	—	24,025.0	—	50,933.0	—	144,378.0
Permanent Station Equip.	—	386.0	386.0	—	—	—	386.0	1,158.0
Diesel Fuel	3,062.5	19,265.0	240.0	10,450.0	13,590.0	16,565.0	240.0	63,412.5
Gasoline	570.5	3,600.0	12.0	1,991.0	2,718.0	3,525.0	12.0	12,428.5
Aviation Fuel	85.0	380.0	50.0	100.0	100.0	1,010.0	50.0	1,775.0
Heating Fuel	450.0	2,958.0	378.0	1,320.0	2,160.0	2,220.0	378.0	9,864.0
Sub total — Fuel Cargo	4,168.0	26,203.0	680.0	13,861.0	18,568.0	23,320.0	680.0	87,480.0
Propane	175.0	1,001.4	30.0	755.6	810.0	577.5	30.0	3,379.5
Lubricants, Methanol and Replacement Parts	54.2	420.3	8.4	260.1	277.8	320.4	8.4	1,349.6
Construction Materials	—	6,583.2	109.9	4,458.5	5,753.5	4,535.2	109.9	21,550.2
Construction Equipment	—	—	—	—	—	—	—	—
Food	—	197.5	10.0	187.5	187.5	187.5	10.0	780.0
Camp	—	—	—	—	—	—	—	—
TOTALS	15,077.2	93,531.4	1,224.3	43,547.7	25,596.8	79,873.6	1,224.3	260,075.3

TOTAL EQUIPMENT FLEET REQUIREMENTS

The following table summarizes the total marine and shoreside equipment necessary for ATL to undertake successfully the carriage of the specified tonnage (Appendix I) in the manner described in Section II **Marine Transport Operations**.

<u>Equipment Category</u>	<u>(Year 1) 1978 Number Required</u>	<u>(Year 2) 1979 Number Required</u>	<u>(Year 3) 1980 Number Required</u>
Ocean Linehaul			
Barges to 12,000 Tons	34	37	24
Linehaul/Lighter			
Barges to 2,000 Tons	30	67	53
Offshore Crane/Camp			
Barges	4	5	4
Ocean Linehaul Tugs			
to 9,000 h.p.	34	38	12
Lighter Tugs			
to 1,500 h.p.	10	15	15
Crawler Cranes/Large			
Forklifts	20	24	19
Oilfield Tractor —			
Trailer Units	56	63	56
Offshore Camps — 60 Man	4	5	4
Onshore Camps — 210 Man	2	0	0
Onshore Camps — 105 Man	0	5	2
Onshore Camps — 72 Man	0	0	3
Aircraft (Twin Engine)	2	2	2

Plus: Miscellaneous equipment including small fork lifts, pickups, service vehicles, light plants, pumps, compressors, cargo handling gear, crew boats, communications centres, etc.



**ATL STANDARD CONTRACT OF PRIVATE
CARRIAGE FORM**



CONTRACT OF PRIVATE CARRIAGE

ARCTIC TRANSPORTATION LTD.

(herein called the "Carrier") agrees to perform the following transportation service by tug and barge for
..... (herein called the "Shipper"), subject to all the terms and conditions of Parts I, II and III of this contract of private carriage.

Part I

PARTICULARS OF CARGO, LOADING, DISCHARGE AND FREIGHT

1. Cargo:
.....
..... (herein called the "cargo").
2. Approximate Date of Loading:
..... (herein called the "Approximate Loading Date").
3. Port of Loading:
..... (herein called the "Port of Loading").
4. Port of Discharge:
..... (herein called the "Port of Discharge").
5. Freight:
6. Demurrage:
 - (a) Lay-days for loading and stowing:
 - (b) Lay-days for discharge:
 - (c) Demurrage:
7. Period during which barge is to be tendered at Port of Loading 19 to
..... 19 inclusive (herein called the "Barge Tender Period").
8. Last Date for Sailing:



THIS CONTRACT OF PRIVATE CARRIAGE INCLUDES AND IS SUBJECT TO ALL TERMS AND CONDITIONS SET FORTH IN PART II AND PART III HEREOF.

IN WITNESS WHEREOF, the parties hereto have signed this contract on the dates and at the places set forth below:

CARRIER: Arctic Transportation Ltd.	SHIPPER:
ADDRESS 700 The Baxter Building	ADDRESS
FOR 1111 West Hastings Street	FOR
SERVICE: Vancouver, British Columbia	SERVICE:
By	By
Its	Its
Date	Date

Part II

TERMS AND CONDITIONS

1. **Liberties; Scope of Voyage** — The Carrier shall have the following liberties, any warranty or rule of law to the contrary notwithstanding: of carrying all or any portion of the cargo on deck; of towing the barge with other tows on a double or multiple tow basis, and of substituting for or changing either the tug or barge, at any stage of the voyage; to include in scope of voyage any port or ports whether on or outside of the customary or direct route, and the barge may call at any such port for any purpose, and in any order, all such calls to be included in the contract voyage; to sail with or without pilots; to adjust compasses; to be drydocked at any time, at any place, for any purpose with or without cargo on board; to tow or be towed; to assist vessels in all situations; to deviate for the purpose of saving life and/or property; and to carry the cargo of others on the same vessel as the cargo shipped hereunder.
2. **Cargo Insurance** — Shipper agrees to obtain insurance on the cargo for the full value thereof under the broadest terms of coverage available in the American or London markets. Said insurance shall expressly name Carrier (as defined in Paragraph 6 hereof) as an additional assured without right of subrogation.
3. **Liability** — Notwithstanding anything contained in this Agreement, the Shipper, on its own behalf and on behalf of the consignee and owner of the cargo, assumes all risk of loss, damage, misdelivery, delay, and expense to or in connection with the cargo and the loading, stowage, lashing, transportation and discharge thereof, and neither Carrier, the barge, nor any vessel used in the transportation (including any towing vessel) nor the owners or operators thereof shall be liable therefor whether resulting from negligence, unseaworthiness, deviation or otherwise, except to the extent the same results from Carrier's failure to exercise due diligence at the commencement of the voyage to make the tug and barge seaworthy to perform services hereunder.
4. **General Average** — In the event of accident, danger, damage or disaster before or after commencement of the voyage, resulting from any cause whatsoever including negligence, unseaworthiness or deviation, for which or for the consequences of which Carrier is not responsible by reason of contract, statute or otherwise, Shipper and the consignee and/or owner of the cargo shall contribute in general average to the payment of any sacrifice, loss or expense of a general average nature that may be made or incurred and shall pay salvage and special charges incurred in respect of the cargo. General average shall be stated at Vancouver according to York-Antwerp Rules 1974, excluding Rule 22 thereof, and as to matters not therein provided for according to the usages and customs of the Port of Vancouver. Notwithstanding Rule 10(b) of the said York-Antwerp Rules, however, it is expressly agreed that the cost of handling, discharging, and restowing cargo shall be admitted as general average when reasonably necessary for the safe prosecution of the voyage, as well as under the circumstances set forth in said Rule.
5. **Earned Freight** — Freight shall be considered fully and irrevocably earned for the voyage upon completion of loading, and shall be paid in full to Carrier upon receipt of invoice. Carrier shall be entitled to receive and retain the freight in full under all circumstances whatsoever including loss of or damage to cargo or vessel or interruption, frustration or abandonment of voyage from any cause including negligence, unseaworthiness or deviation.
6. **Definition of Carrier; Consignees and Owners Bound** — The word "Carrier", wherever used in this Contract, shall be deemed to include and refer to every vessel used in the transportation, including the towing vessel, as well as the owners, operators, officers and crews thereof, and all officers and employees of the Carrier (as defined in this paragraph) and sub-contractors of the Carrier and their officers and employees, all of whom shall be entitled to all benefits, privileges, rights of the Carrier and exceptions set forth herein. It is hereby expressly agreed that no servant or agent of the Carrier

(including every independent contractor from time to time employed by the Carrier) shall in any circumstances whatsoever be under any liability whatsoever to the Shipper, consignee or owner of the goods for any loss or damage or delay of whatsoever kind arising or resulting directly or indirectly from any act of neglect or default on his part while acting in the course of or in connection with his employment and, without prejudice to the generality of the foregoing provisions in this Clause, every exemption, limitation, condition and liberty contained in this Agreement, and every right, exemption from liability, defence and immunity of whatsoever nature applicable to the Carrier or to which the Carrier is entitled hereunder shall also be available and shall extend to protect every such servant or agent of the Carrier acting as aforesaid and for the purpose of all the foregoing provisions of this Clause the Carrier is or shall be deemed to be acting as agent or trustee on behalf of and for the benefit of all persons who are or might be his servants or agents from time to time (including independent contractors as aforesaid) and all such persons shall to this extent be or deemed to be parties to this Contract. The Shipper, consignee and owner of the cargo jointly and severally undertake that no claim whatsoever shall be made in relation to the cargo against any servant, agent or sub-contractor of the Carrier.

7. **Limitation of Liability** — This agreement shall not be deemed a personal contract of a kind which would deprive the Carrier of the benefits of any exemption from or limitation of liability under applicable Canadian and/or foreign statutes, all of which benefits are expressly claimed and reserved by Carrier.
8. **Exceptions** — Performance by either party hereunder shall be excused if and to the extent the same is prevented or delayed by act of God, war, arrest or restraint of rulers or people, seizure under legal process, quarantine restrictions, ice conditions, pollution conditions, risk of pollution, perils of the sea, strikes, lockouts, riots, civil commotion or other circumstances beyond such party's reasonable control.
9. **Taxes** — Carrier shall not be responsible for any taxes, tolls, royalties or assessments levied or assessed by any foreign or domestic governmental entity in connection with the transportation, loading, discharge or handling of the cargo, and all such taxes, tolls, royalties and assessments shall be for Shipper's account.
10. **Law, Jurisdiction and Interpretation** — This contract shall be interpreted in accordance with the laws of British Columbia. The parties submit to the jurisdiction of the courts of Canada and British Columbia, with respect to any litigation arising out of this contract or performance hereunder, and for such purpose, service of process in any such litigation by mailing it addressed to such party at its address specified in Part I of this Agreement shall be and be deemed to be good and sufficient service of such process on the tenth day after such mailing. The division of this Agreement into sections and the insertion of headings are for convenience of reference only and shall not affect the construction or interpretation of this Agreement. This Agreement shall be binding on the parties hereto and their respective successors and assigns.
11. **Government Orders** — The Shipper shall have liberty to comply with any orders or directions as to departure, arrival, rules, ports of call, stoppages, routes, destination, delivery or otherwise howsoever, given by the Government of Canada or any department or agency thereof or of any other government having jurisdiction, or any person acting or purporting to act with the authority of such government or agency or department thereof or by any committee or person having under the terms of the War Risks insurance of the tug or barge the right to give such orders or directions and if by reason of and in full compliance with any such orders and directions anything is done or is not done the same shall be deemed not to be a deviation and delivery in accordance with such rights or directions shall be fulfillment of the contract voyage and the freight shall be payable accordingly.
12. **Sub-Contract** — The Carrier shall have the right to subcontract all or any part of its performance hereunder, provided that no such sub-contract shall affect its duties or liabilities to Shipper, and any sub-contractor shall have the benefit of all provisions herein benefitting the Carrier.

13. **Both to Blame Collision** — If the tug or barge comes into collision with another ship as a result of negligence of the other ship and any negligence or other fault on the part of the Carrier or its servants or sub-contractors, the Shipper, consignee or the owner of the cargo, as the case may be, shall indemnify Carrier against all loss or liability to the other or non-carrying ship or her owners, insofar as such loss or liability represents loss of, or damage to, or any claim whatsoever of the Shipper, consignee or owner of cargo carried hereunder, paid or payable by the other or non-carrying vessel or her owners to the Shipper, consignee or owner of said cargo and set off, recouped or recovered by the other or non-carrying ship or her owners as part of their claim against the tug or barge or the owner or operator of either. The foregoing provisions shall also apply where the owners, operators or those in charge of any ships or objects other than, or in addition to, the colliding ships or object are at fault in respect of a collision or contact.
14. **Special Nature of Agreement** — Carrier and Shipper agree that the circumstances, terms and conditions under which the transportation is to be performed are such as reasonably to justify a special transportation agreement of type described in Article VI of the Schedule to the Carriage of Goods by Water Act, Revised Statutes of Canada, 1970, Chap. C-15, or Title 46 United States Code, Section 1306, and that this agreement shall have effect pursuant thereto.
15. **Non-Negotiable Receipt** — No bills of lading will be issued hereunder, but Carrier shall, upon demand by Shipper, issue a non-negotiable receipt or receipts in the form of Schedule A hereto, and if not actually issued, the same shall be deemed to have been issued and Schedule A shall constitute the same and shall be applicable to transportation hereunder. The Carrier is not and does not accept the responsibility of a common or public carrier.
16. **Methods of Conveyance** — To the extent the Carrier may do the same, whether through non-compliance by the Shipper, consignee or owner of the cargo, of the obligations hereunder or otherwise:
 - (a) The Carrier shall be at liberty to lighter or otherwise carry the cargo to or from the barge and/or to tranship and/or if in the opinion of the Master it is necessary or advisable for the safety of the barge to shift, re-lash or re-stow the cargo;
 - (b) In case of accident or should the tug or barge put into a port of refuge or from any cause not commence or proceed in the ordinary course of her voyage, the Carrier shall be at liberty to discharge into craft and/or land the cargo or any part thereof and/or store afloat or ashore and/or tranship and/or forward to destination;
 - (c) In case of quarantine, or if entry into the port or place of discharge or transhipment or staying thereat would render the tug or barge liable to quarantine thereat, or at any other port or place, or if the tug or barge is prevented from entering the port or place or is likely to be delayed thereat owing to blockade, interdiction, war, strikes, lockouts, disturbances, ice, storms, or any other cause whatsoever beyond the Carrier's control, the Carrier shall, subject to Part II, Paragraph 18, be at liberty to proceed to a neighbouring safe and convenient port, and there land the cargo and/or store afloat or ashore, and/or transport and/or forward the same to their destination by land or water at the sole risk of the consignee, the Shipper and the owner of the cargo, who, jointly and severally, shall pay all extra freight charges and expenses incurred.
17. **Methods of Delivery** — To the extent that the Carrier may declare the following to be applicable, whether by reason of non-compliance by the Shipper, consignee or owner of the cargo of their obligation hereunder or otherwise:
 - (a) The Carrier shall be at liberty to deliver or discharge day and night, holidays included, as fast as the barge can deliver, regardless of weather conditions, and the Carrier shall be under no liability to notify the consignees of the arrival of the cargo; any custom of the port to the contrary notwithstanding;

- (b) Any loss or expense caused owing to Customs, consular or other regulations not being compiled with, or to Customs' Permit, and/or other necessary papers not being lodged within 24 hours after tug or barge's entry at the Customs, or when required will be charged to the consignees, Shipper and owners of the cargo, who, jointly and severally, shall indemnify the Carrier, and the Carrier shall be at liberty to return the cargo to the port of shipment at the sole risk and expense of the Shipper, owner and consignee of the cargo, jointly and severally;
- (c) The Carrier shall have a lien on the cargo for all sums due under this contract and the cost of enforcing such lien. For the purpose of enforcing such lien, the Carrier may without notice sell or retake possession and sell the cargo by public auction or private treaty.
18. **Alternate Destinations** — Carrier will make all reasonable efforts to deliver the cargo to the Port of Discharge, but it is understood that if the Port of Discharge is in the Arctic and east of Point Barrow, ice and/or weather conditions may render it impossible or imprudent in Carrier's judgment to proceed past Point Barrow. In such event, Carrier shall give telegraphic notice to Shipper, and the parties shall thereupon jointly request a written opinion from Salvage Association, London (or other mutually acceptable independent expert) whether proceeding past Point Barrow is possible and prudent. Should such independent expert conclude that so proceeding is both possible and prudent, Carrier shall continue with the contract voyage. Should such independent expert fail to advise the Shipper and the Carrier that so proceeding is possible and prudent within 24 hours of such request, Shipper shall give telegraphic instructions to Carrier to make delivery at an alternate destination (herein called an "Alternate Destination") (being: Prince Rupert or Vancouver, British Columbia, or Kenai, Anchorage, Valdez or Seward, Alaska) subject to all other terms and conditions of the contract, and delivery at the designated Alternate Destination shall be considered complete performance of the contract voyage. Should Shipper fail to designate an Alternate Destination within 24 hours of the failure of the Shipper or the Carrier to receive the independent expert's opinion that to proceed is possible and prudent, Carrier shall be entitled upon 12 hours' notice to the Shipper to proceed to and discharge the cargo at any of the aforesaid Alternate Destinations, subject to all of the terms and conditions of this contract, and such discharge shall be considered complete performance of the contract voyage.
19. **Notice** — Any notice required to be given to either party under this Agreement shall be sufficiently given if given by telex or delivered or mailed by registered mail to the Shipper addressed to the address specified for the Shipper immediately above the signature of its signing officer in Part I of this Agreement or at such other place as the Shipper may specify to the Carrier in writing, and if delivered or mailed by registered mail to the Carrier addressed as follows:
- Arctic Transportation Ltd.
700 The Baxter Building
1111 West Hastings Street
Vancouver, British Columbia
- or given by telex to the Carrier at:
- Arctic Transportation Ltd.
Vancouver, British Columbia
Telex No. 04-54240
Answerback: ARTICTRSP VCR
- or at such other place as the Carrier may specify to the Shipper in writing, such notice shall be deemed to have been received by such party when delivered if delivered or if sent to the Shipper by telex or mailed, on the date on which it shall have been received by the Shipper; or if sent by telex or mail to the Carrier, on the date it shall have been received by the Carrier.

Part III

SUPPLEMENTARY TERMS AND CONDITIONS

Supplementary terms and conditions covering loading and storage, discharge and demurrage considerations will form Part III of this Contract of Private Carriage. Such terms and conditions are determined for each contract on a separate and individual basis; accordingly, they are subject to mutual agreement between the Shipper and the Carrier.



SCHEDULE A

Non-Negotiable Receipt

Shipped on deck by
for the present voyage from the port of
and bound for the port of, the
following described cargo (Shipper's weight and count; actual quantity unknown; all on board
to be delivered):

All terms, conditions and exceptions as per the Contract of Private Carriage dated for reference
theday of, 19... between Arctic Transportation Ltd.
and

Dated at thisday
of, 19.....

ARCTIC TRANSPORTATION LTD.

By:

.....

**OCEAN SHIP FREIGHT RATES FROM JAPAN TO
WEST COAST AND SOUTHERN
ALASKAN PORTS**

The ocean ship rates, which appear below, are based upon current 1975 charter market conditions. Accordingly, the rates are highly subject to fluctuation; by way of reference — today's charter rates for bulk carrier vessels are running approximately 50% lower than those of 12 to 18 months ago.

The ocean ship rates have, for the purposes of this Transportation Plan, been limited to cargo originating in Japan. However, it should be noted that ocean ship freight rates for cargo originating in western Europe (Germany, France, Italy and The Netherlands) are available upon request to ATL.

**ATL OCEAN SHIP FREIGHT RATES
PER SHORT TON OF 2000 POUNDS
BASIS 1975 COSTS AND CONDITIONS
CANADIAN DOLLARS**

I. FREE IN AND FREE OUT

	48" OD x .8 WT		48" OD x .72 WT		36" OD x .45 WT	
	40' Length	60' Length	40' Length	60' Length	40' Length	60' Length
From Japan to:						
VALDEZ, Alaska	25.00	27.50	28.50	31.35	28.50	31.35
SEWARD, Alaska	25.00	27.50	28.50	31.35	28.50	31.35
SKAGWAY, Alaska	25.00	27.50	28.50	31.35	28.50	31.35

II. FREE IN AND LINER TERMS DISCHARGE TO END OF SHIPS' TACKLE OR SHORE CRANE HOOK

	48" OD x .8 WT		48" OD x .72 WT		36" OD x .45 WT	
	40' Length	60' Length	40' Length	60' Length	40' Length	60' Length
From Japan to:						
VANCOUVER, B.C.	29.50	32.45	33.00	36.30	33.00	36.30
PRINCE RUPERT, B.C.	29.50	32.45	33.00	36.30	33.00	36.30
SKAGWAY, Alaska	36.00	39.60	39.50	43.45	39.50	43.45

The above rates have been based upon the following additional considerations:

1. Loading is to be conducted at one port in Japan. If a second load port is required, add Cdn. \$1.00 per short ton to entire shipload of cargo.
2. On deck shipment, at carrier's option, is to be allowed. If on deck shipment not allowed, add Cdn. \$2.00 per short ton to entire shipload of cargo.
3. For the purposes of carriage of the subject pipe cargo in ocean going ships, there must be no tier limitation.
4. Loading speed is to be 1500 short tons per weather working day, Sundays and holidays excepted unless used. Demurrage is to be Cdn. \$5,000 per day, half despatch laytime saved.