

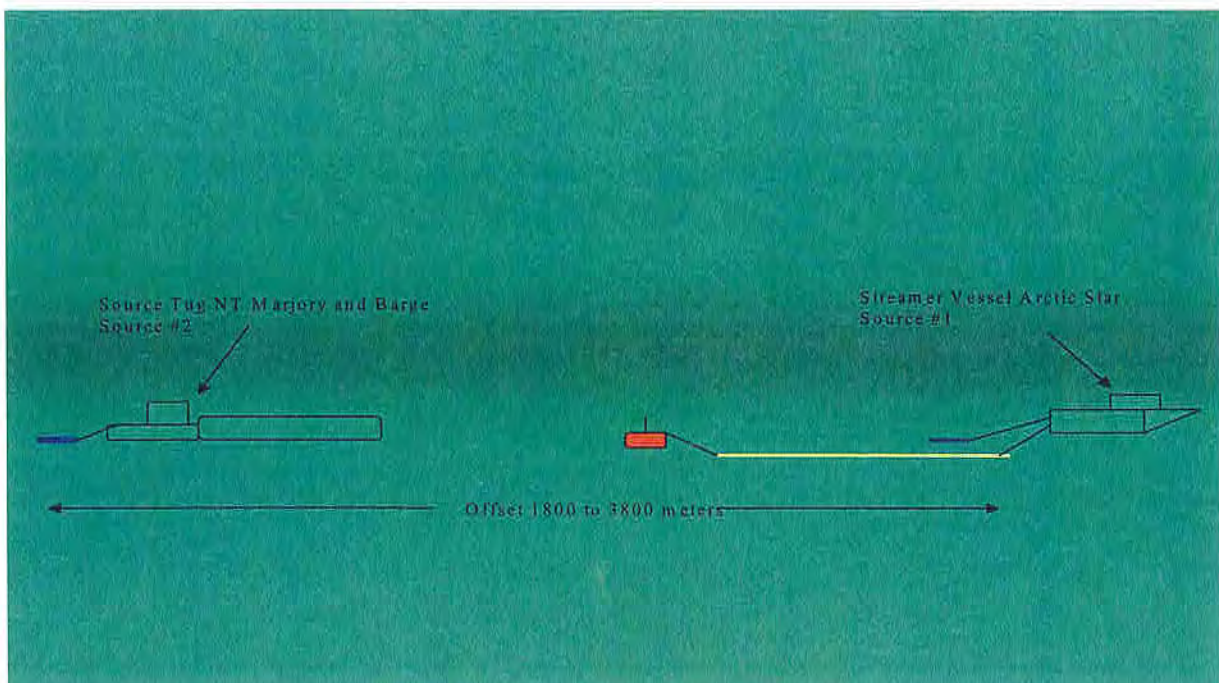


Mackenzie River Seismic Program

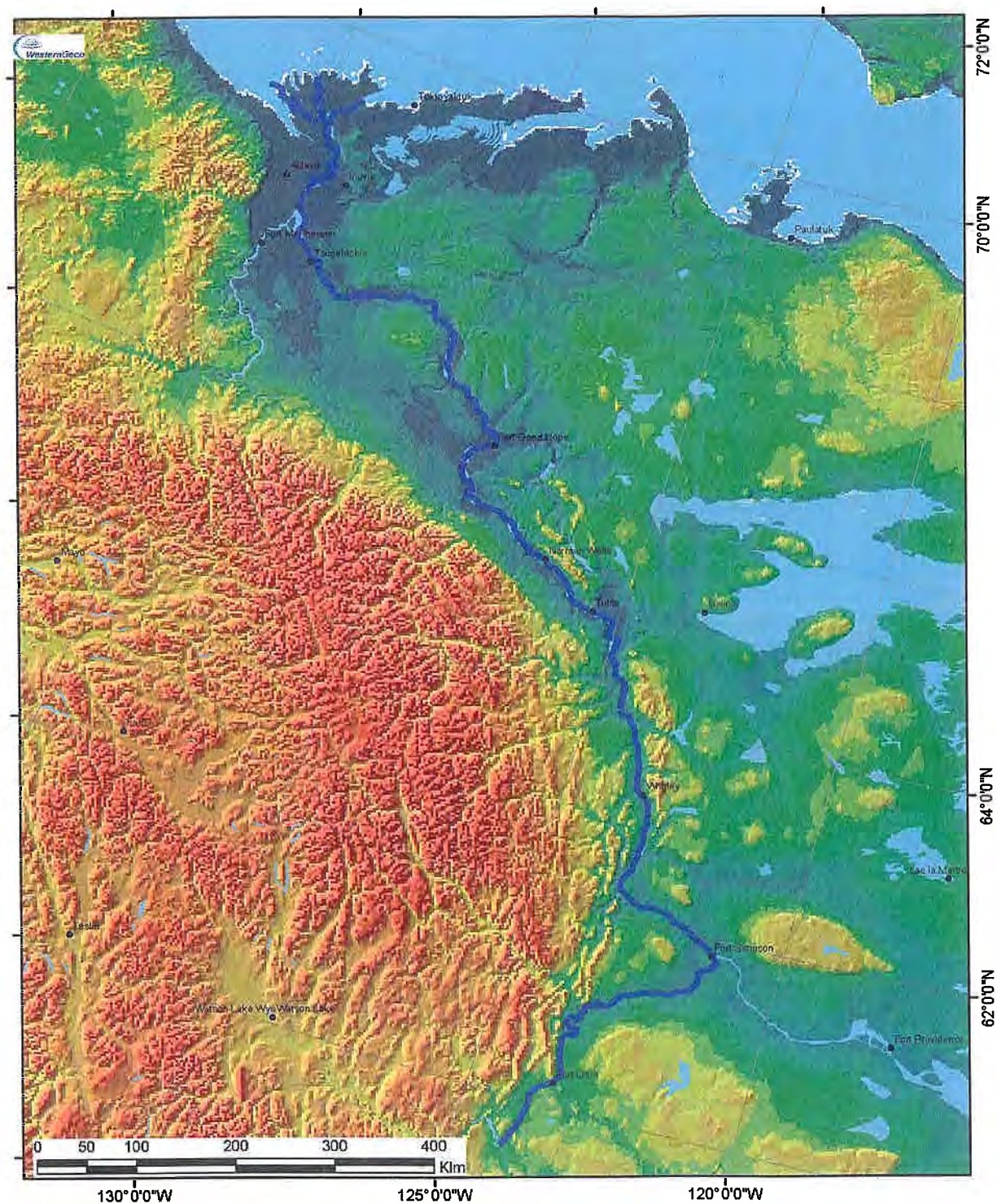
WesternGeco is planning to acquire seismic data set in the Mackenzie River. Our intent is to conduct the seismic survey throughout the length of the Mackenzie River including several tributaries within the Mackenzie Delta and the Liard River. The configuration for this program will be a dual vessel, dual source, single streamer (WesternGeco's survey vessel Arctic Star together with a support vessel supplied by NTCL). Conducted during the summer of 2002 from early June to the end of August, WesternGeco is planning on acquiring over 2000 kilometers of 2D data. The estimation of the duration of the project is 60-75 days.

The intent of this survey is to collect geophysical data along the extent of the Mackenzie River. The method of procurement is one that has been employed throughout the world and conforms to all our national and territorial regulations. The energy source is compressed air and the data is recorded by hydrophones located in a solid streamer cable, which is towed behind the survey vessel.

Below is shown the configuration of the operation.

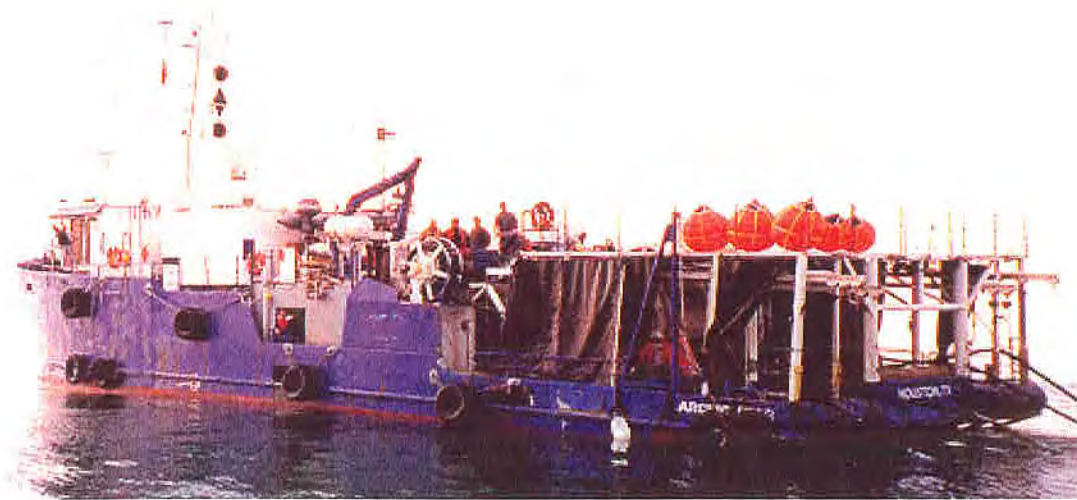


Below is shown the extent of the project.



Seismic Vessel

The Arctic Star I, previously named the Arctic Star, is the seismic vessel contracted for this program (Diagram 2). The Arctic Star I was converted in Stockton, CA in January 1979 is in Canadian waters as a Panamanian flagged vessel. The vessel is 34.3 m long with a maximum draft of 2.6 m. The maximum speed of this vessel in calm water is 9 knots. The transit economy speed is 7.5 knots and the streamer towing speed is 4.5-5 knots.



The Arctic Star I will be mobilized in Inuvik, North West Territory as soon as the vessel is accessible.

Source Vessel

Tug Marjory is a pusher tug owned by NTCL. She is 24.6 m in length and 9 m wide. The tug will be pushing a barge 48.7 meters in length. Her position will be from 1000 to 2000 meters ahead of the Arctic Star I.

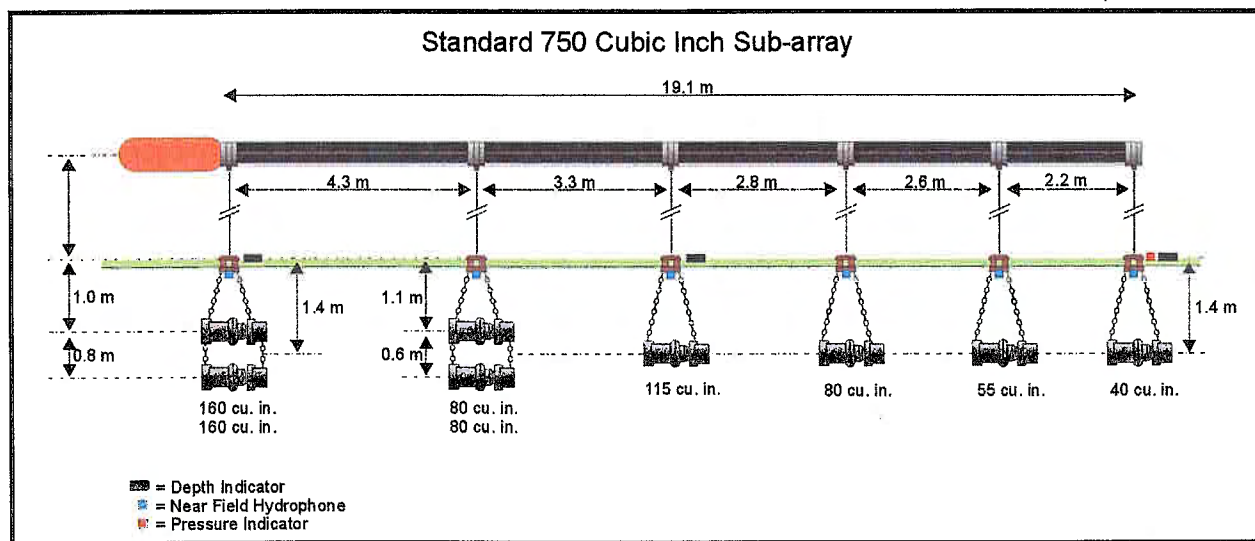


Air Guns

Both vessels will tow air guns from the stern, "Sound source". One airgun array will be located on a recording vessel, the other will be towed by a separate source vessel located approximately 2km ahead of the recording vessel.

WesternGeco is proposing to use two 1500 in³ sleevegun arrays, one on each vessel.

Each sleeve gun array is composed of two 750 in³ subarrays that operate at an air pressure of 2000 psi. Each subarray is comprised of two two-gun clusters, and four single guns. The two subarrays are mounted with a 12 m separation between them.



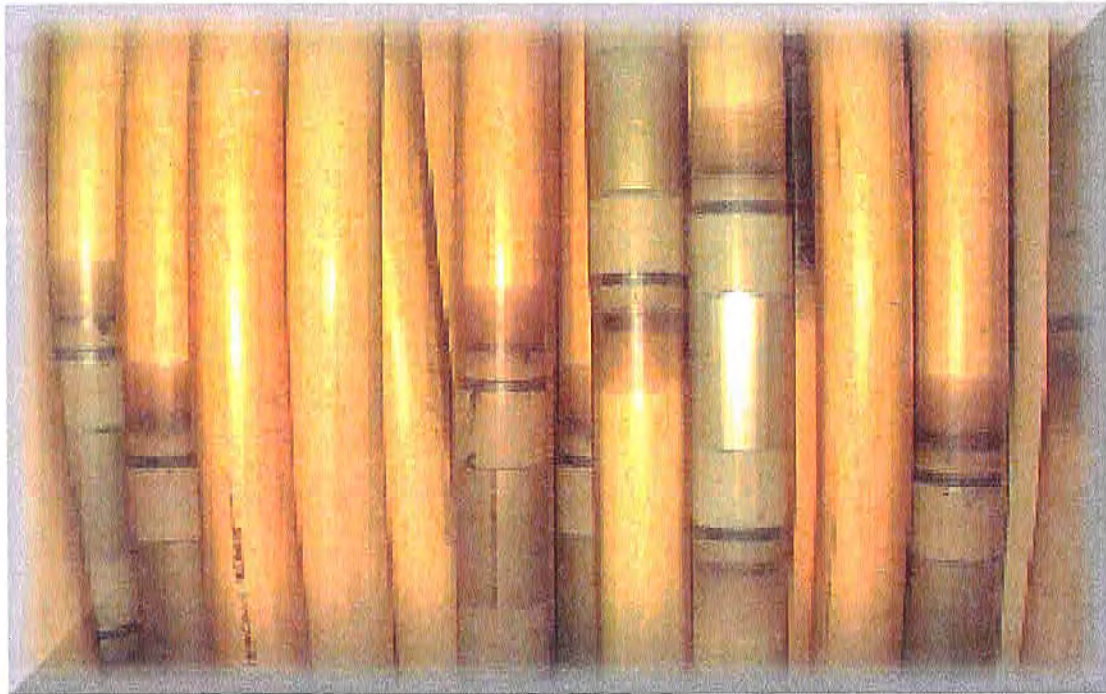
Air Gun sub-array

Seismic Cable

The Arctic Star I will tow 1000 to 2000 meters of solid seismic cable to record data generated by the air guns.

Traditional offshore seismic surveys utilize streamers; solid cables that are towed 5 to 10 m below the surface and contain the hydrophones (devices used to record seismic data). WesternGeco will be towing a single streamer at a depth of 3 to 5 m depending on water depth. The streamer contains acoustic pressure sensors that sense seismic reflections from the earth's subsurface and transmit them to the seismic vessel. In the past, marine seismic exploration was conducted with oil-filled streamer. The streamer that will be used for this program is a solid streamer. The solid streamer ensures that, if damaged, the streamer will not introduce any substance that can harm the environment.

Solid seismic cable on a storage reel.



Mackenzie Basin Seismic Survey

Possible Employment Opportunities

WesternGeco:

➤ Ordinary Seamen:	2 – 4
➤ Handling Engineer Trainee:	2 – 3
➤ Cooks:	1 – 2
➤ Stewards:	1 – 2
➤ Program Liaison Advisors:	3 (1 per region)
➤ Environmental Monitors:	3 (1 per region)

Contractor Employment Opportunities:

➤ Small boat operator:	1 – 2
➤ Small boat deckhand:	1 – 2

Candidates will be given the following at facilities on the East Coast Canada.

- Medical
- Vaccinations
- Flag state documentation, Seaman Book
- BST courses (basic survival training)
- HUET courses (helicopter underwater escape training)
- First Aid course
- WHMIS course (hazardous materials training)

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