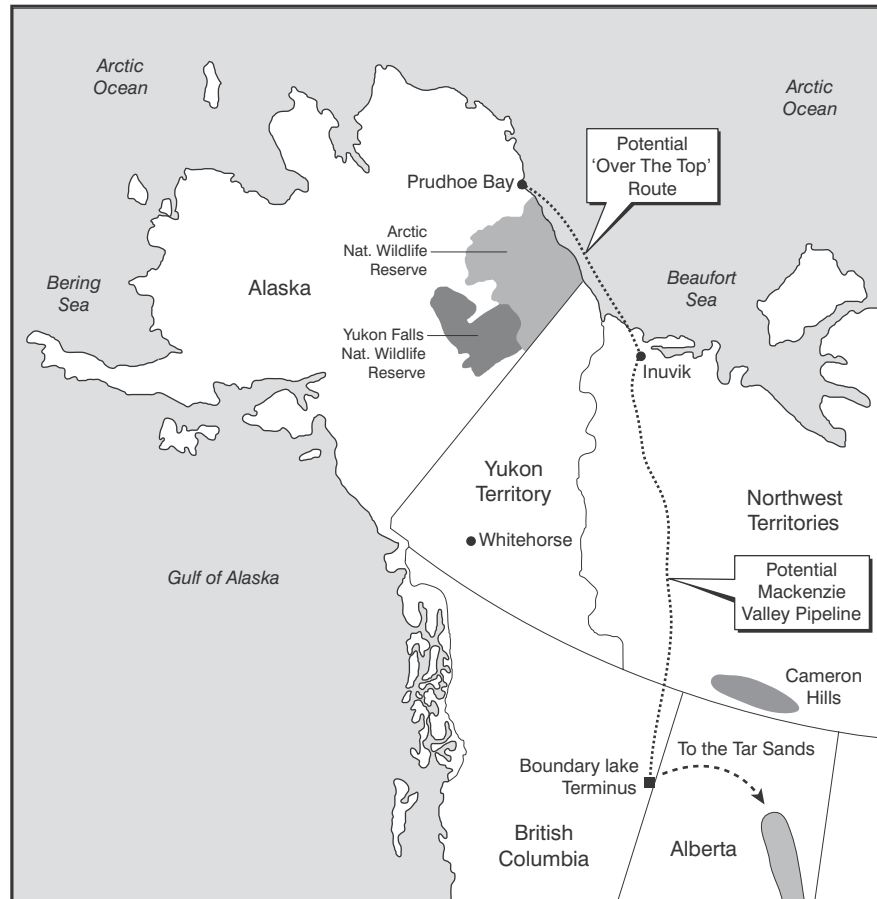


HIGH TECH DEVELOPMENT IN THE ARCTIC – A DME

The North Slope of Alaska and the Mackenzie Valley/Delta areas have been pumping oil successfully for over 30 years. Major global oil companies are involved. At the beginning of the 21st century, gas production in the Mackenzie region and the expansion of Alaskan oil drilling into even more environmentally sensitive areas are both being seriously investigated. Such economic developments require technological leaps forward and the oil companies are currently investing large sums so that the necessary equipment will be in place when it is needed. The main companies involved in the gas developments are Imperial Oil (Esso), Conoco Canada, Shell Canada and ExxonMobil Canada. New oil and gas exploitation in Alaska concerns companies including BP and Conoco. It is estimated that a quarter of the world's untapped oil and gas reserves lie in the Arctic. Certainly Russia believes this; in 2007 its exploration programme of the Losmonosov Ridge, an area which may be attached to the mainland by shallower continental shelf, led it to claim new parts of the Arctic Ocean as Russian territory and planting an underwater flag right at the North Pole.

Figure 1: The Mackenzie Valley pipeline



Source: BP, National Energy Board, Cambridge Energy Research Associates and TransCanada Pipelines Ltd

Exploiting Mackenzie gas

The Mackenzie River basin is the 12th largest in the world by area, occupying one-sixth of Canada. Its delta is the 10th largest globally, covering 12,000 sq km. The river itself runs from Great Slave Lake north to the Beaufort Sea, and is the largest single source of fresh water flowing into the Arctic Ocean. It is a unique area, supporting a diverse ecosystem. Many members of the local tribes still live a traditional lifestyle, depending on the plants and wildlife of the region.

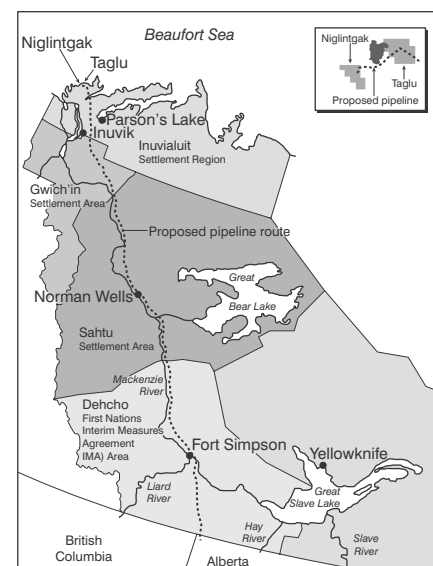
Significant quantities of oil and natural gas have been discovered in the Mackenzie Delta and the central Mackenzie Valley. Oil production is far more advanced than gas. So far, gas is only utilised from the Cameron Hills area of the southern part of the Northwest Territories (Figure 1). Until a natural gas pipeline is built from the Mackenzie Valley to the Alberta or British Columbia pipeline systems, there is no viable commercial

way to move natural gas from source to market. Three gas fields could be exploited: Niglintgak, Taglu and Parson's Lake (Figure 2).

This gas pipeline was proposed as early as the 1970s. The estimated cost of \$16.2 billion will doubtless overrun, as large-scale projects tend to do. Construction would be difficult, as much of the route lies in the permafrost zone. Despite many technological advances, these precarious operating conditions result in pipeline damage, just as the pipelines affect the equilibrium in the permafrost. Moreover, during construction, workers would face hundreds of miles of wilderness roads and immensely difficult weather conditions.

One key difference between the existing Alaskan pipeline and the proposed Mackenzie one is the length. The new gas line would go right across Canada to the US border and beyond, a

Figure 2: Potential gas fields in the Northwest Territories, and indigenous areas through which the pipeline would pass



great deal further than the oil pipeline crossing Alaska to reach a warm water port (Valdez, Figure 3), from which the oil can then be transported by sea. The pipeline would cross more than one Canadian province, each of which would be involved in the decision-making process. Provinces such as Alberta historically support mineral extraction industries – they have been an important part of its economy – but the major urban centres of population further east tend to be more concerned with conserving natural resources. Even if newly developed technology makes pipeline safety much more secure, this body of opinion could have a significant influence on the progress of the whole project.

To put it into context, the Mackenzie Basin gas pipeline scheme would be bigger than the Colorado River dams of the Tennessee Valley Authority scheme. The current Mackenzie River Plan involves building a system linking three known gasfields and then following the river’s course upstream (southwards). Opponents to the Mackenzie pipeline claim it could ‘wreak widespread destruction on one of the last best places on Earth ... This is the environmental frontier. It will be a giant fight over the next 20 years’ (Kert Davies, Greenpeace).

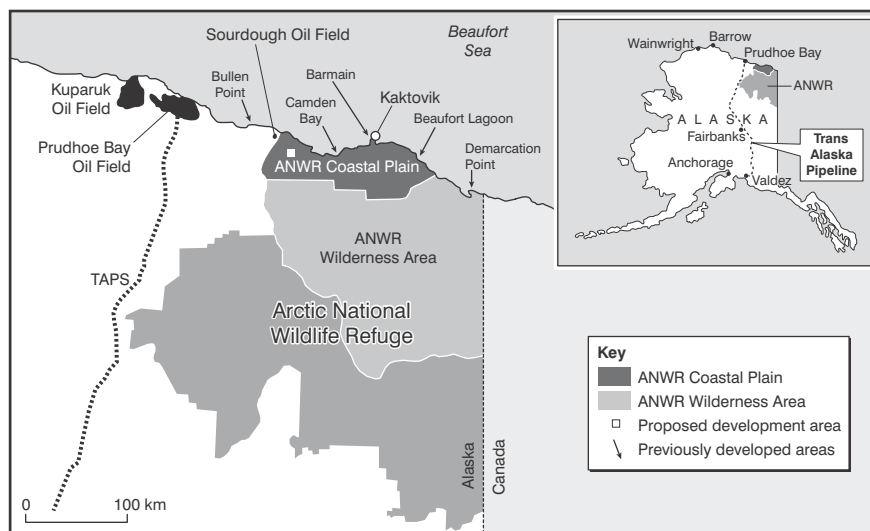
Using gas to produce oil?

Some people believe that the gas will not be piped very far, but that at least some, or perhaps most of it will feed the energy needs of tar sands exploitation in Alberta (Figure 1). Currently, from this resource, Canada produces one million barrels of oil a day. Tar sands are a surface source of heavy oil, and its potential is so huge it could rival Saudi Arabia, but only if new extractive methods are devised. The problem with exploiting tar sands is the resultant pollution and other environmental damage. Huge volumes of water are needed, which could seriously drain the Athabaska River. This process, high on greenhouse gas emissions, could also cause great harm to global climate, widespread destruction of boreal forests and produce large quantities of toxic tailings (waste material).

The likely impact of the gas pipeline

Some people believe that, if built, the Mackenzie pipeline would cause environmental damage far beyond its use in providing a key energy resource. However, similar things

Figure 3: The Trans-Alaska Pipeline and location of the Arctic National Wildlife Refuge (ANWR)



Source: Alaska Dept of Natural Resources

were forecast during the early days of the Trans-Alaskan oil pipeline; many people now find it quite acceptable, though, of course, others do not. The gas pipeline is billed as ‘the biggest project in the history of free enterprise’. A spiral effect would probably occur – industries and other development would be attracted to the pipeline route like a magnet. Today’s pristine Mackenzie Valley would become a vast ‘energy corridor’, with a complex system of feeder pipelines, electric utilities and even urban sprawl. The project would transform the homeland of the region’s indigenous population.

Opinion amongst the First Peoples, or First Nations of the Northwest Territories (the indigenous peoples) is mixed. Many want the exploitation as long as they receive a fair share of the revenue generated from the exploitation of their traditional lands. Four out of five native groups formally support the gas pipeline project, a change from the position in the 1970s, when all were united against the idea. Income from the project might go some way to address key problems of the region such as lack of housing, poor health and a high suicide rate.

The Aboriginal Pipeline Group (APG) has been formed, which will own 34% of the pipeline and will earn money from transport fees for gas carried across their territory. It must borrow finance from the banks to be able to buy into the scheme. The group opposing the pipeline, the Dehcho people, may have more influence than others as their territory comprises 40% of the land over which the pipeline would pass (Figure 2). An arrangement has been made to allow them to join the

profit scheme should they negotiate an agreement. Aware of the environmental concerns, the Dehcho could demand that technology goes as far as possible to limit environmental risks. The more oil and gas prices rise, the more investment is available to achieve exploitation of this huge gas resource. The transnational companies involved very much want to undertake such exploitation.

Expanding oil exploitation on Alaska’s North Slope into the Arctic National Wildlife Refuge (ANWR)

Canada is America’s largest foreign source of oil; Canada’s oil industry is largely run by US companies. Until recently the ANWR has been avoided by oil and gas companies, but US and world demand is now so great that pressure to exploit the region has increased. As oil prices rise, more money is available to fund research into the necessary technology. Exploitation of the ANWR would need much new technology to ensure safety for the particularly fragile ecosystem there. Opponents say that pipelines and production centres would permanently change the tundra, no matter how much new technology is applied. There could still be oil spills; caribou and other wildlife would be threatened. Any new development on the coastal plain of the ANWR would not only alter the wild character of this 1.5 million acre area, but of the entire 19.8 million acre refuge. Environmentalists generally believe that no amount of new technology could ensure safety from oil spills and the devastation they cause.

Nevertheless, 75% of Alaskans support Refuge exploration. Ironically, nationwide only 40% are in favour, with 56% against and 4% ‘don’t knows’ (Gallup poll, March 2001) – but see also Box 6 below to see some different numbers. Based on the performance of the one well so far drilled on the coastal plain of the Refuge, the US Department of Energy predicts that the area could produce about one million barrels of oil a day, doubling Alaskan production to date and increasing national oil production by 17%.

Decision-making exercise

Read carefully the material set out in the boxes. They complement the text you have just read.

Box 1: Arctic disaster

Pipelines are fraught with disaster and risk. In 1999 six anonymous workers on the Alaskan pipeline wrote to warn the government of impending disaster. ‘It won’t be a single gasket, or valve, or person that will cause the catastrophe,’ explained the employees. ‘It will be a combination of small, perhaps seemingly inconsequential conditions that will lead to the accident that we’re all dreading and powerless to prevent.’

In 2006 a rupture in a feeder pipeline near Prudhoe Bay produced a huge spill of crude oil that flowed across the tundra and into the Arctic Ocean. It was estimated to be second only to the earlier Exxon Valdez disaster in Alaskan history (a major oil tanker disaster off the south Alaskan coast in 1989). BP had to shut down and replace miles of pipeline.

Source: <http://oilsandtruth.org>

Box 2: Does the USA have an oil crisis? Does it need to expand production on its own territory?

Discussion between Chris Kelly, spokesperson for the American Petroleum Institute and Mark Lynas, journalist and environmentalist:

Does the US have an oil crisis?

CK: ‘There is not an oil crisis, nor is there an energy crisis at the moment. There could be an energy crisis in the future if the US government ... and energy interests do not get together to fashion an energy strategy for the future, a plan that focuses on oil and gas supplies and conservation as well.’

ML:

‘The US does have an oil crisis. It uses too much of it – with only 5% of the world’s population, America uses nearly a third of the world’s oil. This dependence has made oil corporations like Exxon-Mobil so powerful that it has directly contributed to the country’s current democratic crisis. The industry now blatantly controls the White House, making US government little more than the administrative arm of big oil.’

Will oil drilling have an impact on the environment?

CK: ‘Oil drilling these days is done in a very environmentally safe manner. The size of the drill platforms [is] significantly smaller, thus lessening the impact on the surface. One rig can now drill multiple wells from just one location making drilling much more productive and safe for the environment.’

ML:

‘Oil drilling has disastrous impacts on the environment, both locally because of industrial infrastructure and spills and globally because of climate change. Alaska suffers from both. There are 400 spills annually on the oil-rich North Slope of the state, and few can forget the Exxon Valdez disaster. Development in ANWR (Alaskan National Wildlife Refuge) would simply destroy one of America’s

last great wildernesses. And all over Alaska, climate change is already killing forests, destroying buildings and roads as permafrost melts, and leading to the disappearance of lakes and wildlife.’

Should the US cut energy consumption?

CK: ‘Conservation is a major ingredient in the energy strategy put forward by the president and both parties in congress. But conservation alone will not be enough. Adequate additional oil and natural gas production is essential too.’

ML:

‘US energy consumption is now so high that all the oil in ANWR would keep its cars and factories running for a mere six months. A simple one-mile-per-gallon improvement in automobile fuel efficiency could save half a million barrels of oil per day, yet fuel efficiency standards are going down as people buy bigger and bigger cars.’

Will oil drilling in Alaska benefit the local people?

CK: ‘Yes, all Alaskans now receive an annual payment from the state’s royalty shares. And drilling in Alaska means more jobs for people either directly in the oil industry or indirectly through companies doing business with oil companies.’

ML:

‘The Eskimos of Alaska’s North Slope have long served the public relations front for big oil companies like BP. It is true that they get jobs and revenue from the industry, as do people throughout the state. But oil has also destroyed traditional native culture, and is firmly opposed by the Gwich’in Indians of Arctic Village, who say that drilling in ANWR will destroy the calving grounds of the caribou their tribe depends on. And even the pro-drilling Eskimos oppose oil developments offshore, because they say that spills under the ice could never be properly cleaned up.’

Source: BBC News 8/2/09 <http://news.bbc.co.uk/1/hi/world/americas/1470991.stm>

Box 3: Is ANWR worth drilling?

More Alaska crude would do nothing to solve California’s electricity crisis, which is caused primarily by a shortage of power-generation capacity. Oil from the refuge would also probably not reduce global oil prices. Nor would it free the nation from dependence on OPEC oil or end the nation’s vulnerability to disruptions in the production of foreign crude. Even tapping refuge oil, the US

would still import more than half its crude oil.

The industry and its supporters argue that they can preserve the refuge while getting the oil. There have been no catastrophic oil spills on the North Slope, and air emissions and water quality are within lawful ranges. Oil exploitation has displaced some species such as female caribou from the territory they use for calving.

Nevertheless caribou populations are stable in the oilfield area.

‘I believe the oilfield can go into any sensitive area and work in a way that is fully compatible with the wildlife and other natural resources,’ said Mike Joyce, a biologist who worked on the North Slope for 26 years.

<http://news.nationalgeographic.com/news/pf/21545410.html>

Box 4: Too good an opportunity to resist?

‘The oil industry goes up there and industrialises what has been a pristine area ... suddenly it becomes the new Houston.’

Frank O’Donnell, president of the US environmental group Clean Air Watch

Whilst conservationists are concerned about the threat to the Arctic’s unique ecosystems and wildlife, the governments of countries edging the Arctic see a massive opportunity and are positioning themselves to stake claims to the relevant territory. As global warming creates an increasingly ice-free Arctic (potentially ice-free in summer by 2030, since the region is warming twice as fast as the rest of the globe) oil and gas becomes easier to find and less specialist technology has to be developed to achieve this.

‘Most of the Arctic, especially offshore, is essentially unexplored with respect to petroleum. The extensive Arctic continental shelves may constitute the geographically largest unexplored prospective area for petroleum remaining on earth.’

Donald Gautier, Project Chief for the USGS assessment of the region

Mapping of 8.2 million square miles of subterranean geology already suggests that the formations there are likely to contain fossil fuel deposits.

Box 5: Estimates of undiscovered oil and gas resources in the Arctic region

Oil:		Gas	
Region	Estimated resources (billion barrels)	Region	Estimated resources (tcf)
Arctic Alaska	30	West Siberian Basin	651
Amerasia Basin	9.7	East Barents Basin	318
East Greenland Rift Basins	8.9	Arctic Alaska	221

NB These are resources north of 66.56°N which could be tapped using today’s level of technology. It took 10 years to get Gulf of Mexico oil onshore from the start of development. These more difficult resources are likely to take even longer. A massive amount of infrastructure will be needed, both to exploit the reserves and to carry them to their markets.

Source: www.independent.co.uk

Box 6: Alaskans support development

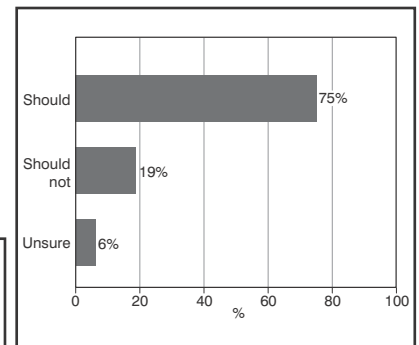
More than 75% of Alaskans support exploration and production on the coastal plain of ANWR. Polling conducted in April 1995 by the Dittman Research Corporation demonstrated that the vast majority of Alaskans supported opening ANWR to oil and gas exploration. Arctic Power, the non-profit citizens organisation representing Alaskans promoting coastal plain development, has over 10,000 members and endorsements from groups spanning the economic spectrum, including miners, fishermen, tourism operators, labour unions,

banks, teachers and many others.

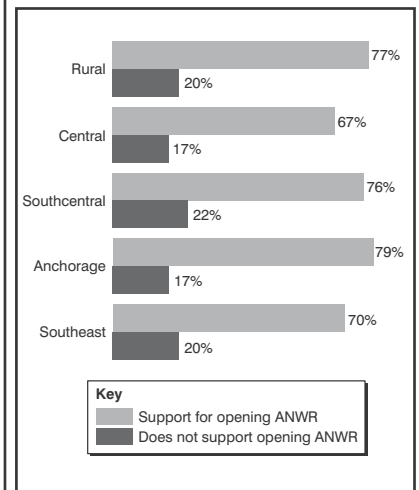
Alaskans supporting opening ANWR to oil and gas exploration dominated the poll by a huge margin (Figure 4).

Figure 4: The Alaskan Poll

‘Do you believe oil and gas exploration should or should not be allowed within the ANWR Coastal plain?’



Support within geographic subgroups:



Survey sample size = 510

Source: http://www.anwr.org

DECISION-MAKING QUESTIONS

1(a) Using both the main text and the boxed material, make two clear lists of the advantages and disadvantages of exploring for, and drilling, oil and gas in the ANWR.

(b) Do the same for new gas exploration in the Mackenzie Delta.

2. Consider the four main groups of people involved:

- the oil and gas companies
- the native peoples of the regions concerned
- the environmentalist lobby
- the US and Canadian governments.

For each, write a summary of their point of view and the reasons behind it. Based on these, you could either discuss ideas and opinions within a small group, or hold a larger class debate.

3. Whilst you are not a specialist in oil and gas drilling technology, what is your opinion on the possibilities of new technology preventing oil and gas spills/leaks? (You could research BP’s record of oil spills at Prudhoe Bay.)

4. You decide!

(a) Should more gas be drilled in the Mackenzie Valley?

(b) Should the ANWR be opened up to oil/gas exploitation?

Summarise your key reasons in each case.