

### challenges

The Arctic has been largely unexplored to date and has significant potential to help meet future global energy demand. Exploration and production in the Arctic, however, are subject to a broad range of challenges, including:

- Remote location
- Icebergs
- Mobile pack ice

leadership

- Permafrost
- Sensitive environment

- Changing ecology
- Prolonged darkness
- Severe storms
- Earthquakes
- Deep water

ExxonMobil is a global company, with operations on six continents and in nearly every country. We are the world's largest non-government producer of oil and gas. Our Arctic leadership is based on more than 80 years of experience in this environment, more than any other major oil and gas company. We also have a sustained commitment to Arctic technology research and development of more than 35 years, and the industry's only dedicated, in-house oil spill response research program. Our Arctic leadership is demonstrated by our:

- History of, and ongoing commitment to, pioneering achievements in the Arctic
- Industry-leading health and safety record
- Strong commitment to operating in an environmentally responsible manner
- Early and ongoing commitment to national content development
- Delivery of complex, integrated projects on time and on budget
- Strong portfolio of assets and opportunities in Arctic environments, including:
  - 1.1 billion oil-equivalent tons (7 billion oil-equivalent barrels) of Arctic resources
  - Several mega-project start-ups planned in Arctic environments for 2009 and beyond
  - Strong Arctic acreage position across four countries

Profiling of ice ridge

1932

First commercial oil field and refinery in Arctic conditions (Norman Wells) 1969

First oil tanker transit through the Canadian Northwest Passage

1978

World's largest ice-strength tests (Prudhoe Bay)

1989

World's largest ice-spray exploration island (Beaufort Sea)

1920

Discovery of the world's most northern oil field at the time (Norman Wells) 1968

Largest oil reservoir in North America discovered (Prudhoe Bay) 1973

First artificial exploration island (Beaufort Sea)

World's largest outdoor ice-test basin (Calgary) 1988

Northern-most offshore well at the time drilled with Mobile Offshore Drilling Unit (Barents Sea) 1997

First iceberg-resistant gravity-based structure (Hibernia)



2002 World's largest landbased drilling rig (Sakhalin)

2006

World's largest fixed-tower Single Point Mooring system (Sakhalin) 2008

World's longest measured depth extended-reach well (Sakhalin)





**Cover photos:** 

Western Gray Whale; Orlan platform in the Sea of Okhotsk; Prudhoe Bay Sag River No.1 well, Alaska North Slope



arctic experience:

# Northwest Territories

# Norman Wells marked the start of the quest for Arctic oil and gas

Norman Wells, located in the Canadian Northwest Territories 1,450 kilometers (900 miles) north of Edmonton, has been operated by ExxonMobil affiliate Imperial Oil Limited since continuous production began in 1932.

When discovered in 1920 by Ted Link, an Imperial Oil geologist, Norman Wells was the world's most northern Arctic oil field. It later became the first commercial Arctic oil field and refinery, operating continuously since 1932.



Gravel production islands during spring ice break-up



Geologist Ted Link discovered oil at Norman Wells, the world's most northern oil field at the time



1920
Discovery of the world's most northern oil field at the time

1932

First commercial oil field and refinery in Arctic conditions

1985
First gravel
production island

Most of the Norman Wells reservoir is located under the Mackenzie River, which is covered with ice up to two meters (seven feet) thick for seven to eight months of the year. Seasonal flooding, ice jams and scouring by thick, freshwater ice make for challenging exploration and production conditions. Some of the first applications of man-made ice islands for winter exploration drilling (1979), and the first application of gravel islands for production (1985) were employed here. Early application of extended-reach drilling technology for horizontal wells to test reservoir quality underneath the river

Produced oil is transported through an 870-kilometer (540 miles) pipeline to Zama, in Alberta, Canada. The Norman Wells Expansion Project, completed in 1986, significantly enhanced recovery while also preserving the natural discontinuous permafrost and ensuring long-term pipeline integrity.

was also employed here in the late 1970s.



Gravel production islands on Mackenzie River





#### arctic experience:

# Alaska

# first ExxonMobil ice-resistant offshore platform

Granite Point field, located in Alaska's Cook Inlet, began production less than two years after ExxonMobil discovered it in 1965. Development and drilling challenges included first-year ice — ice having experienced less than one year's growth — along with earthquakes, high tidal range and strong currents. The Granite Point platform, installed in 1966, was the first ExxonMobil installation of an offshore, ice-resistant platform and is still producing after more than 40 years of successful operation.

### technologies for an Arctic mega-field

On March 13,1968, ExxonMobil and ARCO (Atlantic Richfield Company) announced the discovery of the Prudhoe Bay field, the largest oil reservoir in North America (estimated in-place resource of 4 billion tons or 25 billion oil-equivalent barrels). The field is located on Alaska's North Slope, 400 kilometers (250 miles) north of the Arctic Circle.

Oil transport is one of the key challenges associated with commercializing a remote field such as Prudhoe Bay, with peak production of 115 million tons of oil per year (2 million barrels per day). To explore the feasibility of an Arctic marine transportation system, ExxonMobil led the world's first demonstration voyage of a commercial tanker, the SS Manhattan, through the Northwest Passage in the summer of 1969. In 1972, the Offshore Technology Conference recognized our contribution to marine history and technology as a result of this voyage.



1966 First ExxonMobil ice-resistant platform installed

(Granite Point)



1968
Prudhoe Bay field discovered

1965 Granite Point field discovered

1967
Granite Point production start-up

1969 First oil tanker transit through the Canadian Northwest Passage A pipeline system, made possible by integrating aerospace technology, was ultimately determined to be more effective for Prudhoe Bay oil transport. In 1975, construction began on the Trans-Alaska Pipeline System (TAPS). Challenges associated with the operation of a warm pipeline in thaw-unstable permafrost were solved by elevating the pipe above ground and using pipes to transfer heat from below ground to the air in winter. In 1990, ExxonMobil's heat pipe work was recognized by the United States Space Foundation with an Outstanding Achievement Award for civilian applications of NASA technology. Where the TAPS route crossed unfrozen soil or thaw-stable permafrost, the pipeline was buried.

ExxonMobil enhanced oil recovery technologies, including tailored well-stimulation programs, full-field reservoir simulation and special core analysis capabilities, have been critical to increasing Prudhoe Bay reserves by approximately 30 percent over initial estimates. ExxonMobil

continues to assess opportunities for additional recovery improvements at Prudhoe Bay today.



The Trans-Alaska Pipeline System in winter



first commercial vessel to transit through the Northwest Passage



1975 Construction of

Construction of the Trans-Alaska Pipeline System started



1972

Offshore Technology Conference Award for contribution to marine history by SS Manhattan voyage 1977

Prudhoe Bay production start-up

1990

Outstanding Achievement Award for civilian applications of NASA technology for heat pipe development



#### arctic experience:

## Beaufort Sea

# setting industry standards for Arctic design and leading the development of exploration platforms

Exploration activities in the Beaufort Sea are challenged by a short, open water season and multi-year ice. Multi-year ice has survived at least one melt season, may be much thicker than first-year ice, and typically continues to grow over time. To address these challenges, ExxonMobil undertook significant efforts to develop ice design criteria for exploration and production structures.

In 1973, ExxonMobil built the world's largest ice-test basin in Calgary to study interactions between ice and offshore structures. Five years later, at Prudhoe Bay, we conducted the world's largest ice-strength characterization tests on level ice.

Due in part to the knowledge gained from these studies, we have participated in drilling 44 shallow-water exploration wells in the Canadian and U.S. Beaufort Sea since the early 1970s. These wells were drilled using gravel island, ice island, Caisson Retained Island (CRI), Concrete Island Drilling System (CIDS), Molikpaq and Single Steel Drilling Caisson (SSDC) systems. We are the only company that has application experience with all of them.

ExxonMobil pioneered the use of gravel islands for exploration drilling activities, installing the world's first gravel island in the Canadian Beaufort Sea in 1973 and completing the deepest-water gravel island in 1980. We have also developed industry standards for gravel island technology in the Arctic and held the first industry-wide seminar on the topic.

In addition to our work with gravel islands, we also led an ice island experiment in the U.S. Beaufort Sea from 1978 to 1979. The results of that experiment led to the development of spray-ice construction methodologies and criteria for efficient and cost-effective implementation. In 1989, ExxonMobil built the world's largest ice-spray exploration island, Nipterk P-32, in an area of the Canadian Beaufort Sea outside the protection of the barrier islands, where significant daily ice movements are common.

The CRI structure, which requires less gravel than a traditional gravel island and is less expensive and faster to install, was developed by ExxonMobil and used in the Beaufort Sea in 1983. In order to further reduce construction costs, we also developed a reusable gravity-based structure called CIDS, first used in 1984 at the Antares prospect in the U.S. Beaufort Sea.

Concrete Island
Drilling System (CIDS)
at Antares

ExxonMobil used the heavily instrumented Molikpaq structure, a steel caisson filled with granular material, during Beaufort Sea exploration. In the winter of 1985-86, Molikpaq experienced the most severe ice conditions any man-made structure had ever sustained, including multi-year ice up to seven meters (21 feet) thick. The data collected on this structure significantly enhanced ExxonMobil's ice-load calculation methods and design criteria.

Between 1986 and 1987, ExxonMobil also drilled two exploration wells in the U.S. Beaufort Sea using an SSDC — an ice-strengthened, converted supertanker that rests on a mobile steel platform, allowing for year-round drilling.

The combination of extensive, fundamental studies of ice mechanics, ice data collection and our unique operational experience has provided us with the unparalleled expertise in ice-load calculations that we have subsequently applied in other Arctic environments.

# first Beaufort Sea offshore production system

ExxonMobil is a co-venturer in the Endicott oil field located in the Alaskan Beaufort Sea, about 13 kilometers (eight miles) east of Prudhoe Bay. Key Arctic offshore technical challenges included a short open-water season and severe ice conditions in winter.

To address the issues of severe ice, currents and ice scouring, two gravel production islands were built. These were the first applications of our gravel island technology for offshore Arctic production. The Endicott Production Island started up on October 3,1987, as the first offshore Beaufort Sea production system, and continues to operate today.

Conical structure tests in the largest outdoor test basin in the world



Beaufort Caisson
Retained Island (CRI)

1978

First development of commercial ice island construction method

World's largest ice-strength tests

1989

World's largest ice-spray exploration island

1973

First artificial exploration island

World's largest outdoor ice-test basin

1987

Start-up of first offshore Beaufort Sea production system



arctic experience:

# offshore Eastern Canada and Norwegian Barents Sea



## pioneering iceberg hazard research

ExxonMobil's Arctic research program has included significant work to characterize the hazards associated with icebergs. In 1984, we led the large-scale iceberg strength test program in Pond Inlet, located on Baffin Island in far northeast Canada.

Between 1981 and 1985, ExxonMobil studied more than 700 icebergs in the Grand Banks, located offshore Newfoundland and Labrador, using both aerial photography and underwater profiling to determine iceberg drift velocity, size and mass distributions. These data were released to the research community and formed the core of the iceberg database developed by Canadian scientists from Memorial University of Newfoundland, the Canadian Hydraulics Center and the Centre for Cold Ocean Resources Engineering (C-CORE) in the late 1990s.

In 1988, ExxonMobil drilled the most northern offshore well at the time in the iceberg-prone Norwegian Barents Sea with a Mobile Offshore Drilling Unit. To better understand and quantify iceberg hazards in this area, we established the Ice Data Acquisition Program (IDAP) in conjunction with the Norwegian Polar Institute and the Russian Arctic and Antarctic Research Institute. ExxonMobil coordinated the IDAP from 1988 to 1994, surveying more than 330 icebergs during those years.

ExxonMobil participated in the 1995 Grappling Island iceberg impact test program to measure iceberg impact loads. Icebergs ranging from 200 to 1,000 tons were towed into a segmented ice load panel attached to a nearly vertical cliff on Grappling Island.

In June 2001, offshore Newfoundland and Labrador, ExxonMobil participated in an iceberg impact field program in which the Canadian Coast Guard icebreaker *Terry Fox* was equipped with a novel ice load panel that measured vessel motion during iceberg impact.

test to to a nearly

Iceberg impact tests on the *Terry Fox* icebreaker

1981-1985

Iceberg surveys in the Grand Banks

1988

Barents Sea

Northern-most offshore well at the time drilled with Mobile Offshore Drilling Unit (Barents Sea)

1988-1994

Ice Data Acquisition Program in the

2001

Iceberg impact field program

1984
Pond Inlet Joint

Pond Inlet Joint Industry Project 1995

Grappling Island iceberg impact tests



#### arctic experience:

# **Grand Banks**

# first offshore development project in an iceberg environment

The Hibernia oil field, with between 1 billion and 1.3 billion barrels of recoverable resource, is operated by the Hibernia Management and Development Company (HMDC). ExxonMobil Canada is the lead owner and plays a key role in executing this technologically complex, investment-intensive project. The field is located in the Grand Banks, 315 kilometers (196 miles) east southeast of St. John's, Newfoundland and Labrador, one of the world's foggiest places. The area is also noted for its high waves, icebergs, sea ice and hurricanes. The Titanic accident occurred just southeast of this area in 1912.



**Hibernia platform** 

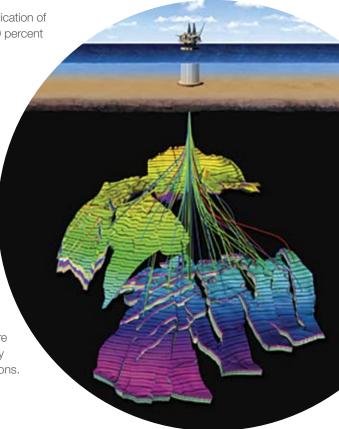
ExxonMobil's enhanced oil recovery technology has been used to support application of both water and gas injection at Hibernia, with the potential to recover up to 60 percent of the resource from the complex and faulted reservoir formations.

# first harsh environment project to use a floating production storage and offloading (FPSO) vessel in North America

ExxonMobil is the second-largest stakeholder in the Terra Nova field, located 35 kilometers (22 miles) southeast of Hibernia.

Terra Nova is the first harsh-environment development in North America to use an FPSO vessel along with subsea production and injection. Relying on iceberg management technology that ExxonMobil helped develop during the Hibernia exploration phase, the Terra Nova FPSO is designed to handle the impact of small icebergs

> moving at average speeds, while being able to disconnect and move away from unmanageable ones. Subsea wells are protected from iceberg scouring by being placed in seafloor excavations.



Hibernia extended-reach drilling broke several world records

**Encroaching iceberg is** "lassoed" with a heavy cable and towed by a support vessel into a different trajectory

1997

First iceberg-resistant gravity-based structure Hibernia production start-up

Terra Nova

Installation of production start-up disconnectable FPSO



Yastreb rig site

arctic experience:

# Sakhalin

## record-setting development offshore Russia

Sakhalin-1, operated by Exxon Neftegas Limited (ENL), and consisting of the Chayvo, Odoptu and Arkutun-Dagi fields, has potential recoverable resources of 307 million tons of oil (2.3 billion barrels) and 485 billion cubic meters of gas (17.1 trillion cubic feet). The fields are

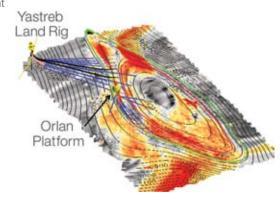
located beneath the shallow water of the Sea of Okhotsk. Exploration and production of these fields are challenged by the presence of thick ice six to seven months out of the year, and severe wave and earthquake activity

year-round.

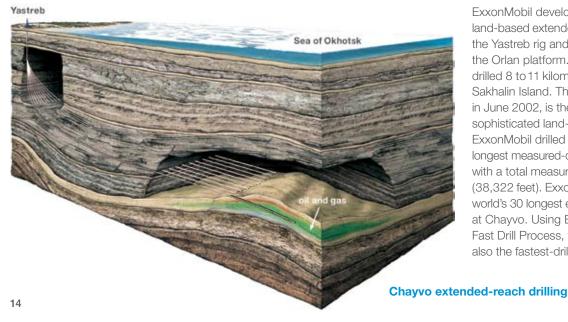
ExxonMobil delineated the reservoir at Chayvo field using proprietary three-dimensional seismic and sequence stratigraphy technologies. In 1983, ExxonMobil researcher Peter Vail was recognized by the Offshore Technology Conference with an award for development of sequence stratigraphy. In 1999, ExxonMobil was recognized for the invention of three-dimensional seismic technology by the Society for Exploration Geophysicists.

Early development studies included research of the western gray whale population and a multi-year ice data collection program conducted in conjunction with the Russian Arctic and Antarctic

Research Institute. These studies provided the environmental data necessary to generate safe and cost-effective design and operating procedures that protect the environment. In 1997, ExxonMobil conducted the first, large-scale, in-situ strength tests of ice ridges at Sakhalin.



Chayvo reservoir map with seismic amplitude



ExxonMobil developed the field using both land-based extended-reach drilling (ERD) with the Yastreb rig and offshore ERD wells from the Orlan platform. Yastreb ERD wells are drilled 8 to 11 kilometers (5 to 7 miles) from Sakhalin Island. The Yastreb rig, completed in June 2002, is the world's largest and most sophisticated land-based drilling rig. In 2008, ExxonMobil drilled the Chayvo Z-12 well, the longest measured-depth ERD well in the world, with a total measured depth of 11,680 meters (38,322 feet). ExxonMobil has drilled 17 of the world's 30 longest extended-reach drilling wells at Chayvo. Using ExxonMobil's proprietary Fast Drill Process, these Sakhalin-1 wells are also the fastest-drilled ERD wells in the world.

ExxonMobil also drilled development wells from the gravity-based offshore platform Orlan, which was designed to handle ice and waves using ExxonMobil's proprietary iceload calculation methodology and a unique wave deflector. Offshore processing facilities on Orlan are minimal, with the full well stream sent to shore for further processing.

Crude oil is transported across Sakhalin Island and the Tatar Strait to the DeKastri terminal in the Russian province of Khabarovsk Krai via a pipeline that crosses three fault lines. ExxonMobil conducted extensive studies of seafloor gouging by ice — including field surveys, laboratory studies and mathematical modeling — to determine the appropriate burial depth for the pipeline. This resulted in robust, proprietary design criteria for pipeline ice scour protection. Fiber optic lines were also installed in the pipeline to monitor integrity.

The DeKastri terminal boasts the world's largest fixed-tower Single Point Mooring tanker loading facility that can accommodate crude export year-round. The fully automated tower is located nearly six kilometers (3.5 miles) offshore.

In the winter of 2002, ExxonMobil conducted a trial in the Tatar Strait, Aniva Bay and LaPerouse Strait with the *Primorye* tanker. The first experimental voyage of a large tanker in ice since the *SS Manhattan*, the trial showed that large marine tankers could safely operate throughout the winter and resulted in the development of safe operational criteria (referred to as "ice passports") used by the tanker fleet currently transporting Sakhalin-1 oil.

Sakhalin-1 has followed a national content strategy focused on contracting qualified Russian companies and organizations. As a result, Russian firms have garnered more than \$4.5 billion in project contracts, or about two-thirds of the total. Local communities are also important recipients of ENL contributions, supporting education, healthcare, civic organizations and the arts. Sakhalin-1 also has a strong partnership with the indigenous minority peoples of the North, and has supported summer camps for children, traditional sports competitions, restoration of historic documents, and music and dance ensembles.

During the more than 68 million work hours of construction and drilling activities associated with the Sakhalin-1 project, employees and contractors achieved a level of safety performance for lost-time injury rates that is several times better than the average for the oil and gas industry. In February of 2007, the Chayvo field reached its peak production rate of 14.5 million tons of oil per year (250,000 barrels per day). Sakhalin-1 is also delivering an average of 115 million cubic feet of gas per day to the Russian domestic market.



**Experimental tanker** trial in the Tatar Strait

2005

Sakhalin-1 production start-up

Orlan offshore platform installed

2006

World's largest fixed-tower Single Point Mooring (SPM) system installed

1997

Unique sea ice data collection offshore Sakhalin

2002

World's largest land-based drilling rig installed

Primorye tanker ice trials

2008

World's longest measured depth extended-reach well

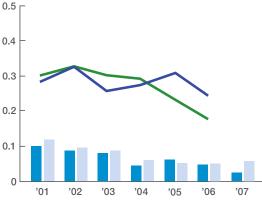


# unparalleled capabilities

ExxonMobil has more than 80 years of operational experience in the Arctic and has had a sustained commitment to Arctic technology research and development spanning more than 35 years. Along with our industry-leading position in safety, national content programs, complex project execution and technological innovation, we bring unparalleled capabilities to Arctic exploration, development and production projects today.

#### **Lost-Time Incident Rate**

(incidents per 200,000 hours)



- ExxonMobil employees
- ExxonMobil contractors
- U.S. petroleum industry employee benchmark\*
- U.S. petroleum industry contractor benchmark\*

\*2007 industry data not available

### safety

ExxonMobil continues its **industry-leading health and safety record**. The main factors contributing to our performance are our Operations Integrity Management System (OIMS); our emphasis on hazard recognition and risk mitigation; and our use of a behavior-based safety approach by all individuals, teams and contractors.

One outcome of a comprehensive focus on safety and operations integrity is higher production uptime. ExxonMobil-operated fields consistently **outperform production reliability of fields operated by others**, with a widening gap in more recent years.

#### national content

ExxonMobil has a proven record of **sustainable national content** programs that achieve economic growth and improve the quality of life in the countries in which we operate. Components of our distinguishing national content program include **workforce development**, **supplier development** and **strategic community investment**. Ultimately, raising the standard of living and the stability of the communities in which we live and do business promotes success for all project partners.



"ExxonMobil, the world's largest publicly traded company, is a master of project management, consistently delivering big projects within budget and on time."

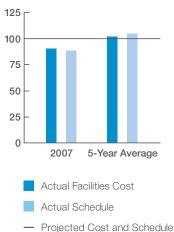
Financial Times November 2, 2005

### project execution

ExxonMobil consistently delivers complex, integrated projects on time and on budget. In fact, our major ExxonMobil-operated projects were delivered within five percent of the cost and schedule projected at funding. The factors that differentiate us include our focus on extensive, detailed front-end planning and our assessment of all options to determine the most robust concept. We identify potential risks early and take steps to mitigate or eliminate them. Our global functional organization also ensures that lessons learned and best practices are systematically captured and shared around the world.



#### **Project Execution Performance**





CONMOBIL UPSTREAM

# unparalleled capabilities

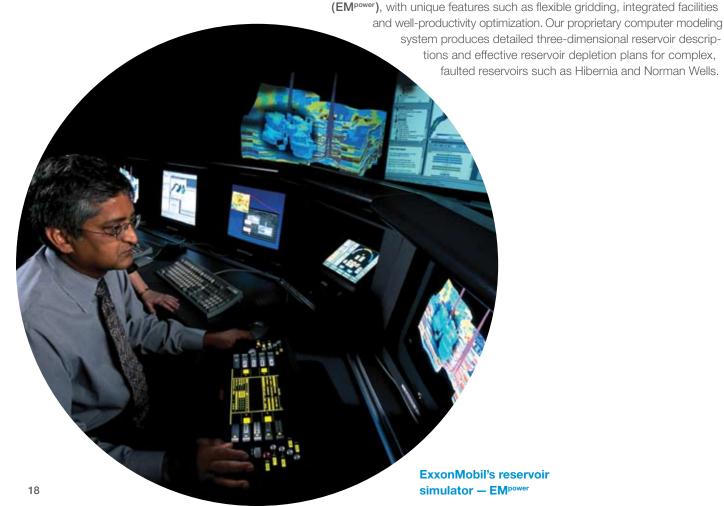
# technology innovation

Technology innovation continues to differentiate ExxonMobil from industry in the Arctic and elsewhere. A few examples of our distinguishing technologies applicable to Arctic exploration, development and production follow.

Remote Reservoir Resistivity Mapping (R³M) technology is a breakthrough in remotely detecting and imaging hydrocarbon reservoirs beneath the ocean. In 2007, in recognition of our development of R³M, the Society of Exploration Geophysicists honored us for contributions that "substantially advanced the science of exploration geophysics." The technology is currently being applied to exploration in the Orphan Basin in the Canadian Grand Banks, among other places.

Our leading position in **Enhanced Oil Recovery (EOR)** stems from our extensive research and development commitment over the past 35 years, our operational capabilities and our worldwide field experience. At Prudhoe Bay, these technologies have helped increase reserves by 30 percent over 1980 estimates, and have the potential to help recover up to 60 percent of the resource at Hibernia. We also operate the world's largest thermal bitumen recovery project at Cold Lake, Alberta, Canada.

Since inventing digital reservoir simulation in the 1950s, ExxonMobil has been a world leader in reservoir simulation. We developed and utilize the world's **most advanced reservoir simulator** 



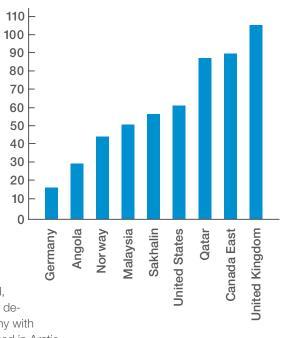
ExxonMobil has distinguishing **ice load simulation** capabilities that provide a proven technology in designing structures for ice environments. These capabilities are grounded in our pioneering fundamental ice mechanics studies, our leadership position in characterizing ice conditions, and are validated by physical testing. Recent application of this technology includes the development of ice design criteria for the Orlan platform at Sakhalin-1.

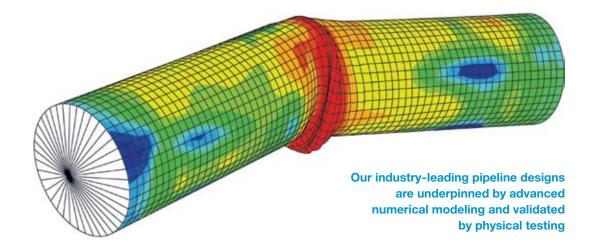
ExxonMobil has an industry-leading strain-based reliability framework for pipeline design in demanding environments. Environmental conditions — including seismic activity, deep water, ice gouging and discontinuous permafrost — are readily addressed using our proven approach. Recent application of this technology includes the pipeline connecting Sakhalin Island to the DeKastri terminal.

Faster drilling rates and reduced downtime are the result of a breakthrough technology we developed called the **Fast Drill Process (FDP)**. Using FDP, Sakhalin-1 wells are the world's fastest-drilled extended-reach drilling wells.

With more than 80 years of operational experience in the Arctic and a sustained commitment to Arctic research and development spanning more than 35 years, the **breadth and depth of our Arctic experience** is second to none. ExxonMobil's pioneering work in fundamental ice mechanics and ice-load calculations, such as Ralston's method, form the basis of several ice design standards. ExxonMobil also pioneered development of gravel- and ice-island technologies, and is the only company with experience in design and construction of a variety of offshore structures used in Arctic environments. In combination with our ongoing research and development program, these demonstrated capabilities provide ExxonMobil with an unparalleled capacity to address current and future challenges of the Arctic environment with our partners.

Rate of Penetration Improvements Achieved with Fast Drill Process during 2007 % Increase







# protecting the environment

ExxonMobil is committed to operating in an environmentally responsible manner everywhere it does business. The Arctic's fragile environment and sensitive ecology present unique challenges. The company's efforts are guided by an in-depth scientific understanding of the environment in which we operate, and the potential impact of our operations on the environment and society. All design and operational plans are based on the goal of eliminating all unacceptable environmental and social impacts, with today's experience used as a basis for improving future performance.

In 1989, the Exxon Valdez super tanker ran aground in Alaska's Prince William Sound, spilling more than 250,000 barrels of oil. It was a tragic accident that the company deeply regrets. ExxonMobil and the U.S. Coast Guard began a massive clean-up effort and, by 1992, the Coast Guard declared the clean-up complete.

In the aftermath of the accident, ExxonMobil redoubled its long-term commitment to safeguarding the environment, employees and operating communities worldwide. We developed an even more rigorous management system and built it into the culture of our company. Today, that system — the Operations Integrity Management System (OIMS) — delivers industry-leading safety performance and an excellent environmental record. ExxonMobil uses OIMS to address safety, health and environmental risks, and the potential impact on local communities.

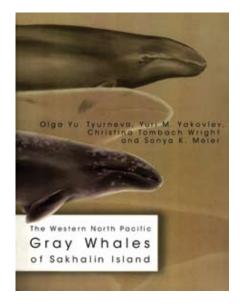
Early consultation with indigenous peoples and local communities is another critical element of our success. For instance, ExxonMobil is collaborating with Inuvialiut communities on whale migration and environmental baseline studies in support of future exploration activities in the Canadian Beaufort Sea. We are also participating in environmental habitat studies offshore Greenland that will include whale migration, fisheries resource assessment, migratory bird habitats and native community impact.



ExxonMobil has a long-term commitment to research and development that addresses environmental issues. For example, we have the industry's only dedicated, in-house oil spill response research program and have led several joint industry projects enhancing oil spill response in ice. We have developed a technique to use icebreaker propeller wash to reduce the environmental impact of an oil spill, even in concentrated ice conditions. In addition, we have developed a new dispersant gel that not only allows treatment of viscous oil in the Arctic environment, but has proven more effective than current products in all environments. This increases dispersant delivery capacity and reduces environmental impact in the event of an oil spill.

We have also begun research on marine vibroseis technology, which minimizes impact on marine life by distributing sound waves over time. Our experience includes application in the Southern Norway North Sea project (1996), where we facilitated seismic acquisition during the Sand Eel fishing season. ExxonMobil also led the effort to create the Exploration & Production Sound and Marine Life Joint Industry Programme, the largest effort of its kind in the history of the industry.

In general, ExxonMobil's technology development efforts are used to provide a competitive advantage. However, the results of our environmental research and technology development are shared with industry and academia for the benefit of all.



Documenting and sharing the results of environmental studies







# future opportunities

ExxonMobil has a portfolio of significant Arctic opportunities, with ongoing studies spanning the range of exploration, project feasibility assessment and planning, and technology development.

### Canadian Beaufort Sea

ExxonMobil and Imperial Oil have recently increased their acreage position in the Beaufort Sea by winning exploration rights to license EL 446, also known as Ajurak. Besides Arctic conditions and a short open water season, Ajurak has water depths ranging from 60 to 1,200 meters (200 to 3,940 feet), making exploration conditions challenging.

An active exploration program is in progress, with plans to acquire extensive three-dimensional seismic data in 2008 using solid streamers, our preferred method to record sound waves in an environmentally sensitive manner. We are currently working with Inuvialiut communities to conduct whale migration and environmental baseline studies.

Ajurak shown on NASA/GSFC MODIS Rapid Response Project satellite image

### West Greenland

In 2007, Esso Exploration Greenland Limited (EEGL), an ExxonMobil affiliate, was awarded the license and operatorship for Block 6 (Orsivik) offshore West Greenland, near Disko Bay. EEGL was also awarded the license for Block 4 (Puilasoq) as a co-venturer.

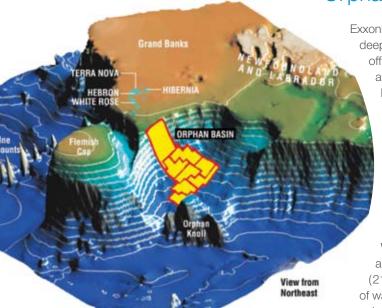
Key Arctic-related challenges for any future West Greenland project include the development of cost-effective solutions for the protection of offshore pipelines, seabed facilities, gravity-based structures and floating production systems in an extreme iceberg environment, where migrating whales and birds spend critical periods of time feeding, breeding and molting.





# future opportunities





ExxonMobil has interest in four operated and four co-venturer operated deepwater exploration blocks in the Orphan Basin, a frontier basin off the eastern coast of Canada and north of the Grand Banks. To aid in Orphan Basin exploration, we are employing our proprietary Remote Reservoir Resistivity Mapping (R³M) technology, which utilizes electromagnetic energy to identify potential hydrocarbon accumulations prior to drilling a well. The first wildcat well in the Orphan Basin was completed in April 2007, and the results are being evaluated.

#### Hebron

The Hebron field, which consists of the Hebron, Ben Nevis and West Ben Nevis reservoirs, is located offshore Newfoundland and Labrador in the Jeanne d'Arc Basin, about 350 kilometers (217 miles) from St. John's in 90 to 100 meters (295 to 328 feet) of water. In addition to the complexities faced by development of the nearby Hibernia field, the Hebron field also faces challenges associated with the recovery of heavy oil.

# Mackenzie Gas Project

The Mackenzie Gas Project includes the potential development of three onshore anchor fields containing approximately 170 billion cubic meters (6 trillion cubic feet) of natural gas in the Mackenzie Delta region of northern Canada. In addition to individual field development, the project includes a gathering pipeline system, a gas processing plant, a natural gas liquids pipeline to Norman Wells, and a natural gas pipeline to northwestern Alberta. ExxonMobil has conducted extensive studies on high-pressure, strain-based design pipelines, applicable to both the Mackenzie and Alaska Gas projects, which provide a solid basis for safe and effective design of large export pipelines in permafrost areas, addressing both frost heave and thaw settlement.

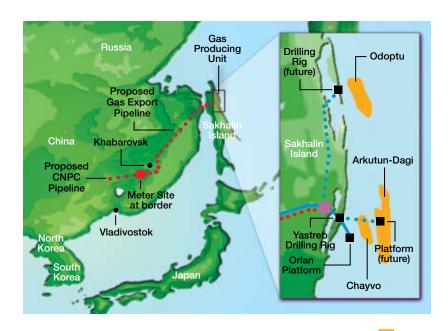
### Alaska Gas Pipeline Project

ExxonMobil is one of the largest holders of gas resources on the North Slope of Alaska, where known resources are about 990 billion cubic meters (35 trillion cubic feet), anchored by Prudhoe Bay. A potential Alaska Gas Pipeline project could transport gas from North Slope fields to Canadian and U.S. gas markets. The project could include a treatment plant on the North Slope and a 3,400-kilometer (2,100 mile) pipeline to central Alberta that could extend as far as Chicago. For the needed economies of scale, the pipeline would be high pressure, large diameter and constructed of high-strength steel. The gas in this buried pipeline would be refrigerated to manage the interactions with both continuous and discontinuous permafrost.

# Sakhalin-1 future phases

Potential future phases of the Sakhalin-1 project involve development of Chayvo gas, as well as development of the Odoptu and Arkutun-Dagi fields. Like Chayvo, Odoptu and Arkutun-Dagi are located in 10 to 60 meters (33 to 197 feet) of water in the Sea of Okhotsk. Production of these fields is challenged by the presence of pack ice one to 1.5 meters (three to five feet) thick six to seven months out of the year, and severe wave and earthquake activity year-round.

ExxonMobil has developed novel production platform concepts for Sakhalin-1 and other sub-Arctic areas, including suction-pile structures with minimal offshore facilities, to continue addressing the unique challenges of the sub-Arctic environment. ExxonMobil has also developed two Arctic Mobile Drilling Unit concepts and has demonstrated that these could be designed for year-round drilling in offshore Sakhalin ice conditions.





Ice-strengthened tankers, like this one shown in partially frozen waters, are loaded every three to four days at the loading structure offshore DeKastri



# current technology research and development

ExxonMobil maintains one of the industry's largest research and development efforts, investing about \$3.5 billion in research over the past five years. We have 15,000 scientists and engineers, including more than 2,000 Ph.Ds. In addition to the research organizations supporting the Upstream, Downstream and Chemical businesses, ExxonMobil Corporate Strategic Research, unique to ExxonMobil in the oil and gas industry, conducts fundamental research intended to have a substantial, business-changing impact corporation-wide.

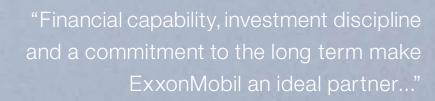
Current areas of Arctic technology research and development by ExxonMobil include:

- Seismic acquisition in ice environments
  - Year-round offshore production in heavy ice conditions, including multi-year ice in deepwater Arctic environments
    - Long-distance tiebacks and flow assurance
    - Remote detection of spilled oil under ice
    - Crafts for safer offshore platform evacuation in ice conditions
    - Year-round and extended-season drilling
    - · Remote sensing of ice, permafrost and icebergs
    - Subsea processing, including gas compression and power transmission
    - High-strength steel for gas-transmission pipelines from remote locations

Our long history of technical achievements and commitment to research ensures we are uniquely qualified to pursue and successfully execute future projects with our partners in the challenging Arctic environment.

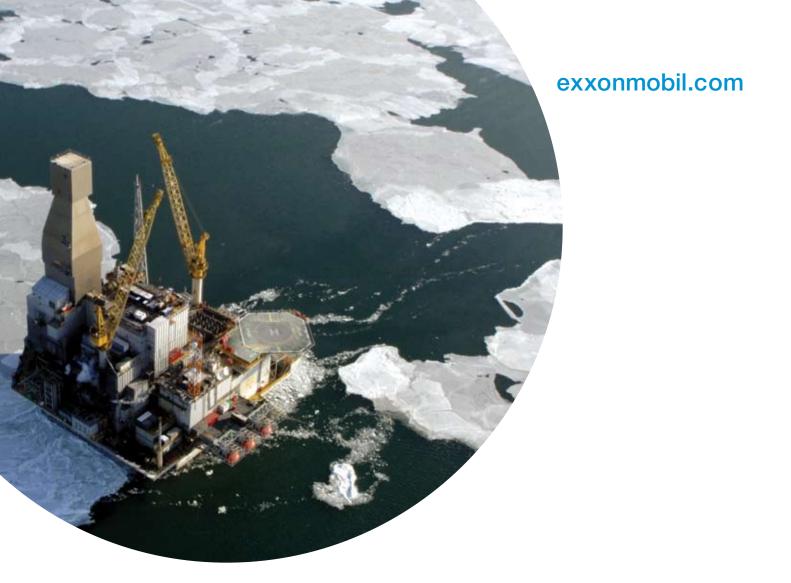
Development of advanced technologies for gas transmission from remote locations

The Shared Earth
Environment is one
component of the
research ExxonMobil
has underway to achieve
breakthrough performance
in subsurface interpretation



UBS Investment Research
October 5, 2007





# **E**xonMobil

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