



ARCTIC ENGINEERING AND OFFSHORE OIL & GAS SERVICES

Golder Associates' experienced group of engineers and scientists focus on solutions for resource development projects in the Arctic. This group of geotechnical-permafrost specialists have been on engineering teams for most major Arctic oil and gas development projects in North America, as well as on Sakhalin Island and in the Barents and Kara seas.

WE CAN SOLVE YOUR FROZEN GROUND PROBLEMS

Golder Associates has been at the forefront of geotechnical-permafrost engineering and has the depth of experience and level of service to solve your frozen ground problems.

- We used our understanding of permafrost to assist with the design, construction, and maintenance of the Trans Alaska Pipeline so that oil can flow south from the Arctic
- We were the foundation engineers for the first drilling structures used in the Canadian Beaufort Sea
- We met the challenge of designing and installing all of the offshore arctic pipelines in Alaska, as well as the shore transitions
- We helped prove that spray ice could be used to provide a stable platform for exploration

- We pioneered the technology for multi-year ice pads on tundra
- We helped with the infrastructure needed to support field development, including the first major horizontal directional drilling (HDD) river crossing in permafrost

Golder Associates continues our history of innovative solutions with ongoing efforts to:

- Understand ice-gouge forces on subsea pipelines
- Improve the reliability of ice roads and pads
- Enhance ways to monitor the effects of climate change on sea ice and the oceans so that we can better protect against coastal erosion and develop adaptive strategies for dealing with these changes
- Continue to work with key suppliers to improve refrigerated foundation systems





A TRUSTED PARTNER

Golder Associates has developed strong working relationships within the oil and gas industry and has gained considerable experience supporting resource development in onshore and offshore areas faced with the challenges of permafrost, extreme cold climates, and remote locations. We provide our clients the benefit of highly skilled engineers, scientists, and other technical specialists who are committed to helping them succeed. By building strong relationships and meeting the needs of our clients, our people have created one of the most trusted professional services firm working in the North.

WORLDWIDE AND ARCTIC PRESENCE

Our network of offices around the Arctic are staffed with people who understand living and working in that environment and can support arctic and offshore oil and gas projects through planning, permitting, design, construction, and closure. Our knowledge of local cultures, languages, and regulatory requirements, combined with our global resources in more than 160 offices, make it possible for us to help our clients achieve their business objectives around the world and at home.

UNIQUE EXPERTISE

- Geotechnical-Permafrost Engineering
- Coastal Erosion and Climate Change Adaptation
- Ice Roads and Winter Travel Logistics
- Geographic Information System (GIS) - Image Analysis
- Pipeline/Ice Keel Interaction
- Baseline Study and Field Investigation
- Subsea Permafrost
- Warm and High Salinity Permafrost
- Thermal Modeling
- Geophysical Site Clearance
- Geohazards Assessment
- Strudel Scour and Ice Gouge Surveys
- Oceanography and Meteorology
- Hydrodynamic Modeling
- Noise and Air Emissions Permitting
- Marine Pipeline Services
- Material Source Evaluation
- Water Resource Development
- Fractured Flow and Reservoir Engineering
- Spray Ice Engineering



ENGINEERING EARTH'S DEVELOPMENT, PRESERVING EARTH'S INTEGRITY.

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