The Moscow Times
30 YEARS
INDEPENDENT NEWS FROM RUSSIA

Oil and Ice: Worse Than Gulf Spill?

By The Moscow Times

November 09, 2010

Workers navigating the Kolva River in the Komi republic as they try to clean up an oil spill on Oct. 29, 1994. One of Russia's worst spills occurred in August 1994 when a pipeline network sprang a lea

YUZHNO-SAKHALINSK — When writer Anton Chekhov arrived on Sakhalin Island in 1890, he was overwhelmed by the harsh conditions at the tsarist penal colony. It wasn't just the floggings, forced prostitution and ill-treatment of children in the colony. It was the environment itself. "There is no climate on Sakhalin, just nasty weather," Chekhov wrote. "And this Island is the foulest place in all of Russia."

More than a century on, Sakhalin's prisoners have been replaced by oil and gas workers, most of whom seem to agree that Chekhov's description still fits.

The sparsely populated island — which is the length of Britain — has some of the most extreme weather on Earth. Marine cyclones and violent snowstorms rip through its forested hills, and the ocean waters off its northern coast freeze solid for a good part of the year. In the winter, temperatures drop to minus 40 degrees Celsius and snow can pile three meters high.

Workers at Exxon's Odoptu oil field, eight kilometers off the northeast coast of Sakhalin, had to shovel their way out of their dormitory last winter to clear pipe valves and free oil pipelines of snow. "The blizzards were so bad that at one point we had to evacuate half of the staff," said Pavel Garkin, head of the field's operations.

Now Moscow hopes to attract global oil players to another extreme location: its icy Arctic waters. Shared by Canada, Denmark, Iceland, Norway, Russia and the United States, the Arctic may hold about one-fifth of the world's untapped oil and gas reserves according to a U.S. geological survey. The past few years have seen a rush of activity in the region, with British oil explorer Cairn Energy drilling for oil off the west coast of Greenland and Norway's Statoil, one of the world's largest offshore oil producers, pushing further and further up the Nordic country's serpentine coastline, drilling wells inside the Arctic Circle beneath both the Norwegian and Barents Seas.

In September, Russia and Norway put an end to a 40-year dispute over maritime boundaries in the Barents Sea, freeing Russia to push for increased exploration under its portion of the waters just three years after the country spelled out its Arctic claim by planting a rust-proof flag on the sea bed more than four kilometers under the North Pole.

The rewards could be huge. Russia, the world's top oil producer with output of more than 10 million barrels of oil per day, estimates that its Arctic zone holds about 51 billion tons of oil, or enough to fully meet global oil demand for more than four years, as well as 87 trillion cubic meters of natural gas. Unlike Norway, Russia is not currently producing in its Arctic offshore, but the country's Natural Resources and Environment Ministry says it wants to invest at least $312.8 billion by 2039 to explore the shelf. Most of this money will go to the Arctic.

But even as Russia opens its northern waters to exploration, there's reason to pause. In the wake of BP's catastrophic leak in the Gulf of Mexico this spring, Russian officials and experts warn an oil spill under the ice could turn out far worse than one in warmer deepwater climates. Arctic conditions — remoteness, fragile ecosystems, darkness, sub-freezing temperatures, ice and high winds — make dealing with an oil spill a massive task.

At an annual conference for global oil and gas heavyweights held on Sakhalin at the end of September, Russian government officials and offshore industry professionals paid close attention to the dangers of drilling on the Arctic continental shelf. "I have attended 13 of the 14 Sakhalin oil conferences, and this is the first where government regulators were visibly and vocally concerned about offshore oil spill risks," said Michael Bradshaw, an expert on Russia's Far East energy industry and professor at the University of Leicester.

It's not that a spill is more likely in the Arctic than in a warmer, deepwater locale, said Nils Masvie, a director at Norwegian offshore risk-assessment firm Det Norske Veritas. "But you cannot extrapolate and say the risk is the same in a cold climate. No, the risk is higher."

That's because it's so much harder to manage a spill and offshore emergency in the ice and dark. "Sometimes search and rescue operations stop in the evening because it is too dark, resuming again at 8 o'clock when the light returns. But if something happens on the Arctic Barents Sea in November it would be, 'OK, we'll come back for you in March,'" said Masvie, whose company verifies and certifies equipment used in offshore oil and gas production, such as the Nord Stream gas pipeline being built under the Baltic Sea for Gazprom.

Lessons From Komi

Russia's track record with oil spills does not inspire confidence.

During the 1970s oil boom, primitive production, drilling and pipeline technology caused pollution levels in rivers, oceans, lakes and ground water to soar. In 1975, for example, several large West Siberian rivers that run north through Russia's biggest oil production region and empty into the Arctic Ocean had oil concentrations 21 times the maximum permissible level, according to a government report, "Status of Environmental Pollution in the U.S.S.R. 1975-1976." Scientists attributed the large-scale contamination to the widespread use of such unsophisticated oil production practices as intense water flooding, where workers inject water into wells at high pressures to drive out the oil. Most pipes also lacked leak-detection technology.

One of the worst spills occurred in August 1994, when the aging pipeline network in the northern Komi republic sprang a leak.

The oil spill was officially put at 79,000 tons, or 585,000 barrels, though independent estimates put it at up to 2 million barrels. At the high end that would have been half as big as BP's 4 million barrel Gulf disaster. Two months after the spill started, heavy rains broke a dam that contained the oil, releasing a massive slick into rivers and across forested tundra near the city of Usinsk.

Komi borders the Arctic Circle where the cold makes it hard for oil to evaporate. The oil that didn't immediately spill into the Arctic Ocean-bound Kolva, Usa and Pechora rivers spread over 186 square kilometers of marshland and tundra. There it froze during winter months, according to an environmental case study by the American University in Washington.

The following spring, the oil from the frozen tundra washed back into the streams, seeping into the surrounding vegetation or traveling further down the Pechora to empty into the Barents Sea. A Greenpeace witness reported that April: "As we feared, the spring has brought a deadly tide of oil over the area. There are acres and acres of blackened marshland, and every river and stream has oil in it."

Geopolis, an environmental consultancy commissioned by the Russian government to conduct a detailed examination of the spill, warned that the local environment near Usinsk would be "significantly impacted" by the spring ice thaw. Ecosystems with only a thin "active" layer of soil above permafrost typically have slow growth rates and are particularly sluggish at filtering out pollutants.

"Following disturbance, recovery is slow because of the short growing season and low annual production of nutrients," the World Conservation Union explains in its Environmental Guidelines for Oil and Gas Production in the Arctic.

Water bodies in cold climates are just as vulnerable. "The chemistry of large Arctic lakes is unusual because of the near-absence of annual cycles of nutrients and micro-organisms and the low quantities of dissolved solids," the guidelines state.

Smaller oil spills have occurred in the same region almost annually since the 1994 accident,

some documented by

LUKoil, which bought the Komi oil company in 1999, and by Russia's environmental agencies. Others have been spotted only by green groups and citizens' organizations.

"Each spring when the Kolva [River] thaws, the bottom of the ice comes up black," said Nikolai Feyodorov, who lives in the village of Ust-Usa. "It happens every year, around May. I haven't caught a clean ide [fish] even from streams in 20 years."

LUKoil, which counts Komi as one of its biggest oil-producing regions, said it spent 4.6 billion rubles ($150 million) from 2000 to 2005 to clean up, re-cultivate and reforest more than 10 square kilometers of polluted land. The company recycled more than 230,000 tons of oil waste, it said, and replaced 878 kilometers of old pipeline. Following the cleanup, the area was taken off Russia's list of environmental disaster zones. By comparison, BP's latest estimate of the total likely cost of its Gulf of Mexico spill was $40 billion.

LUKoil concedes that Komi's climate is a problem for monitoring pipeline leaks and says it would be impossible to replace the entire pipeline system, which was built in the 1970s and is thousands of kilometers long.

"It's a very harsh climate," a LUKoil press secretary told Reuters. "Most of the year it is freezing, and when there is a lot of snow and everything is covered in ice you don't see the leaks and this makes monitoring difficult. The snow melts in June, and the oil can be seen mostly in streams. This is not a secret."

Worse in the Arctic

Environmental groups agree and say the Komi disaster is further proof of how hard it would be to deal with an oil spill in Arctic seas. "If companies can't handle 50 meters of frozen mass, how could you expect them to handle a spill on open ocean in Sakhalin or the Arctic?" said Vladimir Chuprov, Greenpeace's top energy specialist in Russia.

"Cleaning up oil under ocean ice is impossible. You would have to break and remove thousands of tons of ice as the oil keeps moving with the currents further out into the ocean."

Stanislav Meshryakov, head of the department for environmental matters in heavy industry at Russia's Gubkin University of Oil and Gas, concurred. "The conditions on an open, uncovered surface of water are well understood. But under ice, a slick gets trapped, the current takes it away but you can't see how far, where to, how deep," Meshryakov said in a telephone interview.

The standard procedure for an under-ice spill is to cut a wide band of ice around the affected area to expose the water. As in oil spills in warmer waters, the contained oil can then be mechanically removed using booms and skimmers, burned, or dispersed using chemicals sprayed from a helicopter.

"You must have special machinery, and it is a long process. By the time the hole is cut, the heavy oil fractions would have sunk down and been carried away by currents, and the light ones stick to the underside of the ice," Meshryakov said.

In Russia, the State Marine Emergency and Rescue Administration, responsible for leading all oil spill response operations at sea, keeps a stock of oil recovery equipment at Russia's nine major ports, harbors and terminals. The port of Murmansk on the Barents Sea has specialized Arctic vessels and icebreaker escorts.

In the United States, the Coast Guard, oil companies and their contracted emergency responders are required to stockpile cleanup equipment and technology engineered to withstand Arctic conditions. But even with all that preparation, conditions severely limit how effectively equipment can be transported and deployed, creating what the industry calls a "response gap."

An added problem, according to a report on Arctic spill response challenges by the World Wildlife Fund, is that sea ice can move or damage oil containment booms. Skimmers can freeze or get clogged by ice chunks, while slush ice can prevent burning fluid from igniting the oil in burn operations.

To create a stronger, more realistic Arctic oil-spill response plan, the WWF recommends being more realistic about the limitations of equipment. "This assessment requires analysis and study of the response equipment and procedures beyond stating that they are present on-scene and citing manufacturer ratings; the effectiveness of the system in actual conditions that may exist in the likely operating environment must be demonstrated."

Norway, which has some of the world's toughest oil safety regulations, learned to do this the hard way. In 1977, a blowout on the offshore Ekofisk platform gushed crude for eight days, releasing 202,381 barrels of oil in the North Sea's largest ever spill. The poor performance of the equipment was one of the reasons the spill was so damaging.

Immediately following the disaster, in 1978, the country created the Norwegian Clean Seas Association for Operating Companies, which has focused on improving oil spill response technology and so far prevented any repeat of the Ekofisk disaster. As Norwegian firms prepare for more drilling in the Arctic, the association has developed new operating systems and equipment that will help run cleanup operations even when it's dark.

A Post-BP Pause

Following the blowout at BP's Macondo well, many Arctic oil-producing countries including Russia have revisited their safety and drilling regulations.

The administration of U.S. President Barack Obama decided to put a hold on offshore drilling in Alaska until at least 2011 as it reviews its safety and environmental regulations. In September, White House oil spill commission co-chair Bill Reilly said the BP spill had shown that even in a warm-water climate, advances in spill response and cleanup technology have not kept pace with offshore development.

Before the Gulf spill, Obama had proposed ending the drilling moratorium in territorial waters and opening up the Chukchi and Beaufort Seas in the Arctic Ocean to exploration and development. But the U.S. Interior Department has now stopped issuing new drilling permits in the Arctic and adopted a more cautious approach to development in the region because of its unique environmental conditions. A court ruling has also blocked any Chukchi Sea drilling

in the near future.

Canada said in August that while its offshore safety regulations are adequate and no drilling moratorium is necessary, it will investigate whether more safeguards, such as relief wells, are needed and will consider raising the liability cap for operators. Ottawa has also asked Greenland to provide it with more information on the offshore licenses it has issued for drilling in the Davis Strait, part of the North Atlantic Ocean that separates Greenland, a self-governing territory of Denmark, from Canada.

Canada, along with Denmark, is a designated oil-spill responder for Greenland, which according to the WWF has none of its own emergency oil-spill equipment stockpiles.

Norway, the world's No. 5 oil exporter, whose powerful oil industry is looking to expand drilling in the Arctic archipelagoes of Lofoten and Vesteralen, has said it will not issue new deepwater licenses until the government fully investigates what the BP well blowout means for its own regulations.

In Russia, Prime Minister Vladimir Putin's administration drafted a new bill on oil-spill removal that, if passed by the State Duma, would overhaul Russia's safety and environmental regulations. Oil companies say Russia already has some of the tightest regulations in the world but point out that they are inconsistently applied and often open to corruption.

Exxon's Odoptu operation started producing only two months ago. But the road to it from the northern town of Okha — whose municipal emblem is a seagull flying over an oil rig — is flanked by the telltale signs of oil-related degradation from earlier work by other operators: evidence, locals said, of the lax regulatory regime.

Even before a pair of abandoned oil rigs appears on the horizon, the flaxen sand dunes take on a darker color and the scrub and dwarf pines that dominate the coastal landscape lose their natural evergreen hue. Further on, several rigs pump away, their jacks rhythmically rapping the sand for oil like woodpeckers on a tree for bugs. An oily sheen gives the scrubland a charred look.

New Regulations Eyed

But even if operators aren't ready for an Arctic oil spill, don't expect the post-BP pause to last forever. Norway and Russia's recent detente over maritime boundaries has both countries pushing for more exploration in the region.

Norway plans to auction off 51 new blocks in its part of the Barents Sea for oil and gas exploration, while Putin and Russian energy officials hope to see more offshore oil exploration in its part of the sea. Under current legislation, only Gazprom and Rosneft have the right to develop Russia's continental shelf, but as of Jan. 1, Moscow will open it up to foreign producers.

Rosneft is already talking to Western oil and gas majors with experience in offshore drilling, including BP and France's Total with a view to forming joint ventures in the Arctic.

In a recent interview, Rosneft vice president Peter O'Brien said the capital investment in

Arctic offshore development was so high that foreign investors were not interested in signing up unless Russia switched to a profit-based tax regime, which would tax a producer's excess profits on oil production and move away from differentiated taxes adopted by the government for different oil fields.

"For folks to take even exploration risk, some of the partners are requesting clarity on taxation. If changes happen in the legislation then we will consider new structures that optimize the situation under the new legislation," he said.

And it's not just tax that foreign firms worry about. In December 2006, Shell and its Japanese partners ceded control of their $22 billion oil and gas project on Sakhalin to their junior partner Gazprom, after facing months of intense regulatory pressure. Before Gazprom took the reins and Shell reduced its stake to 27.5 percent, Russia's federal environmental watchdog threatened to hit the foreign operators with billions of dollars in fines for ecological violations. Many analysts have described the ecological campaign as a drive by the state to take back control of a lucrative energy concession.

Could new regulations be used to do the same thing, or is the government honest in its attempt to improve conditions around Russian oil wells? Under the proposed regulations, Moscow wants all oil companies and related organizations dealing with oil transport, marketing and storage to create an oil-spill response plan, or OSR, for each deposit and installation they operate.

"This certainly is a first step, and I want to believe that it will work," said Nina Lesikhina, a Russian oil and gas specialist at the Norwegian environmental nongovernmental group Bellona. "The new rules provide for much more control over a company's emergency response. As they are now, there is little oversight."

Inadequate

But Lesikhina and others remain critical of the Russian bill for low-balling the flow rate that the companies will use to figure out what equipment they need on-hand in the event of a spill. According to the bill, the maximum volume of oil that companies drilling offshore would need to account for in their emergency response plan is 5,000 tons. "This is completely inadequate. In the Gulf of Mexico, 50,000 barrels were being spilled each day," Lesikhina said.

The bill, drafted by the Natural Resources and Environment Ministry, also states that a company's emergency oil spill response would be considered finished when the spill is controlled and all the oil collected and disposed of properly. "There is no mention of remaining environmental damage after the oil is cleaned up. The companies don't have to account for this financially or logistically in their oil response plan," Lesikhina said.

The Natural Resources and Environment Ministry said it could not immediately respond to questions.

The State Duma's Natural Resources Committee is also in the process of drafting a new law titled "The Protection of the Russian Federation's Seas from Oil Pollution," which the head of Russia's WWF climate and energy division, Alexei Kokorin, said is a much better alternative to the one proposed by the Natural Resources and Environment Ministry.

“This bill works on the principle of precaution and prevention, is much more technical, stringent, and will bring the law into accordance with international norms,” Kokorin said.

But it’s unlikely that any new rules will severely restrict operators: The Russian government gets more than 50 percent of its revenues from oil and gas, and Putin’s stated aim is to keep producing more than 10 billion barrels a day through 2020. “In Russia, the oil and gas industry is king,” Kokorin said.

Take Exxon’s Russian subsidiary, ENL, or Exxon Neftegaz Ltd. If all goes well, it will soon be producing 30,000 bpd at the Odoptu field. But during the Sakhalin oil and gas conference, ENL’s environmental protection manager, Alexander Ponomarev, could not say whether the company had a specific plan for under-ice spills.

“We are studying the issue and looking for solutions,” Ponomarev said. “We can’t have the magic answer.”

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