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Shrinking Oil Supplies Put Alaskan Pipeline at Risk

By Russell Gold

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As less oil runs through the Alaska Pipeline, the crude it carries is cooling. This is raising the risk of ice formation and waxy buildup. WSJ's Russell Gold reports from Alaska.

FAIRBANKS, Alaska—When the famed Trans Alaska Pipeline carried two million barrels of oil a day, the naturally warm crude surged 800 miles to the Port of Valdez in three days and arrived at a temperature of about 100 degrees.

Now, dwindling oil production along Alaska's northern edge means the pipeline carries less than one-third the volume it once did—and the crude takes five times as long to get to its destination.

That leisurely flow means the oil is above ground longer and more exposed to Alaska's frigid weather; the crude sometimes arrives chilled to 40 degrees. As the flow and temperature continue to drop, experts say the risks of a clog or corrosion increase, as do the odds of ruptures and spills.

A River of Crude Runs Through It

Unless a technological solution can be found, the arcane physics of crude flow may force the multibillion dollar, 48-inch-wide steel pipeline to shut down—and determine the



fate of the largest oil field ever found in the U.S.

There's one other, seemingly simple fix: Add more oil.

"If I could ask for one thing, it is to figure out how to get more oil into this pipe," says Tom Barrett, president of the pipeline's owner, Alyeska Pipeline Service Co.

But production from Alaska's giant oil fields has been falling for years. Turning that around would require drilling in new areas, some of them environmentally sensitive and most controlled by the federal government.

Saving the pipeline has become a political issue in Alaska. The pipeline, which employs 2,000 people, still delivers more than 11% of the oil

produced in the U.S. Almost all of it ends up in refineries in Washington, California and Hawaii. The end of the pipeline would likely translate into higher gasoline prices, which hit an average of \$3.98 a gallon last week, the highest in nearly three years.

Oil companies and many Alaskan officials argue more lands should be opened to drilling so that the pipeline can get the crude it needs to flow fast and safely. Royal Dutch Shell PLC, which wants to drill off the state's coast, recently met with senior White House officials to press its case.

Some environmentalists and federal officials say the oil companies are using the pipeline to bully the government into pushing through

drilling permits or allowing access to areas that should remain protected, such as the waters off Alaska's northern coast. So far, oil companies have expressed little interest in the controversial Arctic National Wildlife Refuge.

"We have a lot of overblown rhetoric that the sky is falling and that we need to open the federal lands and waters because of low flow in the pipeline," says Lois Epstein, Arctic program director for the Wilderness Society, who prefers to find ways to coax more oil out of state lands in and around existing drilling sites.

The time available for arguing about the matter is dwindling.

Exploring for oil and then building the connector pipes and pump stations needed to start up a new oil field can take from five to fifteen years in Alaska. With each passing year, the pipeline is getting colder and its operation more precarious. If the pipeline is shut down, by law it must then be dismantled.

The 800-mile-long Trans Alaska Pipeline has to keep oil relatively warm, even as outside temperatures can reach -10 Fahrenheit. Dwindling oil production in recent years means less oil has been moving through, and the temperature of the crude has been steadily dropping. This can lead to dangerous ice plugs and wax build up, which can cause corrosion.

Shutting the pipeline would force refineries to find new and more expensive supplies of crude oil. And President Barack Obama's efforts to decrease oil imports would suffer a major setback.

The pipeline "is a strategic national asset," says Peter Slaiby, Shell's top executive in Alaska.

Oil was first discovered at the northern edge of Alaska in 1968, when the Prudhoe Bay State No. 1 well drilled through a section of oil-bearing sands the depth of a 50-story building.

The well's owners, Atlantic Richfield and Humble Oil, now parts of BP PLC and Exxon Mobil Corp., respectively, had found a giant. It turned out to be the largest oil field ever discovered in the U.S. and one of the largest in the world. But all that crude was underneath frozen tundra, 250 miles north of the Arctic Circle.

The oil was worthless unless it could be taken to global markets. That required an engineering marvel: the first pipeline to operate in Arctic conditions, an 800-mile-long tube from the oil fields to the port of Valdez.

Environmental opposition was fierce. An act of Congress was required to break a stalemate and secure the right-of-way. Seventy thousand workers took more than three years to build the conduit, commonly known as TAPS, which ended up costing nearly \$8 billion, plus interest, in 1970s dollars.

In June 1977, after months of testing, the pipeline was ready. "Gentlemen, start your engines," a pipeline operator called out on the radio, according to a petroleum engineer who was listening. And the crude began to flow.

For years, the Alaskan North Slope, as the area is called, boomed as companies tapped the giant reservoirs, feeding raw crude to refineries that turned it into the gasoline that Americans pumped into their cars. The operation generated profits for the pipeline's owner, Alyeska, a company now owned by several of the world's most powerful energy companies: BP, Exxon Mobil, ConocoPhillips, Chevron Corp. and Koch Industries Inc.



The volume of crude increased each year for the first 11 years as more and more wells were turned on. At its peak, in 1988, the pipeline carried more than two million barrels a day, about 3% of global crude.

When first tapped, the oil reservoir was pressurized from millennia of being compacted by the weight of the earth. Wells flowed without any coaxing. By 1988, oil companies had removed so many barrels that the pressure had begun falling, and so had the amount of oil that flowed to the surface.

Declining pressure and falling oil production are the norm for oil fields, and the North Slope is no exception. Today, the amount of oil being pumped is dropping by about 6% a year.

The lower the volume of oil flowing through the pipe, the slower it moves. It's like a garden hose: Open up the spigot only slightly and the water will move slowly; turn the spigot to wide open and the water will move quickly through the hose to the other end.

Workers clean a device that removes wax from the pipeline's interior walls.

In the case of the pipeline, the slow flow means the crude spends more time above ground in the cold Alaskan winters; the average January temperature is -10 Fahrenheit at one point in the route.

According to Alyeska, if the current trend continues, the winter temperature of crude in the pipeline could drop to 32 degrees by 2013 and ice crystals will begin to form inside it, putting it at higher risk of a rupture.

The problems facing the pipeline were made very clear in January, when a leak on the North Slope forced two back-to-back winter shutdowns for a total of 148 hours. Temperatures inside the pipeline dropped by almost two degrees a day. Much longer, says E.G. "Betsy" Haines, Alyeska's oil movement director, and wax in the crude would have begun congealing, potentially turning TAPS into the world's largest tube of ChapStick.

After the January leak, a federal oversight agency found that the low volume of oil flowing through the pipeline "has resulted in numerous integrity challenges that have not been fully addressed." Among its concerns: ice can create plugs that damage valves and sensors; wax buildup can cause corrosion. Either can leave the pipeline vulnerable to ruptures and spills.

Alyeska engineers are brainstorming fixes to raise the temperature in the pipeline, such as adding more insulation. Another possibility

involves a refinery along the route owned by Koch Industries' Flint Hills Resources unit. Already, the refinery takes 100,000 barrels a day off the pipeline, uses some to make jet fuel, diesel and other petroleum products, and then puts 60,000 barrels of crude warmed by the refinery back into the pipeline. On a recent March day, this operation warmed the crude in the pipeline by 12 degrees.

Koch has been doing this at no cost to Alyeska, and the pipeline owner would like to draw even more heat from the refinery. But Koch says it has plans to start charging for the winter-heating service.

Mr. Barrett, the head of Alyeska, says any changes or upgrades that would warm the crude are expected to run into the hundreds of millions of dollars.

This may end up being too expensive for Alyeska owners to justify. BP, which owns 46.9% of Alyeska, says as long as the pipeline is running, it



will make required investments to insure system safety.

John Miller, a former chairman of Alyeska, who is now a consultant in Anchorage, says unless more oil is added, “costs are going to go up incredibly.” Companies are charged a fee for each barrel of crude they move through the pipeline. This revenue pays for the pipeline’s operation and upkeep. As the cost of maintaining the pipeline increases and there are fewer barrels transported, the per-barrel fee will rise rapidly.

Since the January incident, anxiety in Alaska over the pipeline has soared. Oil revenues from taxes and royalties make up 85% of the state’s general revenues and provide an annual check for all residents.

Without a simple or cost-effective engineering solution, stakeholders have pushed for a political fix. Gov. Sean Parnell recently proposed cutting taxes on oil producers who drill on state land near existing wells—where federal permits aren’t required—in order to encourage more drilling. But that died in the Legislature.

A generation of production from the North Slope has taken 16.2 billion barrels from the frozen earth, according to the state. But a lot remains to be tapped under the tundra, perhaps more than 10 billion barrels. Most of this oil is more challenging to extract, and likely poses greater risks to the pipeline itself since it’s more abrasive.

Oil companies are having a hard time getting permits for new exploration from the federal government.

Shell earlier this year canceled plans to drill in the Beaufort Sea this summer because, after five years, it couldn’t get a federal air-emission permit for an offshore drilling rig. Its plans for drilling in the Chukchi Sea on Alaska’s northwest coast are also held up by a legal dispute. Exxon Mobil is also waiting for federal environmental approval, and in February, the federal government denied ConocoPhillips a permit the company had been working on for five years.

Even if permits are approved and the lawsuit is resolved quickly, Shell’s Mr. Slaiby says it would take 15 years to produce oil from the remote Chukchi Sea. He says he believes the pipeline would still be operational.

As oil prices have risen, congressional pressure on the Obama administration to expand access to domestic oil and natural gas has increased. Last week, the White House hosted a meeting with Shell on its proposed Alaska projects, to “facilitate the conversation” between the company and the multiple federal agencies whose approval Shell needs, a senior administration official said.

Interior Department Deputy Secretary David Hayes says he recognizes the seriousness of the problems facing the pipeline, but disagrees that the answer is to speed through permits in the environmentally sensitive Arctic region.

“You can’t look to the federal government as the problem here,” he says.

Some environmentalists think the more reasonable answer is to let the pipeline die a natural death.

“We have a pipeline well past its expiration date and there is an obsession with keeping the pipe full and flowing in perpetuity,” says Brendan Cummings, an attorney with the Center for Biological Diversity, which has sued to block Shell’s exploration plans. “It may be nearing the end of its useful life anyway.”