

## BROKEN PROMISE #3

# Directional Drilling is no Panacea



One of more than  
5,500 oil wells on  
Alaska's North Slope.

Arctic Core

## The Promise

New directional drilling technology enables drilling without any surface impacts.

## The Reality

Directional drilling is not new and requires the same infrastructure with the same impacts as all oil development, including surface impacts.

Proponents of oil and gas development in the Arctic National Wildlife Refuge and other sensitive areas of Alaska assert that new advances in directional drilling will reduce, and even eliminate, environmental impacts. In fact, directional drilling has limitations, and its impacts are no different than those of conventional drilling.

## “The industry touted roadless development as the way of the future, and is now abandoning the concept.”

Community of Nuiqsit, 2004<sup>1</sup>

### Directional drilling is not a new practice

According to the U.S. Department of Energy, the first true horizontal well<sup>2</sup> was drilled in 1929 in Texas.<sup>3</sup> Since then, thousands of horizontal wells have been drilled across the world. But as of 1999 horizontal boreholes accounted for only five to eight percent of all U.S. land wells, and extended-reach horizontal drilling is still uncommon.<sup>4</sup> In Arctic Alaska, oil companies have rarely drilled horizontal distances of more than a few miles. Of the 5,549 wells drilled on Alaska’s North Slope to date, only 41 have reached horizontal offset distances of three miles or more.<sup>5</sup>

### Exaggerated claims

Claims that directional drilling can reach eight to ten miles away are exaggerated.<sup>6</sup> Oil companies have drilled distances over seven miles, but such distances are still extremely rare in the industry.<sup>7</sup> On the North Slope, 94% of all existing wells extend less than two miles from the drill rig, and fewer than 2% extend more than three miles. As of August 2009 the maximum horizontal distance drilled was 4.025 miles. Even at ConocoPhillips’ Alpine oil field, which is touted as a model of new directional drilling technology, the average horizontal drill distance is only 1.74 miles.<sup>8</sup>

### Longer-reach drilling is expensive and often presents geologic and engineering challenges

Truly state-of-the art practices are often impractical if not impossible for oil companies. Factors such as where the oil or gas deposit is in relation to the drilling rig, the size and depth of the mineral deposit, and the geology of the area, are all important elements in determining whether directional drilling is possible.<sup>9</sup> Drilling a horizontal or extended-reach well can cost two or three times more than drilling a vertical well in the same reservoir.<sup>10</sup> In 2000, British Petroleum “stopped drilling extended reach wells—those that reach out a long distance from the pad—after oil prices

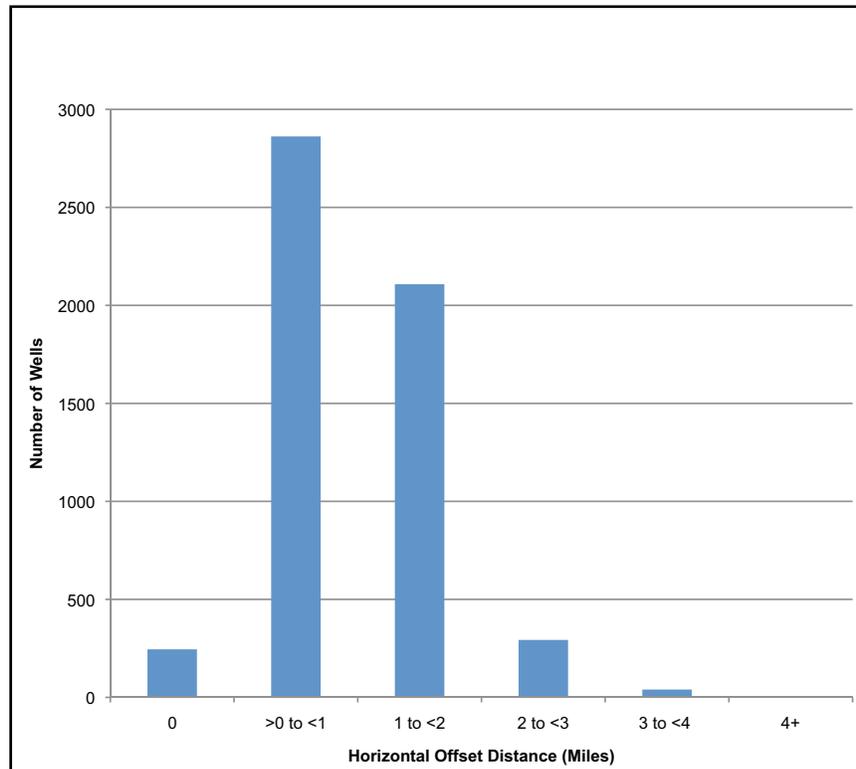
crashed in the late 1990s, because extended-reach drilling is expensive.”<sup>11</sup> In a 2003 draft environmental impact statement for the National Petroleum Reserve-Alaska, the Bureau of Land Management (BLM) wrote:

*“The cost of extended-reach [ERD] wells is considerably higher than conventional wells because of greater distance drilled and problems involving well-bore stability. Alternative field designs must consider the cost tradeoffs between fewer pads with more extended-reach wells as opposed to more pads containing conventional wells. In most instances, it is more practical and cost effective to drill conventional wells from an optimum site, [than] it would be to drill ERD wells from an existing drill site.”<sup>12</sup>*

ConocoPhillips’ Alpine oil field is an example of how optimistic claims about directional drilling technology can quickly fall flat. Alpine was advertised in 1998 as a state-of-the-art roadless development. But the oil field already has several miles of permanent gravel road, and plans for expansion could add as much as 122 more miles.<sup>13</sup> In 2004 the federal government approved plans to expand Alpine from two to seven drill sites.<sup>14</sup> Also in 2004 the Bureau of Land Management granted ConocoPhillips an exemption from a lease stipulation that had previously prohibited the company from building a drill site in a 3-mile



Anne Gore



**Horizontal drilling distances of Alaska North Slope wells (1969-2009).** Source: Alaska Oil and Gas Conservation Commission well database. Data analyzed by Doug Tosa, Alaska Center for the Environment, using known top-hole and bottom-hole latitude/longitude locations of 5,549 completed wells.

buffer zone along Fish Creek.<sup>15</sup> The agency cited economic and geological limitations of directional drilling as the reason:

*"Drilling from outside the setback would require directional drilling for long distances through geologically unstable shale. This drilling approach is very problematic because shale in this area tends to collapse holes. Maintaining drill holes would be difficult and expensive."<sup>16</sup>*

In 2008 British Petroleum announced its plans to drill distances of seven miles or more to reach its offshore Liberty oil field. But the technology remains to be proven. It will also demand doubling the size of Endicott Island—an offshore, man-made island—to make room for extended pipe racks, the massive drilling rig, and a worker's camp.<sup>17</sup>

- ▷ Directional drilling is not a new practice.
- ▷ Claims about distances directional drilling can reach are exaggerated.
- ▷ Directional drilling is expensive and often limited by geology.
- ▷ Directionally drilled wells require the same infrastructure and have the same environmental impacts as conventional wells, including surface impacts.

## Claims that directional drilling will incur no surface impacts are misleading

Before production wells are drilled, seismic testing is conducted and exploration wells are drilled to refine the location of oil deposits. These activities have direct surface impacts.

Seismic exploration typically involves many vehicles driving across the tundra in a grid pattern. Sensitive tundra soil and plants are easily compressed under the weight of these heavy vehicles, even in winter.<sup>18</sup> Seismic lines are often visible on the Arctic tundra for years after exploration, and studies have shown that fragile tundra plants can take decades to recover.<sup>19</sup> Despite industry claims to the contrary, winter exploration can also disturb wildlife.<sup>20</sup>

## The notion that directional drilling allows for a smaller footprint is misleading

Although directional drilling may reduce the number of well pads required to access an oil deposit, it requires the same infrastructure and has the same environmental impacts as conventional drilling. Permanent gravel roads and air strips are still used for access, long pipelines are still required to connect the well sites, and pollution and toxic spills are still inevitable.

Oil production is a high-impact activity, regardless of how you drill. New technology has yet to demonstrate that it can minimize, mitigate, or eliminate the inevitable impacts of oil development to America's Arctic and other sensitive ecosystems.

<sup>1</sup> U.S. Bureau of Land Management. 2005, January. Final Amendment to the Northeast National Petroleum Reserve: Integrated Activity Plan/Environmental Impact Statement. Vol. 2, Response to comments. Kuupik Corporation, Native Village of Nuiqsut, City of Nuiqsut, and Kuupikmuit Subsistence Oversight Panel. Comment Letter No. 197616. P. 6-262.

<sup>2</sup> The terms horizontal and directional drilling are used interchangeably in this document to refer to non-vertical drilling.

<sup>3</sup> Horizontal and Multilateral Wells. *Frontiers of Technology*. (1999, July). *Journal of Petroleum Technology*. Retrieved March 18, 2009 from website: [http://www.spe.org/spe-app/spe/jpt/1999/07/frontiers\\_horiz\\_multilateral.htm#](http://www.spe.org/spe-app/spe/jpt/1999/07/frontiers_horiz_multilateral.htm#).

<sup>4</sup> Pratt, Sara, (2004, March). A Fresh Angle on Oil Drilling, *GeoTimes*.

<sup>5</sup> Horizontal offsets calculated by Doug Tosa, GIS Analyst, Alaska Center for the Environment. August 2009. Source data: Alaska Oil and Gas Conservation Commission well database, <http://www.state.ak.us/local/akpages/ADMIN/ogc/publicdb.shtml>.

<sup>6</sup> Senator Lisa Murkowski's website claims that her directional drilling bill will enable "oil wells to be drilled from the western Alaska state-owned lands, outside of the refuge's boundary, or from state waters to the north, and still to [sic] be able to tap oil and gas deposits located between eight and 10 miles inside the refuge. [http://murkowski.senate.gov/public/index.cfm?FuseAction=IssueStatements.View&Issue\\_id=8160a71d-9c6e-945d-f605-a8959dfbf80b](http://murkowski.senate.gov/public/index.cfm?FuseAction=IssueStatements.View&Issue_id=8160a71d-9c6e-945d-f605-a8959dfbf80b) (last visited March 18, 2009).

<sup>7</sup> British Petroleum's Wytch Farm set the current world extended reach drilling record in June of 1999 when its well M16 reached a "horizontal displacement distance of 10,728 m[eters] a total length of 11,278 m[eters] and a depth of 1638 m[eters]." <http://www.bpnsi.com/index.asp?id=7369643D312669643D313531> (last visited March 18, 2009).

<sup>8</sup> Directional drilling data analysis by Doug Tosa, GIS Analyst, Alaska Center for the Environment. August 2009. Source data: Alaska Oil and Gas Conservation Commission well database retrieved June 16, 2009 from <http://www.state.ak.us/local/akpages/ADMIN/ogc/publicdb.shtml>.

<sup>9</sup> Judzis, A., K. Jardaneh and C. Bowes. 1997. Extended-reach drilling: managing, networking, guidelines, and lessons learned. SPE Paper 37573 presented at the 1997 SPE/IADC Drilling Conference, Amsterdam. March 4-6, 1997.

<sup>10</sup> Horizontal and Multilateral Wells. (1999, July); Van Dyke, Bill, petroleum manager, Alaska Department of Natural Resources. Quoted in Pratt, Sara. (2004, March).

<sup>11</sup> Petroleum News Alaska. (2000, October). BP plans busy exploration season, both in NPR-A and satellites.

<sup>12</sup> U.S. Bureau of Land Management. (2003). Northwest National Petroleum Reserve-Alaska Draft Integrated Activity Plan/Environmental Impact Statement. Sec. IV, p. 20-21.

<sup>13</sup> U.S. Bureau of Land Management. September 2004. Alpine Satellite Development Plan Final Environmental Impact Statement. Vol. 1, Sec. 2. Pp. 69-71.

<sup>14</sup> U.S. Bureau of Land Management. (2004, November). Alpine satellite development plan Record of Decision.

<sup>15</sup> U.S. Bureau of Land Management. (2004, September). Alpine Satellite Development Plan. Final Environmental Impact Statement. Vol. 3. Appendix I, CPAI request for exception to stipulations. ConocoPhillips letter dated April 8, 2004 to BLM. Pp.3-4.

<sup>16</sup> BLM. November 8, 2004. Alpine Satellite Development Plan Record of Decision. p. 17.

<sup>17</sup> Delbridge, Rena. "BP begins development of Liberty oil field project on North Slope, Fairbanks Daily News Miner, July 14, 2008, <http://www.newsminer.com/news/2008/jul/14/bp-begin-developing-liberty-oil-field/> (last visited June 30, 2009).

[http://www.alaskajournal.com/stories/050109/oil\\_img\\_oil001.shtml](http://www.alaskajournal.com/stories/050109/oil_img_oil001.shtml) (last visited June 30, 2009)

[http://www.alaskajournal.com/stories/060509/oil\\_10\\_001.shtml](http://www.alaskajournal.com/stories/060509/oil_10_001.shtml) (last visited June 30, 2009)

<sup>18</sup> Jorgensen, J.C. 1998. Emers, M., J.C. Jorgenson, and M.K. Raynolds. 1995. Response of arctic tundra plant communities to winter vehicle disturbance. *Can. J. Bot.* 73: 905-917.

<sup>19</sup> U.S. Fish and Wildlife Service. 2001. Potential impacts of proposed oil and gas development on the Arctic Refuge's coastal plain: historical overview and issues of concern. Web page of the Arctic National Wildlife Refuge, Fairbanks, Alaska: <http://arctic.fws.gov/issues1.htm>.

<sup>20</sup> *Ibid.*