### Challenge
Attempting to minimize the footprint of the surface location for both environmental and economic reasons, Pioneer Natural Resources needed to reduce the distance between well heads. This created collision avoidance issues in the surface sections of the wells.

### Solution
Sperry Drilling Services provided active magnetic ranging technology, a service allowing very precise measurement between two or more well bores, well beyond what is possible with other surveying methods. This was a new application for active magnetic ranging, typically utilized when drilling SAGD steam assisted gravity drainage wellbores.

### Results
Pioneer was able to drill these wells safely down to the kick-off point, where, once deviation was attained, the risk of well collision was no longer an issue.

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**Pioneer Natural Resources Uses Active Magnetic Ranging to Avoid Risk of Wellbore Collision**

The Oooguruk project, three miles off the coast of Alaska’s North Slope, is a six-acre island built by Pioneer Natural Resources Co. to enable drilling operations in the Arctic Ocean. Attempting to minimize the footprint of the surface location for both environmental and economic reasons, Pioneer needed to reduce the distance between well heads to 7 feet (just over 2 meters) in order to fit the number of wells planned in the space available. This created a collision issue in the vertical section of the well bores. As Joe Polya, Senior Staff Drilling Engineer with Pioneer, explained, “The integrity of the environment and the safety of the personnel are top priorities within the Pioneer organization. On the Oooguruk Island, the risk of wellbore collision presented a significant challenge.” Even when using a gyro survey, the wells were failing anti-collision tests prior to kickoff.

**New Application for Active Magnetic Ranging**
Sperry Drilling Services provided active magnetic ranging technology, a service allowing very precise measurement between two or more well bores, well beyond what is possible with other surveying methods. This was a new application for active magnetic ranging, typically utilized when drilling SAGD steam assisted gravity drainage wellbores.

For this project to be successful, changes were required to both the software (for vertical referencing) and the hardware (for the close proximity). Both modifications were carried out in time to have the magnetic ranging services available for the project commencement.
Four wells were drilled with the use of the MGT™ magnetic guidance tool, a downhole electromagnetic source, combined with Sperry’s measurement-while-drilling (MWD) system. Active magnetic ranging technology provided the customer with wellbore separation distances to a higher degree of accuracy than any survey possible. Pioneer was able to drill these wells safely down to kickoff, where once deviation was attained, the risk of well collision was no longer an issue. Eric Cribbs, Sperry District Manager, Alaska, commented, "Sperry is known for meeting the challenges of wellbore positioning in difficult surveying environments, such as the North Slope of Alaska. The Oooguruk project presented a unique challenge for collision avoidance. Active magnetic ranging technology, which has been used for years for SAGD, was modified for this type of application. This technology is now another proven tool in the Sperry arsenal for meeting the wellbore positioning needs of our customers."

Mercury™ Electromagnetic Telemetry System Saves Time

In addition to magnetic ranging, Sperry also introduced Pioneer to electromagnetic telemetry (EMT). Electromagnetic telemetry allows the two-way transmission of real-time data through the earth’s crust via the generation and propagation of electromagnetic fields and waves. With the superior telemetry rates of Sperry’s Mercury™ EMT system over mud pulse, EMT was recommended as it would save time, especially considering the extra survey information required for magnetic ranging.

EMT was run on the four hole sections and after realizing the time savings achieved, the customer is now looking into the possibility of running it on other wells on the Oooguruk project.

The successful application of magnetic ranging technology to address the well collision challenge has resulted in Pioneer planning to drill at least thirty additional wells utilizing the MGT tool. Armed with the assurance that the tightly spaced surface holes can be drilled more safely and accurately reducing the risk of collision, Polya went on to say, “Sperry, utilizing the latest technology available within the industry, engineered a solution which allows us to determine the distance from an offset wellbore with extreme precision and provides us the confidence we are dealing with collision risks appropriately.”