

## Solution Mining in the 'Nineties

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### **ABSTRACT**

In 1838, Michigan entered the salt speculation business when the state appropriated \$3000 for geological studies. As a result, the city of Manistee eventually became known as the "Salt City of the Inland Seas" after it was found to contain salt considered to be among the purest in the world.

More than one hundred years after Charles Reitz discovered the original "salt block", only the method of mining the salt has changed. At the turn of the century, mining companies founded by former lumber barons, utilized solution mining to remove salt from the ground. Today, more modern technology is employed, as Akzo Salt Inc. recently invested more than \$1 million to drill two new Manistee County brine wells using techniques previously unproven in the field.

Akzo Salt Inc. selected Eastman Christensen to drill a 12-1/4" medium radius horizontal well designed to intersect a 12-1/4" vertical brine well located 913 feet to the east. A build rate of 13.6°/100 ft measured depth was selected to achieve horizontal inclination near the base of the A2 salt.

Eastman Christensen employed a double adjustable angle build (DAAB) positive displacement mud motor to drill the medium radius curve, using a Directional Measurement-While-Drilling (DMWD) tool to ensure the correct azimuth and build rate were continuously monitored.

At 49° inclination, 9-5/8" casing was run in the A2 evaporate, and a steerable motor was used to drill the entire horizontal section. The well was completed in approximately 70% of the estimated time, and is considered a success. Pending final completion, solution mining techniques will be employed, to connect the two wells into a brine production gallery.