# Resonant Sonic Drilling

## Description

ResonantSonic drilling is an innovative tool used to drill wells that are primarily used for sampling. The ResonantSonic drilling rig uses a combination of mechanically generated vibrations and limited rotary power to penetrate the soil. The drill head, which is attached to the drill pipe, consists of two counter rotating, out-of-balance rollers that cause the drill pipe to vibrate. Resonance occurs when the frequency of the vibrations equals to the natural frequency of the drill pipe. The resonance and weight of the drill pipe along with the downward thrust of the drill head permit easier penetration of the formation, without adding drilling muds or lubricating fluids.

To obtain samples, one of two methods is used. In the first method, a wire-line is attached to a barrel that rests upon an open-face bit. After drilling has proceeded far enough that the inner barrel is filled, the wire pulls up the barrel without pulling the drill pipe out of the hole. In the second method, the inner core barrel is attached to a small steel inner rod that is removed for core retrieval. The drill pipe that remains in the ground maintains borehole integrity.

## Limitations and Concerns

Heating samples containing volatile chemical contaminants is of concern. Because this technology does not use fluids to cool the pipe and the formation, it can generate temperatures up to 140 degrees Fahrenheit. This may volatilize VOCs, effecting the integrity of the sample and posing worker safety issues.

The effectiveness of the system varies with the soil medium being drilled.

## Applicability

ResonantSonic drilling has been used to sample geologic formations ranging from unconsolidated gravel-rich material to sandstone/shale sequences to clay-rich glacial till sites. Continuous samples have been obtained at depths as great as 550 feet.

## Technology Development Status

Field demonstrations of the ResonantSonic drilling technology were conducted at the DOE Hanford Site and at Sandia National Laboratory from 1991 through 1994. The technology is commercially available. However, the number of companies that can provide such services is limited.

## Web Links

http://www.em.doe.gov/plumesfa/intech/rsd/index.html

## Other resources

None have been identified

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*This page was last updated AUGUST 24, 1998*

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