



### ADVANTAGES OF SONIC DRILLING FOR SAND AND GRAVEL EXPLORATION

- Sonic drilling offers the world's most advanced drilling technique for aggregates exploration.
- The fastest and most accurate method available to quantify reserves — much faster than conventional rotary methods for sampling sand and gravel deposits.
- The sonic drill has the outstanding ability to provide large diameter, highly representative, relatively undisturbed continuous core samples from both solid and unconsolidated materials.
- Holes are drilled, cored and cased by rotating and vibrating the rod, core barrel and casing at high power resonant sonic frequencies.
- Coring of unconsolidated formations is carried out completely dry without the need for drill mud or other drilling fluid.
- Cased holes prevent the collapse of the borehole and ensure that core quality is not compromised by up-hole debris.
- The sonic drill performs extremely well in difficult soil conditions such as those containing cobbles, boulders and heaving sands.
- Core samples range from 3" to 10" in diameter. Larger diameter bulk samples can be provided in stable holes.
- Retrieved cores are gently extruded by vibration into clear plastic sleeves which can easily be logged, sampled, photographed and archived for future examination.
- Cores can be marked as to their depth and then individually crated for shipping.



## THE SONIC DRILL HEAD

- The patented sonic drill head, manufactured by the Sonic Drill Corporation, provides the rotation and vibration forces necessary to allow the coring and casing of any overburden material to create an accurate geological profile of the subsurface.
- High frequency resonant vibrations are sent down the drill string to the drill bit. The operator controls these frequencies to suit the specific conditions of the soil/rock geology.
- Resonance magnifies the amplitude of the drill bit, which fluidizes the soil particles at the bit face, allowing for fast and easy penetration through most geological formations, including boulders and bedrock, while an internal air spring isolates these vibrational forces from the rest of the structure.



■ Reviewing a 4" diameter, 10' long sonic core sample

## THE SONIC DRILL RIG

- A sonic drill rig is the ideal tool to obtain the most accurate sub-surface information possible to delineate the extent and depth of a deposit.
- Determination of the proportion of sand, silt, clay, gravel and other materials can easily be made, quickly identifying the amount of overburden to be removed.
- Compared to other drilling methods, the sonic drill allows the collection of aggregate samples large enough to provide a more indicative representation of the gradation of material throughout the formation.
- Instead of making predictions, the detailed information obtained from the nearly 100% recovery rate of the continuous core samples can be used to prove with a high level of confidence the quality and quantity of the mineral reserves of a property.
- A sonic drill can easily reach normal surface mining limits and provides the ability to accurately evaluate the underlying geological setting in order to determine the economics of subsequently mining the selected property.







