

Looking for well water?... Try fracture trace analysis

By HAL PHILLIPS

WATERTOWN, Mass. — When venerated Oakley Country Club here sought a long-term solution to its water needs, superintendent Bob Piantendosi took part in an interesting twist on an established, albeit unique technology.

The technology is called fracture trace analysis (FTA) — the study of cracks in the earth's surface using aerial photographs. FTA is most often employed by construction firms looking to identify places *not* to

build heavy structures. But the team at Oakley used the fractures to locate water sources on a site deemed dry by several engineering firms.

"The initial motivation for all this was to reduce our dependency on the public water supply," Piantendosi explained. "First of all, the cost of water is definitely going to escalate in the near future. And we were also concerned they [Watertown city officials] might charge us a sewage fee on top of the water." The project was especially

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delicate because Oakley is a very historic course. In 1899, Donald Ross was hired as Oakley's pro-greenkeeper — his first job after emigrating from Royal Dornoch. At the time, Oakley sported a rough-edged Willie Campbell design that Ross overhauled during his tenure.

Architect Stephen Kay, who has made a name for himself by retouching Ross designs, was retained last spring to handle the course-related amendments. His plans called for creating an

irrigation pond between tee and green at the par-3 15th hole.

This solution required a new, self-contained irrigation and pumping system, designed by Donald Trapp. Wells would be drilled to furnish the water. All told, the project was budgeted at \$250,000.

"A couple of different companies looked at the site," said Piantendosi. "After studying the parcel and various topographical maps, the initial readings told us this wasn't a great site for water."

Enter Patrick Barosh of Barosh & Associates in Concord, Mass., at the suggestion of an Oakley member who had experience in construction matters.

"It's a matter of trying to interpret and look through things," said Barosh, a glacial geologist by training. "It's sort of like staring at a person on the beach and figuring out what their skeleton looks like."

"Massachusetts is lucky because there are aerial photos taken over most of the region every two years. So it's like studying a very slow motion picture."

Barosh identified two lines of subterranean fractures — in the shape of a large "Y" — at the Oakley site. Using Barosh's sketches as a guide, Piantendosi attempted to mark these cracks with a series of pipe tracers, which look like small antennae and react to magnetism emitted through cracks in the earth's surface.

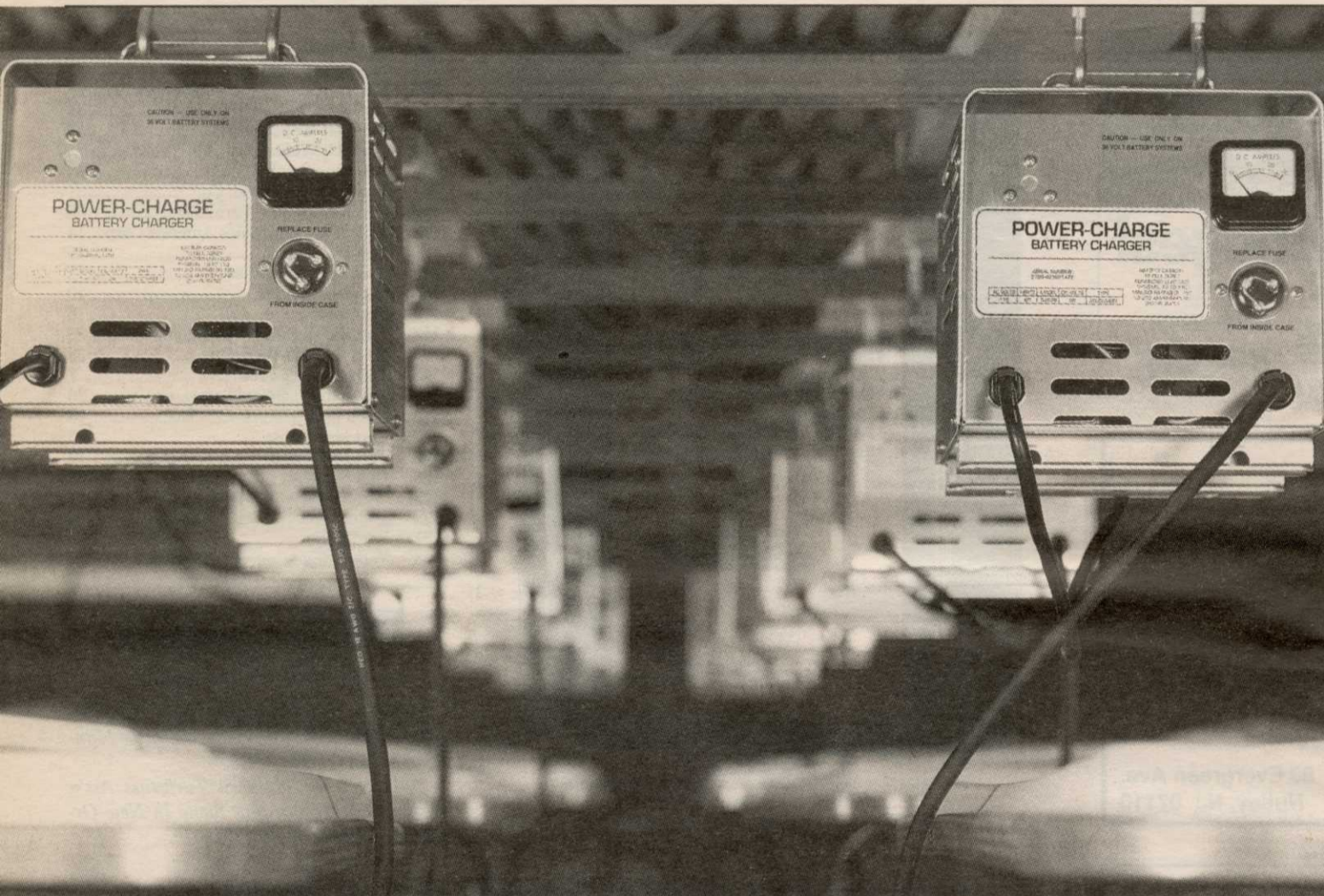
A pattern developed — the tracers mimicked the Barosh sketches. Wells were drilled along the "Y" at strategic points and plentiful water was found in every case.

"In the bedrock in this region, there is very little permeability," Barosh explained. "The water doesn't flow through the rock, unlike the thick sandstone layers in the West. So the only way water flows in this atmosphere is through these fractures."

Piantendosi warned against viewing fracture trace analysis as an expensive, space-aged technology. "This type of photography has been done for years," he said. "Most of the photographic work has already been done and is on file somewhere. You just need the right people to interpret it."

While finding such photography can require some "detective work," Barosh said there are plenty of government agencies that have been taking aerial landscape photos for years. The U.S. Geological Survey in Reston, Va., has a vast stockpile of photographs. EROS Data Center in Sioux Falls, S.D. also keeps track of aerial photography taken all over the country.

The Oakley redesign began at the close of September and is scheduled for completion by mid-December, said Piantendosi — weather permitting.



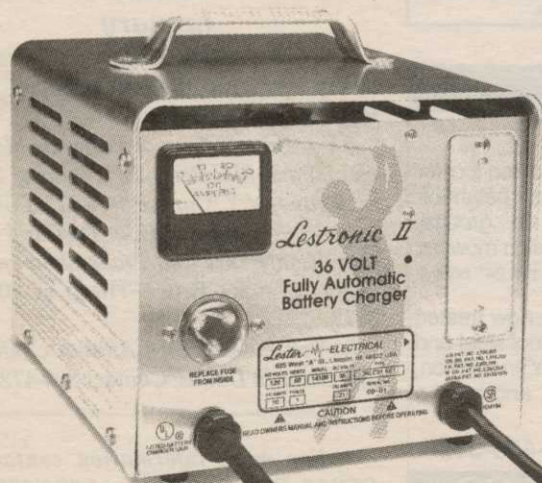
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