

Beneath the Surface

Virginia Tech conducts research at Coles Hill

Star-Tribune

September 10, 2008

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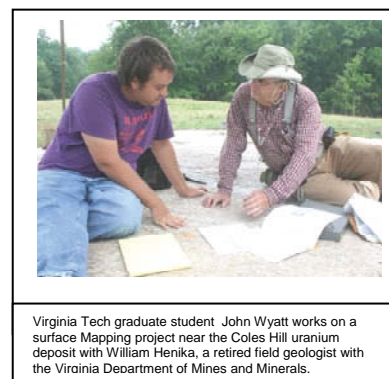


A team of scientists and students from Virginia Tech is trying to see what's underground —without doing any digging — at the Coles Hill uranium deposit in Pittsylvania County. The site, about six miles northeast of Chatham, is believed to be the richest Uranium deposit in the United States. Marline Uranium Corp. discovered the Coles Hill deposit 30 years ago, but abandoned the project when the price of uranium fell. A little over a year ago, Walter Coles, who owns the land and a majority of the ore, formed Virginia Uranium, Inc. to explore the possibility of

eventually mining the deposit, which is now worth an estimated \$10 billion. Three Virginia Tech graduate students started work on the three-year project in late May and early June, and two more are scheduled to begin this fall. "This is an extremely unique opportunity to come in with a large group of faculty and students and do a truly integrated study using all different types of expertise and techniques to study an ore deposit before it's mined," said Dr. Robert J. Bodnar, a distinguished professor in the Department of Geosciences at Virginia Tech. Bodnar has studied ore deposits for 30 years and has been at Virginia Tech 23 years. A geochemist, he has a master's degree from University of Arizona and doctorate from Penn State. Virginia Uranium is providing support for the teachers and students — basically a stipend that covers expenses and part of their salary — but their studies are being conducted independently. "We obviously have mutual interests, but we have an agreement where they don't tell us what to do," said Bodnar. "I don't think any of us have ever felt that we have been pressured by Virginia Uranium to come up with any specific outcomes or results. As a scientist, I look at the facts and try not to let politics or other pressures influence them."



Virginia Tech graduate student John Wyatt works on a surface Mapping project near the Coles Hill uranium deposit.



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"They're professionals, and ultimately it's their name that's on the research," said Mick Mastilovic, vice president of operations for Virginia Uranium. According to Mastilovic, Virginia Tech intends to publish its research and make it available to the public, much like earlier studies on the Coles Hill deposit. "Our goal with Virginia Tech is to turn the science on," he said. "Before you can answer a lot of questions you've got to collect a lot of information." Mastilovic said Virginia Tech's research focuses on geology and what's underground and is not intended to take the place of a study on uranium mining by an independent organization like the National Academy

of Science. Earlier this year, Virginia Uranium had hoped to convince the state to conduct a study on uranium, but the bill was bitterly opposed and ultimately defeated. Opponents feared the study would open the door for uranium mining. "It's a research tool," said Coles, noting the study will provide a better understanding of the ore body and water table. "All their work will benefit us down the road when we develop our mining and milling plan." Virginia Uranium hopes to move forward on a broader, state-sponsored study next year. "We're pushing every day to get some sort of study under way," said Coles. "We're hoping it will happen sooner rather than later."



Virginia Tech graduate student Josh Whitney records information from an electromagnetic study at the Coles Hill uranium deposit about six miles northeast of Chatham. Looking on are Virginia Tech professor Dr. Chet Weiss and Stewart East with Virginia Uranium Inc.

Core samples

Virginia has had a moratorium on uranium mining since 1982, but Virginia Uranium received a state permit to conduct exploratory drilling to verify the deposit. The company began test drilling in December and has drilled 10 holes, according to Mastilovic. Core samples from the test holes are kept in a storage unit next to Virginia Uranium's temporary office on Coles Road. Those cores will be analyzed before other test holes are drilled, said Mastilovic. The company has a permit for 40 test holes. Across the dirt road from Virginia Uranium's office stands an unassuming building that houses Marline Uranium's 65,000 feet of core samples taken from 1977 to 1983. Marline donated the cores — basically long cylinders of solid rock — to the Virginia Museum of Natural History in Martinsville 20 years ago. James S. Beard, curator of earth sciences for the Virginia Museum of Natural History, is a geologist and adjunct professor at Virginia Tech. He is helping with the Virginia Tech study. Visitors to the core shed are required to sign in and out and workers wear radiation badges as a safety precaution, although Mastilovic said there is no danger. "It's essentially a rock collection," he said of the core shed's 7,500 boxes. "The biggest danger is if a box falls on you."



Virginia Uranium Inc. chief geologist Joe Aylor (left) and vice president of operations Mick Mastilovic (right) with some of the recent core samples taken during exploratory drilling at Coles Hill. The company received a state permit for 40 test holes and began drilling last December.

What's underground?

Dr. Chet Weiss, a faculty member in the geosciences department at Virginia Tech, uses ground-penetrating radar to conduct a study at Coles Hill, believed to be the richest uranium deposit in the United States.



Over the past three months, graduate students have employed ground-penetrating radar, electromagnetic studies, and seismic tests — essentially "mini-earthquakes" — to learn more about the uranium deposit. "What we're trying to do is predict what's beneath the surface," said Bodnar. "All of these studies are telling us something about the subsurface — the rocks, when the rock type changes, where the major faults are. "All those pieces of information are critical to understanding the ore deposit as it exists today, and that will be very useful information as the company starts to develop the deposit in the future," he said. Dr. Thomas J. Burbey, an associate professor of hydrogeosciences at Virginia Tech, is studying

hydrology — how water moves through fractures in rocks in the soil, what controls movement, and how that might be affected once the ore body is disturbed. Before coming to Virginia Tech, Burbey was with the U.S. Geological Survey in Nevada for 12 years. He has master's degree and doctorate from the University of Nevada. "I'm always interested in how water flows through fractured rock. It's very complicated. It's even really hard to understand within a single watershed," said Burbey, who teaches and conducts research at Virginia Tech. "Anytime we have an opportunity to learn something we're going to take it," he said. "Fortunately Virginia Uranium opened up an opportunity for us to learn something new." Other Virginia Tech professors participating in the study include Dr. John Holle, a geophysicist; Dr. Chet Weiss, a faculty member in the geosciences department; and Dr. Eric Westman, a faculty member in the Department of Minerals and Mining Engineering. Dr. Marilyn Maisano, a professor at Virginia Military Institute, also is lending a hand with field work and research.

Graduate students

Graduate students conducting research for their master's theses include J.P. Gannon of Franklinville, N.J.; Josh Whitney of Fredericksburg; and John Wyatt of Appomattox. Gannon is doing his thesis on how water moves through fractures in the rocks in the vicinity of the ore body. To get an underground profile of the permeability of the rock and soil around the uranium deposit, he employed a resistivity study, which uses a straight line of evenly spaced electrodes. "There are these really long lines that have to go straight through about anything," said Gannon, "so there's a lot of barbed wire fence jumping, having to line them up to avoid buildings, and hacking through thickets." Whitney, a student in Virginia Tech's Department of Mining and Minerals Engineering, is conducting an electromagnetic and groundpenetrating radar study of the Coles Hill site with Weiss and Westman. "They are looking at slight variations in the magnetic and electrical properties of the rocks and the subsurface," explained Bodnar. Wyatt, a graduate student in the Department of Geosciences, is conducting a surface mapping study. Wyatt, 29, has ties to the area. His mother, Carolyn Mason Wyatt, is from Gretna and his dad, Harold Wyatt, is from Mount Airy. "It's something I've always known," he said about the uranium deposit. "When I was offered the chance to study here, I didn't have to think about it. I said yes." Wyatt is working closely with William Henika, a retired field geologist with the Virginia Department of Mines and Minerals and an adjunct professor at Virginia Tech. Henika is familiar with Coles Hill, having mapped the area for the state years ago. A recent day found Henika and Wyatt huddled under a makeshift canopy, their noses inches from a rock outcropping. "What we're trying to do is see how the deposit evolved," Henika said. "It just didn't happen all at once. We're trying to unravel one piece at a time — 'CSI' fashion." Even though classes have begun at Virginia Tech, Bodnar said students will continue field research on a limited basis during the school year. "We're just interested in the basic science," the professor said.