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From The Morning Call -- March 28, 2004

Little done to learn sinkhole cause

Route 33 bridge closed in January. Probe likely will not get taxpayers off \$6 million ho

By Steve Esack
Of The Morning Call

Nearly two months after state and federal agencies announced a joint investigation into why a sinkhole closed a busy Route 33 bridge over Bushkill Creek in Palmer Township, little has been done.

No agency has sought the lead in determining why 90 sinkholes have opened in the cement quarry region in and around the Bushkill and Schoeneck creeks since 1999. In any event, a study is likely to be futile and taxpayers will foot the \$6 million to build a new span in Northampton County where sinkholes occur naturally by the thousands.

"There's been a lot of talk, but no decision on who's going to provide what's in it," said geologist Sharon Hill, a mining inspector with the state Department of Environmental Protection's Pottsville Mining Bureau, which regulates mines and quarries in eastern and central Pennsylvania.

"There's no state agency that investigates sinkholes unless they are related to some regulatory action."

Unlike Florida, where sinkhole reports are cataloged in the Department of Emergency Management and then ferried out to the appropriate agencies for investigation, Pennsylvania does not have a clearinghouse where residents can report sinkholes. The result often is a disjointed probe by various government agencies.

"We all want to do something, but we are all governed by what we can and cannot do," said Merv Brokke, spokesman for the U.S. Army Corps of Engineers in Philadelphia. "I agree there needs to be a lead organization."

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As the northbound Route 33 bridge over Bushkill Creek is being replaced, nearby residents wonder if PennDOT and three Nazareth area quarries — Hercules Cement Co., Eastern Industries and Essroc Italcementi Group — might be responsible for the sinkholes by altering the groundwater table for decades.

"You'll never find the smoking gun because no one can see what's going on underground," said Tony Ramunni Jr. of Palmer Township, a member of the Brookwood Group homeowners association that formed after the sinkholes started.

Mining and development contribute to the instability of the landscape, but PennDOT and the quarries maintain that sinkholes form naturally in porous limestone, which makes up most of the Lehigh Valley.

"Yes, we have sinkholes on our property and the property behind us, but there's been sinkholes there for years," said Joe Pospisil, Hercules' vice president of manufacturing.

Last year one geologist said the bridge — which carried 17,000 motorists a day — was in jeopardy because sinkholes were migrating toward it. And residents say PennDOT may have altered the groundwater level when it narrowed Bushkill Creek 34 years ago to build Route 33 bridges. They also point to water pumps at the quarries — particularly the 98-year-old Hercules quarry — for possibly triggering sinkholes by lowering the groundwater table by an estimated 520 feet in the quarry pits and by 30 feet at the damaged Route 33 bridge, according to Hercules' 2002 groundwater study.

"My challenge to the state, the county, the Army Corps of Engineers, the quarry is find out what's causing the problem so we don't waste any more taxpayers' money," said Linda Iudicello of Palmer Township, a member of the Brookwood Group.

"We don't want to shut down the quarry; we have friends there," she said. "But they need to be responsible if it is their fault. We've got sinkholes that are 58 feet wide and 48 feet deep. These are craters."

Natural sinkhole formation, which can take decades or millennia to form through erosion, thawing, drought and moisture, gets accelerated by development. Trying to distinguish between the forces of nature and construction or leaky utility lines, which alter the natural level of groundwater table, is nearly impossible, said Dru Germanoski, a Lafayette College geology professor who is helping the state and federal governments with the investigation.

"Where does nature's cause and effect end, and where does human interaction begin," Germanoski said. "It can be a combination of the two. That's the problem with carbonate rocks, and that's the situation we are faced with."

Red tape

At a Feb. 5 public meeting in Nazareth, the DEP, PennDOT and the Army Corps of Engineers planned a joint effort to investigate the sinkholes. But they warned the probe would take time and money and might not find a direct cause, just as a DEP sinkhole study in 2001 could not — because the agencies are limited by law.

Since the public meeting, they have worked separately. However a "high-level" meeting is being planned "between PennDOT and the DEP, and possibly a few other agencies," said PennDOT spokesman Ron Young.

PennDOT can only spend tax dollars to repair its roads and bridges and the land within its right

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way, the area immediately adjacent to its property. And that is all PennDOT engineers have looked at since state Transportation Secretary Allen D. Biehler and other state officials addressed the issue for a joint investigation at the meeting.

In 1972, quarries were added to state mining laws, and the term "sinkhole" was not added to regulations until 1990. The term's relatively recent addition has quarries questioning the DEP's authority in ordering sinkhole repairs outside their respective property lines, according to Roge Hornberger, district mining manager with the Pottsville bureau.

The agency's regulations are evolving, he said.

The Corps, on the other hand, has no sinkhole laws as part of its environmental protection mission which Congress established in 1990. And the Corps cannot stray outside the banks of the Bushkill work on a \$400,000 study of lining the creek bottom with plastic — a study that just began.

"The Corps does not have the authority to fix sinkholes," said Bill Mueller, the Corps' strategic planner in Philadelphia.

If the Corps decides to line the Bushkill, it can't start until a local municipality or private organ agrees to pay for future maintenance — including sinkhole repairs — in the creek.

Northampton County Executive Glenn F. Reibman said the county and municipalities cannot afford the maintenance.

And the Pennsylvania Constitution prohibits a state agency such as the DEP or PennDOT from doing so as well, unless the state Legislature passes a law allowing it.

"No one has asked us to sign into an agreement," Brokke said.

Four months before the Route 33 bridge sank 6 inches and had to be removed at the federal government's expense, East Greenville geologist Michael Perlow, at a sinkhole conference in Alabama, predicted Route 33's demise and signaled the need for a lead authority.

"The creek has a long history of sinkholes; again it's no one single cause that's up there," Perlow said recently. "Water is an active triggering mechanism. But someone has to look at the long-term issue because you are spending a lot of money to fix the short-term issue."

DEP and quarries

In early March, representatives of Hercules, Eastern Industries and Essroc met with the DEP's mining inspectors.

DEP spokesman Karl Lasher declined to reveal the substance of the meetings, but he described it as a good first step in finding a solution to the sinkholes because "all three companies agreed cooperation is in everyone's best interest."

Pospisil of Hercules declined to comment on the meeting.

Rusty Taft, Eastern Industries' mining engineer, said in an e-mail that the company has voluntarily fixed sinkholes on an adjacent parcel owned by Chrin Co. for years. Taft declined to say if the discussed Route 33.

Fabio Rizzi, plant manager at Essroc, said the DEP assured him it does not suspect Essroc or the other quarries of causing the Route 33 sinkhole.

"There is no known connection between the activities at our quarries and sinkholes in the area said. "Our discussions on the subject have been voluntary and relate to our interest in helping the community address the sinkhole problem with our ability to provide equipment and materials."

When a quarry or mine goes deep enough, it eventually will hit the groundwater table, causing water to flow into the pit. To keep the operation dry, a quarry must pump out the groundwater and discharge it someplace else, usually into a stream. The pumping process, which works like a

household well, creates – a funnel effect in the underground that is called the "cone of depression" or "zone of influence."

Studies — one of the most famous was done in 1953 near Hershey — have shown that depending on its size, a quarry's cone can cause sinkholes by sucking groundwater for miles. That undermines limestone, clay filling and soil above where the groundwater had been until the surface buckles; eventually collapses, creating a hole.

Hercules is suspected of having the widest cone because its pit is the deepest, said the DEP's Hill. On a daily basis the company is permitted to discharge about nine times more groundwater into Bushkill Creek than Essroc's Nazareth Quarry 1 and about 24 times more than Eastern Industries, she said. The discharged water is a measurement of how much groundwater flows into the quarry, Hill said.

But the size of Hercules' cone may have more to do with its location than its depth, she added. Hercules' pit, along the Bushkill between Essroc and Eastern Industries, intercepts groundwater that normally would flow to the other quarries on its southeast journey toward the Delaware River, Hill said.

"The zinc mine was another deal where PennDOT lost part of a highway because it was situated right on the edge of the cone, and pumping just sort of went up and down and exacerbated the problem," said Perlow, who in 1984 documented 184 sinkholes in natural and highway drainage areas along approximately four miles of Route 33.

Geologist Arthur Socolow, who retired in 1986 as director of the state Bureau of Topographical and Geological Survey, said it is unfair to say the quarry caused all sinkholes within its cone. "There could be other factors," he said. "You have to look at the groundwater at each location."

In 1983, Socolow studied why a rash of sinkholes opened in Saucon Valley, including one that swallowed 120 feet of Vera Cruz Road. Others blamed a zinc mine and a farmer who rerouted a stream, but Socolow could not determine liability — saying there were too many other accomplices — and taxpayers paid the Vera Cruz Road repairs that cost \$1 million.

It is a similar scenario two decades later. The Nazareth area quarries point to sinkhole maps that William Kochanov, senior geologist at the Pennsylvania Geological Survey in Middletown, Dauphin County, created in 1987 as proof that sinkholes exist well beyond the cones.

The maps plot hundreds of sinkholes and thousands of surface depressions that could turn into sinkholes along the Route 33 corridor and are far from the three quarries.

Hercules, Essroc and Eastern Industries' quarries date to the early 1900s. There are no records of the groundwater table before the quarries began digging, Hill said. Not until 1999, when she ordered Hercules, Essroc and Eastern Industries to replace a Nazareth resident's vanishing supply of well water, is there a reference to the quarries' cones drawing down the groundwater in the surrounding communities.

About a year later, records show, she and other mine investigators were called to the area to investigate sinkholes that opened under the Stockertown-Tatamy bridge and in the yard of David and Valerie Sarkady's home on Babbling Brook Road in Palmer Township.

Hill's 35-page report, which was published on May 31, 2001, could not conclusively say what was causing the sinkholes. It listed nature, construction, Route 33, runoff and other unknown factors but the report said "the Hercules operation likely had some connection to the surface manifestation of sinkholes due to the decades of lowering the groundwater table through pumping."

Stricter regulations

A month after Hill presented her report to residents, DEP records show, the department began taking regulatory steps to force the companies to fix sinkholes on and around all three comparable properties while also allowing the companies to not admit fault for causing them.

In June 2001, Hercules filled a sinkhole within its cone that was tearing apart a Norfolk Southern

railroad abutment over Bushkill Creek. All three companies, however, balked later that month fixing a sinkhole that threatened a sewer line, and that hole remains open.

In 2002, DEP records show, the department began imposing stricter sinkhole regulations on Hercules than on Essroc or Eastern Industries. As part of a permit to mine its pit 150 feet deep which the department granted in March 2003, the DEP forced Hercules to conduct the first groundwater study in the area that showed the probable effect of the quarries' cones on the environment.

Last spring, the department included a sinkhole remediation clause in Hercules' federal water discharge permit, which the state enforces on a local level and quarries must renew every five years.

Hercules' groundwater study, conducted by Hazlett-Kincaid Inc. of Akron in Lancaster County, showed that the quarry's cone stretches for 2.2 square miles, stopping on the east side of the damaged Route 33 bridge. Based on well readings at Hercules, Essroc and Eastern Industries, study found that the quarries' cones overlap for 5.3 square miles, which is the size of Easton a Stockertown combined.

Hercules' cone is expected to grow by another 1.3 square miles when the quarry starts mining deeper, the report says.

Pospasil said it will be years before Hercules goes deeper because the quarry still has about 30 of minable limestone left at its current depth of about 300 feet.

David Sarkady, who now lives in Emmaus, said he doubts the new investigation will point toward Hercules or the other quarries as the cause of sinkholes because then they will be pointing toward the DEP. He said the agency contributed to the problem by allowing millions of gallons of water discharged into the Bushkill, which allowed Hercules to mine more and suck more groundwater causing the sinkholes. The DEP's permit also led to more erosion of the streambed, he said.

But DEP spokesman Lasher said it is not against the law to pump out water. He said if any of the quarries' cones are found to be causing sinkholes, the DEP can shut them down or the company can voluntarily cease operations until the sinkholes are fixed. However, the DEP never has shut a quarry for sinkhole concerns and only once, in central Pennsylvania, did a quarry voluntarily stop operating.

"I'm not blaming Hercules," said Ramunni of the Brookwood Group. "But still, we've had drought through feast and famine, and 33 is over 30 years old. So what's changed? It's only happening in this section of the creek."

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