Groundwater Protection More Than A Fence Around The Wellhead

(Continued from Page A1)

tion techniques at the Lancaster Groundwater Policy Education Project Conference on Tuesday. The conference drew about 150 representatives from farming and other industries, as well as municipal planners and engineers, to speak about the importance of groundwater hydrology and protection.

Nelson said that the issue must be dealt with locally, because groundwater protection "cuts across municipal boundaries." He explained an array of techniques that could be used to plan and implement wellhead protection strategies that can be used in increasing order of complexity and cost.

Groundwater quality

Nelson provided examples of communities in several areas of central Pennsylvania and the eastern shore of Virginia that implement strategies that have done quite a lot of improve groundwater quality.

Nelson emphasized the need to understand the complete hydrological makeup of the land, possible threats at the land surface (including stored material), historical threats from past or future land uses, zoning areas and how they impinge on groundwater protection, and to properly identify possible future threats.

Nelson said that underground storage tanks, used at gas stations, have been identified as the number one threat to water quality, according to the Department of Environmental Resources (DER). Other threats include mixing sites for pesticides and fertilizers, landfills, septic tank systems (which, according to Nelson, contribute largely to nitrate pollution in groundwater), and other sources of contamination.

But all concerns should be site-specific and need to be treated accordingly.

Mark Nelson, senior hydrologist from Horsley Witten Hegemann, Inc., Cambridge, Mass., spoke about tools for groundwater and wellhead protection techniques at the Lancaster Groundwater Policy Education Project Conference on Tuesday.

Virginia Thompson, chief of the groundwater protection section of the EPA Region III, spoke about examples of local cooperative efforts that aided in the study and improvement of groundwater quality.

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Currents understandable

Groundwater currents and flow are completely understandable to those who want to plan wellhead locations, according to Dr. Walter Ebaugh, president of Nittany Geosciences, Inc., State College. Ebaugh explained basic groundwater hydrology and the importance of knowing where the groundwater originates and how it flows.

Ebaugh also explained the differences between the water-table well (which is located at the baseflow of the water table, according to specific site) and artesian wells (which are located deep in the earth, in the layers of limestone in this region).

The direction and rate of water flow is calculable — and the locations of wells can sometimes be determined accurately from photo surveys conducted by aircraft. The location of a well must take in many factors, including the layout of the land, which provide reliable clues to how groundwater originates and flows.

In planning a wellhead, the "cone of depression," or area surrounding the wellhead, affects on groundwater flow. When the well is located down a slope to a stream or waterway, the groundwater tends to follow the layout of the land, and ultimately feeds the baseflow of a stream. When a well is in place, the water is often driven away from the stream baseflow into the cone of depression and up through the well.

Proper location

Some of the problems that wellhead managers may see can be prevented by the proper location of the well. Ebaugh also presented ways to solve problems when wellwater becomes contaminated, including direct source removal, containing and isolation, fixation, or by bioremediation (using bacteria to clean up toxic chemicals that may be present in wells).

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Thompson said that "groundwater flows among municipalities," and that, for any groundwater quality program to work, "perseverance and the spirit of cooperation are required."

Thompson spoke about the Pequea-Mill Creek project and the Rural Clean Water Program projects recently undertaken in Lancaster County and the reasons for their success. "Water quality protection is not easy to do if not all of the people are involved," she said. "The more people that are involved in the beginning, the more successful your efforts will be."

The conference also featured workshops that allowed groups from various municipalties to share their problems and ways of working toward groundwater solutions.

Atlantic Dairy Cooperative

ADC recognized the Ranks as a founding member families: Ray, Rhonda Elisa, Reba, Beth, Ginny, Ruth, Ryan, Rob, Don, and Lloyd Ranck.

Founding member families included: Karl Beegle, Marjorie Beegle, Michael Behrer, Linda Behrer, Bernice Behrer, John Behrer, and Ivo Otto.

(Continued from Page A16)

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Founding member families included: Kenneth and Elaine England, Andrew and Lucille Stoltzfus, William J. Dietrich, Beatrice V. Dietrich, William Brinsfield, Kathryn Brinsfield, Mildred Harrop, David R. Harrop, and William Brinsfield, Jr.

For their continuous membership in the cooperative since 1917, ADC honored these founding member families: Brad Morris, P. Thomas Mason, Elizabeth Williams, Elizabeth H. Morris, Alice Mason, Diana C. Hoopes, Julia Gibboney, Harry T. Williams, Walter T. Morris, III, C. Barclay Hoopes Jr., Stephen L. Gibboney.