NEWS LETTER
TENNESSEE
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TENNESSEE DIVISION OF GEOLOGY NEWS LETTER
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Director's Comments

By Ronald P. Zurawski

Much has happened since publication of our last newsletter in January of 2004. After a couple of years of budget cuts and reductions-in-force, we have finally been able to achieve at least some level of financial stability.

We now have three vacant Geologist 3 positions due to retirement. All are currently in the process of being filled. Two are in Nashville, and one is in our Knoxville regional office. In connection with these personnel changes the Division of Geology has combined its West Tennessee Section with the Mapping Section in its Nashville office.

In January 2004 the division published the *Indian Springs Geologic Map and Mineral Resources Summary* by William B. Brent and Martin S. Kohl. This map is entirely in Sullivan County. Mineral resources that have been mined are limestone and shale. Potential resources include petroleum, natural gas, and possibly zinc. Geologic hazards include flooding, karst, mass movement, and moderate seismic risk. The division also published Volume16, No. 1 of the *Newsletter*. This volume included mining and oil and gas activity and production statistics during 2000, plus an article on Earth Science in Tennessee public schools.

In September 2004 the division published the *Camp Austin Geologic Map and Mineral Resources summary*. Geologic map is by James L. Moore, C. Pratt Finlayson, William D. Rose, Jr., and Albert B. Horton. Mineral resources summary is by Anthony T. Statler and James L. Moore. This map is entirely in Morgan County. Mineral resources that have been mined or produced are coal and oil and gas. Potential resources are clay and shale. Geologic hazards include flooding and acid mine drainage.

In November 2004 the division released as open-file reports in GIS format the *Camelot Geologic Map and Mineral Resources Summary* in Hawkins County by Martin S. Kohl and Peter J. Lemiszki and the *Mascot Geologic Map and Mineral Resources Summary* in Grainger, Jefferson, Knox, and Sevier counties by Barry W. Miller and Robert C. Price, III.

In November 2004 the division also received the 2004 Tennessee Earth Science Teachers *Pterotrigonia thoracica* Award. Named after Tennessee's official state fossil and known as the Ptero Award, this annual award is presented to those who make significant contributions to earth science education in Tennessee. Duplicate plaques were presented to the division's Nashville and Knoxville offices.

In January 2005 the division published the 2005 *Catalogue of Publications*.

In April 2005 Jim Fyke was selected as the new Commissioner for the Department of Environment and Conservation. Jim formerly served as Deputy Commissioner for State Parks and Conservation. At the same time Paul Sloan was named as the new Deputy Commissioner for Environment. Paul has a record of achievement as an educator, attorney, businessman, and environmental leader.

In July 2005 the Division of Geology became part of the Land Resources Group in the Bureau of Environment as a result of departmental reorganization. The Land Resources Group includes the divisions of Remediation, Solid and Hazardous Waste Management, Underground Storage Tanks, Geology, and Department of Energy Oversight in Oak Ridge. The State Oil and Gas Board's regulatory program was also transferred from the Division of Geology to the Division of Water Pollution Control. Geology continues to classify oil and gas wells, and maintain cuttings and cores, well data, and production records. Chuck Head will be serving as designated chairman of the State Oil and Gas Board.

In October 2005 Chuck Head was selected as Senior Director for the Land Resources Group. He has more than 27 years experience with the department. Chuck reports directly to Deputy Commissioner Paul Sloan, and is responsible for the development and coordination of policy, planning and strategy for Land Resources. The five Land Resources directors now report directly to Chuck.

In November 2005 the division released as open-file reports in GIS format the *Binfield Geologic Map and Mineral Resources Summary* in Blount County by Martin S. Kohl and Barry W. Miller and the *Newport Geologic Map and Mineral Resources Summary* in Cocke County by Peter J. Lemiszki and Robert C. Price, III.

In March 2006 the division published the 2006 *Catalogue of Publications*.

In June 2006 the division released as an open-file report in GIS format the *Lenoir City Geologic Map* in Loudon and Roane counties by John W. Jewell and Peter J. Lemiszki.

Also in June 2006 Martin Kohl and Bob Price, along with Larry Bolt, Nick Fielder, and Harry Moore appeared in a video production of the discovery of the Gray Fossil Site that will be shown in the new East Tennessee State University Museum of Natural History and Visitors Center scheduled to open on the site in the spring of 2007.

In July 2006 our Knoxville regional office moved to a new building. Their new address is: 3711 Middlebrook Pike, Knoxville, TN 37921.

In August 2006 the division published Report of Investigations No. 52, *Geophysically Subdividing the Nashville (Trenton) and Stones River (Black River) Groups Beneath the Eastern Highland Rim and Southern Cumberland Plateau in Tennessee and Southern Kentucky* by Jonathan C. Evenick and Robert D. Hatcher, Jr. This report establishes a basis for subdividing and correlating the Nashville and Stones River groups in the subsurface of the Cumberland Plateau and Eastern Highland Rim using geophysical well logs. The Nashville and Stones River groups consist of several rock units that contain some of Tennessee's most productive oil and gas zones.

In December 2006 the division released as an open-file report in GIS format the *Jackson North Geologic Map* in Madison County by John W. Jewell, Elaine P. Foust, and Albert B. Horton. To date, nine geologic maps have been completed using GIS and GPS technology. Earlier releases included the *Cave Creek Geologic Map and Mineral Resources Summary* in Loudon and Roane counties by Peter J. Lemiszki in October 2001, the *Leesburg Geologic Map and Mineral Resources Summary* in Washington County by Robert C. Price, III and the *Sullivan Gardens Geologic Map and Mineral Resources Summary* in Sullivan and Washington counties by Martin S. Kohl in November 2002, and the *Mosheim Geologic Map and Mineral Resources Summary* in Green County by Peter J. Lemiszki in November 2003.

Personnel Notes

On January 16, 2004, Juanita Griggs was appointed to the secretary position that was vacated by Tammy Jackson in September of 2003. Juanita came to us from the Division of Recreation Educational Services, where she had been serving as an administrative secretary.

On March 16, 2004, former State Geologist Robert E. Hershey died in Nashville after a battle with cancer. He served as state geologist from 1969 through 1985. During his tenure he established an environmental geology section and began publishing a new series of bulletins and maps pertaining specifically to environmental geology. He also initiated publication of nontechnical bulletins such as Bulletin 74, *The Geologic History of Tennessee*, plus a new series on the geology of Tennessee's state parks. He was a life member and past president of Nashville Downtown Lions Club, past President of the Board at St. Luke's Community Center, and past President of Middle Tennessee Camilla Club.

On May 11, 2004, Calvin Pernell died at his home in Dickson, Tennessee, after a long illness. Calvin retired from the Division of Geology on February 28, 2003, after nearly 50 years of state service. He spent much of that time processing oil and gas test well samples and operated the division's sample processing facility at Montgomery Bell State Park. He also prepared mineral/rock specimens for educational kits for distribution to students and teachers. During his tenure, he was responsible for processing laboratory grade geologic samples from more than 6,200 oil and gas wells representing nearly nine million feet of drilling.

On July 1, 2004, the division's Drafter 2 position that was formerly occupied by Chris Moxon was transferred to the Department of Education to support their Project Sense K-12 environmental education program.

On August 16, 2004, Cheryl Bullman resigned from her position as Administrative Services Assistant 2 in the division's Nashville office in order to accept a position as an Administrative Services Assistant 3 in the Division of Remediation. She provided administrative support to the division's professional and technical staff and to the State Oil and Gas Board.

On September 8, 2005 Doris Noble died at her home in Gallatin, Tennessee. Doris retired from her position as Publications Editor 1 in the division's Nashville office on June 4, 2003 after more than 25 years of state service. She edited, proofread, and prepared all scientific manuscripts for publication, helped design new series, prepared news releases for new publications, and worked with the publications committee for publications approval. Her early career included positions with Pedlar People Ltd. Of Ontario, Canada, the Seventh Day Adventist Healthcare System in California and Illinois, Vanderbilt University, Vanderbilt School of Medicine, and finally the American Heart Association in Tennessee.

On October 17, 2005 Sharon Watkins was selected to fill the administrative services assistant position that was vacated by Cheryl Bullman. Sharon had previously worked in the division's maps and publications sales office, but was transferred to the department's Underground Storage Tank Division on June 16, 2003 due to a reduction-in-force that eliminated one of our two maps and publications sales office positions.

On March 31, 2006 Geologist 4 Marvin Berwind retired after 25 years of state service. He was in charge of the subsurface geology section in the division's Nashville office.

On April 28, 2006 Geologist 4 Jim Moore retired after 34 years of state service. He was in charge of the mapping section in the division's Nashville office.

On June 16, 2006 Geologist 3 Elaine Foust was promoted to the Geologist 4 position that was vacated by Marvin Berwind. Elaine was in charge of the division's technical support section.

On September 1, 2006 Geologist 3 Tom Hart was promoted to the Geologist 4 position that was vacated by Jim Moore. In addition to heading up the mapping section, Tom is responsible for West Tennessee geology and hazards.

On September 29, 2006 Geologist 3 Bob Price retired after 23 years of state service. He was a field mapper in the division's Knoxville regional office.

Tennessee Department of Environment & Conservation, Authorization No. 327074. 2000 copies. This public document was promulgated at a cost of 35¢ per copy, January 2007.

Oil and Gas Notes

Permitting Activity: Oil and gas well permitting activity in Tennessee decreased by nearly 19 percent during 2001. A total of 167 permits were issued, compared with 205 in 2000. Ten counties had permitting activity, down from 12 in 2000. Overton County remained as the most active, with 93. Pickett County had 26, and Hancock was third, with 16 permits. With nearly 72 percent of the permits issued in 2001, the Eastern Highland Rim (Clay, Overton, and Pickett counties) continued to overshadow the Cumberland Plateau in terms of permitting activity. Permitting on the Cumberland Plateau (Anderson, Campbell, Fentress, Morgan, and Scott counties) increased considerably, however, with nearly 18 percent of the total, up from only 7.3 percent in 2000. There were 17 wells permitted in the Eastern Overthrust area of Tennessee, but none in West Tennessee.

During 2002 permitting activity decreased by more than 16 percent. A total of 140 permits were issued. Eleven counties had permitting activity. Overton County remained as the most active, with 42. Pickett County had 34, and Morgan was third, with 22 permits. With nearly 58 percent of the permits issued in 2002, the Eastern Highland Rim continued to overshadow the Cumberland Plateau. Permitting on the Cumberland Plateau increased considerably, however, to more than 37 percent of the total. Seven wells were permitted in the Eastern Overthrust.

During 2003 permitting activity increased by over 100 percent. A total of 285 permits were issued. Nine counties had permitting activity. Overton County remained as the most active, with 93. Pickett County had 71, and Morgan was third, with 40 permits. With nearly 58 percent of the permits issued in 2003, the Eastern Highland Rim continued to overshadow the Cumberland Plateau. Permitting on the Cumberland Plateau continued to increase, however, to nearly 42 percent of the total. Three wells were permitted in the Eastern Overthrust.

During 2004 permitting activity decreased by nearly 22 percent. A total of 223 permits were issued. Nine counties had permitting activity. Overton County remained as the most active, with 87. Fentress County had 55, and Pickett was third, with 42 permits. With more than 58 percent of the permits issued in 2004, the Eastern Highland rim continued to overshadow the Cumberland Plateau. Permitting on the Cumberland Plateau decreased slightly, to nearly 41 percent of the total. Two wells were permitted in the Eastern Overthrust.

Oil and Gas Well Completions: The Tennessee Division of Geology classified 234 oil and gas tests during 2001, a 31 percent increase over the 178 that were classified in 2000. These included 157 new field wildcats, 70 development wells, and five outposts. There were 26 oil wells, 18 gas,

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Mineral Notes

Coal Production: The Energy Information Administration (EIA) (U.S. Department of Energy) reports that Tennessee's coal production increased by nearly 25 percent in 2001, to 3.324 million short tons (ST), up from 2.669 million ST in 2000. The average price was $27.57 per short ton, an increase of nearly two percent from $27.04 in 2000. Coal production value was about $91.48 million, up from the 2000 value of about $72.17 million. Production came from 23 mines in six counties. Eleven were underground mines, and 12 were surface. The underground mines accounted for 1.321 million ST or 39.7 percent of total production, while surface mines were responsible for 2.003 million ST or 60.3 percent. All of this was medium- and high-volatile bituminous. Recoverable reserves at producing mines were 24 million ST. Average recovery was 74.94 percent for all mines.

In 2002 coal production decreased by nearly five percent from 2001, to 3.166 million ST. The average price was $29.56 per short ton, an increase of more than seven percent. Coal production value increased to about $93.75 million. Production came from 23 mines in six counties. Twelve were underground mines, and 11 were surface. The underground mines accounted for 1.085 million ST or 34.3 percent of total production, while surface mines were responsible for 2.081 million ST or 65.7 percent. Recoverable reserves at producing mines were 16 million ST. Average recovery was 72 percent for all mines.

Coal production continued to decrease in 2003, by more than 19 percent from 2002, to 2.564 million ST. The average price was $29.09 per short ton, a decrease of nearly 1.6 percent. Coal production value decreased to about $74.64 million. Production came from 23 mines in six counties. Ten were underground mines, and 13 were surface. The underground mines accounted for 657 thousand ST or 25.6 percent of total production, while surface mines were responsible for 1.907 million ST or 74.4 percent. Recoverable reserves at producing mines were 22 million ST. Average recovery was 76.43 percent for all mines.

Coal production finally increased in 2004, by more than 12.5 percent from 2003, to 2.887 million ST. The average price also increased, by more than 19 percent, to $34.70 per short ton. Coal production value increased as well, to $101.48 million. Production came from 32 mines in six counties. Twelve were underground mines, and 20 were surface. The underground mines accounted for 826 thousand ST or 28.6 percent of total production, while surface mines were responsible for 2.061 million ST or 71.4 percent. Recoverable reserves at producing mines were 26 million ST. Average recovery was 74.73 percent for all mines.

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Earth Science Week Celebrated in Tennessee

On September 14, 2004, Governor Bredesen officially proclaimed the week of October 10 - 16, 2004, as Earth Science Week in Tennessee. In doing so, Governor Bredesen acknowledged that year's theme "Living on a Restless Earth: Natural Hazards" by recognizing that the earth sciences provide the basis for preparing for and mitigating natural hazards such as floods, landslides, earthquakes, indoor radon, and sinkholes experienced in Tennessee, and that geological factors of hazards are vital to land management and land use decisions made in Tennessee. Tennessee joined President Bush, 22 other states, and city mayors across the nation in recognizing the importance of this seventh annual celebration of the earth sciences.

Earth Science Week provides a focus on the earth sciences that enables organizations such as state geological surveys, universities, and the U.S. Geological Survey to heighten public awareness about the importance earth science plays in each of our lives by sponsoring field trips, open-houses, workshops, and other activities and programs. Earth Science Week was one of a number of 50th anniversary initiatives for the American Geological Institute (AGI), a federation of 44 professional earth science organizations. The Association of American State Geologists, the Geological Society of America, and the National Science Foundation also support it. AGI's role in sponsoring an annual Earth Science Week is to provide a clearinghouse for ideas, activities, and special events, and to provide support materials that make it easy for geoscientists to participate. At the local level, this effort is supported, in part, by Tennessee Earth Science Teachers, by geoscience departments at Middle Tennessee State University, Tennessee Technological University, the University of Memphis, the University of Tennessee's Chattanooga, Knoxville and Martin campuses, the University of the South, Vanderbilt University, and by the Tennessee Division of Geology (TDG). Information about Earth Science Week is available on the Internet at: <www.earthsciweek.org>.

TDG participated in one of the major events that took place during Earth Science Week 2004 in Tennessee. The University of Tennessee (Knoxville) Department of Earth and Planetary Sciences was the site of the 5th Annual Earth Science Fair on Oct. 14. Volunteer students, faculty, and staff from sponsoring organizations provided displays, demonstrations, and hands-on activities. Over 500 students and members of the general public participated in 20 different activities. The event provided participants with the opportunity to increase their understanding of the impact of earth-related processes on their daily lives. Many organizations within the business, professional and university communities supported it.

During Earth Science Week 2005 in Tennessee TDG also participated in the 6th Annual Earth Science Fair on Oct. 13.

On September 7, 2006, Governor Phil Bredesen officially proclaimed the week of October 8 – 14, 2006, as Earth Science Week in Tennessee. In doing so, Governor Bredesen acknowledged this year's theme "Be a Citizen Scientist" by recognizing that the earth sciences contribute to our understanding and appreciation of and respect for nature.

On Thursday, October 12, 2006, the University of Tennessee, Knoxville, Department of Earth and Planetary Sciences, in conjunction with the Frank H. McClung Museum, hosted its Seventh Annual Earth Science Fair for middle and high school students, teachers, and parents. Events took place at the Earth and Planetary Sciences Building and the Frank H. McClung Museum at the University of Tennessee's Knoxville campus. TDG participated in this event as well. Nineteen activities were offered, including gold panning, journey to the Moon, minerals in everyday life, the physics of magnetism, a climb through time, and much more.

TDG also distributed 50 complimentary Earth Science Week 2006 Toolkits to Tennessee teachers. These resource packages are provided by AGI and contain educational posters, disks, and additional publications related to Earth science activities.

Website Update

Revised Home Page

The division's home page was recently revised and has a new look. The sidebar now includes links to the Bureau of Environment's statement of purpose. Geology's home page can now be accessed at http://state.tn.us/environment/tdg/.

Expanded Web Site

The Links of Interest heading has been changed to Helpful Links, which includes new links to the Center for Earthquake Research and Information (CERI); the East Tennessee Seismic Network (ETSN), through the University of Tennessee, which includes earthquake information for East Tennessee and vicinity, and West Tennessee and the New Madrid Seismic Zone; and the Tennessee Oil and Gas Association.

E-commerce is No Longer Available

In April of 2004 the division's E-commerce application was shut down after four years in operation, due to server failure and a software application that was no longer supported by the state of Tennessee. Although utilized by many of our customers, this online ordering service will not be replaced due to the high cost of developing a new state-supported application. Our catalogue of publications is still available online, and we still accept all major credit cards.

Cooperative Project Activities

NCRDS: The Division of Geology (TDG) received more than $7,500 under U.S. Geological Survey (USGS) Cooperative Agreement No. 02ERAG0086 for fiscal year 2003-2004. This award was provided under the National Coal Resources Data System (NCRDS) program. Work included compilation and digitization of coal data, and revision of coal reserve estimates for the Tennessee coalfield. Division personnel involved in this project include staff geologists Elaine Foust; Barry Miller, Bob Price, and secretary Becky Hawkins of the division's Knoxville office; and State Geologist Ron Zurawski. An additional 4,516 individual records were prepared for entry into the NCRDS database at the USGS. This is a long-term, Division of Geology-managed project to systematically revise, one quadrangle at a time, coal reserve maps and reserve estimates for selected areas in the Tennessee coalfield. Our ultimate goal is to publish an up-to-date coal reserve estimate for Tennessee's 20 coal-bearing counties that can be periodically revised and updated as required.

Work was started on a series of bulletins on coal zone correlations in Tennessee. The Tennessee coalfields will be divided into three distinct regions that include the Cumberland Block (also called the Pine Mountain Overthrust) area, the northern coalfields, and the southern coalfields. Each bulletin will concentrate on a specific area and include regional cross-sections, coal correlations, and coal type-sections in that region. The bulletins will include preferred coal zone nomenclature, equivalent nomenclature (local coal names), and regionally recognized marine and other key horizons.

Work was also started on scanning the TDG coal map archives. The Knoxville Field Office of the US Office of Surface Mining (OSM) initiated this project and has scanned approximately 20 percent of the maps available. The TDG coal map archives consist of various coal seam maps drawn on parchment tracing paper at the 1:24,000 scale including a 15-minute quadrangle outline. These coal maps include coal thickness and mined out areas. Most of the mined out areas are referenced to old mine maps that are stored at the TDG Nashville office. The old mine maps are also available as microfiche at the OSM Mine Map Repository in Pittsburgh, Pennsylvania. The coal maps are scanned as high-resolution color TIFF images that can be changed to another file format as needed. OSM personnel cannot continue this project so TDG personnel will work on it until completed using the OSM facilities. This is an important endeavor due to the deteriorating condition of many of the coal maps. The scanned images can be georeferenced and used in any GIS system. The image files are also sent to the OSM Mine Map Repository.

During fiscal year 2004-2005 TDG received nearly $12,000 through the NCRDS program. An additional 5,554 new records were prepared for entry into the NCRDS database. Work continued on the first in a series of bulletins on coal zone correlations in the Tennessee coalfields. Work was also begun on extending the Cumberland Block coal correlation cross-section from Tennessee through Kentucky and into Virginia.

Several regional cross-sections across the length and width of the northern Tennessee coalfield and parts of Kentucky were also constructed using geologic and stratigraphic information from coal exploration drill core, oil and gas exploration holes, surface and underground mines, and measured sections. These cross-sections were tied into as many type-sections of coal zones as possible, and include several regionally recognized horizons that contain marine fossils. These marine horizons were used as marker beds to correlate the various coal zones in Tennessee. The final version of these cross-sections will be produced graphically using Adobe Illustrator 8.0.

During fiscal year 2005-2006 TDG received more than $6,500 through the NCRDS program under Cooperative Agreement No. 05ERAG0043. An additional 1,865 new records were prepared for entry into the NCRDS database, bringing the total to date to 55,152 individual records from Tennessee coalfield quadrangles. Since 1992, the division has received more than $154,000 under this grant program.

NGS: During fiscal year 2004-2005 TDG was approved for funding in the amount of $15,000 under USGS Cooperative Agreement No. 04ERAG0043 through the National Geochemical Survey (NGS) program. This federal grant program is designed to assist the states in collecting about 35,000 samples for analysis as part of a national geochemical survey. The goal is to provide primary data used in defining geochemical baselines for mineral resource assessment and environmental conservation. The NGS has been engaged in this work in Tennessee since 1998.

Division staff collected one stream sediment or soil sample per 100 square miles. The team of Marvin Berwind, Albert Horton, Mike Hoyal, and Gary Pinkerton completed this project over a two-year period at a cost of about $75 per sample on a 10 mile by 10-mile grid-cell basis. This will complete a major component of the NGS by providing data for about 200 samples needed to fill a critical gap in coverage in Middle and West Tennessee. It will help to complete coverage for about 2,600 grid cells nationwide without any data.

STATEMAP: TDG received $40,000 under USGS Cooperative Agreement No. 01HQAG0108 for fiscal year 2003-2004 under the State Geological Mapping Program element (STATEMAP) of the National Geologic Mapping Program. STATEMAP is a federal grant program designed to assist the states in accelerating the process by which geologic maps are made available to the general public.

The purpose of this project was to map the geology of the Camelot and Mascot, Tennessee, 7.5-minute Quadrangles in Grainger, Hawkins, Jefferson, Knox, and Sevier counties. Staff geologists Martin Kohl and Peter Lemiszki were responsible for Camelot. Barry Miller and Bob Price were responsible for Mascot.

During fiscal year 2004-2005 TDG received more than $32,000 through STATEMAP Cooperative Agreement No. 04HQAG0066. The purpose of this project was to map the geology of the Binfield and Newport, Tennessee, 7.5-minute Quadrangles in Blount and Cocke counties. Staff geologists Martin Kohl and Barry Miller were responsible for Binfield. Peter Lemiszki and Bob Price were responsible for Newport.

During fiscal year 2005-2006 TDG received more than $14,500 through STATEMAP Cooperative Agreement No. 05HQAG0061. The purpose of this project was to convert Tennessee geologic maps to digital coverages, including Jackson North in Madison County and Lenoir City in Loudon and Roane counties. Staff geologists Elaine Foust and Albert Horton were responsible for Jackson North. Peter Lemiszki was responsible for Lenoir City. Since 1994, the division has received more than $266,000 and completed 18 geologic maps under this grant program.

Oil and Gas Notes *(Continued from p. 4)*

five dual completions, and 183 dry holes. The overall success rate was nearly 21 percent, down from 29 percent in 2000. The success rate for new field wildcats was nearly 22 percent and for development wells more than 21 percent, but for outposts it was zero. Total drilling footage reported was 419,289 feet, up from 330,604 feet in 2000.

During 2002 the division classified 112 oil and gas tests, a 52 percent decrease from 2001. These included 56 new field wildcats, 50 development wells, six outposts, and two abandoned locations. There were no oil wells, 19 gas, no dual completions, and 91 dry holes. The overall success rate was slightly more than 17 percent. The success rate for new field wildcats was more than 20 percent and for development wells was 16 percent, but for outposts it was zero. Total drilling footage reported was 183,551 feet.

During 2003 the division classified only 17 oil and gas tests, an 85 percent decrease from 2002. These included 10 new field wildcats and seven development wells. There were two oil wells, three gas, and 12 dry holes. The overall success rate was more than 29 percent. The success rate for new field wildcats was 20 percent and for development wells was nearly 43 percent. Total drilling footage reported was 32,085 feet.

No oil and gas tests were classified during 2004.

Oil Production: Oil production totaled 386,428 barrels during 2001, an increase of nearly 12 percent over the 346,332 barrels that were produced in 2000, reversing a decline from Tennessee's all-time high of more than one million barrels in 1982. The average price per barrel decreased to $21.96, resulting in a total value of nearly $8.5 million, down from $9.1 million in 2000, when the average price per barrel was $26.28. The value of Tennessee's oil production reached an all-time high of more than $35 million in 1982, when the average price per barrel was $30.93. For the State of Tennessee, the 2001 oil production generated severance tax revenue of nearly $255,000. Twelve counties reported production, one more than in 2000. Overton County remained the leader, with 160,412 barrels, or more than 41 percent of the state's total. Scott County moved up from third to second place, with 48,683 barrels, and Morgan County moved up from fourth to third, with 45,147 barrels. Tennessee's most productive oil well was the Roger McDonald #5 by John Henry Oil Corporation, a new field wildcat in Overton County. It produced a total of 35,073 barrels in 2001, with a market value of about $770,000. Cumulative production was 47,010 barrels from the Nashville Group since September of 2000.

During 2002 oil production totaled 316,234 barrels, a decrease of more than 18 percent from 2001, renewing a decline from Tennessee's all-time high. The average price per barrel decreased to $21.89, resulting in a total value of more than $6.9 million. The 2002 oil production generated severance tax revenue of nearly $208,000. Eleven counties reported production. Overton County remained the leader, with 94,915 barrels, or more than 30 percent of the state's total. Scott County remained in second place, with 56,084 barrels, and Morgan County remained in third, with 53,754 barrels. Tennessee's most productive oil well was the Paul Reed #5 by Tengasco, a new field wildcat in Hancock County. It produced a total of 8,823 barrels in 2002, with a market value of more than $190,000. Cumulative production was 62,335 barrels from the Stones River Group since September of 1999.

During 2003 oil production totaled 359,924 barrels, an increase of nearly 14 percent from 2002, reversing a recent decline. The average price per barrel increased to $26.56, resulting in a total value of more than $9.5 million. The 2003 oil production generated severance tax revenue of nearly $287,000. Twelve counties reported production. Overton county remained the leader, with 102,331 barrels, or more than 28 percent of the state's total. Morgan County moved up from third to second place, with 58,855 barrels, and Scott County dropped from second to third place, with 55,040 barrels. Tennessee's most productive oil well was the Ostil and Freddie Paul #19 by Basin Oil and Gas Corporation, a new field wildcat in Overton County. It produced a total of 22,836 barrels in 2003, with a market value of more than $600,000. Cumulative production is 24,474 barrels from the Stones River Group since December of 2002.

During 2004 oil production totaled 362,032 barrels, a slight increase from 2003, continuing a recent increase. The average price per barrel increased to $36.46, resulting in a total value of nearly $13.2 million. The 2004 oil production generated severance tax revenue of nearly $396,000. Eleven counties reported production. Overton county remained the leader, with 119,447 barrels, or nearly 33 percent of the state's total. Pickett County moved up from fourth to second place, with 58,584 barrels, and Morgan County dropped from second to third place, with 57,717 barrels. Tennessee's most productive oil well was the Carl Huddleston #9 by Southeastern Energy, Inc., a development well in the Red Hill field in Pickett County. It produced a total of 24,587 barrels from the Stones River Group from March through December of 2004, with a market value of more than $920,000.

Gas Production: Gas production increased by 73.5 percent, to more than 2 billion cubic feet (Bcf) in 2001, up from 1.15 Bcf in 2000, reversing a decline from Tennessee's all-time high of more than 5 Bcf in 1984. The average price decreased, to $3.62 per thousand cubic feet (Mcf), down from $4.08 in 2000. Total value increased, to more than $7.2 million, up from more than $4.7 million in 2000, but still down from Tennessee's all-time high of more than $12 million in 1984. For the State of Tennessee, the 2001 gas production generated severance tax revenue of nearly $220,000. Seven counties reported production, one more than in 2000. Hancock County replaced Claiborne County as the leader, with 979,470 Mcf, or nearly 49 percent of the state's total. Claiborne County dropped to second place, with 351,583 Mcf, and Morgan County remained in third, with 280,191. Tennessee's most productive gas well was the Warren Reed #2 by Tengasco, Incorporated, a new field wildcat in Hancock County. It produced a total of 207,395 Mcf from the Knox Group from April through December of 2001, with a market value of about $530,000.

During 2002 gas production increased by nearly 2.5 percent, to more than 2.05 billion cubic feet, continuing a recent increase, but still below Tennessee's all-time high. The average price decreased to $3.41 per thousand cubic feet (Mcf). Total value also decreased, to nearly $7 million. The 2002 gas production generated severance tax revenue of nearly $210,000. Seven counties reported production. Hancock County remained the leader, with 765,429 Mcf, or more than 37 percent of the state's total. Claiborne County remained in second place, with 354,221 Mcf, and Morgan County remained in third, with 278,031. The Warren Reed #2 by Tengasco, Incorporated, remained the state's most productive gas well. It produced a total of 161,032 Mcf in 2002, with a market value of nearly $520,000. Cumulative production was 368,427 Mcf.

During 2003 gas production decreased by more than 12 percent, to more than 1.8 billion cubic feet, reversing a two-year increase. The average price increased to $5.22 per thousand cubic feet (Mcf). Total value also increased, to more than $9.4 million. The 2003 gas production generated severance tax revenue of more than $280,000. Seven counties reported production. Hancock County remained the leader, with 461,953 Mcf, or more than 25 percent of the state's total. Claiborne County remained in second place, with 322,070 Mcf, and Morgan County remained in third, with 290,250. The Warren Reed #2 by Tengasco, Incorporated, remained the state's most productive gas well. It produced a total of 91,949 Mcf in 2003, with a market value of nearly $495,000. Cumulative production was 460,376 Mcf.

During 2004 gas production increased by more than 19 percent, to more than 2.1 billion cubic feet, reversing a nor-year decline. The average price increased to $6.75 per thousand cubic feet (Mcf). Total value also increased, to nearly $14.5 million. The 2004 gas production generated severance tax revenue of more than $434,000. Seven counties reported production. Anderson County moved up from sixth place to become the leader, with 684,673 Mcf, or nearly 32 percent of the state's total. Morgan County moved up from third to second place, with 400,057 Mcf, and Hancock County dropped from first to third, with 306,226. The Warren Reed #2 by Tengasco, Incorporated, continued to be the state's most productive gas well. It produced a total of 72,341 Mcf in 2004, with a market value of more than $440,000. Cumulative production was 532,717 Mcf.

Oil and Gas Board Activity: The State Oil and Gas Board held two general hearings during 2001. On January 19th, the Board reviewed a contested case regarding uncontrolled flow of oil and failure of an operator to implement proper cleanup at a well in Pickett County, for which there was a pending $10,000 penalty for the violation. An agreed order resulted in reduction of the penalty to $4,000. Half was designated for the State Oil and Gas Board, and half for the Tennessee Oil and Gas Association's spill team. On June 11th, the Board reviewed a request by Jarvis Drilling, Inc. to unitize the West Oneida field in Scott County, Tennessee. A final ruling was delayed until all interested parties could be given adequate notice of the proposal.

During 2002 the board also held two general hearings. On January 28th, the board reviewed three items. The board dismissed the first item, which involved evidence presented by Black Hawk Resources, Inc. that some wells presently in operation were currently on bonds of defunct companies and currently under defunct companies, and that some wells in operation were in violation of Chapter 1040-4-2-.10 Reporting Wells Off Production and Chapter 1040-4-3-.05 Monthly Reporting-Producers. The board denied the second item, which was a request by Miller Petroleum, Inc. to seek relief from wells that they had not been allowed to access in the Big South Fork National River and Recreation Area for the past year. Finally, the board voted to continue a request

by Jarvis Drilling, Inc. to unitize the West Oneida field in Scott County, Tennessee. On June 10th, the Board approved the request by Jarvis Drilling, Inc. to unitize the West Oneida field.

During 2003 the board held one general hearing. On August 29th, the board approved a request by the Tennessee Oil and Gas Association for extension of the special spacing in effect for wells in Clay, Overton, and Pickett counties to portions of Fentress County west of Highway 127 and north and west of Highway 154. This allows wells to be drilled 400 feet apart and 200 feet from the nearest property or unit lines, pursuant to Tennessee Code Annotated 60-1-106.

During 2004 the board held two general hearings. On January 15th, the board approved a request by USP, Inc. to place a vacuum on the Roger Moon well No. 16-3, permit No. 10113, in Section 13-A-54E in Fentress County, Tennessee for the purpose of enhanced oil production. On March 25th, the board held an informational meeting to discuss proposed changes to the board's rules and regulations. On July 29th, the board held a formal rulemaking hearing to consider a number of additions, deletions, and modifications to 13 chapters in its rules and regulations. These included changes to permits; well location plats; well spacing; well identification; casing; well abandonment; filing of well data, maps, and reports; completion, recompletion, and related downhole work; tubing and well equipment; prevention of hazards and pollution; procedures and equipment for metering, measuring, and producing oil, condensate, and gas; requirements for reporting the volume and disposition of oil and gas produced; and forms.

Sample Processing: The Tennessee Division of Geology processed 102 sets of well cuttings during 2001, representing drilling footage of 165,600 feet, up from 138,983 feet in 2000, when 78 sets were processed. During the past 12 years, the Division has processed 1,414 sets of well cuttings, representing drilling footage of 2,234,288 feet. At the end of 2001 the division had processed sample sets available for study on more than 6,000 wells.

During 2002 the division processed 94 sets of well cuttings, representing drilling footage of 179,685 feet. Over a 13-year period, the Division processed 1,508 sets of well cuttings, representing drilling footage of 2,413,973 feet. At the end of 2002 the division had processed sample sets available for study on more than 6,100 wells.

During 2003 the division processed 13 sets of well cuttings, representing drilling footage of 17,460 feet. During the past 14 years, the Division has processed 1,521 sets of well cuttings, representing drilling footage of 2,431,433 feet. At the end of 2003 the division had processed sample sets available for study on more than 6,100 wells.

With Calvin Pernell's retirement from state service on February 28th, along with the subsequent elimination of his position due to statewide budget cuts, the division changed its requirements regarding the submission of well cuttings. Unless the State Oil and Gas Board specifically requests them, well cuttings are no longer required from most oil and gas tests. We will, however, continue to accept processed sample sets from those operators who decide to collect and process their own. We will also continue to maintain existing and any new operator-processed sample sets and to make them available for examination upon request.

Computerized Oil and Gas Database: The divisions of Geology and Water Pollution Control now share the database. At the end of 2004 the database contained information on more than 13,900 wells. Copies of the database are available on CD for a one-time cost of $300. Updates are provided to subscribers upon request.

Big South Fork Project: During 2001, the Division of Geology completed work on a $42,250 cooperative project with the National Park Service/Big South Fork National River and Recreation Area for collecting, analyzing, and reporting oil and gas well site characteristics and non-federal owner/operator information. In addition to financial support, Big South Fork provided a GPS unit for use during the project, as well as inventory sheets and the Microsoft Excel-compatible spreadsheet that were used in the final report. This project provided a site-by-site inventory of the park's 300 oil and gas operations and the associated environmental impacts, as well as an updated list of mineral owners and operators within the park. In addition to being mapped, each site was photographed using video and still cameras.

Mineral Notes *(Continued from p. 4)*

Coal Mining Employment: The average number of miners employed in Tennessee during 2001 was 566, up from 465 in 2000, and down from 2,240 in 1986. Underground miners totaled 276, while there were 290 surface miners. All of these were non-union.

In 2002 the average number of miners employed increased to 619. Underground miners totaled 297, and surface 322.

Mining employment declined somewhat in 2003 when the number of miners was 567. Underground miners totaled 223, and surface 344.

In 2004 the average number of miners increased again, to 646. There were 244 underground miners, and 402 surface.

Coal Reserves: For 2001 the EIA estimated Tennessee's demonstrated reserve base of coal to be 792 million ST remaining as of January 1, 2002. Of this, 518 million ST were underground, and 274 million ST were surface. Recoverable reserves were estimated to be 469 million ST; 284 million ST were underground, and 186 million ST were surface.

For 2002 the demonstrated reserve base of coal was estimated to be 787 million ST remaining as of January 1, 2003. Of this, 516 million ST were underground, and 271 million ST were surface. Recoverable reserves were estimated to be 467 million ST; 283 million ST were underground, and 184 million ST were surface.

For 2003 the demonstrated reserve base of coal was estimated to be 783 million ST remaining as of January 1, 2004. Of this, 515 million ST were underground, and 269 million ST were surface. Recoverable reserves were estimated to be 464 million ST; 282 million ST were underground, and 182 million ST were surface.

For 2004 the demonstrated reserve base of coal was estimated to be 779 million ST remaining as of January 1, 2005. Of this, 513 million ST were underground, and 266 million ST were surface. Recoverable reserves were estimated to be 462 million ST; 281 million ST were underground, and 180 million ST were surface.

Nonfuel Mineral Production: The U.S. Geological Survey, in their Mineral Industry Survey for Tennessee, http://minerals.usgs.gov/minerals/pubs/state/2004/tnstmyb04.pdf estimated that the value of Tennessee's nonfuel mineral production was $711 million in 2001, $648 million in 2002, $623 million in 2003, and $653 million in 2004. In 2004 Tennessee ranked 24th nationally in the total value of nonfuel minerals produced, and accounted for about 1.5 percent of the U.S. total nonfuel mineral production value. Tennessee continued to lead the nation in the value of gemstones and ball clay produced and was ninth in the production of industrial sand and gravel. The State also ranked eighth in the production of primary aluminum from materials imported from other domestic and foreign sources.

Crushed stone production was 58.6 million metric tons (MT) in 2001, 54.9 million MT in 2002, 55.1 million MT in 2003, and 57.9 million MT in 2004. The value of crushed stone produced was $344 million in 2001, $330 million in 2002, $354 million in 2003, and $382 million in 2004. Crushed stone continued to be the State's leading nonfuel mineral commodity, a position held since 1981. It accounted for nearly 60 percent of the State's total nonfuel mineral production value. The major rock types quarried to produce crushed stone were dolomite, granite, limestone, and sandstone.

Ball clay production was 680,000 MT in 2001, 660,000 MT in 2002, 766,000 MT in 2003, and 762,000 MT in 2004. The value of ball clay produced was $28.8 million in 2001, $28.1 million in 2002, $33.4 million in 2003, and $34.3 million in 2004.

Construction sand and gravel production was 8.35 million MT in 2001, 9.22 million MT in 2002, 7.55 million MT in 2003, and 7.83 million MT in 2004. The value of construction sand and gravel produced was $46.4 million in 2001, $51.9 million in 2002, $44.1 million in 2003, and 47.5 million in 2004.

Peter Lemiszki, Chief Geologist in the Division of Geology's Knoxville regional office, provided the following commodity review, and reported that by the end of 2004 about 330 non-fuel mineral operations were permitted in 82 counties across the state.

Clay: Ball clay and kaolin were mined from the Eocene Claiborne and Wilcox Formations in Carroll, Gibson, Henry, and Weakly counties in northwest Tennessee. Companies operating in the state were Boral Bricks Inc., Franklin Minerals Inc. (H. C. Spinks Co.), IMERYS (Kentucky-Tennessee Clay Co.), Old Hickory Clay Co., and Unimin Corp. (United Clays Inc). Fuller's earth (montmorillonite) was mined in Hardeman County by Moltan Co. and in Henry County by American Colloid Co.

On April 30, 2004 the Industrial Minerals Association — North America (IMA-NA) and the US Department of Labor's Mine Safety and Health Administration (MSHA) announced that the Old Hickory Clay Co. operation in Gleason, Tennessee received two joint safety recognition awards. The first award, the IMA-NA Safety Achievement Award, recognizes the best reportable injury rate for 2003. The second award recognized Old Hickory for having more than 200,000 employee hours without a single reportable injury. Recently, H. C. Spinks Co. received the 2004 Safety Achievement Award presented annually by IMA-NA and MSHA. The award criteria evaluated a company's safety performance at all of its U.S. facilities and non-U.S. mining sites in North America.

Crushed Stone and Dimension: The crushed stone industry operated 157 quarries in 2004. Except for 3 quarries in Johnson County, which produced crushed granite and quartzite, limestone and dolomite was produced at 154 quarries and underground mines located primarily in District 2 (Middle Tennessee) and District 3 (East Tennessee). Crushed limestone and dolomite were produced in 66 counties by 43 different companies and 15 county highway departments. The top three producers expanded their operations in Tennessee in 2004. Vulcan Materials Co., which operated 43 quarries in 30 counties, acquired Columbia Rock Products and its limestone quarry to enter new markets in central Tennessee. Rogers Group Inc., which operated 34 quarries in 28 counties, acquired the assets of three quarries in Nashville, Harriman and Ten Mile from Martin Marietta Materials. Rinker Materials operated 12 quarries in 7 counties and acquired Loven Inc. premix concrete business, comprising six concrete plants in northeast Tennessee and Virginia. Existing Rinker Materials quarries will supply part of Loven's aggregate requirements. Loven operates five concrete plants in Greenville, Morristown, Newport, Kingsport, Johnson City, Tennessee and one in Bristol, Virginia. Economic forecasts in the Tri-Cities region indicate solid growth in construction activity over the next four years.

Rogers Group received the 2004 Tennessee American Business Ethics Award in the mid-size category. This honor recognizes companies that exemplify high standards of ethical behavior in their everyday business conduct and in response to specific crises or challenges.

The Holston Limestone was quarried for dimension marble in Blount, Knox, and Loudon counties by the Tennessee Marble Co. and Tennessee Valley Marble Inc. Tennessee Marble Co. acquired the Champlain Black Marble quarry located in Isle La Motte, Vermont. The rich black marble is the only Class "A" black marble quarried in the United States.

Six companies operated eight dimension sandstone quarries in the Pennsylvanian Crab Orchard Sandstone in Cumberland, Bledsoe, Rhea, and Morgan Counties.

Gemstones: The fresh water pearl was designated the official Tennessee State Gem in 1979. On April 12th 2004, the historic Tennessee River Freshwater Pearl Farm and Museum located in Benton County was designated the official site of freshwater pearl culturing in the state of Tennessee. The American Pearl Co. runs the only freshwater pearl farm in North America, which cultivates approximately 250,000 mussels each season. The mussels used for culturing freshwater pearls are native to the Tennessee River and are commonly referred to as the Washboard and Pigtoe varieties. American Shell Co., American Pearl Co. and Tennessee Shell Co. exported mollusk shells from the Tennessee River and to pearl-producing countries such as China, Japan, Tahiti and Taiwan. About 90% of all cultured pearls begin with a mother-of-pearl nucleus taken from the shell of a Tennessee mussel. Tennessee has in excess of 50 million dollars in annual exports to foreign countries of the shells alone.

Sand and Gravel: Construction sand and gravel was produced at 94 sites located in 30 counties and operated by 59 different companies, which was similar to 2003. Companies operating at least five sites are: Ford Construction Co., Memphis Stone and Gravel Co., and Standard Construction Co. located in District 1 (West Tennessee) and Bradley Stone and Sand Inc. located in the eastern part of District 2 (Middle Tennessee). Short Mountain Silica Co. and Fine Sands, LLC mined industrial sand in Hawkins County. Unimin Corp., which operated two industrial sand mines, is considered a major employer in Benton County. Teague Transports, LLC. opened a new industrial sand quarry in Madison County.

Shale: General Shale Brick, the U.S. subsidiary of Wienerberger AG located in Vienna, Austria, operated seven shale mines in Anderson, Carter, Knox, Sullivan and Washington Counties in east Tennessee to supply its brick production plants. The 75-year-old company produces over a billion bricks each year, supplying residential, commercial and specialty architectural bricks and brick pavers. On December 3, 2004, it acquired Wittichen Lime and Cement, a brick and masonry package company headquartered in Memphis, Tennessee. General Shale Brick, the nation's second largest brick manufacturer, is providing more than 200,000 bricks for the construction of East Tennessee State University's new Fossil Site Visitors Interpretive Center in Gray, Tennessee. A groundbreaking ceremony for the 50,000-square-foot visitors center was held November 16, 2004, while the expected opening date is fall of 2006. Two other companies operated two shale mines in Hamilton and Marion Counties in southeast Tennessee.

Other Industrial Minerals: Synthetic gypsum was produced from Tennessee Valley Authority byproducts at the Allied Custom Gypsum plant in Stewart County. Lime plants operated by Bowater Southern Paper Corp. in McMinn County produced high-calcium quicklime, and Global Stone Tenn-Luttrell Inc. in Union County produced high-calcium quicklime and hydrated lime.

Zinc: Zinc mining and processing operations have been suspended in all of Tennessee's once prolific zinc mines (Coy, Young, Immel, Gordonsville, and Clinch Valley). Tennessee Valley Resources (TVR) purchased the New Market and Young zinc mines in Jefferson and Knox Counties previously owned by Asarco Incorporated. TVR uses the mine to supply limestone to produce agricultural limes and other limestone-based products. Rogers Group acquired 140 acres of property and additional assets in Gordonsville from Pasminco Ltd. Rogers Group acquisition of these assets will lengthen the life of this operation for another 50+ years and provide a new open quarry mining area.

Pasminco Ltd. closed the Clinch Valley mine in March 2004 and then sold it to Mossy Creek Mining, LLC. Mossy Creek Mining, LLC, with locations in Gordonsville and Jefferson City, Tennessee, provides a quality Aglime product used as a soil-neutralizing agent. Pasminco Ltd. operated the electrolytic zinc plant in Clarksville (Montgomery County). Production has been impacted in part by lower zinc grade of the raw materials following the closure of the Gordonsville mine. The Clarksville Zinc Plant produced primary cadmium as a byproduct during roasting and leaching of the zinc concentrate.

Government Programs: As part of the U.S. Geological Survey STATEMAP program the Tennessee Division of Geology completed 1:24000 scale geologic maps and mineral resource summaries of the Mascot and Camelot Quadrangles in 2004 and the Mosheim Quadrangle in 2003. The Immel and Beaver Creek zinc mines are located on the Mascot Quadrangle in East Tennessee. These geologic maps have been produced in GIS format and are available as open-file publications through the Division of Geology's Nashville office.

Meeting Presentations/Abstracts

Geological Society of America Northeastern Section (39th Annual) and Southeastern Section (53rd Annual) Joint Meeting: On March 25-27, 2004 in Washington, DC Barry Miller presented a poster entitled "*A Mississippian and Pennsylvanian Regional Correlation Study on the Pine Mountain Overthrust Area of Tennessee and Part of Kentucky*."

Geological Society of America: Peter Lemiszki, along with Robert Hatcher and Jennifer Whisner of the University of Tennessee/Knoxville submitted an abstract entitled *"Boundary Conditions and Internal Deformation in the Curved Southern Appalachian Foreland Fold-Thrust Belt"* for the November 7-11, 2004 Annual Meeting in Denver, Colorado. Peter also joined John Bultman. Neil Whitmer, and Robert Hatcher of UT Knoxville in submitting an abstract entitled *"Detailed Geologic Mapping: Geological Acumen for Sevier-Blountian Basin Dynamics: Bays Mountain Synclinorium, Northeastern Tennessee."*

Tennessee Science Teachers Association: Peter Lemiszki and Barry Miller hosted a session entitled *"Introducing Students to Geological Processes by Constructing Simple Models and Using Interactive Demonstrations"* at a professional development conference on November 19th at the 2004 Annual Meeting in Franklin, Tennessee.

American Society of Civil Engineers: Martin Kohl, along with Michael Clark, Harry Moore, and Ira Sasowsky provided a paper and poster entitled *"The Gray, Tennessee Fossil Site: A Spectacular Example of Ancient Regolith*

Occurrences in Carbonate Terranes, Valley and Ridge Subprovince, Southern Appalachians U.S.A." for the January 24-26 Geo-Frontiers 2005 Conference in Austin, Texas.

East Tennessee Geological Society 2005 Fall Field Trip: Peter Lemiszki and Martin Kohl prepared a guidebook and led a geologic excursion across part of the Southern Appalachian Foreland Fold-Thrust Belt in Northeastern Tennessee on December 3rd.

Geological Society of America Southeastern Section 55th Annual Meeting: Division staff hosted an exhibit booth on March 23-24, 2006 in Knoxville, Tennessee. Peter Lemiszki and Martin Kohl wrote a guidebook and served as leaders for a field trip entitled *"Geologic Excursion Across Part of the Southern Appalachian Foreland Fold-Thrust Belt in Northeastern Tennessee."* Lemiszki presented a talk entitled "*Geologic Mapping in the Southern Appalachian Foreland Fold-Thrust Belt: A Review of New Interpretations by the Tennessee Division of Geology*." Kohl, Lemiszki, Barry Miller, and Bob Price presented a poster entitled "*Tennessee Division of Geology Mapping in the Valley and Ridge Province: An Update*." Miller and Price presented a poster entitled "*GIS and GPS Utility in the Geologic Mapping of Complex Geologic Terrane on the Mascot, TN 7.5' Quadrangle."*

Digital Mapping Techniques 2006: On June 11-14 in Columbus, Ohio Barry Miller and Bob Price presented a poster and paper (included in proceedings) entitled "*GIS and GPS Utility in the Geologic Mapping of Complex Geologic Terrane on the Mascot, TN 7.5' Quadrangle.*"

Cover Photo

Gary Pinkerton collecting stream sediment samples from Yellow Creek in Dickson County. This was one of about 200 samples collected by division staff members Marvin Berwind, Albert Horton, Mike Hoyal, and Gary Pinkerton during a two-year period, with funding provided through the National Geochemical Survey. For more details, please refer to the NGS heading under the related article on cooperative project activities on page 6.

Photo by Albert Horton.

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