Since 1884 the Kentucky Department of Mines & Minerals (KDMM now OMSL) has had a mine mapping function as it relates to mine safety. The CAER’s Mine Mapping Program has provided this service to that agency since 1972. The program has been in continuous operation under the current staff and management over that period. Functions include operating the Mine Map Repository/Mine Map Information Center of the OMSL; and receiving and processing all annual coal mine license maps, old maps, and related data. The Mine Mapping Program staff worked for 30 years indexing, locating, and microfilming coal and clay mine maps in preparation for the next major step in mapping technology -- the online internet mapping system (IMS).

The Kentucky Geological Survey, in cooperation with the U.S. Office of Surface Mining and the Kentucky Department for Surface Mining Reclamation and Enforcement, held a meeting on September 20, 2001 to discuss the administrative, legal, technical, and financial aspects of developing a comprehensive mine mapping system. There was a follow-up meeting on January 7, 2002 to discuss an ideal mine mapping system. Agencies involved in these meetings included: U.S. Office of Surface Mining; U.S. Army Corp of Engineers; U.S. Bureau of Land Management; U.S. Mine Safety and Health Administration; Kentucky Department of Mines and Minerals; Kentucky Department of Surface Mining Reclamation and Enforcement; Kentucky Department of Fish and Wildlife; Governor’s Office for Technology; Kentucky Transportation Cabinet; Kentucky Geological Survey; Kentucky Department of Insurance; Kentucky Revenue Cabinet; and Virginia Department of Mining. A formal working group, the “Kentucky Mine Mapping Initiative,” was established to meet regularly and implement the recommendations of the initial meetings.

The Kentucky Mine Mapping Initiative’s goal is to ensure that every underground and surface mine map in Kentucky is located, digitized and online. Since the mid-1800’s, Kentucky has had significant coal mining. Miners have extracted more than 8.5 billion tons of coal from Eastern and Western Kentucky. The Kentucky Office of Mine Safety and Licensing (OMSL) confirms more than 30,000 abandoned Kentucky coal mines. Its collection of over 165,000 individual mine maps is the largest in the world. Rising coal prices have translated into increased mining activity, often in areas adjacent to the abandoned mines. Flooding and roof instability resulting from new mining adjacent to these old mines threaten the 17,000 coal miners who work in these 550 active mines. The Martin County Coal Corp. slurry spill (Ky), the Quecreek mine inundation (Pa), the recent Utah Crandell Canyon Mine tragedy (UT) and the potential for other disasters underscore the necessity of an online mapping site that provides accurate mine maps immediately.
CAER’s Mine Mapping Program (cont.)

The Kentucky Mine Mapping Initiative reached its first milestone, the launch of the Web-accessible Kentucky Mine Mapping Information System, in October, 2003. The Kentucky mine mapping website (http://minemaps.ky.gov) plays a vital role in the safety of Kentuckians. The project team has successfully called for legislative change in archiving mine maps; reducing the number of maps required for submission; and increasing information and resource sharing throughout the Commonwealth. The Department for Natural Resources/OMSL hopes to eventually scan its entire collection.

This repository is a working demonstration of what can be achieved given continued focus and necessary funding. The website initially contained downloadable, geo-referenced digital engineering mine plans linked to map extents (polygons) of mined-out areas documented by the Kentucky Revenue Cabinet, for all mines active in Kentucky during 2002. This represents about 500 of the 30,000 maps necessary to portray the final condition of every known mine in Kentucky. Mine extents for all known historical mines are also available from the website.

Building upon this success, the team developed and installed a major upgrade to the site in February, 2004 and applied for and was granted a one million dollar Mine Safety and Health Administration (MSHA) grant. This grant was used, over the following two years, to complete the scanning and geo-rectification of the remaining historic mine maps.

The purpose of the Web service is to make available electronic maps of mined-out-areas and approximately 32,000 engineering drawings of operating or closed mines that are located in the state. This is a portion of the 165,000 mine maps currently on file at the Kentucky Office of Mine Safety and Licensing. The system provides scanned imagery of the coal mine license maps submitted by mining companies to the OMSL. These images are accessed from an internet map service using ESRI ArcIMS technology. The internet map displays information about general mapping; aerial photography; mined-out-areas; and oil and gas wells. It also provides a link to database reports about mine history. The website receives approximately 19,000 hits a day translating to 500,000 hits every month.

In 2004 the website was selected to receive a “Special Achievement in GIS” award at ESRI’s 24th Annual User Conference.
CAER’s Mine Mapping Program (cont.)

CAER’s Mine Mapping Program (cont.)

Environmental Systems Research Institute, Incorporated.) This was a special honor that reflected all of the team’s hard work and innovation while leading the country in providing online scanned and geo-referenced coal mine maps. With the introduction of live-mapping applications to the Web, anyone with a computer can access this GIS technology.

Users can query mine information linked to the SQL Server database and download maps as required. In addition, the detailed mine-map images and associated data are used by various agencies in state and federal government for regulatory, fiscal, and safety concerns. Mine-map information is used by the Kentucky Revenue Cabinet; Kentucky Office of Mine Safety and Licensing; Kentucky Division of Permits; Kentucky Division of Abandoned Mine Lands; MSHA; OSM; TVA; USFS; BLM; USDoe-EIA; and many other organizations. This collaboration reduces duplicate map filings required of coal mining companies and gives everyone better access to mine information.

On August 29, 2006 the Mine Mapping Program sponsored the Interstate Mining Compact Commission and OSM regional benchmarking workshop on underground mine mapping. The group was invited to again help present such a workshop in West Virginia this summer.

On March 1, 2007 the project received a grant from the Office of Surface Mining for $71,000 towards its continuation. As of June, 2007 the majority of the Phase I work was completed. Only a few thousand of the most difficult maps remain to be processed. These are oversized, fragile, unusual material or require extensive research.

Future phases of the project will include the archival scanning of all submitted mine maps; the recovery from outside sources of maps that were destroyed in a 1948 fire; and the development of further technology to process maps and related data.

The success of the Mine Mapping Program is made evident by the website’s #1 Google ranking for the search “mine maps.”

John Hiett has been the manager of the Mine Map Repository and Mine Map Information System for the Kentucky Department of Mines & Minerals since 1972. He may be reached at: hiett@caer.uky.edu
NEWS RELEASE

New CAER Director Named

Dr. Rodney Andrews, recently serving as the Acting Director of the University of Kentucky Center for Applied Energy Research, became Director of the Center effective August 15, 2007, subject to UK Board of Trustees approval.

Dr. Andrews received his Ph.D. at the University of Kentucky and his Bachelor of Science degree in chemical engineering from Michigan State University. He joined the research staff at the Center in 1999. He began leading the Carbon Materials Group in 2001. His research interests include production of pitches and heavy aromatics from coal and other fossil resources; thermochemical conversion processes for coal and biomass; carbon fiber and composites; activated carbon materials; pitch chemistry and characterization; synthesis and application of carbon nanomaterials. Since 2003 he has been an Assistant Adjunct Professor, Department of Mechanical Engineering, University of Kentucky.

Dr. Andrews has directed major multi-university and industry-academic collaborative projects. He has published more than 40 peer reviewed journal articles and 3 book chapters. He has been granted four patents.

In addition to his UK achievements, he is on the Advisory Board of the American Carbon Society and the Executive Council of the Consortium for Premium Carbon Products from Coal (CPCPC). He is on the Honorary Editorial Advisory Board for the journal Carbon, and has organized several very successful workshops on adsorbent carbons.

The University of Kentucky’s Center for Applied Energy Research Celebrates its 30th Anniversary

The University of Kentucky Center for Applied Energy Research will be celebrating its 30th anniversary this fall. Below are descriptions of each event we are crafting to honor this milestone. By pulling together a variety of experiences and formats, we hope that CAER can reach both its traditional stakeholders, and motivate new participants to learn about energy. If you are interested in any of these events, contact Teresa Epperson at: 859-257-0200 or register@caer.uky.edu or go to the web site: www.kentuckyenergysummit.org

October 11th
Kentucky Energy Summit
Lexington Convention Center
Cost: $25.00 (includes lunch)
Open to the public
This day-long energy summit will feature internationally-recognized speakers on energy issues. Topics include: coal resources and mining; synthetic natural gas; an overview of Sasol’s coal to liquids work; the economics of coal to liquids; carbon capture; the future of fuel development and use; and finally, national energy security. The content is intended to provide an educated and broad perspective on current and future energy concerns affecting the state and country.

October 24th
Pollution Control in Power Plants Short Course
Buffalo Trace Distillery, Frankfort, KY
8:00 am – 2:00 pm
Cost: $150.00 (includes lunch)
Four engineering professional development hours are offered with this course. This short course is intended to educate our partners at utilities, regulators, R & D groups, and industries with heavy energy consumption on pollution control issues. We will cover SOx, NOx, mercury and CO2 reduction. The course will include fundamental chemistry knowledge related to gas emissions and its mitigation, development history, state-of-the-art control technologies and real world problem solving and analysis.

November 15th
CAER Distinguished Lecture
Worsham Theatre, University of Kentucky campus
7:00 – 8:00 pm
Free, and open to the public
Capping off the series of events, will be an energy-related presentation for a general audience. This year’s distinguished speaker is Mr. Matthew Simmons, author of “Twilight in the Desert: The Coming Saudi Oil Shock and the World Econo-

my.” The book describes what Mr. Simmons sees as a crisis in the not too distant future. He studied energy for over 30 years on-site in the Middle East and spent decades analyzing energy problems. He concluded that ‘proven reserves’ were worthless data. His mission now is to educate the public that the world’s oil peak is much closer than the Saudis are telling us.

January
Energy Fair for Elementary Students
University of Kentucky Campus
Switching from the serious, to the fun and educational, we are organizing an energy open house for elementary school children. Kentucky energy research organizations are participating. The format will include a series of demonstrations on energy-related experiments involving elementary schools. Students from local elementary schools with diverse and traditionally underrepresented populations will attend.
Kentucky and Its Flagship University Guide Us to a Sustainable Future through Energy

Lee Todd
President, University of Kentucky

Investing in our natural resources is second nature for our state. Whether in coal, oil and gas in Eastern and Western Kentucky or in tobacco, or soybeans and horses across the state, generations of Kentuckians have made their living off Kentucky’s bountiful land. As America scourcs for responses to the energy independence riddle, our energy and agricultural expertise will be more valuable than anyone could have imagined.

High crude oil prices and increasing dependence on foreign oil have sparked an intense discussion about energy diversification and independence across the country. It is a conversation the Commonwealth should feel comfortable with, as the University of Kentucky has been at the cutting edge of such issues for more than 30 years.

For starters, Kentucky continues to be among the country’s leaders in the production of coal, which for generations has helped provide efficient and low-cost power for our state and much of the nation.

But while we should remain committed to the production of low-cost energy through coal, we have to also increase our commitment to doing so in an environmentally friendly and sustainable fashion. To that end, Kentucky is home to some of the world’s foremost energy leaders. UK researchers are focused on making energy more sustainable, efficient, and environmentally friendly. UK energy research accounts for about $48 million in ongoing projects across a wide spectrum of research specialties in the Colleges of Engineering, Agriculture, Arts and Sciences, Business and Economics, and Public Health.

Being a leader in America’s move toward energy independence will require Kentucky to invest in a broad portfolio of energy research and technologies. Researchers already have uncovered kinder, friendlier uses for the fossil fuel. Coal can now be gasified, allowing us to release energy in a much cleaner fashion. Another potential use for coal is to turn it into liquid fuel, which would help to alleviate our dependence on foreign crude.

UK researchers are constantly working to make coal more energy-efficient and environmentally friendly. They have uncovered ways to increase carbon dioxide capture and sequestration, mercury removal, coal ash utilization, and ways to safely secure slurry pond impoundments.

Coal will not lead us to energy independence by itself. That’s where Kentucky’s agricultural sector can have an impact on the future of energy. Many conversations about renewable and environmentally-friendly sources of energy are focused on agricultural products. Using biomass has shown great promise. UK is exploring how the conversion technologies developed for coal can be used to convert biomass into fuels and chemicals. This would allow biomass residues that are currently unusable or cost prohibitive to play a role in our national energy portfolio. This expertise is also being applied to the production of biodiesel and bio-oil, a pair of renewable alternative fuel products.

Kentucky’s energy background provides the state with a unique opportunity to become an international leader in energy diversification. But even though we are uniquely prepared to help solve the nation’s energy crisis, we cannot afford to stand still. We must leverage our intellectual assets and invest in energy-related research and development. We must recruit new scientists, engineers and technicians to Kentucky if we hope to establish our state as an energy leader.

Other states, realizing the economic opportunity ahead, are already acting. Wyoming and Montana – a pair of large coal-producing states – are pursuing commercialization of coal-to-liquids technologies. Our neighbors in Illinois have three entities (Illinois Office of Coal Development, Illinois Clean Coal Institute and the Southern Illinois University Coal Research Center) that are enthusiastically supporting an array of research and development activities. In February, Pennsylvania Governor Edward Rendell announced a broad state strategy to improve the state’s energy independence, support alternative energy businesses, and reduce the state’s environmental impact. The plan calls for an $850 million Energy Independence Fund, designed to reduce energy costs for consumers and shift the state’s usage toward clean and renewable sources. The state hopes the plan will save Pennsylvania consumers $10 billion over the next 10 years by lowering energy costs and reducing consumption.

Energy independence isn’t merely an economic crisis; it is an educational issue as well. We have all heard about the science, technology, engineering and mathematics (STEM) pipeline problems. Not many industries have been harder hit than energy. A recent Carnegie Mellon University survey of utility executives showed that workforce aging is by far the industry’s dominant human resource concern. Most utilities estimate that about half of their workforce will be eligible to retire within five years. That’s not good for Kentucky’s energy industry and it’s not good for America’s desire to become energy independent.

The nation has an energy problem. Kentucky has the solution. We must get back to the Commonwealth’s roots and invest in our most precious natural resource – our minds.
www.kentuckyenergysummit.org