Coal to Electricity Energy Education Program

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The Eastern Coal Council wishes to the Powell River Project board for co-sponsoring the 2005 Coal to Electricity Energy Education Program. The twelve participants were able to broaden their understanding about coal, energy and electricity, economics and environmental issues through hands-on field experiences.

The program provided participants with hands-on activities. They explored the Powell River Project Research and Education Center and saw how mined land had been restored for a variety of post-mining land use options. They visited underground mine (continuous mining operation), a surface mine, a coal preparation plant, a coal laboratory, a coal-fired power plant, a co-gen plant in Buchanan County and a coal-bed gas well collection station. They toured Eastman Chemical Company's state-of-the-art Coal Gasification Facility and Joy Mining Machinery's manufacturing plant. They had the opportunity to see and talk with industries' finest. Each teacher received a variety of materials such as videos, books, CDs, DVDs they took back for use in the classroom.

The Virginia Standards of Learning were addressed in several areas. A copy of the standards addressed is attached.

A copy of the week's agenda is enclosed for your information and convenience. Your financial support helps make this program possible, and we hope you will continue to support and embrace this educational program.

The 2006 Coal to Electricity Energy Education Program is tentatively scheduled July 23 through 28, 2006.

Summer 2005 Schedule and Activities

JULY 24 – SUNDAY

Welcome and program introduction by Richard Waddell, Vice Chairman, Eastern Coal Council and General Manager, Jewell Resources.

JULY 25 – MONDAY

Tony Scales, Geologist with Virginia Department of Mines Minerals and Energy, discusses local geologic structure and its impact on the mining industry and local area history.

Jon Rockett, Area Extension Agent, discusses post-mining land use opportunities for economic development, at Powell River Project Research & Education Center

Tour of coal surface mining operation, Red River Coal Company, Wise County.

Guest speaker: Mike Abbott, Public Relations Manager, Virginia Department of Mines Minerals and Energy, discusses the role of government in mining today.

JULY 26 – TUESDAY

Tour of underground coal mine – Paramont Coal Corp VA LLC

Tour of Toms Creek Coal Preparation Plant and Laboratory

Guest Speaker: Tom Rappold, Norfolk Southern Corporation, discusses the importance of coal transportation to electricity production.

JULY 27 – WEDNESDAY

Tour of Jewell Smokeless Coke Ovens

Tour of CONSOL Energy Coalbed Methane Collection Well and Co-generation Plant.

Guest Speaker: Virginia State Senator Phillip Puckett discusses his perspectives.

JULY 28-THURSDAY

Tour of Appalachian Power's Clinch River Plant, a coal-fired electricity generator using current coal-burning technology and air pollution controls.

Tour of environmental restoration and coal fines extraction at a coal refuse pile.

Guest speaker: Herbert Wheary, Dominion Energy – IGCC, discusses advanced clean-coal technology and future electric power generation.

JULY 29 – FRIDAY

Tour of Joy Mining Machinery Re-build Facility in Duffield.

Tour of Eastman Chemical Company's Coal Gasification Plant, at Kingsport, TN.

Discussion/evaluation of program with teachers; Professional Development Certificates presented.

Virginia Standards of Learning Addressed

Fourth Grade:

The fourth grade standards stress the importance of using information, analyzing data, and validating experimental results. Defining variables in experimentation, and application of experimental results for making simple predictions, are emphasized. Students are introduced to basic principles of electricity and to the concept of motion. The students will investigate and understand the characteristics of electricity. Key concepts include:

Force-Motion-Energy

- Conductors and insulators
- Basic circuits (open-closed-parallel-series)
- Static electricity
- The ability of electrical energy to be transformed into heat, light, and mechanical energy
- Simple electromagnets and magnetism, and
- Historical contributions in understanding electricity

Resources

- Minerals, rocks, ores, and energy sources, and
- Forests, soil, and land

Fifth Grade:

The fifth grade standards emphasize the importance of selecting appropriate instruments for measuring and recording observations. Key concepts include:

Earth Patterns-Cycles-Change

- The rock cycle including identification of rock types
- Earth history and fossil evidence
- Weathering and erosion, and
- Human impact

Sixth Grade:

The sixth grade standards continue to emphasize data analysis and experimentation. The concept of change is explored through the study of transformation of energy and matter. Natural resource management, its relation to public policy, and cost/benefit tradeoffs in conservation policies are introduced. Key concepts include:

Force-Motion-Energy

- Potential and kinetic energy
- The role of the sun in the formation of most energy sources on earth
- Nonrenewable energy sources (fossil fuels including petroleum, natural gas, and coal
- Renewable energy sources (wood, wind, hydro, geothermal, tidal and solar) and,
- Energy transformations (heat-light to mechanical, chemical, and electrical energy).

Matter

- The importance of water for agriculture, power generation, and public health
- The importance of protecting and maintaining water resources
- Natural and human caused changes to the atmosphere

Resources

- Management of renewable resources (water, air, soil, plant life and animal life);
- Management of nonrenewable resources (coal, oil natural gas, nuclear power, and mineral resources;
- The mitigation of land-use and environmental hazards through preventive measures; and
- Cost-benefit tradeoffs in conservation policies.

Earth Science Standards:

The Earth Science standards connect the study of the Earth's composition, structure, processes, and history; its atmosphere, fresh water, and oceans; the use of technology to collect, analyze, and report data; and the utilization of science skills in systematic investigation. Problem solving and decision-making are an integral part of the standards, especially as they relate to the costs and benefits of utilizing the Earth's resources. Key concepts include:

ES-3 Investigate and understand how to read and interpret maps, globes, models, charts, and imagery.
- Maps (geologic and topographic)
- Imagery (aerial photography)
- Location by latitude and longitude and topographic profiles

ES-6 Investigate and understand the rock cycle as it relates to the origin and transformation of rock types and hot to identify them.
- Sedimentary (elastic and chemical) rocks

ES-7 Investigate and understand the differences between renewable and nonrenewable resources.
- Fossil fuels, minerals, rocks, water, and vegetation
- Advantages and disadvantages of various energy sources
- Resources found in Virginia
- Making informed judgments related to resource use and its effects on Earth systems, and
- Environmental costs and benefits

ES-8 Investigate and understand geologic processes including plate tectonics.
- How geologic processes are evidenced in the physiographic provinces of Virginia
- Including the Coastal Plain, Piedmont, Blue Ridge, Valley and Ridge, and Appalachian Plateau

ES-10 Investigate and understand that many aspects of the history and evolution of the Earth and life can be inferred by studying rocks and fossils.
- Traces and remains of ancient, often extinct, life are preserved by various means in many sedimentary rocks
- Rocks and fossils from many different geologic periods and epochs are found in Virginia

ES-12 Investigate and understand the origin and evolution of the atmosphere and the interrelationship of geologic processes, biological processes, and human activities as influences on its composition and dynamics.
- Potential atmospheric compositional changes due to human, biologic, and geologic activity.