

# New Technical Reports

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## ELECTRICAL SYSTEMS

### Bipolar HVDC Transmission System Study Between $\pm 600$ kV and $\pm 1200$ kV: Corona Studies

EL-1170 Interim Report (RP430-1)

This reports the results of a comprehensive study of the corona aspects of bipolar HVDC transmission at voltages between  $\pm 600$  and  $\pm 1200$  kV. The study included long-term bipolar line studies, special bipolar line studies, bipolar cage studies, and bipolar bus studies. Basic technical information for the corona performance aspect of design for HVDC transmission systems in the above voltage range is given. The scope of future work is briefly reviewed. The contractor is Institut de Recherche de l'Hydro-Québec. EPRI Project Manager: Richard Kennon

## ENERGY ANALYSIS AND ENVIRONMENT

### Evaluation of a Cooling-Lake Fishery: Fish Food Resources Studies

EA-1148 Final Report, Vol. 4 (RP573)

This volume documents the assessment of benthic communities, zooplankton, and algae in Lake Sangchris (a cooling lake) and in Lake Shelbyville (a nearby ambient flood control reservoir). Samples of each group of organisms were col-

lected in each lake to obtain information on changes in species composition, relative abundance, density, biomass, and species diversity. Data were compiled and analyzed statistically. The contractor is the Illinois Natural History Survey. EPRI Project Manager: John Reynolds

### Effects of 60-Hz Electric and Magnetic Fields on Implanted Cardiac Pacemakers

EA-1174 Final Report (RP679-1)

The effects on implanted cardiac pacemakers of 60-Hz electric and magnetic fields produced by EHV transmission lines were studied by in vitro bench tests of 13 cardiac pacemakers, in vivo tests of 6 cardiac pacemakers implanted in baboons, and nonhazardous skin measurement tests. Analytic methods were developed to predict the thresholds of body current and electric fields capable of affecting normal pacemaker operations in humans. Results indicate that alterations in normal operations are highly dependent on the type of pacemaker and location of the implanted electrodes. The contractor is ITT Research Institute. EPRI Project Manager: Leonard Sagan

## FOSSIL FUEL AND ADVANCED SYSTEMS

### Evaluation of the George Neal No. 3 Electrostatic Precipitator

FP-1145 Final Report (RP780-1)

The electrostatic precipitator at the George Neal Station Unit 3, Iowa Public Service Co., was evaluated from a total-system aspect that included emission performance testing and thorough engineering and economic analyses. The overall collection efficiency, determined with impactors, was 99.7% at 520 MW with outlet mass concentrations of 0.025 lb/10<sup>6</sup> Btu. The stack opacity was measured at 4.6%. The unit capital cost was \$52/gross kW. The operating costs are 1.6 mills/kWh for 1979, based on a 70% capacity factor. The contractors are Meteorology Research, Inc., and Stearns-Roger, Inc. EPRI Project Manager: R. C. Carr

### Design and Fabrication of a 1-MW (th) Bench-Model Solar Receiver

ER-1149-SY Interim Summary Report (RP377-2)

The design and fabrication of a 1-MW (th) bench-model solar receiver (BMSR) following guidelines developed in Phase 1 are highlighted in this Phase 2 report. Documentation is provided for test configuration, design parameters, thermal scale modeling, materials, fabrication, hot-flow testing, instrumentation and functional testing, transportation, and an experimental plant study. The BMSR was configured for testing at the DOE Central Receiver Test Facility in Albuquerque; Phase 2 concluded in August 1978 with the arrival of the BMSR at the facility. Phase 3 (solar testing) is in progress. The contractor is Boeing Engineering & Construction. EPRI Project Manager: John Bigger

### Design of Refractories for Coal Gasification and Combustion Systems

AF-1151 Final Report (RP625-1)

A study was conducted to design refractories for use under the high-temperature erosion-corrosion and slagging conditions found in coal gasification and combustion systems. The report documents

the state of the art; construction and use of large-scale, gas-fired test facilities (both fluidized bed and pneumatic impingement tube); drip and gradient slag tests; wear-resistance ranking of 15 refractories; identification of failure mechanisms; and establishment of design criteria for refractories. The contractor is Westinghouse Electric Corp. EPRI Project Manager: John Stringer

### Solvent-Refined Coal Process: Data Correlation and Analysis

AF-1157 Final Report (RP915)

SRC process data, obtained at three plants and from a literature review, were compiled and correlated. Data relating to liquefaction reactors and to vapor-liquid separation were analyzed, and data on filtration of SRC were reviewed. Procedures for the design of an SRC plant were developed, and recommendations for future work were made. The contractor is The Lummus Co. EPRI Project Manager: H. E. Lebowitz

### Process Development for Improved SRC Options: Interim Short-Residence-Time Studies

AF-1158 Interim Report (RP1134-1)

The short-residence-time liquefaction of bituminous Indiana V coal was investigated in a continuous bench-scale unit. In the second phase of the work, gaseous hydrogen was added. In a parallel study, a batch microautoclave reactor examined the effect on coal liquefaction performance of variations in solvent boiling range and the addition of selected residual product fractions to a distillate recycle solvent. "Light SRC" was found to increase conversion when used as a solvent component in the presence of molecular hydrogen. The contractor is Conoco Coal Development Co. EPRI Project Managers: H. E. Lebowitz and C. J. Kulik

### Production of Methanol From Lignite

AF-1161 Final Report (RP832-1; TPS77-729)

This report contains the summary volume of the Wentworth Brothers, Inc., North Dakota methyl fuel study, C F Braun's review of the study, and Wentworth's comments on Braun's review. The study was limited to a conceptual design and economic evaluation of a project to convert North Dakota lignite into 25,000 t/d of methyl fuel and to develop distribution and marketing of the product. Braun's review discusses the appropriateness of the slurry concentration selected and the selection of the Wentworth methanol synthesis reactor system. The contractors are Wentworth Brothers, Inc., and C F Braun & Co. EPRI Project Managers: N. F. Herskovits and H. E. Lebowitz

### Exploratory Studies in Catalytic Coal Liquefaction

AF-1184 Final Report (RP779-18)

A scoping study relating to the direct catalytic liquefaction of coal was conducted. Liquid products, coal residues, and spent catalysts from several bench-scale test runs were characterized. Materials were obtained from tests in which both commercial and developmental catalysts were evaluated. The same fresh and aged catalysts were contacted with mixtures of model compounds in the presence of molecular hydrogen, which provided information on activity, selectivity, and deactivation for the various catalyst functions related to liquefaction and heteroatom removal.

Helena please obtain a copy. Thanks 3. add Glass