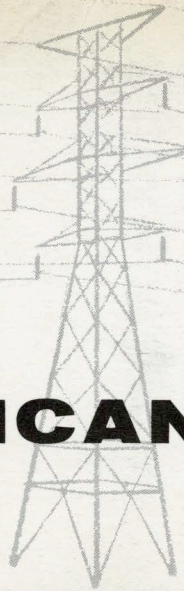
*advance program*



# AMERICAN POWER CONFERENCE

*23rd annual meeting, March 21-23, 1961, Sherman Hotel, Chicago*

Sponsored by

## ILLINOIS INSTITUTE OF TECHNOLOGY

### COOPERATING UNIVERSITIES

Iowa State University
Michigan State University
Northwestern University
Purdue University
State University of Iowa
University of Illinois
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University of Minnesota
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### REGIONAL ASSOCIATED UNIVERSITIES

Agricultural and Mechanical College of Texas
California Institute of Technology
Georgia Institute of Technology
Massachusetts Institute of Technology
New York University

### COOPERATING SOCIETIES

American Institute of Chemical Engineers
American Institute of Electrical Engineers
American Institute of Mining, Metallurgical and Petroleum Engineers
American Society of Civil Engineers
American Society of Heating, Refrigerating and Air Conditioning Engineers
American Society of Mechanical Engineers
National Association of Power Engineers
Western Society of Engineers
Engineers' Society of Milwaukee

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### Purpose of the Conference

The American Power Conference was organized in 1952 as successor to the Midwest Power Conference. It is sponsored by the Illinois Institute of Technology with the cooperation of the universities and technical societies listed above.

The purpose of the Conference is to provide a national forum for discussion of problems and for the exchange of information concerning matters of interest to the power industry and associated lines of endeavor. The program is planned with emphasis on the broad over-all aspects of the subject, rather than the intricate technical details. Papers emphasize the practical rather than the theoretical point of view.

Papers presented at the Conference are by invitation. They are selected by committees composed of experts in the various fields of activity, chosen from the cooperating universities and societies, and from industry and government. Suggestions for papers are always welcome and will be given careful consideration if received on or before September 1 of the year immediately preceding the Conference.

The American Power Conference is open to all persons interested in the generation, transmission, distribution, or utilization of power irrespective of society affiliations. It provides a common meeting ground for all those engaged in the industry's many and varied activities. Academic sponsorship permits the freest possible discussion ranging from the technical through the economic and into the social aspects of the subject.

A cordial invitation is extended to everyone to attend this twenty-third annual meeting of the American Power Conference.



### REGISTRATION

Registration at the Conference will begin on the Mezzanine Floor of the Sherman Hotel at 8:30 A.M. Tuesday, March 21 and continue throughout the three-day period. Everyone planning to attend the technical sessions is required to register. Those who plan to attend only the luncheon or dinner functions are not required to register although they are urged to do so in order to obtain a copy of the Proceedings and to provide support for the Conference.

### REGISTRATION FEE

A registration fee of $15.00 will be charged each registrant. This fee entitles the registrant to receive without further charge a cloth bound volume of the Proceedings containing all of the papers and addresses presented at the Conference. The volume will be mailed to the registrant as soon as it becomes available from the printer. Each registrant also receives an identification badge which will serve as his ticket of admission to all sessions of the Conference.

### REGISTRATION IN ADVANCE BY MAIL

All those who can do so are urged to register in advance by mail on or before Wednesday, March 15. This may be done by filling out the registration card attached to the back cover and returning it together with your remittance to:

**Edwin R. Whitehead, Secretary, American Power Conference**
**Illinois Institute of Technology, Technology Center**
**Chicago 16, Illinois**

Upon arrival at the Conference, badges and tickets ordered in advance may be picked up at a special registration desk reserved for advance registrants.

### HOTEL ACCOMMODATIONS

All meetings of the Conference will be held in the Sherman Hotel located in the Loop on the corner of Randolph and Clark streets in Chicago. Those who plan to attend and are in need of hotel accommodations are urged to make reservations directly with the Sherman Hotel or with any other desired hotel at an early date. For your convenience a reservation card for the Hotel Sherman is attached to the back cover.

### PUBLISHED PROCEEDINGS

Each year papers and addresses delivered at the Conference are published in a cloth bound volume called "The Proceedings of the American Power Conference." A copy of this volume will be mailed without further charge to each registrant. Additional copies may be ordered at the registration desk or by mail. The price of the volume will be $10.00 per copy.

### PREPRINTED PAPERS

As an additional service to registrants, the Conference will have available for sale at the meeting copies of most of the papers scheduled for presentation. These copies will be furnished to the Conference through the courtesy of the authors. A charge of 25¢ will be made for each paper to cover the cost of handling and to help defray some of the expenses of printing the proceedings. Those desiring copies of papers should purchase them at the meeting since many will not be available following the conference.

### FINAL PROGRAM

The advance program is tentative. Copies of the final program incorporating necessary changes will not be mailed but will be available at the registration desk during the meeting. Although it is expected that only minor changes in the advance program will be necessary, there may nevertheless be a few additions and deletions. Each registrant is therefore urged to secure a copy of the final program at the registration desk upon arrival at the meeting.

# ADVANCE PROGRAM

## 1961 Meeting

## AMERICAN POWER CONFERENCE

SHERMAN HOTEL
March 21, 22 and 23, 1961

## TUESDAY, MARCH 21, 1961

**8:30 A.M. REGISTRATION — Mezzanine Floor — Sherman Hotel.**

**9:30 A.M.-12:00 Noon. OPENING MEETING — Grand Ballroom.**
Chairman: Thomas Ayers, Vice President, Commonwealth Edison Company, Chicago, Illinois.
Co-Chairman: Burgess H. Jennings, Professor of Mechanical Engineering, Northwestern University, Evanston, Illinois.

a. Invocation: The Reverend J. Donald Roll, S.J., Chairman, Physics Department and Director of the Seismological Station, Loyola University, Chicago, Illinois.
b. William F. Crawford, President, Edward Valves Inc. and President, Republic Flow Meters Company, Subsidiaries of Rockwell Manufacturing Company, Chicago, Illinois. Our Changing Perspectives.

**11:30 A.M. SPONSORED STUDENT TOUR** (Limited to Sponsored Students and Professors)
A tour of the Dresden Nuclear Power Station of Commonwealth Edison Company has been arranged for the group of students and professors sponsored by the utility industry. Buses will leave from the Sherman Hotel immediately following the Opening Meeting.

**PROGRAM AT DRESDEN STATION:**

a. Welcoming Remarks. Harlan Hoyt, Superintendent of Dresden Station.
b. Operation of the Dresden Nuclear Power Station. B. B. Stephenson, Engineer, Dresden Station.
c. Tour of Station.

**12:15 P.M. JOINT APC-ASME LUNCHEON — Bernard Shaw Room.** Sponsored by the American Society of Mechanical Engineers.
Chairman: William H. Byrne, President, American Society of Mechanical Engineers.
Co-Chairman: E. J. Carraro, Chairman, Chicago Section ASME, General Electric Company, Chicago, Illinois.
Speaker: Sherman Knapp, President, Edison Electric Institute and President, Connecticut Light and Power Company, Berlin, Conn.

**2:00-5:00 P.M. CENTRAL STATIONS I — Avon No. 8 — A Supercritical Plant. — Grand Ballroom.** Sponsored by the Power Division of ASME.
Chairman: J. H. Harlow, Chief Mechanical Engineer, Philadelphia Electric Company, Philadelphia, Pa.
Co-Chairman: H. L. Solberg, Associate Dean of Engineering, Purdue University, Lafayette, Indiana.

a. Initial Operation of Avon No. 8 — A Supercritical Plant. N. F. Gill, Manager, Mechanical Engineering, Cleveland Electric Illuminating Company, Cleveland, Ohio.
b. Supercritical Boiler Operating Experiences at Avon No. 8. J. I. Argersinger, Engineer, Research and Product Development and Gordon C. Smith, Field Service Engineer, Combustion Engineering, Inc., Windsor, Conn.



**TUESDAY P.M.**

c. The Avon Superpressure Steam Turbine-Generator Unit. C. C. Franck, Sr., Consulting Engineer and J. A. Carlson, Supervisory Engineer, Steam Division, Westinghouse Electric Corporation, Lester, Pa.

**2:00-5:00 P.M. HIGH VOLTAGE TRANSMISSION — Louis XVI Room.** Sponsored by the Power Division of AIEE.
Chairman: W. A. Lewis, Director, AIEE, Research Professor of Electrical Engineering, Illinois Institute of Technology, Chicago, Illinois.
Co-Chairman: G. S. Reeder, Chairman, Power Group, Chicago Section, AIEE, Commonwealth Edison Company, Chicago, Illinois.

a. Switching Surges Due to Energization or Reclosing. I. B. Johnson, Manager; D. D. Wilson and R. F. Silva, Transmission and Distribution Analytical Engineering, Electric Utility Analytical Engineering Operation, General Electric Company, Schenectady, New York.
b. Investigations on Wood Pole 345 Kv Test Line. T. W. Schroeder, Manager, Power Production, Illinois Power Company, Decatur, Illinois and J. E. O'Neill, Electric Utility Engineer, Westinghouse Electric Corporation, East Pittsburgh, Pa.
c. A Theory Regarding the Generation of Radio Noise of High-Voltage Transmission Lines. S. B. Griscom, Advisory Engineer, Electric Utility Engineering Department, Westinghouse Electric Corporation, East Pittsburgh, Pa.
d. Radio Interference Design Factors for EHV Lines. R. J. Mather, Principal Technical Assistant, Transmission Design Section and Edward H. Gehrig, Insulation Coordination Engineer, Bonneville Power Administration, Portland, Oregon.

**2:00-5:00 P.M. INDUSTRIAL I — Space Air Conditioning — Assembly Room.** Sponsored by American Society of Heating, Refrigerating and Air Conditioning Engineers.
Chairman: Gilbert F. Carlson, Chief Engineer, Specialties Division, Bell & Gossett Company, Morton Grove, Illinois.
Co-Chairman: William V. Richards, President, Illinois Chapter, ASHRAE, H. A. Phillips & Company, Chicago, Illinois.

a. Off Peak Electricity Using Stored Water for Space Heating. Stanley B. Tupper, Engineering Department, Bell & Gossett Company, Morton Grove, Illinois and Raymond J. Vertovec, Engineer, Electric Heat Technical Section, Commonwealth Edison Company, Chicago, Illinois.
b. A New Approach to Heat Pumps. Gilbert M. Warren, Sales Engineer, Carrier Air Conditioning Company, A Division of Carrier Corporation, Chicago, Illinois.
c. Thermoelectric Heating and Cooling Devices. J. D. Richards, Thermoelectric Products, Minnesota Mining and Manufacturing Company, St. Paul, Minn.
d. High-Temperature High-Pressure Hot Water Heating. D. Lorne Lindsay, Professional Engineer, Wiggs, Walford, Frost and Lindsay, Consulting Engineers, Montreal, Canada.

**2:00-5:00 P.M. INDUSTRIAL II — ELECTRICAL — Crystal Room.** Sponsored by Industrial Group, Chicago Section, AIEE.
Chairman: W. H. Cook, Chairman, Industrial Group, Chicago Section, AIEE, Western Electric Company, Chicago, Illinois.
Co-Chairman: J. N. Banky, Manager, Heavy Industrial Sales, Allis-Chalmers Manufacturing Company, Chicago, Illinois.

## TUESDAY P.M.

**a.** Application and Operation of an 11000 Hp Motor in a Petroleum Refinery. K. R. Sheetz, Senior Staff Engineer, General Engineering Department, American Oil Company, Whiting, Indiana.

**b.** Factors to Consider in the Selection of Diesel Electric Generators for Emergency Power. E. A. Gibbons, Product Manager, Diesel Generators, Engine Handling Division, Allis-Chalmers Manufacturing Company, Milwaukee, Wisconsin.

**c.** Time for More Talk and Less Action. W. J. Neiswander, Plant Engineer, Western Electric Company, Inc., New York, N. Y.

**d.** The Effects of Reclosing on Industrial Plants. G. W. Walsh, Industrial Power Systems Engineering, General Electric Company, Schenectady, New York.

**2:00-5:00 P.M. WATER TECHNOLOGY I — High Purity Water — Bal Tabarin Room.**

Chairman: M. D. Baker, Chief Chemist, West Penn Power Company, Springdale, Pa.

Co-Chairman: G. A. Hellman, Associate Professor of Mechanical Engineering, Michigan College of Mining and Technology, Houghton, Michigan.

**a.** Effective Deaeration in Surface Condensers — Recent Experiences. Paul J. Hamm, Manager, Condenser and Pump Division, C. H. Wheeler Manufacturing Company, Philadelphia, Pa.

**b.** A New Method for Increasing Sensitivity of Conductivity Measurement of Steam Purity. R. W. Lane, Chemist; C. H. Neff, Assistant Chemist and T. F. Larson, Head, Chemistry Section, Illinois State Water Survey, Urbana, Illinois.

**c.** Application Considerations — Demineralization and Flash Evaporation. M. E. Gilwood, Director of Development, Ionac Chemical Company, Birmingham, New Jersey and J. Mack, Process Engineer, The Permutit Company, New York, both Divisions of Pfaudler Permutit Company, Inc., New York, N. Y.

## EVENING FORUM

**8:00-10:00 P.M. — Grand Ballroom.**

**FUTURE SOURCES OF ELECTRICAL POWER**

Chairman: Leonard Reiffel, Director of Physics Research, Armour Research Foundation, Chicago, Illinois.

Co-Chairman: David C. White, Professor of Electrical Engineering, Massachusetts Institute of Technology, Boston, Mass.

**a.** Nuclear Fuel Cells Research. R. E. Henderson, Chief Physicist, Allison Division of General Motors Corporation, Indianapolis, Indiana.

**b.** The Status of Research in Thermonuclear Power. Stirling A. Colgate, Lawrence Radiation Laboratory, Livermore, California.

**c.** Engineering Frontiers of Thermonuclear Power. C. W. Little, Jr., Director of Operations, C-Stellerator Associates, Princeton, New Jersey.

## WEDNESDAY, MARCH 22, 1961

**9:00 A.M.-12:00 Noon CENTRAL STATIONS II — Commercial Operation of the Breed Plant — Grand Ballroom.**

Sponsored by The Power Division of ASME.

Chairman: Philip Sporn, President, American Electric Power Service Corporation (AEPSC), New York, N. Y.

Co-Chairman: Edwin H. Snyder, Vice President in Charge of Electric Operations, Public Service Electric and Gas Company, Newark, New Jersey.



## WEDNESDAY A.M.

**THE DUAL BASIC CONCEPT BEHIND THE BREED PLANT**

1. As a generating station in the westernmost part of the American Electric Power System.
2. As a new technological frontier in the field of economical mass generation of steam-electric energy.

**a.** The Project. Philip Sporn, President, AEPSC.

**b.** The Plant. T. T. Frankenberg, Head, Mechanical Engineering Division, AEPSC.

**c.** Steam Generation. G. W. Bice, Assistant Head, Mechanical Engineering, Division, AEPSC.

**d.** Turbine. C. P. Lugrin, Head, Turbine Engineering Section, AEPSC.

**e.** Chemistry. E. B. Morris, Head, Chemical Engineering Section, AEPSC.

**f.** Generator and Electrical Features. C. P. Zimmerman, Head, Electrical Engineering Division, AEPSC.

Supported by the following papers and co-authors:

1. Breed Plant. Philip Sporn, President and S. N. Fiala, Vice President and Chief Engineer, AEPSC.
2. Steam Generator. G. W. Bice, Assistant Head, Mechanical Engineering Division, AEPSC, Ed Griffin, Field Supervisor, Service Engineering and Paul Koch, Manager of New Products, Examination Engineering, The Babcock & Wilcox Company.
3. Turbine-Generator. P. G. Ipsen, Supervisor of Turbine Control Engineering; J. A. Massingill, Supervisor, Generator Electrical Engineering, General Electric Company; C. P. Lugrin, Head, Turbine Section and J. A. Oliver, Senior Engineer, Electrical Engineering Division, AEPSC.
4. Thermal Cycle Equipment and Performance. T. T. Frankenberg, Head, Mechanical Engineering Division and J. A. Tillinghast, Staff Engineer, AEPSC.
5. Instrumentation and Controls. A. S. Grimes, Head, Results Section and W. S. Morgan, Senior Engineer, AEPSC.
6. Chemical Control and Chemical Cleanup. E. B. Morris, Head, Chemical Section, AEPSC.
7. Piping Systems. G. E. Lien, Head, Piping and Metallurgy Section and A. J. Breugelmans, Engineer, Mechanical Engineering Division, AEPSC.
8. Plant Electrical Features, Switching and Transmission. C. P. Zimmerman, Head, Electrical Engineering Division and T. J. Nagel, Head, System Planning and Analytical Division, AEPSC.
9. Civil Engineering Work, Coal Handling and Supply. H. A. Kammer, Executive Vice President, Engineering, Construction and Purchasing and E. A. Kammer, Head, Design Division, AEPSC.

**9:00 A.M.-12:00 Noon. AUTOMATION AND CONTROL — Louis XVI Room.** Sponsored by the Power Division of AIEE.

Chairman: J. H. Kinghorn, Technical Vice President, Power Division, AIEE, American Electric Power Service Corporation, New York, N. Y.

Co-Chairman: M. Riaz, Professor of Electrical Engineering, University of Minnesota, Minneapolis, Minn.

**a.** Automation of System Operation. L. K. Kirchmayer, Manager, System Generation Analytical Engineering and H. J. Fiedler, Application Engineer, System Protection and Control Engineering, Electric Utility Analytical Engineering Operation, General Electric Company, Schenectady, New York.

**b.** Automatic Power Plants — Application of Control Computers. B. L. Lloyd, Manager, Generation Section, Electric Utility Engineering and R. E. Squires, Engineering Manager, System Control and Instrumentation

Section, Power Control and Communications Department, Westinghouse Electric Corporation, East Pittsburgh, Pa.

c. The Installation of Automatic Controls in an Existing Power Plant for Minimum Down Time. T. H. Bloodworth, Senior Systems Engineer, Allis-Chalmers Manufacturing Company, Milwaukee, Wisconsin; J. A. Reich, Production Manager, Gulf States Utilities Company, Beaumont, Texas and L. Merle Wilson, Manager, Milwaukee Operations for Consolidated Systems Corporation, Monrovia, Calif.

d. Monitoring, Logging and Computing Performance for an Existing Coal and Oil Fired Station. Maurice J. Feldmann, Assistant Superintendent of Engineering and Construction and John W. Purssell, Jr., Assistant Superintendent of Production, Boston Edison Company, Boston, Mass.

**9:00 A.M.-12:00 Noon. FUELS — Assembly Room** — Sponsored by Fuels Division of ASME.

Chairman: James R. Jones, Peabody Coal Company, Chicago, Illinois.
Co-Chairman: Julian Meserve, Dow Chemical Company, Midland, Michigan.

a. Coal Properties as Related to the Corrosion of High Temperature Boiler Surfaces. J. T. Reese, Research Engineer and James Jonakin, Section Leader, Fuels Research, Combustion Engineering, Inc., Chattanooga, Tenn. and J. G. Koopman, Vice President, Electric Energy, Inc., Joppa, Illinois.

b. Liberation of Pyrite from Steam Coals. R. A. Glenn, Supervising Chemist and R. D. Harris, Project Engineer, Bituminous Coal Research, Inc., Columbus, Ohio.

c. Effect of Pulverizer Design on Furnace Performance. H. M. Rayner, Mechanical Engineer, Western Electric Company and P. F. Seibold, Design Engineer, Riley Stoker Corporation, Worcester, Mass.

**9:00 A.M.-12:00 Noon. SYMPOSIUM ON PEAKING I — HYDROELECTRIC — Crystal Room.**

Chairman: A. J. Ackerman, Consulting Engineer and President, Hydroelectric Planners, Madison, Wisconsin.
Co-Chairman: James R. Villemonte, Professor of Civil Engineering, University of Wisconsin, Madison, Wisconsin.

a. Power Peaking on a Combined Hydroelectric and Steam System. J. D. Howard, Vice President, Wisconsin Power and Light Company, Madison, Wisconsin.

b. Hydroelectric Base and Peaking from the Catawba River. Edward E. Williams, Vice President, Duke Power Company, Charlotte, North Carolina.

c. Pumped Storage for Peaking Service. George P. Gamble, Executive Vice President, Union Electric Company, Saint Louis, Missouri.

d. Discussion. Discussions are invited to briefly summarize various recent developments in the production of peaking energy from hydroelectric stations by redesigning old stations, developing new plants with high installed capacity and low capacity factors, and various problems in the economic allocation of units and dispatching for peaking purposes.

**9:00 A.M.-12:00 Noon. WATER TECHNOLOGY II — INDUSTRIAL III — Bal Tabarin Room.**

Chairman: J. F. Wilkes, Director of Research and Development, Dearborn Chemical Company, Chicago, Ill.
Co-Chairman: A. B. Alter, Professor of Mechanical Engineering, Agricultural and Mechanical College of Texas, College Station, Texas.

a. Some Practical Solutions to Industrial Water Treat-





ment Problems. R. S. Walters Supervisor, Technological Coordination, Power Production Division, South Works, United States Steel Corporation, Chicago, Illinois.

b. Boiler Scale Prevention with EDTA Chelating Agents. J. C. Edwards, Assistant Superintendent and E. A. Rozas, Chemical Engineer, Texas Division, Dow Chemical Company, Freeport, Texas.

c. The Use of Chord Thermocouples for monitoring the Thermal Resistance of Boiler Water Side Deposits. J. W. Strub, Consultant, Engineering Service Division, Engineering Department, E. I. duPont de Nemours & Co., Inc., Wilmington, Delaware.

d. Prevention of Corrosion in Steam Systems under Changing Load Conditions. Marcel Stein, Mechanical Engineer, Illinois Institute of Technology, Chicago, Illinois.

**12:15 P.M. APC-AIEE LUNCHEON — Bernard Shaw Room.**

Sponsored by the American Institute of Electrical Engineers.

Chairman: Clarence H. Linder, President, American Institute of Electrical Engineers.

Co-Chairman: W. T. Larner, Chairman, Chicago Section AIEE, Illinois Bell Telephone Company, Chicago, Illinois.
Speaker: George E. Drach, Illinois State Senator, Springfield, Illinois.
Subject: Federal Versus State Regulation in the Development of Atomic Power.

**2:00-5:00 P.M. NUCLEAR POWER PLANTS — Grand Ballroom.**

Chairman: R. M. Casper, General Manager, Atomic Energy Division, and Vice President, Allis-Chalmers Manufacturing Company, Milwaukee, Wisconsin.

Co-Chairman: T. F. Nagey, Director of Research, Allison Division, General Motors Corporation, Indianapolis, Indiana.

a. The Technical and Economic Status of Central Station Gas Cooled Reactors. Titus G. LeClair, Manager, Nuclear Power Applications, General Atomic, San Diego, California.

b. The Technical and Economic Status of Central Station Boiling Water Reactors. R. B. Richards, Manager of Engineering, Atomic Power Equipment Department, General Electric Company, San Jose, California.

c. The Technical and Economic Status of Central Station Pressurized Water Reactors. John W. Simpson, Vice President, Atomic Power Department, Pittsburgh, Pa.

**2:00-5:00 P.M. SYMPOSIUM ON PEAKING — THERMAL — Louis XVI Room.**

Chairman: Rolland H. Bradford, Director-Central Region, Ebasco Services, Inc., Chicago, Illinois.

Co-Chairman: R. C. Porter, Professor of Electrical Engineering, University of Michigan, Ann Arbor, Michigan.

a. Some Fundamental Factors Affecting Peaking. J. Howard Euston, Vice President Business Research Corporation, Chicago, Illinois and W. A. Lewis, Research Professor of Electrical Engineering, Illinois Institute of Technology, Chicago, Illinois.

b. Electromotive Power for Peaking, Area Backup and Reserve. B. B. Brownell, Director of Research and Engineering, Electro-motive Division, General Motors Corporation, La Grange, Illinois.

c. Gas Turbines for Peaking. W. D. Marsh, Application Engineer, Power Generation Engineering, Electric Utility Section, Schenectady, New York.

## WEDNESDAY P.M.

**2:00-5:00 P.M. SYSTEM PLANNING AND OPERATION — Assembly Room.** Sponsored by the Power Division of AIEE.

Chairman: E. R. Moore, Manager of Engineering, The Detroit Edison Company, Detroit, Michigan.

Co-Chairman: J. J. Carey, Professor of Electrical Engineering, The University of Michigan, Ann Arbor, Michigan.

**a.** Automation of System Planning. F. J. Maginniss, Manager, Special Studies and Digital Analysis Engineering, G. D. Galloway, Application Engineer, System Generation Analytical Engineering and A. J. Wood, System Generation Analytical Engineering, Electric Utility Analytical Engineering Operation, General Electric Company, Schenectady, New York.

**b.** Results of a Year of Long Range Planning by Simulation. C. J. Baldwin, Generation Engineer, Electric Utility Engineering Department, Westinghouse Electric Corporation, East Pittsburgh, Pa. and J. A. Casazza, Transmission Planning Engineer, System Planning and Development Department, Public Service Electric and Gas Company, Newark, New Jersey.

**c.** Coordinated Use of Hydro and Steam Generation in a Large Interconnected System. Ross N. Brudenell, Chief, System Loading Branch, Division of Power System Operations and Jack H. Gilbreath, Supervisor, Operation Planning Section, Division of Power System Operations, Tennessee Valley Authority, Chattanooga, Tenn.

**d.** Weather and the Daily Forecasting of Philadelphia Electric System Load. S. S. Clair, Assistant Chief Load Dispatcher, and W. S. Einswechter, Supervising Engineer, Philadelphia Electric Company, Philadelphia, Pa.

**2:00-5:00 P.M. INDUSTRIAL IV — CENTRAL STATIONS III — STEAM GENERATORS — Crystal Room.**

Chairman: Chester R. Earle, Special Projects Editor, Power Engineering, Barrington, Illinois.

Co-Chairman: D. J. Renwick, Associate Professor of Mechanical Engineering, Michigan State University, East Lansing, Michigan.

**a.** Preventing Furnace Explosions — The Application of Flame Detectors and Their Function in a Complete Furnace Protecting System. W. L. Livingston, Burner Group Leader and P. Gray, Jr., Research Engineer, Fuels Section, Kreisinger Development Laboratory, Combustion Engineering, Inc., Chattanooga, Tenn.

**b.** Flue Gas Sampling and Analysis for $0_2$ in Cyclone Furnace Fired Boilers. F. C. Luxl, Field Engineer, Leeds and Northrup Company, Philadelphia, Pa. and J. J. Osochowsky, Results Engineer, Bridgeport Harbor Station, United Illuminating Company, Bridgepoint, Conn.

**c.** Application of Centrifugal Compressors to Soot Blower Systems. J. W. Locke, Assistant Manager, Contract Engineering and R. G. Thesing, Contract Engineer, Diamond Power Specialty Company, Lancaster, Ohio.

**2:00-5:00 P.M. WATER TECHNOLOGY III — Condensate Polishing — Bal Tabarin Room.**

Chairman: Louis F. Wirth, Jr., Manager, Ion Exchange Division, Nalco Chemical Company, Chicago, Illinois.

Co-Chairman: T. J. Hodan, Sales Manager, Water Conditioning Section, Allis-Chalmers Manufacturing Company, Milwaukee, Wisconsin.



## WEDNESDAY P.M. — THURSDAY A.M.

**a.** Plant Experience, High Flow Rate, Externally Regenerated Condensate Polishing Demineralizers-Dresden Nuclear Generating Station. A. B. Sisson, Chemical Engineer, Generating Stations, Commonwealth Edison Company, Chicago, Illinois; R. C. Reed, Systems Specialist, Atomic Power Equipment Department, General Electric Company, San Jose, California and H. W. Frazer, Manager, Ion Exchange Department, Infilco, Inc., Tucson, Arizona.

**b.** Condensate Scavenging — Operating Results in Three Central Station Plants. V. J. Calise, General Sales Manager and J. A. Levendusky, Chief Research Engineer, Graver Water Conditioning Company, New York, N. Y.

## ALL ENGINEERS DINNER

**6:30 P.M. Grand Ballroom.**

Presiding: C. J. Forsberg, President, Wisconsin Power and Light Company, Madison, Wisconsin.
Entertainment: Spartan Bell Ringers of Michigan State University.
Speaker: Hubert G. Ebdon, President, Combustion Engineering, Inc., New York, N. Y.

## THURSDAY, MARCH 23, 1961

**9:00 A.M.-12:00 Noon. CENTRAL STATIONS IV — Grand Ballroom.** Sponsored by the Power Division of the American Society of Civil Engineers.

Chairman: M. P. Aillery, Chairman, Power Division, Executive Committee, ASCE, Chief Structural Engineer, J. G. White Engineering Company, New York, N. Y.

Co-Chairman: Richard N. Bergstrom, Associate, Sargent & Lundy, Engineers, Chicago, Illinois.

**a.** TVA's Paradise Steam Plant with 650,000 - Kilowatt Units. R. A. Elliott, Chief Water Control Planning Engineer; W. F. Emmons, Chief Design Engineer and H. T. Lofft, Chief Construction Engineer, Tennessee Valley Authority, Knoxville, Tenn.

**b** Application of a Governor Test Facility to Analysis and Design of Steam Turbine Generator Control Systems. J. K. Dixon, Thermal Power Department, Allis-Chalmers Manufacturing Department, Milwaukee, Wisconsin.

**c.** Comparison of Contractual Arrangements for Utility and Industrial Projects. William E. Hopkins, Consulting Engineer, Stone and Webster Engineering Corporation, Boston, Mass.

**d.** Cooling Pond or Cooling Tower — An Overall Appraisal. W. R. Steur, Associate, Sargent & Lundy, Engineers, Chicago, Illinois.

**9:00 A.M.-12:00 Noon. POWER PLANT AUXILIARIES — Louis XVI Room.** Sponsored by the Power Division of ASME.

Chairman: Charles D. Birget, Chief Mechanical Engineer, Commonwealth Associates, Inc., Jackson, Michigan.

Co-Chairman: K. G. Picha, Associate Director, School of Mechanical Engineering, Georgia Institute of Technology, Atlanta, Georgia.

**a.** Philadelphia Electric Company Multi-Stage Flash Evaporator. C. Capara, Engineer, Mechanical Engineering Department and W. B. Willsey, Assistant Chief Chemist, Operating Department, Philadelphia Electric Company; D. Crane, Design Engineer, Heat Exchanger Section and E. F. Stalcup, Senior Negotiation Engineer, Sales, Heat Transfer Division, Westinghouse Steam Division, Lester, Pa.

**b.** Corrosion and Vibration in Small Steam Turbines. Stanford Neal, Manager Advance and Development Engineering and W. J. Caruso, Structural Engineer, Small Steam Turbine Department, General Electric Company, Fitchburg, Mass.

**c.** Second Progress Report on High Speed Boiler Feed Pumps. Igor J. Karassik, Consulting Engineer and Manager of Planning and Elliott F. Wright, Chief Engineer, High Pressure Pumps, Harrison Division, Worthington Corporation, Harrison, New Jersey.

**d.** Development and Operation of Fluid Drives for Turbine-Generator Driven Boiler Feed Pumps. R. D. O'Neil, Product Manager-Fluid Drives, American Standard, Industrial Division, Dearborn, Michigan.

**9:00 A.M.-12:00 Noon. INDUSTRIAL V — Training of Plant Personnel — Assembly Room.** Sponsored by the National Association of Power Engineers.

Chairman: Floyd Cooper, President, National Association of Power Engineers, Division of Boiler Inspection, State of Minnesota, Minneapolis, Minnesota.
Co-Chairman: Paul M. Anderson, Department of Mechanical Engineering, Iowa State University, Ames, Iowa.

**a.** On the Job Training for Power Plant Personnel by the Minnesota State Department of Education. Frank W. Randall, Itinerant Instructor, Steam and Power Plant Engineering, Trade and Industrial Unit, Vocational Division, Minnesota State Department of Education, Minneapolis, Minnesota.

**b.** An Adult Education Program for Power Plant Personnel. Harry R. Blount and Walt W. Cartwright, Des Moines Iowa Chapter of the National Association of Power Engineers, Des Moines, Iowa.

**c.** The Neglected Area, Training the Handicapped for Service in Industrial Plants. P. Choncholos, Chief of Vocational Counseling and William Kir-Stimon, Chief, Clinical Psychology and Director, Personal Counseling Service, Rehabilitation Institute of Chicago, Chicago, Illinois.

**d.** Our Experiences in Instrument Maintenance Training Programs. Roland C. Grambau, Instructor, Maintenance Education Department, Midland Division, The Dow Chemical Company, Midland, Michigan.

**9:00 A.M.-12:00 Noon — ELECTRICAL DISTRIBUTION — Crystal Room.**

Chairman: G. L. Welch, Midwestern Region Engineering Manager, Westinghouse Electric Corporation, Chicago, Illinois.
Co-Chairman: R. E. Armington, Associate Professor of Electrical Engineering, Pennsylvania State University, University Park, Pa.

**a.** New Developments in Residential Underground Distribution. R. F. Lawrence, Manager, Distribution Engineering Section, Electric Utility Engineering Department, East Pittsburgh, Pa. and R. B. Pherson, Manager, Commercial Design Engineering, Sharon, Pa. — both of Westinghouse Electric Corporation.

**b.** Overhead Electric Distribution Line Construction Equipment and Practices. K. S. Field, Engineering Consultant, Ebasco Services, Inc., New York, N. Y.

**c.** The Self-Regulating Transformer and its Impact upon Future Distribution Planning. Dennis A. Manning, Manager, Transformer Sales and Service, Line Material Industries, a McGraw-Edison Division, Zanesville, Ohio.

**d.** Planning for Transition from 4-Kv to 13.2-Kv Distribution. R. E. Duerr, Planning and Engineering Division, The Cincinnati Gas and Electric Company, Cincinnati, Ohio.





**9:00-10:30 A.M. WATER TECHNOLOGY IV — Ion Exchange — Operations — Bal Tabarin Room.**

Chairman: S. F. Whirl, Chemical Operating Engineer, Duquesne Light Company, Pittsburgh, Pa.
Co-Chairman: W. R. Homan, Chief Chemist, Commonwealth Edison Company, Chicago, Illinois.

**a.** Mixed Bed Demineralizers in Series for Optimum Operating Control. Eugene Schmidt, Technical Director, L-A Water Conditioning, Inc., Glendale, California and Norbert W. Sager, Chief Steam Plant Engineer, City of Burbank, Burbank, California.

**b.** Four Years Operating Experience with a 3200 GPM Demineralizer. R. I. Smith, Assistant to Chief Engineer and H. D. Reppin, Engineer, Electric Engineering Dept., Public Service Electric and Gas Company, Newark, New Jersey.

**10:30 A.M.-12:00 Noon. WATER TECHNOLOGY V — SEA WATER CONVERSION — Bal Tabarin Room.**

Chairman: R. A. Lorenzini, Vice Chairman, Boiler Feedwater Studies Research Committee, ASME, Chief Engineer, Foster Wheeler Corporation, New York, N. Y.
Co-Chairman: Archie H. Easton, Professor of Civil and Mechanical Engineering, University of Wisconsin, Madison, Wisconsin.

**a.** Operation of the Sea Water Distillation Plant at Mandalay Station. R. E. Whistler, Mechanical Engineer, Southern California Edison Company, Los Angeles, California.

**b.** The Economics of Sea Water Distillation in Power Generation. G. E. Sonderman, Partner, Singmaster and Breyer, Inc., New York, N. Y., an affiliate of the Fluor Corporation, Ltd., Los Angeles, California.

**12:15 P.M. JOINT APC-WSE LUNCHEON — Bernard Shaw Room.** Sponsored by the Western Society of Engineers.

Chairman: Raymond D. Maxson, President, Western Society of Engineers.
Co-Chairman: Joseph C. Boyce, Vice President and Dean of The Graduate School, Illinois Institute of Technology, Chicago, Illinois.
Speaker: Titus G. LeClair, Manager, Nuclear Power Applications, General Atomic, San Diego, California.
Subject: The Future of Atomic Energy.

**2:00-3:30 P.M. CENTRAL STATIONS V — Grand Ballroom.**

Chairman: Ben G. Elliott, Professor Emeritus of Mechanical Engineering, University of Wisconsin, Madison, Wisconsin.
Co-Chairman: Reno C. King, Associate Professor of Mechanical Engineering, New York University, New York, N. Y.

**a.** Improvement in Economics of a 625 Mw Combined Cycle Plant Over a Conventional Steam Cycle Plant. H. J. Peterson, Vice President and Power Consultant, United Engineers and Constructors, Inc., Philadelphia, Pa. and J. O. Stephens, Manager of Engineering-Gas Turbines, Westinghouse Electric Corporation, Lester Pa.

**b.** Binary Cycle for Power Generation — Steam-Peyton-12 System. David Aronson, Consultant, Advanced Products Division, Worthington Corporation, Harrison, New Jersey.

**3:30-5:00 P.M. CENTRAL STATIONS VI — Optimization and Control — Grand Ballroom.**

Chairman: Eric T. B. Gross, Professor of Electrical Engineering, Illinois Institute of Technology, Chicago, Illinois.
Co-Chairman: Donald H. Madsen, Professor of Mechan-

ical Engineering, State University of Iowa, Iowa City, Iowa.

**a.** Automatic Programming for Optimized Power Plant Design. F. H. Westervelt, Assistant Professor of Mechanical Engineering and Research Associate in Computer Center, the University of Michigan, Ann Arbor, Michigan; C. D. Birget, Vice President, Commonwealth Associates, Inc., Jackson, Michigan and F. C. Fisher, General Supervisor of Operations Research, Consumers Power Company, Jackson, Michigan.

**b.** An Integrated Turbine-Reactor Control System for the Sodium Reactor Experiment. R. J. Hall, Control Engineer, Atomics International Division of North American Aviation, Inc., Canoga Park, California and F. C. Six, Field Engineer, Leeds and Northrup Company, Monterey Park, California.

**2:00-5.00 P.M. ELECTRICAL APPARATUS—Louis XVI Room.**
Chairman: F. M. Scott, Manager, Utility Sales, Allis-Chalmers Manufacturing Company, Chicago, Illinois.
Co-Chairman: M. S. Helm, Professor of Electrical Engineering, University of Illinois, Urbana, Illinois.

**a.** New Standards for Power Circuit Breakers and Their Effect on Design, Test and Application. R. C. Van Sickle, Advisory Engineer, Power Circuit Breaker Engineering, Westinghouse Electric Corporation, Trafford, Pa.

**b.** Harmonic Excitation of Synchronous Machines. F. I. Biggs, Engineering Manager and P. I. Nippes, Manager, Turbine Generator Engineering, Ridgway Plant, Elliott Company Division of Carrier Corporation, Ridgway, Pa.

**c.** Whys and Hows of Auto-Transformers. Leonard R. Reid, Supervisory Engineer, Allis-Chalmers Manufacturing Company, Milwaukee, Wisconsin.

**d.** Thermal Upgrading of Power Transformers. J. H. Carpenter, Advance Product Engineer, Medium Transformer Department, General Electric Company, Rome, Georgia and J. R. Meador, Manager, High Voltage Laboratory, Power Transformer Department, General Electric Company, Pittsfield, Mass.

**2:00-5:00 P.M. INDUSTRIAL VI—Economics of Power Plant Operation — Assembly Room.**
Chairman: Kenneth R. Hodges, Chief Engineer, Sears Roebuck and Company, Chicago, Illinois.
Co-Chairman: Roy Sahlstrom, Faville LeVally Corporation, Chicago, Illinois.

**a.** How Small Plants can Conserve Utilities and Reduce Cost. George R. Chadwick, Consulting Engineer, Chicago, Illinois.

**b.** Controlling the Cost of Electricity for Industrial Plants. R. H. Bradford, Director-Central Region, Ebasco Services, Inc., Chicago, Illinois.

**c.** Departmental Allocation of Plant Utility Rates. M. B. Golber, Supervisor, Utilities and Power Plants, Armour & Company, Chicago, Illinois.

**2:00-5:00 P.M. COMPUTERS AND NETWORK ANALYZERS — Crystal Room.**
Chairman: E. L. Nicolson, Manager, Application Engineering, General Electric Company, Chicago, Illinois.
Co-Chairman: E. B. Eggers, Research Engineer, Illinois Institute of Technology, Chicago, Illinois.

**a.** Digital Load Flow Techniques. J. J. Skiles, Professor of Electrical Engineering, University of Wisconsin, Madison, Wisconsin and Consultant to Allis-Chalmers Manufacturing Company; J. B. Cage, Mathematician and H. D. Bickley, Engineering Analyst, Engineering Analysis Section, Allis-Chalmers Manufacturing Company, Milwaukee, Wisconsin.





**b.** Digital Solution of Power System Transients. L. O. Barthold, Transmission and Distribution Analytical Engineer, Electric Utility Analytical Engineering Operation, General Electric Company, Schenectady, N. Y.

**c.** Coordinated Operation of a Medium Sized Digital Computer and A-C Network Analyzer. Harvey D. Hunkins, Head, Power System Planning Unit, U.S. Bureau of Reclamation, Denver, Colorado.

**d.** Automatic Writeout Equipment Used with an A-C Network Calculator. Rodney E. Gilbreath, Westinghouse Electric Corporation, East Pittsburgh, Pa.

**e.** Improvements in the Bonneville Network Analyzer. K. Tuttle, Electrical Engineer, Bonneville Power Administration, Portland, Oregon.

**2:00-5:00 P.M. ATMOSPHERIC POLLUTION — Bal Tabarin Room.** Sponsored by the Power Division, ASME.
Chairman: Robert M. Vanduzer, Assistant Manager of Operations, The Detroit Edison Company, Detroit, Michigan.
Co-Chairman: George L. West, Jr., Department of Naval Architecture and Marine Engineering, University of Michigan, Ann Arbor, Michigan.

**a.** Atmospheric Pollution Prediction by Model Studies of Industrial Stacks. F. K. Boutwell, Assistant Professor of Mechanical Engineering, University of Michigan, Ann Arbor, Michigan.

**b.** Topographical Influence on the Behavior of Stack Effluents. F. Wendell Hewson, Professor of Meteorology; Eugene W. Bierly and Gerald C. Gill, Department of Civil Engineering, University of Michigan, Ann Arbor, Michigan.

**c.** Observations and Experiences Resulting from a Precipitator Improvement Program. M. J. Archbold, General Mechanical Engineer, Commonwealth Edison Company, Chicago, Illinois.

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## SESSION SCHEDULE

| Day | Time | Grand Ballroom | Louis XVI Room | Assembly Room | Crystal Room | Bal Tabarin Room | Bernard Shaw Room |
|---|---|---|---|---|---|---|---|
| Tues. Mar. 21 | 9:30 AM | Opening Meeting | | | | | |
| | 12:15 | | | | | | APC-ASME Luncheon |
| | 2 PM | Central Stations I | High Voltage | Industrial I | Industrial II | Water Technology I | |
| | 5:00 | Avon No. 8 Plant | Transmission | Space Air Conditioning | Electrical | High Purity Water | |
| | 8:00 | Evening Forum | | | | | |
| Wed. Mar. 22 | 9 AM | Central Stations II | Automation and | Fuels | Symposium on Peaking I | Water Technology II | |
| | 10:30 | Breed Plant | Control | | Hydroelectric | Industrial III | |
| | 12:15 | | | | | | APC-AIEE Luncheon |
| | 2 PM | Nuclear Power Plants | Symposium on Peaking II | System Planning | Industrial IV | Water Technology III | |
| | 3:30 | | Thermal | and Operation | Central Stations III | Condensate Polishing | |
| Thurs. Mar. 23 | 6:30 | All Engineers Dinner | | | | | |
| | 9 AM | Central Stations IV | Power Plant Auxiliaries | Industrial V | Electrical Distribution | Water Technology IV | |
| | 10:30 | | | Plant Personnel Training | | Water Technology V | |
| | 12:15 | | | | | | APC-WSE Luncheon |
| | 2 PM | Central Stations V | Electrical Apparatus | Industrial VI | Computers and | Atmospheric | |
| | 3:30 | Central Stations VI | | | Network Analyzers | Pollution | |