



Great Lakes District Meeting

April 19-21, 1961

Minneapolis, Minnesota

Headquarters

The Pick-Nicollet Hotel

SCHEDULE OF EVENTS

Tuesday—April 18, 1961

5:00 to 9:00 PM—Registration

Wednesday—April 19, 1961

8:15 AM to 5:00 PM—Registration

9:30 AM—Technical Sessions

9:45 AM—Ladies' Tour—Southdale

11:45 AM—Ladies' Lunch—
Southdale

12:00 Noon—General Session
Luncheon

2:00 PM—Technical Sessions

2:00 PM—Inspection Trips:
Lightning and Transients
Research Institute and
Northern States Power
Computer Center
Minneapolis Mining and
Manufacturing Co. Elec-
trical Products Laboratory

8:00 PM—Inspection Trip
Northwestern Bell Tele-
phone Co. Long Lines
Division

Thursday—April 20, 1961

8:15 AM to 5:00 PM—Registration

8:30 AM—Inspection Trips:
Electric Machinery Mfg.
Co. and Control Corpora-
tion

9:00 AM—Inspection Trip:
Control Data Corporation

9:30 AM—Ladies' Coffee Hour

9:30 AM—Technical Sessions

12:00 Noon—General Session
Luncheon

1:45 PM—Ladies' Tour American
Swedish Institute

2:00 PM—Technical Sessions

2:00 PM—Inspection Trips:
Northern States Power
Company Southtown
Substation, Black Dog
Steam Plant
Remington Rand Univac

6:00 PM—Hospitality Hour

7:00 PM—Banquet

8:00 PM—Inspection Trip
Northern States Power
Company—System Dis-
patching Office

Friday—April 21, 1961

8:15 AM to 12:00 Noon—Registration

9:00 AM—Inspection Trips:
Northern States Power
Company Testing
Laboratory
Minneapolis Honeywell

9:30 AM—Ladies' Coffee Hour

9:30 AM—Technical Sessions

12:00 Noon—General Sessions
Luncheon

2:00 PM—Technical Sessions

AIEE — DC TO 60 CYCLES TO MEGACYCLES BASIC SCIENCE TO APPLIED ENGINEERING

The AIEE Great Lakes District Meeting will be held at the Pick-Nicollet Hotel on April 19, 20, and 21 in Minneapolis, Minnesota in the land of 10,000 lakes. 76 technical papers in 19 sessions will be presented by outstanding speakers with wide geographic representation. 10 informative inspection tours closely coordinated with the technical papers have been arranged for both technical and general interest.

GENERAL SESSION: Noon luncheons as general sessions will be held each day in the Walnut Room with programs as follows:

Wednesday—C. H. Lindner, President of the AIEE will be the main speaker.

Thursday—Dr. John Kelly, Westinghouse Electric Corp. will be the Main speaker.
His subject — "What's New in Research".

Friday—Presentation of the Student Paper Competition awards will be the principle feature of this program

TECHNICAL SESSIONS: The program schedule of 17 different subject headings in 19 sessions fills all three days. The technical paper presentations range in background from D.C. to 60 cycles to megacycles, from electronics to nucleonics, from applied science and engineering to education, advanced control and communication theory, and to research. A special attempt has been made to arrange the paper presentations to precede related tours to outstanding laboratories, plant and factories located in the Twin Cities Metropolitan area.

STUDENT PAPER COMPETITION: On Thursday, April 21, the Great Lakes District Student Paper Competition will be held in the Hotel Pick-Nicollet Aquatennial Room covering entries from the 17 student branches. The first place winner will receive a \$25.00 award and have the distinction of representing the District at the Summer General Meeting at Cornell University in Ithaca, N. Y. The second place winner will receive a \$25.00 award and the third place \$15.00. Presentation of these awards will be a feature of the Friday noon luncheon.

REGISTRATION: Facilities will be located on the mezzanine floor lobby of the Pick-Nicollet Hotel. For those arriving on April 18, the registration desk will be open from 5:00 to 9:00 P.M. During the meeting registration hours will be from 8:15 A.M. to 5:00 P.M., except on the final day, Friday April 21, when the registration desk will close at 12:00 noon.

Registration fees will be: Members \$4.00, Non-members \$7.00, Student Members no fee. Wives of Registrants \$2.00.

Please return your advance registration card early with an indication of the activities you plan to attend. This will give the committees an opportunity to make adequate provisions for all affairs. *Do not* send money with registration. It is recommended that immediately upon completing registration at the hotel, you procure tickets for inspection trips, luncheons, buffet dinner, theatre party, banquet and ladies' activities.

HOTEL RESERVATIONS: A block of rooms has been set aside at the Pick-Nicollet Hotel, to accommodate those planning to attend the meeting. The hotel reservation card should be completed and returned promptly to the Pick-Nicollet Hotel. The Pick-Nicollet Hotel will arrange for any alternate rooms should their facilities be completely sold out with our record attendance. Rates per day are as follows:

Single Room (one person)	\$ 9.00 — \$13.50
Double Room—Double Bed (two persons)	\$11.50 — \$16.00
Double Room—Twin Beds (two persons)	\$12.50 — \$17.00
Suites (two and three rooms)	\$27.50 — \$70.00

ENTERTAINMENT COMMITTEE

Wednesday—April 19, 1961

9:45 AM—Ladies' Tour — Southdale

11:45 AM—Ladies' Lunch — Southdale

Thursday—April 20, 1961

9:30 AM—Ladies' Coffee Hour

1:45 PM—Ladies' Tour—American Swedish Institute

6:00 PM—Hospitality Hour

7:00 PM—Banquet

Friday—April 21, 1961

9:30 AM—Ladies' Coffee Hour

LADIES' PROGRAM: Wednesday morning (9:45) a guided tour of Southdale will show "behind the scenes" features of this modern unique shopping center with 75 stores and shops within a landscaped, air-conditioned area under one roof. Lunch in one of the tea rooms.

Thursday afternoon (1:45) there will be a guided tour of the American-Swedish Institute.

Ladies' coffee hours have been arranged for Thursday and Friday mornings in the Arrowhead Room of the Pick-Nicollet Hotel.

Continued on page 3

ADVANCE COPIES OF PAPERS

Members may obtain preprints of numbered papers at the uniform price of 50¢ each (\$1.00 each to nonmembers), by sending enclosed order form and remittance to the AIEE Order Department, 33 West 39th Street, New York 18, N. Y. Mail orders (particularly from out-of-town members) are advisable, inasmuch as an adequate supply of each paper at the meeting cannot be assured. Coupon books in \$10 denominations are available for those who wish to avoid remittance by check or otherwise.

Note: Unnumbered District Papers (DP.*) may be available at or after the meeting, if copies are provided by the author. They are not presently scheduled for reproduction in any form by the Institute.

Wednesday, April 19

9:00 a.m.—Science and Research

- Candlelight Room**
 Presiding: ROBERT P. FEATHERSTONE, Univ. of Minn. Linac Lab.
 DP.* The Biomedical Electronics Program at I.S.U. V. W. Bolie, W. B. Boast, Robert Getty, M. J. Swenson, Iowa State University.
 DP.* New Goals in Plasma Energy. E. H. Brill, Allis-Chalmers Mfg. Co.
 DP.* Ball Lightning. E. L. Hill, University of Minn., Lightning & Transients Research Inst.
 DP.* A New Technique for Simultaneous Measurement of Thermoelectric Material Properties as Functions of Temperature. Thomas L. Nystrom, Minn. Mining and Mfg. Co.
 DP.* Sea-Going Lightning Generator. M. M. Newman, J. R. Stahmann, J. D. Robb, Lightning & Transients Research Inst.

9:30 a.m.—Insulating Materials and Systems

- Birchwood Room**
 Presiding: W. M. HANSON, Minn. Mining and Mfg. Co.
 DP.* Silicone Rubber Insulating Systems. R. J. Potts, Allis-Chalmers Mfg. Co.
 DP.* Powdered Epoxy Resins for Electrical Insulating Applications. Rupert Strobel, Minn. Mining and Mfg. Co.
 DP.* Low and Medium Voltage Cable Coverings. H. C. Witthoft, Anaconda Wire & Cable Co.
 DP.* Voltage Endurance of Insulating Materials. Murray Oliphant, Minn. Mining and Mfg. Co.

9:30 a.m.—Digital Data Processing Systems

- Hennepin Room**
 Presiding: JAMES ALMAN, Univac Div. of Sperry Rand Corp.
 DP.* Engineering Data Processing — 1970. J. S. Fouch, International Business Machines Corp.
 DP.* The Satellite Computer System. Alfred Christofferson, Jr., Control Data Corp.
 DP.* Space-Age Digital Computers—Components and Capabilities. Adi J. Khambata, Roger A. Urban, Univac Div. of Sperry Rand Corp.

2:00 p.m.—Education

- Hennepin Room**
 Presiding: HENRY E. HARTIG, University of Minnesota
 DP.* The Harmonic Demonstrator Using Pulse Techniques. Gerold Neudeck, University of North Dakota.
 DP.* A Professional Guidance Program for High School Science Students. C. D. Motchenbacher, Minneapolis Honeywell.
 DP.* Poor Teachers. Edwin M. Anderson, North Dakota State College.
 DP.* Electric Machinery Instruction — Required or Optional? Lawrence F. Stauder, University of Notre Dame.
 DP.* Engineering Education Beyond the Bachelors Level. R. F. Lambert, University of Minnesota.

2:00 p.m.—Instrumentation & Data Logging

- Candlelight Room**
 Presiding: ROBERT W. PINKNEY, Pinkney & Hine Co.
 DP.* Digital Data Acquisition System for Electric Utilities. Herman Wittenberg, James H. Baker, Control Corp.
 CP60-1233. Factors in Design and Application of Digital Telemetering. E. Wylie Head, Control Corp.
 DP.* Instruments and Their Calibration. M. E. Todd, M. Curtis Hughes, Instrumentation Services, Inc.
 DP.* Solid State Analog FM Telemetering System. S. Hille, Control Corp.

2:00 p.m.—Rotating Machinery

- Birchwood Room**
 Presiding: ROBERT L. FILLMORE, Minneapolis Honeywell

- DP.* Static, Electronic, and Rotating Excitation Systems for Turbine Generators. L. M. Domeratzky, M. Temoshok, General Electric Co.
 DP.* Applications of High Frequency Power. Gordon W. Sangster, Electric Machinery Mfg. Co.
 DP.* Magnaflo and Rectiflow Adjustable Speed Drives as Applied to Pumping and Other Applications. R. P. Bleikamp, Westinghouse Electric Corp.
 DP.* Application and Performance of a Static-Excited AC Generator with No Compounding or Field Flashing Devices. H. E. Jorgenson, G. T. Stromme, Onan Div. of Studebaker-Packard.

Thursday, April 20

9:00 a.m.—Communications

- Candlelight Room**
 Presiding: A. J. HENDRY, Northern Pacific Rwy. Co.
 DP.* Personal Radio Systems & Applications. L. Weddig, Motorola, Inc.
 DP.* Broad Band Impedance Matching by Applying a Tybecheff Approximation to Discrete Frequency Data. William Bares, Univ. of North Dakota.
 DP.* Reliability of Communication Facilities. J. S. Oakes, F. S. Hird, Northwestern Bell Telephone Co.
 DP.* The Installation of a Television Station, KCND-TV, For Pembina, North Dakota. C. J. Thomforde, University of North Dakota.

9:00 a.m.—Power System Engineering

- Birchwood Room**
 Presiding: JACK F. ROWE, Minnesota Power & Light Co.
 DP.* Automation of System Operation. L. K. Kirchmayer, H. J. Fiedler, General Electric Co.
 DP.* Evaluation of Tie Capacity between Pools or Systems. H. E. Lokay, M. S. Schultz, Westinghouse Electric Corp.
 DP.* An Operational Cost Simulator. Jules B. Vieaux, International Business Machines Corp.

9:00 a.m.—Transmission and Distribution

- Hennepin Room**
 Presiding: M. W. ANDERSON, Northern States Power Co.
 DP.* Potential Savings in Use of V-Insulator Strings in Transmission Line Design. W. H. Burleson, R. W. Harmon, Ohio Brass Co.
 DP.* Fault Study in Power Systems by Tensor Procedures in Symmetrical Component Analysis. G. L. Kang, Stromberg-Carlson Co., T. J. Higgins, University of Wisconsin.
 DP.* Effect of Lightning on Transmission and Distribution Structures. E. W. Christoferson, T. S. Jepson, Northern States Power Co., J. A. Robb, Lightning & Transients Research Institute.
 CP61-548. Street Lighting Practices. R. E. Warren, Northern States Power Co.

2:00 p.m.—Industrial Power Systems

- Candlelight Room**
 Presiding: W. GORDON BRIERLY, Automatic Control Co.
 DP.* Directional Overcurrent Relays on Industrial Network Type Systems. A. H. Knable, Allis-Chalmers Mfg. Co.
 DP.* Comparing Computer Calculated Horsepower Requirements with Field Test Performance. Richard G. Lynn, American Hoist & Derrick Co.
 DP.* Serving Large Downtown Buildings. T. G. A. Sillers, A. E. Kilgour, L. E. Whitsitt, Allis-Chalmers Mfg. Co.
 DP.* Application of Circuit Breakers with Symmetrical Ratings in Industrial Plants. P. L. Camp, J. D. Wood, ITE Circuit Breaker Co.

2:00 p.m.—Automatic Control Theory

- Birchwood Room**
 Presiding: EDWIN KINNEN, University of Minn.
 DP.* Describing Function Analysis of a Type-I Control System with A Nonsymmetrical Dead-Zone Nonlinearity. Richard P. Langkammer, A. C. Spark Plug Div., G.M.C., T. J. Higgins, University of Wis.
 DP.* Learning Model Approach to Self Evaluation and the Method of Lyapunov. E. R. Rang, C. W. Johnson, Minneapolis Honeywell.
 DP.* Error Coefficient Analysis and Synthesis of Digital and Sampled-Data Control Systems. J. F. Spitzer, International Business Machines Corp., T. J. Higgins, University of Wis.
 DP.* Optimization in a Mean-Square Sense of a Two-Dimensional Sampled-Data System. C. H. Murrish, T. J. Higgins, University of Wis.

2:00 p.m.—Instrumentation

- Hennepin Room**
 Presiding: ROBERT L. SELL, Telex, Inc.
 DP.* Semiconductor Strain Gauges. Don Long, Obert Tufte, Minneapolis Honeywell
 DP.* Instrumentation Technique in Magnetic Amplifier Application. L. A. Gregory, Magnetic Controls Co.
 DP.* A Sensitive Displacement Meter Utilizing a Hall Effect Probe. C. D. Motchenbacher, S. B. Schuldt, Minneapolis Honeywell.
 DP.* Magnetic Recording. Chas. Robinson, Maico Electronics, Inc.

Friday, April 21

9:00 a.m.—Computing Devices

- Candlelight Room**
 Presiding: FRANK KLAUDA, International Bus. Machines, Inc.
 DP.* Integrated Semiconductor Circuits. Wm. J. Rydrych, Univac Div. of Sperry Rand Corp.
 DP.* Influence of Minor Impurities in Ferromagnetic Films. R. J. Prosen, Minneapolis Honeywell.
 DP.* Tolerance Analysis of Tunnel Diode Circuits. Walfred R. Raisanen, Univac Div. of Sperry Rand Corp.
 DP.* Studies of High Coercivity Electrodeposits. J. S. Sallo, Minneapolis Honeywell.

9:00 a.m.—Nuclear Power

- Hennepin Room**
 Presiding: E. C. WARD, Northern States Power Co.
 DP.* Technical and Economic Status of Central Station Pressurized Water Reactors. W. L. Budge, Westinghouse Electric Corp.
 DP.* Electrical Features of Elk River Nuclear Plant. L. J. Blasiak, Allis-Chalmers Mfg. Co.
 DP.* Control Philosophy for a Boiling Water Reactor with an Internal Nuclear Superheater. David Crimmins, J. T. Stone, Allis-Chalmers Mfg. Co.
 DP.* The Primary Control System for Pathfinder Atomic Power Plant. D. M. Leppke, Pioneer Service & Engineering Co.

9:00 a.m.—Process Automation Systems

- Birchwood Room**
 Presiding: WM. J. FIELD, General Magnetics, Inc.
 DP.* Automation of the Postal System. Harold S. Montgomery, Cutler Hammer, Inc.
 DP.* Automatic Directive Systems. Russell Hedline, Thomas Raukar, Thomas Stern, Ramsey Engineering Co.
 DP.* Computers for On-Line Process Control. Walter C. Tice, General Electric Co.

2:00 p.m.—Communications

- Candlelight Room**
 Presiding: H. O. ARNESON, Northwestern Bell Tel. Co.
 DP.* A New Era in Mobile Telephone Systems. W. G. Pree, General Electric Co.
 DP.* Determination by Subareas of the Parameters of Broad-Band Lines Comprised of Strip, Rectangular-Tubular, or Circular-Tubular Conductors. Tai Nien Feng, John Oster Co., T. J. Higgins, University of Wis.
 DP.* Transmission Aspects of an Integrated Private Line Telephone System. R. A. Schaefer, Wisconsin Telephone Co.
 DP.* Radio Relay Development in Northern Minnesota. J. C. Barnes, F. S. Hird, Northwestern Bell Telephone Co.

2:00 p.m.—Economic Dispatch of Power Generation

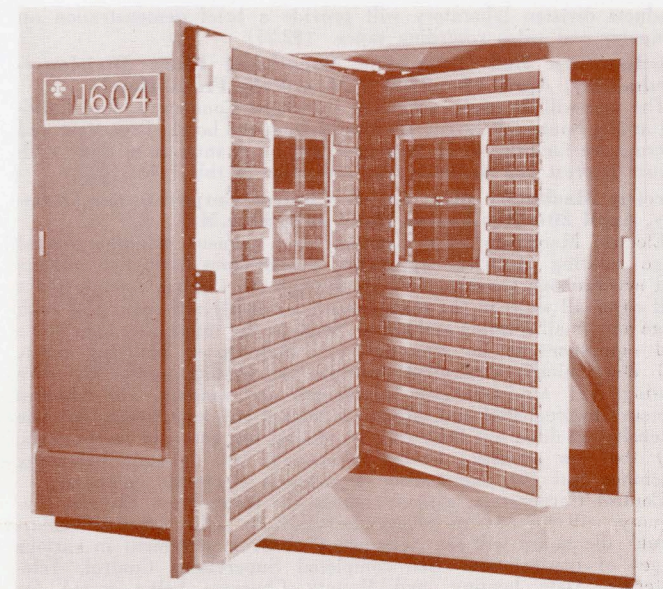
- Birchwood Room**
 Presiding: FRANK J. LINDER, Dairyland Power Cooperative
 DP.* Wisconsin Public Service Corp. Experience with Economic Dispatch. M. A. Peot, Wis. Public Service Co.
 DP.* Digital Computers as Applied to Unit Commitments. P. C. McKillop, International Business Machines Corp.
 DP.* Optimal Unit Selection in Daily Generation Dispatch. C. A. DeSalvo, K. M. Dale, Westinghouse Electric Corp.
 DP.* Input and Output Techniques for an On-Line Digital Computer Control System. W. G. Beyer, W. B. Schultz, T. W. Hissey, Leeds and Northrop Co.

2:00 p.m.—Electronic Components

- Aquatic Room**
 Presiding: ALBERT N. DeSAUTELS, Maico Electronics, Inc.
 DP.* Microminaturization. Joachim Todt, Maico Electronics, Inc.
 DP.* Principles and Functions of Cold Cathode Trigger Tubes. Robert G. Johnson, Minneapolis Honeywell.
 DP.* A High Gain Ceramic Triode for Broad-Band Amplifiers. J. D. Campbell, General Electric Co.
 DP.* Development of a Microminiature Solid Electrolyte Tantalum Capacitor. William Balas, Minneapolis Honeywell.

2:00 p.m.—Transmission and Distribution

- Hennepin Room**
 Presiding: C. T. SICKEL, Minnesota Power and Light Co.



Control Data Corp. 1604 Computer Cabinet

- DP.* Automatic VHF Radio Reporting of System Outages. V. S. Anderson, Motorola, Inc.
 DP.* Thermal Upgrading of Power Transformers. J. H. Carpenter, J. R. Meador, General Electric Co.
 DP.* Distribution Transformer Overload Capacity and Life Expectancy. A. R. Waehner, Line Material Industries.
 DP.* A Computer Study of Distribution Transformer and Secondary Arrangements. R. E. Warren, Northern States Power Co.
 DP.* Line and Revenue Loss Due to System Growth. R. A. Dewberry, Montana-Dakota Utilities Co.

CONTINUED FROM PAGE 1

SOCIAL ACTIVITIES: The banquet will be Thursday at 7:00 P.M. in the Walnut Room following the "Dutch treat" Hospitality Hour beginning at 6:00 P.M. The popular Schiek's Sextette with orchestra will entertain with songs and music from Broadway shows. Dress — informal. Price per person — \$6.50.

INSPECTION TRIPS:
Lightning & Transients Research Institute & Northern States Power Computer Center—Wednesday, April 19—Bus Leaves Hotel at 2:00 P.M.

Demonstrations of high voltage and high current discharges will show the latest lightning protection techniques for jet aircraft. The high voltage discharge to a model aircraft will illustrate current problems in protection of large radome sections. High current discharges to a foil strip protected radome will illustrate the energies involved in lightning discharges to aircraft and the protection system on the modern series of jet airliners.

The Northern States Power Computer Center is located in a new building planned to provide optimum atmospheric conditions through air conditioning and humidity control. Two large computers, the IBM 709 and the IBM 7070, will be in operation. The recently developed IBM 1401, which prints 600 lines per minute or reads 700 cards per minute or punches 250 cards per minute is the major "off-line" machine. Another interesting machine is the bill inserter, which will insert five pieces in an envelope, at a rate of 100 envelopes per minute. Other minor machines, necessary for the computer operation, can also be seen. (\$2.00)

Minnesota Mining & Manufacturing Co.—Electrical Products Laboratory—Wednesday, April 19—Bus Leaves Hotel at 2:00 P.M.

The 3M Company's research center is located on a 265 acre tract just east of St. Paul. There are six major buildings less than six years old with a total of approximately 750,000 square feet of floor space at the center. The tour will cover the facilities of 3M's electrical products and magnetic products divisions — the laboratories where research, product development, engineering and related activities in areas of primary interest to the A.I.E.E. are conducted. Its thermoelectric section will be included on the tour, to provide an insight into the current status of applications for thermoelectric generation and thermoelectric heat pumping. The magnetic

GREAT LAKES DISTRICT MEETING

products division laboratory will provide a brief demonstration on computer and video recording tapes. (\$2.25)

Northwestern Bell Telephone Co.—Long Lines Division—Wednesday, April 19—8:00 P.M.—Walk From Hotel.

The tour will be conducted at the Telephone Company's office building at 224 South 5th Street, six blocks from the hotel. Broadcast and micro wave facilities to be inspected will be of interest to those with casual interest and to those who specialize in this field. (\$.25)

Electric Machinery Mfg. Co. & Control Corporation—Thursday, April 20—Bus Leaves Hotel at 8:30 A.M.

Electric Machinery Mfg. Company is a pioneer manufacturer of large rotating electrical apparatus, synchronous induction motors and synchronous generators. Trip through the Central Avenue plant will cover all steps in the manufacture, assembly and testing of both large and small rotating machines. Some of the interesting operations and equipment to be seen are (1) high speed blanking press, (2) electronically controlled multiple gas cutting torch, (3) core plating, (4) semi-automatic submerged arc welding, (5) vacuum pressure impregnated and silicone insulated coil processing, (6) the extensive machine test floor with its special test pits and instruments, (7) the new acoustics testing laboratory, (8) dynamic balancing machines and (9) engineering department electronic computer.

Control Corporation, directly across the street from Electric Machinery, will provide an interesting half-hour tour. After a "coffee-break" the group will see Supervisory Control equipment in various stages of construction. See completed Supervisory Control, Telemetering, Data logging, and Battery Chargers being tested for shipment. (\$.200)

Control Data Corporation—Thursday, April 20—Bus Leaves Hotel at 9:00 A.M.

This tour will be preceded by a general assembly for a chalk-talk, plus demonstration on general information about the operation and various uses of the computer. After a brief break for coffee and snacks the group will be divided into four or five smaller groups to observe the following items in production: Large scale 1604 Computers in various stages of completion, medium scale Polaris Control Computer, small scale 160 Computers in various stages of completion, Computer peripheral equipment, and, finally, the Computing Center where actual scientific and engineering problems will be in the process of solution. Also a demonstration of how the 160 Computer may be used as a satellite to the 1604 Computer. (\$1.50)

Northern States Power Company—Southtown Substation, Black Dog Steam Plant—Thursday, April 20—Bus Leaves Hotel at 2:00 P.M.

Southtown Substation is a 115-13.8 kv major transmission substation supplying a portion of the south Minneapolis load. The 13.8 kv feeders supply distribution substations with 13.8 — 4.16 kv transformations to the 4.16 kv distribution voltage now used in the urban area. The substation is supplied by three 115 kv lines and uses two 37.5/50/62.5 MVA transformers to feed two 13.8 kv bus sections with a total of 13 feeders.

Black Dog Steam Plant, located on the Minnesota River, is the second largest generating station on the Northern States Power Company system. The completion of Unit No. 4 in 1960 brought the gross capability to 485,000 KW and the net capability to 460,900 KW. (\$.200)

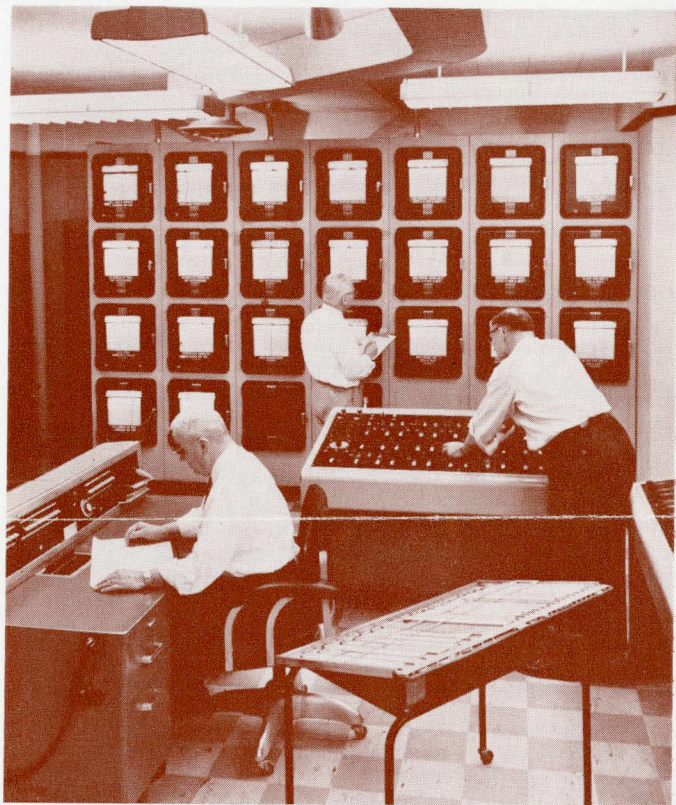
Remington Rand Univac—Thursday, April 20—Bus Leaves Hotel at 2:00 P.M.

A film, "Introduction to Digital Computers", will be followed by inspection of the Solid State 80 Computer, Univac 490 Real Time Computing System, Advanced Core Memory Section, Thin Film Memory Computer, and Nike Zeus Computer Assembly Area. The Thin Film Memory Computer is a test model utilizing destructive and non-destructive read-out thin film memory. Average access time is one twentieth of a micro-second. The Real Time computing system is a proto type development of the first data processing system with communications devices capable of producing results virtually without time loss. The system has an internal ferrite core memory of 32,768 words and a real-time clock which automatically indicates activities or signals the computer to take some pre-programmed action. (\$1.50)

Northern States Power Company Testing Laboratory—Friday, April 21—Bus Leaves Hotel at 9:00 A.M.

A visit to NSP Testing Laboratory offers an opportunity to observe a wide variety of chemical and physical tests of materials. This field which now is largely controlled by ASTM, is expanding rapidly. The laboratory has ten sections concerned with such items as fuel, corrosion, water conditioning, wood preservation, petroleum products, metallurgy, concrete, paint, gases, non-destructive testing, welding, line hardware and safety equipment. The work involves control, inspection, research, technical advice, analysis and standardization. (\$.200)

Northern States Power Company—System Dispatching Office



Northern State Power System Dispatching Center

—Thursday, April 20—8:00 P.M.—Walk 3 Blocks From Hotel.

The nerve center of the Northern States Power Company system is the System Dispatching Office in Room 704 at 15 South Fifth Street, about three blocks from the Pick-Nicollet Hotel.

Total system generator capability is 1,913,755 KW, of which 1,217,000 KW is controlled by automatic load control equipment. Located in the System Dispatching Office, the electronic automatic load control console also incorporates tie line load control on interconnections with neighboring utility systems.

Switching orders on transmission lines, in substations and power plants are performed by the system dispatchers over power line carrier telephones, NSP radio system, and by telephone across the NSP system. (\$.25)

Minneapolis Honeywell—Friday, April 21—Bus Leaves Hotel at 9:00 A.M.

The Temperature Control Division of Minneapolis Honeywell will show some of its Main Plant facilities. Various test facilities for the evaluation of the variety of products under development in the Temperature Controls Division will be inspected. These will include the laboratory for tests and studies on electrostatic air cleaner characteristics for both commercial and domestic applications. Here efficiencies when used with atmospheric or artificial dust, pollens, bacteria, etc., are evaluated on various air cleaners. Facilities for evaluating hydraulic servo components, temperature, humidity, pressure controllers and simulated motor loads for life testing contacts will be examined. The Chemical and Metallurgical Laboratory will show uses of various electronic equipment for material analysis. Production of transistors will be examined. (\$.200)

The Members of the **Great Lakes District Meeting Committee** are: E. A. Willson, General Chairman; James Forchtner, Vice-Chairman; D. C. Peterson, Secretary-Treasurer; L. A. Helling, Hotel Arrangements; C. F. Healy, Registration; H. N. Sommer, Entertainment; S. N. Witts, Technical Program; G. W. Alexander, Inspection Trips; L. W. Christensen, Publicity; R. G. Wiprud, Finance; P. A. Cartwright and J. E. Holt, Student Activities.

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