

TASK 2G DELIVERABLE
REGULATORY COMPUTER PROGRAM DESCRIPTIONS
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EXECUTIVE SUMMARY

This document, "Regulatory Computer Program Descriptions", is a listing of over 300 computer programs which have application to the regulatory or energy field. The programs were identified through information received from a total of 100 state and federal agencies, regional commissions and private firms; an extensive search of available literature; and a mechanized information search of the ERDA and NTIS data bases.

This deliverable discusses the various activities undertaken to carry out this task and contains a brief description of the programs listed. These computer programs are classified according to the four technical assistance areas defined in the February 1978 document Regulatory Assistance Program: On-Site Technical Assistance Package. The areas are Rate Design (35 programs listed), Consumer Programs (21), Forecasting and Planning (240), and State Agency Operation (40). Within each of these areas the programs described are arranged according to the specific applications they address. A listing of these application areas with the number of programs in each area is given in Table 5 (page 12).

The programs described in this document were identified through search techniques directed toward state and federal agencies and private non-utility firms. This effort identified a number of documents containing lists of relevant computer programs. The two such lists used in this study are the NARUC Staff Sub-Committee on Computers' "Catalog of Computer Programs" published in June 1977 and the "Inventory and Analysis of Federal Energy Information Systems" published in September 1977 by the Federal Energy Administration, Office of Data Services. A complementary document to this study is "Regional Power Systems Planning: A State of the Art Assessment" published as an interim report January 1978 by the University of Oklahoma under a contract with the U.S. Department of Energy.

This listing was developed in order to provide information on available computer programs which may aid in the on-site technical assistance projects being conducted by NRRI.

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I. INTRODUCTION

As detailed in the Regulatory Assistance Contract (NO. EC-77-C-01-8683), the purpose of this task (Task 2G) is to compile a listing of computer programs which have application to the technical assistance programs. A listing of computer programs which have applications to the regulatory or energy field is the result of this effort. Numerous computer programs and information systems were identified from both the public and private sectors.

As part of accomplishing this task, information was received from over 100 agencies consisting of regulatory commissions, private firms, universities, state energy offices, regional energy counsels and various federal agencies. In addition, an extensive literative search both mechanized and manual was performed. The information from this comprehensive and extensive group and through the literature search has provided an adequate basis for determining available computer programs.

This deliverable discusses the various actions taken in order to perform this task and contains a brief description of the identified programs. The computer programs identified are classified according to the technical assistance areas as defined in the February 1978 document "Regulatory Assistance Program: On-Site Technical Assistance Package." The collection process pursued by the Institute and a discussion of the other methods employed in obtaining the data contained in this document are reviewed in Chapter II. Chapter III contains a discussion of the information of computer programs supplies by agency type as well as statistical information on the number and types of programs identified. The description of each program by project area is contained in Chapter IV. Chapter V contains a description of the Institute's capabilities in relation to the chosen assistance projects. The document is concluded with discussion of the selection

process which will be used to identify and evaluate specific programs for use in the technical assistance projects. A copy of the abstracting form, instruction sheet, and cover letter; a list of agencies supporting computer program information; and a list of the addresses of the agencies with programs described are included as appendices.

II. THE COLLECTION PROCESS

In order to collect as much information as possible on computer programs with regulatory and energy applications several approaches were employed. These approaches included the development and distribution of a computer program abstracting form, an intensive library search and computerized information searches.

The computer program abstracting form was developed by utilizing the experience of organizations which have compiled such information. The NARUC Subcommittee on Computers recently developed a catalog of computer programs. The catalog was utilized as the foundation for developing the form. Since other information was required for the purpose of this task an expanded form was developed which incorporated the NARUC Computer Staff Subcommittee information as well as additional information. The additional information was based on forms developed by other agencies. The purpose of the form was to show the maximum amount of information on existing computer programs in a single format. Thus, the form was developed in a manner as to limit the difficulty required for completion with the hoped for result of increasing the number of program reports.

The information sought as computer programs included (See Appendix A for a copy of the form):

- . name of the program
- . description of the problem or function the program addresses
- . method of solution utilized by the program
- . restrictions of the problem's complexity
- . input data requirements
- . necessary computer hardware to operate the program
- . programming languages used

- . availability of documentation and related materials
- . procurement costs
- . other relevant information

By knowing the above listed information on each computer program a reasonable assessment of each program's application to the technical assistance program could be made. The description of the submitted programs is contained in Chapter IV of this report. This information is also helpful in the Institute's efforts to develop an informed view of the regulatory programs that are available to commissions as well as the industry.

A detailed search of trade periodicals, professional journals, reference directories and reviewing the state visit reports was conducted by Institute staff (for a bibliography of these sources see Appendix B). Organizations which are indirectly associated with regulatory processes and/or energy were included. These organizations include those of government as well as the private sector. Table 1 is a listing of the various types of organizations which had an opportunity to submit information on computer problems as the number of organizations in each category.

Table 1 Organizations Receiving Inquiries
Regarding Computer Programs

<u>Organization Type</u>	<u>Number Sent</u>
Public Utility Commission	54
Other State Agencies	63
Universities	11
Regional Energy Counsels	14
Federal Agencies	40
Research Institutes	48
Private Firms	<u>300</u>
Total	530

To supplement this information, an extensive literature search which utilized manual processes as well as mechanized search processes was undertaken. The manual library searches entail a review of various trade periodicals, professional journals, and books. This literature search produced some useful documents.

In conjunction with the library search a computerized information search utilizing the ERDA Technical Information Center data base was also conducted. Twenty-one different subject titles dealing with a number of areas such as computers, public utilities, energy efficiency, etc., resulted in 64 key word combinations being searched. The key word combinations are listed in Table 2. This computerized search resulted in information on the availability of over 2,000 items of published literature and unpublished conference papers. This information was reviewed searching for specific computer programs. The computer programs identified are listed in Chapter IV of this document.

The National Technical Information Service (NTIS) of the Department of Commerce also ran a computerized search of its directory for computerized data files, software and technical reports related to energy and regulation. This search revealed a number of computer programs. The Institute was also supplied by NTIS a copy of "A Directory of Computer Software Applications - Energy, 1977." The programs identified from this search and document are listed and described in Chapter IV.

The search for computer programs which deal with energy by the Institute resulted in the finding of a Federal document entitled "Inventory and Analysis of Federal Energy Information Systems." This report lists the detailed inventory of energy information and data systems which are operated, maintained and/or used by Federal government

Table 2 ERDA Mechanized Information Search -
Key Word Combinations

<u>Set</u>	<u>Set History</u>	<u>CITS</u>
<u>Set</u>	<u>Descriptor</u>	
1	IT=COMPUTERS	1661
2	IT=PUBLIC UTILITIES	1511
3	1*2	25
4	IT=ELECTRIC POWER	6967
5	1*4	70
6	IT=NATURAL GAS	5067
7	1*6	48
8	IT=POWER DEMAND	1412
9	1*8	21
10	IT=ENERGY	1767
11	1*10	19
12	IT=OFF-PEAK POWER	4
13	IT=PEAK-LOAD PRICING	62
14	IT=PRESENT WORTH METHOD	3
15	IT=REGULATORY GUIDES	272
16	15*2	3
17	15*4	12
18	15*6	4
19	IT=EFFICIENCY	8978
20	19*2	175
21	8*19	62
22	IT=LOAD MANAGEMENT	417
23	1*22	18
24	2*22	110
25	IT=CHARGES	1474
26	25*2	351
27	26*1	4
28	4*25	432
29	28*1	6
30	6*25	337
31	1*30	5
32	25*8	87
33	IT=CAPITAL	986
34	IT=COST	9018
35	33+34	9651
36	2*35	455
37	1*35	81
38	IT=FINANCING	643
39	2*38	121
40	1*39	1
41	38*4	123
42	41+39	164
43	41+39	164
44	6*38	45
45	IT=INVESTMENT	1048
46	45*2	140
47	45*6	124
48	45*4	185
49	46+47	251

Table 2 ERDA Mechanized Information Search (Continued)

<u>Set</u>	<u>Set History</u>	<u>CITS</u>
<u>Set</u>	<u>Descriptor</u>	
50	46+47+48	344
51	IT=MANAGEMENT	2636
52	2+4+6	12133
53	51*52	357
54	1*51	78
55	IT=PLANNING	6559
56	55*52	1041
57	IT=MATHEMATICAL MODELS	8740
58	IT=SIMULATION	3296
59	57*56	54
60	58*56	27
61	59+60	71
62	52*58	208
63	52*57	354
64	62+63	508

Source: Mechanized Information Center The Ohio State University

agencies concerned with energy and energy resources. There are 19 such Federal agencies represented in the inventory. The inventory reported on a total of 230 energy information systems. Those information systems which are computerized or of potential benefit to the technical assistance projects are listed in Chapter IV of this report.

In summary, the utilization of inquiries, literature searches, and mechanized information searches resulted in the identification of numerous computer programs. The results of this search will produce benefits for the technical assistance projects.

III. THE RESPONSE

The purpose of this chapter is to discuss the response the Institute received to its search for computer information. As was indicated in the previous chapter, 530 inquiries were sent to various firms and agencies. As of the date of this report, 99 responses have been received.

Listed in Table 3 are the number of responses by agency type along with the number of program abstracts submitted. Also listed in that table are the number of responses received which stated that the agency did not have any computer programs. It is interesting to note that while a 54% response was received from public utility commissions, only five commissions submitted any programs. In general, commissions that did not submit any programs did state that they were currently reviewing how computer analysis could best aid them. This indicates that significant coordination among public utility commissions is desirable so that the most benefit can be gained from existing programs and the work that the pioneering commissions in the area of computer assisted regulation have done.

As can be seen from Table 3, the response of other state agencies, universities and regional energy councils although high in terms of percent response was low in terms of the number of programs reported. Since the area defined "Other State Agencies" was comprised mostly of energy offices, one can see that this group is not active in the utilization of computer analysis to aid in performing their task or function.

The federal agencies probably utilize the computer more than any group which responded to the Institute's request for computer information. This is expected because of the specific function of the federal agencies from which information was requested. As indicated earlier, the most valuable submittal for this project from the federal agencies was the "Inventory and Analysis of Federal Energy Information Systems."

From the research institute's contacted, a 17% response was received but again a small number of programs reported. The private firm response, although small in terms of percentage, yielded a significant amount of computer programs. The strong indication here is that in the area of energy and regulation the private firms have seen the need to utilize computer analysis in order to improve their individual capabilities as well as develop a better product or service for their clients.

Although the information request yielded some significant contributions to this effort, the bulk of the information concerning computer programs contained in this document was found from the other sources that were utilized. Table 4 lists the number of computer programs identified in each of the four technical assistance topic areas by the agency type submitting the information. This table shows the private firms to be active in the forecasting and planning area and the PUC's to be active in rate design.

In summary, although the response to the computer program information search was high, a small number of programs were identified. However, it did generate interest and support for the centralization of information on computer programs which can be used in energy and regulatory analysis.

Table 3 Response to Computer Program Information Inquiry by Agency Type

Organization Type	Number of Inquiries	Number Responded	Percent Responded	Number of Programs	Number Responding Without Submitting Program Abstracts
Public Utility Commission	54	30	55%	23	25
Other State Agencies	63	11	17%	3	9
Universities	11	10	91%	3	7
Regional Energy Councils	14	8	57%	0	8
Federal Agencies	40	12	30%	5	8
Energy Research Institutes	48	8	17%	4	6
Private Firms	300	21	7%	71	12
Total	<u>530</u>	<u>100</u>	<u>19%</u>	<u>103</u>	

Source: Frequency count of Abstract submittals

Table 4 Number of Computer Programs Submitted by Agency Type and Technical Assistance Topic Area

Organization Type	Rate Design	Consumer Education	Forecasting and Planning	Agency Operation
Public Utility Commission	13	1	6	3
Other State Agencies	1	0	2	0
Universities	0	1	2	0
Regional Energy Councils	0	0	0	0
Federal Agencies	0	0	5	0
Energy Research Institutes	0	0	3	1
Private Firms	2	0	67	2
Total	<u>16</u>	<u>2</u>	<u>85</u>	<u>6</u>

Source: Frequency count of Abstract submittals

IV. DESCRIPTION OF COMPUTER PROGRAMS

This section contains a brief description of the computer programs which have the potential to be of aid in the technical assistance programs. The programs are arranged by the four general topic areas as listed in the "Regulatory Assistance Program" document. These areas are rate design, consumer programs, forecasting and planning, and state agency operation. Within each of these areas the programs described are arranged according to the specific application they address. A listing of those application areas with the number of programs in each area is given in Table 5.

The Computer programs described in the following section were identified, as described earlier, by utilizing many sources. The sources used are

1. NARUC Catalog on Computer Programs published June, 1977,
2. Response to Abstract Request,
3. Mechanized Information Search - ERDA data base,
4. Manual Literature Search,
5. NTIS Search,
6. Federal Energy Information System Report--September, 1977.

The source for each program in the listing is identified with one or more of the above numbers. Table 6 lists the number of programs identified in each technical assistance program area by the information source.

Table 5 Number of Program Topic Area

I.	Rate Design	
	A. Time of Use Pricing	4
	B. Marginal Cost Pricing	5
	C. Cost of Service	5
	D. Fuel Adjustment	6
	E. Rate Analysis	10
	F. Rate Design	5
	Total number of programs	35
II.	Consumer Programs	
	A. Consumer Energy Conservation Measures	6
	B. Energy Audits	5
	C. Consumer Compliant Systems	4
	D. Other	6
	Total number of programs	21
III.	Forecasting and Planning	
	A. Demand and Energy Forecasting	12
	B. Utility Operating Analysis	57
	C. Expansion Planning and Siting	26
	D. Financial Forecasting and Planning	47
	E. Environmental Analysis	11
	F. Fuel Conversion and Information	17
	G. District Heating	1
	H. Energy Systems	7
	I. Utility Energy Conservation	13
	J. Load Analysis	15
	K. Energy Policy Analysis	25
	L. Economic Forecasting and Analysis	9
	Total number of programs	240

IV. State Agency Operation

A. Documentation of Case Processing	9
B. Data Base Development/Utility Info	17
C. Computer Modeling	2
D. Agency Operation	12

Total number of programs 40

Table 6 Number of Computer Programs by Technical Assistance Topic Area and Source of Information

Information Source	Rate Design	Consumer Education	Forecasting and Planning	Agency Operation
1. NARUC Catalog	13	5	42	29
2. Abstract	7	2	81	5
3. ERDA Data Base	3	8	73	2
4. Manual Search	9	0	12	0
5. NTIS Data Base	1	1	12	0
6. Federal Energy Info.	<u>2</u>	<u>5</u>	<u>19</u>	<u>4</u>
	35	21	240	40

Source: Frequency count of primary information sources.

TECHNICAL ASSISTANCE AREA I

RATE DESIGN

- A) Time of Use Pricing
- B) Marginal Cost Pricing
- C) Cost of Service
- D) Fuel Adjustment
- E) Rate Analysis
- F) Rate Design

1-A TIME-OF-USE PRICING

PROGRAM NAME: Electric Time of Day Pricing (4,1,2)
DEVELOPING AGENT: Ohio PUC, OSU
PROGRAM'S PURPOSE: Program calculates a customer's monthly and annual bills on a time-of-day basis as a function of annual energy use. The system load curve simulates the user's load pattern.
HOST COMPUTER: IBM 370/168
LANGUAGES: FORTRAN

PROGRAM NAME: Neoclassical Approach to Peak-Load Pricing (3)
DEVELOPING AGENT: Bell Telephone Labs., Holmdel, NJ
PROGRAM'S PURPOSE: When a neoclassical technology is specified, optimal pricing requires that users in all periods contribute to the cost of capacity.
HOST COMPUTER:
LANGUAGES:

PROGRAM NAME: Rate Structure-Time of Use, Cost Allocation (1)
DEVELOPING AGENT: Federal Power Commission
PROGRAM'S PURPOSE: These programs calculate time of use rates for an electric utility, and they use these rates to allocate revenue responsibilities among the customer classes.
HOST COMPUTER: IBM 370/143
LANGUAGES: FORTRAN

PROGRAM NAME: Time of Day Pricing Program (TOFDA) (4,1,2)

DEVELOPING AGENT: PUCO, OSU

PROGRAM'S PURPOSE: Program calculates a customer's monthly and annual bills on a time-of-day basis as a function of annual energy use. Since individual load patterns are not available the system load curve is modified to simulate the user's load pattern. To estimate the increase or decrease in revenues for those utilities rate structures based on "time-of-day pricing." Load curve analysis.

HOST COMPUTER: IBM 370

LANGUAGE: FORTRAN

1-B MARGINAL COST PRICING

PROGRAM NAME: Residential Billing Frequency Program (BILFREQ) (4,1,2)

DEVELOPING AGENT: Ohio PUC, OSU

PROGRAM'S PURPOSE: Calculates the expected electric utility and customer group revenues from an input block rate structure. One execution of the program can provide up to four rate structures and time periods in any one year. Information can be provided by consumption block for each month or in summary form for the entire time period.

HOST COMPUTER: IBM 370/168

LANGUAGES: FORTRAN

PROGRAM NAME: Estimating Peak & Off-Peak Marginal Costs for an Electric Power System: An Ex Ante Approach (3)

DEVELOPING AGENT: University of California, Los Angeles
Scherer, C.R.

PROGRAM'S PURPOSE: Mixed-integer programming is used as a framework for a static, cost-minimizing model of system capacity and operating costs incurred in meeting loads that vary with time and geographic location.

HOST COMPUTER:

LANGUAGES:

PROGRAM NAME: The Marginal Cost & Pricing of Electricity:
An Applied Approach (5)

DEVELOPING AGENT: Planning & Conservation Foundation

PROGRAM'S PURPOSE: The purpose of the study is to provide a practical guide for the analysis of the marginal cost structure of electric utilities for the purpose of designing electricity tariffs. The intended audience consists of those who have a working familiarity with electric power systems and who desire a general, but less abstract, discussion of the marginal cost structure of electric power systems than has heretofore been available. The premise states that tariffs which reflect the principal variations in marginal costs are superior to those which do not. Section 1 is a generalized description of the approach to marginal cost, its determinants, sources of variation and calculation; Section 2 consists of three illustrative case studies in which this methodology is applied; Section 3 is a computer algorithm with a User's Guide for the computation of marginal costs and related processes. Appendix A presents the results of a survey of manufacturers of equipment which may be useful in implementing marginal cost pricing. Appendix B is a consideration of experimental design for testing the hypotheses on which marginal cost pricing is premised. Appendix C is a listing of the computer programs discussed in Section 3.

HOST COMPUTER:

LANGUAGES:

PROGRAM NAME: Economic Merit Order Rules and Marginal Costs for
Fossil and Nuclear Units (3)

DEVELOPING AGENT: Oak Ridge National Laboratory

PROGRAM'S PURPOSE:

HOST COMPUTER:

LANGUAGES:

PROGRAM NAME: Marginal Cost of Electricity (2)

DEVELOPING AGENT: Wisconsin Office of Planning and Energy

PROGRAM'S PURPOSE: Program's purpose is designing electricity tariffs.

HOST COMPUTER: UNIVAC 1110 & IBM 370

LANGUAGES: FORTRAN

1-C COST-OF-SERVICE

PROGRAM NAME: Electric Load and Costing Model (4)
DEVELOPING AGENT: Ohio PUC
PROGRAM'S PURPOSE: Simulation alternative load cost alternatives of electric peak load costing theories and power distribution techniques.
HOST COMPUTER: IBM 370/168
LANGUAGES: FORTRAN

PROGRAM NAME: Future Test Year, Cost of Service (1)
DEVELOPING AGENT: Federal Power Commission
PROGRAM'S PURPOSE: These programs permit the user to calculate a projected future test year cost of service for an electric utility. The projections are based on econometric analysis of past sales and operating and maintenance expense, combined with a plant forecast and other parametric data in a complete projected cost of service and revenue requirement.

HOST COMPUTER:
LANGUAGES: FORTRAN

PROGRAM NAME: Electric Load & Costing Model (ALLOCATE) (4,1,2)
DEVELOPING AGENT: Ohio PUC, OSU
PROGRAM'S PURPOSE: Alternative electric load & cost allocation parameters can be tested for revenue structure analysis.
HOST COMPUTER: IBM 370/168
LANGUAGES: FORTRAN

PROGRAM NAME: Cost Allocation Program (2)
DEVELOPING AGENT: Gilbert Associates
PROGRAM'S PURPOSE: This program generates a complete cost of service study and thus measures the costs necessary to render service to the classes of customers under study.
HOST COMPUTER: IBM 370
LANGUAGES: IBM PL/1

PROGRAM NAME: Cost of Service (1)
DEVELOPING AGENT: New York PSC
PROGRAM'S PURPOSE: A model to distribute to various classes of customers their appropriate share of projected rate increases.
HOST COMPUTER: IBM 370
LANGUAGES: FORTRAN

1-D FUEL ADJUSTMENT

PROGRAM NAME: Choice Model of Steam-Electric Power Generation (6)
DEVELOPING AGENT: Federal Energy Administration
PROGRAM'S PURPOSE: This model is designed to determine changed fossil mix in response to changed fuel prices. Collate data to build model of fossil fuel mix and aid in determining response to changed fuel prices, production efficiency with fuel adjustment clauses, and measure the degree of returns.

HOST COMPUTER:

LANGUAGES:

PROGRAM NAME: Fuel Adjustment, Fuel Cost (1)

DEVELOPING AGENT: Federal Power Commission

PROGRAM'S PURPOSE: This program presents an analysis of fuel costs, generation mix, and heat rates for an electric utility. It also calculates monthly fuel adjustments according to three different formulas: one reflecting only fuel price changes, a second reflecting changes in generation mix as well as fuel prices, and the third in accord with FPC Order No. 517.

HOST COMPUTER: UNIVAC 1108

LANGUAGES: FORTRAN

PROGRAM NAME: Purchased Gas Adjustment Clause (PGA) (1)

DEVELOPING AGENT: Michigan PSC

PROGRAM'S PURPOSE: The Michigan PSC PGA monitoring system is an interactive computerized auditing system developed for the use of the Michigan Public Service Commission gas division by the Michigan PSC data development division. The purpose of the PGA monitoring system is to provide a tool to aid the personnel of the gas division in the verification of each utility's PGA factor calculation and to maintain permanent auditable records of the calculation and the supply sources of the

HOST COMPUTER: DEC PDP 10-15

LANGUAGES: FORTRAN

PROGRAM NAME: Fuel Adjustment Data (1)
DEVELOPING AGENT: Pennsylvania PUC
PROGRAM'S PURPOSE: Gathers, stores and prints data from utilities
on source kind, type of fuel procured by power utilities.
HOST COMPUTER: UNIVAC 1110
LANGUAGES:

PROGRAM NAME: PGAYS (2)
DEVELOPING AGENT: Michigan PSC
PROGRAM'S PURPOSE: Monitor and validate purchase gas adjustment clause
data submitted monthly by regulated natural gas distri-
bution companies, in a standardized, uniform method,
including definitions, input (submission) forms and format.
HOST COMPUTER: PDP-11
LANGUAGES: IPL

PROGRAM NAME: Fuel Adjustment Clause (4,1,2)
DEVELOPING AGENT: Ohio PUC, OSU
PROGRAM'S PURPOSE: Program accepts raw data from Ohio electric utilities
via magnetic tapes and does fuel adjustment clause veri-
fications, flags problem areas which may be the cause
to deny additional fuel adjustment cost and provides
summary reports.
HOST COMPUTER: IBM 370/168
LANGUAGES: COBOL

1-E RATE ANALYSIS

PROGRAM NAME: Electric Rate Analysis (1)
DEVELOPING AGENT: Florida PSC
PROGRAM'S PURPOSE: This is an electric rate analysis program which allows the restructuring of electric (KWH) usage blocks, block rates, and increments. Output is both tabular and graphic and reflects average cost per KWH and percent change in KWH cost between different rate structures.
HOST COMPUTER: CDC 6400
LANGUAGES: FORTRAN

PROGRAM NAME: Rate Structure Analysis - Electric Residential (1)
DEVELOPING AGENT: Missouri PSC
PROGRAM'S PURPOSE: Provides a monthly comparison of a typical residential customer's bill for various levels of KWH usage. The comparison includes fuel adjustment factors but does not include tax data.
HOST COMPUTER: IBM 370/158
LANGUAGES: COBOL

PROGRAM NAME: Billing Data Price-Out (1)
DEVELOPING AGENT: New York PSC
PROGRAM'S PURPOSE: Calculates and prints price-out of billing data by block and total at one or more rates
HOST COMPUTER: Commercial Time Sharing Service
LANGUAGES: FORTRAN

PROGRAM NAME: Raw Billing Data, Sort & Compute Bills and Usage (1)

DEVELOPING AGENT: New York PSC

PROGRAM'S PURPOSE: Data Source: Individual customer bills in random order from utility (usually a small utility) sorts random billing data into ascending order, prints data in order if needed, totals number of bills and usage by block. Output use: print-out used by rate sections for rate design purposes, and for further processing into price-out form.

HOST COMPUTER: Commercial Time Sharing Service

LANGUAGES: FORTRAN

PROGRAM NAME: Comparative Bill Tables - Electric, Gas & Steam (1)

DEVELOPING AGENT: New York PSC

PROGRAM'S PURPOSE: Rates from a case filing and trial rates from the rate routine are analyzed based on utility billing data. The output lists customer bills for various consumption levels.

HOST COMPUTER: Commercial Time Sharing Service

LANGUAGES: FORTRAN

PROGRAM NAME: Billing Data, Change Usage in Bills to Usage in Blocks (1)

DEVELOPING AGENT: New York PSC

PROGRAM'S PURPOSE: Converts billing data (one or more sets) from usage in bills to usage in block

HOST COMPUTER: Commercial Time Sharing Service

LANGUAGES: FORTRAN

PROGRAM NAME: Rate Revision Model (2)
DEVELOPING AGENT: Iowa State Commerce Commission
PROGRAM'S PURPOSE: This program computes the expected annual revenues to be produced when a declining block rate is revised in the absence of bill frequency data. It is particularly useful for Rural Electric Cooperatives and other small utilities who do not maintain detailed billing data.
HOST COMPUTER: IBM 370/158
LANGUAGES: FORTRAN

PROGRAM NAME: The Industrial Revenue Code for Variable Rate Block End Points (KWPERKWH) (4,1,2)
DEVELOPING AGENT: Ohio PUC, OSU
PROGRAM'S PURPOSE: This program provides estimates of revenues from rate structures where the end point of the energy rate block is dependent on the customer demand.
HOST COMPUTER: IBM 370/168
LANGUAGES: FORTRAN

PROGRAM NAME: Rate Structure, Industrial Fixed Rate Block (4,1,2)
DEVELOPING AGENT: Ohio PUC, OSU
PROGRAM'S PURPOSE: Program provides estimates of revenues generated from an industrial class of customers for rate structures where the end points of the rate blocks are fixed.
HOST COMPUTER: IBM 370/168
LANGUAGES: FORTRAN

PROGRAM NAME: The Industrial Revenue Code for Fixed Rate Block
End Points (KWKWH) (4,1,2)

DEVELOPING AGENT: Ohio PUC, OSU

PROGRAM'S PURPOSE: Program provides estimates of revenues generated
from an industrial class of customers for rate
structures where the end points of the rate blocks
are fixed.

HOST COMPUTER: IBM 370/168

LANGUAGES:

1-F RATE DESIGN



PROGRAM NAME: TELRAT (2)
DEVELOPING AGENT: Michigan PSC
PROGRAM'S PURPOSE: Design rates and their spread according to given revenue figure, eliminating human error due to volume of calculations required.
HOST COMPUTER: PDP-11
LANGUAGES: FORTRAN

PROGRAM NAME: Rate Design Program
DEVELOPING AGENT: Gilbert Associates Inc. (2)
PROGRAM'S PURPOSE: Program takes the annual revenue requirements by component at any claimed rate of return as developed in the cost of service study and unitizes it block by block on the basis of the company's own bill frequency as used in the demand analysis program.
HOST COMPUTER: IBM 370
LANGUAGES: FORTRAN

PROGRAM NAME: Electric Rate Demonstration Data System (6)
DEVELOPING AGENT: Federal Energy Administration
PROGRAM'S PURPOSE: To assist state regulatory institutions and utilities in their decisions regarding electric utility rates, load management practices, and end-use conservation programs.
HOST COMPUTER:
LANGUAGES:

PROGRAM NAME: Examining Experimental Rate Structure for Gas Utilities (1)
DEVELOPING AGENT: New York PSC
PROGRAM'S PURPOSE: The use of this application allows the rate engineer, who has responsibility for designing rates. A quick and accurate reflection of these trial rates at various levels of consumption for the respective service classes of the utility.
HOST COMPUTER: Commercial Time Sharing Service
LANGUAGES:

PROGRAM NAME: Weather Normalization and Revenue Calculation (2)
DEVELOPING AGENT: North Carolina Utilities Commission (Gene Curtis)
PROGRAM'S PRUPOSE: The program is utilized for rate design purposes. It takes the volumes of gas sold in some period of time and adjusts to a normal weather basis by calculating degree days and adjusting the weather sensitive volume to a normal (calcualted mean) basis.
HOST COMPUTER: IBM 370/158
LANGUAGES: ASSEMBLER

TECHNICAL ASSISTANCE AREA II

CONSUMER PROGRAMS

- A. Consumer Energy Conservation Measures
- B. Energy Audits
- C. Consumer Complaint System
- D. Other

2-A CONSUMER ENERGY CONSERVATION MEASURES

PROGRAM NAME: Engineering-Economic Model of Residential Energy Use (3)

DEVELOPING AGENT: Oak Ridge National Laboratory

PROGRAM'S PURPOSE: Purpose of model is to provide an analytical tool with which to evaluate a variety of conservation policies, technologies, and strategies for their impacts on residential energy use and fuel expenditures over time.

HOST COMPUTER:

LANGUAGES:

PROGRAM NAME: Energy & Cost Analysis of Residential Refrigerators (3)

DEVELOPING AGENT: Oak Ridge National Laboratory

PROGRAM'S PURPOSE: A detailed computer model is developed to calculate energy flows and electricity use for residential refrigerators.

HOST COMPUTER:

LANGUAGES:

PROGRAM NAME: Guidelines for Saving Energy in Existing Buildings. Engineers, Architects, and Operators Manual. (5)

DEVELOPING AGENT: F.E.A., Office of Energy Conservation and Environment.

PROGRAMS PURPOSE: This report is intended for engineers, architects, and skilled building operators who are responsible for analyzing, devising, and implementing comprehensive energy conservation programs. It includes energy conservation measures which can result in further energy savings of 15 to 20% with an investment cost that can be recovered within 10 years through lower operating expenses.

HOST COMPUTER:

LANGUAGES:

PROGRAM NAME: Public Schools Energy Conservation Service System (6)

DEVELOPING AGENT: Federal Energy Administration

PROGRAM'S PURPOSE: Guideline Analysis Program (GAPZ) produces analysis and modifications to building operating procedures and conditions and compare the "guidelines" to actual operations to derive potential energy and cost savings. Capital Improvements Program (CIPZ)

HOST COMPUTER:

LANGUAGES:

PROGRAM NAME: Modeling Residential Energy Use (3)

DEVELOPING AGENT: Oak Ridge National Laboratory

PROGRAM'S PURPOSE: This paper describes a comprehensive engineering-economic computer model used to simulate energy use in the residential sector from 1970 to 2000. The purpose of the model is to provide an analytical tool with which to evaluate a variety of conservation policies, technologies, and strategies for their impacts on residential energy use and fuel expenditures over time.

HOST COMPUTER:

LANGUAGES:

PROGRAM NAME: Computer Program for Energy Analysis of Central Heating and Cooling Plant (3)

DEVELOPING AGENT: Lockheed Electronics Co.

PROGRAM'S PURPOSE: A computer program was developed to predict performance and savings in energy and fuel at a central heating and cooling plant.

HOST COMPUTER:

LANGUAGES:

2-B ENERGY AUDITS

PROGRAM NAME: HVAC - Diesel Driven Chiller with Thermal Storage System (2)

DEVELOPING AGENT: Harry L. Brown, Drexel University

PROGRAM'S PURPOSE: This program provides the capability to evaluate rate structures, load management and energy conservation. The program computes required energy for system components to satisfy imposed building loads into system components which may be analyzed include chillers (electric or diesel operated) diesel engine, generator, thermal storage tanks, a boiler and the auxiliary equipment required for the system including pumps and blowers.

HOST COMPUTER: IBM 370/168

LANGUAGES: FORTRAN

PROGRAM NAME: Energy Conservation Guidelines for New Office Buildings (3)

DEVELOPING AGENT: General Services Administration

PROGRAM'S PURPOSE: Computer software programs useful for energy conservation design and analysis.

HOST COMPUTER:

LANGUAGES:

PROGRAM NAME: Project Conserve (6)

DEVELOPING AGENT: Federal Energy Administration

PROGRAM'S PURPOSE: Enables homeowners to furnish certain characteristics of their dwellings and in return receive advice on what types and qualities of materials to add, and an estimate of yearly energy savings. The program contains a software package to produce print-outs to homeowners suggesting types and amounts of insulation materials needed and potential energy savings.

HOST COMPUTER:

LANGUAGES: 2-B-1

PROGRAM NAME: Building Heating-Cooling-Ventilating Energy Analysis
Computer Program (3)

DEVELOPING AGENT: Union Electric Company

PROGRAM'S PURPOSE:

HOST COMPUTER:

LANGUAGES:

PROGRAM NAME: The Chicago Project: Evaluation and Testing of Three
Types of Energy Audit Processes for School Buildings (3)

DEVELOPING AGENT: Minnesota Energy Agency

PROGRAM'S PURPOSE: This report discusses techniques for identifying and
alleviating excessive and unnecessary energy use in
public schools. One of three methods for accomplishing
these goals analyzed in the report is a computer simu-
lation model (PSECS) developed by Educational Facilities
Laboratories.

HOST COMPUTER:

LANGUAGES:

2-C CONSUMER COMPLAINT SYSTEM



PROGRAM NAME: Informal Complaint System (1)
DEVELOPING AGENT: Wisconsin PSC
PROGRAM'S PURPOSE: Informal complaints are codified to reduce the data required. Data is edited and valid information is added to the master file. A summary report is generated indicating type and number of complaints for each utility. The system is run on a monthly basis. Utility program is used to provide file backup.
HOST COMPUTER: IBM 360-MP65
LANGUAGES: FORTRAN

PROGRAM NAME: Complaint System (1)
DEVELOPING AGENT: Ohio PUC
PROGRAM'S PURPOSE: Generate reports regarding complaints from the public and summarizes complaints identified by category and industry. Shows results and provides information to quality control engineers.
HOST COMPUTER: IBM 370/168
LANGUAGES: COBOL

PROGRAM NAME: Power Complaints Statistics (1)
DEVELOPING AGENT: New York PSC
PROGRAM'S PURPOSE: Tallies number of complaints per 100,000 customers by complaint type and company.
HOST COMPUTER: IBM 370/158
LANGUAGES: COBOL

PROGRAM NAME: Consumer Complaints Automated Information System (1)

DEVELOPING AGENT: Civil Aeronautics Board

PROGRAM'S PURPOSE: When letters of complaint against air carriers are received by the board, a record is entered on a master-file directly from a terminal in the office of the consumer advocate. Letters of acknowledgement are immediately sent to the consumer. As the case moves toward resolution status information is entered via remote terminal and appropriate correspondence is created. At all times the masterfile is accessible through a terminal for inquiry purposes. Also a series of statistical reports are prepared.

HOST COMPUTER: IBM 370/155

LANGUAGES: COBOL

2-D OTHER



PROGRAM NAME: Gas Meter Testing Results Analysis (1)
DEVELOPING AGENT: New York PSC
PROGRAM'S PURPOSE: Input results of gas meter tests performed by commission staff. Programs determine the effect of meter types, use and component parts on the accuracy with increased type and use. The study also establishes by analysis the maximum effective or useful life of gas meters results used to revise meter inspection regulations and, within commission monitoring inspection system, to manipulate meter selection to maintain sample integrity.
HOST COMPUTER: IBM 370/138
LANGUAGES: COBOL, FORTRAN

PROGRAM NAME: Energy Savings Via Behavioral Changes (3)
DEVELOPING AGENT: University of Illinois
PROGRAM'S PURPOSE: Using computer simulations savings in heating and cooling amounts can be evaluated. The evaluation rests on behavioral changes of consumers.
HOST COMPUTER:
LANGUAGES:

PROGRAM NAME: Termination of Service (2)
DEVELOPING AGENT: Pennsylvania PUC
PROGRAM'S PURPOSE: Numbers of Customers overdue, disconnected, reconnected or participating in 3rd party notification programs, including class of customer (residential, commercial or industrial), length of time and amount of money overdue.
HOST COMPUTER: UNIVAC 1110
LANGUAGES: COBOL

PROGRAM NAME: Comprehensive Human Resources Data System (6)
DEVELOPING AGENT: Federal Energy Administration
PROGRAM'S PURPOSE: Estimates on household energy consumption.
Provide estimates on household energy consumption
for selected years from 1974-1985 by computer model
simulation.
HOST COMPUTER:
LANGUAGES:

PROGRAM NAME: Household Energy Expenditure Model (6)
DEVELOPING AGENT: Federal Energy Administration
PROGRAM'S PURPOSE: Model from data is used for socioeconomic impact
analysis.
Nationally representative sample of approximately
50,000 U.S. households, from the 1970 census and 1969
National Personal Transportation Survey, energy data
file.
Data file was statistically aged and model produced
by computer of household energy expenditures.
HOST COMPUTER:
LANGUAGES:

PROGRAM NAME: Household Energy Survey (6)
DEVELOPING AGENT: Federal Energy Administration
PROGRAM'S PURPOSE: Household Energy consumption by: income groups, age,
race, sex, and other socioeconomic and demographic
characteristics. The program provides detailed infor-
mation on households ownership of appliances, use of
insulation, transportation patterns and energy consum-
ption. Data file is used to analyze the impact of
energy politics, including increased energy prices,
and the restructuring of electricity and natural gas
rates, on the residential sector.
HOST COMPUTER:
LANGUAGES:

TECHNICAL ASSISTANCE AREA III

FORECASTING AND PLANNING

- A. Utility Demand and Energy Forecasting
- B. Utility Operation Analysis (Cost, Reliability, etc.)
- C. Expansion Planning and Siting
- D. Financial Planning and Forecasting
- E. Environmental Analysis
- F. Fuel Conversion and Fuel Information
- G. District Heating
- H. Energy Systems
- I. Utility Energy Conservation
- J. Load Analysis
- K. Energy Policy Analysis
- L. Economic Forecasting and Analysis

3-A UTILITY DEMAND AND ENERGY FORECASTING MODEL

PROGRAM NAME: Electrical Power Sufficiency Monitoring System (6)
DEVELOPING AGENT: Federal Energy Administration
PROGRAM'S PURPOSE: System will monitor and forecast supply, demand and potential shortages with aid of computer.
HOST COMPUTER:
LANGUAGES:

PROGRAM NAME: Short Term Load Forecast Program (2)
DEVELOPING AGENT: Power Technologies, Inc.
PROGRAM'S PURPOSE: Provides continuing load forecasts for every day of the year. Key parameters are updated automatically by means of stochastic filtering techniques.
HOST COMPUTER: PRIME
LANGUAGES: FORTRAN

PROGRAM NAME: Constant Shares Income Distribution Model (Formerly the Income Distribution Impact Model) (6)
DEVELOPING AGENT: Federal Energy Administration
PROGRAM'S PURPOSE: Using energy policy forecasts construct constant shares distribution impact model by computer by filling in coefficients.
Program estimates impacts on time distribution of various energy policies (forecasting).
HOST COMPUTER:
LANGUAGES:

PROGRAM NAME: Mathematical Models for Forecasting Energy Demand (3)
DEVELOPING AGENT: Decision Sciences Corp.
PROGRAM'S PURPOSE:

HOST COMPUTER:
LANGUAGES:

PROGRAM NAME: Self Consistency in Estimating Future Electrical Energy Consumption (3)
DEVELOPING AGENT: Oregon State University
PROGRAM'S PURPOSE: A socio-economic computer simulation model for the state of Oregon is described. The Oregon state simulation model (OSSIM) includes a 37 sector model of electrical energy consumption. Coupling between this model and the OSSIM ensures self-consistent scenarios of socio-economic phenomena that underlies energy consumption.

HOST COMPUTER:
LANGUAGES:

PROGRAM NAME: Forecasting Daily Gas Demand: An Analytical Approach (3)
DEVELOPING AGENT: Southern California Gas Company
PROGRAM'S PURPOSE:

HOST COMPUTER:
LANGUAGES:

PROGRAM NAME: Forecasting (1)
DEVELOPING AGENT: Florida PSC
PROGRAM'S PURPOSE: This is a program which utilizes exponential and polynomial functions to compute the relationship between electric consumption values. Output is in the form of tables and graphs which are generated by the sum of least squares method.
HOST COMPUTER: CDC 6400
LANGUAGES: FORTRAN

PROGRAM NAME: Forecasting (1)
DEVELOPING AGENT: Florida PSC
PROGRAM'S PURPOSE: This is a program which uses an exponential-linear formula to compute and forecast kilowatt hours (kwh) demanded of an electric utility. Output is in the form of a graph generated by the sum of least squares method.
HOST COMPUTER: CDC 6400
LANGUAGES: FORTRAN

PROGRAM NAME: BPAISDM - BPA Integrated Supply-Demand Model (2,6)
DEVELOPING AGENT: Bonneville Power Administration
PROGRAM'S PURPOSE: This program is an interactive supply/demand forecasting or simulation model. The supply portion deals with cost, size, and type of both existing and future plants, transmission, distribution, pricing and allocation methods. The demand portion projects electricity sales by class of customer and public and private utility demand.
HOST COMPUTER: CDC 6500-CYBER 71
LANGUAGES: FORTRAN

PROGRAM NAME: Structural Household Energy Demand Model (6)
DEVELOPING AGENT: Federal Energy Administration
PROGRAM'S PURPOSE: Fuel prices, interest rates, income (personal)
1. natural gas 2. heating oil 3. electricity
Model of residential fuel consumption by states,
regions and entire U.S. to interface with PIES
demand model.

HOST COMPUTER:

LANGUAGES:

PROGRAM NAME: Residential Energy Conservation Strategies (3)
DEVELOPING AGENT: Oak Ridge National Laboratory
PROGRAM'S PURPOSE: An engineering-economic model of residential energy
use is used to evaluate the energy impacts from
1975 to 2000 of changes in household formation,
housing choices, per capita income, fuel prices,
equipment efficiencies, and thermal integrities
of new and existing residential buildings.

HOST COMPUTER:

LANGUAGES:

PROGRAM NAME: Dynamic Model for Forecasting of Electrical Energy
Demand in a Specific Region Located in N. & S. Carolina (3)
DEVELOPING AGENT: North Carolina State University
PROGRAM'S PURPOSE: A simulation model was developed to provide a dynamic long-
term forecast of demand for a specific region covering parts
of North and South Carolina. This model was run on the com-
puter to simulate a period up to 1990, and a series of fore-
casts were obtained in relation to varying sets of assumptions
used as inputs in the simulation process.

HOST COMPUTER:

LANGUAGES:

3-B UTILITY OPERATION ANALYSIS

PROGRAM NAME: Electrical Utility Generating System Reliability Analysis Code, SYSREL, Social Cost Studies Program (4, 3)

DEVELOPING AGENT: Argonne National Laboratory

PROGRAM'S PURPOSE: SYSREL is a system planning tool that can be used to assess the reliability and economic performance of alternative expansion patterns of electric utility generation systems.

HOST COMPUTER:

PROGRAM NAME: Cost Analysis - Electric (1)

DEVELOPING AGENT: Missouri PSC

PROGRAM'S PURPOSE: Computes and provides information on volumetric cost trends used for highlighting economies and diseconomies of volume variances for financial studies.

HOST COMPUTER: IBM 370/158

LANGUAGES: FORTRAN

PROGRAM NAME: Energy management & Control System for Iowa-Illinois Gas & Electric Company (3)

DEVELOPING AGENT: Matteson, L.G. (Westinghouse Elect. Corp.)

PROGRAM'S PURPOSE: Uses computerized one-line graphic & alpha-numeric display; Improves operator control of the systems & eliminates most manual record keeping. Alpha-numeric displays provide overviews of total system or detailed studies of system segments.

HOST COMPUTER:

LANGUAGES:

PROGRAM NAME: Marginal Cost Code (MARCIIIB)
Electric Utility Future Simulation Program (4, 1, 2)

DEVELOPING AGENT: Ohio PUC

PROGRAM'S PURPOSE: Using the historical shape of load duration curves and projected peak demands, this program calculates the expected generation by plant to meet the expected load pattern. A probabilistic method is used to simulate forced outages. Using projected fuel costs the expected cost of generation is calculated

HOST COMPUTER: IBM 370/168

LANGUAGES: FORTRAN

PROGRAM NAME: Marginal Cost Code (MARCIIIA)
Electric Utility Past Simulation Program (4, 1, 2)

DEVELOPING AGENT: Ohio PUC

PROGRAM'S PURPOSE: Simulates a utility's past operation on an hourly basis using a Monte Carlo technique to simulate forced outages. Calculates the expected generation of each plant using an economic system dispatching technique. Calculates fuel costs, expected number of plant start-ups and simulates the system's ability to follow rapid load changes. Rate Case Function: Test validity of utilities rate case application with respect to revenue requirements and generating costs. Provides substantial evidence for staff use in hearings. Tests for the usefulness of plants. Calculate costs/savings associated with the changing of load patterns.

HOST COMPUTER: IBM 370/168

LANGUAGES: FORTRAN

PROGRAM NAME: Load Resource Analysis (2)

DEVELOPING AGENT: Southwestern Power Administration

PROGRAM'S PURPOSE: Compares the estimated power loads to power resources and determines purchased power requirements or excess power availability.

HOST COMPUTER: IBM 1130

LANGUAGES: IBM 1130 FORTRAN

PROGRAM NAME: HPROD (2)

DEVELOPING AGENT: General Electric

PROGRAM'S PURPOSE: Simulates the operation of an electric utility system and develops the annual system fuel cost for a given pattern of unit additions. The program uses the output of the load model program LOADS along with the annual peak loads, spinning reserve, thermal unit data, hydro and tie schedules.

HOST COMPUTER:

LANGUAGES: MARK III FORTRAN

PROGRAM NAME: ORCOST II: A Computer Code for Estimating the Cost of Power Steam-Electric Power Plants. (5)

DEVELOPING AGENT: Oak Ridge National Lab.

PROGRAM'S PURPOSE: ORCOST II is a digital computer program for estimating the cost of electrical energy production from single-unit steam-electric power plants. Capital costs and operation and maintenance costs are calculated using base cost models for each of the following types of plants: pressurized-water reactors (PWRs), boiling-water reactors (BWRs), high-temperature gas-cooled reactors (HTGRs), and coal-oil-, and gas-fired plants. Capital cost calculations are based on the cost-model data used in the CONCEPT program. The user may select one of seven input/output options for calculation of capital cost, operating and maintenance (O and M) cost, levelized energy costs, fixed charge rate, annual cash flows, cumulative cash flows, and cumulative discounted cash flows. Options include the input of capital cost and/or fixed charge rate to override the normal calculation of either or both. Transmission and distribution costs are not included. Fuel costs must be input by the user.

HOST COMPUTER:

LANGUAGES:

PROGRAM NAME: Operating Reserve (2)
DEVELOPING AGENT: Power Technologies, Inc.
PROGRAM'S PURPOSE: Operating Reserve Risk Analysis for Pools and Multi-Area Systems Evaluations.
HOST COMPUTER: I370
LANGUAGES:

PROGRAM NAME: MEVAL (2)
DEVELOPING AGENT: Systems Control Inc.
PROGRAM'S PURPOSE: MEVAL is a program for scheduling maintenance outages for power plants to minimize system production cost subject to scheduling and manpower constraints.
HOST COMPUTER: UNVIAC 1108, IBM 360 or 370
LANGUAGES: FORTRAN

PROGRAM NAME: PROCOS (2)
DEVELOPING AGENT: Systems Control Inc.
PROGRAM'S PURPOSE: PROCOS simulates the dispatch of a generation system, computes the production costs, i.e., fuel costs, O & M costs and capital fixed charges, and estimates the reliability of supplying the system load.
HOST COMPUTER: UNIVAC 1108, IBM 360/40: IBM 370/135
LANGUAGES: FORTRAN

PROGRAM NAME: Maintenance Scheduling (2)
DEVELOPING AGENT: Power Technologies, Inc.
PROGRAM'S PURPOSE: Long and short term scheduling with risk levelizing using effective capacity. Recognition of timing and resource constraints. Two and three state unit representation.
HOST COMPUTER: P400, I370
LANGUAGES:

PROGRAM NAME: Operating Policy for Combined Pumped-Storage and Base-Load Electric Generating Stations (3)
DEVELOPING AGENT: West Virginia University
PROGRAM'S PURPOSE: A computer simulation program is developed for thermal generating stations, to determine the optimal base-load level at which pumped storage will be economically feasible. Also, short-range optimum scheduling of the hydro-thermal power generator set is achieved through a computer-oriented algorithm involving both dynamic and Lagrange multipliers.
HOST COMPUTER:
LANGUAGES:

PROGRAM NAME: Optimum Generator Allocation (3)
DEVELOPING AGENT: Thiagarajar College of Engineering
PROGRAM'S PURPOSE: The principle of dynamic programming is applied to allocate the resources. The criterion of generation scheduling in every period is to minimize the difference between the generation and the load of the corresponding period. The solution is obtained by digital simulation on an IBM 1620 computer using FORTRAN.
HOST COMPUTER:
LANGUAGES:

PROGRAM NAME: Interchange Negotiation (2)
DEVELOPING AGENT: Power Technologies, Inc.
PROGRAM'S PURPOSE: For use in interchange negotiations with single and multi-area economic dispatch programs. Develops boundary incremental costs and total costs of transactions. Uses inter-area matrix to predict tie flow changes.
HOST COMPUTER: I360, I370
LANGUAGES:

PROGRAM NAME: Unit Scheduling and Commitment (2)
DEVELOPING AGENT: Power Technologies, Inc.
PROGRAM'S PURPOSE: Large scale recursive algorithm for optimal commitment including automatic ordering of units and start up and shut down. Determining spinning and scheduled reserves for fossil steam and combustion turbine-generator models. Separate routines for pondage and pump storage hydro.
HOST COMPUTER: H440, I360, I370, P400
LANGUAGES:

PROGRAM NAME: Pumped Storage Scheduling (2)
DEVELOPING AGENT: Power Technologies, Inc.
PROGRAM'S PURPOSE: Schedules pumped storage project to minimize system operating cost. Pumping schedule conforms to pump operating limitations. Generator schedule follows turbine-generator incremental dispatch.
HOST COMPUTER: H440, I370
LANGUAGES:

PROGRAM NAME: Economic Dispatch - II (2)
DEVELOPING AGENT: Power Technologies, Inc.
PROGRAM'S PURPOSE: Direct Dispatch principle works directly with the bus admittance data, does not require separate loss formula.
HOST COMPUTER: P400, X-S5
LANGUAGES:

PROGRAM NAME: Production Cost (Deterministic) (2)
DEVELOPING AGENT: Power Technologies Inc.
PROGRAM'S PURPOSE: Up to 300 units. Thermal, hydro, and contract purchases. Weekly or monthly maintenance intervals.
HOST COMPUTER: IBM 360
LANGUAGES:

PROGRAM NAME: Production (Probabilistic) (2)
DEVELOPING AGENT: Power Technologies Inc.
PROGRAM'S PURPOSE: Up to 150 units. Thermal, hydro, and contract purchases and sales. Weekly or monthly maintenance intervals. Full and partial outages on thermal units. Energy availability for hydro plants.
HOST COMPUTER: IBM 360/370
LANGUAGES:

PROGRAM NAME: IPC (2)
DEVELOPING AGENT: Power Technologies, Inc.
PROGRAM'S PURPOSE: Probabilities production costing with weekly or monthly time intervals for up to 150 thermal units and ten hydro and/or storage plants.
HOST COMPUTER: PRIME 400 CPU + PRIMOS IV
LANGUAGES:

PROGRAM NAME: Unit Commitment Program (2)
DEVELOPING AGENT: Power Technologies, Inc.
PROGRAM'S PURPOSE: Determines a commitment schedule for a period such that system operating constraints are satisfied and resultant total cost is minimized.
HOST COMPUTER: PRIME 400 CPU, IBM 370/155
LANGUAGES: FORTRAN

PROGRAM NAME: Economic Dispatch-I (2)
DEVELOPING AGENT: Power Technologies, Inc.
PROGRAM'S PURPOSE: Single and multi-area. Used in conjunction with loss formula and inter-area matrix.
HOST COMPUTER: H440, I360, I370, X-55
LANGUAGES:

PROGRAM NAME: Multi-Area Production Simulation (MAPS) (2)
DEVELOPING AGENT: General Electric
PROGRAM'S PURPOSE: 1) Operating cost benefits of pooled generating systems.
2) Optimal strength of tie-lines to facilitate pool operation.
3) Assessment of hourly energy transfer restrictions on
generating unit commitment and dispatch.
Also see description of Single Area Monthly Production
Simulation (MPS) Program.

HOST COMPUTER: Honeywell based

LANGUAGES: FORTRAN

PROGRAM NAME: Monthly Production Simulation (2)

DEVELOPING AGENT: General Electric

PROGRAM'S PURPOSE: 1) Operating costs (fuel and maintenance) of generating units.
2) Impacts of coordinated operation (unit commitment and
dispatch) and maintenance scheduling of a power system.
3) Fuel consumption of generating units.

HOST COMPUTER: Honeywell based

LANGUAGES: FORTRAN

PROGRAM NAME: Power System Simulator, PSS/2 (2)

DEVELOPING AGENT: Power Technologies, Inc.

PROGRAM'S PURPOSE: Comprehensive Interactive Power System Analysis package
encompassing:
Load Flow
Short Circuit
Dynamic Simulation (including Transient Stability)
Load Flow Equivalents

Features include:

- * 4 load flow solution methods
- * Graphic load flow output
- * Network frequency dependence
- * Library of dynamic equipment models for stability
(generators, excitation systems, governors,
induction motors, special loads)
- * Output of any dynamic variable

Advanced applications include:

- * Load Rejection Overvoltage Studies
- * Power Plant Motor Starting Studies
- * Industrial Power System Analysis
- * Fault/disturbance reconstruction

Capacity = 256 bus
50 generators

HOST COMPUTER: HP2120

LANGUAGES: 3-B-9

PROGRAM NAME: Probabilistic Methodologies: A Review (3)
DEVELOPING AGENT: ERDA
PROGRAM'S PURPOSE: This review is organized about a framework of applications of probability methods to planning, design, and operating tasks in the electric utility industry. Topics included are: failures, outages, and stochastic processes; generation reserve indices, modeling and criteria; probabilistic methodologies in load forecasting; probabilistic methods applied to transmission line design, stochastic power flows; and power flow estimation.

HOST COMPUTER:

LANGUAGES:

PROGRAM NAME: Multi-Area Reliability (MAR) (2)
DEVELOPING AGENT: General Electric
PROGRAM'S PURPOSE: 1) Assessment of loss-of-load-probability (LOLP) of two or more interconnected utility systems.
2) Quantification of reliability value of tie-lines between systems and the effective capability of the interconnection.
Also see description of Single Area Reliability (SAR) Program

HOST COMPUTER: Honeywell based

LANGUAGES: FORTRAN

PROGRAM NAME: Single Area Reliability (2)
DEVELOPING AGENT: General Electric
PROGRAM'S PURPOSE: 1) Assessment of loss-of-load-probability (LOLP) of a utility generation system.
2) Calculation of emergency operating procedure (EOP) probability as well as frequency and duration of outages.
3) Determination of timing of generating unit additions necessary to meet a certain required level of system reliability.

HOST COMPUTER: Honeywell based

LANGUAGES: FORTRAN

PROGRAM NAME: Evaluating Maintenance Strategies in an Electric Utility (3)

DEVELOPING AGENT: University of Tennessee

PROGRAM'S PURPOSE: The development and use of a Monte Carlo simulation model of an electric power utility is described. The model permits utility management to evaluate the effects of various maintenance strategies by presenting them within cost summaries of the simulated system.

HOST COMPUTER:

LANGUAGES:

PROGRAM NAME: Fast, Highly Accurate Means of Modeling Transient Flow in Gas Pipeline Systems by Variational Methods (3)

DEVELOPING AGENT: University of Chicago

PROGRAM'S PURPOSE:

HOST COMPUTER:

LANGUAGES:

PROGRAM NAME: Simulating the Operating Costs of a Natural Gas Distribution System with Linear Flow Models (3)

DEVELOPING AGENT: Pennsylvania State University

PROGRAM'S PURPOSE:

HOST COMPUTER:

LANGUAGES:

PROGRAM NAME: A User-Simplified Power Distribution System
Analysis Program (5)

DEVELOPING AGENT: Air Force Institute of Tech. Wright-Patterson
AFB Ohio School of Engineering

PROGRAM'S PURPOSE: The paper addresses the problem of developing
a user-simplified power distribution system
analysis program. A computer program was
written to perform a load-flow and/or short-cir-
cuit analysis of a power distribution system.
The program utilizes sparsity programming and
large matrix techniques so that a 250 bus, 500
line network may be studied without excessive
computer core requirements. Input routines
were developed to read in line data either as
pre-calculated impedances (ohms or per unit
values), or as descriptive information (i.e.
wire/transformer type, wire/transformer size,
voltage rating, conductor length, etc.) with
branch impedances calculated by the program.
The latter routine incorporates engineering ap-
proximations to derive the necessary branch
sequence impedances for various network ele-
ments (e.g. aerial conductor, cable, transfor-
mers, and series reactive components). The
load-flow solution technique utilized is the
recently described fast-decoupled Newton-
Raphson with dynamic bus ordering. Large
matrix techniques are used in the short-circuit
study, with large systems studied as 50-bus
(maximum) subsystems.

HOST COMPUTER:

LANGUAGES:

PROGRAM NAME: Generation Loss-of-Load Probability (2)

DEVELOPING AGENT: Radian Corporation

PROGRAM'S PURPOSE: Determines index of reliability for utility
generating system.

HOST COMPUTER: UNIVAC 1108

LANGUAGES: FORTRAN

PROGRAM NAME: Modeling of Operating Fossil Fired Power Plants;
An Application Approach (3)

DEVELOPING AGENT: Tennessee University

PROGRAM'S PURPOSE:

HOST COMPUTER:

LANGUAGES:

PROGRAM NAME: Electric Power Unit Commitment Scheduling Using a
Dynamically Evolving Mixed Integer Program (3)

DEVELOPING AGENT: MIT

PROGRAM'S PURPOSE:

HOST COMPUTER:

LANGUAGES:

PROGRAM NAME: Integer Programming Solutions to Problems in Electric
Energy Systems (3)

DEVELOPING AGENT: University of California

PROGRAM'S PURPOSE:

HOST COMPUTER:

LANGUAGES:

PROGRAM NAME: Transmission Reliability Analysis (2)
DEVELOPING AGENT: Power Technologies, Inc.
PROGRAM'S PURPOSE: PTI Contingency Analysis Program, PCAP. Determines overload and load not served probabilities due to forced outages of generators and circuits. Automatically selects and tests the most severe multilevel outages. Up to 1500 buses and 300 circuits.
HOST COMPUTER: P400, I370, U1110, C6600
LANGUAGES:

PROGRAM NAME: Economic Dispatch Simulation (2)
DEVELOPING AGENT: Power Technologies, Inc.
PROGRAM'S PURPOSE: For determining the performance of alternate dispatch methods. Output: fuel cost rate and accumulated fuel cost, generator powers and selected load flow quantities.
HOST COMPUTER: P400
LANGUAGES:

PROGRAM NAME: Loss of Load Probability Program (2)
DEVELOPING AGENT: North Carolina Utilities Commission (Dennis J. Nightingale)
PROGRAM'S PURPOSE: The program is used in determining proper generator addition requirements by convolution of a load model and capacity availability table.
HOST COMPUTER: IBM 1360, IBM 1370
LANGUAGES: FORTRAN IV

PROGRAM NAME: Procedure for Estimating Nonfuel Operating and Maintenance Costs for Large Steam-Electric Power Plants (5)

DEVELOPING AGENT: Oak Ridge National Laboratory

PROGRAM'S PURPOSE: A procedure is presented for estimating annual non-fuel operating and maintenance costs for large steam-electric power plants--LWR, HTGR, LMFBR, and fossil (coal, oil and gas). Cost estimates for fossil plants include the option of limestone slurry scrubbing for flue gas desulfurization. A computer program, OMCST, based on this procedure is also presented.

HOST COMPUTER:

LANGUAGES:

PROGRAM NAME: Analysis and Simulation of Power Transmission Lines by Frequency Response (3)

DEVELOPING AGENT: Purdue University

PROGRAM'S PURPOSE:

HOST COMPUTER:

LANGUAGES:

PROGRAM NAME: Minimization of the Cost of an Electric Transmission Line System (3)

DEVELOPING AGENT: Bechtel Corp.

PROGRAM'S PURPOSE: This paper presents a method for determining design parameters for an electric transmission line system. A mathematical model is formulated using regression analysis to relate system costs and requirements to the system design parameters. A nonlinear programming computer code for a specific problem is presented.

HOST COMPUTER:

LANGUAGES:

PROGRAM NAME: Fossil Energy Equipment Data System (6)

DEVELOPING AGENT: ERDA

PROGRAM'S PURPOSE: Interactive, online, collect-evaluate information of failures & maintenance of fossil energy components, analyze from engineering and statistical viewpoints. Collects and provides information on failures (research)

HOST COMPUTER:

LANGUAGES:

PROGRAM NAME: Multi-Area Reliability Program (MAREL) (2)

DEVELOPING AGENT: Power Technologies, Inc.

PROGRAM'S PURPOSE: Computes the Loss of Load Probability reliability index for electric generating systems of several areas interconnected by a transmission network without any restriction on network topology.

HOST COMPUTER: PRIME 400 or other computers (with extra charge)

LANGUAGES:

PROGRAM NAME: Generating Unit Outage Data Analysis (2)
DEVELOPING AGENT: Power Technologies Inc.
PROGRAM'S PURPOSE: Two programs for 1) edit analysis of generating unit outage data in EEI prime movers format and 2) pooling unit prepared forced outage transfer rate information for use in scheduling operations and capacity planning.
HOST COMPUTER: IBM 360
LANGUAGES:

PROGRAM NAME: Loss of Load Probability and Expected Loss of Energy Program (2)
DEVELOPING AGENT: Gilbert Associates Inc.
PROGRAM'S PURPOSE: Reliability indices used in establishing daily and personal time periods related to time of day analysis. These indices are utilized in one approach to the allocation of resource to specified time periods in T.O.D. studies.
HOST COMPUTER: IBM 370
LANGUAGES: FORTRAN

PROGRAM NAME: Probabilistic Approach to Off-Peak Electric Energy Evaluation (3)
DEVELOPING AGENT: Public Service Electric & Gas Co. Newark, N.J.
PROGRAM'S PURPOSE: The existing computer programs using a frequency and duration method of generating capacity reliability evaluation and probabilistic production cost evaluation, can be used to determine off-peak energy information,
HOST COMPUTER:
LANGUAGES:

PROGRAM NAME: Long-Term Power System Dynamics. Volume II. Long-Term Power System Dynamics Simulation Program (3)

DEVELOPING AGENT: General Electric Co.

PROGRAM'S PURPOSE: This report describes the long-term dynamic simulation program (LOTDYS) as it was developed for the project. It is both a programmer's guide and a user's guide for LOTDYS. It contains a list and description of the program variables, the program itself and the data required to run one of the sample cases of section IB-4.

HOST COMPUTER:

LANGUAGES:

PROGRAM NAME: Gas Safety Analysis (1)

DEVELOPING AGENT: Missouri PSC

PROGRAM'S PURPOSE: Identifies odorization points above a recognized safety level that are reported on the monthly odorization report. Also provides information relative to unaccounted for gas.

HOST COMPUTER: IBM 370/158

LANGUAGES:

PROGRAM NAME: Load Dispatching in Electrical Power Systems (3)

DEVELOPING AGENT: Brown Boveri

PROGRAM'S PURPOSE: Codes & Topology of data system

HOST COMPUTER:

LANGUAGES:

PROGRAM NAME: Control Characteristics of a Power Plant Unit Operated Under Controlled Sliding Pressure (3)

DEVELOPING AGENT: Hartman and Braun Ag.

PROGRAM'S PURPOSE: A control concept which is optimum for a power plant unit operated under controlled variable pressure is described. Different design variants are considered and assessed and compromised figures are quoted for the reactance.

HOST COMPUTER:

LANGUAGES:

PROGRAM NAME: Load Flow Studies (1)

DEVELOPING AGENT: New York PSC

PROGRAM'S PURPOSE: Spot check of load flow studies in transmission case applications. Testing of staff proposed alternates for feasibility only.

HOST COMPUTER: Commercial Time Sharing Service

LANGUAGES:

PROGRAM NAME: Power Generating Unit Reliability & Energy Replacement Cost (3)

DEVELOPING AGENT: Public Service Electric and Gas Company

PROGRAM'S PURPOSE: An on-line computer applicaton is described for monitoring economic loading of power generating units that are load dispatched by incremental cost methods.

HOST COMPUTER:

LANGUAGES:

PROGRAM NAME: Use of Incremental Energy Costs and Loading Order Rules
in the ORSIM Procedure for Midrange Optimization of
Electric Utility Operations (3)

DEVELOPING AGENT: Oak Ridge National Laboratory

PROGRAM'S PURPOSE:

HOST COMPUTER:

LANGUAGES:

PROGRAM NAME: Electric Power Specific Costs (1)

DEVELOPING AGENT: New York PSC

PROGRAM'S PURPOSE: Calculates average demand and energy specific costs
when given financial, fuel, and book costs, as
well as energy generated, purchased and sold.

HOST COMPUTER: Commercial Time Share Service

LANGUAGES:

PROGRAM NAME: Simulation of Minimum Environmental and Economic
Dispatch of Power (5)

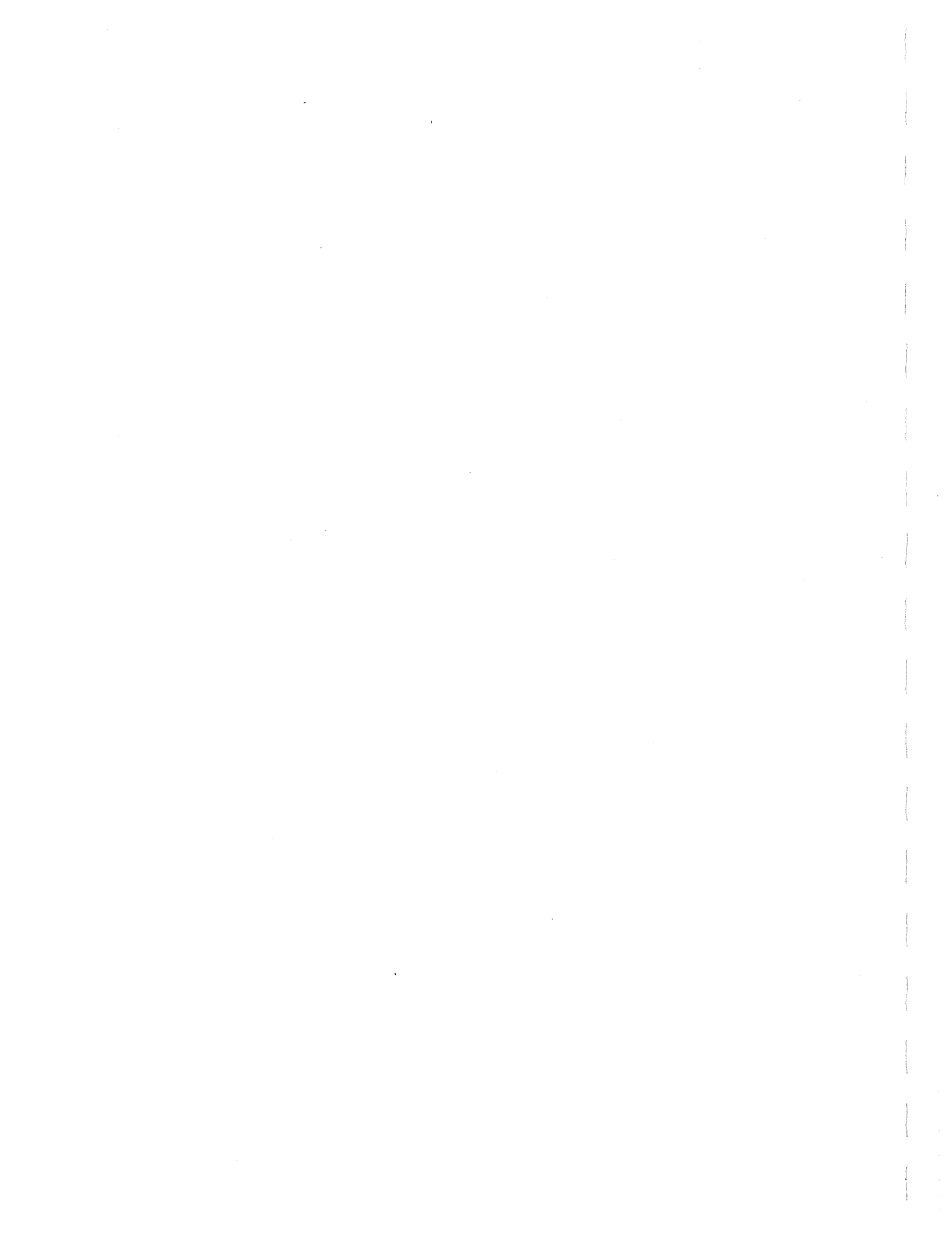
DEVELOPING AGENT: National Center for Energy Management and Power

PROGRAM'S PURPOSE: The cost of producing power according to
minimum emission, or environmental, constraints
is developed and the results are compared to
those obtained from the economic dispatch of
power. The system of a large electric utility
company is simulated with the generation capacity
being placed on line to minimize costs and then
to minimize the amounts of the pollutants, oxides
of sulfur, oxides of nitrogen, particulates, and
thermal emissions, that are discharged into the
surrounding environment. The annual totals of
operating costs and emissions are the bases of
comparison.

HOST COMPUTER:

LANGUAGES:

3-C EXPANSION PLANNING AND SITING



PROGRAM NAME: Thermal Power Plant Cost & Performance Analysis (6)
DEVELOPING AGENT: Bonneville Power Authority
PROGRAM'S PURPOSE: The application covers plant capital cost studies for nuclear power plants; cooling tower and condensor performance prediction; cost/performance/equipment selection and gas turbine performance prediction.
HOST COMPUTER:
LANGUAGES:

PROGRAM NAME: Electric Energy Alternatives Appraisal (2)
DEVELOPING AGENT: Rensselaer Polytechnic Institute
PROGRAM'S PURPOSE: Evaluates implications of alternate scenarios and strategies. Developed in cooperation with N. Y. Public Service Commission. Has been utilized to compare proposal (for actual siting) and alternate plants integrated within system; to evaluate implications of load management; to determine sensitivity to reserve margin, etc. Evaluation includes direct costs and secondary impacts.
HOST COMPUTER: CDC-7600
LANGUAGES: FORTRAN

PROGRAM NAME: EPRI Regional Electricity Supply Model (2)
DEVELOPING AGENT: EPRI, Energy Analysis Department
PROGRAM'S PURPOSE: Provides forecasts and analysis of electric utility expansion plans. For any region, the model forecasts future capacity mixes, fuel uses, environmental emissions and control technology, transmission and distribution requirements, and financial analysis.
HOST COMPUTER: IBM 370/168
LANGUAGES: FORTRAN

PROGRAM NAME: Hydro Energy Planning (2)
DEVELOPING AGENT: Power Technologies, Inc.
PROGRAM'S PURPOSE: Accommodates both run of river and pumped hydro re-
sources. Four pondage plants. Fixed head assumption.
HOST COMPUTER: H440
LANGUAGES:

PROGRAM NAME: Generation Reliability and System Expansion Program (2)
DEVELOPING AGENT: Power Technologies, Inc.
PROGRAM'S PURPOSE: Used to develop reliability indices and reliable generation
system expansion plans. Calculations are based on fre-
quency duration method and include computations of loss-
of-load probability and expected frequency of various
reserve margin states.
HOST COMPUTER: Suitable for Use on IBM, CDC, etc.
LANGUAGES: FORTRAN

PROGRAM NAME: Cost-Model Modifications for the CONCEPT-IV Computer
Code (5)
DEVELOPING AGENT: Oak Ridge National Laboratory
PROGRAM'S PURPOSE: Revisions that have been made to the cost models that were
used by the CONCEPT-II and CONCEPT-III computer codes for
estimating capital costs of steam-electric power plants are
described. The revised cost models are used by the
CONCEPT-IV code and include both first and second-unit cost
models for PWR, BWR, and HTGR nuclear plants; coal and oil
plants without SO₂ removal systems; coal and oil plants
with wet limestone scrubber SO₂ removal systems; and
gas-fired steam-electric power plants. Cost models are
included in the CONCEPT-IV code for all power types equipped
with once-through cooling systems, mechanical-draft evapora-
tive cooling towers, and natural-draft evaporative cooling
towers.
HOST COMPUTER:
LANGUAGES:

PROGRAM NAME: Load Resource Comparison (6)
DEVELOPING AGENT: Bonneville Power Administration
PROGRAM'S PURPOSE: Planner determines the size and time of nuclear (thermal) plant installation as well as the timing of hydro peaking plant additions. It is capable of five different sizes of nuclear plants. It considers the addition of base-hydro and peaking capacity to the system, the reserve requirements for the peakloads, and the benefits resulting from efficiently operating the hydro peaking plants which results in the highest discounted net revenues. Processor is capable of producing a 20-year layout of a load-resource balance, construction cost analysis, and investment cost analysis. It is used to evaluate present worth values of these costs for a given generator installation schedule.

HOST COMPUTER:

LANGUAGES:

PROGRAM NAME: Plant Loading Studies (6)
DEVELOPING AGENT: Bonneville Power Administration
PROGRAM'S PURPOSE: Develops planned loadings on power plants for scheduled levels of developing.

HOST COMPUTER:

LANGUAGES:

PROGRAM NAME: OEP (2)
DEVELOPING AGENT: Systems Control Inc.
PROGRAM'S PURPOSE: OEP is a program for the Optimal Expansion Planning of a generation system. It is capable of modeling the integration of unconventional and intermittent generation alternatives like solar, wind and tidal power.

HOST COMPUTER: UNIVAC 1108, IBM 360 or 370

LANGUAGES: FORTRAN

PROGRAM NAME: Realistic Long Term Electric Generation Expansion Planning in the Face of Future Uncertainties (3)

DEVELOPING AGENT: Carnegie-Mellon University

PROGRAM'S PURPOSE: A realistic long term electrical generation expansion planning model composed of multiple fossil units, nuclear units, hydroelectric units and pumped storage units, facing with uncertainties has been developed.

HOST COMPUTER:

LANGUAGES:

PROGRAM NAME: Automation Removes Uncertainty From Power Systems Planning (3)

DEVELOPING AGENT: Stone and Webster Engineering Corp.

PROGRAM'S PURPOSE: Power generation expansion planning involves selecting the most economical generating capacity to meet the growth needs of a power system. The OPTGEN computer code has been used in many generation expansion studies, the programming for and use of OPTGEN are discussed.

HOST COMPUTER:

LANGUAGES:

PROGRAM NAME: Wein Automatic System Planning Package (WASP): An Electric Utility Optimal Generation Expansion Planning Computer Code (3)

DEVELOPING AGENT: Oak Ridge National Laboratory

PROGRAM'S PURPOSE: The Wein Automatic System Planning Package (WASP) is designed to find the optimal generation expansion policy for an electric utility system. A dynamic programming algorithm is used in the optimization. A Probabilistic Simulation Model is used to evaluate the operating costs.

HOST COMPUTER:

LANGUAGES:

PROGRAM NAME: Optimal Generation Planning (2)
DEVELOPING AGENT: Power Technologies Inc.
PROGRAM'S PURPOSE: Develops sets of economically optimal generation expansion patterns in stages. Considers reliability, production costs and investment costs.
HOST COMPUTER: CDC 6400
LANGUAGES:

PROGRAM NAME: Capacity Planning (2)
DEVELOPING AGENT: Power Technologies Inc.
PROGRAM'S PURPOSE: LOLP and frequency-duration measures, mixed plant types, full, partial and zero capacity states. Automatic maintenance scheduling with risk levelizing.
HOST COMPUTER: IBM 360 & IBM 370
LANGUAGES:

PROGRAM NAME: Hydro/Thermal Capacity/Energy Planning (2)
DEVELOPING AGENT: Power Technologies Inc.
PROGRAM'S PURPOSE: Multi-area program with interconnection models. Energy limitations represented by flow statistics. Special recognition of long duration forced outages of thermal plants.
HOST COMPUTER: IBM 360
LANGUAGES:

PROGRAM NAME: Total Energy System Long-Term Feasibility (3)
DEVELOPING AGENT: Air Force Avionics Lab.
PROGRAM'S PURPOSE: This paper describes a dynamic simulation model of a hypothetical electric utility and its effects on energy supply and consumption in the urban region it serves. The model was used to analyze the long-term feasibility of constructing and operating a total energy plant as opposed to a conventional thermal plant.

HOST COMPUTER:

LANGUAGES:

PROGRAM NAME: A Model for the Determination of Optimal Electric Generating System Expansion Patterns (5)
DEVELOPING AGENT: M.I.T.
PROGRAM'S PURPOSE: Long range electric generating capacity expansion planning requires consideration of a diverse range of issues. To determine the optimum system expansion plan, it is necessary to create a synthesis of combinations of possible technical alternatives, observe the intertemporal effects of the system along the dimensions of the problem, and choose the set of alternatives which best meets the objectives while satisfying all constraints. A system of integrated techniques and computer codes has been formulated to evaluate the economic, environmental and reliability aspects of regional generation expansion strategies. The computer codes comprising the model are used serially and in an iterative manner to find the set of plant and site alternatives and corresponding plant operating histories which will minimize the total present worth of all capital, operating and fuel costs while satisfying the demand for electricity, fuel and site availability, pollution limits, and reliability constraints. Prototypical versions of the 3 major sub models of the GEM exist; initial testing of the capabilities and sensitivities of the first two submodels and their interface is currently being performed.

HOST COMPUTER:

LANGUAGES:

PROGRAM NAME: Optimized Generation Planning (OGP) (2)
DEVELOPING AGENT: General Electric
PROGRAM'S PURPOSE: 1) Long range generation system expansion planning.
2) Assessment of alternative growth scenarios.
3) Development of optimal plant additions.
4) Revenue requirements analysis of generation systems.
5) Comparison of total system cost of alternative generation technologies and installation schedules.
HOST COMPUTER: Honeywell based
LANGUAGES: FORTRAN

PROGRAM NAME: Designing Gas Distribution Networks By Computer (3)
DEVELOPING AGENT: International Gas Union
PROGRAM'S PURPOSE: Optimization of pipe size in order to reduce capital cost of the networks is achieved through use of a computer program. This program is described and its capabilities outlined.
HOST COMPUTER:
LANGUAGES:

PROGRAM NAME: Transmission Network Planning (TNET) (2)
DEVELOPING AGENT: General Electric
PROGRAM'S PURPOSE: 1) Long range transmission system expansion planning.
2) Assessment of alternative generation expansion plans and load growth scenarios as well as alternative network contingency design levels.
3) Development of optimal voltage levels and right-of-way utilization plans.
4) Revenue requirements analysis of transmission systems.
5) Quantification of cost of alternative siting plans.
HOST COMPUTER: Honeywell based
LANGUAGES: FORTRAN

PROGRAM NAME: Probabilistic Simulation & Optimization Models for
Nuclear & Fossil Plant Generation Planning (3)

DEVELOPING AGENT: Oak Ridge National Laboratory

PROGRAM'S PURPOSE:

HOST COMPUTER:

LANGUAGES:

PROGRAM NAME: Long Range Generation Planning (2)

DEVELOPING AGENT: United Engineers & Constructors, Inc.

PROGRAM'S PURPOSE: Program identifies cost of power production plans
generation carrying costs for generation planning
decision making.

HOST COMPUTER: Honeywell 66-60

LANGUAGES: FORTRAN

PROGRAM NAME: Generation Planning (LOADS, PROBS, HPROD & ICOST)
a set of four separate time-shared programs; load
modeling, system reliability, production costs &
investment cost. (2)

DEVELOPING AGENT: General Electric

PROGRAM'S PURPOSE: 1) Generation system operating costs.
2) Impacts of different equipment reliability levels.
3) Revenue requirements of alternative expansion
plans.

HOST COMPUTER: Honeywell based

LANGUAGES: FORTRAN

PROGRAM NAME: A Simulation Model of Long-Range Expansion of Electricity Generation in Wisconsin (5)

DEVELOPING AGENT: The University of Wisconsin Institute for Environmental Studies

PROGRAM'S PURPOSE: The electrical energy supply model discussed in this report focuses on methodologies for planning the expansion of electric generating capacity. The model, called the Electrical GENERating CAPacity Submodel (GENCAP), is a simulation model that can be used to investigate long-range capacity expansion schemes for the state of Wisconsin. GENCAP has been developed to perform three major functions: (1) forecast future capacity requirements based on annual electricity demands for electricity and load duration analysis; (2) provide a structure for investigating capacity expansion strategies; and (3) calculate total yearly costs associated with each expansion strategy.

HOST COMPUTER:

LANGUAGES:

PROGRAM NAME: Capacity Optimization No. 1 (2)

DEVELOPING AGENT: North Carolina Utilities Commission (Dennis J. Nightingale)

PROGRAM'S PURPOSE: The program creates an optimum capacity addition schedule based on expected capital and fuel costs.

HOST COMPUTER: IBM 360, IBM 370

LANGUAGES: FORTRAN IV

PROGRAM NAME: None (2)

DEVELOPING AGENT: Electric Power Research Institute (Jerome J. Karaganis)

PROGRAM'S PURPOSE: This method addressed decisions on planning reserve margins. It recognized major contentions such as outages, fixed and variable costs and environmental costs.

HOST COMPUTER: CDC and IBM

LANGUAGES: FORTRAN

3-D FINANCIAL PLANNING AND FORECASTING

PROGRAM NAME: Corporate Model (2)
DEVELOPING AGENT: Power Technologies Inc.
PROGRAM'S PURPOSE: Expansion of "Financial Model" to include sub-
models for financial inputs, e.g., production
costs, capacity planning, rates, payroll, etc.
HOST COMPUTER: IBM 360/370
LANGUAGES:

PROGRAM NAME: Financial Simulation Program (FSP) (2)
DEVELOPING AGENT: General Electric
PROGRAM'S PURPOSE: Assessment of financial implications of alterna-
tive generation plant addition scenarios, includ-
ing rate changes implied, new financing required,
earnings-per-share, cash flow, electric rates,
etc. Also see description of Optimized Generation
Planning (OGP) Program
HOST COMPUTER: Honeywell
LANGUAGES: FORTRAN

PROGRAM NAME: Financial Model (2)
DEVELOPING AGENT: Power Technologies Inc.
PROGRAM'S PURPOSE: Develop both annual and monthly financial models.
Tax and regulatory constraints. Produces reports
and cash flows.
HOST COMPUTER: IBM 360/370
LANGUAGES:

PROGRAM NAME: Depreciation Study - Simulated Plant Record Method (1)
DEVELOPING AGENT: Maryland PSC
PROGRAM'S PURPOSE: This program is a basic program developed by Iowa State. Data inputs required are additions by year from inception, retirements by year for total account from year of start of study to year of end of study, plus balance at year of start of study. Output is ordered in best fit from least squares and yields type of curve, average service life and indication of fit of data to curve. See also depreciation mortality or retirement rate method.

HOST COMPUTER: UNIVAC 1108

LANGUAGES: FORTRAN

PROGRAM NAME: Depreciation - Mortality or Retirement Rate Method (1)

DEVELOPING AGENT: Maryland PSC

PROGRAM'S PURPOSE: The program uses survivors and retirements by account by vintage from selected start date and computes and prints out percentage surviving by age of plant. Results are plotted and compared with Iowa State curves and average service life selected from best fit. Survivor and retirement data by year for each vintage from year selected to initiate study through year selected to end study is essential. See depreciation study - simulated plant record method.

HOST COMPUTER: UNIVAC 1108

LANGUAGES: FORTRAN

PROGRAM NAME: PRE-SPR - Preprocessing For the Simulated Plant Record Historical Life Analysis Programs. (2)

DEVELOPING AGENT: United Engineers & Constructors, Inc.

PROGRAM'S PURPOSE: This accounting program restates raw data in the form of gross additions and annual retirements, and calculates year-end balances for input to our simulated plant record analysis programs, which provide life study analysis for depreciation purposes, retirement cost estimation, estimation of vintage plant investment, etc.

HOST COMPUTER: Honeywell 66-60

LANGUAGES: FORTRAN

PROGRAM NAME: Financial Forecast for REA Electric
Distribution Borrowers (2,6)

DEVELOPING AGENT: Rural Electrification Administration

PROGRAM'S PURPOSE: Forecasting, demonstration of financial feasibility, determination of total revenue requirements, rate of return, financial ratios. Includes pro forma balance sheet, statement of operations, sources and use of funds, ratios statement. Models REA and supplemental lenders loan terms.

HOST COMPUTER: Univac 9060, IBM 370/20, Burroughs

LANGUAGES: ANSI COBOL

PROGRAM NAME: Power Investment Repayment Study (2)

DEVELOPING AGENT: Southwestern Power Administration

PROGRAM'S PURPOSE: Predicts power investment repayment and estimates revenue required to repay scheduled principal and interest costs.

HOST COMPUTER: IBM 1130

LANGUAGES: IBM 1130 COBOL

PROGRAM NAME: SSGS (Simulated System Growth Scenarios) (2)

DEVELOPING AGENT: United Engineers & Constructors, Inc. Date: March 1978

PROGRAM'S PURPOSE: Program models utility system capital expenditures for possible growth alternatives. Also produces depreciation funds flows and retirement estimations.

HOST COMPUTER: Honeywell 6000-60

LANGUAGES: FORTRAN

PROGRAM NAME: AMORTIZ (Remaining Life Annual Expenses) (2)
DEVELOPING AGENT: United Engineers & Constructors, Inc.
PROGRAM'S PURPOSE: This program allocates the utility's book reserve by function to each account within the function based on indicated accrued depreciation and then determines the annual depreciation expense based on original cost, net salvage percentage, allocated book reserve and remaining life for each account.
HOST COMPUTER: Honeywell 66-60
LANGUAGES: FORTRAN

PROGRAM NAME: LIFE EXP (Life Expectancy Depreciation Requirements) (2)
DEVELOPING AGENT: United Engineers & Constructors, Inc.
PROGRAM'S PURPOSE: The purpose of this program is to determine the total theoretical depreciation requirements for an account with a known expected retirement date.
HOST COMPUTER: Honeywell 66-60
LANGUAGES: FORTRAN

PROGRAM NAME: TRTHDEPR (Trended Theoretical Depreciation) (2)
DEVELOPING AGENT: United Engineers & Constructors, Inc.
PROGRAM'S PURPOSE: This program indexes original cost vintages using Handy Whitman or other indexes and calculates theoretical depreciation requirements based on the indexed costs.
HOST COMPUTER: Honeywell 66-60
LANGUAGES: FORTRAN

PROGRAM NAME: Depreciation Analysis (1)
DEVELOPING AGENT: Florida PSC
PROGRAM'S PURPOSE: This is a utility depreciation analysis program which generates a table of life expectancy and average service life of utility plant accounts using a range of lifetables defined by the user. It generates these tables based upon a theoretical first date of retirement followed by additional tables incrementing the date by steps until the second hypothetical date of final retirement is reached. These tables are then smoothed by use of either C, G, and S values on the retirement rate.
HOST COMPUTER: CDC 6400
LANGUAGES: FORTRAN

PROGRAM NAME: Depreciation Analysis (1)
DEVELOPING AGENT: Florida PSC
PROGRAM'S PURPOSE: This is a utility depreciation analysis program which uses the simulated plant-record method, a class of semiactuarial techniques, to calculate an estimate of the age distribution and average service life of utility plant accounts whose recorded life history provides no indication of the age at which the property units were retired from service. As such it uses an assumed mortality distribution to create its tables and summaries.
HOST COMPUTER: CDC 6400
LANGUAGES: FORTRAN

PROGRAM NAME: Depreciation Analysis (1)
DEVELOPING AGENT: Missouri PSC
PROGRAM'S PURPOSE: Assist the engineer in depreciation accounting by computing statistics as average service life, retirement ratios, trended original cost and theoretically accrued depreciation reserve using the Iowa State Methods.
HOST COMPUTER: IBM 370/158
LANGUAGES:

PROGRAM NAME: THDEPR (Calculation of Theoretical Depreciation) (2)
DEVELOPING AGENT: United Engineers & Constructors, Inc.
PROGRAM'S PURPOSE: The purpose of this program is to calculate the total theoretical straight line depreciation requirement for an account or subaccount utilizing Iowa Curve dispersion.
HOST COMPUTER: Honeywell 66-60
LANGUAGES: FORTRAN

PROGRAM NAME: CHAD (Statistical Dating of Gross Additions) (2)
DEVELOPING AGENT: United Engineers & Constructors, Inc.
PROGRAM'S PURPOSE: The program statistically ages yearly gross additions to determine aged plant for an account or subaccount from the first rank determination of SPR-BM. Accrued depreciation is then calculated on this data.
HOST COMPUTER: Honeywell 66-60
LANGUAGES: FORTRAN

PROGRAM NAME: LSCF (Actuarial Life Analysis) (2)
DEVELOPING AGENT: United Engineers & Constructors, Inc.
PROGRAM'S PURPOSE: The program calculates and ranks to the nearest one one-hundredth of a year the historical life for each Iowa Curve, which best describes the actual survivor values for an account..
HOST COMPUTER: Honeywell 66-60
LANGUAGES: FORTRAN

PROGRAM NAME: INLSCF (Preprocessing for Actuarial) Life
Analysis Program (2)

DEVELOPING AGENT: United Engineers & Constructors, Inc.

PROGRAM'S PURPOSE: The purpose of this program is to identify life
table data for actuarial analysis of an account.

HOST COMPUTER: Honeywell 66-60

LANGUAGES: FORTRAN

PROGRAM NAME: DATEDBAL Aged Plant computation for an account (2)

DEVELOPING AGENT: United Engineers & Constructors, Inc.

PROGRAM'S PURPOSE: The program restates raw data in a form to reflect
dated plant for depreciation computations.

HOST COMPUTER: Honeywell 66-60

LANGUAGES: FORTRAN

PROGRAM NAME: SPR-PRM (Simulated Plant Record - Period Retirement
Method). (2)

DEVELOPING AGENT: United Engineers & Constructors, Inc.

PROGRAM'S PURPOSE: This program calculates and ranks the historical
life to the nearest one one-hundredth of a year
for each of the twenty-eight Iowa Curves.

HOST COMPUTER: Honeywell 66-60

LANGUAGES: FORTRAN

PROGRAM NAME: Life Span Study (Depreciation Studies) (1)
DEVELOPING AGENT: New York PSC
PROGRAM'S PURPOSE: Generates average service lives and reserve requirements based on life span study techniques.
HOST COMPUTER: Commercial Time Sharing Service
LANGUAGES:

PROGRAM NAME: Regression, Depreciation, Rates (1)
DEVELOPING AGENT: New York PSC
PROGRAM'S PURPOSE: 1. Calculation of least squares regression coefficients. 2. Calculation of accrued depreciation using specific "H" curve and average service life. 3. Bill analysis (same as used by tariff analysis section)
HOST COMPUTER: Commercial Time Sharing Service
LANGUAGES:

PROGRAM NAME: Depreciation Analysis Computing RCNLD (1)
DEVELOPING AGENT: Ohio PUC
PROGRAM'S PURPOSE: Calculates RCN, RCNLD, average RCN age and depreciation rate via time sharing using Iowa curves.
HOST COMPUTER: IBM 370/168
LANGUAGES: FORTRAN

PROGRAM NAME: Revenue Projection (1)
DEVELOPING AGENT: New York PSC
PROGRAM'S PURPOSE: From monthly revenue and station data, compiles
12 month rolling bands of revenue per station -
becomes input data to COLNRS for regression
analysis
HOST COMPUTER: Commercial Time Sharing Service
LANGUAGES:

PROGRAM NAME: Plant Survival Rate Analysis (1)
DEVELOPING AGENT: Ohio PUC
PROGRAM'S PURPOSE: Plant depreciation analysis program that produced
projected plant surviving rates and curves over
the expected life of utilities plant and equipment.
HOST COMPUTER: IBM 370/168
LANGUAGES: FORTRAN

PROGRAM NAME: Indicated Survivor Studies Depreciation Studies (1)
DEVELOPING AGENT: New York PSC
PROGRAM'S PURPOSE: Given gross additions and surviving balance,
computer average service life for any input
H-curve value
HOST COMPUTER: Commercial Time Sharing Service
LANGUAGES:

PROGRAM NAME: Depreciation Analysis (1)
DEVELOPING AGENT: Federal Power Commission
PROGRAM'S PURPOSE: Using vintaged data program determines a composited average service life and remaining life. Given an Iowa survivor curve, average service life and truncation period, program computes an abbreviated average life and remaining life for each vintage and a composite life for the entire group of vintages.
HOST COMPUTER: IBM 370/153
LANGUAGES: FORTRAN

PROGRAM NAME: Depreciation Analysis (1)
DEVELOPING AGENT: Federal Power Commission
PROGRAM'S PURPOSE: Program is the simulated plant record analysis in which survivor curves are generated and listed in order of the input date. Program accepts either plant additions retirements or additions and balances and using the generated curves produces a record of retirements or balances.
HOST COMPUTER: IBM 370/158
LANGUAGES: FORTRAN

PROGRAM NAME: Financial Statement Projections (1)
DEVELOPING AGENT: New York PSC
PROGRAM'S PURPOSE: This model is designed to evaluate the financial structure of power companies or pools.
HOST COMPUTER: IBM 370/158
LANGUAGES:

PROGRAM NAME: SPR-BM (Simulated Plant Record-Balances Method). (2)
DEVELOPING AGENT: United Engineers & Constructors, Inc.
PROGRAM'S PURPOSE: This program calculates and appropriately ranks the historical life to the nearest 1/100th of a year for each of the 28 Iowa Curves which are tested. Rankings are made by comparing the actual year-end balances to those simulated in the program.
HOST COMPUTER: Honeywell 66-60
LANGUAGES: FORTRAN

PROGRAM NAME: ICOST (2)
DEVELOPING AGENT: General Electric
PROGRAM'S PURPOSE: Scope - Investment costing program. Provides a mechanism for calculating annual charges on fixed investment, annual fuel inventory and fixed operation and maintenance charges.
HOST COMPUTER: Honeywell
LANGUAGES: Mark III BASIC

PROGRAM NAME: Regulatory Analysis Model (RAm) (4, 1, 2)
DEVELOPING AGENT: Temple, Barker & Sloane, Inc.
PROGRAM'S PURPOSE: RAm makes financial projections for an electric utility given a set of assumptions or projections concerning demand, capital expenditures, operating costs, and financial and regulatory policies. It can be used in the following areas: rate cases, plant construction authorization, policy alternative analysis, external financing projection and authorization, financial condition projection and surveillance, performance evaluation, and future rate projection.
HOST COMPUTER: CDC 3600, IBM 370
LANGUAGES: CDC 3600 time-sharing, FORTRAN

PROGRAM NAME: Utility Financial Model (1)
DEVELOPING AGENT: Michigan PSC
PROGRAM'S PURPOSE: The EUTPROMOD system was designed to assist the Commission staff in the rate case processing. The output of the system consists of 5 financial statements; the income statement, rate base statement, revenue deficiency statement, the rate of return on capital structure statement and the sources and uses of funds statement. This interactive system allows the staff to change any combination of the input variables and print new statements.

HOST COMPUTER:

LANGUAGES: FORTRAN

PROGRAM NAME: Trended Original Cost and Depreciation Study (1)

DEVELOPING AGENT: Pennsylvania PUC

PROGRAM'S PURPOSE: Input-surviving dollars by year of placement, by account number. Including totals for balancing and control. Uses 4 percent compound interest table and trend index tables. Account control card selects index table for the account. Program calculates TOC and TOC reserve as well as 3 and 5 year averages by account number with company totals.

HOST COMPUTER: UNIVAC 1110

LANGUAGES: COBOL

PROGRAM NAME: MIT Regional Electricity Model (REM) (4, 3)

DEVELOPING AGENT: Joskow, P.L., Baughman, M.L., Massachusetts Institute of Technology

PROGRAM'S PURPOSE: An engineering-econometric-financial simulation model of the electric utility industry in the U.S. It includes a supply submodel, a demand submodel, a regulatory financial submodel.

HOST COMPUTER:

LANGUAGES:

PROGRAM NAME: Corporate Modeling & Financial Planning (3)

DEVELOPING AGENT: Public Service Company of Oklahoma

PROGRAM'S PURPOSE: Purpose of model is to evaluate alternative rates, growth patterns, expansion plans and financing.

HOST COMPUTER:

LANGUAGES:

PROGRAM NAME: Electric Utility Corporate Model (2)

DEVELOPING AGENT: General Electric

PROGRAM'S PURPOSE: Development in future time of balance sheets, income statements, tax reports and cash reports. Calculation of earnings-per-share and simulation of regulation on either rate base or common equity. Modeling of single businesses (electric operations)

HOST COMPUTER: Honeywell 600, IBM 360-155

LANGUAGES: FORTRAN

PROGRAM NAME: Power Plant Economic Model Program Description & User's Guide (5)

DEVELOPING AGENT: Aerospace Corp.

PROGRAM'S PURPOSE: The Aerospace Corporation Power Economic Model was developed to provide an analytic tool for comparing the economic of alternative types of power plants. In addition, by comparing the capital investment requirements and operating costs of alternative solar systems, preferred concepts can be identified. The economic feasibility of these preferred systems can be determined by comparative economic evaluation of these and conventional nuclear and fossil-power plants for identical periods of commercial operations.

HOST COMPUTER:

LANGUAGES:

PROGRAM NAME: Plant Mortality Studies (1)
DEVELOPING AGENT: New York PSC
PROGRAM'S PURPOSE: A statistical processing of utility property survivor and retirement data to develop life tables and depreciation ratios for use in making depreciation studies.
HOST COMPUTER: IBM 370/158
LANGUAGES: FORTRAN

PROGRAM NAME: H-Curve Life Tables (Depreciation Studies) (1)
DEVELOPING AGENT: New York PSC
PROGRAM'S PURPOSE: Generates life table values and depreciation ratios for given H-curve and average service life
HOST COMPUTER: Commercial Time Sharing Service
LANGUAGES:

PROGRAM NAME: Plots Six-months Moving Average of Sequential Monthly Data (1)
DEVELOPING AGENT: California PUC
PROGRAM'S PURPOSE: Accepts data, monthly, in sequence, for any number of months. Recognizes an end card has counted the months and proceeds to compute and then plot (on a regular printer) the six-months moving average value, starting to plot with the sixth month and ending on the sixth month before the end of data. This Fortran program produces a plot from which visually a trend in the data is quite obvious.
HOST COMPUTER: CDC CYBER 175
LANGUAGES: FORTRAN

PROGRAM NAME: Depreciation Analysis (1)
DEVELOPING AGENT: Florida PSC
PROGRAM'S PURPOSE: This is a utility depreciation analysis program which calculates the observed life table and the best fit life table of utility plant accounts using as input given distributions of plant retirements and exposures banded by age.
HOST COMPUTER: CDC 6400
LANGUAGES:

PROGRAM NAME: Depreciation Analysis (1)
DEVELOPING AGENT: Florida PSC
PROGRAM'S PURPOSE: This is a utility depreciation analysis program which calculates the theoretical reserve at a given point for a given utility plant account allowing comparison to be made between the calculated theoretical reserve and actual book reserve. The prospective method is used in calculations and represents the reserve necessary to compensate for the retirement of existing plant recognizing future accruals over the life expectancies.
HOST COMPUTER: CDC 6400
LANGUAGES: FORTRAN

PROGRAM NAME: Chi-Squared Plant Life Curve Fitting (1)
DEVELOPING AGENT: Ohio PUC
PROGRAM'S PURPOSE: Selects plant depreciation curves by chi-square curve fitting program.
HOST COMPUTER: IBM 370/168
LANGUAGES: FORTRAN

PROGRAM NAME: Trended Original Cost and Depreciation Study (1)
DEVELOPING AGENT: Pennsylvania PUC
PROGRAM'S PURPOSE: Input-surviving dollars by year of placement, by account number, including totals for balancing and control. Uses 31 tables which include Iowa curves. Trend index tables also input. Account control card selects curve and index to be used for that account. Program calculates TOC and TOC reserve as well as 3 and 5 year average TOC and TOC reserve by account number, with company totals.
HOST COMPUTER: UNIVAC 1110
LANGUAGES: COBOL

PROGRAM NAME: Iowa Survivor Curves (2)
DEVELOPING AGENT: North Carolina Utilities Commission (Gene Curtis)
PROGRAM'S PURPOSE: The program takes historic data as collected through time and matches this data to a curve which "best fits" the historic retirements and average service life of a specific plant account.
HOST COMPUTER: IBM 370 58
LANGUAGES: FORTRAN

3-E ENVIRONMENTAL ANALYSIS

PROGRAM NAME: Air Diffusion Analysis (1)
DEVELOPING AGENT: New York PSC
PROGRAM'S PURPOSE: The transport of the plants emission is modeled by an appropriate diffusion model. The general process follows to determine the production impact of the proposed generator plant on the air quality of the area is to determine the pollutant concentration on a polar grid coordinate system from data submitted by the application. At each grid point the measure background concentrate SO₂ particulate matter, and NO₂ are added to the plant contribution. These concentrate values are then averaged over various periods to determine probable compliance with utility standards.

HOST COMPUTER: IBM 370/158

LANGUAGES: FORTRAN

PROGRAM NAME: Evaluation of Sulfur Dioxide Emission Control Options for Iowa Power Boilers (5)

DEVELOPING AGENT: M.W. Kellogg Co.

PROGRAM'S PURPOSE: The report gives results of an evaluation of SO₂ emission control strategies for major coal burning boilers in Iowa considering options such as using low-sulfur Eastern and Western coals, mechanical coal cleaning, and flue gas desulfurization (FGD). Major utility boilers were surveyed, probable coal sources were determined, and alternate transportation routes were defined. Coal cleaning plant and FGD design studies were performed. Cost data were generated and a linear computer program model was developed to determine minimum cost strategies for meeting emission levels corresponding to no-control and control to 5.0 3.1 and 1.2 lb SO₂/MM Btu. For the cases studied, FGD was most cost effective only for the most restrictive emission level (1.2 lb/MM Btu) and when the supply of low supply of low-sulfur coal was limited. Importing low-sulfur Eastern and Western coals or combinations of mechanical coal cleaning and low-sulfur coal import gave the lowest cost for all other cases.

HOST COMPUTER:

LANGUAGES:

PROGRAM NAME: LANDSAT Data Analysis Package (2)
DEVELOPING AGENT: Radian Corporation
PROGRAM'S PURPOSE: This package is a combination of several hundred programs and subroutines developed primarily by NASA to classify remotely sensed land cover data. Included are classification algorithms- map-producing routines, and many I/O routines for intermediate steps in the generation of land use classifications. This program is especially useful for power plant and/or transmission line siting studies.
HOST COMPUTER: UNIVAC 1108
LANGUAGES: FORTRAN

PROGRAM NAME: Thermal Plume Model (2)
DEVELOPING AGENT: Radian Corporation
PROGRAM'S PURPOSE: Disposal of waste heat from power plants in bodies of water. The model calculates the time-dependent histories of flow patterns and spatial temperature distributions in the water body.
HOST COMPUTER: UNIVAC 1108
LANGUAGES: FORTRAN

PROGRAM NAME: Gaussian Plume Dispersion Model Package (2)
DEVELOPING AGENT: Radian Corporation
PROGRAM'S PURPOSE: Computes ambient ground-level concentrations of pollutants from a number of stacks including point sources, area sources, and line sources.
HOST COMPUTER: UNIVAC 1108
LANGUAGES: FORTRAN

PROGRAM NAME: Development of a General Computer Model for Simulating Thermal Discharges in Three Dimensions (3)

DEVELOPING AGENT: John Hopkins University

PROGRAM'S PURPOSE:

HOST COMPUTER:

LANGUAGES:

PROGRAM NAME: Cooling Pond Temperature Prediction (3)

DEVELOPING AGENT: Tawson College

PROGRAM'S PURPOSE: A model is described which predicts temperature responses in the environment that are associated with the operation of a natural gas fueled thermoelectric power generation station. The model is a piecewise computer simulation, limited at present to closed cooling water systems.

HOST COMPUTER:

LANGUAGES:

PROGRAM NAME: Energy, Pollution, and Employment Policy Model (3)

DEVELOPING AGENT: University of Illinois

PROGRAM'S PURPOSE:

HOST COMPUTER:

LANGUAGES:

PROGRAM NAME: Efficiency Analysis Statistical Test & Evaluation (1)
DEVELOPING AGENT: Ohio PUC
PROGRAM'S PURPOSE: Analysis of thermal efficiency of electric utility systems by providing statistical measures for determining significance of changes in thermal.
HOST COMPUTER: IBM 370/168
LANGUAGES: FORTRAN

PROGRAM NAME: Dynamic Simulation of the Impact of Environmental Protection Measures on a Regional Utility (3)
DEVELOPING AGENT: Secrest, L., Burzlaff, B., Texas Christian University
PROGRAM'S PURPOSE: Forecasting/Gov't. Policies/Investment
HOST COMPUTER:
LANGUAGES:

PROGRAM NAME: Land Use; Energy Flow & Policy Making in Society (3)
DEVELOPING AGENT: Young, J.W. Calif. Univ., Davis Institute of Ecology
PROGRAM'S PURPOSE: To provide a methodology for improving computer aids to modeling and to simulation/ to apply the modeling methodology to the simulation of the use of land and energy in society.
HOST COMPUTER:
LANGUAGES:

3-F FUEL CONVERSION AND FUEL INFORMATION



PROGRAM NAME: Dynamic Energy System Optimization Model (6)
DEVELOPING AGENT: Brookhaven National Laboratory
PROGRAM'S PURPOSE: Linear programming model emphasizing technological detail and interfuel substitution. Optimizes over 5 year periods.
HOST COMPUTER:
LANGUAGES:

PROGRAM NAME: Integration of Solar Thermal Power Plants Into Electric Utility Systems (3)
DEVELOPING AGENT: Southern California Edison Co.
PROGRAM'S PURPOSE: A study of the operation of solar power plants as a part of a large electric utility system was performed using S.C. Edison's loss of load probability and production cost simulation computer programs.
HOST COMPUTER:
LANGUAGES:

PROGRAM NAME: When Do Electric Storage Devices Make Economic Sense (3)
DEVELOPING AGENT: Brookhaven National Laboratory
PROGRAM'S PURPOSE: The linear programming model, the Brookhaven Energy System Optimization Model is discussed.
HOST COMPUTER:
LANGUAGES:

PROGRAM NAME: Natural Gas Curtailment Analysis (1)
DEVELOPING AGENT: Federal Power Commission
PROGRAM'S PURPOSE: Appropriate data files are created and a natural gas curtailment analysis is performed for a particular pipeline. The analysis provides data on the environmental impact expected to occur in the service area of a pipeline due to the implementation of provisions contained in various curtailment plans. Expected increases in particulate and SO₂ emissions are calculated for each state and AQCR involved.
HOST COMPUTER: IBM 370/158
LANGUAGES: COBOL, FORTRAN

PROGRAM NAME: Form 45 (4,1,6)
DEVELOPING AGENT: Federal Power Commission
PROGRAM'S PURPOSE: Compiles volume and price data on intra-state sales of natural gas. Provides listing by month, by state, and by FPC pricing area.
HOST COMPUTER: IBM 370/158
LANGUAGES:

PROGRAM NAME: Form 16 (4,1,6)
DEVELOPING AGENT: Federal Power Commission
PROGRAM'S PURPOSE: Analyzes natural gas curtailment data of interstate pipeline companies, providing listings by company and by state, Firm and interruptible gas categories with actual and projected comparisons.
HOST COMPUTER: IBM 370/158
LANGUAGES:

PROGRAM NAME: Electric Energy Usage & Regional Economic Development (3)
DEVELOPING AGENT: State Univ. of New York, Research Foundation
PROGRAM'S PURPOSE: Determines the impact of changes in electricity prices on key economic variables associated with the economic development of the Buffalo SMSA.
HOST COMPUTER:
LANGUAGES:

PROGRAM NAME: Simulation of Solar Heating of Buildings in Cold Regions to Determine Cost Optimal Design for a Combined Solar and Conventional Heating System (3)
DEVELOPING AGENT: Clarkson College of Technology
PROGRAM'S PURPOSE: This paper describes the development and application of a computer model that simulates the effects of hourly weather conditions on the performance and cost of a combined solar/conventional heating system for buildings in northern climates.
HOST COMPUTER:
LANGUAGES:

PROGRAM NAME: Integration of Solar Thermal Power Plants Into Electric Utility System (3)
DEVELOPING AGENT: Southern California Edison Co.
PROGRAM'S PURPOSE: A study of the operation of solar power plants as a part of a large electric utility system was performed using S.C. Edison's loss of load probability and production cost simulation computer programs.
HOST COMPUTER:
LANGUAGES:

PROGRAM NAME: Planning System to Minimize Environmental
Impact Applied to Route Selection. (3)

DEVELOPING AGENT: Dooley, J.E./Newkirk, R.T.
University of Toronto, Ontario

PROGRAM'S PURPOSE: A computer based planning system is described
which can be used to find continuous non-linear
routes for utilities subject to numerous constraints.

HOST COMPUTER:

LANGUAGES:

PROGRAM NAME: Guidelines for Development of a Quality Assurance
Program. Measuring Pollutants for Which National
Ambient Air Quality Standards Have Been Promulgated (3)

DEVELOPING AGENT: Research Triangle Institute

PROGRAM'S PURPOSE: Guidelines for Computer Simulation are included.

HOST COMPUTER

LANGUAGES:

PROGRAM NAME: Chemical Desulfurization of Coal: Report of
Bench-Scale Developments. Vol. 2 (5)

DEVELOPING AGENT: TRW Systems Group

PROGRAM'S PURPOSE: The report contains the appendices to volume 1
and includes computer programs for analysis of
leach processes, laboratory experimentation,
and data tables.

HOST COMPUTER:

LANGUAGES:

PROGRAM NAME: Intrastate Gas Production (1)
DEVELOPING AGENT: Michigan PSC
PROGRAM'S PURPOSES: This on-line system maintains a 13 month history of intrastate oil gas withdrawals by production field and dry gas withdrawals by well within field, performs dry gas withdrawal proration calculations and maintains monthly/annual totals/balances. Three oil gas and four dry gas reports plus a monthly production trend graph are produced.
HOST COMPUTER: DEC PDP 10-15
LANGUAGES:

PROGRAM NAME: Computer Simulation For Coal Inventory Optimization in the Electric Utility Industry (3)
DEVELOPING AGENT: Pennsylvania Power & Light Co.
PROGRAM'S PURPOSE: A simulation technique for developing coal inventory policies aimed at determining an optimum level which will provide a cushion against both scheduled and random facility outages, at minimum cost.
HOST COMPUTER:
LANGUAGES: PL/1

PROGRAM NAME: Economic Analysis of Geothermal Energy (3)
DEVELOPING AGENT: Battelle Pacific Northwest Labs
PROGRAM'S PURPOSE: The development of the GEOCOST computer program which combines the technical and economic factors of power generation from geothermal energy into one systematic cost accounting framework is described.
HOST COMPUTER:
LANGUAGES:

PROGRAM NAME: Economic Analysis of Declining Petroleum Supplies
in Texas: Income, Employment, Tax and Production
Effects as Measured by Input, Output and Supply
Demand Simulation Models (3)

DEVELOPING AGENT: State of Texas Governor's Energy Advisory Council

PROGRAM'S PURPOSE:

HOST COMPUTER:

LANGUAGES:

PROGRAM NAME: Two-Level Iterative Model for Estimating Inter-
Fuel Substitution Effects (3)

DEVELOPING AGENT: Brookhaven National Laboratory

PROGRAM'S PURPOSE:

HOST COMPUTER:

LANGUAGES:

3-G DISTRICT HEATING

PROGRAM NAME: TDIST, A Program for Community Energy Demand Analysis and Total Energy System Response Simulation, User's Manual (3)

DEVELOPING AGENT: MIT

PROGRAM'S PURPOSE: TDIST, The Thermal Distribution System Simulation Code, is a computer program developed at MIT to aid in the design and dynamic performance analysis of a large integrated total energy system (TES) supplying thermal and electrical energy to a multi-consumer-type metropolitan area.

HOST COMPUTER:

LANGUAGES:

3-H ENERGY SYSTEMS



PROGRAM NAME: Design of an Optimal Total Energy System for a Large Military Installation (3)

DEVELOPING AGENT: MIT

PROGRAM'S PURPOSE: The use of a recently developed computer code for simulating the thermal and electrical energy demand behavior of a multi-consumer-type community and for modeling community's thermal energy utility system is discussed in conjunction with design studies being performed for a proposed total energy system at Fort Bragg, N.C.

HOST COMPUTER:

LANGUAGES:

PROGRAM NAME: Study of Priorities in the Electrical Energy Allocation Problem (3)

DEVELOPING AGENT: National Center for Energy Management & Power

PROGRAM'S PURPOSE: Problem of allocating electric energy for short periods during times of peak demand is treated.

HOST COMPUTER:

LANGUAGES:

PROGRAM NAME: Project Independence Evaluation System Integrating Model (6)

DEVELOPING AGENT: Federal Energy Administration

PROGRAM'S PURPOSE: Supplies of coal, oil, gas, refineries, utilities, energy production via emerging technologies, transportation and importing. The program evaluates various energy policy alternatives by predicting their impact on the energy sector over the next 5 to 15 years. National Energy Outlook receives data from model.

HOST COMPUTER:

LANGUAGES:

PROGRAM NAME: County Energy Data Base (6)
DEVELOPING AGENT: Brookhaven National Laboratory
PROGRAM'S PURPOSE: County level data base: energy
HOST COMPUTER:
LANGUAGES:

PROGRAM NAME: Energy Demand Model (6)
DEVELOPING AGENT: Federal Energy Administration
PROGRAM'S PURPOSE: - Macro variables: Gross domestic product, steel production, vehicle registration forecasts.
- Energy price forecasts by sector.
- Historical energy consumption data.
Forecast energy demand for 19 OECD countries by using supplied variables in computer simulation model.
HOST COMPUTER:
LANGUAGES:

PROGRAM NAME: Gas Load Estimating Factors (3)
DEVELOPING AGENT: Consolidated Gas Supply Corp. Clarksburg, W.V.
PROGRAM'S PURPOSE: Model calculates load estimating factors for nearly all residential and commercial consumers. The concept incorporates the base load-degree day factor theory and uses data from a computerized history file.
HOST COMPUTER:
LANGUAGES:

PROGRAM NAME: Directory of Federal Energy Data Sources.
Computer Products & Recurring Publications (5)

DEVELOPING AGENT: F.E.A., Office of Policy & Analysis

PROGRAM'S PURPOSE: The purpose of this directory is to announce two major types of Federally-sponsored energy-related information: energy information on magnetic tape and recurring publications which contain energy-related numerical data. The information on magnetic tape is primarily in the form of data files. However, there are also computer programs, data base reference services, and mathematical models. The items are listed under broad subject categories. The citations include title, responsible agency, dates of coverage, accession number, availability information, and abstract. Each entry is indexed by subject, originating agency, and accession number.

HOST COMPUTER:

LANGUAGES:

3-I UTILITY ENERGY CONSERVATION

PROGRAM NAME: Power System Protection With Digital Computers (3)

DEVELOPING AGENT: Washington State University

PROGRAM'S PURPOSE:

HOST COMPUTER:

LANGUAGES:

PROGRAM NAME: Modeling and Testing Fossil-Fueled Generating Units (3)

DEVELOPING AGENT: Tennessee University

PROGRAM'S PURPOSE:

HOST COMPUTER:

LANGUAGES:

PROGRAM NAME: Factor Productivity (1) (4, 1)

DEVELOPING AGENT: Federal Power Commission

PROGRAM'S PURPOSE: This program computes weighted output of an electric and also input quantities of fuel, labor, capital, and consumable materials. It uses this data to calculate productivity trends for all of these input factors. Are from FPC form No. 1 (are representative of class A & B utilities)

HOST COMPUTER: UNIVAC 1108

LANGUAGES: FORTRAN

PROGRAM NAME: A Program for Waste Energy Cost Data (1)
DEVELOPING AGENT: New York PSC
PROGRAM'S PURPOSE: Calculates the relevant trucking charge (for a waste burner to receive) based on inputs of investment costs, percent waste burned, steam load factors, and selling price of steam and scrap.
HOST COMPUTER: Commercial Time Sharing Service
LANGUAGES:

PROGRAM NAME: Reservoir Simulation Manual (3)
DEVELOPING AGENT: Scientific Software Corp.
PROGRAM'S PURPOSE: The basic mathematics of various multi-dimensional petroleum and natural gas reservoir simulation procedures are presented and supplied in a tutorial format.
HOST COMPUTER:
LANGUAGES:

PROGRAM NAME: Computer Simulation for Coal Inventory Optimization in the Electric Utility Industry (3)
DEVELOPING AGENT: Pennsylvania Power and Light Company
PROGRAM'S PURPOSE: A simulation technique for developing coal inventory policies in the electric utility industry is presented. The objective is to determine an optimum level of inventory for the company to maintain, in order to provide a cushion against both scheduled and random facility outages, at minimum cost.
HOST COMPUTER:
LANGUAGES:

PROGRAM NAME: Load Modeling (2)
DEVELOPING AGENT: Power Technologies, Inc.
PROGRAM'S PURPOSE: Develops load models for capacity planning and production cost programs. Single companies or pools.
HOST COMPUTER: IBM 360 and 370
LANGUAGES:

PROGRAM NAME: Demand Analysis Program (2)
DEVELOPING AGENT: Gilbert Associates Inc.
PROGRAM'S PURPOSE: Analyzes sales data (bill frequency data, load test data) for the summer or winter peak month and generates contributions to the system and class peaks for the rate groups under study.
HOST COMPUTER: IBM 370
LANGUAGES: FORTRAN

PROGRAM NAME: Gas Activity & Inspection (1)
DEVELOPING AGENT: New York PSC
PROGRAM'S PURPOSE: Operations related to gas safety inspection program. The first part uses staff activity reports (time sheet supplement) to develop annual totals of time and dollars for inspection. The second part receives inspection results by operations headquarters, and each activity related to safety, containing number of records inspected and number of violations found. Programs total detail report data to display company's conformance to safety program requirements.
HOST COMPUTER: IBM 370/158
LANGUAGES:

PROGRAM NAME: Application of Radial Simulation Model (3)
DEVELOPING AGENT: American Institute of Mining, Metallurgical, and
Petroleum Engineering
PROGRAM'S PURPOSE: A radial simulation model has been developed to study
low permeability reservoirs, particularly for gas storage.
HOST COMPUTER: New York PSC
LANGUAGES:

PROGRAM NAME: Gas Restriction Analysis (1)
DEVELOPING AGENT: New York PSC
PROGRAM'S PURPOSE: For use in determining methods of restricting gas use by
business when gas shortages occur. Measures gas saved and
effects on business community of sets of conditions for
use.
HOST COMPUTER: IBM 370/158
LANGUAGES: COBOL

PROGRAM NAME: Planning for Optimal Sizing of LNG Plants for
Peakshaving Purposes (3)
DEVELOPING AGENT: University Microfilms International/Ann Arbor,
Michigan.
PROGRAM'S PURPOSE: The model considers the interaction among peakshavers
and the impact of peakshaving on interruptible
marketing possibilities in the process of choosing
a supply configuration that supplies minimum cost
objectives.
HOST COMPUTER:
LANGUAGES:

3-J LOAD ANALYSIS

PROGRAM NAME: PNW/West Group Load Estimate (6)
DEVELOPING AGENT: Bonneville Power Administration
PROGRAM'S PURPOSE: Loads for utilities, peak and average are estimated.
HOST COMPUTER:
LANGUAGES:

PROGRAM NAME: Weather Normalization Studies (1)
DEVELOPING AGENT: New York PSC
PROGRAM'S PURPOSE: Adjusts sales data to normal weather conditions from abnormal conditions of utility test year and extrapolates historic weather patterns into future years, using multivariable linear regressions.
HOST COMPUTER: IBM 370/158
LANGUAGES: FORTRAN

PROGRAM NAME: Power Peak Load Statistics (1)
DEVELOPING AGENT: New York PSC
PROGRAM'S PURPOSE: Data describing conditions during the weekly peak load hours are collected for each power utility, PASNY and the New York State Power Pool. These data include date, time, peak load total capabilities, capacity out of service, energy transfer transactions, gross margin and subordinate data. The primary products are series of reports displaying the data in various contexts against historical and projected values.
HOST COMPUTER: IBM 370/158
LANGUAGES: COBOL

PROGRAM NAME: Electric Peak Load Study (1)
DEVELOPING AGENT: Ohio PUC
PROGRAM'S PURPOSE: Provides insights on electric peak loads and alternative means of utilizing power. Will provide data base and electric peak load factors useful in planning work under Utilities Department management in cooperation with selected Ohio Electric Utilities with FEA funds.
HOST COMPUTER: IBM 370
LANGUAGES: FORTRAN

PROGRAM NAME: LOLAM1, LOLAM2, LOLAM3, LOLAM4 - Four program modules of TBS Load-Lambda Model (4, 2)
DEVELOPING AGENT: Temple, Barker & Sloane
PROGRAM'S PURPOSE: The programs are designed to evaluate historical load or lambda data for use in such areas as peak-load pricing or load management. The programs calculate general statistics and frequency distributions for peak and off-peak periods defined by the user.
HOST COMPUTER: CDC 3600
LANGUAGES: FORTRAN

PROGRAM NAME: System Load Data Analysis Program (2)
DEVELOPING AGENT: Iowa State Commerce Commission
PROGRAM'S PURPOSE: This program using hourly system load data of an electric utility in the EEI load diversity study format, compiles average weekday hourly loads, hourly loads, load duration curves, period load factors, and period peaks on a monthly, seasonal, and annual basis.
HOST COMPUTER: IBM 370/158
LANGUAGES: FORTRAN

PROGRAM NAME: Perspective on Industrial Energy Load Patterns (3)
DEVELOPING AGENT: Battelle Memorial Institute
PROGRAM'S PURPOSE:

HOST COMPUTER:
LANGUAGES:

PROGRAM NAME: Load Weather Correlation (2)
DEVELOPING AGENT: Power Technologies, Inc.
PROGRAM'S PURPOSE: Series of programs used to develop correlation of weather-sensitive segment of load with historic weather data.
HOST COMPUTER: H440, I360, P400
LANGUAGES:

PROGRAM NAME: Weather Model (2)
DEVELOPING AGENT: Power Technologies, Inc.
PROGRAM'S PURPOSE: This program analyzes raw weather data to produce output in any convenient form necessary for analysis of weather dependent phenomena.
HOST COMPUTER: H440, HP2120
LANGUAGES:

PROGRAM NAME: Loss Analysis Program (2)
DEVELOPING AGENT: Gilbert Associates Inc.
PROGRAM'S PURPOSE: The program calculates demand and energy loss factors by specified voltage levels for conductors and transformers (load and no load). These values are then used to adjust customer usage to account for system losses prior to the allocation of costs to customers.
HOST COMPUTER: IBM 370
LANGUAGES: FORTRAN

PROGRAM NAME: Load Research System Programs (2)
DEVELOPING AGENT: Gilbert Associates Inc.
PROGRAM'S PURPOSE: Comprehensive editing and reporting system for producing a time structured load research data base with user specified output reports and optional graphics.
HOST COMPUTER: IBM 360 and 370
LANGUAGES: FORTRAN, ASSEMBLER, COBOL (ANSI)

PROGRAM NAME: Load Duration/Load Profile Program (2)
DEVELOPING AGENT: Gilbert Associates Inc.
PROGRAM'S PURPOSE: With the aid of a Calcomp pen plotter, the program generates load profile curves for customer, class or system Kwh loads over a specified time period and/or load duration curves for selected Kwh levels over time.
HOST COMPUTER: IBM 370
LANGUAGES: FORTRAN

PROGRAM NAME: Load Data Analysis Code (FRED) (4, 1)
DEVELOPING AGENT: Ohio PUC, OSU
PROGRAM'S PURPOSE: Analyzes electric utility load data:
1. For a specified period: the program determines the peak system demand and the month, day and hour; the load factor, megawatt hours generated, and lists hourly load data.
2. The program calculates and plots the following curves for a specified period:
a. Load frequency
b. Load duration
c. Load probability
d. Average hourly load for each day of the week
3. Peak hourly load for each day of the week

HOST COMPUTER: IBM 360/168

LANGUAGES: FORTRAN

PROGRAM NAME: Megawatt Hour Generation Program (MWHSALES) (4, 1)

DEVELOPING AGENT: Ohio PUC, OSU

PROGRAM'S PURPOSE: An analytical tool which analyzes the hourly generation data submitted by electric utilities to the Edison Electric Institute (EEI). The computer report provides monthly information of the total generation, percent of annual generation, the monthly load factor, the peak system demand in MW's and the day and hour that demand occurred.

HOST COMPUTER: IBM 370/168

LANGUAGES: FORTRAN

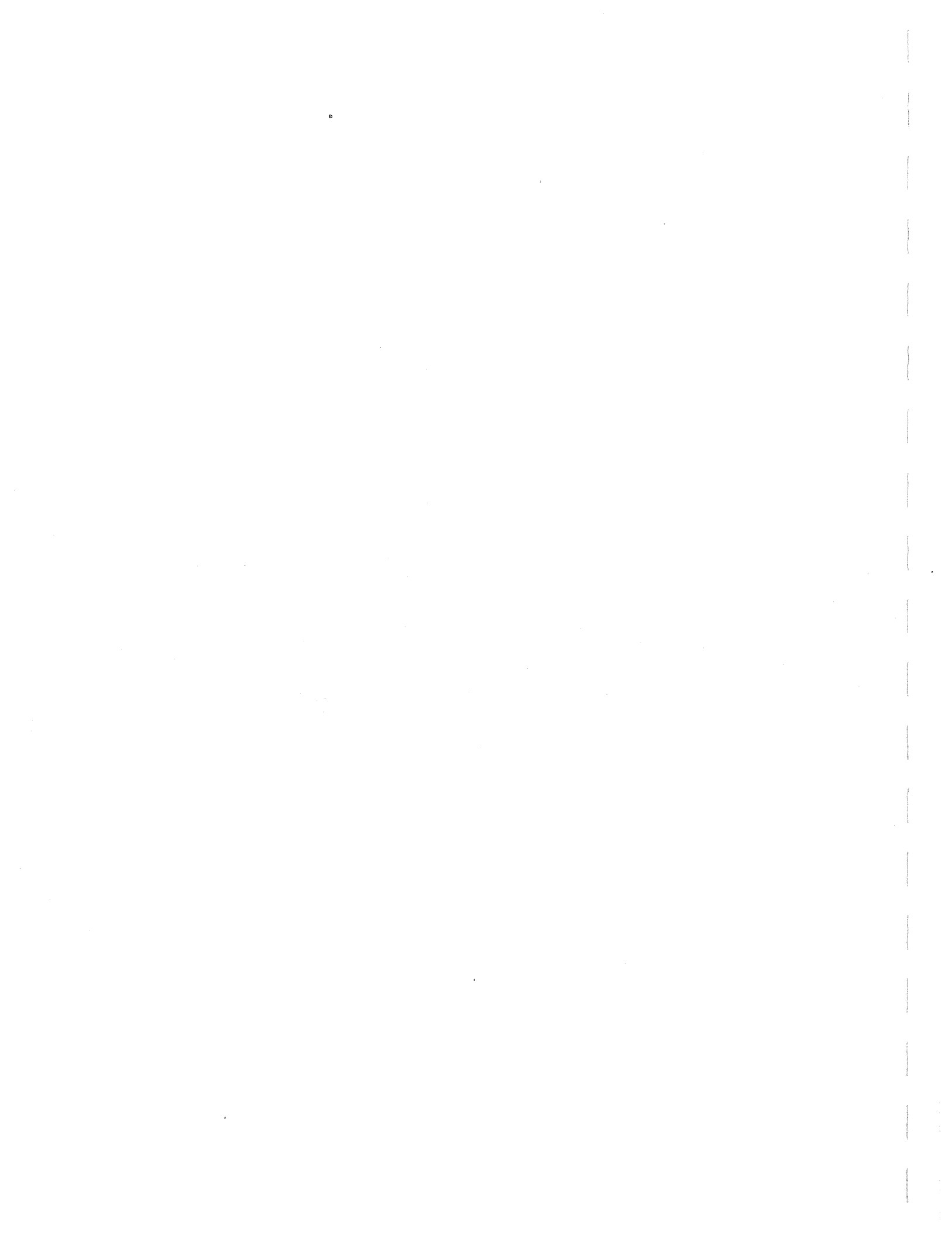
PROGRAM NAME: Load Study (1)

DEVELOPING AGENT: Missouri Public Service Commission

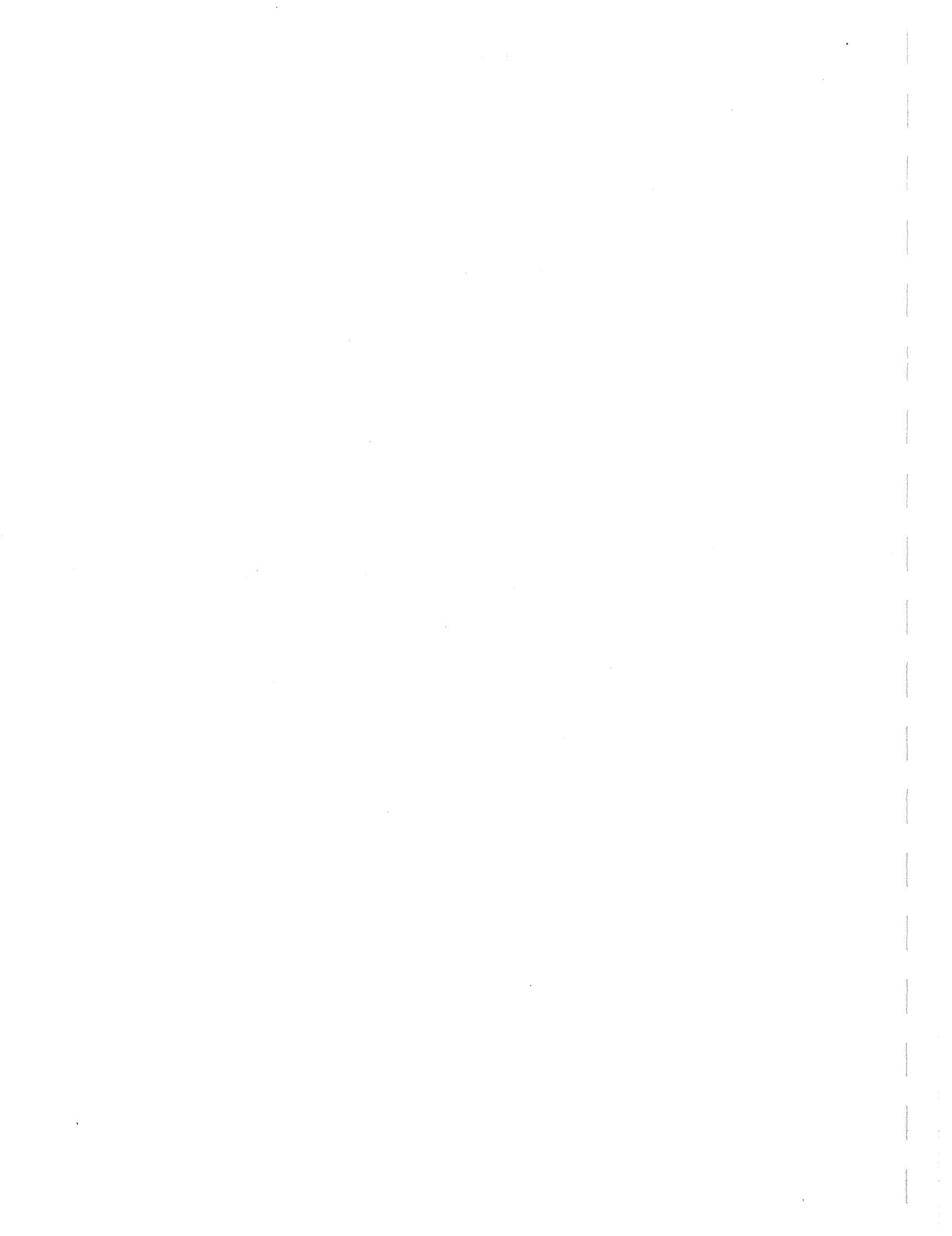
PROGRAM'S PURPOSE: Provides a means of statistically determining a group (sample) of customers that are representative of a system for the purpose of determining participants in a load research study.

HOST COMPUTER: IBM 370/158

LANGUAGES: COBOL, FORTRAN



3-K ENERGY POLICY ANALYSIS



PROGRAM NAME: Dynamic Energy System Optimization Model (6)

DEVELOPING AGENT: Brookhaven National Laboratory

PROGRAM'S PURPOSE: Linear programming model emphasizing technological detail and interfuel substitution. Optimizes over 5 year periods.

HOST COMPUTER:

LANGUAGES:

PROGRAM NAME: Multi-regional Energy System Optimization Model (6)

DEVELOPING AGENT: Brookhaven National Laboratory

PROGRAM'S PURPOSE: Optimized energy costs by region (analysis, R&D, Policy form.)

HOST COMPUTER:

LANGUAGES:

PROGRAM NAME: Total Impacts of Alternative Energy Systems (3)

DEVELOPING AGENT: Federal Power Commission

PROGRAM'S PURPOSE: A number of alternative energy systems are simulated in a future time period with terminal year set in the year 2000.

HOST COMPUTER:

LANGUAGES:

PROGRAM NAME: Regional Framework for Energy Planning/Northeastern U.S.A. (3)

DEVELOPING AGENT: Brookhaven National Laboratory

PROGRAM'S PURPOSE: Regional energy models developed to provide the framework for understanding the priorities of energy policy issues & for calculating the impacts of alternative future strategies.

HOST COMPUTER:

LANGUAGES:

PROGRAM NAME: Energy Supply Planning Model (3)

DEVELOPING AGENT: Bechtel Corp., San Francisco

PROGRAM'S PURPOSE: The energy supply planning model is designed to convert future (1975 to 1995) energy mixes to resource requirements schedules. With this planning tool, the feasibility of various proposed mixes can be assessed in terms of the time, capital, manpower, materials and construction schedules required for the specified energy supply system.

HOST COMPUTER:

LANGUAGES:

PROGRAM NAME: Dynamic Study of Energy System Long-Term Feasibility (3)

DEVELOPING AGENT: University of Washington

PROGRAM'S PURPOSE:

HOST COMPUTER:

LANGUAGES:

PROGRAM NAME: Total Energy System Long-Term Feasibility
Dynamic Simulation Model (3)

DEVELOPING AGENT: Wakefield, R.A. (Air Force Avionics Lab.,
Wright-Patterson AFB, OH.)/Danborg, M.J.

PROGRAM'S PURPOSE: Model was used to analyze the long-term feasibility
of constructing and operating a total energy plant
as opposed to a conventional thermal plant.

HOST COMPUTER:

LANGUAGES:

PROGRAM NAME: Dynamic Simulation for Regional Energy Studies (3)

DEVELOPING AGENT: Jones, B. W., Moretti, P. M./Mize, J. H.
Oklahoma State University, Stillwater

PROGRAM'S PURPOSE: Series of models were developed for regional studies of
energy supply-demand systems. The final goal is to
include all aspects of regional energy systems from
native supplies of energy resources to the economic
activities of the region.

HOST COMPUTER:

LANGUAGES:

PROGRAM NAME: Linear Programming Model of the Nation's Energy
System (3)

DEVELOPING AGENT: Brookhaven National Laboratory

PROGRAM'S PURPOSE:

HOST COMPUTER:

LANGUAGES:

PROGRAM NAME: Coupled Energy System - Economic Models (6)
DEVELOPING AGENT: ERDA
PROGRAM'S PURPOSE: The integrated energy system-economic models are used to evaluate the long run economic, energy, and environmental effects of various combinations of government energy policies. Those include policies relating to research, development, and demonstration of new energy supply, conversion and end-use conservation technologies.
NATURE OF DATA: Four Models
* Data Resources Incorporated (DRI) Macroeconomic Growth Model
* Hudson-Jorgenson Nine-Sector Model
* Input-Output Model
* Brookhaven Energy System Optimization Model (BESOM)
PROCESSING: Collection and tabulation, process.
HOST COMPUTER:
LANGUAGES:

PROGRAM NAME: Regional Energy Policy Project (6)
DEVELOPING AGENT: Bonneville Power Administration
PROGRAM'S PURPOSE: Resources model programs for energy demand and forecasting, environmental impact, contingency planning and energy policy.
HOST COMPUTER:
LANGUAGES:

PROGRAM NAME: Project Independence Evaluation System (PIES) Documentation Volume 1. The Integrating Model of the Project Independence Evaluation System (3)
DEVELOPING AGENT: Logistics Management Inst.
PROGRAM'S PURPOSE: The project independence evaluation system is a complex computer model developed by the FEA for its use in energy policy analyses. PIES represents the energy economy of the nation on an average day in selected target years-1980, 1985 or 1990. This report describes the entire model in a general fashion and the specific implementation of different sectors of the supply side of the model.
HOST COMPUTER:
LANGUAGES:

PROGRAM NAME: Energy Supply and Demand Alternatives for Appalachian Region (6)

DEVELOPING AGENT: Appalachian Regional Commission, Natural Resources Division

PROGRAM'S PURPOSE: This is a regional energy supply and demand computer model that examines future prospects for development of Appalachian Energy Resources and their environmental-economic-social impacts on the region. It relies almost exclusively upon secondary source data, and its principal outputs are energy projections.

HOST COMPUTER:

LANGUAGES:

PROGRAM NAME: Brookhaven Energy Systems Optimization Model (6)

DEVELOPING AGENT: Brookhaven National Laboratory

PROGRAM'S PURPOSE: Forecasting on a regional or national level optimized costs and environmental protection.

HOST COMPUTER:

LANGUAGES:

PROGRAM NAME: Economic Simulation Model for Analyzing Energy Policy Impacts in Texas (3)

DEVELOPING AGENT: Texas Governor's Energy Advisory Council

PROGRAM'S PURPOSE: A simulation model was designed to analyze the impact of public energy policies on the economy of Texas. The model assumes: (1) that the national energy mkt. is stable, (2) that the current Texas input-output model approp. identifies user trade relationships and energy use, (3) that Texas users will have first priority for crude oil and natural gas during shortages, and (4) crude oil and natural gas are the most growth-restricting resources in Texas.

HOST COMPUTER:

LANGUAGES:

PROGRAM NAME: PIES (Project Independence Evaluation System) (2,6)
DEVELOPING AGENT: Federal Department of Energy: Energy Information Admin.
PROGRAM'S PURPOSE: The PIES is a national energy forecasting system used to forecast energy prices, supplies, demands and conversion activities. Potential impacts of changes in Federal policies are investigated by specifying alternative scenarios.
HOST COMPUTER: IBM 370/168
LANGUAGES: FORTRAN and MAGEN

PROGRAM NAME: Energy Resources Gamed Simulation (ERGS) (3)
DEVELOPING AGENT: Brown, H.L., Laessig, R.E., Stribual, M.R.
Drexel University, Philadelphia, Pa.
PROGRAM'S PURPOSE: Designed to teach basic energy management principles and to provide an energy systems perspective.
HOST COMPUTER:
LANGUAGES:

PROGRAM NAME: Multi-regional Energy System Optimization Model (6)
DEVELOPING AGENT: Brookhaven National Laboratory
PROGRAM'S PURPOSE: Forecasts by 9 census-regions which optimize costs of energy and environmental protection.
HOST COMPUTER:
LANGUAGES:

PROGRAM NAME: Energy System Network Simulation (ESNS),
A User's Guide (5)

DEVELOPING AGENT: Brookhaven National Lab

PROGRAM'S PURPOSE: This user's guide was written to serve as a description of the ESNS computer code and corresponding input data file structure. A separate report, The Energy System Network Simulator: (BNL-50492), provides an extended discussion of the capabilities and methodological approach of the model along with a detailed construction of a sample analysis. BNL-50492 should be consulted for an introduction to some of the terms discussed in this guide, and for more detailed descriptions of certain of the input data elements. The ESNS code presently consists of a main program and sixteen subroutines. The main program (ESNS) serves primarily as (a) an input routine for initial data and model structure requirements, and (b) an executor by subroutine call of the various options, analytical computations, data modifications, and output generators built into the code. Listed along with the main program are all subroutines available and a brief description of their functions in the present order of their appearance in the ESNS source code file structure. (Introduction). (ERA citation 01:019445)

HOST COMPUTER:

LANGUAGES:

PROGRAM NAME: Computer Simulation of LNG Cycles (3)

DEVELOPING AGENT: Illinois Institute of Technology

PROGRAM'S PURPOSE: Non-proprietary data and independently developed techniques for predicting fluid mixture properties have been adapted in a computerized system for the purpose of making preliminary studies and comparisons of major LNG cycles. The essentials of the computational techniques and the principles of the processes as encountered in the liquefaction of natural gas are briefly described.

HOST COMPUTER:

LANGUAGES:

PROGRAM NAME: Disaggregating the Electric Utility Sector in a
97-Sector Linear Model of the U.S. Economy (3)

DEVELOPING AGENT: California University

PROGRAM'S PURPOSE:

HOST COMPUTER:

LANGUAGES:

PROGRAM NAME: User's Guide to the MIT Natural Gas Model (3)

DEVELOPING AGENT: MIT

PROGRAM'S PURPOSE:

HOST COMPUTER:

LANGUAGES:

PROGRAM NAME: Use of Linear Programming to Model Business and Computer
Decision Making Related to Energy Consumption (3)

DEVELOPING AGENT: Battelle Pacific Northwest Labs

PROGRAM'S PURPOSE:

HOST COMPUTER:

LANGUAGES:

PROGRAM NAME: E.L.S.A.
An Electric Power Supply Analysis Model for the Pacific Northwest. (3,5)

DEVELOPING AGENT: Battelle Pacific Northwest Labs

PROGRAM'S PURPOSE: Battelle, Pacific Northwest Laboratory (PNL) is conducting a program to help assess impacts of energy-related developments through the year 2025 in six northwestern states--Washington, Oregon, Idaho, Montana, Whoming and Alaska. ELSA (Electric Power Supply Analysis Model), one component of this overall program, is a simulation model of the electric supply system in the Pacific Northwest designed to better define future effects of electrical developments. It permits the analyst to examine the structure of the electric utility industry, to postulate possible scenarios and policy decisions, and to test their effect on the cost and availability of power. ELSA is divided into three major sectors: production, regulatory, and construction. The production sector uses the installed generating capacity of five types of facilities (hydroelectric, nuclear, coal-fired, oil-fired, and combustion turbines) and the requirements for electricity to compute the electrical reserve capacity and the system load factor. The regulatory sector uses information from the production sector and a number of exogenous variables such as capital costs, fuel costs, and tax rates to determine the price of electricity as well as other other financial variables. The construction sector performs three major functions: (1) forecasts the amount of new construction needed, (2) determines the amount of new construction that can be financed, and (3) decides the types of new generating capacity which should be initiated. Future work with ELSA is described.

HOST COMPUTER:

LANGUAGES:

PROGRAM NAME: COMPARES (Computational Procedure for Applying Reference Energy Systems) (2)

DEVELOPING AGENT: Electric Power Research Institute (Dom Geraghty)

PROGRAM'S PURPOSE: Impact of new energy technologies or policies. An interactive program sets up case-studies for nine census regions in terms of the Brookhave National Laboratory's Reference Energy System representation and Energy Modeling Data Base (developed for EPRI contract number EA462).

HOST COMPUTER: IBM 370

LANGUAGES: FORTRAN

3-L ECONOMIC FORECASTING AND ANALYSIS



PROGRAM NAME: Multipurpose - Econometric Program (1)
DEVELOPING AGENT: Oregon PUC
PROGRAM'S PURPOSE: The program performs ordinary, two-and three-stage least squares regressions, with options including correction for serial correlation, specification of polynomial distributed lags, matrix operations, capital stock calculations, nonlinear least squares, and other econometric functions.
HOST COMPUTER: IBM 370/153
LANGUAGES: FORTRAN

PROGRAM NAME: Single-& Multi-Variable Regression Analysis (2)
DEVELOPING AGENT: Radian Corporation
PROGRAM'S PURPOSE: Anything requiring curve fits. Program was designed as part of a power system operations simulation package which is presently available but not stored on our computer.
HOST COMPUTER: UNIVAC 1108
LANGUAGES: FORTRAN

PROGRAM NAME: Cholesky/Regression (2)
DEVELOPING AGENT: Quantitive Economic Research Inc.
PROGRAM'S PURPOSE: Computes regression coefficients and associated statistics for a multiple regression model.
HOST COMPUTER: Burroughs 6700
LANGUAGES: ALGOL

PROGRAM NAME: Idaho Econometric Model (2)
DEVELOPING AGENT: State of Idaho Bureau of State Planning and Community Affairs
PROGRAM'S PURPOSE: What is the general economic outlook and revenue forecast for the upcoming year? What impacts do state policies and taxes have on the economic growth of the state? How does the price of electricity affect the rate of growth in the state? What interdependent links are there between Idaho's economy and the national economy?
HOST COMPUTER: DRI's Burroughs 4100
LANGUAGES: AID, PRL, and other Data Resources, Inc. languages

PROGRAM NAME: WISMOD (Wisconsin Econometric Model) (2)
DEVELOPING AGENT: Wisconsin Office of Planning & Energy
PROGRAM'S PURPOSE: Forecasting: Oriented towards forecasting state income employment & tax revenues, the model is capable of addressing the impact of changes in energy prices.
HOST COMPUTER:
LANGUAGES:

PROGRAM NAME: South Dakota Econometric Model (2)
DEVELOPING AGENT: University of S. Dakota, School of Business
PROGRAM'S PURPOSE: Program provides forecasts and simulation capabilities for the South Dakota economy. Basic sectors include output, employment, wages, income, state government revenue, financial data, farm production and income.
HOST COMPUTER: IBM 370/145
LANGUAGES: FORTRAN

PROGRAM NAME: Allocation Models for Energy Planning (3)
DEVELOPING AGENT: University of Pennsylvania
PROGRAM'S PURPOSE: A linear programming model is developed to study the problem of a sustained shortage. The methodology is first illustrated using a highly consolidated group of industries and then proceeds to an application using an 85-sector breakdown of the economy.

HOST COMPUTER:

LANGUAGES:

PROGRAM NAME: Saturation Surveys (1)
DEVELOPING AGENT: Missouri PSC
PROGRAM'S PURPOSE: Provides a 19 year history of saturation surveys conducted by Missouri utilities. The data is concerned with number of residential customer, avg. annual KWH per home, retail sales of gas & electric appliances, appliance saturation & promotions.

HOST COMPUTER: IBM 370/158

LANGUAGES: COBOL

PROGRAM NAME: Simulation of Energy Market Dynamics (3)
DEVELOPING AGENT: Mathematica, Inc.
PROGRAM'S PURPOSE:

HOST COMPUTER:

LANGUAGES:

TECHNICAL ASSISTANCE AREA IV

- A. Documentation of Case Processing Procedures
- B. Data Base Development and Utility Information System
- C. Aids to Computer Modeling
- D. Agency Operations

A. DOCUMENTATION OF CASE PROCESSING PROCEDURES



PROGRAM NAME: Work Item Tracking System (6)
DEVELOPING AGENT: Civil Aeronautics Board
PROGRAM'S PURPOSE: Broad tracking ability on progress of regulatory work is provided. Milestones and processing time for different work items establish paths and target dates. Override ability is available. Information captured on terminals is in bureaus/offices maintaining perpetual inventory of information.

HOST COMPUTER:

LANGUAGES: COBOL

PROGRAM NAME: Formal Case Management System (1)

DEVELOPING AGENT: Wisconsin PSC

PROGRAM'S PURPOSE: This system provides information to management on the status of formal cases before the PSC. Two reports are produced: the monthly formal case status report contains detailed information on each pending docket; the docket report provides a summary on the number of cases opened, closed and pending for the month.

HOST COMPUTER:

LANGUAGES:

PROGRAM NAME: On-Line Update Rate Case Processing (1)

DEVELOPING AGENT: Ohio PUC

PROGRAM'S PURPOSE: On-line update of events associated with rate case processing. Provides four reports that display status of each case on screen and provides hard copy of all cases listed by data and events, summary by industry and cases assigned to attorney examiners.

HOST COMPUTER: IBM 370/168

LANGUAGES: FORTRAN

PROGRAM NAME: File & Monthly List of Current Processes and Status. (1)
DEVELOPING AGENT: California PUC
PROGRAM'S PURPOSE: This program maintains accessible information on hearing.

HOST COMPUTER:

LANGUAGES: COBOL

PROGRAM NAME: Case Status System (File Maintenance) (1,2)
DEVELOPING AGENT: Ohio PUC
PROGRAM'S PURPOSE: Provides status of all cases on Docket.
Phase I: Provides basic reports on selected status events associated with Docketing activities. Four reports available:

1. Listing with events of all cases or selected group of cases
2. Individual printout of cases.
3. Summary report showing case grouped by numbers in each status category.
4. Cases assigned to examiners.

Phase II: To include Legal and Utilities Department events.

Phase III: To provide a scheduling system indicating projected events with expected completion dates.

HOST COMPUTER: IBM 370/168

LANGUAGES:

PROGRAM NAME: Case Processing - Case Assignments, Summary By
Industry (1)

DEVELOPING AGENT: Ohio PUC

PROGRAM'S PURPOSE: On-line update of events associated with rate case
processing. Provides four reports that display
status of each case on screen and provides hard
copy of all cases listed by date and events, sum-
mary by industry and cases assigned to attorney
examiners.

HOST COMPUTER: IBM 370/168

LANGUAGES: FORTRAN

PROGRAM NAME: Case Inventory and Control System (1)

DEVELOPING AGENT: Interstate Commerce Commission

PROGRAM'S PURPOSE: The purpose of this system is to report informa-
tion concerning pending caseloads and the progress
of administrative proceedings. The system enables
the commission to determine the age and status of
its proceedings docket or how long a specific case
has been particular processing stage. Such infor-
mation provides capability to establish due dates
for the completion of major processing stage.

HOST COMPUTER: DEC System 10

LANGUAGES: COBOL

PROGRAM NAME: Docket or Case Processing (1)

DEVELOPING AGENT: Florida PSC

PROGRAM'S PURPOSE: Docket is a system of computer programs designed to
help manage the large volume of data associated with
commission docket fillings. It consists of three
primary modules-edit, archive, and retrieval. Edit
performs an update function or addition of new docket,
etc. Archieve is used to remove or close out a docket
from an active status. Retrieve is used for docket in-
formation retrieval. The system has the capabilities to
repeat on status of case, retrieve information from
dockets qualified by various criteria.

HOST COMPUTER: CDC 6400

LANGUAGES: FORTRAN

PROGRAM NAME: Case Monitoring System (2)

DEVELOPING AGENT: Pennsylvania PUC

PROGRAM'S PURPOSE: Centralize collection of information pertaining to a docketed case as brought before the commission, the system collects all past action to the particular case and also future actions are maintained for the case.

HOST COMPUTER: UNIVAC 1110

LANGUAGES: COBOL ASCII

4-B DATA BASE DEVELOPMENT AND
UTILITY INFORMATION SYSTEMS

PROGRAM NAME: Electric Power System Recurring Description and
Periodic Operating Information (6)

DEVELOPING AGENT: Federal Power Commission

PROGRAM'S PURPOSE: Provide electric utilities physical generation and
transmission plant information account of the electric
system's energy production, intersystem transfers,
system peak demands and energy sales (no revenue data)

HOST COMPUTER:

LANGUAGES:

PROGRAM NAME: Store & Display Varying Lawful Utility Rate Schedule (1)

DEVELOPING AGENT: California PUC

PROGRAM'S PURPOSE: Utility rate schedules which are approved by the PUC may
vary by locality depending on utility size or customer
peak loads, hours, and other factors. The data base con-
sists of rate schedules; information on size, location,
capital structure, etc.

HOST COMPUTER: CDC Cyber 175

LANGUAGES: FORTRAN

PROGRAM NAME: Structure, Operations & Profitability of Major Utility (1)

DEVELOPING AGENT: California PUC

PROGRAM'S PURPOSE: Based on a nationwide category system (FPC ACC numbers),
standardized, structured information is solicited and
stored on mag tape from largest utilities. Generally
this is balance sheet data and profit-and-loss data, plus,
information on capital structure, sunk investment, production
facilities, marketing facilities, distribution facilities,
etc. Being an innovation (late 1976) the system now
includes several small programs which will be consolidated
into an updated system.

HOST COMPUTER: CDC CYBER 175

LANGUAGES: COBOL

PROGRAM NAME: Corporate, Financial, & Economic Information File
(RISCEID) (6)

DEVELOPING AGENT: Federal Power Commission

PROGRAM'S PURPOSE: To provide monthly and annual financial data on
the electric industry and natural gas pipeline
industry used by FPC, State Regulatory Commissions,
Congress, and other Federal agencies, general
public, and others.

PROCESSING: Sources for data are the electric
utilities and natural gas pipeline companies
filing annual reports, FPC Form 1, 1-M, and/or
FPC Form 2 as prescribed under the requirements
of the Federal Power Act and Natural Gas Act.
Monthly reports, FPC Form 5, are filed by all
electric utilities having \$2.5 million or more
in electric operating revenues, and FPC Form 11,
filed by the major interstate natural gas pipeline
companies whose combined sales for resale and gas
transported (interstate) or stored for a fee ex-
ceeded 50 billion cubic feet during the preceding
calendar year.

HOST COMPUTER:

LANGUAGES:

PROGRAM NAME: Statistical Analysis of Various Company File Data (1)

DEVELOPING AGENT: New York PSC

PROGRAM'S PURPOSE: The statsystem program allows the rate engineer to perform
various statistical analysis of company data, extremely
helpful in preparing weather normalization studies. The
program allows flexibility in data manipulation to perform
analysis of least squares regression, confidence limits,
and regressions to fit different types of curves.

HOST COMPUTER: Commercial Time Sharing Service

LANGUAGES:

PROGRAM NAME: Economic Model using Moody's (1)
DEVELOPING AGENT: Missouri PSC
PROGRAM'S PURPOSE: Provides a complete financial information system for Moodys 125 industrial companies. The data can be accessed by company by year as far back as 1954. Several statistical analyses and reports are available using this data as the source.
HOST COMPUTER:
LANGUAGES: FORTRAN

PROGRAM NAME: Electricity Consumption Analysis Data Base (6)
DEVELOPING AGENT: ERDA
PROGRAM'S PURPOSE: The ECAD file contains data on electricity sales to five (5) consuming sectors by 63 privately owned U.S. utilities.
HOST COMPUTER:
LANGUAGES:

PROGRAM NAME: Utility Financial Data Bank (1)
DEVELOPING AGENT: New York PSC
PROGRAM'S PURPOSE: Edits and stores data from annual financial reports submitted by significant companies (Class A&B). Provides report generating facilities through which user defines reports and calculations desired. Provides for retaining defined reports and automatic redefinition for succeeding years.
HOST COMPUTER: IBM 370/158
LANGUAGES: COBOL

PROGRAM NAME: Econometric Model Using Utility Data (1)
DEVELOPING AGENT: Missouri PSC
PROGRAM'S PURPOSE: Provides analysis on rate of return & special reports using as a source financial related data for approximately 175 market-trended companies.
HOST COMPUTER: IBM 370/158
LANGUAGES: FORTRAN

PROGRAM NAME: Corporation Registration, Assessments & Inquiry (1)
DEVELOPING AGENT: Virginia State Corporation Commission
PROGRAM'S PURPOSE: System supports corporation registration & tax processes. Organized around DMS database. Data entry and inquiry are on-line. Update and report are batch. Data entry includes on-line sight verification. Data entry and verification 90t portable standard functions in designated environment. Update 30t.
HOST COMPUTER: UNIVAC 1100
LANGUAGES: COBOL

PROGRAM NAME: Monthly Financial Surveillance (1)
DEVELOPING AGENT: Missouri PSC
PROGRAM'S PURPOSE: Assists the commission in properly evaluating the financial and operating characteristics of Missouri regulated utilities. Analysis is on a monthly basis and contains 35 major financial and operating characteristics plotted over a 54 month period.
HOST COMPUTER: IBM 370/158
LANGUAGES:

PROGRAM NAME: Yearly Operating and Financial Statements (1)

DEVELOPING AGENT: California PUC

PROGRAM'S PURPOSE: Six reports and produced displaying company investment, gross sales, operating costs, volume of product input, profitability before taxes, production per unit capital investment. The program is used for approving proposed rate schedules allowing costs per unit production and so on.

HOST COMPUTER: CDC CYBER 175

LANGUAGES: COBOL

PROGRAM NAME: Quarterly Reporting System (2)

DEVELOPING AGENT: Pennsylvania PUC

PROGRAM'S PURPOSE: Surveillance of major fixed utilities on a quarter basis. Includes Federal Energy Administration Account Codes reporter quarter for balance sheet, operating, and selected statistical data.

HOST COMPUTER: Burroughs B1700/B2500/B3500/B4800/ Series

LANGUAGES: COBOL

PROGRAM NAME: GASNET 2 (2)

DEVELOPING AGENT: EPRI, Energy Analysis Department

PROGRAM'S PURPOSE: A natural gas transmission, distribution and pricing model. GASNET containing 105 pipeline companies operating in 144 substate regions, 240 distribution companies and a pricing sector. Designed for analyzing distribution patterns for natural gas in the period 1980-2000.

HOST COMPUTER: IBM 370

LANGUAGES: FORTRAN

PROGRAM NAME: Power Fuel Statistics (1)
DEVELOPING AGENT: New York PSC
PROGRAM'S PURPOSE: Takes data available on Federal Power Commission report Forms 4 and 423 and generates the following reports:
1. Statewide fuel usage by fuel for the reported month and for the same month of the previous year.
2. Fuel usage by company and kind of fuel.
3. Statewide average cost of fuel by kind for the previous few months.
4. Fuel costs by company and
5. Composite fuel costs by company for the last period.
HOST COMPUTER: IBM 370/158
LANGUAGES: FORTRAN

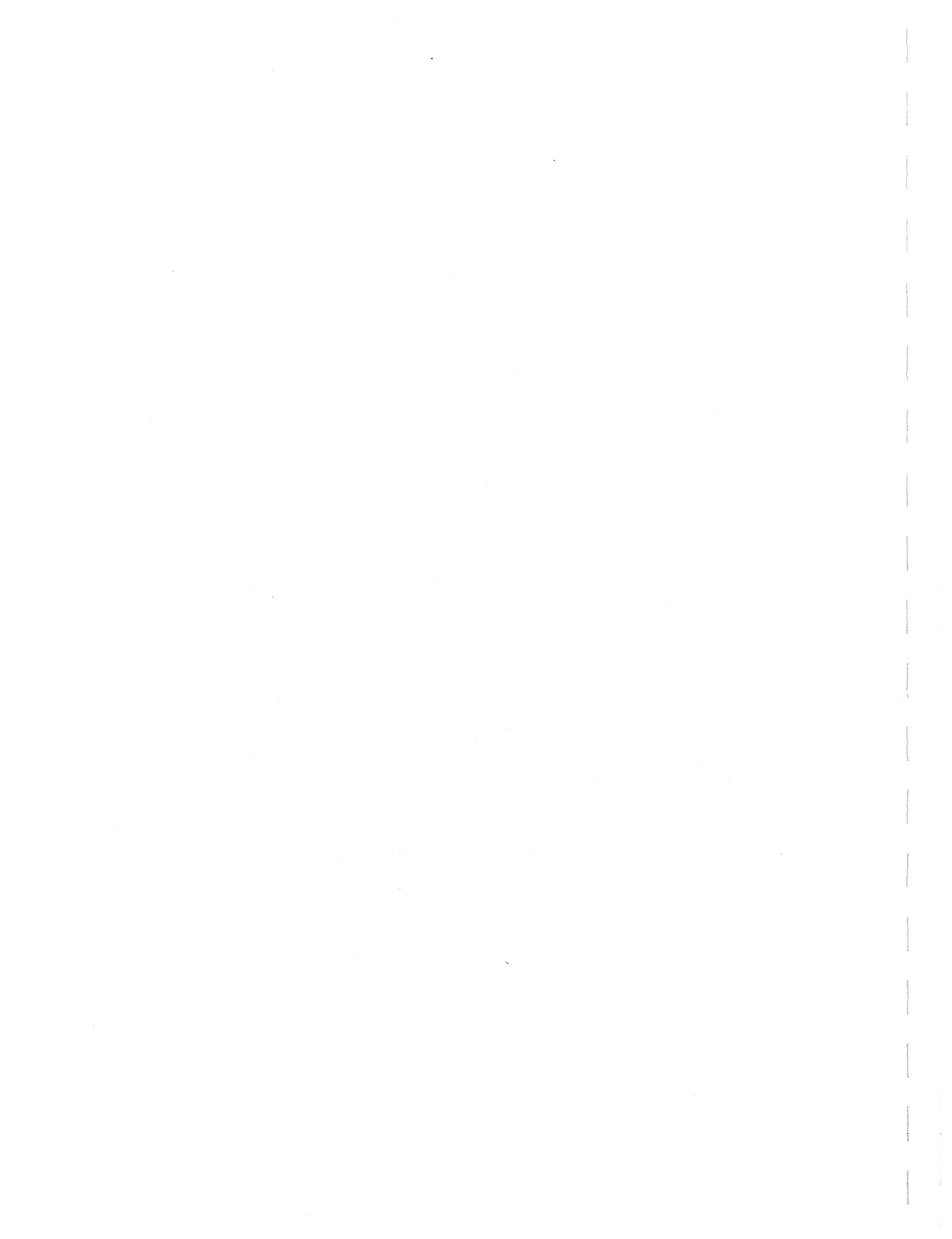
PROGRAM NAME: Utilities Corporations Financial Ratios (1)
DEVELOPING AGENT: Ohio PUC
PROGRAM'S PURPOSE: Programs calculate and provide financial and economic ratios relating to utility corporations.
HOST COMPUTER: IBM 370/168
LANGUAGES: FORTRAN

PROGRAM NAME: Utility Information System (1)
DEVELOPING AGENT: Missouri PSC
PROGRAM'S PURPOSE: Provides a data base of basic information on all Missouri regulated utilities, each utility's service area & a mailing file relating to all news media in the state of Missouri.
HOST COMPUTER: IBM 370/158
LANGUAGES:

4-C AIDS TO COMPUTER MODELING

PROGRAM NAME: Datatrace (2)
DEVELOPING AGENT: Data Index Incorporated
PROGRAM'S PURPOSE: Government and industry are both interested in the documentation of computer systems and programs. DATATRACE facilitates this process by maintaining a documentation library which can be updated, changed and maintained on the computer.
HOST COMPUTER: Any COBOL machine
LANGUAGES: COBOL

PROGRAM NAME: INDEXX (2)
DEVELOPING AGENT: Data Index Incorporated
PROGRAM'S PURPOSE: Thick reports for government regulatory bodies frequently occur. The user needs to have help in "finding his way through" the reports. He needs to have access by key-words and by organizational displays. INDEXX provides this access.
HOST COMPUTER: Any COBOL machine
LANGUAGES: COBOL



4-D AGENCY OPERATIONS

PROGRAM NAME: Dynamics of Electric Utility Rate Regulation (3)
DEVELOPING AGENT: Texas Christian University Research Foundation
PROGRAM'S PURPOSE: A nationally aggregated dynamo model was developed for simulating the financial dynamics of the U.S. electric utility industry. The regulatory sector of this model is presented in detail with flow diagrams and casual loop structures.
HOST COMPUTER:
LANGUAGES:

PROGRAM NAME: Address Mail Lists (1)
DEVELOPING AGENT: Washington Utilities & Transportation Commission
PROGRAM'S PURPOSE: This sytem creates, updates, lists, and prints labels for various mailing requirements.
HOST COMPUTER: DATA POINT 5500
LANGUAGES:

PROGRAM NAME: Simulation of a Regulatory Commission (3)
DEVELOPING AGENT: Denison University
PROGRAM'S PURPOSE: A computer simulation model of a public utility commissioner's task in regulating a typical public utility is discussed with the main emphasis being an instructional one.
HOST COMPUTER:
LANGUAGES:

PROGRAM NAME: Inventory System (1)
DEVELOPING AGENT: Washington Utilities & Transportation Commission
PROGRAM'S PURPOSE: Keeps inventory on all non-expendable equipment. Reports produced are by identification number, type of equipment, and by location. When any equipment is surplus, it is still carried on file and shown on a surplus report.
HOST COMPUTER: IBM 370/158
LANGUAGES:

PROGRAM NAME: Employee Time Reporting System (1)
DEVELOPING AGENT: Wisconsin PSC
PROGRAM'S PURPOSE: The employee time data is added to the employee master file weekly. Data edit is performed on entrex data capture system. Monthly reports are produced to provide detailed employee activity report and summary reports for bureau and division level.
HOST COMPUTER: IBM 360/65
LANGUAGES: COBOL

PROGRAM NAME: Budget Analysis (1)
DEVELOPING AGENT: Kentucky Dept. of Transportation
PROGRAM'S PURPOSE: Projects surplus or deficit amount by using the original allotment, adjustments, recording expenditures versus time elapsed. Provides information by organizational unit and by (salaries, supplies, travel, etc.) within each unit.
HOST COMPUTER: IBM 370/168
LANGUAGES: COBOL

PROGRAM NAME: Field Investigator Reports (1)
DEVELOPING AGENT: Ohio PUC
PROGRAM'S PURPOSE: Provides investigator activity on a month-to-month basis including violations, arrests made, fines collected, and performance of investigators.
HOST COMPUTER: IBM 370/168
LANGUAGES: COBOL

PROGRAM NAME: Department Property Inventory (1)
DEVELOPING AGENT: New York PSC
PROGRAM'S PURPOSE: Contains data on all equipment owned by the department. The files are constructed so that all data required by the state comptroller's rules and regulations are contained in the system. The files are updated as new equipment is purchased and/or obsolete and unusable equipment is discarded. Lists for each unit are generated on a quarterly basis or more frequently if required.
HOST COMPUTER: IBM 370/158
LANGUAGES:

PROGRAM NAME: Budget (1)
DEVELOPING AGENT: Ohio PUC
PROGRAM'S PURPOSE: Provides expense summaries and shows relationships to budget for each month, each three months and annually by departments.
HOST COMPUTER: 370/168
LANGUAGES: COBOL

PROGRAM NAME: Physical Inventory (1)
DEVELOPING AGENT: Missouri PSC
PROGRAM'S PURPOSE: Controls the non-expendable physical inventory of the PSC when new items are obtained or old items removed this reporting system will reflect the changes. Any item may be retrieved, similar types of items listed and listings by location are available.
HOST COMPUTER: IBM 360/158
LANGUAGES:

PROGRAM NAME: Management and Administration System (1)
DEVELOPING AGENT: Interstate Commerce Commission
PROGRAM'S PURPOSE: This system provides management with computer support for position control, status of funds and budgets. The system monitors all positions, including grade ranges, and incumbent personnel within each position. The system is used for forecasting future position requirements and the displaying of authorized versus on-board position strengths. The status of funds - shows up-to-date appropriated funds, and all obligations applied to them.
HOST COMPUTER: UNIVAC Series 70
LANGUAGES: COBOL

PROGRAM NAME: Master Identification & Address Label System (1)
DEVELOPING AGENT: Ohio PUC
PROGRAM'S PURPOSE: A series of programs and files providing pertinent information such as utility and transportation companies names, addresses and key executives' names.
HOST COMPUTER: 370/168
LANGUAGES: COBOL

V. CURRENT INSTITUTE CAPABILITIES IN RELATION TO SELECTED TECHNICAL ASSISTANT PROJECTS

This chapter contains a brief description of the Institute's computer capability in relation to the selected technical assistance projects.

ALTERNATE RATE STRUCTURES

Two projects were selected in this topic area. One with the Delaware Public Service Commission and the other with the Philadelphia Gas Works. Although the Institute has computer capability in rate design and rate analysis, these projects are expected to require minimum computer assistance.

TIME OF USE PRICING

Two projects were selected for this topic area. One with the Idaho Public Utilities and the other with the New York Public Service Commission. The Institute has been actively involved in computer work in the area of time-of-use pricing. Numerous programs have been developed to analyze customer load data, utility load data, customer response to time-of-day pricing, rate structures, development of time of day rates as a function of utility load pattern constrained by revenue requirements, and simulation programs of the response of customers to time-of-day rates. The utilization of this expertise is expected in these two projects.

MARGINAL COST PRICING

The South Carolina Public Service Commission's application in this area was selected. The project request includes a seminar on marginal cost pricing. The Institute has performed work in this area and has operational the Cicchetti computer model for determining marginal costs.

LIFELINE

The technical assistance of the Rhode Island Public Utilities Commission was selected in this topic area. The Institute has previously analyzed lifeline rates and their financial and social implications. Computer capability was utilized in these studies and will be applicable to the Rhode Island project.

COST OF SERVICE

Five projects were selected in the cost of service area. These include the states of Alaska, Nevada, Texas, Montana and Maryland. The Institute has developed a cost of service program which will functionalize the FPC accounts into the appropriate cost categories. This program has been utilized in rate cases in Ohio. It should readily be applicable to some of these projects that require cost of service analysis for a utility specific.

FUEL ADJUSTMENT CLAUSE

Institute staff in previous work with the Ohio Public Utilities Commission actively aided that commission in establishing a fuel adjustment clause and the procedures for monitoring that clause. These procedures include both manual appraisal as well as computerized appraisal. Approximately 15 other states are utilizing a fuel adjustment clause based in part on the Ohio adjustment clause. This expertise will be applied to the Illinois project.

CONSUMER EDUCATION

The Institute currently has no capability in a computer sense in performing or evaluating energy audits. However, the Mechanical Engineering Department of the Ohio State University has a nationally known

group dealing specifically with building energy conservation, energy retrofits and the like. Institute staff has a good working relationship with this group. If computer assistance is needed for this project it will be readily available from that group.

DEMAND FORECASTING MODEL

The Institute currently does not have a forecasting model to transfer to state utility commissions. In this project for the North Carolina Utilities Commission a modification or fine tuning of an existing model is required. It is expected that this minimum computer support from the Institute will be required.

UTILITY ENERGY CONSERVATION

This project which is selected to be done with the Colorado Public Utilities Commission will deal with their request to examine the opportunities for power pooling in Colorado and, in general, for the central western states. The Institute staff working with the Ohio Public Utilities Commission has performed similar studies and developed computer capability to evaluate central dispatching methods, the benefits of pooling, and other questions which arise from this type of study. The current capability of the Institute is sufficient to handle any computer requirements which may arise for this project.

CASE PROCESSING

Three projects were selected for this project area. They consist of projects with the Minnesota Department of Public Service, the New Mexico Public Service Commission and the Wyoming Public Service Commission. These projects deal in general with internal, procedural structure of these commissions, and therefore, it is expected that computer assistance will not be required. However, if assistance is required, the Institute feels that it can handle this need by coordinating

with other commissions who have developed computerized case processing systems for the necessary transfer of these systems.

DATA BASE DEVELOPMENT

The Arizona Corporation Commission's request under this topic area was accepted for technical assistance. This study is designed to aid the Arizona Commission staff in planning their utilization of newly acquired computing facilities. The project will also involve determining which computer models will be most useful to the commission and a time table for acquiring these models. Institute computer support in this project is expected to aid in the identification of models and supplying some of our inhouse models to the Arizona Commission.

COMPUTER MODELING

Three public utilities commissions and one energy office have specifically requested assistance from the Institute in acquiring and making operational the Regulatory Analysis Model (RAm) developed by Temple, Barker and Sloane under the National Bureau of Standards ETIP Project 76 program. The intent of the Institute is to hold an intensive five-day workshop on RAm. The Institute has full access to this model and has helped the Ohio Commission in its development.

In summary, although the potential use of computer programs exists in each of the technical assistance projects selected, it is expected that in only a few areas will computer assistance be required or called upon. When it is, the Institute staff is able and ready to supply the computer support needed by the technical assistance teams.

VI. COMPUTER PROGRAM SELECTION PROCESS FOR USE IN TECHNICAL ASSISTANCE PROJECTS

At this time the technical assistance projects have been identified and chosen, but the detailed work plans for each project have not been formulated. The identification of computer programs that will be beneficial in completing the technical assistance projects cannot be identified until the detail work plans for the technical assistance projects are formulated.

As the technical assistance project work plans are completed, they will be reviewed in detail to ascertain if computer programs identified in this task can be of benefit to that project. If the results of this evaluation are positive, specific programs will be identified and analyzed as to their potential benefit to the project. This analysis will be submitted with the work plan to the Department of Energy.

To evaluate the computer programs in relation to the specific technical assistance projects the following criteria will be utilized.

- (1) Specific applicability of the program to the technical assistance project and problem.
- (2) Availability of the program for transfer to the agency receiving the technical assistance.
- (3) Cost of acquiring the program and the operating cost of the program.
- (4) Assessment of the technical problems which may be associated with transferring the computer program.
- (5) The time frame associated with transferring the program.

It is expected that whenever possible current capabilities of the Institute will be utilized over external capabilities. The reason for this is that the problems associated with cost, availability and

transferrability can be minimized. As discussed in the previous chapter, the Institute has numerous capabilities in the area of computer programming and analysis.

APPENDIX A

Cover Letter,
Computer Abstract Form,
and
Instruction Sheet



The National Regulatory Research Institute

Established by the National Association of Regulatory Utility Commissioners at The Ohio State University

February 27, 1978

The National Regulatory Research Institute was established at The Ohio State University by the National Association of Regulatory Utility Commissioners (NARUC). The purpose of the Institute is to provide regulatory commissions with independent, timely, and high quality research on regulatory issues.

Consistent with this objective, the Institute is collecting abstracts on computer programs which have application to the regulatory field. The areas of application range from computerized docketing systems to energy supply analysis models. The Institute intends to develop a comprehensive list of program abstracts so that regulatory agencies, research organizations, and others can benefit from existing programs rather than assume the high cost of developing new ones. This volume of abstracts will be periodically updated.

Please fill out the supplied abstract form for each computer program or model developed by your organization which has application to regulatory issues and problems. Your cooperation in returning the abstracts by March 22 will be greatly appreciated. If you have any questions, please do not hesitate to contact me at (614) 422-8150.

Very truly yours,



Mark S. Gerber
Associate Director for
Regulatory Methods

MSG/tm1

Enclosures: 10 Abstract Forms
2 Instruction Sheets

A1

NATIONAL REGULATORY RESEARCH INSTITUTE
Computer Program Abstract Form

Submitted by: _____ Date: _____

1. NAME OR DESIGNATION OF PROGRAM _____

2. DESCRIPTION OF REGULATORY PROBLEM OR FUNCTION THE PROGRAM ADDRESSES

3. METHOD OF SOLUTION _____

4. UNUSUAL FEATURES OF THE PROGRAM _____

5. RESTRICTIONS ON PROBLEM COMPLEXITY _____

6. COMPUTER FOR WHICH PROGRAM IS DESIGNED AND OTHERS UPON WHICH IT IS
OPERABLE _____

7. MACHINE REQUIREMENTS _____

8. INPUT DATA REQUIREMENTS _____

9. PROGRAMMING LANGUAGE(S) USED _____

10. OPERATING SYSTEM _____

11. RELATED AND AUXILIARY PROGRAMS _____

12. MATERIAL AVAILABLE AND ACQUISITION COST _____

13. REFERENCES _____

14. NAME OF AUTHOR(S) _____

15. OTHER INFORMATION _____

16. TYPICAL RUNNING TIME _____

THE NATIONAL REGULATORY RESEARCH INSTITUTE
COMPUTER PROGRAM ABSTRACTING INSTRUCTIONS

The following definitions and instructions are provided to aid in supplying the abstract information. To ensure a level of uniformity of response, please read these instructions. Write your responses on the sheets provided. If more room is required, please continue on the back. If enough forms were not supplied, feel free to make additional copies. If you have any questions, contact Mark Gerber at 614-422-8150.

1. Name Or Designation Of Program

This is the name or designation given the program by the author(s).

2. Description Of Regulatory Problem Or Function The Program Addresses

Give a brief description of the problem being solved or a definition of the data processing activity being carried out. Example areas are docketing, rate of return analysis, power plant siting, forecasting, etc.

3. Method Of Solution

Provide a short summary of the mathematical methods employed, numerical algorithms adopted, or procedures incorporated in the program.

4. Unusual Features Of The Program

Enumerate distinguishing features and special capabilities of the program. Information given under this item should allow the user to select from a number of similar programs the one most suitable for his particular problem.

5. Restrictions On Problem Complexity

Describe constraints implied by storage allocations within the program, such as maximum number of power plants which can be analyzed.

6. Computer For Which Program Is Designed And Others Upon Which It Is Operable

Identify the computer hardware system for which the program or system was prepared and the names of other computers for which versions are available.

7. Machine Requirements

List the hardware components essential for full utilization of the program.

8. Input Data Requirements

Indicate the type of data base required to operate the program. If the program utilizes a data base management system, indicate the name of that system.

9. Programming Language(s) Used

Identify the programming language or languages in which the program was written with an indication of the percentage of each used. If certain routines are in assembly rather than compiler language, these should be identified.

10. Operating System

Identify the operating system, associated subroutine or function library, and installation support software used by the program. The version used should be identified and deviations or exceptions noted.

11. Related And Auxiliary Programs

Indicate if this program supersedes or is an extension of an earlier program. Programs used in conjunction with this program, especially those coupled through use of external data files should be mentioned.

12. Material Available and Acquisition Cost

Indicate the material currently available for distribution, such as documentation, copies of the program, and users' manual. Also, indicate the purchase price for this material.

13. References

Indicate available publications pertinent to the program.

14. Name Of Author(s)

Indicate the name of the author(s) of the program and of other machine versions or editions. If the author is no longer responsible for the program, the current contact person should be identified.

15. Other Information

Identify additional information needed to implement the program or determine the extent of the necessary implementation effort.

16. Typical Running Time

List information intended to enable the user to estimate machine time requirements.

Please return completed abstract forms to:

Dr. Mark S. Gerber
National Regulatory Research Institute
206 West 18th Avenue
Columbus, Ohio 43210

As new programs are developed and implemented, the Institute would appreciate the submission of abstracts for those programs.



APPENDIX B

Bibliography of Sources
Used to Develop
Inquiry List



1. United States Government Manual, 1977/78, Office of the Federal Register, National Archives and Records Service, General Services Administration, Washington, D.C.
2. Consultants and Consulting Organizations Directory, Wasserman, Paul, ed., 3rd edition, Detroit: Gale Research Co., 1976.
3. Research Centers Directory, 5th edition, Detroit, Gale Research Co., 1975.
4. Annual Register of Grant Support, 11th edition, Marquis Who's Who Inc., Chicago, Ill., 1977-1978.
5. Energy Directory, Environment Information Center, New York, New York, 1976.
6. "Electrical World", Vols. 187-189, McGraw-Hill, New York, New York: 1977-1978, annual.
7. Electrical World Directory of Electric Utilities, 1st edition, McGraw-Hill, New York, New York, annual.
8. Catalog of Computer Programs, National Association of Regulatory Utility Commissioners, Washington, D.C., 1977.



APPENDIX C

List of Agencies
Supply
Computer Program Information



STATE PUBLIC UTILITY COMMISSIONS

Public Utility Board of Alberta, Canada
Arizona Corp. Commission
Arkansas P.U.C.
Colorado P.U.C.
Connecticut Public Utilities Control Authority
Idaho P.U.C.
Indiana P.U.C.
Iowa Commerce Commission
Kansas State Corp. Commission
Louisiana Public Service Commission
Maine P.U.C.
Maryland P.S.C.
Michigan P.S.C.
Minnesota, Dept. of Public Service
Mississippi, P.S.C.
Montana P.S.C.
Nevada P.S.C.
New Mexico P.S.C.
North Carolina P.S.C.
North Dakota P.S.C.
Ohio P.U.C.
Oklahoma Corp. Commission
Pennsylvania P.U.C.
Rhode Island P.U.C.
South Carolina P.S.C.
South Dakota P.U.C.
Tennessee P.S.C.
Virginia Corp. Commission
Wyoming P.S.C.
Texas P.U.C.

OTHER STATE AGENCIES

State of Alaska, Department of Commerce and Economic Development
Alaska Power Administration
Arizona Office of Economic Planning and Development
Office of Appropriate Technology
Georgia Office of Planning and Budget
Idaho, Bureau of Planning and Community Affairs
Maine, State Development Office
Mississippi Fuel and Energy Management Commission
Nebraska Department of Economic Development
Utah Department of Business Regulation
Wisconsin Office of Planning and Energy

UNIVERSITIES

Boise State University

Clarkson College of Technology

Drexel University

University of Illinois

Michigan State University

Oklahoma State University

Renssler Polytechnic Institute

Syracuse University

University of Pennsylvania

University of South Dakota, School of Business

ENERGY RESEARCH INSTITUTES

Amer. Association for Advancement of Science

Amer. Institute of Planners

Argonne National Laboratory

Association of Edison Illuminating Companies

Colorado Energy Research Institute

Edison Electric Institute

Electric Power Research Institute

National Academy of Engineering

FEDERAL ENERGY AGENCIES

Department of Agriculture, Rural Electrification Administration
Bonneville Power Administration
Department of Commerce, Assistant Secretary for Policy
Department of Commerce, Assistant Secretary for Science and Technology
Department of Commerce, National Technical Information Service
Department of Energy, Energy Information Administration
Energy Research and Development Administration
Executive Office of President, Science and Technology Policy
Department of Interior
Interstate Commerce Commission
Nuclear Regulatory Commission
Southwestern Power Administration

REGIONAL ENERGY AGENCIES

Council of State Government

MAIN Coordination Center

National Electric Reliability Council

National Rural Electric Cooperative Association

Southwest Power Pool

Southeastern Electric Reliability Council

Electric Reliability Council of Texas

Northeast Power Coordinating Council

PRIVATE ENERGY-RELATED FIRMS

Data Index Incorporated
General Electric Company
Gilbert Associates, Inc.
Hollander Associates
International Business Services, Inc.
Mathematica, Inc.
National Economic Research Associates, Inc.
Stephen Patkay and Associates
Pennsylvania Power and Light Company
Power Technologies, Inc.
Public Service Electric and Gas Company
Quantitative Economic Research, Inc.
Radian Corporated
Remote Computing Corp.
Lawrence G. Spielvogel, Inc.
Stone and Webster Engineering Corp.
Systems Control, Inc.
Technology and Economics
Temple, Barker and Sloane, Inc.
Union Electric Company
United Engineers and Constructors, Inc.

APPENDIX D

Locations of Agencies
Having Listed Programs



PRIVATE ENERGY-RELATED FIRMS

Aerospace Corporation
c/o National Technical Information
Center
5285 Port Royal
Springfield, Va.

Bechtel Coporation
P.O. Box 3965
50 Beale
San Francisco, CA 94105

Data Index Incorporated
11300 N. Central Expressway
Dallas, Texas 75243

General Electric Company
One River Road
Schenectady, N.Y. 12345

Hollander Associates
P.O. Box 2276
Fullerton, CA 92633

Lockheed Electronics Co. Inc.
16811 El Camino Real
Houston, Texas 77201
Mathematica, Inc.
P.O. Box 2392
Princeton, N.J. 08540

Stephen Patkay & Associates
9550 Flair Drive
El Monte, CA 91733

Pennsylvania Power & Light Co.
2 North 9th St.
Allentown, PA 18101

Public Service Electric &
Gas Co.
80 Park Place
Newark, NJ 07101

Remote Computing Corp.
1076 East Meadow Circle
Palo Alto, CA 94303

Southern California Gas Company
810 S. Flower
Los Angeles, CA

Bechtel Corporation
Refinery and Chemical Division
1233 West Loop So.
P.O. Box 2166
Houston, Texas 77001

Bell Telephone Labs, Inc.
600 Mountain Ave.
Murray Hill, New Jersey 07974

Consolidated Gas Supply Corp.
445 W. Main St.
Clarksburg, West Va. 26301

Decision Sciences Corp.
11480 Warnen Road
Maryland Heights, MI 63043

Gilbert Associates, Inc.
P.O. Box 1498
Reading, PA 19603

International Business Services, Inc.
1010 Vermont Ave., N.W.
Suite 1010
Washington, D.C. 20005

Logistics Management Institute
Washington, D.C.

National Economic Research
Associates, Inc.
Consulting Economists
80 Broad Street
New York, N.Y. 10004

Power Technologies, Inc.
P.O. Box 1058
Schenectady, N.Y. 12301

Quantitive Economic Research Inc.
6095 Tamilynn Street
San Diego, CA 92122

Scientific Software Corp.
633 Seventeenth Street
Denver Colorado 80202

Southern California Edison Co.
2244 Walnut Grove Ave.
Rosemead, CA 91770

PRIVATE ENERGY-RELATED FIRMS con't.

Lawrence G. Spielvogel, Inc.
Wyncote House
Wyncote, Pennsylvania 19095

Systems Control Inc.
1801 Page Mill Road
Palo Alto, California 94304

Temple, Barker & Sloane, Inc.
15 Walnut Street
Wellesley Hills, Mass. 021081

United Engineers & Constructors, Inc.
100 Summer Street
Boston, MA 02110

Stone and Webster Engineering Corp.
90 Broad Street
New York, N.Y. 10004

Technology & Economics
2225 Massachusetts Avenue
Cambridge, Mass. 02140

Union Electric Company
1 Memorial Drive
St. Louis, MO 62166

Matteson, L.G.
Westinghouse Elect. Corp.
Pittsburgh, PA

ENERGY RESEARCH INSTITUTES

American Association for
Advancement of Science
1515 Massachusetts Ave. N.W.
Washington, D.C. 20005

Argonne National Laboratory
9700 South Cass
Argonne, Illinois 60439

Battelle Pacific Northwest
Laboratories
Richland, Washington 99352

Colorado Energy Research
Institutes
2221 East St.
Golden, Colorado 80401

Electric Power Research
Institute
Energy Analysis Dept.
Robert G. Uhler
3412 Hillview Avenue
P.O. Box 10412
Palo Alto, CA 94303

Oak Ridge National Laboratory
P.O. Box 117
Oak Ridge Tennessee 37830

Rensselaer Polytechnic Institute
Troy, New York 12181

American Institute of Planners
1776 Massachusetts AV, N.W.
Washington, D.C. 20036

Association of Edison Illuminating
Companies
51 East 42nd St.
N.Y., N.Y. 10017

Brookhaven National Laboratory
Upton, Long Island, N.Y. 11973

Edison Electric Institute
90 Park Ave.
N.Y., N.Y. 10016

National Academy of Engineering
2101 Constitution Ave., N.W.
Washington, D.C. 20418

National Center for Energy
Management & Power
Towne Building
220 S. 33rd St.
Philadelphia, PA 19174

Planning & Conservation Foundation
c/o National Technical Info. Center
5285 Port Royal
Springfield, Va.

TRW Systems Group
c/o National Technical Info. Center
5285 Port Royal
Springfield, Va.

(Alternatives)

TRW, Inc.
23555 Euclid Ave.
Cleveland, OH 44117

TRW Energy Systems Group
One Space Park
Redondo Beach, CA 90278

UNIVERSITIES

Air Force Institute of
Technology
Wright-Patterson AFB
Ohio School of Engineering
Ohio 45433

California University
Lawrence Berkeley Laboratory
Berkeley, CA

Chicago University
Chicago, IL 60637

Denison University
Granville, Ohio 43023

John Hopkins University
Baltimore, Maryland 21233

University of Illinois
Center for Advanced Computation
Urbana, Illinois 61801

Joskow, P.L.
Baughman, M.L.
Massachusetts Institute of
Technology
Cambridge, MA

University Microfilms
International
Ann Arbor, Michigan 48109

North Carolina State
University
Raleigh, N.C.

Oregon State University
Corvallis, Oregon

Pennsylvania State University
University Park, PA

Purdue University
W. Lafayette, Ind.

Syracuse University
Department of Geology
Heory Geology Laboratory
Syracuse, New York 13210

Boise State University
Management and Finance School
of Business
1910 University Drive
Boise, Idaho 83725

Carnegie-Mellon University
Pittsburgh, PA

Clarkson College of Technology
Energy & Environment Studies
Institute
Potsdam, N.Y. 13676

Harry L. Brown
Drexel University
Rm 3-157
Philadelphia, Pa. 19104

Illinois Institute of Technology
Chicago, Illinois

Michigan State University
Graduate School of Business Admin.
Institute of Public Utilities
Berkey Hall
East Lansing, Michigan

State University of New York
Research Foundation
Albany, N.Y.

Jones, B.W.
Moretti, P.M.
Mize, J.H.
Oklahoma State University
Stillwater, Oklahoma

University of Pennsylvania
National Center for Energy
Management & Power
Towne Building
220 South 33rd Street
Philadelphia, Pennsylvania 19174

University of S. Dakota
School of Business
Vermillion, South Dakota 57069

UNIVERSITIES con't.

Tennessee University
Knoxville, Tennessee

Towson State College
Baltimore, Maryland

Texas Christian Research
Foundation
Fort Worth, Texas 76129

Washington State University
Pullman, Washington

The University of Wisconsin
Institute for Environmental
Studies
c/o National Technical Info.
Center
5285 Port Royal
Springfield, Va.

Thiagarajar College of Engineering
Madurai, India

Dooley, J.E.
Newkirk, R.T.
University of Toronto
Ontario

University of Washington
Seattle, Washington

West Virginia University
Morgantown, West Virginia

FEDERAL ENERGY AGENCIES

Air Force Avionics Lab.
Wright-Patterson AFB
Ohio

Bonneville Power Administration
P.O. Box 3621
Portland, Oregon 97208

United States Department of
Commerce
The Assistant Secretary for
Policy
Washington, D.C. 20230

United States Department of
Commerce
National Technical Information
Service
5285 Port Royal Road
Springfield, Va. 22161

Department of Energy
Albert H. Linden, Jr.
Asst. Administrator, Energy Data
Energy Information Administration
Washington, D.C. 20545

Federal Power Commission
825 North Capitol Street, N.E.
Washington, D.C. 20426

United States Department of
the Interior
Office of the Secretary
Washington, D.C. 20240

United States
Nuclear Regulatory Commission
Washington, D.C. 20555

United States Dept. of Agriculture
Rural Electrification Administration
Washington, D.C. 20250

Civil Aeronautics Board
1825 Connecticut Avenue N.W.
Washington, D.C. 20428

United States Department of
Commerce
The Assistant Secretary for
Science and Technology
Washington, D.C. 20230

Federal Department of Energy
Energy Information Administration
Washington, D.C. 20545

ERDA
20 Massachusetts Avenue, N.W.
Washington, D.C. 20545

Executive Office of the President
Office of Science and Technology
Policy
Washington, D.C. 20500

General Services Administration
General Service Building
Eighteenth & Fifth Streets, N.W.
Washington, D.C. 20905

Interstate Commerce Commission
Constitution Avenue and Twelfth St.,
N.W.
Washington, D.C. 20004

Southwestern Power Administration
P.O. Drawer 1619
Tulsa, Oklahoma 74101

STATE ENERGY DEPARTMENTS

State of Alaska
Department of Commerce &
Economic Development
1100 MacKay Building
338 Denali Street
Anchorage, Alaska 99501

Arizona Office of Economic
Planning and Development
4th Floor
Executive Tower Room 505
1700 West Washington
Phoenix, Arizona 85007

State of Idaho
Bureau of State Planning and
Community Affairs
State House
Rm. 122
Boise, Id 83720

Mississippi Fuel & Energy
Management Commission
1307 Woolfolk State Office Building
Jackson, Mississippi 39202

State of Utah
Department of Business Regulation
Division of Public Utilities
330 East Fourth South Street
Salt Lake City, Utah 84111

Alaska Power Administration
P.O. Box 50
Juneau, Alaska 99802

Office of Appropriate Technology
State of California
1530 - 10th Street
Sacramento, CA 95814

Georgia Office of Planning &
Budget
270 Washington Street, S.W.
Atlanta, GA 30334

State of Maine
Executive Department
State Department Office
Augusta, Maine 04333

Department of Economic Development
Box 94666
301 Centennial Mall So.
Lincoln, Nebraska 68509

Texas Governor's Energy Advisory
Council
Austin, Texas 78710

Wisconsin Office of Planning & Energy
P.O. Box 511
1 West Wilson
Madison, WI 53701

STATE PUBLIC UTILITY COMMISSIONS

Public Utilities Board Alberta
11th Floor
Manulife House
10055 - 106 Street
Edmonton, Alberta T5J2Y2

Arkansas PSC
Justice Building
State Capitol
Little Rock, Arkansas 72201

Connecticut Public Utilities
Control Authority
State Office Building
Hartford, Connecticut 06115

Idaho PUC
472 Washington Street
State House
Boise, Idaho 83720

State Corp. Commission
Fourth Floor
State Office Building
Topeka, Kansas 66612

Maine PUC
State House
Augusta, Maine 04333

Michigan PSC
Mercantile Building
6545 Merchantile Way
P.O. Box 30221
Lansing, Michigan 48909

Mississippi PSC
Walter Sillers State Office Bldg.
P.O. Box 1174
Jackson, Mississippi 39205

Public Service Commission of
the State of Montana
1227 11th Avenue
Helena, Montana

New Mexico PSC
Bataan Memorial Building
Sante Fe, New Mexico 87503

Arizona Corp. Commission
2222 West Encanto Blvd.
Phoenix, Arizona 85009

Colorado PUC
500 State Services Building
1525 Sherman Street
Denver, Colorado 80203

Florida PUC
700 South Adams Street
Tallahassee, Florida 32304

Indiana PSC
901 State Office Building
Indianapolis, Indiana

Iowa State Commerce Commission
Valley Bank Building
Fourth & Walnut Streets
Des Moines, Iowa 50319

Louisiana Public Service
Commission
One American Place
Suite 1630
Baton Rouge, Louisiana 70825

Maryland PSC
State Office Building
9th Floor
301 West Preston Street
Baltimore, Maryland

State of Minnesota
Department of Public Service
7th Floor American Center Building
Kellogg & Roberts St. S.
Saint Paul, Minn. 55101

Missouri PSC
P.O. Box 360 Jefferson City
Jefferson City, Missouri 39205

Nevada PSC
Kinkead Building
505 East King Street
Carson City, Nevada 89710

STATE PUBLIC UTILITY COMMISSIONS con't.

New York PSC
Empire State Plaza
Agency Building #3
Albany, New York 12223

Ohio PUC
Borden Building
180 East Broad Street
Columbus, Ohio 43215

Pennsylvania PUC
P.O. Box 3265
Harrisburg, Pennsylvania 17120

State of South Carolina
The Public Service Commission
P.O. Drawer 11649
Columbia, South Carolina 29211

Texas PUC
7800 Shoal Creek Blvd.
Suite 400N
Austin, Texas 78757

Wisconsin PSC
475 Hill Farms State Office
Building
4802 Sheboygan Avenue
Madison, WI 53702

North Carolina Utilities
Commission
Dobb Building
430 N. Salisbury Street
Raleigh, North Carolina 27602

North Dakota PSC
Capitol Building
Bismarck, North Dakota 58505

Corporation Commission of
Oklahoma
308 Jim Thorpe Building
Oklahoma City, Oklahoma 73105

Rhode Island Public Utilities
Commission
100 Orange Street
Providence, Rhode Island 02903

South Dakota PUC
State Capitol Building
Pierre, South Dakota 57501

Tennessee PSC
Cordeill Hall Building
Nashville, Tennessee 37219

Virginia State Corporation
Commission
Box 1197
Richmond, Va. 23209

Wyoming PSC
Capitol Hill Building
320 W. 25th Street
Cheyenne, Wyoming 82002

REGIONAL ENERGY AGENCIES

Appalachian Regional Commissions
1666 Connecticut Avenue, N.W.
Washington, D.C. 20235

MAIN Coordination Center
1N301 Swift Road
P.O. Box 278
Lombard, Illinois 60148

National Rural Electric
Cooperative Association
2000 Florida Avenue, N.W.
Washington, D.C. 20009

Southwest Power Pool
540 Plaza West
Little Rock, Arkansas

Electric Reliability Council
of Texas
P.O. Box 32507
San Antonio, Texas 78216

The Council of State Governments
P.O. Box 11910
Iron Works Pike
Lexington, Kentucky 40511

National Electric Reliability
Council
Research Park
Terhune Road
Princeton, New Jersey 08540

Northeast Power Coordinating
Council
1250 Broadway
New York, N.Y. 10001

Southeastern Electric Reliability
Council
308 Daniel Building
15 South 20th Street
Birmingham, Alabama 35233