Alaska Public Utilities Commission
Power Pooling / Central Dispatch Planning Study
Docket U-97-140
Final Report Appendices

October 1998

Appendices

Appendix A: Transmission Maps
Appendix B: 1996 Thermal and Hydro Generation Tables
Appendix C: Existing Thermal and Hydro Generation Tables
Appendix D: POWRPRO Input File -- Benchmark
Appendix E: POWRPRO Output Files -- Benchmark
Appendix F: Planned New Units
Appendix G: Generic Unit Candidates
Appendix H: POWRPRO Input Files -- Planning Horizon
Appendix I: POWRPRO Output Files -- Planning Horizon
Appendix J: Economic Spreadsheets
Appendix K: POWRPRO Input Manual
Appendix L: Multi-Area POWRPRO Description

Alaska Public Utilities Commission
Power Pooling / Central Dispatch Planning Study
Docket U-97-140
Final Report

October 1998

"This report was prepared for the Alaska Public Utilities Commission ("APUC") under a contract with Alaska Electric Generation Transmission Cooperative, Inc. (“AEG&T) by Black & Veatch International, Inc. ("BVI") and is based in part on information not within the control of either BVI, APUC, or AEG&T. BVI has not made an analysis, verified, or rendered an independent judgment of the validity of the information provided by others. While it is believed that the information contained herein will be reliable under the conditions and subject to the limitations set forth herein, BVI does not guarantee the accuracy thereof. Use of this report or any information contained therein shall constitute a release and agreement to defend and indemnify BVI, APUC, and AEG&T from and against any liability (including but not limited to liability for special, indirect or consequential damages) in connection with such use. Such release from and indemnification against liability shall apply in contract, tort (including negligence of BVI, APUC and AEG&T, whether active, passive, joint or concurrent), strict liability, or other theory of legal liability; provided, however, such release, limitation and indemnity provisions shall be effective to, and only to, the maximum extent, scope or amount allowable by law."

Table of Contents

Executive Summary ES-1
1.0 Introduction 1-1
1.1 Description of Each System 1-1
1.2 System Assumptions 1-1
1.3 1996 Benchmark Year 1-1
1.4 Future Generation and Transmission Plans 1-2
1.5 20-Year Planning Horizon 1-2
1.6 Benefit / Cost Analysis 1-2
1.7 Conclusion 1-2

2.0 System Descriptions 2-1
2.1 Alaska Electric Generation & Transmission (AEG&T) 2-1
2.2 Anchorage, Municipal Light & Power (ML&P) 2-2
2.3 Chugach Electric Association (Chugach) 2-2
2.4 Golden Valley Electric Association (GVEA) 2-3
2.5 Homer Electric Association (HEA) 2-4
2.6 Matanuska Electric Association (MEA) 2-4
2.7 Alaska Energy Authority, Bradley Lake 2-4
2.8 Transmission System 2-5
2.9 Current System Operations 2-6

3.0 System Assumptions 3-1
3.1 System Data 3-1
3.1.1 Expected Peak Demand and Net Energy 3-1
3.1.2 1996 Hourly Load File 3-1
3.1.3 Fuel Price Projections 3-4
3.1.4 Transmission System Assumptions 3-4
3.1.5 Planning Reserve Requirements 3-6
3.1.6 Operating and Spinning Reserve Requirements 3-6
3.1.7 Economic Parameters 3-8
3.1.8 Definition of the Seasons 3-8

3.2 Actual 1996 Data 3-9
3.3 Existing Generation, Purchased Power, and Power Sales 3-9
3.3.1 Existing Generation Resources 3-9
3.3.2 Miscellaneous Contracts or Arrangements 3-9

4.0 1996 Benchmark Results 4-1
4.1 ML&P System 4-3
4.2 Chugach System 4-3
4.3 GVEA System 4-4

5.0 Future Generation and Transmission Plans 5-1
5.1 Planned Future Generation 5-1
5.1.1 Retirements 5-1
5.1.2 Installations and Upgrades 5-1
5.2 Purchase and Sales Contract Changes 5-2
5.3 Fuel Forecasts for All New Sites 5-2
5.4 Individual System Expansion 5-2
5.4.1 Generic Future Generation Options 5-2
5.4.2 Testing the Potential Replacement of Older Generation 5-9
5.5 Pooled System Expansions 5-10
5.6 Future Transmission 5-15

6.0 Benefit / Cost Analysis 6-1
6.1 Assumption Highlights 6-1
6.2 Cost Comparison of the Three Cases 6-2
6.3 Cost of Implementing a Power Pool 6-5
6.4 Benefit Analysis 6-7
6.5 Emissions Comparison 6-8

7.0 Conclusion 7-1
7.1 Study Results 7-1
7.2 Institutional Barriers 7-1
7.3 Advantages/Disadvantages of a Power Pool 7-2

7.4 Does a Power Pool Aid in the Transition to Competition? 7-2
7.5 Recommendations 7-3
7.6 Caveat 7-3

Appendices

Appendix A: Transmission Maps
Appendix B: 1996 Thermal and Hydro Generation Tables
Appendix C: Existing Thermal and Hydro Generation Tables
Appendix D: POWRPRO Input File -- Benchmark
Appendix E: POWRPRO Output Files -- Benchmark
Appendix F: Planned New Units
Appendix G: Generic Unit Candidates
Appendix H: POWRPRO Input Files -- Planning Horizon
Appendix I: POWRPRO Output Files -- Planning Horizon
Appendix J: Economic Spreadsheets
Appendix K: POWRPRO Input Manual
Appendix L: Multi-Area POWRPRO Description

List of Tables

ES-1 Summary of CPWC and Savings ES-1
ES-2 Estimated Net Savings ES-2
2-1 Percentage Share and Capacity (MW) of Bradley Lake 2-5
3-1 Expected Peak Demand (MW) 3-2
3-2 Net Energy for Load (MWh) 3-3
3-3 Fuel Prices ($/MBtu) 3-5
3-4 Constrained Lines 3-6
3-5 Economic Parameters for the Railbelt Utilities (%) 3-8
3-6 1996 Railbelt System Purchases 3-10
4-1 1996 Unit Dispatch Order for Individual Systems 4-5
4-2 POWRPRO Benchmark of ML&P 4-6
4-3 POWRPRO Benchmark of Chugach 4-7
4-4 POWRPRO Benchmark of GVEA 4-8

5-1 Fuel Prices for Future Sites ($/MBtu)....5-4
5-2 ML&P's Capacity Balance (MW) 5-5
5-3 Chugach's Capacity Balance (MW)....5-6
5-4 GVEA's Capacity Balance (MW)....5-7
5-5 Generic Oil Fired Unit Alternatives--HAGO....5-8
5-6 Generic Coal Unit Alternatives....5-8
5-7 Generic Natural Gas Unit Alternatives....5-9
5-8 Total Cumulative Present Worth Cost of Expansion Alternatives ($1,000) 5-10
5-9 Total Pool Capacity Balance with Individual System Expansion Plans (MW)...5-12
5-10 Total System Capacity Balance (MW)....5-13
5-11 GVEA's Capacity Balance Including Intertie (MW) 5-14
5-12 Total Cumulative Present Worth Cost of Pooled System Alternatives....5-16
5-13 Transmission Constraints Between Areas 5-16
6-1 Generic Unit Additions for each Case....6-2
6-2 CPWC of the Three Operating Alternatives ($1,000)....6-3
6-3 Estimated Equipment Cost for Pooled Dispatch ($)....6-5
6-4 Total Estimated Capital and Staffing Cost of Implementing Pooled Dispatch....6-6
6-5 Comparison of CPWC Savings and Costs of Pooled Dispatch ($1,000)....6-8
6-6 Emissions Comparison (lbs) 6-9

List of Figures

6-1 CPWC Savings Between the Pooled Cases and the Individual Case....6-4

Executive Summary

This report analyzes the potential benefits of a power pool with central dispatch among the Railbelt Utilities in Alaska pursuant to the Alaska Public Utilities Commission Docket U-97-140. The Power Pooling Study outlines the current operation of the system, benchmarks 1996 operation, provides expansion plans for a 20 year period, and determines the potential benefits and costs of pooled operation. The three expansion cases evaluated are 1) the Individual Case, 2) the Pooled Case, and 3) the Joint Case. The individual case assumes that the status quo is maintained. The pooled case assumes that each utility meets its own capacity requirements, but that all the utilities are centrally dispatched. The joint case assumes the utilities jointly meet capacity requirements and jointly dispatch as if they are one utility.

The existing system is a mixture of municipal utilities and cooperatives. The total, installed thermal generation in the system during the winter is 1,085 MW. Most units in the system burn natural gas, although one utility owns coal and oil units.

The participating utilities provided peak, energy, and fuel forecasts. They also provided unit characteristics and planned unit additions, retirements, and upgrades. These inputs created the basis for the expansion plans modeled in Black & Veatch International's (BVI) POWRPRO, POWROPT, and Multi-Area POWRPRO models. Based on total cumulative present worth costs (CPWC) over the 20 year planning horizon, the least-cost expansion plans for the three cases were determined.

The projected cumulative present worth production and capital costs for each scenario are as follows:

Table ES-1
Summary of CPWC and Savings (Production and Capital)

Case	**Total**	**Savings from Individual Case**	
	($ 1,000)	**($ 1,000)**	**(%)**
Joint	1,384,969	48,103	3.36
Pooled	1,403,095	29,977	2.09
Individual	1,433,072	--	--

In comparison with the individual case, the pooled case, which has the same expansion plans with the same capital additions, is cheaper to operate due to better economic dispatch. The joint case has an even lower CPWC due to joint planning with respect to future capacity needs.

The implementation of a power pool will have costs for necessary equipment and staffing. The study provides rough estimates of these costs for two scenarios. The first is that the pooled dispatch is conducted by one of the existing Railbelt Utilities. The second is that an independent system operator would be used. The estimated cumulative present worth costs for these two scenarios are as follows:

- Railbelt utility operator $23.435 million
- Independent system operator $57.841 million

The net savings from the two pooled scenarios are projected as follows:

Table ES-2
Estimated Net Savings

Case	**Railbelt Utility Operator**		**Independent System Operator**	
	($ 1,000)	**(%)**	**($ 1,000)**	**(%)**
Joint Case	24,669	1.7	(9,738)	(0.7)
Pooled Case	6,542	0.5	(27,864)	(1.9)

The pooled and joint cases assume that there are no contractual limitations to the economic dispatch of all the units of the Railbelt Utilities. To achieve this assumption, existing power purchase and sales contracts would either have to be eliminated or renegotiated so that they would not constrain economic dispatch of the utilities. The same is true for existing fuel contracts that would constrain economic dispatch. Any costs associated with eliminating or modifying the existing contracts to achieve the dispatching modeled will reduce the savings for the joint or pooled cases.

These savings are based on projected production and new capital investment costs. Since production and new capital investment costs represent only a portion of the total costs for retail customers, their savings would be smaller.

1.0 Introduction

The Railbelt Utilities of Alaska, under the auspices of the Alaska Public Utilities Commission (APUC), have retained Black & Veatch International (BVI) to conduct a Power Pooling/Central Dispatch study under Docket U-97-140. The study first models the current electric system within the Railbelt area. Then, over a 20 year planning horizon spanning 1997 to 2016, the current dispatch and operating system is evaluated versus a pooled dispatch arrangement. The study estimates savings for two pooled dispatch scenarios. The first is based on each of the Railbelt Utilities independently meeting their capacity requirements and then jointly dispatching the resulting systems, referred to as the pooled case. The second scenario is based on the Railbelt Utilities jointly providing their capacity requirements and then dispatching the resultant joint system, referred to as the joint case.

Contained within this report are the following sections, which contain the in-depth analyses.

1.1 Description of Each System

Section 2.0 of the Planning Study provides a brief description of the utilities within the Railbelt and their transmission system.

1.2 System Assumptions

Railbelt system characteristics as well as existing generation capabilities and actual 1996 dispatch are discussed in Section 3.0. Economic parameters, fuel price projections, peak demand, and net energy for load are established. The criteria for operating and spinning reserves, based on the *Alaska Intertie Agreement*, are outlined and the values for the study are calculated. Actual 1996 purchase data, along with unit level generation data, are described in this section and in Appendix B.

1.3 1996 Benchmark Year

The choice for benchmark year is based on the latest calendar year for which data is available. Since the study began in the fall of 1997, the benchmark year is 1996. The

actual generation data and hourly loads are used to benchmark BVI's economic dispatch/ production costing model, POWRPRO.

A brief description of the dispatch mechanism of POWRPRO is located in Section 4.0 along with some specific assumptions made in modeling the Bradley Lake and Eklutna Hydroelectric Projects. Both the input and output files and the POWRPRO manual are contained in the appendices.

1.4 Future Generation and Transmission Plans

Section 5.0 discusses planned generation changes for the Railbelt utilities as well as options for generic unit additions. Expansion plans are developed for each of the Railbelt Utilities individually, as well as for the Railbelt Utilities as a single entity. The Northern and Southern Intertie changes are also discussed.

1.5 20-Year Planning Horizon

The planning horizon for the study extends from 1997 through 2016. Production cost simulation is conducted for each of the Railbelt Utilities individually and jointly based on the individual Railbelt Utility expansion plans. Production cost simulation is also conducted for the joint expansion plan.

1.6 Benefit / Cost Analysis

Considering the output from Section 6.0, Section 7.0 presents a year-by-year economic comparison of the three dispatching options. The section also discusses the cost of setting up a centrally dispatched pool.

1.7 Conclusion

Based on the cumulative present worth savings between the cases and the cost of implementing a pooled environment, this section highlights the outcome, recommends a course of action based on the outcome, and outlines any other caveats to the study.

2.0 System Descriptions

The Railbelt Utilities produce approximately 86 percent of the electricity generated in the state of Alaska. The utilities contained within the Railbelt are listed below:

- Alaska Electric Generation and Transmission Cooperative (AEG&T)
  - Homer Electric Association (HEA)
  - Matanuska Electric Association (MEA)
- Anchorage, Municipal Light & Power (ML&P)
- Chugach Electric Association (Chugach)
  - Seward Electric System (SES)
- Golden Valley Electric Association (GVEA)
  - Fairbanks Municipal Utility System (FMUS)

HEA and MEA are the founding members of AEG&T, which has entered into several contracts with Chugach to supply and dispatch power on their behalf. SES is an all-requirements customer of Chugach even though they own a few diesel generators in standby and will not be studied as a separate entity for this Power Pooling study. FMUS sold their generation and transmission assets to GVEA and Aurora Energy, LLC., in October 1997 and is now a part of GVEA's service territory.

The Railbelt transmission system is shown in Appendix A. The northern half is GVEA's system while the southern half is split between Chugach's service territory (inclusive of AEG&T) and ML&P's service territory. Chugach services the Kenai Peninsula and the area south of Anchorage while ML&P serves the Anchorage area.

2.1 Alaska Electric Generation and Transmission (AEG&T)

AEG&T is a generation and transmission cooperative formed by Homer Electric Association (HEA) and Matanuska Electric Association (MEA). AEG&T provides the major power requirements for MEA and HEA.

AEG&T owns Soldotna 1, a 42 MW simple cycle gas turbine unit. However, HEA is responsible for its operation and maintenance while Chugach dispatches Soldotna's energy and capacity.

The sum of MEA's and HEA's non-hydro requirements equals AEG&T's power requirements.

2.2 Anchorage, Municipal Light & Power (ML&P)

ML&P has seven combustion turbines (Units 1-5, 7, 8), which operate on natural gas, and one steam turbine (Unit 6), which derives its steam from unfired waste heat boilers. Combustion turbines 5 and 7 have heat recovery steam generators (HRSGs), which allow them to operate in a combined cycle mode with the Unit 6 steam turbine. Unit 5 is frequently cycled when used in combined cycle or simple cycle mode. Unit 5 or Unit 7 may be operated in simple cycle mode when the steam turbine is unavailable. ML&P's thermal generating capability is over 300 MW. ML&P also has percentage shares in two hydroelectric projects, Bradley Lake (25.9 percent) and Eklutna Lake (53.3 percent). ML&P is also responsible for dispatch of Eklutna energy. Eklutna is a lake storage plant with two recently upgraded 22 MW units. In combination, their capability is 40 MW. Eklutna does not have any spinning reserve limitations.

ML&P's system requirements are expected to grow at an average annual rate of 1.4 percent from 1997 to 2016. Currently, ML&P does not have any firm power contracts in effect with the other Railbelt Utilities.

2.3 Chugach Electric Association (Chugach)

Chugach's generation consists of three gas turbine plants: Beluga, International, and Bernice; and one lake storage plant, Cooper Lake. Their thermal generating capability is over 500 MW. They also have a 30 percent share of the electric capability of the Eklutna hydroelectric project and a 30.4 percent share of Bradley Lake's capability. The Beluga plant is Chugach's largest thermal plant consisting of six combustion turbines (Units 1-3, 5-7) and one steam turbine (Unit 8). Combustion turbines 6 and 7 have HRSGs, which allow them to operate as a combined cycle in conjunction with Unit 8. The combined cycle is Chugach's base load unit, and when Unit 8 is down for maintenance, Units 6 and 7 can run in simple cycle mode.

Chugach expects their system requirements to increase at an average rate of 1.8 percent per year over the 1997-2021 time frame.

Chugach supplies MEA's power on an all-requirements basis, though MEA can purchase power elsewhere while incurring penalties. These other purchases serve less than 0.2 percent of MEA's energy needs.

Chugach and HEA have a take-or-pay contract through which Chugach supplies approximately 85 percent of HEA's requirements. The contractual minimum demand is 73 MW and a minimum annual energy of 350,000 MWh. HEA can also obtain power from other sources including Bradley Lake and the Soldotna plant. In 1991, Chugach entered into a dispatch agreement with AEG&T/HEA, which allows Chugach to use Soldotna output for system use and economy sales. In 1992, another agreement obligated Chugach to dispatch HEA's percentage of Bradley Lake.

Chugach also has a non-firm energy agreement with GVEA, which obligates them to provide GVEA's non-firm energy whenever Chugach has the capability to do so. Furthermore, Chugach dispatches GVEA's share of Bradley Lake under a power banking arrangement.

For purposes of this study, Seward Electric System, AEG&T, HEA and MEA will be considered as a part of Chugach's load for the individual case. GVEA load will also be combined with Chugach's system for the duration of the non-firm purchase agreement. For the pooled cases, their loads will be distributed to the appropriate areas.

2.4 Golden Valley Electric Association (GVEA)

GVEA has 190 MW of thermal generating capacity, which provides approximately 57 percent of their total energy requirements. This generation consists of steam units fueled by coal and combustion turbines fueled by high atmospheric gasoil (HAGO). GVEA has contracted to purchase the electric capability of the Healy Clean Coal Project (HCCP), owned by Alaska Industrial Development and Export Authority (AIDEA), with an estimated electrical capacity of 53 MW once it is commercially operable. The HCCP is currently undergoing start-up testing. GVEA also has purchased 16.9 percent of the electric capability of the Bradley Lake project and purchases non-firm power under contract from Chugach to displace its HAGO fuel generation.

In 1997, FMUS divested itself of the Chena Plant. GVEA acquired Chena 6, which is a combustion turbine with a capacity of 23 MW in summer and 29 MW in winter. Aurora Energy, an independent energy producer, acquired Chena Units 1, 2, 3, and 5. These units are steam turbine units fueled by coal that provide district heating as well as

electric energy. The four steam turbines have a total capacity of approximately 29 MW. Aurora has contracted with GVEA to sell 120,000 MWh of energy each year from its Chena units.

2.5 Homer Electric Association (HEA)

HEA is an all-requirements customer of AEG&T and a member of a tripartite agreement with Chugach and AEG&T. The agreement makes HEA a partial-requirements customer of Chugach in a take-or-pay contract for 73 MW of capacity and 350,000 MWh of energy annually. The contract expires January 1, 2014. Since the study ends in 2016, the study will assume the agreement is renewed for the individual expansion case.

HEA uses AEG&T's Soldotna 1 for needs above 73 MW. HEA also has a 12 percent share of the Bradley Lake project, owned by the Alaska Energy Authority. Their project interest equates to 10.8 MW of power, 3.5 MW of spinning reserves, and approximately 43,800 MWh of annual energy. HEA has entered into a separate agreement with Chugach, which allows Chugach to schedule HEA's Bradley Lake output as desired while HEA receives an energy and power credit on their bill from Chugach. HEA is also the on-site O&M contractor for Bradley Lake.

2.6 Matanuska Electric Association (MEA)

MEA has a percentage share of two hydro projects, Eklutna (16.67 percent) and Bradley Lake (13.8 percent). MEA is also responsible for the operation of Eklutna. Under a net-billing arrangement, MEA has transferred its hydro power to Chugach.

MEA, AEG&T, and Chugach have entered into a tripartite agreement that expires December 31, 2014. Since the study ends in 2016, the study will assume the agreement is renewed in the individual case. This agreement obligates MEA to being an all-requirements customer of Chugach.

2.7 Alaska Energy Authority, Bradley Lake

Bradley Lake is a 120 MW hydroelectric plant owned by the Alaska Energy Authority (AEA). However, only 90 MW of capability are typically used for energy production. Bradley Lake also supplies a maximum of 27 MW of spinning reserves under current operating rules. Each Railbelt utility has entered into a power sales agreement

with AEA to purchase an allocated percentage share of Bradley Lake capacity, associated energy, and spinning reserve. The percentage shares are as follows, in Table 2-1.

GVEA's percentage includes FMUS. The contract expires on October 1, 2037, with an option for renewal. Each purchaser also pays its percentage share of annual project costs for each fiscal year. Annual project costs are all the costs resulting from the ownership (including debt service on AEA bonds issued to finance the project), operation, and maintenance of the project.

Table 2-1
Percentage Share and Capacity (MW) of Bradley Lake

Plant	ML&P	Chugach	GVEA	HEA	MEA	SES
Ownership	25.9%	30.4%	16.9%	12.0%	13.8%	1.0%
For 120 MW	31.1	36.5	20.3	14.4	16.6	1.2
For 90 MW	23.3	27.4	15.2	10.8	12.4	0.9
Spinning Res.	7.0	8.2	4.6	3.2	3.7	0.3

2.8 Transmission System

The *Alaska Intertie Agreement* governs the interconnection between the northern utilities of GVEA and FMUS with the southern utilities of ML&P, Chugach, and AEG&T.

The Alaska Energy Authority owns the Intertie while ML&P operates the southern region and GVEA operates the northern region. The midpoint of the line between the Douglas and Healy substations is the interconnection point. Power and energy on the line is scheduled on either an hour-ahead, day-ahead, week-ahead, or month-ahead basis.

The minimum intertie transfer capability rights (MITCR) are recalculated every July 1. A utility's MITCR is based on the utility's average annual system demand, the total average annual system demand for the region, and the transfer capability of the Intertie, which is 70 MW. For this study, AEG&T's demand is contained within HEA and MEA, which in turn is contained within Chugach's demand, leaving Chugach and ML&P as the utilities of the southern region. Also, since GVEA has acquired FMUS, it is now the only utility in the northern region. Based on these assumptions and the 1997 demand outlined in Table 3-1 of Section 3.0, the MITCR of GVEA is 70 MW, Chugach's is 50 MW, and ML&P's is 20 MW.

2.9 Current System Operations

Currently a significant portion of the Railbelt is dispatched as a loose power pool. This pool consists of a series of relatively flexible bilateral agreements between Railbelt generators and distribution utilities. These agreements include, but are not limited to, the AEG&T/Chugach Tripartite Agreement, the Soldotna One Dispatch Agreement, Chugach/Golden Valley Non-Firm Energy Agreement and the related FMUS Tier II pricing arrangement, the Bradley Lake Banking Arrangement, the Chugach/Homer Bradley Lake Dispatch Agreement, etc. As a result of these agreements all AEG&T/SES/GVEA/FMUS/Chugach loads are operated as one control area with Chugach/GVEA providing unit commitment service and Chugach providing load following (real time economic dispatch) service for all loads within the area. ML&P operates as a separate control area and sells excess non-firm energy into the Chugach/GVEA Control area through several arrangements. From time to time, ML&P non-firm energy has been purchased for the pool by Chugach. It also has been purchased by members of the pool directly and wheeled through the Chugach/GVEA Control Area. This loose pooling is represented in study by the individual case.

3.0 System Assumptions

The following section displays input data provided by each utility. Throughout the section any italicized text indicates values supplied by BVI at the request of the utility.

3.1 System Data

The following data was developed from a data gathering process, which started with a request in December 1997 for thirteen items classified as system data. A description of the data received follows.

3.1.1 Expected Peak Demand and Net Energy

Tables 3-1 and 3-2 outline each utility's expected peak demand and net energy for load for each year of the planning study (1997-2016). Also shown are the actual 1996 peak and energy values.

Table 3-1 indicates the annual peak demand increases over the 1997 through 2016 study period as follows for the utilities: ML&P 1.4 percent, Chugach 1.5 percent, GVEA 2.9 percent, HEA 1.4 percent, and MEA 1.3 percent. Table 3-2 shows that ML&P's average annual net energy growth is 1.4 percent, Chugach's is 1.5 percent, GVEA's is 2.8 percent, HEA's is 1.4 percent, and MEA's is 2.0 percent. Load growth for the Railbelt Utilities is relatively consistent through time with the exception of GVEA, which acquired FMUS's service territory in October, 1997, and a 30 MW mining load at Fort Knox in 1997.

3.1.2 1996 Hourly Load File

ML&P, Chugach, GVEA, FMUS, HEA, and MEA all provided their hourly load file for 1996. Any missing data was assumed to be the average of the bounding days' load for that particular hour. Chugach's load file contained their wholesale sales to HEA, MEA, and SES.

Chugach's 1996 generation was about 200,000 MWh greater than the loads in their hourly load file representing the sales from Chugach's non-firm energy contract with GVEA. Likewise, GVEA's hourly loads were about 200,000 MWh higher than GVEA's 1996 generation representing the non-firm purchase from Chugach.

Table 3-1
Expected Peak Demand (MW)

Year	**ML&P**	**Chugach[1]**	**GVEA**	**HEA**	**MEA**
1996	150.6	381	127.3	72.7	94.2
1997	151.5	380	166.7	73.3	97.6
1998	153.8	384	195.5	74.3	99.7
1999	155.7	389	200.5	75.2	101.2
2000	157.7	394	203.4	76.2	102.7
2001	160.2	399	208.4	77.1	104.3
2002	163.0	405	213.5	78.1	105.8
2003	165.7	413	219.8	79.1	107.4
2004	168.0	420	227.6	80.0	109.0
2005	170.3	424	232.1	81.0	110.7
2006	172.6	426	235.9	81.0	112.3
2007	174.8	432	240.6	82.0	114.0
2008	177.1	439	245.4	82.9	115.7
2009	179.3	446	250.3	84.9	116.9
2010	181.7	453	255.3	85.8	118.0
2011	184.0	461	260.4	86.8	119.2
2012	186.5	470	265.6	88.7	120.4
2013	189.1	478	270.9	90.6	121.6
2014	192.0	487	276.4	91.6	122.8
2015	194.9	497	281.9	93.5	124.1
2016	*197.0*	506	287.5	95.5	125.3
AAGR[2] (%)	1.39	1.52	2.91	1.40	1.32

[1] Chugach's peak demand includes AEG&T, HEA, MEA, and SES.
[2] Annual Average Growth Rate over 1997 - 2016.

Table 3-2
Net Energy for Load (MWh)

Year	**ML&P**	**Chugach[1]**	**GVEA**	**HEA**	**MEA**
1996	875,503	2,156,962	637,636	462,053	490,000
1997	882,923	2,162,299	1,026,864	458,666	491,000
1998	896,476	2,188,566	1,198,393	465,121	503,000
1999	907,992	2,221,438	1,226,805	471,111	512,000
2000	920,042	2,255,291	1,240,428	476,365	523,000
2001	934,732	2,286,365	1,268,553	482,790	533,000
2002	951,747	2,323,228	1,298,013	490,200	544,000
2003	967,660	2,363,085	1,334,264	497,486	555,000
2004	981,708	2,396,918	1,381,035	502,804	566,000
2005	995,494	2,421,573	1,406,373	506,864	577,000
2006	1,009,044	2,443,309	1,428,155	511,371	589,000
2007	1,022,142	2,470,134	1,455,576	516,736	601,000
2008	1,035,736	2,507,947	1,483,523	523,316	613,000
2009	1,049,139	2,553,196	1,512,006	530,936	622,000
2010	1,063,424	2,603,883	1,541,037	539,577	634,000
2011	1,077,342	2,657,815	1,570,625	548,811	647,000
2012	1,092,209	2,712,485	1,600,781	558,556	660,000
2013	1,107,938	2,769,056	1,631,516	568,262	673,000
2014	1,125,070	2,829,738	1,662,841	577,987	686,000
2015	1,142,503	2,896,051	1,694,767	587,851	700,000
2016	1,158,498	2,877,804	1,727,024	598,452	714,000
AAGR[2] (%)	1.44	1.52	2.77	1.41	1.99

[1] Chugach's net energy for load includes AEG&T, HEA, MEA, and SES.
[2] Annual Average Growth Rate is for 1997 - 2016.

3.1.3 Fuel Price Projections

Table 3-3 depicts the primary/start-up fuel price forecast for 1997-2016 and the actual 1996 prices provided by the utilities. The prices include a commodity component, which does escalate, and, as appropriate, a commodity-based transportation cost, which does not escalate. Healy 1's fuel price drops in 1998 due to an upgrade, which allows the unit to operate partially on waste coal.

ML&P's fuel price situation, however, is unique. They own a fuel reserve for which the cost is already sunk. The fuel reserve was also financed through tax-exempt bonds. A possible condition of this tax-exempt status, which has not been fully investigated to date, is that the fuel can only be used for serving native load. If fuel from the reserve is used for load other than native, the tax-exempt financing may be revoked. To model this situation, the Railbelt Utilities and the APUC representative agreed, for this study only, to set ML&P's natural gas fuel price to the Beluga gas price plus a $0.28 transportation component. This price reflects the most likely market-based price ML&P would have to assign to its fuel in a pooled environment. For this study, the prices shown in Table 3-3 are used in all cases.

3.1.4 Transmission System Assumptions

For use in POWRPRO, the transmission system was divided into four transmission areas designated as Fairbanks, Healy, Anchorage, and Kenai. Appendix A contains a transmission map highlighting the four areas of the Railbelt transmission area. Each area constitutes a section of transmission capability that is relatively unconstrained. However, the lines connecting each area are constrained. These areas are the Fairbanks region, which includes GVEA and FMUS; the Healy region, which contains the Healy plant; the Anchorage region, which includes Anchorage and the Beluga Plant; and the Kenai region, which covers the Kenai Peninsula. The constrained lines interconnecting these four areas are described in Table 3-4.

Table 3-3
Fuel Prices ($/MBtu)

Utility	**ML&P**	**Chugach**			**HEA**	**GVEA**			
Plant	**All**	**Beluga**	**Bernice**	**Int'l**	**Soldotna**	**Healy**	**North**	**Zehnder**	**Chena**
Unit(s)	**All**	**1-8**	**2-4**	**1-3**	**1**	**1**	**Pole**		**6**
Fuel	**NG**	**NG**	**NG**	**NG**	**NG**	**Coal**	**Hago**	**Hago**	**Hago**
1996	1.86	1.17	1.38	1.98	1.98	1.36	3.00	3.21	--
1997	1.74	1.46	1.50	2.25	2.25	1.39	3.09	3.31	3.40
1998	1.97	1.69	1.70	2.05	2.05	1.02	3.18	3.41	3.50
1999	2.01	1.73	1.75	2.10	2.10	0.94	3.28	3.51	3.61
2000	2.06	1.78	1.80	2.15	2.15	0.97	3.38	3.62	3.72
2001	2.12	1.84	1.85	2.20	2.20	0.99	3.48	3.73	3.83
2002	2.16	1.88	1.90	2.25	2.25	1.05	3.58	3.84	3.94
2003	2.22	1.94	1.95	2.30	2.30	1.07	3.69	3.95	4.06
2004	2.27	1.99	2.00	2.35	2.35	1.09	3.80	4.07	4.18
2005	2.33	2.05	2.06	2.41	2.41	1.11	3.91	4.19	4.31
2006	2.39	2.11	2.12	2.47	2.47	1.13	4.03	4.32	4.44
2007	2.44	2.16	2.18	2.53	2.53	1.16	4.15	4.45	4.57
2008	2.50	2.22	2.24	2.59	2.59	1.18	4.28	4.58	4.71
2009	2.57	2.29	2.30	2.65	2.65	1.20	4.41	4.72	4.85
2010	2.63	2.35	2.37	2.72	2.72	1.22	4.54	4.86	4.99
2011	2.70	2.42	2.44	2.79	2.79	1.25	4.67	5.01	5.14
2012	2.77	2.49	2.50	2.85	2.85	1.27	4.81	5.16	5.30
2013	2.84	2.56	2.57	2.92	2.92	1.29	4.96	5.31	5.46
2014	2.91	2.63	2.65	3.00	3.00	1.32	5.11	5.47	5.62
2015	2.98	2.70	2.72	3.07	3.07	1.34	5.26	5.64	5.79
2016	3.06	2.78	2.80	3.15	3.15	1.37	5.42	5.80	5.96

Table 3-4
Constrained Lines

From	To	Voltage (kV)	Capacity (MW)	Losses[1] a	Losses[1] b
Healy	Fairbanks	138	100	-0.0226	0.0013
Anchorage	Healy	138	70	-0.0041	0.0008
Kenai	Anchorage	115	75	-0.0015	0.0014

[1] Losses are modeled using a quadratic relationship: $y = ax + bx^2$, where x = total load on the line in MW and y = line losses, which is valid over the normal range of line loadings.

3.1.5 Planning Reserve Requirements

The *Alaska Intertie Agreement Addendum 1: Articles A & B* state, "the Reserve Capacity obligation of a Utility Participant, for any year, shall initially be equal to thirty (30) percent of the projected Annual System Demand of that Utility Participant." However, the percentage may be adjusted by the Operating Committee. For purposes of this study the reserve margin is assumed to stay constant at 30 percent.

3.1.6 Operating and Spinning Reserve Requirements

The total operating reserve is 150 percent of the capability of the largest generating unit operating on the interconnected systems. The operating reserve consists of spinning and non-spinning reserves. Spinning reserves are defined as the amount of unloaded generating capability of the participant connected to and synchronized with the interconnected system of participants and ready to take load. Non-spinning reserve is defined as all unloaded generating capability not meeting the spinning reserve criteria that can be made fully effective in 45 minutes.

Quantitatively, spinning reserve is at least 100 percent of the declared capability of the largest generating unit on-line on the interconnected system. Declared capability can be determined by the utility. Non-spinning reserve is the remaining balance, or no more than 50 percent of the declared capability of the largest generating unit on-line. Essentially, the total spinning reserve is at least two-thirds of the total operating reserve.

The system spinning reserve equals the summation of the net capability of all generation on-line in the respective system (northern or southern) plus SILOS minus the involved systems' integrated demand.

For this study, spinning reserves were calculated using the winter base ratings for the units at the agreed upon average winter temperatures (ML&P = 20 °F, Chugach = 10 °F, GVEA = 0 °F). Chugach's largest unit is Unit 6/8 (101.5 MW), ML&P's largest unit is Unit 6/7 (109.5 MW), GVEA's largest unit is it's North Pole unit at 62.5 MW, and FMUS's largest unit is Chena 6 at 29 MW. The largest generating unit is therefore the 109.5 MW of capability declared by ML&P. The sum of the largest units is 302.5 MW. Therefore, Chugach's spinning requirement in 1996 is 101.5/302.5*109.5 = 36.7 MW, ML&P = 39.6 MW, GVEA = 22.6 MW, and FMUS = 10.5 MW.

However, these values must be recalculated for 1997 and beyond since FMUS sold its units and GVEA has taken over its service territory. The sum of the largest units is now 270.3 MW, changing the spinning requirements to the following for the planning horizon: Chugach = 41.1 MW, ML&P = 44.4 MW, and GVEA = 24.0 MW. Since Bradley Lake hydro provides 27 MW of spin (20 MW to Chugach and 7 MW to ML&P), their spin and operating reserve requirements will be lowered, thus reducing the amount of thermal generation resources needed to meet those requirements.

Utilities in Alaska also have the option of shedding load in lieu of spin (SILOS). GVEA uses this technique, which causes some interruptions of service, but reduces costs and leads to lower rates for GVEA customers. Chugach, AEG&T, HEA, and MEA also have the SILOS option written into their respective tripartite agreements. SILOS is currently only used by GVEA and for this study will only be modeled in GVEA's system. To model GVEA's SILOS, a pseudo unit was created. The SILOS unit is a 70 MW unit based on the size of the Intertie. Spinning reserves were set equal to a regulation capacity of 10 MW and operating reserves were set at 80 MW (regulation capacity plus Intertie capacity). The unit is also identified as a "quick start" unit, which means its capacity can be counted towards operating reserves if it is not already dispatched.

When the utility resources are pooled the spinning reserve will be 109.5 MW. In the pooled case, the multi-area version of POWRPRO allows spin to be assigned to each area. For purposes of this study, the individual spin of Chugach was allocated to the Anchorage and Kenai areas based on the percentage of total generation in those areas. Based on this allocation, the spinning reserves for the four areas are: Fairbanks = 24 MW,

Healy = 0 MW, Anchorage = 77 MW, and Kenai = 8.5 MW, which adds up to a total of 109.5 MW for the entire pooled system.

Since the spinning reserve is at least two-thirds of the operating reserve for the individual systems, the following operating reserves are used in 1996: Chugach = 59.4 MW, ML&P = 55.1 MW, GVEA = 33.9 MW, and FMUS = 15.8 MW. For 1997, the operating reserves increase to: Chugach = 61.7 MW, ML&P = 66.6 MW, and GVEA = 36 MW. The pooled system operating reserves are 164.3 MW. As described above, GVEA's spinning and operating reserves are supplied through SILOS.

3.1.7 Economic Parameters

Table 3-5 indicates the inflation rate, the present worth discount rate, and the escalation rates for variable O&M, fixed O&M, and capital provided by the utilities.

Table 3-5
Economic Parameters for the Railbelt Utilities (%)

	ML&P	**Chugach**	**GVEA**	**HEA**	**MEA**
Inflation Rate	*3.0*	3.0	3.0	3.5	2.5
Discount Rate	8.0	9.0	6.0	8.0	6.5
Variable O&M	*3.0*	3.0	3.0	3.5	2.5[1]
Fixed O&M	*3.0*	3.0	3.0	3.5	1.0[1]
Capital Costs	*3.0*	3.0	2.0	3.5	2.5

[1] Transmission only.

For this study, a 3.0 percent escalation rate and an 8.0 percent present worth discount rate will be used for all the utilities to eliminate any differences due solely to different economic parameters. The 3.0 percent escalation rate and the 8.0 percent present worth discount rate were selected as being generally representative of the Railbelt utilities as a group.

3.1.8 Definition of the Seasons

Based on the seasonal definitions suggested by the utilities, this study will define the winter months as October 1 to March 31 and the summer months as April 1 to September 30.

3.2 Actual 1996 Data

Appendix B contains the benchmark data provided by the utilities, such as actual hours operated, fuel consumed, and energy generated for each unit operating in 1996.

Purchase and sales contracts in existence in 1996 and extending well into the study period are summarized in Section 3.3.2. This section outlines current purchase/sales amounts and prices for each Railbelt utility as reported in each utility's Annual Report and as shown in Table 3-6. Since AEG&T is an intermediate utility that purchases electric energy for HEA and MEA, their purchases and sales will be incorporated within HEA's and MEA's transactions.

ML&P purchased 167,000 MWh from the two hydro projects and sold 20,188 MWh to Chugach in 1996. ML&P sells about 2,500 MWh/month on average. ML&P had 92 MWh of economy purchases at $0.0401/kWh.

Chugach purchased for their own needs approximately 222,306 MWh. They also purchased on MEA's behalf 26,021 MWh from Eklutna and 47,223 MWh from Bradley Lake.

From power bank purchases, Chugach purchased a net amount of 4,930 MWh from GVEA and sold a net amount of 2,391 MWh to HEA.

3.3 Existing Generation, Purchased Power, and Power Sales

3.3.1 Existing Generation Resources

Appendix C contains the input values for the thermal and hydro units of the Railbelt Utilities. The maintenance schedule shows the planned schedule for the study period. Items such as ramp rates and minimum up times do not change from the benchmark year. Based on comments from the Railbelt Utilities, a few unit characteristics were levelized. For natural gas combustion turbines (CT's), variable O&M is set to $2.00/MWh in 1996. For simple cycle CT's, minimum on- and off-line times are set to 1 hour, each. Minimum on- and off-line times for Frame 7 units are 6 hours, each. For combined cycle CT's, the minimum on-line time is 16 hours and the minimum off-line time is 6 hours.

3.3.2 Miscellaneous Contracts or Arrangements

The Eklutna Plant, a hydroelectric project, is owned by ML&P (53.3 percent), Chugach (30 percent), and MEA (16.7 percent) and consists of 2 units rated at 15 MW

Table 3-6
1996 Railbelt System Purchases

Source	**MWh**	**$/MWh**	**Type**
Buyer = ML&P			
Bradley Lake	90,333	37.33	Firm
Eklutna	76,483	18.61	Firm
Chugach	92	40.14	Non-Firm
GVEA	4	53.50	Non-Firm
Buyer = Chugach			
Bradley Lake	108,185	37.79	Firm
Eklutna	46,865	18.34	Firm
Soldotna 1	46,786	28.62	Firm
GVEA	282	54.48	Non-Firm
ML&P	20,188	24.48	Non-Firm
Buyer = GVEA			
Bradley Lake	53,000	52.14	Firm
Chugach	246,513	31.81	Non-Firm
FMUS	52	35.00	Non-Firm
ML&P	7,799	36.77	Non-Firm
North Star	1,118	30.00	Non-Firm
Univ. of Alaska	319	18.31	Non-Firm
Buyer = HEA			
Bradley Lake	43,613	35.82	Firm
Chugach	414,284	38.57	Firm
Soldotna 1	(991)	(2,160)	Firm
Buyer = MEA			
Bradley Lake	47,223	38.10	Firm
Chugach	491,540	42.30	Firm
Eklutna	26,021	16.20	Firm
Enerdyne	477	39.99	Firm

individually or 30 MW together. Neither unit can be operated continuously in the 8-11 MW range due to vibration. The units were upgraded in 1997 to 22 MW each, or 40 MW combined. The three owning utilities take their respective percentage share of the energy produced at Eklutna.

Bradley Lake is owned by the Alaska Energy Authority (AEA). The Railbelt Utilities have individually purchased the right to a percentage share of the project capability (capacity and energy) as follows: HEA = 12 percent, MEA = 13.8 percent, GVEA = 16.9 percent, Chugach = 30.4 percent, ML&P = 25.9 percent, SES = 1 percent. AEG&T contracts with AEA on behalf of HEA and MEA for their respective shares of project capability.

With regards to the transmission of Bradley Lake energy, Chugach has entered into an agreement with the other Railbelt Utilities to provide wheeling services for the Bradley Lake energy. When transmission capacity is not available to wheel a utility's share of Bradley Lake power to Anchorage, Chugach has agreed to provide storage in its Cooper Lake hydro project for excess power and deliver offsetting power from other Chugach generation when practicable, or purchase excess power to the extent it can displace Chugach generation. For this study, wheeling charges will not be included in the costs in any of the cases.

As indicated in Section 2.4, Aurora Energy has contracted to sell GVEA power to be generated by its Chena generating facility. The agreement has a term of 20 years and will provide GVEA with 120,000 MWh of energy annually at a fixed Tier 1 rate. Initially, the Tier 1 rate is fixed at $.04/kWh until the completion of the Northern Intertie, when it will decrease by $.003/kWh. The reduced Tier 1 rates will remain in place for a minimum of 18 months and a maximum of 30 months. The ensuing rate will be determined in each subsequent year effective January 1, based upon GVEA's average cost of power from third party suppliers. Any additional energy scheduled from Aurora by GVEA will be provided at Tier 2 rates based upon GVEA's avoided cost, initially set at $.026/kWh. For modeling purposes, the following assumptions will be made:

- Northern Intertie complete January 1, 2000.
- Price readjustment period begins January 1, 2002.
- Price will escalate at the same rate as coal.

GVEA also has a non-firm energy contract with Chugach with a term length of twenty years and an option for extension. The contract is scheduled to expire in April of

2009. GVEA's non-firm energy is defined as the difference between the load in any hour and generation from GVEA's own resources in that hour. GVEA is obligated to purchase non-firm energy first from Chugach, as priority supplier, before soliciting other suppliers unless that supplier is a Qualifying Facility (QF). Although Chugach does not have to supply, and although GVEA does not have to purchase a specified amount of non-firm energy as in a firm power contract, Chugach is obligated to supply GVEA's non-firm energy whenever their generating capabilities allow. In the individual case, multi-area POWRPRO is used to model both the Chugach and GVEA systems from 1997 through 2008.

4.0 1996 Benchmark Results

The benchmark year is 1996 and consists of three major systems: ML&P, Chugach, and GVEA. The Chugach system includes AEG&T, HEA, MEA, and SES. FMUS was not benchmarked since actual 1996 operating values could not be obtained.

Each utility provided, to the best of their ability, their actual 1996 hourly loads, fuel costs, variable operating and maintenance costs, MWh generated, fuel use, and unit availability. These values are in Appendix B.

Hydroelectric generation for Chugach and GVEA is modeled as peaking based on monthly takes, while ML&P is modeled as peaking based on annual takes. ML&P, however, does not apply a standard peak shaving use for its hydroelectric generation. Instead, they take the maximum amount of hydro possible during maintenance periods when their combined cycle unit is out for significant periods. After scheduling that hydro energy take, they allocate the remaining energy over the rest of the year and use that energy to delay the start of their peaking thermal units. Over the length of a 20 year study period, however, the differences between actual and modeled hydro takes should be minimal.

The Bradley Lake energy, in particular, presents the problem of actual physical electricity flow versus contractual flow. The physical system naturally flows north because excess capacity exists in the Kenai Peninsula and in the Anchorage area. The thermal and hydro generators in the Kenai produce about 50,000 MWh annually over the energy needs of the area and send that amount north. This energy combines with that generated in the Anchorage region. This region produces about 200,000 MWh in excess non-firm energy, which is transmitted north to Fairbanks over the Alaska Intertie to displace GVEA's oil-fired generation. That 200,000 MWh is contractually a mix of Bradley Lake energy and Chugach non-firm energy. However, the electrons may be coming from any number of generators. Therefore, electricity physically flows north because the Bradley Lake energy, which is purchased by each utility in the Railbelt, is enough to cover three-fourths of the Kenai Peninsula needs. However, contractually, that Bradley Lake energy flows north all the way to Fairbanks while Chugach energy produced at Beluga moves south to supply the needs of the Kenai.

Thermal generating units are modeled in POWRPRO based on the information provided by the Railbelt Utilities. A copy of the input file for each system is in Appendix D and a copy of the input manual is located in Appendix K.

POWRPRO can commit and dispatch units on fuel cost only or fuel cost plus variable O&M. For this study, the fuel cost plus variable O&M option is used. POWRPRO has the option to specify any percentage of the full load output of units for determining the tentative commitment order. For this study, the 100 percent load heat rate is used to determine the tentative commitment order. Table 4-1, located at the end of the section, shows the expected initial 1996 dispatch order of the generating units for the three systems considering fuel cost at full load heat rate and variable O&M costs. Chugach's fuel costs for 1996, as shown in Table 4-1, are the average cost over the year.

POWRPRO provides the user with the option of specifying a maintenance schedule or allowing automatic scheduling of specified amounts of maintenance on an annual basis to maximize the system reserve margin. POWRPRO also randomly schedules forced outage rates. In attempting to benchmark the Railbelt system, actual outages were scheduled as closely as possible by starting and stopping the unit. If adequate capacity is not available on a system to meet load requirements plus operating reserve requirements, POWRPRO will use an emergency purchase to supply the necessary capacity and energy. The emergency purchase is set to an extremely high price to ensure that POWRPRO only dispatches emergency purchase energy if absolutely necessary. Any emergency purchase taken represents unserved load.

Some specific assumptions regarding spinning reserve were assumed for the benchmark and expansion plan runs. Since Bradley Lake supplies 27 MW of spinning reserves, the amount of spinning reserves and operating reserves were decreased in the POWRPRO runs by the amount allocated to each system, (ML&P = 7 MW, Chugach = 20 MW).

The POWRPRO summary sheets, located in Appendix E, indicate the maximum capability of a unit; the maximum capacity at which a unit is operated; the energy produced; the fuel used; the hours on line; heat rate; capacity factor; and total dollar costs for fuel, variable O&M, and fixed O&M.

4.1 ML&P System

ML&P's total net generation equaled 749,159 MWh and they purchased, by contract, 166,816 MWh from Bradley Lake and Eklutna. POWRPRO dispatch versus actual 1996 data is outlined in Table 4-2 at the end of this section.

Plant 1 actually produced 2,434 MWh with a fuel usage of 96,441 MBtu. The plant capacity factor is 0.78 percent. POWRPRO dispatched Plant 1 at a 4.6 percent capacity factor with 14,332 MWh generated. POWRPRO generally over-dispatched the peaking units. One reason is that the units are derated for the summer, but the heat rates are from winter, which would make the peaking units look better than actual. A second reason is that POWRPRO has perfect knowledge of the future loads and dispatches as economically as possible based on this knowledge. A real dispatcher does not have this knowledge and may commit other units than peaking units.

Plant 2 actually generated 746,725 MWh at a 32.2 percent capacity factor. POWRPRO dispatched 734,752 MWh from Plant 2 at a 31.7 percent capacity factor.

The total ML&P system heat rate from POWRPRO is 3.4 percent higher than actual. One reason for this may that the fuel costs provided by ML&P for the benchmark are different from the average fuel costs shown in their annual report. The average fuel price for Plant 1 is actually higher than for Plant 2. Given a fuel price difference between the plants, POWRPRO may have operated units at Plant 2 more and at lower heat rates.

4.2 Chugach System

The Chugach system was modeled using multi-area POWRPRO because of the stability requirement that one thermal unit must always be spinning on the Kenai. POWRPRO and multi-area POWRPRO allow the user to specify a minimum number of generators to be on-line. By breaking the Chugach system into two areas, the Kenai area could be constrained to have one unit always on-line.

In 1996, Chugach had a total system peak of 381 MW and a net energy for load of 2,361,673 MWh. POWRPRO dispatched the Beluga plant at a 64.9 percent capacity factor while the plant actually operated at a 62 percent capacity factor, as shown in Table 4-3 at the end of this section. Once again, POWRPRO over-utilized the Beluga peaking Units 1 and 2 at 18,023 MWh instead of 5,709 MWh. The intermediate Units 3 and 5 were slightly under-utilized (577,314 MWh versus 602,303 MWh). The base load combined cycle units were over-dispatched, producing 101,127 MWh more than actual

1996 dispatch. POWRPRO also dispatched the Bernice plant at a 21.3 percent capacity factor while it actually had a 33.6 percent capacity factor. POWRPRO even dispatched the International plant three times as much as it actually ran, but the International plant still only accounts for 0.6 percent of Chugach's total generation. With the other units dispatching more than their 1996 actual generation, Soldotna 1 had to be dispatched less than actual with a capacity factor of only 2.4 percent when the unit actually ran at a 14.4 percent capacity factor. POWRPRO's total system heat rate, however, was lower than Chugach's actual total average heat rate of 11,266 Btu/kWh. POWRPRO's total fuel cost was also lower than Chugach's actual 1996 fuel expenditure by approximately $459,000.

4.3 GVEA System

The GVEA system in 1996 had a total net generation of 406,265 MWh and about 53,000 MWh of purchases from Bradley Lake. However, their net energy for load (NEL) equaled 637,637 MWh. The difference is non-firm or economy energy purchases. Bradley Lake purchases were shaved from the hourly load file based on a typical monthly usage pattern. POWRPRO closely approximates GVEA's 1996 system with a utility output of 405,626 MWh and a capacity factor of 24.6 percent, as shown in Table 4-4 at the end of this section. GVEA's actual output and capacity factor are 406,265 MWh and 24.7 percent, respectively. On the plant level, Zehnder ran slightly less than actual with a 3.7 percent capacity factor and generation totaling 12,551 MWh. North Pole ran less than actual with a capacity factor of 22.4 percent versus 25.7 percent. The Healy plant overproduced by about 33,000 MWh or a 21.5 percent difference in capacity factors.

Table 4-1
1996 Unit Dispatch Order for Individual Systems

Plant Name	**Unit Number**	**Full Load HR MBtu/MWh**	**Fuel $/MBtu**	**Var O&M $/MWh**	**Dispatch $/MWh**
Chugach					
Beluga	7/8	9.149	1.17	2.00	12.70
Beluga	6/8	9.372	1.17	2.00	12.97
Beluga	3	12.288	1.17	2.00	16.38
Beluga	5	12.537	1.17	2.00	16.67
Beluga	6	12.743	1.17	2.00	16.91
Beluga	7	13.172	1.17	2.00	17.41
Bernice	3	13.512	1.38	2.00	20.65
Bernice	4	13.715	1.38	2.00	20.93
Beluga	1	16.924	1.17	2.00	21.80
Beluga	2	17.320	1.17	2.00	22.26
Bernice	2	14.817	1.38	2.00	22.45
Soldotna	1	11.401	1.98	2.00	24.57
International	3	15.030	1.98	2.00	31.76
International	1	15.992	1.98	2.00	33.66
International	2	17.384	1.98	2.00	36.42
GVEA					
Healy	1	13.995	1.36	10.87	29.90
North Pole	GT 2	9.154	3.03	4.66	32.40
North Pole	GT 1	9.751	3.03	4.66	34.20
Healy	D1	11.451	3.11	8.00	43.61
Zehnder	GT 1	14.560	3.21	5.21	51.95
Zehnder	GT 2	14.560	3.21	5.21	51.95
Zehnder	EMD 5	25.679	3.21	8.00	90.43
Zehnder	EMD 6	25.679	3.21	8.00	90.43
ML&P					
Plant 2	7/6	8.527	1.88	2.00	18.03
Plant 2	5/6	10.106	1.88	2.00	21.00
Plant 2	8	11.557	1.88	2.00	23.73
Plant 1	2	13.980	1.88	2.00	28.28
Plant 1	3	14.371	1.88	2.00	29.02
Plant 1	1	14.590	1.88	2.00	29.43
Plant 1	4	17.324	1.88	2.00	34.57

Table 4-2
POWRPRO Benchmark of ML&P

Unit	POWRPRO					1996 Data				
	Capacity Factor %	**Energy MWh**	**Fuel MBtu**	**Fuel $**	**Heat Rate Btu/kWh**	**Capacity Factor %**	**Energy[1] MWh**	**Total Fuel MBtu**	**Fuel[3] $**	**Heat Rate Btu/kWh**
P1 U1		-	-	-	-		-	-		-
P1 U2	5.1	7,610	158,098	294,062	20,774	0.6	896	32,002		35,728
P1 U3	4.2	6,722	124,149	230,916	15,469	1.0	1,538	64,439		41,890
P1 U4		-	-	-	-		-	-		-
Total P1	4.6	14,332	282,247	524,978	19,693	0.78	2,434	96,441	203,156	39,622
P2 U5/6	31.3	140,130	1,585,302	2,948,644	11,313	20.0	89,462	1,000,045		11,178
P2 U7/6	44.8	461,278	4,322,260	8,039,318	9,370	50.9	524,346	5,001,168		9,538
P2 U8	15.9	133,344	2,085,246	3,878,697	15,638	15.8	132,917	1,896,824		14,271
Total P2	31.7	734,752	7,992,808	14,866,659	10,878	32.2	746,725	7,898,037	15,768,229	10,577
Total ML&P		749,084	8,275,055	15,391,637	11,047		749,159	7,994,478	15,971,385	10,671
Hydro		166,528					166,816			
Gnd Total[2]		915,612	8,275,055				915,975	7,994,478		

[1] Energy is estimated net energy based on allocating station use to individual units.

[2] Energy includes approximately 40,000 MWh of economy energy sales.

[3] Fuel cost in the annual report differs from the value provided for the benchmark.

Table 4-3
POWRPRO Benchmark of Chugach

Unit	POWRPRO					1996 Data				
	Capacity Factor %	**Energy MWh**	**Fuel MBtu**	**Fuel $**	**Heat Rate Btu/kWh**	**Capacity Factor %**	**Energy[1] MWh**	**Fuel MBtu**	**Fuel $**	**Heat Rate Btu/kWh**
Beluga 1	4.9	6,787	192,086	224,742	28,302	1.9	2,698	53,567		19,855
Beluga 2	8.0	11,236	197,954	231,607	17,617	2.2	3,011	55,535		18,447
Beluga 3	54.6	281,185	3,584,325	4,193,802	12,747	52.4	270,192	3,300,971		12,217
Beluga 5	57.5	296,129	3,863,434	4,520,283	13,046	64.5	332,111	4,516,805		13,600
Beluga 6/8	69.5	599,773	5,628,025	6,584,562	9,383	63.1	544,127	5,284,008		9,711
Beluga 7/8	89.3	770,924	7,058,200	8,259,045	9,155	84.1	725,443	7,147,733		9,853
Total Blg	64.9	1,966,034	20,524,024	24,014,041	10,439	61.9	1,877,581	20,358,619	22,926,375	10,843
Bernice 2	0.0	-	-		-	0.0	-	-		-
Bernice 3	29.3	59,293	1,351,157	1,823,160	22,281	36.0	72,981	1,150,833		15,769
Bernice 4	13.3	26,968	444,110	612,869	16,468	31.1	63,073	1,024,791		16,248
Total Brn	21.3	86,261	1,795,267	2,436,029	20,812	33.6	136,054	2,175,624	3,166,370	15,991
Intl 1	0.7	965	19,636	38,879	20,349	0.4	561	22,836		40,706
Intl 2	0.7	958	18,423	36,477	19,230	0.3	415	12,573		30,296
Intl 3	1.2	1,862	32,752	64,848	17,589	0.2	284	12,633		44,482
Tot. Intl	0.9	3,785	70,811	140,204	18,708	0.3	1,260	48,042	125,441	38,129
Soldotna 1	2.4	7,687	112,392	222,536	14,621	14.4	46,786	645,534	1,053,592	13,798
Total CEA		2,063,767	22,502,494	26,812,810	10,904		2,061,681	23,227,819	27,271,778	11,266
Hydro		299,452					299,992			
Gnd Total		2,363,219	22,502,494				2,361,673	23,227,819		

[1] Energy is estimated net energy based on allocating station use to individual units.

Table 4-4
POWRPRO Benchmark of GVEA

Unit	POWRPRO					1996 Data				
	Capacity Factor %	**Energy MWh**	**Fuel MBtu**	**Fuel $**	**Heat Rate Btu/kWh**	**Capacity Factor %**	**Energy[1] MWh**	**Total Fuel MBtu**	**Fuel[2] $**	**Heat Rate Btu/kWh**
Zehnder 1	2.8	4,194	94,971	305,195	22,642	5.8	8,590	147,731	864,093	17,198
Zehnder 2	5.7	8,354	194,007	623,452	23,224	2.7	4,016	73,737		18,361
Zehnder 5	0.0	3	64	206	25,679	0.2	51	1,305	16,843	25,679
Zehnder 6	0.0	-	-	-	-	0.1	34	870		25,679
Total Zen	3.7	12,551	289,042	928,853	23,029	3.7	12,691	223,643	880,936	17,623
North Pole 1	9.5	50,500	525,088	1,575,258	10,397	15.1	80,272	835,523		10,409
North Pole 2	35.3	187,679	1,757,977	5,273,936	9,366	36.3	192,874	1,898,889		9,845
Total NP	22.4	238,179	2,283,065	6,849,194	9,586	25.7	273,146	2,734,412	8,625,421	10,011
Healy 1	70.0	153,323	2,155,443	2,931,331	14,058	55.0	120,346	1,667,835	3,197,926	13,859
Healy D1	6.9	1,573	18,007	55,944	11,450	0.4	82	939	140,563	11,451
Tot. Healy	64.1	154,896	2,173,450	2,987,275	14,032	49.8	120,428	1,668,774	3,338,489	13,857
Total GVEA	24.6	405,626	4,745,557	10,765,322	11,699	24.7	406,265	4,626,829	12,844,846	11,389
NFC Chug.		178,538					178,372			
Hydro		53,476					53,000			
Gnd Tot		637,640	4,745,557				637,637	4,626,829		

[1] Energy is estimated net energy based on allocating station use to individual units.

[2] Fuel cost in the annual report differs from the value provided for the benchmark.

5.0 Future Generation and Transmission Plans

5.1 Planned Future Generation

5.1.1 Retirements

GVEA is the only utility planning to retire units in the 1997-2016 time frame. They are Zehnder 1 in 2011, Zehnder 2 and Chena 6 in 2012, and North Pole 1 in 2016. All retirements will be assumed to occur on January 1.

5.1.2 Installations and Upgrades

Appendix F contains an input table for the two planned unit additions. The first is an LM6000PA in simple cycle mode planned for installation by Chugach in the year 2014. For modeling purposes, the plant will be made available for operation on January 1. The new plant's planned location is Anchorage, and it will increase Chugach's capacity by 40 MW. The second addition is AIDEA's Healy Clean Coal Project (HCCP) unit, which is committed to GVEA's system. It will increase GVEA's total capacity by 53 MW in late 1999 or early 2000. The unit, however, is currently providing some generation during its DOE test runs.

Some unit upgrades are also scheduled for the 20 year planning horizon. Chugach plans on upgrading Beluga Unit 7 by January 2004 and Beluga Unit 6 by January 2005, which will result in a 6.5 percent decrease in heat rate characteristics and an overall increase in winter plant capacity of 10 MW. GVEA is currently retrofitting Healy 1 with low NO_x burners. The upgraded unit will also burn 40 percent waste coal. For modeling purposes, the fuel costs for Healy 1 are assumed to change to 30 percent waste coal for 1998 and 40 percent waste coal for 1999 through 2016.

Another potential change to the system is the proposed relocation of the Soldotna 1 Plant to the Unocal Agricultural Plant in Nikiski. The Soldotna 1 Plant will provide steam to Unocal in exchange for fuel. The move will also lower Soldotna 1's fuel price for its remaining fuel consumption to that of the Bernice Plant. These changes could have a significant effect on the amount of savings in a pooled environment. However, since the Soldotna move has not been finalized, the effects of this move will not be evaluated.

5.2 Purchase and Sales Contract Changes

The two existing tripartite agreements between Chugach, AEG&T, HEA, and MEA will both expire in 2014. Although AEG&T, HEA, and MEA do not plan to renew their contracts with Chugach, the study will assume that the agreements are extended through 2016 for the individual expansion case.

GVEA's non-firm power purchase agreement (PPA) with Chugach is scheduled to expire in the spring of 2009. Chugach, GVEA, and ML&P are currently discussing possible arrangements, which would open some potential GVEA non-firm energy purchases to the open market. To coordinate Chugach generation with non-firm purchase sales for 1997 through 2008, Chugach's and GVEA's combined system was modeled using Multi-Area POWRPRO. From 2009 to 2016, the systems were modeled separately.

5.3 Fuel Forecasts for All New Sites

Fuel forecasts for planned and generic future generation are shown in Table 5-1. Chugach's new site fuel forecast will be the fuel price for their LM6000PA unit. GVEA provided a fuel forecast for their HCCP coal unit. For generic oil units, the forecast is an average of the fuel prices at Zehnder and North Pole. The generic natural gas unit fuel price is assumed to be equivalent to ML&P's natural gas fuel forecast since new units will most likely be built in Anchorage.

5.4 Individual System Expansion

Tables 5-2 through 5-4 depict the excess/deficit capacity for the three main Railbelt systems. Both ML&P and Chugach have excess capacity throughout the period. However, GVEA will be needing more capacity than currently planned, by as early as 2004. The input and output files for the individual and pooled cases are in Appendices H and I, respectively.

5.4.1 Generic Future Generation Options

Several options for generic additions to the capacity in the Railbelt region exist. Based on current unit sizes in the Railbelt region and GVEA being the only utility with a capacity deficit, the following units will be evaluated for potential generation. The two fuel types evaluated for the units are HAGO and coal. Tables 5-5 and 5-6 show unit type,

size, O&M costs, and capital costs for each fuel type. Appendix G, Tables G-1 through G-3, summarizes the dispatch constraints for the prospective units. Other possible options that were not evaluated in the study are the repowering or conversion of current units. Also not evaluated was the potential for transmission system upgrades in lieu of installing new generation.

Black & Veatch's POWROPT model was employed to find the optimal expansion plan. The optimal plans are determined based on minimum net cumulative present worth costs subject to user specified constraints. The expansion plans from POWROPT are generated by selecting from a list of candidate units provided as input to the model. Units are added through the planning horizon to either meet reserve margins, as in this study, or loss of load probability criteria. The user specifies, as input, constraints such as first and last year a particular unit is available, the maximum number of units that can be installed in any one year, and the maximum number of each unit that can be installed over the entire planning horizon.

The set of states forming the optimal expansion plan is determined after all the states in every year have been considered. Using dynamic programming techniques, the optimal end state is identified and a trace back through the previous stages is performed to determine the optimal plan. POWROPT uses the identical commitment and dispatch algorithms used in POWRPRO.

Based on these alternatives, POWROPT picked the GE 7EA SC in 2004 and the GE 7EA CC in 2012 as the most economical expansion plan for the GVEA system.

Table 5-1
Fuel Prices for Future Sites ($/MBtu)

Utility	**Chugach**	**GVEA**	**Generic**	
Plant	**New**	**HCCP**	**New**	**New**
Fuel	**NG**	**Coal**	**HAGO**	**NG**
1997	2.25	0.60	3.27	2.03
1998	2.05	0.62	3.36	1.96
1999	2.10	0.65	3.47	1.80
2000	2.15	0.67	3.57	1.85
2001	2.20	0.70	3.68	1.95
2002	2.25	0.76	3.79	2.05
2003	2.30	0.77	3.90	2.10
2004	2.35	0.79	4.02	2.16
2005	2.41	0.80	4.14	2.21
2006	2.47	0.82	4.26	2.28
2007	2.53	0.83	4.39	2.34
2008	2.59	0.85	4.52	2.41
2009	2.65	0.87	4.66	2.47
2010	2.72	0.88	4.80	2.54
2011	2.79	0.90	4.94	2.60
2012	2.85	0.92	5.09	2.67
2013	2.92	0.93	5.24	2.75
2014	3.00	0.95	5.40	2.82
2015	3.07	0.97	5.56	2.90
2016	3.15	0.99	5.73	2.97

Table 5-2
ML&P's Capacity Balance (MW)

Year	Capability	Peak	Peak + Reserve Margin[1]	Excess	
				Peak	Peak & RM
1997	386	152	197	234	189
1998	386	154	200	232	186
1999	386	156	202	230	184
2000	386	158	205	228	181
2001	386	160	208	226	178
2002	386	163	212	223	174
2003	386	166	215	220	171
2004	386	168	218	218	168
2005	386	170	221	216	165
2006	386	173	224	213	162
2007	386	175	227	211	159
2008	386	177	230	209	156
2009	386	179	233	207	153
2010	386	182	236	204	150
2011	386	184	239	202	147
2012	386	187	242	199	144
2013	386	189	246	197	140
2014	386	192	250	194	136
2015	386	195	253	191	133
2016	386	197	256	189	130

[1] Planning Reserve Margin

Table 5-3
Chugach's Capacity Balance (MW)

Year	Capability	Peak	Peak + Reserve Margin[1]	Excess	
				Peak	Peak & RM
1997	641	380	494	261	147
1998	641	384	499	257	142
1999	649	389	506	260	143
2000	649	394	512	255	137
2001	649	399	519	250	130
2002	649	405	527	244	123
2003	649	413	537	236	112
2004	654	420	546	234	108
2005	659	424	551	235	108
2006	659	426	554	233	105
2007	659	432	562	227	97
2008	659	439	571	220	88
2009	659	446	580	213	79
2010	659	453	589	206	70
2011	659	461	599	198	60
2012	659	470	611	189	48
2013	659	478	621	181	38
2014	699	487	633	212	66
2015	699	497	646	202	53
2016	699	506	658	193	42

[1] Planning Reserve Margin

Table 5-4
GVEA's Capacity Balance (MW)

Year	Capability	Peak	Peak + Reserve Margin[1]	Excess	
				Peak	Peak & RM
1997	237	167	217	70	20
1998	290	196	254	94	35
1999	290	201	261	89	29
2000	290	203	264	86	25
2001	290	208	271	81	19
2002	290	214	278	76	12
2003	290	220	286	70	4
2004	290	228	296	62	-6
2005	290	232	302	58	-12
2006	290	236	307	54	-17
2007	290	241	313	49	-23
2008	290	245	319	44	-29
2009	290	250	325	39	-36
2010	290	255	332	34	-42
2011	272	260	339	11	-67
2012	224	266	345	-41	-121
2013	224	271	352	-47	-128
2014	224	276	359	-52	-135
2015	224	282	366	-58	-142
2016	162	288	374	-126	-212

[1] Planning Reserve Margin

Table 5-5
Generic Oil Fired Unit Alternatives -- HAGO

Unit Type	**Unit Size**	**Capital Cost**	**O&M**	
			Variable	**Fixed**
	MW	**$/kW**	**$/MWh**	**$/kW-yr**
1x1 GE 6B Combined Cycle	58.5	726.2	3.84	23.38
1x1 GE LM6000 Combined Cycle	57.3	769.7	4.27	23.93
1x1 GE 7EA Combined Cycle	128.1	542.3	2.63	11.72
2x1 GE LM6000 Combined Cycle	124.5	657.3	3.44	16.03
1x0 GE 6B Simple Cycle	39.6	509.9	4.41	7.63
1x0 GE LM2500 Simple Cycle	26.4	661.1	5.53	10.88
1x0 GE 5PA Simple Cycle	27.1	569.4	2.84	10.18
1x0 GE LM6000 Simple Cycle	41.5	565.3	4.53	7.72
1x0 GE 7EA Simple Cycle	85.4	392.1	3.03	4.40

Table 5-6
Generic Coal Unit Alternatives

Unit Type	**Unit Size**	**Capital Cost**	**O&M**	
			Variable	**Fixed**
	MW	**$/kW**	**$/MWh**	**$/kW-yr**
50 MW Pulverized Coal w/Scrubbers	50	1985.13	3.04	64.24
75 MW Pulverized Coal w/Scrubbers	75	1687.93	3.04	54.60
150 MW Pulverized Coal w/Scrubbers	150	1228.83	3.04	48.68

5.4.2 Testing the Potential Replacement of Older Generation

Although the Railbelt system has significant excess capacity, a large percentage of that capacity is relatively old and less efficient than current technology, indicating that economies may exist in construction of a new unit and retiring older units. To test the economics, a 1x1 GE 6B combined cycle was chosen for addition to ML&P and GVEA and a 1x1 GE 7EA combined cycle was chosen for Chugach. Even though combined cycles are more efficient than peaking units, the GE 6B simple cycle was also evaluated for each system since most of the older generation is peaking. Since all of ML&P's and Chugach's thermal capacity burns natural gas, units being tested for economic addition within these systems will also burn natural gas. Table 5-7 shows unit type, size, O&M costs, and capital costs for the natural gas units being tested for economic addition. The dispatch constraints for the natural gas units are also shown in Appendix G, Table G-4.

Table 5-7
Generic Natural Gas Unit Alternatives

Unit Type	**Unit Size**	**Capital Cost**	**O&M**	
			Variable	**Fixed**
	MW	**$/kW**	**$/MWh**	**$/kW-yr**
1x1 GE 6B Combined Cycle	58.5	717.7	2.99	23.38
1x1 GE 7EA Combined Cycle	128.1	536.0	2.10	11.72
1x0 GE 6B Simple Cycle	39.6	490.8	2.82	7.63

The cumulative present worth cost (CPWC) of the additional generating units versus the optimal expansion plan from Section 5.4.1 for each system are shown in Table 5-8. The CPWC in Table 5-8 do not include fixed O&M costs for existing units, but include the fixed O&M costs for the units being tested for economic addition. This approximates the replacement of an older unit with the new generation. The annualized capital cost is based on escalating the 1998 capital cost to the mid-point of construction and then calculating the interest during construction based on an 8.5 percent annual interest rate and annualizing the capital cost based on a fixed charge rate (FCR) of 12 percent for simple cycle combustion turbines and 11 percent for combined cycle combustion turbines.

Table 5-8
Total Cumulative Present Worth Cost of Expansion Alternatives ($ 1,000)

Year Unit	ML&P		Chugach		GVEA	
Installed	GE 6B	GE 6B 1x1	GE 6B	GE 7EA 1x1	GE 6B	GE 6B 1x1
1999	253,284	276,383	679,119	712,614	340,641	365,570
2000	251,358	272,472	677,345	707,992	338,642	358,075
2001	249,577	269,032	675,479	703,397	336,710	353,563
2002	247,818	265,405	673,689	699,286	334,884	349,229
2003	246,163	261,965	672,015	695,237	333,141	344,943
2004	244,587	258,718	670,436	691,315	332,486	341,722
2005	243,149	255,691	668,912	688,015	330,909	338,538
2006	241,740	252,717	667,489	683,907	329,387	335,058
2007	240,414	249,998	666,026	679,986	328,006	332,077
2008	239,149	247,408	664,451	676,466	326,673	329,053
2009	237,954	245,077	663,362	673,590	325,345	326,551
2010	236,794	242,838	662,170	670,023	324,141	327,421
2011	235,755	240,841	661,046	666,635	322,989	327,419
2012	235,260	238,797	660,507	664,111	322,750	329,902
2013	233,795	236,919	658,912	661,826	321,191	325,951
2014	232,810	235,040	658,285	660,028	320,277	323,687
2015	231,879	233,228	657,333	658,115	319,344	321,363
2016	231,002	231,660	656,425	656,839	318,522	319,337
Base[1]	230,163		655,662		318,805	

[1] The base for ML&P and Chugach is no unit additions.
For GVEA it is the POWROPT expansion plan.

For ML&P and Chugach, the least-cost expansion plan is to not add capacity. For GVEA, the least-cost expansion plan is to add a GE 7EA SC in 2004, a GE 7EA CC in 2012, and a GE 6B SC in 2016.

5.5 Pooled System Expansions

Two pooled system expansion plans have been evaluated: an individual expansion pooled system (pooled case) and a joint expansion plan (joint case). The pooled region

with the individual optimal expansion plans for ML&P, Chugach, and GVEA would have an excess capacity of 193 MW in 2016, as shown in Table 5-9.

Table 5-10 shows that the pooled system has excess capacity throughout the planning horizon without the selected generating unit additions for GVEA's individual expansion plan. Since ML&P and Chugach have enough excess capacity to serve GVEA's deficit capacity, transmission constraints between Anchorage and Fairbanks may be the largest factor in determining whether units need to be added in GVEA's system. Table 5-11 shows GVEA's capability plus tie line capability between Anchorage and Fairbanks versus GVEA's projected peak and regulating margin. The table indicates that GVEA will still be short of capacity by the year 2015 and that a unit will need to be placed in the Fairbanks area.

A POWROPT case was run for GVEA based on the deficit shown in Table 5-11. The optimal unit addition is a GE 7EA simple cycle combustion turbine in 2015. However, this unit is the optimal unit for the GVEA system, alone. A unit burning cheaper fuel may provide more economic benefits for the pool. Therefore, the addition of a 75 MW and a 150 MW pulverized coal unit in 2015 were each tested in the joint case. The results of the test indicate that the addition of a GE 7EA simple cycle unit in 2015 in the GVEA service area is the least-cost alternative, as follows.

- GE 7EA CPWC = $1.208 billion
- 75 MW PC CPWC = $1.210 billion
- 150 MW PC CPWC = $1.211 billion

As with the individual expansion case, the pooled cases were also evaluated to see if a new, more efficient unit could be added to the mix of resources for greater economic benefit. The unit chosen is the GE 7EA 1x1 combined cycle and will be placed in the Anchorage area. Table 5-12 shows the results of the test for both the pooled and joint cases. For both the pooled and joint cases, the least-cost alternative is to not add any other new capacity than the POWROPT expansion plans.

Table 5-9
Total Pool Capacity Balance with Individual System Expansion Plans (MW)

Year	Capability	Peak[1]	Peak + Reserve Margin[2]	Excess	
				Peak	Peak & RM
1997	1264	672	874	592	390
1998	1317	707	919	610	398
1999	1325	718	933	607	391
2000	1325	728	946	597	378
2001	1325	740	962	585	363
2002	1325	753	979	572	346
2003	1325	770	1001	555	324
2004	1329	780	1014	549	315
2005	1335	797	1036	538	298
2006	1360	805	1047	555	313
2007	1360	817	1062	543	297
2008	1360	831	1080	529	279
2009	1360	845	1099	515	261
2010	1360	859	1117	501	243
2011	1507	874	1136	633	370
2012	1459	890	1157	569	302
2013	1459	906	1178	553	281
2014	1500	923	1200	577	300
2015	1500	933	1213	567	287
2016	1437	957	1244	480	193

[1] Coincident Peak Demand
[2] Planning Reserve Margin

Table 5-10
Total System Capacity Balance (MW)

Year	Capability	Peak[1]	Peak + Reserve Margin[2]	Excess	
				Peak	Peak & RM
1997	1264	672	874	592	390
1998	1317	707	919	610	398
1999	1325	718	933	607	391
2000	1325	728	946	597	378
2001	1325	740	962	585	363
2002	1325	753	979	572	346
2003	1325	770	1001	555	324
2004	1329	780	1014	549	315
2005	1335	797	1036	538	298
2006	1335	805	1047	530	288
2007	1335	817	1062	518	272
2008	1335	831	1080	504	254
2009	1335	845	1099	490	236
2010	1335	859	1117	476	218
2011	1317	874	1136	443	180
2012	1269	890	1157	379	112
2013	1269	906	1178	363	91
2014	1310	923	1200	387	110
2015	1310	933	1213	377	97
2016	1247	957	1244	290	3

[1] Coincident Peak Demand
[2] Planning Reserve Margin

Table 5-11
GVEA's Capacity Balance Including Intertie[1] (MW)

Year	Generation & Intertie	Peak	Peak + Reg. Margin[2]	Excess	
				Peak	Peak & RM
1997	259	167	177	92	82
1998	312	196	206	116	106
1999	312	201	211	111	101
2000	352	203	213	148	138
2001	352	208	218	143	133
2002	352	214	224	138	128
2003	352	220	230	132	122
2004	352	228	238	124	114
2005	352	232	242	120	110
2006	352	236	246	116	106
2007	352	241	251	111	101
2008	352	245	255	106	96
2009	352	250	260	101	91
2010	352	255	265	96	86
2011	334	260	270	73	63
2012	286	266	276	21	11
2013	286	271	281	15	5
2014	286	276	286	10	0
2015	286	282	292	4	-6
2016	224	288	298	-64	-74

[1] Excess Intertie capacity is 22 MW 1997 through 1999, and 62 MW from 2000 on.

[2] Regulating Margin is 10 MW.

5.6 Future Transmission

Two new intertie lines are being proposed, one in the north between Healy and Fairbanks and one in the south from the Kenai area to Anchorage. The new Northern Intertie will increase the transmission capability between Anchorage and Healy by 9 MW and between Healy and Fairbanks by 40 MW, with an expected completion date in late 1999. As part of the Northern Intertie, a 40 MW Battery Energy Storage System (BESS) will also be installed, which will provide spinning reserves to each Railbelt utility. (ML&P = 9.0 MW, Chugach = 12.1 MW, GVEA = 8.0 MW, HEA = 4.6 MW, MEA = 5.7 MW, and SES = 0.6 MW.) The new addition to the Southern Intertie is expected to be available in 2002 and will be a 138 kV line with 70 MW of capacity between the International substation in Anchorage and the Bernice Lake power plant. Table 5-13 shows the expected losses for the new Interties.

Table 5-12
Total Cumulative Present Worth Cost of Pooled System Alternatives ($ 1,000)

Year Unit Installed	**Individual Expansion GE 7EA 1x1**	**Joint Expansion GE 7EA 1x1**
1999	1,224,103	1,250,322
2000	1,217,988	1,244,207
2001	1,215,388	1,241,607
2002	1,211,685	1,237,904
2003	1,207,396	1,233,836
2004	1,203,285	1,229,905
2005	1,200,202	1,226,635
2006	1,197,225	1,223,994
2007	1,195,063	1,221,240
2008	1,192,983	1,218,662
2009	1,190,900	1,216,134
2010	1,188,998	1,214,094
2011	1,187,159	1,212,496
2012	1,185,539	1,211,289
2013	1,183,041	1,210,116
2014	1,180,348	1,210,261
2015	1,178,667	1,208,938
2016	1,177,512	1,207,394
Base	1,176,363	1,205,420

Table 5-13
Transmission Constraints Between Areas

From	**To**	**Capacity (MW)**	**Losses[1] a**	**Losses[1] b**
Healy	Fairbanks	140	-0.0059	0.0004
Anchorage	Healy	79	-0.0041	0.0008
Kenai	Anchorage	145	0.0093	0.0003

[1] Losses are modeled using a quadratic relationship: $y = ax + bx^2$, where x = total load on the line in MW and y = line losses, which is valid over the normal range of line loadings.

6.0 Benefit / Cost Analysis

This section outlines the assumptions made for the three planning horizon cases and compares the cumulative present worth cost of the individual case versus the two pooled cases.

6.1 Assumption Highlights

As discussed in Section 3.0, the individual case assumes that all contracts are renewed through the planning horizon except for the Chugach/GVEA non-firm power purchase agreement. Since it ends soon after the midpoint of the study (April 2009) whereas other contracts do not expire until Dec. 2014 and Dec. 2015, the agreement is not renewed for the study. In the pooled cases, the tripartite agreements and non-firm contracts are not in effect since all resources are pooled to serve the total requirements in each area.

Also discussed in Section 4.0 is the difference between the contractual hydro flow from Bradley Lake versus the actual electron flow. Contractually, each of the Railbelt Utilities receives and pays for an allocated amount of capacity and energy from Bradley Lake. However, due to actual system requirements and the location of the Bradley Lake plant, electrons from Bradley Lake may not flow all the way to GVEA's system, but a power banking arrangement between Chugach and GVEA facilitates this transfer. For modeling purposes, hydroelectric power is still allocated to each owner and shaved accordingly in the pooled cases. Specifically, the Kenai area receives HEA's and SES's share of Bradley Lake, the Anchorage area receives Chugach's and ML&P's, and the Fairbanks area has GVEA's share.

The BESS portion of the Northern Intertie reduces spinning reserves for each of the utilities in the year 2000 as outlined in Section 5.0. This reduction is accounted for in all three dispatch scenarios.

The individual system case assumes that the utilities continue to operate "as is" throughout the 20 year planning horizon. The pooled case with individual expansion, examined the joint dispatch of all the units in the Railbelt region but assumed that each utility would add and retire units based on the individual expansion plans discussed in

Section 5.0. The joint expansion case examines joint dispatch and joint ownership of any additional units. Table 6-1 summarizes the generic unit additions for the three cases.

Table 6-1
Generic Unit Additions for each Case

Individual	**Pooled**	**Joint**
GE 7EA SC in 2004 in GVEA's system.	GE 7EA SC in 2004 in GVEA's system.	GE 7EA SC in 2015 in GVEA's system.
GE 7EA CC in 2012 in GVEA's system.	GE 7EA CC in 2012 in GVEA's system.	
GE 6B SC in 2016 in GVEA's system.	GE 6B SC in 2016 in GVEA's system.	

6.2 Cost Comparison of the Three Cases

Table 6-2 shows the total cumulative present worth cost (CPWC) of the three cases. Appendix J contains the complete economic spreadsheets. Fixed O&M, although not a pooled phenomenon, is included in these values since expansion plans do vary.

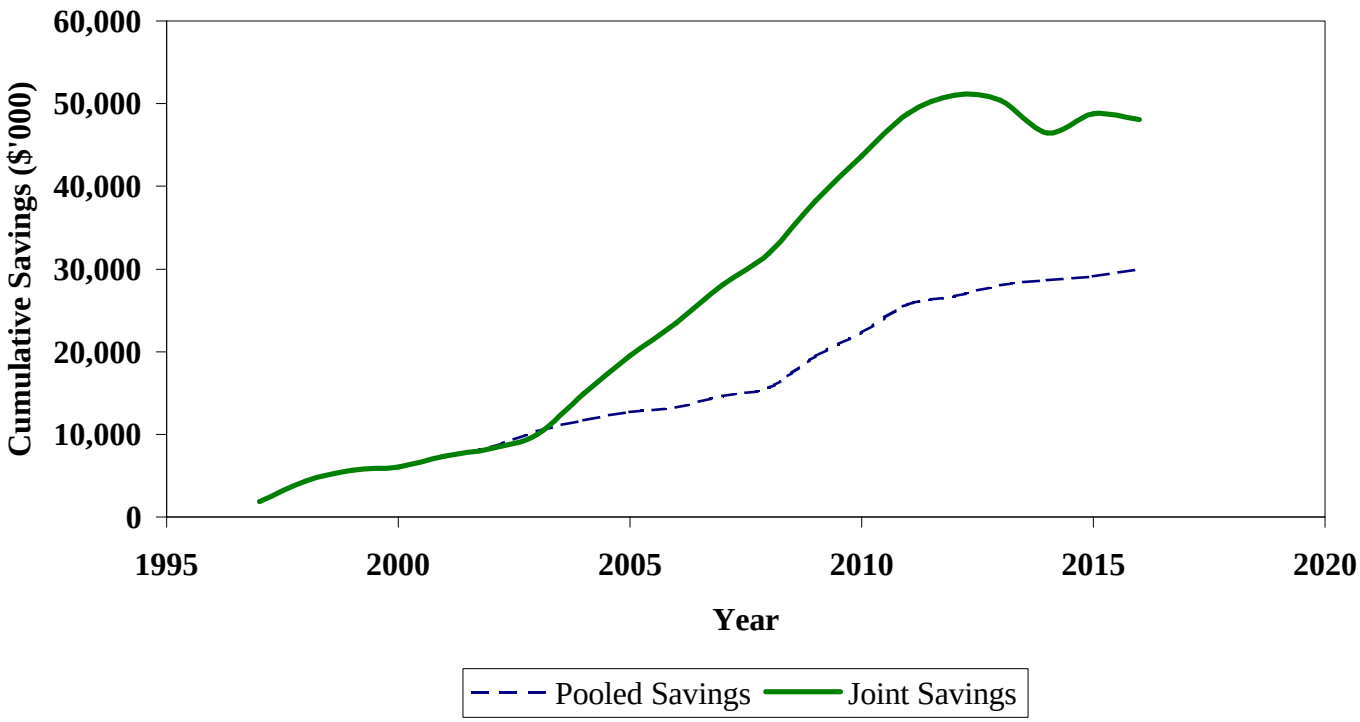
The least cost scenario is the joint case in which the Railbelt dispatches and plans future expansion as if it were one utility. By the year 2016, the CPWC savings between the individual and joint cases are $48.1 million. The pooled case provides savings amounting to $30 million over the individual case. Figure 6-1 graphically displays the CPWC savings associated with the pooled and joint cases.

The savings of the individual case over the pooled case are attributed to lower cost operation since both cases have the same expansion plan. The further savings of the joint case are due to joint planning for resource and load management. This case uses the maximum transfer capability between the Anchorage and Fairbanks areas to offset oil-fired generation with cheaper gas-fired generation from the south. By transferring capacity north, capital expansion plans for GVEA can be significantly delayed.

Table 6-2
CPWC of the Three Operating Alternatives ($ 1,000)

Year	Individual	Pooled		Joint	
	($ 1,000)	($ 1,000)	(%)	($ 1,000)	(%)
1997	91,347	89,475	2.05	89,475	2.05
1998	183,954	179,598	2.37	179,598	2.37
1999	272,880	267,264	2.06	267,264	2.06
2000	353,194	347,116	1.72	347,116	1.72
2001	432,591	425,233	1.70	425,233	1.70
2002	508,754	500,283	1.67	500,503	1.62
2003	584,141	573,765	1.78	574,166	1.71
2004	660,796	649,103	1.77	645,867	2.26
2005	734,668	721,989	1.73	715,161	2.66
2006	805,452	792,178	1.65	781,961	2.92
2007	875,576	860,914	1.67	847,469	3.21
2008	942,502	926,835	1.66	910,590	3.39
2009	1,010,448	990,987	1.93	972,174	3.79
2010	1,075,355	1,053,025	2.08	1,031,676	4.06
2011	1,139,453	1,113,721	2.26	1,090,668	4.28
2012	1,201,991	1,175,282	2.22	1,150,966	4.25
2013	1,262,783	1,234,731	2.22	1,212,357	3.99
2014	1,320,921	1,292,306	2.17	1,274,470	3.52
2015	1,377,712	1,348,564	2.12	1,328,929	3.54
2016	1,433,072	1,403,095	2.09	1,384,969	3.36

Figure 6-1 CPWC Savings Between the Pooled Cases and the Individual Case



6.3 Cost of Implementing a Power Pool

Power pooling systems are usually set up in two ways: either a member of the system takes on the role of system operator or an independent operator is established. BVI has provided a rough cost estimate for a pooled environment based on these two options. A detailed study would be necessary to develop the actual design requirements and to determine availability of existing equipment.

In general, the types of equipment needed are RTUs, meters, communication lines, instrument transformers, a SCADA system, and other software. For the cost estimates, the following assumptions have been made:

- RTUs have multiple reading capability, and 1 RTU can handle 4 Units.
- Meters will be of revenue-grade accuracy and required for each unit.
- Telephone lines for communications are available for lease at $200/mo.
- Instrument transformers are needed at every intertie point.

The Railbelt system is estimated to require approximately 14 RTUs, 39 meters, 31 lines, and 18 instrument transformers. The costs for these items are tabulated in Table 6-3. The total estimated equipment cost is approximately $5.6 million.

Table 6-3
Estimated Equipment Cost for Pooled Dispatch ($)

Item	Quantity	Unit $	Total $
RTU	14	15,000	210,000
Meters	39	15,000	585,000
Lines	31	2,400	74,400
Instrument Transformer	18	250,000	4,500,000
Software	1	200,000	200,000
TOTAL			5,569,400

The cost differential between an Independent System Operator (ISO) and a Railbelt Utility (RUO) running the system is in the SCADA system, staffing, and building costs. An ISO would require a new SCADA system, a separate control center, and approximately 11 full-time equivalent (FTE) employees. The salary for an FTE has been estimated at $144,000, based on comments from the participating utilities. The price for a new control center is estimated to be $1 million. A small building could easily house the

dispatch room, communications room, computer room, and electrical equipment room, among other necessary facilities. Control centers are often built as an addition to an existing structure to take advantage of common facilities such as a restroom or break room, reducing costs even further. If the RUO scenario is adopted, then the current SCADA system would need an upgrade and a current control center and existing personnel would probably be adequate. While few, if any, additional personnel would be required in such a situation, a reasonable assumption is that the host utility would likely allocate a portion of their existing dispatch personnel to the pool and recover the costs for those personnel. For cost estimating purposes, BVI has assumed 6 FTEs will be allocated to the pooled operation. Table 6-4 shows the total estimated costs for establishing a pooled environment.

Table 6-4
Total Estimated Capital and Staffing Cost of Implementing Pooled Dispatch (1998 $)

Item	Railbelt Utility Operator	Independent System Operator
Capital		
Equipment	5,569,400	5,569,400
SCADA[1]	1,000,000	5,000,000
Control Center	0	1,000,000
Staffing	864,000	1,584,000
TOTAL	7,433,400	13,153,400

[1] SCADA system upgrade after 10 years with same 1998 $ plus escalation.

The estimated 1998 total cumulative present worth cost (CPWC) of implementing pooled dispatch is $23 million for a Railbelt Utility Operator and $58 million for an ISO. The CPWC assumes that labor costs and lease line costs escalate at 3.0 percent annually. A present worth discount rate of 8.0 is used for consistency with the economic assumptions in Section 3.0. Costs are included for replacement of the SCADA systems halfway through the 20 year planning period since SCADA systems become obsolete.

Other costs to implementing the pool are associated with renegotiating current power contracts. Some of the contracts that may need to be changed are the tripartite agreements between Chugach, AEG&T, HEA, and MEA; the power purchase agreement between Chugach and SES; and the non-firm power purchase contract between Chugach

and GVEA. Gas companies may also require their contracts to be renegotiated under pooled operation. Depending on which wholesale contracts need to be changed, transmission service contracts may also need to be renegotiated. The study does not estimate costs associated with renegotiating these contracts.

6.4 Benefit Analysis

Pooled operation of the Railbelt Utilities has the potential to provide 2-4 percent savings over current operation. However, some of these savings will be used to establish, maintain, and operate the pool. Table 6-5 shows the potential economic benefit of pooled operation after taking into account the estimated cost of implementing the pool.

If the RUO scenario is implemented, savings would start in 2004 and total $25 million on a CPWC basis by 2016. If the ISO is implemented, savings are only realized between 2009 and 2014. However, if a move to competition is imminent, then an ISO would be created anyway.

These savings are only estimated values and do not include the cost of renegotiating contracts, but they do provide an estimate for potential savings. Any costs associated with renegotiating existing contracts would have to be covered by these savings for pooling to be more economical than existing operation. Based on the potential savings of the RUO scenario, further analysis into the actual costs of implementing a pool and an estimate on costs associated with renegotiating any necessary existing contracts would be appropriate.

6.5 Emissions Comparison

Table 6-6 summarizes the total SO_2 and NO_x emissions for the three cases. Over the entire study period, SO_2 emissions are reduced in both pooled environments. For almost the entire study period, NO_x emissions are also reduced.

Table 6-5
Comparison of CPWC Savings and Costs
of Pooled Dispatch ($ 1,000)

Year	Savings	Cost		Benefit	
	Joint Case	RUO	ISO	RUO	ISO
1997	1,873	7,217	12,770	(5,344)	(10,898)
1998	4,357	8,086	14,306	(3,729)	(9,949)
1999	5,616	8,914	15,770	(3,299)	(10,155)
2000	6,077	9,705	17,167	(3,627)	(11,090)
2001	7,358	10,458	18,499	(3,100)	(11,141)
2002	8,251	11,177	19,769	(2,926)	(11,518)
2003	9,975	11,863	20,981	(1,888)	(11,006)
2004	14,929	12,517	22,136	2,413	(7,207)
2005	19,507	13,140	23,238	6,367	(3,731)
2006	23,492	13,735	24,289	9,757	(798)
2007	28,107	14,924	28,404	13,182	(297)
2008	31,912	16,059	32,328	15,853	(416)
2009	38,274	17,141	36,071	21,133	2,204
2010	43,679	18,173	39,640	25,506	4,039
2011	48,785	19,157	43,044	29,628	5,741
2012	51,025	20,096	46,291	30,930	4,735
2013	50,426	20,991	49,387	29,435	1,040
2014	46,451	21,845	52,339	24,607	(5,888)
2015	48,783	22,659	55,156	26,124	(6,373)
2016	48,104	23,435	57,841	24,669	(9,738)

Table 6-6
Emissions Comparison (lbs)

Year	Individual		Pooled		Joint	
	SO_2	NO_x	SO_2	NO_x	SO_2	NO_x
1997	1,947	8,729	1,744	8,381	1,744	8,381
1998	2,120	8,785	1,992	8,416	1,992	8,416
1999	2,159	9,025	2,028	8,537	2,028	8,537
2000	1,428	8,503	1,342	8,422	1,342	8,422
2001	1,594	9,042	1,459	8,626	1,459	8,626
2002	1,689	9,062	1,553	8,682	1,556	8,689
2003	1,784	9,329	1,651	8,923	1,650	8,923
2004	1,989	9,633	1,910	9,218	1,926	9,206
2005	2,135	9,584	1,984	9,348	1,990	9,330
2006	2,214	9,804	2,046	9,269	2,058	9,265
2007	2,295	10,212	2,089	9,473	2,099	9,430
2008	2,391	10,462	2,221	9,597	2,231	9,593
2009	3,726	10,781	2,321	9,840	2,351	9,823
2010	4,402	10,780	2,346	9,999	2,375	9,987
2011	4,222	11,261	2,321	10,179	2,358	10,104
2012	2,915	10,551	1,230	10,188	2,458	10,327
2013	2,995	10,961	1,236	10,588	2,553	10,863
2014	2,491	10,823	1,072	10,669	2,775	10,964
2015	3,125	11,057	1,320	11,020	2,662	11,305
2016	3,040	11,039	1,259	11,035	2,220	11,342

7.0 Conclusion

The Alaska Public Utilities Commission, along with the Railbelt Utilities, is interested in evaluating potential savings between current loose-pool/independent operations and a power pool with central dispatch. Also of interest is how a tight pool may help ease the transition to full retail competition.

7.1 Study Results

The study evaluated, over a 20-year period extending from 1997 through 2016, the economic benefits in production and capital expenditure costs between the current operation of the system and a tight pool. Two pooling scenarios were examined. The pooled case assumes the individual generating utilities plan future generation needs independently. The joint case assumes joint planning of all utilities to serve future load requirements. Both cases centrally dispatch available generation to meet load.

The pooled case shows savings of 2.1 percent over the 20-year period and the joint case shows savings of 3.4 percent. These levels of savings are consistent with the level of savings generally expected from pooled dispatch. In BVI's experience, actual savings, once the pool is implemented, are even higher.

Some of these savings will be required to offset the cost of implementing a pool. Pools require a system operator, which oversees commitment and dispatch of generation and transmission. The operator may either come from within the existing system (RUO) or be independent (ISO). According to the estimated costs for setting up and operating a pool, using an RUO would leave $25 million in CPW savings over the study period, and an ISO would not leave any savings.

7.2 Institutional Barriers

The Railbelt system is currently operated through several power sales agreements, transmission agreements, and fuel contracts, which help to create the loose pool environment. Although these contracts provide savings in the current environment, they also provide a potential barrier to further savings from pooled operation. The cost of renegotiating these contracts to allow for pooled operation has not been estimated at this

time. During BVI's meetings with the Railbelt Utilities, the parties agreed it would take considerable time and input to determine the economic value of these contracts.

7.3 Advantages / Disadvantages of a Power Pool

Power pools have many advantages, as evidenced by the fact that many of the Railbelt Utilities already participate in a loose pool environment. Power pools allow for better utilization of resources to meet the aggregated load. Better utilization of resources leads to lower production costs and more economical capital improvement plans. Power pools inherently share knowledge, which, if transition to competition is imminent, will help smooth the process and automatically create a level playing field.

Disadvantages to power pools are the initial start-up costs and the fear that employees will be laid off. From past experience, employees are not laid off. Either they are transferred to the main SCADA operating facility, remain at a particular utility to operate the SCADA from that end, or are re-trained to serve new positions that are created by the pooled environment.

7.4 Does Pooling Aid in the Transition to Competition?

While not an absolute prerequisite to full competition as evidenced by the California experience, power pooling is generally the first step in a natural evolution to full competition. The California and Alberta models both require an ISO and a PX to administer competition in generation. A pool provides a means to ease into these institutions. The essential ingredient to wholesale generation competition is full price disclosure. While a pool environment does not provide full price disclosure, it does provide full cost disclosure, a necessary ingredient to price determination. The pooled environment allows for a number of the constraints associated with competition, such as "must run" units and stability requirements, to be established before they become market levers. In California, the ISO originally had to assume that units labeled as "must run" really were "must run." In PJM and NEPOOL, these types of constraints had already been clarified in the pooled environment.

7.5 Recommendations

Since the savings for joint operation of the utilities in the Railbelt is within the expected range, BVI feels this warrants a deeper look into implementing a pool. Several areas require further investigation either into costs or as sensitivities to the assumptions made in this study.

Cost of Implementing a Pool: The costs can vary significantly based on the equipment already in place and based on whether it makes more sense to create an ISO if deregulation in Alaska is probable.

Cost of Renegotiating Contracts: Significant investigation is required to determine the extent and cost associated with renegotiating contracts for purchase power, transmission wheeling, and fuel.

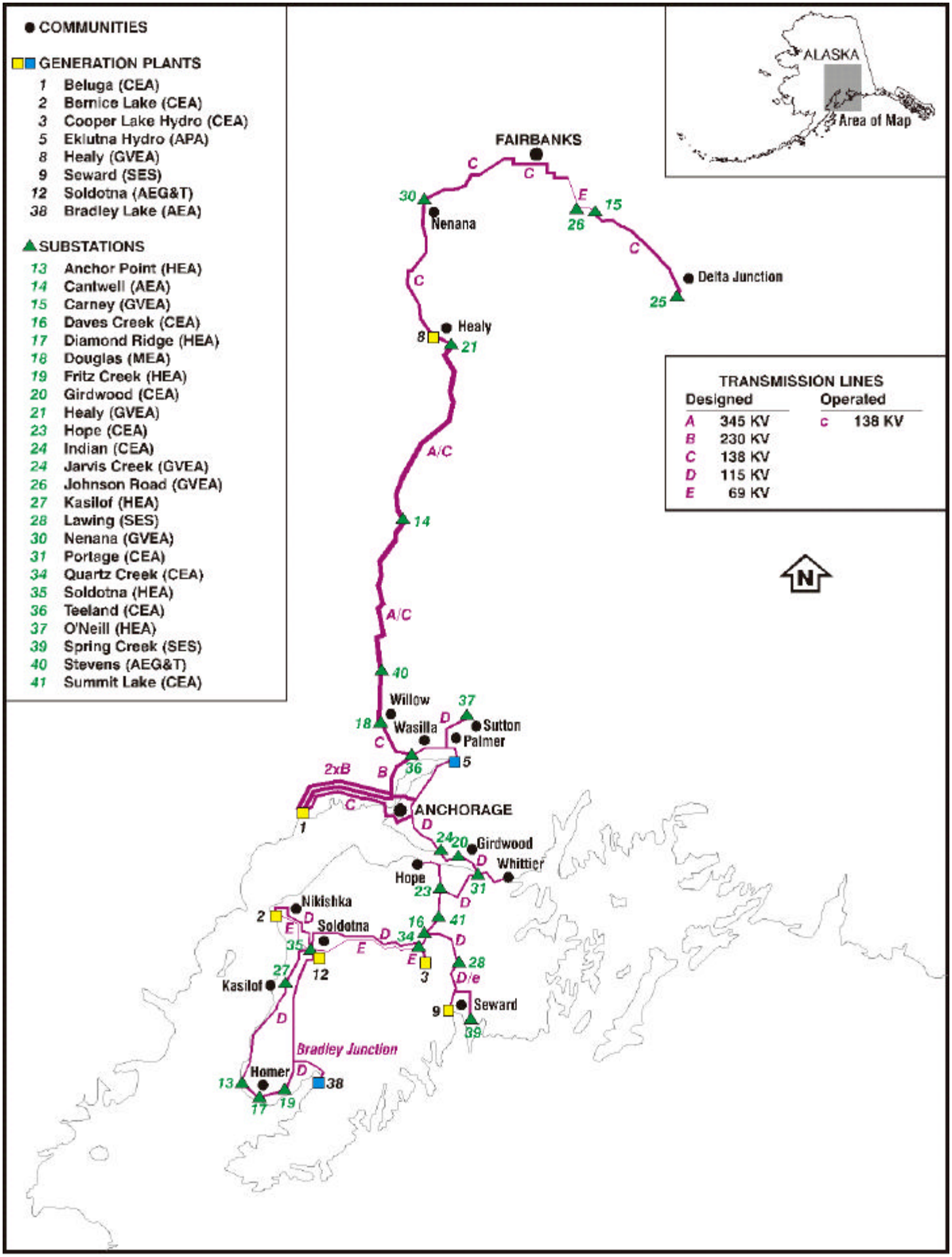
Soldotna 1 Move: The potential move and co-generation configuration of this combustion turbine could have significant impacts on the benefits of pooling. The unit will be efficient in a co-generation configuration and will be operating at a more competitive gas price if the move is approved. The Soldotna 1 unit in a co-generation operation will displace generation from other less efficient units. A sensitivity analysis of this move is appropriate.

ML&P Fuel Reserve Usage and Subsequent Price: ML&P's fuel reserve is paid for through tax-exempt bonds issued by the Municipality of Anchorage. The fuel from that reserve may be restricted to use only for firing generators to meet ML&P's native load. However, ML&P does not currently serve all the residents of Anchorage. Since these residents, through municipal taxes, etc. subsidize the fuel reserve, ML&P may be able to serve their load as well as their current native load without jeopardizing the tax-exempt bond status. The issue of any private use restrictions needs to be resolved.

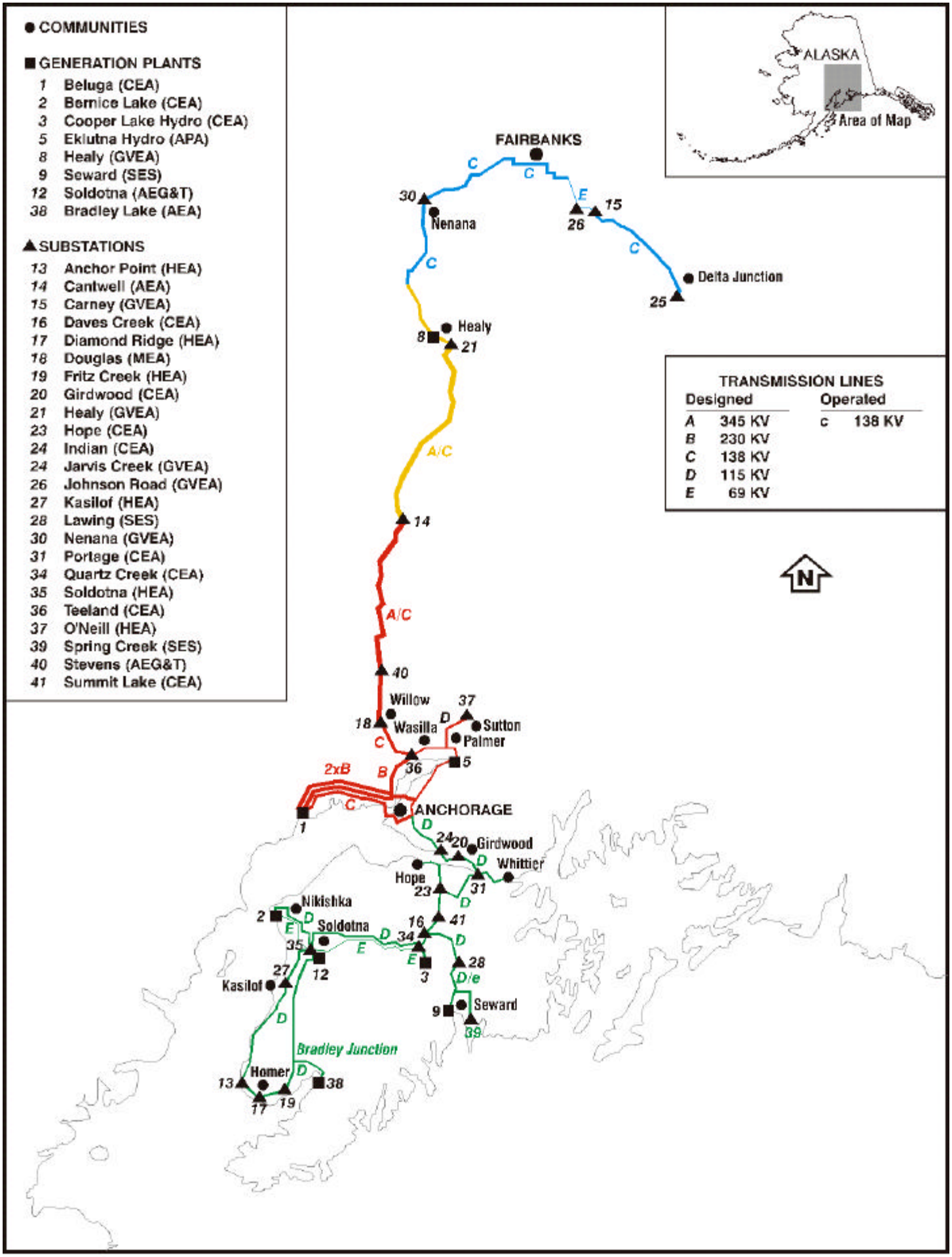
7.6 Caveat

One of the issues that causes greatest dispute among participants in a pool is how to allocate costs and share savings. The scope of this study does not include an evaluation into how costs and savings should be allocated among the utilities.

Appendix A
Transmission Maps



Overview of Alaskan Railbelt Transmission System
Figure A-1



Transmission Areas
Figure A-2

Appendix B
1996 Thermal and Hydro Generation Tables

Table B-1
Specific 1996 Thermal Data for Benchmarking

Utility Name	**ML&P**								
Plant Name	**Plant 1**				**Plant 2**				
Unit Name	**1**	**2**	**3**	**4**	**5**	**5/6**	**7**	**6/7**	**8**
Unit Type	CT	CT	CT	CT	CT	CC	CT	CC	CT
Summer Max. Dependable Capacity (MW)[1]	14	14	17.7	31.1	33.8	44.6	74.4	99.4	77.3
Summer Min. Capacity (MW)	3	3	3	3		10		10	20
Winter Max. Dependable Capacity (MW)[2]	16.8	16.8	19.5	34.1	38.4	49.2	84.5	109.5	87.6
Winter Min. Capacity (MW)	3	3	3	3		10		10	20
Primary & Start up Fuel Type	NG	NG	NG	NG	NG	NG	NG	NG	NG
1996 Fuel price ($/MBtu)	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88
1996 Variable O&M rate ($/MWh)	2.19	2.19	2.19	2.19	2.19	2.19	2.19	2.19	2.19
1996 Fixed O&M rate ($/MW-yr)	*7,437*	*7,437*	*7,437*	*7,437*		*7,054*		*7,054*	*7,054*
Hours of operation in 1996 / unit	0	211	439	0	2,432	Note 3	6,613	Note 3	3,589
MWh of Net generation in 1996 / unit[4]	0	896	1,538	0	66,459	Note 3	389,791	Note 3	132,917
Fuel consumed in 1996 / unit (MBtu)	0	32,002	64,439	0	1,000,045		5,001,168		1,896,824
Outages:									
Length of Period (days)	365	2	14	365		20		79	1
Start date of period	0101	0105	0101	0101		0601		0416	0401
Length of Period (days)		5	5			80			
Start date of period		0216	0205			0716			
Length of Period (days)						16			
Start date of period						1105			
Length of Period (days)						19			
Start date of period						1202			

[1] Summer Capacity at 60 deg. F.

[2] Winter Capacity at 20 deg. F.

[3] Unit 6 operated 6,991 hours, generated approximately 157,559 MWh, and was out for maintenance 20 days in June and 15 days in July.

[4] Estimated Net Generation.

Table B-2
Specific 1996 Thermal Data for Benchmarking

Utility Name	**Chugach**						
Plant Name	**Beluga**						
Unit Name	**1**	**2**	**3**	**5**	**6**	**7**	**8**
Unit Type	CT	CT	CT	CT	CT	CT	ST
Summer Max. Dependable Capacity (MW)[1]	14.4	14.4	60.3	59.5	68	68	51.2
Summer Min. Capacity (MW)	3	3	3	3	35	35	
Winter Max. Dependable Capacity (MW)[1]	16.7	16.7	66.9	71	74	74	55
Winter Min. Capacity (MW)	3	3	3	3	35	35	
Primary & Start up Fuel Type	NG	NG	NG	NG	NG	NG	WH
1996 Fuel price ($/MBtu)	1.45	1.45	1.45	1.45	1.45	1.45	1.45
1996 Variable O&M rate ($/MWh)	2.00	2.00	2.00	2.00	2.00	2.00	2.00
1996 Fixed O&M rate ($/MW-yr)	7,950	7,950	7,950	7,950	7,950	7,950	7,950
Hours of operation in 1996 / unit	291	284	4878	6539	6123	7860	8150
MWh of generation in 1996 / unit[2]	2,698	3,011	270,192	332,111	404,071	538,717	326,782
Fuel consumed in 1996 / unit (MBtu)	53,567	55,535	3,300,971	4,516,805	5,284,008	7,147,733	0
Outages:							
Length of period (days)	1	1	51	1	1	3	
Start date of period	0601	0210	0101	0318	0225	0323	
Length of period (days)	6		6	1	110	27	
Start date of period	0801		0311	0416	0707	0602	
Length of period (days)	1		2	1		4	
Start date of period	0911		0402	0717		0714	
Length of period (days)	1		1	2		2	
Start date of period	1101		0615	1115		1104	
Length of period (days)	27		1	3		2	
Start date of period	1201		0816	1206		1213	
Length of period (days)			2				
Start date of period			0918				
Length of period (days)			2				
Start date of period			1001				
Length of period (days)			6				
Start date of period			1118				
Length of period (days)			16				
Start date of period			1205				

[1] Summer Capacity at 60 deg. F. and Winter Capacity at 10 deg. F.

[2] Estimated Net Generation.

Table B-2 Continued
Specific 1996 Thermal Data for Benchmarking

Utility Name	**Chugach**						**HEA**
Plant Name	**Bernice Lake**			**International**			**Soldotna[1]**
Unit Name	**2**	**3**	**4**	**1**	**2**	**3**	**1**
Unit Type	CT	CT	CT	CT	CT	CT	GT
Summer Max. Dependable Capacity (MW)[2]	16.7	25.5	25.5	13.8	13.8	16.7	35.2
Summer Min. Capacity (MW)	3	3	7	3	3	3	6
Winter Max. Dependable Capacity (MW)[2]	19.3	28.0	28.0	15.0	15.1	18.9	39.0
Winter Min. Capacity (MW)	3	3	7	3	3	3	6
Primary and Start up Fuel Type	NG	NG	NG	NG	NG	NG	NG
1996 Fuel price ($/MBtu)	1.46	1.46	1.46	2.19	2.19	2.19	2.19
1996 Variable O&M rate ($/MWh)	2.00	2.00	2.00	2.00	2.00	2.00	2.00
1996 Fixed O&M rate ($/MW-yr)	6,500	6,500	6,500	5,750	5,750	5,750	3,300
Hours of operation in 1996 / unit	0	4,321	3,764	164	108	93	6,983
MWh of generation in 1996 / unit[3]	0	72,981	63,073	561	415	284	46,786
Fuel consumed in 1996 / unit (MBtu)	0	1,150,833	1,024,791	22,836	12,573	12,633	645,534
Outages:							
Length of period (days)	0	23	29	2	1	19	0
Start date of period		1001	0901	0103	0115	0501	
Length of period (days)			2	1	15	1	
Start date of period			1013	0201	0401	0613	
Length of period (days)				14	1		
Start date of period				0407	0516		
Length of period (days)				7			
Start date of period				0513			
Length of period (days)				68			
Start date of period				0609			

[1] Soldotna #1 is owned by AEG&T, operated by HEA, and dispatched at Chugach's discretion.

[2] Summer Capacity at 60 deg. F. and Winter Capacity at 10 deg. F.

[3] Estimated Net Generation.

Table B-3
Specific 1996 Thermal Data for Benchmarking

Utility Name	**GVEA**							
Plant Name	**Zehnder**				**North Pole**		**Healy**	
Unit Name	**EMD #5**	**EMD #6**	**GT #1**	**GT #2**	**GT #1**	**GT #2**	**1**	**D #1**
Unit Type	Diesel	Diesel	CT	CT	CT	CT	ST	Diesel
Summer Max. Dependable Capacity (MW)[1]	2.6	2.6	15.7	15.7	57.4	57.4	25	2.6
Summer Min. Capacity (MW)	0.5	0.5	3	3	5	5	3	0.5
Winter Max. Dependable Capacity (MW)[1]	2.6	2.6	18	18	62.5	62.5	25	2.6
Winter Min. Capacity (MW)	0.5	0.5	3	3	5	5	3	0.5
Primary Fuel Type	LAGO	LAGO	HAGO	HAGO	HAGO	HAGO	Coal	FO_2
1996 Fuel price ($/MBtu)	3.21	3.21	3.21	3.21	3.03	3.03	1.36	3.11
Start up Fuel Type							Oil	
1996 Fuel Price ($/MBtu)							3.11	
1996 Variable O&M rate ($/MWh)	8.00	8.00	5.21	5.21	4.66	4.66	10.87	8.00
1996 Fixed O&M rate ($/MW-yr)	8,199	8,199	7,618	7,618	5,167	5,167	94,657	22,655
Hours of operation in 1996 / unit	66	44	926	608	1722	3781	5779	57
MWh of generation in 1996 / unit	51	34	8,590	4,016	80,272	192,874	120,346	82
Fuel consumed in 1996 / unit (MBtu)	1,305	870	146,836	71,832	835,523	1,898,889	1,571,560	939
Start up fuel consumed in 1996/unit (MBtu)							96,275	
Outages								
Length of period (days)	1	1	1	1	59	5	5	4
Start date of period					0408	0212	0204	0204
Length of period (days)					16	5	96	
Start date of period					0722	0305	0614	
Length of period (days)						1		
Start date of period						0501		
Length of period (days)						1		
Start date of period						0709		
Length of period (days)						1		
Start date of period						0810		
Length of period (days)						10		
Start date of period						1028		

[1] Summer capacity at 60 deg. F and Winter capacity at 0 deg. F.

Table B-4
Specific 1996 Thermal Data for Benchmarking

Utility Name	**FMUS**				
Plant Name	**Chena**				
Unit Name	**1[1]**	**2[1]**	**3[1]**	**5[2]**	**6**
Unit Type	ST	ST	ST	ST	CT
Summer Max. Dependable Capacity (MW)	5	2	1.5	20	23.4
Summer Min. Capacity (MW)	2	1	1	12	
Winter Max. Dependable Capacity (MW)	5	2	1.5	20	29
Winter Min. Capacity (MW)	2	1	1	12	
Primary and Start up Fuel Type	Coal	Coal	Coal	Coal	Hago
1996 Fuel price ($/MBtu)	Unknown				3.4
1996 Variable O&M rate ($/MWh)	Unknown				0.30
1996 Fixed O&M rate ($/MW-yr)	Unknown				
Hours of operation in 1996 / unit	Unknown				
MWh of generation in 1996 / unit	Unknown				
Fuel consumed in 1996 / unit (MBtu)	Unknown				
Maintenance:					
Number of days per year (OR)	Unknown				
Number of scheduled periods					
Length of first period (days)					
Start date of first period					
Length of second period (days)					
Start date of second period					
Major Overhaul	Unknown				

[1] Turbine can be supplied from any one of 3 B&W boilers or pressure reduced steam from boiler #5.

[2] Capacity of unit will be less when unit is supplying district heat steam if all old plant (unit 1, 2 and 3) B&W boilers are off line.

Table B-5
1996 Hydroelectric Generation--Storage

Utility Name	**GVEA**	**HEA**	**ML&P**		**Chugach**			
Plant Name	**Bradley**	**Bradley**	**Bradley**	**Eklutna**	**Bradley**	**Eklutna**	**Cooper Lake[1]**	
Unit Name	**Lake**	**Lake**	**Lake**	**Lake**	**MEA/SES**	**MEA**	**1**	**2**
1996 Energy Production (MWh)								
January	*6,519*	*5,070*			16,781	8,235	955	953
February	*4,717*	*3,669*			16,651	5,201	771	607
March	*3,180*	*2,473*			13,600	3,388	1,036	480
April	*795*	*618*			3,276	2,173	1,041	485
May	*2,703*	*2,102*			18,016	6,006	929	771
June	*5,406*	*4,205*			18,822	11,030	2,538	2,157
July	*6,307*	*4,905*			17,197	10,427	2,658	1,543
August	*3,021*	*2,350*			8,961	6,042	818	2
September	*3,498*	*2,721*			4,047	7,787	1,857	1,620
October	*4,770*	*3,710*			18,159	2,971	1,879	1,808
November	*5,353*	*4,163*			17,937	3,951	1,247	1,239
December	*6,625*	*5,153*			11,984	4,188	1,121	1,138
1996 Annual (MWh)	52,894	41,139	90,333	76,483	165,431	71,399	16,850	12,803
Minimum generation capability (MW)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Maximum generation capability (MW)	15.2	10.8	23.3		40.7		8.6	8.6
January				16.0		15.0		
February				16.0		15.0		
March				16.0		15.0		
April				16.0		15.0		
May				16.0		15.0		
June				16.0		15.0		
July				16.0		15.0		
August				16.0		15.0		
September				16.0		15.0		
October				8.5		7.5		
November				8.5		7.5		
December				8.5		7.5		
1996 Variable O&M rate ($/MWh)	2.10	2.10	2.10	2.10	2.10	2.10	0.20	0.20

Table B-5
1996 Hydroelectric Generation--Storage

Utility Name	**GVEA**	**HEA**	**ML&P**		**Chugach**			
Plant Name	**Bradley**	**Bradley**	**Bradley**	**Eklutna**	**Bradley**	**Eklutna**	**Cooper Lake[1]**	
Unit Name	**Lake**	**Lake**	**Lake**	**Lake**	**MEA/SES**	**MEA**	**1**	**2**
1996 Fixed O&M rate ($/MW-yr)	20,000	20,000	20,000	20,000	20,000	20,000	21,512	21,512
Maintenance:								
Number of scheduled periods	1	1			1	1	2	1
Length of first period (days)	20	20			20	20	20	19
Start date of first period	0401	1001			0401	0401	0801	0801
Length of second period (days)							3	
Start date of second period							0915	

[1] Cooper Lake units run at about a 40 percent capacity factor.

Appendix C
Existing Thermal and Hydro Generation Tables

Table C-1
ML&P's Existing Thermal Generation

Plant Name	**Plant 1**				**Plant 2**				
Unit Name	**1**	**2**	**3**	**4**	**5**	**5/6**	**7**	**7/6**	**8**
Unit Type	CT	CT	CT	CT	CT	CC	CT	CC	CT
Summer Max. Dependable Capacity (MW)[1]	14	14	17.7	31.1	33.8	44.6	74.4	99.4	77.3
Summer Min. Capacity (MW)	3	3	3	3		10		10	20
Winter Max. Dependable Capacity (MW)[1]	16.8	16.8	19.5	34.1	38.4	49.2	84.5	109.5	87.6
Winter Min. Capacity (MW)	3	3	3	3		10		10	10
Dispatch Constraints:									
Must run? (Y, N)	N	N	N	N	N	N	N	N	N
Quick start? (Y,N)	Y	Y	Y	Y	N	N	N	N	N
Retirement date, if any (Month-year)	none	none	none	none	none	none	none	none	none
Forced Outage rate (%)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
Equivalent Availability (%)	*96.7*	*96.7*	*96.7*	*96.7*	*96.7*	*96.7*	*96.7*	*96.7*	*96.7*
1997 Variable O&M rate ($/MWh)	2.06	2.06	2.06	2.06	2.06	2.06	2.06	2.06	2.06
1997 Fixed O&M rate ($/MW-yr)	*7,660*	*7,660*	*7,660*	*7,660*		*7,266*		*7,266*	*7,266*
Fuel burn rate:									
Coefficient 1 (MBtu/h)	79.63	74.92	86.7	165.1	163.51	168	205.17	199	216.7
Coefficient 2 (MBtu/h-MW)	9.2837	8.254	7.7585	7.5594	7.7731	6.74	8.151	5.93	8.1877
Coefficient 3 (MBtu/h-MW^2)	0.049	0.0869	0.1111	0.0329	0.0366	0.0026	0.0163	0.008	0.0122
Primary & start up fuel	NG	NG	NG	NG	NG	NG	NG	NG	NG
Maintenance -- typical									
Length (days)	7	7	14	14	14	14	7	14	14
Overhauls[2]	every 8 years				every 5 years				
Ramp up rate (fraction of rated capacity / hr)	1	1	1	1	1		1		1
Ramp down rate (fraction of rated capacity / hr)	1	1	1	1	1		1		1
Required minimum on-line time	1	1	1	1	4	16	8	16	6
Required minimum off-line time	1	1	1	1	6	6	6	6	6
SO_2 emission rate (lb/MBtu)	0	0	0	0	0	0	0	0	0
NO_x emission rate (lb/MBtu)	0.44	0.44	0.44	0.44	0.625		0.28		0.078
Time to start from warm condition (h)	*0.250*	*0.250*	*0.250*	*0.125*	*0.125*	*0.165*	*0.084*	*0.165*	*0.084*
Time to start from cold condition (h)	0.5	0.5	0.5	0.25	0.25	0.33	0.167	0.33	0.167

Table C-1
ML&P's Existing Thermal Generation

Plant Name	**Plant 1**				**Plant 2**				
Unit Name	**1**	**2**	**3**	**4**	**5**	**5/6**	**7**	**7/6**	**8**
Time to cool to warm condition (h)	*0.5*	*0.5*	*0.5*	*0.25*	*0.25*	*0.33*	*0.167*	*0.33*	*0.167*
Generation capacity in first hour on-line (dec.)	1	1	1	1	1	1	1	1	1
Shut down cost ($)	200	200	200	200	200	200	200	200	200
Start up fuel used in cold start (MBtu)	79.63	74.92	86.70	165.07	0.00	168.00	0.00	199.00	216.20
Start up cost adder-base cost ($) winter	402	400	441	791		1148		2539	2057
Start up cost adder-base cost ($) summer	320	320	406	697		1005		2337	1746
Start up cost adder-escalation rate (%)	*3*	*3*	*3*	*3*		*3*		*3*	*3*
Start up cost adder-base year for escalation	1997	1997	1997	1997		1997		1997	1997

[1] Summer capacity at 60 deg. F and Winter capacity at 20 deg. F.

[2] Unit 1 and Unit 4 overhauls: 2004, 2012. Unit 2 overhauls: 1997, 2006, 2013. Unit 3 overhauls: 1999, 2007, 2016.
Unit 5, Unit 6, and Unit 7 overhauls: 2000, 2005, 2010, 2015.
Overhauls will last 12 weeks.

Table C-2
Chugach's Existing Thermal Generation

Plant Name	**Beluga**							
Unit Name	**1**	**2**	**3**	**5**	**6**	**7**	**6-8**	**7-8**
Unit Type	SCCT	SCCT	SCCT	SCCT	SCCT	SCCT	1 on 1	1 on 1
Summer Max. Dependable Capacity (MW)[1]	14.4	14.4	60.3	59.5	68	68	95.5	95.5
Summer Min. Capacity (MW)	3	3	3	3	3	3	48	48
Winter Max. Dependable Capacity (MW)[1]	16.7	16.7	66.9	71	74	74	101.5	101.5
Winter Min. Capacity (MW)	3	3	3	3	3	3	48	48
Dispatch Constraints:								
Must run? (Y, N)	N	N	N	N	Y	Y	Y	Y
Quick start? (Y,N)	Y	Y	Y	Y	Y	Y	N	N
Retirement date, if any (Month-year)	Dec-26	Dec-26						
Forced Outage rate (%)	*7.00*	*0.40*	*1.00*	*0.00*	*0.00*	*0.40*	*0.40*	*0.40*
Equivalent Availability (%)	*93.0*	*98.0*	*96.0*	*97.0*	*90.0*	*95.0*	*90.0*	*90.0*
1997 Variable O&M rate ($/MWh)	2.06	2.06	2.06	2.06	2.06	2.06	2.06	2.06
1997 Fixed O&M rate ($/MW-yr)	7,950	7,950	7,950	7,950	7,950	7,950	7,950	7,950
Fuel burn rate:								
Coefficient 1 (MBtu/h)	83.57	129.98	197.00	208.69	243.94	222.88	380.78	291.96
Coefficient 2 (MBtu/h-MW)	10.856	8.337	8.449	7.877	8.525	8.300	2.695	4.463
Coefficient 3 (MBtu/h-MW^2)	0.070	0.083	0.012	0.022	0.012	0.025	0.029	0.018
Primary fuel and start up fuel	NG	NG	NG	NG	NG	NG	NG	NG
Maintenance -- typical								
Length (days)	21	21	28	28	28	28	28	28
Overhauls					every 4 years[2]			
Ramp up rate (fraction of rated capacity / hr)	1	1	1	1	1	1		
Ramp down rate (fraction of rated capacity / hr)	1	1	1	1	1	1		
Required minimum on-line time	1	1	6	6	6	6	16	16
Required minimum off-line time	1	1	6	6	6	6	6	6
SO_2 emission rate (lb/MBtu)	0	*0*	*0*	*0*	*0*	*0*	*0*	*0*
NO_x emission rate (lb/MBtu)	0.44	*0.44*	*0.44*	*0.44*	*0.44*	*0.44*	*0.44*	*0.44*
Time to start from warm condition (h)	*0.15*	*0.115*	*0.15*	*0.185*	*0.185*	*0.21*	*0.5*	*0.5*
Time to start from cold condition (h)	0.30	0.23	0.30	0.37	0.37	0.42	1.00	1.00

Table C-2
Chugach's Existing Thermal Generation

Plant Name	**Beluga**							
Unit Name	**1**	**2**	**3**	**5**	**6**	**7**	**6-8**	**7-8**
Time to cool to warm condition (h)	*0.30*	*0.23*	*0.30*	*0.37*	*0.37*	*0.42*	*1.00*	*1.00*
Generation capacity in first hour on-line (dec.)	1	1	1	1	1	1	0.45	0.45
Shut down cost ($)	200	200	200	200	200	200	200	200
Primary fuel used in cold start (MBtu)	0	0	0	0	0	0	0	0
Startup fuel used in cold start (MBtu)	20	32.5	67.0	67.0	67.0	67.0	67.0	67.0
Start up cost adder-base cost ($)	1000	1000	1600	1600	3600	3600	3600	3600
Start up cost adder-escalation rate (%)	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*
Start up cost adder-base year for escalation	*1997*	*1997*	*1997*	*1997*	*1997*	*1997*	*1997*	*1997*

[1] Summer capacity at 60 deg. F., Winter capacity at 10 deg. F.

[2] Unit 6 overhauls scheduled in 1996, 1999, 2004, 2008, 2012, 2016. Unit 7 overhauls scheduled in 1998, 2003, 2007, 2011, 2015. Unit 8 overhauls scheduled in 2001, 2007, 2013. Overhauls last 12 weeks.

Table C-2 Continued
Chugach's Existing Thermal Generation

Plant Name	**Bernice Lake**			**International**			**Soldotna**[2]
Unit Name	**2**[1]	**3**	**4**	**1**	**2**	**3**	**1**
Unit Type	CT	CT	CT	CT	CT	CT	CT
Summer Max. Dependable Capacity (MW)[3]	16.7	25.5	25.5	13.8	13.8	16.7	35.2
Summer Min. Capacity (MW)	3	3	7	3	3	3	6
Winter Max. Dependable Capacity (MW)[3]	19.3	28.0	28.0	15.0	15.1	18.9	39.0
Winter Min. Capacity (MW)	3	3	7	3	3	3	6
Dispatch Constraints:							
Must run? (Y, N)	N	N	N	N	N	N	N
Quick start? (Y,N)	Y	Y	Y	Y	Y	Y	N
Retirement date, if any (Month-year)	Dec-26	Dec-17	Dec-25	Dec-26	Dec-26	Dec-26	none
Forced Outage rate (%)	*0.00*	*0.11*	*0.00*	*0.00*	*0.00*	*0.00*	*1.00*
Equivalent Availability (%)	*100.0*	*93.0*	*95.0*	*90.0*	*90.0*	*89.0*	*99*
1997 Variable O&M rate ($/MWh)	2.06	2.06	2.06	2.06	2.06	2.06	2.06
1997 Fixed O&M rate ($/MW-yr)	6,500	6,500	6,500	5,750	5,750	5,750	3,399
Fuel burn rate:							
Coefficient 1 (MBtu/h)	82.82	104.4	102.7	83.07	88.96	91.76	136.1
Coefficient 2 (MBtu/h-MW)	8.776	7.836	9.357	8.483	5.909	7.947	5.571
Coefficient 3 (MBtu/h-MW^2)	0.08	0.06	0.01	0.14	0.37	0.12	0.06
Primary and start up fuel	NG	NG	NG	NG	NG	NG	NG
Maintenance -- typical							
Length (days)	21	21	21	14	14	14	14
Overhauls							*Note 4*
Ramp up rate (fraction of rated capacity / hr)	1	1	1	1	1	1	1
Ramp down rate (fraction of rated capacity / hr)	1	1	1	1	1	1	1
Required minimum on-line time	1	1	1	1	1	1	6
Required minimum off-line time	1	1	1	1	1	1	6
SO_2 emission rate (lb/MBtu)	*0*	*0*	*0*	*0*	*0*	*0*	0
NO_x emission rate (lb/MBtu)	*0.44*	*0.44*	*0.44*	*0.44*	*0.44*	*0.44*	0.42
Time to start from warm condition (h)	*0.15*	*0.165*	*0.165*	*0.21*	*0.21*	*0.21*	*0.125*
Time to start from cold condition (h)	0.30	0.33	0.33	0.42	0.42	0.42	0.25

Table C-2 Continued
Chugach's Existing Thermal Generation

Plant Name	**Bernice Lake**			**International**			**Soldotna[2]**
Unit Name	**2[1]**	**3**	**4**	**1**	**2**	**3**	**1**
Time to cool to warm condition (h)	*0.30*	*0.33*	*0.33*	*0.42*	*0.42*	*0.42*	*0.25*
Generation capacity in first hour on-line (dec.)	1	1	1	1	1	1	1
Shut down cost ($)	200	200	200	200	200	*200*	200
Primary fuel used in cold start (MBtu)	0	0	0	0	0	0	0
Startup fuel used in cold start (MBtu)	25.0	25.0	25.0	21.0	21.0	23.0	45.0
Start up cost adder-base cost ($)	1000	1000	1000	1000	1000	*1000*	1000
Start up cost adder-escalation rate (%)	*3*	*3*	*3*	*3*	*3*	*3*	*3*
Start up cost adder-base year for escalation	*1997*	*1997*	*1997*	*1997*	*1997*	*1997*	*1997*

[1] Bernice #2 is emergency stand by only.

[2] Soldotna #1 is owned by AEG&T, operated by HEA, but dispatched at Chugach's discretion.

[3] Summer capacity is at 60 deg. F., Winter capacity at 0 deg. F.

[4] Major combustion inspection every 8,000 fired hours for 4 weeks. (2000, 2003 2006, 2009, 2012, 2015)
Hot gas inspection every 24,000 fired hours for 6 weeks. (2000, 2009)
Major overhaul every 48,000 fired hours for 8 weeks. (2009)

Table C-3
GVEA's Existing Thermal Generation

Plant Name	**Chena**	**Zehnder**				**North Pole**		**Healy**	
Unit Name	**6**	**EMD #5**	**EMD #6**	**GT #1**	**GT #2**	**GT #1**	**GT #2**	**1**	**D #1**
Unit Type	CT	Diesel	Diesel	CT	CT	CT	CT	ST	Diesel
Summer Max. Dependable Capacity (MW)[1]	23.4	2.6	2.6	15.7	15.7	45.9	43.8	25	2.6
Summer Min. Capacity (MW)	10	0.5	0.5	3	3	3	3	3	0.5
Winter Max. Dependable Capacity (MW)[1]	29	2.6	2.6	18	18	56.7	59.3	25	2.6
Winter Min. Capacity (MW)	10	0.5	0.5	3	3	3	3	3	0.5
Dispatch Constraints:									
Must run? (Y, N)	*N*	*N*	*N*	*N*	*N*	*N*	*N*	*Y*	*N*
Quick start? (Y,N)	*Y*	*N*	*N*	*Y*	*Y*	*N*	*Y*	*N*	*N*
Retirement date, if any (Month-year)	2012	none	none	2011	2012	2016	2017	2017	none
Forced Outage rate (%)	*5.0*	1.0	1.0	1.0	1.0	4.0	6.0	8.0	5.0
Equivalent Availability (%)	*95.0*	99.0	99.0	99.0	99.0	95.0	92.0	91.0	95.0
1997 Variable O&M rate ($/MWh)	0.30	*8.24*	*8.24*	5.37	5.37	4.80	4.80	11.20	*8.24*
1997 Fixed O&M rate ($/MW-yr)	*9,000*	8,445	8,445	7,847	7,847	5,322	5,322	97,497	23,335
Fuel burn rate:									
Coefficient 1 (MBtu/h)	72.972	*0*	*0*	97.72	97.72	167.46	181.74	*95.738*	*0*
Coefficient 2 (MBtu/MWh)	8.8103	*13.5*	*13.5*	6.2534	6.2534	5.022	4.5092	*7.998*	*13.5*
Coefficient 3 (MBtu/h-MW^2)	0.014	*0*	*0*	0.1599	0.1599	0.033	0.0282	*0.0867*	*0*
Primary fuel	HAGO	#2 FO	#2 FO	HAGO	HAGO	HAGO	HAGO	Coal	#2 FO
Start up fuel								#2 FO	
Maintenance -- typical									
Number of scheduled periods	1	0	0	2	2	2	2	2	2
Length of first period (days)	15			3	3	3	3	7	7
Start date of first period	0501			0415	0401	0515	0501	0115	0215
Length of second period (days)				3	3	3	3	10	10
Start date of second period				1001	1015	1101	1115	0615	0601
Overhauls				every 7 yrs[2]		every 4 yrs[3]		every 4-5 yrs[4]	
Ramp up rate (fraction of rated capacity / hr)	1	1	1	1	1	1	1	1	1
Ramp down rate (fraction of rated capacity / hr)	1	1	1	1	1	1	1	1	1
Required minimum on-line time	1	1	1	1	1	6	6	1	1

Table C-3
GVEA's Existing Thermal Generation

Plant Name	**Chena**	**Zehnder**				**North Pole**		**Healy**	
Unit Name	**6**	**EMD #5**	**EMD #6**	**GT #1**	**GT #2**	**GT #1**	**GT #2**	**1**	**D #1**
Required minimum off-line time	1	1	1	1	1	6	6	1	1
SO_2 emission rate (lb/MBtu)	0.02	0.01	0.01	0.66	0.66	0.60	0.60	1.80	0.01
NO_x emission rate (lb/MBtu)	0.12	0.76	0.76	0.76	0.76	0.73	0.73	0.37	0.76
Time to start from warm condition (h)	*0.15*	*0.035*	*0.035*	*0.15*	*0.15*	*0.365*	*0.365*	*6.5*	*0.025*
Time to start from cold condition (h)	0.30	0.07	0.07	0.30	0.30	0.73	0.73	13.00	0.05
Time to cool to warm condition (h)	*0.30*	*0.07*	*0.07*	*0.30*	*0.30*	*0.73*	*0.73*	*13.00*	*0.05*
Generation capacity in first hour on-line (dec.)	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*
Shut down cost ($)	*200*	*200*	*200*	*200*	*200*	*200*	*200*	*200*	*200*
Primary fuel used in cold start (MBtu)	0	0	0	0	0	0	0	0	0
Startup fuel used in cold start (MBtu)	26.3	*0*	*0*	*20*	*20*	*30*	*30*	*20*	*0*
Start up cost adder-base cost ($)	*1000*	*500*	*500*	*1000*	*1000*	*1600*	*1600*	*1000*	*500*
Start up cost adder-escalation rate (%)	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*
Start up cost adder-base year for escalation	*1997*	*1997*	*1997*	*1997*	*1997*	*1997*	*1997*	*1997*	*1997*

[1] Summer capacity at 60 deg. F., Winter capacity at 0 deg. F.

[2] 3 months of maintenance in 1998, 2005.

[3] 3 months of maintenance in 1999, 2003, 2007, 2013, 2015.

[4] 3 months of maintenance in 2000, 2004, 2009, 2014.

Table C-4
Existing Hydroelectric Generation--Storage

Utility Name	**GVEA**	**HEA**	**ML&P**		**Chugach**			
Plant Name	**Bradley**	**Bradley**	**Bradley**	**Eklutna**	**Bradley**	**Eklutna[1]**	**Cooper Lake**	
Unit Name	**Lake**	**Lake**	**Lake**	**Lake**	**SES/MEA**	**MEA**	**1**	**2**
Expected energy production (annual or monthly)								
First Month of 1997 (MWh)	*6,519*	*5,070*			20,974	5,208	3,361	3,361
Month 2 (MWh)	*4,717*	*3,669*			15,275	4,704	1,840	1,840
Month 3 (MWh)	*3,180*	*2,473*			11,881	5,208	1,545	1,545
Month 4 (MWh)	*795*	*618*			5,962	5,040	392	392
Month 5 (MWh)	*2,703*	*2,102*			0	5,190	2,428	2,428
Month 6 (MWh)	*5,406*	*4,205*			0	5,016	1,913	1,913
Month 7 (MWh)	*6,307*	*4,905*			11,792	5,242	1,398	1,398
Month 8 (MWh)	*3,021*	*2,350*			19,952	5,159	3,213	3,213
Month 9 (MWh)	*3,498*	*2,721*			15,566	5,045	1,374	1,374
Month 10 (MWh)	*4,770*	*3,710*			11,558	5,195	1,398	1,398
Month 11 (MWh)	*5,353*	*4,163*			17,176	4,965	2,281	2,281
Month 12 (MWh)	*6,625*	*5,153*			21,148	5,347	3,385	3,385
1997 Annual (MWh)	52,894	41,139	90,333	74,945	151,284	61,319	24,530	24,530
Minimum generation capability (MW)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Maximum generation capability (MW)	15.2	10.8	23.3		40.7		8.6	8.6
January				8.5		7.5		
February				8.5		7.5		
March				8.5		7.5		
April				11.4		10		
May				11.4		10		
June				11.4		10		
July				11.4		10		
August				11.4		10		
September				11.4		10		
October				21.3		18.7		
November				21.3		18.7		
December				21.3		18.7		
Retirement date, if any (month-year)								

Table C-4
Existing Hydroelectric Generation--Storage

Utility Name	**GVEA**	**HEA**	**ML&P**		**Chugach**			
Plant Name	**Bradley**	**Bradley**	**Bradley**	**Eklutna**	**Bradley**	**Eklutna[1]**	**Cooper Lake**	
Unit Name	**Lake**	**Lake**	**Lake**	**Lake**	**SES/MEA**	**MEA**	**1**	**2**
1997 Variable O&M rate ($/MWh)	2.16	2.16	2.16	2.16	2.16	2.16	0.21	0.21
1997 Fixed O&M rate ($/MW-yr)	20,600	20,600	20,000	20,000	20,600	20,600	22,157	22,157
Forced Outage Rate (%)								
Maintenance:								
Number of scheduled periods	1	1			1		1	1
Length of first period (days)	20	20			20		20	20
Start date of first period	0401	1001			0401		0401	0401
Length of second period (days)								
Start date of second period								

[1] Eklunta units are down for overhauls throughout 1997, resulting in a new max. capacity of 40 MW.

Appendix D
POWRPRO Input File -- Benchmark

```
T  Alaska Public Utilities Commission -- ML&P
T  Power Pooling / Central Dispatch Planning Study
T  Docket U-97-140
T  INPUT FILE Benchm.PPI
*
*  input echo: > zero will cause an input echo
*  |  first month of run
*  |  |   # of days to be run
*  |  |   |  capacity fraction for priority list
*  |  |   |  |  minimum # of units required on-line
*  |  |   |  |  |  variable o&m factor: 1 - variable o&m incl. in dispatch
*  |  |   |  |  |  |  output table selector: 0 thru 3
*  |  |   |  |  |  |  |  a  b: spinning reserve = a * demand + b
*  |  |   |  |  |  |  |  |  |    a  b: operating reserve = a * demand + b
*  |  |   |  |  |  |  |  |  |    |   |    emission allowance price
*  |  |   |  |  |  |  |  |  |    |   |    |
-8761 1 365  1  0  1  3  0  32.6 0.0 52.4 0
*
*************************************************************************
*   Spinning reserve varies for each utility depending on which units are *
*   running. The spin will be changed for each individual utility run     *
*   Chugach = 36.7 MW, ML&P = 39.6 MW, GVEA = 22.6 MW. Bradley Lake       *
*   provides 20 MW of spin for Chugach and 7 MW ML&P.                     *
*                                                                         *
*   Operating reserve for the individual systems is 3/2 larger than the   *
*   spinning reserve (or spin = 2/3 oper).                                *
*   Chugach = 55.1 MW, ML&P = 59.4 MW, GVEA = 33.9 MW                     *
*************************************************************************
*
*  broker  toggle: 1 - yes, 0 - no
*  |  number of pumped storage plants
*  |  |  hourly incremental cost file toggle
*  |  |  |  dispatch review option toggle
*  |  |  |  |  hourly avgerage fuel cost file
*  |  |  |  |  |  annual summary output file
*  |  |  |  |  |  |  edit request: 0 1 or 2
*  |  |  |  |  |  |  |  fuel limits indicator
*  |  |  |  |  |  |  |  |  peaking hydro output selector
*  |  |  |  |  |  |  |  |  |  request pumped storage modified demands output
*  |  |  |  |  |  |  |  |  |  |  request hourly generation output for a unit
*  |  |  |  |  |  |  |  |  |  |  |
   0  0  0  0  0  1  0  0  0  0  0
*
*  first year of simulation
*  |      last year of simulation
*  |      |      hourly demands filename
*  |      |      |
1996   1997     '/u/jurotich/shave/mlp.shv'
*
***************************** Name of summary output file****************
'/u/jurotich/Alaska/mlp96c.sum'
*
*
*************************************************************************
*                        Generator Data Begins Here                     *
*************************************************************************
*
*
*************************************************************************
*              Anchorage, Municipal Light and Power (ML&P)              *
*************************************************************************
*
G 1 'ML&P P1 U1' 16.8 3 'Q' 0 'U' 0.05
1
1
2.00 0.03 1996 7660 0.03 1997
79.63 9.2837 0.049
365
1    1   1      1   0 0.44 0
0.25 0.5 0.5    1
```

```
200  0   79.629 402 0.03 1997
**********************************************
G 2 'ML&P P1 U2' 16.8 3 'Q' 0 'A' 0.0
1
1
2.00 0.03 1996 7660 0.03 1997
74.92 8.254 0.0869
2 2 0105 5 0216
1    1   1     1   0 0.44 0
0.25 0.5 0.5   1
200  0   77.92 400 0.03 1997
**********************************************
G 3 'ML&P P1 U3' 19.5 3 'Q' 0 'A' 0.0
1
1
2.00 0.03 1996 7660 0.03 1997
86.7 7.7585 0.1111
2 14 0101 5 0205
1    1   1    1   0 0.44 0
0.25 0.5 0.25 1
200  0   87.6 441 0.03 1997
**********************************************
G 4 'ML&P P1 U4' 34.1 3 'Q' 0 'U' 0.0
1
1
2.00 0.03 1996 7660 0.03 1996
165.1 7.5594 0.0329
365
1     1    1      1   0 0.44 0
0.125 0.25 0.25   1
200   0    165.07 791 0.03 1997
**********************************************
G 5 'ML&P P2 U5-6' 49.2 10 ' ' 0 'A' 0.0
1
1
2.00 0.03 1996 7266 0.03 1997
168 6.74 0.0026
0
1     1      16     6    0 0.625 0
0.165 0.33   0.33  1
200   0      168.0 1148 0.03 1997
**********************************************
G 6 'ML&P P2 U7-6' 109.5 10 ' ' 0 'A' 0.0
1
1
2.00 0.03 1996 7266 0.03 1997
199 5.93 0.008
0
1     1      16     6    0 0.28 0
0.165 0.33   0.33  1
200   0      199.0 2539 0.03 1997
**********************************************
G 7 'ML&P P2 U8' 87.6 20 ' ' 0 'A' 0.0
1
1
2.00 0.03 1996 7266 0.03 1997
216.7 8.1877 0.0122
1 1 0401
1     1      6     6    0.005 0.078 0
0.084 0.167  0.167 1
200   0      216.2 2057 0.03      1997
*
***************************************************************************
*                                Purchases                                *
***************************************************************************
*
************** Emergency Purchase ***********
*
PR 999 'EMERG PURCH' 150 0  ' ' 0  'A' 0
999.0 0.035 1996
```

```
*
*
PRICES
*
*************************************************************************
*                Annual Fuel Price & Purchase Price Table               *
*************************************************************************
*                                Soldotna                               *
*       ML&P &                   Intnatnl                               *
*       Joint   Beluga  Bernice NewPlant HCCP   Aurora  Healy           *
*       NGas    NGas    NGas    NGas     Coal   Purch.  Coal            *
*       $/MBtu  $/MBtu  $/MBtu  $/MBtu   $/MBtu $/MWh   $/MBtu          *
*************************************************************************
1996    1.86    1.17    1.38    1.98     0.00   00.00   1.36
1997    1.74    1.46    1.50    2.25     0.60   00.00   1.39
1998    1.97    1.69    1.70    2.05     0.62   40.00   1.02
1999    2.01    1.73    1.75    2.10     0.65   40.00   0.94
2000    2.06    1.78    1.80    2.15     0.67   37.00   0.97
2001    2.12    1.84    1.85    2.20     0.70   37.00   0.99
2002    2.16    1.88    1.90    2.25     0.76   37.93   1.05
2003    2.22    1.94    1.95    2.30     0.77   38.87   1.07
2004    2.27    1.99    2.00    2.35     0.79   39.84   1.09
2005    2.33    2.05    2.06    2.41     0.80   40.84   1.11
2006    2.39    2.11    2.12    2.47     0.82   41.86   1.13
2007    2.44    2.16    2.18    2.53     0.83   42.91   1.16
2008    2.50    2.22    2.24    2.59     0.85   43.98   1.18
2009    2.57    2.29    2.30    2.65     0.87   45.08   1.20
2010    2.63    2.35    2.37    2.72     0.88   46.21   1.22
2011    2.70    2.42    2.44    2.79     0.90   47.36   1.25
2012    2.77    2.49    2.50    2.85     0.92   48.55   1.27
2013    2.84    2.56    2.57    2.92     0.93   49.76   1.29
2014    2.91    2.63    2.65    3.00     0.95   51.00   1.32
2015    2.98    2.70    2.72    3.07     0.97   52.28   1.34
2016    3.06    2.78    2.80    3.15     0.99   53.59   1.37
2017    3.06    2.78    2.80    3.15     0.99   53.59   1.37
*
*************************************************************************
*                          Starts & Retirements                         *
*************************************************************************
*
******************** ML&P ***
RETIRE   6 1996 0416
START    6 1996 0703
RETIRE   5 1996 0601
START    5 1996 0621
RETIRE   5 1996 0716
START    5 1996 1004
RETIRE   5 1996 1105
START    5 1996 1121
RETIRE   5 1996 1202
START    5 1996 1221
*
*************************************************************************
*                          Change Mod Section                           *
*************************************************************************
*
YEAR 1996
DUP BEGIN
DAY 0401
MOD 1  1  14
MOD 23 1  320   0.03    1997
MOD 1  2  14
MOD 23 2  320   0.03    1997
MOD 1  3  17.7
MOD 23 3  406   0.03    1997
MOD 1  4  31.1
MOD 23 4  697   0.03    1997
MOD 1  5  44.6
MOD 23 5  1005  0.03    1997
MOD 1  6  99.4
```

```
MOD 23 6  2237  0.03    1997
MOD 1  7  77.3
MOD 23 7  1746  0.03    1997
DUP END
*
YEAR 1996
DUP BEGIN
DAY 1001
MOD 1  1  16.8
MOD 23 1  402 0.03 1997
MOD 1  2  16.8
MOD 23 2  400 0.03 1997
MOD 1  3  19.5
MOD 23 3  441 0.03 1997
MOD 1  4  34.1
MOD 23 4  791 0.03 1997
MOD 1  5  49.2
MOD 23 5  1148 0.03 1997
MOD 1  6  109.5
MOD 23 6  2539 0.03 1997
MOD 1  7  87.6
MOD 23 7  2057 0.03 1997
DUP END
*
*
END
```

```
PARAMETERS  0.50 75
* Optional output title lines as in POWRPRO data
*
T Multi Area Model with all Systems
T Uses Power Pool Price Files from the Traditional Scenario
T
*
* Control on printing input echo and/or progress of run to screen (see POWRPRO input
* description - Block 2 Line 1)7
* |     First month of run
* |     |     Number of days to run
* |     |     |    Number of areas to be simulated
* |     |     |    |    Capacity fraction to use for calculaton of commitment priority
* |     |     |    |    |     Enter 1 to have variable o&m included in commitment and
* |     |     |    |    |     dispatch - 0 otherwise
* |     |     |    |    |     |   Output selector (see POWRPRO input description -
* |     |     |    |    |     |   Block 2 Line 1)
* |     |     |    |    |     |   |     Enter the # of areas to calculate the hourly
* |     |     |    |    |     |   |     dispatch incremental, else 0
* |     |     |    |    |     |   |     |   Enter 1 to activate dispatch review option
* |     |     |    |    |     |   |     |   - 0 otherwise
* |     |     |    |    |     |   |     |   |   Enter 1 to have hourly average fuel prices
* |     |     |    |    |     |   |     |   |   written to a file - 0 otherwise
* |     |     |    |    |     |   |     |   |   |   Enter 1 to have annual summary written
* |     |     |    |    |     |   |     |   |   |   to a file - 0 otherwise
* |     |     |    |    |     |   |     |   |   |   |   Enter a unit number here to get
* |     |     |    |    |     |   |     |   |   |   |   it's hourly generation written to
* |     |     |    |    |     |   |     |   |   |   |   a file - 0 otherwise
* |     |     |    |    |     |   |     |   |   |   |   |     _______ These two items are
* |     |     |    |    |     |   |     |   |   |   |   |     |    | not yet implemented
* |     |     |    |    |     |   |     |   |   |   |   |     |    | - enter zeroes
* |     |     |    |    |     |   |     |   |   |   |   |     |    |
 -1000  1     365  2    1.0   1   3     0   0   0   0   0     0    0
*
*  First year to run
*  |
*  |       Last year to run
*  |       |
   1996    1997
*
*
*
TIE (code indicating tie line data follow - must be entered as shown - not needed if
*   only one area is simulated)
*
* Tie line number
* | 'From' area
* |  |    'To' area
* |  |     |      Tie line capacity - Mw
* |  |     |      |         a       b: power loss in tie line (mw) = a x Mw + b x Mw**2
* |  |     |      |         |       |   (where Mw = megawatts flowing)
* |  |     |      |         |       |       Wheeling cost ($/Mwh)
* |  |     |      |         |       |       |
*
* Kenai to Anchorage
  1  1     2      75       -0.0015  0.0014  0
  2  2     1      75       -0.0015  0.0014  0
*
*****************************************************************************
*                            Kenai Peninsula                                *
*****************************************************************************
* Begin data for first area (see below description for area 2)
*
AREA
'Kenai'
'/u/jurotich/shave/healy.shv'
  0  0  0  0  0  0  1
  * Connectivity data (see accompanying diagram)
* Area number this area connects with
* |  Number of tie lines in connection path
```

```
* |  |     Tie line numbers (in order from this area to connected area)
* |  |     |
  2  1     1
************** EXISTING GENERATION **********
G 18 'Bernice 2' 19.3 3 'Q' 0 'U' 0.05
3
3
2.00 0.030 1996 6500 0.030 1997
82.82 8.77628 0.08
21
1    1   1    1    0 0.44 0
0.15 0.3 0.3  1
200  0   25.0 1000 0.03 1997
**********************************************
G 19 'Bernice 3' 28 3 'Q' 0 'A' 0.0
3
3
2.00 0.030 1996 6500 0.030 1997
104.4 7.83575 0.06
1 23 1001
1     1    1    1    0 0.44 0
0.165 0.33 0.33 1
200   0    25.0 1000 0.03 1997
**********************************************
G 20 'Bernice 4' 28 7 'Q' 0 'A' 0.0
3
3
2.00 0.030 1996 6500 0.030 1997
102.7 9.3567 0.01
2 29 0901 2 1013
1     1    1    1    0 0.44 0
0.165 0.33 0.33 1
200   0    25.0 1000 0 0.03 1997
**********************************************
G 24 'Soldotna 1' 39 6 ' ' 0 'A' 0.0
4
4
2.00 0.030 1996 3300 0.030 1996
136.1 5.571 0.060
0
1     1    6    6    0    0.42 0
0.125 0.25 0.25 1
200   0    45   1000 0.03 1997
*
*************************************************************************
*                              Anchorage Area                           *
*************************************************************************
*
*
AREA
*
* area name (maximum of 12 characters enclosed in quotes)
* |
  'Anchorage'
* Hourly demands filename for this area (maximum of 48 characters enclosed in quotes)
* |
 '/u/jurotich/shave/chugach.shv'
 *
* ____These two items are not yet implemented - enter zeroes
* |  |
* |  |  a  b: Spinning reserve requirement for this area = a x demand + b
* |  |  |  |
* |  |  |  |   a  b: Operating reserve requirement for this area = a x demand + b
* |  |  |  |   |  |
* |  |  |  |   |  |  Minimum number of on-line units required for this area
* |  |  |  |   |  |  |
  0  0  0  16.7  0  35.1 0
*
* Connectivity data (see accompanying diagram)
* Area number this area connects with
```

```
* |  Number of tie lines in connection path
* |  |     Tie line numbers (in order from this area to connected area)
* |  |     |
  1  1     2
************** EXISTING GENERATION **********
G 10 'Beluga 1' 16.7 3 'Q ' 0 'A' 0.0
2
2
2.00 0.030 1996 7950 0.030 1997
83.57046 10.856 0.07032
0
1    1    1    1    0 0.44 0
0.15 0.30 0.30 1
200  0    20.0 1000 0.03 1997
**********************************************
G 11 'Beluga 2' 16.7 3 'Q ' 0 'A' 0.0
2
2
2.00 0.030 1996 7950 0.030 1997
129.98 8.3371 0.0829
0
1    1    1    1    0 0.44  0
0.15 0.23 0.23 1
200  0    32.0 1000 0.03 1997
**********************************************
G 12 'Beluga 3' 66.9 3 'Q' 0 'U' 0.0
2
2
2.00 0.030 1996 7950 0.030 1997
196.9959 8.4491 0.01243
0
1    1    6    6    0 0.44  0
0.15 0.30 0.30 1
200  0    67.0 1600 0.03 1997
**********************************************
G 13 'Beluga 5' 71 3 'Q' 0 'A' 0.0
2
2
2.00 0.030 1996 7950 0.030 1997
208.6894 7.8766 0.0223
0
1     1    6    6    0 0.44  0
0.185 0.37 0.37 1
200   0    67.0 1600 0.03 1997
**********************************************
G 14 'Beluga 6CT' 74 3 ' ' 0 'U' 0.0
2
2
2.00 0.030 1996 7950 0.030 1997
243.93564 8.525 0.01201
28
1     1    6    6    0 0.44 0
0.185 0.37 0.37 1
200   0    67.0 3600 0.03 1997
**********************************************
G 15 'Beluga 6-8' 101.5 48 ' ' 0 'A' 0.0
2
2
2.00 0.030 1996 7950 0.030 1997
380.7771 2.6953 0.02882
0
1   1   16    6    0 0.44 0
0.5 1.0 1.0  0.45
200 0   67.0 3600 0.03 1997
**********************************************
G 16 'Beluga 7CT' 74 3 ' ' 0 'U' 0.0
2
2
2.00 0.030 1996 7950 0.030 1997
222.87852 8.3 0.02489
```

```
14
1    1    6    6    0 0.44 0
0.21 0.42 0.42 1
200  0    67.0 3600 0.03 1997
**********************************************
G 17 'Beluga 7-8' 101.5 48 ' ' 0 'A' 0.0
2
2
2.00 0.030 1996 7950 0.030 1997
291.9567 4.463 0.01783
0
1   1   16    6    0    0.44 0
0.5 1.0 1.0  0.45
200 0   67.0 3600 0.03 1997
**********************************************
G 21 'Intrnl 1' 15 3 'Q' 0 'A' 0.0
4
4
2.00 0.030 1996 5750 0.030 1997
83.07 8.48275 0.14
0
1    1    1    1    0 0.44  0
0.21 0.42 0.42 1
200  0    21.0 1000 0.03 1997
**********************************************
G 22 'Intrnl 2' 15.1 3 'Q' 0 'A' 0.0
4
4
2.00 0.030 1996 5750 0.030 1997
88.96 5.90928 0.37
2 15 0401 1 0516
1    1    1    1    0 0.44  0
0.21 0.42 0.42 1
200  0    21.0 1000 0.03 1997
**********************************************
G 23 'Intrnl 3' 18.9 3 'Q' 0 'A' 0.0
4
4
2.00 0.030 1996 5750 0.030 1997
91.76 7.94660 0.12
2 19 0501 1 0613
1    1    1    1    0 0.44  0
0.21 0.42 0.42 1
200  0    23.0 1000 0.03 1997
*
************** Emergency Purchase ***********
*
PR 998 'EMERG PURCH' 150 0  ' ' 0  'A' 0
999.0 0.035 1996
*
*
PRICES
*
*************************************************************************
*                Annual Fuel Price & Purchase Price Table               *
*************************************************************************
*                                  New Plant                            *
*       ML&P &                     Soldotna                             *
*       Joint   Beluga  Bernice & Intn'l HCCP   Aurora  Healy            *
*       NGas    NGas    NGas    NGas     Coal   Purch.  Coal             *
*       $/MBtu  $/MBtu  $/MBtu  $/MBtu   $/MBtu $/MWh   $/MBtu           *
*************************************************************************
1996    1.86    1.17    1.38    1.98     0.00   00.00   1.36
1997    1.74    1.46    1.50    2.25     0.60   00.00   1.39
1998    1.97    1.69    1.70    2.05     0.62   40.00   1.02
1999    2.01    1.73    1.75    2.10     0.65   40.00   0.94
2000    2.06    1.78    1.80    2.15     0.67   37.00   0.97
2001    2.12    1.84    1.85    2.20     0.70   37.00   0.99
2002    2.16    1.88    1.90    2.25     0.76   37.93   1.05
2003    2.22    1.94    1.95    2.30     0.77   38.87   1.07
```

2004	2.27	1.99	2.00	2.35	0.79	39.84	1.09
2005	2.33	2.05	2.06	2.41	0.80	40.84	1.11
2006	2.39	2.11	2.12	2.47	0.82	41.86	1.13
2007	2.44	2.16	2.18	2.53	0.83	42.91	1.16
2008	2.50	2.22	2.24	2.59	0.85	43.98	1.18
2009	2.57	2.29	2.30	2.65	0.87	45.08	1.20
2010	2.63	2.35	2.37	2.72	0.88	46.21	1.22
2011	2.70	2.42	2.44	2.79	0.90	47.36	1.25
2012	2.77	2.49	2.50	2.85	0.92	48.55	1.27
2013	2.84	2.56	2.57	2.92	0.93	49.76	1.29
2014	2.91	2.63	2.65	3.00	0.95	51.00	1.32
2015	2.98	2.70	2.72	3.07	0.97	52.28	1.34
2016	3.06	2.78	2.80	3.15	0.99	53.59	1.37
2017	3.06	2.78	2.80	3.15	0.99	53.59	1.37

```
*
*****************************************************************************
*                            Starts & Retirements                           *
*****************************************************************************
*
RETIRE 21 1996 0103
START  21 1996 0105
RETIRE 22 1996 0115
START  22 1996 0116
RETIRE 21 1996 0201
START  21 1996 0202
RETIRE 11 1996 0210
START  11 1996 0211
START  12 1996 0221
RETIRE 15 1996 0225
START  15 1996 0226
RETIRE 12 1996 0311
START  12 1996 0317
RETIRE 13 1996 0318
START  13 1996 0319
RETIRE 17 1996 0323
START  17 1996 0326
RETIRE 12 1996 0402
START  12 1996 0404
RETIRE 21 1996 0407
RETIRE 13 1996 0416
START  13 1996 0417
START  21 1996 0422
START  21 1996 0513
RETIRE 21 1996 0520
RETIRE 10 1996 0601
START  10 1996 0602
RETIRE 17 1996 0602
RETIRE 21 1996 0609
RETIRE 12 1996 0615
START  12 1996 0616
START  17 1996 0629
RETIRE 15 1996 0707
RETIRE 17 1996 0714
RETIRE 13 1996 0717
START  13 1996 0718
START  17 1996 0718
RETIRE 10 1996 0801
START  10 1996 0807
RETIRE 12 1996 0816
START  12 1996 0817
START  21 1996 0817
RETIRE 10 1996 0911
START  10 1996 0912
RETIRE 12 1996 0918
START  12 1996 0920
RETIRE 12 1996 1001
START  12 1996 1003
START  15 1996 1025
RETIRE 10 1996 1101
START  10 1996 1102
```

```
RETIRE 17 1996 1104
START  17 1996 1106
RETIRE 13 1996 1115
START  13 1996 1117
RETIRE 12 1996 1118
START  12 1996 1124
RETIRE 10 1996 1201
RETIRE 12 1996 1205
RETIRE 13 1996 1206
START  13 1996 1209
RETIRE 17 1996 1213
START  17 1996 1215
START  12 1996 1221
START  10 1996 1228
*
*****************************************************************************
*                           Change Mod Section                              *
*****************************************************************************
*
YEAR 1996
DAY 0401
MOD 1  10 14.4
MOD 1  11 14.4
MOD 1  12 60.3
MOD 1  13 59.5
MOD 1  14 68
MOD 1  15 95.5
MOD 1  16 68
MOD 1  17 95.5
MOD 1  18 16.7
MOD 1  19 25.5
MOD 1  20 25.5
MOD 1  21 13.8
MOD 1  22 13.8
MOD 1  23 16.7
MOD 1  24 35.2
*
YEAR 1996
DAY 1001
MOD 1  10 16.7
MOD 1  11 16.7
MOD 1  12 66.9
MOD 1  13 71
MOD 1  14 74
MOD 1  15 101.5
MOD 1  16 74
MOD 1  17 101.5
MOD 1  18 19.3
MOD 1  19 28
MOD 1  20 28
MOD 1  21 15
MOD 1  22 15.1
MOD 1  23 18.9
MOD 1  24 39
*
*
END
```

```
T  Alaska Public Utilities Commission -- GVEA
T  Power Pooling / Central Dispatch Planning Study
T  Docket U-97-140
T  INPUT FILE Benchg.PPI
*
*  input echo: > zero will cause an input echo
*  |  first month of run
*  |  |   # of days to be run
*  |  |   |  capacity fraction for priority list
*  |  |   |  |  minimum # of units required on-line
*  |  |   |  |  |  variable o&m factor: 1 - variable o&m incl. in dispatch
*  |  |   |  |  |  |  output table selector: 0 thru 3
*  |  |   |  |  |  |  |  a  b: spinning reserve = a * demand + b
*  |  |   |  |  |  |  |  |  |    a  b: operating reserve = a * demand + b
*  |  |   |  |  |  |  |  |  |    |   |    emission allowance price
*  |  |   |  |  |  |  |  |  |    |   |    |
-8761 1 365  1  0  1  3  0  10 0.0  80  0
*
*************************************************************************
*   Spinning reserve varies for each utility depending on which units are *
*   running. The spin will be changed for each individual utility run     *
*   Chugach = 36.7 MW, ML&P = 39.6 MW, GVEA = 22.6 MW. Bradley Lake       *
*   provides 20 MW of spin for Chugach and 7 MW ML&P.                     *
*                                                                         *
*   Operating reserve for the individual systems is 3/2 larger than the   *
*   spinning reserve (or spin = 2/3 oper).                                *
*   Chugach = 55.1 MW, ML&P = 59.4 MW, GVEA = 33.9 MW                     *
*************************************************************************
*
*  broker  toggle: 1 - yes, 0 - no
*  |  number of pumped storage plants
*  |  |  hourly incremental cost file toggle
*  |  |  |  dispatch review option toggle
*  |  |  |  |  hourly avgerage fuel cost file
*  |  |  |  |  |  annual summary output file
*  |  |  |  |  |  |  edit request: 0 1 or 2
*  |  |  |  |  |  |  |  fuel limits indicator
*  |  |  |  |  |  |  |  |  peaking hydro output selector
*  |  |  |  |  |  |  |  |  |  request pumped storage modified demands output
*  |  |  |  |  |  |  |  |  |  |  request hourly generation output for a unit
*  |  |  |  |  |  |  |  |  |  |  |
   0  0  0  0  0  1  0  0  0  0  0
*
*  first year of simulation
*  |      last year of simulation
*  |      |      hourly demands filename
*  |      |      |
1996   1997     '/u/jurotich/shave/gvea.shv'
*
***************************** Name of summary output file****************
'/u/jurotich/Alaska/gvea96c.sum'
*
*
*************************************************************************
*                        Generator Data Begins Here                     *
*************************************************************************
*
*
*************************************************************************
*                     Golden Valley Electric Association (GVEA)         *
*************************************************************************
*
G 30 'Zehnder EMD5' 2.6 0.5 ' ' 0 'A' 0.0
3.31  0.03  1997
3.31  0.03  1997
8.00 0.030 1996 8199 0.030 1996
0 25.679 0
1
1     1    1    1   0.01 0.76   0
0.035 0.07 0.07 1
```

```
200   0    0    500 0.03    1997
**********************************************
G 31 'Zehnder EMD6' 2.6 0.5 ' ' 0 'A' 0.0
3.31  0.03  1997
3.31  0.03  1997
8.00 0.030 1996 8199 0.030 1996
0 25.67901 0
1
1     1    1    1   0.01 0.76   0
0.035 0.07 0.07 1
200   0    0    500 0.03    1997
**********************************************
G 32 'Zehnder GT1' 18 6 'Q' 0 'A' 0.0
3.31  0.03  1997
3.31  0.03  1997
5.21 0.030 1996 7618 0.030 1996
97.72 6.2534 0.1599
1
1    1    1    1    0.66 0.76   0
0.15 0.30 0.30 1
200  0    20   1000 0.03    1997
**********************************************
G 33 'Zehnder GT2' 18 6 'Q' 0 'A' 0.0
3.31  0.03  1997
3.31  0.03  1997
5.21 0.030 1996 7618 0.030 1996
97.72 6.253401 0.1599
1
1    1    1    1    0.66 0.76   0
0.15 0.30 0.30 1
200  0    20   1000 0.03    1997
**********************************************
G 34 'North Pole 1' 62.5 5 ' ' 0 'A' 0.0
3.09  0.03  1997
3.09  0.03  1997
4.66 0.030 1996 5167 0.030 1996
167.46 5.022 0.033
1
1     1    6    6    0.60 0.73  0
0.365 0.73 0.73 1
200   0    30   1600 0.03   1997
**********************************************
G 35 'North Pole 2' 62.5 5 'Q' 0 'A' 0.0
3.09  0.03  1997
3.09  0.03  1997
4.66 0.030 1996 5167 0.030 1996
181.74 4.5092 0.0282
0
1     1    6    6    0.060 0.73 0
0.365 0.73 0.73 1
200   0    30   1600 0.03   1997
**********************************************
G 36 'Healy 1' 25 3 'M' 0 'A' 0.0
7
3.11  0.03  1996
10.87 0.030 1996 94657 0.030 1996
95.738 7.998 0.0867
0
1   1  1  1    1.80 0.37    0
6.5 13 13 1
200 0  20 1000 0.03 1997
**********************************************
G 37 'Healy D1' 2.6 0.5 ' ' 0 'A' 0.0
3.20  0.03  1997
3.20  0.03  1997
8.00 0.030 1996 22655 0.030 1996
0 11.451 0
1 4 0204
1     1    1    1   0.01 0.76   0
0.025 0.05 0.05 1
```

```
200   0    0    500 0.03    1997
*********************************************
G 38 'SILOS' 70 0.5 'Q' 274 'A' 0.0
100.00  0.03  1996
100.00  0.03  1996
10.00 0.030 1996 0 0.030 1996
0 10.000 0
0
1 1 1 1 0 0 0
0 0 0 1
0 0 0 0 0 0
*
*****************************************************************************
*                                Purchases                                  *
*****************************************************************************
*
********** GVEA NF from Chugach *************
*
PR 120 'NFC Chugach' 47 1 ' ' 0 'A' 0.0
28.08  0.03 1996
*
************** Emergency Purchase ***********
*
PR 999 'EMERG PURCH' 150 0  ' ' 0  'A' 0
999.0 0.035 1996
*
*
PRICES
*
*****************************************************************************
*               Annual Fuel Price & Purchase Price Table                    *
*****************************************************************************
*                                New Plant                                  *
*       ML&P &                   Soldotna                                  *
*       Joint   Beluga  Bernice & Intn'l HCCP   Aurora  Healy               *
*       NGas    NGas    NGas    NGas     Coal   Purch.  Coal               *
*       $/MBtu  $/MBtu  $/MBtu  $/MBtu   $/MBtu $/MWh   $/MBtu              *
*****************************************************************************
1996    1.86    1.17    1.38    1.98     0.00   00.00   1.36
1997    1.74    1.46    1.50    2.25     0.60   00.00   1.39
1998    1.97    1.69    1.70    2.05     0.62   40.00   1.02
1999    2.01    1.73    1.75    2.10     0.65   40.00   0.94
2000    2.06    1.78    1.80    2.15     0.67   37.00   0.97
2001    2.12    1.84    1.85    2.20     0.70   37.00   0.99
2002    2.16    1.88    1.90    2.25     0.76   37.93   1.05
2003    2.22    1.94    1.95    2.30     0.77   38.87   1.07
2004    2.27    1.99    2.00    2.35     0.79   39.84   1.09
2005    2.33    2.05    2.06    2.41     0.80   40.84   1.11
2006    2.39    2.11    2.12    2.47     0.82   41.86   1.13
2007    2.44    2.16    2.18    2.53     0.83   42.91   1.16
2008    2.50    2.22    2.24    2.59     0.85   43.98   1.18
2009    2.57    2.29    2.30    2.65     0.87   45.08   1.20
2010    2.63    2.35    2.37    2.72     0.88   46.21   1.22
2011    2.70    2.42    2.44    2.79     0.90   47.36   1.25
2012    2.77    2.49    2.50    2.85     0.92   48.55   1.27
2013    2.84    2.56    2.57    2.92     0.93   49.76   1.29
2014    2.91    2.63    2.65    3.00     0.95   51.00   1.32
2015    2.98    2.70    2.72    3.07     0.97   52.28   1.34
2016    3.06    2.78    2.80    3.15     0.99   53.59   1.37
2017    3.06    2.78    2.80    3.15     0.99   53.59   1.37
*
*****************************************************************************
*                            Starts & Retirements                           *
*****************************************************************************
*
******************** GVEA ***
RETIRE 36 1996 0204
START  36 1996 0209
RETIRE 35 1996 0212
START  35 1996 0217
```

```
RETIRE 35 1996 0305
START  35 1996 0310
RETIRE 34 1996 0408
RETIRE 35 1996 0501
START  35 1996 0502
START  34 1996 0607
RETIRE 36 1996 0614
RETIRE 35 1996 0709
START  35 1996 0710
RETIRE 34 1996 0722
START  34 1996 0807
RETIRE 35 1996 0810
START  35 1996 0811
START  36 1996 0919
RETIRE 35 1996 1028
START  35 1996 1107
*
***************************************************************************
*                           Change Mod Section                            *
***************************************************************************
*
YEAR 1996
DUP BEGIN
DAY 0401
MOD 1 34 57.4
MOD 1 35 57.4
MOD 1 32 15.7
MOD 1 33 15.7
DUP END
*
YEAR 1996
DUP BEGIN
DAY 1001
MOD 1 34 62.5
MOD 1 35 62.5
MOD 1 32 18
MOD 1 33 18
DUP END
*
*
END
```

Appendix E
POWRPRO Output Files -- Benchmark

POWRPRO - PRODUCTION COSTING MODEL - VERSION 13G TIME: 15:54:48 DATE: Aug 25 1998 PAGE: 1

Alaska Public Utilities Commission -- ML&P
Power Pooling / Central Dispatch Planning Study

INPUT FILENAME
benchm.ppi

ANNUAL SUMMARY - 1996 8760 HOURS AVERAGE INCREMENTAL COST 20.41 ANNUAL PEAK DEMAND 143 MW

UNIT OR PURCHASE #	NAME	MAX CAPACITY MW	MAX OUTPUT MW	ENERGY OUTPUT MWH	FUEL USED MBTU	FUEL PRICE $/MBTU	FUEL COST $	FUEL AVG $/MWH	HOURS ON LINE	HEAT RATE BTU/KWH	CAPACITY FACTOR OPER.	CAPACITY FACTOR AVG.	O & M VARIABLE $	O & M FIXED $
6	ML&P P2 U7-6	109.5	109.5	461278	4322260	1.86	8039318	17.43	6888	9370	.633	.633	922560	607381
5	ML&P P2 U5-6	49.2	49.2	140130	1585302	1.86	2948644	21.04	3918	11313	.765	.535	280264	218704
7	ML&P P2 U8	87.6	77.3	133344	2085246	1.86	3878697	29.09	4715	15638	.356	.185	266688	617962
2	ML&P P1 U2	16.8	14.0	7610	158098	1.86	294062	38.64	1331	20774	.379	.056	15220	124939
3	ML&P P1 U3	19.5	17.7	6722	124149	1.86	230916	34.35	807	18469	.466	.041	13444	145019
999	EMERG PURCH	150.0	24.6	379	379	999.00	378224	999.01	642	1000	.004	.000	0	0
	TOTAL			749463			15769860	21.04					1498176	1714008

0ENERGY DUMPED (MWH) 45.

UNIT OR PURCHASE #	NAME	EMISSIONS SO2 TONS	SO2 LB/MBTU	SO2 LB/MWH	NOX TONS	NOX LB/MBTU	NOX LB/MWH
6	ML&P P2 U7-6	0	.00	.00	605	.28	2.62
5	ML&P P2 U5-6	0	.00	.00	495	.62	7.07
7	ML&P P2 U8	5	.00	.08	81	.08	1.22
2	ML&P P1 U2	0	.00	.00	35	.44	9.14
3	ML&P P1 U3	0	.00	.00	27	.44	8.13
999	EMERG PURCH	0	.00	.00	0	.00	.00
	TOTAL	5		.01	1244		3.32

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 15:55:12 DATE: Aug 25 1998 PAGE: 1

Multi Area Model for Chugach System
Uses Power Pool Price Files from the Traditional Scenario

INPUT FILENAME
benchc.ppi

ANNUAL SUMMARY - 1996 8760 HOURS AVERAGE INCREMENTAL COST 9.66 ANNUAL PEAK DEMAND 0 MW

UNIT OR PURCHASE #	NAME	AREA	MAX CAPACITY MW	MAX OUTPUT MW	ENERGY OUTPUT MWH	FUEL USED MBTU	FUEL PRICE $/MBTU	FUEL COST $	FUEL AVG $/MWH	HOURS ON LINE	HEAT RATE BTU/KWH	CAPACITY FACTOR OPER.	CAPACITY FACTOR AVG.	O & M VARIABLE $	O & M FIXED $
17	Beluga 7-8	2	101.5	101.5	770924	7058200	1.17	8259045	10.71	7848	9155	.995	.995	1541847	701860
15	Beluga 6-8	2	101.5	101.5	599773	5628025	1.17	6584562	10.98	6096	9383	.992	.992	1199546	545176
12	Beluga 3	2	66.9	66.9	281185	3584325	1.17	4193802	14.91	5415	12747	.828	.672	562366	393285
13	Beluga 5	2	71.0	71.0	296129	3863434	1.17	4520283	15.26	5980	13046	.760	.530	592256	535998
19	Bernice 3	1	28.0	28.0	59293	1321157	1.38	1823160	30.75	8199	22281	.271	.253	118586	176699
20	Bernice 4	1	28.0	28.0	26968	444110	1.38	612869	22.73	1874	16468	.530	.115	53936	176699
10	Beluga 1	2	16.7	16.7	6787	192086	1.17	224742	33.11	1503	28302	.296	.056	13574	116184
11	Beluga 2	2	16.7	16.7	11236	197954	1.17	231607	20.61	729	17617	.983	.083	22473	128544
24	Soldotna 1	1	39.0	39.0	7687	112392	1.98	222536	28.95	451	14621	.456	.024	15374	128699
23	Intrnl 3	2	18.9	18.9	1862	32752	1.98	64848	34.83	166	17589	.618	.012	3724	105509
21	Intrnl 1	2	15.0	15.0	965	19636	1.98	38879	40.29	121	20349	.537	.011	1930	59190
22	Intrnl 2	2	15.1	15.1	958	18423	1.98	36477	38.08	99	19230	.662	.008	1916	84065
998	EMERG PURCH	2	150.0	57.7	977	977	999.00	976020	999.01	71	1000	.092	.001	0	0
TOTAL					2064744			27788828	13.46					4127527	3151913

Transmission Losses and Dumped Energy (MWH) 3443.

UNIT OR PURCHASE #	NAME	EMISSIONS SO2 TONS	SO2 LB/MBTU	SO2 LB/MWH	NOX TONS	NOX LB/MBTU	NOX LB/MWH
17	Beluga 7-8	0	.00	.00	1553	.44	4.03
15	Beluga 6-8	0	.00	.00	1238	.44	4.13
12	Beluga 3	0	.00	.00	789	.44	5.61
13	Beluga 5	0	.00	.00	850	.44	5.74
19	Bernice 3	0	.00	.00	291	.44	9.80
20	Bernice 4	0	.00	.00	98	.44	7.25
10	Beluga 1	0	.00	.00	42	.44	12.45
11	Beluga 2	0	.00	.00	44	.44	7.75
24	Soldotna 1	0	.00	.00	24	.42	6.14
23	Intrnl 3	0	.00	.00	7	.44	7.74
21	Intrnl 1	0	.00	.00	4	.44	8.95
22	Intrnl 2	0	.00	.00	4	.44	8.46
998	EMERG PURCH	0	.00	.00	0	.00	.00
TOTAL		0		.00	4943		4.79

POWRPRO - PRODUCTION COSTING MODEL - VERSION 13G TIME: 12:50:58 DATE: Aug 26 1998 PAGE: 1

Alaska Public Utilities Commission -- GVEA
Power Pooling / Central Dispatch Planning Study

INPUT FILENAME
benchg.ppi

ANNUAL SUMMARY - 1996 8760 HOURS AVERAGE INCREMENTAL COST 27.96 ANNUAL PEAK DEMAND 127 MW

UNIT OR PURCHASE #	NAME	MAX CAPACITY MW	MAX OUTPUT MW	ENERGY OUTPUT MWH	FUEL USED MBTU	FUEL PRICE $/MBTU	FUEL COST $	FUEL AVG $/MWH	HOURS ON LINE	HEAT RATE BTU/KWH	CAPACITY FACTOR OPER.	CAPACITY FACTOR AVG.	O & M VARIABLE $	O & M FIXED $
36	Healy 1	25.0	25.0	153323	2155443	1.36	2931331	19.12	6312	14058	.972	.972	1666625	1705122
120	NFC Chugach	47.0	47.0	178538	178545	28.08	5013559	28.08	8759	1000	.434	.434	0	0
35	North Pole 2	62.5	58.5	187679	1757977	3.00	5273936	28.10	3511	9366	.884	.382	874591	302588
34	North Pole 1	62.5	42.2	50500	525088	3.00	1575258	31.19	1273	10397	.671	.120	235331	255695
37	Healy D1	2.6	.5	1573	18007	3.11	55944	35.58	3145	11450	.192	.069	12580	58902
32	Zehnder GT1	18.0	10.4	4194	94971	3.21	305195	72.76	694	22642	.354	.028	21853	137124
33	Zehnder GT2	18.0	10.3	8354	194007	3.21	623452	74.63	1427	23224	.340	.057	43522	137124
30	Zehnder EMD5	2.6	.5	3	64	3.21	206	82.52	5	25679	.192	.000	20	21317
31	Zehnder EMD6	2.6	.0	0	0	3.21	0	.00	0	0	.000	.000	0	21317
38	SILOS	70.0	.0	0	0	100.00	0	.00	0	0	.000	.000	0	0
999	EMERG PURCH	150.0	.0	0	0	999.00	0	.00	0	0	.000	.000	0	0
TOTAL				584164			15778879	27.01					2854522	2639192

UNIT OR PURCHASE #	NAME	EMISSIONS SO2 TONS	SO2 LB/MBTU	SO2 LB/MWH	NOX TONS	NOX LB/MBTU	NOX LB/MWH
36	Healy 1	1940	1.80	25.30	399	.37	5.20
120	NFC Chugach	0	.00	.00	0	.00	.00
35	North Pole 2	53	.06	.56	642	.73	6.84
34	North Pole 1	158	.60	6.24	192	.73	7.59
37	Healy D1	0	.01	.11	7	.76	8.70
32	Zehnder GT1	31	.66	14.94	36	.76	17.21
33	Zehnder GT2	64	.66	15.33	74	.76	17.65
30	Zehnder EMD5	0	.01	.26	0	.76	19.52
31	Zehnder EMD6	0	.01	.00	0	.76	.00
38	SILOS	0	.00	.00	0	.00	.00
999	EMERG PURCH	0	.00	.00	0	.00	.00
TOTAL		2246		7.69	1349		4.62

Appendix F
Planned New Units

Table F-1
Planned Generation Additions

Utility	**Chugach**	**GVEA**
Plant Name	**New**	**HCCP**
Unit Name	**1**	
Unit Type	SCCT	ST
Summer Max. Dependable Capacity (MW)	36.5	53
Summer Min. Capacity (MW)	10	10
Winter Max. Dependable Capacity (MW)	40.5	53
Winter Min. Capacity (MW)	10	10
Dispatch Constraints:		
Must run? (Y, N)	N	Y
Quick start? (Y,N)	Y	N
Start Date (month-year)	2014	Jul-99
Forced Outage rate (%)	*5.00*	*10.00*
Equivalent Availability (%)	91.00	85.00
1997 Variable O&M rate ($/MWh)	2.06	*10.00*
1997 Fixed O&M rate ($/MW-yr)	7,950	*63,800*
Fuel burn rate:		
Coefficient 1 (MBtu/h)	97.797	80.138
Coefficient 2 (MBtu/h-MW)	6.1712	7.9918
Coefficient 3 (MBtu/h-MW^2)	0.0382	0.0434
Primary fuel	NG	Coal
Start up fuel		Oil
Maintenance[2]:		
Number of days per year (or)	28	20
Number of scheduled periods		
Length of first period (days)		
Start date of first period		
Length of second period (days)		
Start date of second period		
Ramp up rate (fraction of rated capacity / hr)	1	1
Ramp down rate (fraction of rated capacity / hr)	1	1
Required minimum on-line time	1	1
Required minimum off-line time	1	1
SO_2 emission rate (lb/MBtu)	*0*	*0.3*
NO_x emission rate (lb/MBtu)	*0.42*	0.35
Time to start from warm condition (h)	1.5	*3.0*
Time to start from cold condition (h)	3.5	8.0
Time to cool to warm condition (h)	*3.5*	*4.0*
Generation capacity in first hour on-line (%)	100%	100%
Shut down cost ($)	200	200
Start up fuel used in cold start (MBtu)	43.00	1,112
Start up cost adder-base cost ($)	750	1,000
Start up cost adder-escalation rate (%)	3	3
Start up cost adder-base year for escalation	1997	1997

[1] HCCP overhaul schedule 2004, 2009, 2014 for 3 months.

Appendix G
Generic Unit Candidates

Table G-1
Generic Simple Cycle Unit Expansion Options on Fuel Oil

Unit Type	**Simple Cycle Combustion Turbines**				
	GE 6B	**LM2500**	**GE 5 PA**	**LM6000**	**GE 7EA**
Max. Dependable Capacity (MW)	38	26	25	37	83
Minimum Capacity (MW)	5	5	5	5	20
Dispatch Constraints:					
Must run? (Y, N)	N	N	N	N	N
Quick start? (Y,N)	N	N	N	N	N
Forced Outage rate (%)	5	5	5	5	5
Equivalent Availability (%)	92	92	92	92	91
1998 Variable O&M rate ($/MWh)	4.41	5.53	2.84	4.53	3.03
1998 Fixed O&M rate ($/MW-yr)	7,630	10,880	10,180	7,720	4,400
Fuel burn rate:					
Coefficient 1 (MBtu/h)	116.18	50.704	95.013	94.058	243.93
Coefficient 2 (MBtu/h-MW)	6.9159	7.9528	7.448	5.9764	6.0178
Coefficient 3 (MBtu/h-MW^2)	0.0597	0.0293	0.0926	0.0382	0.0333
Primary & start up fuel	Oil	Oil	Oil	Oil	Oil
Maintenance:					
Number of days per year	14	14	14	14	17
Ramp up rate (fraction of rated capacity / hr)	1	1	1	1	1
Ramp down rate (fraction of rated capacity / hr)	1	1	1	1	1
Required minimum on-line time	1	1	1	1	1
Required minimum off-line time	1	1	1	1	1
SO_2 emission rate (lb/MBtu)	0	0	0	0	0
NO_x emission rate (lb/MBtu)	0.5	0.5	0.5	0.5	0.5
Time to start from warm condition (h)	1.5	1.5	1.5	1.5	1.5
Time to start from cold condition (h)	3.5	3.5	3.5	3.5	3.5
Time to cool to warm condition (h)	24	24	24	24	24
Generation capacity in first hour on-line (%)	100%	100%	100%	100%	100%
Shut down cost ($)	200	200	200	200	200
Start up fuel used in cold start (MBtu)	30.00	22.00	21.00	30.00	138.00
Start up cost adder-base cost ($)	750	500	500	750	1,000
Start up cost adder-escalation rate (%)	3	3	3	3	3
Start up cost adder-base year for escalation	1998	1998	1998	1998	1998
Unit Life	20	20	20	20	20
Capital Cost ('000$)	20,201	17,453	15,442	23,461	33,485
Base Year	1998	1998	1998	1998	1998
Escalation Rate (%)	2	2	2	2	2
Construction Period (Year)	1	1	1	1	1
FCR (%)	11.901	11.901	11.901	11.901	11.901
Finance Period (Years)	20	20	20	20	20

Table G-2
Generic Combined Cycle Unit Expansion Options -- Oil Fired

Unit Type	**LM6000 1x1**	**GE 6B 1x1**	**GE 7EA 1x1**	**LM6000 2x1**
Max. Dependable Capacity (MW)	50	58	128	100
Minimum Capacity (MW)	10	10	45	40
Dispatch Constraints:				
Must run? (Y, N)	N	N	N	N
Quick start? (Y,N)	N	N	N	N
Forced Outage rate (%)	5	5	5	5
Equivalent Availability (%)	90	90	90	90
1998 Variable O&M rate ($/MWh)	4.27	3.84	2.63	3.44
1998 Fixed O&M rate ($/MW-yr)	23,930	23,380	11,720	16,030
Fuel burn rate:				
Coefficient 1 (MBtu/h)	103.218	111.1965	233.599	148.77
Coefficient 2 (MBtu/h-MW)	5.6586	5.9924	5.8424	5.851
Coefficient 3 (MBtu/h-MW^2)	0	0	0	0.002
Primary & start up fuel	Oil	Oil	Oil	Oil
Maintenance:				
Number of days per year	17	17	17	17
Ramp up rate (fraction of rated capacity / hr)	1	1	1	1
Ramp down rate (fraction of rated capacity / hr)	1	1	1	1
Required minimum on-line time	16	16	16	16
Required minimum off-line time	6	6	6	6
SO_2 emission rate (lb/MBtu)	0	0	0	0
NO_x emission rate (lb/MBtu)	0.5	0.5	0.5	0.5
Time to start from warm condition (h)	2.0	2.0	2.0	2.0
Time to start from cold condition (h)	4.0	4.0	4.0	4.0
Time to cool to warm condition (h)	24	24	24	24
Generation capacity in first hour on-line (%)	100%	100%	100%	100%
Shut down cost ($)	200	200	200	200
Start up fuel used in cold start (MBtu)	52.00	50.00	56.00	104.00
Start up cost adder-base cost ($)	750	750	1,000	1,000
Start up cost adder-escalation rate (%)	3	3	3	3
Start up cost adder-base year for escalation	1998	1998	1998	1998
Unit Life	25	25	25	25
Capital Cost ('000$)	47,916	42,480	69,473	81,831
Base Year	1998	1998	1998	1998
Escalation Rate (%)	2	2	2	2
Construction Period (Year)	1.33	1.33	1.33	1.5
FCR (%)	10.999	10.999	10.999	10.999
Finance Period (Years)	25	25	25	25

Table G-3
Generic Coal Unit Expansion Options

Unit Type	**Pulverized Coal w/ Scrubbers**		
Max. Dependable Capacity (MW)	50	75	150
Minimum Capacity (MW)	10	25	50
Dispatch Constraints:			
Must run? (Y, N)	N	N	N
Quick start? (Y,N)	N	N	N
Forced Outage rate (%)	6	6	7
Equivalent Availability (%)	86	86	85
1998 Variable O&M rate ($/MWh)	3.04	3.04	3.04
1998 Fixed O&M rate ($/MW-yr)	64,240	54,600	48,680
Fuel burn rate:			
Coefficient 1 (MBtu/h)	80.138	118.11	220.36
Coefficient 2 (MBtu/h-MW)	7.9918	8.1394	7.6493
Coefficient 3 (MBtu/h-MW^2)	0.0434	0.0158	0.0074
Primary & start up fuel	Coal	Coal	Coal
Maintenance:			
Number of days per year	21	21	28
Ramp up rate (fraction of rated capacity / hr)	1	1	1
Ramp down rate (fraction of rated capacity / hr)	1	1	1
Required minimum on-line time	4	4	4
Required minimum off-line time	0	0	0
SO_2 emission rate (lb/MBtu)	1.5	1.5	1.5
NO_x emission rate (lb/MBtu)	0.25	0.25	0.25
Time to start from warm condition (h)	6.0	6.0	6.0
Time to start from cold condition (h)	12	12	12
Time to cool to warm condition (h)	12	12	12
Generation capacity in first hour on-line (%)	100%	100%	100%
Shut down cost ($)	200	200	200
Start up fuel used in cold start (MBtu)	350	500	1000
Start up cost adder-base cost ($)	1,000	1,000	1,600
Start up cost adder-escalation rate (%)	3	3	3
Start up cost adder-base year for escalation	1998	1998	1998
Unit Life	30	30	30
Capital Cost ('000$)	99,257	126,594	184,324
Base Year	1998	1998	1998
Escalation Rate (%)	2	2	2
Construction Period (Year)	1	2.17	2.5
FCR (%)	10.478	10.478	10.478
Finance Period (Years)	30	30	30

Table G-4
Generic Unit Expansion Options on Natural Gas

Unit Type	**GE 6B 1x0**	**GE 6B 1x1**	**GE 7EA 1x1**
Max. Dependable Capacity (MW)	38	58	128
Minimum Capacity (MW)	5	10	45
Dispatch Constraints:			
Must run? (Y, N)	N	N	N
Quick start? (Y,N)	N	N	N
Forced Outage rate (%)	5	5	5
Equivalent Availability (%)	92	90	90
1998 Variable O&M rate ($/MWh)	2.82	2.99	2.10
1998 Fixed O&M rate ($/MW-yr)	7,630	23,380	11,720
Fuel burn rate:			
Coefficient 1 (MBtu/h)	119.84	116.72	242.194
Coefficient 2 (MBtu/h-MW)	6.9756	5.5606	5.9429
Coefficient 3 (MBtu/h-MW^2)	0.0599	0.0073	0
Primary & start up fuel	NGas	NGas	NGas
Maintenance:			
Number of days per year	14	17	17
Ramp up rate (fraction of rated capacity / hr)	1	1	1
Ramp down rate (fraction of rated capacity / hr)	1	1	1
Required minimum on-line time	1	16	16
Required minimum off-line time	1	6	6
SO_2 emission rate (lb/MBtu)	0	0	0
NO_x emission rate (lb/MBtu)	0.42	0.42	0.42
Time to start from warm condition (h)	1.5	2.0	2.0
Time to start from cold condition (h)	3.5	4.0	4.0
Time to cool to warm condition (h)	24	24	24
Generation capacity in first hour on-line (%)	100%	100%	100%
Shut down cost ($)	200	200	200
Start up fuel used in cold start (MBtu)	31.00	51.00	59.00
Start up cost adder-base cost ($)	750	750	1,000
Start up cost adder-escalation rate (%)	3	3	3
Start up cost adder-base year for escalation	1998	1998	1998
Unit Life	20	25	25
Capital Cost ('000$)	19,446	41,986	68,664
Base Year	1998	1998	1998
Escalation Rate (%)	2	2	2
Construction Period (Year)	1	1.33	1.33
FCR (%)	11.901	10.999	10.999
Finance Period (Years)	20	25	25

Appendix H
POWRPRO Input Files -- Planning Horizon

```
T  Alaska Public Utilities Commission -- ML&P
T  Power Pooling / Central Dispatch Planning Study
T  Docket U-97-140
T  INPUT FILE mlp.PPI   (before N.I.)
*
*  input echo: > zero will cause an input echo
*  |  first month of run
*  |  |   # of days to be run
*  |  |   |  capacity fraction for priority list
*  |  |   |  |  minimum # of units required on-line
*  |  |   |  |  |  variable o&m factor: 1 - variable o&m incl. in dispatch
*  |  |   |  |  |  |  output table selector: 0 thru 3
*  |  |   |  |  |  |  |  a  b: spinning reserve = a * demand + b
*  |  |   |  |  |  |  |  |  |    a  b: operating reserve = a * demand + b
*  |  |   |  |  |  |  |  |  |    |   |    emission allowance price
*  |  |   |  |  |  |  |  |  |    |   |    |
-8761 1 365  1  0  1  2  0  37.4 0.0 59.6 0
*
*
*  broker  toggle: 1 - yes, 0 - no
*  |  number of pumped storage plants
*  |  |  hourly incremental cost file toggle
*  |  |  |  dispatch review option toggle
*  |  |  |  |  hourly avgerage fuel cost file
*  |  |  |  |  |  annual summary output file
*  |  |  |  |  |  |  edit request: 0 1 or 2
*  |  |  |  |  |  |  |  fuel limits indicator
*  |  |  |  |  |  |  |  |  peaking hydro output selector
*  |  |  |  |  |  |  |  |  |  request pumped storage modified demands output
*  |  |  |  |  |  |  |  |  |  |  request hourly generation output for a unit
*  |  |  |  |  |  |  |  |  |  |  |
   0  0  0  0  0  1  0  0  0  0  0
*
*
*  first year of simulation
*  |      last year of simulation
*  |      |      hourly demands filename
*  |      |      |
1997   1999     '/u/jurotich/shave/mlp.shv'
*
*
***************************** Name of summary output file****************
'/u/jurotich/Alaska/mlp.sum'
*
*
*****************************************************************************
*                        Generator Data Begins Here                         *
*****************************************************************************
*
*
*****************************************************************************
*               Anchorage, Municipal Light and Power (ML&P)                 *
*****************************************************************************
*
G 1 'ML&P P1 U1' 16.8 3 'Q' 0 'A' 0.033
1
1
2.06 0.03 1997 7660 0.03 1997
79.63 9.2837 0.049
7
1    1   1      1   0 0.44 0
0.25 0.5 0.5    1
200  0   79.629 402 0.03 1997
***********************************************
G 2 'ML&P P1 U2' 16.8 3 'Q' 0 'A' 0.033
1
1
2.06 0.03 1997 7660 0.03 1997
74.92 8.254 0.0869
7
```

```
1    1   1     1   0 0.44 0
0.25 0.5 0.5   1
200  0   74.92 400 0.03 1997
**********************************************
G 3 'ML&P P1 U3' 19.5 3 'Q' 0 'A' 0.033
1
1
2.06 0.03 1997 7660 0.03 1997
86.7 7.7585 0.1111
14
1    1   1    1   0 0.44 0
0.25 0.5 0.25 1
200  0   86.7 441 0.03 1997
**********************************************
G 4 'ML&P P1 U4' 34.1 3 'Q' 0 'A' 0.033
1
1
2.06 0.03 1996 7660 0.03 1996
165.1 7.5594 0.0329
14
1     1    1      1   0    0.44 0
0.125 0.25 0.25   1
200   0    165.07 791 0.03 1997
**********************************************
G 5 'ML&P P2 U5-6' 49.2 10 ' ' 0 'A' 0.033
1
1
2.06 0.03 1997 7266 0.03 1997
168 6.74 0.0026
14
1     1     16    6    0    0.625 0
0.165 0.33  0.33  1
200   0     168.0 1148 0.03 1997
**********************************************
G 6 'ML&P P2 U7-6' 109.5 10 ' ' 0 'A' 0.033
1
1
2.06 0.03 1997 7266 0.03 1997
199 5.93 0.008
14
1     1    16    6    0    0.28 0
0.165 0.33 0.33  1
200   0    199.0 2539 0.03 1997
**********************************************
G 7 'ML&P P2 U8' 87.6 20 ' ' 0 'A' 0.033
1
1
2.06 0.03 1997 7266 0.03 1997
216.7 8.1877 0.0122
14
1     1     6      6     0    0.078 0
0.084 0.167 0.167  1
200   0     216.2  2057  0.03 1997
*************************************************************************
*                                Purchases                              *
*************************************************************************
*
************** Emergency Purchase ***********
*
PR 999 'EMERG PURCH' 500 0  ' ' 0  'A' 0
500.0 0.035 1996
*
*
PRICES
*
*************************************************************************
*               Annual Fuel Price & Purchase Price Table                *
*************************************************************************
*                               New Plant                               *
*       ML&P &                  Soldotna                                *
```

```
*       Joint   Beluga  Bernice & Intn'l HCCP   Aurora  Healy             *
*       NGas    NGas    NGas    NGas     Coal   Purch.  Coal              *
*       $/MBtu  $/MBtu  $/MBtu  $/MBtu   $/MBtu $/MWh   $/MBtu            *
***********************************************************************
1996    1.86    1.17    1.38    1.98     0.00   00.00   1.36
1997    1.74    1.46    1.50    2.25     0.60   00.00   1.39
1998    1.97    1.69    1.70    2.05     0.62   40.00   1.02
1999    2.01    1.73    1.75    2.10     0.65   40.00   0.94
2000    2.06    1.78    1.80    2.15     0.67   37.00   0.97
2001    2.12    1.84    1.85    2.20     0.70   37.00   0.99
2002    2.16    1.88    1.90    2.25     0.76   37.93   1.05
2003    2.22    1.94    1.95    2.30     0.77   38.87   1.07
2004    2.27    1.99    2.00    2.35     0.79   39.84   1.09
2005    2.33    2.05    2.06    2.41     0.80   40.84   1.11
2006    2.39    2.11    2.12    2.47     0.82   41.86   1.13
2007    2.44    2.16    2.18    2.53     0.83   42.91   1.16
2008    2.50    2.22    2.24    2.59     0.85   43.98   1.18
2009    2.57    2.29    2.30    2.65     0.87   45.08   1.20
2010    2.63    2.35    2.37    2.72     0.88   46.21   1.22
2011    2.70    2.42    2.44    2.79     0.90   47.36   1.25
2012    2.77    2.49    2.50    2.85     0.92   48.55   1.27
2013    2.84    2.56    2.57    2.92     0.93   49.76   1.29
2014    2.91    2.63    2.65    3.00     0.95   51.00   1.32
2015    2.98    2.70    2.72    3.07     0.97   52.28   1.34
2016    3.06    2.78    2.80    3.15     0.99   53.59   1.37
2017    3.06    2.78    2.80    3.15     0.99   53.59   1.37
***********************************************************************
*                          Starts & Retirements                       *
***********************************************************************
*
*
***********************************************************************
*                          Change Mod Section                         *
***********************************************************************
*
YEAR 1997
DAY 0101
MOD 12 2 92
*
YEAR 1998
DAY 0101
MOD 12 2 7
MOD 12 7 55
*
YEAR 1999
DAY 0101
MOD 12 7 14
MOD 12 3 92
*
YEAR 1997
DUP BEGIN
DAY 0401
MOD 1  1  14
MOD 23 1  320   0.03    1997
MOD 1  2  14
MOD 23 2  320   0.03    1997
MOD 1  3  17.7
MOD 23 3  406   0.03    1997
MOD 1  4  31.1
MOD 23 4  697   0.03    1997
MOD 1  5  44.6
MOD 23 5  1005  0.03    1997
MOD 1  6  99.4
MOD 23 6  2237  0.03    1997
MOD 1  7  77.3
MOD 23 7  1746  0.03    1997
DUP END
*
YEAR 1997
DUP BEGIN
```

```
DAY 1001
MOD 1  1  16.8
MOD 23 1  402 0.03 1997
MOD 1  2  16.8
MOD 23 2  400 0.03 1997
MOD 1  3  19.5
MOD 23 3  441 0.03 1997
MOD 1  4  34.1
MOD 23 4  791 0.03 1997
MOD 1  5  49.2
MOD 23 5  1148 0.03 1997
MOD 1  6  109.5
MOD 23 6  2539 0.03 1997
MOD 1  7  87.6
MOD 23 7  2057 0.03 1997
DUP END
*
*
END
```

```
T  Alaska Public Utilities Commission -- ML&P
T  Power Pooling / Central Dispatch Planning Study
T  Docket U-97-140
T  INPUT FILE mlp.PPI
*
*  input echo: > zero will cause an input echo
*  |  first month of run
*  |  |   # of days to be run
*  |  |   |  capacity fraction for priority list
*  |  |   |  |  minimum # of units required on-line
*  |  |   |  |  |  variable o&m factor: 1 - variable o&m incl. in dispatch
*  |  |   |  |  |  |  output table selector: 0 thru 3
*  |  |   |  |  |  |  |  a  b: spinning reserve = a * demand + b
*  |  |   |  |  |  |  |  |  |    a  b: operating reserve = a * demand + b
*  |  |   |  |  |  |  |  |  |    |   |    emission allowance price
*  |  |   |  |  |  |  |  |  |    |   |    |
-8761 1 365  1  0  1  2  0  28.4 0.0 50.6 0
*
*
*  broker  toggle: 1 - yes, 0 - no
*  |  number of pumped storage plants
*  |  |  hourly incremental cost file toggle
*  |  |  |  dispatch review option toggle
*  |  |  |  |  hourly avgerage fuel cost file
*  |  |  |  |  |  annual summary output file
*  |  |  |  |  |  |  edit request: 0 1 or 2
*  |  |  |  |  |  |  |  fuel limits indicator
*  |  |  |  |  |  |  |  |  peaking hydro output selector
*  |  |  |  |  |  |  |  |  |  request pumped storage modified demands output
*  |  |  |  |  |  |  |  |  |  |  request hourly generation output for a unit
*  |  |  |  |  |  |  |  |  |  |  |
   0  0  0  0  0  1  0  0  0  0  0
*
*
*  first year of simulation
*  |      last year of simulation
*  |      |      hourly demands filename
*  |      |      |
2000   2016     '/u/jurotich/shave/mlp.shv'
*
*
***************************** Name of summary output file****************
'/u/jurotich/Alaska/mlp1.sum'
*
*
*****************************************************************************
*                        Generator Data Begins Here                         *
*****************************************************************************
*
*
*****************************************************************************
*               Anchorage, Municipal Light and Power (ML&P)                 *
*****************************************************************************
*
G 1 'ML&P P1 U1' 16.8 3 'Q' 0 'A' 0.033
1
1
2.06 0.03 1997 7660 0.03 1997
79.63 9.2837 0.049
7
1    1   1      1   0 0.44 0
0.25 0.5 0.5    1
200  0   79.629 402 0.03 1997
***********************************************
G 2 'ML&P P1 U2' 16.8 3 'Q' 0 'A' 0.033
1
1
2.06 0.03 1997 7660 0.03 1997
74.92 8.254 0.0869
7
```

```
1    1   1     1   0 0.44 0
0.25 0.5 0.5   1
200  0   74.92 400 0.03 1997
**********************************************
G 3 'ML&P P1 U3' 19.5 3 'Q' 0 'A' 0.033
1
1
2.06 0.03 1997 7660 0.03 1997
86.7 7.7585 0.1111
14
1    1   1    1   0 0.44 0
0.25 0.5 0.25 1
200  0   86.7 441 0.03 1997
**********************************************
G 4 'ML&P P1 U4' 34.1 3 'Q' 0 'A' 0.033
1
1
2.06 0.03 1996 7660 0.03 1996
165.1 7.5594 0.0329
14
1     1    1      1   0    0.44 0
0.125 0.25 0.25   1
200   0    165.07 791 0.03 1997
**********************************************
G 5 'ML&P P2 U5-6' 49.2 10 ' ' 0 'A' 0.033
1
1
2.06 0.03 1997 7266 0.03 1997
168 6.74 0.0026
14
1     1     16    6    0    0.625 0
0.165 0.33  0.33  1
200   0     168.0 1148 0.03 1997
**********************************************
G 6 'ML&P P2 U7-6' 109.5 10 ' ' 0 'A' 0.033
1
1
2.06 0.03 1997 7266 0.03 1997
199 5.93 0.008
14
1     1    16    6    0    0.28 0
0.165 0.33 0.33  1
200   0    199.0 2539 0.03 1997
**********************************************
G 7 'ML&P P2 U8' 87.6 20 ' ' 0 'A' 0.033
1
1
2.06 0.03 1997 7266 0.03 1997
216.7 8.1877 0.0122
14
1     1     6      6     0    0.078 0
0.084 0.167 0.167  1
200   0     216.2  2057  0.03 1997
*************************************************************************
*                                Purchases                              *
*************************************************************************
*
************** Emergency Purchase ***********
*
PR 999 'EMERG PURCH' 500 0  ' ' 0  'A' 0
500.0 0.035 1996
*
*
PRICES
*
*************************************************************************
*               Annual Fuel Price & Purchase Price Table                *
*************************************************************************
*                               New Plant                               *
*       ML&P &                  Soldotna                                *
```

```
*       Joint   Beluga  Bernice & Intn'l HCCP   Aurora  Healy             *
*       NGas    NGas    NGas    NGas     Coal   Purch.  Coal              *
*       $/MBtu  $/MBtu  $/MBtu  $/MBtu   $/MBtu $/MWh   $/MBtu            *
***********************************************************************
1996    1.86    1.17    1.38    1.98     0.00   00.00   1.36
1997    1.74    1.46    1.50    2.25     0.60   00.00   1.39
1998    1.97    1.69    1.70    2.05     0.62   40.00   1.02
1999    2.01    1.73    1.75    2.10     0.65   40.00   0.94
2000    2.06    1.78    1.80    2.15     0.67   37.00   0.97
2001    2.12    1.84    1.85    2.20     0.70   37.00   0.99
2002    2.16    1.88    1.90    2.25     0.76   37.93   1.05
2003    2.22    1.94    1.95    2.30     0.77   38.87   1.07
2004    2.27    1.99    2.00    2.35     0.79   39.84   1.09
2005    2.33    2.05    2.06    2.41     0.80   40.84   1.11
2006    2.39    2.11    2.12    2.47     0.82   41.86   1.13
2007    2.44    2.16    2.18    2.53     0.83   42.91   1.16
2008    2.50    2.22    2.24    2.59     0.85   43.98   1.18
2009    2.57    2.29    2.30    2.65     0.87   45.08   1.20
2010    2.63    2.35    2.37    2.72     0.88   46.21   1.22
2011    2.70    2.42    2.44    2.79     0.90   47.36   1.25
2012    2.77    2.49    2.50    2.85     0.92   48.55   1.27
2013    2.84    2.56    2.57    2.92     0.93   49.76   1.29
2014    2.91    2.63    2.65    3.00     0.95   51.00   1.32
2015    2.98    2.70    2.72    3.07     0.97   52.28   1.34
2016    3.06    2.78    2.80    3.15     0.99   53.59   1.37
2017    3.06    2.78    2.80    3.15     0.99   53.59   1.37
***********************************************************************
*                           Starts & Retirements                      *
***********************************************************************
*
*
***********************************************************************
*                           Change Mod Section                        *
***********************************************************************
*
YEAR 2000
DAY 0101
MOD 12 3 14
MOD 12 5 92
MOD 12 6 92
*
YEAR 2001
DAY 0101
MOD 12 5 14
MOD 12 6 14
*
YEAR 2003
DAY 0101
MOD 12 7 92
*
YEAR 2004
DAY 0101
MOD 12 7 14
MOD 12 1 92
MOD 12 4 92
*
YEAR 2005
DAY 0101
MOD 12 1 7
MOD 12 4 14
MOD 12 5 92
MOD 12 6 92
*
YEAR 2006
DAY 0101
MOD 12 5 14
MOD 12 6 14
MOD 12 2 92
*
YEAR 2007
```

```
DAY 0101
MOD 12 2 7
MOD 12 3 92
*
YEAR 2008
DAY 0101
MOD 12 3 14
MOD 12 7 92
*
YEAR 2009
DAY 0101
MOD 12 7 14
*
YEAR 2010
DAY 0101
MOD 12 5 61
MOD 12 6 61
*
YEAR 2011
DAY 0101
MOD 12 5 14
MOD 12 6 14
*
YEAR 2012
DAY 0101
MOD 12 1 92
MOD 12 4 92
*
YEAR 2013
DAY 0101
MOD 12 1 7
MOD 12 4 14
MOD 12 2 61
MOD 12 7 61
*
YEAR 2014
DAY 0101
MOD 12 2 7
MOD 12 7 14
*
YEAR 2015
DAY 0101
MOD 12 5 92
MOD 12 6 92
*
YEAR 2016
DAY 0101
MOD 12 3 92
*
YEAR 1999
DUP BEGIN
DAY 0401
MOD 1  1  14
MOD 23 1  320   0.03    1997
MOD 1  2  14
MOD 23 2  320   0.03    1997
MOD 1  3  17.7
MOD 23 3  406   0.03    1997
MOD 1  4  31.1
MOD 23 4  697   0.03    1997
MOD 1  5  44.6
MOD 23 5  1005  0.03    1997
MOD 1  6  99.4
MOD 23 6  2237  0.03    1997
MOD 1  7  77.3
MOD 23 7  1746  0.03    1997
DUP END
*
YEAR 1999
DUP BEGIN
```

```
DAY 1001
MOD 1  1  16.8
MOD 23 1  402 0.03 1997
MOD 1  2  16.8
MOD 23 2  400 0.03 1997
MOD 1  3  19.5
MOD 23 3  441 0.03 1997
MOD 1  4  34.1
MOD 23 4  791 0.03 1997
MOD 1  5  49.2
MOD 23 5  1148 0.03 1997
MOD 1  6  109.5
MOD 23 6  2539 0.03 1997
MOD 1  7  87.6
MOD 23 7  2057 0.03 1997
DUP END
*
*
END
```

```
PARAMETERS  0.50 75
* Optional output title lines as in POWRPRO data
*
T Multi Area Model with Chugach/AEG&T/GVEA
T Uses Power Pool Price Files from the Traditional Scenario
T
*
* Control on printing input echo and/or progress of run to screen (see POWRPRO input
* description - Block 2 Line 1)7
* |     First month of run
* |     |     Number of days to run
* |     |     |    Number of areas to be simulated
* |     |     |    |    Capacity fraction to use for calculaton of commitment priority
* |     |     |    |    |     Enter 1 to have variable o&m included in commitment and
* |     |     |    |    |     dispatch - 0 otherwise
* |     |     |    |    |     |   Output selector (see POWRPRO input description -
* |     |     |    |    |     |   Block 2 Line 1)
* |     |     |    |    |     |   |     Enter the # of areas to calculate the hourly
* |     |     |    |    |     |   |     dispatch incremental, else 0
* |     |     |    |    |     |   |     |   Enter 1 to activate dispatch review option
* |     |     |    |    |     |   |     |   - 0 otherwise
* |     |     |    |    |     |   |     |   |   Enter 1 to have hourly average fuel prices
* |     |     |    |    |     |   |     |   |   written to a file - 0 otherwise
* |     |     |    |    |     |   |     |   |   |   Enter 1 to have annual summary written
* |     |     |    |    |     |   |     |   |   |   to a file - 0 otherwise
* |     |     |    |    |     |   |     |   |   |   |   Enter a unit number here to get
* |     |     |    |    |     |   |     |   |   |   |   it's hourly generation written to
* |     |     |    |    |     |   |     |   |   |   |   a file - 0 otherwise
* |     |     |    |    |     |   |     |   |   |   |   |     _______ These two items are
* |     |     |    |    |     |   |     |   |   |   |   |     |     | not yet implemented
* |     |     |    |    |     |   |     |   |   |   |   |     |     | - enter zeroes
* |     |     |    |    |     |   |     |   |   |   |   |     |     |
 -1000  1     365  4    1.0   1   2     0   0   0   2   0     0     0
*
*  First year to run
*  |
*  |       Last year to run
*  |       |
   1997    1999
*
'/u/jurotich/expansion/ceagvea1.sum'
*
*
*
TIE (code indicating tie line data follow - must be entered as shown - not needed if
*   only one area is simulated)
*
* Tie line number
* | 'From' area
* |  |     'To' area
* |  |     |      Tie line capacity - Mw
* |  |     |      |         a       b: power loss in tie line (mw) = a x Mw + b x Mw**2
* |  |     |      |         |       |   (where Mw = megawatts flowing)
* |  |     |      |         |       |       Wheeling cost ($/Mwh)
* |  |     |      |         |       |       |
*
* Kenai to Anchorage
  1  1     2      75       -0.0015  0.0014  0
  2  2     1      75       -0.0015  0.0014  0
* Anchorage to Healy
  3  2     3      70       -0.0041  0.0008  0
  4  3     2      70       -0.0041  0.0008  0
* Healy to Fairbanks
  5  3     4      100      -0.0226  0.0013  0
  6  4     3      100      -0.0226  0.0013  0
*
*************************************************************************
*                            Kenai Peninsula                            *
*************************************************************************
* Begin data for first area (see below description for area 2)
```

```
*
AREA
'Kenai'
'/u/jurotich/shave/kenai.shv'
   0  0  0  5  0  8.1  1
  * Connectivity data (see accompanying diagram)
* Area number this area connects with
* |  Number of tie lines in connection path
* |  |     Tie line numbers (in order from this area to connected area)
* |  |     |
  2  1     1
  3  2     1 3
  4  3     1 3 5
************** EXISTING GENERATION **********
G 18 'Bernice 2' 19.3 3 'Q' 100 'U' 0.05
3
3
2.06 0.030 1997 6500 0.030 1997
82.82 8.77628 0.08
21
1    1   1    1    0 0.44 0
0.15 0.3 0.3  1
200  0   25.0 1000 0.03 1997
**********************************************
G 19 'Bernice 3' 28 3 'Q' 0 'A' 0.07
3
3
2.06 0.030 1997 6500 0.030 1997
104.4 7.83575 0.06
21
1     1    1    1    0 0.44 0
0.165 0.33 0.33 1
200   0    25.0 1000 0.03 1997
**********************************************
G 20 'Bernice 4' 28 7 'Q' 0 'A' 0.05
3
3
2.06 0.030 1997 6500 0.030 1997
102.7 9.3567 0.01
21
1     1    1    1    0 0.44 0
0.165 0.33 0.33 1
200   0    25.0 1000 0 0.03 1997
**********************************************
G 24 'Soldotna 1' 39 6 ' ' 0 'A' 0.01
4
4
2.06 0.030 1997 3300 0.030 1996
136.1 5.571 0.060
14
1     1    6    6    0    0.42 0
0.125 0.25 0.25 1
200   0    45   1000 0.03 1997
*
************** Emergency Purchase ***********
*
PR 997 'EMERG PURCH' 150 0  ' ' 0  'A' 0
999.0 0.035 1996
*
*************************************************************************
*                              Anchorage Area                           *
*************************************************************************
*
*
AREA
*
* area name (maximum of 12 characters enclosed in quotes)
* |
  'Chugach'
* Hourly demands filename for this area (maximum of 48 characters enclosed in quotes)
```

```
* |
 '/u/jurotich/shave/cea2.shv'
 *
* ____These two items are not yet implemented - enter zeroes
* |  |
* |  |  a  b: Spinning reserve requirement for this area = a x demand + b
* |  |  |  |
* |  |  |  |    a  b: Operating reserve requirement for this area = a x demand + b
* |  |  |  |    |  |
* |  |  |  |    |  |    Minimum number of on-line units required for this area
* |  |  |  |    |  |    |
  0  0  0  16.1 0  32.1 0
*
* Connectivity data (see accompanying diagram)
* Area number this area connects with
* |  Number of tie lines in connection path
* |  |     Tie line numbers (in order from this area to connected area)
* |  |     |
  1  1     2
  3  1     3
  4  2     3 5
************** EXISTING GENERATION **********
G 10 'Beluga 1' 16.7 3 'Q ' 0 'A' 0.07
2
2
2.06 0.030 1997 7950 0.030 1997
83.57046 10.856 0.07032
21
1    1    1    1    0 0.44 0
0.15 0.30 0.30 1
200  0    20.0 1000 0.03 1997
************************************************
G 11 'Beluga 2' 16.7 3 'Q ' 0 'A' 0.004
2
2
2.06 0.030 1997 7950 0.030 1997
129.98 8.3371 0.0829
21
1    1    1    1    0 0.44  0
0.15 0.23 0.23 1
200  0    32.0 1000 0.03 1997
***********************************************
G 12 'Beluga 3' 66.9 3 'Q' 0 'A' 0.01
2
2
2.06 0.030 1997 7950 0.030 1997
196.9959 8.4491 0.01243
28
1    1    6   6   0 0.44  0
0.15 0.30 0.30 1
200  0    67.0 1600 0.03 1997
***********************************************
G 13 'Beluga 5' 71 3 'Q' 0 'A' 0.00
2
2
2.06 0.030 1997 7950 0.030 1997
208.6894 7.8766 0.0223
28
1     1    6   6   0 0.44  0
0.185 0.37 0.37 1
200   0    67.0 1600 0.03 1997
***********************************************
G 14 'Beluga 6CT' 74 3 ' ' 0 'U' 0.10
2
2
2.06 0.030 1997 7950 0.030 1997
243.93564 8.525 0.01201
28
1     1    6   6   0 0.44 0
0.185 0.37 0.37 1
```

```
200   0    67.0 3600 0.03 1997
**********************************************
G 15 'Beluga 6-8' 101.5 48 ' ' 0 'A' 0.004
2
2
2.06 0.030 1997 7950 0.030 1997
380.7771 2.6953 0.02882
28
1   1   16   6   0 0.44 0
0.5 1.0 1.0  0.45
200 0   67.0 3600 0.03 1997
**********************************************
G 16 'Beluga 7CT' 74 3 ' ' 0 'U' 0.004
2
2
2.06 0.030 1997 7950 0.030 1997
222.87852 8.3 0.02489
28
1    1    6   6   0 0.44 0
0.21 0.42 0.42 1
200  0    67.0 3600 0.03 1997
**********************************************
G 17 'Beluga 7-8' 101.5 48 ' ' 0 'A' 0.04
2
2
2.06 0.030 1997 7950 0.030 1997
291.9567 4.463 0.01783
28
1   1   16   6   0    0.44 0
0.5 1.0 1.0  0.45
200 0   67.0 3600 0.03 1997
**********************************************
G 21 'Intrnl 1' 15 3 'Q' 0 'A' 0.10
4
4
2.06 0.030 1997 5750 0.030 1997
83.07 8.48275 0.14
14
1    1    1    1    0 0.44  0
0.21 0.42 0.42 1
200  0    21.0 1000 0.03 1997
**********************************************
G 22 'Intrnl 2' 15.1 3 'Q' 0 'A' 0.10
4
4
2.06 0.030 1997 5750 0.030 1997
88.96 5.90928 0.37
14
1    1    1    1    0 0.44  0
0.21 0.42 0.42 1
200  0    21.0 1000 0.03 1997
**********************************************
G 23 'Intrnl 3' 18.9 3 'Q' 0 'A' 0.11
4
4
2.06 0.030 1997 5750 0.030 1997
91.76 7.94660 0.12
14
1    1    1    1    0 0.44  0
0.21 0.42 0.42 1
200  0    23.0 1000 0.03 1997
*
************** Emergency Purchase ***********
*
PR 998 'EMERG PURCH' 150 0  ' ' 0  'A' 0
999.0 0.035 1996
*
*****************************************************************************
*                                 Healy                                     *
*****************************************************************************
```

```
* Begin data for third area (see above description for area 2)
*
AREA
'Healy'
'/u/jurotich/shave/healy.shv'
  0  0  0  0  0  0  0
* Connectivity data (see accompanying diagram)
* Area number this area connects with
* |  Number of tie lines in connection path
* |  |     Tie line numbers (in order from this area to connected area)
* |  |     |
  1  2     4 2
  2  1     4
  4  1     5
*
************** EXISTING GENERATION **********
G 36 'Healy 1' 25 3 'M' 0 'A' 0.09
7
3.11  0.03  1996
10.87 0.030 1996 94657 0.030 1996
95.738 7.998 0.0867
2 7 0115 10 0615
1   1  1  1    0.46 0.37    0
6.5 13 13 1
200 0  20 1000 0.03 1997
**********************************************
G 37 'Healy D1' 2.6 0.5 ' ' 0 'A' 0.05
3.20  0.03  1997
3.20  0.03  1997
8.00 0.030 1996 22655 0.030 1996
0 14.00 0
2 7 0215 10 0601
1     1    1    1   0.84 0.76   0
0.025 0.05 0.05 1
200   0    0    500 0.03    1997
**********************************************
G 38 'HCCP' 53 10 'M' 0 'A' 0.10
5
3.11  0.03  1996
10.00 0.03 1997 63800 0.03 1997
80.138 7.9918 0.0434
20
1   1    1  1    0.3 0.35   0
3   8    4  1
200 1112 0  1000 0.03   1997
*
*****************************************************************************
*                            Fairbanks Area                                 *
*****************************************************************************
* Begin data for fourth area (see above description for area 2)
*
AREA
'Fairbanks'
'/u/jurotich/shave/gvea.shv'
  0  0  0  10  0  80  0
  * Connectivity data (see accompanying diagram)
* Area number this area connects with
* |  Number of tie lines in connection path
* |  |     Tie line numbers (in order from this area to connected area)
* |  |     |
  1  3     6 4 2
  2  2     6 4
  3  1     6
*
************** EXISTING GENERATION **********
G 30 'Zehnder EMD5' 2.6 0.5 ' ' 0 'A' 0.01
3.31  0.03  1997
3.31  0.03  1997
8.00 0.030 1996 8199 0.030 1996
0 14.00 0
```

```
0
1     1    1    1   0.84 0.76   0
0.035 0.07 0.07 1
200   0    0    500 0.03    1997
**********************************************
G 31 'Zehnder EMD6' 2.6 0.5 ' ' 0 'A' 0.01
3.31  0.03  1997
3.31  0.03  1997
8.00 0.030 1996 8199 0.030 1996
0 14.00 0
0
1     1    1    1   0.84 0.76   0
0.035 0.07 0.07 1
200   0    0    500 0.03    1997
**********************************************
G 32 'Zehnder GT1' 18 6 'Q' 0 'A' 0.01
3.31  0.03  1997
3.31  0.03  1997
5.21 0.030 1996 7618 0.030 1996
97.72 6.2534 0.1599
2 3 0415 3 1001
1    1    1    1    0.84 0.76   0
0.15 0.30 0.30 1
200  0    20   1000 0.03    1997
**********************************************
G 33 'Zehnder GT2' 18 6 'Q' 0 'A' 0.01
3.31  0.03  1997
3.31  0.03  1997
5.21 0.030 1996 7618 0.030 1996
97.72 6.253401 0.1599
2 3 0401 3 1015
1    1    1    1    0.84 0.76   0
0.15 0.30 0.30 1
200  0    20   1000 0.03    1997
**********************************************
G 34 'North Pole 1' 64 5 ' ' 0 'A' 0.05
3.09  0.03  1997
3.09  0.03  1997
4.66 0.030 1996 5167 0.030 1996
167.46 5.022 0.033
2 3 0515 3 1101
1     1    6    6    0.89 0.73  0
0.365 0.73 0.73 1
200   0    30   1600 0.03   1997
**********************************************
G 35 'North Pole 2' 64 5 'Q' 0 'A' 0.08
3.09  0.03  1997
3.09  0.03  1997
4.66 0.030 1996 5167 0.030 1996
181.74 4.5092 0.0282
2 3 0501 3 1115
1     1    6    6    0.89 0.73  0
0.365 0.73 0.73 1
200   0    30   1600 0.03   1997
**********************************************
G 39 'Chena 6' 29.3 10  'Q' 0 'U' 0.05
3.40 0.03 1996
3.40 0.03 1996
0.30 0.030 1997 9000 0.030 1997
72.972 8.8103 0.014
1 15 0501
1    1    4    0   0.02 0.12  0
0.15 0.30 0.30 1
200  0    26.3    1000 0.03 1997
**********************************************
G 40 'SILOS' 70 0.5 'Q' 274 'A' 0.0
100.00  0.03  1996
100.00  0.03  1996
10.00 0.030 1996 0 0.030 1996
0 10.000 0
```

```
0
1 1 1 1 0 0 0
0 0 0 1
0 0 0 0 0 0
*
************** Emergency Purchase ***********
*
PR 999 'EMERG PURCH' 150 0  ' ' 0  'A' 0
999.0 0.035 1996
*
*
PRICES
*
*****************************************************************************
*                Annual Fuel Price & Purchase Price Table                   *
*****************************************************************************
*                                New Plant                                  *
*       ML&P &                   Soldotna                                   *
*       Joint   Beluga  Bernice & Intn'l HCCP   Aurora  Healy               *
*       NGas    NGas    NGas    NGas     Coal   Purch.  Coal                *
*       $/MBtu  $/MBtu  $/MBtu  $/MBtu   $/MBtu $/MWh   $/MBtu              *
*****************************************************************************
1996    1.86    1.17    1.38    1.98     0.00   00.00   1.36
1997    1.74    1.46    1.50    2.25     0.60   00.00   1.39
1998    1.97    1.69    1.70    2.05     0.62   40.00   1.02
1999    2.01    1.73    1.75    2.10     0.65   40.00   0.94
2000    2.06    1.78    1.80    2.15     0.67   37.00   0.97
2001    2.12    1.84    1.85    2.20     0.70   37.00   0.99
2002    2.16    1.88    1.90    2.25     0.76   37.93   1.05
2003    2.22    1.94    1.95    2.30     0.77   38.87   1.07
2004    2.27    1.99    2.00    2.35     0.79   39.84   1.09
2005    2.33    2.05    2.06    2.41     0.80   40.84   1.11
2006    2.39    2.11    2.12    2.47     0.82   41.86   1.13
2007    2.44    2.16    2.18    2.53     0.83   42.91   1.16
2008    2.50    2.22    2.24    2.59     0.85   43.98   1.18
2009    2.57    2.29    2.30    2.65     0.87   45.08   1.20
2010    2.63    2.35    2.37    2.72     0.88   46.21   1.22
2011    2.70    2.42    2.44    2.79     0.90   47.36   1.25
2012    2.77    2.49    2.50    2.85     0.92   48.55   1.27
2013    2.84    2.56    2.57    2.92     0.93   49.76   1.29
2014    2.91    2.63    2.65    3.00     0.95   51.00   1.32
2015    2.98    2.70    2.72    3.07     0.97   52.28   1.34
2016    3.06    2.78    2.80    3.15     0.99   53.59   1.37
2017    3.06    2.78    2.80    3.15     0.99   53.59   1.37
*
*****************************************************************************
*                           Starts & Retirements                            *
*****************************************************************************
*
START  39 1997 1001
START  18 1998 0101
*
*****************************************************************************
*                           Change Mod Section                              *
*****************************************************************************
*
YEAR 1996
DAY 0401
MOD 1  10 14.4
MOD 1  11 14.4
MOD 1  12 60.3
MOD 1  13 59.5
MOD 1  14 68
MOD 1  15 95.5
MOD 1  16 68
MOD 1  17 95.5
MOD 1  18 16.7
MOD 1  19 25.5
MOD 1  20 25.5
MOD 1  21 13.8
```

```
MOD 1  22 13.8
MOD 1  23 16.7
MOD 1  24 35.2
*
YEAR 1996
DAY 1001
MOD 1  10 16.7
MOD 1  11 16.7
MOD 1  12 66.9
MOD 1  13 71
MOD 1  14 74
MOD 1  15 101.5
MOD 1  16 74
MOD 1  17 101.5
MOD 1  18 19.3
MOD 1  19 28
MOD 1  20 28
MOD 1  21 15
MOD 1  22 15.1
MOD 1  23 18.9
MOD 1  24 39
************
YEAR 1997
DAY 0401
MOD 1  10 14.4
MOD 1  11 14.4
MOD 1  12 60.3
MOD 1  13 59.5
MOD 1  14 68
MOD 1  15 95.5
MOD 1  16 68
MOD 1  17 95.5
MOD 1  18 16.7
MOD 1  19 25.5
MOD 1  20 25.5
MOD 1  21 13.8
MOD 1  22 13.8
MOD 1  23 16.7
MOD 1  24 35.2
MOD 1  32 15.7
MOD 1  33 15.7
MOD 1  34 45.9
MOD 1  35 43.8
************
YEAR 1997
DAY 1001
MOD 1  10 16.7
MOD 1  11 16.7
MOD 1  12 66.9
MOD 1  13 71
MOD 1  14 74
MOD 1  15 101.5
MOD 1  16 74
MOD 1  17 101.5
MOD 1  18 19.3
MOD 1  19 28
MOD 1  20 28
MOD 1  21 15
MOD 1  22 15.1
MOD 1  23 18.9
MOD 1  24 39
MOD 1  32 18
MOD 1  33 18
MOD 1  34 56.7
MOD 1  35 59.3
MOD 1  32 18
MOD 1  33 18
MOD 1  34 56.7
MOD 1  35 59.3
************
```

```
YEAR 1998
DAY 0101
MOD 12 17 120
MOD 12 32 92
MOD 12 33 92
************
YEAR 1998
DAY 0401
MOD 1  10 14.4
MOD 1  11 14.4
MOD 1  12 60.3
MOD 1  13 59.5
MOD 1  14 68
MOD 1  15 95.5
MOD 1  16 68
MOD 1  17 95.5
MOD 1  18 16.7
MOD 1  19 25.5
MOD 1  20 25.5
MOD 1  21 13.8
MOD 1  22 13.8
MOD 1  23 16.7
MOD 1  24 35.2
MOD 1  32 15.7
MOD 1  33 15.7
MOD 1  34 45.9
MOD 1  35 43.8
************
YEAR 1998
DAY 1001
MOD 1  10 16.7
MOD 1  11 16.7
MOD 1  12 66.9
MOD 1  13 71
MOD 1  14 74
MOD 1  15 101.5
MOD 1  16 74
MOD 1  17 101.5
MOD 1  18 19.3
MOD 1  19 28
MOD 1  20 28
MOD 1  21 15
MOD 1  22 15.1
MOD 1  23 18.9
MOD 1  24 39
MOD 1  32 18
MOD 1  33 18
MOD 1  34 56.7
MOD 1  35 59.3
**************
YEAR 1999
DAY 0101
MOD 12 15 119
MOD 12 17 28
MOD 12 32 2 3 0415 3 1001
MOD 12 33 2 3 0401 3 1015
MOD 12 34 92
MOD 12 35 92
************
YEAR 1999
DAY 0401
MOD 1  10 14.4
MOD 1  11 14.4
MOD 1  12 60.3
MOD 1  13 59.5
MOD 1  14 68
MOD 1  15 95.5
MOD 1  16 68
MOD 1  17 95.5
MOD 1  18 16.7
```

```
MOD 1  19 25.5
MOD 1  20 25.5
MOD 1  21 13.8
MOD 1  22 13.8
MOD 1  23 16.7
MOD 1  24 35.2
MOD 1  32 15.7
MOD 1  33 15.7
MOD 1  34 45.9
MOD 1  35 43.8
************
YEAR 1999
DAY 1001
MOD 1  10 16.7
MOD 1  11 16.7
MOD 1  12 66.9
MOD 1  13 71
MOD 1  14 74
MOD 1  15 101.5
MOD 1  16 74
MOD 1  17 101.5
MOD 1  18 19.3
MOD 1  19 28
MOD 1  20 28
MOD 1  21 15
MOD 1  22 15.1
MOD 1  23 18.9
MOD 1  24 39
MOD 1  32 18
MOD 1  33 18
MOD 1  34 56.7
MOD 1  35 59.3
*
*
END
```

```
PARAMETERS  0.50 75
* Optional output title lines as in POWRPRO data
*
T Multi Area Model with Chugach/AEG&T/GVEA
T Uses Power Pool Price Files from the Traditional Scenario
T
*
* Control on printing input echo and/or progress of run to screen (see POWRPRO input
* description - Block 2 Line 1)7
* |     First month of run
* |     |     Number of days to run
* |     |     |    Number of areas to be simulated
* |     |     |    |    Capacity fraction to use for calculaton of commitment priority
* |     |     |    |    |     Enter 1 to have variable o&m included in commitment and
* |     |     |    |    |     dispatch - 0 otherwise
* |     |     |    |    |     |   Output selector (see POWRPRO input description -
* |     |     |    |    |     |   Block 2 Line 1)
* |     |     |    |    |     |   |     Enter the # of areas to calculate the hourly
* |     |     |    |    |     |   |     dispatch incremental, else 0
* |     |     |    |    |     |   |     |   Enter 1 to activate dispatch review option
* |     |     |    |    |     |   |     |   - 0 otherwise
* |     |     |    |    |     |   |     |   |   Enter 1 to have hourly average fuel prices
* |     |     |    |    |     |   |     |   |   written to a file - 0 otherwise
* |     |     |    |    |     |   |     |   |   |   Enter 1 to have annual summary written
* |     |     |    |    |     |   |     |   |   |   to a file - 0 otherwise
* |     |     |    |    |     |   |     |   |   |   |   Enter a unit number here to get
* |     |     |    |    |     |   |     |   |   |   |   it's hourly generation written to
* |     |     |    |    |     |   |     |   |   |   |   a file - 0 otherwise
* |     |     |    |    |     |   |     |   |   |   |   |     _______ These two items are
* |     |     |    |    |     |   |     |   |   |   |   |     |     | not yet implemented
* |     |     |    |    |     |   |     |   |   |   |   |     |     | - enter zeroes
* |     |     |    |    |     |   |     |   |   |   |   |     |     |
 -1000  1     365  4    1.0   1   2     0   0   0   2   0     0     0
*
*  First year to run
*  |
*  |       Last year to run
*  |       |
   2000    2001
*
'/u/jurotich/expansion/ceagvea2.sum'
*
*
*
TIE (code indicating tie line data follow - must be entered as shown - not needed if
*   only one area is simulated)
*
* Tie line number
* | 'From' area
* |  |     'To' area
* |  |     |      Tie line capacity - Mw
* |  |     |      |         a       b: power loss in tie line (mw) = a x Mw + b x Mw**2
* |  |     |      |         |       |   (where Mw = megawatts flowing)
* |  |     |      |         |       |       Wheeling cost ($/Mwh)
* |  |     |      |         |       |       |
*
* Kenai to Anchorage
  1  1     2      75       -0.0015  0.0014  0
  2  2     1      75       -0.0015  0.0014  0
* Anchorage to Healy
  3  2     3      79       -0.0041  0.0008  0
  4  3     2      79       -0.0041  0.0008  0
* Healy to Fairbanks
  5  3     4      140      -0.0059  0.0004  0
  6  4     3      140      -0.0059  0.0004  0
*
*************************************************************************
*                            Kenai Peninsula                            *
*************************************************************************
* Begin data for first area (see below description for area 2)
```

```
*
AREA
'Kenai'
'/u/jurotich/shave/kenai.shv'
   0  0  0  0.1  0  2.9  1
  * Connectivity data (see accompanying diagram)
* Area number this area connects with
* |  Number of tie lines in connection path
* |  |     Tie line numbers (in order from this area to connected area)
* |  |     |
  2  1     1
  3  2     1 3
  4  3     1 3 5
************** EXISTING GENERATION **********
G 18 'Bernice 2' 19.3 3 'Q' 100 'U' 0.05
3
3
2.06 0.030 1997 6500 0.030 1997
82.82 8.77628 0.08
21
1    1   1    1    0 0.44 0
0.15 0.3 0.3  1
200  0   25.0 1000 0.03 1997
**********************************************
G 19 'Bernice 3' 28 3 'Q' 0 'A' 0.07
3
3
2.06 0.030 1997 6500 0.030 1997
104.4 7.83575 0.06
21
1     1    1    1    0 0.44 0
0.165 0.33 0.33 1
200   0    25.0 1000 0.03 1997
**********************************************
G 20 'Bernice 4' 28 7 'Q' 0 'A' 0.05
3
3
2.06 0.030 1997 6500 0.030 1997
102.7 9.3567 0.01
21
1     1    1    1    0 0.44 0
0.165 0.33 0.33 1
200   0    25.0 1000 0 0.03 1997
**********************************************
G 24 'Soldotna 1' 39 6 ' ' 0 'A' 0.01
4
4
2.06 0.030 1997 3300 0.030 1996
136.1 5.571 0.060
14
1     1    6    6    0    0.42 0
0.125 0.25 0.25 1
200   0    45   1000 0.03 1997
*
************** Emergency Purchase ***********
*
PR 997 'EMERG PURCH' 150 0  ' ' 0  'A' 0
999.0 0.035 1996
*
*************************************************************************
*                              Anchorage Area                           *
*************************************************************************
*
*
AREA
*
* area name (maximum of 12 characters enclosed in quotes)
* |
  'Chugach'
* Hourly demands filename for this area (maximum of 48 characters enclosed in quotes)
```

```
* |
 '/u/jurotich/shave/cea2.shv'
 *
* ____These two items are not yet implemented - enter zeroes
* |  |
* |  |  a  b: Spinning reserve requirement for this area = a x demand + b
* |  |  |  |
* |  |  |  |  a  b: Operating reserve requirement for this area = a x demand + b
* |  |  |  |  |  |
* |  |  |  |  |  |   Minimum number of on-line units required for this area
* |  |  |  |  |  |   |
  0  0  0 0.1 0 14.3 0
*
* Connectivity data (see accompanying diagram)
* Area number this area connects with
* |  Number of tie lines in connection path
* |  |     Tie line numbers (in order from this area to connected area)
* |  |     |
  1  1     2
  3  1     3
  4  2     3 5
************** EXISTING GENERATION **********
G 10 'Beluga 1' 16.7 3 'Q ' 0 'A' 0.07
2
2
2.06 0.030 1997 7950 0.030 1997
83.57046 10.856 0.07032
21
1    1    1    1    0 0.44 0
0.15 0.30 0.30 1
200  0    20.0 1000 0.03 1997
************************************************
G 11 'Beluga 2' 16.7 3 'Q ' 0 'A' 0.004
2
2
2.06 0.030 1997 7950 0.030 1997
129.98 8.3371 0.0829
21
1    1    1    1    0 0.44  0
0.15 0.23 0.23 1
200  0    32.0 1000 0.03 1997
***********************************************
G 12 'Beluga 3' 66.9 3 'Q' 0 'A' 0.01
2
2
2.06 0.030 1997 7950 0.030 1997
196.9959 8.4491 0.01243
28
1    1    6   6   0 0.44  0
0.15 0.30 0.30 1
200  0    67.0 1600 0.03 1997
***********************************************
G 13 'Beluga 5' 71 3 'Q' 0 'A' 0.00
2
2
2.06 0.030 1997 7950 0.030 1997
208.6894 7.8766 0.0223
28
1     1    6   6   0 0.44  0
0.185 0.37 0.37 1
200   0    67.0 1600 0.03 1997
***********************************************
G 14 'Beluga 6CT' 74 3 ' ' 0 'U' 0.10
2
2
2.06 0.030 1997 7950 0.030 1997
243.93564 8.525 0.01201
28
1     1    6   6   0 0.44 0
0.185 0.37 0.37 1
```

```
200   0    67.0 3600 0.03 1997
**********************************************
G 15 'Beluga 6-8' 101.5 48 ' ' 0 'A' 0.004
2
2
2.06 0.030 1997 7950 0.030 1997
380.7771 2.6953 0.02882
28
1   1   16   6   0 0.44 0
0.5 1.0 1.0  0.45
200 0   67.0 3600 0.03 1997
**********************************************
G 16 'Beluga 7CT' 74 3 ' ' 0 'U' 0.004
2
2
2.06 0.030 1997 7950 0.030 1997
222.87852 8.3 0.02489
28
1    1    6   6   0 0.44 0
0.21 0.42 0.42 1
200  0    67.0 3600 0.03 1997
**********************************************
G 17 'Beluga 7-8' 101.5 48 ' ' 0 'A' 0.04
2
2
2.06 0.030 1997 7950 0.030 1997
291.9567 4.463 0.01783
28
1   1   16   6   0    0.44 0
0.5 1.0 1.0  0.45
200 0   67.0 3600 0.03 1997
**********************************************
G 21 'Intrnl 1' 15 3 'Q' 0 'A' 0.10
4
4
2.06 0.030 1997 5750 0.030 1997
83.07 8.48275 0.14
14
1    1    1    1    0 0.44  0
0.21 0.42 0.42 1
200  0    21.0 1000 0.03 1997
**********************************************
G 22 'Intrnl 2' 15.1 3 'Q' 0 'A' 0.10
4
4
2.06 0.030 1997 5750 0.030 1997
88.96 5.90928 0.37
14
1    1    1    1    0 0.44  0
0.21 0.42 0.42 1
200  0    21.0 1000 0.03 1997
**********************************************
G 23 'Intrnl 3' 18.9 3 'Q' 0 'A' 0.11
4
4
2.06 0.030 1997 5750 0.030 1997
91.76 7.94660 0.12
14
1    1    1    1    0 0.44  0
0.21 0.42 0.42 1
200  0    23.0 1000 0.03 1997
************** Emergency Purchase ***********
*
PR 998 'EMERG PURCH' 150 0  ' ' 0  'A' 0
999.0 0.035 1996
*
*************************************************************************
*                                Healy                                  *
*************************************************************************
* Begin data for third area (see above description for area 2)
```

```
*
AREA
'Healy'
'/u/jurotich/shave/healy.shv'
  0  0  0  0  0  0  0
* Connectivity data (see accompanying diagram)
* Area number this area connects with
* |  Number of tie lines in connection path
* |  |     Tie line numbers (in order from this area to connected area)
* |  |     |
  1  2     4 2
  2  1     4
  4  1     5
*
************** EXISTING GENERATION **********
G 36 'Healy 1' 25 3 'M' 0 'A' 0.09
7
3.11  0.03  1996
10.87 0.030 1996 94657 0.030 1996
95.738 7.998 0.0867
2 7 0115 10 0615
1   1  1  1    0.46 0.37    0
6.5 13 13 1
200 0  20 1000 0.03 1997
**********************************************
G 37 'Healy D1' 2.6 0.5 ' ' 0 'A' 0.05
3.20  0.03  1997
3.20  0.03  1997
8.00 0.030 1996 22655 0.030 1996
0 14.00 0
2 7 0215 10 0601
1     1    1    1   0.84 0.76   0
0.025 0.05 0.05 1
200   0    0    500 0.03    1997
**********************************************
G 38 'HCCP' 53 10 'M' 0 'A' 0.10
5
3.11  0.03  1996
10.00 0.03 1997 63800 0.03 1997
80.138 7.9918 0.0434
20
1   1    1  1    0.3 0.35   0
3   8    4  1
200 1112 0  1000 0.03   1997
*
*****************************************************************************
*                            Fairbanks Area                                 *
*****************************************************************************
* Begin data for fourth area (see above description for area 2)
*
AREA
'Fairbanks'
'/u/jurotich/shave/gvea.shv'
  0  0  0  10  0  80  0
  * Connectivity data (see accompanying diagram)
* Area number this area connects with
* |  Number of tie lines in connection path
* |  |     Tie line numbers (in order from this area to connected area)
* |  |     |
  1  3     6 4 2
  2  2     6 4
  3  1     6
*
************** EXISTING GENERATION **********
G 30 'Zehnder EMD5' 2.6 0.5 ' ' 0 'A' 0.01
3.31  0.03  1997
3.31  0.03  1997
8.00 0.030 1996 8199 0.030 1996
0 14.00 0
0
```

```
1     1    1    1   0.84 0.76   0
0.035 0.07 0.07 1
200   0    0    500 0.03    1997
**********************************************
G 31 'Zehnder EMD6' 2.6 0.5 ' ' 0 'A' 0.01
3.31  0.03  1997
3.31  0.03  1997
8.00 0.030 1996 8199 0.030 1996
0 14.00 0
0
1     1    1    1   0.84 0.76   0
0.035 0.07 0.07 1
200   0    0    500 0.03    1997
**********************************************
G 32 'Zehnder GT1' 18 6 'Q' 0 'A' 0.01
3.31  0.03  1997
3.31  0.03  1997
5.21 0.030 1996 7618 0.030 1996
97.72 6.2534 0.1599
2 3 0415 3 1001
1    1    1    1    0.84 0.76   0
0.15 0.30 0.30 1
200  0    20   1000 0.03    1997
**********************************************
G 33 'Zehnder GT2' 18 6 'Q' 0 'A' 0.01
3.31  0.03  1997
3.31  0.03  1997
5.21 0.030 1996 7618 0.030 1996
97.72 6.253401 0.1599
2 3 0401 3 1015
1    1    1    1    0.84 0.76   0
0.15 0.30 0.30 1
200  0    20   1000 0.03    1997
**********************************************
G 34 'North Pole 1' 64 5 ' ' 0 'A' 0.05
3.09  0.03  1997
3.09  0.03  1997
4.66 0.030 1996 5167 0.030 1996
167.46 5.022 0.033
2 3 0515 3 1101
1     1    6    6    0.89 0.73  0
0.365 0.73 0.73 1
200   0    30   1600 0.03   1997
**********************************************
G 35 'North Pole 2' 64 5 'Q' 0 'A' 0.08
3.09  0.03  1997
3.09  0.03  1997
4.66 0.030 1996 5167 0.030 1996
181.74 4.5092 0.0282
2 3 0501 3 1115
1     1    6    6    0.89 0.73  0
0.365 0.73 0.73 1
200   0    30   1600 0.03   1997
**********************************************
G 39 'Chena 6' 29.3 10  'Q' 0 'U' 0.05
3.40 0.03 1996
3.40 0.03 1996
0.30 0.030 1997 9000 0.030 1997
72.972 8.8103 0.014
1 15 0501
1    1    4    0   0.02 0.12  0
0.15 0.30 0.30 1
200  0    26.3    1000 0.03 1997
**********************************************
G 40 'SILOS' 70 0.5 'Q' 274 'A' 0.0
100.00  0.03  1996
100.00  0.03  1996
10.00 0.030 1996 0 0.030 1996
0 10.000 0
0
```

```
1 1 1 1 0 0 0
0 0 0 1
0 0 0 0 0 0
*
************** Emergency Purchase ***********
*
PR 999 'EMERG PURCH' 150 0  ' ' 0  'A' 0
999.0 0.035 1996
*
*
PRICES
*
*****************************************************************************
*                Annual Fuel Price & Purchase Price Table                   *
*****************************************************************************
*                                New Plant                                  *
*       ML&P &                   Soldotna                                   *
*       Joint   Beluga  Bernice & Intn'l HCCP   Aurora  Healy               *
*       NGas    NGas    NGas    NGas     Coal   Purch.  Coal                *
*       $/MBtu  $/MBtu  $/MBtu  $/MBtu   $/MBtu $/MWh   $/MBtu              *
*****************************************************************************
1996    1.86    1.17    1.38    1.98     0.00   00.00   1.36
1997    1.74    1.46    1.50    2.25     0.60   00.00   1.39
1998    1.97    1.69    1.70    2.05     0.62   40.00   1.02
1999    2.01    1.73    1.75    2.10     0.65   40.00   0.94
2000    2.06    1.78    1.80    2.15     0.67   37.00   0.97
2001    2.12    1.84    1.85    2.20     0.70   37.00   0.99
2002    2.16    1.88    1.90    2.25     0.76   37.93   1.05
2003    2.22    1.94    1.95    2.30     0.77   38.87   1.07
2004    2.27    1.99    2.00    2.35     0.79   39.84   1.09
2005    2.33    2.05    2.06    2.41     0.80   40.84   1.11
2006    2.39    2.11    2.12    2.47     0.82   41.86   1.13
2007    2.44    2.16    2.18    2.53     0.83   42.91   1.16
2008    2.50    2.22    2.24    2.59     0.85   43.98   1.18
2009    2.57    2.29    2.30    2.65     0.87   45.08   1.20
2010    2.63    2.35    2.37    2.72     0.88   46.21   1.22
2011    2.70    2.42    2.44    2.79     0.90   47.36   1.25
2012    2.77    2.49    2.50    2.85     0.92   48.55   1.27
2013    2.84    2.56    2.57    2.92     0.93   49.76   1.29
2014    2.91    2.63    2.65    3.00     0.95   51.00   1.32
2015    2.98    2.70    2.72    3.07     0.97   52.28   1.34
2016    3.06    2.78    2.80    3.15     0.99   53.59   1.37
2017    3.06    2.78    2.80    3.15     0.99   53.59   1.37
*
*****************************************************************************
*                            Starts & Retirements                           *
*****************************************************************************
*
START  39 1997 1001
*********************
START  18 1998 0101
*********************
RETIRE 15 2001 0430
RETIRE 17 2001 0430
START  14 2001 0501
START  16 2001 0501
RETIRE 14 2001 0731
RETIRE 16 2001 0731
START  15 2001 0801
START  17 2001 0801
*
*****************************************************************************
*                            Change Mod Section                             *
*****************************************************************************
*
YEAR 1999
DAY 0101
MOD 12 15 119
MOD 12 17 28
MOD 12 32 2 3 0415 3 1001
```

```
MOD 12 33 2 3 0401 3 1015
MOD 12 34 92
MOD 12 35 92
************
YEAR 1999
DAY 0401
MOD 1  10 14.4
MOD 1  11 14.4
MOD 1  12 60.3
MOD 1  13 59.5
MOD 1  14 68
MOD 1  15 95.5
MOD 1  16 68
MOD 1  17 95.5
MOD 1  18 16.7
MOD 1  19 25.5
MOD 1  20 25.5
MOD 1  21 13.8
MOD 1  22 13.8
MOD 1  23 16.7
MOD 1  24 35.2
MOD 1  32 15.7
MOD 1  33 15.7
MOD 1  34 45.9
MOD 1  35 43.8
************
YEAR 1999
DAY 1001
MOD 1  10 16.7
MOD 1  11 16.7
MOD 1  12 66.9
MOD 1  13 71
MOD 1  14 74
MOD 1  15 101.5
MOD 1  16 74
MOD 1  17 101.5
MOD 1  18 19.3
MOD 1  19 28
MOD 1  20 28
MOD 1  21 15
MOD 1  22 15.1
MOD 1  23 18.9
MOD 1  24 39
MOD 1  32 18
MOD 1  33 18
MOD 1  34 56.7
MOD 1  35 59.3
************
YEAR 2000
DAY 0101
MOD 12 15 28
MOD 12 24 45
MOD 12 34 2 3 0515 3 1101
MOD 12 35 2 3 0501 3 1115
MOD 12 36 92
************
YEAR 2000
DAY 0401
MOD 1  10 14.4
MOD 1  11 14.4
MOD 1  12 60.3
MOD 1  13 59.5
MOD 1  14 68
MOD 1  15 95.5
MOD 1  16 68
MOD 1  17 95.5
MOD 1  18 16.7
MOD 1  19 25.5
MOD 1  20 25.5
MOD 1  21 13.8
```

```
MOD 1  22 13.8
MOD 1  23 16.7
MOD 1  24 35.2
MOD 1  32 15.7
MOD 1  33 15.7
MOD 1  34 45.9
MOD 1  35 43.8
************
YEAR 2000
DAY 1001
MOD 1  10 16.7
MOD 1  11 16.7
MOD 1  12 66.9
MOD 1  13 71
MOD 1  14 74
MOD 1  15 101.5
MOD 1  16 74
MOD 1  17 101.5
MOD 1  18 19.3
MOD 1  19 28
MOD 1  20 28
MOD 1  21 15
MOD 1  22 15.1
MOD 1  23 18.9
MOD 1  24 39
MOD 1  32 18
MOD 1  33 18
MOD 1  34 56.7
MOD 1  35 59.3
**************
YEAR 2001
DAY 0101
MOD 12 24 14
MOD 12 15 0
MOD 12 17 0
MOD 12 36 2 7 0115 10 0615
************
YEAR 2001
DAY 0401
MOD 1  10 14.4
MOD 1  11 14.4
MOD 1  12 60.3
MOD 1  13 59.5
MOD 1  14 68
MOD 1  15 95.5
MOD 1  16 68
MOD 1  17 95.5
MOD 1  18 16.7
MOD 1  19 25.5
MOD 1  20 25.5
MOD 1  21 13.8
MOD 1  22 13.8
MOD 1  23 16.7
MOD 1  24 35.2
MOD 1  32 15.7
MOD 1  33 15.7
MOD 1  34 45.9
MOD 1  35 43.8
************
YEAR 2001
DAY 1001
MOD 1  10 16.7
MOD 1  11 16.7
MOD 1  12 66.9
MOD 1  13 71
MOD 1  14 74
MOD 1  15 101.5
MOD 1  16 74
MOD 1  17 101.5
MOD 1  18 19.3
```

```
MOD 1  19 28
MOD 1  20 28
MOD 1  21 15
MOD 1  22 15.1
MOD 1  23 18.9
MOD 1  24 39
MOD 1  32 18
MOD 1  33 18
MOD 1  34 56.7
MOD 1  35 59.3
************
YEAR 2002
DAY 0101
MOD 12 15 28
MOD 12 17 28
************
YEAR 2002
DAY 0401
MOD 1  10 14.4
MOD 1  11 14.4
MOD 1  12 60.3
MOD 1  13 59.5
MOD 1  14 68
MOD 1  15 95.5
MOD 1  16 68
MOD 1  17 95.5
MOD 1  18 16.7
MOD 1  19 25.5
MOD 1  20 25.5
MOD 1  21 13.8
MOD 1  22 13.8
MOD 1  23 16.7
MOD 1  24 35.2
MOD 1  32 15.7
MOD 1  33 15.7
MOD 1  34 45.9
MOD 1  35 43.8
************
YEAR 2002
DAY 1001
MOD 1  10 16.7
MOD 1  11 16.7
MOD 1  12 66.9
MOD 1  13 71
MOD 1  14 74
MOD 1  15 101.5
MOD 1  16 74
MOD 1  17 101.5
MOD 1  18 19.3
MOD 1  19 28
MOD 1  20 28
MOD 1  21 15
MOD 1  22 15.1
MOD 1  23 18.9
MOD 1  24 39
MOD 1  32 18
MOD 1  33 18
MOD 1  34 56.7
MOD 1  35 59.3
************
YEAR 2003
DAY 0101
MOD 12 17 119
MOD 12 24 30
MOD 12 34 92
MOD 12 35 92
************
YEAR 2003
DAY 0401
MOD 1  10 14.4
```

```
MOD 1  11 14.4
MOD 1  12 60.3
MOD 1  13 59.5
MOD 1  14 68
MOD 1  15 95.5
MOD 1  16 68
MOD 1  17 95.5
MOD 1  18 16.7
MOD 1  19 25.5
MOD 1  20 25.5
MOD 1  21 13.8
MOD 1  22 13.8
MOD 1  23 16.7
MOD 1  24 35.2
MOD 1  32 15.7
MOD 1  33 15.7
MOD 1  34 45.9
MOD 1  35 43.8
************
YEAR 2003
DAY 1001
MOD 1  10 16.7
MOD 1  11 16.7
MOD 1  12 66.9
MOD 1  13 71
MOD 1  14 74
MOD 1  15 101.5
MOD 1  16 74
MOD 1  17 101.5
MOD 1  18 19.3
MOD 1  19 28
MOD 1  20 28
MOD 1  21 15
MOD 1  22 15.1
MOD 1  23 18.9
MOD 1  24 39
MOD 1  32 18
MOD 1  33 18
MOD 1  34 56.7
MOD 1  35 59.3
*
*
END
```

```
PARAMETERS  0.50 75
* Optional output title lines as in POWRPRO data
*
T Multi Area Model with Chugach/AEG&T/GVEA
T Uses Power Pool Price Files from the Traditional Scenario
T
*
* Control on printing input echo and/or progress of run to screen (see POWRPRO input
* description - Block 2 Line 1)
* |     First month of run
* |     |     Number of days to run
* |     |     |    Number of areas to be simulated
* |     |     |    |    Capacity fraction to use for calculaton of commitment priority
* |     |     |    |    |     Enter 1 to have variable o&m included in commitment and
* |     |     |    |    |     dispatch - 0 otherwise
* |     |     |    |    |     |   Output selector (see POWRPRO input description -
* |     |     |    |    |     |   Block 2 Line 1)
* |     |     |    |    |     |   |     Enter the # of areas to calculate the hourly
* |     |     |    |    |     |   |     dispatch incremental, else 0
* |     |     |    |    |     |   |     |   Enter 1 to activate dispatch review option
* |     |     |    |    |     |   |     |   - 0 otherwise
* |     |     |    |    |     |   |     |   |   Enter 1 to have hourly average fuel prices
* |     |     |    |    |     |   |     |   |   written to a file - 0 otherwise
* |     |     |    |    |     |   |     |   |   |   Enter 1 to have annual summary written
* |     |     |    |    |     |   |     |   |   |   to a file - 0 otherwise
* |     |     |    |    |     |   |     |   |   |   |   Enter a unit number here to get
* |     |     |    |    |     |   |     |   |   |   |   it's hourly generation written to
* |     |     |    |    |     |   |     |   |   |   |   a file - 0 otherwise
* |     |     |    |    |     |   |     |   |   |   |   |     _______ These two items are
* |     |     |    |    |     |   |     |   |   |   |   |     |     | not yet implemented
* |     |     |    |    |     |   |     |   |   |   |   |     |     | - enter zeroes
* |     |     |    |    |     |   |     |   |   |   |   |     |     |
 -1000  1     365  4    1.0   1   2     0   0   0   2   0     0     0
*
*  First year to run
*  |
*  |       Last year to run
*  |       |
   2002    2008
*
'/u/jurotich/expansion/ceagvea3.sum'
*
*
*
TIE (code indicating tie line data follow - must be entered as shown - not needed if
*   only one area is simulated)
*
* Tie line number
* | 'From' area
* |  |     'To' area
* |  |     |      Tie line capacity - Mw
* |  |     |      |         a       b: power loss in tie line (mw) = a x Mw + b x Mw**2
* |  |     |      |         |       |   (where Mw = megawatts flowing)
* |  |     |      |         |       |       Wheeling cost ($/Mwh)
* |  |     |      |         |       |       |
*
* Kenai to Anchorage
  1  1     2      145       0.0093  0.0003  0
  2  2     1      145       0.0093  0.0003  0
* Anchorage to Healy
  3  2     3      79       -0.0041  0.0008  0
  4  3     2      79       -0.0041  0.0008  0
* Healy to Fairbanks
  5  3     4      140      -0.0059  0.0004  0
  6  4     3      140      -0.0059  0.0004  0
*
***************************************************************************
*                            Kenai Peninsula                              *
***************************************************************************
* Begin data for first area (see below description for area 2)
```

```
*
AREA
'Kenai'
'/u/jurotich/shave/kenai.shv'
   0  0  0  0.1  0  2.9  1
  * Connectivity data (see accompanying diagram)
* Area number this area connects with
* |  Number of tie lines in connection path
* |  |     Tie line numbers (in order from this area to connected area)
* |  |     |
  2  1     1
  3  2     1 3
  4  3     1 3 5
************** EXISTING GENERATION **********
G 18 'Bernice 2' 19.3 3 'Q' 100 'U' 0.05
3
3
2.06 0.030 1997 6500 0.030 1997
82.82 8.77628 0.08
21
1    1   1    1    0 0.44 0
0.15 0.3 0.3  1
200  0   25.0 1000 0.03 1997
**********************************************
G 19 'Bernice 3' 28 3 'Q' 0 'A' 0.07
3
3
2.06 0.030 1997 6500 0.030 1997
104.4 7.83575 0.06
21
1     1    1    1    0 0.44 0
0.165 0.33 0.33 1
200   0    25.0 1000 0.03 1997
**********************************************
G 20 'Bernice 4' 28 7 'Q' 0 'A' 0.05
3
3
2.06 0.030 1997 6500 0.030 1997
102.7 9.3567 0.01
21
1     1    1    1    0 0.44 0
0.165 0.33 0.33 1
200   0    25.0 1000 0 0.03 1997
**********************************************
G 24 'Soldotna 1' 39 6 ' ' 0 'A' 0.01
4
4
2.06 0.030 1997 3300 0.030 1996
136.1 5.571 0.060
14
1     1    6    6    0    0.42 0
0.125 0.25 0.25 1
200   0    45   1000 0.03 1997
*
************** Emergency Purchase ***********
*
PR 997 'EMERG PURCH' 150 0  ' ' 0  'A' 0
999.0 0.035 1996
*
*************************************************************************
*                              Anchorage Area                           *
*************************************************************************
*
*
AREA
*
* area name (maximum of 12 characters enclosed in quotes)
* |
  'Chugach'
* Hourly demands filename for this area (maximum of 48 characters enclosed in quotes)
```

```
* |
 '/u/jurotich/shave/cea2.shv'
 *
* ____These two items are not yet implemented - enter zeroes
* |  |
* |  |  a  b: Spinning reserve requirement for this area = a x demand + b
* |  |  |  |
* |  |  |  |   a  b: Operating reserve requirement for this area = a x demand + b
* |  |  |  |   |  |
* |  |  |  |   |  |   Minimum number of on-line units required for this area
* |  |  |  |   |  |   |
  0  0  0  0.1 0  14.3 0
*
* Connectivity data (see accompanying diagram)
* Area number this area connects with
* |  Number of tie lines in connection path
* |  |     Tie line numbers (in order from this area to connected area)
* |  |     |
  1  1     2
  3  1     3
  4  2     3 5
************** EXISTING GENERATION **********
G 10 'Beluga 1' 16.7 3 'Q ' 0 'A' 0.07
2
2
2.06 0.030 1997 7950 0.030 1997
83.57046 10.856 0.07032
21
1    1    1    1    0 0.44 0
0.15 0.30 0.30 1
200  0    20.0 1000 0.03 1997
************************************************
G 11 'Beluga 2' 16.7 3 'Q ' 0 'A' 0.004
2
2
2.06 0.030 1997 7950 0.030 1997
129.98 8.3371 0.0829
21
1    1    1    1    0 0.44  0
0.15 0.23 0.23 1
200  0    32.0 1000 0.03 1997
***********************************************
G 12 'Beluga 3' 66.9 3 'Q' 0 'A' 0.01
2
2
2.06 0.030 1997 7950 0.030 1997
196.9959 8.4491 0.01243
28
1    1    6   6   0 0.44  0
0.15 0.30 0.30 1
200  0    67.0 1600 0.03 1997
***********************************************
G 13 'Beluga 5' 71 3 'Q' 0 'A' 0.00
2
2
2.06 0.030 1997 7950 0.030 1997
208.6894 7.8766 0.0223
28
1     1    6   6   0 0.44  0
0.185 0.37 0.37 1
200   0    67.0 1600 0.03 1997
***********************************************
G 14 'Beluga 6CT' 74 3 ' ' 0 'U' 0.10
2
2
2.06 0.030 1997 7950 0.030 1997
243.93564 8.525 0.01201
28
1     1    6   6   0 0.44 0
0.185 0.37 0.37 1
```

```
200   0    67.0 3600 0.03 1997
**********************************************
G 15 'Beluga 6-8' 101.5 48 ' ' 0 'A' 0.004
2
2
2.06 0.030 1997 7950 0.030 1997
380.7771 2.6953 0.02882
28
1   1   16   6   0 0.44 0
0.5 1.0 1.0  0.45
200 0   67.0 3600 0.03 1997
**********************************************
G 16 'Beluga 7CT' 74 3 ' ' 0 'U' 0.004
2
2
2.06 0.030 1997 7950 0.030 1997
222.87852 8.3 0.02489
28
1    1    6   6   0 0.44 0
0.21 0.42 0.42 1
200  0    67.0 3600 0.03 1997
**********************************************
G 17 'Beluga 7-8' 101.5 48 ' ' 0 'A' 0.04
2
2
2.06 0.030 1997 7950 0.030 1997
291.9567 4.463 0.01783
28
1   1   16   6   0    0.44 0
0.5 1.0 1.0  0.45
200 0   67.0 3600 0.03 1997
**********************************************
G 21 'Intrnl 1' 15 3 'Q' 0 'A' 0.10
4
4
2.06 0.030 1997 5750 0.030 1997
83.07 8.48275 0.14
14
1    1    1    1    0 0.44  0
0.21 0.42 0.42 1
200  0    21.0 1000 0.03 1997
**********************************************
G 22 'Intrnl 2' 15.1 3 'Q' 0 'A' 0.10
4
4
2.06 0.030 1997 5750 0.030 1997
88.96 5.90928 0.37
14
1    1    1    1    0 0.44  0
0.21 0.42 0.42 1
200  0    21.0 1000 0.03 1997
**********************************************
G 23 'Intrnl 3' 18.9 3 'Q' 0 'A' 0.11
4
4
2.06 0.030 1997 5750 0.030 1997
91.76 7.94660 0.12
14
1    1    1    1    0 0.44  0
0.21 0.42 0.42 1
200  0    23.0 1000 0.03 1997
**********************************************
G 25 'LM6000 Chug' 40.5 10 ' ' 0 'U' 0.05
4
4
2.06 0.030 1997 7950 0.030 1997
97.797 6.1712 0.0382
28
1   1   1   1    0    0.42 0
1.5 3.5 3.5 1
```

```
200 0   43  750 0.03 1997
********************************************** Upgraded Units 6 & 7 ***
G 26 'Beluga 6CT' 78.4 3 ' ' 0 'U' 0.10
2
2
2.06 0.030 1997 7950 0.030 1997
228.0798 7.971 0.0112
28
1     1    99   24   0 0.44 0
0.185 0.37 0.37 1
200   0    67.0 3600 0.03 1997
**********************************************
G 27 'Beluga 6-8' 105.5 48 ' ' 0 'U' 0.004
2
2
2.06 0.030 1997 7950 0.030 1997
356.027 2.52 0.0308
28
1   1   99   99   0 0.44 0
0.5 1.0 1.0  0.45
200 0   67.0 3600 0.03 1997
**********************************************
G 28 'Beluga 7CT' 78.4 3 ' ' 0 'U' 0.004
2
2
2.06 0.030 1997 7950 0.030 1997
208.39 7.7605 0.2327
28
1    1    99   24   0 0.44 0
0.21 0.42 0.42 1
200  0    67.0 3600 0.03 1997
**********************************************
G 29 'Beluga 7-8' 105.5 48 ' ' 0 'U' 0.04
2
2
2.06 0.030 1997 7950 0.030 1997
272.9795 4.173 0.01667
28
1   1   99   99   0    0.44 0
0.5 1.0 1.0  0.45
200 0   67.0 3600 0.03 1997
*
************** Emergency Purchase ***********
*
PR 998 'EMERG PURCH' 150 0  ' ' 0  'A' 0
999.0 0.035 1996
*
*****************************************************************************
*                                 Healy                                     *
*****************************************************************************
* Begin data for third area (see above description for area 2)
*
AREA
'Healy'
'/u/jurotich/shave/healy.shv'
  0  0  0  0  0  0  0
* Connectivity data (see accompanying diagram)
* Area number this area connects with
* |  Number of tie lines in connection path
* |  |     Tie line numbers (in order from this area to connected area)
* |  |     |
  1  2     4 2
  2  1     4
  4  1     5
*
************** EXISTING GENERATION **********
G 36 'Healy 1' 25 3 'M' 0 'A' 0.09
7
3.11  0.03  1996
10.87 0.030 1996 94657 0.030 1996
```

```
95.738 7.998 0.0867
2 7 0115 10 0615
1   1  1  1    0.46 0.37    0
6.5 13 13 1
200 0  20 1000 0.03 1997
**********************************************
G 37 'Healy D1' 2.6 0.5 ' ' 0 'A' 0.05
3.20  0.03  1997
3.20  0.03  1997
8.00 0.030 1996 22655 0.030 1996
0 14.00 0
2 7 0215 10 0601
1     1    1    1   0.84 0.76   0
0.025 0.05 0.05 1
200   0    0    500 0.03    1997
**********************************************
G 38 'HCCP' 53 10 'M' 0 'A' 0.10
5
3.11  0.03  1996
10.00 0.03 1997 63800 0.03 1997
80.138 7.9918 0.0434
20
1   1    1  1    0.3 0.35   0
3   8    4  1
200 1112 0  1000 0.03   1997
*
*************************************************************************
*                            Fairbanks Area                             *
*************************************************************************
* Begin data for fourth area (see above description for area 2)
*
AREA
'Fairbanks'
'/u/jurotich/shave/gvea.shv'
  0  0  0  10  0  80  0
  * Connectivity data (see accompanying diagram)
* Area number this area connects with
* |  Number of tie lines in connection path
* |  |     Tie line numbers (in order from this area to connected area)
* |  |     |
  1  3     6 4 2
  2  2     6 4
  3  1     6
*
************** EXISTING GENERATION **********
G 30 'Zehnder EMD5' 2.6 0.5 ' ' 0 'A' 0.01
3.31  0.03  1997
3.31  0.03  1997
8.00 0.030 1996 8199 0.030 1996
0 14.00 0
0
1     1    1    1   0.84 0.76   0
0.035 0.07 0.07 1
200   0    0    500 0.03    1997
**********************************************
G 31 'Zehnder EMD6' 2.6 0.5 ' ' 0 'A' 0.01
3.31  0.03  1997
3.31  0.03  1997
8.00 0.030 1996 8199 0.030 1996
0 14.00 0
0
1     1    1    1   0.84 0.76   0
0.035 0.07 0.07 1
200   0    0    500 0.03    1997
**********************************************
G 32 'Zehnder GT1' 18 6 'Q' 0 'A' 0.01
3.31  0.03  1997
3.31  0.03  1997
5.21 0.030 1996 7618 0.030 1996
97.72 6.2534 0.1599
```

```
2 3 0415 3 1001
1    1    1    1    0.84 0.76   0
0.15 0.30 0.30 1
200  0    20   1000 0.03    1997
**********************************************
G 33 'Zehnder GT2' 18 6 'Q' 0 'A' 0.01
3.31  0.03  1997
3.31  0.03  1997
5.21 0.030 1996 7618 0.030 1996
97.72 6.253401 0.1599
2 3 0401 3 1015
1    1    1    1    0.84 0.76   0
0.15 0.30 0.30 1
200  0    20   1000 0.03    1997
**********************************************
G 34 'North Pole 1' 64 5 ' ' 0 'A' 0.05
3.09  0.03  1997
3.09  0.03  1997
4.66 0.030 1996 5167 0.030 1996
167.46 5.022 0.033
2 3 0515 3 1101
1     1    6    6    0.89 0.73  0
0.365 0.73 0.73 1
200   0    30   1600 0.03   1997
**********************************************
G 35 'North Pole 2' 64 5 'Q' 0 'A' 0.08
3.09  0.03  1997
3.09  0.03  1997
4.66 0.030 1996 5167 0.030 1996
181.74 4.5092 0.0282
2 3 0501 3 1115
1     1    6    6    0.89 0.73  0
0.365 0.73 0.73 1
200   0    30   1600 0.03   1997
**********************************************
G 39 'Chena 6' 29.3 10  'Q' 0 'U' 0.05
3.40 0.03 1996
3.40 0.03 1996
0.30 0.030 1997 9000 0.030 1997
72.972 8.8103 0.014
1 15 0501
1    1    4    0   0.02 0.12  0
0.15 0.30 0.30 1
200  0    26.3    1000 0.03 1997
**********************************************
G 40 'SILOS' 70 0.5 'Q' 274 'A' 0.0
100.00  0.03  1996
100.00  0.03  1996
10.00 0.030 1996 0 0.030 1996
0 10.000 0
0
1 1 1 1 0 0 0
0 0 0 1
0 0 0 0 0 0
*****************************************OGEM***
G 204  'GE 7EA SC'  83 10  ' ' 0  'U'  0.05
3.11 0.03 1998
3.11 0.03 1998
3.03  0.03  1998 4400  0.03  1998
243.93 6.0178 0.0333
17
1 1 1 1 0 0.5 0
1.5 3.5 24 1
200 138.0 0 1000 0.03 1998
*****************************************OGEM***
G 207  'GE 7EA 1x1'  128 45  ' ' 0  'U'  0.05
3.11 0.03 1998
3.11 0.03 1998
2.63  0.03  1998 11720  0.03  1998
233.599 5.8424 0
```

```
17
1 1 16 6 0 0.5 0
2 4 24 1
200 56.0 0 1000 0.03 1998
*
************** Emergency Purchase ***********
*
PR 999 'EMERG PURCH' 150 0  ' ' 0  'A' 0
999.0 0.035 1996
*
*
PRICES
*
*****************************************************************************
*                Annual Fuel Price & Purchase Price Table                   *
*****************************************************************************
*                                New Plant                                  *
*       ML&P &                   Soldotna                                   *
*       Joint   Beluga  Bernice & Intn'l HCCP   Aurora  Healy               *
*       NGas    NGas    NGas    NGas     Coal   Purch.  Coal                *
*       $/MBtu  $/MBtu  $/MBtu  $/MBtu   $/MBtu $/MWh   $/MBtu              *
*****************************************************************************
1996    1.86    1.17    1.38    1.98     0.00   00.00   1.36
1997    1.74    1.46    1.50    2.25     0.60   00.00   1.39
1998    1.97    1.69    1.70    2.05     0.62   40.00   1.02
1999    2.01    1.73    1.75    2.10     0.65   40.00   0.94
2000    2.06    1.78    1.80    2.15     0.67   37.00   0.97
2001    2.12    1.84    1.85    2.20     0.70   37.00   0.99
2002    2.16    1.88    1.90    2.25     0.76   37.93   1.05
2003    2.22    1.94    1.95    2.30     0.77   38.87   1.07
2004    2.27    1.99    2.00    2.35     0.79   39.84   1.09
2005    2.33    2.05    2.06    2.41     0.80   40.84   1.11
2006    2.39    2.11    2.12    2.47     0.82   41.86   1.13
2007    2.44    2.16    2.18    2.53     0.83   42.91   1.16
2008    2.50    2.22    2.24    2.59     0.85   43.98   1.18
2009    2.57    2.29    2.30    2.65     0.87   45.08   1.20
2010    2.63    2.35    2.37    2.72     0.88   46.21   1.22
2011    2.70    2.42    2.44    2.79     0.90   47.36   1.25
2012    2.77    2.49    2.50    2.85     0.92   48.55   1.27
2013    2.84    2.56    2.57    2.92     0.93   49.76   1.29
2014    2.91    2.63    2.65    3.00     0.95   51.00   1.32
2015    2.98    2.70    2.72    3.07     0.97   52.28   1.34
2016    3.06    2.78    2.80    3.15     0.99   53.59   1.37
2017    3.06    2.78    2.80    3.15     0.99   53.59   1.37
*
*****************************************************************************
*                           Starts & Retirements                            *
*****************************************************************************
*
START  39 1997 1001
*********************
START  18 1998 0101
*********************
RETIRE 15 2001 0430
RETIRE 17 2001 0430
START  14 2001 0501
START  16 2001 0501
RETIRE 14 2001 0731
RETIRE 16 2001 0731
START  15 2001 0801
START  17 2001 0801
*********************
RETIRE 16 2003 1231
RETIRE 17 2003 1231
*********************
START 204 2004 0101
START  29 2004 0101
RETIRE 14 2004 1231
RETIRE 15 2004 1231
*********************
```

```
START  27 2005 0101
*********************
RETIRE 27 2007 0430
RETIRE 29 2007 0430
START  26 2007 0501
RETIRE 26 2007 0731
START  27 2007 0801
START  29 2007 0801
********************* Retiring GVEA Units ***
RETIRE 32 2011 0101
********************* Retiring GVEA Units ***
START 207 2012 0101
RETIRE 33 2012 0101
RETIRE 39 2012 0101
*********************
RETIRE 27 2013 0430
RETIRE 29 2013 0430
START  26 2013 0501
START  28 2013 0501
RETIRE 26 2013 0731
RETIRE 28 2013 0731
START  27 2013 0801
START  29 2013 0801
********************* Start new Chugach Unit ***
START 25 2014 0101
********************* Retiring GVEA Units ***
RETIRE 34 2016 0101
*
*****************************************************************************
*                           Change Mod Section                              *
*****************************************************************************
*
YEAR 2002
DAY 0101
MOD 12 15 28
MOD 12 17 28
************
YEAR 2002
DAY 0401
MOD 1  10 14.4
MOD 1  11 14.4
MOD 1  12 60.3
MOD 1  13 59.5
MOD 1  14 68
MOD 1  15 95.5
MOD 1  16 68
MOD 1  17 95.5
MOD 1  18 16.7
MOD 1  19 25.5
MOD 1  20 25.5
MOD 1  21 13.8
MOD 1  22 13.8
MOD 1  23 16.7
MOD 1  24 35.2
MOD 1  32 15.7
MOD 1  33 15.7
MOD 1  34 45.9
MOD 1  35 43.8
************
YEAR 2002
DAY 1001
MOD 1  10 16.7
MOD 1  11 16.7
MOD 1  12 66.9
MOD 1  13 71
MOD 1  14 74
MOD 1  15 101.5
MOD 1  16 74
MOD 1  17 101.5
MOD 1  18 19.3
```

```
MOD 1  19 28
MOD 1  20 28
MOD 1  21 15
MOD 1  22 15.1
MOD 1  23 18.9
MOD 1  24 39
MOD 1  32 18
MOD 1  33 18
MOD 1  34 56.7
MOD 1  35 59.3
************
YEAR 2003
DAY 0101
MOD 12 17 119
MOD 12 24 30
MOD 12 34 92
MOD 12 35 92
************
YEAR 2003
DAY 0401
MOD 1  10 14.4
MOD 1  11 14.4
MOD 1  12 60.3
MOD 1  13 59.5
MOD 1  14 68
MOD 1  15 95.5
MOD 1  16 68
MOD 1  17 95.5
MOD 1  18 16.7
MOD 1  19 25.5
MOD 1  20 25.5
MOD 1  21 13.8
MOD 1  22 13.8
MOD 1  23 16.7
MOD 1  24 35.2
MOD 1  32 15.7
MOD 1  33 15.7
MOD 1  34 45.9
MOD 1  35 43.8
************
YEAR 2003
DAY 1001
MOD 1  10 16.7
MOD 1  11 16.7
MOD 1  12 66.9
MOD 1  13 71
MOD 1  14 74
MOD 1  15 101.5
MOD 1  16 74
MOD 1  17 101.5
MOD 1  18 19.3
MOD 1  19 28
MOD 1  20 28
MOD 1  21 15
MOD 1  22 15.1
MOD 1  23 18.9
MOD 1  24 39
MOD 1  32 18
MOD 1  33 18
MOD 1  34 56.7
MOD 1  35 59.3
************
YEAR 2004
DAY 0101
MOD 12 15 119
MOD 12 24 14
MOD 12 34 2 3 0515 3 1101
MOD 12 35 2 3 0501 3 1115
MOD 12 36 92
MOD 12 38 92
```

```
************
YEAR 2004
DAY 0401
MOD 1  10 14.4
MOD 1  11 14.4
MOD 1  12 60.3
MOD 1  13 59.5
MOD 1  14 68
MOD 1  15 95.5
MOD 1  18 16.7
MOD 1  19 25.5
MOD 1  20 25.5
MOD 1  21 13.8
MOD 1  22 13.8
MOD 1  23 16.7
MOD 1  24 35.2
MOD 1  28 71.0
MOD 1  29 100
MOD 1  32 15.7
MOD 1  33 15.7
MOD 1  34 45.9
MOD 1  35 43.8
************
YEAR 2004
DAY 1001
MOD 1  10 16.7
MOD 1  11 16.7
MOD 1  12 66.9
MOD 1  13 71
MOD 1  14 74
MOD 1  15 101.5
MOD 1  18 19.3
MOD 1  19 28
MOD 1  20 28
MOD 1  21 15
MOD 1  22 15.1
MOD 1  23 18.9
MOD 1  24 39
MOD 1  28 78.4
MOD 1  29 105.5
MOD 1  32 18
MOD 1  33 18
MOD 1  34 56.7
MOD 1  35 59.3
************
YEAR 2005
DAY 0101
MOD 12 36 2 7 0115 10 0615
MOD 12 38 20
MOD 12 32 92
MOD 12 33 92
************
YEAR 2005
DAY 0401
MOD 1  10 14.4
MOD 1  11 14.4
MOD 1  12 60.3
MOD 1  13 59.5
MOD 1  18 16.7
MOD 1  19 25.5
MOD 1  20 25.5
MOD 1  21 13.8
MOD 1  22 13.8
MOD 1  23 16.7
MOD 1  24 35.2
MOD 1  26 71.0
MOD 1  27 100
MOD 1  28 71.0
MOD 1  29 100
MOD 1  32 15.7
```

```
MOD 1  33 15.7
MOD 1  34 45.9
MOD 1  35 43.8
************
YEAR 2005
DAY 1001
MOD 1  10 16.7
MOD 1  11 16.7
MOD 1  12 66.9
MOD 1  13 71
MOD 1  18 19.3
MOD 1  19 28
MOD 1  20 28
MOD 1  21 15
MOD 1  22 15.1
MOD 1  23 18.9
MOD 1  24 39
MOD 1  26 78.4
MOD 1  27 105.5
MOD 1  28 78.4
MOD 1  29 105.5
MOD 1  32 18
MOD 1  33 18
MOD 1  34 56.7
MOD 1  35 59.3
************
YEAR 2006
DAY 0101
MOD 12 24 30
MOD 12 32 2 3 0415 3 1001
MOD 12 33 2 3 0401 3 1015
************
YEAR 2006
DAY 0401
MOD 1  10 14.4
MOD 1  11 14.4
MOD 1  12 60.3
MOD 1  13 59.5
MOD 1  18 16.7
MOD 1  19 25.5
MOD 1  20 25.5
MOD 1  21 13.8
MOD 1  22 13.8
MOD 1  23 16.7
MOD 1  24 35.2
MOD 1  26 71.0
MOD 1  27 100
MOD 1  28 71.0
MOD 1  29 100
MOD 1  32 15.7
MOD 1  33 15.7
MOD 1  34 45.9
MOD 1  35 43.8
************
YEAR 2006
DAY 1001
MOD 1  10 16.7
MOD 1  11 16.7
MOD 1  12 66.9
MOD 1  13 71
MOD 1  18 19.3
MOD 1  19 28
MOD 1  20 28
MOD 1  21 15
MOD 1  22 15.1
MOD 1  23 18.9
MOD 1  24 39
MOD 1  26 78.4
MOD 1  27 105.5
MOD 1  28 78.4
```

```
MOD 1  29 105.5
MOD 1  32 18
MOD 1  33 18
MOD 1  34 56.7
MOD 1  35 59.3
************
YEAR 2007
DAY 0101
MOD 12 24 14
MOD 12 27 0
MOD 12 29 0
MOD 12 34 92
MOD 12 35 92
************
YEAR 2007
DAY 0401
MOD 1  10 14.4
MOD 1  11 14.4
MOD 1  12 60.3
MOD 1  13 59.5
MOD 1  18 16.7
MOD 1  19 25.5
MOD 1  20 25.5
MOD 1  21 13.8
MOD 1  22 13.8
MOD 1  23 16.7
MOD 1  24 35.2
MOD 1  26 71.0
MOD 1  27 100
MOD 1  28 71.0
MOD 1  29 100
MOD 1  32 15.7
MOD 1  33 15.7
MOD 1  34 45.9
MOD 1  35 43.8
************
YEAR 2007
DAY 1001
MOD 1  10 16.7
MOD 1  11 16.7
MOD 1  12 66.9
MOD 1  13 71
MOD 1  18 19.3
MOD 1  19 28
MOD 1  20 28
MOD 1  21 15
MOD 1  22 15.1
MOD 1  23 18.9
MOD 1  24 39
MOD 1  26 78.4
MOD 1  27 105.5
MOD 1  28 78.4
MOD 1  29 105.5
MOD 1  32 18
MOD 1  33 18
MOD 1  34 56.7
MOD 1  35 59.3
************
YEAR 2008
DAY 0101
MOD 12 27 119
MOD 12 29 28
MOD 12 34 2 3 0515 3 1101
MOD 12 35 2 3 0501 3 1115
************
YEAR 2008
DAY 0401
MOD 1  10 14.4
MOD 1  11 14.4
MOD 1  12 60.3
```

```
MOD 1  13 59.5
MOD 1  18 16.7
MOD 1  19 25.5
MOD 1  20 25.5
MOD 1  21 13.8
MOD 1  22 13.8
MOD 1  23 16.7
MOD 1  24 35.2
MOD 1  26 71.0
MOD 1  27 100
MOD 1  28 71.0
MOD 1  29 100
MOD 1  32 15.7
MOD 1  33 15.7
MOD 1  34 45.9
MOD 1  35 43.8
************
YEAR 2008
DAY 1001
MOD 1  10 16.7
MOD 1  11 16.7
MOD 1  12 66.9
MOD 1  13 71
MOD 1  18 19.3
MOD 1  19 28
MOD 1  20 28
MOD 1  21 15
MOD 1  22 15.1
MOD 1  23 18.9
MOD 1  24 39
MOD 1  26 78.4
MOD 1  27 105.5
MOD 1  28 78.4
MOD 1  29 105.5
MOD 1  32 18
MOD 1  33 18
MOD 1  34 56.7
MOD 1  35 59.3
************
YEAR 2009
DAY 0101
MOD 12 27 28
MOD 12 24 30
MOD 12 36 92
MOD 12 38 92
************
YEAR 2009
DAY 0401
MOD 1  10 14.4
MOD 1  11 14.4
MOD 1  12 60.3
MOD 1  13 59.5
MOD 1  18 16.7
MOD 1  19 25.5
MOD 1  20 25.5
MOD 1  21 13.8
MOD 1  22 13.8
MOD 1  23 16.7
MOD 1  24 35.2
MOD 1  26 71.0
MOD 1  27 100
MOD 1  28 71.0
MOD 1  29 100
MOD 1  32 15.7
MOD 1  33 15.7
MOD 1  34 45.9
MOD 1  35 43.8
************
YEAR 2009
DAY 1001
```

```
MOD 1  10 16.7
MOD 1  11 16.7
MOD 1  12 66.9
MOD 1  13 71
MOD 1  18 19.3
MOD 1  19 28
MOD 1  20 28
MOD 1  21 15
MOD 1  22 15.1
MOD 1  23 18.9
MOD 1  24 39
MOD 1  26 78.4
MOD 1  27 105.5
MOD 1  28 78.4
MOD 1  29 105.5
MOD 1  32 18
MOD 1  33 18
MOD 1  34 56.7
MOD 1  35 59.3
*
*
END
```

```
PARAMETERS  0.50 75
* Optional output title lines as in POWRPRO data
*
T Multi Area Model Chugach/AEG&T
T Uses Power Pool Price Files from the Traditional Scenario
T
*
* Control on printing input echo and/or progress of run to screen (see POWRPRO input
* description - Block 2 Line 1)7
* |     First month of run
* |     |     Number of days to run
* |     |     |    Number of areas to be simulated
* |     |     |    |    Capacity fraction to use for calculaton of commitment priority
* |     |     |    |    |     Enter 1 to have variable o&m included in commitment and
* |     |     |    |    |     dispatch - 0 otherwise
* |     |     |    |    |     |   Output selector (see POWRPRO input description -
* |     |     |    |    |     |   Block 2 Line 1)
* |     |     |    |    |     |   |     Enter the # of areas to calculate the hourly
* |     |     |    |    |     |   |     dispatch incremental, else 0
* |     |     |    |    |     |   |     |   Enter 1 to activate dispatch review option
* |     |     |    |    |     |   |     |   - 0 otherwise
* |     |     |    |    |     |   |     |   |   Enter 1 to have hourly average fuel prices
* |     |     |    |    |     |   |     |   |   written to a file - 0 otherwise
* |     |     |    |    |     |   |     |   |   |   Enter 1 to have annual summary written
* |     |     |    |    |     |   |     |   |   |   to a file - 0 otherwise
* |     |     |    |    |     |   |     |   |   |   |   Enter a unit number here to get
* |     |     |    |    |     |   |     |   |   |   |   it's hourly generation written to
* |     |     |    |    |     |   |     |   |   |   |   a file - 0 otherwise
* |     |     |    |    |     |   |     |   |   |   |   |     _______ These two items are
* |     |     |    |    |     |   |     |   |   |   |   |     |    | not yet implemented
* |     |     |    |    |     |   |     |   |   |   |   |     |    | - enter zeroes
* |     |     |    |    |     |   |     |   |   |   |   |     |    |
 -1000  1     365  2    1.0   1   2     0   0   0   1   0     0    0
*
*  First year to run
*  |
*  |       Last year to run
*  |       |
   2009    2016
*
'/u/jurotich/expansion/chug4.sum'
*
*
*
TIE (code indicating tie line data follow - must be entered as shown - not needed if
*   only one area is simulated)
*
* Tie line number
* | 'From' area
* |  |     'To' area
* |  |     |      Tie line capacity - Mw
* |  |     |      |         a       b: power loss in tie line (mw) = a x Mw + b x Mw**2
* |  |     |      |         |       |   (where Mw = megawatts flowing)
* |  |     |      |         |       |       Wheeling cost ($/Mwh)
* |  |     |      |         |       |       |
*
* Kenai to Anchorage
  1  1     2      145       0.0093  0.0003  0
  2  2     1      145       0.0093  0.0003  0
*
*************************************************************************
*                           Kenai Peninsula                             *
*************************************************************************
* Begin data for first area (see below description for area 2)
*
AREA
'Kenai'
'/u/jurotich/shave/kenai.shv'
   0  0  0  0.1  0  2.9  1
  * Connectivity data (see accompanying diagram)
```

```
* Area number this area connects with
* |  Number of tie lines in connection path
* |  |     Tie line numbers (in order from this area to connected area)
* |  |     |
  2  1     1
************** EXISTING GENERATION **********
G 18 'Bernice 2' 19.3 3 'Q' 100 'A' 0.05
3
3
2.06 0.030 1997 6500 0.030 1997
82.82 8.77628 0.08
21
1    1   1    1    0 0.44 0
0.15 0.3 0.3  1
200  0   25.0 1000 0.03 1997
**********************************************
G 19 'Bernice 3' 28 3 'Q' 0 'A' 0.07
3
3
2.06 0.030 1997 6500 0.030 1997
104.4 7.83575 0.06
21
1     1    1    1    0 0.44 0
0.165 0.33 0.33 1
200   0    25.0 1000 0.03 1997
**********************************************
G 20 'Bernice 4' 28 7 'Q' 0 'A' 0.05
3
3
2.06 0.030 1997 6500 0.030 1997
102.7 9.3567 0.01
21
1     1    1    1    0 0.44 0
0.165 0.33 0.33 1
200   0    25.0 1000 0 0.03 1997
**********************************************
G 24 'Soldotna 1' 39 6 ' ' 0 'A' 0.01
4
4
2.06 0.030 1997 3300 0.030 1996
136.1 5.571 0.060
14
1     1    6    6    0    0.42 0
0.125 0.25 0.25 1
200   0    45   1000 0.03 1997
*
************** Emergency Purchase ***********
*
PR 997 'EMERG PURCH' 150 0  ' ' 0  'A' 0
999.0 0.035 1996
*
*************************************************************************
*                              Anchorage Area                           *
*************************************************************************
*
*
AREA
*
* area name (maximum of 12 characters enclosed in quotes)
* |
  'Chugach'
* Hourly demands filename for this area (maximum of 48 characters enclosed in quotes)
* |
 '/u/jurotich/shave/cea2.shv'
 *
* ____These two items are not yet implemented - enter zeroes
* |  |
* |  |  a  b: Spinning reserve requirement for this area = a x demand + b
* |  |  |  |
* |  |  |  |   a  b: Operating reserve requirement for this area = a x demand + b
```

```
* |  |  |  |   |  |
* |  |  |  |   |  |  Minimum number of on-line units required for this area
* |  |  |  |   |  |  |
  0  0  0  0.1 0  14.3 0
*
* Connectivity data (see accompanying diagram)
* Area number this area connects with
* |  Number of tie lines in connection path
* |  |     Tie line numbers (in order from this area to connected area)
* |  |     |
  1  1     2
************** EXISTING GENERATION **********
G 10 'Beluga 1' 16.7 3 'Q ' 0 'A' 0.07
2
2
2.06 0.030 1997 7950 0.030 1997
83.57046 10.856 0.07032
21
1    1    1    1    0 0.44 0
0.15 0.30 0.30 1
200  0    20.0 1000 0.03 1997
**********************************************
G 11 'Beluga 2' 16.7 3 'Q ' 0 'A' 0.004
2
2
2.06 0.030 1997 7950 0.030 1997
129.98 8.3371 0.0829
21
1    1    1    1    0 0.44  0
0.15 0.23 0.23 1
200  0    32.0 1000 0.03 1997
**********************************************
G 12 'Beluga 3' 66.9 3 'Q' 0 'A' 0.01
2
2
2.06 0.030 1997 7950 0.030 1997
196.9959 8.4491 0.01243
28
1    1    6   6   0 0.44  0
0.15 0.30 0.30 1
200  0    67.0 1600 0.03 1997
**********************************************
G 13 'Beluga 5' 71 3 'Q' 0 'A' 0.00
2
2
2.06 0.030 1997 7950 0.030 1997
208.6894 7.8766 0.0223
28
1     1    6   6   0 0.44  0
0.185 0.37 0.37 1
200   0    67.0 1600 0.03 1997
**********************************************
G 21 'Intrnl 1' 15 3 'Q' 0 'A' 0.10
4
4
2.06 0.030 1997 5750 0.030 1997
83.07 8.48275 0.14
14
1    1    1    1    0 0.44  0
0.21 0.42 0.42 1
200  0    21.0 1000 0.03 1997
**********************************************
G 22 'Intrnl 2' 15.1 3 'Q' 0 'A' 0.10
4
4
2.06 0.030 1997 5750 0.030 1997
88.96 5.90928 0.37
14
1    1    1    1    0 0.44  0
0.21 0.42 0.42 1
```

```
200  0    21.0 1000 0.03 1997
**********************************************
G 23 'Intrnl 3' 18.9 3 'Q' 0 'A' 0.11
4
4
2.06 0.030 1997 5750 0.030 1997
91.76 7.94660 0.12
14
1    1    1    1    0 0.44  0
0.21 0.42 0.42 1
200  0    23.0 1000 0.03 1997
**********************************************
G 25 'LM6000 Chug' 40.5 10 ' ' 0 'U' 0.05
4
4
2.06 0.030 1997 7950 0.030 1997
97.797 6.1712 0.0382
28
1   1   1   1    0    0.42 0
1.5 3.5 3.5 1
200 0   43  750 0.03 1997
********************************************** Upgraded Units 6 & 7 ***
G 26 'Beluga 6CT' 78.4 3 ' ' 0 'A' 0.10
2
2
2.06 0.030 1997 7950 0.030 1997
228.0798 7.971 0.0112
28
1     1    6   6   0 0.44 0
0.185 0.37 0.37 1
200   0    67.0 3600 0.03 1997
**********************************************
G 27 'Beluga 6-8' 105.5 48 ' ' 0 'A' 0.004
2
2
2.06 0.030 1997 7950 0.030 1997
356.027 2.52 0.0308
28
1   1   16   6   0 0.44 0
0.5 1.0 1.0  0.45
200 0   67.0 3600 0.03 1997
**********************************************
G 28 'Beluga 7CT' 78.4 3 ' ' 0 'A' 0.004
2
2
2.06 0.030 1997 7950 0.030 1997
208.39 7.7605 0.2327
28
1    1    6   6   0 0.44 0
0.21 0.42 0.42 1
200  0    67.0 3600 0.03 1997
**********************************************
G 29 'Beluga 7-8' 105.5 48 ' ' 0 'A' 0.04
2
2
2.06 0.030 1997 7950 0.030 1997
272.9795 4.173 0.01667
28
1   1   16   6   0    0.44 0
0.5 1.0 1.0  0.45
200 0   67.0 3600 0.03 1997
*
************** Emergency Purchase ***********
*
PR 998 'EMERG PURCH' 150 0  ' ' 0  'A' 0
999.0 0.035 1996
*
*
PRICES
*
```

```
*************************************************************************
*                                New Plant                              *
*       ML&P &                   Soldotna                               *
*       Joint   Beluga  Bernice & Intn'l HCCP   Aurora  Healy           *
*       NGas    NGas    NGas    NGas     Coal   Purch.  Coal            *
*       $/MBtu  $/MBtu  $/MBtu  $/MBtu   $/MBtu $/MWh   $/MBtu          *
*************************************************************************
1996    1.86    1.17    1.38    1.98     0.00   00.00   1.36
1997    1.74    1.46    1.50    2.25     0.60   00.00   1.39
1998    1.97    1.69    1.70    2.05     0.62   40.00   1.02
1999    2.01    1.73    1.75    2.10     0.65   40.00   0.94
2000    2.06    1.78    1.80    2.15     0.67   37.00   0.97
2001    2.12    1.84    1.85    2.20     0.70   37.00   0.99
2002    2.16    1.88    1.90    2.25     0.76   37.93   1.05
2003    2.22    1.94    1.95    2.30     0.77   38.87   1.07
2004    2.27    1.99    2.00    2.35     0.79   39.84   1.09
2005    2.33    2.05    2.06    2.41     0.80   40.84   1.11
2006    2.39    2.11    2.12    2.47     0.82   41.86   1.13
2007    2.44    2.16    2.18    2.53     0.83   42.91   1.16
2008    2.50    2.22    2.24    2.59     0.85   43.98   1.18
2009    2.57    2.29    2.30    2.65     0.87   45.08   1.20
2010    2.63    2.35    2.37    2.72     0.88   46.21   1.22
2011    2.70    2.42    2.44    2.79     0.90   47.36   1.25
2012    2.77    2.49    2.50    2.85     0.92   48.55   1.27
2013    2.84    2.56    2.57    2.92     0.93   49.76   1.29
2014    2.91    2.63    2.65    3.00     0.95   51.00   1.32
2015    2.98    2.70    2.72    3.07     0.97   52.28   1.34
2016    3.06    2.78    2.80    3.15     0.99   53.59   1.37
2017    3.06    2.78    2.80    3.15     0.99   53.59   1.37
*
*************************************************************************
*                          Starts & Retirements                         *
*************************************************************************
*
RETIRE 27 2013 0430
RETIRE 29 2013 0430
START  26 2013 0501
START  28 2013 0501
RETIRE 26 2013 0731
RETIRE 28 2013 0731
START  27 2013 0801
START  29 2013 0801
******************** Start new Chugach Unit ***
START 25 2014 0101
*
*************************************************************************
*                          Change Mod Section                           *
*************************************************************************
*
YEAR 2008
DAY 0101
MOD 12 27 119
MOD 12 29 28
************
YEAR 2008
DAY 0401
MOD 1  10 14.4
MOD 1  11 14.4
MOD 1  12 60.3
MOD 1  13 59.5
MOD 1  18 16.7
MOD 1  19 25.5
MOD 1  20 25.5
MOD 1  21 13.8
MOD 1  22 13.8
MOD 1  23 16.7
MOD 1  24 35.2
MOD 1  26 71.0
MOD 1  27 100
MOD 1  28 71.0
```

```
MOD 1  29 100
************
YEAR 2008
DAY 1001
MOD 1  10 16.7
MOD 1  11 16.7
MOD 1  12 66.9
MOD 1  13 71
MOD 1  18 19.3
MOD 1  19 28
MOD 1  20 28
MOD 1  21 15
MOD 1  22 15.1
MOD 1  23 18.9
MOD 1  24 39
MOD 1  26 78.4
MOD 1  27 105.5
MOD 1  28 78.4
MOD 1  29 105.5
************
YEAR 2009
DAY 0101
MOD 12 27 28
MOD 12 24 30
************
YEAR 2009
DAY 0401
MOD 1  10 14.4
MOD 1  11 14.4
MOD 1  12 60.3
MOD 1  13 59.5
MOD 1  18 16.7
MOD 1  19 25.5
MOD 1  20 25.5
MOD 1  21 13.8
MOD 1  22 13.8
MOD 1  23 16.7
MOD 1  24 35.2
MOD 1  26 71.0
MOD 1  27 100
MOD 1  28 71.0
MOD 1  29 100
************
YEAR 2009
DAY 1001
MOD 1  10 16.7
MOD 1  11 16.7
MOD 1  12 66.9
MOD 1  13 71
MOD 1  18 19.3
MOD 1  19 28
MOD 1  20 28
MOD 1  21 15
MOD 1  22 15.1
MOD 1  23 18.9
MOD 1  24 39
MOD 1  26 78.4
MOD 1  27 105.5
MOD 1  28 78.4
MOD 1  29 105.5
************
YEAR 2010
DAY 0101
MOD 12 24 14
************
YEAR 2010
DAY 0401
MOD 1  10 14.4
MOD 1  11 14.4
MOD 1  12 60.3
```

```
MOD 1  13 59.5
MOD 1  18 16.7
MOD 1  19 25.5
MOD 1  20 25.5
MOD 1  21 13.8
MOD 1  22 13.8
MOD 1  23 16.7
MOD 1  24 35.2
MOD 1  26 71.0
MOD 1  27 100
MOD 1  28 71.0
MOD 1  29 100
************
YEAR 2010
DAY 1001
MOD 1  10 16.7
MOD 1  11 16.7
MOD 1  12 66.9
MOD 1  13 71
MOD 1  18 19.3
MOD 1  19 28
MOD 1  20 28
MOD 1  21 15
MOD 1  22 15.1
MOD 1  23 18.9
MOD 1  24 39
MOD 1  26 78.4
MOD 1  27 105.5
MOD 1  28 78.4
MOD 1  29 105.5
***********
YEAR 2011
DAY 0101
MOD 12 29 119
************
YEAR 2011
DAY 0401
MOD 1  10 14.4
MOD 1  11 14.4
MOD 1  12 60.3
MOD 1  13 59.5
MOD 1  18 16.7
MOD 1  19 25.5
MOD 1  20 25.5
MOD 1  21 13.8
MOD 1  22 13.8
MOD 1  23 16.7
MOD 1  24 35.2
MOD 1  26 71.0
MOD 1  27 100
MOD 1  28 71.0
MOD 1  29 100
************
YEAR 2011
DAY 1001
MOD 1  10 16.7
MOD 1  11 16.7
MOD 1  12 66.9
MOD 1  13 71
MOD 1  18 19.3
MOD 1  19 28
MOD 1  20 28
MOD 1  21 15
MOD 1  22 15.1
MOD 1  23 18.9
MOD 1  24 39
MOD 1  26 78.4
MOD 1  27 105.5
MOD 1  28 78.4
MOD 1  29 105.5
```

```
************
YEAR 2012
DAY 0101
MOD 12 24 30
MOD 12 27 119
MOD 12 29 28
************
YEAR 2012
DAY 0401
MOD 1  10 14.4
MOD 1  11 14.4
MOD 1  12 60.3
MOD 1  13 59.5
MOD 1  18 16.7
MOD 1  19 25.5
MOD 1  20 25.5
MOD 1  21 13.8
MOD 1  22 13.8
MOD 1  23 16.7
MOD 1  24 35.2
MOD 1  26 71.0
MOD 1  27 100
MOD 1  28 71.0
MOD 1  29 100
************
YEAR 2012
DAY 1001
MOD 1  10 16.7
MOD 1  11 16.7
MOD 1  12 66.9
MOD 1  13 71
MOD 1  18 19.3
MOD 1  19 28
MOD 1  20 28
MOD 1  21 15
MOD 1  22 15.1
MOD 1  23 18.9
MOD 1  24 39
MOD 1  26 78.4
MOD 1  27 105.5
MOD 1  28 78.4
MOD 1  29 105.5
************
YEAR 2013
DAY 0101
MOD 12 24 14
MOD 12 27 0
MOD 12 29 0
************
YEAR 2013
DAY 0401
MOD 1  10 14.4
MOD 1  11 14.4
MOD 1  12 60.3
MOD 1  13 59.5
MOD 1  18 16.7
MOD 1  19 25.5
MOD 1  20 25.5
MOD 1  21 13.8
MOD 1  22 13.8
MOD 1  23 16.7
MOD 1  24 35.2
MOD 1  26 71.0
MOD 1  27 100
MOD 1  28 71.0
MOD 1  29 100
************
YEAR 2013
DAY 1001
MOD 1  10 16.7
```

```
MOD 1  11 16.7
MOD 1  12 66.9
MOD 1  13 71
MOD 1  18 19.3
MOD 1  19 28
MOD 1  20 28
MOD 1  21 15
MOD 1  22 15.1
MOD 1  23 18.9
MOD 1  24 39
MOD 1  26 78.4
MOD 1  27 105.5
MOD 1  28 78.4
MOD 1  29 105.5
************
YEAR 2014
DAY 0101
MOD 12 27 28
MOD 12 29 28
************
YEAR 2014
DAY 0401
MOD 1  10 14.4
MOD 1  11 14.4
MOD 1  12 60.3
MOD 1  13 59.5
MOD 1  18 16.7
MOD 1  19 25.5
MOD 1  20 25.5
MOD 1  21 13.8
MOD 1  22 13.8
MOD 1  23 16.7
MOD 1  24 35.2
MOD 1  26 71.0
MOD 1  27 100
MOD 1  28 71.0
MOD 1  29 100
************
YEAR 2014
DAY 1001
MOD 1  10 16.7
MOD 1  11 16.7
MOD 1  12 66.9
MOD 1  13 71
MOD 1  18 19.3
MOD 1  19 28
MOD 1  20 28
MOD 1  21 15
MOD 1  22 15.1
MOD 1  23 18.9
MOD 1  24 39
MOD 1  26 78.4
MOD 1  27 105.5
MOD 1  28 78.4
MOD 1  29 105.5
************
YEAR 2015
DAY 0101
MOD 12 24 30
MOD 12 29 119
************
YEAR 2015
DAY 0401
MOD 1  10 14.4
MOD 1  11 14.4
MOD 1  12 60.3
MOD 1  13 59.5
MOD 1  18 16.7
MOD 1  19 25.5
MOD 1  20 25.5
```

```
MOD 1  21 13.8
MOD 1  22 13.8
MOD 1  23 16.7
MOD 1  24 35.2
MOD 1  26 71.0
MOD 1  27 100
MOD 1  28 71.0
MOD 1  29 100
************
YEAR 2015
DAY 1001
MOD 1  10 16.7
MOD 1  11 16.7
MOD 1  12 66.9
MOD 1  13 71
MOD 1  18 19.3
MOD 1  19 28
MOD 1  20 28
MOD 1  21 15
MOD 1  22 15.1
MOD 1  23 18.9
MOD 1  24 39
MOD 1  26 78.4
MOD 1  27 105.5
MOD 1  28 78.4
MOD 1  29 105.5
************
YEAR 2016
DAY 0101
MOD 12 24 14
MOD 12 27 119
MOD 12 29 28
************
YEAR 2016
DAY 0401
MOD 1  10 14.4
MOD 1  11 14.4
MOD 1  12 60.3
MOD 1  13 59.5
MOD 1  18 16.7
MOD 1  19 25.5
MOD 1  20 25.5
MOD 1  21 13.8
MOD 1  22 13.8
MOD 1  23 16.7
MOD 1  24 35.2
MOD 1  26 71.0
MOD 1  27 100
MOD 1  28 71.0
MOD 1  29 100
************
YEAR 2016
DAY 1001
MOD 1  10 16.7
MOD 1  11 16.7
MOD 1  12 66.9
MOD 1  13 71
MOD 1  18 19.3
MOD 1  19 28
MOD 1  20 28
MOD 1  21 15
MOD 1  22 15.1
MOD 1  23 18.9
MOD 1  24 39
MOD 1  26 78.4
MOD 1  27 105.5
MOD 1  28 78.4
MOD 1  29 105.5
*
*
```

END

```
T  Alaska Public Utilities Commission -- GVEA
T  Power Pooling / Central Dispatch Planning Study Docket U-97-140
*
*  input echo: > zero will cause an input echo
*  |  first month of run
*  |  |   # of days to be run
*  |  |   |  capacity fraction for priority list
*  |  |   |  |  minimum # of units required on-line
*  |  |   |  |  |  variable o&m factor: 1 - variable o&m incl. in dispatch
*  |  |   |  |  |  |  output table selector: 0 thru 3
*  |  |   |  |  |  |  |  a  b: spinning reserve = a * demand + b
*  |  |   |  |  |  |  |  |  |    a  b: operating reserve = a * demand + b
*  |  |   |  |  |  |  |  |  |    |   |    emission allowance price
*  |  |   |  |  |  |  |  |  |    |   |    |
-8761 1 365  1  0  1  2  0  10 0.0   80 0
*
*  broker  toggle: 1 - yes, 0 - no
*  |  number of pumped storage plants
*  |  |  hourly incremental cost file toggle
*  |  |  |  dispatch review option toggle
*  |  |  |  |  hourly avgerage fuel cost file
*  |  |  |  |  |  annual summary output file
*  |  |  |  |  |  |  edit request: 0 1 or 2
*  |  |  |  |  |  |  |  fuel limits indicator
*  |  |  |  |  |  |  |  |  peaking hydro output selector
*  |  |  |  |  |  |  |  |  |  request pumped storage modified demands output
*  |  |  |  |  |  |  |  |  |  |  request hourly generation output for a unit
*  |  |  |  |  |  |  |  |  |  |  |
   0  0  0  0  0  1  0  0  0  0  0
*
*
*  first year of simulation
*  |      last year of simulation
*  |      |      hourly demands filename
*  |      |      |
2009   2016     '/u/jurotich/shave/gvea.shv'
*
*
***************************** Name of summary output file****************
'/u/jurotich/Alaska/gvea_os.sum'
*
*
*****************************************************************************
*                        Generator Data Begins Here                         *
*****************************************************************************
*
*
******************************************************************************
*                     Golden Valley Electric Association (GVEA)              *
******************************************************************************
*
G 30 'Zehnder EMD5' 2.6 0.5 ' ' 0 'A' 0.0
3.31  0.03  1997
3.31  0.03  1997
8.00 0.030 1996 8199 0.030 1996
0 25.679 0
1
1     1    1    1   0.01 0.76   0
0.035 0.07 0.07 1
200   0    0    500 0.03    1997
*********************************************
G 31 'Zehnder EMD6' 2.6 0.5 ' ' 0 'A' 0.0
3.31  0.03  1997
3.31  0.03  1997
8.00 0.030 1996 8199 0.030 1996
0 25.67901 0
1
1     1    1    1   0.01 0.76   0
0.035 0.07 0.07 1
200   0    0    500 0.03    1997
```

```
**********************************************
G 32 'Zehnder GT1' 18 6 'Q' 0 'A' 0.0
3.31  0.03  1997
3.31  0.03  1997
5.21 0.030 1996 7618 0.030 1996
97.72 6.2534 0.1599
1
1    1    1    1    0.66 0.76   0
0.15 0.30 0.30 1
200  0    20   1000 0.03    1997
**********************************************
G 33 'Zehnder GT2' 18 6 'Q' 0 'A' 0.0
3.31  0.03  1997
3.31  0.03  1997
5.21 0.030 1996 7618 0.030 1996
97.72 6.253401 0.1599
1
1    1    1    1    0.66 0.76   0
0.15 0.30 0.30 1
200  0    20   1000 0.03    1997
**********************************************
G 34 'North Pole 1' 56.7 5 ' ' 0 'A' 0.0
3.09  0.03  1997
3.09  0.03  1997
4.66 0.030 1996 5167 0.030 1996
167.46 5.022 0.033
1
1     1    6    6    0.60 0.73  0
0.365 0.73 0.73 1
200   0    30   1600 0.03   1997
**********************************************
G 35 'North Pole 2' 59.3 5 'Q' 0 'A' 0.0
3.09  0.03  1997
3.09  0.03  1997
4.66 0.030 1996 5167 0.030 1996
181.74 4.5092 0.0282
0
1     1    6    6    0.060 0.73 0
0.365 0.73 0.73 1
200   0    30   1600 0.03   1997
**********************************************
G 36 'Healy 1' 25 3 'M' 0 'A' 0.0
7
3.11  0.03  1996
10.87 0.030 1996 94657 0.030 1996
95.738 7.998 0.0867
0
1   1  1  1    1.80 0.37    0
6.5 13 13 1
200 0  20 1000 0.03 1997
**********************************************
G 37 'Healy D1' 2.6 0.5 ' ' 0 'A' 0.0
7
3.20  0.03  1997
8.00 0.030 1996 22655 0.030 1996
0 11.451 0
1 4 0204
1     1    1    1   0.01 0.76   0
0.025 0.05 0.05 1
200   0    0    500 0.03    1997
**********************************************
G 38 'HCCP' 53 10 'M' 0 'A' 0.10
5
3.11  0.03  1996
10.00 0.03 1997 63800 0.03 1997
80.138 7.9918 0.0434
20
1   1    1  1    0.3 0.35   0
3   8    4  1
200 1112 0  1000 0.03   1997
```

```
**********************************************
G 39 'Chena 6' 29 10  'Q' 0 'U' 0.05
3.40 0.03 1996
3.40 0.03 1996
0.30 0.030 1997 9000 0.030 1997
72.972 8.8103 0.014
1 15 0501
1    1    1    1   0.02 0.12  0
0.15 0.30 0.30 1
200  0    26.3    1000 0.03 1997
**********************************************
G 40 'SILOS' 62 0.5 'Q' 274 'A' 0.0
100.00  0.03  1996
100.00  0.03  1996
10.00 0.030 1996 0 0.030 1996
0 10.000 0
0
1 1 1 1 0 0 0
0 0 0 1
0 0 0 0 0 0
**********************************************
G 200  'GE 6B SC'  38 5  ' ' 0  'U'  0.05
3.11 0.03 1998
3.11 0.03 1998
4.41  0.03  1998 7630  0.03  1998
116.18 6.9159 0.0597
14
1 1 1 1 0 0.5 0
1.5 3.5 24 1
200 30.0 0 750 0.03 1998
****************************************OGEM***
G 204  'GE 7EA SC'  83 10  ' ' 0  'A'  0.05
3.11 0.03 1998
3.11 0.03 1998
3.03  0.03  1998 4400  0.03  1998
243.93 6.0178 0.0333
17
1 1 1 1 0 0.5 0
1.5 3.5 24 1
200 138.0 0 1000 0.03 1998
****************************************OGEM***
G 207  'GE 7EA 1x1'  128 45  ' ' 0  'U'  0.05
3.11 0.03 1998
3.11 0.03 1998
2.63  0.03  1998 11720  0.03  1998
233.599 5.8424 0
17
1 1 16 6 0 0.5 0
2 4 24 1
200 56.0 0 1000 0.03 1998

*
*****************************************************************************
*                                 Purchases                                 *
*****************************************************************************
*
************** Emergency Purchase ***********
*
PR 999 'EMERG PURCH' 500 0  ' ' 0  'A' 0
500.0 0.035 1996
*
*
PRICES
*
*****************************************************************************
*                Annual Fuel Price & Purchase Price Table                   *
*****************************************************************************
*                                 New Plant                                 *
*       ML&P &                    Soldotna                                  *
*       Joint   Beluga  Bernice & Intn'l HCCP   Aurora  Healy               *
```

```
*       NGas    NGas    NGas    NGas     Coal   Purch.  Coal              *
*       $/MBtu  $/MBtu  $/MBtu  $/MBtu   $/MBtu $/MWh   $/MBtu            *
***************************************************************************
1996    1.86    1.17    1.38    1.98     0.00   00.00   1.36
1997    1.74    1.46    1.50    2.25     0.60   00.00   1.39
1998    1.97    1.69    1.70    2.05     0.62   40.00   1.02
1999    2.01    1.73    1.75    2.10     0.65   40.00   0.94
2000    2.06    1.78    1.80    2.15     0.67   37.00   0.97
2001    2.12    1.84    1.85    2.20     0.70   37.00   0.99
2002    2.16    1.88    1.90    2.25     0.76   37.93   1.05
2003    2.22    1.94    1.95    2.30     0.77   38.87   1.07
2004    2.27    1.99    2.00    2.35     0.79   39.84   1.09
2005    2.33    2.05    2.06    2.41     0.80   40.84   1.11
2006    2.39    2.11    2.12    2.47     0.82   41.86   1.13
2007    2.44    2.16    2.18    2.53     0.83   42.91   1.16
2008    2.50    2.22    2.24    2.59     0.85   43.98   1.18
2009    2.57    2.29    2.30    2.65     0.87   45.08   1.20
2010    2.63    2.35    2.37    2.72     0.88   46.21   1.22
2011    2.70    2.42    2.44    2.79     0.90   47.36   1.25
2012    2.77    2.49    2.50    2.85     0.92   48.55   1.27
2013    2.84    2.56    2.57    2.92     0.93   49.76   1.29
2014    2.91    2.63    2.65    3.00     0.95   51.00   1.32
2015    2.98    2.70    2.72    3.07     0.97   52.28   1.34
2016    3.06    2.78    2.80    3.15     0.99   53.59   1.37
2017    3.06    2.78    2.80    3.15     0.99   53.59   1.37
***************************************************************************
*                           Starts & Retirements                          *
***************************************************************************
*
********************* This section is for actual ***
********************* starts and retirments ***
START  39 1997 1001
********************* Retiring GVEA Units ***
RETIRE 32 2011 0101
********************* Starting OGEM Units ***
START 207 2012 0101
********************* Retiring GVEA Units ***
RETIRE 33 2012 0101
RETIRE 39 2012 0101
********************* Retiring GVEA Units ***
RETIRE 34 2016 0101
START 200 2016 0101
*
***************************************************************************
*                            Change Mod Section                           *
***************************************************************************
*
YEAR 2000
DAY 0101
MOD 12 34 2 3 0515 3 1101
MOD 12 35 2 3 0501 3 1115
MOD 12 36 92
*
YEAR 2001
DAY 0101
MOD 12 36 2 7 0115 10 0615
*
YEAR 2003
DAY 0101
MOD 12 34 92
MOD 12 35 92
*
YEAR 2004
DAY 0101
MOD 12 34 2 3 0515 3 1101
MOD 12 35 2 3 0501 3 1115
MOD 12 36 92
MOD 12 38 92
*
YEAR 2005
```

```
DAY 0101
MOD 12 36 2 7 0115 10 0615
MOD 12 38 20
MOD 12 32 92
MOD 12 33 92
*
YEAR 2006
DAY 0101
MOD 12 32 2 3 0415 3 1001
MOD 12 33 2 3 0401 3 1015
*
YEAR 2007
DAY 0101
MOD 12 34 92
MOD 12 35 92
*
YEAR 2008
DAY 0101
MOD 12 34 2 3 0515 3 1101
MOD 12 35 2 3 0501 3 1115
*
YEAR 2009
DAY 0101
MOD 12 36 92
MOD 12 38 92
*
YEAR 2010
DAY 0101
MOD 12 36 2 7 0115 10 0615
MOD 12 38 20
*
YEAR 2011
DAY 0101
MOD 12 34 92
MOD 12 35 92
*
YEAR 2012
DAY 0101
MOD 12 34 2 3 0515 3 1101
MOD 12 35 2 3 0501 3 1115
*
YEAR 2014
DAY 0101
MOD 12 36 92
MOD 12 38 92
*
YEAR 2015
DAY 0101
MOD 12 36 2 7 0115 10 0615
MOD 12 38 20
MOD 12 35 92
*
YEAR 2016
DAY 0101
MOD 12 35 2 3 0501 3 1115
*
YEAR 2000
DUP BEGIN
DAY 0401
MOD 1  32 15.7
MOD 1  33 15.7
MOD 1  34 45.9
MOD 1  35 43.8
DUP END
*
YEAR 2000
DUP BEGIN
DAY 1001
MOD 1  32 18
MOD 1  33 18
```

```
MOD 1  34 56.7
MOD 1  35 59.3
DUP END
*
*
END
```

```
PARAMETERS  0.50 75
* Optional output title lines as in POWRPRO data
*
T Multi Area Model Pooled Case
T Uses Power Pool Price Files from the Traditional Scenario
T
*
* Control on printing input echo and/or progress of run to screen (see POWRPRO input
* description - Block 2 Line 1)
* |     First month of run
* |     |     Number of days to run
* |     |     |    Number of areas to be simulated
* |     |     |    |    Capacity fraction to use for calculaton of commitment priority
* |     |     |    |    |     Enter 1 to have variable o&m included in commitment and
* |     |     |    |    |     dispatch - 0 otherwise
* |     |     |    |    |     |   Output selector (see POWRPRO input description -
* |     |     |    |    |     |   Block 2 Line 1)
* |     |     |    |    |     |   |     Enter the # of areas to calculate the hourly
* |     |     |    |    |     |   |     dispatch incremental, else 0
* |     |     |    |    |     |   |     |   Enter 1 to activate dispatch review option
* |     |     |    |    |     |   |     |   - 0 otherwise
* |     |     |    |    |     |   |     |   |   Enter 1 to have hourly average fuel prices
* |     |     |    |    |     |   |     |   |   written to a file - 0 otherwise
* |     |     |    |    |     |   |     |   |   |   Enter 1 to have annual summary written
* |     |     |    |    |     |   |     |   |   |   to a file - 0 otherwise
* |     |     |    |    |     |   |     |   |   |   |   Enter a unit number here to get
* |     |     |    |    |     |   |     |   |   |   |   it's hourly generation written to
* |     |     |    |    |     |   |     |   |   |   |   a file - 0 otherwise
* |     |     |    |    |     |   |     |   |   |   |   |     _______ These two items are
* |     |     |    |    |     |   |     |   |   |   |   |     |     | not yet implemented
* |     |     |    |    |     |   |     |   |   |   |   |     |     | - enter zeroes
* |     |     |    |    |     |   |     |   |   |   |   |     |     |
 -1000  1     365  4    1.0   1   2     0   0   0   1   0     0     0
*
*  First year to run
*  |
*  |       Last year to run
*  |       |
   1997    1999
*
'/u/jurotich/pool/pool1.sum'
*
*
*
TIE (code indicating tie line data follow - must be entered as shown - not needed if
*   only one area is simulated)
*
* Tie line number
* | 'From' area
* |  |     'To' area
* |  |     |      Tie line capacity - Mw
* |  |     |      |         a       b: power loss in tie line (mw) = a x Mw + b x Mw**2
* |  |     |      |         |       |   (where Mw = megawatts flowing)
* |  |     |      |         |       |       Wheeling cost ($/Mwh)
* |  |     |      |         |       |       |
*
* Kenai to Anchorage
  1  1     2      75       -0.0015  0.0014  0
  2  2     1      75       -0.0015  0.0014  0
* Anchorage to Healy
  3  2     3      70       -0.0041  0.0008  0
  4  3     2      70       -0.0041  0.0008  0
* Healy to Fairbanks
  5  3     4      100      -0.0226  0.0013  0
  6  4     3      100      -0.0226  0.0013  0
*
*************************************************************************
*                           Kenai Peninsula                             *
*************************************************************************
* Begin data for first area (see below description for area 2)
```

```
*
AREA
'Kenai'
'/u/jurotich/shave/kenai.shv'
  0  0  0  5  0  8.1  1
  * Connectivity data (see accompanying diagram)
* Area number this area connects with
* |  Number of tie lines in connection path
* |  |     Tie line numbers (in order from this area to connected area)
* |  |     |
  2  1     1
  3  2     1 3
  4  3     1 3 5
************** EXISTING GENERATION **********
G 18 'Bernice 2' 19.3 3 'Q' 100 'U' 0.05
3
3
2.06 0.030 1997 6500 0.030 1997
82.82 8.77628 0.08
21
1    1   1    1    0 0.44 0
0.15 0.3 0.3  1
200  0   25.0 1000 0.03 1997
**********************************************
G 19 'Bernice 3' 28 3 'Q' 0 'A' 0.07
3
3
2.06 0.030 1997 6500 0.030 1997
104.4 7.83575 0.06
21
1     1    1    1    0 0.44 0
0.165 0.33 0.33 1
200   0    25.0 1000 0.03 1997
**********************************************
G 20 'Bernice 4' 28 7 'Q' 0 'A' 0.05
3
3
2.06 0.030 1997 6500 0.030 1997
102.7 9.3567 0.01
21
1     1    1    1    0 0.44 0
0.165 0.33 0.33 1
200   0    25.0 1000 0 0.03 1997
**********************************************
G 24 'Soldotna 1' 39 6 ' ' 0 'A' 0.01
4
4
2.06 0.030 1997 3300 0.030 1996
136.1 5.571 0.060
14
1     1    6    6    0    0.42 0
0.125 0.25 0.25 1
200   0    45   1000 0.03 1997
*
************** Emergency Purchase ***********
*
PR 997 'EMERG PURCH' 150 0  ' ' 0  'A' 0
999.0 0.035 1996
*
*************************************************************************
*                              Anchorage Area                           *
*************************************************************************
*
*
AREA
*
* area name (maximum of 12 characters enclosed in quotes)
* |
  'Anchorage'
* Hourly demands filename for this area (maximum of 48 characters enclosed in quotes)
```

```
* |
 '/u/jurotich/shave/anchrage.shv'
 *
* ____These two items are not yet implemented - enter zeroes
* |  |
* |  |  a  b: Spinning reserve requirement for this area = a x demand + b
* |  |  |  |
* |  |  |  |   a  b: Operating reserve requirement for this area = a x demand + b
* |  |  |  |   |  |
* |  |  |  |   |  |  Minimum number of on-line units required for this area
* |  |  |  |   |  |  |
  0  0  0  53.5  0  91.7 0
*
* Connectivity data (see accompanying diagram)
* Area number this area connects with
* |  Number of tie lines in connection path
* |  |     Tie line numbers (in order from this area to connected area)
* |  |     |
  1  1     2
  3  1     3
  4  2     3 5
************** EXISTING GENERATION **********
*
G 1 'ML&P P1 U1' 16.8 3 'Q' 0 'A' 0.033
1
1
2.06 0.03 1997 7660 0.03 1997
79.63 9.2837 0.049
7
1    1   1      1   0 0.44 0
0.25 0.5 0.5    1
200  0   79.629 402 0.03 1997
************************************************
G 2 'ML&P P1 U2' 16.8 3 'Q' 0 'A' 0.033
1
1
2.06 0.03 1997 7660 0.03 1997
74.92 8.254 0.0869
7
1    1   1     1   0 0.44 0
0.25 0.5 0.5   1
200  0   74.92 400 0.03 1997
************************************************
G 3 'ML&P P1 U3' 19.5 3 'Q' 0 'A' 0.033
1
1
2.06 0.03 1997 7660 0.03 1997
86.7 7.7585 0.1111
14
1    1   1    1   0 0.44 0
0.25 0.5 0.25 1
200  0   86.7 441 0.03 1997
************************************************
G 4 'ML&P P1 U4' 34.1 3 'Q' 0 'A' 0.033
1
1
2.06 0.03 1996 7660 0.03 1996
165.1 7.5594 0.0329
14
1     1    1      1   0    0.44 0
0.125 0.25 0.25   1
200   0    165.07 791 0.03 1997
************************************************
G 5 'ML&P P2 U5-6' 49.2 10 ' ' 0 'A' 0.033
1
1
2.06 0.03 1997 7266 0.03 1997
168 6.74 0.0026
14
1     1     16    6    0    0.625 0
```

```
0.165 0.33  0.33  1
200   0     168.0 1148 0.03 1997
**********************************************
G 6 'ML&P P2 U7-6' 109.5 10 ' ' 0 'A' 0.033
1
1
2.06 0.03 1997 7266 0.03 1997
199 5.93 0.008
14
1     1    16    6    0    0.28 0
0.165 0.33 0.33  1
200   0    199.0 2539 0.03 1997
**********************************************
G 7 'ML&P P2 U8' 87.6 20 ' ' 0 'A' 0.033
1
1
2.06 0.03 1997 7266 0.03 1997
216.7 8.1877 0.0122
14
1     1     6      6     0    0.078 0
0.084 0.167 0.167  1
200   0     216.2  2057  0.03 1997
**********************************************
G 10 'Beluga 1' 16.7 3 'Q ' 0 'A' 0.07
2
2
2.06 0.030 1997 7950 0.030 1997
83.57046 10.856 0.07032
21
1    1    1    1    0 0.44 0
0.15 0.30 0.30 1
200  0    20.0 1000 0.03 1997
**********************************************
G 11 'Beluga 2' 16.7 3 'Q ' 0 'A' 0.004
2
2
2.06 0.030 1997 7950 0.030 1997
129.98 8.3371 0.0829
21
1    1    1    1    0 0.44  0
0.15 0.23 0.23 1
200  0    32.0 1000 0.03 1997
*********************************************
G 12 'Beluga 3' 66.9 3 'Q' 0 'A' 0.01
2
2
2.06 0.030 1997 7950 0.030 1997
196.9959 8.4491 0.01243
28
1    1    6   6   0 0.44  0
0.15 0.30 0.30 1
200  0    67.0 1600 0.03 1997
*********************************************
G 13 'Beluga 5' 71 3 'Q' 0 'A' 0.00
2
2
2.06 0.030 1997 7950 0.030 1997
208.6894 7.8766 0.0223
28
1     1    6   6   0 0.44  0
0.185 0.37 0.37 1
200   0    67.0 1600 0.03 1997
*********************************************
G 14 'Beluga 6CT' 74 3 ' ' 0 'U' 0.10
2
2
2.06 0.030 1997 7950 0.030 1997
243.93564 8.525 0.01201
28
1     1    6   6   0 0.44 0
```

```
0.185 0.37 0.37 1
200   0    67.0 3600 0.03 1997
**********************************************
G 15 'Beluga 6-8' 101.5 48 ' ' 0 'A' 0.004
2
2
2.06 0.030 1997 7950 0.030 1997
380.7771 2.6953 0.02882
28
1   1   16   6   0 0.44 0
0.5 1.0 1.0  0.45
200 0   67.0 3600 0.03 1997
**********************************************
G 16 'Beluga 7CT' 74 3 ' ' 0 'U' 0.004
2
2
2.06 0.030 1997 7950 0.030 1997
222.87852 8.3 0.02489
28
1    1    6   6   0 0.44 0
0.21 0.42 0.42 1
200  0    67.0 3600 0.03 1997
**********************************************
G 17 'Beluga 7-8' 101.5 48 ' ' 0 'A' 0.04
2
2
2.06 0.030 1997 7950 0.030 1997
291.9567 4.463 0.01783
28
1   1   16   6   0    0.44 0
0.5 1.0 1.0  0.45
200 0   67.0 3600 0.03 1997
**********************************************
G 21 'Intrnl 1' 15 3 'Q' 0 'A' 0.10
4
4
2.06 0.030 1997 5750 0.030 1997
83.07 8.48275 0.14
14
1    1    1    1    0 0.44  0
0.21 0.42 0.42 1
200  0    21.0 1000 0.03 1997
**********************************************
G 22 'Intrnl 2' 15.1 3 'Q' 0 'A' 0.10
4
4
2.06 0.030 1997 5750 0.030 1997
88.96 5.90928 0.37
14
1    1    1    1    0 0.44  0
0.21 0.42 0.42 1
200  0    21.0 1000 0.03 1997
**********************************************
G 23 'Intrnl 3' 18.9 3 'Q' 0 'A' 0.11
4
4
2.06 0.030 1997 5750 0.030 1997
91.76 7.94660 0.12
14
1    1    1    1    0 0.44  0
0.21 0.42 0.42 1
200  0    23.0 1000 0.03 1997
*
************** Emergency Purchase ***********
*
PR 998 'EMERG PURCH' 150 0  ' ' 0  'A' 0
999.0 0.035 1996
*
*************************************************************************
*                                Healy                                  *
```

```
*****************************************************************************
* Begin data for third area (see above description for area 2)
*
AREA
'Healy'
'/u/jurotich/shave/healy.shv'
  0  0  0  0  0  0  0
* Connectivity data (see accompanying diagram)
* Area number this area connects with
* |  Number of tie lines in connection path
* |  |     Tie line numbers (in order from this area to connected area)
* |  |     |
  1  2     4 2
  2  1     4
  4  1     5
*
************** EXISTING GENERATION **********
G 36 'Healy 1' 25 3 'M' 0 'A' 0.09
7
3.11  0.03  1996
10.87 0.030 1996 94657 0.030 1996
95.738 7.998 0.0867
2 7 0115 10 0615
1   1  1  1    0.46 0.37    0
6.5 13 13 1
200 0  20 1000 0.03 1997
*********************************************
G 37 'Healy D1' 2.6 0.5 ' ' 0 'A' 0.05
3.20  0.03  1997
3.20  0.03  1997
8.00 0.030 1996 22655 0.030 1996
0 14.00 0
2 7 0215 10 0601
1     1    1    1   0.84 0.76   0
0.025 0.05 0.05 1
200   0    0    500 0.03    1997
*********************************************
G 38 'HCCP' 53 10 'M' 0 'A' 0.10
5
3.11  0.03  1996
10.00 0.03 1997 63800 0.03 1997
80.138 7.9918 0.0434
20
1   1    1  1    0.3 0.35   0
3   8    4  1
200 1112 0  1000 0.03   1997
*
*****************************************************************************
*                             Fairbanks Area                                *
*****************************************************************************
* Begin data for fourth area (see above description for area 2)
*
AREA
'Fairbanks'
'/u/jurotich/shave/gvea.shv'
  0  0  0  10  0  80  0
  * Connectivity data (see accompanying diagram)
* Area number this area connects with
* |  Number of tie lines in connection path
* |  |     Tie line numbers (in order from this area to connected area)
* |  |     |
  1  3     6 4 2
  2  2     6 4
  3  1     6
*
************** EXISTING GENERATION **********
G 30 'Zehnder EMD5' 2.6 0.5 ' ' 0 'A' 0.01
3.31  0.03  1997
3.31  0.03  1997
8.00 0.030 1996 8199 0.030 1996
```

```
0 14.00 0
0
1     1    1    1   0.84 0.76   0
0.035 0.07 0.07 1
200   0    0    500 0.03    1997
**********************************************
G 31 'Zehnder EMD6' 2.6 0.5 ' ' 0 'A' 0.01
3.31  0.03  1997
3.31  0.03  1997
8.00 0.030 1996 8199 0.030 1996
0 14.00 0
0
1     1    1    1   0.84 0.76   0
0.035 0.07 0.07 1
200   0    0    500 0.03    1997
**********************************************
G 32 'Zehnder GT1' 18 6 'Q' 0 'A' 0.01
3.31  0.03  1997
3.31  0.03  1997
5.21 0.030 1996 7618 0.030 1996
97.72 6.2534 0.1599
2 3 0415 3 1001
1    1    1    1    0.84 0.76   0
0.15 0.30 0.30 1
200  0    20   1000 0.03    1997
**********************************************
G 33 'Zehnder GT2' 18 6 'Q' 0 'A' 0.01
3.31  0.03  1997
3.31  0.03  1997
5.21 0.030 1996 7618 0.030 1996
97.72 6.253401 0.1599
2 3 0401 3 1015
1    1    1    1    0.84 0.76   0
0.15 0.30 0.30 1
200  0    20   1000 0.03    1997
**********************************************
G 34 'North Pole 1' 64 5 ' ' 0 'A' 0.05
3.09  0.03  1997
3.09  0.03  1997
4.66 0.030 1996 5167 0.030 1996
167.46 5.022 0.033
2 3 0515 3 1101
1     1    6    6    0.89 0.73  0
0.365 0.73 0.73 1
200   0    30   1600 0.03   1997
**********************************************
G 35 'North Pole 2' 64 5 'Q' 0 'A' 0.08
3.09  0.03  1997
3.09  0.03  1997
4.66 0.030 1996 5167 0.030 1996
181.74 4.5092 0.0282
2 3 0501 3 1115
1     1    6    6    0.89 0.73  0
0.365 0.73 0.73 1
200   0    30   1600 0.03   1997
**********************************************
G 39 'Chena 6' 29.3 10  'Q' 0 'U' 0.05
3.40 0.03 1996
3.40 0.03 1996
0.30 0.030 1997 9000 0.030 1997
72.972 8.8103 0.014
1 15 0501
1    1    4    0   0.02 0.12  0
0.15 0.30 0.30 1
200  0    26.3    1000 0.03 1997
**********************************************
G 40 'SILOS' 70 0.5 'Q' 274 'A' 0.0
100.00  0.03  1996
100.00  0.03  1996
10.00 0.030 1996 0 0.030 1996
```

```
0 10.000 0
0
1 1 1 1 0 0 0
0 0 0 1
0 0 0 0 0 0
*
************** Emergency Purchase ***********
*
PR 999 'EMERG PURCH' 150 0  ' ' 0  'A' 0
999.0 0.035 1996
*
*
PRICES
*
*****************************************************************************
*                Annual Fuel Price & Purchase Price Table                   *
*****************************************************************************
*                                New Plant                                  *
*       ML&P &                   Soldotna                                   *
*       Joint   Beluga  Bernice & Intn'l HCCP   Aurora  Healy               *
*       NGas    NGas    NGas    NGas     Coal   Purch.  Coal               *
*       $/MBtu  $/MBtu  $/MBtu  $/MBtu   $/MBtu $/MWh   $/MBtu              *
*****************************************************************************
1996    1.86    1.17    1.38    1.98     0.00   00.00   1.36
1997    1.74    1.46    1.50    2.25     0.60   00.00   1.39
1998    1.97    1.69    1.70    2.05     0.62   40.00   1.02
1999    2.01    1.73    1.75    2.10     0.65   40.00   0.94
2000    2.06    1.78    1.80    2.15     0.67   37.00   0.97
2001    2.12    1.84    1.85    2.20     0.70   37.00   0.99
2002    2.16    1.88    1.90    2.25     0.76   37.93   1.05
2003    2.22    1.94    1.95    2.30     0.77   38.87   1.07
2004    2.27    1.99    2.00    2.35     0.79   39.84   1.09
2005    2.33    2.05    2.06    2.41     0.80   40.84   1.11
2006    2.39    2.11    2.12    2.47     0.82   41.86   1.13
2007    2.44    2.16    2.18    2.53     0.83   42.91   1.16
2008    2.50    2.22    2.24    2.59     0.85   43.98   1.18
2009    2.57    2.29    2.30    2.65     0.87   45.08   1.20
2010    2.63    2.35    2.37    2.72     0.88   46.21   1.22
2011    2.70    2.42    2.44    2.79     0.90   47.36   1.25
2012    2.77    2.49    2.50    2.85     0.92   48.55   1.27
2013    2.84    2.56    2.57    2.92     0.93   49.76   1.29
2014    2.91    2.63    2.65    3.00     0.95   51.00   1.32
2015    2.98    2.70    2.72    3.07     0.97   52.28   1.34
2016    3.06    2.78    2.80    3.15     0.99   53.59   1.37
2017    3.06    2.78    2.80    3.15     0.99   53.59   1.37
*
*****************************************************************************
*                            Starts & Retirements                           *
*****************************************************************************
*
START  39 1997 1001
*********************
START   18 1998 0101
*
*****************************************************************************
*                            Change Mod Section                             *
*****************************************************************************
*
YEAR 1997
DAY 0101
MOD 12 2 92
************
YEAR 1997
DAY 0401
MOD 1  1  14
MOD 23 1  320   0.03    1997
MOD 1  2  14
MOD 23 2  320   0.03    1997
MOD 1  3  17.7
MOD 23 3  406   0.03    1997
```

```
MOD 1  4  31.1
MOD 23 4  697   0.03    1997
MOD 1  5  44.6
MOD 23 5  1005  0.03    1997
MOD 1  6  99.4
MOD 23 6  2237  0.03    1997
MOD 1  7  77.3
MOD 23 7  1746  0.03    1997
MOD 1  10 14.4
MOD 1  11 14.4
MOD 1  12 60.3
MOD 1  13 59.5
MOD 1  14 68
MOD 1  15 95.5
MOD 1  16 68
MOD 1  17 95.5
MOD 1  18 16.7
MOD 1  19 25.5
MOD 1  20 25.5
MOD 1  21 13.8
MOD 1  22 13.8
MOD 1  23 16.7
MOD 1  24 35.2
MOD 1  32 15.7
MOD 1  33 15.7
MOD 1  34 45.9
MOD 1  35 43.8
************
YEAR 1997
DAY 1001
MOD 1  1  16.8
MOD 23 1  402 0.03 1997
MOD 1  2  16.8
MOD 23 2  400 0.03 1997
MOD 1  3  19.5
MOD 23 3  441 0.03 1997
MOD 1  4  34.1
MOD 23 4  791 0.03 1997
MOD 1  5  49.2
MOD 23 5  1148 0.03 1997
MOD 1  6  109.5
MOD 23 6  2539 0.03 1997
MOD 1  7  87.6
MOD 23 7  2057 0.03 1997
MOD 1  10 16.7
MOD 1  11 16.7
MOD 1  12 66.9
MOD 1  13 71
MOD 1  14 74
MOD 1  15 101.5
MOD 1  16 74
MOD 1  17 101.5
MOD 1  18 19.3
MOD 1  19 28
MOD 1  20 28
MOD 1  21 15
MOD 1  22 15.1
MOD 1  23 18.9
MOD 1  24 39
MOD 1  32 18
MOD 1  33 18
MOD 1  34 56.7
MOD 1  35 59.3
************
YEAR 1998
DAY 0101
MOD 12 17 120
MOD 12 2 7
MOD 12 7 55
MOD 12 32 92
```

```
MOD 12 33 92
************
YEAR 1998
DAY 0401
MOD 1  1  14
MOD 23 1  320   0.03    1997
MOD 1  2  14
MOD 23 2  320   0.03    1997
MOD 1  3  17.7
MOD 23 3  406   0.03    1997
MOD 1  4  31.1
MOD 23 4  697   0.03    1997
MOD 1  5  44.6
MOD 23 5  1005  0.03    1997
MOD 1  6  99.4
MOD 23 6  2237  0.03    1997
MOD 1  7  77.3
MOD 23 7  1746  0.03    1997
MOD 1  10 14.4
MOD 1  11 14.4
MOD 1  12 60.3
MOD 1  13 59.5
MOD 1  14 68
MOD 1  15 95.5
MOD 1  16 68
MOD 1  17 95.5
MOD 1  18 16.7
MOD 1  19 25.5
MOD 1  20 25.5
MOD 1  21 13.8
MOD 1  22 13.8
MOD 1  23 16.7
MOD 1  24 35.2
MOD 1  32 15.7
MOD 1  33 15.7
MOD 1  34 45.9
MOD 1  35 43.8
************
YEAR 1998
DAY 1001
MOD 1  1  16.8
MOD 23 1  402 0.03 1997
MOD 1  2  16.8
MOD 23 2  400 0.03 1997
MOD 1  3  19.5
MOD 23 3  441 0.03 1997
MOD 1  4  34.1
MOD 23 4  791 0.03 1997
MOD 1  5  49.2
MOD 23 5  1148 0.03 1997
MOD 1  6  109.5
MOD 23 6  2539 0.03 1997
MOD 1  7  87.6
MOD 23 7  2057 0.03 1997
MOD 1  10 16.7
MOD 1  11 16.7
MOD 1  12 66.9
MOD 1  13 71
MOD 1  14 74
MOD 1  15 101.5
MOD 1  16 74
MOD 1  17 101.5
MOD 1  18 19.3
MOD 1  19 28
MOD 1  20 28
MOD 1  21 15
MOD 1  22 15.1
MOD 1  23 18.9
MOD 1  24 39
MOD 1  32 18
```

```
MOD 1  33 18
MOD 1  34 56.7
MOD 1  35 59.3
**************
YEAR 1999
DAY 0101
MOD 12 15 119
MOD 12 17 28
MOD 12 7 14
MOD 12 3 92
MOD 12 32 2 3 0415 3 1001
MOD 12 33 2 3 0401 3 1015
MOD 12 34 92
MOD 12 35 92
************
YEAR 1999
DAY 0401
MOD 1  1  14
MOD 23 1  320   0.03    1997
MOD 1  2  14
MOD 23 2  320   0.03    1997
MOD 1  3  17.7
MOD 23 3  406   0.03    1997
MOD 1  4  31.1
MOD 23 4  697   0.03    1997
MOD 1  5  44.6
MOD 23 5  1005  0.03    1997
MOD 1  6  99.4
MOD 23 6  2237  0.03    1997
MOD 1  7  77.3
MOD 23 7  1746  0.03    1997
MOD 1  10 14.4
MOD 1  11 14.4
MOD 1  12 60.3
MOD 1  13 59.5
MOD 1  14 68
MOD 1  15 95.5
MOD 1  16 68
MOD 1  17 95.5
MOD 1  18 16.7
MOD 1  19 25.5
MOD 1  20 25.5
MOD 1  21 13.8
MOD 1  22 13.8
MOD 1  23 16.7
MOD 1  24 35.2
MOD 1  32 15.7
MOD 1  33 15.7
MOD 1  34 45.9
MOD 1  35 43.8
************
YEAR 1999
DAY 1001
MOD 1  1  16.8
MOD 23 1  402 0.03 1997
MOD 1  2  16.8
MOD 23 2  400 0.03 1997
MOD 1  3  19.5
MOD 23 3  441 0.03 1997
MOD 1  4  34.1
MOD 23 4  791 0.03 1997
MOD 1  5  49.2
MOD 23 5  1148 0.03 1997
MOD 1  6  109.5
MOD 23 6  2539 0.03 1997
MOD 1  7  87.6
MOD 23 7  2057 0.03 1997
MOD 1  10 16.7
MOD 1  11 16.7
MOD 1  12 66.9
```

```
MOD 1  13 71
MOD 1  14 74
MOD 1  15 101.5
MOD 1  16 74
MOD 1  17 101.5
MOD 1  18 19.3
MOD 1  19 28
MOD 1  20 28
MOD 1  21 15
MOD 1  22 15.1
MOD 1  23 18.9
MOD 1  24 39
MOD 1  32 18
MOD 1  33 18
MOD 1  34 56.7
MOD 1  35 59.3
************
YEAR 2000
DAY 0101
MOD 12 15 28
MOD 12 24 45
MOD 12 3 14
MOD 12 5 92
MOD 12 6 92
MOD 12 34 2 3 0515 3 1101
MOD 12 35 2 3 0501 3 1115
MOD 12 36 92
*
*
END
```

```
PARAMETERS  0.50 75
* Optional output title lines as in POWRPRO data
*
T Multi Area Model -- Pooled Case
T Uses Power Pool Price Files from the Traditional Scenario
T
*
* Control on printing input echo and/or progress of run to screen (see POWRPRO input
* description - Block 2 Line 1)
* |     First month of run
* |     |     Number of days to run
* |     |     |    Number of areas to be simulated
* |     |     |    |    Capacity fraction to use for calculaton of commitment priority
* |     |     |    |    |     Enter 1 to have variable o&m included in commitment and
* |     |     |    |    |     dispatch - 0 otherwise
* |     |     |    |    |     |   Output selector (see POWRPRO input description -
* |     |     |    |    |     |   Block 2 Line 1)
* |     |     |    |    |     |   |     Enter the # of areas to calculate the hourly
* |     |     |    |    |     |   |     dispatch incremental, else 0
* |     |     |    |    |     |   |     |   Enter 1 to activate dispatch review option
* |     |     |    |    |     |   |     |   - 0 otherwise
* |     |     |    |    |     |   |     |   |   Enter 1 to have hourly average fuel prices
* |     |     |    |    |     |   |     |   |   written to a file - 0 otherwise
* |     |     |    |    |     |   |     |   |   |   Enter 1 to have annual summary written
* |     |     |    |    |     |   |     |   |   |   to a file - 0 otherwise
* |     |     |    |    |     |   |     |   |   |   |   Enter a unit number here to get
* |     |     |    |    |     |   |     |   |   |   |   it's hourly generation written to
* |     |     |    |    |     |   |     |   |   |   |   a file - 0 otherwise
* |     |     |    |    |     |   |     |   |   |   |   |     _______ These two items are
* |     |     |    |    |     |   |     |   |   |   |   |     |     | not yet implemented
* |     |     |    |    |     |   |     |   |   |   |   |     |     | - enter zeroes
* |     |     |    |    |     |   |     |   |   |   |   |     |     |
 -1000  1     365  4    1.0   1   2     0   0   0   1   0     0     0
*
*  First year to run
*  |
*  |       Last year to run
*  |       |
   2000    2001
*
'/u/jurotich/pool/pool2.sum'
*
*
*
TIE (code indicating tie line data follow - must be entered as shown - not needed if
*   only one area is simulated)
*
* Tie line number
* | 'From' area
* |  |     'To' area
* |  |     |      Tie line capacity - Mw
* |  |     |      |         a       b: power loss in tie line (mw) = a x Mw + b x Mw**2
* |  |     |      |         |       |   (where Mw = megawatts flowing)
* |  |     |      |         |       |       Wheeling cost ($/Mwh)
* |  |     |      |         |       |       |
*
* Kenai to Anchorage
  1  1     2      75       -0.0015  0.0014  0
  2  2     1      75       -0.0015  0.0014  0
* Anchorage to Healy
  3  2     3      79       -0.0041  0.0008  0
  4  3     2      79       -0.0041  0.0008  0
* Healy to Fairbanks
  5  3     4      140      -0.0059  0.0004  0
  6  4     3      140      -0.0059  0.0004  0
*
*************************************************************************
*                           Kenai Peninsula                             *
*************************************************************************
* Begin data for first area (see below description for area 2)
```

```
*
AREA
'Kenai'
'/u/jurotich/shave/kenai.shv'
  0  0  0  0.1  0  2.9  1
  * Connectivity data (see accompanying diagram)
* Area number this area connects with
* |  Number of tie lines in connection path
* |  |     Tie line numbers (in order from this area to connected area)
* |  |     |
  2  1     1
  3  2     1 3
  4  3     1 3 5
************** EXISTING GENERATION **********
G 18 'Bernice 2' 19.3 3 'Q' 100 'U' 0.05
3
3
2.06 0.030 1997 6500 0.030 1997
82.82 8.77628 0.08
21
1    1   1    1    0 0.44 0
0.15 0.3 0.3  1
200  0   25.0 1000 0.03 1997
**********************************************
G 19 'Bernice 3' 28 3 'Q' 0 'A' 0.07
3
3
2.06 0.030 1997 6500 0.030 1997
104.4 7.83575 0.06
21
1     1    1    1    0 0.44 0
0.165 0.33 0.33 1
200   0    25.0 1000 0.03 1997
**********************************************
G 20 'Bernice 4' 28 7 'Q' 0 'A' 0.05
3
3
2.06 0.030 1997 6500 0.030 1997
102.7 9.3567 0.01
21
1     1    1    1    0 0.44 0
0.165 0.33 0.33 1
200   0    25.0 1000 0 0.03 1997
**********************************************
G 24 'Soldotna 1' 39 6 ' ' 0 'A' 0.01
4
4
2.06 0.030 1997 3300 0.030 1996
136.1 5.571 0.060
14
1     1    6    6    0    0.42 0
0.125 0.25 0.25 1
200   0    45   1000 0.03 1997
*
************** Emergency Purchase ***********
*
PR 997 'EMERG PURCH' 150 0  ' ' 0  'A' 0
999.0 0.035 1996
*
*************************************************************************
*                              Anchorage Area                           *
*************************************************************************
*
*
AREA
*
* area name (maximum of 12 characters enclosed in quotes)
* |
  'Anchorage'
* Hourly demands filename for this area (maximum of 48 characters enclosed in quotes)
```

```
* |
 '/u/jurotich/shave/anchrage.shv'
 *
* ____These two items are not yet implemented - enter zeroes
* |  |
* |  |  a  b: Spinning reserve requirement for this area = a x demand + b
* |  |  |  |
* |  |  |  |   a  b: Operating reserve requirement for this area = a x demand + b
* |  |  |  |   |  |
* |  |  |  |   |  |  Minimum number of on-line units required for this area
* |  |  |  |   |  |  |
  0  0  0 28.5 0  64.9 0
*
* Connectivity data (see accompanying diagram)
* Area number this area connects with
* |  Number of tie lines in connection path
* |  |     Tie line numbers (in order from this area to connected area)
* |  |     |
  1  1     2
  3  1     3
  4  2     3 5
************** EXISTING GENERATION **********
*
G 1 'ML&P P1 U1' 16.8 3 'Q' 0 'A' 0.033
1
1
2.06 0.03 1997 7660 0.03 1997
79.63 9.2837 0.049
7
1    1   1      1   0 0.44 0
0.25 0.5 0.5    1
200  0   79.629 402 0.03 1997
************************************************
G 2 'ML&P P1 U2' 16.8 3 'Q' 0 'A' 0.033
1
1
2.06 0.03 1997 7660 0.03 1997
74.92 8.254 0.0869
7
1    1   1     1   0 0.44 0
0.25 0.5 0.5   1
200  0   74.92 400 0.03 1997
************************************************
G 3 'ML&P P1 U3' 19.5 3 'Q' 0 'A' 0.033
1
1
2.06 0.03 1997 7660 0.03 1997
86.7 7.7585 0.1111
14
1    1   1    1   0 0.44 0
0.25 0.5 0.25 1
200  0   86.7 441 0.03 1997
************************************************
G 4 'ML&P P1 U4' 34.1 3 'Q' 0 'A' 0.033
1
1
2.06 0.03 1996 7660 0.03 1996
165.1 7.5594 0.0329
14
1     1    1      1   0    0.44 0
0.125 0.25 0.25   1
200   0    165.07 791 0.03 1997
************************************************
G 5 'ML&P P2 U5-6' 49.2 10 ' ' 0 'A' 0.033
1
1
2.06 0.03 1997 7266 0.03 1997
168 6.74 0.0026
14
1     1     16    6    0    0.625 0
```

```
0.165 0.33  0.33  1
200   0     168.0 1148 0.03 1997
**********************************************
G 6 'ML&P P2 U7-6' 109.5 10 ' ' 0 'A' 0.033
1
1
2.06 0.03 1997 7266 0.03 1997
199 5.93 0.008
14
1     1    16    6    0    0.28 0
0.165 0.33 0.33  1
200   0    199.0 2539 0.03 1997
**********************************************
G 7 'ML&P P2 U8' 87.6 20 ' ' 0 'A' 0.033
1
1
2.06 0.03 1997 7266 0.03 1997
216.7 8.1877 0.0122
14
1     1     6      6     0    0.078 0
0.084 0.167 0.167  1
200   0     216.2  2057  0.03 1997
**********************************************
G 10 'Beluga 1' 16.7 3 'Q ' 0 'A' 0.07
2
2
2.06 0.030 1997 7950 0.030 1997
83.57046 10.856 0.07032
21
1    1    1    1    0 0.44 0
0.15 0.30 0.30 1
200  0    20.0 1000 0.03 1997
**********************************************
G 11 'Beluga 2' 16.7 3 'Q ' 0 'A' 0.004
2
2
2.06 0.030 1997 7950 0.030 1997
129.98 8.3371 0.0829
21
1    1    1    1    0 0.44  0
0.15 0.23 0.23 1
200  0    32.0 1000 0.03 1997
*********************************************
G 12 'Beluga 3' 66.9 3 'Q' 0 'A' 0.01
2
2
2.06 0.030 1997 7950 0.030 1997
196.9959 8.4491 0.01243
28
1    1    6   6   0 0.44  0
0.15 0.30 0.30 1
200  0    67.0 1600 0.03 1997
*********************************************
G 13 'Beluga 5' 71 3 'Q' 0 'A' 0.00
2
2
2.06 0.030 1997 7950 0.030 1997
208.6894 7.8766 0.0223
28
1     1    6   6   0 0.44  0
0.185 0.37 0.37 1
200   0    67.0 1600 0.03 1997
*********************************************
G 14 'Beluga 6CT' 74 3 ' ' 0 'U' 0.10
2
2
2.06 0.030 1997 7950 0.030 1997
243.93564 8.525 0.01201
28
1     1    6   6   0 0.44 0
```

```
0.185 0.37 0.37 1
200   0    67.0 3600 0.03 1997
**********************************************
G 15 'Beluga 6-8' 101.5 48 ' ' 0 'A' 0.004
2
2
2.06 0.030 1997 7950 0.030 1997
380.7771 2.6953 0.02882
28
1   1   16   6   0 0.44 0
0.5 1.0 1.0  0.45
200 0   67.0 3600 0.03 1997
**********************************************
G 16 'Beluga 7CT' 74 3 ' ' 0 'U' 0.004
2
2
2.06 0.030 1997 7950 0.030 1997
222.87852 8.3 0.02489
28
1    1    6   6   0 0.44 0
0.21 0.42 0.42 1
200  0    67.0 3600 0.03 1997
**********************************************
G 17 'Beluga 7-8' 101.5 48 ' ' 0 'A' 0.04
2
2
2.06 0.030 1997 7950 0.030 1997
291.9567 4.463 0.01783
28
1   1   16   6   0    0.44 0
0.5 1.0 1.0  0.45
200 0   67.0 3600 0.03 1997
**********************************************
G 21 'Intrnl 1' 15 3 'Q' 0 'A' 0.10
4
4
2.06 0.030 1997 5750 0.030 1997
83.07 8.48275 0.14
14
1    1    1    1    0 0.44  0
0.21 0.42 0.42 1
200  0    21.0 1000 0.03 1997
**********************************************
G 22 'Intrnl 2' 15.1 3 'Q' 0 'A' 0.10
4
4
2.06 0.030 1997 5750 0.030 1997
88.96 5.90928 0.37
14
1    1    1    1    0 0.44  0
0.21 0.42 0.42 1
200  0    21.0 1000 0.03 1997
**********************************************
G 23 'Intrnl 3' 18.9 3 'Q' 0 'A' 0.11
4
4
2.06 0.030 1997 5750 0.030 1997
91.76 7.94660 0.12
14
1    1    1    1    0 0.44  0
0.21 0.42 0.42 1
200  0    23.0 1000 0.03 1997
*
************** Emergency Purchase ***********
*
PR 998 'EMERG PURCH' 150 0  ' ' 0  'A' 0
999.0 0.035 1996
*
*************************************************************************
*                                Healy                                  *
```

```
*****************************************************************************
* Begin data for third area (see above description for area 2)
*
AREA
'Healy'
'/u/jurotich/shave/healy.shv'
  0  0  0  0  0  0  0
* Connectivity data (see accompanying diagram)
* Area number this area connects with
* |  Number of tie lines in connection path
* |  |     Tie line numbers (in order from this area to connected area)
* |  |     |
  1  2     4 2
  2  1     4
  4  1     5
*
************** EXISTING GENERATION **********
G 36 'Healy 1' 25 3 'M' 0 'A' 0.09
7
3.11  0.03  1996
10.87 0.030 1996 94657 0.030 1996
95.738 7.998 0.0867
2 7 0115 10 0615
1   1  1  1    0.46 0.37    0
6.5 13 13 1
200 0  20 1000 0.03 1997
*********************************************
G 37 'Healy D1' 2.6 0.5 ' ' 0 'A' 0.05
3.20  0.03  1997
3.20  0.03  1997
8.00 0.030 1996 22655 0.030 1996
0 14.00 0
2 7 0215 10 0601
1     1    1    1   0.84 0.76   0
0.025 0.05 0.05 1
200   0    0    500 0.03    1997
*********************************************
G 38 'HCCP' 53 10 'M' 0 'A' 0.10
5
3.11  0.03  1996
10.00 0.03 1997 63800 0.03 1997
80.138 7.9918 0.0434
20
1   1    1  1    0.3 0.35   0
3   8    4  1
200 1112 0  1000 0.03   1997
*
*****************************************************************************
*                             Fairbanks Area                                *
*****************************************************************************
* Begin data for fourth area (see above description for area 2)
*
AREA
'Fairbanks'
'/u/jurotich/shave/gvea.shv'
  0  0  0  10  0  80  0
  * Connectivity data (see accompanying diagram)
* Area number this area connects with
* |  Number of tie lines in connection path
* |  |     Tie line numbers (in order from this area to connected area)
* |  |     |
  1  3     6 4 2
  2  2     6 4
  3  1     6
*
************** EXISTING GENERATION **********
G 30 'Zehnder EMD5' 2.6 0.5 ' ' 0 'A' 0.01
3.31  0.03  1997
3.31  0.03  1997
8.00 0.030 1996 8199 0.030 1996
```

```
0 14.00 0
0
1     1    1    1   0.84 0.76   0
0.035 0.07 0.07 1
200   0    0    500 0.03    1997
**********************************************
G 31 'Zehnder EMD6' 2.6 0.5 ' ' 0 'A' 0.01
3.31  0.03  1997
3.31  0.03  1997
8.00 0.030 1996 8199 0.030 1996
0 14.00 0
0
1     1    1    1   0.84 0.76   0
0.035 0.07 0.07 1
200   0    0    500 0.03    1997
**********************************************
G 32 'Zehnder GT1' 18 6 'Q' 0 'A' 0.01
3.31  0.03  1997
3.31  0.03  1997
5.21 0.030 1996 7618 0.030 1996
97.72 6.2534 0.1599
2 3 0415 3 1001
1    1    1    1    0.84 0.76   0
0.15 0.30 0.30 1
200  0    20   1000 0.03    1997
**********************************************
G 33 'Zehnder GT2' 18 6 'Q' 0 'A' 0.01
3.31  0.03  1997
3.31  0.03  1997
5.21 0.030 1996 7618 0.030 1996
97.72 6.253401 0.1599
2 3 0401 3 1015
1    1    1    1    0.84 0.76   0
0.15 0.30 0.30 1
200  0    20   1000 0.03    1997
**********************************************
G 34 'North Pole 1' 64 5 ' ' 0 'A' 0.05
3.09  0.03  1997
3.09  0.03  1997
4.66 0.030 1996 5167 0.030 1996
167.46 5.022 0.033
2 3 0515 3 1101
1     1    6    6    0.89 0.73  0
0.365 0.73 0.73 1
200   0    30   1600 0.03   1997
**********************************************
G 35 'North Pole 2' 64 5 'Q' 0 'A' 0.08
3.09  0.03  1997
3.09  0.03  1997
4.66 0.030 1996 5167 0.030 1996
181.74 4.5092 0.0282
2 3 0501 3 1115
1     1    6    6    0.89 0.73  0
0.365 0.73 0.73 1
200   0    30   1600 0.03   1997
**********************************************
G 39 'Chena 6' 29.3 10  'Q' 0 'U' 0.05
3.40 0.03 1996
3.40 0.03 1996
0.30 0.030 1997 9000 0.030 1997
72.972 8.8103 0.014
1 15 0501
1    1    4    0   0.02 0.12  0
0.15 0.30 0.30 1
200  0    26.3    1000 0.03 1997
**********************************************
G 40 'SILOS' 70 0.5 'Q' 274 'A' 0.0
100.00  0.03  1996
100.00  0.03  1996
10.00 0.030 1996 0 0.030 1996
```

```
0 10.000 0
0
1 1 1 1 0 0 0
0 0 0 1
0 0 0 0 0 0
*
************** Emergency Purchase ***********
*
PR 999 'EMERG PURCH' 150 0  ' ' 0  'A' 0
999.0 0.035 1996
*
*
PRICES
*
*****************************************************************************
*                Annual Fuel Price & Purchase Price Table                   *
*****************************************************************************
*                                New Plant                                  *
*       ML&P &                   Soldotna                                   *
*       Joint   Beluga  Bernice & Intn'l HCCP   Aurora  Healy               *
*       NGas    NGas    NGas    NGas     Coal   Purch.  Coal                *
*       $/MBtu  $/MBtu  $/MBtu  $/MBtu   $/MBtu $/MWh   $/MBtu              *
*****************************************************************************
1996    1.86    1.17    1.38    1.98     0.00   00.00   1.36
1997    1.74    1.46    1.50    2.25     0.60   00.00   1.39
1998    1.97    1.69    1.70    2.05     0.62   40.00   1.02
1999    2.01    1.73    1.75    2.10     0.65   40.00   0.94
2000    2.06    1.78    1.80    2.15     0.67   37.00   0.97
2001    2.12    1.84    1.85    2.20     0.70   37.00   0.99
2002    2.16    1.88    1.90    2.25     0.76   37.93   1.05
2003    2.22    1.94    1.95    2.30     0.77   38.87   1.07
2004    2.27    1.99    2.00    2.35     0.79   39.84   1.09
2005    2.33    2.05    2.06    2.41     0.80   40.84   1.11
2006    2.39    2.11    2.12    2.47     0.82   41.86   1.13
2007    2.44    2.16    2.18    2.53     0.83   42.91   1.16
2008    2.50    2.22    2.24    2.59     0.85   43.98   1.18
2009    2.57    2.29    2.30    2.65     0.87   45.08   1.20
2010    2.63    2.35    2.37    2.72     0.88   46.21   1.22
2011    2.70    2.42    2.44    2.79     0.90   47.36   1.25
2012    2.77    2.49    2.50    2.85     0.92   48.55   1.27
2013    2.84    2.56    2.57    2.92     0.93   49.76   1.29
2014    2.91    2.63    2.65    3.00     0.95   51.00   1.32
2015    2.98    2.70    2.72    3.07     0.97   52.28   1.34
2016    3.06    2.78    2.80    3.15     0.99   53.59   1.37
2017    3.06    2.78    2.80    3.15     0.99   53.59   1.37
*
*****************************************************************************
*                            Starts & Retirements                           *
*****************************************************************************
*
START  39 1997 1001
*********************
START   18 1998 0101
*********************
RETIRE 15 2001 0430
RETIRE 17 2001 0430
START  14 2001 0501
START  16 2001 0501
RETIRE 14 2001 0731
RETIRE 16 2001 0731
START  15 2001 0801
START  17 2001 0801
*
*****************************************************************************
*                            Change Mod Section                             *
*****************************************************************************
*
**************
YEAR 1999
DAY 0101
```

```
MOD 12 15 119
MOD 12 17 28
MOD 12 7 14
MOD 12 3 92
MOD 12 32 2 3 0415 3 1001
MOD 12 33 2 3 0401 3 1015
MOD 12 34 92
MOD 12 35 92
************
YEAR 1999
DAY 0401
MOD 1  1  14
MOD 23 1  320   0.03    1997
MOD 1  2  14
MOD 23 2  320   0.03    1997
MOD 1  3  17.7
MOD 23 3  406   0.03    1997
MOD 1  4  31.1
MOD 23 4  697   0.03    1997
MOD 1  5  44.6
MOD 23 5  1005  0.03    1997
MOD 1  6  99.4
MOD 23 6  2237  0.03    1997
MOD 1  7  77.3
MOD 23 7  1746  0.03    1997
MOD 1  10 14.4
MOD 1  11 14.4
MOD 1  12 60.3
MOD 1  13 59.5
MOD 1  14 68
MOD 1  15 95.5
MOD 1  16 68
MOD 1  17 95.5
MOD 1  18 16.7
MOD 1  19 25.5
MOD 1  20 25.5
MOD 1  21 13.8
MOD 1  22 13.8
MOD 1  23 16.7
MOD 1  24 35.2
MOD 1  32 15.7
MOD 1  33 15.7
MOD 1  34 45.9
MOD 1  35 43.8
************
YEAR 1999
DAY 1001
MOD 1  1  16.8
MOD 23 1  402 0.03 1997
MOD 1  2  16.8
MOD 23 2  400 0.03 1997
MOD 1  3  19.5
MOD 23 3  441 0.03 1997
MOD 1  4  34.1
MOD 23 4  791 0.03 1997
MOD 1  5  49.2
MOD 23 5  1148 0.03 1997
MOD 1  6  109.5
MOD 23 6  2539 0.03 1997
MOD 1  7  87.6
MOD 23 7  2057 0.03 1997
MOD 1  10 16.7
MOD 1  11 16.7
MOD 1  12 66.9
MOD 1  13 71
MOD 1  14 74
MOD 1  15 101.5
MOD 1  16 74
MOD 1  17 101.5
MOD 1  18 19.3
```

```
MOD 1  19 28
MOD 1  20 28
MOD 1  21 15
MOD 1  22 15.1
MOD 1  23 18.9
MOD 1  24 39
MOD 1  32 18
MOD 1  33 18
MOD 1  34 56.7
MOD 1  35 59.3
************
YEAR 2000
DAY 0101
MOD 12 15 28
MOD 12 24 45
MOD 12 3 14
MOD 12 5 92
MOD 12 6 92
MOD 12 34 2 3 0515 3 1101
MOD 12 35 2 3 0501 3 1115
MOD 12 36 92
************
YEAR 2000
DAY 0401
MOD 1  1  14
MOD 23 1  320   0.03    1997
MOD 1  2  14
MOD 23 2  320   0.03    1997
MOD 1  3  17.7
MOD 23 3  406   0.03    1997
MOD 1  4  31.1
MOD 23 4  697   0.03    1997
MOD 1  5  44.6
MOD 23 5  1005  0.03    1997
MOD 1  6  99.4
MOD 23 6  2237  0.03    1997
MOD 1  7  77.3
MOD 23 7  1746  0.03    1997
MOD 1  10 14.4
MOD 1  11 14.4
MOD 1  12 60.3
MOD 1  13 59.5
MOD 1  14 68
MOD 1  15 95.5
MOD 1  16 68
MOD 1  17 95.5
MOD 1  18 16.7
MOD 1  19 25.5
MOD 1  20 25.5
MOD 1  21 13.8
MOD 1  22 13.8
MOD 1  23 16.7
MOD 1  24 35.2
MOD 1  32 15.7
MOD 1  33 15.7
MOD 1  34 45.9
MOD 1  35 43.8
************
YEAR 2000
DAY 1001
MOD 1  1  16.8
MOD 23 1  402 0.03 1997
MOD 1  2  16.8
MOD 23 2  400 0.03 1997
MOD 1  3  19.5
MOD 23 3  441 0.03 1997
MOD 1  4  34.1
MOD 23 4  791 0.03 1997
MOD 1  5  49.2
MOD 23 5  1148 0.03 1997
```

```
MOD 1  6  109.5
MOD 23 6  2539 0.03 1997
MOD 1  7  87.6
MOD 23 7  2057 0.03 1997
MOD 1  10 16.7
MOD 1  11 16.7
MOD 1  12 66.9
MOD 1  13 71
MOD 1  14 74
MOD 1  15 101.5
MOD 1  16 74
MOD 1  17 101.5
MOD 1  18 19.3
MOD 1  19 28
MOD 1  20 28
MOD 1  21 15
MOD 1  22 15.1
MOD 1  23 18.9
MOD 1  24 39
MOD 1  32 18
MOD 1  33 18
MOD 1  34 56.7
MOD 1  35 59.3
**************
YEAR 2001
DAY 0101
MOD 12 24 14
MOD 12 15 0
MOD 12 17 0
MOD 12 5 14
MOD 12 6 14
MOD 12 36 2 7 0115 10 0615
************
YEAR 2001
DAY 0401
MOD 1  1  14
MOD 23 1  320   0.03    1997
MOD 1  2  14
MOD 23 2  320   0.03    1997
MOD 1  3  17.7
MOD 23 3  406   0.03    1997
MOD 1  4  31.1
MOD 23 4  697   0.03    1997
MOD 1  5  44.6
MOD 23 5  1005  0.03    1997
MOD 1  6  99.4
MOD 23 6  2237  0.03    1997
MOD 1  7  77.3
MOD 23 7  1746  0.03    1997
MOD 1  10 14.4
MOD 1  11 14.4
MOD 1  12 60.3
MOD 1  13 59.5
MOD 1  14 68
MOD 1  15 95.5
MOD 1  16 68
MOD 1  17 95.5
MOD 1  18 16.7
MOD 1  19 25.5
MOD 1  20 25.5
MOD 1  21 13.8
MOD 1  22 13.8
MOD 1  23 16.7
MOD 1  24 35.2
MOD 1  32 15.7
MOD 1  33 15.7
MOD 1  34 45.9
MOD 1  35 43.8
************
YEAR 2001
```

```
DAY 1001
MOD 1  1  16.8
MOD 23 1  402 0.03 1997
MOD 1  2  16.8
MOD 23 2  400 0.03 1997
MOD 1  3  19.5
MOD 23 3  441 0.03 1997
MOD 1  4  34.1
MOD 23 4  791 0.03 1997
MOD 1  5  49.2
MOD 23 5  1148 0.03 1997
MOD 1  6  109.5
MOD 23 6  2539 0.03 1997
MOD 1  7  87.6
MOD 23 7  2057 0.03 1997
MOD 1  10 16.7
MOD 1  11 16.7
MOD 1  12 66.9
MOD 1  13 71
MOD 1  14 74
MOD 1  15 101.5
MOD 1  16 74
MOD 1  17 101.5
MOD 1  18 19.3
MOD 1  19 28
MOD 1  20 28
MOD 1  21 15
MOD 1  22 15.1
MOD 1  23 18.9
MOD 1  24 39
MOD 1  32 18
MOD 1  33 18
MOD 1  34 56.7
MOD 1  35 59.3
************
YEAR 2002
DAY 0101
MOD 12 15 28
MOD 12 17 28
*
*
END
```

```
PARAMETERS  0.50 75
* Optional output title lines as in POWRPRO data
*
T Multi Area Model -- Pooled Case
T Uses Power Pool Price Files from the Traditional Scenario
T
*
* Control on printing input echo and/or progress of run to screen (see POWRPRO input
* description - Block 2 Line 1)
* |     First month of run
* |     |     Number of days to run
* |     |     |    Number of areas to be simulated
* |     |     |    |    Capacity fraction to use for calculaton of commitment priority
* |     |     |    |    |     Enter 1 to have variable o&m included in commitment and
* |     |     |    |    |     dispatch - 0 otherwise
* |     |     |    |    |     |   Output selector (see POWRPRO input description -
* |     |     |    |    |     |   Block 2 Line 1)
* |     |     |    |    |     |   |     Enter the # of areas to calculate the hourly
* |     |     |    |    |     |   |     dispatch incremental, else 0
* |     |     |    |    |     |   |     |   Enter 1 to activate dispatch review option
* |     |     |    |    |     |   |     |   - 0 otherwise
* |     |     |    |    |     |   |     |   |   Enter 1 to have hourly average fuel prices
* |     |     |    |    |     |   |     |   |   written to a file - 0 otherwise
* |     |     |    |    |     |   |     |   |   |   Enter 1 to have annual summary written
* |     |     |    |    |     |   |     |   |   |   to a file - 0 otherwise
* |     |     |    |    |     |   |     |   |   |   |   Enter a unit number here to get
* |     |     |    |    |     |   |     |   |   |   |   it's hourly generation written to
* |     |     |    |    |     |   |     |   |   |   |   a file - 0 otherwise
* |     |     |    |    |     |   |     |   |   |   |   |     _______ These two items are
* |     |     |    |    |     |   |     |   |   |   |   |     |     | not yet implemented
* |     |     |    |    |     |   |     |   |   |   |   |     |     | - enter zeroes
* |     |     |    |    |     |   |     |   |   |   |   |     |     |
 -1000  1     365  4    1.0   1   2     0   0   0   1   0     0     0
*
*  First year to run
*  |
*  |       Last year to run
*  |       |
   2002    2016
*
'/u/jurotich/pool/pool3.sum'
*
*
*
TIE (code indicating tie line data follow - must be entered as shown - not needed if
*   only one area is simulated)
*
* Tie line number
* | 'From' area
* |  |     'To' area
* |  |     |      Tie line capacity - Mw
* |  |     |      |         a       b: power loss in tie line (mw) = a x Mw + b x Mw**2
* |  |     |      |         |       |   (where Mw = megawatts flowing)
* |  |     |      |         |       |       Wheeling cost ($/Mwh)
* |  |     |      |         |       |       |
*
* Kenai to Anchorage
  1  1     2      145       0.0093  0.0003  0
  2  2     1      145       0.0093  0.0003  0
* Anchorage to Healy
  3  2     3      79       -0.0041  0.0008  0
  4  3     2      79       -0.0041  0.0008  0
* Healy to Fairbanks
  5  3     4      140      -0.0059  0.0004  0
  6  4     3      140      -0.0059  0.0004  0
*
*************************************************************************
*                           Kenai Peninsula                             *
*************************************************************************
* Begin data for first area (see below description for area 2)
```

```
*
AREA
'Kenai'
'/u/jurotich/shave/kenai.shv'
  0  0  0  0.1  0  2.9  1
  * Connectivity data
* Area number this area connects with
* |  Number of tie lines in connection path
* |  |     Tie line numbers (in order from this area to connected area)
* |  |     |
  2  1     1
  3  2     1 3
  4  3     1 3 5
************** EXISTING GENERATION **********
G 18 'Bernice 2' 19.3 3 'Q' 100 'U' 0.05
3
3
2.06 0.030 1997 6500 0.030 1997
82.82 8.77628 0.08
21
1    1   1    1    0 0.44 0
0.15 0.3 0.3  1
200  0   25.0 1000 0.03 1997
**********************************************
G 19 'Bernice 3' 28 3 'Q' 0 'A' 0.07
3
3
2.06 0.030 1997 6500 0.030 1997
104.4 7.83575 0.06
21
1     1    1    1    0 0.44 0
0.165 0.33 0.33 1
200   0    25.0 1000 0.03 1997
**********************************************
G 20 'Bernice 4' 28 7 'Q' 0 'A' 0.05
3
3
2.06 0.030 1997 6500 0.030 1997
102.7 9.3567 0.01
21
1     1    1    1    0 0.44 0
0.165 0.33 0.33 1
200   0    25.0 1000 0 0.03 1997
**********************************************
G 24 'Soldotna 1' 39 6 ' ' 0 'A' 0.01
4
4
2.06 0.030 1996 3300 0.030 1996
136.1 5.571 0.060
14
1     1    6    6    0    0.42 0
0.125 0.25 0.25 1
200   0    45   1000 0.03 1997
*
************** Emergency Purchase ***********
*
PR 997 'EMERG PURCH' 150 0  ' ' 0  'A' 0
999.0 0.035 1996
*
*************************************************************************
*                              Anchorage Area                           *
*************************************************************************
*
*
AREA
*
* area name (maximum of 12 characters enclosed in quotes)
* |
  'Anchorage'
* Hourly demands filename for this area (maximum of 48 characters enclosed in quotes)
```

```
* |
 '/u/jurotich/shave/anchrage.shv'
 *
* ____These two items are not yet implemented - enter zeroes
* |  |
* |  |  a  b: Spinning reserve requirement for this area = a x demand + b
* |  |  |  |
* |  |  |  |   a  b: Operating reserve requirement for this area = a x demand + b
* |  |  |  |   |  |
* |  |  |  |   |  |  Minimum number of on-line units required for this area
* |  |  |  |   |  |  |
  0  0  0 28.5 0 64.9 0
*
* Connectivity data (see accompanying diagram)
* Area number this area connects with
* |  Number of tie lines in connection path
* |  |     Tie line numbers (in order from this area to connected area)
* |  |     |
  1  1     2
  3  1     3
  4  2     3 5
************** EXISTING GENERATION **********
*
G 1 'ML&P P1 U1' 16.8 3 'Q' 0 'A' 0.033
1
1
2.06 0.03 1997 7660 0.03 1997
79.63 9.2837 0.049
7
1    1   1      1   0 0.44 0
0.25 0.5 0.5    1
200  0   79.629 402 0.03 1997
************************************************
G 2 'ML&P P1 U2' 16.8 3 'Q' 0 'A' 0.033
1
1
2.06 0.03 1997 7660 0.03 1997
74.92 8.254 0.0869
7
1    1   1     1   0 0.44 0
0.25 0.5 0.5   1
200  0   74.92 400 0.03 1997
************************************************
G 3 'ML&P P1 U3' 19.5 3 'Q' 0 'A' 0.033
1
1
2.06 0.03 1997 7660 0.03 1997
86.7 7.7585 0.1111
14
1    1   1    1   0 0.44 0
0.25 0.5 0.25 1
200  0   86.7 441 0.03 1997
************************************************
G 4 'ML&P P1 U4' 34.1 3 'Q' 0 'A' 0.033
1
1
2.06 0.03 1996 7660 0.03 1996
165.1 7.5594 0.0329
14
1     1    1      1   0    0.44 0
0.125 0.25 0.25   1
200   0    165.07 791 0.03 1997
************************************************
G 5 'ML&P P2 U5-6' 49.2 10 ' ' 0 'A' 0.033
1
1
2.06 0.03 1997 7266 0.03 1997
168 6.74 0.0026
14
1     1     16    6    0    0.625 0
```

```
0.165 0.33  0.33  1
200   0     168.0 1148 0.03 1997
**********************************************
G 6 'ML&P P2 U7-6' 109.5 10 ' ' 0 'A' 0.033
1
1
2.06 0.03 1997 7266 0.03 1997
199 5.93 0.008
14
1     1    16    6    0    0.28 0
0.165 0.33 0.33  1
200   0    199.0 2539 0.03 1997
**********************************************
G 7 'ML&P P2 U8' 87.6 20 ' ' 0 'A' 0.033
1
1
2.06 0.03 1997 7266 0.03 1997
216.7 8.1877 0.0122
14
1     1     6      6     0    0.078 0
0.084 0.167 0.167  1
200   0     216.2  2057  0.03 1997
**********************************************
G 10 'Beluga 1' 16.7 3 'Q ' 0 'A' 0.07
2
2
2.06 0.030 1997 7950 0.030 1997
83.57046 10.856 0.07032
21
1    1    1    1    0 0.44 0
0.15 0.30 0.30 1
200  0    20.0 1000 0.03 1997
**********************************************
G 11 'Beluga 2' 16.7 3 'Q ' 0 'A' 0.004
2
2
2.06 0.030 1997 7950 0.030 1997
129.98 8.3371 0.0829
21
1    1    1    1    0 0.44  0
0.15 0.23 0.23 1
200  0    32.0 1000 0.03 1997
*********************************************
G 12 'Beluga 3' 66.9 3 'Q' 0 'A' 0.01
2
2
2.06 0.030 1997 7950 0.030 1997
196.9959 8.4491 0.01243
28
1    1    6   6   0 0.44  0
0.15 0.30 0.30 1
200  0    67.0 1600 0.03 1997
*********************************************
G 13 'Beluga 5' 71 3 'Q' 0 'A' 0.00
2
2
2.06 0.030 1997 7950 0.030 1997
208.6894 7.8766 0.0223
28
1     1    6   6   0 0.44  0
0.185 0.37 0.37 1
200   0    67.0 1600 0.03 1997
*********************************************
G 14 'Beluga 6CT' 74 3 ' ' 0 'U' 0.10
2
2
2.06 0.030 1997 7950 0.030 1997
243.93564 8.525 0.01201
28
1     1    6   6   0 0.44 0
```

```
0.185 0.37 0.37 1
200   0    67.0 3600 0.03 1997
**********************************************
G 15 'Beluga 6-8' 101.5 48 ' ' 0 'A' 0.004
2
2
2.06 0.030 1997 7950 0.030 1997
380.7771 2.6953 0.02882
28
1   1   16   6   0 0.44 0
0.5 1.0 1.0  0.45
200 0   67.0 3600 0.03 1997
**********************************************
G 16 'Beluga 7CT' 74 3 ' ' 0 'U' 0.004
2
2
2.06 0.030 1997 7950 0.030 1997
222.87852 8.3 0.02489
28
1    1    6   6   0 0.44 0
0.21 0.42 0.42 1
200  0    67.0 3600 0.03 1997
**********************************************
G 17 'Beluga 7-8' 101.5 48 ' ' 0 'A' 0.04
2
2
2.06 0.030 1997 7950 0.030 1997
291.9567 4.463 0.01783
28
1   1   16   6   0    0.44 0
0.5 1.0 1.0  0.45
200 0   67.0 3600 0.03 1997
**********************************************
G 21 'Intrnl 1' 15 3 'Q' 0 'A' 0.10
4
4
2.06 0.030 1997 5750 0.030 1997
83.07 8.48275 0.14
14
1    1    1    1    0 0.44  0
0.21 0.42 0.42 1
200  0    21.0 1000 0.03 1997
**********************************************
G 22 'Intrnl 2' 15.1 3 'Q' 0 'A' 0.10
4
4
2.06 0.030 1997 5750 0.030 1997
88.96 5.90928 0.37
14
1    1    1    1    0 0.44  0
0.21 0.42 0.42 1
200  0    21.0 1000 0.03 1997
**********************************************
G 23 'Intrnl 3' 18.9 3 'Q' 0 'A' 0.11
4
4
2.06 0.030 1997 5750 0.030 1997
91.76 7.94660 0.12
14
1    1    1    1    0 0.44  0
0.21 0.42 0.42 1
200  0    23.0 1000 0.03 1997
**********************************************
G 25 'LM6000 Chug' 40.5 10 ' ' 0 'U' 0.05
4
4
2.06 0.030 1997 7950 0.030 1997
97.797 6.1712 0.0382
28
1   1   1   1    0    0.42 0
```

```
1.5 3.5 3.5 1
200 0   43  750 0.03 1997
********************************************** Upgraded Units 6 & 7 ***
G 26 'Beluga 6CT' 78.4 3 ' ' 0 'U' 0.10
2
2
2.06 0.030 1997 7950 0.030 1997
228.0798 7.971 0.0112
28
1     1    6   6   0 0.44 0
0.185 0.37 0.37 1
200   0    67.0 3600 0.03 1997
**********************************************
G 27 'Beluga 6-8' 105.5 48 ' ' 0 'U' 0.004
2
2
2.06 0.030 1997 7950 0.030 1997
356.027 2.52 0.0308
28
1   1   16   6   0 0.44 0
0.5 1.0 1.0  0.45
200 0   67.0 3600 0.03 1997
**********************************************
G 28 'Beluga 7CT' 78.4 3 ' ' 0 'U' 0.004
2
2
2.06 0.030 1997 7950 0.030 1997
208.39 7.7605 0.2327
28
1    1    6   6   0 0.44 0
0.21 0.42 0.42 1
200  0    67.0 3600 0.03 1997
**********************************************
G 29 'Beluga 7-8' 105.5 48 ' ' 0 'U' 0.04
2
2
2.06 0.030 1997 7950 0.030 1997
272.9795 4.173 0.01667
28
1   1   16   6   0    0.44 0
0.5 1.0 1.0  0.45
200 0   67.0 3600 0.03 1997
*
************** Emergency Purchase ***********
*
PR 998 'EMERG PURCH' 150 0  ' ' 0  'A' 0
999.0 0.035 1996
*
*****************************************************************************
*                                 Healy                                     *
*****************************************************************************
* Begin data for third area (see above description for area 2)
*
AREA
'Healy'
'/u/jurotich/shave/healy.shv'
  0  0  0  0  0  0  0
* Connectivity data (see accompanying diagram)
* Area number this area connects with
* |  Number of tie lines in connection path
* |  |     Tie line numbers (in order from this area to connected area)
* |  |     |
  1  2     4 2
  2  1     4
  4  1     5
************** EXISTING GENERATION **********
G 36 'Healy 1' 25 3 'M' 0 'A' 0.09
7
3.11  0.03  1996
10.87 0.030 1996 94657 0.030 1996
```

```
95.738 7.998 0.0867
2 7 0115 10 0615
1   1  1  1    0.46 0.37    0
6.5 13 13 1
200 0  20 1000 0.03 1997
**********************************************
G 37 'Healy D1' 2.6 0.5 ' ' 0 'A' 0.05
3.20  0.03  1997
3.20  0.03  1997
8.00 0.030 1996 22655 0.030 1996
0 14.00 0
2 7 0215 10 0601
1     1    1    1   0.84 0.76   0
0.025 0.05 0.05 1
200   0    0    500 0.03    1997
**********************************************
G 38 'HCCP' 53 10 'M' 0 'A' 0.10
5
3.11  0.03  1996
10.00 0.03 1997 63800 0.03 1997
80.138 7.9918 0.0434
20
1   1    1  1    0.3 0.35   0
3   8    4  1
200 1112 0  1000 0.03   1997
*
*************************************************************************
*                              Fairbanks Area                           *
*************************************************************************
* Begin data for fourth area (see above description for area 2)
*
AREA
'Fairbanks'
'/u/jurotich/shave/gvea.shv'
  0  0  0  10  0  80  0
  * Connectivity data (see accompanying diagram)
* Area number this area connects with
* |  Number of tie lines in connection path
* |  |     Tie line numbers (in order from this area to connected area)
* |  |     |
  1  3     6 4 2
  2  2     6 4
  3  1     6
************** EXISTING GENERATION **********
G 30 'Zehnder EMD5' 2.6 0.5 ' ' 0 'A' 0.01
3.31  0.03  1997
3.31  0.03  1997
8.00 0.030 1996 8199 0.030 1996
0 14.00 0
0
1     1    1    1   0.84 0.76   0
0.035 0.07 0.07 1
200   0    0    500 0.03    1997
**********************************************
G 31 'Zehnder EMD6' 2.6 0.5 ' ' 0 'A' 0.01
3.31  0.03  1997
3.31  0.03  1997
8.00 0.030 1996 8199 0.030 1996
0 14.00 0
0
1     1    1    1   0.84 0.76   0
0.035 0.07 0.07 1
200   0    0    500 0.03    1997
**********************************************
G 32 'Zehnder GT1' 18 6 'Q' 0 'A' 0.01
3.31  0.03  1997
3.31  0.03  1997
5.21 0.030 1996 7618 0.030 1996
97.72 6.2534 0.1599
2 3 0415 3 1001
```

```
1    1    1    1    0.84 0.76   0
0.15 0.30 0.30 1
200  0    20   1000 0.03    1997
**********************************************
G 33 'Zehnder GT2' 18 6 'Q' 0 'A' 0.01
3.31  0.03  1997
3.31  0.03  1997
5.21 0.030 1996 7618 0.030 1996
97.72 6.253401 0.1599
2 3 0401 3 1015
1    1    1    1    0.84 0.76   0
0.15 0.30 0.30 1
200  0    20   1000 0.03    1997
**********************************************
G 34 'North Pole 1' 64 5 ' ' 0 'A' 0.05
3.09  0.03  1997
3.09  0.03  1997
4.66 0.030 1996 5167 0.030 1996
167.46 5.022 0.033
2 3 0515 3 1101
1     1    6    6    0.89 0.73  0
0.365 0.73 0.73 1
200   0    30   1600 0.03   1997
**********************************************
G 35 'North Pole 2' 64 5 'Q' 0 'A' 0.08
3.09  0.03  1997
3.09  0.03  1997
4.66 0.030 1996 5167 0.030 1996
181.74 4.5092 0.0282
2 3 0501 3 1115
1     1    6    6    0.89 0.73  0
0.365 0.73 0.73 1
200   0    30   1600 0.03   1997
**********************************************
G 39 'Chena 6' 29.3 10  'Q' 0 'U' 0.05
3.40 0.03 1996
3.40 0.03 1996
0.30 0.030 1997 9000 0.030 1997
72.972 8.8103 0.014
1 15 0501
1    1    4    0   0.02 0.12  0
0.15 0.30 0.30 1
200  0    26.3    1000 0.03 1997
**********************************************
G 40 'SILOS' 70 0.5 'Q' 274 'A' 0.0
100.00  0.03  1996
100.00  0.03  1996
10.00 0.030 1996 0 0.030 1996
0 10.000 0
0
1 1 1 1 0 0 0
0 0 0 1
0 0 0 0 0 0
**********************************************
G 200  'GE 6B'  38 5  ' ' 0  'U'  0.05
3.11 0.03 1998
3.11 0.03 1998
4.41  0.03  1998 7630  0.03  1998
116.18 6.9159 0.0597
14
1 1 1 1 0 0.5 0
1.5 3.5 24 1
200 30.0 0 750 0.03 1998
*******************************************OGEM***
G 204  'GE 7EA SC'  83 10  ' ' 0  'U'  0.05
3.11 0.03 1998
3.11 0.03 1998
3.03  0.03  1998 4400  0.03  1998
243.93 6.0178 0.0333
17
```

```
1 1 1 1 0 0.5 0
1.5 3.5 24 1
200 138.0 0 1000 0.03 1998
****************************************OGEM***
G 207  'GE 7EA 1x1'  128 45  ' ' 0  'U'  0.05
3.11 0.03 1998
3.11 0.03 1998
2.63  0.03  1998 11720  0.03  1998
233.599 5.8424 0
17
1 1 16 6 0 0.5 0
2 4 24 1
200 56.0 0 1000 0.03 1998
*
************** Emergency Purchase ***********
*
PR 999 'EMERG PURCH' 150 0  ' ' 0  'A' 0
999.0 0.035 1996
*
*
PRICES
*
*****************************************************************************
*               Annual Fuel Price & Purchase Price Table                    *
*****************************************************************************
*                                New Plant                                  *
*       ML&P &                   Soldotna                                   *
*       Joint   Beluga  Bernice & Intn'l HCCP   Aurora  Healy               *
*       NGas    NGas    NGas    NGas     Coal   Purch.  Coal                *
*       $/MBtu  $/MBtu  $/MBtu  $/MBtu   $/MBtu $/MWh   $/MBtu              *
*****************************************************************************
1996    1.86    1.17    1.38    1.98     0.00   00.00   1.36
1997    1.74    1.46    1.50    2.25     0.60   00.00   1.39
1998    1.97    1.69    1.70    2.05     0.62   40.00   1.02
1999    2.01    1.73    1.75    2.10     0.65   40.00   0.94
2000    2.06    1.78    1.80    2.15     0.67   37.00   0.97
2001    2.12    1.84    1.85    2.20     0.70   37.00   0.99
2002    2.16    1.88    1.90    2.25     0.76   37.93   1.05
2003    2.22    1.94    1.95    2.30     0.77   38.87   1.07
2004    2.27    1.99    2.00    2.35     0.79   39.84   1.09
2005    2.33    2.05    2.06    2.41     0.80   40.84   1.11
2006    2.39    2.11    2.12    2.47     0.82   41.86   1.13
2007    2.44    2.16    2.18    2.53     0.83   42.91   1.16
2008    2.50    2.22    2.24    2.59     0.85   43.98   1.18
2009    2.57    2.29    2.30    2.65     0.87   45.08   1.20
2010    2.63    2.35    2.37    2.72     0.88   46.21   1.22
2011    2.70    2.42    2.44    2.79     0.90   47.36   1.25
2012    2.77    2.49    2.50    2.85     0.92   48.55   1.27
2013    2.84    2.56    2.57    2.92     0.93   49.76   1.29
2014    2.91    2.63    2.65    3.00     0.95   51.00   1.32
2015    2.98    2.70    2.72    3.07     0.97   52.28   1.34
2016    3.06    2.78    2.80    3.15     0.99   53.59   1.37
2017    3.06    2.78    2.80    3.15     0.99   53.59   1.37
*
*****************************************************************************
*                            Starts & Retirements                           *
*****************************************************************************
*
START  39 1997 1001
*********************
START   18 1998 0101
*********************
RETIRE 15 2001 0430
RETIRE 17 2001 0430
START  14 2001 0501
START  16 2001 0501
RETIRE 14 2001 0731
RETIRE 16 2001 0731
START  15 2001 0801
START  17 2001 0801
```

```
*********************
RETIRE 16 2003 1231
RETIRE 17 2003 1231
*********************
START 204 2004 0101
START  29 2004 0101
RETIRE 14 2004 1231
RETIRE 15 2004 1231
*********************
START  27 2005 0101
*********************
RETIRE 27 2007 0430
RETIRE 29 2007 0430
START  26 2007 0501
RETIRE 26 2007 0731
START  27 2007 0801
START  29 2007 0801
********************* Retiring GVEA Units ***
RETIRE 32 2010 1231
********************* Retiring GVEA Units ***
RETIRE 33 2011 1231
RETIRE 39 2011 1231
START 207 2012 0101
*********************
RETIRE 27 2013 0430
RETIRE 29 2013 0430
START  26 2013 0501
START  28 2013 0501
RETIRE 26 2013 0731
RETIRE 28 2013 0731
START  27 2013 0801
START  29 2013 0801
********************* Start new Chugach Unit ***
START 25 2014 0101
********************* Retiring GVEA Units ***
RETIRE 34 2016 0101
START 200 2016 0101
*
*****************************************************************************
*                            Change Mod Section                             *
*****************************************************************************
*
**************
YEAR 2001
DAY 0101
MOD 12 24 14
MOD 12 15 0
MOD 12 17 0
MOD 12 5 14
MOD 12 6 14
MOD 12 36 2 7 0115 10 0615
************
YEAR 2001
DAY 0401
MOD 1  1  14
MOD 23 1  320   0.03    1997
MOD 1  2  14
MOD 23 2  320   0.03    1997
MOD 1  3  17.7
MOD 23 3  406   0.03    1997
MOD 1  4  31.1
MOD 23 4  697   0.03    1997
MOD 1  5  44.6
MOD 23 5  1005  0.03    1997
MOD 1  6  99.4
MOD 23 6  2237  0.03    1997
MOD 1  7  77.3
MOD 23 7  1746  0.03    1997
MOD 1  10 14.4
MOD 1  11 14.4
```

```
MOD 1  12 60.3
MOD 1  13 59.5
MOD 1  14 68
MOD 1  15 95.5
MOD 1  16 68
MOD 1  17 95.5
MOD 1  18 16.7
MOD 1  19 25.5
MOD 1  20 25.5
MOD 1  21 13.8
MOD 1  22 13.8
MOD 1  23 16.7
MOD 1  24 35.2
MOD 1  32 15.7
MOD 1  33 15.7
MOD 1  34 45.9
MOD 1  35 43.8
************
YEAR 2001
DAY 1001
MOD 1  1  16.8
MOD 23 1  402 0.03 1997
MOD 1  2  16.8
MOD 23 2  400 0.03 1997
MOD 1  3  19.5
MOD 23 3  441 0.03 1997
MOD 1  4  34.1
MOD 23 4  791 0.03 1997
MOD 1  5  49.2
MOD 23 5  1148 0.03 1997
MOD 1  6  109.5
MOD 23 6  2539 0.03 1997
MOD 1  7  87.6
MOD 23 7  2057 0.03 1997
MOD 1  10 16.7
MOD 1  11 16.7
MOD 1  12 66.9
MOD 1  13 71
MOD 1  14 74
MOD 1  15 101.5
MOD 1  16 74
MOD 1  17 101.5
MOD 1  18 19.3
MOD 1  19 28
MOD 1  20 28
MOD 1  21 15
MOD 1  22 15.1
MOD 1  23 18.9
MOD 1  24 39
MOD 1  32 18
MOD 1  33 18
MOD 1  34 56.7
MOD 1  35 59.3
************
YEAR 2002
DAY 0101
MOD 12 15 28
MOD 12 17 28
************
YEAR 2002
DAY 0401
MOD 1  1  14
MOD 23 1  320   0.03    1997
MOD 1  2  14
MOD 23 2  320   0.03    1997
MOD 1  3  17.7
MOD 23 3  406   0.03    1997
MOD 1  4  31.1
MOD 23 4  697   0.03    1997
MOD 1  5  44.6
```

```
MOD 23 5  1005  0.03    1997
MOD 1  6  99.4
MOD 23 6  2237  0.03    1997
MOD 1  7  77.3
MOD 23 7  1746  0.03    1997
MOD 1  10 14.4
MOD 1  11 14.4
MOD 1  12 60.3
MOD 1  13 59.5
MOD 1  14 68
MOD 1  15 95.5
MOD 1  16 68
MOD 1  17 95.5
MOD 1  18 16.7
MOD 1  19 25.5
MOD 1  20 25.5
MOD 1  21 13.8
MOD 1  22 13.8
MOD 1  23 16.7
MOD 1  24 35.2
MOD 1  32 15.7
MOD 1  33 15.7
MOD 1  34 45.9
MOD 1  35 43.8
************
YEAR 2002
DAY 1001
MOD 1  1  16.8
MOD 23 1  402 0.03 1997
MOD 1  2  16.8
MOD 23 2  400 0.03 1997
MOD 1  3  19.5
MOD 23 3  441 0.03 1997
MOD 1  4  34.1
MOD 23 4  791 0.03 1997
MOD 1  5  49.2
MOD 23 5  1148 0.03 1997
MOD 1  6  109.5
MOD 23 6  2539 0.03 1997
MOD 1  7  87.6
MOD 23 7  2057 0.03 1997
MOD 1  10 16.7
MOD 1  11 16.7
MOD 1  12 66.9
MOD 1  13 71
MOD 1  14 74
MOD 1  15 101.5
MOD 1  16 74
MOD 1  17 101.5
MOD 1  18 19.3
MOD 1  19 28
MOD 1  20 28
MOD 1  21 15
MOD 1  22 15.1
MOD 1  23 18.9
MOD 1  24 39
MOD 1  32 18
MOD 1  33 18
MOD 1  34 56.7
MOD 1  35 59.3
************
YEAR 2003
DAY 0101
MOD 12 17 119
MOD 12 24 30
MOD 12 7 92
MOD 12 34 92
MOD 12 35 92
************
YEAR 2003
```

```
DAY 0401
MOD 1  1  14
MOD 23 1  320   0.03    1997
MOD 1  2  14
MOD 23 2  320   0.03    1997
MOD 1  3  17.7
MOD 23 3  406   0.03    1997
MOD 1  4  31.1
MOD 23 4  697   0.03    1997
MOD 1  5  44.6
MOD 23 5  1005  0.03    1997
MOD 1  6  99.4
MOD 23 6  2237  0.03    1997
MOD 1  7  77.3
MOD 23 7  1746  0.03    1997
MOD 1  10 14.4
MOD 1  11 14.4
MOD 1  12 60.3
MOD 1  13 59.5
MOD 1  14 68
MOD 1  15 95.5
MOD 1  16 68
MOD 1  17 95.5
MOD 1  18 16.7
MOD 1  19 25.5
MOD 1  20 25.5
MOD 1  21 13.8
MOD 1  22 13.8
MOD 1  23 16.7
MOD 1  24 35.2
MOD 1  32 15.7
MOD 1  33 15.7
MOD 1  34 45.9
MOD 1  35 43.8
************
YEAR 2003
DAY 1001
MOD 1  1  16.8
MOD 23 1  402 0.03 1997
MOD 1  2  16.8
MOD 23 2  400 0.03 1997
MOD 1  3  19.5
MOD 23 3  441 0.03 1997
MOD 1  4  34.1
MOD 23 4  791 0.03 1997
MOD 1  5  49.2
MOD 23 5  1148 0.03 1997
MOD 1  6  109.5
MOD 23 6  2539 0.03 1997
MOD 1  7  87.6
MOD 23 7  2057 0.03 1997
MOD 1  10 16.7
MOD 1  11 16.7
MOD 1  12 66.9
MOD 1  13 71
MOD 1  14 74
MOD 1  15 101.5
MOD 1  16 74
MOD 1  17 101.5
MOD 1  18 19.3
MOD 1  19 28
MOD 1  20 28
MOD 1  21 15
MOD 1  22 15.1
MOD 1  23 18.9
MOD 1  24 39
MOD 1  32 18
MOD 1  33 18
MOD 1  34 56.7
MOD 1  35 59.3
```

```
************
YEAR 2004
DAY 0101
MOD 12 15 119
MOD 12 24 14
MOD 12 7 14
MOD 12 1 92
MOD 12 4 92
MOD 12 34 2 3 0515 3 1101
MOD 12 35 2 3 0501 3 1115
MOD 12 36 92
MOD 12 38 92
************
YEAR 2004
DAY 0401
MOD 1  1  14
MOD 23 1  320   0.03    1997
MOD 1  2  14
MOD 23 2  320   0.03    1997
MOD 1  3  17.7
MOD 23 3  406   0.03    1997
MOD 1  4  31.1
MOD 23 4  697   0.03    1997
MOD 1  5  44.6
MOD 23 5  1005  0.03    1997
MOD 1  6  99.4
MOD 23 6  2237  0.03    1997
MOD 1  7  77.3
MOD 23 7  1746  0.03    1997
MOD 1  10 14.4
MOD 1  11 14.4
MOD 1  12 60.3
MOD 1  13 59.5
MOD 1  14 68
MOD 1  15 95.5
MOD 1  18 16.7
MOD 1  19 25.5
MOD 1  20 25.5
MOD 1  21 13.8
MOD 1  22 13.8
MOD 1  23 16.7
MOD 1  24 35.2
MOD 1  28 71.0
MOD 1  29 100
MOD 1  32 15.7
MOD 1  33 15.7
MOD 1  34 45.9
MOD 1  35 43.8
************
YEAR 2004
DAY 1001
MOD 1  1  16.8
MOD 23 1  402 0.03 1997
MOD 1  2  16.8
MOD 23 2  400 0.03 1997
MOD 1  3  19.5
MOD 23 3  441 0.03 1997
MOD 1  4  34.1
MOD 23 4  791 0.03 1997
MOD 1  5  49.2
MOD 23 5  1148 0.03 1997
MOD 1  6  109.5
MOD 23 6  2539 0.03 1997
MOD 1  7  87.6
MOD 23 7  2057 0.03 1997
MOD 1  10 16.7
MOD 1  11 16.7
MOD 1  12 66.9
MOD 1  13 71
MOD 1  14 74
```

```
MOD 1  15 101.5
MOD 1  18 19.3
MOD 1  19 28
MOD 1  20 28
MOD 1  21 15
MOD 1  22 15.1
MOD 1  23 18.9
MOD 1  24 39
MOD 1  28 78.4
MOD 1  29 105.5
MOD 1  32 18
MOD 1  33 18
MOD 1  34 56.7
MOD 1  35 59.3
************
YEAR 2005
DAY 0101
MOD 12 1 7
MOD 12 4 14
MOD 12 5 92
MOD 12 6 92
MOD 12 36 2 7 0115 10 0615
MOD 12 38 20
MOD 12 32 92
MOD 12 33 92
************
YEAR 2005
DAY 0401
MOD 1  1  14
MOD 23 1  320   0.03    1997
MOD 1  2  14
MOD 23 2  320   0.03    1997
MOD 1  3  17.7
MOD 23 3  406   0.03    1997
MOD 1  4  31.1
MOD 23 4  697   0.03    1997
MOD 1  5  44.6
MOD 23 5  1005  0.03    1997
MOD 1  6  99.4
MOD 23 6  2237  0.03    1997
MOD 1  7  77.3
MOD 23 7  1746  0.03    1997
MOD 1  10 14.4
MOD 1  11 14.4
MOD 1  12 60.3
MOD 1  13 59.5
MOD 1  18 16.7
MOD 1  19 25.5
MOD 1  20 25.5
MOD 1  21 13.8
MOD 1  22 13.8
MOD 1  23 16.7
MOD 1  24 35.2
MOD 1  26 71.0
MOD 1  27 100
MOD 1  28 71.0
MOD 1  29 100
MOD 1  32 15.7
MOD 1  33 15.7
MOD 1  34 45.9
MOD 1  35 43.8
************
YEAR 2005
DAY 1001
MOD 1  1  16.8
MOD 23 1  402 0.03 1997
MOD 1  2  16.8
MOD 23 2  400 0.03 1997
MOD 1  3  19.5
MOD 23 3  441 0.03 1997
```

```
MOD 1  4  34.1
MOD 23 4  791 0.03 1997
MOD 1  5  49.2
MOD 23 5  1148 0.03 1997
MOD 1  6  109.5
MOD 23 6  2539 0.03 1997
MOD 1  7  87.6
MOD 23 7  2057 0.03 1997
MOD 1  10 16.7
MOD 1  11 16.7
MOD 1  12 66.9
MOD 1  13 71
MOD 1  18 19.3
MOD 1  19 28
MOD 1  20 28
MOD 1  21 15
MOD 1  22 15.1
MOD 1  23 18.9
MOD 1  24 39
MOD 1  26 78.4
MOD 1  27 105.5
MOD 1  28 78.4
MOD 1  29 105.5
MOD 1  32 18
MOD 1  33 18
MOD 1  34 56.7
MOD 1  35 59.3
************
YEAR 2006
DAY 0101
MOD 12 24 30
MOD 12 5 14
MOD 12 6 14
MOD 12 2 92
MOD 12 32 2 3 0415 3 1001
MOD 12 33 2 3 0401 3 1015
************
YEAR 2006
DAY 0401
MOD 1  1  14
MOD 23 1  320   0.03    1997
MOD 1  2  14
MOD 23 2  320   0.03    1997
MOD 1  3  17.7
MOD 23 3  406   0.03    1997
MOD 1  4  31.1
MOD 23 4  697   0.03    1997
MOD 1  5  44.6
MOD 23 5  1005  0.03    1997
MOD 1  6  99.4
MOD 23 6  2237  0.03    1997
MOD 1  7  77.3
MOD 23 7  1746  0.03    1997
MOD 1  10 14.4
MOD 1  11 14.4
MOD 1  12 60.3
MOD 1  13 59.5
MOD 1  18 16.7
MOD 1  19 25.5
MOD 1  20 25.5
MOD 1  21 13.8
MOD 1  22 13.8
MOD 1  23 16.7
MOD 1  24 35.2
MOD 1  26 71.0
MOD 1  27 100
MOD 1  28 71.0
MOD 1  29 100
MOD 1  32 15.7
MOD 1  33 15.7
```

```
MOD 1  34 45.9
MOD 1  35 43.8
************
YEAR 2006
DAY 1001
MOD 1  1  16.8
MOD 23 1  402 0.03 1997
MOD 1  2  16.8
MOD 23 2  400 0.03 1997
MOD 1  3  19.5
MOD 23 3  441 0.03 1997
MOD 1  4  34.1
MOD 23 4  791 0.03 1997
MOD 1  5  49.2
MOD 23 5  1148 0.03 1997
MOD 1  6  109.5
MOD 23 6  2539 0.03 1997
MOD 1  7  87.6
MOD 23 7  2057 0.03 1997
MOD 1  10 16.7
MOD 1  11 16.7
MOD 1  12 66.9
MOD 1  13 71
MOD 1  18 19.3
MOD 1  19 28
MOD 1  20 28
MOD 1  21 15
MOD 1  22 15.1
MOD 1  23 18.9
MOD 1  24 39
MOD 1  26 78.4
MOD 1  27 105.5
MOD 1  28 78.4
MOD 1  29 105.5
MOD 1  32 18
MOD 1  33 18
MOD 1  34 56.7
MOD 1  35 59.3
************
YEAR 2007
DAY 0101
MOD 12 24 14
MOD 12 27 0
MOD 12 29 0
MOD 12 2 7
MOD 12 3 92
MOD 12 34 92
MOD 12 35 92
************
YEAR 2007
DAY 0401
MOD 1  1  14
MOD 23 1  320   0.03    1997
MOD 1  2  14
MOD 23 2  320   0.03    1997
MOD 1  3  17.7
MOD 23 3  406   0.03    1997
MOD 1  4  31.1
MOD 23 4  697   0.03    1997
MOD 1  5  44.6
MOD 23 5  1005  0.03    1997
MOD 1  6  99.4
MOD 23 6  2237  0.03    1997
MOD 1  7  77.3
MOD 23 7  1746  0.03    1997
MOD 1  10 14.4
MOD 1  11 14.4
MOD 1  12 60.3
MOD 1  13 59.5
MOD 1  18 16.7
```

```
MOD 1  19 25.5
MOD 1  20 25.5
MOD 1  21 13.8
MOD 1  22 13.8
MOD 1  23 16.7
MOD 1  24 35.2
MOD 1  26 71.0
MOD 1  27 100
MOD 1  28 71.0
MOD 1  29 100
MOD 1  32 15.7
MOD 1  33 15.7
MOD 1  34 45.9
MOD 1  35 43.8
************
YEAR 2007
DAY 1001
MOD 1  1  16.8
MOD 23 1  402 0.03 1997
MOD 1  2  16.8
MOD 23 2  400 0.03 1997
MOD 1  3  19.5
MOD 23 3  441 0.03 1997
MOD 1  4  34.1
MOD 23 4  791 0.03 1997
MOD 1  5  49.2
MOD 23 5  1148 0.03 1997
MOD 1  6  109.5
MOD 23 6  2539 0.03 1997
MOD 1  7  87.6
MOD 23 7  2057 0.03 1997
MOD 1  10 16.7
MOD 1  11 16.7
MOD 1  12 66.9
MOD 1  13 71
MOD 1  18 19.3
MOD 1  19 28
MOD 1  20 28
MOD 1  21 15
MOD 1  22 15.1
MOD 1  23 18.9
MOD 1  24 39
MOD 1  26 78.4
MOD 1  27 105.5
MOD 1  28 78.4
MOD 1  29 105.5
MOD 1  32 18
MOD 1  33 18
MOD 1  34 56.7
MOD 1  35 59.3
************
YEAR 2008
DAY 0101
MOD 12 27 119
MOD 12 29 28
MOD 12 3 14
MOD 12 7 92
MOD 12 34 2 3 0515 3 1101
MOD 12 35 2 3 0501 3 1115
************
YEAR 2008
DAY 0401
MOD 1  1  14
MOD 23 1  320   0.03    1997
MOD 1  2  14
MOD 23 2  320   0.03    1997
MOD 1  3  17.7
MOD 23 3  406   0.03    1997
MOD 1  4  31.1
MOD 23 4  697   0.03    1997
```

```
MOD 1  5  44.6
MOD 23 5  1005  0.03    1997
MOD 1  6  99.4
MOD 23 6  2237  0.03    1997
MOD 1  7  77.3
MOD 23 7  1746  0.03    1997
MOD 1  10 14.4
MOD 1  11 14.4
MOD 1  12 60.3
MOD 1  13 59.5
MOD 1  18 16.7
MOD 1  19 25.5
MOD 1  20 25.5
MOD 1  21 13.8
MOD 1  22 13.8
MOD 1  23 16.7
MOD 1  24 35.2
MOD 1  26 71.0
MOD 1  27 100
MOD 1  28 71.0
MOD 1  29 100
MOD 1  32 15.7
MOD 1  33 15.7
MOD 1  34 45.9
MOD 1  35 43.8
************
YEAR 2008
DAY 1001
MOD 1  1  16.8
MOD 23 1  402 0.03 1997
MOD 1  2  16.8
MOD 23 2  400 0.03 1997
MOD 1  3  19.5
MOD 23 3  441 0.03 1997
MOD 1  4  34.1
MOD 23 4  791 0.03 1997
MOD 1  5  49.2
MOD 23 5  1148 0.03 1997
MOD 1  6  109.5
MOD 23 6  2539 0.03 1997
MOD 1  7  87.6
MOD 23 7  2057 0.03 1997
MOD 1  10 16.7
MOD 1  11 16.7
MOD 1  12 66.9
MOD 1  13 71
MOD 1  18 19.3
MOD 1  19 28
MOD 1  20 28
MOD 1  21 15
MOD 1  22 15.1
MOD 1  23 18.9
MOD 1  24 39
MOD 1  26 78.4
MOD 1  27 105.5
MOD 1  28 78.4
MOD 1  29 105.5
MOD 1  32 18
MOD 1  33 18
MOD 1  34 56.7
MOD 1  35 59.3
************
YEAR 2009
DAY 0101
MOD 12 27 28
MOD 12 24 30
MOD 12  7 14
MOD 12 36 92
MOD 12 38 92
************
```

```
YEAR 2009
DAY 0401
MOD 1  1  14
MOD 23 1  320   0.03    1997
MOD 1  2  14
MOD 23 2  320   0.03    1997
MOD 1  3  17.7
MOD 23 3  406   0.03    1997
MOD 1  4  31.1
MOD 23 4  697   0.03    1997
MOD 1  5  44.6
MOD 23 5  1005  0.03    1997
MOD 1  6  99.4
MOD 23 6  2237  0.03    1997
MOD 1  7  77.3
MOD 23 7  1746  0.03    1997
MOD 1  10 14.4
MOD 1  11 14.4
MOD 1  12 60.3
MOD 1  13 59.5
MOD 1  18 16.7
MOD 1  19 25.5
MOD 1  20 25.5
MOD 1  21 13.8
MOD 1  22 13.8
MOD 1  23 16.7
MOD 1  24 35.2
MOD 1  26 71.0
MOD 1  27 100
MOD 1  28 71.0
MOD 1  29 100
MOD 1  32 15.7
MOD 1  33 15.7
MOD 1  34 45.9
MOD 1  35 43.8
************
YEAR 2009
DAY 1001
MOD 1  1  16.8
MOD 23 1  402 0.03 1997
MOD 1  2  16.8
MOD 23 2  400 0.03 1997
MOD 1  3  19.5
MOD 23 3  441 0.03 1997
MOD 1  4  34.1
MOD 23 4  791 0.03 1997
MOD 1  5  49.2
MOD 23 5  1148 0.03 1997
MOD 1  6  109.5
MOD 23 6  2539 0.03 1997
MOD 1  7  87.6
MOD 23 7  2057 0.03 1997
MOD 1  10 16.7
MOD 1  11 16.7
MOD 1  12 66.9
MOD 1  13 71
MOD 1  18 19.3
MOD 1  19 28
MOD 1  20 28
MOD 1  21 15
MOD 1  22 15.1
MOD 1  23 18.9
MOD 1  24 39
MOD 1  26 78.4
MOD 1  27 105.5
MOD 1  28 78.4
MOD 1  29 105.5
MOD 1  32 18
MOD 1  33 18
MOD 1  34 56.7
```

```
MOD 1  35 59.3
************
YEAR 2010
DAY 0101
MOD 12 24 14
MOD 12 5 61
MOD 12 6 61
MOD 12 36 2 7 0115 10 0615
MOD 12 38 20
************
YEAR 2010
DAY 0401
MOD 1  1  14
MOD 23 1  320   0.03    1997
MOD 1  2  14
MOD 23 2  320   0.03    1997
MOD 1  3  17.7
MOD 23 3  406   0.03    1997
MOD 1  4  31.1
MOD 23 4  697   0.03    1997
MOD 1  5  44.6
MOD 23 5  1005  0.03    1997
MOD 1  6  99.4
MOD 23 6  2237  0.03    1997
MOD 1  7  77.3
MOD 23 7  1746  0.03    1997
MOD 1  10 14.4
MOD 1  11 14.4
MOD 1  12 60.3
MOD 1  13 59.5
MOD 1  18 16.7
MOD 1  19 25.5
MOD 1  20 25.5
MOD 1  21 13.8
MOD 1  22 13.8
MOD 1  23 16.7
MOD 1  24 35.2
MOD 1  26 71.0
MOD 1  27 100
MOD 1  28 71.0
MOD 1  29 100
MOD 1  32 15.7
MOD 1  33 15.7
MOD 1  34 45.9
MOD 1  35 43.8
************
YEAR 2010
DAY 1001
MOD 1  1  16.8
MOD 23 1  402 0.03 1997
MOD 1  2  16.8
MOD 23 2  400 0.03 1997
MOD 1  3  19.5
MOD 23 3  441 0.03 1997
MOD 1  4  34.1
MOD 23 4  791 0.03 1997
MOD 1  5  49.2
MOD 23 5  1148 0.03 1997
MOD 1  6  109.5
MOD 23 6  2539 0.03 1997
MOD 1  7  87.6
MOD 23 7  2057 0.03 1997
MOD 1  10 16.7
MOD 1  11 16.7
MOD 1  12 66.9
MOD 1  13 71
MOD 1  18 19.3
MOD 1  19 28
MOD 1  20 28
MOD 1  21 15
```

```
MOD 1  22 15.1
MOD 1  23 18.9
MOD 1  24 39
MOD 1  26 78.4
MOD 1  27 105.5
MOD 1  28 78.4
MOD 1  29 105.5
MOD 1  32 18
MOD 1  33 18
MOD 1  34 56.7
MOD 1  35 59.3
***********
YEAR 2011
DAY 0101
MOD 12 29 119
MOD 12  5 14
MOD 12  6 14
MOD 12 34 92
MOD 12 35 92
************
YEAR 2011
DAY 0401
MOD 1  1  14
MOD 23 1  320   0.03    1997
MOD 1  2  14
MOD 23 2  320   0.03    1997
MOD 1  3  17.7
MOD 23 3  406   0.03    1997
MOD 1  4  31.1
MOD 23 4  697   0.03    1997
MOD 1  5  44.6
MOD 23 5  1005  0.03    1997
MOD 1  6  99.4
MOD 23 6  2237  0.03    1997
MOD 1  7  77.3
MOD 23 7  1746  0.03    1997
MOD 1  10 14.4
MOD 1  11 14.4
MOD 1  12 60.3
MOD 1  13 59.5
MOD 1  18 16.7
MOD 1  19 25.5
MOD 1  20 25.5
MOD 1  21 13.8
MOD 1  22 13.8
MOD 1  23 16.7
MOD 1  24 35.2
MOD 1  26 71.0
MOD 1  27 100
MOD 1  28 71.0
MOD 1  29 100
MOD 1  32 15.7
MOD 1  33 15.7
MOD 1  34 45.9
MOD 1  35 43.8
************
YEAR 2011
DAY 1001
MOD 1  1  16.8
MOD 23 1  402 0.03 1997
MOD 1  2  16.8
MOD 23 2  400 0.03 1997
MOD 1  3  19.5
MOD 23 3  441 0.03 1997
MOD 1  4  34.1
MOD 23 4  791 0.03 1997
MOD 1  5  49.2
MOD 23 5  1148 0.03 1997
MOD 1  6  109.5
MOD 23 6  2539 0.03 1997
```

```
MOD 1  7  87.6
MOD 23 7  2057 0.03 1997
MOD 1  10 16.7
MOD 1  11 16.7
MOD 1  12 66.9
MOD 1  13 71
MOD 1  18 19.3
MOD 1  19 28
MOD 1  20 28
MOD 1  21 15
MOD 1  22 15.1
MOD 1  23 18.9
MOD 1  24 39
MOD 1  26 78.4
MOD 1  27 105.5
MOD 1  28 78.4
MOD 1  29 105.5
MOD 2  32 18
MOD 2  33 18
MOD 2  34 56.7
MOD 2  35 59.3
************
YEAR 2012
DAY 0101
MOD 12 24 30
MOD 12 27 119
MOD 12 29 28
MOD 12 1 92
MOD 12 4 92
MOD 12 34 2 3 0515 3 1101
MOD 12 35 2 3 0501 3 1115
************
YEAR 2012
DAY 0401
MOD 1  1  14
MOD 23 1  320   0.03    1997
MOD 1  2  14
MOD 23 2  320   0.03    1997
MOD 1  3  17.7
MOD 23 3  406   0.03    1997
MOD 1  4  31.1
MOD 23 4  697   0.03    1997
MOD 1  5  44.6
MOD 23 5  1005  0.03    1997
MOD 1  6  99.4
MOD 23 6  2237  0.03    1997
MOD 1  7  77.3
MOD 23 7  1746  0.03    1997
MOD 1  10 14.4
MOD 1  11 14.4
MOD 1  12 60.3
MOD 1  13 59.5
MOD 1  18 16.7
MOD 1  19 25.5
MOD 1  20 25.5
MOD 1  21 13.8
MOD 1  22 13.8
MOD 1  23 16.7
MOD 1  24 35.2
MOD 1  26 71.0
MOD 1  27 100
MOD 1  28 71.0
MOD 1  29 100
MOD 1  32 15.7
MOD 1  33 15.7
MOD 1  34 45.9
MOD 1  35 43.8
************
YEAR 2012
DAY 1001
```

```
MOD 1  1  16.8
MOD 23 1  402 0.03 1997
MOD 1  2  16.8
MOD 23 2  400 0.03 1997
MOD 1  3  19.5
MOD 23 3  441 0.03 1997
MOD 1  4  34.1
MOD 23 4  791 0.03 1997
MOD 1  5  49.2
MOD 23 5  1148 0.03 1997
MOD 1  6  109.5
MOD 23 6  2539 0.03 1997
MOD 1  7  87.6
MOD 23 7  2057 0.03 1997
MOD 1  10 16.7
MOD 1  11 16.7
MOD 1  12 66.9
MOD 1  13 71
MOD 1  18 19.3
MOD 1  19 28
MOD 1  20 28
MOD 1  21 15
MOD 1  22 15.1
MOD 1  23 18.9
MOD 1  24 39
MOD 1  26 78.4
MOD 1  27 105.5
MOD 1  28 78.4
MOD 1  29 105.5
MOD 1  32 18
MOD 1  33 18
MOD 1  34 56.7
MOD 1  35 59.3
************
YEAR 2013
DAY 0101
MOD 12 24 14
MOD 12 27 0
MOD 12 29 0
MOD 12 1 7
MOD 12 4 14
MOD 12 2 61
MOD 12 7 61
************
YEAR 2013
DAY 0401
MOD 1  1  14
MOD 23 1  320   0.03    1997
MOD 1  2  14
MOD 23 2  320   0.03    1997
MOD 1  3  17.7
MOD 23 3  406   0.03    1997
MOD 1  4  31.1
MOD 23 4  697   0.03    1997
MOD 1  5  44.6
MOD 23 5  1005  0.03    1997
MOD 1  6  99.4
MOD 23 6  2237  0.03    1997
MOD 1  7  77.3
MOD 23 7  1746  0.03    1997
MOD 1  10 14.4
MOD 1  11 14.4
MOD 1  12 60.3
MOD 1  13 59.5
MOD 1  18 16.7
MOD 1  19 25.5
MOD 1  20 25.5
MOD 1  21 13.8
MOD 1  22 13.8
MOD 1  23 16.7
```

```
MOD 1  24 35.2
MOD 1  26 71.0
MOD 1  27 100
MOD 1  28 71.0
MOD 1  29 100
MOD 1  32 15.7
MOD 1  33 15.7
MOD 1  34 45.9
MOD 1  35 43.8
************
YEAR 2013
DAY 1001
MOD 1  1  16.8
MOD 23 1  402 0.03 1997
MOD 1  2  16.8
MOD 23 2  400 0.03 1997
MOD 1  3  19.5
MOD 23 3  441 0.03 1997
MOD 1  4  34.1
MOD 23 4  791 0.03 1997
MOD 1  5  49.2
MOD 23 5  1148 0.03 1997
MOD 1  6  109.5
MOD 23 6  2539 0.03 1997
MOD 1  7  87.6
MOD 23 7  2057 0.03 1997
MOD 1  10 16.7
MOD 1  11 16.7
MOD 1  12 66.9
MOD 1  13 71
MOD 1  18 19.3
MOD 1  19 28
MOD 1  20 28
MOD 1  21 15
MOD 1  22 15.1
MOD 1  23 18.9
MOD 1  24 39
MOD 1  26 78.4
MOD 1  27 105.5
MOD 1  28 78.4
MOD 1  29 105.5
MOD 1  32 18
MOD 1  33 18
MOD 1  34 56.7
MOD 1  35 59.3
************
YEAR 2014
DAY 0101
MOD 12 27 28
MOD 12 29 28
MOD 12  2 7
MOD 12  7 14
MOD 12 36 92
MOD 12 38 92
************
YEAR 2014
DAY 0401
MOD 1  1  14
MOD 23 1  320   0.03    1997
MOD 1  2  14
MOD 23 2  320   0.03    1997
MOD 1  3  17.7
MOD 23 3  406   0.03    1997
MOD 1  4  31.1
MOD 23 4  697   0.03    1997
MOD 1  5  44.6
MOD 23 5  1005  0.03    1997
MOD 1  6  99.4
MOD 23 6  2237  0.03    1997
MOD 1  7  77.3
```

```
MOD 23 7  1746  0.03    1997
MOD 1  10 14.4
MOD 1  11 14.4
MOD 1  12 60.3
MOD 1  13 59.5
MOD 1  18 16.7
MOD 1  19 25.5
MOD 1  20 25.5
MOD 1  21 13.8
MOD 1  22 13.8
MOD 1  23 16.7
MOD 1  24 35.2
MOD 1  26 71.0
MOD 1  27 100
MOD 1  28 71.0
MOD 1  29 100
MOD 1  32 15.7
MOD 1  33 15.7
MOD 1  34 45.9
MOD 1  35 43.8
************
YEAR 2014
DAY 1001
MOD 1  1  16.8
MOD 23 1  402 0.03 1997
MOD 1  2  16.8
MOD 23 2  400 0.03 1997
MOD 1  3  19.5
MOD 23 3  441 0.03 1997
MOD 1  4  34.1
MOD 23 4  791 0.03 1997
MOD 1  5  49.2
MOD 23 5  1148 0.03 1997
MOD 1  6  109.5
MOD 23 6  2539 0.03 1997
MOD 1  7  87.6
MOD 23 7  2057 0.03 1997
MOD 1  10 16.7
MOD 1  11 16.7
MOD 1  12 66.9
MOD 1  13 71
MOD 1  18 19.3
MOD 1  19 28
MOD 1  20 28
MOD 1  21 15
MOD 1  22 15.1
MOD 1  23 18.9
MOD 1  24 39
MOD 1  26 78.4
MOD 1  27 105.5
MOD 1  28 78.4
MOD 1  29 105.5
MOD 1  32 18
MOD 1  33 18
MOD 1  34 56.7
MOD 1  35 59.3
************
YEAR 2015
DAY 0101
MOD 12 24 30
MOD 12 29 119
MOD 12 5 92
MOD 12 6 92
MOD 12 36 2 7 0115 10 0615
MOD 12 38 20
MOD 12 35 92
************
YEAR 2015
DAY 0401
MOD 1  1  14
```

```
MOD 23 1  320   0.03    1997
MOD 1  2  14
MOD 23 2  320   0.03    1997
MOD 1  3  17.7
MOD 23 3  406   0.03    1997
MOD 1  4  31.1
MOD 23 4  697   0.03    1997
MOD 1  5  44.6
MOD 23 5  1005  0.03    1997
MOD 1  6  99.4
MOD 23 6  2237  0.03    1997
MOD 1  7  77.3
MOD 23 7  1746  0.03    1997
MOD 1  10 14.4
MOD 1  11 14.4
MOD 1  12 60.3
MOD 1  13 59.5
MOD 1  18 16.7
MOD 1  19 25.5
MOD 1  20 25.5
MOD 1  21 13.8
MOD 1  22 13.8
MOD 1  23 16.7
MOD 1  24 35.2
MOD 1  26 71.0
MOD 1  27 100
MOD 1  28 71.0
MOD 1  29 100
MOD 1  32 15.7
MOD 1  33 15.7
MOD 1  34 45.9
MOD 1  35 43.8
************
YEAR 2015
DAY 1001
MOD 1  1  16.8
MOD 23 1  402 0.03 1997
MOD 1  2  16.8
MOD 23 2  400 0.03 1997
MOD 1  3  19.5
MOD 23 3  441 0.03 1997
MOD 1  4  34.1
MOD 23 4  791 0.03 1997
MOD 1  5  49.2
MOD 23 5  1148 0.03 1997
MOD 1  6  109.5
MOD 23 6  2539 0.03 1997
MOD 1  7  87.6
MOD 23 7  2057 0.03 1997
MOD 1  10 16.7
MOD 1  11 16.7
MOD 1  12 66.9
MOD 1  13 71
MOD 1  18 19.3
MOD 1  19 28
MOD 1  20 28
MOD 1  21 15
MOD 1  22 15.1
MOD 1  23 18.9
MOD 1  24 39
MOD 1  26 78.4
MOD 1  27 105.5
MOD 1  28 78.4
MOD 1  29 105.5
MOD 1  32 18
MOD 1  33 18
MOD 1  34 56.7
MOD 1  35 59.3
************
YEAR 2016
```

```
DAY 0101
MOD 12 24 14
MOD 12 27 119
MOD 12 29 28
MOD 12 3 92
MOD 12 35 2 3 0501 3 1115
************
YEAR 2016
DAY 0401
MOD 1  1  14
MOD 23 1  320   0.03    1997
MOD 1  2  14
MOD 23 2  320   0.03    1997
MOD 1  3  17.7
MOD 23 3  406   0.03    1997
MOD 1  4  31.1
MOD 23 4  697   0.03    1997
MOD 1  5  44.6
MOD 23 5  1005  0.03    1997
MOD 1  6  99.4
MOD 23 6  2237  0.03    1997
MOD 1  7  77.3
MOD 23 7  1746  0.03    1997
MOD 1  10 14.4
MOD 1  11 14.4
MOD 1  12 60.3
MOD 1  13 59.5
MOD 1  18 16.7
MOD 1  19 25.5
MOD 1  20 25.5
MOD 1  21 13.8
MOD 1  22 13.8
MOD 1  23 16.7
MOD 1  24 35.2
MOD 1  26 71.0
MOD 1  27 100
MOD 1  28 71.0
MOD 1  29 100
MOD 1  32 15.7
MOD 1  33 15.7
MOD 1  34 45.9
MOD 1  35 43.8
************
YEAR 2016
DAY 1001
MOD 1  1  16.8
MOD 23 1  402 0.03 1997
MOD 1  2  16.8
MOD 23 2  400 0.03 1997
MOD 1  3  19.5
MOD 23 3  441 0.03 1997
MOD 1  4  34.1
MOD 23 4  791 0.03 1997
MOD 1  5  49.2
MOD 23 5  1148 0.03 1997
MOD 1  6  109.5
MOD 23 6  2539 0.03 1997
MOD 1  7  87.6
MOD 23 7  2057 0.03 1997
MOD 1  10 16.7
MOD 1  11 16.7
MOD 1  12 66.9
MOD 1  13 71
MOD 1  18 19.3
MOD 1  19 28
MOD 1  20 28
MOD 1  21 15
MOD 1  22 15.1
MOD 1  23 18.9
MOD 1  24 39
```

```
MOD 1  26 78.4
MOD 1  27 105.5
MOD 1  28 78.4
MOD 1  29 105.5
MOD 1  32 18
MOD 1  33 18
MOD 1  34 56.7
MOD 1  35 59.3
*
*
END
```

Please Note:

Since differences between the Pooled Case and Joint Case do not occur until 2004, pool1.ppi and pool2.ppi serve for both the pooled case and the joint case.

```
PARAMETERS  0.50 75
* Optional output title lines as in POWRPRO data
*
T Multi Area Model -- Joint Case
T Uses Power Pool Price Files from the Traditional Scenario
T
*
* Control on printing input echo and/or progress of run to screen (see POWRPRO input
* description - Block 2 Line 1)
* |     First month of run
* |     |     Number of days to run
* |     |     |    Number of areas to be simulated
* |     |     |    |    Capacity fraction to use for calculaton of commitment priority
* |     |     |    |    |     Enter 1 to have variable o&m included in commitment and
* |     |     |    |    |     dispatch - 0 otherwise
* |     |     |    |    |     |   Output selector (see POWRPRO input description -
* |     |     |    |    |     |   Block 2 Line 1)
* |     |     |    |    |     |   |     Enter the # of areas to calculate the hourly
* |     |     |    |    |     |   |     dispatch incremental, else 0
* |     |     |    |    |     |   |     |   Enter 1 to activate dispatch review option
* |     |     |    |    |     |   |     |   - 0 otherwise
* |     |     |    |    |     |   |     |   |   Enter 1 to have hourly average fuel prices
* |     |     |    |    |     |   |     |   |   written to a file - 0 otherwise
* |     |     |    |    |     |   |     |   |   |   Enter 1 to have annual summary written
* |     |     |    |    |     |   |     |   |   |   to a file - 0 otherwise
* |     |     |    |    |     |   |     |   |   |   |   Enter a unit number here to get
* |     |     |    |    |     |   |     |   |   |   |   it's hourly generation written to
* |     |     |    |    |     |   |     |   |   |   |   a file - 0 otherwise
* |     |     |    |    |     |   |     |   |   |   |   |     _______ These two items are
* |     |     |    |    |     |   |     |   |   |   |   |     |     | not yet implemented
* |     |     |    |    |     |   |     |   |   |   |   |     |     | - enter zeroes
* |     |     |    |    |     |   |     |   |   |   |   |     |     |
 -1000  1     365  4    1.0   1   2     0   0   0   1   0     0     0
*
*  First year to run
*  |
*  |       Last year to run
*  |       |
   2002    2016
*
'/u/jurotich/pool/joint3.sum'
*
*
*
TIE (code indicating tie line data follow - must be entered as shown - not needed if
*   only one area is simulated)
*
* Tie line number
* | 'From' area
* |  |     'To' area
* |  |     |      Tie line capacity - Mw
* |  |     |      |         a       b: power loss in tie line (mw) = a x Mw + b x Mw**2
* |  |     |      |         |       |   (where Mw = megawatts flowing)
* |  |     |      |         |       |       Wheeling cost ($/Mwh)
* |  |     |      |         |       |       |
*
* Kenai to Anchorage
  1  1     2      145       0.0093  0.0003  0
  2  2     1      145       0.0093  0.0003  0
* Anchorage to Healy
  3  2     3      79       -0.0041  0.0008  0
  4  3     2      79       -0.0041  0.0008  0
* Healy to Fairbanks
  5  3     4      140      -0.0059  0.0004  0
  6  4     3      140      -0.0059  0.0004  0
*
***************************************************************************
*                            Kenai Peninsula                              *
***************************************************************************
* Begin data for first area (see below description for area 2)
```

```
*
AREA
'Kenai'
'/u/jurotich/shave/kenai.shv'
  0  0  0  0.1  0  2.9  1
  * Connectivity data
* Area number this area connects with
* |  Number of tie lines in connection path
* |  |     Tie line numbers (in order from this area to connected area)
* |  |     |
  2  1     1
  3  2     1 3
  4  3     1 3 5
************** EXISTING GENERATION **********
G 18 'Bernice 2' 19.3 3 'Q' 100 'U' 0.05
3
3
2.06 0.030 1997 6500 0.030 1997
82.82 8.77628 0.08
21
1    1   1    1    0 0.44 0
0.15 0.3 0.3  1
200  0   25.0 1000 0.03 1997
**********************************************
G 19 'Bernice 3' 28 3 'Q' 0 'A' 0.07
3
3
2.06 0.030 1997 6500 0.030 1997
104.4 7.83575 0.06
21
1     1    1    1    0 0.44 0
0.165 0.33 0.33 1
200   0    25.0 1000 0.03 1997
**********************************************
G 20 'Bernice 4' 28 7 'Q' 0 'A' 0.05
3
3
2.06 0.030 1997 6500 0.030 1997
102.7 9.3567 0.01
21
1     1    1    1    0 0.44 0
0.165 0.33 0.33 1
200   0    25.0 1000 0 0.03 1997
**********************************************
G 24 'Soldotna 1' 39 6 ' ' 0 'A' 0.01
4
4
2.06 0.030 1996 3300 0.030 1996
136.1 5.571 0.060
14
1     1    6    6    0    0.42 0
0.125 0.25 0.25 1
200   0    45   1000 0.03 1997
*
************** Emergency Purchase ***********
*
PR 997 'EMERG PURCH' 150 0  ' ' 0  'A' 0
999.0 0.035 1996
*
*************************************************************************
*                              Anchorage Area                           *
*************************************************************************
*
*
AREA
*
* area name (maximum of 12 characters enclosed in quotes)
* |
  'Anchorage'
* Hourly demands filename for this area (maximum of 48 characters enclosed in quotes)
```

```
* |
 '/u/jurotich/shave/anchrage.shv'
 *
* ____These two items are not yet implemented - enter zeroes
* |  |
* |  |  a  b: Spinning reserve requirement for this area = a x demand + b
* |  |  |  |
* |  |  |  |   a  b: Operating reserve requirement for this area = a x demand + b
* |  |  |  |   |  |
* |  |  |  |   |  |  Minimum number of on-line units required for this area
* |  |  |  |   |  |  |
  0  0  0 28.5 0 64.9 0
*
* Connectivity data (see accompanying diagram)
* Area number this area connects with
* |  Number of tie lines in connection path
* |  |     Tie line numbers (in order from this area to connected area)
* |  |     |
  1  1     2
  3  1     3
  4  2     3 5
************** EXISTING GENERATION **********
*
G 1 'ML&P P1 U1' 16.8 3 'Q' 0 'A' 0.033
1
1
2.06 0.03 1997 7660 0.03 1997
79.63 9.2837 0.049
7
1    1   1      1   0 0.44 0
0.25 0.5 0.5    1
200  0   79.629 402 0.03 1997
************************************************
G 2 'ML&P P1 U2' 16.8 3 'Q' 0 'A' 0.033
1
1
2.06 0.03 1997 7660 0.03 1997
74.92 8.254 0.0869
7
1    1   1     1   0 0.44 0
0.25 0.5 0.5   1
200  0   74.92 400 0.03 1997
************************************************
G 3 'ML&P P1 U3' 19.5 3 'Q' 0 'A' 0.033
1
1
2.06 0.03 1997 7660 0.03 1997
86.7 7.7585 0.1111
14
1    1   1    1   0 0.44 0
0.25 0.5 0.25 1
200  0   86.7 441 0.03 1997
************************************************
G 4 'ML&P P1 U4' 34.1 3 'Q' 0 'A' 0.033
1
1
2.06 0.03 1996 7660 0.03 1996
165.1 7.5594 0.0329
14
1     1    1      1   0    0.44 0
0.125 0.25 0.25   1
200   0    165.07 791 0.03 1997
************************************************
G 5 'ML&P P2 U5-6' 49.2 10 ' ' 0 'A' 0.033
1
1
2.06 0.03 1997 7266 0.03 1997
168 6.74 0.0026
14
1     1     16    6    0    0.625 0
```

```
0.165 0.33  0.33  1
200   0     168.0 1148 0.03 1997
**********************************************
G 6 'ML&P P2 U7-6' 109.5 10 ' ' 0 'A' 0.033
1
1
2.06 0.03 1997 7266 0.03 1997
199 5.93 0.008
14
1     1    16    6    0    0.28 0
0.165 0.33 0.33  1
200   0    199.0 2539 0.03 1997
**********************************************
G 7 'ML&P P2 U8' 87.6 20 ' ' 0 'A' 0.033
1
1
2.06 0.03 1997 7266 0.03 1997
216.7 8.1877 0.0122
14
1     1     6      6     0    0.078 0
0.084 0.167 0.167  1
200   0     216.2  2057  0.03 1997
**********************************************
G 10 'Beluga 1' 16.7 3 'Q ' 0 'A' 0.07
2
2
2.06 0.030 1997 7950 0.030 1997
83.57046 10.856 0.07032
21
1    1    1    1    0 0.44 0
0.15 0.30 0.30 1
200  0    20.0 1000 0.03 1997
**********************************************
G 11 'Beluga 2' 16.7 3 'Q ' 0 'A' 0.004
2
2
2.06 0.030 1997 7950 0.030 1997
129.98 8.3371 0.0829
21
1    1    1    1    0 0.44  0
0.15 0.23 0.23 1
200  0    32.0 1000 0.03 1997
*********************************************
G 12 'Beluga 3' 66.9 3 'Q' 0 'A' 0.01
2
2
2.06 0.030 1997 7950 0.030 1997
196.9959 8.4491 0.01243
28
1    1    6   6   0 0.44  0
0.15 0.30 0.30 1
200  0    67.0 1600 0.03 1997
*********************************************
G 13 'Beluga 5' 71 3 'Q' 0 'A' 0.00
2
2
2.06 0.030 1997 7950 0.030 1997
208.6894 7.8766 0.0223
28
1     1    6   6   0 0.44  0
0.185 0.37 0.37 1
200   0    67.0 1600 0.03 1997
*********************************************
G 14 'Beluga 6CT' 74 3 ' ' 0 'U' 0.10
2
2
2.06 0.030 1997 7950 0.030 1997
243.93564 8.525 0.01201
28
1     1    6   6   0 0.44 0
```

```
0.185 0.37 0.37 1
200   0    67.0 3600 0.03 1997
**********************************************
G 15 'Beluga 6-8' 101.5 48 ' ' 0 'A' 0.004
2
2
2.06 0.030 1997 7950 0.030 1997
380.7771 2.6953 0.02882
28
1   1   16   6   0 0.44 0
0.5 1.0 1.0  0.45
200 0   67.0 3600 0.03 1997
**********************************************
G 16 'Beluga 7CT' 74 3 ' ' 0 'U' 0.004
2
2
2.06 0.030 1997 7950 0.030 1997
222.87852 8.3 0.02489
28
1    1    6   6   0 0.44 0
0.21 0.42 0.42 1
200  0    67.0 3600 0.03 1997
**********************************************
G 17 'Beluga 7-8' 101.5 48 ' ' 0 'A' 0.04
2
2
2.06 0.030 1997 7950 0.030 1997
291.9567 4.463 0.01783
28
1   1   16   6   0    0.44 0
0.5 1.0 1.0  0.45
200 0   67.0 3600 0.03 1997
**********************************************
G 21 'Intrnl 1' 15 3 'Q' 0 'A' 0.10
4
4
2.06 0.030 1997 5750 0.030 1997
83.07 8.48275 0.14
14
1    1    1    1    0 0.44  0
0.21 0.42 0.42 1
200  0    21.0 1000 0.03 1997
**********************************************
G 22 'Intrnl 2' 15.1 3 'Q' 0 'A' 0.10
4
4
2.06 0.030 1997 5750 0.030 1997
88.96 5.90928 0.37
14
1    1    1    1    0 0.44  0
0.21 0.42 0.42 1
200  0    21.0 1000 0.03 1997
**********************************************
G 23 'Intrnl 3' 18.9 3 'Q' 0 'A' 0.11
4
4
2.06 0.030 1997 5750 0.030 1997
91.76 7.94660 0.12
14
1    1    1    1    0 0.44  0
0.21 0.42 0.42 1
200  0    23.0 1000 0.03 1997
**********************************************
G 25 'LM6000 Chug' 40.5 10 ' ' 0 'U' 0.05
4
4
2.06 0.030 1997 7950 0.030 1997
97.797 6.1712 0.0382
28
1   1   1   1    0    0.42 0
```

```
1.5 3.5 3.5 1
200 0   43  750 0.03 1997
********************************************** Upgraded Units 6 & 7 ***
G 26 'Beluga 6CT' 78.4 3 ' ' 0 'U' 0.10
2
2
2.06 0.030 1997 7950 0.030 1997
228.0798 7.971 0.0112
28
1     1    6   6   0 0.44 0
0.185 0.37 0.37 1
200   0    67.0 3600 0.03 1997
**********************************************
G 27 'Beluga 6-8' 105.5 48 ' ' 0 'U' 0.004
2
2
2.06 0.030 1997 7950 0.030 1997
356.027 2.52 0.0308
28
1   1   16   6   0 0.44 0
0.5 1.0 1.0  0.45
200 0   67.0 3600 0.03 1997
**********************************************
G 28 'Beluga 7CT' 78.4 3 ' ' 0 'U' 0.004
2
2
2.06 0.030 1997 7950 0.030 1997
208.39 7.7605 0.2327
28
1    1    6   6   0 0.44 0
0.21 0.42 0.42 1
200  0    67.0 3600 0.03 1997
**********************************************
G 29 'Beluga 7-8' 105.5 48 ' ' 0 'U' 0.04
2
2
2.06 0.030 1997 7950 0.030 1997
272.9795 4.173 0.01667
28
1   1   16   6   0    0.44 0
0.5 1.0 1.0  0.45
200 0   67.0 3600 0.03 1997
*
************** Emergency Purchase ***********
*
PR 998 'EMERG PURCH' 150 0  ' ' 0  'A' 0
999.0 0.035 1996
*
*****************************************************************************
*                                 Healy                                     *
*****************************************************************************
* Begin data for third area (see above description for area 2)
*
AREA
'Healy'
'/u/jurotich/shave/healy.shv'
  0  0  0  0  0  0  0
* Connectivity data (see accompanying diagram)
* Area number this area connects with
* |  Number of tie lines in connection path
* |  |     Tie line numbers (in order from this area to connected area)
* |  |     |
  1  2     4 2
  2  1     4
  4  1     5
************** EXISTING GENERATION **********
G 36 'Healy 1' 25 3 'M' 0 'A' 0.09
7
3.11  0.03  1996
10.87 0.030 1996 94657 0.030 1996
```

```
95.738 7.998 0.0867
2 7 0115 10 0615
1   1  1  1    0.46 0.37    0
6.5 13 13 1
200 0  20 1000 0.03 1997
**********************************************
G 37 'Healy D1' 2.6 0.5 ' ' 0 'A' 0.05
3.20  0.03  1997
3.20  0.03  1997
8.00 0.030 1996 22655 0.030 1996
0 14.00 0
2 7 0215 10 0601
1     1    1    1   0.84 0.76   0
0.025 0.05 0.05 1
200   0    0    500 0.03    1997
**********************************************
G 38 'HCCP' 53 10 'M' 0 'A' 0.10
5
3.11  0.03  1996
10.00 0.03 1997 63800 0.03 1997
80.138 7.9918 0.0434
20
1   1    1  1    0.3 0.35   0
3   8    4  1
200 1112 0  1000 0.03   1997
*
*************************************************************************
*                              Fairbanks Area                           *
*************************************************************************
* Begin data for fourth area (see above description for area 2)
*
AREA
'Fairbanks'
'/u/jurotich/shave/gvea.shv'
  0  0  0  10  0  80  0
  * Connectivity data (see accompanying diagram)
* Area number this area connects with
* |  Number of tie lines in connection path
* |  |     Tie line numbers (in order from this area to connected area)
* |  |     |
  1  3     6 4 2
  2  2     6 4
  3  1     6
************** EXISTING GENERATION **********
G 30 'Zehnder EMD5' 2.6 0.5 ' ' 0 'A' 0.01
3.31  0.03  1997
3.31  0.03  1997
8.00 0.030 1996 8199 0.030 1996
0 14.00 0
0
1     1    1    1   0.84 0.76   0
0.035 0.07 0.07 1
200   0    0    500 0.03    1997
**********************************************
G 31 'Zehnder EMD6' 2.6 0.5 ' ' 0 'A' 0.01
3.31  0.03  1997
3.31  0.03  1997
8.00 0.030 1996 8199 0.030 1996
0 14.00 0
0
1     1    1    1   0.84 0.76   0
0.035 0.07 0.07 1
200   0    0    500 0.03    1997
**********************************************
G 32 'Zehnder GT1' 18 6 'Q' 0 'A' 0.01
3.31  0.03  1997
3.31  0.03  1997
5.21 0.030 1996 7618 0.030 1996
97.72 6.2534 0.1599
2 3 0415 3 1001
```

```
1    1    1    1    0.84 0.76   0
0.15 0.30 0.30 1
200  0    20   1000 0.03    1997
**********************************************
G 33 'Zehnder GT2' 18 6 'Q' 0 'A' 0.01
3.31  0.03  1997
3.31  0.03  1997
5.21 0.030 1996 7618 0.030 1996
97.72 6.253401 0.1599
2 3 0401 3 1015
1    1    1    1    0.84 0.76   0
0.15 0.30 0.30 1
200  0    20   1000 0.03    1997
**********************************************
G 34 'North Pole 1' 64 5 ' ' 0 'A' 0.05
3.09  0.03  1997
3.09  0.03  1997
4.66 0.030 1996 5167 0.030 1996
167.46 5.022 0.033
2 3 0515 3 1101
1     1    6    6    0.89 0.73  0
0.365 0.73 0.73 1
200   0    30   1600 0.03   1997
**********************************************
G 35 'North Pole 2' 64 5 'Q' 0 'A' 0.08
3.09  0.03  1997
3.09  0.03  1997
4.66 0.030 1996 5167 0.030 1996
181.74 4.5092 0.0282
2 3 0501 3 1115
1     1    6    6    0.89 0.73  0
0.365 0.73 0.73 1
200   0    30   1600 0.03   1997
**********************************************
G 39 'Chena 6' 29.3 10  'Q' 0 'U' 0.05
3.40 0.03 1996
3.40 0.03 1996
0.30 0.030 1997 9000 0.030 1997
72.972 8.8103 0.014
1 15 0501
1    1    4    0   0.02 0.12  0
0.15 0.30 0.30 1
200  0    26.3    1000 0.03 1997
**********************************************
G 40 'SILOS' 70 0.5 'Q' 274 'A' 0.0
100.00  0.03  1996
100.00  0.03  1996
10.00 0.030 1996 0 0.030 1996
0 10.000 0
0
1 1 1 1 0 0 0
0 0 0 1
0 0 0 0 0 0
**************************************************OGEM***
G 204  'GE 7EA SC'  83 10  ' ' 0  'U'  0.05
3.11 0.03 1998
3.11 0.03 1998
3.03  0.03  1998 4400  0.03  1998
243.93 6.0178 0.0333
17
1 1 1 1 0 0.5 0
1.5 3.5 24 1
200 138.0 0 1000 0.03 1998
*
************** Emergency Purchase ***********
*
PR 999 'EMERG PURCH' 150 0  ' ' 0  'A' 0
999.0 0.035 1996
*
*
```

PRICES
*
****
* Annual Fuel Price & Purchase Price Table *
****

*	ML&P & Joint NGas $/MBtu	Beluga NGas $/MBtu	Bernice NGas $/MBtu	New Plant Soldotna & Intn'l NGas $/MBtu	HCCP Coal $/MBtu	Aurora Purch. $/MWh	Healy Coal $/MBtu
1996	1.86	1.17	1.38	1.98	0.00	00.00	1.36
1997	1.74	1.46	1.50	2.25	0.60	00.00	1.39
1998	1.97	1.69	1.70	2.05	0.62	40.00	1.02
1999	2.01	1.73	1.75	2.10	0.65	40.00	0.94
2000	2.06	1.78	1.80	2.15	0.67	37.00	0.97
2001	2.12	1.84	1.85	2.20	0.70	37.00	0.99
2002	2.16	1.88	1.90	2.25	0.76	37.93	1.05
2003	2.22	1.94	1.95	2.30	0.77	38.87	1.07
2004	2.27	1.99	2.00	2.35	0.79	39.84	1.09
2005	2.33	2.05	2.06	2.41	0.80	40.84	1.11
2006	2.39	2.11	2.12	2.47	0.82	41.86	1.13
2007	2.44	2.16	2.18	2.53	0.83	42.91	1.16
2008	2.50	2.22	2.24	2.59	0.85	43.98	1.18
2009	2.57	2.29	2.30	2.65	0.87	45.08	1.20
2010	2.63	2.35	2.37	2.72	0.88	46.21	1.22
2011	2.70	2.42	2.44	2.79	0.90	47.36	1.25
2012	2.77	2.49	2.50	2.85	0.92	48.55	1.27
2013	2.84	2.56	2.57	2.92	0.93	49.76	1.29
2014	2.91	2.63	2.65	3.00	0.95	51.00	1.32
2015	2.98	2.70	2.72	3.07	0.97	52.28	1.34
2016	3.06	2.78	2.80	3.15	0.99	53.59	1.37
2017	3.06	2.78	2.80	3.15	0.99	53.59	1.37

*
****
* Starts & Retirements *
****
*
START 39 1997 1001
****
START   18 1998 0101
****
RETIRE 15 2001 0430
RETIRE 17 2001 0430
START 14 2001 0501
START 16 2001 0501
RETIRE 14 2001 0731
RETIRE 16 2001 0731
START 15 2001 0801
START 17 2001 0801
****
RETIRE 16 2003 1231
RETIRE 17 2003 1231
****
START 29 2004 0101
RETIRE 14 2004 1231
RETIRE 15 2004 1231
****
START 27 2005 0101
****
RETIRE 27 2007 0430
RETIRE 29 2007 0430
START 26 2007 0501
RETIRE 26 2007 0731
START 27 2007 0801
START 29 2007 0801
********** Retiring GVEA Units ***
RETIRE 32 2010 1231
********** Starting GVEA Units ***
********** Retiring GVEA Units ***

```
RETIRE 33 2011 1231
RETIRE 39 2011 1231
*********************
RETIRE 27 2013 0430
RETIRE 29 2013 0430
START  26 2013 0501
START  28 2013 0501
RETIRE 26 2013 0731
RETIRE 28 2013 0731
START  27 2013 0801
START  29 2013 0801
********************* Start new Chugach Unit ***
START 25 2014 0101
********************* Starting OGEM Unit ***
START 204 2015 0101
********************* Retiring GVEA Units ***
RETIRE 34 2016 0101
*
*****************************************************************************
*                            Change Mod Section                             *
*****************************************************************************
*
**************
YEAR 2001
DAY 0101
MOD 12 24 14
MOD 12 15 0
MOD 12 17 0
MOD 12 5 14
MOD 12 6 14
MOD 12 36 2 7 0115 10 0615
************
YEAR 2001
DAY 0401
MOD 1  1  14
MOD 23 1  320   0.03    1997
MOD 1  2  14
MOD 23 2  320   0.03    1997
MOD 1  3  17.7
MOD 23 3  406   0.03    1997
MOD 1  4  31.1
MOD 23 4  697   0.03    1997
MOD 1  5  44.6
MOD 23 5  1005  0.03    1997
MOD 1  6  99.4
MOD 23 6  2237  0.03    1997
MOD 1  7  77.3
MOD 23 7  1746  0.03    1997
MOD 1  10 14.4
MOD 1  11 14.4
MOD 1  12 60.3
MOD 1  13 59.5
MOD 1  14 68
MOD 1  15 95.5
MOD 1  16 68
MOD 1  17 95.5
MOD 1  18 16.7
MOD 1  19 25.5
MOD 1  20 25.5
MOD 1  21 13.8
MOD 1  22 13.8
MOD 1  23 16.7
MOD 1  24 35.2
MOD 1  32 15.7
MOD 1  33 15.7
MOD 1  34 45.9
MOD 1  35 43.8
************
YEAR 2001
DAY 1001
```

```
MOD 1  1  16.8
MOD 23 1  402 0.03 1997
MOD 1  2  16.8
MOD 23 2  400 0.03 1997
MOD 1  3  19.5
MOD 23 3  441 0.03 1997
MOD 1  4  34.1
MOD 23 4  791 0.03 1997
MOD 1  5  49.2
MOD 23 5  1148 0.03 1997
MOD 1  6  109.5
MOD 23 6  2539 0.03 1997
MOD 1  7  87.6
MOD 23 7  2057 0.03 1997
MOD 1  10 16.7
MOD 1  11 16.7
MOD 1  12 66.9
MOD 1  13 71
MOD 1  14 74
MOD 1  15 101.5
MOD 1  16 74
MOD 1  17 101.5
MOD 1  18 19.3
MOD 1  19 28
MOD 1  20 28
MOD 1  21 15
MOD 1  22 15.1
MOD 1  23 18.9
MOD 1  24 39
MOD 1  32 18
MOD 1  33 18
MOD 1  34 56.7
MOD 1  35 59.3
************
YEAR 2002
DAY 0101
MOD 12 15 28
MOD 12 17 28
************
YEAR 2002
DAY 0401
MOD 1  1  14
MOD 23 1  320   0.03    1997
MOD 1  2  14
MOD 23 2  320   0.03    1997
MOD 1  3  17.7
MOD 23 3  406   0.03    1997
MOD 1  4  31.1
MOD 23 4  697   0.03    1997
MOD 1  5  44.6
MOD 23 5  1005  0.03    1997
MOD 1  6  99.4
MOD 23 6  2237  0.03    1997
MOD 1  7  77.3
MOD 23 7  1746  0.03    1997
MOD 1  10 14.4
MOD 1  11 14.4
MOD 1  12 60.3
MOD 1  13 59.5
MOD 1  14 68
MOD 1  15 95.5
MOD 1  16 68
MOD 1  17 95.5
MOD 1  18 16.7
MOD 1  19 25.5
MOD 1  20 25.5
MOD 1  21 13.8
MOD 1  22 13.8
MOD 1  23 16.7
MOD 1  24 35.2
```

```
MOD 1  32 15.7
MOD 1  33 15.7
MOD 1  34 45.9
MOD 1  35 43.8
************
YEAR 2002
DAY 1001
MOD 1  1  16.8
MOD 23 1  402 0.03 1997
MOD 1  2  16.8
MOD 23 2  400 0.03 1997
MOD 1  3  19.5
MOD 23 3  441 0.03 1997
MOD 1  4  34.1
MOD 23 4  791 0.03 1997
MOD 1  5  49.2
MOD 23 5  1148 0.03 1997
MOD 1  6  109.5
MOD 23 6  2539 0.03 1997
MOD 1  7  87.6
MOD 23 7  2057 0.03 1997
MOD 1  10 16.7
MOD 1  11 16.7
MOD 1  12 66.9
MOD 1  13 71
MOD 1  14 74
MOD 1  15 101.5
MOD 1  16 74
MOD 1  17 101.5
MOD 1  18 19.3
MOD 1  19 28
MOD 1  20 28
MOD 1  21 15
MOD 1  22 15.1
MOD 1  23 18.9
MOD 1  24 39
MOD 1  32 18
MOD 1  33 18
MOD 1  34 56.7
MOD 1  35 59.3
************
YEAR 2003
DAY 0101
MOD 12 17 119
MOD 12 24 30
MOD 12 7 92
MOD 12 34 92
MOD 12 35 92
************
YEAR 2003
DAY 0401
MOD 1  1  14
MOD 23 1  320   0.03    1997
MOD 1  2  14
MOD 23 2  320   0.03    1997
MOD 1  3  17.7
MOD 23 3  406   0.03    1997
MOD 1  4  31.1
MOD 23 4  697   0.03    1997
MOD 1  5  44.6
MOD 23 5  1005  0.03    1997
MOD 1  6  99.4
MOD 23 6  2237  0.03    1997
MOD 1  7  77.3
MOD 23 7  1746  0.03    1997
MOD 1  10 14.4
MOD 1  11 14.4
MOD 1  12 60.3
MOD 1  13 59.5
MOD 1  14 68
```

```
MOD 1  15 95.5
MOD 1  16 68
MOD 1  17 95.5
MOD 1  18 16.7
MOD 1  19 25.5
MOD 1  20 25.5
MOD 1  21 13.8
MOD 1  22 13.8
MOD 1  23 16.7
MOD 1  24 35.2
MOD 1  32 15.7
MOD 1  33 15.7
MOD 1  34 45.9
MOD 1  35 43.8
************
YEAR 2003
DAY 1001
MOD 1  1  16.8
MOD 23 1  402 0.03 1997
MOD 1  2  16.8
MOD 23 2  400 0.03 1997
MOD 1  3  19.5
MOD 23 3  441 0.03 1997
MOD 1  4  34.1
MOD 23 4  791 0.03 1997
MOD 1  5  49.2
MOD 23 5  1148 0.03 1997
MOD 1  6  109.5
MOD 23 6  2539 0.03 1997
MOD 1  7  87.6
MOD 23 7  2057 0.03 1997
MOD 1  10 16.7
MOD 1  11 16.7
MOD 1  12 66.9
MOD 1  13 71
MOD 1  14 74
MOD 1  15 101.5
MOD 1  16 74
MOD 1  17 101.5
MOD 1  18 19.3
MOD 1  19 28
MOD 1  20 28
MOD 1  21 15
MOD 1  22 15.1
MOD 1  23 18.9
MOD 1  24 39
MOD 1  32 18
MOD 1  33 18
MOD 1  34 56.7
MOD 1  35 59.3
************
YEAR 2004
DAY 0101
MOD 12 15 119
MOD 12 24 14
MOD 12 7 14
MOD 12 1 92
MOD 12 4 92
MOD 12 34 2 3 0515 3 1101
MOD 12 35 2 3 0501 3 1115
MOD 12 36 92
MOD 12 38 92
************
YEAR 2004
DAY 0401
MOD 1  1  14
MOD 23 1  320   0.03    1997
MOD 1  2  14
MOD 23 2  320   0.03    1997
MOD 1  3  17.7
```

```
MOD 23 3  406   0.03    1997
MOD 1  4  31.1
MOD 23 4  697   0.03    1997
MOD 1  5  44.6
MOD 23 5  1005  0.03    1997
MOD 1  6  99.4
MOD 23 6  2237  0.03    1997
MOD 1  7  77.3
MOD 23 7  1746  0.03    1997
MOD 1  10 14.4
MOD 1  11 14.4
MOD 1  12 60.3
MOD 1  13 59.5
MOD 1  14 68
MOD 1  15 95.5
MOD 1  18 16.7
MOD 1  19 25.5
MOD 1  20 25.5
MOD 1  21 13.8
MOD 1  22 13.8
MOD 1  23 16.7
MOD 1  24 35.2
MOD 1  28 71.0
MOD 1  29 100
MOD 1  32 15.7
MOD 1  33 15.7
MOD 1  34 45.9
MOD 1  35 43.8
************
YEAR 2004
DAY 1001
MOD 1  1  16.8
MOD 23 1  402 0.03 1997
MOD 1  2  16.8
MOD 23 2  400 0.03 1997
MOD 1  3  19.5
MOD 23 3  441 0.03 1997
MOD 1  4  34.1
MOD 23 4  791 0.03 1997
MOD 1  5  49.2
MOD 23 5  1148 0.03 1997
MOD 1  6  109.5
MOD 23 6  2539 0.03 1997
MOD 1  7  87.6
MOD 23 7  2057 0.03 1997
MOD 1  10 16.7
MOD 1  11 16.7
MOD 1  12 66.9
MOD 1  13 71
MOD 1  14 74
MOD 1  15 101.5
MOD 1  18 19.3
MOD 1  19 28
MOD 1  20 28
MOD 1  21 15
MOD 1  22 15.1
MOD 1  23 18.9
MOD 1  24 39
MOD 1  28 78.4
MOD 1  29 105.5
MOD 1  32 18
MOD 1  33 18
MOD 1  34 56.7
MOD 1  35 59.3
************
YEAR 2005
DAY 0101
MOD 12 1 7
MOD 12 4 14
MOD 12 5 92
```

```
MOD 12 6 92
MOD 12 36 2 7 0115 10 0615
MOD 12 38 20
MOD 12 32 92
MOD 12 33 92
************
YEAR 2005
DAY 0401
MOD 1  1  14
MOD 23 1  320   0.03    1997
MOD 1  2  14
MOD 23 2  320   0.03    1997
MOD 1  3  17.7
MOD 23 3  406   0.03    1997
MOD 1  4  31.1
MOD 23 4  697   0.03    1997
MOD 1  5  44.6
MOD 23 5  1005  0.03    1997
MOD 1  6  99.4
MOD 23 6  2237  0.03    1997
MOD 1  7  77.3
MOD 23 7  1746  0.03    1997
MOD 1  10 14.4
MOD 1  11 14.4
MOD 1  12 60.3
MOD 1  13 59.5
MOD 1  18 16.7
MOD 1  19 25.5
MOD 1  20 25.5
MOD 1  21 13.8
MOD 1  22 13.8
MOD 1  23 16.7
MOD 1  24 35.2
MOD 1  26 71.0
MOD 1  27 100
MOD 1  28 71.0
MOD 1  29 100
MOD 1  32 15.7
MOD 1  33 15.7
MOD 1  34 45.9
MOD 1  35 43.8
************
YEAR 2005
DAY 1001
MOD 1  1  16.8
MOD 23 1  402 0.03 1997
MOD 1  2  16.8
MOD 23 2  400 0.03 1997
MOD 1  3  19.5
MOD 23 3  441 0.03 1997
MOD 1  4  34.1
MOD 23 4  791 0.03 1997
MOD 1  5  49.2
MOD 23 5  1148 0.03 1997
MOD 1  6  109.5
MOD 23 6  2539 0.03 1997
MOD 1  7  87.6
MOD 23 7  2057 0.03 1997
MOD 1  10 16.7
MOD 1  11 16.7
MOD 1  12 66.9
MOD 1  13 71
MOD 1  18 19.3
MOD 1  19 28
MOD 1  20 28
MOD 1  21 15
MOD 1  22 15.1
MOD 1  23 18.9
MOD 1  24 39
MOD 1  26 78.4
```

```
MOD 1  27 105.5
MOD 1  28 78.4
MOD 1  29 105.5
MOD 1  32 18
MOD 1  33 18
MOD 1  34 56.7
MOD 1  35 59.3
************
YEAR 2006
DAY 0101
MOD 12 24 30
MOD 12 5 14
MOD 12 6 14
MOD 12 2 92
MOD 12 32 2 3 0415 3 1001
MOD 12 33 2 3 0401 3 1015
************
YEAR 2006
DAY 0401
MOD 1  1  14
MOD 23 1  320   0.03    1997
MOD 1  2  14
MOD 23 2  320   0.03    1997
MOD 1  3  17.7
MOD 23 3  406   0.03    1997
MOD 1  4  31.1
MOD 23 4  697   0.03    1997
MOD 1  5  44.6
MOD 23 5  1005  0.03    1997
MOD 1  6  99.4
MOD 23 6  2237  0.03    1997
MOD 1  7  77.3
MOD 23 7  1746  0.03    1997
MOD 1  10 14.4
MOD 1  11 14.4
MOD 1  12 60.3
MOD 1  13 59.5
MOD 1  18 16.7
MOD 1  19 25.5
MOD 1  20 25.5
MOD 1  21 13.8
MOD 1  22 13.8
MOD 1  23 16.7
MOD 1  24 35.2
MOD 1  26 71.0
MOD 1  27 100
MOD 1  28 71.0
MOD 1  29 100
MOD 1  32 15.7
MOD 1  33 15.7
MOD 1  34 45.9
MOD 1  35 43.8
************
YEAR 2006
DAY 1001
MOD 1  1  16.8
MOD 23 1  402 0.03 1997
MOD 1  2  16.8
MOD 23 2  400 0.03 1997
MOD 1  3  19.5
MOD 23 3  441 0.03 1997
MOD 1  4  34.1
MOD 23 4  791 0.03 1997
MOD 1  5  49.2
MOD 23 5  1148 0.03 1997
MOD 1  6  109.5
MOD 23 6  2539 0.03 1997
MOD 1  7  87.6
MOD 23 7  2057 0.03 1997
MOD 1  10 16.7
```

```
MOD 1  11 16.7
MOD 1  12 66.9
MOD 1  13 71
MOD 1  18 19.3
MOD 1  19 28
MOD 1  20 28
MOD 1  21 15
MOD 1  22 15.1
MOD 1  23 18.9
MOD 1  24 39
MOD 1  26 78.4
MOD 1  27 105.5
MOD 1  28 78.4
MOD 1  29 105.5
MOD 1  32 18
MOD 1  33 18
MOD 1  34 56.7
MOD 1  35 59.3
************
YEAR 2007
DAY 0101
MOD 12 24 14
MOD 12 27 0
MOD 12 29 0
MOD 12 2 7
MOD 12 3 92
MOD 12 34 92
MOD 12 35 92
************
YEAR 2007
DAY 0401
MOD 1  1  14
MOD 23 1  320   0.03    1997
MOD 1  2  14
MOD 23 2  320   0.03    1997
MOD 1  3  17.7
MOD 23 3  406   0.03    1997
MOD 1  4  31.1
MOD 23 4  697   0.03    1997
MOD 1  5  44.6
MOD 23 5  1005  0.03    1997
MOD 1  6  99.4
MOD 23 6  2237  0.03    1997
MOD 1  7  77.3
MOD 23 7  1746  0.03    1997
MOD 1  10 14.4
MOD 1  11 14.4
MOD 1  12 60.3
MOD 1  13 59.5
MOD 1  18 16.7
MOD 1  19 25.5
MOD 1  20 25.5
MOD 1  21 13.8
MOD 1  22 13.8
MOD 1  23 16.7
MOD 1  24 35.2
MOD 1  26 71.0
MOD 1  27 100
MOD 1  28 71.0
MOD 1  29 100
MOD 1  32 15.7
MOD 1  33 15.7
MOD 1  34 45.9
MOD 1  35 43.8
************
YEAR 2007
DAY 1001
MOD 1  1  16.8
MOD 23 1  402 0.03 1997
MOD 1  2  16.8
```

```
MOD 23 2  400 0.03 1997
MOD 1  3  19.5
MOD 23 3  441 0.03 1997
MOD 1  4  34.1
MOD 23 4  791 0.03 1997
MOD 1  5  49.2
MOD 23 5  1148 0.03 1997
MOD 1  6  109.5
MOD 23 6  2539 0.03 1997
MOD 1  7  87.6
MOD 23 7  2057 0.03 1997
MOD 1  10 16.7
MOD 1  11 16.7
MOD 1  12 66.9
MOD 1  13 71
MOD 1  18 19.3
MOD 1  19 28
MOD 1  20 28
MOD 1  21 15
MOD 1  22 15.1
MOD 1  23 18.9
MOD 1  24 39
MOD 1  26 78.4
MOD 1  27 105.5
MOD 1  28 78.4
MOD 1  29 105.5
MOD 1  32 18
MOD 1  33 18
MOD 1  34 56.7
MOD 1  35 59.3
************
YEAR 2008
DAY 0101
MOD 12 27 119
MOD 12 29 28
MOD 12 3 14
MOD 12 7 92
MOD 12 34 2 3 0515 3 1101
MOD 12 35 2 3 0501 3 1115
************
YEAR 2008
DAY 0401
MOD 1  1  14
MOD 23 1  320   0.03    1997
MOD 1  2  14
MOD 23 2  320   0.03    1997
MOD 1  3  17.7
MOD 23 3  406   0.03    1997
MOD 1  4  31.1
MOD 23 4  697   0.03    1997
MOD 1  5  44.6
MOD 23 5  1005  0.03    1997
MOD 1  6  99.4
MOD 23 6  2237  0.03    1997
MOD 1  7  77.3
MOD 23 7  1746  0.03    1997
MOD 1  10 14.4
MOD 1  11 14.4
MOD 1  12 60.3
MOD 1  13 59.5
MOD 1  18 16.7
MOD 1  19 25.5
MOD 1  20 25.5
MOD 1  21 13.8
MOD 1  22 13.8
MOD 1  23 16.7
MOD 1  24 35.2
MOD 1  26 71.0
MOD 1  27 100
MOD 1  28 71.0
```

```
MOD 1  29 100
MOD 1  32 15.7
MOD 1  33 15.7
MOD 1  34 45.9
MOD 1  35 43.8
************
YEAR 2008
DAY 1001
MOD 1  1  16.8
MOD 23 1  402 0.03 1997
MOD 1  2  16.8
MOD 23 2  400 0.03 1997
MOD 1  3  19.5
MOD 23 3  441 0.03 1997
MOD 1  4  34.1
MOD 23 4  791 0.03 1997
MOD 1  5  49.2
MOD 23 5  1148 0.03 1997
MOD 1  6  109.5
MOD 23 6  2539 0.03 1997
MOD 1  7  87.6
MOD 23 7  2057 0.03 1997
MOD 1  10 16.7
MOD 1  11 16.7
MOD 1  12 66.9
MOD 1  13 71
MOD 1  18 19.3
MOD 1  19 28
MOD 1  20 28
MOD 1  21 15
MOD 1  22 15.1
MOD 1  23 18.9
MOD 1  24 39
MOD 1  26 78.4
MOD 1  27 105.5
MOD 1  28 78.4
MOD 1  29 105.5
MOD 1  32 18
MOD 1  33 18
MOD 1  34 56.7
MOD 1  35 59.3
************
YEAR 2009
DAY 0101
MOD 12 27 28
MOD 12 24 30
MOD 12  7 14
MOD 12 36 92
MOD 12 38 92
************
YEAR 2009
DAY 0401
MOD 1  1  14
MOD 23 1  320   0.03    1997
MOD 1  2  14
MOD 23 2  320   0.03    1997
MOD 1  3  17.7
MOD 23 3  406   0.03    1997
MOD 1  4  31.1
MOD 23 4  697   0.03    1997
MOD 1  5  44.6
MOD 23 5  1005  0.03    1997
MOD 1  6  99.4
MOD 23 6  2237  0.03    1997
MOD 1  7  77.3
MOD 23 7  1746  0.03    1997
MOD 1  10 14.4
MOD 1  11 14.4
MOD 1  12 60.3
MOD 1  13 59.5
```

```
MOD 1  18 16.7
MOD 1  19 25.5
MOD 1  20 25.5
MOD 1  21 13.8
MOD 1  22 13.8
MOD 1  23 16.7
MOD 1  24 35.2
MOD 1  26 71.0
MOD 1  27 100
MOD 1  28 71.0
MOD 1  29 100
MOD 1  32 15.7
MOD 1  33 15.7
MOD 1  34 45.9
MOD 1  35 43.8
************
YEAR 2009
DAY 1001
MOD 1  1  16.8
MOD 23 1  402 0.03 1997
MOD 1  2  16.8
MOD 23 2  400 0.03 1997
MOD 1  3  19.5
MOD 23 3  441 0.03 1997
MOD 1  4  34.1
MOD 23 4  791 0.03 1997
MOD 1  5  49.2
MOD 23 5  1148 0.03 1997
MOD 1  6  109.5
MOD 23 6  2539 0.03 1997
MOD 1  7  87.6
MOD 23 7  2057 0.03 1997
MOD 1  10 16.7
MOD 1  11 16.7
MOD 1  12 66.9
MOD 1  13 71
MOD 1  18 19.3
MOD 1  19 28
MOD 1  20 28
MOD 1  21 15
MOD 1  22 15.1
MOD 1  23 18.9
MOD 1  24 39
MOD 1  26 78.4
MOD 1  27 105.5
MOD 1  28 78.4
MOD 1  29 105.5
MOD 1  32 18
MOD 1  33 18
MOD 1  34 56.7
MOD 1  35 59.3
************
YEAR 2010
DAY 0101
MOD 12 24 14
MOD 12 5 61
MOD 12 6 61
MOD 12 36 2 7 0115 10 0615
MOD 12 38 20
************
YEAR 2010
DAY 0401
MOD 1  1  14
MOD 23 1  320   0.03    1997
MOD 1  2  14
MOD 23 2  320   0.03    1997
MOD 1  3  17.7
MOD 23 3  406   0.03    1997
MOD 1  4  31.1
MOD 23 4  697   0.03    1997
```

```
MOD 1  5  44.6
MOD 23 5  1005  0.03    1997
MOD 1  6  99.4
MOD 23 6  2237  0.03    1997
MOD 1  7  77.3
MOD 23 7  1746  0.03    1997
MOD 1  10 14.4
MOD 1  11 14.4
MOD 1  12 60.3
MOD 1  13 59.5
MOD 1  18 16.7
MOD 1  19 25.5
MOD 1  20 25.5
MOD 1  21 13.8
MOD 1  22 13.8
MOD 1  23 16.7
MOD 1  24 35.2
MOD 1  26 71.0
MOD 1  27 100
MOD 1  28 71.0
MOD 1  29 100
MOD 1  32 15.7
MOD 1  33 15.7
MOD 1  34 45.9
MOD 1  35 43.8
************
YEAR 2010
DAY 1001
MOD 1  1  16.8
MOD 23 1  402 0.03 1997
MOD 1  2  16.8
MOD 23 2  400 0.03 1997
MOD 1  3  19.5
MOD 23 3  441 0.03 1997
MOD 1  4  34.1
MOD 23 4  791 0.03 1997
MOD 1  5  49.2
MOD 23 5  1148 0.03 1997
MOD 1  6  109.5
MOD 23 6  2539 0.03 1997
MOD 1  7  87.6
MOD 23 7  2057 0.03 1997
MOD 1  10 16.7
MOD 1  11 16.7
MOD 1  12 66.9
MOD 1  13 71
MOD 1  18 19.3
MOD 1  19 28
MOD 1  20 28
MOD 1  21 15
MOD 1  22 15.1
MOD 1  23 18.9
MOD 1  24 39
MOD 1  26 78.4
MOD 1  27 105.5
MOD 1  28 78.4
MOD 1  29 105.5
MOD 1  32 18
MOD 1  33 18
MOD 1  34 56.7
MOD 1  35 59.3
***********
YEAR 2011
DAY 0101
MOD 12 29 119
MOD 12  5 14
MOD 12  6 14
MOD 12 34 92
MOD 12 35 92
************
```

```
YEAR 2011
DAY 0401
MOD 1  1  14
MOD 23 1  320   0.03    1997
MOD 1  2  14
MOD 23 2  320   0.03    1997
MOD 1  3  17.7
MOD 23 3  406   0.03    1997
MOD 1  4  31.1
MOD 23 4  697   0.03    1997
MOD 1  5  44.6
MOD 23 5  1005  0.03    1997
MOD 1  6  99.4
MOD 23 6  2237  0.03    1997
MOD 1  7  77.3
MOD 23 7  1746  0.03    1997
MOD 1  10 14.4
MOD 1  11 14.4
MOD 1  12 60.3
MOD 1  13 59.5
MOD 1  18 16.7
MOD 1  19 25.5
MOD 1  20 25.5
MOD 1  21 13.8
MOD 1  22 13.8
MOD 1  23 16.7
MOD 1  24 35.2
MOD 1  26 71.0
MOD 1  27 100
MOD 1  28 71.0
MOD 1  29 100
MOD 1  32 15.7
MOD 1  33 15.7
MOD 1  34 45.9
MOD 1  35 43.8
************
YEAR 2011
DAY 1001
MOD 1  1  16.8
MOD 23 1  402 0.03 1997
MOD 1  2  16.8
MOD 23 2  400 0.03 1997
MOD 1  3  19.5
MOD 23 3  441 0.03 1997
MOD 1  4  34.1
MOD 23 4  791 0.03 1997
MOD 1  5  49.2
MOD 23 5  1148 0.03 1997
MOD 1  6  109.5
MOD 23 6  2539 0.03 1997
MOD 1  7  87.6
MOD 23 7  2057 0.03 1997
MOD 1  10 16.7
MOD 1  11 16.7
MOD 1  12 66.9
MOD 1  13 71
MOD 1  18 19.3
MOD 1  19 28
MOD 1  20 28
MOD 1  21 15
MOD 1  22 15.1
MOD 1  23 18.9
MOD 1  24 39
MOD 1  26 78.4
MOD 1  27 105.5
MOD 1  28 78.4
MOD 1  29 105.5
MOD 2  32 18
MOD 2  33 18
MOD 2  34 56.7
```

```
MOD 2  35 59.3
************
YEAR 2012
DAY 0101
MOD 12 24 30
MOD 12 27 119
MOD 12 29 28
MOD 12 1 92
MOD 12 4 92
MOD 12 34 2 3 0515 3 1101
MOD 12 35 2 3 0501 3 1115
************
YEAR 2012
DAY 0401
MOD 1  1  14
MOD 23 1  320   0.03    1997
MOD 1  2  14
MOD 23 2  320   0.03    1997
MOD 1  3  17.7
MOD 23 3  406   0.03    1997
MOD 1  4  31.1
MOD 23 4  697   0.03    1997
MOD 1  5  44.6
MOD 23 5  1005  0.03    1997
MOD 1  6  99.4
MOD 23 6  2237  0.03    1997
MOD 1  7  77.3
MOD 23 7  1746  0.03    1997
MOD 1  10 14.4
MOD 1  11 14.4
MOD 1  12 60.3
MOD 1  13 59.5
MOD 1  18 16.7
MOD 1  19 25.5
MOD 1  20 25.5
MOD 1  21 13.8
MOD 1  22 13.8
MOD 1  23 16.7
MOD 1  24 35.2
MOD 1  26 71.0
MOD 1  27 100
MOD 1  28 71.0
MOD 1  29 100
MOD 1  32 15.7
MOD 1  33 15.7
MOD 1  34 45.9
MOD 1  35 43.8
************
YEAR 2012
DAY 1001
MOD 1  1  16.8
MOD 23 1  402 0.03 1997
MOD 1  2  16.8
MOD 23 2  400 0.03 1997
MOD 1  3  19.5
MOD 23 3  441 0.03 1997
MOD 1  4  34.1
MOD 23 4  791 0.03 1997
MOD 1  5  49.2
MOD 23 5  1148 0.03 1997
MOD 1  6  109.5
MOD 23 6  2539 0.03 1997
MOD 1  7  87.6
MOD 23 7  2057 0.03 1997
MOD 1  10 16.7
MOD 1  11 16.7
MOD 1  12 66.9
MOD 1  13 71
MOD 1  18 19.3
MOD 1  19 28
```

```
MOD 1  20 28
MOD 1  21 15
MOD 1  22 15.1
MOD 1  23 18.9
MOD 1  24 39
MOD 1  26 78.4
MOD 1  27 105.5
MOD 1  28 78.4
MOD 1  29 105.5
MOD 1  32 18
MOD 1  33 18
MOD 1  34 56.7
MOD 1  35 59.3
************
YEAR 2013
DAY 0101
MOD 12 24 14
MOD 12 27 0
MOD 12 29 0
MOD 12 1 7
MOD 12 4 14
MOD 12 2 61
MOD 12 7 61
************
YEAR 2013
DAY 0401
MOD 1  1  14
MOD 23 1  320   0.03    1997
MOD 1  2  14
MOD 23 2  320   0.03    1997
MOD 1  3  17.7
MOD 23 3  406   0.03    1997
MOD 1  4  31.1
MOD 23 4  697   0.03    1997
MOD 1  5  44.6
MOD 23 5  1005  0.03    1997
MOD 1  6  99.4
MOD 23 6  2237  0.03    1997
MOD 1  7  77.3
MOD 23 7  1746  0.03    1997
MOD 1  10 14.4
MOD 1  11 14.4
MOD 1  12 60.3
MOD 1  13 59.5
MOD 1  18 16.7
MOD 1  19 25.5
MOD 1  20 25.5
MOD 1  21 13.8
MOD 1  22 13.8
MOD 1  23 16.7
MOD 1  24 35.2
MOD 1  26 71.0
MOD 1  27 100
MOD 1  28 71.0
MOD 1  29 100
MOD 1  32 15.7
MOD 1  33 15.7
MOD 1  34 45.9
MOD 1  35 43.8
************
YEAR 2013
DAY 1001
MOD 1  1  16.8
MOD 23 1  402 0.03 1997
MOD 1  2  16.8
MOD 23 2  400 0.03 1997
MOD 1  3  19.5
MOD 23 3  441 0.03 1997
MOD 1  4  34.1
MOD 23 4  791 0.03 1997
```

```
MOD 1  5  49.2
MOD 23 5  1148 0.03 1997
MOD 1  6  109.5
MOD 23 6  2539 0.03 1997
MOD 1  7  87.6
MOD 23 7  2057 0.03 1997
MOD 1  10 16.7
MOD 1  11 16.7
MOD 1  12 66.9
MOD 1  13 71
MOD 1  18 19.3
MOD 1  19 28
MOD 1  20 28
MOD 1  21 15
MOD 1  22 15.1
MOD 1  23 18.9
MOD 1  24 39
MOD 1  26 78.4
MOD 1  27 105.5
MOD 1  28 78.4
MOD 1  29 105.5
MOD 1  32 18
MOD 1  33 18
MOD 1  34 56.7
MOD 1  35 59.3
************
YEAR 2014
DAY 0101
MOD 12 27 28
MOD 12 29 28
MOD 12  2 7
MOD 12  7 14
MOD 12 36 92
MOD 12 38 92
************
YEAR 2014
DAY 0401
MOD 1  1  14
MOD 23 1  320   0.03    1997
MOD 1  2  14
MOD 23 2  320   0.03    1997
MOD 1  3  17.7
MOD 23 3  406   0.03    1997
MOD 1  4  31.1
MOD 23 4  697   0.03    1997
MOD 1  5  44.6
MOD 23 5  1005  0.03    1997
MOD 1  6  99.4
MOD 23 6  2237  0.03    1997
MOD 1  7  77.3
MOD 23 7  1746  0.03    1997
MOD 1  10 14.4
MOD 1  11 14.4
MOD 1  12 60.3
MOD 1  13 59.5
MOD 1  18 16.7
MOD 1  19 25.5
MOD 1  20 25.5
MOD 1  21 13.8
MOD 1  22 13.8
MOD 1  23 16.7
MOD 1  24 35.2
MOD 1  26 71.0
MOD 1  27 100
MOD 1  28 71.0
MOD 1  29 100
MOD 1  32 15.7
MOD 1  33 15.7
MOD 1  34 45.9
MOD 1  35 43.8
```

```
************
YEAR 2014
DAY 1001
MOD 1  1  16.8
MOD 23 1  402 0.03 1997
MOD 1  2  16.8
MOD 23 2  400 0.03 1997
MOD 1  3  19.5
MOD 23 3  441 0.03 1997
MOD 1  4  34.1
MOD 23 4  791 0.03 1997
MOD 1  5  49.2
MOD 23 5  1148 0.03 1997
MOD 1  6  109.5
MOD 23 6  2539 0.03 1997
MOD 1  7  87.6
MOD 23 7  2057 0.03 1997
MOD 1  10 16.7
MOD 1  11 16.7
MOD 1  12 66.9
MOD 1  13 71
MOD 1  18 19.3
MOD 1  19 28
MOD 1  20 28
MOD 1  21 15
MOD 1  22 15.1
MOD 1  23 18.9
MOD 1  24 39
MOD 1  26 78.4
MOD 1  27 105.5
MOD 1  28 78.4
MOD 1  29 105.5
MOD 1  32 18
MOD 1  33 18
MOD 1  34 56.7
MOD 1  35 59.3
************
YEAR 2015
DAY 0101
MOD 12 24 30
MOD 12 29 119
MOD 12 5 92
MOD 12 6 92
MOD 12 36 2 7 0115 10 0615
MOD 12 38 20
MOD 12 35 92
************
YEAR 2015
DAY 0401
MOD 1  1  14
MOD 23 1  320   0.03    1997
MOD 1  2  14
MOD 23 2  320   0.03    1997
MOD 1  3  17.7
MOD 23 3  406   0.03    1997
MOD 1  4  31.1
MOD 23 4  697   0.03    1997
MOD 1  5  44.6
MOD 23 5  1005  0.03    1997
MOD 1  6  99.4
MOD 23 6  2237  0.03    1997
MOD 1  7  77.3
MOD 23 7  1746  0.03    1997
MOD 1  10 14.4
MOD 1  11 14.4
MOD 1  12 60.3
MOD 1  13 59.5
MOD 1  18 16.7
MOD 1  19 25.5
MOD 1  20 25.5
```

```
MOD 1  21 13.8
MOD 1  22 13.8
MOD 1  23 16.7
MOD 1  24 35.2
MOD 1  26 71.0
MOD 1  27 100
MOD 1  28 71.0
MOD 1  29 100
MOD 1  32 15.7
MOD 1  33 15.7
MOD 1  34 45.9
MOD 1  35 43.8
************
YEAR 2015
DAY 1001
MOD 1  1  16.8
MOD 23 1  402 0.03 1997
MOD 1  2  16.8
MOD 23 2  400 0.03 1997
MOD 1  3  19.5
MOD 23 3  441 0.03 1997
MOD 1  4  34.1
MOD 23 4  791 0.03 1997
MOD 1  5  49.2
MOD 23 5  1148 0.03 1997
MOD 1  6  109.5
MOD 23 6  2539 0.03 1997
MOD 1  7  87.6
MOD 23 7  2057 0.03 1997
MOD 1  10 16.7
MOD 1  11 16.7
MOD 1  12 66.9
MOD 1  13 71
MOD 1  18 19.3
MOD 1  19 28
MOD 1  20 28
MOD 1  21 15
MOD 1  22 15.1
MOD 1  23 18.9
MOD 1  24 39
MOD 1  26 78.4
MOD 1  27 105.5
MOD 1  28 78.4
MOD 1  29 105.5
MOD 1  32 18
MOD 1  33 18
MOD 1  34 56.7
MOD 1  35 59.3
************
YEAR 2016
DAY 0101
MOD 12 24 14
MOD 12 27 119
MOD 12 29 28
MOD 12 3 92
MOD 12 35 2 3 0501 3 1115
************
YEAR 2016
DAY 0401
MOD 1  1  14
MOD 23 1  320   0.03    1997
MOD 1  2  14
MOD 23 2  320   0.03    1997
MOD 1  3  17.7
MOD 23 3  406   0.03    1997
MOD 1  4  31.1
MOD 23 4  697   0.03    1997
MOD 1  5  44.6
MOD 23 5  1005  0.03    1997
MOD 1  6  99.4
```

```
MOD 23 6  2237  0.03    1997
MOD 1  7  77.3
MOD 23 7  1746  0.03    1997
MOD 1  10 14.4
MOD 1  11 14.4
MOD 1  12 60.3
MOD 1  13 59.5
MOD 1  18 16.7
MOD 1  19 25.5
MOD 1  20 25.5
MOD 1  21 13.8
MOD 1  22 13.8
MOD 1  23 16.7
MOD 1  24 35.2
MOD 1  26 71.0
MOD 1  27 100
MOD 1  28 71.0
MOD 1  29 100
MOD 1  32 15.7
MOD 1  33 15.7
MOD 1  34 45.9
MOD 1  35 43.8
************
YEAR 2016
DAY 1001
MOD 1  1  16.8
MOD 23 1  402 0.03 1997
MOD 1  2  16.8
MOD 23 2  400 0.03 1997
MOD 1  3  19.5
MOD 23 3  441 0.03 1997
MOD 1  4  34.1
MOD 23 4  791 0.03 1997
MOD 1  5  49.2
MOD 23 5  1148 0.03 1997
MOD 1  6  109.5
MOD 23 6  2539 0.03 1997
MOD 1  7  87.6
MOD 23 7  2057 0.03 1997
MOD 1  10 16.7
MOD 1  11 16.7
MOD 1  12 66.9
MOD 1  13 71
MOD 1  18 19.3
MOD 1  19 28
MOD 1  20 28
MOD 1  21 15
MOD 1  22 15.1
MOD 1  23 18.9
MOD 1  24 39
MOD 1  26 78.4
MOD 1  27 105.5
MOD 1  28 78.4
MOD 1  29 105.5
MOD 1  32 18
MOD 1  33 18
MOD 1  34 56.7
MOD 1  35 59.3
*
*
END
```

Appendix I
POWRPRO Output Files -- Planning Horizon

POWRPRO - PRODUCTION COSTING MODEL - VERSION 13G TIME: 13:40:56 DATE: Oct 04 1998 PAGE: 1

Alaska Public Utilities Commission -- ML&P
Power Pooling / Central Dispatch Planning Study

INPUT FILENAME
mlp.ppi

ANNUAL SUMMARY - 1997 8760 HOURS AVERAGE INCREMENTAL COST 16.21 ANNUAL PEAK DEMAND 142 MW

UNIT OR PURCHASE #	NAME	MAX CAPACITY MW	MAX OUTPUT MW	ENERGY OUTPUT MWH	FUEL USED MBTU	FUEL PRICE $/MBTU	FUEL COST $	FUEL AVG $/MWH	HOURS ON LINE	HEAT RATE BTU/KWH	CAPACITY FACTOR OPER.	CAPACITY FACTOR AVG.	O & M VARIABLE $	O & M FIXED $
6	ML&P P2 U7-6	109.5	109.5	605543	5561923	1.74	9677475	15.98	8134	9185	.712	.662	1247440	795627
5	ML&P P2 U5-6	49.2	49.2	179124	2052298	1.74	3570963	19.94	5265	11457	.740	.436	368983	357487
7	ML&P P2 U8	87.6	87.6	27620	431531	1.74	750860	27.19	962	15624	.355	.038	56897	636501
4	ML&P P1 U4	34.1	34.1	1794	37882	1.74	65914	36.75	142	21118	.380	.006	3806	269042
2	ML&P P1 U2	16.8	14.0	6547	213048	1.74	370701	56.63	2199	32543	.186	.049	13486	128688
3	ML&P P1 U3	19.5	17.7	2723	91983	1.74	160049	58.79	825	33785	.175	.017	5609	149369
1	ML&P P1 U1	16.8	14.0	1270	38572	1.74	67115	52.86	364	30379	.228	.009	2615	128688
999	EMERG PURCH	500.0	31.1	271	271	517.50	140295	517.50	33	1000	.016	.000	0	0
TOTAL				824892			14803372	17.95					1698834	2465404

0ENERGY DUMPED (MWH) 107261.

UNIT OR PURCHASE #	NAME	STARTS # OF	STARTS COST $	STOPS # OF	STOPS COST $	HOURS TOTAL	HOURS MAINT	HOURS OUT-AGE	EMISSIONS SO2 TONS	SO2 LB/MBTU	SO2 LB/MWH	NOX TONS	NOX LB/MBTU	NOX LB/MWH
6	ML&P P2 U7-6	1	2885	1	200	8760	336	288	0	.00	.00	779	.28	2.57
5	ML&P P2 U5-6	25	36008	25	5000	8760	336	288	0	.00	.00	641	.62	7.16
7	ML&P P2 U8	47	114360	47	9400	8760	336	288	0	.00	.00	17	.08	1.22
4	ML&P P1 U4	11	11860	11	2200	8760	336	288	0	.00	.00	8	.44	9.29
2	ML&P P1 U2	141	74781	141	28200	8760	2208	216	0	.00	.00	47	.44	14.32
3	ML&P P1 U3	86	50900	86	17200	8760	336	288	0	.00	.00	20	.44	14.87
1	ML&P P1 U1	82	44325	82	16400	8760	168	288	0	.00	.00	8	.44	13.37
999	EMERG PURCH	4	0	4	0	8760	0	0	0	.00	.00	0	.00	.00
TOTAL		397	335120	397	78600				0		.00	1521		3.69

POWRPRO - PRODUCTION COSTING MODEL - VERSION 13G TIME: 13:40:56 DATE: Oct 04 1998 PAGE: 2

Alaska Public Utilities Commission -- ML&P
Power Pooling / Central Dispatch Planning Study

INPUT FILENAME
mlp.ppi

ANNUAL SUMMARY - 1998 8760 HOURS AVERAGE INCREMENTAL COST 17.18 ANNUAL PEAK DEMAND 145 MW

UNIT OR PURCHASE #	NAME	MAX CAPACITY MW	MAX OUTPUT MW	ENERGY OUTPUT MWH	FUEL USED MBTU	FUEL PRICE $/MBTU	FUEL COST $	FUEL AVG $/MWH	HOURS ON LINE	HEAT RATE BTU/KWH	CAPACITY FACTOR OPER.	CAPACITY FACTOR AVG.	O & M VARIABLE $	O & M FIXED $
6	ML&P P2 U7-6	109.5	109.5	624619	5699043	1.97	11226274	17.97	8134	9124	.734	.683	1325359	819495
5	ML&P P2 U5-6	49.2	49.2	166439	1915027	1.97	3772719	22.67	4940	11505	.733	.405	353149	368211
7	ML&P P2 U8	87.6	77.3	23962	376471	1.97	741647	30.95	840	15711	.349	.033	50843	655596
4	ML&P P1 U4	34.1	34.1	1717	29901	1.97	58906	34.31	96	17414	.542	.006	3753	277113
2	ML&P P1 U2	16.8	6.3	6688	222914	1.97	439127	65.65	2392	33328	.180	.050	14192	132548
3	ML&P P1 U3	19.5	6.8	1765	64550	1.97	127163	72.04	611	36567	.156	.011	3745	153851
1	ML&P P1 U1	16.8	3.3	1034	37061	1.97	73010	70.64	374	35858	.179	.008	2193	132548
999	EMERG PURCH	500.0	.0	0	0	535.61	0	.00	2	0	.000	.000	0	0
TOTAL				826224			16438846	19.90					1753233	2539366

0ENERGY DUMPED (MWH) 125054.

UNIT OR PURCHASE #	NAME	STARTS # OF	STARTS COST $	STOPS # OF	STOPS COST $	HOURS TOTAL	HOURS MAINT	HOURS OUT-AGE	EMISSIONS SO2 TONS	SO2 LB/MBTU	SO2 LB/MWH	NOX TONS	NOX LB/MBTU	NOX LB/MWH
6	ML&P P2 U7-6	1	3007	1	200	8760	336	288	0	.00	.00	798	.28	2.55
5	ML&P P2 U5-6	21	31781	21	4200	8760	336	288	0	.00	.00	598	.62	7.19
7	ML&P P2 U8	34	86517	34	6800	8760	1320	240	0	.00	.00	15	.08	1.23
4	ML&P P1 U4	12	13679	12	2400	8760	336	288	0	.00	.00	7	.44	7.66
2	ML&P P1 U2	143	80022	143	28600	8760	168	288	0	.00	.00	49	.44	14.66
3	ML&P P1 U3	94	58753	94	18800	8760	336	288	0	.00	.00	14	.44	16.09
1	ML&P P1 U1	98	55951	98	19600	8760	168	288	0	.00	.00	8	.44	15.78
999	EMERG PURCH	1	0	1	0	8760	0	0	0	.00	.00	0	.00	.00
TOTAL		404	329710	404	80600				0		.00	1489		3.60

POWRPRO - PRODUCTION COSTING MODEL - VERSION 13G TIME: 13:40:56 DATE: Oct 04 1998 PAGE: 3

Alaska Public Utilities Commission -- ML&P
Power Pooling / Central Dispatch Planning Study

INPUT FILENAME
mlp.ppi

ANNUAL SUMMARY - 1999 8760 HOURS AVERAGE INCREMENTAL COST 17.22 ANNUAL PEAK DEMAND 146 MW

UNIT OR PURCHASE #	NAME	MAX CAPACITY MW	MAX OUTPUT MW	ENERGY OUTPUT MWH	FUEL USED MBTU	FUEL PRICE $/MBTU	FUEL COST $	FUEL AVG $/MWH	HOURS ON LINE	HEAT RATE BTU/KWH	CAPACITY FACTOR OPER.	CAPACITY FACTOR AVG.	O & M VARIABLE $	O & M FIXED $
6	ML&P P2 U7-6	109.5	109.5	571602	5311116	2.01	10675159	18.68	8134	9291	.674	.625	1249162	844080
5	ML&P P2 U5-6	49.2	49.2	200403	2315836	2.01	4654709	23.23	5989	11555	.725	.488	437979	379258
7	ML&P P2 U8	87.6	87.6	23557	375867	2.01	755489	32.07	816	15955	.338	.033	51483	675264
4	ML&P P1 U4	34.1	34.1	1607	35361	2.01	71075	44.24	136	22007	.353	.006	3617	285426
2	ML&P P1 U2	16.8	3.0	4968	166398	2.01	334464	67.32	1753	33490	.179	.037	10859	136525
3	ML&P P1 U3	19.5	3.1	1262	46685	2.01	93836	74.34	438	36983	.154	.008	2759	158466
1	ML&P P1 U1	16.8	3.0	922	33186	2.01	66704	72.31	339	35974	.179	.007	2016	136525
999	EMERG PURCH	500.0	.0	0	0	554.36	0	.00	8	0	.000	.000	0	0
TOTAL				804321			16651436	20.70					1757874	2615547

0ENERGY DUMPED (MWH) 91694.

UNIT OR PURCHASE #	NAME	STARTS # OF	STARTS COST $	STOPS # OF	STOPS COST $	HOURS TOTAL	HOURS MAINT	HOURS OUT-AGE	EMISSIONS SO2 TONS	SO2 LB/MBTU	SO2 LB/MWH	NOX TONS	NOX LB/MBTU	NOX LB/MWH
6	ML&P P2 U7-6	1	3094	1	200	8760	336	288	0	.00	.00	744	.28	2.60
5	ML&P P2 U5-6	25	38890	25	5000	8760	336	288	0	.00	.00	724	.62	7.22
7	ML&P P2 U8	35	91589	35	7000	8760	336	288	0	.00	.00	15	.08	1.24
4	ML&P P1 U4	12	14052	12	2400	8760	336	288	0	.00	.00	8	.44	9.68
2	ML&P P1 U2	131	75318	131	26200	8760	168	288	0	.00	.00	37	.44	14.74
3	ML&P P1 U3	61	39170	61	12200	8760	2208	216	0	.00	.00	10	.44	16.27
1	ML&P P1 U1	82	48096	82	16400	8760	168	288	0	.00	.00	7	.44	15.83
999	EMERG PURCH	2	0	2	0	8760	0	0	0	.00	.00	0	.00	.00
TOTAL		349	310208	349	69400				0		.00	1544		3.84

POWRPRO - PRODUCTION COSTING MODEL - VERSION 13G TIME: 13:36:42 DATE: Oct 04 1998 PAGE: 2

Alaska Public Utilities Commission -- ML&P
Power Pooling / Central Dispatch Planning Study

INPUT FILENAME
mlp1.ppi

ANNUAL SUMMARY - 2000 8760 HOURS AVERAGE INCREMENTAL COST 19.74 ANNUAL PEAK DEMAND 148 MW

UNIT OR PURCHASE #	NAME	MAX CAPACITY MW	MAX OUTPUT MW	ENERGY OUTPUT MWH	FUEL USED MBTU	FUEL PRICE $/MBTU	FUEL COST $	FUEL AVG $/MWH	HOURS ON LINE	HEAT RATE BTU/KWH	CAPACITY FACTOR OPER.	CAPACITY FACTOR AVG.	O & M VARIABLE $	O & M FIXED $
6	ML&P P2 U7-6	109.5	109.5	620909	5425564	2.06	11175960	18.00	6334	8738	.923	.679	1397712	869403
5	ML&P P2 U5-6	49.2	49.2	150869	1567103	2.06	3228251	21.40	3405	10387	.970	.367	339610	390635
7	ML&P P2 U8	87.6	77.3	97746	1436828	2.06	2959843	30.28	2979	14699	.415	.135	220027	695522
4	ML&P P1 U4	34.1	34.1	5150	83501	2.06	172012	33.40	256	16214	.627	.018	11940	293989
2	ML&P P1 U2	16.8	8.3	6371	208006	2.06	428500	67.25	2236	32646	.185	.047	14342	140620
3	ML&P P1 U3	19.5	8.7	1783	61466	2.06	126619	71.00	568	34464	.169	.011	4015	163220
1	ML&P P1 U1	16.8	14.0	1118	38056	2.06	78396	70.11	369	34034	.193	.008	2517	140620
999	EMERG PURCH	500.0	.0	0	0	573.76	0	.00	55	0	.000	.000	0	0
TOTAL				883946			18169580	20.56					1990162	2694014

0ENERGY DUMPED (MWH) 159302.

UNIT OR PURCHASE #	NAME	STARTS # OF	STARTS COST $	STOPS # OF	STOPS COST $	HOURS TOTAL	HOURS MAINT	HOURS OUT-AGE	EMISSIONS SO2 TONS	SO2 LB/MBTU	SO2 LB/MWH	NOX TONS	NOX LB/MBTU	NOX LB/MWH
6	ML&P P2 U7-6	1	3184	1	200	8760	2208	216	0	.00	.00	760	.28	2.45
5	ML&P P2 U5-6	28	44815	28	5600	8760	2208	216	0	.00	.00	490	.62	6.49
7	ML&P P2 U8	51	137349	51	10200	8760	336	288	0	.00	.00	56	.08	1.15
4	ML&P P1 U4	21	25292	21	4200	8760	336	288	0	.00	.00	18	.44	7.13
2	ML&P P1 U2	212	125383	212	42400	8760	168	288	0	.00	.00	46	.44	14.36
3	ML&P P1 U3	62	40951	62	12400	8760	336	288	0	.00	.00	14	.44	15.16
1	ML&P P1 U1	102	61538	102	20400	8760	168	288	0	.00	.00	8	.44	14.98
999	EMERG PURCH	5	0	5	0	8760	0	0	0	.00	.00	0	.00	.00
TOTAL		482	438511	482	95400				0		.00	1391		3.15

POWRPRO - PRODUCTION COSTING MODEL - VERSION 13G TIME: 13:36:42 DATE: Oct 04 1998 PAGE: 3

Alaska Public Utilities Commission -- ML&P
Power Pooling / Central Dispatch Planning Study

INPUT FILENAME
mlp1.ppi

ANNUAL SUMMARY - 2001 8760 HOURS AVERAGE INCREMENTAL COST 18.67 ANNUAL PEAK DEMAND 151 MW

UNIT OR PURCHASE #	NAME	MAX CAPACITY MW	MAX OUTPUT MW	ENERGY OUTPUT MWH	FUEL USED MBTU	FUEL PRICE $/MBTU	FUEL COST $	FUEL AVG $/MWH	HOURS ON LINE	HEAT RATE BTU/KWH	CAPACITY FACTOR OPER.	CAPACITY FACTOR AVG.	O & M VARIABLE $	O & M FIXED $
6	ML&P P2 U7-6	109.5	109.5	619089	5659809	2.12	11997844	19.38	8134	9142	.728	.677	1435387	895485
5	ML&P P2 U5-6	49.2	49.2	185570	2072736	2.12	4394052	23.68	5132	11169	.790	.452	430255	402354
7	ML&P P2 U8	87.6	87.6	33584	531300	2.12	1126348	33.54	1200	15819	.346	.047	77866	716388
4	ML&P P1 U4	34.1	34.1	1705	30101	2.12	63814	37.43	99	17654	.525	.006	4072	302809
2	ML&P P1 U2	16.8	5.2	4225	141202	2.12	299349	70.85	1464	33422	.179	.031	9796	144839
3	ML&P P1 U3	19.5	5.9	1102	39250	2.12	83210	75.49	358	35607	.162	.007	2556	168117
1	ML&P P1 U1	16.8	3.6	575	20617	2.12	43709	76.04	206	35868	.179	.004	1333	144839
999	EMERG PURCH	500.0	.0	0	0	593.84	0	.00	22	0	.000	.000	0	0
TOTAL				845850			18008324	21.29					1961263	2774834

0ENERGY DUMPED (MWH) 106201.

UNIT OR PURCHASE #	NAME	STARTS # OF	STARTS COST $	STOPS # OF	STOPS COST $	HOURS TOTAL	HOURS MAINT	HOURS OUT-AGE	EMISSIONS SO2 TONS	SO2 LB/MBTU	SO2 LB/MWH	NOX TONS	NOX LB/MBTU	NOX LB/MWH
6	ML&P P2 U7-6	1	3280	1	200	8760	336	288	0	.00	.00	792	.28	2.56
5	ML&P P2 U5-6	28	46151	28	5600	8760	336	288	0	.00	.00	648	.62	6.98
7	ML&P P2 U8	50	138676	50	10000	8760	336	288	0	.00	.00	21	.08	1.23
4	ML&P P1 U4	10	12402	10	2000	8760	336	288	0	.00	.00	7	.44	7.77
2	ML&P P1 U2	134	81611	134	26800	8760	168	288	0	.00	.00	31	.44	14.71
3	ML&P P1 U3	45	30607	45	9000	8760	336	288	0	.00	.00	9	.44	15.67
1	ML&P P1 U1	76	47216	76	15200	8760	168	288	0	.00	.00	5	.44	15.78
999	EMERG PURCH	2	0	2	0	8760	0	0	0	.00	.00	0	.00	.00
TOTAL		346	359942	346	68800				0		.00	1512		3.57

POWRPRO - PRODUCTION COSTING MODEL - VERSION 13G TIME: 13:36:42 DATE: Oct 04 1998 PAGE: 4

Alaska Public Utilities Commission -- ML&P
Power Pooling / Central Dispatch Planning Study

INPUT FILENAME
mlp1.ppi

ANNUAL SUMMARY - 2002 8760 HOURS AVERAGE INCREMENTAL COST 19.18 ANNUAL PEAK DEMAND 153 MW

UNIT OR PURCHASE #	NAME	MAX CAPACITY MW	MAX OUTPUT MW	ENERGY OUTPUT MWH	FUEL USED MBTU	FUEL PRICE $/MBTU	FUEL COST $	FUEL AVG $/MWH	HOURS ON LINE	HEAT RATE BTU/KWH	CAPACITY FACTOR OPER.	CAPACITY FACTOR AVG.	O & M VARIABLE $	O & M FIXED $
6	ML&P P2 U7-6	109.5	109.5	637173	5790482	2.16	12507270	19.63	8134	9087	.749	.696	1521611	922349
5	ML&P P2 U5-6	49.2	49.2	188074	2070708	2.16	4472504	23.78	4997	11010	.821	.458	449147	414425
7	ML&P P2 U8	87.6	87.6	33194	516086	2.16	1114741	33.58	1137	15547	.361	.046	79270	737879
4	ML&P P1 U4	34.1	34.1	1550	29510	2.16	63742	41.12	103	19036	.455	.005	3813	311893
2	ML&P P1 U2	16.8	5.8	5173	171877	2.16	371247	71.76	1809	33223	.181	.038	12354	149184
3	ML&P P1 U3	19.5	6.2	1471	51094	2.16	110362	75.01	467	34726	.167	.009	3514	173160
1	ML&P P1 U1	16.8	3.8	875	31296	2.16	67599	77.23	314	35755	.180	.006	2090	149184
999	EMERG PURCH	500.0	.0	0	0	614.63	0	.00	22	0	.000	.000	0	0
TOTAL				867510			18707466	21.56					2071799	2858079

0ENERGY DUMPED (MWH) 111004.

UNIT OR PURCHASE #	NAME	STARTS # OF	STARTS COST $	STOPS # OF	STOPS COST $	HOURS TOTAL	HOURS MAINT	HOURS OUT-AGE	EMISSIONS SO2 TONS	SO2 LB/MBTU	SO2 LB/MWH	NOX TONS	NOX LB/MBTU	NOX LB/MWH
6	ML&P P2 U7-6	1	3373	1	200	8760	336	288	0	.00	.00	811	.28	2.54
5	ML&P P2 U5-6	24	40649	24	4800	8760	336	288	0	.00	.00	647	.62	6.88
7	ML&P P2 U8	38	108361	38	7600	8760	336	288	0	.00	.00	20	.08	1.21
4	ML&P P1 U4	11	14009	11	2200	8760	336	288	0	.00	.00	6	.44	8.38
2	ML&P P1 U2	150	93831	150	30000	8760	168	288	0	.00	.00	38	.44	14.62
3	ML&P P1 U3	62	43308	62	12400	8760	336	288	0	.00	.00	11	.44	15.28
1	ML&P P1 U1	92	58698	92	18400	8760	168	288	0	.00	.00	7	.44	15.73
999	EMERG PURCH	2	0	2	0	8760	0	0	0	.00	.00	0	.00	.00
TOTAL		380	362230	380	75600				0		.00	1540		3.55

POWRPRO - PRODUCTION COSTING MODEL - VERSION 13G TIME: 13:36:42 DATE: Oct 04 1998 PAGE: 5

Alaska Public Utilities Commission -- ML&P
Power Pooling / Central Dispatch Planning Study

INPUT FILENAME
mlp1.ppi

ANNUAL SUMMARY - 2003 8760 HOURS AVERAGE INCREMENTAL COST 19.97 ANNUAL PEAK DEMAND 156 MW

UNIT OR PURCHASE #	NAME	MAX CAPACITY MW	MAX OUTPUT MW	ENERGY OUTPUT MWH	FUEL USED MBTU	FUEL PRICE $/MBTU	FUEL COST $	FUEL AVG $/MWH	HOURS ON LINE	HEAT RATE BTU/KWH	CAPACITY FACTOR OPER.	CAPACITY FACTOR AVG.	O & M VARIABLE $	O & M FIXED $
6	ML&P P2 U7-6	109.5	109.5	617905	5649426	2.22	12540618	20.30	8134	9142	.727	.675	1519943	950020
5	ML&P P2 U5-6	49.2	49.2	207905	2272710	2.22	5045071	24.27	5407	10931	.837	.506	511405	426858
7	ML&P P2 U8	87.6	87.6	23470	342762	2.22	760930	32.42	659	14604	.424	.032	57731	760016
4	ML&P P1 U4	34.1	34.1	5208	87504	2.22	194259	37.30	279	16801	.581	.018	13195	321250
2	ML&P P1 U2	16.8	14.0	6349	199851	2.22	443664	69.88	2069	31478	.195	.047	15616	153660
3	ML&P P1 U3	19.5	17.7	2621	80026	2.22	177656	67.79	703	30536	.200	.016	6446	178355
1	ML&P P1 U1	16.8	14.0	1638	45920	2.22	101942	62.22	413	28026	.258	.012	4030	153660
999	EMERG PURCH	500.0	3.0	8	8	636.14	5280	636.14	155	1000	.000	.000	0	0
TOTAL				865104			19269418	22.27					2128366	2943821

0ENERGY DUMPED (MWH) 92659.

UNIT OR PURCHASE #	NAME	STARTS # OF	STARTS COST $	STOPS # OF	STOPS COST $	HOURS TOTAL	HOURS MAINT	HOURS OUT-AGE	EMISSIONS SO2 TONS	SO2 LB/MBTU	SO2 LB/MWH	NOX TONS	NOX LB/MBTU	NOX LB/MWH
6	ML&P P2 U7-6	1	3473	1	200	8760	336	288	0	.00	.00	791	.28	2.56
5	ML&P P2 U5-6	26	45337	26	5200	8760	336	288	0	.00	.00	710	.62	6.83
7	ML&P P2 U8	29	85148	29	5800	8760	2208	216	0	.00	.00	13	.08	1.14
4	ML&P P1 U4	15	19664	15	3000	8760	336	288	0	.00	.00	19	.44	7.39
2	ML&P P1 U2	148	95304	148	29600	8760	168	288	0	.00	.00	44	.44	13.85
3	ML&P P1 U3	80	57524	80	16000	8760	336	288	0	.00	.00	18	.44	13.44
1	ML&P P1 U1	82	53856	82	16400	8760	168	288	0	.00	.00	10	.44	12.33
999	EMERG PURCH	8	0	8	0	8760	0	0	0	.00	.00	0	.00	.00
TOTAL		389	360307	389	76200				0		.00	1605		3.71

POWRPRO - PRODUCTION COSTING MODEL - VERSION 13G TIME: 13:36:42 DATE: Oct 04 1998 PAGE: 6

Alaska Public Utilities Commission -- ML&P
Power Pooling / Central Dispatch Planning Study

INPUT FILENAME
mlp1.ppi

ANNUAL SUMMARY - 2004 8760 HOURS AVERAGE INCREMENTAL COST 20.87 ANNUAL PEAK DEMAND 158 MW

UNIT OR PURCHASE #	NAME	MAX CAPACITY MW	MAX OUTPUT MW	ENERGY OUTPUT MWH	FUEL USED MBTU	FUEL PRICE $/MBTU	FUEL COST $	FUEL AVG $/MWH	HOURS ON LINE	HEAT RATE BTU/KWH	CAPACITY FACTOR OPER.	CAPACITY FACTOR AVG.	O & M VARIABLE $	O & M FIXED $
6	ML&P P2 U7-6	109.5	109.5	603494	5545194	2.27	12586288	20.86	8134	9188	.709	.660	1528933	978520
5	ML&P P2 U5-6	49.2	49.2	224595	2440659	2.27	5540046	24.67	5759	10866	.851	.547	569032	439664
7	ML&P P2 U8	87.6	87.6	31036	456786	2.27	1036898	33.41	913	14717	.414	.043	78632	782816
4	ML&P P1 U4	34.1	31.1	1565	25766	2.27	58488	37.38	80	16465	.608	.005	4084	330887
2	ML&P P1 U2	16.8	14.0	4838	154056	2.27	349712	72.29	1555	31843	.192	.036	12257	158269
3	ML&P P1 U3	19.5	17.7	2440	80385	2.27	182475	74.79	709	32946	.181	.015	6181	183706
1	ML&P P1 U1	16.8	14.0	862	23736	2.27	53881	62.53	207	27547	.266	.006	2183	158269
999	EMERG PURCH	500.0	20.5	147	147	658.40	96851	658.41	55	1000	.005	.000	0	0
TOTAL				868977			19904640	22.91					2201301	3032136

0ENERGY DUMPED (MWH) 82414.

UNIT OR PURCHASE #	NAME	STARTS # OF	STARTS COST $	STOPS # OF	STOPS COST $	HOURS TOTAL	HOURS MAINT	HOURS OUT-AGE	EMISSIONS SO2 TONS	SO2 LB/MBTU	SO2 LB/MWH	NOX TONS	NOX LB/MBTU	NOX LB/MWH
6	ML&P P2 U7-6	1	3574	1	200	8760	336	288	0	.00	.00	776	.28	2.57
5	ML&P P2 U5-6	22	39452	22	4400	8760	336	288	0	.00	.00	763	.62	6.79
7	ML&P P2 U8	42	126866	42	8400	8760	336	288	0	.00	.00	18	.08	1.15
4	ML&P P1 U4	12	16170	12	2400	8760	2208	216	0	.00	.00	6	.44	7.24
2	ML&P P1 U2	157	103937	157	31400	8760	168	288	0	.00	.00	34	.44	14.01
3	ML&P P1 U3	90	66527	90	18000	8760	336	288	0	.00	.00	18	.44	14.50
1	ML&P P1 U1	50	33758	50	10000	8760	2208	216	0	.00	.00	5	.44	12.12
999	EMERG PURCH	3	0	3	0	8760	0	0	0	.00	.00	0	.00	.00
TOTAL		377	390284	377	74800				0		.00	1619		3.73

POWRPRO - PRODUCTION COSTING MODEL - VERSION 13G TIME: 13:36:42 DATE: Oct 04 1998 PAGE: 7

Alaska Public Utilities Commission -- ML&P
Power Pooling / Central Dispatch Planning Study

INPUT FILENAME
mlp1.ppi

ANNUAL SUMMARY - 2005 8760 HOURS AVERAGE INCREMENTAL COST 22.35 ANNUAL PEAK DEMAND 160 MW

UNIT OR PURCHASE #	NAME	MAX CAPACITY MW	MAX OUTPUT MW	ENERGY OUTPUT MWH	FUEL USED MBTU	FUEL PRICE $/MBTU	FUEL COST $	FUEL AVG $/MWH	HOURS ON LINE	HEAT RATE BTU/KWH	CAPACITY FACTOR OPER.	CAPACITY FACTOR AVG.	O & M VARIABLE $	O & M FIXED $
6	ML&P P2 U7-6	109.5	109.5	557812	4969475	2.33	11578026	20.76	6334	8908	.829	.610	1455639	1007876
5	ML&P P2 U5-6	49.2	49.2	206325	2159757	2.33	5032059	24.39	4756	10467	.947	.502	538399	452854
7	ML&P P2 U8	87.6	77.3	122480	1725009	2.33	4019253	32.82	3337	14083	.469	.170	319622	806301
4	ML&P P1 U4	34.1	34.1	8348	139831	2.33	325807	39.03	436	16750	.585	.029	22438	340814
2	ML&P P1 U2	16.8	14.0	6539	207448	2.33	483356	73.92	2128	31723	.193	.048	17065	163018
3	ML&P P1 U3	19.5	14.0	3208	107766	2.33	251095	78.28	969	33595	.175	.020	8371	189217
1	ML&P P1 U1	16.8	14.0	1321	40912	2.33	95325	72.18	380	30978	.221	.010	3446	163018
999	EMERG PURCH	500.0	.0	0	0	681.45	0	.00	99	0	.000	.000	0	0
TOTAL				906033			21784918	24.04					2364979	3123100

0ENERGY DUMPED (MWH) 105669.

UNIT OR PURCHASE #	NAME	STARTS # OF	STARTS COST $	STOPS # OF	STOPS COST $	HOURS TOTAL	HOURS MAINT	HOURS OUT-AGE	EMISSIONS SO2 TONS	SO2 LB/MBTU	SO2 LB/MWH	NOX TONS	NOX LB/MBTU	NOX LB/MWH
6	ML&P P2 U7-6	1	3680	1	200	8760	2208	216	0	.00	.00	696	.28	2.49
5	ML&P P2 U5-6	20	36914	20	4000	8760	2208	216	0	.00	.00	675	.62	6.54
7	ML&P P2 U8	28	87066	28	5600	8760	336	288	0	.00	.00	67	.08	1.10
4	ML&P P1 U4	28	38826	28	5600	8760	336	288	0	.00	.00	31	.44	7.37
2	ML&P P1 U2	185	126035	185	37000	8760	168	288	0	.00	.00	46	.44	13.96
3	ML&P P1 U3	101	76826	101	20200	8760	336	288	0	.00	.00	24	.44	14.78
1	ML&P P1 U1	82	56972	82	16400	8760	168	288	0	.00	.00	9	.44	13.63
999	EMERG PURCH	6	0	6	0	8760	0	0	0	.00	.00	0	.00	.00
TOTAL		451	426319	451	89000				0		.00	1547		3.41

POWRPRO - PRODUCTION COSTING MODEL - VERSION 13G TIME: 13:36:42 DATE: Oct 04 1998 PAGE: 8

Alaska Public Utilities Commission -- ML&P
Power Pooling / Central Dispatch Planning Study

INPUT FILENAME
mlp1.ppi

ANNUAL SUMMARY - 2006 8760 HOURS AVERAGE INCREMENTAL COST 21.27 ANNUAL PEAK DEMAND 162 MW

UNIT OR PURCHASE #	NAME	MAX CAPACITY MW	MAX OUTPUT MW	ENERGY OUTPUT MWH	FUEL USED MBTU	FUEL PRICE $/MBTU	FUEL COST $	FUEL AVG $/MWH	HOURS ON LINE	HEAT RATE BTU/KWH	CAPACITY FACTOR OPER.	CAPACITY FACTOR AVG.	O & M VARIABLE $	O & M FIXED $
6	ML&P P2 U7-6	109.5	109.5	603873	5548492	2.39	13260520	21.96	8134	9188	.710	.660	1623196	1038112
5	ML&P P2 U5-6	49.2	49.2	238453	2537585	2.39	6064389	25.43	5741	10641	.903	.581	640928	466439
7	ML&P P2 U8	87.6	87.6	38882	570338	2.39	1363106	35.06	1131	14668	.421	.054	104509	830490
4	ML&P P1 U4	34.1	34.1	2122	38936	2.39	93058	43.84	131	18345	.485	.007	5876	351039
2	ML&P P1 U2	16.8	9.4	5017	165944	2.39	396598	79.06	1699	33078	.182	.037	13484	167908
3	ML&P P1 U3	19.5	9.5	2417	85889	2.39	205275	84.93	788	35535	.162	.015	6496	194893
1	ML&P P1 U1	16.8	6.6	890	31609	2.39	75546	84.88	318	35515	.182	.007	2392	167908
999	EMERG PURCH	500.0	.0	0	0	705.30	0	.00	36	0	.000	.000	0	0
TOTAL				891654			21458490	24.07					2396881	3216793

0ENERGY DUMPED (MWH) 77842.

UNIT OR PURCHASE #	NAME	STARTS # OF	STARTS COST $	STOPS # OF	STOPS COST $	HOURS TOTAL	HOURS MAINT	HOURS OUT-AGE	EMISSIONS SO2 TONS	SO2 LB/MBTU	SO2 LB/MWH	NOX TONS	NOX LB/MBTU	NOX LB/MWH
6	ML&P P2 U7-6	1	3788	1	200	8760	336	288	0	.00	.00	777	.28	2.57
5	ML&P P2 U5-6	32	60781	32	6400	8760	336	288	0	.00	.00	793	.62	6.65
7	ML&P P2 U8	62	198439	62	12400	8760	336	288	0	.00	.00	22	.08	1.14
4	ML&P P1 U4	13	18546	13	2600	8760	336	288	0	.00	.00	9	.44	8.07
2	ML&P P1 U2	150	105145	150	30000	8760	2208	216	0	.00	.00	37	.44	14.55
3	ML&P P1 U3	85	66522	85	17000	8760	336	288	0	.00	.00	19	.44	15.64
1	ML&P P1 U1	77	55042	77	15400	8760	168	288	0	.00	.00	7	.44	15.63
999	EMERG PURCH	4	0	4	0	8760	0	0	0	.00	.00	0	.00	.00
TOTAL		424	508264	424	84000				0		.00	1663		3.73

POWRPRO - PRODUCTION COSTING MODEL - VERSION 13G TIME: 13:36:42 DATE: Oct 04 1998 PAGE: 9

Alaska Public Utilities Commission -- ML&P
Power Pooling / Central Dispatch Planning Study

INPUT FILENAME
mlp1.ppi

ANNUAL SUMMARY - 2007 8760 HOURS AVERAGE INCREMENTAL COST 21.74 ANNUAL PEAK DEMAND 164 MW

UNIT OR PURCHASE #	NAME	MAX CAPACITY MW	MAX OUTPUT MW	ENERGY OUTPUT MWH	FUEL USED MBTU	FUEL PRICE $/MBTU	FUEL COST $	FUEL AVG $/MWH	HOURS ON LINE	HEAT RATE BTU/KWH	CAPACITY FACTOR OPER.	CAPACITY FACTOR AVG.	O & M VARIABLE $	O & M FIXED $
6	ML&P P2 U7-6	109.5	109.5	598740	5511225	2.44	13446536	22.46	8134	9204	.704	.654	1657578	1069256
5	ML&P P2 U5-6	49.2	49.2	249473	2637276	2.44	6434649	25.79	5882	10571	.920	.607	690634	480432
7	ML&P P2 U8	87.6	87.6	41453	598613	2.44	1460612	35.24	1156	14440	.440	.057	114762	855404
4	ML&P P1 U4	34.1	34.1	1810	38003	2.44	92728	51.23	144	20994	.380	.006	5162	361570
2	ML&P P1 U2	16.8	6.5	5356	178431	2.44	435367	81.29	1865	33315	.180	.040	14828	172945
3	ML&P P1 U3	19.5	4.7	2134	78628	2.44	191852	89.89	720	36839	.155	.013	5909	200740
1	ML&P P1 U1	16.8	3.3	776	27850	2.44	67953	87.57	276	35890	.179	.006	2148	172945
999	EMERG PURCH	500.0	.0	0	0	729.98	0	.00	13	0	.000	.000	0	0
TOTAL				899742			22129696	24.60					2491021	3313297

0ENERGY DUMPED (MWH) 72830.

UNIT OR PURCHASE #	NAME	STARTS # OF	STARTS COST $	STOPS # OF	STOPS COST $	HOURS TOTAL	HOURS MAINT	HOURS OUT-AGE	EMISSIONS SO2 TONS	SO2 LB/MBTU	SO2 LB/MWH	NOX TONS	NOX LB/MBTU	NOX LB/MWH
6	ML&P P2 U7-6	1	3898	1	200	8760	336	288	0	.00	.00	772	.28	2.58
5	ML&P P2 U5-6	33	64440	33	6600	8760	336	288	0	.00	.00	824	.62	6.61
7	ML&P P2 U8	69	227146	69	13800	8760	336	288	0	.00	.00	23	.08	1.13
4	ML&P P1 U4	21	30782	21	4200	8760	336	288	0	.00	.00	8	.44	9.24
2	ML&P P1 U2	157	113099	157	31400	8760	168	288	0	.00	.00	39	.44	14.66
3	ML&P P1 U3	83	66750	83	16600	8760	2208	216	0	.00	.00	17	.44	16.21
1	ML&P P1 U1	66	48480	66	13200	8760	168	288	0	.00	.00	6	.44	15.79
999	EMERG PURCH	2	0	2	0	8760	0	0	0	.00	.00	0	.00	.00
TOTAL		432	554594	432	86000				0		.00	1690		3.76

POWRPRO - PRODUCTION COSTING MODEL - VERSION 13G TIME: 13:36:42 DATE: Oct 04 1998 PAGE: 10

Alaska Public Utilities Commission -- ML&P
Power Pooling / Central Dispatch Planning Study

INPUT FILENAME
mlp1.ppi

ANNUAL SUMMARY - 2008 8760 HOURS AVERAGE INCREMENTAL COST 22.96 ANNUAL PEAK DEMAND 167 MW

UNIT OR PURCHASE #	NAME	MAX CAPACITY MW	MAX OUTPUT MW	ENERGY OUTPUT MWH	FUEL USED MBTU	FUEL PRICE $/MBTU	FUEL COST $	FUEL AVG $/MWH	HOURS ON LINE	HEAT RATE BTU/KWH	CAPACITY FACTOR OPER.	CAPACITY FACTOR AVG.	O & M VARIABLE $	O & M FIXED $
6	ML&P P2 U7-6	109.5	109.5	481317	4665651	2.50	11664303	24.23	8134	9693	.566	.526	1372478	1101333
5	ML&P P2 U5-6	49.2	49.2	335596	3566176	2.50	8915496	26.57	7891	10626	.907	.817	957011	494845
7	ML&P P2 U8	87.6	87.6	32812	481758	2.50	1204398	36.71	947	14682	.420	.045	93566	881067
4	ML&P P1 U4	34.1	34.1	6724	104857	2.50	262143	38.99	305	15594	.687	.024	19749	372417
2	ML&P P1 U2	16.8	14.0	4226	123009	2.50	307523	72.77	1280	29108	.219	.031	12050	178134
3	ML&P P1 U3	19.5	17.7	2282	61653	2.50	154132	67.53	518	27012	.242	.014	6508	206763
1	ML&P P1 U1	16.8	14.0	1269	29653	2.50	74132	58.43	244	23373	.349	.009	3618	178134
999	EMERG PURCH	500.0	12.8	116	116	755.53	87491	755.53	159	1000	.001	.000	0	0
TOTAL				864342			22669620	26.23					2464980	3412696

0ENERGY DUMPED (MWH) 23743.

UNIT OR PURCHASE #	NAME	STARTS # OF	STARTS COST $	STOPS # OF	STOPS COST $	HOURS TOTAL	HOURS MAINT	HOURS OUT-AGE	EMISSIONS SO2 TONS	SO2 LB/MBTU	SO2 LB/MWH	NOX TONS	NOX LB/MBTU	NOX LB/MWH
6	ML&P P2 U7-6	1	4012	1	200	8760	336	288	0	.00	.00	653	.28	2.71
5	ML&P P2 U5-6	6	12055	5	1000	8760	336	288	0	.00	.00	1114	.62	6.64
7	ML&P P2 U8	52	176169	52	10400	8760	2208	216	0	.00	.00	19	.08	1.15
4	ML&P P1 U4	17	25629	17	3400	8760	336	288	0	.00	.00	23	.44	6.86
2	ML&P P1 U2	105	77804	105	21000	8760	168	288	0	.00	.00	27	.44	12.81
3	ML&P P1 U3	47	38878	47	9400	8760	336	288	0	.00	.00	14	.44	11.89
1	ML&P P1 U1	38	28710	38	7600	8760	168	288	0	.00	.00	7	.44	10.28
999	EMERG PURCH	8	0	8	0	8760	0	0	0	.00	.00	0	.00	.00
TOTAL		274	363258	273	53000				0		.00	1857		4.30

POWRPRO - PRODUCTION COSTING MODEL - VERSION 13G TIME: 13:36:42 DATE: Oct 04 1998 PAGE: 11

Alaska Public Utilities Commission -- ML&P
Power Pooling / Central Dispatch Planning Study

INPUT FILENAME
mlp1.ppi

ANNUAL SUMMARY - 2009 8760 HOURS AVERAGE INCREMENTAL COST 22.04 ANNUAL PEAK DEMAND 169 MW

UNIT OR PURCHASE #	NAME	MAX CAPACITY MW	MAX OUTPUT MW	ENERGY OUTPUT MWH	FUEL USED MBTU	FUEL PRICE $/MBTU	FUEL COST $	FUEL AVG $/MWH	HOURS ON LINE	HEAT RATE BTU/KWH	CAPACITY FACTOR OPER.	CAPACITY FACTOR AVG.	O & M VARIABLE $	O & M FIXED $
6	ML&P P2 U7-6	109.5	109.5	480086	4656669	2.57	11967902	24.93	8134	9699	.564	.525	1410013	1134373
5	ML&P P2 U5-6	49.2	49.2	345516	3661066	2.57	9408374	27.23	8050	10595	.914	.841	1014811	509691
7	ML&P P2 U8	87.6	87.6	42010	611742	2.57	1572176	37.42	1220	14561	.429	.058	123386	907499
4	ML&P P1 U4	34.1	34.1	2759	47585	2.57	122294	44.32	155	17246	.552	.010	8347	383589
2	ML&P P1 U2	16.8	6.5	3030	99128	2.57	254760	84.09	1082	32719	.184	.022	8898	183478
3	ML&P P1 U3	19.5	7.5	1114	39044	2.57	100342	90.06	365	35042	.165	.007	3272	212965
1	ML&P P1 U1	16.8	3.7	355	12583	2.57	32337	91.19	127	35482	.182	.003	1042	183478
999	EMERG PURCH	500.0	.0	0	0	781.98	0	.00	24	0	.000	.000	0	0
TOTAL				874870			23458186	26.81					2569769	3515076

0ENERGY DUMPED (MWH) 21054.

UNIT OR PURCHASE #	NAME	STARTS # OF	STARTS COST $	STOPS # OF	STOPS COST $	HOURS TOTAL	HOURS MAINT	HOURS OUT-AGE	EMISSIONS SO2 TONS	SO2 LB/MBTU	SO2 LB/MWH	NOX TONS	NOX LB/MBTU	NOX LB/MWH
6	ML&P P2 U7-6	1	4131	1	200	8760	336	288	0	.00	.00	652	.28	2.72
5	ML&P P2 U5-6	2	4137	2	400	8760	336	288	0	.00	.00	1144	.62	6.62
7	ML&P P2 U8	53	184886	53	10600	8760	336	288	0	.00	.00	24	.08	1.14
4	ML&P P1 U4	18	27936	18	3600	8760	336	288	0	.00	.00	10	.44	7.59
2	ML&P P1 U2	110	83913	110	22000	8760	168	288	0	.00	.00	22	.44	14.40
3	ML&P P1 U3	43	36618	43	8600	8760	336	288	0	.00	.00	9	.44	15.42
1	ML&P P1 U1	45	35001	45	9000	8760	168	288	0	.00	.00	3	.44	15.61
999	EMERG PURCH	1	0	1	0	8760	0	0	0	.00	.00	0	.00	.00
TOTAL		273	376623	273	54400				0		.00	1864		4.26

POWRPRO - PRODUCTION COSTING MODEL - VERSION 13G TIME: 13:36:42 DATE: Oct 04 1998 PAGE: 12

Alaska Public Utilities Commission -- ML&P
Power Pooling / Central Dispatch Planning Study

INPUT FILENAME
mlp1.ppi

ANNUAL SUMMARY - 2010 8760 HOURS AVERAGE INCREMENTAL COST 25.86 ANNUAL PEAK DEMAND 171 MW

UNIT OR PURCHASE #	NAME	MAX CAPACITY MW	MAX OUTPUT MW	ENERGY OUTPUT MWH	FUEL USED MBTU	FUEL PRICE $/MBTU	FUEL COST $	FUEL AVG $/MWH	HOURS ON LINE	HEAT RATE BTU/KWH	CAPACITY FACTOR OPER.	CAPACITY FACTOR AVG.	O & M VARIABLE $	O & M FIXED $
6	ML&P P2 U7-6	109.5	109.5	478052	4488794	2.63	11805778	24.70	7054	9389	.643	.523	1446174	1168405
5	ML&P P2 U5-6	49.2	49.2	307266	3238972	2.63	8517656	27.72	7054	10541	.928	.748	929530	524982
7	ML&P P2 U8	87.6	87.6	116626	1680176	2.63	4418818	37.89	3285	14406	.442	.161	352814	934724
4	ML&P P1 U4	34.1	34.1	9465	141591	2.63	372384	39.34	383	14958	.761	.033	29493	395097
2	ML&P P1 U2	16.8	16.8	4296	120032	2.63	315689	73.48	1231	27937	.233	.032	12997	188982
3	ML&P P1 U3	19.5	19.5	2186	54903	2.63	144395	66.05	441	25112	.272	.013	6614	219354
1	ML&P P1 U1	16.8	16.8	1404	33376	2.63	87778	62.50	274	23764	.339	.010	4249	188982
999	EMERG PURCH	500.0	30.3	285	285	809.35	230826	809.35	115	1000	.005	.000	0	0
TOTAL				919580			25893322	28.16					2781871	3620529

0ENERGY DUMPED (MWH) 51435.

UNIT OR PURCHASE #	NAME	STARTS # OF	STARTS COST $	STOPS # OF	STOPS COST $	HOURS TOTAL	HOURS MAINT	HOURS OUT-AGE	EMISSIONS SO2 TONS	SO2 LB/MBTU	SO2 LB/MWH	NOX TONS	NOX LB/MBTU	NOX LB/MWH
6	ML&P P2 U7-6	1	4252	1	200	8760	1464	240	0	.00	.00	628	.28	2.63
5	ML&P P2 U5-6	1	2128	1	200	8760	1464	240	0	.00	.00	1012	.62	6.59
7	ML&P P2 U8	33	118450	33	6600	8760	336	288	0	.00	.00	66	.08	1.12
4	ML&P P1 U4	27	43085	27	5400	8760	336	288	0	.00	.00	31	.44	6.58
2	ML&P P1 U2	129	101194	129	25800	8760	168	288	0	.00	.00	26	.44	12.29
3	ML&P P1 U3	43	37653	43	8600	8760	336	288	0	.00	.00	12	.44	11.05
1	ML&P P1 U1	48	38389	48	9600	8760	168	288	0	.00	.00	7	.44	10.46
999	EMERG PURCH	12	0	12	0	8760	0	0	0	.00	.00	0	.00	.00
TOTAL		294	345151	294	56400				0		.00	1783		3.88

POWRPRO - PRODUCTION COSTING MODEL - VERSION 13G TIME: 13:36:42 DATE: Oct 04 1998 PAGE: 13

Alaska Public Utilities Commission -- ML&P
Power Pooling / Central Dispatch Planning Study

INPUT FILENAME
mlp1.ppi

ANNUAL SUMMARY - 2011 8760 HOURS AVERAGE INCREMENTAL COST 23.29 ANNUAL PEAK DEMAND 173 MW

UNIT OR PURCHASE #	NAME	MAX CAPACITY MW	MAX OUTPUT MW	ENERGY OUTPUT MWH	FUEL USED MBTU	FUEL PRICE $/MBTU	FUEL COST $	FUEL AVG $/MWH	HOURS ON LINE	HEAT RATE BTU/KWH	CAPACITY FACTOR OPER.	CAPACITY FACTOR AVG.	O & M VARIABLE $	O & M FIXED $
6	ML&P P2 U7-6	109.5	109.5	493197	4748138	2.70	12820020	25.99	8134	9627	.580	.539	1536797	1203457
5	ML&P P2 U5-6	49.2	49.2	357937	3759581	2.70	10150087	28.36	8134	10503	.938	.871	1115353	540731
7	ML&P P2 U8	87.6	87.6	39462	548298	2.70	1480401	37.51	1001	13894	.492	.055	122961	962765
4	ML&P P1 U4	34.1	34.1	3667	77077	2.70	208108	56.75	300	21019	.384	.013	11769	406950
2	ML&P P1 U2	16.8	8.9	3921	124519	2.70	336206	85.74	1323	31755	.192	.029	12218	194652
3	ML&P P1 U3	19.5	8.8	1632	53593	2.70	144700	88.67	484	32842	.180	.010	5085	225935
1	ML&P P1 U1	16.8	6.7	617	20635	2.70	55715	90.25	198	33427	.198	.005	1924	194652
999	EMERG PURCH	500.0	.0	0	0	837.67	0	.00	24	0	.000	.000	0	0
TOTAL				900433			25195238	27.98					2806106	3729145

0ENERGY DUMPED (MWH) 18467.

UNIT OR PURCHASE #	NAME	STARTS # OF	STARTS COST $	STOPS # OF	STOPS COST $	HOURS TOTAL	HOURS MAINT	HOURS OUT-AGE	EMISSIONS SO2 TONS	SO2 LB/MBTU	SO2 LB/MWH	NOX TONS	NOX LB/MBTU	NOX LB/MWH
6	ML&P P2 U7-6	1	4378	1	200	8760	336	288	0	.00	.00	665	.28	2.70
5	ML&P P2 U5-6	1	2190	1	200	8760	336	288	0	.00	.00	1175	.62	6.56
7	ML&P P2 U8	36	133025	36	7200	8760	336	288	0	.00	.00	21	.08	1.08
4	ML&P P1 U4	33	54191	33	6600	8760	336	288	0	.00	.00	17	.44	9.25
2	ML&P P1 U2	132	106566	132	26400	8760	168	288	0	.00	.00	27	.44	13.97
3	ML&P P1 U3	55	49563	55	11000	8760	336	288	0	.00	.00	12	.44	14.45
1	ML&P P1 U1	56	46091	56	11200	8760	168	288	0	.00	.00	5	.44	14.71
999	EMERG PURCH	1	0	1	0	8760	0	0	0	.00	.00	0	.00	.00
TOTAL		315	396004	315	62800				0		.00	1922		4.27

POWRPRO - PRODUCTION COSTING MODEL - VERSION 13G TIME: 13:36:42 DATE: Oct 04 1998 PAGE: 14

Alaska Public Utilities Commission -- ML&P
Power Pooling / Central Dispatch Planning Study

INPUT FILENAME
mlp1.ppi

ANNUAL SUMMARY - 2012 8760 HOURS AVERAGE INCREMENTAL COST 25.78 ANNUAL PEAK DEMAND 176 MW

UNIT OR PURCHASE #	NAME	MAX CAPACITY MW	MAX OUTPUT MW	ENERGY OUTPUT MWH	FUEL USED MBTU	FUEL PRICE $/MBTU	FUEL COST $	FUEL AVG $/MWH	HOURS ON LINE	HEAT RATE BTU/KWH	CAPACITY FACTOR OPER.	CAPACITY FACTOR AVG.	O & M VARIABLE $	O & M FIXED $
6	ML&P P2 U7-6	109.5	109.5	504383	4826775	2.77	13370195	26.51	8134	9569	.593	.551	1618759	1239561
5	ML&P P2 U5-6	49.2	49.2	362133	3784651	2.77	10483678	28.95	8128	10451	.952	.882	1162134	556953
7	ML&P P2 U8	87.6	87.6	39320	535497	2.77	1483325	37.72	926	13618	.524	.054	126194	991648
4	ML&P P1 U4	34.1	31.1	3203	65898	2.77	182538	56.99	250	20575	.398	.011	10588	419158
2	ML&P P1 U2	16.8	14.0	4738	146326	2.77	405322	85.54	1516	30882	.200	.035	15207	200491
3	ML&P P1 U3	19.5	17.7	2145	63962	2.77	177176	82.60	550	29819	.209	.013	6884	232713
1	ML&P P1 U1	16.8	14.0	1184	32661	2.77	90470	76.41	297	27585	.265	.009	3800	200491
999	EMERG PURCH	500.0	35.5	375	375	866.99	324863	867.00	90	1000	.008	.000	0	0
TOTAL				917481			26517566	28.90					2943565	3841019

0ENERGY DUMPED (MWH) 20488.

UNIT OR PURCHASE #	NAME	STARTS # OF	STARTS COST $	STOPS # OF	STOPS COST $	HOURS TOTAL	HOURS MAINT	HOURS OUT-AGE	EMISSIONS SO2 TONS	SO2 LB/MBTU	SO2 LB/MWH	NOX TONS	NOX LB/MBTU	NOX LB/MWH
6	ML&P P2 U7-6	1	4507	1	200	8760	336	288	0	.00	.00	676	.28	2.68
5	ML&P P2 U5-6	1	2254	1	200	8760	336	288	0	.00	.00	1183	.62	6.53
7	ML&P P2 U8	46	174966	46	9200	8760	336	288	0	.00	.00	21	.08	1.06
4	ML&P P1 U4	26	43930	26	5200	8760	2208	216	0	.00	.00	14	.44	9.05
2	ML&P P1 U2	136	112977	136	27200	8760	168	288	0	.00	.00	32	.44	13.59
3	ML&P P1 U3	82	76032	82	16400	8760	336	288	0	.00	.00	14	.44	13.12
1	ML&P P1 U1	82	69444	82	16400	8760	2208	216	0	.00	.00	7	.44	12.14
999	EMERG PURCH	6	0	6	0	8760	0	0	0	.00	.00	0	.00	.00
TOTAL		380	484110	380	74800				0		.00	1947		4.24

POWRPRO - PRODUCTION COSTING MODEL - VERSION 13G TIME: 13:36:42 DATE: Oct 04 1998 PAGE: 15

Alaska Public Utilities Commission -- ML&P
Power Pooling / Central Dispatch Planning Study

INPUT FILENAME
mlp1.ppi

ANNUAL SUMMARY - 2013 8760 HOURS AVERAGE INCREMENTAL COST 24.63 ANNUAL PEAK DEMAND 178 MW

UNIT OR PURCHASE #	NAME	MAX CAPACITY MW	MAX OUTPUT MW	ENERGY OUTPUT MWH	FUEL USED MBTU	FUEL PRICE $/MBTU	FUEL COST $	FUEL AVG $/MWH	HOURS ON LINE	HEAT RATE BTU/KWH	CAPACITY FACTOR OPER.	CAPACITY FACTOR AVG.	O & M VARIABLE $	O & M FIXED $
6	ML&P P2 U7-6	109.5	109.5	514817	4900406	2.84	13917556	27.03	8134	9518	.605	.563	1701854	1276747
5	ML&P P2 U5-6	49.2	49.2	363885	3801897	2.84	10797666	29.67	8134	10448	.953	.886	1202865	573662
7	ML&P P2 U8	87.6	87.6	40133	551178	2.84	1565340	39.00	979	13733	.513	.056	132667	1021398
4	ML&P P1 U4	34.1	34.1	7508	145798	2.84	414066	55.15	533	19420	.440	.026	25562	431733
2	ML&P P1 U2	16.8	9.4	4141	124528	2.84	353664	85.40	1280	30069	.208	.031	13690	206506
3	ML&P P1 U3	19.5	9.6	1961	56508	2.84	160482	81.85	492	28820	.217	.012	6481	239694
1	ML&P P1 U1	16.8	14.0	1680	52702	2.84	149674	89.08	529	31366	.217	.012	5554	206506
999	EMERG PURCH	500.0	.0	0	0	897.34	0	.00	131	0	.000	.000	0	0
TOTAL				934125			27358448	29.29					3088674	3956250

0ENERGY DUMPED (MWH) 21381.

UNIT OR PURCHASE #	NAME	STARTS # OF	STARTS COST $	STOPS # OF	STOPS COST $	HOURS TOTAL	HOURS MAINT	HOURS OUT-AGE	SO2 TONS	SO2 LB/MBTU	SO2 LB/MWH	NOX TONS	NOX LB/MBTU	NOX LB/MWH
6	ML&P P2 U7-6	1	4640	1	200	8760	336	288	0	.00	.00	686	.28	2.67
5	ML&P P2 U5-6	1	2319	1	200	8760	336	288	0	.00	.00	1188	.62	6.53
7	ML&P P2 U8	27	105702	27	5400	8760	1464	240	0	.00	.00	21	.08	1.07
4	ML&P P1 U4	40	69525	40	8000	8760	336	288	0	.00	.00	32	.44	8.54
2	ML&P P1 U2	133	113669	133	26600	8760	1464	240	0	.00	.00	27	.44	13.23
3	ML&P P1 U3	61	58188	61	12200	8760	336	288	0	.00	.00	12	.44	12.68
1	ML&P P1 U1	86	74927	86	17200	8760	168	288	0	.00	.00	12	.44	13.80
999	EMERG PURCH	9	0	9	0	8760	0	0	0	.00	.00	0	.00	.00
TOTAL		358	428970	358	69800				0		.00	1979		4.24

POWRPRO - PRODUCTION COSTING MODEL - VERSION 13G TIME: 13:36:42 DATE: Oct 04 1998 PAGE: 16

Alaska Public Utilities Commission -- ML&P
Power Pooling / Central Dispatch Planning Study

INPUT FILENAME
mlp1.ppi

ANNUAL SUMMARY - 2014 8760 HOURS AVERAGE INCREMENTAL COST 25.34 ANNUAL PEAK DEMAND 181 MW

UNIT OR PURCHASE #	NAME	MAX CAPACITY MW	MAX OUTPUT MW	ENERGY OUTPUT MWH	FUEL USED MBTU	FUEL PRICE $/MBTU	FUEL COST $	FUEL AVG $/MWH	HOURS ON LINE	HEAT RATE BTU/KWH	CAPACITY FACTOR OPER.	CAPACITY FACTOR AVG.	O & M VARIABLE $	O & M FIXED $
6	ML&P P2 U7-6	109.5	109.5	527323	4988534	2.91	14516877	27.53	8134	9460	.620	.576	1795518	1315050
5	ML&P P2 U5-6	49.2	49.2	366961	3822118	2.91	11121847	30.31	8134	10415	.962	.893	1249459	590871
7	ML&P P2 U8	87.6	87.6	44136	603182	2.91	1755276	39.77	1059	13666	.519	.061	150278	1052040
4	ML&P P1 U4	34.1	34.1	5841	119950	2.91	349053	59.76	459	20534	.396	.020	20486	444685
2	ML&P P1 U2	16.8	9.1	4501	145025	2.91	422023	93.77	1541	32221	.188	.033	15325	212701
3	ML&P P1 U3	19.5	9.3	2035	68999	2.91	200788	98.67	629	33906	.173	.012	6929	246885
1	ML&P P1 U1	16.8	6.8	839	29143	2.91	84807	101.08	292	34736	.187	.006	2857	212701
999	EMERG PURCH	500.0	.0	0	0	928.74	0	.00	10	0	.000	.000	0	0
TOTAL				951636			28450672	29.90					3240851	4074938

0ENERGY DUMPED (MWH) 21871.

UNIT OR PURCHASE #	NAME	STARTS # OF	STARTS COST $	STOPS # OF	STOPS COST $	HOURS TOTAL	HOURS MAINT	HOURS OUT-AGE	EMISSIONS SO2 TONS	SO2 LB/MBTU	SO2 LB/MWH	NOX TONS	NOX LB/MBTU	NOX LB/MWH
6	ML&P P2 U7-6	1	4776	1	200	8760	336	288	0	.00	.00	698	.28	2.65
5	ML&P P2 U5-6	1	2386	1	200	8760	336	288	0	.00	.00	1194	.62	6.51
7	ML&P P2 U8	39	157133	39	7800	8760	336	288	0	.00	.00	24	.08	1.07
4	ML&P P1 U4	41	73298	41	8200	8760	336	288	0	.00	.00	26	.44	9.04
2	ML&P P1 U2	174	152973	174	34800	8760	168	288	0	.00	.00	32	.44	14.18
3	ML&P P1 U3	71	69665	71	14200	8760	336	288	0	.00	.00	15	.44	14.92
1	ML&P P1 U1	81	72589	81	16200	8760	168	288	0	.00	.00	6	.44	15.28
999	EMERG PURCH	3	0	3	0	8760	0	0	0	.00	.00	0	.00	.00
TOTAL		411	532821	411	81600				0		.00	1996		4.20

POWRPRO - PRODUCTION COSTING MODEL - VERSION 13G TIME: 13:36:42 DATE: Oct 04 1998 PAGE: 17

Alaska Public Utilities Commission -- ML&P
Power Pooling / Central Dispatch Planning Study

INPUT FILENAME
mlp1.ppi

ANNUAL SUMMARY - 2015 8760 HOURS AVERAGE INCREMENTAL COST 29.00 ANNUAL PEAK DEMAND 183 MW

UNIT OR PURCHASE #	NAME	MAX CAPACITY MW	MAX OUTPUT MW	ENERGY OUTPUT MWH	FUEL USED MBTU	FUEL PRICE $/MBTU	FUEL COST $	FUEL AVG $/MWH	HOURS ON LINE	HEAT RATE BTU/KWH	CAPACITY FACTOR OPER.	CAPACITY FACTOR AVG.	O & M VARIABLE $	O & M FIXED $
6	ML&P P2 U7-6	109.5	109.5	490666	4484324	2.98	13363262	27.23	6334	9139	.729	.536	1720821	1354501
5	ML&P P2 U5-6	49.2	49.2	299307	3078028	2.98	9172013	30.64	6334	10283	1.000	.729	1049730	608598
7	ML&P P2 U8	87.6	87.6	179962	2486414	2.98	7410033	41.18	4530	13816	.502	.249	631116	1083601
4	ML&P P1 U4	34.1	34.1	24654	389648	2.98	1161143	47.10	1181	15804	.664	.086	89057	458026
2	ML&P P1 U2	16.8	14.0	6318	183016	2.98	545395	86.32	1921	28967	.220	.047	22157	219082
3	ML&P P1 U3	19.5	17.7	2898	82605	2.98	246163	84.95	717	28504	.221	.018	10163	254292
1	ML&P P1 U1	16.8	14.0	1857	51088	2.98	152243	81.97	480	27507	.265	.014	6513	219082
999	EMERG PURCH	500.0	8.0	11	11	961.25	10574	961.25	192	1000	.000	.000	0	0
TOTAL				1005673			32060824	31.88					3529559	4197185

0ENERGY DUMPED (MWH) 58469.

UNIT OR PURCHASE #	NAME	STARTS # OF	STARTS COST $	STOPS # OF	STOPS COST $	HOURS TOTAL	HOURS MAINT	HOURS OUT-AGE	EMISSIONS SO2 TONS	SO2 LB/MBTU	SO2 LB/MWH	NOX TONS	NOX LB/MBTU	NOX LB/MWH
6	ML&P P2 U7-6	1	4915	1	200	8760	2208	216	0	.00	.00	628	.28	2.56
5	ML&P P2 U5-6	1	2455	1	200	8760	2208	216	0	.00	.00	962	.62	6.43
7	ML&P P2 U8	22	91216	22	4400	8760	336	288	0	.00	.00	97	.08	1.08
4	ML&P P1 U4	48	88250	48	9600	8760	336	288	0	.00	.00	86	.44	6.95
2	ML&P P1 U2	258	233292	258	51600	8760	168	288	0	.00	.00	40	.44	12.75
3	ML&P P1 U3	75	75685	75	15000	8760	336	288	0	.00	.00	18	.44	12.54
1	ML&P P1 U1	96	88481	96	19200	8760	168	288	0	.00	.00	11	.44	12.10
999	EMERG PURCH	19	0	19	0	8760	0	0	0	.00	.00	0	.00	.00
TOTAL		520	584295	520	100200				0		.00	1842		3.66

POWRPRO - PRODUCTION COSTING MODEL - VERSION 13G TIME: 13:36:42 DATE: Oct 04 1998 PAGE: 18

Alaska Public Utilities Commission -- ML&P
Power Pooling / Central Dispatch Planning Study

INPUT FILENAME
mlp1.ppi

ANNUAL SUMMARY - 2016 8760 HOURS AVERAGE INCREMENTAL COST 30.02 ANNUAL PEAK DEMAND 186 MW

UNIT OR PURCHASE #	NAME	MAX CAPACITY MW	MAX OUTPUT MW	ENERGY OUTPUT MWH	FUEL USED MBTU	FUEL PRICE $/MBTU	FUEL COST $	FUEL AVG $/MWH	HOURS ON LINE	HEAT RATE BTU/KWH	CAPACITY FACTOR OPER.	CAPACITY FACTOR AVG.	O & M VARIABLE $	O & M FIXED $
6	ML&P P2 U7-6	109.5	109.5	494301	4507630	3.06	13792692	27.90	6334	9119	.735	.540	1785475	1395136
5	ML&P P2 U5-6	49.2	49.2	299307	3078034	3.06	9418448	31.47	6334	10283	1.000	.729	1081229	626855
7	ML&P P2 U8	87.6	87.6	182800	2540877	3.06	7775277	42.53	4681	13899	.493	.253	660313	1116109
4	ML&P P1 U4	34.1	34.1	31475	487412	3.06	1491485	47.39	1436	15485	.693	.110	117106	471767
2	ML&P P1 U2	16.8	14.0	6356	181714	3.06	556049	87.48	1887	28587	.224	.047	22961	225655
3	ML&P P1 U3	19.5	17.7	2757	70946	3.06	217094	78.74	592	25733	.258	.017	9959	261921
1	ML&P P1 U1	16.8	14.0	2452	69949	3.06	214043	87.30	660	28530	.250	.018	8856	225655
999	EMERG PURCH	500.0	7.5	17	17	994.89	16515	994.89	206	1000	.000	.000	0	0
TOTAL				1019465			33481604	32.84					3685898	4323101

0ENERGY DUMPED (MWH) 56174.

UNIT OR PURCHASE #	NAME	STARTS # OF	STARTS COST $	STOPS # OF	STOPS COST $	HOURS TOTAL	HOURS MAINT	HOURS OUT-AGE	EMISSIONS SO2 TONS	SO2 LB/MBTU	SO2 LB/MWH	NOX TONS	NOX LB/MBTU	NOX LB/MWH
6	ML&P P2 U7-6	1	5061	1	200	8760	2208	216	0	.00	.00	631	.28	2.55
5	ML&P P2 U5-6	1	2527	1	200	8760	2208	216	0	.00	.00	962	.62	6.43
7	ML&P P2 U8	31	132325	31	6200	8760	336	288	0	.00	.00	99	.08	1.08
4	ML&P P1 U4	45	85146	45	9000	8760	336	288	0	.00	.00	107	.44	6.81
2	ML&P P1 U2	236	219635	236	47200	8760	168	288	0	.00	.00	40	.44	12.58
3	ML&P P1 U3	58	60239	58	11600	8760	2208	216	0	.00	.00	16	.44	11.32
1	ML&P P1 U1	127	120469	127	25400	8760	168	288	0	.00	.00	15	.44	12.55
999	EMERG PURCH	24	0	24	0	8760	0	0	0	.00	.00	0	.00	.00
TOTAL		523	625401	523	99800				0		.00	1870		3.67

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 13:12:25 DATE: Oct 04 1998 PAGE: 1

Multi Area Model with Chugach/AEG&T/GVEA INPUT FILENAME
Uses Power Pool Price Files from the Traditional Scenario ceagvea1.ppi

ANNUAL SUMMARY - 1997 8760 HOURS AVERAGE INCREMENTAL COST 22.81 ANNUAL PEAK DEMAND 0 MW

UNIT #	OR PURCHASE NAME	AREA	MAX CAPACITY MW	MAX OUTPUT MW	ENERGY OUTPUT MWH	FUEL USED MBTU	FUEL PRICE $/MBTU	FUEL COST $	FUEL AVG $/MWH	HOURS ON LINE	HEAT RATE BTU/KWH	CAPACITY FACTOR OPER.	CAPACITY FACTOR AVG.	O & M VARIABLE $	O & M FIXED $
36	Healy 1	3	25.0	25.0	81450	1443607	1.39	2006616	24.64	6966	17723	.468	.372	911901	2437417
38	HCCP	3	53.0	53.0	341865	4036128	.60	2421772	7.08	6958	11806	.927	.736	3418661	3381399
17	Beluga 7-8	2	101.5	101.5	764769	6996510	1.46	10215784	13.36	7750	9148	1.000	.886	1575560	806924
15	Beluga 6-8	2	101.5	101.5	781802	7327687	1.46	10697520	13.68	7920	9372	1.000	.906	1610654	806924
12	Beluga 3	2	66.9	66.9	335833	4158596	1.46	6071584	18.08	5633	12382	.938	.603	691815	531855
13	Beluga 5	2	71.0	71.0	226286	2886588	1.46	4214417	18.62	4171	12756	.839	.396	466141	564450
19	Bernice 3	1	28.0	28.0	167733	2306079	1.50	3459070	20.62	7435	13748	.842	.716	345540	182000
20	Bernice 4	1	28.0	28.0	70032	946094	1.50	1419117	20.26	2776	13509	.945	.299	144269	182000
10	Beluga 1	2	16.7	16.7	7893	173914	1.46	253916	32.17	1033	22033	.485	.058	16260	132765
11	Beluga 2	2	16.7	16.7	7998	150619	1.46	219903	27.49	599	18831	.841	.059	16476	132765
24	Soldotna 1	1	39.0	39.0	20843	266299	2.25	599172	28.75	882	12776	.634	.064	42937	132560
35	North Pole 2	4	59.3	64.0	157814	1834934	3.09	5669937	35.93	6262	11627	.464	.342	757477	315595
34	North Pole 1	4	56.7	60.2	33502	408243	3.09	1261470	37.65	1461	12185	.439	.072	160801	301757
23	Intrnl 3	2	18.9	11.4	107	2477	2.25	5574	51.89	18	23060	.345	.001	221	108674
21	Intrnl 1	2	15.0	8.0	40	1089	2.25	2450	60.70	9	26979	.313	.000	83	86250
22	Intrnl 2	2	15.1	5.7	18	477	2.25	1074	60.25	4	26776	.308	.000	37	86825
39	Chena 6	4	29.3	29.3	1599	22355	3.50	78289	48.97	108	13983	.505	.025	480	66466
37	Healy D1	3	2.6	2.6	215	3013	3.20	9641	44.80	118	14000	.701	.009	1773	60670
33	Zehnder GT2	4	18.0	16.2	988	18645	3.31	61715	62.49	124	18880	.496	.007	5299	141237
32	Zehnder GT1	4	18.0	12.4	144	2547	3.31	8429	58.46	16	17661	.559	.001	774	141237
31	Zehnder EMD6	4	2.6	2.5	12	161	3.31	533	46.34	16	14000	.277	.001	95	21956
30	Zehnder EMD5	4	2.6	2.5	16	226	3.31	749	46.34	23	14000	.270	.001	133	21956
40	SILOS	4	70.0	.5	1	10	103.00	10301	030.00	2	10000	.007	.000	10	0
999	EMERG PURCH	4	150.0	.0	0	0	1033.96	0	.00	0	0	.000	.000	0	0
997	EMERG PURCH	1	150.0	32.5	33	33	1033.96	33605	1033.98	5	1000	.043	.000	0	0
998	EMERG PURCH	2	150.0	.0	0	0	1033.96	0	.00	0	0	.000	.000	0	0
TOTAL					3000993			48713356	16.23					10167396	10643693

Transmission Losses and Dumped Energy (MWH) 133646.

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 13:12:25 DATE: Oct 04 1998 PAGE: 2

Multi Area Model with Chugach/AEG&T/GVEA
Uses Power Pool Price Files from the Traditional Scenario

INPUT FILENAME
ceagvea1.ppi

ANNUAL SUMMARY - 1997 8760 HOURS AVERAGE INCREMENTAL COST 22.81 ANNUAL PEAK DEMAND 0 MW

UNIT OR PURCHASE #	NAME	STARTS # OF	STARTS COST $	STOPS # OF	STOPS COST $	HOURS TOTAL	HOURS MAINT	HOURS OUT-AGE	EMISSIONS SO2 TONS	SO2 LB/MBTU	SO2 LB/MWH	NOX TONS	NOX LB/MBTU	NOX LB/MWH
36	Healy 1	622	625359	622	124400	8760	408	744	332	.46	8.15	267	.37	6.56
38	HCCP	475	517536	475	95000	8760	480	840	605	.30	3.54	706	.35	4.13
17	Beluga 7-8	6	22187	5	1000	8760	672	312	0	.00	.00	1539	.44	4.03
15	Beluga 6-8	26	92446	26	5200	8760	672	0	0	.00	.00	1612	.44	4.12
12	Beluga 3	240	407476	240	48000	8760	672	72	0	.00	.00	915	.44	5.45
13	Beluga 5	240	407476	240	48000	8760	672	0	0	.00	.00	635	.44	5.61
19	Bernice 3	79	72625	79	15800	8760	504	576	0	.00	.00	507	.44	6.05
20	Bernice 4	380	388025	380	76000	8760	504	408	0	.00	.00	208	.44	5.94
10	Beluga 1	236	242892	236	47200	8760	504	576	0	.00	.00	38	.44	9.69
11	Beluga 2	139	145494	139	27800	8760	504	0	0	.00	.00	33	.44	8.29
24	Soldotna 1	106	114530	106	21200	8760	336	96	0	.00	.00	56	.42	5.37
35	North Pole 2	179	206510	179	35800	8760	144	696	817	.89	10.35	670	.73	8.49
34	North Pole 1	147	140494	147	29400	8760	144	432	182	.89	10.85	149	.73	8.90
23	Intrnl 3	7	7362	7	1400	8760	336	936	0	.00	.00	1	.44	10.15
21	Intrnl 1	4	4189	4	800	8760	336	840	0	.00	.00	0	.44	11.87
22	Intrnl 2	2	2095	2	400	8760	336	840	0	.00	.00	0	.44	11.78
39	Chena 6	11	8737	11	2200	2208	0	120	0	.02	.28	1	.12	1.68
37	Healy D1	38	14000	38	7600	8760	408	408	1	.84	11.76	1	.76	10.64
33	Zehnder GT2	37	14927	37	7400	8760	144	96	8	.84	15.86	7	.76	14.35
32	Zehnder GT1	10	7463	10	2000	8760	144	96	1	.84	14.84	1	.76	13.42
31	Zehnder EMD6	11	5500	11	2200	8760	0	96	0	.84	11.76	0	.76	10.64
30	Zehnder EMD5	9	4500	9	1800	8760	0	96	0	.84	11.76	0	.76	10.64
40	SILOS	2	0	2	0	8760	0	0	0	.00	.00	0	.00	.00
999	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
997	EMERG PURCH	4	0	4	0	8760	0	0	0	.00	.00	0	.00	.00
998	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
TOTAL		3010	3451821	3009	600600				1946		1.30	7348		4.90

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 13:12:25 DATE: Oct 04 1998 PAGE: 4

Multi Area Model with Chugach/AEG&T/GVEA INPUT FILENAME
Uses Power Pool Price Files from the Traditional Scenario ceagvea1.ppi

ANNUAL SUMMARY - 1998 8760 HOURS AVERAGE INCREMENTAL COST 30.17 ANNUAL PEAK DEMAND 0 MW

UNIT OR PURCHASE #	NAME	AREA	MAX CAPACITY MW	MAX OUTPUT MW	ENERGY OUTPUT MWH	FUEL USED MBTU	FUEL PRICE $/MBTU	FUEL COST $	FUEL AVG $/MWH	HOURS ON LINE	HEAT RATE BTU/KWH	CAPACITY FACTOR OPER.	CAPACITY FACTOR AVG.	O & M VARIABLE $	O & M FIXED $
36	Healy 1	3	25.0	25.0	97491	1638852	1.02	1671626	17.15	7362	16810	.530	.445	1124283	2510540
38	HCCP	3	53.0	53.0	368175	4348655	.62	2696507	7.32	7257	11811	.957	.793	3792418	3482841
17	Beluga 7-8	2	101.5	101.5	563329	5153964	1.69	8710401	15.46	5638	9149	1.000	.653	1195294	831132
15	Beluga 6-8	2	101.5	101.5	794170	7443510	1.69	12579627	15.84	8045	9372	1.000	.920	1685081	831132
12	Beluga 3	2	66.9	66.9	380637	4703403	1.69	7948701	20.88	6390	12356	.947	.683	807606	547810
13	Beluga 5	2	71.0	71.0	273452	3469900	1.69	5864219	21.45	4955	12689	.862	.479	580212	581383
19	Bernice 3	1	28.0	28.0	168931	2290384	1.70	3893743	23.05	7083	13558	.889	.721	358437	187460
20	Bernice 4	1	28.0	28.0	78925	1056637	1.70	1796283	22.76	3033	13387	.977	.337	167464	187460
24	Soldotna 1	1	39.0	39.0	56750	675497	2.05	1384770	24.40	1967	11903	.784	.175	120411	136537
10	Beluga 1	2	16.7	15.2	3873	100018	1.69	169030	43.64	736	25821	.348	.028	8219	136747
11	Beluga 2	2	16.7	16.7	3274	60971	1.69	103040	31.47	252	18623	.861	.024	6947	136747
23	Intrnl 3	2	18.9	12.3	488	10524	2.05	21575	44.23	74	21573	.385	.003	1035	111935
35	North Pole 2	4	59.3	59.3	183163	2095385	3.18	6668956	36.41	7437	11439	.475	.406	905519	325063
21	Intrnl 1	2	15.0	6.3	21	652	2.05	1337	64.83	6	31625	.246	.000	44	88837
34	North Pole 1	4	56.7	55.1	28123	333911	3.18	1062740	37.79	1225	11873	.453	.063	139036	310810
22	Intrnl 2	2	15.1	7.7	46	1175	2.05	2408	52.68	10	25695	.331	.000	97	89429
39	Chena 6	4	29.3	29.3	5274	67454	3.61	243312	46.14	265	12790	.679	.021	1630	271611
37	Healy D1	3	2.6	2.6	97	1357	3.30	4473	46.14	52	14000	.717	.004	823	62490
33	Zehnder GT2	4	18.0	18.0	821	11994	3.41	40892	49.80	47	14607	.984	.006	4538	145474
32	Zehnder GT1	4	18.0	18.0	414	6044	3.41	20605	49.80	24	14606	.984	.003	2287	145474
31	Zehnder EMD6	4	2.6	2.6	86	1198	3.41	4086	47.73	41	14000	.803	.004	727	22615
30	Zehnder EMD5	4	2.6	2.6	37	521	3.41	1776	47.73	24	14000	.596	.002	316	22615
18	Bernice 2	1	19.3	19.3	585	9302	1.70	15814	27.02	46	15895	.737	.004	1242	129213
40	SILOS	4	70.0	47.4	1019	10190	106.09	1081032	1060.93	44	10000	.331	.002	10810	0
999	EMERG PURCH	4	150.0	.0	0	0	1070.15	0	.00	0	0	.000	.000	0	0
997	EMERG PURCH	1	150.0	.0	0	0	1070.15	0	.00	4	0	.000	.000	0	0
998	EMERG PURCH	2	150.0	.0	0	0	1070.15	0	.00	0	0	.000	.000	0	0
TOTAL					3009181			55986952	18.61					10914476	11295368

Transmission Losses and Dumped Energy (MWH) 138093.

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 13:12:25 DATE: Oct 04 1998 PAGE: 5

Multi Area Model with Chugach/AEG&T/GVEA
Uses Power Pool Price Files from the Traditional Scenario

INPUT FILENAME
ceagvea1.ppi

ANNUAL SUMMARY - 1998 8760 HOURS AVERAGE INCREMENTAL COST 30.17 ANNUAL PEAK DEMAND 0 MW

UNIT OR PURCHASE #	NAME	STARTS # OF	STARTS COST $	STOPS # OF	STOPS COST $	HOURS TOTAL	HOURS MAINT	HOURS OUT-AGE	EMISSIONS SO2 TONS	SO2 LB/MBTU	SO2 LB/MWH	NOX TONS	NOX LB/MBTU	NOX LB/MWH
36	Healy 1	245	253787	246	49200	8760	408	744	377	.46	7.73	303	.37	6.22
38	HCCP	176	197655	176	35200	8760	480	840	652	.30	3.54	761	.35	4.13
17	Beluga 7-8	1	3821	1	200	8760	2880	240	0	.00	.00	1134	.44	4.03
15	Beluga 6-8	7	26749	7	1400	8760	672	0	0	.00	.00	1638	.44	4.12
12	Beluga 3	164	288842	164	32800	8760	672	72	0	.00	.00	1035	.44	5.44
13	Beluga 5	232	408605	232	46400	8760	672	0	0	.00	.00	763	.44	5.58
19	Bernice 3	123	124410	123	24600	8760	504	576	0	.00	.00	504	.44	5.97
20	Bernice 4	368	379470	368	73600	8760	504	408	0	.00	.00	232	.44	5.89
24	Soldotna 1	177	198638	177	35400	8760	336	96	0	.00	.00	142	.42	5.00
10	Beluga 1	152	161697	152	30400	8760	504	576	0	.00	.00	22	.44	11.36
11	Beluga 2	57	61793	57	11400	8760	504	0	0	.00	.00	13	.44	8.19
23	Intrnl 3	14	15080	14	2800	8760	336	936	0	.00	.00	2	.44	9.49
35	North Pole 2	59	74970	59	11800	8760	144	696	932	.89	10.18	765	.73	8.35
21	Intrnl 1	3	3219	3	600	8760	336	840	0	.00	.00	0	.44	13.92
34	North Pole 1	83	97635	83	16600	8760	144	432	149	.89	10.57	122	.73	8.67
22	Intrnl 2	2	2146	2	400	8760	336	840	0	.00	.00	0	.44	11.31
39	Chena 6	39	38245	39	7800	8760	360	432	1	.02	.26	4	.12	1.53
37	Healy D1	19	8240	19	3800	8760	408	408	1	.84	11.76	1	.76	10.64
33	Zehnder GT2	9	4393	9	1800	8760	2208	72	5	.84	12.27	5	.76	11.10
32	Zehnder GT1	7	5491	7	1400	8760	2208	72	3	.84	12.27	2	.76	11.10
31	Zehnder EMD6	14	4635	14	2800	8760	0	96	1	.84	11.76	0	.76	10.64
30	Zehnder EMD5	8	3090	8	1600	8760	0	96	0	.84	11.76	0	.76	10.64
18	Bernice 2	10	10725	10	2000	8760	504	408	0	.00	.00	2	.44	6.99
40	SILOS	3	0	3	0	8760	0	0	0	.00	.00	0	.00	.00
999	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
997	EMERG PURCH	1	0	1	0	8760	0	0	0	.00	.00	0	.00	.00
998	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
TOTAL		1973	2373335	1974	394000				2120		1.41	7451		4.95

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 13:12:25 DATE: Oct 04 1998 PAGE: 7

Multi Area Model with Chugach/AEG&T/GVEA INPUT FILENAME
Uses Power Pool Price Files from the Traditional Scenario ceagvea1.ppi

ANNUAL SUMMARY - 1999 8760 HOURS AVERAGE INCREMENTAL COST 27.37 ANNUAL PEAK DEMAND 0 MW

UNIT #	OR PURCHASE NAME	AREA	MAX CAPACITY MW	MAX OUTPUT MW	ENERGY OUTPUT MWH	FUEL USED MBTU	FUEL PRICE $/MBTU	FUEL COST $	FUEL AVG $/MWH	HOURS ON LINE	HEAT RATE BTU/KWH	CAPACITY FACTOR OPER.	CAPACITY FACTOR AVG.	O & M VARIABLE $	O & M FIXED $
36	Healy 1	3	25.0	25.0	97569	1627320	.94	1529672	15.68	7301	16678	.535	.446	1158915	2585856
38	HCCP	3	53.0	53.0	367796	4342553	.65	2822941	7.68	7214	11806	.962	.792	3901809	3587327
17	Beluga 7-8	2	101.5	101.5	767293	7019638	1.73	12145640	15.83	7776	9148	1.000	.889	1676959	856066
15	Beluga 6-8	2	101.5	101.5	588575	5516778	1.73	9543719	16.21	5893	9373	.999	.682	1286307	856066
12	Beluga 3	2	66.9	66.9	393132	4858089	1.73	8404637	21.38	6603	12357	.946	.706	859176	564244
13	Beluga 5	2	71.0	71.0	293922	3737553	1.73	6466020	22.00	5392	12716	.850	.514	642356	598825
19	Bernice 3	1	28.0	28.0	164364	2246831	1.75	3931936	23.92	7170	13669	.855	.702	359212	193083
20	Bernice 4	1	28.0	28.0	85317	1139528	1.75	1994190	23.37	3256	13356	.985	.364	186451	193083
24	Soldotna 1	1	39.0	39.0	60225	717375	2.10	1506488	25.01	2099	11911	.780	.185	131619	140633
10	Beluga 1	2	16.7	16.7	4617	132750	1.73	229658	49.75	1062	28755	.288	.034	10089	140850
11	Beluga 2	2	16.7	16.7	6143	112158	1.73	194034	31.59	455	18257	.900	.045	13426	140850
23	Intrnl 3	2	18.9	16.9	1261	26357	2.10	55349	43.89	178	20898	.410	.008	2756	115293
35	North Pole 2	4	59.3	59.3	164442	1797981	3.28	5894112	35.84	5771	10933	.527	.364	837356	334814
21	Intrnl 1	2	15.0	12.5	197	4005	2.10	8411	42.79	27	20378	.516	.002	430	91502
34	North Pole 1	4	56.7	56.5	62515	722998	3.28	2370119	37.91	2659	11565	.487	.139	318335	320135
22	Intrnl 2	2	15.1	8.2	42	1101	2.10	2311	54.71	9	26051	.327	.000	92	92112
39	Chena 6	4	29.3	29.3	12417	158997	3.72	590719	47.57	626	12804	.677	.048	3952	279759
37	Healy D1	3	2.6	2.6	135	1883	3.39	6394	47.53	106	14000	.488	.006	1176	64364
33	Zehnder GT2	4	18.0	17.6	866	14724	3.51	51705	59.70	80	16999	.610	.006	4931	149839
32	Zehnder GT1	4	18.0	14.0	534	8875	3.51	31166	58.40	47	16630	.638	.004	3038	149839
31	Zehnder EMD6	4	2.6	.5	14	189	3.51	664	49.16	27	14000	.192	.001	118	23294
30	Zehnder EMD5	4	2.6	.5	5	63	3.51	221	49.16	9	14000	.192	.000	39	23294
18	Bernice 2	1	19.3	19.3	478	7533	1.75	13183	27.58	37	15758	.752	.003	1045	133089
40	SILOS	4	70.0	.0	0	0	109.27	0	.00	0	0	.000	.000	0	0
999	EMERG PURCH	4	150.0	.0	0	0	1107.61	0	.00	0	0	.000	.000	0	0
997	EMERG PURCH	1	150.0	.0	0	0	1107.61	0	.00	0	0	.000	.000	0	0
998	EMERG PURCH	2	150.0	.0	0	0	1107.61	0	.00	0	0	.000	.000	0	0
TOTAL					3071859			57793284	18.81					11399588	11634226

Transmission Losses and Dumped Energy (MWH) 139474.

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 13:12:25 DATE: Oct 04 1998 PAGE: 8

Multi Area Model with Chugach/AEG&T/GVEA
Uses Power Pool Price Files from the Traditional Scenario

INPUT FILENAME
ceagvea1.ppi

ANNUAL SUMMARY - 1999 8760 HOURS AVERAGE INCREMENTAL COST 27.37 ANNUAL PEAK DEMAND 0 MW

UNIT OR PURCHASE #	NAME	STARTS # OF	STARTS COST $	STOPS # OF	STOPS COST $	HOURS TOTAL	HOURS MAINT	HOURS OUT-AGE	EMISSIONS SO2 TONS	SO2 LB/MBTU	SO2 LB/MWH	NOX TONS	NOX LB/MBTU	NOX LB/MWH
36	Healy 1	309	329632	308	61600	8760	408	744	374	.46	7.67	301	.37	6.17
38	HCCP	219	252756	219	43800	8760	480	840	651	.30	3.54	760	.35	4.13
17	Beluga 7-8	1	3935	1	200	8760	672	312	0	.00	.00	1544	.44	4.03
15	Beluga 6-8	2	7870	2	400	8760	2856	0	0	.00	.00	1214	.44	4.12
12	Beluga 3	154	279255	154	30800	8760	672	72	0	.00	.00	1069	.44	5.44
13	Beluga 5	220	398936	220	44000	8760	672	0	0	.00	.00	822	.44	5.60
19	Bernice 3	124	125930	124	24800	8760	504	576	0	.00	.00	494	.44	6.01
20	Bernice 4	411	425850	411	82200	8760	504	408	0	.00	.00	251	.44	5.88
24	Soldotna 1	179	206817	179	35800	8760	336	96	0	.00	.00	151	.42	5.00
10	Beluga 1	205	224578	205	41000	8760	504	576	0	.00	.00	29	.44	12.65
11	Beluga 2	76	84836	76	15200	8760	504	0	0	.00	.00	25	.44	8.03
23	Intrnl 3	28	31058	28	5600	8760	336	936	0	.00	.00	6	.44	9.20
35	North Pole 2	36	43099	36	7200	8760	2208	528	800	.89	9.73	656	.73	7.98
21	Intrnl 1	5	5525	5	1000	8760	336	840	0	.00	.00	1	.44	8.97
34	North Pole 1	74	91585	74	14800	8760	2208	336	322	.89	10.29	264	.73	8.44
22	Intrnl 2	5	5525	5	1000	8760	336	840	0	.00	.00	0	.44	11.46
39	Chena 6	70	68358	70	14000	8760	360	432	2	.02	.26	10	.12	1.54
37	Healy D1	23	10079	23	4600	8760	408	408	1	.84	11.76	1	.76	10.64
33	Zehnder GT2	10	9049	10	2000	8760	144	96	6	.84	14.28	6	.76	12.92
32	Zehnder GT1	9	7918	9	1800	8760	144	96	4	.84	13.97	3	.76	12.64
31	Zehnder EMD6	6	3183	6	1200	8760	0	96	0	.84	11.76	0	.76	10.64
30	Zehnder EMD5	5	2652	5	1000	8760	0	96	0	.84	11.76	0	.76	10.64
18	Bernice 2	7	7733	7	1400	8760	504	408	0	.00	.00	2	.44	6.93
40	SILOS	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
999	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
997	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
998	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
TOTAL		2178	2626157	2177	435400				2160		1.41	7608		4.95

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 13:14:58 DATE: Oct 04 1998 PAGE: 4

Multi Area Model with Chugach/AEG&T/GVEA INPUT FILENAME
Uses Power Pool Price Files from the Traditional Scenario ceagvea2.ppi

ANNUAL SUMMARY - 2000 8760 HOURS AVERAGE INCREMENTAL COST 25.29 ANNUAL PEAK DEMAND 0 MW

UNIT OR PURCHASE #	NAME	AREA	MAX CAPACITY MW	MAX OUTPUT MW	ENERGY OUTPUT MWH	FUEL USED MBTU	FUEL PRICE $/MBTU	FUEL COST $	FUEL AVG $/MWH	HOURS ON LINE	HEAT RATE BTU/KWH	CAPACITY FACTOR OPER.	CAPACITY FACTOR AVG.	O & M VARIABLE $	O & M FIXED $
36	Healy 1	3	25.0	25.0	101262	1547012	.97	1500592	14.82	5899	15277	.687	.462	1238873	2663432
38	HCCP	3	53.0	53.0	391036	4615349	.67	3092695	7.91	7439	11802	.992	.842	4273240	3694947
17	Beluga 7-8	2	101.5	101.5	767316	7019766	1.78	12496758	16.29	7774	9148	1.000	.889	1727374	881748
15	Beluga 6-8	2	101.5	101.5	797145	7471327	1.78	13297251	16.68	8074	9372	1.000	.924	1794527	881748
12	Beluga 3	2	66.9	66.9	414505	5155971	1.78	9177454	22.14	7087	12438	.917	.744	933054	581172
13	Beluga 5	2	71.0	71.0	248385	3211437	1.78	5716410	23.01	4875	12929	.782	.435	559116	616789
19	Bernice 3	1	28.0	28.0	151680	2137400	1.80	3847308	25.36	7459	14091	.759	.647	341438	198876
20	Bernice 4	1	28.0	28.0	77313	1042396	1.80	1876294	24.27	3042	13482	.951	.330	174032	198876
24	Soldotna 1	1	39.0	39.0	39080	467840	2.15	1005856	25.74	1368	11971	.770	.120	87970	144852
10	Beluga 1	2	16.7	16.7	4814	108244	1.78	192674	40.03	684	22486	.460	.035	10836	145075
11	Beluga 2	2	16.7	16.7	2996	55512	1.78	98811	32.98	221	18528	.873	.022	6744	145075
23	Intrnl 3	2	18.9	18.9	925	15863	2.15	34106	36.88	81	17151	.645	.006	2082	118752
35	North Pole 2	4	59.3	58.7	54957	671228	3.38	2266429	41.24	2327	12213	.425	.122	288245	344859
21	Intrnl 1	2	15.0	15.0	246	4230	2.15	9095	36.98	22	17199	.791	.002	554	94247
34	North Pole 1	4	56.7	56.4	13891	163993	3.38	553725	39.86	527	11805	.481	.031	72856	329739
22	Intrnl 2	2	15.1	10.5	140	3145	2.15	6762	48.13	24	22385	.423	.001	316	94876
39	Chena 6	4	29.3	29.3	1603	22686	3.83	86814	54.15	112	14151	.489	.006	526	288152
37	Healy D1	3	2.6	2.6	1164	16302	3.50	57005	48.95	586	14000	.764	.051	10485	66295
33	Zehnder GT2	4	18.0	15.5	100	1693	3.62	6125	61.17	9	16912	.618	.001	587	154334
32	Zehnder GT1	4	18.0	.0	0	0	3.62	0	.00	0	0	.000	.000	0	154334
31	Zehnder EMD6	4	2.6	.5	3	35	3.62	127	50.64	5	14000	.192	.000	23	23992
30	Zehnder EMD5	4	2.6	.5	3	42	3.62	152	50.64	6	14000	.192	.000	27	23992
18	Bernice 2	1	19.3	19.3	1099	17760	1.80	31968	29.08	88	16155	.683	.007	2475	137082
40	SILOS	4	70.0	.5	2	15	112.55	16881	125.51	3	10000	.007	.000	17	0
999	EMERG PURCH	4	150.0	.0	0	0	1146.38	0	.00	0	0	.000	.000	0	0
997	EMERG PURCH	1	150.0	.0	0	0	1146.38	0	.00	0	0	.000	.000	0	0
998	EMERG PURCH	2	150.0	.0	0	0	1146.38	0	.00	0	0	.000	.000	0	0
TOTAL					3069665			55356100	18.03					11525395	11983254

Transmission Losses and Dumped Energy (MWH) 89845.

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 13:14:58 DATE: Oct 04 1998 PAGE: 5

Multi Area Model with Chugach/AEG&T/GVEA INPUT FILENAME
Uses Power Pool Price Files from the Traditional Scenario ceagvea2.ppi

ANNUAL SUMMARY - 2000 8760 HOURS AVERAGE INCREMENTAL COST 25.29 ANNUAL PEAK DEMAND 0 MW

UNIT OR PURCHASE #	NAME	STARTS # OF	STARTS COST $	STOPS # OF	STOPS COST $	HOURS TOTAL	HOURS MAINT	HOURS OUT-AGE	EMISSIONS SO2 TONS	SO2 LB/MBTU	SO2 LB/MWH	NOX TONS	NOX LB/MBTU	NOX LB/MWH
36	Healy 1	54	59363	54	10800	8760	2208	600	356	.46	7.03	286	.37	5.65
38	HCCP	2	3024	2	400	8760	480	840	692	.30	3.54	808	.35	4.13
17	Beluga 7-8	1	4053	1	200	8760	672	312	0	.00	.00	1544	.44	4.03
15	Beluga 6-8	3	12159	3	600	8760	672	0	0	.00	.00	1644	.44	4.12
12	Beluga 3	83	155013	83	16600	8760	672	72	0	.00	.00	1134	.44	5.47
13	Beluga 5	151	282011	152	30400	8760	672	0	0	.00	.00	707	.44	5.69
19	Bernice 3	44	25030	43	8600	8760	504	576	0	.00	.00	470	.44	6.20
20	Bernice 4	290	284240	290	58000	8760	504	408	0	.00	.00	229	.44	5.93
24	Soldotna 1	110	128463	109	21800	8760	1080	72	0	.00	.00	98	.42	5.03
10	Beluga 1	92	101549	92	18400	8760	504	576	0	.00	.00	24	.44	9.89
11	Beluga 2	35	40239	35	7000	8760	504	0	0	.00	.00	12	.44	8.15
23	Intrnl 3	13	14848	13	2600	8760	336	936	0	.00	.00	3	.44	7.55
35	North Pole 2	125	138724	125	25000	8760	144	696	299	.89	10.87	245	.73	8.92
21	Intrnl 1	2	2276	2	400	8760	336	840	0	.00	.00	1	.44	7.57
34	North Pole 1	58	62888	58	11600	8760	144	432	73	.89	10.51	60	.73	8.62
22	Intrnl 2	3	3414	3	600	8760	336	840	0	.00	.00	1	.44	9.85
39	Chena 6	16	14320	16	3200	8760	360	432	0	.02	.28	1	.12	1.70
37	Healy D1	256	68842	256	51200	8760	408	408	7	.84	11.76	6	.76	10.64
33	Zehnder GT2	1	1165	1	200	8760	144	96	1	.84	14.21	1	.76	12.85
32	Zehnder GT1	0	0	0	0	8760	144	96	0	.84	.00	0	.76	.00
31	Zehnder EMD6	3	1639	3	600	8760	0	96	0	.84	11.76	0	.76	10.64
30	Zehnder EMD5	3	1639	3	600	8760	0	96	0	.84	11.76	0	.76	10.64
18	Bernice 2	54	56886	54	10800	8760	504	408	0	.00	.00	4	.44	7.11
40	SILOS	3	0	3	0	8760	0	0	0	.00	.00	0	.00	.00
999	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
997	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
998	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
TOTAL		1402	1461787	1401	279600				1428		.93	7279		4.74

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 13:14:58 DATE: Oct 04 1998 PAGE: 7

Multi Area Model with Chugach/AEG&T/GVEA INPUT FILENAME
Uses Power Pool Price Files from the Traditional Scenario ceagvea2.ppi

ANNUAL SUMMARY - 2001 8760 HOURS AVERAGE INCREMENTAL COST 25.29 ANNUAL PEAK DEMAND 0 MW

UNIT OR PURCHASE #	NAME	AREA	MAX CAPACITY MW	MAX OUTPUT MW	ENERGY OUTPUT MWH	FUEL USED MBTU	FUEL PRICE $/MBTU	FUEL COST $	FUEL AVG $/MWH	HOURS ON LINE	HEAT RATE BTU/KWH	CAPACITY FACTOR OPER.	CAPACITY FACTOR AVG.	O & M VARIABLE $	O & M FIXED $
36	Healy 1	3	25.0	25.0	141577	2111879	.99	2090744	14.77	7557	14916	.749	.646	1784015	2743335
38	HCCP	3	53.0	53.0	390585	4610216	.70	3227484	8.26	7440	11803	.991	.841	4395956	3805795
17	Beluga 7-8	2	101.5	101.5	615960	5635348	1.84	10369308	16.83	6192	9148	1.000	.948	1428225	676796
15	Beluga 6-8	2	101.5	101.5	649628	6088730	1.84	11202354	17.24	6528	9372	1.000	1.000	1506314	676796
12	Beluga 3	2	66.9	66.9	439694	5448346	1.84	10024943	22.80	7383	12391	.934	.789	1019478	598607
13	Beluga 5	2	71.0	71.0	249588	3196118	1.84	5881028	23.56	4625	12805	.825	.437	578694	635293
14	Beluga 6CT	2	74.0	68.0	126749	1612350	1.84	2966699	23.41	1872	12720	.996	.853	293869	165080
16	Beluga 7CT	2	74.0	68.0	115279	1563267	1.84	2876406	24.95	2099	13560	.808	.776	267279	165080
19	Bernice 3	1	28.0	28.0	163155	2254206	1.85	4170229	25.56	7432	13816	.819	.696	378278	204842
20	Bernice 4	1	28.0	28.0	89654	1197916	1.85	2216148	24.72	3425	13361	.984	.383	207871	204842
24	Soldotna 1	1	39.0	39.0	49727	583006	2.20	1282609	25.79	1591	11724	.845	.153	115294	149198
10	Beluga 1	2	16.7	16.7	6355	131800	1.84	242511	38.16	766	20739	.553	.047	14734	149428
11	Beluga 2	2	16.7	16.7	5134	90869	1.84	167198	32.57	356	17698	.972	.038	11904	149428
23	Intrnl 3	2	18.9	18.9	2708	46263	2.20	101779	37.59	242	17086	.652	.017	6278	122314
35	North Pole 2	4	59.3	59.2	63628	751316	3.48	2612949	41.07	2537	11807	.451	.141	343733	355205
21	Intrnl 1	2	15.0	13.8	433	7366	2.20	16206	37.40	38	16999	.826	.003	1005	97075
34	North Pole 1	4	56.7	56.2	14376	176984	3.48	615519	42.82	624	12311	.430	.032	77661	339631
22	Intrnl 2	2	15.1	12.8	114	2112	2.20	4646	40.80	12	18546	.672	.001	264	97722
39	Chena 6	4	29.3	23.9	1503	21656	3.94	85359	56.80	111	14410	.462	.006	507	296796
37	Healy D1	3	2.6	2.6	683	9565	3.60	34450	50.42	385	14000	.683	.030	6336	68284
33	Zehnder GT2	4	18.0	.0	0	0	3.73	0	.00	0	0	.000	.000	0	158964
32	Zehnder GT1	4	18.0	.0	0	0	3.73	0	.00	0	0	.000	.000	0	158964
31	Zehnder EMD6	4	2.6	.5	3	42	3.73	156	52.16	6	14000	.192	.000	28	24712
30	Zehnder EMD5	4	2.6	.5	4	56	3.73	209	52.16	8	14000	.192	.000	37	24712
18	Bernice 2	1	19.3	19.3	1823	28538	1.85	52796	28.96	137	15652	.759	.012	4227	141195
40	SILOS	4	70.0	3.3	4	38	115.93	44281	159.28	2	10000	.027	.000	44	0
999	EMERG PURCH	4	150.0	.0	0	0	1186.50	0	.00	0	0	.000	.000	0	0
997	EMERG PURCH	1	150.0	.0	0	0	1186.50	0	.00	3	0	.000	.000	0	0
998	EMERG PURCH	2	150.0	.0	0	0	1186.50	0	.00	0	0	.000	.000	0	0
TOTAL					3128364			60246160	19.26					12442031	12210104

Transmission Losses and Dumped Energy (MWH) 89068.

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 13:14:58 DATE: Oct 04 1998 PAGE: 8

Multi Area Model with Chugach/AEG&T/GVEA INPUT FILENAME
Uses Power Pool Price Files from the Traditional Scenario ceagvea2.ppi

ANNUAL SUMMARY - 2001 8760 HOURS AVERAGE INCREMENTAL COST 25.29 ANNUAL PEAK DEMAND 0 MW

UNIT OR PURCHASE #	NAME	STARTS # OF	STARTS COST $	STOPS # OF	STOPS COST $	HOURS TOTAL	HOURS MAINT	HOURS OUT-AGE	EMISSIONS SO2 TONS	SO2 LB/MBTU	SO2 LB/MWH	NOX TONS	NOX LB/MBTU	NOX LB/MWH
36	Healy 1	53	60079	53	10600	8760	408	744	486	.46	6.86	391	.37	5.52
38	HCCP	1	1904	1	200	8760	480	840	692	.30	3.54	807	.35	4.13
17	Beluga 7-8	1	4175	0	0	6528	0	336	0	.00	.00	1240	.44	4.03
15	Beluga 6-8	1	4175	0	0	6528	0	0	0	.00	.00	1340	.44	4.12
12	Beluga 3	75	144307	75	15000	8760	672	72	0	.00	.00	1199	.44	5.45
13	Beluga 5	150	288614	149	29800	8760	672	0	0	.00	.00	703	.44	5.63
14	Beluga 6CT	6	25051	0	0	2184	0	168	0	.00	.00	355	.44	5.60
16	Beluga 7CT	8	33401	7	1400	2184	0	0	0	.00	.00	344	.44	5.97
19	Bernice 3	52	35153	52	10400	8760	504	576	0	.00	.00	496	.44	6.08
20	Bernice 4	309	293996	310	62000	8760	504	408	0	.00	.00	264	.44	5.88
24	Soldotna 1	112	134696	113	22600	8760	336	96	0	.00	.00	122	.42	4.92
10	Beluga 1	86	97634	86	17200	8760	504	576	0	.00	.00	29	.44	9.13
11	Beluga 2	42	49744	42	8400	8760	504	0	0	.00	.00	20	.44	7.79
23	Intrnl 3	23	27051	23	4600	8760	336	936	0	.00	.00	10	.44	7.52
35	North Pole 2	120	163843	120	24000	8760	144	696	334	.89	10.51	274	.73	8.62
21	Intrnl 1	8	9374	8	1600	8760	336	840	0	.00	.00	2	.44	7.48
34	North Pole 1	60	70491	60	12000	8760	144	432	79	.89	10.96	65	.73	8.99
22	Intrnl 2	5	5859	5	1000	8760	336	840	0	.00	.00	0	.44	8.16
39	Chena 6	17	17208	17	3400	8760	360	432	0	.02	.29	1	.12	1.73
37	Healy D1	175	47834	175	35000	8760	408	408	4	.84	11.76	4	.76	10.64
33	Zehnder GT2	0	0	0	0	8760	144	96	0	.84	.00	0	.76	.00
32	Zehnder GT1	0	0	0	0	8760	144	96	0	.84	.00	0	.76	.00
31	Zehnder EMD6	2	1126	2	400	8760	0	96	0	.84	11.76	0	.76	10.64
30	Zehnder EMD5	4	2251	4	800	8760	0	96	0	.84	11.76	0	.76	10.64
18	Bernice 2	73	84367	73	14600	8760	504	408	0	.00	.00	6	.44	6.89
40	SILOS	2	0	2	0	8760	0	0	0	.00	.00	0	.00	.00
999	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
997	EMERG PURCH	2	0	2	0	8760	0	0	0	.00	.00	0	.00	.00
998	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
TOTAL		1387	1602331	1379	275000				1595		1.02	7670		4.90

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 13:19:58 DATE: Oct 04 1998 PAGE: 4

Multi Area Model with Chugach/AEG&T/GVEA INPUT FILENAME
Uses Power Pool Price Files from the Traditional Scenario ceagvea3.ppi

ANNUAL SUMMARY - 2002 8760 HOURS AVERAGE INCREMENTAL COST 25.49 ANNUAL PEAK DEMAND 0 MW

UNIT #	OR PURCHASE NAME	AREA	MAX CAPACITY MW	MAX OUTPUT MW	ENERGY OUTPUT MWH	FUEL USED MBTU	FUEL PRICE $/MBTU	FUEL COST $	FUEL AVG $/MWH	HOURS ON LINE	HEAT RATE BTU/KWH	CAPACITY FACTOR OPER.	CAPACITY FACTOR AVG.	O & M VARIABLE $	O & M FIXED $
36	Healy 1	3	25.0	25.0	127815	1955348	1.05	2053121	16.06	7462	15298	.685	.584	1658988	2825635
38	HCCP	3	53.0	53.0	389608	4598626	.76	3495364	8.97	7439	11803	.988	.839	4516881	3919969
17	Beluga 7-8	2	101.5	101.5	767366	7020220	1.88	13199239	17.20	7776	9148	1.000	.889	1832591	935447
15	Beluga 6-8	2	101.5	101.5	798400	7483050	1.88	14066438	17.62	8086	9372	1.000	.925	1906719	935447
12	Beluga 3	2	66.9	66.9	426776	5285827	1.88	9937487	23.29	7149	12385	.936	.766	1019165	616565
13	Beluga 5	2	71.0	71.0	273966	3519236	1.88	6616246	24.15	5194	12845	.809	.479	654264	654352
19	Bernice 3	1	28.0	28.0	159430	2203457	1.90	4186492	26.26	7275	13820	.818	.680	380740	210987
20	Bernice 4	1	28.0	28.0	85064	1142597	1.90	2170971	25.52	3295	13432	.965	.363	203137	210987
24	Soldotna 1	1	39.0	39.0	54197	640043	2.25	1440092	26.57	1771	11809	.818	.167	129427	153674
10	Beluga 1	2	16.7	16.7	3672	87047	1.88	163648	44.57	568	23708	.412	.027	8768	153911
11	Beluga 2	2	16.7	16.7	3673	66320	1.88	124681	33.94	254	18055	.926	.027	8772	153911
23	Intrnl 3	2	18.9	18.9	1368	23508	2.25	52894	38.68	120	17190	.644	.009	3266	125984
35	North Pole 2	4	59.3	63.6	78602	989677	3.58	3545143	45.10	3529	12590	.400	.170	437369	365861
21	Intrnl 1	2	15.0	15.0	536	10255	2.25	23074	43.06	60	19138	.616	.004	1280	99987
34	North Pole 1	4	56.7	56.7	16050	220034	3.58	788195	49.11	849	13708	.351	.035	89309	349820
22	Intrnl 2	2	15.1	12.4	316	6578	2.25	14800	46.85	43	20822	.528	.002	754	100653
39	Chena 6	4	29.3	29.3	2190	30865	4.06	125305	57.22	151	14094	.495	.009	762	305700
37	Healy D1	3	2.6	2.6	1321	18495	3.71	68610	51.94	556	14000	.914	.058	12619	70333
33	Zehnder GT2	4	18.0	17.4	313	5357	3.84	20557	65.78	29	17142	.607	.002	1944	163733
32	Zehnder GT1	4	18.0	12.6	114	1981	3.84	7602	66.58	11	17350	.577	.001	710	163733
31	Zehnder EMD6	4	2.6	1.7	3	38	3.84	147	53.72	3	14000	.350	.000	26	25454
30	Zehnder EMD5	4	2.6	.0	0	0	3.84	0	.00	0	0	.000	.000	0	25454
18	Bernice 2	1	19.3	19.3	1468	23740	1.90	45106	30.72	121	16167	.680	.009	3507	145430
40	SILOS	4	70.0	1.3	2	23	119.41	27711	194.05	2	10000	.017	.000	28	0
998	EMERG PURCH	2	150.0	.0	0	0	1228.03	0	.00	0	0	.000	.000	0	0
997	EMERG PURCH	1	150.0	.0	0	0	1228.03	0	.00	0	0	.000	.000	0	0
999	EMERG PURCH	4	150.0	.0	0	0	1228.03	0	.00	0	0	.000	.000	0	0
TOTAL					3192250			62147980	19.47					12871026	12713038

Transmission Losses and Dumped Energy (MWH) 86874.

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 13:19:58 DATE: Oct 04 1998 PAGE: 5

Multi Area Model with Chugach/AEG&T/GVEA
Uses Power Pool Price Files from the Traditional Scenario

INPUT FILENAME
ceagvea3.ppi

ANNUAL SUMMARY - 2002 8760 HOURS AVERAGE INCREMENTAL COST 25.49 ANNUAL PEAK DEMAND 0 MW

UNIT OR PURCHASE #	NAME	STARTS # OF	STARTS COST $	STOPS # OF	STOPS COST $	HOURS TOTAL	HOURS MAINT	HOURS OUT-AGE	EMISSIONS SO2 TONS	SO2 LB/MBTU	SO2 LB/MWH	NOX TONS	NOX LB/MBTU	NOX LB/MWH
36	Healy 1	148	172595	148	29600	8760	408	744	450	.46	7.04	362	.37	5.66
38	HCCP	2	3269	2	400	8760	480	840	690	.30	3.54	805	.35	4.13
17	Beluga 7-8	1	4299	1	200	8760	672	312	0	.00	.00	1544	.44	4.03
15	Beluga 6-8	1	4299	1	200	8760	672	0	0	.00	.00	1646	.44	4.12
12	Beluga 3	89	176291	88	17600	8760	672	72	0	.00	.00	1163	.44	5.45
13	Beluga 5	138	273350	138	27600	8760	672	0	0	.00	.00	774	.44	5.65
19	Bernice 3	77	51891	78	15600	8760	504	576	0	.00	.00	485	.44	6.08
20	Bernice 4	317	315298	317	63400	8760	504	408	0	.00	.00	251	.44	5.91
24	Soldotna 1	139	165129	138	27600	8760	336	96	0	.00	.00	134	.42	4.96
10	Beluga 1	87	99341	87	17400	8760	504	576	0	.00	.00	19	.44	10.43
11	Beluga 2	29	35364	29	5800	8760	504	0	0	.00	.00	15	.44	7.94
23	Intrnl 3	18	21798	18	3600	8760	336	936	0	.00	.00	5	.44	7.56
35	North Pole 2	217	233514	217	43400	8760	144	696	440	.89	11.21	361	.73	9.19
21	Intrnl 1	7	8446	7	1400	8760	336	840	0	.00	.00	2	.44	8.42
34	North Pole 1	104	98115	104	20800	8760	144	432	98	.89	12.20	80	.73	10.01
22	Intrnl 2	6	7239	6	1200	8760	336	840	0	.00	.00	1	.44	9.16
39	Chena 6	25	21523	25	5000	8760	360	432	0	.02	.28	2	.12	1.69
37	Healy D1	171	45212	172	34400	8760	408	408	8	.84	11.76	7	.76	10.64
33	Zehnder GT2	5	3708	5	1000	8760	144	96	2	.84	14.40	2	.76	13.03
32	Zehnder GT1	2	1236	2	400	8760	144	96	1	.84	14.57	1	.76	13.19
31	Zehnder EMD6	1	580	1	200	8760	0	96	0	.84	11.76	0	.76	10.64
30	Zehnder EMD5	0	0	0	0	8760	0	96	0	.84	.00	0	.76	.00
18	Bernice 2	73	86888	73	14600	8760	504	408	0	.00	.00	5	.44	7.11
40	SILOS	2	0	2	0	8760	0	0	0	.00	.00	0	.00	.00
998	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
997	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
999	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
TOTAL		1659	1829384	1659	331400				1689		1.06	7666		4.80

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 13:19:58 DATE: Oct 04 1998 PAGE: 7

Multi Area Model with Chugach/AEG&T/GVEA INPUT FILENAME
Uses Power Pool Price Files from the Traditional Scenario ceagvea3.ppi

ANNUAL SUMMARY - 2003 8760 HOURS AVERAGE INCREMENTAL COST 35.35 ANNUAL PEAK DEMAND 0 MW

UNIT #	OR PURCHASE NAME	AREA	MAX CAPACITY MW	MAX OUTPUT MW	ENERGY OUTPUT MWH	FUEL USED MBTU	FUEL PRICE $/MBTU	FUEL COST $	FUEL AVG $/MWH	HOURS ON LINE	HEAT RATE BTU/KWH	CAPACITY FACTOR OPER.	CAPACITY FACTOR AVG.	O & M VARIABLE $	O & M FIXED $
36	Healy 1	3	25.0	25.0	131220	1994689	1.07	2134347	16.27	7485	15201	.701	.599	1754262	2910404
38	HCCP	3	53.0	53.0	389839	4601285	.77	3543450	9.09	7440	11803	.989	.840	4654753	4037568
17	Beluga 7-8	2	101.5	101.5	824244	7540444	1.94	14630365	17.75	8376	9148	1.000	.958	2027217	960870
15	Beluga 6-8	2	101.5	101.5	797844	7477821	1.94	14505207	18.18	8080	9372	1.000	.925	1962289	963510
12	Beluga 3	2	66.9	66.9	404811	5036849	1.94	9771351	24.14	6906	12442	.916	.727	995725	635062
13	Beluga 5	2	71.0	71.0	280394	3614372	1.94	7012011	25.01	5355	12890	.797	.491	689688	673982
19	Bernice 3	1	28.0	28.0	161358	2219040	1.95	4327157	26.82	7208	13752	.836	.689	396898	217317
20	Bernice 4	1	28.0	28.0	90660	1220101	1.95	2379306	26.24	3526	13457	.958	.387	223003	217317
24	Soldotna 1	1	39.0	39.0	59686	703039	2.30	1616986	27.09	1925	11778	.828	.184	146813	158284
10	Beluga 1	2	16.7	16.7	4195	91018	1.94	176575	42.09	523	21694	.499	.031	10319	158528
11	Beluga 2	2	16.7	16.7	2519	47270	1.94	91703	36.40	187	18765	.848	.018	6196	158528
23	Intrnl 3	2	18.9	18.9	790	14869	2.30	34199	43.28	84	18818	.519	.005	1944	129763
35	North Pole 2	4	59.3	59.3	86351	1041293	3.69	3841976	44.49	3539	12058	.438	.191	494896	376837
21	Intrnl 1	2	15.0	15.0	296	5604	2.30	12888	43.61	32	18960	.617	.002	727	102987
34	North Pole 1	4	56.7	56.7	25724	355670	3.69	1312285	51.01	1524	13826	.345	.057	147428	360314
22	Intrnl 2	2	15.1	10.8	175	3752	2.30	8631	49.23	26	21405	.463	.001	431	103673
39	Chena 6	4	29.3	28.0	6572	98483	4.18	411812	62.66	539	14984	.416	.026	2354	314871
37	Healy D1	3	2.6	2.6	1751	24512	3.82	93661	53.49	757	14000	.890	.077	17227	72443
33	Zehnder GT2	4	18.0	11.9	220	4663	3.95	18430	83.94	32	21236	.394	.001	1407	168645
32	Zehnder GT1	4	18.0	11.9	22	372	3.95	1470	66.85	2	16913	.611	.000	141	168645
31	Zehnder EMD6	4	2.6	.0	0	0	3.95	0	.00	0	0	.000	.000	0	26217
30	Zehnder EMD5	4	2.6	.0	0	0	3.95	0	.00	0	0	.000	.000	0	26217
18	Bernice 2	1	19.3	19.3	1196	19112	1.95	37269	31.17	92	15982	.706	.008	2941	149793
40	SILOS	4	70.0	58.8	1265	12652	122.99	1555992	1229.94	24	10000	.753	.002	15559	0
998	EMERG PURCH	2	150.0	.0	0	0	1271.01	0	.00	0	0	.000	.000	0	0
997	EMERG PURCH	1	150.0	.0	0	0	1271.01	0	.00	1	0	.000	.000	0	0
999	EMERG PURCH	4	150.0	.0	0	0	1271.01	0	.00	0	0	.000	.000	0	0
TOTAL					3271132			67517072	20.64					13552218	13091789

Transmission Losses and Dumped Energy (MWH) 89621.

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 13:19:58 DATE: Oct 04 1998 PAGE: 8

Multi Area Model with Chugach/AEG&T/GVEA
Uses Power Pool Price Files from the Traditional Scenario

INPUT FILENAME
ceagvea3.ppi

ANNUAL SUMMARY - 2003 8760 HOURS AVERAGE INCREMENTAL COST 35.35 ANNUAL PEAK DEMAND 0 MW

UNIT OR PURCHASE #	NAME	STARTS # OF	STARTS COST $	STOPS # OF	STOPS COST $	HOURS TOTAL	HOURS MAINT	HOURS OUT-AGE	EMISSIONS SO2 TONS	SO2 LB/MBTU	SO2 LB/MWH	NOX TONS	NOX LB/MBTU	NOX LB/MWH
36	Healy 1	125	150133	125	25000	8760	408	744	459	.46	6.99	369	.37	5.62
38	HCCP	1	2050	1	200	8760	480	840	690	.30	3.54	805	.35	4.13
17	Beluga 7-8	0	0	0	0	8736	0	360	0	.00	.00	1659	.44	4.03
15	Beluga 6-8	2	8857	2	400	8760	672	0	0	.00	.00	1645	.44	4.12
12	Beluga 3	111	226492	111	22200	8760	672	72	0	.00	.00	1108	.44	5.47
13	Beluga 5	156	318313	156	31200	8760	672	0	0	.00	.00	795	.44	5.67
19	Bernice 3	80	59654	79	15800	8760	504	576	0	.00	.00	488	.44	6.05
20	Bernice 4	311	302040	310	62000	8760	504	408	0	.00	.00	268	.44	5.92
24	Soldotna 1	152	188145	152	30400	8760	720	72	0	.00	.00	148	.42	4.95
10	Beluga 1	100	119587	99	19800	8760	504	576	0	.00	.00	20	.44	9.55
11	Beluga 2	37	46477	36	7200	8760	504	0	0	.00	.00	10	.44	8.26
23	Intrnl 3	20	24939	20	4000	8760	336	936	0	.00	.00	3	.44	8.28
35	North Pole 2	205	222329	205	41000	8760	2208	528	463	.89	10.73	380	.73	8.80
21	Intrnl 1	5	6212	5	1000	8760	336	840	0	.00	.00	1	.44	8.34
34	North Pole 1	178	169778	178	35600	8760	2208	336	158	.89	12.31	130	.73	10.09
22	Intrnl 2	6	7454	6	1200	8760	336	840	0	.00	.00	1	.44	9.42
39	Chena 6	106	74330	106	21200	8760	360	432	1	.02	.30	6	.12	1.80
37	Healy D1	230	60897	230	46000	8760	408	408	10	.84	11.76	9	.76	10.64
33	Zehnder GT2	17	14004	17	3400	8760	144	96	2	.84	17.84	2	.76	16.14
32	Zehnder GT1	2	1273	2	400	8760	144	96	0	.84	14.21	0	.76	12.85
31	Zehnder EMD6	0	0	0	0	8760	0	96	0	.84	.00	0	.76	.00
30	Zehnder EMD5	0	0	0	0	8760	0	96	0	.84	.00	0	.76	.00
18	Bernice 2	68	80782	68	13600	8760	504	408	0	.00	.00	4	.44	7.03
40	SILOS	1	0	1	0	8760	0	0	0	.00	.00	0	.00	.00
998	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
997	EMERG PURCH	1	0	1	0	8760	0	0	0	.00	.00	0	.00	.00
999	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
TOTAL		1914	2083746	1910	381600				1784		1.09	7853		4.80

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 13:19:58 DATE: Oct 04 1998 PAGE: 10

Multi Area Model with Chugach/AEG&T/GVEA INPUT FILENAME
Uses Power Pool Price Files from the Traditional Scenario ceagvea3.ppi

ANNUAL SUMMARY - 2004 8760 HOURS AVERAGE INCREMENTAL COST 31.47 ANNUAL PEAK DEMAND 0 MW

UNIT OR PURCHASE #	NAME	AREA	MAX CAPACITY MW	MAX OUTPUT MW	ENERGY OUTPUT MWH	FUEL USED MBTU	FUEL PRICE $/MBTU	FUEL COST $	FUEL AVG $/MWH	HOURS ON LINE	HEAT RATE BTU/KWH	CAPACITY FACTOR OPER.	CAPACITY FACTOR AVG.	O & M VARIABLE $	O & M FIXED $
36	Healy 1	3	25.0	25.0	116337	1721173	1.09	1876122	16.13	5918	14794	.786	.531	1601959	2997716
38	HCCP	3	53.0	53.0	310323	3662627	.79	2893729	9.32	5904	11802	.992	.668	3816437	4158695
29	Beluga 7-8	2	105.5	105.5	800989	6824484	1.99	13580357	16.95	7775	8520	1.000	.890	2029322	1031525
15	Beluga 6-8	2	101.5	101.5	859720	8057724	1.99	16033617	18.65	8730	9372	1.000	.999	2178190	989697
12	Beluga 3	2	66.9	66.9	392803	4962724	1.99	9875917	25.14	7207	12634	.855	.705	995178	654114
13	Beluga 5	2	71.0	71.0	299696	3930580	1.99	7822010	26.10	6244	13115	.736	.524	759291	694202
19	Bernice 3	1	28.0	28.0	159831	2199549	2.00	4399098	27.52	7156	13761	.835	.682	404936	223837
20	Bernice 4	1	28.0	28.0	105588	1415248	2.00	2830496	26.81	4085	13403	.972	.451	267510	223837
24	Soldotna 1	1	39.0	39.0	73273	862247	2.35	2026280	27.65	2383	11767	.833	.225	185642	163033
10	Beluga 1	2	16.7	16.7	5680	146522	1.99	291582	51.34	1064	25798	.352	.042	14389	163284
11	Beluga 2	2	16.7	16.7	4090	76805	1.99	152842	37.37	317	18779	.847	.030	10362	163284
23	Intrnl 3	2	18.9	18.9	2229	42136	2.35	99019	44.42	246	18904	.523	.014	5647	133656
21	Intrnl 1	2	15.0	15.0	635	12702	2.35	29851	47.02	78	20008	.561	.005	1608	106076
35	North Pole 2	4	59.3	59.3	156590	1852739	3.80	7041094	44.97	6540	11831	.457	.347	924379	388142
34	North Pole 1	4	56.7	56.6	38603	442767	3.80	1682655	43.59	1494	11469	.510	.086	227880	371124
22	Intrnl 2	2	15.1	12.5	202	4655	2.35	10940	54.19	35	23060	.413	.002	511	106783
204	GE 7EA SC	4	83.0	73.0	11582	165986	3.71	616387	53.22	323	14331	.432	.016	41904	436067
39	Chena 6	4	29.3	20.3	557	8581	4.31	36957	66.31	49	15394	.388	.002	206	324317
37	Healy D1	3	2.6	2.6	3722	52104	3.94	205061	55.10	1578	13999	.907	.163	37717	74616
33	Zehnder GT2	4	18.0	.0	0	0	4.07	0	.00	0	0	.000	.000	0	173704
32	Zehnder GT1	4	18.0	.0	0	0	4.07	0	.00	0	0	.000	.000	0	173704
31	Zehnder EMD6	4	2.6	.5	3	42	4.07	171	56.99	6	14000	.192	.000	30	27004
30	Zehnder EMD5	4	2.6	.5	3	42	4.07	171	56.99	6	14000	.192	.000	30	27004
18	Bernice 2	1	19.3	19.3	1918	31110	2.00	62220	32.45	158	16223	.680	.012	4858	154287
40	SILOS	4	70.0	.0	0	0	126.68	0	.00	0	0	.000	.000	0	0
998	EMERG PURCH	2	150.0	.0	0	0	1315.49	0	.00	0	0	.000	.000	0	0
997	EMERG PURCH	1	150.0	.0	0	0	1315.49	0	.00	0	0	.000	.000	0	0
999	EMERG PURCH	4	150.0	.0	0	0	1315.49	0	.00	0	0	.000	.000	0	0
TOTAL					3344374			71566560	21.40					13507986	13959720

Transmission Losses and Dumped Energy (MWH) 92287.

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 13:19:58 DATE: Oct 04 1998 PAGE: 11

Multi Area Model with Chugach/AEG&T/GVEA INPUT FILENAME
Uses Power Pool Price Files from the Traditional Scenario ceagvea3.ppi

ANNUAL SUMMARY - 2004 8760 HOURS AVERAGE INCREMENTAL COST 31.47 ANNUAL PEAK DEMAND 0 MW

UNIT OR PURCHASE #	NAME	STARTS # OF	STARTS COST $	STOPS # OF	STOPS COST $	HOURS TOTAL	HOURS MAINT	HOURS OUT-AGE	EMISSIONS SO2 TONS	SO2 LB/MBTU	SO2 LB/MWH	NOX TONS	NOX LB/MBTU	NOX LB/MWH
36	Healy 1	35	43330	35	7000	8760	2208	600	396	.46	6.81	318	.37	5.47
38	HCCP	1	2108	1	200	8760	2208	648	549	.30	3.54	641	.35	4.13
29	Beluga 7-8	2	9122	1	200	8760	672	312	0	.00	.00	1501	.44	3.75
15	Beluga 6-8	1	4561	1	200	8736	0	0	0	.00	.00	1773	.44	4.12
12	Beluga 3	90	189101	90	18000	8760	672	72	0	.00	.00	1092	.44	5.56
13	Beluga 5	126	264742	126	25200	8760	672	0	0	.00	.00	865	.44	5.77
19	Bernice 3	84	66553	84	16800	8760	504	576	0	.00	.00	484	.44	6.06
20	Bernice 4	344	347550	344	68800	8760	504	408	0	.00	.00	311	.44	5.90
24	Soldotna 1	164	215036	164	32800	8760	336	96	0	.00	.00	181	.42	4.94
10	Beluga 1	128	159979	128	25600	8760	504	576	0	.00	.00	32	.44	11.35
11	Beluga 2	42	54329	42	8400	8760	504	0	0	.00	.00	17	.44	8.26
23	Intrnl 3	38	48789	37	7400	8760	336	936	0	.00	.00	9	.44	8.32
21	Intrnl 1	9	11513	8	1600	8760	336	840	0	.00	.00	3	.44	8.80
35	North Pole 2	168	224835	168	33600	8760	144	696	824	.89	10.53	676	.73	8.64
34	North Pole 1	132	162381	132	26400	8760	144	432	197	.89	10.21	162	.73	8.37
22	Intrnl 2	6	7675	6	1200	8760	336	840	0	.00	.00	1	.44	10.15
204	GE 7EA SC	47	42027	47	9400	8760	408	408	0	.00	.00	41	.50	7.17
39	Chena 6	10	13431	10	2000	8760	360	432	0	.02	.31	1	.12	1.85
37	Healy D1	476	111919	476	95200	8760	408	408	22	.84	11.76	20	.76	10.64
33	Zehnder GT2	0	0	0	0	8760	144	96	0	.84	.00	0	.76	.00
32	Zehnder GT1	0	0	0	0	8760	144	96	0	.84	.00	0	.76	.00
31	Zehnder EMD6	3	1845	3	600	8760	0	96	0	.84	11.76	0	.76	10.64
30	Zehnder EMD5	3	1845	3	600	8760	0	96	0	.84	11.76	0	.76	10.64
18	Bernice 2	88	101110	88	17600	8760	504	408	0	.00	.00	7	.44	7.14
40	SILOS	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
998	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
997	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
999	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
TOTAL		1997	2083782	1994	398800				1989		1.19	8135		4.86

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 13:19:58 DATE: Oct 04 1998 PAGE: 13

Multi Area Model with Chugach/AEG&T/GVEA
Uses Power Pool Price Files from the Traditional Scenario

INPUT FILENAME
ceagvea3.ppi

ANNUAL SUMMARY - 2005 8760 HOURS AVERAGE INCREMENTAL COST 33.58 ANNUAL PEAK DEMAND 0 MW

UNIT OR PURCHASE #	NAME	AREA	MAX CAPACITY MW	MAX OUTPUT MW	ENERGY OUTPUT MWH	FUEL USED MBTU	FUEL PRICE $/MBTU	FUEL COST $	FUEL AVG $/MWH	HOURS ON LINE	HEAT RATE BTU/KWH	CAPACITY FACTOR OPER.	CAPACITY FACTOR AVG.	O & M VARIABLE $	O & M FIXED $
36	Healy 1	3	25.0	25.0	136250	2052706	1.11	2278509	16.72	7485	15065	.728	.622	1932423	3087647
38	HCCP	3	53.0	53.0	391120	4616517	.80	3693599	9.44	7440	11803	.992	.842	4955010	4283456
29	Beluga 7-8	2	105.5	105.5	801087	6825329	2.05	13989213	17.46	7776	8520	1.000	.890	2090407	1062471
27	Beluga 6-8	2	105.5	105.5	828340	7574381	2.05	15529126	18.75	8044	9144	1.000	.920	2161532	1062471
12	Beluga 3	2	66.9	66.9	412226	5103685	2.05	10462197	25.38	6906	12380	.938	.740	1075725	673738
13	Beluga 5	2	71.0	71.0	296214	3785835	2.05	7761097	26.20	5442	12780	.833	.518	772979	715028
19	Bernice 3	1	28.0	28.0	164412	2231135	2.06	4596187	27.96	6927	13570	.888	.702	429036	230552
20	Bernice 4	1	28.0	28.0	97859	1312123	2.06	2703096	27.62	3760	13408	.971	.418	255369	230552
24	Soldotna 1	1	39.0	39.0	79316	925170	2.41	2229638	28.11	2437	11664	.870	.244	206977	167924
10	Beluga 1	2	16.7	16.7	6235	138871	2.05	284685	45.66	863	22273	.472	.046	16270	168182
11	Beluga 2	2	16.7	16.7	3171	57931	2.05	118758	37.45	235	18267	.902	.023	8276	168182
23	Intrnl 3	2	18.9	18.9	2052	37116	2.41	89451	43.59	206	18087	.572	.013	5355	137666
21	Intrnl 1	2	15.0	9.3	142	2820	2.41	6795	47.85	19	19856	.542	.001	371	109258
35	North Pole 2	4	59.3	59.3	141068	1724419	3.91	6749956	47.85	6271	12224	.427	.312	857725	399786
34	North Pole 1	4	56.7	56.5	35590	432214	3.91	1691822	47.54	1547	12144	.445	.079	216399	382257
22	Intrnl 2	2	15.1	.0	0	0	2.41	0	.00	0	0	.000	.000	0	109987
204	GE 7EA SC	4	83.0	67.6	4238	65973	3.82	252340	59.54	144	15565	.355	.006	15794	449149
39	Chena 6	4	29.3	29.3	993	14505	4.44	64346	64.78	76	14601	.446	.004	378	334047
37	Healy D1	3	2.6	2.6	1773	24821	4.05	100617	56.75	790	14000	.863	.078	18506	76855
33	Zehnder GT2	4	18.0	14.4	87	1440	4.19	6039	69.17	8	16497	.659	.001	594	178915
32	Zehnder GT1	4	18.0	.0	0	0	4.19	0	.00	0	0	.000	.000	0	178915
31	Zehnder EMD6	4	2.6	.5	1	14	4.19	59	58.70	2	14000	.192	.000	10	27814
30	Zehnder EMD5	4	2.6	.5	5	70	4.19	294	58.70	10	14000	.192	.000	52	27814
18	Bernice 2	1	19.3	19.3	1740	27498	2.06	56646	32.56	132	15805	.739	.011	4540	158916
40	SILOS	4	70.0	.0	0	0	130.48	0	.00	0	0	.000	.000	0	0
998	EMERG PURCH	2	150.0	.0	0	0	1361.53	0	.00	0	0	.000	.000	0	0
997	EMERG PURCH	1	150.0	.0	0	0	1361.53	0	.00	0	0	.000	.000	0	0
999	EMERG PURCH	4	150.0	.0	0	0	1361.53	0	.00	0	0	.000	.000	0	0
TOTAL					3403919			72664464	21.35					15023727	14421593

Transmission Losses and Dumped Energy (MWH) 91738.

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 13:19:58 DATE: Oct 04 1998 PAGE: 14

Multi Area Model with Chugach/AEG&T/GVEA
Uses Power Pool Price Files from the Traditional Scenario

INPUT FILENAME
ceagvea3.ppi

ANNUAL SUMMARY - 2005 8760 HOURS AVERAGE INCREMENTAL COST 33.58 ANNUAL PEAK DEMAND 0 MW

UNIT OR PURCHASE #	NAME	STARTS # OF	STARTS COST $	STOPS # OF	STOPS COST $	HOURS TOTAL	HOURS MAINT	HOURS OUT-AGE	EMISSIONS SO2 TONS	SO2 LB/MBTU	SO2 LB/MWH	NOX TONS	NOX LB/MBTU	NOX LB/MWH
36	Healy 1	117	149092	117	23400	8760	408	744	472	.46	6.93	380	.37	5.57
38	HCCP	1	2156	1	200	8760	480	840	692	.30	3.54	808	.35	4.13
29	Beluga 7-8	1	4698	1	200	8760	672	312	0	.00	.00	1502	.44	3.75
27	Beluga 6-8	2	9395	1	200	8760	672	0	0	.00	.00	1666	.44	4.02
12	Beluga 3	122	264031	122	24400	8760	672	72	0	.00	.00	1123	.44	5.45
13	Beluga 5	186	402539	186	37200	8760	672	0	0	.00	.00	833	.44	5.62
19	Bernice 3	132	127872	132	26400	8760	504	576	0	.00	.00	491	.44	5.97
20	Bernice 4	394	379592	394	78800	8760	504	408	0	.00	.00	289	.44	5.90
24	Soldotna 1	210	279169	211	42200	8760	336	96	0	.00	.00	194	.42	4.90
10	Beluga 1	157	196165	158	31600	8760	504	576	0	.00	.00	31	.44	9.80
11	Beluga 2	52	67951	53	10600	8760	504	0	0	.00	.00	13	.44	8.04
23	Intrnl 3	43	56855	44	8800	8760	336	936	0	.00	.00	8	.44	7.96
21	Intrnl 1	2	2635	3	600	8760	336	840	0	.00	.00	1	.44	8.74
35	North Pole 2	195	274466	195	39000	8760	144	696	767	.89	10.88	629	.73	8.92
34	North Pole 1	153	210138	153	30600	8760	144	432	192	.89	10.81	158	.73	8.87
22	Intrnl 2	0	0	0	0	8760	336	840	0	.00	.00	0	.44	.00
204	GE 7EA SC	38	40375	38	7600	8760	408	408	0	.00	.00	16	.50	7.78
39	Chena 6	13	16601	13	2600	8760	360	432	0	.02	.29	1	.12	1.75
37	Healy D1	273	96274	273	54600	8760	408	408	10	.84	11.76	9	.76	10.64
33	Zehnder GT2	2	2701	2	400	8760	2208	72	1	.84	13.86	1	.76	12.54
32	Zehnder GT1	0	0	0	0	8760	2208	72	0	.84	.00	0	.76	.00
31	Zehnder EMD6	2	1267	2	400	8760	0	96	0	.84	11.76	0	.76	10.64
30	Zehnder EMD5	3	1900	3	600	8760	0	96	0	.84	11.76	0	.76	10.64
18	Bernice 2	78	98870	78	15600	8760	504	408	0	.00	.00	6	.44	6.95
40	SILOS	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
998	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
997	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
999	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
TOTAL		2176	2684743	2180	436000				2136		1.25	8158		4.79

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 13:19:58 DATE: Oct 04 1998 PAGE: 16

Multi Area Model with Chugach/AEG&T/GVEA
Uses Power Pool Price Files from the Traditional Scenario

INPUT FILENAME
ceagvea3.ppi

ANNUAL SUMMARY - 2006 8760 HOURS AVERAGE INCREMENTAL COST 32.76 ANNUAL PEAK DEMAND 0 MW

UNIT #	OR PURCHASE NAME	AREA	MAX CAPACITY MW	MAX OUTPUT MW	ENERGY OUTPUT MWH	FUEL USED MBTU	FUEL PRICE $/MBTU	FUEL COST $	FUEL AVG $/MWH	HOURS ON LINE	HEAT RATE BTU/KWH	CAPACITY FACTOR OPER.	CAPACITY FACTOR AVG.	O & M VARIABLE $	O & M FIXED $
38	HCCP	3	53.0	53.0	393800	4647989	.82	3811676	9.68	7440	11802	.999	.848	5138004	4411960
36	Healy 1	3	25.0	25.0	139935	2087631	1.13	2359025	16.86	7426	14918	.754	.639	2044215	3180277
29	Beluga 7-8	2	105.5	105.5	800632	6821434	2.11	14391329	17.97	7774	8520	1.000	.890	2152044	1094345
27	Beluga 6-8	2	105.5	105.5	828364	7574576	2.11	15983079	19.29	8044	9144	1.000	.920	2226548	1094345
12	Beluga 3	2	66.9	66.9	423369	5236431	2.11	11048962	26.10	7051	12368	.943	.760	1137927	693950
13	Beluga 5	2	71.0	71.0	302664	3869835	2.11	8165423	26.98	5568	12785	.832	.530	813514	736479
19	Bernice 3	1	28.0	28.0	162667	2205713	2.12	4675998	28.75	6821	13559	.892	.694	437213	237468
24	Soldotna 1	1	39.0	39.0	113527	1324234	2.47	3270868	28.81	3503	11664	.869	.349	305138	172962
20	Bernice 4	1	28.0	28.0	70212	939145	2.12	1991016	28.36	2665	13375	.980	.300	188721	237468
10	Beluga 1	2	16.7	16.7	6200	136945	2.11	288954	46.60	845	22086	.481	.046	16666	173228
11	Beluga 2	2	16.7	16.7	3115	56084	2.11	118338	37.99	223	18002	.933	.023	8373	173228
23	Intrnl 3	2	18.9	18.9	2925	50596	2.47	124973	42.73	264	17299	.640	.019	7861	141796
21	Intrnl 1	2	15.0	15.0	413	8539	2.47	21092	51.10	58	20686	.510	.003	1110	112536
35	North Pole 2	4	59.3	59.1	151150	1797110	4.03	7245482	47.94	6356	11889	.449	.335	946601	411780
34	North Pole 1	4	56.7	56.7	42888	512441	4.03	2066031	48.17	1847	11948	.458	.095	268592	393725
22	Intrnl 2	2	15.1	11.2	218	4367	2.47	10787	49.48	29	20034	.545	.002	586	113286
204	GE 7EA SC	4	83.0	61.5	2650	43812	3.94	172603	65.13	103	16532	.310	.004	10172	462624
39	Chena 6	4	29.3	22.5	883	12493	4.57	57086	64.63	62	14144	.486	.003	346	344068
37	Healy D1	3	2.6	2.6	1461	20452	4.18	85390	58.45	675	14000	.832	.064	15706	79160
33	Zehnder GT2	4	18.0	10.0	16	295	4.32	1276	79.75	2	18465	.510	.000	112	184283
32	Zehnder GT1	4	18.0	10.0	10	166	4.32	717	71.73	1	16609	.637	.000	70	184283
31	Zehnder EMD6	4	2.6	.5	1	7	4.32	30	60.46	1	14000	.192	.000	5	28648
30	Zehnder EMD5	4	2.6	.5	1	7	4.32	30	60.46	1	14000	.192	.000	5	28648
18	Bernice 2	1	19.3	19.3	981	15644	2.12	33166	33.81	78	15949	.709	.006	2636	163683
40	SILOS	4	70.0	.0	0	0	134.39	0	.00	0	0	.000	.000	0	0
998	EMERG PURCH	2	150.0	.0	0	0	1409.19	0	.00	0	0	.000	.000	0	0
997	EMERG PURCH	1	150.0	.0	0	0	1409.19	0	.00	0	0	.000	.000	0	0
999	EMERG PURCH	4	150.0	.0	0	0	1409.19	0	.00	0	0	.000	.000	0	0
TOTAL					3448082			75923344	22.02					15722164	14854242

Transmission Losses and Dumped Energy (MWH) 92436.

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 13:19:58 DATE: Oct 04 1998 PAGE: 17

Multi Area Model with Chugach/AEG&T/GVEA
Uses Power Pool Price Files from the Traditional Scenario

INPUT FILENAME
ceagvea3.ppi

ANNUAL SUMMARY - 2006 8760 HOURS AVERAGE INCREMENTAL COST 32.76 ANNUAL PEAK DEMAND 0 MW

UNIT OR PURCHASE #	NAME	STARTS # OF	STARTS COST $	STOPS # OF	STOPS COST $	HOURS TOTAL	HOURS MAINT	HOURS OUT-AGE	EMISSIONS SO2 TONS	SO2 LB/MBTU	SO2 LB/MWH	NOX TONS	NOX LB/MBTU	NOX LB/MWH
38	HCCP	1	2217	1	200	8760	480	840	697	.30	3.54	813	.35	4.13
36	Healy 1	178	233729	178	35600	8760	408	744	480	.46	6.86	386	.37	5.52
29	Beluga 7-8	1	4839	1	200	8760	672	312	0	.00	.00	1501	.44	3.75
27	Beluga 6-8	1	4839	1	200	8760	672	0	0	.00	.00	1666	.44	4.02
12	Beluga 3	110	245190	110	22000	8760	672	72	0	.00	.00	1152	.44	5.44
13	Beluga 5	180	401220	180	36000	8760	672	0	0	.00	.00	851	.44	5.63
19	Bernice 3	147	153428	147	29400	8760	504	576	0	.00	.00	485	.44	5.97
24	Soldotna 1	199	252034	199	39800	8760	720	72	0	.00	.00	278	.42	4.90
20	Bernice 4	390	393822	391	78200	8760	504	408	0	.00	.00	207	.44	5.89
10	Beluga 1	127	168372	127	25400	8760	504	576	0	.00	.00	30	.44	9.72
11	Beluga 2	30	41169	30	6000	8760	504	0	0	.00	.00	12	.44	7.92
23	Intrnl 3	34	46294	34	6800	8760	336	936	0	.00	.00	11	.44	7.61
21	Intrnl 1	6	8140	6	1200	8760	336	840	0	.00	.00	2	.44	9.10
35	North Pole 2	182	251779	182	36400	8760	144	696	800	.89	10.58	656	.73	8.68
34	North Pole 1	167	223068	167	33400	8760	144	432	228	.89	10.63	187	.73	8.72
22	Intrnl 2	6	8140	6	1200	8760	336	840	0	.00	.00	1	.44	8.81
204	GE 7EA SC	36	41276	36	7200	8760	408	408	0	.00	.00	11	.50	8.27
39	Chena 6	9	12825	9	1800	8760	360	432	0	.02	.28	1	.12	1.70
37	Healy D1	255	95248	255	51000	8760	408	408	9	.84	11.76	8	.76	10.64
33	Zehnder GT2	1	0	1	200	8760	144	96	0	.84	15.51	0	.76	14.03
32	Zehnder GT1	1	1391	1	200	8760	144	96	0	.84	13.95	0	.76	12.62
31	Zehnder EMD6	1	652	1	200	8760	0	96	0	.84	11.76	0	.76	10.64
30	Zehnder EMD5	1	652	1	200	8760	0	96	0	.84	11.76	0	.76	10.64
18	Bernice 2	55	71962	55	11000	8760	504	408	0	.00	.00	3	.44	7.02
40	SILOS	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
998	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
997	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
999	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
TOTAL		2118	2662285	2119	423800				2214		1.28	8263		4.79

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 13:19:58 DATE: Oct 04 1998 PAGE: 19

Multi Area Model with Chugach/AEG&T/GVEA INPUT FILENAME
Uses Power Pool Price Files from the Traditional Scenario ceagvea3.ppi

ANNUAL SUMMARY - 2007 8760 HOURS AVERAGE INCREMENTAL COST 34.89 ANNUAL PEAK DEMAND 0 MW

UNIT #	OR PURCHASE NAME	AREA	MAX CAPACITY MW	MAX OUTPUT MW	ENERGY OUTPUT MWH	FUEL USED MBTU	FUEL PRICE $/MBTU	FUEL COST $	FUEL AVG $/MWH	HOURS ON LINE	HEAT RATE BTU/KWH	CAPACITY FACTOR OPER.	CAPACITY FACTOR AVG.	O & M VARIABLE $	O & M FIXED $
36	Healy 1	3	25.0	25.0	146998	2173236	1.16	2520971	17.15	7468	14784	.787	.671	2211796	3275685
38	HCCP	3	53.0	53.0	391216	4617507	.83	3832809	9.80	7440	11802	.992	.843	5257824	4544318
29	Beluga 7-8	2	105.5	105.5	646968	5512048	2.16	11904219	18.40	6240	8519	1.000	.956	1791269	839977
27	Beluga 6-8	2	105.5	105.5	676783	6188402	2.16	13367543	19.75	6528	9143	1.000	1.000	1873814	839977
26	Beluga 6CT	2	78.4	71.0	117576	1382488	2.16	2986172	25.40	1656	11758	1.000	.758	325506	208835
12	Beluga 3	2	66.9	66.9	407847	5041470	2.16	10889993	26.70	6775	12361	.946	.732	1129095	714768
13	Beluga 5	2	71.0	71.0	292746	3715326	2.16	8025119	27.41	5129	12691	.869	.512	810457	758573
24	Soldotna 1	1	39.0	39.0	259236	3001687	2.53	7594372	29.30	7709	11578	.906	.798	717686	178150
19	Bernice 3	1	28.0	28.0	98346	1314219	2.18	2864964	29.13	3853	13363	.956	.420	272264	244592
20	Bernice 4	1	28.0	28.0	107467	1431866	2.18	3121470	29.05	4077	13323	.994	.459	297520	244592
10	Beluga 1	2	16.7	16.7	23575	440910	2.16	952346	40.40	2152	18702	.735	.173	65267	178425
11	Beluga 2	2	16.7	16.7	30476	539264	2.16	1164803	38.22	2134	17694	.973	.224	84372	178425
23	Intrnl 3	2	18.9	18.9	23128	372513	2.53	942464	40.75	1758	16106	.782	.148	64031	146050
21	Intrnl 1	2	15.0	13.8	13754	234821	2.53	594095	43.20	1203	17073	.827	.109	38077	115912
35	North Pole 2	4	59.3	59.3	151332	1699938	4.15	7059300	46.65	5479	11233	.505	.335	976170	424133
22	Intrnl 2	2	15.1	13.8	7881	147030	2.53	371986	47.20	835	18655	.682	.062	21820	116685
34	North Pole 1	4	56.7	56.7	65115	728767	4.15	3026357	46.48	2484	11191	.545	.145	420026	405537
204	GE 7EA SC	4	83.0	76.0	23596	356521	4.06	1446709	61.31	750	15109	.379	.032	93285	476503
39	Chena 6	4	29.3	29.3	6622	86213	4.71	405750	61.27	355	13018	.637	.026	2670	354390
37	Healy D1	3	2.6	2.6	1550	21698	4.30	93313	60.21	749	14000	.796	.068	17163	81535
33	Zehnder GT2	4	18.0	17.9	991	17095	4.45	76043	76.73	96	17248	.592	.007	7147	189811
32	Zehnder GT1	4	18.0	14.9	504	8845	4.45	39344	78.12	53	17562	.568	.003	3632	189811
31	Zehnder EMD6	4	2.6	.7	24	339	4.45	1508	62.28	48	14000	.194	.001	268	29508
30	Zehnder EMD5	4	2.6	.5	18	245	4.45	1090	62.28	35	14000	.192	.001	194	29508
18	Bernice 2	1	19.3	19.3	2812	43310	2.18	94416	33.58	203	15401	.805	.018	7785	168594
40	SILOS	4	70.0	.5	8	80	138.42	110741	384.23	16	10000	.007	.000	111	0
998	EMERG PURCH	2	150.0	.3	1	1	1458.51	1015	1458.51	22	1000	.000	.000	0	0
997	EMERG PURCH	1	150.0	.0	0	0	1458.51	0	.00	16	0	.000	.000	0	0
999	EMERG PURCH	4	150.0	.0	0	0	1458.51	0	.00	0	0	.000	.000	0	0
TOTAL					3496570			83389240	23.85					16489249	14934308

Transmission Losses and Dumped Energy (MWH) 86626.

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 13:19:58 DATE: Oct 04 1998 PAGE: 20

Multi Area Model with Chugach/AEG&T/GVEA INPUT FILENAME
Uses Power Pool Price Files from the Traditional Scenario ceagvea3.ppi

ANNUAL SUMMARY - 2007 8760 HOURS AVERAGE INCREMENTAL COST 34.89 ANNUAL PEAK DEMAND 0 MW

UNIT OR PURCHASE #	NAME	STARTS # OF	STARTS COST $	STOPS # OF	STOPS COST $	HOURS TOTAL	HOURS MAINT	HOURS OUT-AGE	EMISSIONS SO2 TONS	SO2 LB/MBTU	SO2 LB/MWH	NOX TONS	NOX LB/MBTU	NOX LB/MWH
36	Healy 1	142	191982	142	28400	8760	408	744	500	.46	6.80	402	.37	5.47
38	HCCP	1	2267	1	200	8760	480	840	693	.30	3.54	808	.35	4.13
29	Beluga 7-8	1	4983	0	0	6528	0	288	0	.00	.00	1213	.44	3.75
27	Beluga 6-8	1	4983	0	0	6528	0	0	0	.00	.00	1361	.44	4.02
26	Beluga 6CT	8	39863	0	0	2184	0	288	0	.00	.00	304	.44	5.17
12	Beluga 3	148	339658	148	29600	8760	672	72	0	.00	.00	1109	.44	5.44
13	Beluga 5	208	477358	208	41600	8760	672	0	0	.00	.00	817	.44	5.58
24	Soldotna 1	77	81635	76	15200	8760	336	96	0	.00	.00	630	.42	4.86
19	Bernice 3	275	334221	275	55000	8760	504	576	0	.00	.00	289	.44	5.88
20	Bernice 4	368	382784	368	73600	8760	504	408	0	.00	.00	315	.44	5.86
10	Beluga 1	162	223325	162	32400	8760	504	576	0	.00	.00	97	.44	8.23
11	Beluga 2	94	131412	94	18800	8760	504	0	0	.00	.00	119	.44	7.79
23	Intrnl 3	57	77116	57	11400	8760	336	936	0	.00	.00	82	.44	7.09
21	Intrnl 1	40	54485	40	8000	8760	336	840	0	.00	.00	52	.44	7.51
35	North Pole 2	80	152415	80	16000	8760	2208	528	756	.89	10.00	620	.73	8.20
22	Intrnl 2	36	48897	36	7200	8760	336	840	0	.00	.00	32	.44	8.21
34	North Pole 1	121	241134	121	24200	8760	2208	336	324	.89	9.96	266	.73	8.17
204	GE 7EA SC	122	141330	122	24400	8760	408	408	0	.00	.00	89	.50	7.55
39	Chena 6	32	45499	32	6400	8760	360	432	1	.02	.26	5	.12	1.56
37	Healy D1	253	98778	253	50600	8760	408	408	9	.84	11.76	8	.76	10.64
33	Zehnder GT2	9	12896	9	1800	8760	144	96	7	.84	14.49	6	.76	13.11
32	Zehnder GT1	11	15762	11	2200	8760	144	96	4	.84	14.75	3	.76	13.35
31	Zehnder EMD6	11	7392	11	2200	8760	0	96	0	.84	11.76	0	.76	10.64
30	Zehnder EMD5	9	6048	9	1800	8760	0	96	0	.84	11.76	0	.76	10.64
18	Bernice 2	101	107678	101	20200	8760	504	408	0	.00	.00	10	.44	6.78
40	SILOS	2	0	2	0	8760	0	0	0	.00	.00	0	.00	.00
998	EMERG PURCH	9	0	9	0	8760	0	0	0	.00	.00	0	.00	.00
997	EMERG PURCH	4	0	4	0	8760	0	0	0	.00	.00	0	.00	.00
999	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
TOTAL		2382	3223898	2371	471200				2294		1.31	8640		4.94

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 13:19:58 DATE: Oct 04 1998 PAGE: 22

Multi Area Model with Chugach/AEG&T/GVEA INPUT FILENAME
Uses Power Pool Price Files from the Traditional Scenario ceagvea3.ppi

ANNUAL SUMMARY - 2008 8760 HOURS AVERAGE INCREMENTAL COST 38.29 ANNUAL PEAK DEMAND 0 MW

UNIT OR PURCHASE #	NAME	AREA	MAX CAPACITY MW	MAX OUTPUT MW	ENERGY OUTPUT MWH	FUEL USED MBTU	FUEL PRICE $/MBTU	FUEL COST $	FUEL AVG $/MWH	HOURS ON LINE	HEAT RATE BTU/KWH	CAPACITY FACTOR OPER.	CAPACITY FACTOR AVG.	O & M VARIABLE $	O & M FIXED $
36	Healy 1	3	25.0	25.0	152928	2240274	1.18	2643514	17.29	7556	14649	.810	.698	2370135	3373956
38	HCCP	3	53.0	53.0	391550	4621585	.85	3928569	10.03	7439	11803	.993	.843	5419999	4680648
29	Beluga 7-8	2	105.5	105.5	800896	6823690	2.22	15146564	18.91	7774	8520	1.000	.890	2283681	1160991
27	Beluga 6-8	2	105.5	105.5	614197	5616199	2.22	12468886	20.30	5902	9143	1.000	.682	1751436	1160991
12	Beluga 3	2	66.9	66.9	451995	5565008	2.22	12354211	27.33	7431	12312	.965	.811	1288816	736211
13	Beluga 5	2	71.0	71.0	386265	4871827	2.22	10815639	28.00	6693	12612	.897	.676	1101466	781330
24	Soldotna 1	1	39.0	39.0	267275	3087832	2.59	7997482	29.92	7850	11553	.917	.822	762122	183495
19	Bernice 3	1	28.0	28.0	114438	1531924	2.24	3431424	29.98	4540	13386	.948	.488	326329	251930
20	Bernice 4	1	28.0	28.0	95326	1272427	2.24	2850385	29.90	3632	13348	.988	.407	271827	251930
10	Beluga 1	2	16.7	16.7	15698	325941	2.22	723590	46.09	1900	20762	.554	.115	44764	183777
11	Beluga 2	2	16.7	16.7	11563	209612	2.22	465340	40.24	826	18127	.918	.085	32973	183777
23	Intrnl 3	2	18.9	18.9	8182	140625	2.59	364220	44.51	726	17186	.650	.052	23332	150431
21	Intrnl 1	2	15.0	15.0	2223	40498	2.59	104891	47.18	228	18215	.694	.018	6340	119390
35	North Pole 2	4	59.3	59.3	179605	1980319	4.28	8470394	47.16	6499	11025	.526	.398	1193307	436857
22	Intrnl 2	2	15.1	13.6	1004	18648	2.59	48298	48.13	105	18581	.688	.008	2862	120186
34	North Pole 1	4	56.7	56.7	57278	653547	4.28	2795411	48.80	2202	11409	.513	.127	380562	417703
204	GE 7EA SC	4	83.0	82.0	9826	141908	4.18	593114	60.36	277	14441	.427	.014	40013	490798
39	Chena 6	4	29.3	23.7	1017	14021	4.85	67966	66.82	66	13784	.526	.004	422	365022
37	Healy D1	3	2.6	2.6	1466	20519	4.43	90889	62.01	736	14000	.766	.064	16717	83981
33	Zehnder GT2	4	18.0	14.7	160	2761	4.58	12652	79.10	17	17264	.599	.001	1188	195506
32	Zehnder GT1	4	18.0	15.4	99	1804	4.58	8266	83.71	12	18269	.524	.001	733	195506
31	Zehnder EMD6	4	2.6	.5	1	7	4.58	32	64.15	1	14000	.192	.000	6	30393
30	Zehnder EMD5	4	2.6	.5	3	35	4.58	160	64.15	5	14000	.192	.000	29	30393
18	Bernice 2	1	19.3	19.3	2643	41056	2.24	91965	34.80	200	15534	.779	.017	7536	173652
40	SILOS	4	70.0	.0	0	0	142.58	0	.00	0	0	.000	.000	0	0
998	EMERG PURCH	2	150.0	.0	0	0	1509.56	0	.00	0	0	.000	.000	0	0
997	EMERG PURCH	1	150.0	.0	0	0	1509.56	0	.00	1	0	.000	.000	0	0
999	EMERG PURCH	4	150.0	.0	0	0	1509.56	0	.00	0	0	.000	.000	0	0
TOTAL					3565638			85473848	23.97					17326596	15758864

Transmission Losses and Dumped Energy (MWH) 89936.

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 13:19:58 DATE: Oct 04 1998 PAGE: 23

Multi Area Model with Chugach/AEG&T/GVEA INPUT FILENAME
Uses Power Pool Price Files from the Traditional Scenario ceagvea3.ppi

ANNUAL SUMMARY - 2008 8760 HOURS AVERAGE INCREMENTAL COST 38.29 ANNUAL PEAK DEMAND 0 MW

UNIT OR PURCHASE #	NAME	STARTS # OF	STARTS COST $	STOPS # OF	STOPS COST $	HOURS TOTAL	HOURS MAINT	HOURS OUT-AGE	EMISSIONS SO2 TONS	SO2 LB/MBTU	SO2 LB/MWH	NOX TONS	NOX LB/MBTU	NOX LB/MWH
36	Healy 1	54	75328	54	10800	8760	408	744	515	.46	6.74	414	.37	5.42
38	HCCP	2	3832	2	400	8760	480	840	693	.30	3.54	809	.35	4.13
29	Beluga 7-8	1	5132	1	200	8760	672	312	0	.00	.00	1501	.44	3.75
27	Beluga 6-8	1	5132	1	200	8760	2856	0	0	.00	.00	1236	.44	4.02
12	Beluga 3	69	163083	69	13800	8760	672	72	0	.00	.00	1224	.44	5.42
13	Beluga 5	124	293076	124	24800	8760	672	0	0	.00	.00	1072	.44	5.55
24	Soldotna 1	56	76540	56	11200	8760	336	96	0	.00	.00	648	.42	4.85
19	Bernice 3	260	313971	260	52000	8760	504	576	0	.00	.00	337	.44	5.89
20	Bernice 4	400	412896	400	80000	8760	504	408	0	.00	.00	280	.44	5.87
10	Beluga 1	184	254297	184	36800	8760	504	576	0	.00	.00	72	.44	9.14
11	Beluga 2	110	160080	110	22000	8760	504	0	0	.00	.00	46	.44	7.98
23	Intrnl 3	91	131386	91	18200	8760	336	936	0	.00	.00	31	.44	7.56
21	Intrnl 1	26	37404	26	5200	8760	336	840	0	.00	.00	9	.44	8.02
35	North Pole 2	163	264770	163	32600	8760	144	696	881	.89	9.81	723	.73	8.05
22	Intrnl 2	12	17263	12	2400	8760	336	840	0	.00	.00	4	.44	8.18
34	North Pole 1	181	260083	181	36200	8760	144	432	291	.89	10.15	239	.73	8.33
204	GE 7EA SC	50	56163	50	10000	8760	408	408	0	.00	.00	35	.50	7.22
39	Chena 6	13	16629	13	2600	8760	360	432	0	.02	.28	1	.12	1.65
37	Healy D1	297	111431	297	59400	8760	408	408	9	.84	11.76	8	.76	10.64
33	Zehnder GT2	1	1476	1	200	8760	144	96	1	.84	14.50	1	.76	13.12
32	Zehnder GT1	1	1476	1	200	8760	144	96	1	.84	15.35	1	.76	13.88
31	Zehnder EMD6	1	692	1	200	8760	0	96	0	.84	11.76	0	.76	10.64
30	Zehnder EMD5	2	1384	2	400	8760	0	96	0	.84	11.76	0	.76	10.64
18	Bernice 2	83	100816	83	16600	8760	504	408	0	.00	.00	9	.44	6.84
40	SILOS	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
998	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
997	EMERG PURCH	1	0	1	0	8760	0	0	0	.00	.00	0	.00	.00
999	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
TOTAL		2183	2764341	2183	436400				2391		1.34	8700		4.88

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 13:25:50 DATE: Oct 04 1998 PAGE: 3

Multi Area Model Chugach/AEG&T
Uses Power Pool Price Files from the Traditional Scenario

INPUT FILENAME
chug4.ppi

ANNUAL SUMMARY - 2009 8760 HOURS AVERAGE INCREMENTAL COST 24.30 ANNUAL PEAK DEMAND 0 MW

UNIT OR PURCHASE #	NAME	AREA	MAX CAPACITY MW	MAX OUTPUT MW	ENERGY OUTPUT MWH	FUEL USED MBTU	FUEL PRICE $/MBTU	FUEL COST $	FUEL AVG $/MWH	HOURS ON LINE	HEAT RATE BTU/KWH	CAPACITY FACTOR OPER.	CAPACITY FACTOR AVG.	O & M VARIABLE $	O & M FIXED $
29	Beluga 7-8	2	105.5	105.5	799482	6811984	2.29	15597898	19.51	7767	8520	1.000	.888	2348145	1195821
27	Beluga 6-8	2	105.5	105.5	823368	7532780	2.29	17250074	20.95	8075	9148	.990	.915	2418280	1195821
26	Beluga 6CT	2	78.4	78.4	231403	2861440	2.29	6552701	28.32	3836	12365	.797	.354	679641	888648
12	Beluga 3	2	66.9	66.9	105201	1380464	2.29	3161268	30.05	2216	13122	.733	.189	308982	758298
13	Beluga 5	2	71.0	71.0	38194	507081	2.29	1161217	30.40	853	13276	.697	.067	112177	804770
24	Soldotna 1	1	39.0	39.0	164002	2085920	2.65	5527691	33.71	7070	12718	.621	.505	481685	189000
19	Bernice 3	1	28.0	28.0	30309	454875	2.30	1046214	34.52	1884	15007	.620	.129	89021	259488
20	Bernice 4	1	28.0	28.0	26995	389600	2.30	896079	33.19	1362	14432	.757	.115	79284	259488
10	Beluga 1	2	16.7	13.8	60	1719	2.29	3936	66.15	14	28885	.285	.000	175	189291
23	Intrnl 3	2	18.9	13.0	76	1694	2.65	4490	59.18	12	22332	.363	.000	223	154944
11	Beluga 2	2	16.7	.0	0	0	2.29	0	.00	0	0	.000	.000	0	189291
21	Intrnl 1	2	15.0	.0	0	0	2.65	0	.00	0	0	.000	.000	0	122971
22	Intrnl 2	2	15.1	.0	0	0	2.65	0	.00	0	0	.000	.000	0	123791
28	Beluga 7CT	2	78.4	.0	0	0	2.29	0	.00	0	0	.000	.000	0	888648
18	Bernice 2	1	19.3	12.9	120	2381	2.30	5476	45.65	15	19845	.418	.001	352	178861
997	EMERG PURCH	1	150.0	.0	0	0	1562.39	0	.00	0	0	.000	.000	0	0
998	EMERG PURCH	2	150.0	.0	0	0	1562.39	0	.00	0	0	.000	.000	0	0
TOTAL					2219210			51207044	23.07					6517966	7399138

Transmission Losses and Dumped Energy (MWH) 7430.

UNIT OR PURCHASE #	NAME	STARTS # OF	STARTS COST $	STOPS # OF	STOPS COST $	HOURS TOTAL	HOURS MAINT	HOURS OUT-AGE	EMISSIONS SO2 TONS	SO2 LB/MBTU	SO2 LB/MWH	NOX TONS	NOX LB/MBTU	NOX LB/MWH
29	Beluga 7-8	2	10572	2	400	8760	672	312	0	.00	.00	1499	.44	3.75
27	Beluga 6-8	2	10572	2	400	8760	672	0	0	.00	.00	1657	.44	4.03
26	Beluga 6CT	97	512758	97	19400	8760	672	816	0	.00	.00	630	.44	5.44
12	Beluga 3	138	335981	137	27400	8760	672	72	0	.00	.00	304	.44	5.77
13	Beluga 5	74	180164	74	14800	8760	672	0	0	.00	.00	112	.44	5.84
24	Soldotna 1	109	58710	110	22000	8760	720	72	0	.00	.00	438	.42	5.34
19	Bernice 3	119	94929	118	23600	8760	504	576	0	.00	.00	100	.44	6.60
20	Bernice 4	174	179775	174	34800	8760	504	408	0	.00	.00	86	.44	6.35
10	Beluga 1	4	5886	4	800	8760	504	576	0	.00	.00	0	.44	12.71
23	Intrnl 3	7	10407	7	1400	8760	336	936	0	.00	.00	0	.44	9.83
11	Beluga 2	0	0	0	0	8760	504	0	0	.00	.00	0	.44	.00
21	Intrnl 1	0	0	0	0	8760	336	840	0	.00	.00	0	.44	.00
22	Intrnl 2	0	0	0	0	8760	336	840	0	.00	.00	0	.44	.00
28	Beluga 7CT	0	0	0	0	8760	672	0	0	.00	.00	0	.44	.00
18	Bernice 2	7	7416	7	1400	8760	504	408	0	.00	.00	1	.44	8.73
997	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
998	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
TOTAL		733	1407171	732	146400				0		.00	4826		4.35

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 13:25:50 DATE: Oct 04 1998 PAGE: 5

Multi Area Model Chugach/AEG&T
Uses Power Pool Price Files from the Traditional Scenario

INPUT FILENAME
chug4.ppi

ANNUAL SUMMARY - 2010 8760 HOURS AVERAGE INCREMENTAL COST 25.07 ANNUAL PEAK DEMAND 0 MW

UNIT OR PURCHASE #	NAME	AREA	MAX CAPACITY MW	MAX OUTPUT MW	ENERGY OUTPUT MWH	FUEL USED MBTU	FUEL PRICE $/MBTU	FUEL COST $	FUEL AVG $/MWH	HOURS ON LINE	HEAT RATE BTU/KWH	CAPACITY FACTOR OPER.	CAPACITY FACTOR AVG.	O & M VARIABLE $	O & M FIXED $
29	Beluga 7-8	2	105.5	105.5	800290	6818750	2.35	16022020	20.02	7774	8520	1.000	.889	2421032	1231695
27	Beluga 6-8	2	105.5	105.5	825892	7554916	2.35	17754828	21.50	8087	9147	.992	.918	2498508	1231695
26	Beluga 6CT	2	78.4	78.4	271359	3336891	2.35	7841818	28.90	4385	12296	.815	.415	820913	915307
12	Beluga 3	2	66.9	66.9	98292	1277883	2.35	3003020	30.55	2011	13000	.760	.176	297351	781046
13	Beluga 5	2	71.0	71.0	41014	545445	2.35	1281795	31.25	923	13299	.696	.072	124074	828913
24	Soldotna 1	1	39.0	39.0	175673	2213449	2.72	6020562	34.27	7381	12599	.640	.541	531443	194670
19	Bernice 3	1	28.0	28.0	22798	346042	2.37	820120	35.97	1455	15178	.599	.097	68967	267273
20	Bernice 4	1	28.0	28.0	33326	481589	2.37	1141360	34.25	1676	14450	.754	.142	100817	267273
10	Beluga 1	2	16.7	14.4	241	4868	2.35	11440	47.55	28	20233	.587	.002	728	194969
23	Intrnl 3	2	18.9	16.7	185	3145	2.72	8554	46.18	17	16976	.653	.001	560	159592
11	Beluga 2	2	16.7	14.4	52	950	2.35	2231	42.87	4	18244	.904	.000	157	194969
21	Intrnl 1	2	15.0	13.8	33	569	2.72	1549	46.54	3	17110	.804	.000	101	126661
22	Intrnl 2	2	15.1	.0	0	0	2.72	0	.00	0	0	.000	.000	0	127505
28	Beluga 7CT	2	78.4	57.0	204	4760	2.35	11187	54.97	6	23391	.478	.000	616	915307
18	Bernice 2	1	19.3	14.7	448	8805	2.37	20869	46.57	60	19651	.425	.003	1356	184227
997	EMERG PURCH	1	150.0	.0	0	01617.08		0	.00	0	0	.000	.000	0	0
998	EMERG PURCH	2	150.0	.0	0	01617.08		0	.00	0	0	.000	.000	0	0
TOTAL					2269807			53941352	23.76					6866621	7621112

Transmission Losses and Dumped Energy (MWH) 7477.

UNIT OR PURCHASE #	NAME	STARTS # OF	STARTS COST $	STOPS # OF	STOPS COST $	HOURS TOTAL	HOURS MAINT	HOURS OUT-AGE	EMISSIONS SO2 TONS	SO2 LB/MBTU	SO2 LB/MWH	NOX TONS	NOX LB/MBTU	NOX LB/MWH
29	Beluga 7-8	1	5444	1	200	8760	672	312	0	.00	.00	1500	.44	3.75
27	Beluga 6-8	1	5444	1	200	8760	672	0	0	.00	.00	1662	.44	4.02
26	Beluga 6CT	100	544417	100	20000	8760	672	816	0	.00	.00	734	.44	5.41
12	Beluga 3	143	358516	143	28600	8760	672	72	0	.00	.00	281	.44	5.72
13	Beluga 5	79	198061	79	15800	8760	672	0	0	.00	.00	120	.44	5.85
24	Soldotna 1	126	44546	126	25200	8760	336	96	0	.00	.00	465	.42	5.29
19	Bernice 3	167	139028	167	33400	8760	504	576	0	.00	.00	76	.44	6.68
20	Bernice 4	218	227739	218	43600	8760	504	408	0	.00	.00	106	.44	6.36
10	Beluga 1	11	16671	11	2200	8760	504	576	0	.00	.00	1	.44	8.90
23	Intrnl 3	4	6124	4	800	8760	336	936	0	.00	.00	1	.44	7.47
11	Beluga 2	3	4631	3	600	8760	504	0	0	.00	.00	0	.44	8.03
21	Intrnl 1	2	3051	2	400	8760	336	840	0	.00	.00	0	.44	7.53
22	Intrnl 2	0	0	0	0	8760	336	840	0	.00	.00	0	.44	.00
28	Beluga 7CT	1	5444	1	200	8760	672	0	0	.00	.00	1	.44	10.29
18	Bernice 2	24	35139	24	4800	8760	504	408	0	.00	.00	2	.44	8.65
997	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
998	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
TOTAL		880	1594256	880	176000				0		.00	4949		4.36

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 13:25:50 DATE: Oct 04 1998 PAGE: 7

Multi Area Model Chugach/AEG&T
Uses Power Pool Price Files from the Traditional Scenario

INPUT FILENAME
chug4.ppi

ANNUAL SUMMARY - 2011 8760 HOURS AVERAGE INCREMENTAL COST 26.43 ANNUAL PEAK DEMAND 0 MW

UNIT OR PURCHASE #	NAME	AREA	MAX CAPACITY MW	MAX OUTPUT MW	ENERGY OUTPUT MWH	FUEL USED MBTU	FUEL PRICE $/MBTU	FUEL COST $	FUEL AVG $/MWH	HOURS ON LINE	HEAT RATE BTU/KWH	CAPACITY FACTOR OPER.	CAPACITY FACTOR AVG.	O & M VARIABLE $	O & M FIXED $
29	Beluga 7-8	2	105.5	105.5	589168	5019467	2.42	12146197	20.62	5662	8519	1.000	.655	1835826	1268646
27	Beluga 6-8	2	105.5	105.5	829892	7589403	2.42	18367064	22.13	8086	9145	.997	.922	2585976	1268646
26	Beluga 6CT	2	78.4	78.4	408053	4928125	2.42	11926306	29.23	6266	12077	.880	.624	1271470	942766
12	Beluga 3	2	66.9	66.9	199730	2573592	2.42	6228214	31.18	4044	12885	.785	.359	622347	804478
13	Beluga 5	2	71.0	71.0	68887	909294	2.42	2200492	31.94	1497	13199	.712	.121	214648	853781
24	Soldotna 1	1	39.0	39.0	180561	2254197	2.79	6289221	34.83	7404	12484	.656	.556	562617	200510
19	Bernice 3	1	28.0	28.0	15813	239063	2.44	583313	36.89	987	15118	.604	.067	49272	275291
20	Bernice 4	1	28.0	28.0	31338	449380	2.44	1096481	34.99	1533	14339	.772	.134	97649	275291
10	Beluga 1	2	16.7	8.1	55	1420	2.42	3436	62.20	11	25701	.349	.000	172	200818
23	Intrnl 3	2	18.9	7.2	28	693	2.79	1933	68.59	5	24585	.305	.000	88	164380
11	Beluga 2	2	16.7	.0	0	0	2.42	0	.00	0	0	.000	.000	0	200818
21	Intrnl 1	2	15.0	.0	0	0	2.79	0	.00	0	0	.000	.000	0	130460
22	Intrnl 2	2	15.1	.0	0	0	2.79	0	.00	0	0	.000	.000	0	131330
28	Beluga 7CT	2	78.4	.0	0	0	2.42	0	.00	0	0	.000	.000	0	942766
18	Bernice 2	1	19.3	16.6	550	9478	2.44	23125	42.03	54	17223	.574	.003	1715	189754
997	EMERG PURCH	1	150.0	.0	0	01673.67		0	.00	0	0	.000	.000	0	0
998	EMERG PURCH	2	150.0	.0	0	01673.67		0	.00	0	0	.000	.000	0	0
TOTAL					2324075			58865780	25.33					7241781	7849745

Transmission Losses and Dumped Energy (MWH) 7796.

UNIT OR PURCHASE #	NAME	STARTS # OF	STARTS COST $	STOPS # OF	STOPS COST $	HOURS TOTAL	HOURS MAINT	HOURS OUT-AGE	EMISSIONS SO2 TONS	SO2 LB/MBTU	SO2 LB/MWH	NOX TONS	NOX LB/MBTU	NOX LB/MWH
29	Beluga 7-8	1	5607	1	200	8760	2856	240	0	.00	.00	1104	.44	3.75
27	Beluga 6-8	1	5607	1	200	8760	672	0	0	.00	.00	1670	.44	4.02
26	Beluga 6CT	77	431775	77	15400	8760	672	816	0	.00	.00	1084	.44	5.31
12	Beluga 3	154	397671	154	30800	8760	672	72	0	.00	.00	566	.44	5.67
13	Beluga 5	114	294380	114	22800	8760	672	0	0	.00	.00	200	.44	5.81
24	Soldotna 1	113	24572	112	22400	8760	336	96	0	.00	.00	473	.42	5.24
19	Bernice 3	132	105430	133	26600	8760	504	576	0	.00	.00	53	.44	6.65
20	Bernice 4	210	218566	210	42000	8760	504	408	0	.00	.00	99	.44	6.31
10	Beluga 1	6	9366	6	1200	8760	504	576	0	.00	.00	0	.44	11.31
23	Intrnl 3	5	7884	5	1000	8760	336	936	0	.00	.00	0	.44	10.82
11	Beluga 2	0	0	0	0	8760	504	0	0	.00	.00	0	.44	.00
21	Intrnl 1	0	0	0	0	8760	336	840	0	.00	.00	0	.44	.00
22	Intrnl 2	0	0	0	0	8760	336	840	0	.00	.00	0	.44	.00
28	Beluga 7CT	0	0	0	0	8760	672	0	0	.00	.00	0	.44	.00
18	Bernice 2	24	37766	24	4800	8760	504	408	0	.00	.00	2	.44	7.58
997	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
998	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
TOTAL		837	1538626	837	167400				0		.00	5252		4.52

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 13:25:50 DATE: Oct 04 1998 PAGE: 9

Multi Area Model Chugach/AEG&T
Uses Power Pool Price Files from the Traditional Scenario

INPUT FILENAME
chug4.ppi

ANNUAL SUMMARY - 2012 8760 HOURS AVERAGE INCREMENTAL COST 27.36 ANNUAL PEAK DEMAND 0 MW

UNIT OR PURCHASE #	NAME	AREA	MAX CAPACITY MW	MAX OUTPUT MW	ENERGY OUTPUT MWH	FUEL USED MBTU	FUEL PRICE $/MBTU	FUEL COST $	FUEL AVG $/MWH	HOURS ON LINE	HEAT RATE BTU/KWH	CAPACITY FACTOR OPER.	CAPACITY FACTOR AVG.	O & M VARIABLE $	O & M FIXED $
29	Beluga 7-8	2	105.5	105.5	800500	6820309	2.49	16980900	21.21	7774	8520	1.000	.889	2569156	1306706
27	Beluga 6-8	2	105.5	105.5	611832	5595250	2.49	13932222	22.77	5902	9145	.996	.680	1963690	1306706
26	Beluga 6CT	2	78.4	78.4	424749	5120085	2.49	12748921	30.02	6464	12054	.888	.649	1363212	971049
12	Beluga 3	2	66.9	66.9	219169	2803160	2.49	6979936	31.85	4299	12789	.810	.393	703404	828612
13	Beluga 5	2	71.0	71.0	81241	1068524	2.49	2660629	32.75	1750	13152	.725	.142	260734	879394
24	Soldotna 1	1	39.0	39.0	179889	2230595	2.85	6357217	35.34	7219	12399	.669	.554	577337	206525
19	Bernice 3	1	28.0	28.0	25972	386122	2.50	965302	37.17	1562	14866	.632	.111	83356	283550
20	Bernice 4	1	28.0	28.0	33106	467719	2.50	1169297	35.32	1533	14128	.810	.141	106251	283550
10	Beluga 1	2	16.7	16.7	617	11481	2.49	28587	46.33	57	18606	.745	.005	1980	206843
23	Intrnl 3	2	18.9	17.2	304	4938	2.85	14073	46.36	24	16266	.745	.002	974	169312
11	Beluga 2	2	16.7	14.4	245	4285	2.49	10670	43.59	17	17504	1.000	.002	786	206843
21	Intrnl 1	2	15.0	12.5	173	2977	2.85	8483	49.07	16	17218	.783	.001	555	134374
22	Intrnl 2	2	15.1	10.3	137	2651	2.85	7554	55.21	17	19371	.583	.001	439	135270
28	Beluga 7CT	2	78.4	.0	0	0	2.49	0	.00	0	0	.000	.000	0	971049
18	Bernice 2	1	19.3	16.7	839	14241	2.50	35603	42.44	81	16976	.592	.005	2692	195446
997	EMERG PURCH	1	150.0	.0	0	01732.25		0	.00	0	0	.000	.000	0	0
998	EMERG PURCH	2	150.0	.0	0	01732.25		0	.00	0	0	.000	.000	0	0
TOTAL					2378773			61899396	26.02					7634566	8085239

Transmission Losses and Dumped Energy (MWH) 7838.

UNIT OR PURCHASE #	NAME	STARTS # OF	STARTS COST $	STOPS # OF	STOPS COST $	HOURS TOTAL	HOURS MAINT	HOURS OUT-AGE	EMISSIONS SO2 TONS	SO2 LB/MBTU	SO2 LB/MWH	NOX TONS	NOX LB/MBTU	NOX LB/MWH
29	Beluga 7-8	1	5776	1	200	8760	672	312	0	.00	.00	1500	.44	3.75
27	Beluga 6-8	1	5776	1	200	8760	2856	0	0	.00	.00	1231	.44	4.02
26	Beluga 6CT	74	427388	74	14800	8760	672	816	0	.00	.00	1126	.44	5.30
12	Beluga 3	155	412234	155	31000	8760	672	72	0	.00	.00	617	.44	5.63
13	Beluga 5	129	343085	129	25800	8760	672	0	0	.00	.00	235	.44	5.79
24	Soldotna 1	104	21921	104	20800	8760	720	72	0	.00	.00	468	.42	5.21
19	Bernice 3	161	134499	161	32200	8760	504	576	0	.00	.00	85	.44	6.54
20	Bernice 4	212	222063	212	42400	8760	504	408	0	.00	.00	103	.44	6.22
10	Beluga 1	8	12862	8	1600	8760	504	576	0	.00	.00	3	.44	8.19
23	Intrnl 3	5	8118	5	1000	8760	336	936	0	.00	.00	1	.44	7.16
11	Beluga 2	2	3275	2	400	8760	504	0	0	.00	.00	1	.44	7.70
21	Intrnl 1	1	1618	1	200	8760	336	840	0	.00	.00	1	.44	7.58
22	Intrnl 2	1	1618	1	200	8760	336	840	0	.00	.00	1	.44	8.52
28	Beluga 7CT	0	0	0	0	8760	672	0	0	.00	.00	0	.44	.00
18	Bernice 2	44	69680	44	8800	8760	504	408	0	.00	.00	3	.44	7.47
997	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
998	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
TOTAL		898	1669911	898	179600				0		.00	5375		4.52

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 13:25:50 DATE: Oct 04 1998 PAGE: 11

Multi Area Model Chugach/AEG&T
Uses Power Pool Price Files from the Traditional Scenario

INPUT FILENAME
chug4.ppi

ANNUAL SUMMARY - 2013 8760 HOURS AVERAGE INCREMENTAL COST 38.49 ANNUAL PEAK DEMAND 0 MW

UNIT OR PURCHASE #	NAME	AREA	MAX CAPACITY MW	MAX OUTPUT MW	ENERGY OUTPUT MWH	FUEL USED MBTU	FUEL PRICE $/MBTU	FUEL COST $	FUEL AVG $/MWH	HOURS ON LINE	HEAT RATE BTU/KWH	CAPACITY FACTOR OPER.	CAPACITY FACTOR AVG.	O & M VARIABLE $	O & M FIXED $
29	Beluga 7-8	2	105.5	105.5	644700	5492719	2.56	14060749	21.81	6216	8519	1.000	.953	2131227	1002977
27	Beluga 6-8	2	105.5	105.5	675407	6176187	2.56	15812532	23.41	6528	9144	.998	.998	2232745	1002977
26	Beluga 6CT	2	78.4	78.4	277997	3322419	2.56	8505294	30.59	4059	11951	.924	.740	918955	578187
12	Beluga 3	2	66.9	66.9	271238	3430116	2.56	8781680	32.38	4993	12646	.854	.487	896622	853471
13	Beluga 5	2	71.0	71.0	174488	2237889	2.56	5729031	32.83	3344	12825	.822	.305	576804	905776
24	Soldotna 1	1	39.0	39.0	211159	2555497	2.92	7462081	35.34	7723	12102	.737	.650	698035	212721
19	Bernice 3	1	28.0	28.0	52000	715698	2.57	1839347	35.37	2369	13763	.840	.222	171896	292056
20	Bernice 4	1	28.0	28.0	70992	966075	2.57	2482834	34.97	2943	13608	.920	.303	234682	292056
10	Beluga 1	2	16.7	16.7	12681	239286	2.56	612573	48.30	1236	18869	.711	.093	41921	213048
23	Intrnl 3	2	18.9	18.5	12265	198779	2.92	580436	47.33	967	16207	.757	.079	40544	174391
11	Beluga 2	2	16.7	16.7	9952	174494	2.56	446702	44.89	693	17533	.996	.073	32898	213048
21	Intrnl 1	2	15.0	14.0	5531	95187	2.92	277947	50.25	500	17208	.801	.044	18285	138405
22	Intrnl 2	2	15.1	13.8	4384	84005	2.92	245294	55.95	504	19159	.630	.035	14494	139328
28	Beluga 7CT	2	78.4	71.0	8153	209316	2.56	535849	65.72	377	25673	.305	.022	26952	578187
18	Bernice 2	1	19.3	19.3	2772	43837	2.57	112662	40.64	217	15813	.739	.018	9164	201310
997	EMERG PURCH	1	150.0	43.5	44	441792.88		781421792.91		35	1000	.008	.000	0	0
998	EMERG PURCH	2	150.0	53.2	395	3951792.88		7073041792.90		61	1000	.043	.000	0	0
TOTAL					2434158			68270464	28.05					8045224	6797946

Transmission Losses and Dumped Energy (MWH) 6611.

UNIT OR PURCHASE #	NAME	STARTS # OF	STARTS COST $	STOPS # OF	STOPS COST $	HOURS TOTAL	HOURS MAINT	HOURS OUT-AGE	EMISSIONS SO2 TONS	SO2 LB/MBTU	SO2 LB/MWH	NOX TONS	NOX LB/MBTU	NOX LB/MWH
29	Beluga 7-8	1	5948	0	0	6528	0	312	0	.00	.00	1208	.44	3.75
27	Beluga 6-8	1	5948	0	0	6528	0	0	0	.00	.00	1359	.44	4.02
26	Beluga 6CT	35	208196	32	6400	5064	0	552	0	.00	.00	731	.44	5.26
12	Beluga 3	128	350599	128	25600	8760	672	72	0	.00	.00	755	.44	5.56
13	Beluga 5	124	339642	123	24600	8760	672	0	0	.00	.00	492	.44	5.64
24	Soldotna 1	81	46875	81	16200	8760	336	96	0	.00	.00	537	.42	5.08
19	Bernice 3	136	125172	136	27200	8760	504	576	0	.00	.00	157	.44	6.06
20	Bernice 4	232	243713	232	46400	8760	504	408	0	.00	.00	213	.44	5.99
10	Beluga 1	41	66236	41	8200	8760	504	576	0	.00	.00	53	.44	8.30
23	Intrnl 3	43	71890	43	8600	8760	336	936	0	.00	.00	44	.44	7.13
11	Beluga 2	34	57345	34	6800	8760	504	0	0	.00	.00	38	.44	7.71
21	Intrnl 1	39	64975	39	7800	8760	336	840	0	.00	.00	21	.44	7.57
22	Intrnl 2	30	49981	30	6000	8760	336	840	0	.00	.00	18	.44	8.43
28	Beluga 7CT	18	107072	18	3600	5064	0	0	0	.00	.00	46	.44	11.30
18	Bernice 2	82	126841	82	16400	8760	504	408	0	.00	.00	10	.44	6.96
997	EMERG PURCH	16	0	16	0	8760	0	0	0	.00	.00	0	.00	.00
998	EMERG PURCH	8	0	8	0	8760	0	0	0	.00	.00	0	.00	.00
TOTAL		1049	1870434	1043	203800				0		.00	5682		4.67

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 13:25:50 DATE: Oct 04 1998 PAGE: 13

Multi Area Model Chugach/AEG&T
Uses Power Pool Price Files from the Traditional Scenario

INPUT FILENAME
chug4.ppi

ANNUAL SUMMARY - 2014 8760 HOURS AVERAGE INCREMENTAL COST 29.74 ANNUAL PEAK DEMAND 0 MW

UNIT OR PURCHASE #	NAME	AREA	MAX CAPACITY MW	MAX OUTPUT MW	ENERGY OUTPUT MWH	FUEL USED MBTU	FUEL PRICE $/MBTU	FUEL COST $	FUEL AVG $/MWH	HOURS ON LINE	HEAT RATE BTU/KWH	CAPACITY FACTOR OPER.	CAPACITY FACTOR AVG.	O & M VARIABLE $	O & M FIXED $
29	Beluga 7-8	2	105.5	105.5	800460	6820092	2.63	17936308	22.41	7776	8520	1.000	.889	2725579	1386284
27	Beluga 6-8	2	105.5	105.5	831493	7603697	2.63	19999156	24.05	8086	9144	.999	.924	2831237	1386284
25	LM6000 Chug	2	40.5	40.5	189850	1962287	3.00	5886849	31.01	5453	10335	.860	.535	646412	532175
12	Beluga 3	2	66.9	66.9	284479	3558835	2.63	9360120	32.90	4966	12510	.893	.511	968626	879075
13	Beluga 5	2	71.0	71.0	116815	1502663	2.63	3951993	33.83	2217	12863	.800	.204	397740	932949
24	Soldotna 1	1	39.0	39.0	209283	2527444	3.00	7582285	36.23	7650	12076	.736	.644	712583	219103
19	Bernice 3	1	28.0	28.0	26669	381892	2.65	1012015	37.95	1413	14319	.712	.114	90806	300818
20	Bernice 4	1	28.0	28.0	34439	466406	2.65	1235978	35.89	1381	13543	.936	.147	117258	300818
10	Beluga 1	2	16.7	16.7	221	4546	2.63	11956	54.01	24	20537	.565	.002	754	219440
23	Intrnl 3	2	18.9	17.6	415	7287	3.00	21862	52.62	38	17540	.599	.003	1415	179623
11	Beluga 2	2	16.7	16.7	277	4890	2.63	12860	46.51	17	17683	.974	.002	942	219440
21	Intrnl 1	2	15.0	.0	0	0	3.00	0	.00	0	0	.000	.000	0	142558
22	Intrnl 2	2	15.1	.0	0	0	3.00	0	.00	0	0	.000	.000	0	143508
18	Bernice 2	1	19.3	19.2	1249	20744	2.65	54971	44.00	112	16603	.630	.008	4254	207349
997	EMERG PURCH	1	150.0	32.0	96	961	855.63	177396	1855.65	4	1000	.159	.000	0	0
998	EMERG PURCH	2	150.0	.0	0	0	1855.63	0	.00	0	0	.000	.000	0	0
TOTAL					2495746			67243752	26.94					8497605	7049431

Transmission Losses and Dumped Energy (MWH) 7505.

UNIT OR PURCHASE #	NAME	STARTS # OF	STARTS COST $	STOPS # OF	STOPS COST $	HOURS TOTAL	HOURS MAINT	HOURS OUT-AGE	EMISSIONS SO2 TONS	SO2 LB/MBTU	SO2 LB/MWH	NOX TONS	NOX LB/MBTU	NOX LB/MWH
29	Beluga 7-8	1	6126	1	200	8760	672	312	0	.00	.00	1500	.44	3.75
27	Beluga 6-8	1	6126	1	200	8760	672	0	0	.00	.00	1673	.44	4.02
25	LM6000 Chug	409	530798	409	81800	8760	672	408	0	.00	.00	412	.42	4.34
12	Beluga 3	184	519022	184	36800	8760	672	72	0	.00	.00	783	.44	5.50
13	Beluga 5	170	479531	170	34000	8760	672	0	0	.00	.00	331	.44	5.66
24	Soldotna 1	103	107271	103	20600	8760	336	96	0	.00	.00	531	.42	5.07
19	Bernice 3	177	180505	177	35400	8760	504	576	0	.00	.00	84	.44	6.30
20	Bernice 4	241	252701	241	48200	8760	504	408	0	.00	.00	103	.44	5.96
10	Beluga 1	6	10233	6	1200	8760	504	576	0	.00	.00	1	.44	9.04
23	Intrnl 3	14	24106	14	2800	8760	336	936	0	.00	.00	2	.44	7.72
11	Beluga 2	3	5211	3	600	8760	504	0	0	.00	.00	1	.44	7.78
21	Intrnl 1	0	0	0	0	8760	336	840	0	.00	.00	0	.44	.00
22	Intrnl 2	0	0	0	0	8760	336	840	0	.00	.00	0	.44	.00
18	Bernice 2	46	77359	46	9200	8760	504	408	0	.00	.00	5	.44	7.31
997	EMERG PURCH	1	0	1	0	8760	0	0	0	.00	.00	0	.00	.00
998	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
TOTAL		1356	2198991	1356	271000				0		.00	5424		4.35

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 13:25:50 DATE: Oct 04 1998 PAGE: 15

Multi Area Model Chugach/AEG&T
Uses Power Pool Price Files from the Traditional Scenario

INPUT FILENAME
chug4.ppi

ANNUAL SUMMARY - 2015 8760 HOURS AVERAGE INCREMENTAL COST 32.70 ANNUAL PEAK DEMAND 0 MW

UNIT OR PURCHASE #	NAME	AREA	MAX CAPACITY MW	MAX OUTPUT MW	ENERGY OUTPUT MWH	FUEL USED MBTU	FUEL PRICE $/MBTU	FUEL COST $	FUEL AVG $/MWH	HOURS ON LINE	HEAT RATE BTU/KWH	CAPACITY FACTOR OPER.	CAPACITY FACTOR AVG.	O & M VARIABLE $	O & M FIXED $
29	Beluga 7-8	2	105.5	105.5	589432	5021715	2.70	13558331	23.00	5662	8519	1.000	.655	2067204	1427873
27	Beluga 6-8	2	105.5	105.5	832493	7612363	2.70	20553042	24.69	8086	9144	1.000	.925	2919736	1427873
25	LM6000 Chug	2	40.5	40.5	209528	2151724	3.07	6605942	31.53	5780	10269	.895	.591	734825	548140
12	Beluga 3	2	66.9	66.9	410383	5083118	2.70	13723931	33.44	6948	12386	.935	.737	1439266	905447
13	Beluga 5	2	71.0	71.0	230479	2958736	2.70	7988612	34.66	4501	12837	.804	.403	808290	960938
24	Soldotna 1	1	39.0	39.0	212142	2529454	3.07	7765432	36.60	7374	11923	.773	.653	743983	225676
19	Bernice 3	1	28.0	28.0	33738	476746	2.72	1296755	38.44	1704	14130	.746	.144	118320	309842
20	Bernice 4	1	28.0	28.0	37247	502174	2.72	1365902	36.67	1457	13482	.951	.159	130627	309842
10	Beluga 1	2	16.7	16.7	1687	32652	2.70	88160	52.25	167	19352	.664	.012	5917	226023
23	Intrnl 3	2	18.9	18.9	1494	24081	3.07	73929	49.49	110	16121	.773	.010	5238	185011
11	Beluga 2	2	16.7	16.7	1162	20404	2.70	55091	47.43	76	17566	.991	.009	4073	226023
21	Intrnl 1	2	15.0	15.0	531	8862	3.07	27206	51.20	42	16677	.880	.004	1864	146834
22	Intrnl 2	2	15.1	15.1	509	9473	3.07	29082	57.13	52	18607	.687	.004	1785	147813
18	Bernice 2	1	19.3	19.1	1165	19344	2.72	52617	45.16	102	16601	.629	.007	4086	213570
997	EMERG PURCH	1	150.0	22.2	125	1251	920.58	2400	921920.59	35	1000	.024	.000	0	0
998	EMERG PURCH	2	150.0	18.7	19	191	920.58	360	691920.59	9	1000	.014	.000	0	0
TOTAL					2562134			73460192	28.67					8985214	7260913

Transmission Losses and Dumped Energy (MWH) 7483.

UNIT OR PURCHASE #	NAME	STARTS # OF	STARTS COST $	STOPS # OF	STOPS COST $	HOURS TOTAL	HOURS MAINT	HOURS OUT-AGE	EMISSIONS SO2 TONS	SO2 LB/MBTU	SO2 LB/MWH	NOX TONS	NOX LB/MBTU	NOX LB/MWH
29	Beluga 7-8	1	6310	1	200	8760	2856	240	0	.00	.00	1105	.44	3.75
27	Beluga 6-8	1	6310	1	200	8760	672	0	0	.00	.00	1675	.44	4.02
25	LM6000 Chug	346	454643	346	69200	8760	672	408	0	.00	.00	452	.42	4.31
12	Beluga 3	98	284670	98	19600	8760	672	72	0	.00	.00	1118	.44	5.45
13	Beluga 5	146	424099	146	29200	8760	672	0	0	.00	.00	651	.44	5.65
24	Soldotna 1	78	86507	78	15600	8760	720	72	0	.00	.00	531	.42	5.01
19	Bernice 3	179	201829	179	35800	8760	504	576	0	.00	.00	105	.44	6.22
20	Bernice 4	255	271272	255	51000	8760	504	408	0	.00	.00	110	.44	5.93
10	Beluga 1	25	42154	25	5000	8760	504	576	0	.00	.00	7	.44	8.51
23	Intrnl 3	13	23050	13	2600	8760	336	936	0	.00	.00	5	.44	7.09
11	Beluga 2	8	14311	8	1600	8760	504	0	0	.00	.00	4	.44	7.73
21	Intrnl 1	5	8835	5	1000	8760	336	840	0	.00	.00	2	.44	7.34
22	Intrnl 2	5	8835	5	1000	8760	336	840	0	.00	.00	2	.44	8.19
18	Bernice 2	63	109767	63	12600	8760	504	408	0	.00	.00	4	.44	7.30
997	EMERG PURCH	3	0	3	0	8760	0	0	0	.00	.00	0	.00	.00
998	EMERG PURCH	3	0	3	0	8760	0	0	0	.00	.00	0	.00	.00
TOTAL		1229	1942590	1229	244600				0		.00	5772		4.51

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 13:25:50 DATE: Oct 04 1998 PAGE: 17

Multi Area Model Chugach/AEG&T
Uses Power Pool Price Files from the Traditional Scenario

INPUT FILENAME
chug4.ppi

ANNUAL SUMMARY - 2016 8760 HOURS AVERAGE INCREMENTAL COST 31.99 ANNUAL PEAK DEMAND 0 MW

UNIT OR PURCHASE #	NAME	AREA	MAX CAPACITY MW	MAX OUTPUT MW	ENERGY OUTPUT MWH	FUEL USED MBTU	FUEL PRICE $/MBTU	FUEL COST $	FUEL AVG $/MWH	HOURS ON LINE	HEAT RATE BTU/KWH	CAPACITY FACTOR OPER.	CAPACITY FACTOR AVG.	O & M VARIABLE $	O & M FIXED $
29	Beluga 7-8	2	105.5	105.5	800568	6820893	2.78	18959536	23.68	7776	8520	1.000	.889	2891732	1470709
27	Beluga 6-8	2	105.5	105.5	613964	5614121	2.78	15607670	25.42	5902	9144	1.000	.682	2217835	1470709
25	LM6000 Chug	2	40.5	40.5	214278	2199901	3.15	6929604	32.34	5887	10266	.899	.604	774022	564585
12	Beluga 3	2	66.9	66.9	405005	5018751	2.78	13951956	34.45	6825	12391	.933	.727	1462954	932610
13	Beluga 5	2	71.0	71.0	210636	2701849	2.78	7511209	35.66	4137	12827	.810	.369	760860	989766
24	Soldotna 1	1	39.0	39.0	225222	2684188	3.15	8455189	37.54	7819	11917	.776	.693	813554	232446
19	Bernice 3	1	28.0	28.0	31098	440201	2.80	1232561	39.63	1579	14155	.742	.133	112332	319138
20	Bernice 4	1	28.0	28.0	37469	504037	2.80	1411299	37.67	1458	13452	.959	.160	135345	319138
10	Beluga 1	2	16.7	16.7	1195	24840	2.78	69056	57.80	146	20792	.547	.009	4315	232804
23	Intrnl 3	2	18.9	18.9	908	15441	3.15	48638	53.59	80	17014	.646	.006	3278	190562
11	Beluga 2	2	16.7	16.7	862	15158	2.78	42139	48.86	57	17574	.990	.006	3116	232804
21	Intrnl 1	2	15.0	11.9	55	1030	3.15	3244	58.82	6	18674	.630	.000	199	151239
22	Intrnl 2	2	15.1	14.6	121	2524	3.15	7950	65.58	16	20818	.505	.001	438	152248
18	Bernice 2	1	19.3	19.3	2284	37024	2.80	103667	45.39	191	16212	.676	.014	8249	219977
997	EMERG PURCH	1	150.0	59.8	260	2601	987.80	5175341	987.83	9	1000	.193	.000	0	0
998	EMERG PURCH	2	150.0	.0	0	0	1987.80	0	.00	2	0	.000	.000	0	0
TOTAL					2543925			74851248	29.42					9188228	7478741

Transmission Losses and Dumped Energy (MWH) 7531.

UNIT OR PURCHASE #	NAME	STARTS # OF	STARTS COST $	STOPS # OF	STOPS COST $	HOURS TOTAL	HOURS MAINT	HOURS OUT-AGE	EMISSIONS SO2 TONS	SO2 LB/MBTU	SO2 LB/MWH	NOX TONS	NOX LB/MBTU	NOX LB/MWH
29	Beluga 7-8	1	6499	1	200	8760	672	312	0	.00	.00	1501	.44	3.75
27	Beluga 6-8	1	6499	1	200	8760	2856	0	0	.00	.00	1235	.44	4.02
25	LM6000 Chug	376	504597	376	75200	8760	672	408	0	.00	.00	462	.42	4.31
12	Beluga 3	121	362017	121	24200	8760	672	72	0	.00	.00	1104	.44	5.45
13	Beluga 5	151	451773	151	30200	8760	672	0	0	.00	.00	594	.44	5.64
24	Soldotna 1	74	83391	74	14800	8760	336	96	0	.00	.00	564	.42	5.01
19	Bernice 3	209	246173	209	41800	8760	504	576	0	.00	.00	97	.44	6.23
20	Bernice 4	269	285690	269	53800	8760	504	408	0	.00	.00	111	.44	5.92
10	Beluga 1	26	47037	26	5200	8760	504	576	0	.00	.00	5	.44	9.15
23	Intrnl 3	23	41997	23	4600	8760	336	936	0	.00	.00	3	.44	7.49
11	Beluga 2	12	22110	12	2400	8760	504	0	0	.00	.00	3	.44	7.73
21	Intrnl 1	4	7279	4	800	8760	336	840	0	.00	.00	0	.44	8.22
22	Intrnl 2	3	5459	3	600	8760	336	840	0	.00	.00	1	.44	9.16
18	Bernice 2	97	175057	97	19400	8760	504	408	0	.00	.00	8	.44	7.13
997	EMERG PURCH	3	0	3	0	8760	0	0	0	.00	.00	0	.00	.00
998	EMERG PURCH	2	0	2	0	8760	0	0	0	.00	.00	0	.00	.00
TOTAL		1372	2245576	1372	273400				0		.00	5689		4.47

POWRPRO - PRODUCTION COSTING MODEL - VERSION 13G TIME: 13:28:38 DATE: Oct 04 1998 PAGE: 2

Alaska Public Utilities Commission -- GVEA
Power Pooling / Central Dispatch Planning Study Docket U-97-140

INPUT FILENAME
gvea_os.ppi

ANNUAL SUMMARY - 2009 8760 HOURS AVERAGE INCREMENTAL COST 46.63 ANNUAL PEAK DEMAND 228 MW

UNIT OR PURCHASE #	NAME	MAX CAPACITY MW	MAX OUTPUT MW	ENERGY OUTPUT MWH	FUEL USED MBTU	FUEL PRICE $/MBTU	FUEL COST $	FUEL AVG $/MWH	HOURS ON LINE	HEAT RATE BTU/KWH	CAPACITY FACTOR OPER.	CAPACITY FACTOR AVG.	O & M VARIABLE $	O & M FIXED $
36	Healy 1	25.0	25.0	163475	2287901	1.20	2745333	16.79	6539	13995	1.000	.746	2609562	3475174
38	HCCP	53.0	53.0	312445	3687901	.87	3208588	10.27	5896	11803	1.000	.673	4454877	4821068
37	Healy D1	2.6	2.6	22519	257840	1.20	309453	13.74	8662	11449	1.000	.989	264569	86501
35	North Pole 2	59.3	59.3	441666	4088073	4.41	18010464	40.78	8612	9256	.995	.978	3022401	449963
34	North Pole 1	56.7	56.7	352991	3682665	4.41	16224133	45.96	8612	10432	.799	.786	2415673	430234
204	GE 7EA SC	83.0	83.0	104242	1536493	4.30	6614513	63.45	3174	14739	.396	.143	437211	505522
39	Chena 6	29.0	29.0	14047	186130	4.99	929356	66.16	795	13250	.609	.055	6008	372123
32	Zehnder GT1	18.0	8.5	1362	31869	4.72	150400	110.45	254	23403	.335	.009	10419	201371
33	Zehnder GT2	18.0	8.5	1451	33939	4.72	160165	110.39	271	23391	.336	.010	11101	201371
30	Zehnder EMD5	2.6	.0	0	0	4.72	0	.00	0	0	.000	.000	0	31305
31	Zehnder EMD6	2.6	.0	0	0	4.72	0	.00	0	0	.000	.000	0	31305
40	SILOS	62.0	.5	1	10	146.85	1469	1468.53	2	10000	.008	.000	15	0
999	EMERG PURCH	500.0	.0	0	0	781.98	0	.00	0	0	.000	.000	0	0
TOTAL				1414199			48353872	34.19					13231836	10605940

0ENERGY DUMPED (MWH) 76437.

UNIT OR PURCHASE #	NAME	STARTS # OF	STARTS COST $	STOPS # OF	STOPS COST $	HOURS TOTAL	HOURS MAINT	HOURS OUT-AGE	EMISSIONS SO2 TONS	SO2 LB/MBTU	SO2 LB/MWH	NOX TONS	NOX LB/MBTU	NOX LB/MWH
36	Healy 1	1	1517	1	200	8760	2208	0	2059	1.80	25.19	423	.37	5.18
38	HCCP	1	2393	1	200	8760	2208	648	553	.30	3.54	645	.35	4.13
37	Healy D1	1	713	1	200	8760	96	0	1	.01	.11	98	.76	8.70
35	North Pole 2	2	4827	2	400	8760	144	0	123	.06	.56	1492	.73	6.76
34	North Pole 1	2	4827	2	400	8760	144	0	1105	.60	6.26	1344	.73	7.62
204	GE 7EA SC	27	53160	27	5400	8760	408	408	0	.00	.00	384	.50	7.37
39	Chena 6	110	171279	110	22000	8760	360	432	2	.02	.27	11	.12	1.59
32	Zehnder GT1	35	53205	35	7000	8760	144	0	11	.66	15.45	12	.76	17.79
33	Zehnder GT2	24	36484	24	4800	8760	144	0	11	.66	15.44	13	.76	17.78
30	Zehnder EMD5	0	0	0	0	8760	24	0	0	.01	.00	0	.76	.00
31	Zehnder EMD6	0	0	0	0	8760	24	0	0	.01	.00	0	.76	.00
40	SILOS	2	0	2	0	8760	0	0	0	.00	.00	0	.00	.00
999	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
TOTAL		205	328404	205	40600				3865		5.47	4423		6.26

POWRPRO - PRODUCTION COSTING MODEL - VERSION 13G TIME: 13:28:38 DATE: Oct 04 1998 PAGE: 3

Alaska Public Utilities Commission -- GVEA
Power Pooling / Central Dispatch Planning Study Docket U-97-140

INPUT FILENAME
gvea_os.ppi

ANNUAL SUMMARY - 2010 8760 HOURS AVERAGE INCREMENTAL COST 49.12 ANNUAL PEAK DEMAND 233 MW

UNIT OR PURCHASE #	NAME	MAX CAPACITY MW	MAX OUTPUT MW	ENERGY OUTPUT MWH	FUEL USED MBTU	FUEL PRICE $/MBTU	FUEL COST $	FUEL AVG $/MWH	HOURS ON LINE	HEAT RATE BTU/KWH	CAPACITY FACTOR OPER.	CAPACITY FACTOR AVG.	O & M VARIABLE $	O & M FIXED $
36	Healy 1	25.0	25.0	208128	2913122	1.22	3553418	17.07	8326	13996	1.000	.950	3421754	3579430
38	HCCP	53.0	53.0	393853	4648669	.88	4091005	10.39	7432	11803	1.000	.848	5784090	4965700
37	Healy D1	2.6	2.6	22519	257840	1.22	314600	13.97	8662	11449	1.000	.989	272525	89096
35	North Pole 2	59.3	59.3	439483	4072360	4.54	18479684	42.05	8612	9266	.990	.974	3097892	463462
34	North Pole 1	56.7	56.7	326661	3498834	4.54	15876627	48.60	8612	10710	.740	.727	2302524	443141
204	GE 7EA SC	83.0	83.0	42467	601943	4.43	2669075	62.85	1162	14174	.440	.058	183461	520687
39	Chena 6	29.0	29.0	19270	253838	5.14	1305436	67.75	1070	13172	.621	.076	8490	383287
32	Zehnder GT1	18.0	18.0	1500	30312	4.86	147345	98.25	204	20213	.440	.010	11818	207412
33	Zehnder GT2	18.0	18.0	1764	36494	4.86	177393	100.59	252	20693	.420	.012	13898	207412
30	Zehnder EMD5	2.6	2.6	42	1072	4.86	5210	124.82	42	25679	.382	.002	505	32244
31	Zehnder EMD6	2.6	2.6	40	1031	4.86	5013	124.82	42	25679	.368	.002	486	32244
40	SILOS	62.0	11.9	36	359	151.26	54302	1512.59	49	10000	.012	.000	543	0
999	EMERG PURCH	500.0	3.4	9	9	809.35	7689	809.35	34	1000	.001	.000	0	0
TOTAL				1455772			46686796	32.07					15097986	10924118

0ENERGY DUMPED (MWH) 89075.

UNIT OR PURCHASE #	NAME	STARTS # OF	STARTS COST $	STOPS # OF	STOPS COST $	HOURS TOTAL	HOURS MAINT	HOURS OUT-AGE	EMISSIONS SO2 TONS	SO2 LB/MBTU	SO2 LB/MWH	NOX TONS	NOX LB/MBTU	NOX LB/MWH
36	Healy 1	2	3125	2	400	8760	408	0	2622	1.80	25.19	539	.37	5.18
38	HCCP	1	2447	1	200	8760	480	840	697	.30	3.54	814	.35	4.13
37	Healy D1	1	734	1	200	8760	96	0	1	.01	.11	98	.76	8.70
35	North Pole 2	2	4972	2	400	8760	144	0	122	.06	.56	1486	.73	6.76
34	North Pole 1	2	4972	2	400	8760	144	0	1050	.60	6.43	1277	.73	7.82
204	GE 7EA SC	27	54755	27	5400	8760	408	408	0	.00	.00	150	.50	7.09
39	Chena 6	120	192455	120	24000	8760	360	432	3	.02	.26	15	.12	1.58
32	Zehnder GT1	27	42275	27	5400	8760	144	0	10	.66	13.34	12	.76	15.36
33	Zehnder GT2	25	39144	25	5000	8760	144	0	12	.66	13.66	14	.76	15.73
30	Zehnder EMD5	2	1469	2	400	8760	24	0	0	.01	.26	0	.76	19.52
31	Zehnder EMD6	2	1469	2	400	8760	24	0	0	.01	.26	0	.76	19.52
40	SILOS	9	0	9	0	8760	0	0	0	.00	.00	0	.00	.00
999	EMERG PURCH	4	0	4	0	8760	0	0	0	.00	.00	0	.00	.00
TOTAL		224	347816	224	42200				4517		6.21	4406		6.05

POWRPRO - PRODUCTION COSTING MODEL - VERSION 13G TIME: 13:28:38 DATE: Oct 04 1998 PAGE: 4

Alaska Public Utilities Commission -- GVEA
Power Pooling / Central Dispatch Planning Study Docket U-97-140

INPUT FILENAME
gvea_os.ppi

ANNUAL SUMMARY - 2011 8760 HOURS AVERAGE INCREMENTAL COST 54.41 ANNUAL PEAK DEMAND 238 MW

UNIT OR PURCHASE #	NAME	MAX CAPACITY MW	MAX OUTPUT MW	ENERGY OUTPUT MWH	FUEL USED MBTU	FUEL PRICE $/MBTU	FUEL COST $	FUEL AVG $/MWH	HOURS ON LINE	HEAT RATE BTU/KWH	CAPACITY FACTOR OPER.	CAPACITY FACTOR AVG.	O & M VARIABLE $	O & M FIXED $
36	Healy 1	25.0	25.0	208128	2913122	1.25	3640819	17.49	8326	13996	1.000	.950	3525070	3686812
38	HCCP	53.0	53.0	393853	4648669	.90	4183912	10.62	7432	11803	1.000	.848	5957156	5114670
37	Healy D1	2.6	2.6	22519	257840	1.25	322353	14.31	8662	11449	1.000	.989	280676	91768
35	North Pole 2	59.3	59.3	350349	3247971	4.67	15181931	43.33	6550	9270	.988	.776	2543515	477366
34	North Pole 1	56.7	56.7	295547	3019052	4.67	14110141	47.74	6550	10215	.861	.658	2145703	456435
204	GE 7EA SC	83.0	83.0	155284	2301319	4.57	10510555	67.69	4728	14820	.396	.214	690951	536308
39	Chena 6	29.0	29.0	30120	390858	5.30	2070380	68.74	1589	12976	.654	.119	13668	394785
33	Zehnder GT2	18.0	18.0	3571	74911	5.01	375057	105.02	528	20976	.410	.024	28988	213634
30	Zehnder EMD5	2.6	2.6	218	5595	5.01	28015	128.57	251	25679	.334	.010	2716	33211
31	Zehnder EMD6	2.6	2.6	212	5441	5.01	27243	128.57	239	25679	.341	.009	2641	33211
40	SILOS	62.0	15.0	137	1370	155.80	213442	1557.97	245	10000	.009	.000	2134	0
999	EMERG PURCH	500.0	34.7	988	988	837.67	827625	837.68	185	1000	.011	.000	0	0
TOTAL				1460926			51491476	35.25					15193217	11038208

0ENERGY DUMPED (MWH) 64592.

UNIT OR PURCHASE #	NAME	STARTS # OF	STARTS COST $	STOPS # OF	STOPS COST $	HOURS TOTAL	HOURS MAINT	HOURS OUT-AGE	EMISSIONS SO2 TONS	SO2 LB/MBTU	SO2 LB/MWH	NOX TONS	NOX LB/MBTU	NOX LB/MWH
36	Healy 1	2	3219	2	400	8760	408	0	2622	1.80	25.19	539	.37	5.18
38	HCCP	1	2513	1	200	8760	480	840	697	.30	3.54	814	.35	4.13
37	Healy D1	1	756	1	200	8760	96	0	1	.01	.11	98	.76	8.70
35	North Pole 2	1	2560	1	200	8760	2208	0	97	.06	.56	1186	.73	6.77
34	North Pole 1	1	2560	1	200	8760	2208	0	906	.60	6.13	1102	.73	7.46
204	GE 7EA SC	20	39995	20	4000	8760	408	408	0	.00	.00	575	.50	7.41
39	Chena 6	121	199881	121	24200	8760	360	432	4	.02	.26	23	.12	1.56
33	Zehnder GT2	53	85474	53	10600	8760	144	0	25	.66	13.84	28	.76	15.94
30	Zehnder EMD5	18	13613	18	3600	8760	24	0	0	.01	.26	2	.76	19.52
31	Zehnder EMD6	16	12101	16	3200	8760	24	0	0	.01	.26	2	.76	19.52
40	SILOS	24	0	23	0	8760	0	0	0	.00	.00	0	.00	.00
999	EMERG PURCH	18	0	18	0	8760	0	0	0	.00	.00	0	.00	.00
TOTAL		276	362673	275	46800				4352		5.96	4369		5.98

POWRPRO - PRODUCTION COSTING MODEL - VERSION 13G TIME: 13:28:38 DATE: Oct 04 1998 PAGE: 5

Alaska Public Utilities Commission -- GVEA
Power Pooling / Central Dispatch Planning Study Docket U-97-140

INPUT FILENAME
gvea_os.ppi

ANNUAL SUMMARY - 2012 8760 HOURS AVERAGE INCREMENTAL COST 34.71 ANNUAL PEAK DEMAND 243 MW

UNIT OR PURCHASE #	NAME	MAX CAPACITY MW	MAX OUTPUT MW	ENERGY OUTPUT MWH	FUEL USED MBTU	FUEL PRICE $/MBTU	FUEL COST $	FUEL AVG $/MWH	HOURS ON LINE	HEAT RATE BTU/KWH	CAPACITY FACTOR OPER.	CAPACITY FACTOR AVG.	O & M VARIABLE $	O & M FIXED $
36	Healy 1	25.0	25.0	74995	1511233	1.27	1919246	25.59	8326	20151	.360	.342	1308160	3797417
38	HCCP	53.0	53.0	394277	4653673	.92	4281638	10.86	7440	11803	1.000	.849	6142301	5268111
37	Healy D1	2.6	2.6	22480	257393	1.27	326933	14.54	8647	11449	1.000	.987	288573	94522
207	GE 7EA 1x1	128.0	128.0	934353	7311626	4.70	34398100	36.81	7928	7825	.921	.833	3717156	2269126
35	North Pole 2	59.3	59.3	50407	579287	4.81	2788747	55.32	1883	11492	.551	.112	376940	491687
34	North Pole 1	56.7	56.7	30903	394851	4.81	1900847	61.51	1286	12776	.467	.069	231093	470129
204	GE 7EA SC	83.0	46.8	10565	208042	4.70	978662	92.63	560	19692	.227	.015	48420	552397
30	Zehnder EMD5	2.6	2.6	65	1682	5.16	8672	132.42	79	25679	.319	.003	841	34208
31	Zehnder EMD6	2.6	2.6	54	1387	5.16	7152	132.42	57	25679	.364	.002	693	34208
40	SILOS	62.0	.5	29	285	160.47	457341	604.71	57	10000	.008	.000	457	0
999	EMERG PURCH	500.0	20.3	144	145	866.99	125281	866.99	33	1000	.009	.000	0	0
TOTAL				1518272			46781016	30.81					12114634	13011808

0ENERGY DUMPED (MWH) 91737.

UNIT OR PURCHASE #	NAME	STARTS # OF	STARTS COST $	STOPS # OF	STOPS COST $	HOURS TOTAL	HOURS MAINT	HOURS OUT-AGE	EMISSIONS SO2 TONS	SO2 LB/MBTU	SO2 LB/MWH	NOX TONS	NOX LB/MBTU	NOX LB/MWH
36	Healy 1	2	3316	2	400	8760	408	0	1360	1.80	36.27	280	.37	7.46
38	HCCP	1	2581	1	200	8760	480	840	698	.30	3.54	814	.35	4.13
37	Healy D1	2	1558	2	400	8760	96	0	1	.01	.11	98	.76	8.70
207	GE 7EA 1x1	3	5130	2	400	8760	408	408	0	.00	.00	1828	.50	3.91
35	North Pole 2	38	100213	39	7800	8760	144	0	17	.06	.69	211	.73	8.39
34	North Pole 1	48	126584	49	9800	8760	144	0	118	.60	7.67	144	.73	9.33
204	GE 7EA SC	80	150313	80	16000	8760	408	408	0	.00	.00	52	.50	9.85
30	Zehnder EMD5	21	16359	21	4200	8760	24	0	0	.01	.26	1	.76	19.52
31	Zehnder EMD6	18	14022	18	3600	8760	24	0	0	.01	.26	1	.76	19.52
40	SILOS	22	0	23	0	8760	0	0	0	.00	.00	0	.00	.00
999	EMERG PURCH	3	0	3	0	8760	0	0	0	.00	.00	0	.00	.00
TOTAL		238	420075	240	42800				2195		2.89	3428		4.52

POWRPRO - PRODUCTION COSTING MODEL - VERSION 13G TIME: 13:28:38 DATE: Oct 04 1998 PAGE: 6

Alaska Public Utilities Commission -- GVEA
Power Pooling / Central Dispatch Planning Study Docket U-97-140

INPUT FILENAME
gvea_os.ppi

ANNUAL SUMMARY - 2013 8760 HOURS AVERAGE INCREMENTAL COST 35.95 ANNUAL PEAK DEMAND 248 MW

UNIT OR PURCHASE #	NAME	MAX CAPACITY MW	MAX OUTPUT MW	ENERGY OUTPUT MWH	FUEL USED MBTU	FUEL PRICE $/MBTU	FUEL COST $	FUEL AVG $/MWH	HOURS ON LINE	HEAT RATE BTU/KWH	CAPACITY FACTOR OPER.	CAPACITY FACTOR AVG.	O & M VARIABLE $	O & M FIXED $
36	Healy 1	25.0	25.0	78928	1551686	1.29	2001794	25.36	8326	19659	.379	.360	1418025	3911339
38	HCCP	53.0	53.0	394277	4653673	.93	4328192	10.98	7440	11803	1.000	.849	6327029	5426154
37	Healy D1	2.6	2.6	22519	257840	1.29	332644	14.77	8662	11449	1.000	.989	297751	97357
207	GE 7EA 1x1	128.0	128.0	951331	7413388	4.85	35921308	37.76	7939	7792	.936	.848	3898172	2337200
35	North Pole 2	59.3	59.3	53540	620830	4.96	3078409	57.50	2026	11595	.538	.119	412381	506437
34	North Pole 1	56.7	56.7	32166	406455	4.96	2015422	62.66	1309	12636	.476	.072	247748	484232
204	GE 7EA SC	83.0	50.1	12141	227935	4.85	1104413	90.97	595	18774	.246	.017	57313	568969
30	Zehnder EMD5	2.6	2.6	72	1848	5.31	9817	136.40	85	25679	.326	.003	952	35234
31	Zehnder EMD6	2.6	2.6	59	1516	5.31	8050	136.40	61	25679	.372	.003	780	35234
40	SILOS	62.0	9.4	39	389	165.28	642961	652.85	60	10000	.010	.000	643	0
999	EMERG PURCH	500.0	25.2	139	140	897.34	125179	897.34	32	1000	.009	.000	0	0
TOTAL				1545211			48989520	31.70					12660794	13402161

0ENERGY DUMPED (MWH) 88009.

UNIT OR PURCHASE #	NAME	STARTS # OF	STARTS COST $	STOPS # OF	STOPS COST $	HOURS TOTAL	HOURS MAINT	HOURS OUT-AGE	EMISSIONS SO2 TONS	SO2 LB/MBTU	SO2 LB/MWH	NOX TONS	NOX LB/MBTU	NOX LB/MWH
36	Healy 1	2	3415	2	400	8760	408	0	1397	1.80	35.39	287	.37	7.27
38	HCCP	1	2639	1	200	8760	480	840	698	.30	3.54	814	.35	4.13
37	Healy D1	1	802	1	200	8760	96	0	1	.01	.11	98	.76	8.70
207	GE 7EA 1x1	1	1829	1	200	8760	408	408	0	.00	.00	1853	.50	3.90
35	North Pole 2	38	103219	37	7400	8760	144	0	19	.06	.70	227	.73	8.46
34	North Pole 1	49	133098	49	9800	8760	144	0	122	.60	7.58	148	.73	9.22
204	GE 7EA SC	80	155013	80	16000	8760	408	408	0	.00	.00	57	.50	9.39
30	Zehnder EMD5	15	12035	15	3000	8760	24	0	0	.01	.26	1	.76	19.52
31	Zehnder EMD6	12	9628	12	2400	8760	24	0	0	.01	.26	1	.76	19.52
40	SILOS	25	0	25	0	8760	0	0	0	.00	.00	0	.00	.00
999	EMERG PURCH	2	0	2	0	8760	0	0	0	.00	.00	0	.00	.00
TOTAL		226	421679	225	39600				2236		2.89	3486		4.51

POWRPRO - PRODUCTION COSTING MODEL - VERSION 13G TIME: 13:28:38 DATE: Oct 04 1998 PAGE: 7

Alaska Public Utilities Commission -- GVEA
Power Pooling / Central Dispatch Planning Study Docket U-97-140

INPUT FILENAME
gvea_os.ppi

ANNUAL SUMMARY - 2014 8760 HOURS AVERAGE INCREMENTAL COST 36.54 ANNUAL PEAK DEMAND 254 MW

UNIT OR PURCHASE #	NAME	MAX CAPACITY MW	MAX OUTPUT MW	ENERGY OUTPUT MWH	FUEL USED MBTU	FUEL PRICE $/MBTU	FUEL COST $	FUEL AVG $/MWH	HOURS ON LINE	HEAT RATE BTU/KWH	CAPACITY FACTOR OPER.	CAPACITY FACTOR AVG.	O & M VARIABLE $	O & M FIXED $
36	Healy 1	25.0	25.0	90725	1513679	1.32	1998177	22.02	6539	16684	.555	.414	1678871	4028680
38	HCCP	53.0	53.0	312445	3687901	.95	3503613	11.21	5896	11803	1.000	.673	5164189	5588939
37	Healy D1	2.6	2.6	22519	257840	1.32	340395	15.12	8662	11449	1.000	.989	306682	100278
207	GE 7EA 1x1	128.0	128.0	1003288	7716953	4.99	38514288	38.39	7939	7691	.987	.895	4234459	2407316
35	North Pole 2	59.3	59.3	76596	1027193	5.11	5246217	68.49	4011	13410	.396	.170	607657	521630
34	North Pole 1	56.7	56.7	34683	417799	5.11	2133804	61.52	1306	12046	.531	.077	275153	498759
204	GE 7EA SC	83.0	83.0	22621	376817	4.99	1880554	83.13	885	16657	.308	.031	109989	586038
30	Zehnder EMD5	2.6	.5	48	1220	5.47	6673	140.49	95	25678	.192	.002	647	36291
31	Zehnder EMD6	2.6	.5	41	1053	5.47	5760	140.49	82	25679	.192	.002	558	36291
40	SILOS	62.0	.5	43	425	170.24	723531	702.43	85	10000	.008	.000	724	0
999	EMERG PURCH	500.0	.0	0	0	928.74	0	.00	49	0	.000	.000	0	0
TOTAL				1563009			53701828	34.36					12378930	13804227

0ENERGY DUMPED (MWH) 74403.

UNIT OR PURCHASE #	NAME	STARTS # OF	STARTS COST $	STOPS # OF	STOPS COST $	HOURS TOTAL	HOURS MAINT	HOURS OUT-AGE	EMISSIONS SO2 TONS	SO2 LB/MBTU	SO2 LB/MWH	NOX TONS	NOX LB/MBTU	NOX LB/MWH
36	Healy 1	1	1759	1	200	8760	2208	0	1362	1.80	30.03	280	.37	6.17
38	HCCP	1	2709	1	200	8760	2208	648	553	.30	3.54	645	.35	4.13
37	Healy D1	1	826	1	200	8760	96	0	1	.01	.11	98	.76	8.70
207	GE 7EA 1x1	1	1884	1	200	8760	408	408	0	.00	.00	1929	.50	3.85
35	North Pole 2	31	86731	31	6200	8760	144	0	31	.06	.80	375	.73	9.79
34	North Pole 1	47	131495	47	9400	8760	144	0	125	.60	7.23	152	.73	8.79
204	GE 7EA SC	95	194163	95	19000	8760	408	408	0	.00	.00	94	.50	8.33
30	Zehnder EMD5	10	8264	10	2000	8760	24	0	0	.01	.26	0	.76	19.52
31	Zehnder EMD6	8	6611	8	1600	8760	24	0	0	.01	.26	0	.76	19.52
40	SILOS	26	0	26	0	8760	0	0	0	.00	.00	0	.00	.00
999	EMERG PURCH	5	0	5	0	8760	0	0	0	.00	.00	0	.00	.00
TOTAL		226	434444	226	39000				2073		2.65	3575		4.57

POWRPRO - PRODUCTION COSTING MODEL - VERSION 13G TIME: 13:28:38 DATE: Oct 04 1998 PAGE: 8

Alaska Public Utilities Commission -- GVEA
Power Pooling / Central Dispatch Planning Study Docket U-97-140

INPUT FILENAME
gvea_os.ppi

ANNUAL SUMMARY - 2015 8760 HOURS AVERAGE INCREMENTAL COST 39.81 ANNUAL PEAK DEMAND 259 MW

UNIT OR PURCHASE #	NAME	MAX CAPACITY MW	MAX OUTPUT MW	ENERGY OUTPUT MWH	FUEL USED MBTU	FUEL PRICE $/MBTU	FUEL COST $	FUEL AVG $/MWH	HOURS ON LINE	HEAT RATE BTU/KWH	CAPACITY FACTOR OPER.	CAPACITY FACTOR AVG.	O & M VARIABLE $	O & M FIXED $
36	Healy 1	25.0	25.0	87951	1645874	1.34	2205580	25.08	8326	18713	.423	.402	1676295	4149540
38	HCCP	53.0	53.0	393896	4649130	.97	4509901	11.45	7432	11802	1.000	.848	6706276	5756607
37	Healy D1	2.6	2.6	22519	257840	1.34	345553	15.34	8662	11449	1.000	.989	315884	103286
207	GE 7EA 1x1	128.0	128.0	971925	7533718	5.14	38727320	39.85	7939	7751	.956	.867	4225193	2479536
35	North Pole 2	59.3	59.3	60006	722966	5.26	3803158	63.38	2314	12048	.488	.133	490325	537279
34	North Pole 1	56.7	56.7	34535	438843	5.26	2308524	66.85	1458	12707	.467	.077	282197	513722
204	GE 7EA SC	83.0	83.0	19745	320239	5.14	1646150	83.37	721	16219	.330	.027	98883	603619
30	Zehnder EMD5	2.6	2.6	94	2414	5.64	13602	144.70	83	25679	.436	.004	1319	37380
31	Zehnder EMD6	2.6	2.6	78	2013	5.64	11345	144.70	56	25679	.538	.003	1100	37380
40	SILOS	62.0	.5	25	250	175.35	438381	753.51	50	10000	.008	.000	438	0
999	EMERG PURCH	500.0	42.6	487	487	961.25	467746	961.25	24	1000	.041	.000	0	0
TOTAL				1591261			54082708	33.99					13797910	14218353

0ENERGY DUMPED (MWH) 70875.

UNIT OR PURCHASE #	NAME	STARTS # OF	STARTS COST $	STOPS # OF	STOPS COST $	HOURS TOTAL	HOURS MAINT	HOURS OUT-AGE	EMISSIONS SO2 TONS	SO2 LB/MBTU	SO2 LB/MWH	NOX TONS	NOX LB/MBTU	NOX LB/MWH
36	Healy 1	2	3623	2	400	8760	408	0	1481	1.80	33.68	304	.37	6.92
38	HCCP	1	2781	1	200	8760	480	840	697	.30	3.54	814	.35	4.13
37	Healy D1	1	851	1	200	8760	96	0	1	.01	.11	98	.76	8.70
207	GE 7EA 1x1	1	1941	1	200	8760	408	408	0	.00	.00	1883	.50	3.88
35	North Pole 2	37	106623	37	7400	8760	2208	0	22	.06	.72	264	.73	8.80
34	North Pole 1	54	155612	54	10800	8760	144	0	132	.60	7.62	160	.73	9.28
204	GE 7EA SC	73	156126	73	14600	8760	408	408	0	.00	.00	80	.50	8.11
30	Zehnder EMD5	19	16173	19	3800	8760	24	0	0	.01	.26	1	.76	19.52
31	Zehnder EMD6	16	13619	16	3200	8760	24	0	0	.01	.26	1	.76	19.52
40	SILOS	22	0	22	0	8760	0	0	0	.00	.00	0	.00	.00
999	EMERG PURCH	1	0	1	0	8760	0	0	0	.00	.00	0	.00	.00
TOTAL		227	457350	227	40800				2333		2.93	3605		4.53

POWRPRO - PRODUCTION COSTING MODEL - VERSION 13G TIME: 13:28:38 DATE: Oct 04 1998 PAGE: 9

Alaska Public Utilities Commission -- GVEA
Power Pooling / Central Dispatch Planning Study Docket U-97-140

INPUT FILENAME
gvea_os.ppi

ANNUAL SUMMARY - 2016 8760 HOURS AVERAGE INCREMENTAL COST 44.88 ANNUAL PEAK DEMAND 265 MW

UNIT OR PURCHASE #	NAME	MAX CAPACITY MW	MAX OUTPUT MW	ENERGY OUTPUT MWH	FUEL USED MBTU	FUEL PRICE $/MBTU	FUEL COST $	FUEL AVG $/MWH	HOURS ON LINE	HEAT RATE BTU/KWH	CAPACITY FACTOR OPER.	CAPACITY FACTOR AVG.	O & M VARIABLE $	O & M FIXED $
36	Healy 1	25.0	25.0	90190	1669519	1.37	2287376	25.36	8326	18511	.433	.412	1770558	4274026
38	HCCP	53.0	53.0	394277	4653673	.99	4607334	11.69	7440	11803	1.000	.849	6913866	5929305
37	Healy D1	2.6	2.6	22519	257840	1.37	353239	15.69	8662	11449	1.000	.989	325357	106385
207	GE 7EA 1x1	128.0	128.0	982114	7593247	5.29	40206136	40.94	7939	7731	.966	.876	4396955	2553921
35	North Pole 2	59.3	59.3	73604	868515	5.42	4705956	63.94	2785	11799	.511	.163	619488	553398
204	GE 7EA SC	83.0	83.0	37171	521408	5.29	2760627	74.27	975	14027	.459	.051	191744	621728
200	GE 6B SC	38.0	38.0	7630	134706	5.29	713214	93.48	618	17655	.325	.023	57281	493603
30	Zehnder EMD5	2.6	2.6	185	4759	5.80	27622	149.04	101	25679	.706	.008	2678	38501
31	Zehnder EMD6	2.6	2.6	172	4406	5.80	25572	149.04	89	25679	.741	.008	2479	38501
40	SILOS	62.0	.5	66	655	180.61	118300	1806.11	131	10000	.008	.000	1183	0
999	EMERG PURCH	500.0	59.4	1567	1567	994.89	1558608	994.90	82	1000	.038	.000	0	0
TOTAL				1609495			57363984	35.64					14281589	14609372

0ENERGY DUMPED (MWH) 56832.

UNIT OR PURCHASE #	NAME	STARTS # OF	STARTS COST $	STOPS # OF	STOPS COST $	HOURS TOTAL	HOURS MAINT	HOURS OUT-AGE	EMISSIONS SO2 TONS	SO2 LB/MBTU	SO2 LB/MWH	NOX TONS	NOX LB/MBTU	NOX LB/MWH
36	Healy 1	2	3732	2	400	8760	408	0	1503	1.80	33.32	309	.37	6.85
38	HCCP	1	2854	1	200	8760	480	840	698	.30	3.54	814	.35	4.13
37	Healy D1	1	877	1	200	8760	96	0	1	.01	.11	98	.76	8.70
207	GE 7EA 1x1	1	1999	1	200	8760	408	408	0	.00	.00	1898	.50	3.87
35	North Pole 2	45	133567	45	9000	8760	144	0	26	.06	.71	317	.73	8.61
204	GE 7EA SC	53	118202	53	10600	8760	408	408	0	.00	.00	130	.50	7.01
200	GE 6B SC	63	86975	63	12600	8760	336	432	0	.00	.00	34	.50	8.83
30	Zehnder EMD5	7	6137	7	1400	8760	24	0	0	.01	.26	2	.76	19.52
31	Zehnder EMD6	4	3507	4	800	8760	24	0	0	.01	.26	2	.76	19.52
40	SILOS	38	0	38	0	8760	0	0	0	.00	.00	0	.00	.00
999	EMERG PURCH	5	0	5	0	8760	0	0	0	.00	.00	0	.00	.00
TOTAL		220	357850	220	35400				2228		2.77	3604		4.48

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 12:36:05 DATE: Oct 04 1998 PAGE: 1

Multi Area Model Pooled Case
Uses Power Pool Price Files from the Traditional Scenario

INPUT FILENAME
pool1.ppi

ANNUAL SUMMARY - 1997 8760 HOURS AVERAGE INCREMENTAL COST 24.18 ANNUAL PEAK DEMAND 0 MW

UNIT #	OR PURCHASE NAME	AREA	MAX CAPACITY MW	MAX OUTPUT MW	ENERGY OUTPUT MWH	FUEL USED MBTU	FUEL PRICE $/MBTU	FUEL COST $	FUEL AVG $/MWH	HOURS ON LINE	HEAT RATE BTU/KWH	CAPACITY FACTOR OPER.	CAPACITY FACTOR AVG.	O & M VARIABLE $	O & M FIXED $
36	Healy 1	3	25.0	24.8	54586	1173308	1.39	1630894	29.88	6895	21494	.317	.249	611151	2437417
38	HCCP	3	53.0	53.0	277827	3298643	.60	1979224	7.12	6916	11873	.758	.598	2778264	3381399
17	Beluga 7-8	2	101.5	101.5	766484	7012138	1.46	10238595	13.36	7760	9148	1.000	.888	1579095	806924
15	Beluga 6-8	2	101.5	101.5	784023	7348443	1.46	10727833	13.68	7946	9372	1.000	.909	1615227	806924
6	ML&P P2 U7-6	2	109.5	109.5	808998	6997083	1.74	12174297	15.05	7935	8649	.978	.884	1666553	795627
12	Beluga 3	2	66.9	66.9	260524	3369301	1.46	4919206	18.88	5273	12932	.777	.468	536680	531855
5	ML&P P2 U5-6	2	49.2	49.2	264527	2720559	1.74	4733672	17.89	5652	10284	1.000	.644	544916	357487
13	Beluga 5	2	71.0	71.0	151588	2047948	1.46	2990000	19.72	3600	13509	.647	.265	312271	564450
19	Bernice 3	1	28.0	28.0	117653	1799870	1.50	2699795	22.95	7504	15298	.585	.502	242366	182000
20	Bernice 4	1	28.0	28.0	47624	700249	1.50	1050383	22.06	2487	14703	.717	.203	98106	182000
7	ML&P P2 U8	2	87.6	87.6	22231	326415	1.74	567962	25.55	641	14682	.417	.031	45796	636501
4	ML&P P1 U4	2	34.1	34.1	3954	74401	1.74	129458	32.74	263	18818	.456	.014	8389	269042
2	ML&P P1 U2	2	16.8	16.8	1230	34456	1.74	59954	48.73	347	28007	.231	.009	2534	128688
10	Beluga 1	2	16.7	6.8	79	2648	1.46	3867	49.03	22	33579	.223	.001	162	132765
3	ML&P P1 U3	2	19.5	15.2	724	19361	1.74	33689	46.54	164	26748	.243	.004	1491	149369
11	Beluga 2	2	16.7	16.7	128	2358	1.46	3443	26.89	9	18419	.879	.001	264	132765
24	Soldotna 1	1	39.0	38.2	1890	33918	2.25	76316	40.38	168	17944	.305	.006	3894	132560
1	ML&P P1 U1	2	16.8	11.9	242	7313	1.74	12725	52.56	74	30207	.229	.002	499	128688
35	North Pole 2	4	59.3	63.7	149023	1828491	3.09	5650055	37.91	6564	12269	.417	.323	715289	315595
34	North Pole 1	4	56.7	60.9	25372	344132	3.09	1063365	41.91	1434	13563	.350	.055	121778	301757
23	Intrnl 3	2	18.9	.0	0	0	2.25	0	.00	0	0	.000	.000	0	108674
21	Intrnl 1	2	15.0	.0	0	0	2.25	0	.00	0	0	.000	.000	0	86250
22	Intrnl 2	2	15.1	.0	0	0	2.25	0	.00	0	0	.000	.000	0	86825
39	Chena 6	4	29.3	29.3	1168	15256	3.50	53425	45.76	63	13066	.633	.018	350	66466
37	Healy D1	3	2.6	2.6	100	1397	3.20	4470	44.80	41	14000	.936	.004	822	60670
33	Zehnder GT2	4	18.0	18.0	1220	20470	3.31	67756	55.53	115	16775	.649	.008	6548	141237
32	Zehnder GT1	4	18.0	18.0	424	6652	3.31	22020	51.88	32	15672	.761	.003	2278	141237
31	Zehnder EMD6	4	2.6	2.6	28	393	3.31	1300	46.34	13	14000	.830	.001	231	21956
30	Zehnder EMD5	4	2.6	2.6	12	169	3.31	561	46.34	5	14000	.931	.001	100	21956
40	SILOS	4	70.0	8.0	72	721	103.00	74263	1030.01	12	10000	.086	.000	743	0
998	EMERG PURCH	2	150.0	.0	0	0	1033.96	0	.00	0	0	.000	.000	0	0
997	EMERG PURCH	1	150.0	.0	0	0	1033.96	0	.00	0	0	.000	.000	0	0
999	EMERG PURCH	4	150.0	.0	0	0	1033.96	0	.00	0	0	.000	.000	0	0
TOTAL					3741731			60968520	16.29					10895797	13109097

Transmission Losses and Dumped Energy (MWH) 156680.

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 12:36:05 DATE: Oct 04 1998 PAGE: 2

Multi Area Model Pooled Case
Uses Power Pool Price Files from the Traditional Scenario

INPUT FILENAME
pool1.ppi

ANNUAL SUMMARY - 1997 8760 HOURS AVERAGE INCREMENTAL COST 24.18 ANNUAL PEAK DEMAND 0 MW

UNIT OR PURCHASE #	NAME	STARTS # OF	STARTS COST $	STOPS # OF	STOPS COST $	HOURS TOTAL	HOURS MAINT	HOURS OUT-AGE	EMISSIONS SO2 TONS	SO2 LB/MBTU	SO2 LB/MWH	NOX TONS	NOX LB/MBTU	NOX LB/MWH
36	Healy 1	707	710709	707	141400	8760	408	744	270	.46	9.89	217	.37	7.95
38	HCCP	525	573456	525	105000	8760	480	840	495	.30	3.56	577	.35	4.16
17	Beluga 7-8	3	11093	3	600	8760	672	312	0	.00	.00	1543	.44	4.03
15	Beluga 6-8	21	77654	21	4200	8760	672	0	0	.00	.00	1617	.44	4.12
6	ML&P P2 U7-6	29	83673	29	5800	8760	336	288	0	.00	.00	980	.28	2.42
12	Beluga 3	251	426152	251	50200	8760	672	72	0	.00	.00	741	.44	5.69
5	ML&P P2 U5-6	244	351437	243	48600	8760	336	288	0	.00	.00	850	.62	6.43
13	Beluga 5	256	434641	256	51200	8760	672	0	0	.00	.00	451	.44	5.94
19	Bernice 3	40	28013	40	8000	8760	504	576	0	.00	.00	396	.44	6.73
20	Bernice 4	375	384913	375	75000	8760	504	408	0	.00	.00	154	.44	6.47
7	ML&P P2 U8	79	192222	79	15800	8760	336	288	0	.00	.00	13	.08	1.15
4	ML&P P1 U4	81	87336	81	16200	8760	336	288	0	.00	.00	16	.44	8.28
2	ML&P P1 U2	109	57809	109	21800	8760	2208	216	0	.00	.00	8	.44	12.32
10	Beluga 1	10	10292	10	2000	8760	504	576	0	.00	.00	1	.44	14.77
3	ML&P P1 U3	58	34328	58	11600	8760	336	288	0	.00	.00	4	.44	11.77
11	Beluga 2	4	4187	4	800	8760	504	0	0	.00	.00	1	.44	8.10
24	Soldotna 1	7	6608	7	1400	8760	336	96	0	.00	.00	7	.42	7.54
1	ML&P P1 U1	28	15136	28	5600	8760	168	288	0	.00	.00	2	.44	13.29
35	North Pole 2	140	194661	141	28200	8760	144	696	814	.89	10.92	667	.73	8.96
34	North Pole 1	137	152343	136	27200	8760	144	432	153	.89	12.07	126	.73	9.90
23	Intrnl 3	0	0	0	0	8760	336	936	0	.00	.00	0	.44	.00
21	Intrnl 1	0	0	0	0	8760	336	840	0	.00	.00	0	.44	.00
22	Intrnl 2	0	0	0	0	8760	336	840	0	.00	.00	0	.44	.00
39	Chena 6	6	5461	6	1200	2208	0	120	0	.02	.26	1	.12	1.57
37	Healy D1	12	4500	12	2400	8760	408	408	1	.84	11.76	1	.76	10.64
33	Zehnder GT2	22	10662	22	4400	8760	144	96	9	.84	14.09	8	.76	12.75
32	Zehnder GT1	10	10662	10	2000	8760	144	96	3	.84	13.17	3	.76	11.91
31	Zehnder EMD6	3	1500	3	600	8760	0	96	0	.84	11.76	0	.76	10.64
30	Zehnder EMD5	1	500	1	200	8760	0	96	0	.84	11.76	0	.76	10.64
40	SILOS	4	0	4	0	8760	0	0	0	.00	.00	0	.00	.00
998	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
997	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
999	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
TOTAL		3162	3869945	3161	631400				1744		.93	8381		4.48

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 12:36:05 DATE: Oct 04 1998 PAGE: 4

Multi Area Model Pooled Case
Uses Power Pool Price Files from the Traditional Scenario

INPUT FILENAME
pool1.ppi

ANNUAL SUMMARY - 1998 8760 HOURS AVERAGE INCREMENTAL COST 24.93 ANNUAL PEAK DEMAND 0 MW

UNIT OR PURCHASE #	NAME	AREA	MAX CAPACITY MW	MAX OUTPUT MW	ENERGY OUTPUT MWH	FUEL USED MBTU	FUEL PRICE $/MBTU	FUEL COST $	FUEL AVG $/MWH	HOURS ON LINE	HEAT RATE BTU/KWH	CAPACITY FACTOR OPER.	CAPACITY FACTOR AVG.	O & M VARIABLE $	O & M FIXED $
38	HCCP	3	53.0	53.0	345419	4078081	.62	2528639	7.32	7234	11806	.901	.744	3557971	3482841
36	Healy 1	3	25.0	25.0	59848	1234454	1.02	1259180	21.04	7052	20626	.339	.273	690195	2510540
17	Beluga 7-8	2	101.5	101.5	563629	5156684	1.69	8714995	15.46	5638	9149	1.000	.653	1195931	831132
15	Beluga 6-8	2	101.5	101.5	791557	7418950	1.69	12538269	15.84	8037	9372	1.000	.917	1679529	831132
6	ML&P P2 U7-6	2	109.5	109.5	828596	7157488	1.97	14099192	17.02	8057	8638	.987	.906	1758223	819495
5	ML&P P2 U5-6	2	49.2	49.2	307913	3166284	1.97	6237371	20.26	6573	10283	1.000	.750	653284	368211
12	Beluga 3	2	66.9	66.9	249792	3282317	1.69	5547100	22.21	5445	13140	.729	.448	530004	547810
13	Beluga 5	2	71.0	71.0	148189	2032447	1.69	3434825	23.18	3753	13715	.612	.259	314428	581383
19	Bernice 3	1	28.0	28.0	110265	1706990	1.70	2901885	26.32	7268	15480	.566	.471	233960	187460
20	Bernice 4	1	28.0	28.0	49740	731822	1.70	1244098	25.01	2596	14712	.716	.212	105539	187460
7	ML&P P2 U8	2	87.6	87.6	21536	314151	1.97	618877	28.74	631	14587	.420	.030	45695	655596
24	Soldotna 1	1	39.0	39.0	29308	375968	2.05	770735	26.30	1319	12828	.600	.090	62185	136537
4	ML&P P1 U4	2	34.1	34.1	2059	36301	1.97	71513	34.74	124	17632	.515	.007	4499	277113
2	ML&P P1 U2	2	16.8	15.8	1054	30562	1.97	60206	57.10	313	28986	.219	.008	2237	132548
3	ML&P P1 U3	2	19.5	12.3	337	9141	1.97	18008	53.45	78	27132	.237	.002	715	153851
10	Beluga 1	2	16.7	3.4	9	344	1.69	581	61.69	3	36501	.197	.000	20	136747
1	ML&P P1 U1	2	16.8	3.0	63	2271	1.97	4474	70.46	24	35766	.180	.000	135	132548
11	Beluga 2	2	16.7	.0	0	0	1.69	0	.00	0	0	.000	.000	0	136747
23	Intrnl 3	2	18.9	.0	0	0	2.05	0	.00	0	0	.000	.000	0	111935
35	North Pole 2	4	59.3	59.3	182542	2123867	3.18	6759569	37.03	7739	11634	.457	.404	902447	325063
21	Intrnl 1	2	15.0	.0	0	0	2.05	0	.00	0	0	.000	.000	0	88837
34	North Pole 1	4	56.7	56.5	29397	335067	3.18	1066415	36.28	1123	11398	.506	.065	145331	310810
22	Intrnl 2	2	15.1	.0	0	0	2.05	0	.00	0	0	.000	.000	0	89429
39	Chena 6	4	29.3	29.3	2180	28341	3.61	102228	46.88	116	12997	.642	.008	674	271611
37	Healy D1	3	2.6	2.6	90	1256	3.30	4140	46.14	41	14000	.842	.004	761	62490
33	Zehnder GT2	4	18.0	17.9	184	3172	3.41	10813	58.69	17	17215	.602	.001	1018	145474
32	Zehnder GT1	4	18.0	12.1	22	368	3.41	1254	58.23	2	17078	.598	.000	119	145474
31	Zehnder EMD6	4	2.6	.0	0	0	3.41	0	.00	0	0	.000	.000	0	22615
30	Zehnder EMD5	4	2.6	.0	0	0	3.41	0	.00	0	0	.000	.000	0	22615
18	Bernice 2	1	19.3	18.7	181	4034	1.70	6857	37.99	32	22344	.335	.001	383	129213
40	SILOS	4	70.0	.0	0	0	106.09	0	.00	0	0	.000	.000	0	0
998	EMERG PURCH	2	150.0	.0	0	0	1070.15	0	.00	0	0	.000	.000	0	0
997	EMERG PURCH	1	150.0	.0	0	0	1070.15	0	.00	0	0	.000	.000	0	0
999	EMERG PURCH	4	150.0	.0	0	0	1070.15	0	.00	0	0	.000	.000	0	0
TOTAL					3723910			68001232	18.26					11885283	13834733

Transmission Losses and Dumped Energy (MWH) 151510.

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 12:36:05 DATE: Oct 04 1998 PAGE: 5

Multi Area Model Pooled Case
Uses Power Pool Price Files from the Traditional Scenario

INPUT FILENAME
pool1.ppi

ANNUAL SUMMARY - 1998 8760 HOURS AVERAGE INCREMENTAL COST 24.93 ANNUAL PEAK DEMAND 0 MW

UNIT OR PURCHASE #	NAME	STARTS # OF	STARTS COST $	STOPS # OF	STOPS COST $	HOURS TOTAL	HOURS MAINT	HOURS OUT-AGE	EMISSIONS SO2 TONS	SO2 LB/MBTU	SO2 LB/MWH	NOX TONS	NOX LB/MBTU	NOX LB/MWH
38	HCCP	199	222724	199	39800	8760	480	840	612	.30	3.54	714	.35	4.13
36	Healy 1	545	564377	545	109000	8760	408	744	284	.46	9.49	228	.37	7.63
17	Beluga 7-8	1	3821	1	200	8760	2880	240	0	.00	.00	1134	.44	4.03
15	Beluga 6-8	8	30570	8	1600	8760	672	0	0	.00	.00	1632	.44	4.12
6	ML&P P2 U7-6	12	36086	12	2400	8760	336	288	0	.00	.00	1002	.28	2.42
5	ML&P P2 U5-6	210	317815	210	42000	8760	336	288	0	.00	.00	989	.62	6.43
12	Beluga 3	207	364574	208	41600	8760	672	72	0	.00	.00	722	.44	5.78
13	Beluga 5	262	461441	261	52200	8760	672	0	0	.00	.00	447	.44	6.03
19	Bernice 3	107	99743	107	21400	8760	504	576	0	.00	.00	376	.44	6.81
20	Bernice 4	406	417000	406	81200	8760	504	408	0	.00	.00	161	.44	6.47
7	ML&P P2 U8	66	167945	66	13200	8760	1320	240	0	.00	.00	12	.08	1.14
24	Soldotna 1	136	151504	136	27200	8760	336	96	0	.00	.00	79	.42	5.39
4	ML&P P1 U4	35	39897	35	7000	8760	336	288	0	.00	.00	8	.44	7.76
2	ML&P P1 U2	108	60436	108	21600	8760	168	288	0	.00	.00	7	.44	12.75
3	ML&P P1 U3	31	19376	31	6200	8760	336	288	0	.00	.00	2	.44	11.94
10	Beluga 1	2	2128	2	400	8760	504	576	0	.00	.00	0	.44	16.06
1	ML&P P1 U1	11	6280	11	2200	8760	168	288	0	.00	.00	0	.44	15.74
11	Beluga 2	0	0	0	0	8760	504	0	0	.00	.00	0	.44	.00
23	Intrnl 3	0	0	0	0	8760	336	936	0	.00	.00	0	.44	.00
35	North Pole 2	25	34870	25	5000	8760	144	696	945	.89	10.36	775	.73	8.49
21	Intrnl 1	0	0	0	0	8760	336	840	0	.00	.00	0	.44	.00
34	North Pole 1	56	81944	56	11200	8760	144	432	149	.89	10.14	122	.73	8.32
22	Intrnl 2	0	0	0	0	8760	336	840	0	.00	.00	0	.44	.00
39	Chena 6	19	19123	19	3800	8760	360	432	0	.02	.26	2	.12	1.56
37	Healy D1	13	6180	13	2600	8760	408	408	1	.84	11.76	0	.76	10.64
33	Zehnder GT2	3	2196	3	600	8760	2208	72	1	.84	14.46	1	.76	13.08
32	Zehnder GT1	1	1098	1	200	8760	2208	72	0	.84	14.35	0	.76	12.98
31	Zehnder EMD6	0	0	0	0	8760	0	96	0	.84	.00	0	.76	.00
30	Zehnder EMD5	0	0	0	0	8760	0	96	0	.84	.00	0	.76	.00
18	Bernice 2	6	6435	6	1200	8760	504	408	0	.00	.00	1	.44	9.83
40	SILOS	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
998	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
997	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
999	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
TOTAL		2469	3117562	2469	493800				1992		1.07	8416		4.52

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 12:36:05 DATE: Oct 04 1998 PAGE: 7

Multi Area Model Pooled Case
Uses Power Pool Price Files from the Traditional Scenario

INPUT FILENAME
pool1.ppi

ANNUAL SUMMARY - 1999 8760 HOURS AVERAGE INCREMENTAL COST 27.06 ANNUAL PEAK DEMAND 0 MW

UNIT OR PURCHASE #	NAME	AREA	MAX CAPACITY MW	MAX OUTPUT MW	ENERGY OUTPUT MWH	FUEL USED MBTU	FUEL PRICE $/MBTU	FUEL COST $	FUEL AVG $/MWH	HOURS ON LINE	HEAT RATE BTU/KWH	CAPACITY FACTOR OPER.	CAPACITY FACTOR AVG.	O & M VARIABLE $	O & M FIXED $
38	HCCP	3	53.0	53.0	341630	4036508	.65	2623896	7.68	7234	11815	.891	.736	3624262	3587327
36	Healy 1	3	25.0	25.0	62183	1252229	.94	1177151	18.93	7005	20137	.355	.284	738592	2585856
17	Beluga 7-8	2	101.5	101.5	765774	7005639	1.73	12121431	15.83	7753	9148	1.000	.888	1673636	856066
15	Beluga 6-8	2	101.5	101.5	581046	5446058	1.73	9421389	16.21	5818	9372	1.000	.673	1269849	856066
6	ML&P P2 U7-6	2	109.5	109.5	831326	7180244	2.01	14431927	17.36	8041	8637	.988	.909	1816786	844080
5	ML&P P2 U5-6	2	49.2	49.2	297971	3064033	2.01	6158669	20.67	6370	10282	1.000	.725	651168	379258
12	Beluga 3	2	66.9	66.9	269921	3522378	1.73	6093740	22.58	5736	13049	.750	.485	589898	564244
13	Beluga 5	2	71.0	71.0	169515	2303746	1.73	3985492	23.51	4216	13590	.632	.297	370468	598825
19	Bernice 3	1	28.0	28.0	107531	1652956	1.75	2892670	26.90	6956	15371	.576	.459	235004	193083
20	Bernice 4	1	28.0	28.0	56792	826109	1.75	1445691	25.46	2891	14546	.741	.242	124116	193083
7	ML&P P2 U8	2	87.6	87.6	39155	560904	2.01	1127414	28.79	1111	14325	.441	.054	85571	675264
24	Soldotna 1	1	39.0	36.6	32420	411770	2.10	864717	26.67	1436	12701	.618	.100	70852	140633
4	ML&P P1 U4	2	34.1	26.6	2547	42264	2.01	84952	33.35	139	16592	.582	.009	5734	285426
2	ML&P P1 U2	2	16.8	8.8	1239	35045	2.01	70439	56.86	365	28287	.227	.009	2707	136525
3	ML&P P1 U3	2	19.5	9.5	609	16570	2.01	33306	54.70	145	27213	.236	.004	1331	158466
10	Beluga 1	2	16.7	5.3	59	1958	1.73	3387	57.16	18	33039	.229	.000	129	140850
1	ML&P P1 U1	2	16.8	6.8	107	3244	2.01	6520	61.10	30	30399	.227	.001	233	136525
11	Beluga 2	2	16.7	10.9	11	215	1.73	371	33.98	1	19640	.759	.000	24	140850
23	Intrnl 3	2	18.9	.0	0	0	2.10	0	.00	0	0	.000	.000	0	115293
35	North Pole 2	4	59.3	59.3	169072	1844623	3.28	6047041	35.77	5898	10910	.529	.375	860934	334814
21	Intrnl 1	2	15.0	.0	0	0	2.10	0	.00	0	0	.000	.000	0	91502
34	North Pole 1	4	56.7	56.5	57195	675422	3.28	2214153	38.71	2602	11809	.460	.127	291244	320135
22	Intrnl 2	2	15.1	.0	0	0	2.10	0	.00	0	0	.000	.000	0	92112
39	Chena 6	4	29.3	29.3	10327	129848	3.72	482419	46.71	486	12573	.725	.040	3287	279759
37	Healy D1	3	2.6	2.6	28	399	3.39	1354	47.53	11	14000	.996	.001	249	64364
33	Zehnder GT2	4	18.0	14.5	994	17561	3.51	61666	62.04	101	17666	.565	.007	5659	149839
32	Zehnder GT1	4	18.0	14.5	685	11163	3.51	39199	57.23	59	16298	.680	.005	3899	149839
31	Zehnder EMD6	4	2.6	.0	0	0	3.51	0	.00	0	0	.000	.000	0	23294
30	Zehnder EMD5	4	2.6	.0	0	0	3.51	0	.00	0	0	.000	.000	0	23294
18	Bernice 2	1	19.3	13.2	194	3719	1.75	6509	33.61	26	19202	.443	.001	423	133089
40	SILOS	4	70.0	.0	0	0	109.27	0	.00	0	0	.000	.000	0	0
998	EMERG PURCH	2	150.0	.0	0	0	1107.61	0	.00	0	0	.000	.000	0	0
997	EMERG PURCH	1	150.0	.0	0	0	1107.61	0	.00	2	0	.000	.000	0	0
999	EMERG PURCH	4	150.0	.0	0	0	1107.61	0	.00	0	0	.000	.000	0	0
TOTAL					3798331			71395504	18.80					12426053	14249773

Transmission Losses and Dumped Energy (MWH) 153294.

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 12:36:05 DATE: Oct 04 1998 PAGE: 8

Multi Area Model Pooled Case
Uses Power Pool Price Files from the Traditional Scenario

INPUT FILENAME
pool1.ppi

ANNUAL SUMMARY - 1999 8760 HOURS AVERAGE INCREMENTAL COST 27.06 ANNUAL PEAK DEMAND 0 MW

UNIT OR PURCHASE #	NAME	STARTS # OF	STARTS COST $	STOPS # OF	STOPS COST $	HOURS TOTAL	HOURS MAINT	HOURS OUT-AGE	EMISSIONS SO2 TONS	SO2 LB/MBTU	SO2 LB/MWH	NOX TONS	NOX LB/MBTU	NOX LB/MWH
38	HCCP	199	230996	199	39800	8760	480	840	605	.30	3.54	706	.35	4.14
36	Healy 1	604	644175	604	120800	8760	408	744	288	.46	9.26	232	.37	7.45
17	Beluga 7-8	4	15741	4	800	8760	672	312	0	.00	.00	1541	.44	4.03
15	Beluga 6-8	13	51157	13	2600	8760	2856	0	0	.00	.00	1198	.44	4.12
6	ML&P P2 U7-6	14	43311	14	2800	8760	336	288	0	.00	.00	1005	.28	2.42
5	ML&P P2 U5-6	239	371787	239	47800	8760	336	288	0	.00	.00	958	.62	6.43
12	Beluga 3	226	409816	225	45000	8760	672	72	0	.00	.00	775	.44	5.74
13	Beluga 5	250	453336	251	50200	8760	672	0	0	.00	.00	507	.44	5.98
19	Bernice 3	158	160174	158	31600	8760	504	576	0	.00	.00	364	.44	6.76
20	Bernice 4	410	426894	410	82000	8760	504	408	0	.00	.00	182	.44	6.40
7	ML&P P2 U8	113	295702	113	22600	8760	336	288	0	.00	.00	22	.08	1.12
24	Soldotna 1	152	175621	152	30400	8760	336	96	0	.00	.00	86	.42	5.33
4	ML&P P1 U4	52	60890	52	10400	8760	336	288	0	.00	.00	9	.44	7.30
2	ML&P P1 U2	121	69569	121	24200	8760	168	288	0	.00	.00	8	.44	12.45
3	ML&P P1 U3	45	28896	45	9000	8760	2208	216	0	.00	.00	4	.44	11.97
10	Beluga 1	6	6573	6	1200	8760	504	576	0	.00	.00	0	.44	14.54
1	ML&P P1 U1	14	8212	14	2800	8760	168	288	0	.00	.00	1	.44	13.38
11	Beluga 2	1	1116	1	200	8760	504	0	0	.00	.00	0	.44	8.64
23	Intrnl 3	0	0	0	0	8760	336	936	0	.00	.00	0	.44	.00
35	North Pole 2	20	32324	20	4000	8760	2208	528	821	.89	9.71	673	.73	7.96
21	Intrnl 1	0	0	0	0	8760	336	840	0	.00	.00	0	.44	.00
34	North Pole 1	45	75423	45	9000	8760	2208	336	301	.89	10.51	247	.73	8.62
22	Intrnl 2	0	0	0	0	8760	336	840	0	.00	.00	0	.44	.00
39	Chena 6	41	37076	41	8200	8760	360	432	1	.02	.25	8	.12	1.51
37	Healy D1	4	2122	4	800	8760	408	408	0	.84	11.76	0	.76	10.64
33	Zehnder GT2	19	21492	19	3800	8760	144	96	7	.84	14.84	7	.76	13.43
32	Zehnder GT1	6	5656	6	1200	8760	144	96	5	.84	13.69	4	.76	12.39
31	Zehnder EMD6	0	0	0	0	8760	0	96	0	.84	.00	0	.76	.00
30	Zehnder EMD5	0	0	0	0	8760	0	96	0	.84	.00	0	.76	.00
18	Bernice 2	3	3314	3	600	8760	504	408	0	.00	.00	1	.44	8.45
40	SILOS	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
998	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
997	EMERG PURCH	1	0	1	0	8760	0	0	0	.00	.00	0	.00	.00
999	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
TOTAL		2760	3631371	2760	551800				2028		1.07	8537		4.50

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 12:38:04 DATE: Oct 04 1998 PAGE: 4

Multi Area Model -- Pooled Case INPUT FILENAME
Uses Power Pool Price Files from the Traditional Scenario pool2.ppi

ANNUAL SUMMARY - 2000 8760 HOURS AVERAGE INCREMENTAL COST 25.13 ANNUAL PEAK DEMAND 0 MW

UNIT OR PURCHASE #	NAME	AREA	MAX CAPACITY MW	MAX OUTPUT MW	ENERGY OUTPUT MWH	FUEL USED MBTU	FUEL PRICE $/MBTU	FUEL COST $	FUEL AVG $/MWH	HOURS ON LINE	HEAT RATE BTU/KWH	CAPACITY FACTOR OPER.	CAPACITY FACTOR AVG.	O & M VARIABLE $	O & M FIXED $
38	HCCP	3	53.0	53.0	390494	4607499	.67	3087409	7.91	7439	11799	.990	.841	4267292	3694947
36	Healy 1	3	25.0	25.0	80636	1303845	.97	1264721	15.68	5624	16169	.574	.368	986527	2663432
17	Beluga 7-8	2	101.5	101.5	763573	6985433	1.78	12435584	16.29	7774	9148	1.000	.885	1718953	881748
15	Beluga 6-8	2	101.5	101.5	797558	7475253	1.78	13304278	16.68	8079	9372	1.000	.924	1795455	881748
6	ML&P P2 U7-6	2	109.5	109.5	665985	5748590	2.06	11841256	17.78	6318	8631	.993	.728	1499181	869403
5	ML&P P2 U5-6	2	49.2	49.2	237496	2442162	2.06	5030690	21.18	5058	10282	1.000	.578	534611	390635
12	Beluga 3	2	66.9	66.9	338367	4389437	1.78	7813254	23.09	7002	12972	.767	.607	761664	581172
13	Beluga 5	2	71.0	71.0	223323	3019768	1.78	5375215	24.07	5328	13521	.643	.391	502704	616789
19	Bernice 3	1	28.0	28.0	122949	1851311	1.80	3332347	27.10	7517	15057	.610	.525	276761	198876
20	Bernice 4	1	28.0	28.0	57339	814017	1.80	1465221	25.55	2701	14196	.798	.245	129071	198876
7	ML&P P2 U8	2	87.6	87.6	30687	461874	2.06	951459	31.01	967	15051	.390	.042	69076	695522
24	Soldotna 1	1	39.0	39.0	23476	296292	2.15	637028	27.14	1000	12621	.632	.072	52844	144852
4	ML&P P1 U4	2	34.1	31.8	1739	29045	2.06	59832	34.41	94	16702	.574	.006	4032	293989
2	ML&P P1 U2	2	16.8	16.8	3737	96160	2.06	198090	53.01	950	25732	.262	.028	8412	140620
3	ML&P P1 U3	2	19.5	12.6	969	22924	2.06	47223	48.71	182	23647	.293	.006	2182	163220
10	Beluga 1	2	16.7	.0	0	0	1.78	0	.00	0	0	.000	.000	0	145075
1	ML&P P1 U1	2	16.8	16.8	511	17194	2.06	35419	69.27	177	33624	.196	.004	1151	140620
11	Beluga 2	2	16.7	.0	0	0	1.78	0	.00	0	0	.000	.000	0	145075
23	Intrnl 3	2	18.9	.0	0	0	2.15	0	.00	0	0	.000	.000	0	118752
35	North Pole 2	4	59.3	59.3	51578	653148	3.38	2205370	42.76	2323	12663	.395	.114	270520	344859
21	Intrnl 1	2	15.0	.0	0	0	2.15	0	.00	0	0	.000	.000	0	94247
34	North Pole 1	4	56.7	53.3	8803	120079	3.38	405449	46.06	465	13639	.349	.020	46173	329739
22	Intrnl 2	2	15.1	.0	0	0	2.15	0	.00	0	0	.000	.000	0	94876
39	Chena 6	4	29.3	27.9	816	11533	3.83	44135	54.06	57	14127	.489	.003	268	288152
37	Healy D1	3	2.6	2.6	988	13829	3.50	48355	48.95	481	14000	.790	.043	8894	66295
33	Zehnder GT2	4	18.0	15.7	76	1162	3.62	4203	55.62	6	15376	.802	.001	443	154334
32	Zehnder GT1	4	18.0	15.7	76	1162	3.62	4203	55.62	6	15376	.802	.001	443	154334
31	Zehnder EMD6	4	2.6	2.1	3	36	3.62	130	50.64	2	14000	.494	.000	23	23992
30	Zehnder EMD5	4	2.6	.5	1	7	3.62	25	50.64	1	14000	.192	.000	5	23992
18	Bernice 2	1	19.3	14.2	834	15489	1.80	27881	33.42	99	18564	.475	.005	1878	137082
40	SILOS	4	70.0	43.0	751	7513	112.55	845631	1125.56	19	10000	.565	.001	8456	0
998	EMERG PURCH	2	150.0	.0	0	0	1146.38	0	.00	0	0	.000	.000	0	0
997	EMERG PURCH	1	150.0	.0	0	0	1146.38	0	.00	0	0	.000	.000	0	0
999	EMERG PURCH	4	150.0	.0	0	0	1146.38	0	.00	0	0	.000	.000	0	0
TOTAL					3802765			70464400	18.53					12947018	14677268

Transmission Losses and Dumped Energy (MWH) 98106.

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 12:38:04 DATE: Oct 04 1998 PAGE: 5

Multi Area Model -- Pooled Case
Uses Power Pool Price Files from the Traditional Scenario

INPUT FILENAME
pool2.ppi

ANNUAL SUMMARY - 2000 8760 HOURS AVERAGE INCREMENTAL COST 25.13 ANNUAL PEAK DEMAND 0 MW

UNIT OR PURCHASE #	NAME	STARTS # OF	STARTS COST $	STOPS # OF	STOPS COST $	HOURS TOTAL	HOURS MAINT	HOURS OUT-AGE	EMISSIONS SO2 TONS	SO2 LB/MBTU	SO2 LB/MWH	NOX TONS	NOX LB/MBTU	NOX LB/MWH
38	HCCP	2	3024	2	400	8760	480	840	691	.30	3.54	806	.35	4.13
36	Healy 1	321	352672	321	64200	8760	2208	600	300	.46	7.44	241	.37	5.98
17	Beluga 7-8	1	4053	1	200	8760	672	312	0	.00	.00	1537	.44	4.03
15	Beluga 6-8	2	8106	2	400	8760	672	0	0	.00	.00	1645	.44	4.12
6	ML&P P2 U7-6	1	3184	1	200	8760	2208	216	0	.00	.00	805	.28	2.42
5	ML&P P2 U5-6	136	217672	136	27200	8760	2208	216	0	.00	.00	763	.62	6.43
12	Beluga 3	94	175557	94	18800	8760	672	72	0	.00	.00	966	.44	5.71
13	Beluga 5	158	295085	158	31600	8760	672	0	0	.00	.00	664	.44	5.95
19	Bernice 3	33	18204	33	6600	8760	504	576	0	.00	.00	407	.44	6.63
20	Bernice 4	251	246620	252	50400	8760	504	408	0	.00	.00	179	.44	6.25
7	ML&P P2 U8	60	161587	60	12000	8760	336	288	0	.00	.00	18	.08	1.17
24	Soldotna 1	88	101106	88	17600	8760	1080	72	0	.00	.00	62	.42	5.30
4	ML&P P1 U4	24	28905	24	4800	8760	336	288	0	.00	.00	6	.44	7.35
2	ML&P P1 U2	165	97585	164	32800	8760	168	288	0	.00	.00	21	.44	11.32
3	ML&P P1 U3	48	31704	48	9600	8760	336	288	0	.00	.00	5	.44	10.41
10	Beluga 1	0	0	0	0	8760	504	576	0	.00	.00	0	.44	.00
1	ML&P P1 U1	56	33785	56	11200	8760	168	288	0	.00	.00	4	.44	14.79
11	Beluga 2	0	0	0	0	8760	504	0	0	.00	.00	0	.44	.00
23	Intrnl 3	0	0	0	0	8760	336	936	0	.00	.00	0	.44	.00
35	North Pole 2	105	127626	105	21000	8760	144	696	291	.89	11.27	238	.73	9.24
21	Intrnl 1	0	0	0	0	8760	336	840	0	.00	.00	0	.44	.00
34	North Pole 1	56	59189	56	11200	8760	144	432	53	.89	12.14	44	.73	9.96
22	Intrnl 2	0	0	0	0	8760	336	840	0	.00	.00	0	.44	.00
39	Chena 6	9	9547	9	1800	8760	360	432	0	.02	.28	1	.12	1.70
37	Healy D1	193	56822	193	38600	8760	408	408	6	.84	11.76	5	.76	10.64
33	Zehnder GT2	1	1165	1	200	8760	144	96	0	.84	12.92	0	.76	11.69
32	Zehnder GT1	1	1165	1	200	8760	144	96	0	.84	12.92	0	.76	11.69
31	Zehnder EMD6	2	1093	2	400	8760	0	96	0	.84	11.76	0	.76	10.64
30	Zehnder EMD5	1	546	1	200	8760	0	96	0	.84	11.76	0	.76	10.64
18	Bernice 2	78	88743	78	15600	8760	504	408	0	.00	.00	3	.44	8.17
40	SILOS	2	0	2	0	8760	0	0	0	.00	.00	0	.00	.00
998	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
997	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
999	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
TOTAL		1888	2124746	1888	377200				1342		.71	8422		4.43

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 12:38:04 DATE: Oct 04 1998 PAGE: 7

Multi Area Model -- Pooled Case INPUT FILENAME
Uses Power Pool Price Files from the Traditional Scenario pool2.ppi

ANNUAL SUMMARY - 2001 8760 HOURS AVERAGE INCREMENTAL COST 23.65 ANNUAL PEAK DEMAND 0 MW

UNIT OR PURCHASE #	NAME	AREA	MAX CAPACITY MW	MAX OUTPUT MW	ENERGY OUTPUT MWH	FUEL USED MBTU	FUEL PRICE $/MBTU	FUEL COST $	FUEL AVG $/MWH	HOURS ON LINE	HEAT RATE BTU/KWH	CAPACITY FACTOR OPER.	CAPACITY FACTOR AVG.	O & M VARIABLE $	O & M FIXED $
38	HCCP	3	53.0	53.0	390495	4607487	.70	3225516	8.26	7440	11799	.990	.841	4394953	3805795
36	Healy 1	3	25.0	25.0	108866	1733545	.99	1716190	15.76	7204	15923	.604	.497	1371829	2743335
17	Beluga 7-8	2	101.5	101.5	618395	5657623	1.84	10410313	16.83	6216	9148	1.000	.952	1433874	676796
15	Beluga 6-8	2	101.5	101.5	649480	6087464	1.84	11200059	17.24	6528	9372	1.000	1.000	1505967	676796
6	ML&P P2 U7-6	2	109.5	109.5	844167	7285586	2.12	15444049	18.30	8120	8630	.994	.923	1957218	895485
5	ML&P P2 U5-6	2	49.2	49.2	310098	3188748	2.12	6759626	21.80	6625	10283	1.000	.755	718962	402354
12	Beluga 3	2	66.9	66.9	277952	3620190	1.84	6661463	23.97	5752	13024	.759	.499	644454	598607
13	Beluga 5	2	71.0	71.0	183556	2439408	1.84	4488529	24.45	4104	13289	.696	.321	425584	635293
14	Beluga 6CT	2	74.0	68.0	109411	1405658	1.84	2586390	23.64	1695	12847	.949	.737	253674	165080
16	Beluga 7CT	2	74.0	68.0	70750	1012002	1.84	1862081	26.32	1666	14304	.625	.476	164036	165080
19	Bernice 3	1	28.0	28.0	127019	1884170	1.85	3485689	27.44	7400	14833	.640	.542	294498	204842
20	Bernice 4	1	28.0	28.0	57595	803632	1.85	1486701	25.81	2578	13953	.846	.246	133539	204842
7	ML&P P2 U8	2	87.6	87.6	26671	363187	2.12	769956	28.87	630	13617	.516	.037	61839	716388
24	Soldotna 1	1	39.0	39.0	32059	396677	2.20	872692	27.22	1301	12373	.674	.099	74331	149198
4	ML&P P1 U4	2	34.1	34.1	3946	59434	2.12	126000	31.93	171	15061	.728	.014	9424	302809
2	ML&P P1 U2	2	16.8	16.8	3652	78976	2.12	167429	45.84	709	21624	.349	.027	8468	144839
3	ML&P P1 U3	2	19.5	16.5	983	20410	2.12	43268	43.99	147	20752	.367	.006	2280	168117
10	Beluga 1	2	16.7	4.0	91	3465	1.84	6376	70.16	33	38130	.185	.001	211	149428
1	ML&P P1 U1	2	16.8	16.8	393	11650	2.12	24697	62.86	111	29652	.236	.003	911	144839
11	Beluga 2	2	16.7	.0	0	0	1.84	0	.00	0	0	.000	.000	0	149428
23	Intrnl 3	2	18.9	.0	0	0	2.20	0	.00	0	0	.000	.000	0	122314
35	North Pole 2	4	59.3	59.0	54503	708080	3.48	2462581	45.18	2634	12991	.372	.121	294439	355205
21	Intrnl 1	2	15.0	.0	0	0	2.20	0	.00	0	0	.000	.000	0	97075
34	North Pole 1	4	56.7	55.8	8131	112155	3.48	390055	47.97	439	13793	.336	.018	43926	339631
22	Intrnl 2	2	15.1	.0	0	0	2.20	0	.00	0	0	.000	.000	0	97722
39	Chena 6	4	29.3	29.3	764	11551	3.94	45530	59.61	64	15124	.407	.003	258	296796
37	Healy D1	3	2.6	2.6	525	7349	3.60	26467	50.42	331	14000	.610	.023	4868	68284
33	Zehnder GT2	4	18.0	15.5	58	967	3.73	3601	61.59	5	16531	.650	.000	353	158964
32	Zehnder GT1	4	18.0	10.0	10	177	3.73	658	65.57	1	17599	.557	.000	61	158964
31	Zehnder EMD6	4	2.6	.0	0	0	3.73	0	.00	0	0	.000	.000	0	24712
30	Zehnder EMD5	4	2.6	.5	1	14	3.73	52	52.16	2	14000	.192	.000	9	24712
18	Bernice 2	1	19.3	16.6	738	13060	1.85	24161	32.74	80	17698	.538	.005	1711	141195
40	SILOS	4	70.0	.5	1	5	115.93	580	1159.27	1	10000	.007	.000	6	0
998	EMERG PURCH	2	150.0	.0	0	0	1186.50	0	.00	0	0	.000	.000	0	0
997	EMERG PURCH	1	150.0	.0	0	0	1186.50	0	.00	0	0	.000	.000	0	0
999	EMERG PURCH	4	150.0	.0	0	0	1186.50	0	.00	0	0	.000	.000	0	0
TOTAL					3880310			74290704	19.15					13801683	14984939

Transmission Losses and Dumped Energy (MWH) 101498.

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 12:38:04 DATE: Oct 04 1998 PAGE: 8

Multi Area Model -- Pooled Case
Uses Power Pool Price Files from the Traditional Scenario

INPUT FILENAME
pool2.ppi

ANNUAL SUMMARY - 2001 8760 HOURS AVERAGE INCREMENTAL COST 23.65 ANNUAL PEAK DEMAND 0 MW

UNIT OR PURCHASE #	NAME	STARTS # OF	STARTS COST $	STOPS # OF	STOPS COST $	HOURS TOTAL	HOURS MAINT	HOURS OUT-AGE	EMISSIONS SO2 TONS	SO2 LB/MBTU	SO2 LB/MWH	NOX TONS	NOX LB/MBTU	NOX LB/MWH
38	HCCP	1	1904	1	200	8760	480	840	691	.30	3.54	806	.35	4.13
36	Healy 1	406	459344	406	81200	8760	408	744	399	.46	7.32	321	.37	5.89
17	Beluga 7-8	1	4175	0	0	6528	0	312	0	.00	.00	1245	.44	4.03
15	Beluga 6-8	1	4175	0	0	6528	0	0	0	.00	.00	1339	.44	4.12
6	ML&P P2 U7-6	3	9839	3	600	8760	336	288	0	.00	.00	1020	.28	2.42
5	ML&P P2 U5-6	174	286795	174	34800	8760	336	288	0	.00	.00	996	.62	6.43
12	Beluga 3	174	334792	174	34800	8760	672	72	0	.00	.00	796	.44	5.73
13	Beluga 5	177	340565	177	35400	8760	672	0	0	.00	.00	537	.44	5.85
14	Beluga 6CT	7	29226	6	1200	2184	0	408	0	.00	.00	309	.44	5.65
16	Beluga 7CT	28	116903	27	5400	2184	0	0	0	.00	.00	223	.44	6.29
19	Bernice 3	61	38668	61	12200	8760	504	576	0	.00	.00	415	.44	6.53
20	Bernice 4	290	288765	290	58000	8760	504	408	0	.00	.00	177	.44	6.14
7	ML&P P2 U8	60	166411	60	12000	8760	336	288	0	.00	.00	14	.08	1.06
24	Soldotna 1	121	143268	121	24200	8760	336	96	0	.00	.00	83	.42	5.20
4	ML&P P1 U4	33	40927	33	6600	8760	336	288	0	.00	.00	13	.44	6.63
2	ML&P P1 U2	140	85265	141	28200	8760	168	288	0	.00	.00	17	.44	9.51
3	ML&P P1 U3	43	29247	43	8600	8760	336	288	0	.00	.00	4	.44	9.13
10	Beluga 1	3	3487	3	600	8760	504	576	0	.00	.00	1	.44	16.78
1	ML&P P1 U1	51	31685	51	10200	8760	168	288	0	.00	.00	3	.44	13.05
11	Beluga 2	0	0	0	0	8760	504	0	0	.00	.00	0	.44	.00
23	Intrnl 3	0	0	0	0	8760	336	936	0	.00	.00	0	.44	.00
35	North Pole 2	117	190515	117	23400	8760	144	696	315	.89	11.56	258	.73	9.48
21	Intrnl 1	0	0	0	0	8760	336	840	0	.00	.00	0	.44	.00
34	North Pole 1	48	59060	48	9600	8760	144	432	50	.89	12.28	41	.73	10.07
22	Intrnl 2	0	0	0	0	8760	336	840	0	.00	.00	0	.44	.00
39	Chena 6	13	8604	13	2600	8760	360	432	0	.02	.30	1	.12	1.81
37	Healy D1	125	43895	125	25000	8760	408	408	3	.84	11.76	3	.76	10.64
33	Zehnder GT2	1	1200	1	200	8760	144	96	0	.84	13.89	0	.76	12.56
32	Zehnder GT1	1	1200	1	200	8760	144	96	0	.84	14.78	0	.76	13.38
31	Zehnder EMD6	0	0	0	0	8760	0	96	0	.84	.00	0	.76	.00
30	Zehnder EMD5	1	563	1	200	8760	0	96	0	.84	11.76	0	.76	10.64
18	Bernice 2	46	53901	46	9200	8760	504	408	0	.00	.00	3	.44	7.79
40	SILOS	1	0	1	0	8760	0	0	0	.00	.00	0	.00	.00
998	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
997	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
999	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
TOTAL		2127	2774376	2124	424600				1459		.75	8626		4.45

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 12:40:39 DATE: Oct 04 1998 PAGE: 4

Multi Area Model -- Pooled Case
Uses Power Pool Price Files from the Traditional Scenario

INPUT FILENAME
pool3.ppi

ANNUAL SUMMARY - 2002 8760 HOURS AVERAGE INCREMENTAL COST 23.71 ANNUAL PEAK DEMAND 0 MW

UNIT OR PURCHASE #	NAME	AREA	MAX CAPACITY MW	MAX OUTPUT MW	ENERGY OUTPUT MWH	FUEL USED MBTU	FUEL PRICE $/MBTU	FUEL COST $	FUEL AVG $/MWH	HOURS ON LINE	HEAT RATE BTU/KWH	CAPACITY FACTOR OPER.	CAPACITY FACTOR AVG.	O & M VARIABLE $	O & M FIXED $
36	Healy 1	3	25.0	25.0	87766	1531954	1.05	1608569	18.33	7316	17454	.480	.401	1139166	2825635
38	HCCP	3	53.0	53.0	385263	4544976	.76	3454511	8.97	7439	11797	.977	.830	4466465	3919969
17	Beluga 7-8	2	101.5	101.5	767614	7022485	1.88	13203481	17.20	7774	9148	1.000	.890	1833183	935447
15	Beluga 6-8	2	101.5	101.5	795857	7459392	1.88	14022016	17.62	8063	9372	1.000	.922	1900646	935447
6	ML&P P2 U7-6	2	109.5	109.5	839784	7249206	2.16	15657412	18.64	8092	8632	.992	.918	2005492	922349
5	ML&P P2 U5-6	2	49.2	49.2	301102	3096265	2.16	6686994	22.21	6425	10283	1.000	.733	719053	414425
12	Beluga 3	2	66.9	66.9	281531	3676381	1.88	6911703	24.55	5903	13058	.750	.505	672322	616565
13	Beluga 5	2	71.0	71.0	172267	2350106	1.88	4418200	25.65	4239	13642	.627	.301	411393	654352
19	Bernice 3	1	28.0	28.0	126466	1868257	1.90	3549623	28.07	7285	14772	.647	.540	302014	210987
20	Bernice 4	1	28.0	28.0	52414	733943	1.90	1394489	26.61	2367	14002	.834	.224	125172	210987
7	ML&P P2 U8	2	87.6	87.6	28748	407507	2.16	880213	30.62	760	14175	.460	.040	68653	737879
24	Soldotna 1	1	39.0	39.0	26515	330176	2.25	742898	28.02	1084	12452	.661	.082	65220	153674
4	ML&P P1 U4	2	34.1	34.1	1780	28040	2.16	60567	34.03	84	15754	.656	.006	4378	311893
2	ML&P P1 U2	2	16.8	15.7	1799	46107	2.16	99592	55.37	458	25636	.264	.013	4295	149184
3	ML&P P1 U3	2	19.5	12.9	528	12340	2.16	26654	50.44	96	23350	.300	.003	1262	173160
10	Beluga 1	2	16.7	2.6	21	806	1.88	1514	73.18	8	38923	.180	.000	49	153911
1	ML&P P1 U1	2	16.8	11.9	239	7557	2.16	16323	68.22	76	31584	.215	.002	571	149184
11	Beluga 2	2	16.7	.0	0	0	1.88	0	.00	0	0	.000	.000	0	153911
23	Intrnl 3	2	18.9	5.0	5	124	2.25	280	55.82	1	24810	.300	.000	12	125984
35	North Pole 2	4	59.3	58.9	68622	921361	3.58	3300433	48.10	3605	13426	.355	.152	381833	365861
21	Intrnl 1	2	15.0	.0	0	0	2.25	0	.00	0	0	.000	.000	0	99987
34	North Pole 1	4	56.7	56.5	15731	228629	3.58	818982	52.06	978	14533	.308	.035	87533	349820
22	Intrnl 2	2	15.1	.0	0	0	2.25	0	.00	0	0	.000	.000	0	100653
39	Chena 6	4	29.3	29.3	1981	28778	4.06	116833	58.96	149	14523	.454	.008	689	305700
37	Healy D1	3	2.6	2.6	1045	14634	3.71	54286	51.94	478	14000	.841	.046	9985	70333
33	Zehnder GT2	4	18.0	13.3	120	2268	3.84	8704	72.74	14	18956	.484	.001	744	163733
32	Zehnder GT1	4	18.0	.0	0	0	3.84	0	.00	0	0	.000	.000	0	163733
31	Zehnder EMD6	4	2.6	.0	0	0	3.84	0	.00	0	0	.000	.000	0	25454
30	Zehnder EMD5	4	2.6	.0	0	0	3.84	0	.00	0	0	.000	.000	0	25454
18	Bernice 2	1	19.3	16.1	660	11828	1.90	22473	34.05	74	17918	.519	.004	1576	145430
40	SILOS	4	70.0	.0	0	0	119.41	0	.00	0	0	.000	.000	0	0
998	EMERG PURCH	2	150.0	.0	0	0	1228.03	0	.00	0	0	.000	.000	0	0
999	EMERG PURCH	4	150.0	.0	0	0	1228.03	0	.00	0	0	.000	.000	0	0
997	EMERG PURCH	1	150.0	.0	0	0	1228.03	0	.00	0	0	.000	.000	0	0
TOTAL					3957858			77056752	19.47					14201706	15571115

Transmission Losses and Dumped Energy (MWH) 95963.

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 12:40:39 DATE: Oct 04 1998 PAGE: 5

Multi Area Model -- Pooled Case
Uses Power Pool Price Files from the Traditional Scenario

INPUT FILENAME
pool3.ppi

ANNUAL SUMMARY - 2002 8760 HOURS AVERAGE INCREMENTAL COST 23.71 ANNUAL PEAK DEMAND 0 MW

UNIT OR PURCHASE #	NAME	STARTS # OF	STARTS COST $	STOPS # OF	STOPS COST $	HOURS TOTAL	HOURS MAINT	HOURS OUT-AGE	EMISSIONS SO2 TONS	SO2 LB/MBTU	SO2 LB/MWH	NOX TONS	NOX LB/MBTU	NOX LB/MWH
36	Healy 1	288	335694	288	57600	8760	408	744	352	.46	8.03	283	.37	6.46
38	HCCP	2	3269	2	400	8760	480	840	682	.30	3.54	795	.35	4.13
17	Beluga 7-8	1	4299	1	200	8760	672	312	0	.00	.00	1545	.44	4.03
15	Beluga 6-8	4	17197	4	800	8760	672	0	0	.00	.00	1641	.44	4.12
6	ML&P P2 U7-6	7	23613	7	1400	8760	336	288	0	.00	.00	1015	.28	2.42
5	ML&P P2 U5-6	189	320115	189	37800	8760	336	288	0	.00	.00	968	.62	6.43
12	Beluga 3	187	370410	186	37200	8760	672	72	0	.00	.00	809	.44	5.75
13	Beluga 5	231	457566	231	46200	8760	672	0	0	.00	.00	517	.44	6.00
19	Bernice 3	70	48271	70	14000	8760	504	576	0	.00	.00	411	.44	6.50
20	Bernice 4	321	323678	322	64400	8760	504	408	0	.00	.00	161	.44	6.16
7	ML&P P2 U8	73	208168	73	14600	8760	336	288	0	.00	.00	16	.08	1.11
24	Soldotna 1	109	137397	110	22000	8760	336	96	0	.00	.00	69	.42	5.23
4	ML&P P1 U4	16	20377	16	3200	8760	336	288	0	.00	.00	6	.44	6.93
2	ML&P P1 U2	117	73188	117	23400	8760	168	288	0	.00	.00	10	.44	11.28
3	ML&P P1 U3	41	28639	41	8200	8760	336	288	0	.00	.00	3	.44	10.27
10	Beluga 1	1	1197	1	200	8760	504	576	0	.00	.00	0	.44	17.13
1	ML&P P1 U1	31	19779	31	6200	8760	168	288	0	.00	.00	2	.44	13.90
11	Beluga 2	0	0	0	0	8760	504	0	0	.00	.00	0	.44	.00
23	Intrnl 3	1	1211	1	200	8760	336	936	0	.00	.00	0	.44	10.92
35	North Pole 2	252	345365	252	50400	8760	144	696	410	.89	11.95	336	.73	9.80
21	Intrnl 1	0	0	0	0	8760	336	840	0	.00	.00	0	.44	.00
34	North Pole 1	117	135399	117	23400	8760	144	432	102	.89	12.93	83	.73	10.61
22	Intrnl 2	0	0	0	0	8760	336	840	0	.00	.00	0	.44	.00
39	Chena 6	29	26587	29	5800	8760	360	432	0	.02	.29	2	.12	1.74
37	Healy D1	115	44632	115	23000	8760	408	408	6	.84	11.76	6	.76	10.64
33	Zehnder GT2	3	1236	3	600	8760	144	96	1	.84	15.92	1	.76	14.41
32	Zehnder GT1	0	0	0	0	8760	144	96	0	.84	.00	0	.76	.00
31	Zehnder EMD6	0	0	0	0	8760	0	96	0	.84	.00	0	.76	.00
30	Zehnder EMD5	0	0	0	0	8760	0	96	0	.84	.00	0	.76	.00
18	Bernice 2	39	47064	39	7800	8760	504	408	0	.00	.00	3	.44	7.88
40	SILOS	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
998	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
999	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
997	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
TOTAL		2244	2994350	2245	449000				1553		.78	8682		4.39

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 12:40:39 DATE: Oct 04 1998 PAGE: 7

Multi Area Model -- Pooled Case
Uses Power Pool Price Files from the Traditional Scenario

INPUT FILENAME
pool3.ppi

ANNUAL SUMMARY - 2003 8760 HOURS AVERAGE INCREMENTAL COST 28.35 ANNUAL PEAK DEMAND 0 MW

UNIT #	OR PURCHASE NAME	AREA	MAX CAPACITY MW	MAX OUTPUT MW	ENERGY OUTPUT MWH	FUEL USED MBTU	FUEL PRICE $/MBTU	FUEL COST $	FUEL AVG $/MWH	HOURS ON LINE	HEAT RATE BTU/KWH	CAPACITY FACTOR OPER.	CAPACITY FACTOR AVG.	O & M VARIABLE $	O & M FIXED $
36	Healy 1	3	25.0	25.0	94982	1607321	1.07	1719861	18.11	7352	16922	.517	.434	1269806	2910404
38	HCCP	3	53.0	53.0	384736	4539550	.77	3495855	9.09	7440	11799	.976	.829	4593835	4037568
17	Beluga 7-8	2	101.5	101.5	825091	7548212	1.94	14645449	17.75	8376	9148	1.000	.959	2029300	960870
15	Beluga 6-8	2	101.5	101.5	796335	7464434	1.94	14479277	18.18	8073	9373	.999	.923	1958588	963510
6	ML&P P2 U7-6	2	109.5	109.5	835057	7213431	2.22	16012740	19.18	8080	8638	.987	.913	2054093	950020
5	ML&P P2 U5-6	2	49.2	49.2	304983	3136196	2.22	6961530	22.83	6525	10283	1.000	.743	750178	426858
12	Beluga 3	2	66.9	66.9	260942	3423281	1.94	6641281	25.45	5522	13118	.740	.468	641853	635062
13	Beluga 5	2	71.0	71.0	178559	2421604	1.94	4697926	26.31	4276	13561	.644	.312	439211	673982
19	Bernice 3	1	28.0	28.0	130476	1913637	1.95	3731597	28.60	7327	14666	.664	.557	320939	217317
20	Bernice 4	1	28.0	28.0	57817	813610	1.95	1586535	27.44	2644	14072	.822	.247	142217	217317
7	ML&P P2 U8	2	87.6	87.6	31867	435474	2.22	966750	30.34	751	13665	.514	.044	78384	760016
24	Soldotna 1	1	39.0	39.0	36693	450506	2.30	1036165	28.24	1417	12277	.696	.113	92964	158284
4	ML&P P1 U4	2	34.1	34.1	5107	79341	2.22	176137	34.49	232	15534	.682	.018	12940	321250
2	ML&P P1 U2	2	16.8	16.3	2889	68133	2.22	151257	52.36	642	23584	.302	.021	7106	153660
3	ML&P P1 U3	2	19.5	13.5	1013	21074	2.22	46785	46.19	153	20804	.366	.006	2492	178355
1	ML&P P1 U1	2	16.8	9.0	320	9415	2.22	20902	65.33	90	29425	.238	.002	787	153660
10	Beluga 1	2	16.7	.0	0	0	1.94	0	.00	0	0	.000	.000	0	158528
11	Beluga 2	2	16.7	.0	0	0	1.94	0	.00	0	0	.000	.000	0	158528
23	Intrnl 3	2	18.9	.0	0	0	2.30	0	.00	0	0	.000	.000	0	129763
35	North Pole 2	4	59.3	59.3	74771	973345	3.69	3591257	48.03	3572	13017	.377	.166	428530	376837
21	Intrnl 1	2	15.0	.0	0	0	2.30	0	.00	0	0	.000	.000	0	102987
34	North Pole 1	4	56.7	56.0	20879	332640	3.69	1227312	58.78	1608	15931	.265	.046	119662	360314
22	Intrnl 2	2	15.1	.0	0	0	2.30	0	.00	0	0	.000	.000	0	103673
39	Chena 6	4	29.3	29.3	7881	113988	4.18	476648	60.48	585	14464	.460	.031	2823	314871
37	Healy D1	3	2.6	2.6	1728	24194	3.82	92443	53.49	713	14000	.932	.076	17003	72443
33	Zehnder GT2	4	18.0	17.3	698	11938	3.95	47181	67.56	65	17093	.605	.005	4475	168645
32	Zehnder GT1	4	18.0	15.6	480	7620	3.95	30118	62.72	37	15868	.721	.003	3077	168645
31	Zehnder EMD6	4	2.6	.0	0	0	3.95	0	.00	0	0	.000	.000	0	26217
30	Zehnder EMD5	4	2.6	.0	0	0	3.95	0	.00	0	0	.000	.000	0	26217
18	Bernice 2	1	19.3	19.3	503	8740	1.95	17043	33.91	51	17390	.561	.003	1236	149793
40	SILOS	4	70.0	.0	0	0	122.99	0	.00	0	0	.000	.000	0	0
998	EMERG PURCH	2	150.0	.0	0	0	1271.01	0	.00	0	0	.000	.000	0	0
999	EMERG PURCH	4	150.0	.0	0	0	1271.01	0	.00	0	0	.000	.000	0	0
997	EMERG PURCH	1	150.0	.0	0	0	1271.01	0	.00	0	0	.000	.000	0	0
TOTAL					4053807			81852048	20.19					14971499	16035610

Transmission Losses and Dumped Energy (MWH) 99802.

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 12:40:39 DATE: Oct 04 1998 PAGE: 8

Multi Area Model -- Pooled Case
Uses Power Pool Price Files from the Traditional Scenario

INPUT FILENAME
pool3.ppi

ANNUAL SUMMARY - 2003 8760 HOURS AVERAGE INCREMENTAL COST 28.35 ANNUAL PEAK DEMAND 0 MW

UNIT OR PURCHASE #	NAME	STARTS # OF	STARTS COST $	STOPS # OF	STOPS COST $	HOURS TOTAL	HOURS MAINT	HOURS OUT-AGE	EMISSIONS SO2 TONS	SO2 LB/MBTU	SO2 LB/MWH	NOX TONS	NOX LB/MBTU	NOX LB/MWH
36	Healy 1	250	300208	250	50000	8760	408	744	370	.46	7.78	297	.37	6.26
38	HCCP	1	2050	1	200	8760	480	840	681	.30	3.54	794	.35	4.13
17	Beluga 7-8	0	0	0	0	8736	0	360	0	.00	.00	1661	.44	4.03
15	Beluga 6-8	3	13286	3	600	8760	672	0	0	.00	.00	1642	.44	4.12
6	ML&P P2 U7-6	9	31261	9	1800	8760	336	288	0	.00	.00	1010	.28	2.42
5	ML&P P2 U5-6	180	313872	180	36000	8760	336	288	0	.00	.00	980	.62	6.43
12	Beluga 3	205	418296	205	41000	8760	672	72	0	.00	.00	753	.44	5.77
13	Beluga 5	208	424417	208	41600	8760	672	0	0	.00	.00	533	.44	5.97
19	Bernice 3	84	65868	84	16800	8760	504	576	0	.00	.00	421	.44	6.45
20	Bernice 4	337	342941	337	67400	8760	504	408	0	.00	.00	179	.44	6.19
7	ML&P P2 U8	60	176168	59	11800	8760	2208	216	0	.00	.00	17	.08	1.07
24	Soldotna 1	141	177765	141	28200	8760	720	72	0	.00	.00	95	.42	5.16
4	ML&P P1 U4	42	55060	42	8400	8760	336	288	0	.00	.00	17	.44	6.84
2	ML&P P1 U2	144	92728	144	28800	8760	168	288	0	.00	.00	15	.44	10.38
3	ML&P P1 U3	44	31638	44	8800	8760	336	288	0	.00	.00	5	.44	9.15
1	ML&P P1 U1	41	26928	41	8200	8760	168	288	0	.00	.00	2	.44	12.95
10	Beluga 1	0	0	0	0	8760	504	576	0	.00	.00	0	.44	.00
11	Beluga 2	0	0	0	0	8760	504	0	0	.00	.00	0	.44	.00
23	Intrnl 3	0	0	0	0	8760	336	936	0	.00	.00	0	.44	.00
35	North Pole 2	209	291049	209	41800	8760	2208	528	433	.89	11.59	355	.73	9.50
21	Intrnl 1	0	0	0	0	8760	336	840	0	.00	.00	0	.44	.00
34	North Pole 1	190	256689	190	38000	8760	2208	336	148	.89	14.18	121	.73	11.63
22	Intrnl 2	0	0	0	0	8760	336	840	0	.00	.00	0	.44	.00
39	Chena 6	107	99106	107	21400	8760	360	432	1	.02	.29	7	.12	1.74
37	Healy D1	173	72240	173	34600	8760	408	408	10	.84	11.76	9	.76	10.64
33	Zehnder GT2	14	11458	14	2800	8760	144	96	5	.84	14.36	5	.76	12.99
32	Zehnder GT1	2	2546	2	400	8760	144	96	3	.84	13.33	3	.76	12.06
31	Zehnder EMD6	0	0	0	0	8760	0	96	0	.84	.00	0	.76	.00
30	Zehnder EMD5	0	0	0	0	8760	0	96	0	.84	.00	0	.76	.00
18	Bernice 2	37	45984	37	7400	8760	504	408	0	.00	.00	2	.44	7.65
40	SILOS	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
998	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
999	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
997	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
TOTAL		2481	3251558	2480	496000				1651		.81	8923		4.40

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 12:40:39 DATE: Oct 04 1998 PAGE: 10

Multi Area Model -- Pooled Case
Uses Power Pool Price Files from the Traditional Scenario

INPUT FILENAME
pool3.ppi

ANNUAL SUMMARY - 2004 8760 HOURS AVERAGE INCREMENTAL COST 29.37 ANNUAL PEAK DEMAND 0 MW

UNIT OR PURCHASE #	NAME	AREA	MAX CAPACITY MW	MAX OUTPUT MW	ENERGY OUTPUT MWH	FUEL USED MBTU	FUEL PRICE $/MBTU	FUEL COST $	FUEL AVG $/MWH	HOURS ON LINE	HEAT RATE BTU/KWH	CAPACITY FACTOR OPER.	CAPACITY FACTOR AVG.	O & M VARIABLE $	O & M FIXED $
36	Healy 1	3	25.0	25.0	95051	1495426	1.09	1630040	17.15	5909	15732	.643	.434	1308841	2997716
38	HCCP	3	53.0	53.0	309007	3646090	.79	2880661	9.32	5903	11799	.988	.666	3800237	4158695
29	Beluga 7-8	2	105.5	105.5	800896	6823693	1.99	13578795	16.95	7774	8520	1.000	.890	2029084	1031525
15	Beluga 6-8	2	101.5	101.5	858167	8044593	1.99	16007543	18.65	8729	9374	.998	.997	2174243	989697
6	ML&P P2 U7-6	2	109.5	109.5	829632	7172629	2.27	16280937	19.62	8092	8645	.980	.907	2101879	978520
5	ML&P P2 U5-6	2	49.2	49.2	311681	3205219	2.27	7275565	23.34	6655	10283	1.000	.759	789631	439664
12	Beluga 3	2	66.9	66.9	271137	3700266	1.99	7363585	27.16	6579	13647	.648	.487	686944	654114
13	Beluga 5	2	71.0	71.0	188114	2623666	1.99	5221126	27.76	4959	13947	.586	.329	476593	694202
19	Bernice 3	1	28.0	28.0	129555	1903883	2.00	3807767	29.39	7335	14695	.660	.553	328234	223837
20	Bernice 4	1	28.0	28.0	62383	866287	2.00	1732574	27.77	2743	13886	.859	.266	158047	223837
7	ML&P P2 U8	2	87.6	87.6	41235	617563	2.27	1401868	34.00	1275	14976	.398	.057	104471	782816
24	Soldotna 1	1	39.0	39.0	37959	465963	2.35	1095013	28.85	1468	12275	.693	.117	99055	163033
4	ML&P P1 U4	2	34.1	34.1	3396	56567	2.27	128406	37.81	180	16658	.581	.012	8861	330887
2	ML&P P1 U2	2	16.8	16.8	2562	69227	2.27	157146	61.35	713	27025	.243	.019	6490	158269
3	ML&P P1 U3	2	19.5	11.5	869	24516	2.27	55651	64.03	214	28204	.224	.005	2202	183706
1	ML&P P1 U1	2	16.8	11.1	219	7082	2.27	16076	73.48	71	32368	.207	.002	554	158269
10	Beluga 1	2	16.7	7.8	110	3353	1.99	6673	60.92	29	30614	.258	.001	277	163284
11	Beluga 2	2	16.7	.0	0	0	1.99	0	.00	0	0	.000	.000	0	163284
23	Intrnl 3	2	18.9	.0	0	0	2.35	0	.00	0	0	.000	.000	0	133656
21	Intrnl 1	2	15.0	.0	0	0	2.35	0	.00	0	0	.000	.000	0	106076
35	North Pole 2	4	59.3	59.3	148624	1826480	3.80	6941342	46.70	6702	12289	.423	.329	877363	388142
34	North Pole 1	4	56.7	56.6	35098	415176	3.80	1577792	44.95	1462	11828	.474	.078	207190	371124
22	Intrnl 2	2	15.1	4.2	20	561	2.35	1319	64.51	5	27451	.296	.000	52	106783
204	GE 7EA SC	4	83.0	66.1	7578	105814	3.71	392940	51.85	196	13963	.466	.010	27417	436067
39	Chena 6	4	29.3	26.0	383	5788	4.31	24928	65.03	32	15098	.409	.001	141	324317
37	Healy D1	3	2.6	2.6	3452	48332	3.94	190215	55.10	1440	13999	.922	.152	34986	74616
33	Zehnder GT2	4	18.0	13.8	153	2938	4.07	11961	78.24	18	19218	.472	.001	1009	173704
32	Zehnder GT1	4	18.0	.0	0	0	4.07	0	.00	0	0	.000	.000	0	173704
31	Zehnder EMD6	4	2.6	.5	1	7	4.07	28	56.99	1	14000	.192	.000	5	27004
30	Zehnder EMD5	4	2.6	.5	2	21	4.07	85	56.99	3	14000	.192	.000	15	27004
18	Bernice 2	1	19.3	16.7	893	16167	2.00	32335	36.20	101	18098	.508	.006	2263	154287
40	SILOS	4	70.0	.5	1	5	126.68	633	1266.77	1	10000	.007	.000	6	0
998	EMERG PURCH	2	150.0	.0	0	0	1315.49	0	.00	0	0	.000	.000	0	0
999	EMERG PURCH	4	150.0	.0	0	0	1315.49	0	.00	0	0	.000	.000	0	0
997	EMERG PURCH	1	150.0	.0	0	0	1315.49	0	.00	0	0	.000	.000	0	0
TOTAL					4138178			87813008	21.22					15226089	16991854

Transmission Losses and Dumped Energy (MWH) 99595.

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 12:40:39 DATE: Oct 04 1998 PAGE: 11

Multi Area Model -- Pooled Case
Uses Power Pool Price Files from the Traditional Scenario

INPUT FILENAME
pool3.ppi

ANNUAL SUMMARY - 2004 8760 HOURS AVERAGE INCREMENTAL COST 29.37 ANNUAL PEAK DEMAND 0 MW

UNIT OR PURCHASE #	NAME	STARTS # OF	STARTS COST $	STOPS # OF	STOPS COST $	HOURS TOTAL	HOURS MAINT	HOURS OUT-AGE	EMISSIONS SO2 TONS	SO2 LB/MBTU	SO2 LB/MWH	NOX TONS	NOX LB/MBTU	NOX LB/MWH
36	Healy 1	43	53218	43	8600	8760	2208	600	344	.46	7.24	277	.37	5.82
38	HCCP	2	3448	2	400	8760	2208	648	547	.30	3.54	638	.35	4.13
29	Beluga 7-8	2	9122	1	200	8760	672	312	0	.00	.00	1501	.44	3.75
15	Beluga 6-8	1	4561	1	200	8736	0	0	0	.00	.00	1770	.44	4.12
6	ML&P P2 U7-6	7	25021	7	1400	8760	336	288	0	.00	.00	1004	.28	2.42
5	ML&P P2 U5-6	168	301266	169	33800	8760	336	288	0	.00	.00	1002	.62	6.43
12	Beluga 3	146	306764	146	29200	8760	672	72	0	.00	.00	814	.44	6.00
13	Beluga 5	200	420225	199	39800	8760	672	0	0	.00	.00	577	.44	6.14
19	Bernice 3	84	66553	84	16800	8760	504	576	0	.00	.00	419	.44	6.47
20	Bernice 4	297	305550	297	59400	8760	504	408	0	.00	.00	191	.44	6.11
7	ML&P P2 U8	79	238629	79	15800	8760	336	288	0	.00	.00	24	.08	1.17
24	Soldotna 1	159	208357	159	31800	8760	336	96	0	.00	.00	98	.42	5.16
4	ML&P P1 U4	39	52554	39	7800	8760	2208	216	0	.00	.00	12	.44	7.33
2	ML&P P1 U2	145	95993	145	29000	8760	168	288	0	.00	.00	15	.44	11.89
3	ML&P P1 U3	63	46569	63	12600	8760	336	288	0	.00	.00	5	.44	12.41
1	ML&P P1 U1	32	21605	32	6400	8760	2208	216	0	.00	.00	2	.44	14.24
10	Beluga 1	9	11427	9	1800	8760	504	576	0	.00	.00	1	.44	13.47
11	Beluga 2	0	0	0	0	8760	504	0	0	.00	.00	0	.44	.00
23	Intrnl 3	0	0	0	0	8760	336	936	0	.00	.00	0	.44	.00
21	Intrnl 1	0	0	0	0	8760	336	840	0	.00	.00	0	.44	.00
35	North Pole 2	152	214426	152	30400	8760	144	696	813	.89	10.94	667	.73	8.97
34	North Pole 1	120	147808	120	24000	8760	144	432	185	.89	10.53	152	.73	8.64
22	Intrnl 2	1	1279	1	200	8760	336	840	0	.00	.00	0	.44	12.08
204	GE 7EA SC	36	27597	36	7200	8760	408	408	0	.00	.00	26	.50	6.98
39	Chena 6	7	2686	7	1400	8760	360	432	0	.02	.30	0	.12	1.81
37	Healy D1	376	126677	376	75200	8760	408	408	20	.84	11.76	18	.76	10.64
33	Zehnder GT2	3	2623	3	600	8760	144	96	1	.84	16.14	1	.76	14.61
32	Zehnder GT1	0	0	0	0	8760	144	96	0	.84	.00	0	.76	.00
31	Zehnder EMD6	1	615	1	200	8760	0	96	0	.84	11.76	0	.76	10.64
30	Zehnder EMD5	2	1230	2	400	8760	0	96	0	.84	11.76	0	.76	10.64
18	Bernice 2	56	71673	56	11200	8760	504	408	0	.00	.00	4	.44	7.96
40	SILOS	1	0	1	0	8760	0	0	0	.00	.00	0	.00	.00
998	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
999	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
997	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
TOTAL		2231	2767477	2230	445800				1910		.92	9218		4.45

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 12:40:39 DATE: Oct 04 1998 PAGE: 13

Multi Area Model -- Pooled Case
Uses Power Pool Price Files from the Traditional Scenario

INPUT FILENAME
pool3.ppi

ANNUAL SUMMARY - 2005 8760 HOURS AVERAGE INCREMENTAL COST 28.99 ANNUAL PEAK DEMAND 0 MW

UNIT #	OR PURCHASE NAME	AREA	MAX CAPACITY MW	MAX OUTPUT MW	ENERGY OUTPUT MWH	FUEL USED MBTU	FUEL PRICE $/MBTU	FUEL COST $	FUEL AVG $/MWH	HOURS ON LINE	HEAT RATE BTU/KWH	CAPACITY FACTOR OPER.	CAPACITY FACTOR AVG.	O & M VARIABLE $	O & M FIXED $
38	HCCP	3	53.0	53.0	393342	4642124	.80	3714086	9.44	7440	11801	.998	.847	4983151	4283456
36	Healy 1	3	25.0	25.0	105581	1713718	1.11	1902230	18.02	7366	16231	.573	.482	1497420	3087647
29	Beluga 7-8	2	105.5	105.5	797332	6793313	2.05	13923663	17.46	7774	8520	1.000	.886	2080602	1062471
27	Beluga 6-8	2	105.5	105.5	828302	7574682	2.05	15529597	18.75	8065	9144	.997	.920	2161443	1062471
6	ML&P P2 U7-6	2	109.5	109.5	665915	5744502	2.33	13382694	20.10	6292	8626	.998	.728	1737721	1007876
5	ML&P P2 U5-6	2	49.2	49.2	246164	2531311	2.33	5897858	23.96	5228	10283	1.000	.599	642341	452854
12	Beluga 3	2	66.9	66.9	371552	4692097	2.05	9618639	25.89	6816	12628	.860	.667	969573	673738
13	Beluga 5	2	71.0	71.0	271077	3550004	2.05	7277550	26.85	5667	13095	.740	.474	707388	715028
19	Bernice 3	1	28.0	28.0	144419	2033631	2.06	4189265	29.01	7087	14081	.761	.616	376866	230552
7	ML&P P2 U8	2	87.6	87.6	94658	1277276	2.33	2976059	31.44	2184	13493	.533	.131	247013	806301
20	Bernice 4	1	28.0	28.0	64983	875661	2.06	1803847	27.76	2555	13475	.954	.277	169576	230552
24	Soldotna 1	1	39.0	39.0	61462	738985	2.41	1780951	28.98	2205	12023	.748	.189	165201	167924
4	ML&P P1 U4	2	34.1	34.1	5896	88627	2.33	206501	35.02	246	15032	.737	.021	15847	340814
2	ML&P P1 U2	2	16.8	16.8	3785	78752	2.33	183492	48.47	675	20804	.374	.028	9878	163018
3	ML&P P1 U3	2	19.5	17.7	1697	34126	2.33	79513	46.85	239	20107	.390	.010	4429	189217
1	ML&P P1 U1	2	16.8	11.2	403	11336	2.33	26412	65.52	103	28121	.255	.003	1052	163018
10	Beluga 1	2	16.7	6.4	35	967	2.05	1983	56.52	7	27568	.306	.000	92	168182
11	Beluga 2	2	16.7	14.4	14	252	2.05	517	35.88	1	17504	1.000	.000	38	168182
23	Intrnl 3	2	18.9	8.0	21	435	2.41	1049	48.78	3	20241	.429	.000	56	137666
21	Intrnl 1	2	15.0	5.4	5	126	2.41	305	56.68	1	23516	.390	.000	14	109258
35	North Pole 2	4	59.3	59.3	123644	1638778	3.91	6414726	51.88	6394	13253	.365	.274	751784	399786
34	North Pole 1	4	56.7	56.6	26725	349998	3.91	1370005	51.26	1394	13096	.375	.059	162494	382257
22	Intrnl 2	2	15.1	5.2	5	123	2.41	296	57.00	1	23652	.377	.000	14	109987
204	GE 7EA SC	4	83.0	64.1	4116	79662	3.82	304701	74.02	210	19353	.236	.006	15339	449149
39	Chena 6	4	29.3	29.3	275	4082	4.44	18107	65.93	22	14862	.426	.001	104	334047
37	Healy D1	3	2.6	2.6	1401	19610	4.05	79492	56.75	576	14000	.935	.062	14621	76855
33	Zehnder GT2	4	18.0	12.0	50	924	4.19	3876	77.97	6	18594	.503	.000	338	178915
32	Zehnder GT1	4	18.0	.0	0	0	4.19	0	.00	0	0	.000	.000	0	178915
31	Zehnder EMD6	4	2.6	.0	0	0	4.19	0	.00	0	0	.000	.000	0	27814
30	Zehnder EMD5	4	2.6	.0	0	0	4.19	0	.00	0	0	.000	.000	0	27814
18	Bernice 2	1	19.3	17.6	777	13440	2.06	27687	35.64	79	17303	.568	.005	2027	158916
40	SILOS	4	70.0	4.3	6	55	130.48	71791	304.78	3	10000	.026	.000	72	0
998	EMERG PURCH	2	150.0	.0	0	01361.53		0	.00	0	0	.000	.000	0	0
999	EMERG PURCH	4	150.0	.0	0	01361.53		0	.00	0	0	.000	.000	0	0
997	EMERG PURCH	1	150.0	.0	0	01361.53		0	.00	0	0	.000	.000	0	0
TOTAL					4213642			90722296	21.53					16716494	17544688

Transmission Losses and Dumped Energy (MWH) 101166.

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 12:40:39 DATE: Oct 04 1998 PAGE: 14

Multi Area Model -- Pooled Case
Uses Power Pool Price Files from the Traditional Scenario

INPUT FILENAME
pool3.ppi

ANNUAL SUMMARY - 2005 8760 HOURS AVERAGE INCREMENTAL COST 28.99 ANNUAL PEAK DEMAND 0 MW

UNIT OR PURCHASE #	NAME	STARTS # OF	STARTS COST $	STOPS # OF	STOPS COST $	HOURS TOTAL	HOURS MAINT	HOURS OUT-AGE	EMISSIONS SO2 TONS	SO2 LB/MBTU	SO2 LB/MWH	NOX TONS	NOX LB/MBTU	NOX LB/MWH
38	HCCP	1	2156	1	200	8760	480	840	696	.30	3.54	812	.35	4.13
36	Healy 1	244	310765	244	48800	8760	408	744	394	.46	7.47	317	.37	6.01
29	Beluga 7-8	1	4698	1	200	8760	672	312	0	.00	.00	1495	.44	3.75
27	Beluga 6-8	5	23489	4	800	8760	672	0	0	.00	.00	1666	.44	4.02
6	ML&P P2 U7-6	7	25760	7	1400	8760	2208	216	0	.00	.00	804	.28	2.42
5	ML&P P2 U5-6	136	251014	135	27000	8760	2208	216	0	.00	.00	791	.62	6.43
12	Beluga 3	141	305150	141	28200	8760	672	72	0	.00	.00	1032	.44	5.56
13	Beluga 5	216	467464	217	43400	8760	672	0	0	.00	.00	781	.44	5.76
19	Bernice 3	117	119963	118	23600	8760	504	576	0	.00	.00	447	.44	6.20
7	ML&P P2 U8	130	404235	131	26200	8760	336	288	0	.00	.00	50	.08	1.05
20	Bernice 4	377	383798	377	75400	8760	504	408	0	.00	.00	193	.44	5.93
24	Soldotna 1	226	306674	225	45000	8760	336	96	0	.00	.00	155	.42	5.05
4	ML&P P1 U4	69	95677	69	13800	8760	336	288	0	.00	.00	19	.44	6.61
2	ML&P P1 U2	180	122629	180	36000	8760	168	288	0	.00	.00	17	.44	9.15
3	ML&P P1 U3	74	56289	74	14800	8760	336	288	0	.00	.00	8	.44	8.85
1	ML&P P1 U1	53	36823	53	10600	8760	168	288	0	.00	.00	2	.44	12.37
10	Beluga 1	3	3923	3	600	8760	504	576	0	.00	.00	0	.44	12.13
11	Beluga 2	1	1332	1	200	8760	504	0	0	.00	.00	0	.44	7.70
23	Intrnl 3	2	2644	2	400	8760	336	936	0	.00	.00	0	.44	8.91
21	Intrnl 1	1	1317	1	200	8760	336	840	0	.00	.00	0	.44	10.35
35	North Pole 2	175	283043	175	35000	8760	144	696	729	.89	11.80	598	.73	9.68
34	North Pole 1	131	180118	131	26200	8760	144	432	156	.89	11.66	128	.73	9.56
22	Intrnl 2	1	1317	1	200	8760	336	840	0	.00	.00	0	.44	10.41
204	GE 7EA SC	36	41454	36	7200	8760	408	408	0	.00	.00	20	.50	9.68
39	Chena 6	5	5534	5	1000	8760	360	432	0	.02	.30	0	.12	1.78
37	Healy D1	145	56371	145	29000	8760	408	408	8	.84	11.76	7	.76	10.64
33	Zehnder GT2	2	1351	2	400	8760	2208	72	0	.84	15.62	0	.76	14.13
32	Zehnder GT1	0	0	0	0	8760	2208	72	0	.84	.00	0	.76	.00
31	Zehnder EMD6	0	0	0	0	8760	0	96	0	.84	.00	0	.76	.00
30	Zehnder EMD5	0	0	0	0	8760	0	96	0	.84	.00	0	.76	.00
18	Bernice 2	41	54049	41	8200	8760	504	408	0	.00	.00	3	.44	7.61
40	SILOS	3	0	3	0	8760	0	0	0	.00	.00	0	.00	.00
998	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
999	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
997	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
TOTAL		2523	3549038	2523	504000				1984		.94	9348		4.44

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 12:40:39 DATE: Oct 04 1998 PAGE: 16

Multi Area Model -- Pooled Case
Uses Power Pool Price Files from the Traditional Scenario

INPUT FILENAME
pool3.ppi

ANNUAL SUMMARY - 2006 8760 HOURS AVERAGE INCREMENTAL COST 30.16 ANNUAL PEAK DEMAND 0 MW

UNIT #	OR PURCHASE NAME	AREA	MAX CAPACITY MW	MAX OUTPUT MW	ENERGY OUTPUT MWH	FUEL USED MBTU	FUEL PRICE $/MBTU	FUEL COST $	FUEL AVG $/MWH	HOURS ON LINE	HEAT RATE BTU/KWH	CAPACITY FACTOR OPER.	CAPACITY FACTOR AVG.	O & M VARIABLE $	O & M FIXED $
38	HCCP	3	53.0	53.0	393146	4639842	.82	3804977	9.68	7440	11801	.997	.847	5129503	4411960
36	Healy 1	3	25.0	25.0	99736	1639924	1.13	1853101	18.58	7147	16442	.558	.455	1456988	3180277
29	Beluga 7-8	2	105.5	105.5	800896	6823690	2.11	14396033	17.97	7774	8520	1.000	.890	2152758	1094345
27	Beluga 6-8	2	105.5	105.5	828148	7574098	2.11	15982016	19.30	8086	9145	.995	.920	2225970	1094345
6	ML&P P2 U7-6	2	109.5	109.5	842121	7266080	2.39	17365496	20.62	8079	8628	.996	.921	2263455	1038112
5	ML&P P2 U5-6	2	49.2	49.2	293633	3019458	2.39	7215822	24.57	6282	10283	1.000	.715	789237	466439
12	Beluga 3	2	66.9	66.9	292563	3746844	2.11	7905949	27.02	5661	12806	.812	.525	786342	693950
13	Beluga 5	2	71.0	71.0	202027	2675021	2.11	5644332	27.94	4371	13240	.710	.354	543017	736479
7	ML&P P2 U8	2	87.6	87.6	86557	1173502	2.39	2804676	32.40	2012	13557	.526	.120	232651	830490
19	Bernice 3	1	28.0	28.0	136982	1930204	2.12	4092013	29.87	6705	14090	.762	.585	368183	237468
20	Bernice 4	1	28.0	28.0	46006	626416	2.12	1328003	28.87	1887	13615	.919	.196	123655	237468
24	Soldotna 1	1	39.0	39.0	65243	782799	2.47	1933516	29.64	2316	11998	.757	.201	180624	172962
4	ML&P P1 U4	2	34.1	34.1	3321	52213	2.39	124789	37.58	154	15722	.661	.012	9194	351039
2	ML&P P1 U2	2	16.8	15.9	887	17510	2.39	41848	47.19	142	19743	.415	.007	2384	167908
3	ML&P P1 U3	2	19.5	11.9	468	9333	2.39	22307	47.71	64	19963	.396	.003	1257	194893
1	ML&P P1 U1	2	16.8	16.8	179	4254	2.39	10167	56.72	36	23731	.339	.001	482	167908
10	Beluga 1	2	16.7	8.8	52	1348	2.11	2844	54.67	10	25911	.345	.000	140	173228
11	Beluga 2	2	16.7	.0	0	0	2.11	0	.00	0	0	.000	.000	0	173228
23	Intrnl 3	2	18.9	.0	0	0	2.47	0	.00	0	0	.000	.000	0	141796
21	Intrnl 1	2	15.0	.0	0	0	2.47	0	.00	0	0	.000	.000	0	112536
35	North Pole 2	4	59.3	59.1	135461	1710014	4.03	6894347	50.90	6431	12623	.398	.300	848343	411780
34	North Pole 1	4	56.7	56.6	36707	456468	4.03	1840369	50.14	1718	12435	.419	.082	229882	393725
22	Intrnl 2	2	15.1	.0	0	0	2.47	0	.00	0	0	.000	.000	0	113286
204	GE 7EA SC	4	83.0	68.7	5395	85783	3.94	337955	62.64	193	15900	.337	.007	20708	462624
39	Chena 6	4	29.3	29.3	315	4596	4.57	21002	66.61	24	14578	.448	.001	123	344068
37	Healy D1	3	2.6	2.6	1489	20848	4.18	87043	58.45	603	14000	.950	.065	16010	79160
33	Zehnder GT2	4	18.0	18.0	34	497	4.32	2148	63.74	2	14759	.936	.000	236	184283
32	Zehnder GT1	4	18.0	18.0	36	524	4.32	2264	62.88	2	14560	1.000	.000	252	184283
31	Zehnder EMD6	4	2.6	1.6	3	36	4.32	157	60.46	2	14000	.500	.000	28	28648
30	Zehnder EMD5	4	2.6	1.6	2	23	4.32	99	60.46	1	14000	.628	.000	18	28648
18	Bernice 2	1	19.3	19.3	185	3060	2.12	6486	34.97	16	16497	.656	.001	498	163683
40	SILOS	4	70.0	.0	0	0	134.39	0	.00	0	0	.000	.000	0	0
998	EMERG PURCH	2	150.0	.0	0	01409.19		0	.00	0	0	.000	.000	0	0
999	EMERG PURCH	4	150.0	.0	0	01409.19		0	.00	0	0	.000	.000	0	0
997	EMERG PURCH	1	150.0	.0	0	01409.19		0	.00	0	0	.000	.000	0	0
TOTAL					4271592			93719760	21.94					17381938	18071038

Transmission Losses and Dumped Energy (MWH) 102098.

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 12:40:39 DATE: Oct 04 1998 PAGE: 17

Multi Area Model -- Pooled Case
Uses Power Pool Price Files from the Traditional Scenario

INPUT FILENAME
pool3.ppi

ANNUAL SUMMARY - 2006 8760 HOURS AVERAGE INCREMENTAL COST 30.16 ANNUAL PEAK DEMAND 0 MW

UNIT OR PURCHASE #	NAME	STARTS # OF	STARTS COST $	STOPS # OF	STOPS COST $	HOURS TOTAL	HOURS MAINT	HOURS OUT-AGE	EMISSIONS SO2 TONS	SO2 LB/MBTU	SO2 LB/MWH	NOX TONS	NOX LB/MBTU	NOX LB/MWH
38	HCCP	1	2217	1	200	8760	480	840	696	.30	3.54	812	.35	4.13
36	Healy 1	462	605977	463	92600	8760	408	744	377	.46	7.56	303	.37	6.08
29	Beluga 7-8	1	4839	1	200	8760	672	312	0	.00	.00	1501	.44	3.75
27	Beluga 6-8	1	4839	1	200	8760	672	0	0	.00	.00	1666	.44	4.02
6	ML&P P2 U7-6	9	34096	9	1800	8760	336	288	0	.00	.00	1017	.28	2.42
5	ML&P P2 U5-6	223	423567	223	44600	8760	336	288	0	.00	.00	944	.62	6.43
12	Beluga 3	248	552793	248	49600	8760	672	72	0	.00	.00	824	.44	5.64
13	Beluga 5	287	639724	286	57200	8760	672	0	0	.00	.00	589	.44	5.83
7	ML&P P2 U8	173	553709	173	34600	8760	336	288	0	.00	.00	46	.08	1.06
19	Bernice 3	189	191446	188	37600	8760	504	576	0	.00	.00	425	.44	6.20
20	Bernice 4	358	367497	358	71600	8760	504	408	0	.00	.00	138	.44	5.99
24	Soldotna 1	243	342654	244	48800	8760	720	72	0	.00	.00	164	.42	5.04
4	ML&P P1 U4	62	88449	62	12400	8760	336	288	0	.00	.00	11	.44	6.92
2	ML&P P1 U2	63	44161	63	12600	8760	2208	216	0	.00	.00	4	.44	8.69
3	ML&P P1 U3	31	24261	31	6200	8760	336	288	0	.00	.00	2	.44	8.78
1	ML&P P1 U1	17	12152	17	3400	8760	168	288	0	.00	.00	1	.44	10.44
10	Beluga 1	4	5388	4	800	8760	504	576	0	.00	.00	0	.44	11.40
11	Beluga 2	0	0	0	0	8760	504	0	0	.00	.00	0	.44	.00
23	Intrnl 3	0	0	0	0	8760	336	936	0	.00	.00	0	.44	.00
21	Intrnl 1	0	0	0	0	8760	336	840	0	.00	.00	0	.44	.00
35	North Pole 2	178	355583	178	35600	8760	144	696	761	.89	11.24	624	.73	9.22
34	North Pole 1	156	273865	156	31200	8760	144	432	203	.89	11.07	167	.73	9.08
22	Intrnl 2	0	0	0	0	8760	336	840	0	.00	.00	0	.44	.00
204	GE 7EA SC	44	52939	44	8800	8760	408	408	0	.00	.00	21	.50	7.95
39	Chena 6	1	1425	1	200	8760	360	432	0	.02	.29	0	.12	1.75
37	Healy D1	158	80896	158	31600	8760	408	408	9	.84	11.76	8	.76	10.64
33	Zehnder GT2	1	1391	1	200	8760	144	96	0	.84	12.40	0	.76	11.22
32	Zehnder GT1	1	1391	1	200	8760	144	96	0	.84	12.23	0	.76	11.07
31	Zehnder EMD6	1	652	1	200	8760	0	96	0	.84	11.76	0	.76	10.64
30	Zehnder EMD5	1	652	1	200	8760	0	96	0	.84	11.76	0	.76	10.64
18	Bernice 2	9	12220	9	1800	8760	504	408	0	.00	.00	1	.44	7.26
40	SILOS	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
998	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
999	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
997	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
TOTAL		2922	4678784	2922	584400				2046		.96	9269		4.34

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 12:40:39 DATE: Oct 04 1998 PAGE: 19

Multi Area Model -- Pooled Case
Uses Power Pool Price Files from the Traditional Scenario

INPUT FILENAME
pool3.ppi

ANNUAL SUMMARY - 2007 8760 HOURS AVERAGE INCREMENTAL COST 32.30 ANNUAL PEAK DEMAND 0 MW

UNIT OR PURCHASE #	NAME	AREA	MAX CAPACITY MW	MAX OUTPUT MW	ENERGY OUTPUT MWH	FUEL USED MBTU	FUEL PRICE $/MBTU	FUEL COST $	FUEL AVG $/MWH	HOURS ON LINE	HEAT RATE BTU/KWH	CAPACITY FACTOR OPER.	CAPACITY FACTOR AVG.	O & M VARIABLE $	O & M FIXED $
38	HCCP	3	53.0	53.0	394088	4651317	.83	3860881	9.80	7440	11802	.999	.849	5296446	4544318
36	Healy 1	3	25.0	25.0	106249	1712028	1.16	1985997	18.69	7213	16113	.589	.485	1598684	3275685
29	Beluga 7-8	2	105.5	105.5	638607	5440796	2.16	11750414	18.40	6162	8519	1.000	.944	1768121	839977
27	Beluga 6-8	2	105.5	105.5	672023	6145754	2.16	13275364	19.75	6508	9145	.996	.993	1860621	839977
6	ML&P P2 U7-6	2	109.5	109.5	840475	7249730	2.44	17687260	21.04	8042	8625	.998	.919	2326733	1069256
5	ML&P P2 U5-6	2	49.2	49.2	306142	3148101	2.44	7681118	25.09	6533	10283	1.000	.745	847516	480432
26	Beluga 6CT	2	78.4	71.0	126031	1482051	2.16	3201218	25.40	1776	11759	.999	.813	348915	208835
12	Beluga 3	2	66.9	66.9	318714	4043858	2.16	8734984	27.41	5951	12688	.844	.572	882335	714768
13	Beluga 5	2	71.0	71.0	226264	2949293	2.16	6370449	28.15	4570	13034	.763	.396	626401	758573
7	ML&P P2 U8	2	87.6	87.6	178751	2296976	2.44	5604618	31.35	3498	12850	.634	.247	494867	855404
19	Bernice 3	1	28.0	28.0	137800	1918779	2.18	4182913	30.36	6461	13924	.797	.588	381498	244592
24	Soldotna 1	1	39.0	39.0	106307	1260724	2.53	3189637	30.00	3626	11859	.795	.327	303137	178150
20	Bernice 4	1	28.0	28.0	53554	717895	2.18	1565037	29.22	2084	13405	.972	.229	148260	244592
4	ML&P P1 U4	2	34.1	34.1	21428	301886	2.44	736604	34.38	771	14088	.881	.075	61103	361570
2	ML&P P1 U2	2	16.8	16.8	5565	96247	2.44	234844	42.20	710	17295	.547	.041	15406	172945
3	ML&P P1 U3	2	19.5	16.5	3089	54132	2.44	132082	42.75	332	17522	.519	.019	8553	200740
1	ML&P P1 U1	2	16.8	16.8	1873	36927	2.44	90101	48.11	276	19715	.476	.014	5185	172945
10	Beluga 1	2	16.7	14.4	631	16896	2.16	36496	57.87	134	26790	.325	.005	1746	178425
11	Beluga 2	2	16.7	14.7	855	15059	2.16	32528	38.03	60	17605	.985	.006	2368	178425
23	Intrnl 3	2	18.9	8.9	309	6747	2.53	17069	55.16	49	21800	.374	.002	857	146050
21	Intrnl 1	2	15.0	4.8	54	1636	2.53	4139	76.44	15	30215	.262	.000	150	115912
35	North Pole 2	4	59.3	59.3	137073	1615966	4.15	6710605	48.96	5485	11789	.456	.304	884198	424133
22	Intrnl 2	2	15.1	6.8	178	4064	2.53	10283	57.72	32	22815	.403	.001	493	116685
34	North Pole 1	4	56.7	56.3	48157	604416	4.15	2509960	52.12	2416	12550	.406	.107	310639	405537
204	GE 7EA SC	4	83.0	70.5	12487	227597	4.06	923553	73.96	578	18226	.260	.017	49367	476503
39	Chena 6	4	29.3	17.8	395	6102	4.71	28717	72.65	35	15437	.385	.002	159	354390
37	Healy D1	3	2.6	2.6	1529	21410	4.30	92076	60.21	638	14000	.922	.067	16935	81535
33	Zehnder GT2	4	18.0	.0	0	0	4.45	0	.00	0	0	.000	.000	0	189811
32	Zehnder GT1	4	18.0	.0	0	0	4.45	0	.00	0	0	.000	.000	0	189811
31	Zehnder EMD6	4	2.6	.0	0	0	4.45	0	.00	0	0	.000	.000	0	29508
30	Zehnder EMD5	4	2.6	.0	0	0	4.45	0	.00	0	0	.000	.000	0	29508
18	Bernice 2	1	19.3	19.3	743	11716	2.18	25540	34.38	58	15771	.749	.005	2056	168594
40	SILOS	4	70.0	.0	0	0	138.42	0	.00	0	0	.000	.000	0	0
998	EMERG PURCH	2	150.0	.0	0	0	1458.51	0	.00	0	0	.000	.000	0	0
999	EMERG PURCH	4	150.0	.0	0	0	1458.51	0	.00	0	0	.000	.000	0	0
997	EMERG PURCH	1	150.0	.0	0	0	1458.51	0	.00	0	0	.000	.000	0	0
TOTAL					4339371			100674488	23.20					18242752	18247602

Transmission Losses and Dumped Energy (MWH) 102472.

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 12:40:39 DATE: Oct 04 1998 PAGE: 20

Multi Area Model -- Pooled Case
Uses Power Pool Price Files from the Traditional Scenario

INPUT FILENAME
pool3.ppi

ANNUAL SUMMARY - 2007 8760 HOURS AVERAGE INCREMENTAL COST 32.30 ANNUAL PEAK DEMAND 0 MW

UNIT OR PURCHASE #	NAME	STARTS # OF	STARTS COST $	STOPS # OF	STOPS COST $	HOURS TOTAL	HOURS MAINT	HOURS OUT-AGE	EMISSIONS SO2 TONS	SO2 LB/MBTU	SO2 LB/MWH	NOX TONS	NOX LB/MBTU	NOX LB/MWH
38	HCCP	1	2267	1	200	8760	480	840	698	.30	3.54	814	.35	4.13
36	Healy 1	398	537812	397	79400	8760	408	744	394	.46	7.41	317	.37	5.96
29	Beluga 7-8	2	9966	1	200	6528	0	360	0	.00	.00	1197	.44	3.75
27	Beluga 6-8	4	19931	3	600	6528	0	0	0	.00	.00	1352	.44	4.02
6	ML&P P2 U7-6	14	54569	14	2800	8760	336	288	0	.00	.00	1015	.28	2.42
5	ML&P P2 U5-6	209	408123	209	41800	8760	336	288	0	.00	.00	984	.62	6.43
26	Beluga 6CT	5	24914	0	0	2184	0	240	0	.00	.00	326	.44	5.17
12	Beluga 3	239	548503	239	47800	8760	672	72	0	.00	.00	890	.44	5.58
13	Beluga 5	279	640303	279	55800	8760	672	0	0	.00	.00	649	.44	5.74
7	ML&P P2 U8	151	497087	151	30200	8760	336	288	0	.00	.00	90	.08	1.00
19	Bernice 3	229	251715	229	45800	8760	504	576	0	.00	.00	422	.44	6.13
24	Soldotna 1	227	327998	227	45400	8760	336	96	0	.00	.00	265	.42	4.98
20	Bernice 4	358	374348	358	71600	8760	504	408	0	.00	.00	158	.44	5.90
4	ML&P P1 U4	86	126060	86	17200	8760	336	288	0	.00	.00	66	.44	6.20
2	ML&P P1 U2	132	95089	132	26400	8760	168	288	0	.00	.00	21	.44	7.61
3	ML&P P1 U3	38	30560	38	7600	8760	2208	216	0	.00	.00	12	.44	7.71
1	ML&P P1 U1	52	38197	52	10400	8760	168	288	0	.00	.00	8	.44	8.67
10	Beluga 1	16	22194	16	3200	8760	504	576	0	.00	.00	4	.44	11.79
11	Beluga 2	11	15543	11	2200	8760	504	0	0	.00	.00	3	.44	7.75
23	Intrnl 3	10	14021	10	2000	8760	336	936	0	.00	.00	1	.44	9.59
21	Intrnl 1	2	2794	2	400	8760	336	840	0	.00	.00	0	.44	13.29
35	North Pole 2	79	172888	80	16000	8760	2208	528	719	.89	10.49	590	.73	8.61
22	Intrnl 2	3	4191	3	600	8760	336	840	0	.00	.00	1	.44	10.04
34	North Pole 1	152	279806	151	30200	8760	2208	336	269	.89	11.17	221	.73	9.16
204	GE 7EA SC	124	146918	124	24800	8760	408	408	0	.00	.00	57	.50	9.11
39	Chena 6	7	5871	7	1400	8760	360	432	0	.02	.31	0	.12	1.85
37	Healy D1	142	77275	142	28400	8760	408	408	9	.84	11.76	8	.76	10.64
33	Zehnder GT2	0	0	0	0	8760	144	96	0	.84	.00	0	.76	.00
32	Zehnder GT1	0	0	0	0	8760	144	96	0	.84	.00	0	.76	.00
31	Zehnder EMD6	0	0	0	0	8760	0	96	0	.84	.00	0	.76	.00
30	Zehnder EMD5	0	0	0	0	8760	0	96	0	.84	.00	0	.76	.00
18	Bernice 2	23	32164	23	4600	8760	504	408	0	.00	.00	3	.44	6.94
40	SILOS	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
998	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
999	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
997	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
TOTAL		2993	4761106	2985	597000				2089		.96	9473		4.37

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 12:40:39 DATE: Oct 04 1998 PAGE: 22

Multi Area Model -- Pooled Case
Uses Power Pool Price Files from the Traditional Scenario

INPUT FILENAME
pool3.ppi

ANNUAL SUMMARY - 2008 8760 HOURS AVERAGE INCREMENTAL COST 33.34 ANNUAL PEAK DEMAND 0 MW

UNIT #	OR PURCHASE NAME	AREA	MAX CAPACITY MW	MAX OUTPUT MW	ENERGY OUTPUT MWH	FUEL USED MBTU	FUEL PRICE $/MBTU	FUEL COST $	FUEL AVG $/MWH	HOURS ON LINE	HEAT RATE BTU/KWH	CAPACITY FACTOR OPER.	CAPACITY FACTOR AVG.	O & M VARIABLE $	O & M FIXED $
36	Healy 1	3	25.0	25.0	110387	1774972	1.18	2094503	18.97	7492	16079	.589	.504	1710759	3373956
38	HCCP	3	53.0	53.0	394056	4650978	.85	3953561	10.03	7440	11802	.999	.849	5454675	4680648
29	Beluga 7-8	2	105.5	105.5	798377	6802178	2.22	15098933	18.91	7774	8520	1.000	.887	2276478	1160991
27	Beluga 6-8	2	105.5	105.5	611671	5593721	2.22	12418914	20.30	5896	9144	.997	.680	1744234	1160991
6	ML&P P2 U7-6	2	109.5	109.5	843778	7277713	2.50	18193712	21.56	8106	8625	.999	.922	2406207	1101333
5	ML&P P2 U5-6	2	49.2	49.2	314027	3229091	2.50	8072819	25.71	6717	10282	1.000	.765	895513	494845
12	Beluga 3	2	66.9	66.9	355045	4455938	2.22	9892155	27.86	6315	12550	.885	.637	1012385	736211
13	Beluga 5	2	71.0	71.0	259953	3354155	2.22	7446331	28.64	5110	12902	.794	.455	741258	781330
7	ML&P P2 U8	2	87.6	87.6	152846	1971256	2.50	4928139	32.24	2994	12897	.624	.212	435843	881067
24	Soldotna 1	1	39.0	39.0	222898	2635600	2.59	6826157	30.62	7423	11824	.808	.686	654668	183495
19	Bernice 3	1	28.0	28.0	64097	871487	2.24	1952124	30.46	2738	13596	.875	.274	182774	251930
20	Bernice 4	1	28.0	28.0	54933	733727	2.24	1643571	29.92	2076	13356	.985	.234	156643	251930
4	ML&P P1 U4	2	34.1	34.1	10414	155180	2.50	387950	37.25	422	14901	.753	.036	30585	372417
2	ML&P P1 U2	2	16.8	16.8	2760	51672	2.50	129180	46.80	393	18720	.460	.020	7871	178134
3	ML&P P1 U3	2	19.5	19.5	1386	26546	2.50	66366	47.90	171	19158	.428	.009	3951	206763
1	ML&P P1 U1	2	16.8	12.7	414	9821	2.50	24552	59.30	81	23721	.337	.003	1181	178134
10	Beluga 1	2	16.7	14.5	106	3039	2.22	6746	63.42	23	28566	.291	.001	303	183777
11	Beluga 2	2	16.7	16.7	104	1908	2.22	4236	40.71	7	18336	.890	.001	297	183777
23	Intrnl 3	2	18.9	7.7	13	280	2.59	725	54.58	2	21073	.398	.000	38	150431
21	Intrnl 1	2	15.0	.0	0	0	2.59	0	.00	0	0	.000	.000	0	119390
35	North Pole 2	4	59.3	59.3	165421	1916268	4.28	8196429	49.55	6666	11584	.472	.366	1099068	436857
22	Intrnl 2	2	15.1	.0	0	0	2.59	0	.00	0	0	.000	.000	0	120186
34	North Pole 1	4	56.7	56.7	47397	572668	4.28	2449467	51.68	2095	12082	.441	.106	314911	417703
204	GE 7EA SC	4	83.0	72.8	6171	103142	4.18	431090	69.86	247	16714	.301	.008	25127	490798
39	Chena 6	4	29.3	17.5	144	2241	4.85	10863	75.42	13	15557	.378	.001	60	365022
37	Healy D1	3	2.6	2.6	1345	18832	4.43	83416	62.01	581	14000	.890	.059	15343	83981
33	Zehnder GT2	4	18.0	.0	0	0	4.58	0	.00	0	0	.000	.000	0	195506
32	Zehnder GT1	4	18.0	.0	0	0	4.58	0	.00	0	0	.000	.000	0	195506
31	Zehnder EMD6	4	2.6	.0	0	0	4.58	0	.00	0	0	.000	.000	0	30393
30	Zehnder EMD5	4	2.6	.0	0	0	4.58	0	.00	0	0	.000	.000	0	30393
18	Bernice 2	1	19.3	19.3	459	7251	2.24	16241	35.40	37	15802	.733	.003	1308	173652
40	SILOS	4	70.0	.5	1	5	142.58	713	1425.76	1	10000	.007	.000	7	0
998	EMERG PURCH	2	150.0	.0	0	0	1509.56	0	.00	0	0	.000	.000	0	0
999	EMERG PURCH	4	150.0	.0	0	0	1509.56	0	.00	0	0	.000	.000	0	0
997	EMERG PURCH	1	150.0	.0	0	0	1509.56	0	.00	0	0	.000	.000	0	0
TOTAL					4418203			104328880	23.61					19171490	19171560

Transmission Losses and Dumped Energy (MWH) 102022.

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 12:40:39 DATE: Oct 04 1998 PAGE: 23

Multi Area Model -- Pooled Case
Uses Power Pool Price Files from the Traditional Scenario

INPUT FILENAME
pool3.ppi

ANNUAL SUMMARY - 2008 8760 HOURS AVERAGE INCREMENTAL COST 33.34 ANNUAL PEAK DEMAND 0 MW

UNIT OR PURCHASE #	NAME	STARTS # OF	STARTS COST $	STOPS # OF	STOPS COST $	HOURS TOTAL	HOURS MAINT	HOURS OUT-AGE	EMISSIONS SO2 TONS	SO2 LB/MBTU	SO2 LB/MWH	NOX TONS	NOX LB/MBTU	NOX LB/MWH
36	Healy 1	118	164404	118	23600	8760	408	744	408	.46	7.40	328	.37	5.95
38	HCCP	1	2329	1	200	8760	480	840	698	.30	3.54	814	.35	4.13
29	Beluga 7-8	1	5132	1	200	8760	672	312	0	.00	.00	1496	.44	3.75
27	Beluga 6-8	2	10264	2	400	8760	2856	0	0	.00	.00	1231	.44	4.02
6	ML&P P2 U7-6	5	20060	5	1000	8760	336	288	0	.00	.00	1019	.28	2.42
5	ML&P P2 U5-6	196	393783	197	39400	8760	336	288	0	.00	.00	1009	.62	6.43
12	Beluga 3	209	493973	209	41800	8760	672	72	0	.00	.00	980	.44	5.52
13	Beluga 5	259	612148	259	51800	8760	672	0	0	.00	.00	738	.44	5.68
7	ML&P P2 U8	161	545448	161	32200	8760	2208	216	0	.00	.00	77	.08	1.01
24	Soldotna 1	114	135070	113	22600	8760	336	96	0	.00	.00	553	.42	4.97
19	Bernice 3	355	491117	356	71200	8760	504	576	0	.00	.00	192	.44	5.98
20	Bernice 4	480	506880	480	96000	8760	504	408	0	.00	.00	161	.44	5.88
4	ML&P P1 U4	115	173375	115	23000	8760	336	288	0	.00	.00	34	.44	6.56
2	ML&P P1 U2	143	105962	143	28600	8760	168	288	0	.00	.00	11	.44	8.24
3	ML&P P1 U3	66	54595	66	13200	8760	336	288	0	.00	.00	6	.44	8.43
1	ML&P P1 U1	35	26444	35	7000	8760	168	288	0	.00	.00	2	.44	10.44
10	Beluga 1	11	15715	11	2200	8760	504	576	0	.00	.00	1	.44	12.57
11	Beluga 2	5	7276	5	1000	8760	504	0	0	.00	.00	0	.44	8.07
23	Intrnl 3	2	2888	2	400	8760	336	936	0	.00	.00	0	.44	9.27
21	Intrnl 1	0	0	0	0	8760	336	840	0	.00	.00	0	.44	.00
35	North Pole 2	155	309288	155	31000	8760	144	696	853	.89	10.31	699	.73	8.46
22	Intrnl 2	0	0	0	0	8760	336	840	0	.00	.00	0	.44	.00
34	North Pole 1	179	337405	179	35800	8760	144	432	255	.89	10.75	209	.73	8.82
204	GE 7EA SC	56	76905	56	11200	8760	408	408	0	.00	.00	26	.50	8.36
39	Chena 6	3	1512	3	600	8760	360	432	0	.02	.31	0	.12	1.87
37	Healy D1	159	82362	159	31800	8760	408	408	8	.84	11.76	7	.76	10.64
33	Zehnder GT2	0	0	0	0	8760	144	96	0	.84	.00	0	.76	.00
32	Zehnder GT1	0	0	0	0	8760	144	96	0	.84	.00	0	.76	.00
31	Zehnder EMD6	0	0	0	0	8760	0	96	0	.84	.00	0	.76	.00
30	Zehnder EMD5	0	0	0	0	8760	0	96	0	.84	.00	0	.76	.00
18	Bernice 2	12	17283	12	2400	8760	504	408	0	.00	.00	2	.44	6.95
40	SILOS	1	0	1	0	8760	0	0	0	.00	.00	0	.00	.00
998	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
999	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
997	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
TOTAL		2843	4591618	2844	568600				2221		1.01	9597		4.34

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 12:40:39 DATE: Oct 04 1998 PAGE: 25

Multi Area Model -- Pooled Case
Uses Power Pool Price Files from the Traditional Scenario

INPUT FILENAME
pool3.ppi

ANNUAL SUMMARY - 2009 8760 HOURS AVERAGE INCREMENTAL COST 37.29 ANNUAL PEAK DEMAND 0 MW

UNIT OR PURCHASE #	NAME	AREA	MAX CAPACITY MW	MAX OUTPUT MW	ENERGY OUTPUT MWH	FUEL USED MBTU	FUEL PRICE $/MBTU	FUEL COST $	FUEL AVG $/MWH	HOURS ON LINE	HEAT RATE BTU/KWH	CAPACITY FACTOR OPER.	CAPACITY FACTOR AVG.	O & M VARIABLE $	O & M FIXED $
38	HCCP	3	53.0	53.0	312771	3691630	.87	3211828	10.27	5904	11802	1.000	.674	4459516	4821068
36	Healy 1	3	25.0	25.0	98880	1516918	1.20	1820323	18.41	5703	15341	.694	.452	1578419	3475174
29	Beluga 7-8	2	105.5	105.5	799304	6810120	2.29	15593628	19.51	7766	8520	1.000	.888	2347621	1195821
27	Beluga 6-8	2	105.5	105.5	828808	7579869	2.29	17358022	20.94	8086	9145	.995	.921	2434258	1195821
6	ML&P P2 U7-6	2	109.5	109.5	843385	7274978	2.57	18695490	22.17	8070	8625	.998	.922	2477095	1134373
5	ML&P P2 U5-6	2	49.2	49.2	310575	3193661	2.57	8206638	26.42	6620	10283	1.000	.756	912190	509691
12	Beluga 3	2	66.9	66.9	310669	4022926	2.29	9212633	29.65	6306	12949	.777	.558	912456	758298
13	Beluga 5	2	71.0	71.0	228966	3070973	2.29	7032571	30.71	5265	13412	.672	.401	672490	804770
7	ML&P P2 U8	2	87.6	87.6	129771	1758791	2.57	4520090	34.83	3039	13553	.526	.180	381147	907499
24	Soldotna 1	1	39.0	39.0	211100	2500443	2.65	6626166	31.39	7068	11844	.802	.650	638619	189000
19	Bernice 3	1	28.0	28.0	51318	712969	2.30	1639827	31.95	2413	13893	.803	.219	150723	259488
20	Bernice 4	1	28.0	28.0	52319	706444	2.30	1624848	31.06	2082	13502	.947	.223	153666	259488
4	ML&P P1 U4	2	34.1	34.1	7555	114626	2.57	294590	38.99	323	15172	.721	.026	22855	383589
2	ML&P P1 U2	2	16.8	14.9	2285	46174	2.57	118667	51.94	383	20209	.396	.017	6711	183478
3	ML&P P1 U3	2	19.5	17.0	1459	26938	2.57	69231	47.44	168	18458	.463	.009	4286	212965
1	ML&P P1 U1	2	16.8	15.9	617	14103	2.57	36244	58.78	109	22871	.359	.005	1811	183478
10	Beluga 1	2	16.7	9.3	223	6963	2.29	15945	71.63	55	31279	.249	.002	654	189291
23	Intrnl 3	2	18.9	10.4	278	5890	2.65	15609	56.19	38	21201	.394	.002	816	154944
11	Beluga 2	2	16.7	16.7	236	4234	2.29	9695	41.02	15	17914	.943	.002	694	189291
21	Intrnl 1	2	15.0	6.5	36	998	2.65	2645	72.64	8	27411	.303	.000	107	122971
35	North Pole 2	4	59.3	59.3	219993	2314805	4.41	10198024	46.36	7105	10522	.594	.487	1505503	449963
22	Intrnl 2	2	15.1	.0	0	0	2.65	0	.00	0	0	.000	.000	0	123791
34	North Pole 1	4	56.7	56.7	74068	828222	4.41	3648806	49.26	2789	11181	.533	.165	506874	430234
204	GE 7EA SC	4	83.0	80.5	13131	197527	4.30	850347	64.76	421	15042	.376	.018	55075	505522
39	Chena 6	4	29.3	28.7	680	9448	4.99	47171	69.34	45	13886	.516	.003	291	375973
37	Healy D1	3	2.6	2.6	3346	46843	4.56	213720	63.87	1367	13999	.941	.147	39309	86501
33	Zehnder GT2	4	18.0	14.0	14	216	4.72	1021	73.06	1	15480	.776	.000	107	201371
32	Zehnder GT1	4	18.0	14.0	14	216	4.72	1021	73.06	1	15480	.776	.000	107	201371
31	Zehnder EMD6	4	2.6	.0	0	0	4.72	0	.00	0	0	.000	.000	0	31305
30	Zehnder EMD5	4	2.6	.0	0	0	4.72	0	.00	0	0	.000	.000	0	31305
18	Bernice 2	1	19.3	19.3	192	2986	2.30	6867	35.73	14	15534	.787	.001	565	178861
40	SILOS	4	70.0	.0	0	0	146.85	0	.00	0	0	.000	.000	0	0
998	EMERG PURCH	2	150.0	.0	0	0	1562.39	0	.00	0	0	.000	.000	0	0
999	EMERG PURCH	4	150.0	.0	0	0	1562.39	0	.00	0	0	.000	.000	0	0
997	EMERG PURCH	1	150.0	.0	0	0	1562.39	0	.00	0	0	.000	.000	0	0
TOTAL					4501993			111071664	24.67					19263958	19746710

Transmission Losses and Dumped Energy (MWH) 98460.

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 12:40:39 DATE: Oct 04 1998 PAGE: 26

Multi Area Model -- Pooled Case
Uses Power Pool Price Files from the Traditional Scenario

INPUT FILENAME
pool3.ppi

ANNUAL SUMMARY - 2009 8760 HOURS AVERAGE INCREMENTAL COST 37.29 ANNUAL PEAK DEMAND 0 MW

UNIT OR PURCHASE #	NAME	STARTS # OF	STARTS COST $	STOPS # OF	STOPS COST $	HOURS TOTAL	HOURS MAINT	HOURS OUT-AGE	EMISSIONS SO2 TONS	SO2 LB/MBTU	SO2 LB/MWH	NOX TONS	NOX LB/MBTU	NOX LB/MWH
38	HCCP	1	2393	1	200	8760	2208	648	554	.30	3.54	646	.35	4.13
36	Healy 1	249	356995	249	49800	8760	2208	600	349	.46	7.06	281	.37	5.68
29	Beluga 7-8	2	5286	2	400	8760	672	312	0	.00	.00	1498	.44	3.75
27	Beluga 6-8	1	5286	1	200	8760	672	0	0	.00	.00	1668	.44	4.02
6	ML&P P2 U7-6	10	41314	10	2000	8760	336	288	0	.00	.00	1018	.28	2.42
5	ML&P P2 U5-6	207	428186	206	41200	8760	336	288	0	.00	.00	998	.62	6.43
12	Beluga 3	211	513711	211	42200	8760	672	72	0	.00	.00	885	.44	5.70
13	Beluga 5	285	693874	285	57000	8760	672	0	0	.00	.00	676	.44	5.90
7	ML&P P2 U8	204	711640	204	40800	8760	336	288	0	.00	.00	69	.08	1.06
24	Soldotna 1	114	129781	114	22800	8760	720	72	0	.00	.00	525	.42	4.97
19	Bernice 3	299	422728	299	59800	8760	504	576	0	.00	.00	157	.44	6.11
20	Bernice 4	420	443093	420	84000	8760	504	408	0	.00	.00	155	.44	5.94
4	ML&P P1 U4	77	119505	77	15400	8760	336	288	0	.00	.00	25	.44	6.68
2	ML&P P1 U2	114	86965	114	22800	8760	168	288	0	.00	.00	10	.44	8.89
3	ML&P P1 U3	49	41727	49	9800	8760	336	288	0	.00	.00	6	.44	8.12
1	ML&P P1 U1	23	17889	23	4600	8760	168	288	0	.00	.00	3	.44	10.06
10	Beluga 1	8	11772	8	1600	8760	504	576	0	.00	.00	2	.44	13.76
23	Intrnl 3	8	11894	8	1600	8760	336	936	0	.00	.00	1	.44	9.33
11	Beluga 2	4	5996	4	800	8760	504	0	0	.00	.00	1	.44	7.88
21	Intrnl 1	3	4444	3	600	8760	336	840	0	.00	.00	0	.44	12.06
35	North Pole 2	106	231685	105	21000	8760	144	696	1030	.89	9.36	845	.73	7.68
22	Intrnl 2	0	0	0	0	8760	336	840	0	.00	.00	0	.44	.00
34	North Pole 1	191	388555	192	38400	8760	144	432	369	.89	9.95	302	.73	8.16
204	GE 7EA SC	77	105290	77	15400	8760	408	408	0	.00	.00	49	.50	7.52
39	Chena 6	6	9342	6	1200	8760	360	432	0	.02	.28	1	.12	1.67
37	Healy D1	344	181784	344	68800	8760	408	408	20	.84	11.76	18	.76	10.64
33	Zehnder GT2	1	1520	1	200	8760	144	96	0	.84	13.00	0	.76	11.77
32	Zehnder GT1	1	1520	1	200	8760	144	96	0	.84	13.00	0	.76	11.77
31	Zehnder EMD6	0	0	0	0	8760	0	96	0	.84	.00	0	.76	.00
30	Zehnder EMD5	0	0	0	0	8760	0	96	0	.84	.00	0	.76	.00
18	Bernice 2	9	13349	9	1800	8760	504	408	0	.00	.00	1	.44	6.84
40	SILOS	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
998	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
999	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
997	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
TOTAL		3024	4987527	3023	604600				2321		1.03	9840		4.37

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 12:40:39 DATE: Oct 04 1998 PAGE: 28

Multi Area Model -- Pooled Case
Uses Power Pool Price Files from the Traditional Scenario

INPUT FILENAME
pool3.ppi

ANNUAL SUMMARY - 2010 8760 HOURS AVERAGE INCREMENTAL COST 38.04 ANNUAL PEAK DEMAND 0 MW

UNIT OR PURCHASE #	NAME	AREA	MAX CAPACITY MW	MAX OUTPUT MW	ENERGY OUTPUT MWH	FUEL USED MBTU	FUEL PRICE $/MBTU	FUEL COST $	FUEL AVG $/MWH	HOURS ON LINE	HEAT RATE BTU/KWH	CAPACITY FACTOR OPER.	CAPACITY FACTOR AVG.	O & M VARIABLE $	O & M FIXED $
38	HCCP	3	53.0	53.0	394214	4652842	.88	4094677	10.39	7440	11802	1.000	.849	5789392	4965700
36	Healy 1	3	25.0	25.0	102251	1668216	1.22	2035219	19.90	7271	16314	.563	.467	1681180	3579430
29	Beluga 7-8	2	105.5	105.5	799169	6808932	2.35	15999051	20.02	7774	8520	1.000	.888	2417643	1231695
27	Beluga 6-8	2	105.5	105.5	829959	7589578	2.35	17836392	21.49	8073	9144	.998	.922	2510809	1231695
6	ML&P P2 U7-6	2	109.5	109.5	741263	6393227	2.63	16811502	22.68	7034	8624	.999	.810	2242486	1168405
5	ML&P P2 U5-6	2	49.2	49.2	273851	2816067	2.63	7405435	27.04	5793	10283	1.000	.667	828438	524982
12	Beluga 3	2	66.9	66.9	366284	4603892	2.35	10819420	29.54	6619	12569	.878	.658	1108079	781046
13	Beluga 5	2	71.0	71.0	265522	3453134	2.35	8114898	30.56	5337	13005	.765	.465	803256	828913
7	ML&P P2 U8	2	87.6	87.6	193559	2468152	2.63	6491255	33.54	3628	12751	.654	.268	585548	934724
24	Soldotna 1	1	39.0	39.0	229466	2707638	2.72	7364718	32.10	7576	11799	.815	.706	714995	194670
19	Bernice 3	1	28.0	28.0	60640	823735	2.37	1952264	32.19	2586	13584	.879	.259	183445	267273
20	Bernice 4	1	28.0	28.0	53656	715333	2.37	1695319	31.60	2024	13331	.992	.229	162317	267273
4	ML&P P1 U4	2	34.1	34.1	13519	195724	2.63	514756	38.08	508	14478	.815	.047	42123	395097
2	ML&P P1 U2	2	16.8	16.8	3504	64495	2.63	169623	48.41	491	18408	.476	.026	10599	188982
3	ML&P P1 U3	2	19.5	19.5	1885	35142	2.63	92422	49.03	224	18642	.453	.012	5702	219354
1	ML&P P1 U1	2	16.8	16.8	848	17733	2.63	46638	55.00	132	20912	.424	.006	2565	188982
10	Beluga 1	2	16.7	16.7	252	6901	2.35	16217	64.42	51	27411	.312	.002	762	194969
23	Intrnl 3	2	18.9	18.9	305	6083	2.72	16547	54.32	37	19972	.447	.002	921	159592
11	Beluga 2	2	16.7	13.2	73	1465	2.35	3442	47.00	6	20000	.731	.001	222	194969
21	Intrnl 1	2	15.0	.0	0	0	2.72	0	.00	0	0	.000	.000	0	126661
35	North Pole 2	4	59.3	59.3	193133	2115154	4.54	9598084	49.70	6903	10951	.535	.428	1361335	463462
22	Intrnl 2	2	15.1	.0	0	0	2.72	0	.00	0	0	.000	.000	0	127505
34	North Pole 1	4	56.7	56.7	63103	709001	4.54	3217283	50.98	2319	11235	.529	.140	444795	443141
204	GE 7EA SC	4	83.0	82.6	12555	180965	4.43	802421	63.91	363	14413	.417	.017	54239	520687
39	Chena 6	4	29.3	29.3	788	9818	5.14	50495	64.08	36	12459	.747	.003	347	387252
37	Healy D1	3	2.6	2.6	1316	18431	4.70	86611	65.79	594	14000	.852	.058	15930	89096
33	Zehnder GT2	4	18.0	9.1	17	300	4.86	1459	87.64	2	18029	.530	.000	131	207412
32	Zehnder GT1	4	18.0	9.1	9	157	4.86	763	84.20	1	17322	.577	.000	71	206844
31	Zehnder EMD6	4	2.6	.0	0	0	4.86	0	.00	0	0	.000	.000	0	32244
30	Zehnder EMD5	4	2.6	.0	0	0	4.86	0	.00	0	0	.000	.000	0	32244
18	Bernice 2	1	19.3	19.3	451	7304	2.37	17310	38.34	39	16179	.682	.003	1366	184227
40	SILOS	4	70.0	48.8	191	1911	151.26	2890251	512.66	4	10000	.682	.000	2890	0
998	EMERG PURCH	2	150.0	.0	0	01617.08		0	.00	0	0	.000	.000	0	0
999	EMERG PURCH	4	150.0	.0	0	01617.08		0	.00	0	0	.000	.000	0	0
997	EMERG PURCH	1	150.0	.0	0	01617.08		0	.00	0	0	.000	.000	0	0
TOTAL					4601783			115543248	25.11					20971592	20338540

Transmission Losses and Dumped Energy (MWH) 104538.

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 12:40:39 DATE: Oct 04 1998 PAGE: 29

Multi Area Model -- Pooled Case
Uses Power Pool Price Files from the Traditional Scenario

INPUT FILENAME
pool3.ppi

ANNUAL SUMMARY - 2010 8760 HOURS AVERAGE INCREMENTAL COST 38.04 ANNUAL PEAK DEMAND 0 MW

UNIT OR PURCHASE #	NAME	STARTS # OF	STARTS COST $	STOPS # OF	STOPS COST $	HOURS TOTAL	HOURS MAINT	HOURS OUT-AGE	EMISSIONS SO2 TONS	SO2 LB/MBTU	SO2 LB/MWH	NOX TONS	NOX LB/MBTU	NOX LB/MWH
38	HCCP	1	2447	1	200	8760	480	840	698	.30	3.54	814	.35	4.13
36	Healy 1	338	499036	338	67600	8760	408	744	384	.46	7.50	309	.37	6.04
29	Beluga 7-8	1	5444	1	200	8760	672	312	0	.00	.00	1498	.44	3.75
27	Beluga 6-8	3	16333	3	600	8760	672	0	0	.00	.00	1670	.44	4.02
6	ML&P P2 U7-6	4	17008	4	800	8760	1464	240	0	.00	.00	895	.28	2.41
5	ML&P P2 U5-6	176	374478	176	35200	8760	1464	240	0	.00	.00	880	.62	6.43
12	Beluga 3	171	428714	172	34400	8760	672	72	0	.00	.00	1013	.44	5.53
13	Beluga 5	282	707004	282	56400	8760	672	0	0	.00	.00	760	.44	5.72
7	ML&P P2 U8	242	868629	241	48200	8760	336	288	0	.00	.00	96	.08	.99
24	Soldotna 1	103	124093	103	20600	8760	336	96	0	.00	.00	569	.42	4.96
19	Bernice 3	371	545418	371	74200	8760	504	576	0	.00	.00	181	.44	5.98
20	Bernice 4	438	462892	438	87600	8760	504	408	0	.00	.00	157	.44	5.87
4	ML&P P1 U4	143	228192	143	28600	8760	336	288	0	.00	.00	43	.44	6.37
2	ML&P P1 U2	138	108255	138	27600	8760	168	288	0	.00	.00	14	.44	8.10
3	ML&P P1 U3	75	65673	75	15000	8760	336	288	0	.00	.00	8	.44	8.20
1	ML&P P1 U1	40	31991	40	8000	8760	168	288	0	.00	.00	4	.44	9.20
10	Beluga 1	18	27280	18	3600	8760	504	576	0	.00	.00	2	.44	12.06
23	Intrnl 3	6	9187	6	1200	8760	336	936	0	.00	.00	1	.44	8.79
11	Beluga 2	1	1544	1	200	8760	504	0	0	.00	.00	0	.44	8.80
21	Intrnl 1	0	0	0	0	8760	336	840	0	.00	.00	0	.44	.00
35	North Pole 2	127	295808	127	25400	8760	144	696	941	.89	9.75	772	.73	7.99
22	Intrnl 2	0	0	0	0	8760	336	840	0	.00	.00	0	.44	.00
34	North Pole 1	176	372868	176	35200	8760	144	432	316	.89	10.00	259	.73	8.20
204	GE 7EA SC	64	105193	64	12800	8760	408	408	0	.00	.00	45	.50	7.21
39	Chena 6	4	4811	4	800	8760	360	432	0	.02	.25	1	.12	1.50
37	Healy D1	109	61678	109	21800	8760	408	408	8	.84	11.76	7	.76	10.64
33	Zehnder GT2	2	1566	2	400	8760	144	96	0	.84	15.14	0	.76	13.70
32	Zehnder GT1	1	1566	1	200	8736	0	96	0	.84	14.55	0	.76	13.17
31	Zehnder EMD6	0	0	0	0	8760	0	96	0	.84	.00	0	.76	.00
30	Zehnder EMD5	0	0	0	0	8760	0	96	0	.84	.00	0	.76	.00
18	Bernice 2	12	18333	12	2400	8760	504	408	0	.00	.00	2	.44	7.12
40	SILOS	1	0	1	0	8760	0	0	0	.00	.00	0	.00	.00
998	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
999	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
997	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
TOTAL		3047	5385442	3047	609200				2346		1.02	9999		4.35

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 12:40:39 DATE: Oct 04 1998 PAGE: 31

Multi Area Model -- Pooled Case INPUT FILENAME
Uses Power Pool Price Files from the Traditional Scenario pool3.ppi

ANNUAL SUMMARY - 2011 8760 HOURS AVERAGE INCREMENTAL COST 40.76 ANNUAL PEAK DEMAND 0 MW

UNIT #	OR PURCHASE NAME	AREA	MAX CAPACITY MW	MAX OUTPUT MW	ENERGY OUTPUT MWH	FUEL USED MBTU	FUEL PRICE $/MBTU	FUEL COST $	FUEL AVG $/MWH	HOURS ON LINE	HEAT RATE BTU/KWH	CAPACITY FACTOR OPER.	CAPACITY FACTOR AVG.	O & M VARIABLE $	O & M FIXED $
38	HCCP	3	53.0	53.0	394147	4651991	.90	4186904	10.62	7440	11802	1.000	.849	5961607	5114670
36	Healy 1	3	25.0	25.0	106004	1719921	1.25	2149956	20.28	7422	16225	.571	.484	1795156	3686812
29	Beluga 7-8	2	105.5	105.5	589136	5019188	2.42	12145534	20.62	5663	8519	1.000	.655	1835721	1268646
27	Beluga 6-8	2	105.5	105.5	831625	7604747	2.42	18404180	22.13	8086	9144	.999	.924	2591381	1268646
6	ML&P P2 U7-6	2	109.5	109.5	849872	7329566	2.70	19787940	23.28	8127	8624	1.000	.929	2648354	1203457
5	ML&P P2 U5-6	2	49.2	49.2	310005	3187828	2.70	8606384	27.76	6636	10283	1.000	.755	966000	540731
12	Beluga 3	2	66.9	66.9	391447	4872842	2.42	11792005	30.12	6787	12448	.916	.703	1219726	804478
13	Beluga 5	2	71.0	71.0	287627	3705175	2.42	8966569	31.17	5561	12881	.797	.503	896228	853781
7	ML&P P2 U8	2	87.6	87.6	238140	3033784	2.70	8191207	34.40	4468	12739	.655	.330	742029	962765
24	Soldotna 1	1	39.0	39.0	234887	2754251	2.79	7684236	32.71	7555	11725	.838	.723	753856	200510
19	Bernice 3	1	28.0	28.0	72129	976798	2.44	2383377	33.04	3034	13542	.891	.308	224748	275291
20	Bernice 4	1	28.0	28.0	67497	898854	2.44	2193207	32.49	2536	13316	.996	.288	210316	275291
4	ML&P P1 U4	2	34.1	34.1	22689	331179	2.70	894183	39.41	885	14596	.793	.079	72817	406950
2	ML&P P1 U2	2	16.8	16.8	5140	97892	2.70	264309	51.42	769	19044	.444	.038	16017	194652
3	ML&P P1 U3	2	19.5	15.8	3200	62059	2.70	167559	52.36	420	19393	.417	.020	9971	225935
1	ML&P P1 U1	2	16.8	16.8	1325	30572	2.70	82543	62.29	250	23069	.355	.010	4129	194652
10	Beluga 1	2	16.7	16.7	325	9528	2.42	23058	71.03	75	29351	.279	.002	1011	200818
23	Intrnl 3	2	18.9	12.3	380	8581	2.79	23941	63.04	63	22594	.353	.002	1183	164380
11	Beluga 2	2	16.7	16.7	278	4999	2.42	12098	43.59	19	18012	.929	.002	865	200818
21	Intrnl 1	2	15.0	4.8	30	1034	2.79	2886	95.75	10	34317	.218	.000	94	130460
35	North Pole 2	4	59.3	59.3	178025	1830989	4.67	8557840	48.07	5667	10285	.580	.394	1292488	477366
22	Intrnl 2	2	15.1	.0	0	0	2.79	0	.00	0	0	.000	.000	0	131330
34	North Pole 1	4	56.7	56.7	80581	897116	4.67	4193054	52.04	3072	11133	.524	.179	585028	456435
204	GE 7EA SC	4	83.0	76.9	30864	476703	4.57	2177174	70.54	1043	15445	.357	.042	137333	536308
39	Chena 6	4	29.3	29.3	2328	30540	5.30	161772	69.49	128	13118	.621	.009	1056	397777
33	Zehnder GT2	4	18.0	6.5	96	2002	5.01	10023	104.56	15	20884	.403	.001	778	213049
37	Healy D1	3	2.6	2.6	2130	29822	4.84	144347	67.76	882	14000	.929	.094	26549	91768
31	Zehnder EMD6	4	2.6	.5	1	14	5.01	70	70.09	2	14000	.192	.000	12	33211
30	Zehnder EMD5	4	2.6	.0	0	0	5.01	0	.00	0	0	.000	.000	0	33211
18	Bernice 2	1	19.3	19.3	515	8175	2.44	19947	38.74	41	15879	.727	.003	1604	189754
40	SILOS	4	70.0	.0	0	0	155.80	0	.00	0	0	.000	.000	0	0
998	EMERG PURCH	2	150.0	.0	0	0	1673.67	0	.00	0	0	.000	.000	0	0
999	EMERG PURCH	4	150.0	.0	0	0	1673.67	0	.00	0	0	.000	.000	0	0
997	EMERG PURCH	1	150.0	.0	0	0	1673.67	0	.00	0	0	.000	.000	0	0
TOTAL					4700423			123226304	26.22					21996060	20733964

Transmission Losses and Dumped Energy (MWH) 105696.

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 12:40:39 DATE: Oct 04 1998 PAGE: 32

Multi Area Model -- Pooled Case
Uses Power Pool Price Files from the Traditional Scenario

INPUT FILENAME
pool3.ppi

ANNUAL SUMMARY - 2011 8760 HOURS AVERAGE INCREMENTAL COST 40.76 ANNUAL PEAK DEMAND 0 MW

UNIT OR PURCHASE #	NAME	STARTS # OF	STARTS COST $	STOPS # OF	STOPS COST $	HOURS TOTAL	HOURS MAINT	HOURS OUT-AGE	EMISSIONS SO2 TONS	SO2 LB/MBTU	SO2 LB/MWH	NOX TONS	NOX LB/MBTU	NOX LB/MWH
38	HCCP	1	2513	1	200	8760	480	840	698	.30	3.54	814	.35	4.13
36	Healy 1	187	284427	187	37400	8760	408	744	396	.46	7.46	318	.37	6.00
29	Beluga 7-8	1	5607	1	200	8760	2856	240	0	.00	.00	1104	.44	3.75
27	Beluga 6-8	1	5607	1	200	8760	672	0	0	.00	.00	1673	.44	4.02
6	ML&P P2 U7-6	2	8756	2	400	8760	336	288	0	.00	.00	1026	.28	2.41
5	ML&P P2 U5-6	211	462102	211	42200	8760	336	288	0	.00	.00	996	.62	6.43
12	Beluga 3	157	405418	156	31200	8760	672	72	0	.00	.00	1072	.44	5.48
13	Beluga 5	276	712712	276	55200	8760	672	0	0	.00	.00	815	.44	5.67
7	ML&P P2 U8	256	945953	257	51400	8760	336	288	0	.00	.00	118	.08	.99
24	Soldotna 1	100	150709	101	20200	8760	336	96	0	.00	.00	578	.42	4.92
19	Bernice 3	414	634156	413	82600	8760	504	576	0	.00	.00	215	.44	5.96
20	Bernice 4	535	566574	535	107000	8760	504	408	0	.00	.00	198	.44	5.86
4	ML&P P1 U4	191	313650	191	38200	8760	336	288	0	.00	.00	73	.44	6.42
2	ML&P P1 U2	195	157427	195	39000	8760	168	288	0	.00	.00	22	.44	8.38
3	ML&P P1 U3	98	88312	98	19600	8760	336	288	0	.00	.00	14	.44	8.53
1	ML&P P1 U1	60	49384	60	12000	8760	168	288	0	.00	.00	7	.44	10.15
10	Beluga 1	23	35903	23	4600	8760	504	576	0	.00	.00	2	.44	12.91
23	Intrnl 3	15	23651	15	3000	8760	336	936	0	.00	.00	2	.44	9.94
11	Beluga 2	8	12720	8	1600	8760	504	0	0	.00	.00	1	.44	7.93
21	Intrnl 1	2	3142	2	400	8760	336	840	0	.00	.00	0	.44	15.10
35	North Pole 2	59	138259	60	12000	8760	2208	528	815	.89	9.15	668	.73	7.51
22	Intrnl 2	0	0	0	0	8760	336	840	0	.00	.00	0	.44	.00
34	North Pole 1	155	391736	154	30800	8760	2208	336	399	.89	9.91	327	.73	8.13
204	GE 7EA SC	168	253787	167	33400	8760	408	408	0	.00	.00	119	.50	7.72
39	Chena 6	19	19823	19	3800	8736	0	432	0	.02	.26	2	.12	1.57
33	Zehnder GT2	4	6451	4	800	8736	0	96	1	.84	17.54	1	.76	15.87
37	Healy D1	151	86218	151	30200	8760	408	408	13	.84	11.76	11	.76	10.64
31	Zehnder EMD6	1	756	1	200	8760	0	96	0	.84	11.76	0	.76	10.64
30	Zehnder EMD5	0	0	0	0	8760	0	96	0	.84	.00	0	.76	.00
18	Bernice 2	15	20457	15	3000	8760	504	408	0	.00	.00	2	.44	6.99
40	SILOS	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
998	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
999	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
997	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
TOTAL		3305	5786212	3304	660800				2321		.99	10179		4.33

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 12:40:39 DATE: Oct 04 1998 PAGE: 34

Multi Area Model -- Pooled Case
Uses Power Pool Price Files from the Traditional Scenario

INPUT FILENAME
pool3.ppi

ANNUAL SUMMARY - 2012 8760 HOURS AVERAGE INCREMENTAL COST 24.78 ANNUAL PEAK DEMAND 0 MW

UNIT #	OR PURCHASE NAME	AREA	MAX CAPACITY MW	MAX OUTPUT MW	ENERGY OUTPUT MWH	FUEL USED MBTU	FUEL PRICE $/MBTU	FUEL COST $	FUEL AVG $/MWH	HOURS ON LINE	HEAT RATE BTU/KWH	CAPACITY FACTOR OPER.	CAPACITY FACTOR AVG.	O & M VARIABLE $	O & M FIXED $
36	Healy 1	3	25.0	25.0	116595	1840251	1.27	2337118	20.04	7554	15783	.617	.532	2033778	3797417
38	HCCP	3	53.0	53.0	392545	4632850	.92	4262472	10.86	7430	11802	.997	.845	6115330	5268111
29	Beluga 7-8	2	105.5	105.5	798641	6804417	2.49	16941328	21.21	7774	8519	1.000	.887	2563201	1306706
27	Beluga 6-8	2	105.5	105.5	613320	5608256	2.49	13964585	22.77	5896	9144	1.000	.681	1968476	1306706
6	ML&P P2 U7-6	2	109.5	109.5	847628	7309910	2.77	20247116	23.89	8100	8623	1.000	.927	2720444	1239561
5	ML&P P2 U5-6	2	49.2	49.2	360917	3711197	2.77	10279862	28.48	7701	10282	1.000	.879	1158229	556953
12	Beluga 3	2	66.9	66.9	386626	4844884	2.49	12063906	31.20	6890	12531	.888	.694	1240813	828612
13	Beluga 5	2	71.0	71.0	288736	3739021	2.49	9310210	32.24	5733	12949	.775	.505	926676	879394
7	ML&P P2 U8	2	87.6	87.6	174824	2285634	2.77	6331209	36.21	3631	13073	.591	.242	561082	991648
24	Soldotna 1	1	39.0	39.0	206530	2481100	2.85	7071129	34.24	7371	12013	.752	.636	682726	206525
19	Bernice 3	1	28.0	28.0	70847	993961	2.50	2484909	35.07	3465	14029	.770	.302	227379	283550
20	Bernice 4	1	28.0	28.0	71536	969165	2.50	2422926	33.87	2872	13547	.935	.305	229590	283550
207	GE 7EA 1x1	4	128.0	128.0	418530	4237529	4.70	19934804	47.63	7672	10124	.426	.373	1664901	2269126
4	ML&P P1 U4	2	34.1	34.1	7816	112873	2.77	312659	40.00	298	14440	.818	.027	25839	419158
2	ML&P P1 U2	2	16.8	16.8	1889	35838	2.77	99270	52.54	286	18967	.450	.014	6064	200491
3	ML&P P1 U3	2	19.5	19.5	953	18515	2.77	51287	53.83	124	19433	.418	.006	3058	232713
1	ML&P P1 U1	2	16.8	14.0	344	6668	2.77	18470	53.75	46	19405	.491	.003	1103	200491
10	Beluga 1	2	16.7	10.0	51	1663	2.49	4140	80.45	13	32307	.237	.000	165	206843
23	Intrnl 3	2	18.9	11.6	51	1013	2.85	2886	56.25	6	19735	.452	.000	165	169312
11	Beluga 2	2	16.7	16.7	66	1163	2.49	2896	43.73	4	17560	.991	.000	213	206843
21	Intrnl 1	2	15.0	.0	0	0	2.85	0	.00	0	0	.000	.000	0	134374
35	North Pole 2	4	59.3	59.1	20309	204742	4.81	985653	48.53	849	10081	.510	.045	151869	491687
22	Intrnl 2	2	15.1	.0	0	0	2.85	0	.00	0	0	.000	.000	0	135270
34	North Pole 1	4	56.7	55.9	3880	43156	4.81	207760	53.54	180	11121	.452	.009	29017	470129
204	GE 7EA SC	4	83.0	34.5	286	5382	4.70	25316	88.37	14	18786	.247	.000	1313	552397
37	Healy D1	3	2.6	2.6	220	3086	4.99	15383	69.80	104	14000	.815	.010	2829	94522
31	Zehnder EMD6	4	2.6	.0	0	0	5.16	0	.00	0	0	.000	.000	0	34208
30	Zehnder EMD5	4	2.6	.0	0	0	5.16	0	.00	0	0	.000	.000	0	34208
18	Bernice 2	1	19.3	19.3	267	4048	2.50	10119	37.90	17	15159	.847	.002	857	195446
40	SILOS	4	70.0	.0	0	0	160.47	0	.00	0	0	.000	.000	0	0
998	EMERG PURCH	2	150.0	.0	0	0	1732.25	0	.00	0	0	.000	.000	0	0
999	EMERG PURCH	4	150.0	.0	0	0	1732.25	0	.00	0	0	.000	.000	0	0
997	EMERG PURCH	1	150.0	.0	0	0	1732.25	0	.00	0	0	.000	.000	0	0
TOTAL					4783407			129387416	27.05					22315112	22995964

Transmission Losses and Dumped Energy (MWH) 88894.

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 12:40:39 DATE: Oct 04 1998 PAGE: 35

Multi Area Model -- Pooled Case
Uses Power Pool Price Files from the Traditional Scenario

INPUT FILENAME
pool3.ppi

ANNUAL SUMMARY - 2012 8760 HOURS AVERAGE INCREMENTAL COST 24.78 ANNUAL PEAK DEMAND 0 MW

UNIT OR PURCHASE #	NAME	STARTS # OF	STARTS COST $	STOPS # OF	STOPS COST $	HOURS TOTAL	HOURS MAINT	HOURS OUT-AGE	EMISSIONS SO2 TONS	SO2 LB/MBTU	SO2 LB/MWH	NOX TONS	NOX LB/MBTU	NOX LB/MWH
36	Healy 1	55	86295	55	11000	8760	408	744	423	.46	7.26	340	.37	5.84
38	HCCP	11	19439	11	2200	8760	480	840	695	.30	3.54	811	.35	4.13
29	Beluga 7-8	1	5776	1	200	8760	672	312	0	.00	.00	1497	.44	3.75
27	Beluga 6-8	2	11551	2	400	8760	2856	0	0	.00	.00	1234	.44	4.02
6	ML&P P2 U7-6	6	27041	6	1200	8760	336	288	0	.00	.00	1023	.28	2.41
5	ML&P P2 U5-6	60	135234	60	12000	8760	336	288	0	.00	.00	1160	.62	6.43
12	Beluga 3	130	345745	130	26000	8760	672	72	0	.00	.00	1066	.44	5.51
13	Beluga 5	238	632977	238	47600	8760	672	0	0	.00	.00	823	.44	5.70
7	ML&P P2 U8	236	897655	236	47200	8760	336	288	0	.00	.00	89	.08	1.02
24	Soldotna 1	75	109604	74	14800	8760	720	72	0	.00	.00	521	.42	5.05
19	Bernice 3	343	549338	344	68800	8760	504	576	0	.00	.00	219	.44	6.17
20	Bernice 4	455	483438	454	90800	8760	504	408	0	.00	.00	213	.44	5.96
207	GE 7EA 1x1	33	43013	32	6400	8760	408	408	0	.00	.00	1059	.50	5.06
4	ML&P P1 U4	78	131788	78	15600	8760	2208	216	0	.00	.00	25	.44	6.35
2	ML&P P1 U2	85	70611	85	17000	8760	168	288	0	.00	.00	8	.44	8.35
3	ML&P P1 U3	39	36162	39	7800	8760	336	288	0	.00	.00	4	.44	8.55
1	ML&P P1 U1	14	11856	14	2800	8760	2208	216	0	.00	.00	1	.44	8.54
10	Beluga 1	6	9647	6	1200	8760	504	576	0	.00	.00	0	.44	14.22
23	Intrnl 3	3	4871	3	600	8760	336	936	0	.00	.00	0	.44	8.68
11	Beluga 2	1	1638	1	200	8760	504	0	0	.00	.00	0	.44	7.73
21	Intrnl 1	0	0	0	0	8760	336	840	0	.00	.00	0	.44	.00
35	North Pole 2	58	126584	58	11600	8760	144	696	91	.89	8.97	75	.73	7.36
22	Intrnl 2	0	0	0	0	8760	336	840	0	.00	.00	0	.44	.00
34	North Pole 1	20	23735	21	4200	8760	144	432	19	.89	9.90	16	.73	8.12
204	GE 7EA SC	7	12043	8	1600	8760	408	408	0	.00	.00	1	.50	9.39
37	Healy D1	27	13243	27	5400	8760	408	408	1	.84	11.76	1	.76	10.64
31	Zehnder EMD6	0	0	0	0	8760	0	96	0	.84	.00	0	.76	.00
30	Zehnder EMD5	0	0	0	0	8760	0	96	0	.84	.00	0	.76	.00
18	Bernice 2	10	16205	10	2000	8760	504	408	0	.00	.00	1	.44	6.67
40	SILOS	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
998	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
999	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
997	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
TOTAL		1993	3805488	1993	398600				1230		.51	10188		4.26

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 12:40:39 DATE: Oct 04 1998 PAGE: 37

Multi Area Model -- Pooled Case
Uses Power Pool Price Files from the Traditional Scenario

INPUT FILENAME
pool3.ppi

ANNUAL SUMMARY - 2013 8760 HOURS AVERAGE INCREMENTAL COST 24.70 ANNUAL PEAK DEMAND 0 MW

UNIT OR PURCHASE #	NAME	AREA	MAX CAPACITY MW	MAX OUTPUT MW	ENERGY OUTPUT MWH	FUEL USED MBTU	FUEL PRICE $/MBTU	FUEL COST $	FUEL AVG $/MWH	HOURS ON LINE	HEAT RATE BTU/KWH	CAPACITY FACTOR OPER.	CAPACITY FACTOR AVG.	O & M VARIABLE $	O & M FIXED $
36	Healy 1	3	25.0	25.0	116971	1846390	1.29	2381843	20.36	7573	15785	.618	.534	2101565	3911339
38	HCCP	3	53.0	53.0	393198	4640549	.93	4315976	10.98	7439	11802	.997	.847	6309713	5426154
29	Beluga 7-8	2	105.5	105.5	644436	5490478	2.56	14054989	21.81	6216	8519	1.000	.952	2130358	1002977
27	Beluga 6-8	2	105.5	105.5	676507	6185957	2.56	15837545	23.41	6528	9143	1.000	1.000	2236384	1002977
6	ML&P P2 U7-6	2	109.5	109.5	845730	7293600	2.84	20712258	24.49	8078	8624	1.000	.924	2795887	1276747
5	ML&P P2 U5-6	2	49.2	49.2	367528	3779214	2.84	10733454	29.20	7832	10282	1.000	.895	1214913	573662
26	Beluga 6CT	2	78.4	71.0	137008	1613168	2.56	4129709	30.14	1944	11774	.993	.884	452917	249360
12	Beluga 3	2	66.9	66.9	383763	4827988	2.56	12359407	32.21	6909	12580	.871	.689	1268569	853471
13	Beluga 5	2	71.0	71.0	296001	3836474	2.56	9821390	33.18	5914	12960	.774	.518	978488	905776
7	ML&P P2 U8	2	87.6	87.6	141047	1836985	2.84	5217036	36.99	2848	13023	.603	.195	466258	1021398
24	Soldotna 1	1	39.0	39.0	215962	2593198	2.92	7572145	35.06	7707	12007	.754	.665	735322	212721
19	Bernice 3	1	28.0	28.0	72898	1021808	2.57	2626048	36.02	3561	14016	.775	.311	240979	292056
20	Bernice 4	1	28.0	28.0	88562	1197669	2.57	3078109	34.76	3566	13523	.941	.378	292763	292056
207	GE 7EA 1x1	4	128.0	128.0	450125	4475195	4.85	21684646	48.17	7899	9942	.445	.401	1844329	2337200
4	ML&P P1 U4	2	34.1	34.1	15022	212366	2.84	603122	40.15	551	14136	.870	.053	51149	431733
2	ML&P P1 U2	2	16.8	14.0	3404	57806	2.84	164170	48.23	422	16981	.570	.025	11253	206506
3	ML&P P1 U3	2	19.5	15.5	2663	47639	2.84	135294	50.81	304	17889	.494	.016	8803	239694
1	ML&P P1 U1	2	16.8	14.0	1043	20526	2.84	58293	55.88	155	19675	.478	.008	3449	206506
10	Beluga 1	2	16.7	12.0	170	4320	2.56	11058	65.01	33	25394	.358	.001	562	213048
23	Intrnl 3	2	18.9	12.1	266	4947	2.92	14446	54.36	31	18617	.513	.002	878	174391
11	Beluga 2	2	16.7	.0	0	0	2.56	0	.00	0	0	.000	.000	0	213048
21	Intrnl 1	2	15.0	.0	0	0	2.92	0	.00	0	0	.000	.000	0	138405
35	North Pole 2	4	59.3	59.1	20168	198445	4.96	983996	48.79	730	9839	.566	.045	155338	506437
22	Intrnl 2	2	15.1	.0	0	0	2.92	0	.00	0	0	.000	.000	0	139328
34	North Pole 1	4	56.7	47.4	5593	59403	4.96	294554	52.67	205	10621	.532	.012	43076	484232
204	GE 7EA SC	4	83.0	39.4	1075	18865	4.85	91406	85.03	47	17548	.276	.001	5075	568969
28	Beluga 7CT	2	78.4	.0	0	0	2.56	0	.00	0	0	.000	.000	0	249360
37	Healy D1	3	2.6	2.6	138	1926	5.14	9889	71.89	68	14000	.778	.006	1819	97357
31	Zehnder EMD6	4	2.6	.5	2	28	5.31	149	74.36	4	14000	.192	.000	26	35234
30	Zehnder EMD5	4	2.6	.5	2	21	5.31	112	74.36	3	14000	.192	.000	20	35234
18	Bernice 2	1	19.3	15.9	904	14038	2.57	36077	39.90	68	15524	.778	.006	2989	201310
40	SILOS	4	70.0	.5	1	5	165.28	826	1652.85	1	10000	.007	.000	8	0
998	EMERG PURCH	2	150.0	.0	0	0	1792.88	0	.00	0	0	.000	.000	0	0
999	EMERG PURCH	4	150.0	.0	0	0	1792.88	0	.00	0	0	.000	.000	0	0
997	EMERG PURCH	1	150.0	.0	0	0	1792.88	0	.00	0	0	.000	.000	0	0
TOTAL					4880187			136927968	28.06					23352884	23498698

Transmission Losses and Dumped Energy (MWH) 82719.

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 12:40:39 DATE: Oct 04 1998 PAGE: 38

Multi Area Model -- Pooled Case
Uses Power Pool Price Files from the Traditional Scenario

INPUT FILENAME
pool3.ppi

ANNUAL SUMMARY - 2013 8760 HOURS AVERAGE INCREMENTAL COST 24.70 ANNUAL PEAK DEMAND 0 MW

UNIT OR PURCHASE #	NAME	STARTS # OF	STARTS COST $	STOPS # OF	STOPS COST $	HOURS TOTAL	HOURS MAINT	HOURS OUT-AGE	EMISSIONS SO2 TONS	SO2 LB/MBTU	SO2 LB/MWH	NOX TONS	NOX LB/MBTU	NOX LB/MWH
36	Healy 1	24	38893	24	4800	8760	408	744	425	.46	7.26	342	.37	5.84
38	HCCP	2	4373	2	400	8760	480	840	696	.30	3.54	812	.35	4.13
29	Beluga 7-8	1	5948	0	0	6528	0	312	0	.00	.00	1208	.44	3.75
27	Beluga 6-8	1	5948	0	0	6528	0	0	0	.00	.00	1361	.44	4.02
6	ML&P P2 U7-6	9	41756	9	1800	8760	336	288	0	.00	.00	1021	.28	2.41
5	ML&P P2 U5-6	44	102050	44	8800	8760	336	288	0	.00	.00	1181	.62	6.43
26	Beluga 6CT	1	5948	0	0	2184	0	240	0	.00	.00	355	.44	5.18
12	Beluga 3	138	377989	138	27600	8760	672	72	0	.00	.00	1062	.44	5.54
13	Beluga 5	205	561506	205	41000	8760	672	0	0	.00	.00	844	.44	5.70
7	ML&P P2 U8	172	673360	172	34400	8760	1464	240	0	.00	.00	72	.08	1.02
24	Soldotna 1	73	118055	73	14600	8760	336	96	0	.00	.00	545	.42	5.04
19	Bernice 3	273	452288	273	54600	8760	504	576	0	.00	.00	225	.44	6.17
20	Bernice 4	339	360781	340	68000	8760	504	408	0	.00	.00	263	.44	5.95
207	GE 7EA 1x1	7	11584	7	1400	8760	408	408	0	.00	.00	1119	.50	4.97
4	ML&P P1 U4	85	147740	85	17000	8760	336	288	0	.00	.00	47	.44	6.22
2	ML&P P1 U2	59	50425	59	11800	8760	1464	240	0	.00	.00	13	.44	7.47
3	ML&P P1 U3	50	47695	50	10000	8760	336	288	0	.00	.00	10	.44	7.87
1	ML&P P1 U1	27	23523	27	5400	8760	168	288	0	.00	.00	5	.44	8.66
10	Beluga 1	2	3312	2	400	8760	504	576	0	.00	.00	1	.44	11.17
23	Intrnl 3	3	5016	3	600	8760	336	936	0	.00	.00	1	.44	8.19
11	Beluga 2	0	0	0	0	8760	504	0	0	.00	.00	0	.44	.00
21	Intrnl 1	0	0	0	0	8760	336	840	0	.00	.00	0	.44	.00
35	North Pole 2	32	76056	32	6400	8760	144	696	88	.89	8.76	72	.73	7.18
22	Intrnl 2	0	0	0	0	8760	336	840	0	.00	.00	0	.44	.00
34	North Pole 1	15	19014	15	3000	8760	144	432	26	.89	9.45	22	.73	7.75
204	GE 7EA SC	6	9289	6	1200	8760	408	408	0	.00	.00	5	.50	8.77
28	Beluga 7CT	0	0	0	0	2184	0	0	0	.00	.00	0	.44	.00
37	Healy D1	19	10431	19	3800	8760	408	408	1	.84	11.76	1	.76	10.64
31	Zehnder EMD6	1	802	1	200	8760	0	96	0	.84	11.76	0	.76	10.64
30	Zehnder EMD5	1	802	1	200	8760	0	96	0	.84	11.76	0	.76	10.64
18	Bernice 2	23	35048	23	4600	8760	504	408	0	.00	.00	3	.44	6.83
40	SILOS	1	0	1	0	8760	0	0	0	.00	.00	0	.00	.00
998	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
999	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
997	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
TOTAL		1613	3189633	1611	322000				1236		.51	10588		4.34

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 12:40:39 DATE: Oct 04 1998 PAGE: 40

Multi Area Model -- Pooled Case
Uses Power Pool Price Files from the Traditional Scenario

INPUT FILENAME
pool3.ppi

ANNUAL SUMMARY - 2014 8760 HOURS AVERAGE INCREMENTAL COST 31.00 ANNUAL PEAK DEMAND 0 MW

UNIT OR PURCHASE #	NAME	AREA	MAX CAPACITY MW	MAX OUTPUT MW	ENERGY OUTPUT MWH	FUEL USED MBTU	FUEL PRICE $/MBTU	FUEL COST $	FUEL AVG $/MWH	HOURS ON LINE	HEAT RATE BTU/KWH	CAPACITY FACTOR OPER.	CAPACITY FACTOR AVG.	O & M VARIABLE $	O & M FIXED $
36	Healy 1	3	25.0	25.0	103689	1581141	1.32	2087099	20.13	5908	15248	.702	.473	1918852	4028680
38	HCCP	3	53.0	53.0	311161	3672281	.95	3488765	11.21	5902	11801	.995	.670	5142941	5588939
29	Beluga 7-8	2	105.5	105.5	799104	6808413	2.63	17905620	22.41	7764	8520	1.000	.888	2720959	1386284
27	Beluga 6-8	2	105.5	105.5	831670	7605086	2.63	20002794	24.05	8086	9144	.999	.924	2831838	1386284
6	ML&P P2 U7-6	2	109.5	109.5	849409	7325481	2.91	21315410	25.09	8122	8624	1.000	.928	2892110	1315050
5	ML&P P2 U5-6	2	49.2	49.2	369210	3796520	2.91	11047105	29.92	7892	10282	1.000	.899	1257095	590871
25	LM6000 Chug	2	40.5	40.5	231847	2424857	3.00	7274509	31.38	7142	10458	.802	.653	789406	532175
12	Beluga 3	2	66.9	66.9	337575	4317837	2.63	11356181	33.64	6519	12790	.811	.606	1149399	879075
13	Beluga 5	2	71.0	71.0	223441	2999797	2.63	7889475	35.31	5160	13425	.662	.391	760786	932949
7	ML&P P2 U8	2	87.6	86.7	108470	1502269	2.91	4371607	40.30	2730	13849	.487	.150	369326	1052040
24	Soldotna 1	1	39.0	39.0	201050	2440877	3.00	7322630	36.42	7502	12140	.721	.619	705084	219103
19	Bernice 3	1	28.0	28.0	51219	737240	2.65	1953695	38.14	2747	14393	.702	.219	174395	300818
20	Bernice 4	1	28.0	28.0	58584	807539	2.65	2139999	36.53	2497	13784	.880	.250	199473	300818
207	GE 7EA 1x1	4	128.0	126.0	479854	4629335	4.99	23103654	48.15	7815	9647	.480	.428	2025109	2407316
4	ML&P P1 U4	2	34.1	34.1	4104	66644	2.91	193934	47.26	209	16239	.612	.014	14392	444685
2	ML&P P1 U2	2	16.8	11.8	668	15714	2.91	45727	68.49	153	23537	.303	.005	2273	212701
3	ML&P P1 U3	2	19.5	9.8	429	9691	2.91	28200	65.66	74	22564	.316	.003	1462	246885
1	ML&P P1 U1	2	16.8	8.0	92	2784	2.91	8101	88.15	25	30293	.228	.001	313	212701
10	Beluga 1	2	16.7	3.0	18	701	2.63	1843	102.37	6	38923	.180	.000	61	219440
23	Intrnl 3	2	18.9	7.0	54	1291	3.00	3873	72.26	9	24086	.315	.000	182	179623
11	Beluga 2	2	16.7	14.8	15	272	2.63	714	48.25	1	18347	.886	.000	50	219440
21	Intrnl 1	2	15.0	.0	0	0	3.00	0	.00	0	0	.000	.000	0	142558
35	North Pole 2	4	59.3	58.0	23059	219411	5.11	1120595	48.60	753	9515	.635	.051	182934	521630
22	Intrnl 2	2	15.1	.0	0	0	3.00	0	.00	0	0	.000	.000	0	143508
34	North Pole 1	4	56.7	54.9	12267	124074	5.11	633687	51.66	382	10114	.654	.027	97322	498759
204	GE 7EA SC	4	83.0	65.2	3088	40399	4.99	201619	65.29	69	13083	.539	.004	15014	586038
37	Healy D1	3	2.6	2.6	867	12137	5.29	64196	74.05	360	14000	.926	.038	11807	100278
31	Zehnder EMD6	4	2.6	.0	0	0	5.47	0	.00	0	0	.000	.000	0	36291
30	Zehnder EMD5	4	2.6	.0	0	0	5.47	0	.00	0	0	.000	.000	0	36291
18	Bernice 2	1	19.3	15.9	453	7140	2.65	18920	41.79	36	15768	.740	.003	1542	207349
40	SILOS	4	70.0	.0	0	0	170.24	0	.00	0	0	.000	.000	0	0
998	EMERG PURCH	2	150.0	.0	0	0	1855.63	0	.00	0	0	.000	.000	0	0
999	EMERG PURCH	4	150.0	.0	0	0	1855.63	0	.00	0	0	.000	.000	0	0
997	EMERG PURCH	1	150.0	.0	0	0	1855.63	0	.00	0	0	.000	.000	0	0
TOTAL					5001397			143579936	28.71					23264130	24928592

Transmission Losses and Dumped Energy (MWH) 94640.

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 12:40:39 DATE: Oct 04 1998 PAGE: 41

Multi Area Model -- Pooled Case
Uses Power Pool Price Files from the Traditional Scenario

INPUT FILENAME
pool3.ppi

ANNUAL SUMMARY - 2014 8760 HOURS AVERAGE INCREMENTAL COST 31.00 ANNUAL PEAK DEMAND 0 MW

UNIT OR PURCHASE #	NAME	STARTS # OF	STARTS COST $	STOPS # OF	STOPS COST $	HOURS TOTAL	HOURS MAINT	HOURS OUT-AGE	EMISSIONS SO2 TONS	SO2 LB/MBTU	SO2 LB/MWH	NOX TONS	NOX LB/MBTU	NOX LB/MWH
36	Healy 1	39	64876	39	7800	8760	2208	600	364	.46	7.01	293	.37	5.64
38	HCCP	3	6279	3	600	8760	2208	648	551	.30	3.54	643	.35	4.13
29	Beluga 7-8	2	6126	2	400	8760	672	312	0	.00	.00	1498	.44	3.75
27	Beluga 6-8	1	6126	1	200	8760	672	0	0	.00	.00	1673	.44	4.02
6	ML&P P2 U7-6	3	14327	3	600	8760	336	288	0	.00	.00	1026	.28	2.41
5	ML&P P2 U5-6	35	83522	35	7000	8760	336	288	0	.00	.00	1186	.62	6.43
25	LM6000 Chug	148	190506	147	29400	8760	672	408	0	.00	.00	509	.42	4.39
12	Beluga 3	184	519022	184	36800	8760	672	72	0	.00	.00	950	.44	5.63
13	Beluga 5	311	877258	311	62200	8760	672	0	0	.00	.00	660	.44	5.91
7	ML&P P2 U8	222	894451	222	44400	8760	336	288	0	.00	.00	59	.08	1.08
24	Soldotna 1	107	185936	107	21400	8760	336	96	0	.00	.00	513	.42	5.10
19	Bernice 3	341	567302	341	68200	8760	504	576	0	.00	.00	162	.44	6.33
20	Bernice 4	449	478746	448	89600	8760	504	408	0	.00	.00	178	.44	6.07
207	GE 7EA 1x1	16	27003	16	3200	8760	408	408	0	.00	.00	1157	.50	4.82
4	ML&P P1 U4	71	126931	71	14200	8760	336	288	0	.00	.00	15	.44	7.15
2	ML&P P1 U2	56	49233	56	11200	8760	168	288	0	.00	.00	3	.44	10.36
3	ML&P P1 U3	28	27474	28	5600	8760	336	288	0	.00	.00	2	.44	9.93
1	ML&P P1 U1	7	6273	7	1400	8760	168	288	0	.00	.00	1	.44	13.33
10	Beluga 1	2	3411	2	400	8760	504	576	0	.00	.00	0	.44	17.13
23	Intrnl 3	2	3444	2	400	8760	336	936	0	.00	.00	0	.44	10.60
11	Beluga 2	1	1737	1	200	8760	504	0	0	.00	.00	0	.44	8.07
21	Intrnl 1	0	0	0	0	8760	336	840	0	.00	.00	0	.44	.00
35	North Pole 2	47	111911	47	9400	8760	144	696	98	.89	8.47	80	.73	6.95
22	Intrnl 2	0	0	0	0	8760	336	840	0	.00	.00	0	.44	.00
34	North Pole 1	28	75540	28	5600	8760	144	432	55	.89	9.00	45	.73	7.38
204	GE 7EA SC	8	17560	8	1600	8760	408	408	0	.00	.00	10	.50	6.54
37	Healy D1	107	74378	107	21400	8760	408	408	5	.84	11.76	5	.76	10.64
31	Zehnder EMD6	0	0	0	0	8760	0	96	0	.84	.00	0	.76	.00
30	Zehnder EMD5	0	0	0	0	8760	0	96	0	.84	.00	0	.76	.00
18	Bernice 2	9	13753	9	1800	8760	504	408	0	.00	.00	2	.44	6.94
40	SILOS	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
998	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
999	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
997	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
TOTAL		2227	4433126	2225	445000				1072		.43	10669		4.27

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 12:40:39 DATE: Oct 04 1998 PAGE: 43

Multi Area Model -- Pooled Case
Uses Power Pool Price Files from the Traditional Scenario

INPUT FILENAME
pool3.ppi

ANNUAL SUMMARY - 2015 8760 HOURS AVERAGE INCREMENTAL COST 27.90 ANNUAL PEAK DEMAND 0 MW

UNIT #	OR PURCHASE NAME	AREA	MAX CAPACITY MW	MAX OUTPUT MW	ENERGY OUTPUT MWH	FUEL USED MBTU	FUEL PRICE $/MBTU	FUEL COST $	FUEL AVG $/MWH	HOURS ON LINE	HEAT RATE BTU/KWH	CAPACITY FACTOR OPER.	CAPACITY FACTOR AVG.	O & M VARIABLE $	O & M FIXED $
36	Healy 1	3	25.0	25.0	128809	1972305	1.34	2642891	20.52	7601	15311	.678	.588	2455178	4149540
38	HCCP	3	53.0	53.0	394244	4653217	.97	4513864	11.45	7440	11802	1.000	.849	6712194	5756607
29	Beluga 7-8	2	105.5	105.5	589168	5019467	2.70	13552247	23.00	5662	8519	1.000	.655	2066278	1427873
27	Beluga 6-8	2	105.5	105.5	832563	7612979	2.70	20554724	24.69	8086	9144	1.000	.925	2919979	1427873
6	ML&P P2 U7-6	2	109.5	109.5	659637	5688563	2.98	16950662	25.70	6334	8623	1.000	.721	2313429	1354501
5	ML&P P2 U5-6	2	49.2	49.2	293411	3017249	2.98	8990717	30.64	6299	10283	1.000	.714	1029038	608598
25	LM6000 Chug	2	40.5	40.5	274365	2811912	3.07	8632640	31.46	7443	10248	.910	.773	962232	548140
12	Beluga 3	2	66.9	66.9	452009	5596283	2.70	15108934	33.43	7619	12380	.938	.811	1585263	905447
13	Beluga 5	2	71.0	71.0	337190	4351579	2.70	11749327	34.84	6562	12905	.784	.590	1182531	960938
7	ML&P P2 U8	2	87.6	87.6	242068	3136263	2.98	9346029	38.61	4855	12956	.609	.335	848933	1083601
24	Soldotna 1	1	39.0	39.0	215712	2561099	3.07	7862546	36.45	7351	11872	.788	.664	779201	225676
19	Bernice 3	1	28.0	28.0	91355	1274465	2.72	3466536	37.95	4385	13950	.784	.390	320380	309842
20	Bernice 4	1	28.0	28.0	94304	1265647	2.72	3442546	36.50	3652	13420	.968	.402	330715	309842
207	GE 7EA 1x1	4	128.0	128.0	450136	4464733	5.14	22950084	50.98	7854	9918	.448	.401	1956776	2479536
4	ML&P P1 U4	2	34.1	34.1	11624	167156	2.98	498127	42.85	441	14380	.826	.041	41988	458026
2	ML&P P1 U2	2	16.8	12.1	2874	51966	2.98	154858	53.88	390	18080	.494	.021	10080	219082
3	ML&P P1 U3	2	19.5	11.7	1767	33384	2.98	99484	56.29	225	18890	.439	.011	6198	254292
1	ML&P P1 U1	2	16.8	14.0	531	10871	2.98	32395	61.00	83	20468	.441	.004	1863	219082
10	Beluga 1	2	16.7	4.8	49	1699	2.70	4588	93.35	16	34572	.213	.000	172	226023
23	Intrnl 3	2	18.9	7.7	60	1264	3.07	3881	64.38	9	20969	.401	.000	211	185011
11	Beluga 2	2	16.7	13.2	40	716	2.70	1933	48.89	3	18107	.915	.000	139	226023
21	Intrnl 1	2	15.0	3.6	11	325	3.07	998	93.91	3	30588	.257	.000	37	146834
35	North Pole 2	4	59.3	59.3	24741	231890	5.26	1219864	49.31	691	9372	.714	.055	202166	537279
22	Intrnl 2	2	15.1	.0	0	0	3.07	0	.00	0	0	.000	.000	0	147813
34	North Pole 1	4	56.7	56.5	14078	142400	5.26	749098	53.21	429	10114	.654	.031	115039	513722
204	GE 7EA SC	4	83.0	68.0	3333	42937	5.14	220712	66.23	72	12883	.558	.005	16690	603619
37	Healy D1	3	2.6	2.6	327	4584	5.45	24972	76.27	142	14000	.887	.014	4593	103286
31	Zehnder EMD6	4	2.6	.5	1	7	5.64	39	78.89	1	14000	.192	.000	7	37380
30	Zehnder EMD5	4	2.6	.0	0	0	5.64	0	.00	0	0	.000	.000	0	37380
18	Bernice 2	1	19.3	16.1	199	3201	2.72	8706	43.84	16	16117	.696	.001	696	213570
40	SILOS	4	70.0	.0	0	0	175.35	0	.00	0	0	.000	.000	0	0
998	EMERG PURCH	2	150.0	.0	0	0	1920.58	0	.00	0	0	.000	.000	0	0
999	EMERG PURCH	4	150.0	.0	0	0	1920.58	0	.00	0	0	.000	.000	0	0
997	EMERG PURCH	1	150.0	.0	0	0	1920.58	0	.00	0	0	.000	.000	0	0
TOTAL					5114606			152783424	29.87					25862010	25676450

Transmission Losses and Dumped Energy (MWH) 92280.

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 12:40:39 DATE: Oct 04 1998 PAGE: 44

Multi Area Model -- Pooled Case
Uses Power Pool Price Files from the Traditional Scenario

INPUT FILENAME
pool3.ppi

ANNUAL SUMMARY - 2015 8760 HOURS AVERAGE INCREMENTAL COST 27.90 ANNUAL PEAK DEMAND 0 MW

UNIT OR PURCHASE #	NAME	STARTS # OF	STARTS COST $	STOPS # OF	STOPS COST $	HOURS TOTAL	HOURS MAINT	HOURS OUT-AGE	EMISSIONS SO2 TONS	SO2 LB/MBTU	SO2 LB/MWH	NOX TONS	NOX LB/MBTU	NOX LB/MWH
36	Healy 1	6	10466	6	1200	8760	408	744	454	.46	7.04	365	.37	5.67
38	HCCP	1	2781	1	200	8760	480	840	698	.30	3.54	814	.35	4.13
29	Beluga 7-8	1	6310	1	200	8760	2856	240	0	.00	.00	1104	.44	3.75
27	Beluga 6-8	1	6310	1	200	8760	672	0	0	.00	.00	1675	.44	4.02
6	ML&P P2 U7-6	1	4915	1	200	8760	2208	216	0	.00	.00	796	.28	2.41
5	ML&P P2 U5-6	6	14730	6	1200	8760	2208	216	0	.00	.00	943	.62	6.43
25	LM6000 Chug	65	86124	65	13000	8760	672	408	0	.00	.00	591	.42	4.30
12	Beluga 3	48	139430	48	9600	8760	672	72	0	.00	.00	1231	.44	5.45
13	Beluga 5	186	540291	186	37200	8760	672	0	0	.00	.00	957	.44	5.68
7	ML&P P2 U8	255	1057277	255	51000	8760	336	288	0	.00	.00	122	.08	1.01
24	Soldotna 1	73	128841	73	14600	8760	720	72	0	.00	.00	538	.42	4.99
19	Bernice 3	364	637357	364	72800	8760	504	576	0	.00	.00	280	.44	6.14
20	Bernice 4	497	530796	498	99600	8760	504	408	0	.00	.00	278	.44	5.91
207	GE 7EA 1x1	10	15523	10	2000	8760	408	408	0	.00	.00	1116	.50	4.96
4	ML&P P1 U4	112	205916	112	22400	8760	336	288	0	.00	.00	37	.44	6.33
2	ML&P P1 U2	93	84094	93	18600	8760	168	288	0	.00	.00	11	.44	7.96
3	ML&P P1 U3	47	47430	47	9400	8760	336	288	0	.00	.00	7	.44	8.31
1	ML&P P1 U1	26	23963	26	5200	8760	168	288	0	.00	.00	2	.44	9.01
10	Beluga 1	3	5269	3	600	8760	504	576	0	.00	.00	0	.44	15.21
23	Intrnl 3	3	5319	3	600	8760	336	936	0	.00	.00	0	.44	9.23
11	Beluga 2	1	1789	1	200	8760	504	0	0	.00	.00	0	.44	7.97
21	Intrnl 1	1	1767	1	200	8760	336	840	0	.00	.00	0	.44	13.46
35	North Pole 2	19	48989	19	3800	8760	2208	528	103	.89	8.34	85	.73	6.84
22	Intrnl 2	0	0	0	0	8760	336	840	0	.00	.00	0	.44	.00
34	North Pole 1	28	66279	28	5600	8760	144	432	63	.89	9.00	52	.73	7.38
204	GE 7EA SC	8	14781	8	1600	8760	408	408	0	.00	.00	11	.50	6.44
37	Healy D1	37	23834	37	7400	8760	408	408	2	.84	11.76	2	.76	10.64
31	Zehnder EMD6	1	851	1	200	8760	0	96	0	.84	11.76	0	.76	10.64
30	Zehnder EMD5	0	0	0	0	8760	0	96	0	.84	.00	0	.76	.00
18	Bernice 2	8	14163	8	1600	8760	504	408	0	.00	.00	1	.44	7.09
40	SILOS	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
998	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
999	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
997	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
TOTAL		1901	3725597	1902	380400				1320		.52	11020		4.31

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 12:40:39 DATE: Oct 04 1998 PAGE: 46

Multi Area Model -- Pooled Case INPUT FILENAME
Uses Power Pool Price Files from the Traditional Scenario pool3.ppi

ANNUAL SUMMARY - 2016 8760 HOURS AVERAGE INCREMENTAL COST 31.04 ANNUAL PEAK DEMAND 0 MW

UNIT OR PURCHASE #	NAME	AREA	MAX CAPACITY MW	MAX OUTPUT MW	ENERGY OUTPUT MWH	FUEL USED MBTU	FUEL PRICE $/MBTU	FUEL COST $	FUEL AVG $/MWH	HOURS ON LINE	HEAT RATE BTU/KWH	CAPACITY FACTOR OPER.	CAPACITY FACTOR AVG.	O & M VARIABLE $	O & M FIXED $
36	Healy 1	3	25.0	25.0	130962	1997840	1.37	2737038	20.90	7601	15255	.689	.598	2571101	4274026
38	HCCP	3	53.0	53.0	394187	4652551	.99	4606222	11.69	7439	11802	1.000	.849	6912292	5929305
29	Beluga 7-8	2	105.5	105.5	798720	6805095	2.78	18915488	23.68	7776	8520	1.000	.887	2885090	1470709
27	Beluga 6-8	2	105.5	105.5	614288	5617054	2.78	15615815	25.42	5904	9144	1.000	.683	2219008	1470709
6	ML&P P2 U7-6	2	109.5	109.5	662038	5709486	3.06	17469098	26.39	6336	8624	1.000	.724	2391278	1395136
5	ML&P P2 U5-6	2	49.2	49.2	292022	3002713	3.06	9188681	31.47	6269	10282	1.000	.711	1054903	626855
25	LM6000 Chug	2	40.5	40.5	277794	2846985	3.15	8967722	32.28	7527	10248	.911	.783	1003463	564585
12	Beluga 3	2	66.9	66.9	449946	5584180	2.78	15523668	34.50	7601	12410	.928	.808	1625292	932610
13	Beluga 5	2	71.0	71.0	344308	4455716	2.78	12386882	35.98	6810	12941	.774	.603	1243724	989766
7	ML&P P2 U8	2	87.6	87.6	250153	3237089	3.06	9905485	39.60	5034	12940	.611	.346	903609	1116109
24	Soldotna 1	1	39.0	39.0	222049	2634789	3.15	8299554	37.38	7563	11865	.790	.683	826156	232446
19	Bernice 3	1	28.0	28.0	85864	1200220	2.80	3360598	39.14	4132	13978	.778	.366	310160	319138
20	Bernice 4	1	28.0	28.0	101039	1355344	2.80	3795075	37.56	3894	13414	.970	.431	364985	319138
207	GE 7EA 1x1	4	128.0	128.0	467924	4585290	5.29	24277216	51.88	7925	9799	.461	.417	2095128	2553921
4	ML&P P1 U4	2	34.1	34.1	9797	143377	3.06	438735	44.78	386	14635	.786	.034	36449	471767
2	ML&P P1 U2	2	16.8	12.3	2933	54223	3.06	165921	56.58	424	18489	.471	.022	10593	225655
3	ML&P P1 U3	2	19.5	11.9	790	15315	3.06	46863	59.31	100	19383	.418	.005	2854	261921
1	ML&P P1 U1	2	16.8	11.3	524	12727	3.06	38945	74.34	109	24292	.323	.004	1892	225655
10	Beluga 1	2	16.7	3.0	112	4341	2.78	12067	108.21	38	38923	.180	.001	403	232804
23	Intrnl 3	2	18.9	6.3	116	3633	3.15	11443	98.43	29	31249	.213	.001	420	190562
11	Beluga 2	2	16.7	14.4	255	5462	2.78	15185	59.49	24	21400	.641	.002	922	232804
21	Intrnl 1	2	15.0	3.0	27	979	3.15	3085	115.27	9	36592	.200	.000	97	151239
35	North Pole 2	4	59.3	59.3	23675	224874	5.42	1218442	51.47	729	9498	.672	.052	199260	553398
22	Intrnl 2	2	15.1	4.5	17	480	3.15	1512	90.80	4	28824	.276	.000	60	152248
204	GE 7EA SC	4	83.0	83.0	13586	174421	5.29	923482	67.97	277	12838	.591	.019	70081	621728
200	GE 6B	4	38.0	38.0	1145	14407	5.29	76281	66.61	37	12581	.814	.003	8597	493603
37	Healy D1	3	2.6	2.6	284	3975	5.61	22304	78.56	128	14000	.853	.012	4102	106385
31	Zehnder EMD6	4	2.6	2.5	10	141	5.80	819	81.26	5	14000	.776	.000	146	38501
30	Zehnder EMD5	4	2.6	2.3	3	40	5.80	230	81.26	2	14000	.545	.000	41	38501
18	Bernice 2	1	19.3	16.2	670	10187	2.80	28525	42.60	47	15212	.834	.004	2419	219977
40	SILOS	4	70.0	9.9	41	408	180.61	73683	1806.13	5	10000	.117	.000	737	0
998	EMERG PURCH	2	150.0	.0	0	0	1987.80	0	.00	0	0	.000	.000	0	0
999	EMERG PURCH	4	150.0	.0	0	0	1987.80	0	.00	0	0	.000	.000	0	0
997	EMERG PURCH	1	150.0	.0	0	0	1987.80	0	.00	0	0	.000	.000	0	0
TOTAL					5145279			158126064	30.73					26745254	26411218

Transmission Losses and Dumped Energy (MWH) 92977.

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 12:40:39 DATE: Oct 04 1998 PAGE: 47

Multi Area Model -- Pooled Case
Uses Power Pool Price Files from the Traditional Scenario

INPUT FILENAME
pool3.ppi

ANNUAL SUMMARY - 2016 8760 HOURS AVERAGE INCREMENTAL COST 31.04 ANNUAL PEAK DEMAND 0 MW

UNIT OR PURCHASE #	NAME	--- STARTS -- # OF	COST $	--- STOPS --- # OF	COST $	----- HOURS ----- TOTAL	MAINT	OUT-AGE	EMISSIONS SO2 TONS	SO2 LB/MBTU	SO2 LB/MWH	NOX TONS	NOX LB/MBTU	NOX LB/MWH
36	Healy 1	9	16067	9	1800	8760	408	744	460	.46	7.02	370	.37	5.64
38	HCCP	2	4746	2	400	8760	480	840	698	.30	3.54	814	.35	4.13
29	Beluga 7-8	1	6499	1	200	8760	672	312	0	.00	.00	1497	.44	3.75
27	Beluga 6-8	1	6499	1	200	8760	2856	0	0	.00	.00	1236	.44	4.02
6	ML&P P2 U7-6	1	5061	1	200	8760	2208	216	0	.00	.00	799	.28	2.41
5	ML&P P2 U5-6	10	25271	10	2000	8760	2208	216	0	.00	.00	938	.62	6.43
25	LM6000 Chug	41	56010	41	8200	8760	672	408	0	.00	.00	598	.42	4.30
12	Beluga 3	55	164553	55	11000	8760	672	72	0	.00	.00	1229	.44	5.46
13	Beluga 5	158	472716	158	31600	8760	672	0	0	.00	.00	980	.44	5.69
7	ML&P P2 U8	255	1088479	255	51000	8760	336	288	0	.00	.00	126	.08	1.01
24	Soldotna 1	86	151621	86	17200	8760	336	96	0	.00	.00	553	.42	4.98
19	Bernice 3	373	678343	373	74600	8760	504	576	0	.00	.00	264	.44	6.15
20	Bernice 4	495	529650	495	99000	8760	504	408	0	.00	.00	298	.44	5.90
207	GE 7EA 1x1	4	7329	4	800	8760	408	408	0	.00	.00	1146	.50	4.90
4	ML&P P1 U4	111	210027	111	22200	8760	336	288	0	.00	.00	32	.44	6.44
2	ML&P P1 U2	104	96788	104	20800	8760	168	288	0	.00	.00	12	.44	8.14
3	ML&P P1 U3	25	25965	25	5000	8760	2208	216	0	.00	.00	3	.44	8.53
1	ML&P P1 U1	29	27509	29	5800	8760	168	288	0	.00	.00	3	.44	10.69
10	Beluga 1	6	10855	6	1200	8760	504	576	0	.00	.00	1	.44	17.13
23	Intrnl 3	7	12782	7	1400	8760	336	936	0	.00	.00	1	.44	13.75
11	Beluga 2	5	9212	5	1000	8760	504	0	0	.00	.00	1	.44	9.42
21	Intrnl 1	2	3639	2	400	8760	336	840	0	.00	.00	0	.44	16.10
35	North Pole 2	23	53427	23	4600	8760	144	696	100	.89	8.45	82	.73	6.93
22	Intrnl 2	1	1820	1	200	8760	336	840	0	.00	.00	0	.44	12.68
204	GE 7EA SC	19	41290	19	3800	8760	408	408	0	.00	.00	44	.50	6.42
200	GE 6B	4	5607	4	800	8760	336	432	0	.00	.00	4	.50	6.29
37	Healy D1	36	22796	36	7200	8760	408	408	2	.84	11.76	2	.76	10.64
31	Zehnder EMD6	3	1754	3	600	8760	0	96	0	.84	11.76	0	.76	10.64
30	Zehnder EMD5	2	877	2	400	8760	0	96	0	.84	11.76	0	.76	10.64
18	Bernice 2	14	23706	14	2800	8760	504	408	0	.00	.00	2	.44	6.69
40	SILOS	1	0	1	0	8760	0	0	0	.00	.00	0	.00	.00
998	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
999	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
997	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
TOTAL		1883	3760894	1883	376400				1259		.49	11035		4.29

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 12:55:22 DATE: Oct 04 1998 PAGE: 4

Multi Area Model -- Joint Case
Uses Power Pool Price Files from the Traditional Scenario

INPUT FILENAME
joint3.ppi

ANNUAL SUMMARY - 2002 8760 HOURS AVERAGE INCREMENTAL COST 23.94 ANNUAL PEAK DEMAND 0 MW

UNIT OR PURCHASE #	NAME	AREA	MAX CAPACITY MW	MAX OUTPUT MW	ENERGY OUTPUT MWH	FUEL USED MBTU	FUEL PRICE $/MBTU	FUEL COST $	FUEL AVG $/MWH	HOURS ON LINE	HEAT RATE BTU/KWH	CAPACITY FACTOR OPER.	CAPACITY FACTOR AVG.	O & M VARIABLE $	O & M FIXED $
38	HCCP	3	53.0	53.0	386400	4558580	.76	3464844	8.97	7439	11797	.980	.832	4479643	3919969
36	Healy 1	3	25.0	25.0	86855	1505348	1.05	1580631	18.20	7119	17331	.488	.397	1127333	2825635
17	Beluga 7-8	2	101.5	101.5	767615	7022487	1.88	13203484	17.20	7774	9148	1.000	.890	1833184	935447
15	Beluga 6-8	2	101.5	101.5	795371	7454821	1.88	14013418	17.62	8058	9372	1.000	.922	1899486	935447
6	ML&P P2 U7-6	2	109.5	109.5	837780	7231165	2.16	15618427	18.64	8067	8631	.993	.916	2000706	922349
5	ML&P P2 U5-6	2	49.2	49.2	302283	3108407	2.16	6713215	22.21	6449	10283	1.000	.736	721873	414425
12	Beluga 3	2	66.9	66.9	283365	3696665	1.88	6949847	24.53	5920	13045	.753	.509	676701	616565
13	Beluga 5	2	71.0	71.0	174555	2375241	1.88	4465460	25.58	4254	13607	.633	.305	416855	654352
19	Bernice 3	1	28.0	28.0	123840	1840672	1.90	3497224	28.24	7272	14863	.635	.529	295743	210987
20	Bernice 4	1	28.0	28.0	51858	727976	1.90	1383150	26.67	2361	14037	.828	.221	123843	210987
7	ML&P P2 U8	2	87.6	87.6	27543	393061	2.16	849011	30.82	744	14270	.451	.038	65776	737879
24	Soldotna 1	1	39.0	39.0	26766	333312	2.25	749954	28.02	1094	12452	.661	.082	65838	153674
4	ML&P P1 U4	2	34.1	34.1	1847	29094	2.16	62844	34.03	87	15753	.656	.006	4543	311893
2	ML&P P1 U2	2	16.8	15.7	1802	45931	2.16	99211	55.05	455	25487	.266	.013	4304	149184
3	ML&P P1 U3	2	19.5	12.2	496	11865	2.16	25629	51.67	94	23923	.288	.003	1184	173160
10	Beluga 1	2	16.7	2.6	21	806	1.88	1514	73.18	8	38923	.180	.000	49	153911
1	ML&P P1 U1	2	16.8	11.9	248	7720	2.16	16675	67.28	77	31147	.219	.002	592	149184
11	Beluga 2	2	16.7	.0	0	0	1.88	0	.00	0	0	.000	.000	0	153911
23	Intrnl 3	2	18.9	5.0	5	124	2.25	280	55.82	1	24810	.300	.000	12	125984
35	North Pole 2	4	59.3	58.9	69230	931700	3.58	3337475	48.21	3647	13458	.353	.153	385217	365861
21	Intrnl 1	2	15.0	.0	0	0	2.25	0	.00	0	0	.000	.000	0	99987
34	North Pole 1	4	56.7	56.5	16063	234128	3.58	838682	52.21	1002	14575	.307	.036	89382	349820
22	Intrnl 2	2	15.1	.0	0	0	2.25	0	.00	0	0	.000	.000	0	100653
39	Chena 6	4	29.3	29.3	1979	28687	4.06	116463	58.85	148	14495	.456	.008	688	305700
37	Healy D1	3	2.6	2.6	1049	14685	3.71	54475	51.94	479	14000	.842	.046	10019	70333
33	Zehnder GT2	4	18.0	13.3	127	2425	3.84	9304	72.98	15	19020	.480	.001	793	163733
32	Zehnder GT1	4	18.0	.0	0	0	3.84	0	.00	0	0	.000	.000	0	163733
31	Zehnder EMD6	4	2.6	.0	0	0	3.84	0	.00	0	0	.000	.000	0	25454
30	Zehnder EMD5	4	2.6	.0	0	0	3.84	0	.00	0	0	.000	.000	0	25454
18	Bernice 2	1	19.3	14.7	656	11774	1.90	22371	34.13	74	17961	.515	.004	1565	145430
40	SILOS	4	70.0	.0	0	0	119.41	0	.00	0	0	.000	.000	0	0
998	EMERG PURCH	2	150.0	.0	0	0	1228.03	0	.00	0	0	.000	.000	0	0
999	EMERG PURCH	4	150.0	.0	0	0	1228.03	0	.00	0	0	.000	.000	0	0
997	EMERG PURCH	1	150.0	.0	0	0	1228.03	0	.00	0	0	.000	.000	0	0
TOTAL					3957754			77073568	19.47					14205328	15571115

Transmission Losses and Dumped Energy (MWH) 95859.

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 12:55:22 DATE: Oct 04 1998 PAGE: 5

Multi Area Model -- Joint Case
Uses Power Pool Price Files from the Traditional Scenario

INPUT FILENAME
joint3.ppi

ANNUAL SUMMARY - 2002 8760 HOURS AVERAGE INCREMENTAL COST 23.94 ANNUAL PEAK DEMAND 0 MW

UNIT OR PURCHASE #	NAME	STARTS # OF	STARTS COST $	STOPS # OF	STOPS COST $	HOURS TOTAL	HOURS MAINT	HOURS OUT-AGE	EMISSIONS SO2 TONS	SO2 LB/MBTU	SO2 LB/MWH	NOX TONS	NOX LB/MBTU	NOX LB/MWH
38	HCCP	2	3269	2	400	8760	480	840	684	.30	3.54	798	.35	4.13
36	Healy 1	485	565239	485	97000	8760	408	744	346	.46	7.97	278	.37	6.41
17	Beluga 7-8	1	4299	1	200	8760	672	312	0	.00	.00	1545	.44	4.03
15	Beluga 6-8	5	21497	5	1000	8760	672	0	0	.00	.00	1640	.44	4.12
6	ML&P P2 U7-6	11	37106	11	2200	8760	336	288	0	.00	.00	1012	.28	2.42
5	ML&P P2 U5-6	188	318421	188	37600	8760	336	288	0	.00	.00	971	.62	6.43
12	Beluga 3	189	374372	188	37600	8760	672	72	0	.00	.00	813	.44	5.74
13	Beluga 5	233	461527	233	46600	8760	672	0	0	.00	.00	523	.44	5.99
19	Bernice 3	72	49478	72	14400	8760	504	576	0	.00	.00	405	.44	6.54
20	Bernice 4	317	319488	318	63600	8760	504	408	0	.00	.00	160	.44	6.18
7	ML&P P2 U8	72	205317	72	14400	8760	336	288	0	.00	.00	15	.08	1.11
24	Soldotna 1	110	138658	111	22200	8760	336	96	0	.00	.00	70	.42	5.23
4	ML&P P1 U4	18	22924	18	3600	8760	336	288	0	.00	.00	6	.44	6.93
2	ML&P P1 U2	118	73813	118	23600	8760	168	288	0	.00	.00	10	.44	11.21
3	ML&P P1 U3	40	27940	40	8000	8760	336	288	0	.00	.00	3	.44	10.53
10	Beluga 1	1	1197	1	200	8760	504	576	0	.00	.00	0	.44	17.13
1	ML&P P1 U1	32	20417	32	6400	8760	168	288	0	.00	.00	2	.44	13.70
11	Beluga 2	0	0	0	0	8760	504	0	0	.00	.00	0	.44	.00
23	Intrnl 3	1	1211	1	200	8760	336	936	0	.00	.00	0	.44	10.92
35	North Pole 2	254	341441	254	50800	8760	144	696	415	.89	11.98	340	.73	9.82
21	Intrnl 1	0	0	0	0	8760	336	840	0	.00	.00	0	.44	.00
34	North Pole 1	121	149135	121	24200	8760	144	432	104	.89	12.97	85	.73	10.64
22	Intrnl 2	0	0	0	0	8760	336	840	0	.00	.00	0	.44	.00
39	Chena 6	29	26587	29	5800	8760	360	432	0	.02	.29	2	.12	1.74
37	Healy D1	115	44632	115	23000	8760	408	408	6	.84	11.76	6	.76	10.64
33	Zehnder GT2	3	2472	3	600	8760	144	96	1	.84	15.98	1	.76	14.46
32	Zehnder GT1	0	0	0	0	8760	144	96	0	.84	.00	0	.76	.00
31	Zehnder EMD6	0	0	0	0	8760	0	96	0	.84	.00	0	.76	.00
30	Zehnder EMD5	0	0	0	0	8760	0	96	0	.84	.00	0	.76	.00
18	Bernice 2	38	45857	38	7600	8760	504	408	0	.00	.00	3	.44	7.90
40	SILOS	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
998	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
999	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
997	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
TOTAL		2455	3256296	2456	491200				1556		.79	8689		4.39

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 12:55:22 DATE: Oct 04 1998 PAGE: 7

Multi Area Model -- Joint Case
Uses Power Pool Price Files from the Traditional Scenario

INPUT FILENAME
joint3.ppi

ANNUAL SUMMARY - 2003 8760 HOURS AVERAGE INCREMENTAL COST 28.59 ANNUAL PEAK DEMAND 0 MW

UNIT #	OR PURCHASE NAME	AREA	MAX CAPACITY MW	MAX OUTPUT MW	ENERGY OUTPUT MWH	FUEL USED MBTU	FUEL PRICE $/MBTU	FUEL COST $	FUEL AVG $/MWH	HOURS ON LINE	HEAT RATE BTU/KWH	CAPACITY FACTOR OPER.	CAPACITY FACTOR AVG.	O & M VARIABLE $	O & M FIXED $
38	HCCP	3	53.0	53.0	385761	4551721	.77	3505222	9.09	7440	11799	.978	.831	4606072	4037568
36	Healy 1	3	25.0	25.0	94011	1580816	1.07	1691497	17.99	7165	16815	.525	.429	1256821	2910404
17	Beluga 7-8	2	101.5	101.5	825091	7548213	1.94	14645453	17.75	8376	9148	1.000	.959	2029300	960870
15	Beluga 6-8	2	101.5	101.5	796369	7464717	1.94	14479825	18.18	8073	9373	.999	.923	1958670	963510
6	ML&P P2 U7-6	2	109.5	109.5	834077	7204502	2.22	15992917	19.17	8067	8637	.987	.912	2051680	950020
5	ML&P P2 U5-6	2	49.2	49.2	304245	3128607	2.22	6944685	22.83	6510	10283	1.000	.741	748363	426858
12	Beluga 3	2	66.9	66.9	263769	3453909	1.94	6700699	25.40	5543	13094	.745	.473	648807	635062
13	Beluga 5	2	71.0	71.0	178709	2425851	1.94	4706166	26.33	4293	13574	.641	.313	439580	673982
19	Bernice 3	1	28.0	28.0	128151	1891116	1.95	3687680	28.78	7342	14756	.651	.547	315220	217317
20	Bernice 4	1	28.0	28.0	57481	809838	1.95	1579177	27.47	2639	14088	.819	.245	141389	217317
7	ML&P P2 U8	2	87.6	87.6	32601	445080	2.22	988075	30.31	765	13652	.515	.045	80190	760016
24	Soldotna 1	1	39.0	39.0	36873	452835	2.30	1041521	28.25	1425	12280	.696	.113	93420	158284
4	ML&P P1 U4	2	34.1	34.1	5152	80520	2.22	178754	34.70	237	15628	.673	.018	13053	321250
2	ML&P P1 U2	2	16.8	16.3	2952	69653	2.22	154630	52.39	655	23597	.301	.022	7261	153660
3	ML&P P1 U3	2	19.5	13.5	1025	21430	2.22	47576	46.43	156	20915	.362	.006	2520	178355
1	ML&P P1 U1	2	16.8	9.0	326	9631	2.22	21381	65.59	92	29546	.237	.002	802	153660
10	Beluga 1	2	16.7	.0	0	0	1.94	0	.00	0	0	.000	.000	0	158528
11	Beluga 2	2	16.7	.0	0	0	1.94	0	.00	0	0	.000	.000	0	158528
23	Intrnl 3	2	18.9	.0	0	0	2.30	0	.00	0	0	.000	.000	0	129763
35	North Pole 2	4	59.3	59.3	75020	977362	3.69	3606080	48.07	3587	13027	.376	.166	429955	376837
21	Intrnl 1	2	15.0	.0	0	0	2.30	0	.00	0	0	.000	.000	0	102987
34	North Pole 1	4	56.7	54.8	21012	335292	3.69	1237097	58.88	1621	15957	.264	.047	120424	360314
22	Intrnl 2	2	15.1	.0	0	0	2.30	0	.00	0	0	.000	.000	0	103673
39	Chena 6	4	29.3	29.3	7875	113933	4.18	476419	60.50	585	14468	.459	.031	2821	314871
37	Healy D1	3	2.6	2.6	1729	24209	3.82	92501	53.49	714	14000	.931	.076	17014	72443
33	Zehnder GT2	4	18.0	17.3	701	11958	3.95	47263	67.44	65	17063	.607	.005	4491	168645
32	Zehnder GT1	4	18.0	15.6	480	7620	3.95	30118	62.72	37	15868	.721	.003	3077	168645
31	Zehnder EMD6	4	2.6	.0	0	0	3.95	0	.00	0	0	.000	.000	0	26217
30	Zehnder EMD5	4	2.6	.0	0	0	3.95	0	.00	0	0	.000	.000	0	26217
18	Bernice 2	1	19.3	18.8	441	7936	1.95	15475	35.12	49	18011	.514	.003	1084	149793
40	SILOS	4	70.0	.0	0	0	122.99	0	.00	0	0	.000	.000	0	0
998	EMERG PURCH	2	150.0	.0	0	0	1271.01	0	.00	0	0	.000	.000	0	0
999	EMERG PURCH	4	150.0	.0	0	0	1271.01	0	.00	0	0	.000	.000	0	0
997	EMERG PURCH	1	150.0	.0	0	0	1271.01	0	.00	0	0	.000	.000	0	0
TOTAL					4053851			81870208	20.20					14972013	16035610

Transmission Losses and Dumped Energy (MWH) 99846.

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 12:55:22 DATE: Oct 04 1998 PAGE: 8

Multi Area Model -- Joint Case
Uses Power Pool Price Files from the Traditional Scenario

INPUT FILENAME
joint3.ppi

ANNUAL SUMMARY - 2003 8760 HOURS AVERAGE INCREMENTAL COST 28.59 ANNUAL PEAK DEMAND 0 MW

UNIT OR PURCHASE #	NAME	STARTS # OF	STARTS COST $	STOPS # OF	STOPS COST $	HOURS TOTAL	HOURS MAINT	HOURS OUT-AGE	EMISSIONS SO2 TONS	SO2 LB/MBTU	SO2 LB/MWH	NOX TONS	NOX LB/MBTU	NOX LB/MWH
38	HCCP	1	2050	1	200	8760	480	840	683	.30	3.54	797	.35	4.13
36	Healy 1	437	524679	437	87400	8760	408	744	364	.46	7.73	292	.37	6.22
17	Beluga 7-8	0	0	0	0	8736	0	360	0	.00	.00	1661	.44	4.03
15	Beluga 6-8	3	13286	3	600	8760	672	0	0	.00	.00	1642	.44	4.12
6	ML&P P2 U7-6	11	38208	11	2200	8760	336	288	0	.00	.00	1009	.28	2.42
5	ML&P P2 U5-6	181	315615	181	36200	8760	336	288	0	.00	.00	978	.62	6.43
12	Beluga 3	203	414215	203	40600	8760	672	72	0	.00	.00	760	.44	5.76
13	Beluga 5	207	422377	207	41400	8760	672	0	0	.00	.00	534	.44	5.97
19	Bernice 3	81	64626	81	16200	8760	504	576	0	.00	.00	416	.44	6.49
20	Bernice 4	335	339795	335	67000	8760	504	408	0	.00	.00	178	.44	6.20
7	ML&P P2 U8	62	182040	61	12200	8760	2208	216	0	.00	.00	17	.08	1.06
24	Soldotna 1	140	177765	140	28000	8760	720	72	0	.00	.00	95	.42	5.16
4	ML&P P1 U4	43	56371	43	8600	8760	336	288	0	.00	.00	18	.44	6.88
2	ML&P P1 U2	146	94016	146	29200	8760	168	288	0	.00	.00	15	.44	10.38
3	ML&P P1 U3	46	33076	46	9200	8760	336	288	0	.00	.00	5	.44	9.20
1	ML&P P1 U1	43	28242	43	8600	8760	168	288	0	.00	.00	2	.44	13.00
10	Beluga 1	0	0	0	0	8760	504	576	0	.00	.00	0	.44	.00
11	Beluga 2	0	0	0	0	8760	504	0	0	.00	.00	0	.44	.00
23	Intrnl 3	0	0	0	0	8760	336	936	0	.00	.00	0	.44	.00
35	North Pole 2	210	287007	210	42000	8760	2208	528	435	.89	11.59	357	.73	9.51
21	Intrnl 1	0	0	0	0	8760	336	840	0	.00	.00	0	.44	.00
34	North Pole 1	192	258710	192	38400	8760	2208	336	149	.89	14.20	122	.73	11.65
22	Intrnl 2	0	0	0	0	8760	336	840	0	.00	.00	0	.44	.00
39	Chena 6	107	96498	107	21400	8760	360	432	1	.02	.29	7	.12	1.74
37	Healy D1	174	72837	174	34800	8760	408	408	10	.84	11.76	9	.76	10.64
33	Zehnder GT2	14	11458	14	2800	8760	144	96	5	.84	14.33	5	.76	12.97
32	Zehnder GT1	2	2546	2	400	8760	144	96	3	.84	13.33	3	.76	12.06
31	Zehnder EMD6	0	0	0	0	8760	0	96	0	.84	.00	0	.76	.00
30	Zehnder EMD5	0	0	0	0	8760	0	96	0	.84	.00	0	.76	.00
18	Bernice 2	36	44741	36	7200	8760	504	408	0	.00	.00	2	.44	7.93
40	SILOS	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
998	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
999	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
997	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
TOTAL		2674	3480157	2673	534600				1650		.81	8923		4.40

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 12:55:22 DATE: Oct 04 1998 PAGE: 10

Multi Area Model -- Joint Case
Uses Power Pool Price Files from the Traditional Scenario

INPUT FILENAME
joint3.ppi

ANNUAL SUMMARY - 2004 8760 HOURS AVERAGE INCREMENTAL COST 29.52 ANNUAL PEAK DEMAND 0 MW

UNIT OR PURCHASE #	NAME	AREA	MAX CAPACITY MW	MAX OUTPUT MW	ENERGY OUTPUT MWH	FUEL USED MBTU	FUEL PRICE $/MBTU	FUEL COST $	FUEL AVG $/MWH	HOURS ON LINE	HEAT RATE BTU/KWH	CAPACITY FACTOR OPER.	CAPACITY FACTOR AVG.	O & M VARIABLE $	O & M FIXED $
38	HCCP	3	53.0	53.0	309143	3647724	.79	2881952	9.32	5904	11799	.988	.666	3801919	4158695
36	Healy 1	3	25.0	25.0	94249	1478616	1.09	1611709	17.10	5806	15688	.649	.430	1297803	2997716
29	Beluga 7-8	2	105.5	105.5	800896	6823693	1.99	13578795	16.95	7774	8520	1.000	.890	2029084	1031525
15	Beluga 6-8	2	101.5	101.5	858184	8044738	1.99	16007827	18.65	8729	9374	.998	.997	2174286	989697
6	ML&P P2 U7-6	2	109.5	109.5	829736	7173415	2.27	16282713	19.62	8092	8645	.981	.907	2102142	978520
5	ML&P P2 U5-6	2	49.2	49.2	312566	3214322	2.27	7296236	23.34	6673	10283	1.000	.761	791874	439664
12	Beluga 3	2	66.9	66.9	270875	3696952	1.99	7356996	27.16	6573	13648	.648	.486	686278	654114
13	Beluga 5	2	71.0	71.0	187927	2619538	1.99	5212915	27.74	4946	13939	.587	.329	476120	694202
19	Bernice 3	1	28.0	28.0	127203	1875855	2.00	3751709	29.49	7287	14746	.652	.543	322274	223837
20	Bernice 4	1	28.0	28.0	63007	875446	2.00	1750893	27.79	2773	13894	.857	.269	159628	223837
7	ML&P P2 U8	2	87.6	87.6	41230	617667	2.27	1402105	34.01	1276	14981	.397	.057	104458	782816
24	Soldotna 1	1	39.0	39.0	39027	479450	2.35	1126707	28.87	1511	12285	.692	.120	101843	163033
4	ML&P P1 U4	2	34.1	34.1	3355	55241	2.27	125397	37.38	174	16465	.596	.012	8755	330887
2	ML&P P1 U2	2	16.8	16.8	2462	66230	2.27	150341	61.05	680	26895	.245	.018	6239	158269
3	ML&P P1 U3	2	19.5	11.5	846	23707	2.27	53815	63.60	206	28015	.226	.005	2144	183706
1	ML&P P1 U1	2	16.8	11.1	194	6183	2.27	14035	72.42	62	31903	.212	.001	491	158269
10	Beluga 1	2	16.7	7.8	104	3152	1.99	6272	60.10	27	30202	.264	.001	264	163284
11	Beluga 2	2	16.7	.0	0	0	1.99	0	.00	0	0	.000	.000	0	163284
23	Intrnl 3	2	18.9	.0	0	0	2.35	0	.00	0	0	.000	.000	0	133656
21	Intrnl 1	2	15.0	.0	0	0	2.35	0	.00	0	0	.000	.000	0	106076
35	North Pole 2	4	59.3	59.3	151776	1853004	3.80	7042148	46.40	6750	12208	.429	.336	895967	388142
34	North Pole 1	4	56.7	56.6	36842	430832	3.80	1637293	44.44	1482	11693	.490	.082	217486	371124
22	Intrnl 2	2	15.1	4.2	20	561	2.35	1319	64.51	5	27451	.296	.000	52	106783
39	Chena 6	4	29.3	29.3	3773	53447	4.31	230195	61.01	265	14164	.486	.015	1392	324317
37	Healy D1	3	2.6	2.6	3288	46027	3.94	181146	55.10	1393	13999	.908	.144	33318	74616
33	Zehnder GT2	4	18.0	14.7	349	6705	4.07	27294	78.12	44	19190	.474	.002	2306	173704
32	Zehnder GT1	4	18.0	14.7	15	217	4.07	882	60.05	1	14750	.935	.000	97	173704
31	Zehnder EMD6	4	2.6	.5	2	21	4.07	85	56.99	3	14000	.192	.000	15	27004
30	Zehnder EMD5	4	2.6	.5	1	7	4.07	28	56.99	1	14000	.192	.000	5	27004
18	Bernice 2	1	19.3	16.7	868	15770	2.00	31540	36.34	99	18172	.504	.006	2199	154287
40	SILOS	4	70.0	.5	1	5	126.68	633	1266.77	1	10000	.007	.000	6	0
998	EMERG PURCH	2	150.0	.0	0	0	1315.49	0	.00	0	0	.000	.000	0	0
999	EMERG PURCH	4	150.0	.0	0	0	1315.49	0	.00	0	0	.000	.000	0	0
997	EMERG PURCH	1	150.0	.0	0	0	1315.49	0	.00	0	0	.000	.000	0	0
TOTAL					4137939			87762984	21.21					15218445	16555785

Transmission Losses and Dumped Energy (MWH) 99356.

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 12:55:22 DATE: Oct 04 1998 PAGE: 11

Multi Area Model -- Joint Case
Uses Power Pool Price Files from the Traditional Scenario

INPUT FILENAME
joint3.ppi

ANNUAL SUMMARY - 2004 8760 HOURS AVERAGE INCREMENTAL COST 29.52 ANNUAL PEAK DEMAND 0 MW

UNIT OR PURCHASE #	NAME	STARTS # OF	STARTS COST $	STOPS # OF	STOPS COST $	HOURS TOTAL	HOURS MAINT	HOURS OUT-AGE	EMISSIONS SO2 TONS	SO2 LB/MBTU	SO2 LB/MWH	NOX TONS	NOX LB/MBTU	NOX LB/MWH
38	HCCP	1	2108	1	200	8760	2208	648	547	.30	3.54	638	.35	4.13
36	Healy 1	146	180562	146	29200	8760	2208	600	340	.46	7.22	274	.37	5.80
29	Beluga 7-8	2	9122	1	200	8760	672	312	0	.00	.00	1501	.44	3.75
15	Beluga 6-8	1	4561	1	200	8736	0	0	0	.00	.00	1770	.44	4.12
6	ML&P P2 U7-6	7	25021	7	1400	8760	336	288	0	.00	.00	1004	.28	2.42
5	ML&P P2 U5-6	169	303060	170	34000	8760	336	288	0	.00	.00	1004	.62	6.43
12	Beluga 3	145	304663	145	29000	8760	672	72	0	.00	.00	813	.44	6.01
13	Beluga 5	199	418124	198	39600	8760	672	0	0	.00	.00	576	.44	6.13
19	Bernice 3	88	67833	88	17600	8760	504	576	0	.00	.00	413	.44	6.49
20	Bernice 4	302	310800	302	60400	8760	504	408	0	.00	.00	193	.44	6.11
7	ML&P P2 U8	79	238629	79	15800	8760	336	288	0	.00	.00	24	.08	1.17
24	Soldotna 1	160	209693	160	32000	8760	336	96	0	.00	.00	101	.42	5.16
4	ML&P P1 U4	36	48511	36	7200	8760	2208	216	0	.00	.00	12	.44	7.25
2	ML&P P1 U2	141	93345	141	28200	8760	168	288	0	.00	.00	15	.44	11.83
3	ML&P P1 U3	65	48047	65	13000	8760	336	288	0	.00	.00	5	.44	12.33
1	ML&P P1 U1	29	19580	29	5800	8760	2208	216	0	.00	.00	1	.44	14.04
10	Beluga 1	7	8888	7	1400	8760	504	576	0	.00	.00	1	.44	13.29
11	Beluga 2	0	0	0	0	8760	504	0	0	.00	.00	0	.44	.00
23	Intrnl 3	0	0	0	0	8760	336	936	0	.00	.00	0	.44	.00
21	Intrnl 1	0	0	0	0	8760	336	840	0	.00	.00	0	.44	.00
35	North Pole 2	149	210263	149	29800	8760	144	696	825	.89	10.87	676	.73	8.91
34	North Pole 1	115	149890	115	23000	8760	144	432	192	.89	10.41	157	.73	8.54
22	Intrnl 2	1	1279	1	200	8760	336	840	0	.00	.00	0	.44	12.08
39	Chena 6	40	24177	40	8000	8760	360	432	1	.02	.28	3	.12	1.70
37	Healy D1	381	126062	381	76200	8760	408	408	19	.84	11.76	17	.76	10.64
33	Zehnder GT2	8	3934	8	1600	8760	144	96	3	.84	16.12	3	.76	14.58
32	Zehnder GT1	1	0	1	200	8760	144	96	0	.84	12.39	0	.76	11.21
31	Zehnder EMD6	2	1230	2	400	8760	0	96	0	.84	11.76	0	.76	10.64
30	Zehnder EMD5	1	615	1	200	8760	0	96	0	.84	11.76	0	.76	10.64
18	Bernice 2	55	70393	55	11000	8760	504	408	0	.00	.00	3	.44	8.00
40	SILOS	1	0	1	0	8760	0	0	0	.00	.00	0	.00	.00
998	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
999	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
997	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
TOTAL		2331	2880389	2330	465800				1926		.93	9206		4.45

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 12:55:22 DATE: Oct 04 1998 PAGE: 13

Multi Area Model -- Joint Case
Uses Power Pool Price Files from the Traditional Scenario

INPUT FILENAME
joint3.ppi

ANNUAL SUMMARY - 2005 8760 HOURS AVERAGE INCREMENTAL COST 29.07 ANNUAL PEAK DEMAND 0 MW

UNIT #	OR PURCHASE NAME	AREA	MAX CAPACITY MW	MAX OUTPUT MW	ENERGY OUTPUT MWH	FUEL USED MBTU	FUEL PRICE $/MBTU	FUEL COST $	FUEL AVG $/MWH	HOURS ON LINE	HEAT RATE BTU/KWH	CAPACITY FACTOR OPER.	CAPACITY FACTOR AVG.	O & M VARIABLE $	O & M FIXED $
36	Healy 1	3	25.0	25.0	106669	1736474	1.11	1927494	18.07	7506	16279	.568	.487	1512857	3087647
38	HCCP	3	53.0	53.0	393140	4639662	.80	3712116	9.44	7440	11801	.997	.847	4980595	4283456
29	Beluga 7-8	2	105.5	105.5	797332	6793313	2.05	13923663	17.46	7774	8520	1.000	.886	2080602	1062471
27	Beluga 6-8	2	105.5	105.5	828165	7573484	2.05	15527128	18.75	8065	9144	.997	.920	2161086	1062471
6	ML&P P2 U7-6	2	109.5	109.5	665714	5742972	2.33	13379146	20.10	6292	8626	.997	.728	1737198	1007876
5	ML&P P2 U5-6	2	49.2	49.2	244846	2517757	2.33	5866284	23.96	5200	10283	1.000	.596	638902	452854
12	Beluga 3	2	66.9	66.9	371633	4693640	2.05	9621802	25.89	6821	12629	.860	.667	969783	673738
13	Beluga 5	2	71.0	71.0	271320	3554819	2.05	7287417	26.86	5687	13101	.738	.475	708022	715028
19	Bernice 3	1	28.0	28.0	145990	2052037	2.06	4227182	28.96	7112	14056	.767	.623	380966	230552
7	ML&P P2 U8	2	87.6	87.6	97263	1309858	2.33	3051974	31.38	2226	13467	.536	.135	253810	806301
20	Bernice 4	1	28.0	28.0	64475	868691	2.06	1789489	27.75	2534	13473	.954	.275	168252	230552
24	Soldotna 1	1	39.0	39.0	60287	724963	2.41	1747158	28.98	2164	12025	.748	.186	162042	167924
4	ML&P P1 U4	2	34.1	34.1	5452	82069	2.33	191221	35.07	228	15053	.735	.019	14654	340814
2	ML&P P1 U2	2	16.8	16.8	3722	77360	2.33	180248	48.42	665	20783	.375	.028	9713	163018
3	ML&P P1 U3	2	19.5	14.2	1644	33415	2.33	77858	47.35	237	20323	.381	.010	4291	189217
1	ML&P P1 U1	2	16.8	10.1	374	10907	2.33	25412	67.89	101	29136	.242	.003	977	163018
10	Beluga 1	2	16.7	6.4	35	967	2.05	1983	56.52	7	27568	.306	.000	92	168182
11	Beluga 2	2	16.7	14.4	14	252	2.05	517	35.88	1	17504	1.000	.000	38	168182
23	Intrnl 3	2	18.9	8.0	21	435	2.41	1049	48.78	3	20241	.429	.000	56	137666
21	Intrnl 1	2	15.0	5.4	5	126	2.41	305	56.68	1	23516	.390	.000	14	109258
35	North Pole 2	4	59.3	59.3	122805	1633753	3.91	6395065	52.07	6391	13303	.363	.272	746685	399786
34	North Pole 1	4	56.7	56.6	27441	353844	3.91	1385057	50.47	1377	12894	.390	.061	166848	382257
22	Intrnl 2	2	15.1	5.2	5	123	2.41	296	57.00	1	23652	.377	.000	14	109987
39	Chena 6	4	29.3	29.3	3197	47556	4.44	210971	65.98	257	14873	.425	.012	1215	334047
37	Healy D1	3	2.6	2.6	1314	18394	4.05	74565	56.75	544	14000	.929	.058	13715	76855
33	Zehnder GT2	4	18.0	16.4	215	3821	4.19	16023	74.59	23	17789	.556	.001	1460	178915
32	Zehnder GT1	4	18.0	10.7	11	183	4.19	765	71.82	1	17127	.592	.000	72	178915
31	Zehnder EMD6	4	2.6	.0	0	0	4.19	0	.00	0	0	.000	.000	0	27814
30	Zehnder EMD5	4	2.6	.0	0	0	4.19	0	.00	0	0	.000	.000	0	27814
18	Bernice 2	1	19.3	19.2	753	12979	2.06	26736	35.51	76	17238	.573	.005	1965	158916
40	SILOS	4	70.0	4.3	6	55	130.48	71791	304.78	3	10000	.026	.000	72	0
998	EMERG PURCH	2	150.0	.0	0	0	1361.53	0	.00	0	0	.000	.000	0	0
999	EMERG PURCH	4	150.0	.0	0	0	1361.53	0	.00	0	0	.000	.000	0	0
997	EMERG PURCH	1	150.0	.0	0	0	1361.53	0	.00	0	0	.000	.000	0	0
TOTAL					4213848			90656112	21.51					16715995	17095538

Transmission Losses and Dumped Energy (MWH) 101372.

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 12:55:22 DATE: Oct 04 1998 PAGE: 14

Multi Area Model -- Joint Case
Uses Power Pool Price Files from the Traditional Scenario

INPUT FILENAME
joint3.ppi

ANNUAL SUMMARY - 2005 8760 HOURS AVERAGE INCREMENTAL COST 29.07 ANNUAL PEAK DEMAND 0 MW

UNIT OR PURCHASE #	NAME	STARTS # OF	STARTS COST $	STOPS # OF	STOPS COST $	HOURS TOTAL	HOURS MAINT	HOURS OUT-AGE	EMISSIONS SO2 TONS	SO2 LB/MBTU	SO2 LB/MWH	NOX TONS	NOX LB/MBTU	NOX LB/MWH
36	Healy 1	104	132543	104	20800	8760	408	744	399	.46	7.49	321	.37	6.02
38	HCCP	1	2156	1	200	8760	480	840	696	.30	3.54	812	.35	4.13
29	Beluga 7-8	1	4698	1	200	8760	672	312	0	.00	.00	1495	.44	3.75
27	Beluga 6-8	5	23489	4	800	8760	672	0	0	.00	.00	1666	.44	4.02
6	ML&P P2 U7-6	7	25760	7	1400	8760	2208	216	0	.00	.00	804	.28	2.42
5	ML&P P2 U5-6	136	251014	135	27000	8760	2208	216	0	.00	.00	787	.62	6.43
12	Beluga 3	141	305150	141	28200	8760	672	72	0	.00	.00	1033	.44	5.56
13	Beluga 5	209	452315	210	42000	8760	672	0	0	.00	.00	782	.44	5.76
19	Bernice 3	113	112053	113	22600	8760	504	576	0	.00	.00	451	.44	6.18
7	ML&P P2 U8	132	410454	133	26600	8760	336	288	0	.00	.00	51	.08	1.05
20	Bernice 4	376	382746	376	75200	8760	504	408	0	.00	.00	191	.44	5.93
24	Soldotna 1	217	294297	217	43400	8760	336	96	0	.00	.00	152	.42	5.05
4	ML&P P1 U4	64	88744	64	12800	8760	336	288	0	.00	.00	18	.44	6.62
2	ML&P P1 U2	177	120585	177	35400	8760	168	288	0	.00	.00	17	.44	9.14
3	ML&P P1 U3	75	57049	75	15000	8760	336	288	0	.00	.00	7	.44	8.94
1	ML&P P1 U1	51	35434	51	10200	8760	168	288	0	.00	.00	2	.44	12.82
10	Beluga 1	3	3923	3	600	8760	504	576	0	.00	.00	0	.44	12.13
11	Beluga 2	1	1332	1	200	8760	504	0	0	.00	.00	0	.44	7.70
23	Intrnl 3	2	2644	2	400	8760	336	936	0	.00	.00	0	.44	8.91
21	Intrnl 1	1	1317	1	200	8760	336	840	0	.00	.00	0	.44	10.35
35	North Pole 2	175	285187	175	35000	8760	144	696	727	.89	11.84	596	.73	9.71
34	North Pole 1	126	177974	126	25200	8760	144	432	157	.89	11.48	129	.73	9.41
22	Intrnl 2	1	1317	1	200	8760	336	840	0	.00	.00	0	.44	10.41
39	Chena 6	36	31819	36	7200	8760	360	432	0	.02	.30	3	.12	1.78
37	Healy D1	148	59538	148	29600	8760	408	408	8	.84	11.76	7	.76	10.64
33	Zehnder GT2	6	6753	6	1200	8760	2208	72	2	.84	14.94	1	.76	13.52
32	Zehnder GT1	1	1351	1	200	8760	2208	72	0	.84	14.39	0	.76	13.02
31	Zehnder EMD6	0	0	0	0	8760	0	96	0	.84	.00	0	.76	.00
30	Zehnder EMD5	0	0	0	0	8760	0	96	0	.84	.00	0	.76	.00
18	Bernice 2	38	50094	38	7600	8760	504	408	0	.00	.00	3	.44	7.58
40	SILOS	3	0	3	0	8760	0	0	0	.00	.00	0	.00	.00
998	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
999	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
997	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
TOTAL		2350	3321739	2350	469400				1990		.94	9330		4.43

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 12:55:22 DATE: Oct 04 1998 PAGE: 16

Multi Area Model -- Joint Case
Uses Power Pool Price Files from the Traditional Scenario

INPUT FILENAME
joint3.ppi

ANNUAL SUMMARY - 2006 8760 HOURS AVERAGE INCREMENTAL COST 30.00 ANNUAL PEAK DEMAND 0 MW

UNIT #	OR PURCHASE NAME	AREA	MAX CAPACITY MW	MAX OUTPUT MW	ENERGY OUTPUT MWH	FUEL USED MBTU	FUEL PRICE $/MBTU	FUEL COST $	FUEL AVG $/MWH	HOURS ON LINE	HEAT RATE BTU/KWH	CAPACITY FACTOR OPER.	CAPACITY FACTOR AVG.	O & M VARIABLE $	O & M FIXED $
36	Healy 1	3	25.0	25.0	100988	1674269	1.13	1891913	18.73	7402	16578	.546	.461	1475272	3180277
38	HCCP	3	53.0	53.0	392760	4635202	.82	3801172	9.68	7439	11801	.996	.846	5124459	4411960
29	Beluga 7-8	2	105.5	105.5	800896	6823690	2.11	14396033	17.97	7774	8520	1.000	.890	2152758	1094345
27	Beluga 6-8	2	105.5	105.5	827818	7571189	2.11	15975882	19.30	8086	9145	.994	.920	2225084	1094345
6	ML&P P2 U7-6	2	109.5	109.5	841240	7258791	2.39	17348068	20.62	8074	8628	.996	.920	2261087	1038112
5	ML&P P2 U5-6	2	49.2	49.2	296060	3044433	2.39	7275529	24.57	6334	10283	1.000	.721	795761	466439
12	Beluga 3	2	66.9	66.9	291583	3741746	2.11	7895195	27.08	5685	12832	.806	.523	783709	693950
13	Beluga 5	2	71.0	71.0	200582	2660833	2.11	5614395	27.99	4368	13265	.705	.351	539131	736479
7	ML&P P2 U8	2	87.6	87.6	86668	1175865	2.39	2810324	32.43	2016	13567	.525	.120	232949	830490
19	Bernice 3	1	28.0	28.0	139995	1962629	2.12	4160750	29.72	6721	14019	.777	.598	376280	237468
20	Bernice 4	1	28.0	28.0	45135	613528	2.12	1300680	28.82	1843	13593	.924	.193	121316	237468
24	Soldotna 1	1	39.0	39.0	65228	781989	2.47	1931514	29.61	2311	11988	.760	.201	180582	172962
4	ML&P P1 U4	2	34.1	34.1	3310	52065	2.39	124435	37.59	154	15729	.661	.012	9164	351039
2	ML&P P1 U2	2	16.8	15.9	870	17042	2.39	40730	46.82	136	19589	.421	.006	2338	167908
3	ML&P P1 U3	2	19.5	11.9	399	7950	2.39	19000	47.57	54	19903	.398	.002	1074	194893
1	ML&P P1 U1	2	16.8	16.8	233	4995	2.39	11938	51.16	39	21405	.409	.002	627	167908
10	Beluga 1	2	16.7	8.8	52	1348	2.11	2844	54.67	10	25911	.345	.000	140	173228
11	Beluga 2	2	16.7	.0	0	0	2.11	0	.00	0	0	.000	.000	0	173228
23	Intrnl 3	2	18.9	.0	0	0	2.47	0	.00	0	0	.000	.000	0	141796
21	Intrnl 1	2	15.0	.0	0	0	2.47	0	.00	0	0	.000	.000	0	112536
35	North Pole 2	4	59.3	59.3	135325	1708934	4.03	6889990	50.91	6418	12628	.398	.300	847491	411780
34	North Pole 1	4	56.7	56.5	37505	464026	4.03	1870843	49.88	1725	12372	.427	.083	234882	393725
22	Intrnl 2	2	15.1	.0	0	0	2.47	0	.00	0	0	.000	.000	0	113286
39	Chena 6	4	29.3	29.3	3309	47803	4.57	218425	66.01	246	14446	.459	.013	1295	344068
37	Healy D1	3	2.6	2.6	1390	19462	4.18	81258	58.45	569	14000	.940	.061	14946	79160
33	Zehnder GT2	4	18.0	18.0	156	2779	4.32	12001	77.00	17	17827	.565	.001	1091	184283
32	Zehnder GT1	4	18.0	18.0	55	852	4.32	3679	66.31	4	15352	.823	.000	389	184283
31	Zehnder EMD6	4	2.6	1.0	2	27	4.32	117	60.46	2	14000	.372	.000	21	28648
30	Zehnder EMD5	4	2.6	.0	0	0	4.32	0	.00	0	0	.000	.000	0	28648
18	Bernice 2	1	19.3	19.3	221	3584	2.12	7598	34.43	18	16240	.687	.001	593	163683
40	SILOS	4	70.0	.0	0	0	134.39	0	.00	0	0	.000	.000	0	0
998	EMERG PURCH	2	150.0	.0	0	0	1409.19	0	.00	0	0	.000	.000	0	0
999	EMERG PURCH	4	150.0	.0	0	0	1409.19	0	.00	0	0	.000	.000	0	0
997	EMERG PURCH	1	150.0	.0	0	0	1409.19	0	.00	0	0	.000	.000	0	0
TOTAL					4271780			93684304	21.93					17382438	17608414

Transmission Losses and Dumped Energy (MWH) 102286.

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 12:55:22 DATE: Oct 04 1998 PAGE: 17

Multi Area Model -- Joint Case
Uses Power Pool Price Files from the Traditional Scenario

INPUT FILENAME
joint3.ppi

ANNUAL SUMMARY - 2006 8760 HOURS AVERAGE INCREMENTAL COST 30.00 ANNUAL PEAK DEMAND 0 MW

UNIT OR PURCHASE #	NAME	STARTS # OF	STARTS COST $	STOPS # OF	STOPS COST $	HOURS TOTAL	HOURS MAINT	HOURS OUT-AGE	EMISSIONS SO2 TONS	SO2 LB/MBTU	SO2 LB/MWH	NOX TONS	NOX LB/MBTU	NOX LB/MWH
36	Healy 1	208	272930	208	41600	8760	408	744	385	.46	7.63	310	.37	6.13
38	HCCP	2	3635	2	400	8760	480	840	695	.30	3.54	811	.35	4.13
29	Beluga 7-8	1	4839	1	200	8760	672	312	0	.00	.00	1501	.44	3.75
27	Beluga 6-8	1	4839	1	200	8760	672	0	0	.00	.00	1666	.44	4.02
6	ML&P P2 U7-6	10	37884	10	2000	8760	336	288	0	.00	.00	1016	.28	2.42
5	ML&P P2 U5-6	220	417869	220	44000	8760	336	288	0	.00	.00	951	.62	6.43
12	Beluga 3	248	552793	248	49600	8760	672	72	0	.00	.00	823	.44	5.65
13	Beluga 5	288	641953	287	57400	8760	672	0	0	.00	.00	585	.44	5.84
7	ML&P P2 U8	179	572913	179	35800	8760	336	288	0	.00	.00	46	.08	1.06
19	Bernice 3	182	181941	182	36400	8760	504	576	0	.00	.00	432	.44	6.17
20	Bernice 4	355	364338	355	71000	8760	504	408	0	.00	.00	135	.44	5.98
24	Soldotna 1	239	338406	239	47800	8760	720	72	0	.00	.00	164	.42	5.04
4	ML&P P1 U4	61	87022	61	12200	8760	336	288	0	.00	.00	11	.44	6.92
2	ML&P P1 U2	64	44862	64	12800	8760	2208	216	0	.00	.00	4	.44	8.62
3	ML&P P1 U3	31	24261	31	6200	8760	336	288	0	.00	.00	2	.44	8.76
1	ML&P P1 U1	18	12867	18	3600	8760	168	288	0	.00	.00	1	.44	9.42
10	Beluga 1	4	5388	4	800	8760	504	576	0	.00	.00	0	.44	11.40
11	Beluga 2	0	0	0	0	8760	504	0	0	.00	.00	0	.44	.00
23	Intrnl 3	0	0	0	0	8760	336	936	0	.00	.00	0	.44	.00
21	Intrnl 1	0	0	0	0	8760	336	840	0	.00	.00	0	.44	.00
35	North Pole 2	179	353375	179	35800	8760	144	696	760	.89	11.24	624	.73	9.22
34	North Pole 1	153	262822	153	30600	8760	144	432	206	.89	11.01	169	.73	9.03
22	Intrnl 2	0	0	0	0	8760	336	840	0	.00	.00	0	.44	.00
39	Chena 6	35	35624	35	7000	8760	360	432	0	.02	.29	3	.12	1.73
37	Healy D1	164	81548	164	32800	8760	408	408	8	.84	11.76	7	.76	10.64
33	Zehnder GT2	8	5565	8	1600	8760	144	96	1	.84	14.98	1	.76	13.55
32	Zehnder GT1	3	2782	3	600	8760	144	96	0	.84	12.90	0	.76	11.67
31	Zehnder EMD6	1	652	1	200	8760	0	96	0	.84	11.76	0	.76	10.64
30	Zehnder EMD5	0	0	0	0	8760	0	96	0	.84	.00	0	.76	.00
18	Bernice 2	10	13578	10	2000	8760	504	408	0	.00	.00	1	.44	7.15
40	SILOS	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
998	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
999	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
997	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
TOTAL		2664	4324685	2663	532600				2058		.96	9265		4.34

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 12:55:22 DATE: Oct 04 1998 PAGE: 19

Multi Area Model -- Joint Case
Uses Power Pool Price Files from the Traditional Scenario

INPUT FILENAME
joint3.ppi

ANNUAL SUMMARY - 2007 8760 HOURS AVERAGE INCREMENTAL COST 32.60 ANNUAL PEAK DEMAND 0 MW

UNIT OR PURCHASE #	NAME	AREA	MAX CAPACITY MW	MAX OUTPUT MW	ENERGY OUTPUT MWH	FUEL USED MBTU	FUEL PRICE $/MBTU	FUEL COST $	FUEL AVG $/MWH	HOURS ON LINE	HEAT RATE BTU/KWH	CAPACITY FACTOR OPER.	CAPACITY FACTOR AVG.	O & M VARIABLE $	O & M FIXED $
36	Healy 1	3	25.0	25.0	108111	1753341	1.16	2033926	18.81	7484	16217	.578	.494	1626707	3275685
38	HCCP	3	53.0	53.0	393974	4649912	.83	3859714	9.80	7440	11802	.999	.849	5294906	4544318
29	Beluga 7-8	2	105.5	105.5	637974	5435402	2.16	11738768	18.40	6156	8519	1.000	.943	1766368	839977
27	Beluga 6-8	2	105.5	105.5	672014	6145669	2.16	13275181	19.75	6508	9145	.996	.993	1860596	839977
6	ML&P P2 U7-6	2	109.5	109.5	843365	7274788	2.44	17748398	21.04	8073	8625	.998	.922	2334736	1069256
5	ML&P P2 U5-6	2	49.2	49.2	306136	3148037	2.44	7680966	25.09	6534	10283	1.000	.745	847499	480432
26	Beluga 6CT	2	78.4	71.0	126015	1481895	2.16	3200882	25.40	1776	11759	.999	.813	348871	208835
12	Beluga 3	2	66.9	66.9	313593	3985764	2.16	8609486	27.45	5895	12710	.838	.563	868157	714768
13	Beluga 5	2	71.0	71.0	228307	2980135	2.16	6437073	28.19	4635	13053	.758	.400	632058	758573
7	ML&P P2 U8	2	87.6	87.6	179395	2312866	2.44	5643391	31.46	3557	12892	.626	.248	496650	855404
19	Bernice 3	1	28.0	28.0	141320	1959081	2.18	4270766	30.22	6515	13862	.811	.603	391246	244592
24	Soldotna 1	1	39.0	39.0	105613	1251227	2.53	3165612	29.97	3584	11847	.799	.325	301159	178150
20	Bernice 4	1	28.0	28.0	52439	702373	2.18	1531196	29.20	2034	13394	.975	.224	145174	244592
4	ML&P P1 U4	2	34.1	34.1	20569	288672	2.44	704362	34.24	732	14034	.890	.072	58653	361570
2	ML&P P1 U2	2	16.8	16.8	5487	95567	2.44	233183	42.50	712	17416	.538	.041	15191	172945
3	ML&P P1 U3	2	19.5	16.5	3152	55143	2.44	134548	42.69	338	17494	.521	.019	8726	200740
1	ML&P P1 U1	2	16.8	14.0	1822	36126	2.44	88148	48.38	272	19826	.471	.014	5044	172945
10	Beluga 1	2	16.7	14.4	585	15450	2.16	33371	57.03	121	26402	.334	.004	1620	178425
11	Beluga 2	2	16.7	14.7	813	14310	2.16	30909	38.03	57	17605	.985	.006	2250	178425
23	Intrnl 3	2	18.9	9.8	318	6842	2.53	17310	54.44	49	21519	.383	.002	880	146050
21	Intrnl 1	2	15.0	3.6	10	321	2.53	812	79.76	3	31526	.246	.000	28	115912
35	North Pole 2	4	59.3	59.3	136420	1605694	4.15	6667917	48.88	5407	11770	.459	.302	879980	424133
22	Intrnl 2	2	15.1	6.8	133	2900	2.53	7338	55.25	22	21838	.437	.001	368	116685
34	North Pole 1	4	56.7	56.2	47924	598242	4.15	2484326	51.84	2364	12483	.412	.107	309133	405537
39	Chena 6	4	29.3	29.3	10681	151349	4.71	712305	66.69	751	14169	.485	.042	4306	354390
37	Healy D1	3	2.6	2.6	1301	18218	4.30	78347	60.21	551	14000	.908	.057	14410	81535
33	Zehnder GT2	4	18.0	17.8	695	12613	4.45	56109	80.76	82	18156	.527	.005	5010	189811
32	Zehnder GT1	4	18.0	11.4	441	7875	4.45	35029	79.51	52	17873	.540	.003	3177	189811
31	Zehnder EMD6	4	2.6	.5	1	7	4.45	31	62.28	1	14000	.192	.000	6	29508
30	Zehnder EMD5	4	2.6	.0	0	0	4.45	0	.00	0	0	.000	.000	0	29508
18	Bernice 2	1	19.3	19.3	796	12456	2.18	27155	34.10	61	15640	.768	.005	2205	168594
40	SILOS	4	70.0	.0	0	0	138.42	0	.00	0	0	.000	.000	0	0
998	EMERG PURCH	2	150.0	.0	0	01458.51		0	.00	0	0	.000	.000	0	0
999	EMERG PURCH	4	150.0	.0	0	01458.51		0	.00	0	0	.000	.000	0	0
997	EMERG PURCH	1	150.0	.0	0	01458.51		0	.00	0	0	.000	.000	0	0
TOTAL					4339404			100506568	23.16					18225114	17771098

Transmission Losses and Dumped Energy (MWH) 102506.

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 12:55:22 DATE: Oct 04 1998 PAGE: 20

Multi Area Model -- Joint Case
Uses Power Pool Price Files from the Traditional Scenario

INPUT FILENAME
joint3.ppi

ANNUAL SUMMARY - 2007 8760 HOURS AVERAGE INCREMENTAL COST 32.60 ANNUAL PEAK DEMAND 0 MW

UNIT OR PURCHASE #	NAME	STARTS # OF	STARTS COST $	STOPS # OF	STOPS COST $	HOURS TOTAL	HOURS MAINT	HOURS OUT-AGE	EMISSIONS SO2 TONS	SO2 LB/MBTU	SO2 LB/MWH	NOX TONS	NOX LB/MBTU	NOX LB/MWH
36	Healy 1	126	170327	126	25200	8760	408	744	403	.46	7.46	324	.37	6.00
38	HCCP	1	2267	1	200	8760	480	840	697	.30	3.54	814	.35	4.13
29	Beluga 7-8	3	14948	2	400	6528	0	360	0	.00	.00	1196	.44	3.75
27	Beluga 6-8	4	19931	3	600	6528	0	0	0	.00	.00	1352	.44	4.02
6	ML&P P2 U7-6	10	38978	10	2000	8760	336	288	0	.00	.00	1018	.28	2.42
5	ML&P P2 U5-6	206	402264	206	41200	8760	336	288	0	.00	.00	984	.62	6.43
26	Beluga 6CT	5	24914	0	0	2184	0	240	0	.00	.00	326	.44	5.17
12	Beluga 3	244	559978	244	48800	8760	672	72	0	.00	.00	877	.44	5.59
13	Beluga 5	280	642598	280	56000	8760	672	0	0	.00	.00	656	.44	5.74
7	ML&P P2 U8	147	483919	147	29400	8760	336	288	0	.00	.00	90	.08	1.01
19	Bernice 3	232	258707	232	46400	8760	504	576	0	.00	.00	431	.44	6.10
24	Soldotna 1	223	319251	223	44600	8760	336	96	0	.00	.00	263	.42	4.98
20	Bernice 4	355	371184	355	71000	8760	504	408	0	.00	.00	155	.44	5.89
4	ML&P P1 U4	82	120196	82	16400	8760	336	288	0	.00	.00	64	.44	6.18
2	ML&P P1 U2	131	94369	131	26200	8760	168	288	0	.00	.00	21	.44	7.66
3	ML&P P1 U3	45	36190	45	9000	8760	2208	216	0	.00	.00	12	.44	7.70
1	ML&P P1 U1	49	35993	49	9800	8760	168	288	0	.00	.00	8	.44	8.72
10	Beluga 1	15	20807	15	3000	8760	504	576	0	.00	.00	3	.44	11.62
11	Beluga 2	10	14130	10	2000	8760	504	0	0	.00	.00	3	.44	7.75
23	Intrnl 3	10	14021	10	2000	8760	336	936	0	.00	.00	2	.44	9.47
21	Intrnl 1	1	1397	1	200	8760	336	840	0	.00	.00	0	.44	13.87
35	North Pole 2	83	166064	84	16800	8760	2208	528	715	.89	10.48	586	.73	8.59
22	Intrnl 2	2	2794	2	400	8760	336	840	0	.00	.00	1	.44	9.61
34	North Pole 1	153	284356	152	30400	8760	2208	336	266	.89	11.11	218	.73	9.11
39	Chena 6	120	136496	120	24000	8760	360	432	2	.02	.28	9	.12	1.70
37	Healy D1	158	83995	158	31600	8760	408	408	8	.84	11.76	7	.76	10.64
33	Zehnder GT2	14	12896	14	2800	8760	144	96	5	.84	15.25	5	.76	13.80
32	Zehnder GT1	5	7164	5	1000	8760	144	96	3	.84	15.01	3	.76	13.58
31	Zehnder EMD6	1	672	1	200	8760	0	96	0	.84	11.76	0	.76	10.64
30	Zehnder EMD5	0	0	0	0	8760	0	96	0	.84	.00	0	.76	.00
18	Bernice 2	27	37757	27	5400	8760	504	408	0	.00	.00	3	.44	6.88
40	SILOS	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
998	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
999	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
997	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
TOTAL		2742	4378565	2735	547000				2099		.97	9430		4.35

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 12:55:22 DATE: Oct 04 1998 PAGE: 22

Multi Area Model -- Joint Case
Uses Power Pool Price Files from the Traditional Scenario

INPUT FILENAME
joint3.ppi

ANNUAL SUMMARY - 2008 8760 HOURS AVERAGE INCREMENTAL COST 33.62 ANNUAL PEAK DEMAND 0 MW

UNIT OR PURCHASE #	NAME	AREA	MAX CAPACITY MW	MAX OUTPUT MW	ENERGY OUTPUT MWH	FUEL USED MBTU	FUEL PRICE $/MBTU	FUEL COST $	FUEL AVG $/MWH	HOURS ON LINE	HEAT RATE BTU/KWH	CAPACITY FACTOR OPER.	CAPACITY FACTOR AVG.	O & M VARIABLE $	O & M FIXED $
36	Healy 1	3	25.0	25.0	109549	1766010	1.18	2083928	19.02	7493	16120	.585	.500	1697771	3373956
38	HCCP	3	53.0	53.0	394094	4651423	.85	3953939	10.03	7440	11802	.999	.849	5455198	4680648
29	Beluga 7-8	2	105.5	105.5	798377	6802178	2.22	15098933	18.91	7774	8520	1.000	.887	2276478	1160991
27	Beluga 6-8	2	105.5	105.5	611688	5593857	2.22	12419221	20.30	5896	9144	.997	.680	1744280	1160991
6	ML&P P2 U7-6	2	109.5	109.5	843819	7278021	2.50	18194474	21.56	8106	8625	.999	.922	2406326	1101333
5	ML&P P2 U5-6	2	49.2	49.2	314635	3235338	2.50	8088441	25.71	6733	10282	1.000	.766	897246	494845
12	Beluga 3	2	66.9	66.9	357760	4488189	2.22	9963755	27.85	6353	12545	.886	.642	1020128	736211
13	Beluga 5	2	71.0	71.0	262278	3385179	2.22	7515201	28.65	5162	12906	.793	.459	747888	781330
7	ML&P P2 U8	2	87.6	87.6	149192	1925379	2.50	4813449	32.26	2929	12905	.623	.207	425424	881067
24	Soldotna 1	1	39.0	39.0	222525	2632809	2.59	6818934	30.64	7435	11831	.805	.685	653573	183495
19	Bernice 3	1	28.0	28.0	63072	858240	2.24	1922451	30.48	2702	13607	.872	.269	179849	251930
20	Bernice 4	1	28.0	28.0	55133	736287	2.24	1649307	29.91	2082	13354	.986	.235	157213	251930
4	ML&P P1 U4	2	34.1	34.1	10246	152544	2.50	381360	37.22	414	14888	.755	.036	30092	372417
2	ML&P P1 U2	2	16.8	16.8	2783	52170	2.50	130424	46.87	395	18747	.459	.021	7935	178134
3	ML&P P1 U3	2	19.5	19.5	1405	26967	2.50	67418	47.98	174	19190	.426	.009	4007	206763
1	ML&P P1 U1	2	16.8	12.7	403	9709	2.50	24273	60.20	81	24081	.328	.003	1150	178134
10	Beluga 1	2	16.7	14.5	101	2837	2.22	6299	62.24	21	28037	.300	.001	289	183777
11	Beluga 2	2	16.7	16.7	104	1908	2.22	4236	40.71	7	18336	.890	.001	297	183777
23	Intrnl 3	2	18.9	7.7	13	280	2.59	725	54.58	2	21073	.398	.000	38	150431
21	Intrnl 1	2	15.0	.0	0	0	2.59	0	.00	0	0	.000	.000	0	119390
35	North Pole 2	4	59.3	59.3	166733	1924684	4.28	8232434	49.37	6653	11543	.476	.369	1107786	436857
22	Intrnl 2	2	15.1	.0	0	0	2.59	0	.00	0	0	.000	.000	0	120186
34	North Pole 1	4	56.7	56.7	48442	579701	4.28	2479555	51.19	2079	11966	.454	.108	321850	417703
39	Chena 6	4	29.3	29.3	3570	51781	4.85	251015	70.31	268	14504	.455	.014	1483	365022
37	Healy D1	3	2.6	2.6	1083	15162	4.43	67162	62.01	481	14000	.866	.048	12353	83981
33	Zehnder GT2	4	18.0	17.0	550	10164	4.58	46568	84.67	66	18478	.514	.004	4086	195506
32	Zehnder GT1	4	18.0	10.5	213	3534	4.58	16193	76.00	21	16587	.642	.001	1583	195506
31	Zehnder EMD6	4	2.6	.0	0	0	4.58	0	.00	0	0	.000	.000	0	30393
30	Zehnder EMD5	4	2.6	.0	0	0	4.58	0	.00	0	0	.000	.000	0	30393
18	Bernice 2	1	19.3	19.3	467	7336	2.24	16433	35.23	37	15725	.746	.003	1330	173652
40	SILOS	4	70.0	.5	1	5	142.58	713	1425.76	1	10000	.007	.000	7	0
998	EMERG PURCH	2	150.0	.0	0	0	1509.56	0	.00	0	0	.000	.000	0	0
999	EMERG PURCH	4	150.0	.0	0	0	1509.56	0	.00	0	0	.000	.000	0	0
997	EMERG PURCH	1	150.0	.0	0	0	1509.56	0	.00	0	0	.000	.000	0	0
TOTAL					4418236			104246816	23.59					19155658	18680762

Transmission Losses and Dumped Energy (MWH) 102056.

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 12:55:22 DATE: Oct 04 1998 PAGE: 23

Multi Area Model -- Joint Case
Uses Power Pool Price Files from the Traditional Scenario

INPUT FILENAME
joint3.ppi

ANNUAL SUMMARY - 2008 8760 HOURS AVERAGE INCREMENTAL COST 33.62 ANNUAL PEAK DEMAND 0 MW

UNIT OR PURCHASE #	NAME	STARTS # OF	STARTS COST $	STOPS # OF	STOPS COST $	HOURS TOTAL	HOURS MAINT	HOURS OUT-AGE	EMISSIONS SO2 TONS	SO2 LB/MBTU	SO2 LB/MWH	NOX TONS	NOX LB/MBTU	NOX LB/MWH
36	Healy 1	117	163108	117	23400	8760	408	744	406	.46	7.42	327	.37	5.96
38	HCCP	1	2329	1	200	8760	480	840	698	.30	3.54	814	.35	4.13
29	Beluga 7-8	1	5132	1	200	8760	672	312	0	.00	.00	1496	.44	3.75
27	Beluga 6-8	2	10264	2	400	8760	2856	0	0	.00	.00	1231	.44	4.02
6	ML&P P2 U7-6	5	20060	5	1000	8760	336	288	0	.00	.00	1019	.28	2.42
5	ML&P P2 U5-6	193	387756	194	38800	8760	336	288	0	.00	.00	1011	.62	6.43
12	Beluga 3	203	479792	203	40600	8760	672	72	0	.00	.00	987	.44	5.52
13	Beluga 5	252	595604	252	50400	8760	672	0	0	.00	.00	745	.44	5.68
7	ML&P P2 U8	160	542060	160	32000	8760	2208	216	0	.00	.00	75	.08	1.01
24	Soldotna 1	114	130568	113	22600	8760	336	96	0	.00	.00	553	.42	4.97
19	Bernice 3	346	476715	347	69400	8760	504	576	0	.00	.00	189	.44	5.99
20	Bernice 4	479	505824	479	95800	8760	504	408	0	.00	.00	162	.44	5.88
4	ML&P P1 U4	115	173375	115	23000	8760	336	288	0	.00	.00	34	.44	6.55
2	ML&P P1 U2	143	105962	143	28600	8760	168	288	0	.00	.00	11	.44	8.25
3	ML&P P1 U3	66	54595	66	13200	8760	336	288	0	.00	.00	6	.44	8.44
1	ML&P P1 U1	37	27955	37	7400	8760	168	288	0	.00	.00	2	.44	10.60
10	Beluga 1	11	15715	11	2200	8760	504	576	0	.00	.00	1	.44	12.34
11	Beluga 2	5	7276	5	1000	8760	504	0	0	.00	.00	0	.44	8.07
23	Intrnl 3	2	2888	2	400	8760	336	936	0	.00	.00	0	.44	9.27
21	Intrnl 1	0	0	0	0	8760	336	840	0	.00	.00	0	.44	.00
35	North Pole 2	155	309288	155	31000	8760	144	696	856	.89	10.27	703	.73	8.43
22	Intrnl 2	0	0	0	0	8760	336	840	0	.00	.00	0	.44	.00
34	North Pole 1	179	335062	179	35800	8760	144	432	258	.89	10.65	212	.73	8.74
39	Chena 6	44	49887	44	8800	8760	360	432	1	.02	.29	3	.12	1.74
37	Healy D1	172	89283	172	34400	8760	408	408	6	.84	11.76	6	.76	10.64
33	Zehnder GT2	12	11807	12	2400	8760	144	96	4	.84	15.52	4	.76	14.04
32	Zehnder GT1	4	5903	4	800	8760	144	96	1	.84	13.93	1	.76	12.61
31	Zehnder EMD6	0	0	0	0	8760	0	96	0	.84	.00	0	.76	.00
30	Zehnder EMD5	0	0	0	0	8760	0	96	0	.84	.00	0	.76	.00
18	Bernice 2	12	17283	12	2400	8760	504	408	0	.00	.00	2	.44	6.92
40	SILOS	1	0	1	0	8760	0	0	0	.00	.00	0	.00	.00
998	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
999	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
997	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
TOTAL		2831	4525492	2832	566200				2231		1.01	9593		4.34

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 12:55:22 DATE: Oct 04 1998 PAGE: 25

Multi Area Model -- Joint Case
Uses Power Pool Price Files from the Traditional Scenario

INPUT FILENAME
joint3.ppi

ANNUAL SUMMARY - 2009 8760 HOURS AVERAGE INCREMENTAL COST 38.62 ANNUAL PEAK DEMAND 0 MW

UNIT #	OR PURCHASE NAME	AREA	MAX CAPACITY MW	MAX OUTPUT MW	ENERGY OUTPUT MWH	FUEL USED MBTU	FUEL PRICE $/MBTU	FUEL COST $	FUEL AVG $/MWH	HOURS ON LINE	HEAT RATE BTU/KWH	CAPACITY FACTOR OPER.	CAPACITY FACTOR AVG.	O & M VARIABLE $	O & M FIXED $
36	Healy 1	3	25.0	25.0	100180	1545611	1.20	1854757	18.51	5888	15428	.681	.457	1599182	3475174
38	HCCP	3	53.0	53.0	312713	3690940	.87	3211228	10.27	5904	11802	.999	.674	4458692	4821068
29	Beluga 7-8	2	105.5	105.5	799504	6811824	2.29	15597530	19.51	7768	8520	1.000	.888	2348208	1195821
27	Beluga 6-8	2	105.5	105.5	828989	7581429	2.29	17361602	20.94	8086	9145	.996	.921	2434790	1195821
6	ML&P P2 U7-6	2	109.5	109.5	843748	7277774	2.57	18702676	22.17	8070	8625	.998	.922	2478162	1134373
5	ML&P P2 U5-6	2	49.2	49.2	311461	3202768	2.57	8230050	26.42	6641	10283	1.000	.758	914793	509691
12	Beluga 3	2	66.9	66.9	312689	4051541	2.29	9278150	29.67	6364	12957	.775	.561	918389	758298
13	Beluga 5	2	71.0	71.0	226008	3032523	2.29	6944517	30.73	5209	13417	.671	.395	663804	804770
7	ML&P P2 U8	2	87.6	87.6	129121	1751485	2.57	4501317	34.86	3029	13564	.525	.179	379237	907499
24	Soldotna 1	1	39.0	39.0	209384	2477001	2.65	6564040	31.35	6964	11829	.807	.644	633430	189000
19	Bernice 3	1	28.0	28.0	52386	727043	2.30	1672196	31.92	2453	13878	.806	.224	153862	259488
20	Bernice 4	1	28.0	28.0	53962	727562	2.30	1673423	31.01	2137	13482	.952	.230	158491	259488
4	ML&P P1 U4	2	34.1	34.1	7293	110404	2.57	283737	38.91	310	15138	.724	.026	22062	383589
2	ML&P P1 U2	2	16.8	16.8	2375	47683	2.57	122546	51.61	393	20080	.401	.018	6975	183478
3	ML&P P1 U3	2	19.5	19.5	1461	26844	2.57	68988	47.24	167	18379	.467	.009	4290	212965
1	ML&P P1 U1	2	16.8	15.9	624	14238	2.57	36592	58.63	110	22811	.361	.005	1833	183478
10	Beluga 1	2	16.7	9.3	199	6281	2.29	14384	72.22	50	31538	.246	.001	585	189291
23	Intrnl 3	2	18.9	10.4	260	5455	2.65	14456	55.68	35	21012	.400	.002	762	154944
11	Beluga 2	2	16.7	16.7	166	2908	2.29	6660	40.20	10	17556	.992	.001	487	189291
21	Intrnl 1	2	15.0	4.7	5	126	2.65	334	71.06	1	26813	.313	.000	14	122971
35	North Pole 2	4	59.3	59.3	221887	2331319	4.41	10270796	46.29	7112	10506	.598	.492	1518464	449963
22	Intrnl 2	2	15.1	.0	0	0	2.65	0	.00	0	0	.000	.000	0	123791
34	North Pole 1	4	56.7	56.6	76352	843284	4.41	3715155	48.66	2747	11044	.557	.170	522503	430234
39	Chena 6	4	29.3	29.3	6511	90364	4.99	451192	69.29	430	13877	.517	.025	2785	375973
37	Healy D1	3	2.6	2.6	3027	42377	4.56	193343	63.87	1258	13999	.925	.133	35561	86501
33	Zehnder GT2	4	18.0	17.6	1106	20835	4.72	98324	88.87	141	18832	.494	.007	8465	201371
32	Zehnder GT1	4	18.0	15.6	332	5175	4.72	24424	73.66	27	15608	.762	.002	2537	201371
31	Zehnder EMD6	4	2.6	.0	0	0	4.72	0	.00	0	0	.000	.000	0	31305
30	Zehnder EMD5	4	2.6	.0	0	0	4.72	0	.00	0	0	.000	.000	0	31305
18	Bernice 2	1	19.3	19.3	218	3327	2.30	7651	35.13	15	15274	.835	.001	640	178861
40	SILOS	4	70.0	60.5	290	2903	146.85	4262421	468.62	6	10000	.691	.000	4262	0
998	EMERG PURCH	2	150.0	.0	0	0	1562.39	0	.00	0	0	.000	.000	0	0
999	EMERG PURCH	4	150.0	.0	0	0	1562.39	0	.00	0	0	.000	.000	0	0
997	EMERG PURCH	1	150.0	.0	0	0	1562.39	0	.00	0	0	.000	.000	0	0
TOTAL					4502251			111326328	24.73					19273258	19241186

Transmission Losses and Dumped Energy (MWH) 98718.

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 12:55:22 DATE: Oct 04 1998 PAGE: 26

Multi Area Model -- Joint Case
Uses Power Pool Price Files from the Traditional Scenario

INPUT FILENAME
joint3.ppi

ANNUAL SUMMARY - 2009 8760 HOURS AVERAGE INCREMENTAL COST 38.62 ANNUAL PEAK DEMAND 0 MW

UNIT OR PURCHASE #	NAME	STARTS # OF	STARTS COST $	STOPS # OF	STOPS COST $	HOURS TOTAL	HOURS MAINT	HOURS OUT-AGE	EMISSIONS SO2 TONS	SO2 LB/MBTU	SO2 LB/MWH	NOX TONS	NOX LB/MBTU	NOX LB/MWH
36	Healy 1	64	91832	64	12800	8760	2208	600	355	.46	7.10	286	.37	5.71
38	HCCP	1	2393	1	200	8760	2208	648	554	.30	3.54	646	.35	4.13
29	Beluga 7-8	2	5286	2	400	8760	672	312	0	.00	.00	1499	.44	3.75
27	Beluga 6-8	1	5286	1	200	8760	672	0	0	.00	.00	1668	.44	4.02
6	ML&P P2 U7-6	10	41314	10	2000	8760	336	288	0	.00	.00	1019	.28	2.42
5	ML&P P2 U5-6	208	430255	207	41400	8760	336	288	0	.00	.00	1001	.62	6.43
12	Beluga 3	204	496669	204	40800	8760	672	72	0	.00	.00	891	.44	5.70
13	Beluga 5	278	676831	278	55600	8760	672	0	0	.00	.00	667	.44	5.90
7	ML&P P2 U8	201	701175	201	40200	8760	336	288	0	.00	.00	68	.08	1.06
24	Soldotna 1	124	143686	124	24800	8760	720	72	0	.00	.00	520	.42	4.97
19	Bernice 3	298	422728	298	59600	8760	504	576	0	.00	.00	160	.44	6.11
20	Bernice 4	421	444150	421	84200	8760	504	408	0	.00	.00	160	.44	5.93
4	ML&P P1 U4	77	119505	77	15400	8760	336	288	0	.00	.00	24	.44	6.66
2	ML&P P1 U2	111	84676	111	22200	8760	168	288	0	.00	.00	10	.44	8.84
3	ML&P P1 U3	49	41727	49	9800	8760	336	288	0	.00	.00	6	.44	8.09
1	ML&P P1 U1	24	18667	24	4800	8760	168	288	0	.00	.00	3	.44	10.04
10	Beluga 1	9	13244	9	1800	8760	504	576	0	.00	.00	1	.44	13.88
23	Intrnl 3	10	14867	10	2000	8760	336	936	0	.00	.00	1	.44	9.25
11	Beluga 2	3	4497	3	600	8760	504	0	0	.00	.00	1	.44	7.72
21	Intrnl 1	1	1481	1	200	8760	336	840	0	.00	.00	0	.44	11.80
35	North Pole 2	104	234099	103	20600	8760	144	696	1037	.89	9.35	851	.73	7.67
22	Intrnl 2	0	0	0	0	8760	336	840	0	.00	.00	0	.44	.00
34	North Pole 1	187	359594	188	37600	8760	144	432	375	.89	9.83	308	.73	8.06
39	Chena 6	63	77854	63	12600	8760	360	432	1	.02	.28	5	.12	1.67
37	Healy D1	372	193190	372	74400	8760	408	408	18	.84	11.76	16	.76	10.64
33	Zehnder GT2	18	21282	18	3600	8760	144	96	9	.84	15.82	8	.76	14.31
32	Zehnder GT1	4	6081	4	800	8760	144	96	2	.84	13.11	2	.76	11.86
31	Zehnder EMD6	0	0	0	0	8760	0	96	0	.84	.00	0	.76	.00
30	Zehnder EMD5	0	0	0	0	8760	0	96	0	.84	.00	0	.76	.00
18	Bernice 2	10	14833	10	2000	8760	504	408	0	.00	.00	1	.44	6.72
40	SILOS	2	0	2	0	8760	0	0	0	.00	.00	0	.00	.00
998	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
999	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
997	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
TOTAL		2856	4667203	2855	570600				2351		1.04	9823		4.36

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 12:55:22 DATE: Oct 04 1998 PAGE: 28

Multi Area Model -- Joint Case
Uses Power Pool Price Files from the Traditional Scenario

INPUT FILENAME
joint3.ppi

ANNUAL SUMMARY - 2010 8760 HOURS AVERAGE INCREMENTAL COST 38.48 ANNUAL PEAK DEMAND 0 MW

UNIT OR PURCHASE #	NAME	AREA	MAX CAPACITY MW	MAX OUTPUT MW	ENERGY OUTPUT MWH	FUEL USED MBTU	FUEL PRICE $/MBTU	FUEL COST $	FUEL AVG $/MWH	HOURS ON LINE	HEAT RATE BTU/KWH	CAPACITY FACTOR OPER.	CAPACITY FACTOR AVG.	O & M VARIABLE $	O & M FIXED $
36	Healy 1	3	25.0	25.0	103488	1697349	1.22	2070754	20.01	7473	16401	.554	.473	1701514	3579430
38	HCCP	3	53.0	53.0	394164	4652243	.88	4094149	10.39	7440	11802	1.000	.849	5788664	4965700
29	Beluga 7-8	2	105.5	105.5	799169	6808932	2.35	15999051	20.02	7774	8520	1.000	.888	2417643	1231695
27	Beluga 6-8	2	105.5	105.5	830628	7595721	2.35	17850830	21.49	8080	9144	.998	.923	2512836	1231695
6	ML&P P2 U7-6	2	109.5	109.5	742047	6399960	2.63	16829224	22.68	7041	8624	.999	.811	2244856	1168405
5	ML&P P2 U5-6	2	49.2	49.2	273721	2814724	2.63	7401903	27.04	5791	10283	1.000	.666	828042	524982
12	Beluga 3	2	66.9	66.9	367346	4617881	2.35	10852278	29.54	6642	12570	.877	.659	1111294	781046
13	Beluga 5	2	71.0	71.0	265465	3456581	2.35	8122993	30.60	5364	13020	.761	.465	803083	828913
7	ML&P P2 U8	2	87.6	87.6	191326	2442330	2.63	6423350	33.57	3601	12765	.652	.265	578792	934724
24	Soldotna 1	1	39.0	39.0	228805	2696460	2.72	7334313	32.05	7510	11784	.820	.704	712934	194670
19	Bernice 3	1	28.0	28.0	60309	819327	2.37	1941816	32.20	2572	13585	.878	.257	182446	267273
20	Bernice 4	1	28.0	28.0	55757	743371	2.37	1761769	31.60	2104	13332	.992	.238	168673	267273
4	ML&P P1 U4	2	34.1	34.1	13095	187601	2.63	493393	37.68	479	14326	.838	.046	40802	395097
2	ML&P P1 U2	2	16.8	16.8	3442	63672	2.63	167458	48.66	486	18500	.472	.026	10411	188982
3	ML&P P1 U3	2	19.5	19.5	1891	35584	2.63	93586	49.49	229	18817	.445	.012	5721	219354
1	ML&P P1 U1	2	16.8	16.8	817	16921	2.63	44503	54.46	125	20706	.432	.006	2472	188982
10	Beluga 1	2	16.7	16.7	237	6317	2.35	14844	62.70	46	26681	.327	.002	716	194969
23	Intrnl 3	2	18.9	18.9	292	5606	2.72	15249	52.16	33	19177	.484	.002	884	159592
11	Beluga 2	2	16.7	15.6	16	280	2.35	658	42.23	1	17971	.933	.000	47	194969
21	Intrnl 1	2	15.0	.0	0	0	2.72	0	.00	0	0	.000	.000	0	126661
35	North Pole 2	4	59.3	59.3	194306	2126148	4.54	9647974	49.65	6913	10942	.537	.430	1369608	463462
22	Intrnl 2	2	15.1	.0	0	0	2.72	0	.00	0	0	.000	.000	0	127505
34	North Pole 1	4	56.7	56.7	66061	732057	4.54	3321906	50.29	2306	11081	.558	.147	465640	443141
39	Chena 6	4	29.3	29.3	6870	92652	5.14	476492	69.36	415	13486	.565	.027	3027	387252
37	Healy D1	3	2.6	2.6	1262	17671	4.70	83042	65.79	577	14000	.841	.055	15274	89096
33	Zehnder GT2	4	18.0	16.6	729	13937	4.86	67744	92.98	93	19127	.476	.005	5742	207412
32	Zehnder GT1	4	18.0	18.0	56	857	4.86	4164	74.39	4	15304	.831	.000	441	206844
31	Zehnder EMD6	4	2.6	2.4	5	64	4.86	311	68.05	2	14000	.880	.000	55	32244
30	Zehnder EMD5	4	2.6	2.4	2	34	4.86	165	68.05	1	14000	.933	.000	29	32244
18	Bernice 2	1	19.3	19.3	444	7160	2.37	16968	38.26	38	16141	.688	.003	1342	184227
40	SILOS	4	70.0	48.8	219	2190	151.26	331305	1512.66	5	10000	.626	.000	3313	0
998	EMERG PURCH	2	150.0	.0	0	0	1617.08	0	.00	0	0	.000	.000	0	0
999	EMERG PURCH	4	150.0	.0	0	0	1617.08	0	.00	0	0	.000	.000	0	0
997	EMERG PURCH	1	150.0	.0	0	0	1617.08	0	.00	0	0	.000	.000	0	0
TOTAL					4601969			115462192	25.09					20976300	19817852

Transmission Losses and Dumped Energy (MWH) 104724.

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 12:55:22 DATE: Oct 04 1998 PAGE: 29

Multi Area Model -- Joint Case
Uses Power Pool Price Files from the Traditional Scenario

INPUT FILENAME
joint3.ppi

ANNUAL SUMMARY - 2010 8760 HOURS AVERAGE INCREMENTAL COST 38.48 ANNUAL PEAK DEMAND 0 MW

UNIT OR PURCHASE #	NAME	STARTS # OF	STARTS COST $	STOPS # OF	STOPS COST $	HOURS TOTAL	HOURS MAINT	HOURS OUT-AGE	EMISSIONS SO2 TONS	SO2 LB/MBTU	SO2 LB/MWH	NOX TONS	NOX LB/MBTU	NOX LB/MWH
36	Healy 1	136	200878	136	27200	8760	408	744	390	.46	7.54	314	.37	6.07
38	HCCP	1	2447	1	200	8760	480	840	698	.30	3.54	814	.35	4.13
29	Beluga 7-8	1	5444	1	200	8760	672	312	0	.00	.00	1498	.44	3.75
27	Beluga 6-8	2	10888	2	400	8760	672	0	0	.00	.00	1671	.44	4.02
6	ML&P P2 U7-6	3	12756	3	600	8760	1464	240	0	.00	.00	896	.28	2.41
5	ML&P P2 U5-6	178	378734	178	35600	8760	1464	240	0	.00	.00	880	.62	6.43
12	Beluga 3	166	416179	167	33400	8760	672	72	0	.00	.00	1016	.44	5.53
13	Beluga 5	282	707004	282	56400	8760	672	0	0	.00	.00	760	.44	5.73
7	ML&P P2 U8	234	839914	233	46600	8760	336	288	0	.00	.00	95	.08	1.00
24	Soldotna 1	106	124093	106	21200	8760	336	96	0	.00	.00	566	.42	4.95
19	Bernice 3	371	540835	371	74200	8760	504	576	0	.00	.00	180	.44	5.98
20	Bernice 4	441	467129	441	88200	8760	504	408	0	.00	.00	164	.44	5.87
4	ML&P P1 U4	136	217021	136	27200	8760	336	288	0	.00	.00	41	.44	6.30
2	ML&P P1 U2	136	106686	136	27200	8760	168	288	0	.00	.00	14	.44	8.14
3	ML&P P1 U3	71	62171	71	14200	8760	336	288	0	.00	.00	8	.44	8.28
1	ML&P P1 U1	37	29592	37	7400	8760	168	288	0	.00	.00	4	.44	9.11
10	Beluga 1	17	25764	17	3400	8760	504	576	0	.00	.00	1	.44	11.74
23	Intrnl 3	7	10718	7	1400	8760	336	936	0	.00	.00	1	.44	8.44
11	Beluga 2	1	1544	1	200	8760	504	0	0	.00	.00	0	.44	7.91
21	Intrnl 1	0	0	0	0	8760	336	840	0	.00	.00	0	.44	.00
35	North Pole 2	125	278408	125	25000	8760	144	696	946	.89	9.74	776	.73	7.99
22	Intrnl 2	0	0	0	0	8760	336	840	0	.00	.00	0	.44	.00
34	North Pole 1	173	370382	173	34600	8760	144	432	326	.89	9.86	267	.73	8.09
39	Chena 6	56	73774	56	11200	8760	360	432	1	.02	.27	6	.12	1.62
37	Healy D1	128	71224	128	25600	8760	408	408	7	.84	11.76	7	.76	10.64
33	Zehnder GT2	17	23486	17	3400	8760	144	96	6	.84	16.07	5	.76	14.54
32	Zehnder GT1	2	3132	2	400	8736	0	96	0	.84	12.86	0	.76	11.63
31	Zehnder EMD6	1	734	1	200	8760	0	96	0	.84	11.76	0	.76	10.64
30	Zehnder EMD5	1	734	1	200	8760	0	96	0	.84	11.76	0	.76	10.64
18	Bernice 2	11	16806	11	2200	8760	504	408	0	.00	.00	2	.44	7.10
40	SILOS	2	0	2	0	8760	0	0	0	.00	.00	0	.00	.00
998	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
999	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
997	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
TOTAL		2842	4998478	2842	568000				2375		1.03	9987		4.34

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 12:55:22 DATE: Oct 04 1998 PAGE: 31

Multi Area Model -- Joint Case
Uses Power Pool Price Files from the Traditional Scenario

INPUT FILENAME
joint3.ppi

ANNUAL SUMMARY - 2011 8760 HOURS AVERAGE INCREMENTAL COST 49.37 ANNUAL PEAK DEMAND 0 MW

UNIT #	OR PURCHASE NAME	AREA	MAX CAPACITY MW	MAX OUTPUT MW	ENERGY OUTPUT MWH	FUEL USED MBTU	FUEL PRICE $/MBTU	FUEL COST $	FUEL AVG $/MWH	HOURS ON LINE	HEAT RATE BTU/KWH	CAPACITY FACTOR OPER.	CAPACITY FACTOR AVG.	O & M VARIABLE $	O & M FIXED $
38	HCCP	3	53.0	53.0	394231	4653035	.90	4187842	10.62	7440	11802	1.000	.849	5962867	5114670
36	Healy 1	3	25.0	25.0	105769	1723270	1.25	2154124	20.37	7507	16292	.564	.483	1791177	3686812
29	Beluga 7-8	2	105.5	105.5	589136	5019188	2.42	12145534	20.62	5663	8519	1.000	.655	1835721	1268646
27	Beluga 6-8	2	105.5	105.5	831571	7604261	2.42	18403008	22.13	8086	9144	.999	.924	2591212	1268646
6	ML&P P2 U7-6	2	109.5	109.5	850650	7336259	2.70	19806014	23.28	8134	8624	1.000	.930	2650778	1203457
5	ML&P P2 U5-6	2	49.2	49.2	307565	3162739	2.70	8538645	27.76	6585	10283	1.000	.749	958395	540731
12	Beluga 3	2	66.9	66.9	394013	4904146	2.42	11867728	30.12	6832	12446	.916	.707	1227722	804478
13	Beluga 5	2	71.0	71.0	288260	3720219	2.42	9002976	31.23	5626	12905	.790	.504	898200	853781
7	ML&P P2 U8	2	87.6	87.6	239273	3053775	2.70	8245184	34.46	4523	12762	.651	.331	745559	962765
24	Soldotna 1	1	39.0	39.0	235673	2763393	2.79	7709719	32.71	7571	11725	.838	.725	756381	200510
19	Bernice 3	1	28.0	28.0	71233	964723	2.44	2353920	33.05	2994	13543	.890	.304	221959	275291
20	Bernice 4	1	28.0	28.0	67721	901839	2.44	2200493	32.49	2544	13317	.996	.289	211012	275291
4	ML&P P1 U4	2	34.1	34.1	21293	309389	2.70	835352	39.23	819	14530	.803	.075	68337	406950
2	ML&P P1 U2	2	16.8	16.8	5216	99732	2.70	269276	51.62	787	19119	.440	.039	16254	194652
3	ML&P P1 U3	2	19.5	13.9	3319	64249	2.70	173473	52.27	434	19359	.418	.020	10341	225935
1	ML&P P1 U1	2	16.8	16.8	1283	29864	2.70	80632	62.82	244	23267	.349	.010	3999	194652
10	Beluga 1	2	16.7	16.7	305	9154	2.42	22152	72.69	73	30037	.268	.002	950	200818
23	Intrnl 3	2	18.9	9.1	404	9574	2.79	26711	66.08	72	23684	.325	.003	1260	164380
11	Beluga 2	2	16.7	16.7	291	5260	2.42	12728	43.70	20	18058	.923	.002	908	200818
21	Intrnl 1	2	15.0	4.8	11	334	2.79	931	86.10	3	30859	.254	.000	34	130460
35	North Pole 2	4	59.3	59.3	182867	1872883	4.67	8753651	47.87	5719	10241	.589	.405	1327646	477366
22	Intrnl 2	2	15.1	.0	0	0	2.79	0	.00	0	0	.000	.000	0	131330
34	North Pole 1	4	56.7	56.7	83540	915179	4.67	4277472	51.20	2983	10954	.559	.186	606515	456435
39	Chena 6	4	29.3	29.3	21871	289600	5.30	1534038	70.14	1244	13241	.600	.085	9925	397777
33	Zehnder GT2	4	18.0	18.0	1458	25214	5.01	126239	86.59	151	17295	.571	.010	11833	213049
37	Healy D1	3	2.6	2.6	1590	22266	4.84	107772	67.76	681	14000	.898	.070	19822	91768
31	Zehnder EMD6	4	2.6	2.6	76	1069	5.01	5350	70.09	31	14000	.947	.003	951	33211
30	Zehnder EMD5	4	2.6	2.6	6	85	5.01	425	70.09	3	14000	.777	.000	76	33211
18	Bernice 2	1	19.3	19.3	467	7418	2.44	18099	38.73	38	15872	.727	.003	1456	189754
40	SILOS	4	70.0	48.3	1368	13679	155.80	2131183	1558.02	47	10000	.416	.002	21311	0
998	EMERG PURCH	2	150.0	.0	0	0	1673.67	0	.00	0	0	.000	.000	0	0
999	EMERG PURCH	4	150.0	.0	0	0	1673.67	0	.00	0	0	.000	.000	0	0
997	EMERG PURCH	1	150.0	.0	0	0	1673.67	0	.00	0	0	.000	.000	0	0
TOTAL					4700460			124990672	26.59					21952604	20197654

Transmission Losses and Dumped Energy (MWH) 105734.

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 12:55:22 DATE: Oct 04 1998 PAGE: 32

Multi Area Model -- Joint Case
Uses Power Pool Price Files from the Traditional Scenario

INPUT FILENAME
joint3.ppi

ANNUAL SUMMARY - 2011 8760 HOURS AVERAGE INCREMENTAL COST 49.37 ANNUAL PEAK DEMAND 0 MW

UNIT OR PURCHASE #	NAME	STARTS # OF	STARTS COST $	STOPS # OF	STOPS COST $	HOURS TOTAL	HOURS MAINT	HOURS OUT-AGE	EMISSIONS SO2 TONS	SO2 LB/MBTU	SO2 LB/MWH	NOX TONS	NOX LB/MBTU	NOX LB/MWH
38	HCCP	1	2513	1	200	8760	480	840	698	.30	3.54	814	.35	4.13
36	Healy 1	102	155224	102	20400	8760	408	744	396	.46	7.49	319	.37	6.03
29	Beluga 7-8	1	5607	1	200	8760	2856	240	0	.00	.00	1104	.44	3.75
27	Beluga 6-8	1	5607	1	200	8760	672	0	0	.00	.00	1673	.44	4.02
6	ML&P P2 U7-6	1	4378	1	200	8760	336	288	0	.00	.00	1027	.28	2.41
5	ML&P P2 U5-6	214	468672	215	43000	8760	336	288	0	.00	.00	988	.62	6.43
12	Beluga 3	152	392507	151	30200	8760	672	72	0	.00	.00	1079	.44	5.48
13	Beluga 5	269	694636	269	53800	8760	672	0	0	.00	.00	818	.44	5.68
7	ML&P P2 U8	246	909002	246	49200	8760	336	288	0	.00	.00	119	.08	1.00
24	Soldotna 1	94	129413	94	18800	8760	336	96	0	.00	.00	580	.42	4.92
19	Bernice 3	408	626288	408	81600	8760	504	576	0	.00	.00	212	.44	5.96
20	Bernice 4	534	565513	534	106800	8760	504	408	0	.00	.00	198	.44	5.86
4	ML&P P1 U4	181	297228	181	36200	8760	336	288	0	.00	.00	68	.44	6.39
2	ML&P P1 U2	193	155813	193	38600	8760	168	288	0	.00	.00	22	.44	8.41
3	ML&P P1 U3	95	85608	95	19000	8760	336	288	0	.00	.00	14	.44	8.52
1	ML&P P1 U1	62	51030	62	12400	8760	168	288	0	.00	.00	7	.44	10.24
10	Beluga 1	23	35903	23	4600	8760	504	576	0	.00	.00	2	.44	13.22
23	Intrnl 3	17	26805	17	3400	8760	336	936	0	.00	.00	2	.44	10.42
11	Beluga 2	9	14310	9	1800	8760	504	0	0	.00	.00	1	.44	7.95
21	Intrnl 1	2	3142	2	400	8760	336	840	0	.00	.00	0	.44	13.58
35	North Pole 2	49	102414	49	9800	8760	2208	528	833	.89	9.12	684	.73	7.48
22	Intrnl 2	0	0	0	0	8760	336	840	0	.00	.00	0	.44	.00
34	North Pole 1	148	363572	148	29600	8760	2208	336	407	.89	9.75	334	.73	8.00
39	Chena 6	166	218051	166	33200	8736	0	432	3	.02	.26	17	.12	1.59
33	Zehnder GT2	39	56445	38	7600	8736	0	96	11	.84	14.53	10	.76	13.14
37	Healy D1	174	96049	174	34800	8760	408	408	9	.84	11.76	8	.76	10.64
31	Zehnder EMD6	7	5294	7	1400	8760	0	96	0	.84	11.76	0	.76	10.64
30	Zehnder EMD5	2	756	2	400	8760	0	96	0	.84	11.76	0	.76	10.64
18	Bernice 2	12	18883	12	2400	8760	504	408	0	.00	.00	2	.44	6.98
40	SILOS	6	0	6	0	8760	0	0	0	.00	.00	0	.00	.00
998	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
999	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
997	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
TOTAL		3208	5490666	3207	640200				2358		1.00	10104		4.30

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 12:55:22 DATE: Oct 04 1998 PAGE: 34

Multi Area Model -- Joint Case
Uses Power Pool Price Files from the Traditional Scenario

INPUT FILENAME
joint3.ppi

ANNUAL SUMMARY - 2012 8760 HOURS AVERAGE INCREMENTAL COST 114.43 ANNUAL PEAK DEMAND 0 MW

UNIT #	OR PURCHASE NAME	AREA	MAX CAPACITY MW	MAX OUTPUT MW	ENERGY OUTPUT MWH	FUEL USED MBTU	FUEL PRICE $/MBTU	FUEL COST $	FUEL AVG $/MWH	HOURS ON LINE	HEAT RATE BTU/KWH	CAPACITY FACTOR OPER.	CAPACITY FACTOR AVG.	O & M VARIABLE $	O & M FIXED $
38	HCCP	3	53.0	53.0	394256	4653391	.92	4281374	10.86	7440	11802	1.000	.849	6141982	5268111
36	Healy 1	3	25.0	25.0	104079	1702076	1.27	2161663	20.77	7457	16353	.558	.475	1815508	3797417
29	Beluga 7-8	2	105.5	105.5	798641	6804417	2.49	16941328	21.21	7774	8519	1.000	.887	2563201	1306706
27	Beluga 6-8	2	105.5	105.5	613670	5611551	2.49	13972781	22.77	5902	9144	.999	.682	1969597	1306706
6	ML&P P2 U7-6	2	109.5	109.5	851153	7340407	2.77	20331598	23.89	8135	8624	1.000	.930	2731762	1239561
5	ML&P P2 U5-6	2	49.2	49.2	317191	3261645	2.77	9034715	28.48	6770	10282	1.000	.772	1017906	556953
12	Beluga 3	2	66.9	66.9	400661	4990683	2.49	12426881	31.02	6964	12456	.913	.719	1285849	828612
13	Beluga 5	2	71.0	71.0	309960	3992615	2.49	9941636	32.07	5974	12881	.797	.542	994789	879394
7	ML&P P2 U8	2	87.6	87.6	253278	3233310	2.77	8956271	35.36	4799	12765	.648	.351	812873	991648
24	Soldotna 1	1	39.0	39.0	232597	2713483	2.85	7733191	33.25	7257	11666	.861	.716	768908	206525
19	Bernice 3	1	28.0	28.0	84575	1138083	2.50	2845177	33.64	3457	13456	.918	.361	271438	283550
20	Bernice 4	1	28.0	28.0	77354	1030634	2.50	2576592	33.31	2921	13323	.995	.330	248263	283550
4	ML&P P1 U4	2	34.1	34.1	25384	365228	2.77	1011680	39.86	955	14388	.826	.089	83912	419158
2	ML&P P1 U2	2	16.8	16.8	6754	124806	2.77	345713	51.18	958	18477	.474	.050	21678	200491
3	ML&P P1 U3	2	19.5	19.5	4263	81686	2.77	226271	53.08	544	19163	.429	.026	13680	232713
1	ML&P P1 U1	2	16.8	16.8	1611	35559	2.77	98498	61.15	284	22075	.383	.012	5170	200491
10	Beluga 1	2	16.7	16.7	478	15303	2.49	38105	79.73	126	32020	.241	.004	1534	206843
23	Intrnl 3	2	18.9	18.9	581	11730	2.85	33431	57.53	75	20184	.436	.004	1865	169312
11	Beluga 2	2	16.7	16.7	605	11012	2.49	27419	45.33	41	18205	.905	.004	1941	206843
21	Intrnl 1	2	15.0	10.4	80	2143	2.85	6107	76.58	17	26870	.314	.001	256	134374
35	North Pole 2	4	59.3	59.3	225093	2162803	4.81	10412047	46.26	7083	9608	.612	.499	1683247	491687
22	Intrnl 2	2	15.1	6.1	72	1812	2.85	5164	71.39	14	25048	.342	.001	232	135270
34	North Pole 1	4	56.7	56.7	85211	875272	4.81	4213671	49.45	2668	10271	.609	.190	637206	470129
37	Healy D1	3	2.6	2.6	1794	25111	4.99	125189	69.80	805	14000	.857	.079	23025	94522
31	Zehnder EMD6	4	2.6	2.6	764	10691	5.16	55133	72.20	380	14000	.773	.034	9804	34208
30	Zehnder EMD5	4	2.6	2.6	270	3773	5.16	19457	72.20	120	14000	.864	.012	3460	34208
18	Bernice 2	1	19.3	19.3	817	12251	2.50	30628	37.50	50	14999	.892	.005	2621	195446
40	SILOS	4	70.0	67.8	8654	86546	160.47	13888051	1604.75	388	10000	.319	.014	138876	0
998	EMERG PURCH	2	150.0	.0	0	01732.25		0	.00	14	0	.000	.000	0	0
999	EMERG PURCH	4	150.0	.0	0	01732.25		0	.00	3	0	.000	.000	0	0
997	EMERG PURCH	1	150.0	.0	0	01732.25		0	.00	0	0	.000	.000	0	0
TOTAL					4799846			141739792	29.53					23250584	20174438

Transmission Losses and Dumped Energy (MWH) 105334.

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 12:55:22 DATE: Oct 04 1998 PAGE: 35

Multi Area Model -- Joint Case
Uses Power Pool Price Files from the Traditional Scenario

INPUT FILENAME
joint3.ppi

ANNUAL SUMMARY - 2012 8760 HOURS AVERAGE INCREMENTAL COST 114.43 ANNUAL PEAK DEMAND 0 MW

UNIT OR PURCHASE #	NAME	STARTS # OF	STARTS COST $	STOPS # OF	STOPS COST $	HOURS TOTAL	HOURS MAINT	HOURS OUT-AGE	EMISSIONS SO2 TONS	SO2 LB/MBTU	SO2 LB/MWH	NOX TONS	NOX LB/MBTU	NOX LB/MWH
38	HCCP	1	2581	1	200	8760	480	840	698	.30	3.54	814	.35	4.13
36	Healy 1	152	238216	152	30400	8760	408	744	391	.46	7.52	315	.37	6.05
29	Beluga 7-8	1	5776	1	200	8760	672	312	0	.00	.00	1497	.44	3.75
27	Beluga 6-8	1	5776	1	200	8760	2856	0	0	.00	.00	1235	.44	4.02
6	ML&P P2 U7-6	1	4507	1	200	8760	336	288	0	.00	.00	1028	.28	2.41
5	ML&P P2 U5-6	193	435004	193	38600	8760	336	288	0	.00	.00	1019	.62	6.43
12	Beluga 3	139	369681	139	27800	8760	672	72	0	.00	.00	1098	.44	5.48
13	Beluga 5	235	624999	235	47000	8760	672	0	0	.00	.00	878	.44	5.67
7	ML&P P2 U8	206	783546	206	41200	8760	336	288	0	.00	.00	126	.08	1.00
24	Soldotna 1	91	133211	92	18400	8760	720	72	0	.00	.00	570	.42	4.90
19	Bernice 3	381	610915	381	76200	8760	504	576	0	.00	.00	250	.44	5.92
20	Bernice 4	504	535500	503	100600	8760	504	408	0	.00	.00	227	.44	5.86
4	ML&P P1 U4	180	304127	180	36000	8760	2208	216	0	.00	.00	80	.44	6.33
2	ML&P P1 U2	241	200203	241	48200	8760	168	288	0	.00	.00	27	.44	8.13
3	ML&P P1 U3	139	128884	139	27800	8760	336	288	0	.00	.00	18	.44	8.43
1	ML&P P1 U1	74	62669	74	14800	8760	2208	216	0	.00	.00	8	.44	9.71
10	Beluga 1	36	57880	36	7200	8760	504	576	0	.00	.00	3	.44	14.09
23	Intrnl 3	19	30847	19	3800	8760	336	936	0	.00	.00	3	.44	8.88
11	Beluga 2	5	8188	5	1000	8760	504	0	0	.00	.00	2	.44	8.01
21	Intrnl 1	2	3236	2	400	8760	336	840	0	.00	.00	0	.44	11.82
35	North Pole 2	117	274266	117	23400	8760	144	696	962	.89	8.55	789	.73	7.01
22	Intrnl 2	1	1618	1	200	8760	336	840	0	.00	.00	0	.44	11.02
34	North Pole 1	194	392938	194	38800	8760	144	432	389	.89	9.14	319	.73	7.50
37	Healy D1	136	81793	136	27200	8760	408	408	11	.84	11.76	10	.76	10.64
31	Zehnder EMD6	126	82572	126	25200	8760	0	96	4	.84	11.76	4	.76	10.64
30	Zehnder EMD5	62	40507	62	12400	8760	0	96	2	.84	11.76	1	.76	10.64
18	Bernice 2	23	37271	23	4600	8760	504	408	0	.00	.00	3	.44	6.60
40	SILOS	71	0	71	0	8760	0	0	0	.00	.00	0	.00	.00
998	EMERG PURCH	1	0	1	0	8760	0	0	0	.00	.00	0	.00	.00
999	EMERG PURCH	2	0	2	0	8760	0	0	0	.00	.00	0	.00	.00
997	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
TOTAL		3334	5456708	3334	652000				2458		1.02	10327		4.30

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 12:55:22 DATE: Oct 04 1998 PAGE: 37

Multi Area Model -- Joint Case
Uses Power Pool Price Files from the Traditional Scenario

INPUT FILENAME
joint3.ppi

ANNUAL SUMMARY - 2013 8760 HOURS AVERAGE INCREMENTAL COST 127.79 ANNUAL PEAK DEMAND 0 MW

UNIT #	OR PURCHASE NAME	AREA	MAX CAPACITY MW	MAX OUTPUT MW	ENERGY OUTPUT MWH	FUEL USED MBTU	FUEL PRICE $/MBTU	FUEL COST $	FUEL AVG $/MWH	HOURS ON LINE	HEAT RATE BTU/KWH	CAPACITY FACTOR OPER.	CAPACITY FACTOR AVG.	O & M VARIABLE $	O & M FIXED $
38	HCCP	3	53.0	53.0	394269	4653548	.93	4328074	10.98	7440	11802	1.000	.849	6326906	5426154
36	Healy 1	3	25.0	25.0	104056	1703635	1.29	2197697	21.12	7456	16372	.558	.475	1869589	3911339
29	Beluga 7-8	2	105.5	105.5	644436	5490478	2.56	14054989	21.81	6216	8519	1.000	.952	2130358	1002977
27	Beluga 6-8	2	105.5	105.5	674683	6169401	2.56	15795115	23.41	6514	9144	.999	.997	2230354	1002977
6	ML&P P2 U7-6	2	109.5	109.5	850423	7334079	2.84	20827204	24.49	8121	8624	1.000	.930	2811403	1276747
5	ML&P P2 U5-6	2	49.2	49.2	330635	3399911	2.84	9656025	29.20	7057	10282	1.000	.805	1092964	573662
26	Beluga 6CT	2	78.4	71.0	137921	1621944	2.56	4152180	30.11	1944	11759	.999	.889	455936	249360
12	Beluga 3	2	66.9	66.9	381049	4765404	2.56	12199110	32.01	6688	12506	.896	.684	1259596	853471
13	Beluga 5	2	71.0	71.0	303203	3925940	2.56	10050419	33.15	6020	12948	.777	.531	1002294	905776
7	ML&P P2 U8	2	87.6	87.6	198771	2558877	2.84	7267248	36.56	3822	12873	.630	.275	657077	1021398
24	Soldotna 1	1	39.0	39.0	240808	2805317	2.92	8191506	34.02	7484	11649	.867	.741	819927	212721
19	Bernice 3	1	28.0	28.0	94253	1274657	2.57	3275844	34.76	3967	13523	.897	.402	311575	292056
20	Bernice 4	1	28.0	28.0	96370	1283666	2.57	3299186	34.23	3671	13320	.995	.411	318575	292056
4	ML&P P1 U4	2	34.1	34.1	55461	792099	2.84	2249549	40.56	2072	14282	.844	.194	188837	431733
2	ML&P P1 U2	2	16.8	14.0	12853	224995	2.84	638984	49.71	1661	17504	.535	.095	42489	206506
3	ML&P P1 U3	2	19.5	17.7	12737	223898	2.84	635869	49.92	1369	17578	.520	.078	42106	239694
1	ML&P P1 U1	2	16.8	14.0	6355	121868	2.84	346105	54.46	880	19176	.509	.047	21008	206506
10	Beluga 1	2	16.7	14.4	2893	64348	2.56	164732	56.94	419	22240	.473	.021	9564	213048
23	Intrnl 3	2	18.9	16.7	3154	59444	2.92	173577	55.03	369	18845	.508	.020	10427	174391
11	Beluga 2	2	16.7	14.8	3052	55189	2.56	141285	46.29	226	18082	.923	.022	10089	213048
21	Intrnl 1	2	15.0	13.8	1064	20462	2.92	59748	56.14	128	19226	.599	.008	3518	138405
35	North Pole 2	4	59.3	59.3	239560	2277853	4.96	11294694	47.15	7260	9508	.637	.531	1845166	506437
22	Intrnl 2	2	15.1	10.5	628	13365	2.92	39025	62.11	96	21269	.471	.005	2077	139328
34	North Pole 1	4	56.7	56.7	95482	974759	4.96	4833391	50.62	2940	10208	.617	.213	735423	484232
28	Beluga 7CT	2	78.4	20.0	1062	31643	2.56	81007	76.30	108	29804	.138	.007	3510	249360
37	Healy D1	3	2.6	2.6	1667	23342	5.14	119863	71.89	759	14000	.845	.073	22046	97357
31	Zehnder EMD6	4	2.6	2.6	693	9702	5.31	51533	74.36	337	14000	.791	.030	9163	35234
30	Zehnder EMD5	4	2.6	2.6	350	4898	5.31	26015	74.36	163	14000	.825	.015	4626	35234
18	Bernice 2	1	19.3	19.3	1082	16437	2.57	42243	39.05	74	15193	.850	.007	3576	201310
40	SILOS	4	70.0	70.0	11772	117729	165.28	194588581	652.92	437	10000	.385	.019	194581	0
998	EMERG PURCH	2	150.0	.0	0	0	1792.88	0	.00	0	0	.000	.000	0	0
999	EMERG PURCH	4	150.0	147.4	1858	18581	792.88	33304061	792.93	24	1000	.516	.001	0	0
997	EMERG PURCH	1	150.0	.0	0	0	1792.88	0	.00	1	0	.000	.000	0	0
TOTAL					4902600			158981472	32.43					24434756	20592528

Transmission Losses and Dumped Energy (MWH) 105132.

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 12:55:22 DATE: Oct 04 1998 PAGE: 38

Multi Area Model -- Joint Case
Uses Power Pool Price Files from the Traditional Scenario

INPUT FILENAME
joint3.ppi

ANNUAL SUMMARY - 2013 8760 HOURS AVERAGE INCREMENTAL COST 127.79 ANNUAL PEAK DEMAND 0 MW

UNIT OR PURCHASE #	NAME	STARTS # OF	STARTS COST $	STOPS # OF	STOPS COST $	HOURS TOTAL	HOURS MAINT	HOURS OUT-AGE	EMISSIONS SO2 TONS	SO2 LB/MBTU	SO2 LB/MWH	NOX TONS	NOX LB/MBTU	NOX LB/MWH
38	HCCP	1	2639	1	200	8760	480	840	698	.30	3.54	814	.35	4.13
36	Healy 1	152	245307	152	30400	8760	408	744	392	.46	7.53	315	.37	6.06
29	Beluga 7-8	1	5948	0	0	6528	0	312	0	.00	.00	1208	.44	3.75
27	Beluga 6-8	3	17845	2	400	6528	0	0	0	.00	.00	1357	.44	4.02
6	ML&P P2 U7-6	3	13919	3	600	8760	336	288	0	.00	.00	1027	.28	2.41
5	ML&P P2 U5-6	150	347898	149	29800	8760	336	288	0	.00	.00	1062	.62	6.43
26	Beluga 6CT	1	5948	0	0	2184	0	240	0	.00	.00	357	.44	5.17
12	Beluga 3	171	468378	172	34400	8760	672	72	0	.00	.00	1048	.44	5.50
13	Beluga 5	232	635461	232	46400	8760	672	0	0	.00	.00	864	.44	5.70
7	ML&P P2 U8	202	790806	202	40400	8760	1464	240	0	.00	.00	100	.08	1.00
24	Soldotna 1	111	159722	110	22000	8760	336	96	0	.00	.00	589	.42	4.89
19	Bernice 3	377	614177	376	75200	8760	504	576	0	.00	.00	280	.44	5.95
20	Bernice 4	446	473591	447	89400	8760	504	408	0	.00	.00	282	.44	5.86
4	ML&P P1 U4	230	399769	230	46000	8760	336	288	0	.00	.00	174	.44	6.28
2	ML&P P1 U2	185	158111	185	37000	8760	1464	240	0	.00	.00	49	.44	7.70
3	ML&P P1 U3	151	144040	151	30200	8760	336	288	0	.00	.00	49	.44	7.73
1	ML&P P1 U1	106	92351	106	21200	8760	168	288	0	.00	.00	27	.44	8.44
10	Beluga 1	38	62924	38	7600	8760	504	576	0	.00	.00	14	.44	9.79
23	Intrnl 3	38	63531	38	7600	8760	336	936	0	.00	.00	13	.44	8.29
11	Beluga 2	19	32046	19	3800	8760	504	0	0	.00	.00	12	.44	7.96
21	Intrnl 1	15	24990	15	3000	8760	336	840	0	.00	.00	5	.44	8.46
35	North Pole 2	87	203721	87	17400	8760	144	696	1014	.89	8.46	831	.73	6.94
22	Intrnl 2	8	13328	8	1600	8760	336	840	0	.00	.00	3	.44	9.36
34	North Pole 1	164	380280	164	32800	8760	144	432	434	.89	9.09	356	.73	7.45
28	Beluga 7CT	7	41639	7	1400	2184	0	0	0	.00	.00	7	.44	13.11
37	Healy D1	136	77026	136	27200	8760	408	408	10	.84	11.76	9	.76	10.64
31	Zehnder EMD6	127	74619	126	25200	8760	0	96	4	.84	11.76	4	.76	10.64
30	Zehnder EMD5	77	43327	77	15400	8760	0	96	2	.84	11.76	2	.76	10.64
18	Bernice 2	40	66758	40	8000	8760	504	408	0	.00	.00	4	.44	6.69
40	SILOS	84	0	84	0	8760	0	0	0	.00	.00	0	.00	.00
998	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
999	EMERG PURCH	1	0	1	0	8760	0	0	0	.00	.00	0	.00	.00
997	EMERG PURCH	1	0	1	0	8760	0	0	0	.00	.00	0	.00	.00
TOTAL		3364	5660101	3359	654600				2553		1.04	10863		4.43

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 12:55:22 DATE: Oct 04 1998 PAGE: 40

Multi Area Model -- Joint Case
Uses Power Pool Price Files from the Traditional Scenario

INPUT FILENAME
joint3.ppi

ANNUAL SUMMARY - 2014 8760 HOURS AVERAGE INCREMENTAL COST 188.28 ANNUAL PEAK DEMAND 0 MW

UNIT #	OR PURCHASE NAME	AREA	MAX CAPACITY MW	MAX OUTPUT MW	ENERGY OUTPUT MWH	FUEL USED MBTU	FUEL PRICE $/MBTU	FUEL COST $	FUEL AVG $/MWH	HOURS ON LINE	HEAT RATE BTU/KWH	CAPACITY FACTOR OPER.	CAPACITY FACTOR AVG.	O & M VARIABLE $	O & M FIXED $
38	HCCP	3	53.0	53.0	312899	3693200	.95	3508647	11.21	5904	11803	1.000	.674	5171686	5588939
36	Healy 1	3	25.0	25.0	96920	1511234	1.32	1994796	20.58	5923	15592	.655	.443	1793628	4028680
29	Beluga 7-8	2	105.5	105.5	798504	6803301	2.63	17892174	22.41	7758	8520	1.000	.887	2718916	1386284
27	Beluga 6-8	2	105.5	105.5	831360	7602373	2.63	19995624	24.05	8086	9144	.998	.924	2830784	1386284
6	ML&P P2 U7-6	2	109.5	109.5	850137	7331904	2.91	21334114	25.09	8130	8624	1.000	.929	2894587	1315050
5	ML&P P2 U5-6	2	49.2	49.2	350116	3600210	2.91	10475798	29.92	7484	10282	1.000	.852	1192078	590871
25	LM6000 Chug	2	40.5	40.5	204773	2142837	3.00	6428502	31.39	6318	10464	.800	.577	697223	532175
12	Beluga 3	2	66.9	66.9	337017	4305836	2.63	11324621	33.60	6475	12776	.817	.605	1147501	879075
13	Beluga 5	2	71.0	71.0	229714	3085625	2.63	8115225	35.33	5320	13432	.662	.402	782146	932949
7	ML&P P2 U8	2	87.6	87.6	163462	2227830	2.91	6482996	39.66	3905	13629	.514	.226	556567	1052040
24	Soldotna 1	1	39.0	39.0	230095	2692555	3.00	8077553	35.11	7302	11701	.848	.708	806935	219103
19	Bernice 3	1	28.0	28.0	62455	850795	2.65	2254624	36.10	2702	13622	.867	.267	212652	300818
20	Bernice 4	1	28.0	28.0	63153	841754	2.65	2230664	35.32	2384	13328	.993	.270	215029	300818
4	ML&P P1 U4	2	34.1	34.1	13280	209580	2.91	609879	45.92	626	15781	.652	.047	46575	444685
2	ML&P P1 U2	2	16.8	16.8	2811	65548	2.91	190746	67.85	615	23315	.307	.021	9572	212701
3	ML&P P1 U3	2	19.5	12.5	1601	36079	2.91	104991	65.59	277	22539	.317	.010	5450	246885
1	ML&P P1 U1	2	16.8	12.7	462	14287	2.91	41576	89.96	141	30915	.222	.003	1574	212701
10	Beluga 1	2	16.7	3.0	155	6038	2.63	15879	102.18	58	38850	.180	.001	529	219440
23	Intrnl 3	2	18.9	6.2	148	4658	3.00	13973	94.62	41	31539	.210	.001	503	179623
11	Beluga 2	2	16.7	13.7	233	4869	2.63	12805	54.95	24	20895	.670	.002	793	219440
21	Intrnl 1	2	15.0	3.0	44	1618	3.00	4855	109.34	16	36445	.201	.000	151	142558
35	North Pole 2	4	59.3	59.3	269988	2510229	5.11	12820339	47.48	7248	9297	.718	.598	2141932	521630
22	Intrnl 2	2	15.1	3.9	53	1535	3.00	4606	86.44	14	28812	.276	.000	181	143508
34	North Pole 1	4	56.7	56.7	162107	1631278	5.11	8331357	51.39	4701	10062	.673	.361	1286060	498759
37	Healy D1	3	2.6	2.6	3824	53542	5.29	283197	74.05	1581	13999	.930	.168	52086	100278
31	Zehnder EMD6	4	2.6	2.6	1036	14501	5.47	79333	76.59	548	14000	.727	.045	14107	36291
30	Zehnder EMD5	4	2.6	2.6	259	3619	5.47	19801	76.59	118	14000	.843	.011	3521	36291
18	Bernice 2	1	19.3	19.3	559	8787	2.65	23286	41.68	44	15726	.747	.004	1902	207349
40	SILOS	4	70.0	70.0	19377	193782	170.24	32990034	1702.50	718	10000	.386	.032	329889	0
998	EMERG PURCH	2	150.0	.0	0	0	1855.63	0	.00	0	0	.000	.000	0	0
999	EMERG PURCH	4	150.0	15.3	15	15	1855.63	28331	1855.64	1	1000	.102	.000	0	0
997	EMERG PURCH	1	150.0	.0	0	0	1855.63	0	.00	0	0	.000	.000	0	0
TOTAL					5006557			175690336	35.09					24914558	21935238

Transmission Losses and Dumped Energy (MWH) 99800.

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 12:55:22 DATE: Oct 04 1998 PAGE: 41

Multi Area Model -- Joint Case
Uses Power Pool Price Files from the Traditional Scenario

INPUT FILENAME
joint3.ppi

ANNUAL SUMMARY - 2014 8760 HOURS AVERAGE INCREMENTAL COST 188.28 ANNUAL PEAK DEMAND 0 MW

UNIT OR PURCHASE #	NAME	STARTS # OF	STARTS COST $	STOPS # OF	STOPS COST $	HOURS TOTAL	HOURS MAINT	HOURS OUT-AGE	EMISSIONS SO2 TONS	SO2 LB/MBTU	SO2 LB/MWH	NOX TONS	NOX LB/MBTU	NOX LB/MWH
38	HCCP	1	2709	1	200	8760	2208	648	554	.30	3.54	646	.35	4.13
36	Healy 1	24	39962	24	4800	8760	2208	600	348	.46	7.17	280	.37	5.77
29	Beluga 7-8	1	6126	1	200	8760	672	312	0	.00	.00	1497	.44	3.75
27	Beluga 6-8	1	6126	1	200	8760	672	0	0	.00	.00	1673	.44	4.02
6	ML&P P2 U7-6	2	9551	2	400	8760	336	288	0	.00	.00	1026	.28	2.41
5	ML&P P2 U5-6	94	224317	94	18800	8760	336	288	0	.00	.00	1125	.62	6.43
25	LM6000 Chug	402	516579	401	80200	8760	672	408	0	.00	.00	450	.42	4.40
12	Beluga 3	197	555692	196	39200	8760	672	72	0	.00	.00	947	.44	5.62
13	Beluga 5	305	860333	305	61000	8760	672	0	0	.00	.00	679	.44	5.91
7	ML&P P2 U8	251	1011294	252	50400	8760	336	288	0	.00	.00	87	.08	1.06
24	Soldotna 1	128	205602	128	25600	8760	336	96	0	.00	.00	565	.42	4.91
19	Bernice 3	397	661854	398	79600	8760	504	576	0	.00	.00	187	.44	5.99
20	Bernice 4	525	559781	525	105000	8760	504	408	0	.00	.00	185	.44	5.86
4	ML&P P1 U4	167	298555	167	33400	8760	336	288	0	.00	.00	46	.44	6.94
2	ML&P P1 U2	181	159127	181	36200	8760	168	288	0	.00	.00	14	.44	10.26
3	ML&P P1 U3	80	78496	80	16000	8760	336	288	0	.00	.00	8	.44	9.92
1	ML&P P1 U1	53	47497	53	10600	8760	168	288	0	.00	.00	3	.44	13.60
10	Beluga 1	20	34109	20	4000	8760	504	576	0	.00	.00	1	.44	17.09
23	Intrnl 3	11	18940	11	2200	8760	336	936	0	.00	.00	1	.44	13.88
11	Beluga 2	6	10422	6	1200	8760	504	0	0	.00	.00	1	.44	9.19
21	Intrnl 1	2	3432	2	400	8760	336	840	0	.00	.00	0	.44	16.04
35	North Pole 2	110	282576	110	22000	8760	144	696	1117	.89	8.27	916	.73	6.79
22	Intrnl 2	2	3432	2	400	8760	336	840	0	.00	.00	0	.44	12.68
34	North Pole 1	194	523185	194	38800	8760	144	432	726	.89	8.96	595	.73	7.35
37	Healy D1	308	212391	308	61600	8760	408	408	22	.84	11.76	20	.76	10.64
31	Zehnder EMD6	149	113220	149	29800	8760	0	96	6	.84	11.76	6	.76	10.64
30	Zehnder EMD5	81	60329	80	16000	8760	0	96	2	.84	11.76	1	.76	10.64
18	Bernice 2	18	30944	18	3600	8760	504	408	0	.00	.00	2	.44	6.92
40	SILOS	109	0	108	0	8760	0	0	0	.00	.00	0	.00	.00
998	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
999	EMERG PURCH	1	0	1	0	8760	0	0	0	.00	.00	0	.00	.00
997	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
TOTAL		3820	6536581	3818	741800				2775		1.11	10964		4.38

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 12:55:22 DATE: Oct 04 1998 PAGE: 43

Multi Area Model -- Joint Case
Uses Power Pool Price Files from the Traditional Scenario

INPUT FILENAME
joint3.ppi

ANNUAL SUMMARY - 2015 8760 HOURS AVERAGE INCREMENTAL COST 58.63 ANNUAL PEAK DEMAND 0 MW

UNIT OR PURCHASE #	NAME	AREA	MAX CAPACITY MW	MAX OUTPUT MW	ENERGY OUTPUT MWH	FUEL USED MBTU	FUEL PRICE $/MBTU	FUEL COST $	FUEL AVG $/MWH	HOURS ON LINE	HEAT RATE BTU/KWH	CAPACITY FACTOR OPER.	CAPACITY FACTOR AVG.	O & M VARIABLE $	O & M FIXED $
38	HCCP	3	53.0	53.0	394288	4653762	.97	4514397	11.45	7440	11802	1.000	.849	6712954	5756607
36	Healy 1	3	25.0	25.0	99953	1666562	1.34	2233127	22.34	7587	16673	.527	.456	1905177	4149540
29	Beluga 7-8	2	105.5	105.5	589168	5019467	2.70	13552247	23.00	5662	8519	1.000	.655	2066278	1427873
27	Beluga 6-8	2	105.5	105.5	831661	7604803	2.70	20532652	24.69	8079	9144	1.000	.924	2916818	1427873
6	ML&P P2 U7-6	2	109.5	109.5	659581	5688136	2.98	16949394	25.70	6334	8623	1.000	.721	2313233	1354501
5	ML&P P2 U5-6	2	49.2	49.2	281622	2896001	2.98	8629409	30.64	6045	10283	1.000	.686	987690	608598
25	LM6000 Chug	2	40.5	40.5	253071	2589393	3.07	7949629	31.41	6767	10231	.923	.713	887552	548140
12	Beluga 3	2	66.9	66.9	438329	5412530	2.70	14612905	33.34	7300	12348	.951	.787	1537296	905447
13	Beluga 5	2	71.0	71.0	335134	4300225	2.70	11610686	34.64	6316	12831	.809	.586	1175319	960938
7	ML&P P2 U8	2	87.6	87.6	328625	4184538	2.98	12469919	37.95	6150	12733	.652	.455	1152491	1083601
24	Soldotna 1	1	39.0	39.0	230025	2670126	3.07	8197146	35.64	7007	11608	.882	.708	830901	225676
19	Bernice 3	1	28.0	28.0	110675	1489834	2.72	4052353	36.62	4547	13461	.914	.472	388134	309842
20	Bernice 4	1	28.0	28.0	97016	1291992	2.72	3514193	36.22	3663	13317	.996	.414	340221	309842
4	ML&P P1 U4	2	34.1	34.1	43009	622711	2.98	1855678	43.15	1643	14478	.811	.151	155359	458026
2	ML&P P1 U2	2	16.8	16.8	10928	207316	2.98	617799	56.54	1642	18971	.446	.081	38323	219082
3	ML&P P1 U3	2	19.5	19.5	7893	150077	2.98	447229	56.66	1004	19012	.434	.048	27683	254292
1	ML&P P1 U1	2	16.8	16.8	2746	66982	2.98	199606	72.69	581	24392	.321	.020	9630	219082
10	Beluga 1	2	16.7	16.7	588	22194	2.70	59925	101.93	208	37750	.188	.004	2062	226023
23	Intrnl 3	2	18.9	18.9	1125	25024	3.07	76823	68.30	177	22247	.366	.007	3945	185011
11	Beluga 2	2	16.7	16.7	904	16679	2.70	45035	49.83	68	18456	.878	.007	3169	226023
21	Intrnl 1	2	15.0	5.3	43	1246	3.07	3824	88.72	11	28898	.280	.000	151	146834
35	North Pole 2	4	59.3	59.3	216724	2012109	5.26	10584654	48.84	5617	9284	.711	.480	1770907	537279
22	Intrnl 2	2	15.1	7.5	25	558	3.07	1714	69.80	4	22735	.407	.000	86	147813
34	North Pole 1	4	56.7	56.7	149684	1521575	5.26	8004309	53.47	4638	10165	.638	.333	1223121	513722
204	GE 7EA SC	4	83.0	83.0	43953	579237	5.14	2977483	67.74	992	13178	.534	.060	220124	603619
37	Healy D1	3	2.6	2.6	1177	16484	5.45	89800	76.27	526	14000	.861	.052	16517	103286
31	Zehnder EMD6	4	2.6	2.6	89	1241	5.64	6994	78.89	44	14000	.775	.004	1244	37380
30	Zehnder EMD5	4	2.6	2.6	61	857	5.64	4831	78.89	28	14000	.841	.003	859	37380
18	Bernice 2	1	19.3	19.3	151	2414	2.72	6565	43.49	12	15987	.716	.001	529	213570
40	SILOS	4	70.0	25.2	593	5928	175.35	1039412	1753.54	37	10000	.229	.001	10394	0
998	EMERG PURCH	2	150.0	.0	0	0	1920.58	0	.00	0	0	.000	.000	0	0
999	EMERG PURCH	4	150.0	.0	0	0	1920.58	0	.00	0	0	.000	.000	0	0
997	EMERG PURCH	1	150.0	.0	0	0	1920.58	0	.00	0	0	.000	.000	0	0
TOTAL					5128841			154839728	30.19					26698168	23196914

Transmission Losses and Dumped Energy (MWH) 106516.

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 12:55:22 DATE: Oct 04 1998 PAGE: 44

Multi Area Model -- Joint Case
Uses Power Pool Price Files from the Traditional Scenario

INPUT FILENAME
joint3.ppi

ANNUAL SUMMARY - 2015 8760 HOURS AVERAGE INCREMENTAL COST 58.63 ANNUAL PEAK DEMAND 0 MW

UNIT OR PURCHASE #	NAME	STARTS # OF	STARTS COST $	STOPS # OF	STOPS COST $	HOURS TOTAL	HOURS MAINT	HOURS OUT-AGE	EMISSIONS SO2 TONS	SO2 LB/MBTU	SO2 LB/MWH	NOX TONS	NOX LB/MBTU	NOX LB/MWH
38	HCCP	1	2781	1	200	8760	480	840	698	.30	3.54	814	.35	4.13
36	Healy 1	21	36129	21	4200	8760	408	744	383	.46	7.67	308	.37	6.17
29	Beluga 7-8	1	6310	1	200	8760	2856	240	0	.00	.00	1104	.44	3.75
27	Beluga 6-8	2	12619	2	400	8760	672	0	0	.00	.00	1673	.44	4.02
6	ML&P P2 U7-6	1	4915	1	200	8760	2208	216	0	.00	.00	796	.28	2.41
5	ML&P P2 U5-6	44	108021	44	8800	8760	2208	216	0	.00	.00	905	.62	6.43
25	LM6000 Chug	296	391103	296	59200	8760	672	408	0	.00	.00	544	.42	4.30
12	Beluga 3	98	284670	98	19600	8760	672	72	0	.00	.00	1191	.44	5.43
13	Beluga 5	224	650674	224	44800	8760	672	0	0	.00	.00	946	.44	5.65
7	ML&P P2 U8	214	887284	214	42800	8760	336	288	0	.00	.00	163	.08	.99
24	Soldotna 1	100	171174	101	20200	8760	720	72	0	.00	.00	561	.42	4.88
19	Bernice 3	463	817942	463	92600	8760	504	576	0	.00	.00	328	.44	5.92
20	Bernice 4	610	651480	609	121800	8760	504	408	0	.00	.00	284	.44	5.86
4	ML&P P1 U4	321	590170	321	64200	8760	336	288	0	.00	.00	137	.44	6.37
2	ML&P P1 U2	355	321004	355	71000	8760	168	288	0	.00	.00	46	.44	8.35
3	ML&P P1 U3	231	233111	231	46200	8760	336	288	0	.00	.00	33	.44	8.37
1	ML&P P1 U1	151	139172	151	30200	8760	168	288	0	.00	.00	15	.44	10.73
10	Beluga 1	55	96604	55	11000	8760	504	576	0	.00	.00	5	.44	16.61
23	Intrnl 3	45	79787	45	9000	8760	336	936	0	.00	.00	6	.44	9.79
11	Beluga 2	26	46510	26	5200	8760	504	0	0	.00	.00	4	.44	8.12
21	Intrnl 1	7	12368	7	1400	8760	336	840	0	.00	.00	0	.44	12.72
35	North Pole 2	67	172902	67	13400	8760	2208	528	895	.89	8.26	734	.73	6.78
22	Intrnl 2	2	3534	2	400	8760	336	840	0	.00	.00	0	.44	10.00
34	North Pole 1	134	357332	133	26600	8760	144	432	677	.89	9.05	555	.73	7.42
204	GE 7EA SC	116	198367	116	23200	8760	408	408	0	.00	.00	145	.50	6.59
37	Healy D1	111	78312	111	22200	8760	408	408	7	.84	11.76	6	.76	10.64
31	Zehnder EMD6	9	7661	10	2000	8760	0	96	1	.84	11.76	0	.76	10.64
30	Zehnder EMD5	6	5107	7	1400	8760	0	96	0	.84	11.76	0	.76	10.64
18	Bernice 2	10	17704	10	2000	8760	504	408	0	.00	.00	1	.44	7.03
40	SILOS	7	0	8	0	8760	0	0	0	.00	.00	0	.00	.00
998	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
999	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
997	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
TOTAL		3728	6384749	3730	744400				2662		1.04	11305		4.41

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 12:55:22 DATE: Oct 04 1998 PAGE: 46

Multi Area Model -- Joint Case
Uses Power Pool Price Files from the Traditional Scenario

INPUT FILENAME
joint3.ppi

ANNUAL SUMMARY - 2016 8760 HOURS AVERAGE INCREMENTAL COST 107.71 ANNUAL PEAK DEMAND 0 MW

UNIT OR PURCHASE #	NAME	AREA	MAX CAPACITY MW	MAX OUTPUT MW	ENERGY OUTPUT MWH	FUEL USED MBTU	FUEL PRICE $/MBTU	FUEL COST $	FUEL AVG $/MWH	HOURS ON LINE	HEAT RATE BTU/KWH	CAPACITY FACTOR OPER.	CAPACITY FACTOR AVG.	O & M VARIABLE $	O & M FIXED $
38	HCCP	3	53.0	53.0	394298	4653872	.99	4607529	11.69	7440	11802	1.000	.849	6914243	5929305
36	Healy 1	3	25.0	25.0	101151	1679880	1.37	2301462	22.75	7586	16607	.533	.462	1985890	4274026
29	Beluga 7-8	2	105.5	105.5	798509	6803297	2.78	18910492	23.68	7774	8520	1.000	.887	2884328	1470709
27	Beluga 6-8	2	105.5	105.5	613781	5612526	2.78	15603210	25.42	5902	9144	.999	.682	2217180	1470709
6	ML&P P2 U7-6	2	109.5	109.5	661828	5707685	3.06	17463586	26.39	6334	8624	1.000	.723	2390519	1395136
5	ML&P P2 U5-6	2	49.2	49.2	282296	2902734	3.06	8882627	31.47	6053	10282	1.000	.687	1019767	626855
25	LM6000 Chug	2	40.5	40.5	257477	2637648	3.15	8308307	32.27	6937	10244	.916	.726	930075	564585
12	Beluga 3	2	66.9	66.9	434205	5390929	2.78	14986504	34.51	7345	12415	.928	.779	1568431	932610
13	Beluga 5	2	71.0	71.0	333463	4305022	2.78	11967971	35.89	6510	12910	.784	.584	1204546	989766
7	ML&P P2 U8	2	87.6	87.6	316880	4056122	3.06	12411795	39.17	6115	12800	.637	.439	1144645	1116109
24	Soldotna 1	1	39.0	39.0	238439	2769344	3.15	8723293	36.59	7308	11614	.878	.734	887144	232446
19	Bernice 3	1	28.0	28.0	110243	1489412	2.80	4170306	37.83	4591	13510	.898	.471	398227	319138
20	Bernice 4	1	28.0	28.0	104494	1390734	2.80	3894186	37.27	3912	13309	.999	.446	377466	319138
4	ML&P P1 U4	2	34.1	34.1	44976	661452	3.06	2024040	45.00	1789	14706	.776	.158	167337	471767
2	ML&P P1 U2	2	16.8	16.8	10859	210469	3.06	644036	59.31	1686	19381	.428	.081	39226	225655
3	ML&P P1 U3	2	19.5	19.5	5750	113480	3.06	347248	60.39	764	19736	.403	.035	20769	261921
1	ML&P P1 U1	2	16.8	16.8	3320	83992	3.06	257016	77.42	734	25300	.302	.025	11992	225655
10	Beluga 1	2	16.7	13.9	988	34210	2.78	95104	96.31	304	34642	.213	.007	3567	232804
23	Intrnl 3	2	18.9	17.3	1116	25448	3.15	80162	71.83	182	22803	.349	.007	4031	190562
11	Beluga 2	2	16.7	16.7	1892	36267	2.78	100823	53.30	154	19171	.805	.014	6833	232804
21	Intrnl 1	2	15.0	10.2	243	5868	3.15	18483	75.96	46	24115	.378	.002	879	151239
35	North Pole 2	4	59.3	59.3	270025	2513815	5.42	13620677	50.44	7336	9309	.718	.598	2272625	553398
22	Intrnl 2	2	15.1	7.0	215	5205	3.15	16397	76.25	42	24205	.364	.002	777	152248
204	GE 7EA SC	4	83.0	83.0	159679	2097336	5.29	11104565	69.54	3541	13134	.543	.220	823683	621728
37	Healy D1	3	2.6	2.6	2187	30614	5.61	171781	78.56	926	14000	.908	.096	31595	106385
31	Zehnder EMD6	4	2.6	2.6	409	5721	5.80	33208	81.26	195	14000	.806	.018	5905	38501
30	Zehnder EMD5	4	2.6	2.6	208	2908	5.80	16880	81.26	87	14000	.918	.009	3001	38501
18	Bernice 2	1	19.3	19.3	831	12990	2.80	36371	43.76	61	15628	.763	.005	3002	219977
40	SILOS	4	70.0	70.0	7751	77518	180.61	14000589	1806.19	259	10000	.428	.013	140000	0
998	EMERG PURCH	2	150.0	.0	0	0	1987.80	0	.00	0	0	.000	.000	0	0
999	EMERG PURCH	4	150.0	107.1	1582	1582	1987.80	3145364	1987.85	28	1000	.377	.001	0	0
997	EMERG PURCH	1	150.0	.0	0	0	1987.80	0	.00	0	0	.000	.000	0	0
TOTAL					5159095			177943952	34.49					27457682	23363692

Transmission Losses and Dumped Energy (MWH) 106793.

POWRPRO - PRODUCTION COSTING MODEL - VERS MULTI TIME: 12:55:22 DATE: Oct 04 1998 PAGE: 47

Multi Area Model -- Joint Case
Uses Power Pool Price Files from the Traditional Scenario

INPUT FILENAME
joint3.ppi

ANNUAL SUMMARY - 2016 8760 HOURS AVERAGE INCREMENTAL COST 107.71 ANNUAL PEAK DEMAND 0 MW

UNIT OR PURCHASE #	NAME	STARTS # OF	STARTS COST $	STOPS # OF	STOPS COST $	HOURS TOTAL	HOURS MAINT	HOURS OUT-AGE	EMISSIONS SO2 TONS	SO2 LB/MBTU	SO2 LB/MWH	NOX TONS	NOX LB/MBTU	NOX LB/MWH
38	HCCP	1	2854	1	200	8760	480	840	698	.30	3.54	814	.35	4.13
36	Healy 1	24	42499	24	4800	8760	408	744	386	.46	7.64	311	.37	6.14
29	Beluga 7-8	1	6499	1	200	8760	672	312	0	.00	.00	1497	.44	3.75
27	Beluga 6-8	1	6499	1	200	8760	2856	0	0	.00	.00	1235	.44	4.02
6	ML&P P2 U7-6	1	5061	1	200	8760	2208	216	0	.00	.00	799	.28	2.41
5	ML&P P2 U5-6	42	106138	42	8400	8760	2208	216	0	.00	.00	907	.62	6.43
25	LM6000 Chug	226	307707	226	45200	8760	672	408	0	.00	.00	554	.42	4.30
12	Beluga 3	94	281236	94	18800	8760	672	72	0	.00	.00	1186	.44	5.46
13	Beluga 5	206	616326	206	41200	8760	672	0	0	.00	.00	947	.44	5.68
7	ML&P P2 U8	203	866514	203	40600	8760	336	288	0	.00	.00	158	.08	1.00
24	Soldotna 1	127	217954	126	25200	8760	336	96	0	.00	.00	582	.42	4.88
19	Bernice 3	454	822399	454	90800	8760	504	576	0	.00	.00	328	.44	5.94
20	Bernice 4	623	666610	623	124600	8760	504	408	0	.00	.00	306	.44	5.86
4	ML&P P1 U4	343	649001	343	68600	8760	336	288	0	.00	.00	146	.44	6.47
2	ML&P P1 U2	395	367609	395	79000	8760	168	288	0	.00	.00	46	.44	8.53
3	ML&P P1 U3	206	213951	206	41200	8760	2208	216	0	.00	.00	25	.44	8.68
1	ML&P P1 U1	183	173589	183	36600	8760	168	288	0	.00	.00	18	.44	11.13
10	Beluga 1	76	137492	76	15200	8760	504	576	0	.00	.00	8	.44	15.24
23	Intrnl 3	64	116861	64	12800	8760	336	936	0	.00	.00	6	.44	10.03
11	Beluga 2	34	62644	34	6800	8760	504	0	0	.00	.00	8	.44	8.44
21	Intrnl 1	6	10918	6	1200	8760	336	840	0	.00	.00	1	.44	10.61
35	North Pole 2	98	249325	99	19800	8760	144	696	1119	.89	8.29	918	.73	6.80
22	Intrnl 2	7	12738	7	1400	8760	336	840	0	.00	.00	1	.44	10.65
204	GE 7EA SC	197	375281	196	39200	8760	408	408	0	.00	.00	524	.50	6.57
37	Healy D1	170	119238	170	34000	8760	408	408	13	.84	11.76	12	.76	10.64
31	Zehnder EMD6	64	46468	64	12800	8760	0	96	2	.84	11.76	2	.76	10.64
30	Zehnder EMD5	40	26303	40	8000	8760	0	96	1	.84	11.76	1	.76	10.64
18	Bernice 2	22	40117	22	4400	8760	504	408	0	.00	.00	3	.44	6.88
40	SILOS	35	0	35	0	8760	0	0	0	.00	.00	0	.00	.00
998	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
999	EMERG PURCH	3	0	3	0	8760	0	0	0	.00	.00	0	.00	.00
997	EMERG PURCH	0	0	0	0	8760	0	0	0	.00	.00	0	.00	.00
TOTAL		3946	6549833	3945	781400				2220		.86	11342		4.40

Appendix J
Economic Spreadsheets

Table J-1
Economic Cost of Total Individual System

Year	Operating Costs				Other Costs				Total	
	O&M				Start	Shut				
	Fixed	Variable	Fuel	Total	up	Down	Capital[1]	Total	Costs	CPWC
	('000 $)	('000 $)	('000 $)	('000 $)	('000 $)	('000 $)	('000 $)	('000 $)	('000 $)	('000 $)
1997	13,109	11,645	62,127	86,881	3,787	679		4,466	91,347	91,347
1998	13,835	12,402	70,601	96,838	2,703	475		3,178	100,016	183,954
1999	14,250	12,957	73,075	100,282	2,936	505		3,441	103,723	272,880
2000	14,677	13,157	71,063	98,897	1,900	375		2,275	101,172	353,194
2001	14,985	14,157	76,571	105,713	1,962	344		2,306	108,019	432,591
2002	15,571	14,678	79,061	109,310	2,192	407		2,599	111,909	508,754
2003	16,036	15,453	85,239	116,727	2,444	458		2,902	119,629	584,141
2004	16,992	15,501	90,062	122,554	2,474	474	5,872	8,820	131,374	660,796
2005	17,545	17,113	92,566	127,224	3,111	525	5,872	9,508	136,732	734,668
2006	18,071	17,910	95,966	131,947	3,171	508	5,872	9,550	141,497	805,452
2007	18,248	18,779	104,159	141,185	3,778	557	5,872	10,208	151,393	875,576
2008	19,172	19,724	107,662	146,558	3,128	489	5,872	9,489	156,047	942,502
2009	21,520	21,714	119,640	162,875	2,112	241	5,872	8,226	171,101	1,010,448
2010	22,166	23,985	121,937	168,087	2,287	275	5,872	8,434	176,521	1,075,355
2011	22,617	24,694	132,511	179,822	2,297	277	5,872	8,446	188,268	1,139,453
2012	24,938	23,346	130,848	179,132	2,574	297	16,378	19,250	198,382	1,201,991
2013	24,156	24,526	140,175	188,858	2,721	313	16,378	19,413	208,271	1,262,783
2014	24,929	24,384	145,861	195,174	3,166	392	16,378	19,936	215,110	1,320,921
2015	25,676	27,072	154,440	207,188	2,984	386	16,378	19,748	226,937	1,377,712
2016	26,411	28,046	160,906	215,364	3,229	409	19,920	23,557	238,921	1,433,072

[1] GE 7EA SC added in 2004, GE 7EA CC in 2012, and GE 6B SC in 2016.

Table J-2
Economic Cost of Pooled System with Individual Expansion

Year	Operating Costs				Other Costs				Total	
	O&M				Start	Shut				
	Fixed	Variable	Fuel	Total	up	Down	Capital[1]	Total	Costs	CPWC
	('000 $)	('000 $)	('000 $)	('000 $)	('000 $)	('000 $)	('000 $)	('000 $)	('000 $)	('000 $)
1997	13,109	10,896	60,969	84,973	3,870	631		4,501	89,475	89,475
1998	13,835	11,885	68,001	93,721	3,118	494		3,611	97,333	179,598
1999	14,250	12,426	71,396	98,071	3,631	552		4,183	102,255	267,264
2000	14,677	12,947	70,464	98,089	2,125	377		2,502	100,591	347,116
2001	14,985	13,802	74,291	103,077	2,774	425		3,199	106,276	425,233
2002	15,571	14,202	77,057	106,830	2,994	449		3,443	110,273	500,283
2003	16,036	14,971	81,852	112,859	3,252	496		3,748	116,607	573,765
2004	16,992	15,226	87,813	120,031	2,767	446	5,872	9,085	129,116	649,103
2005	17,545	16,716	90,722	124,983	3,549	504	5,872	9,925	134,908	721,989
2006	18,071	17,382	93,720	129,173	4,679	584	5,872	11,135	140,308	792,178
2007	18,248	18,243	100,674	137,165	4,761	597	5,872	11,230	148,395	860,914
2008	19,172	19,171	104,329	142,672	4,592	569	5,872	11,032	153,704	926,835
2009	19,747	19,264	111,072	150,082	4,988	605	5,872	11,464	161,546	990,987
2010	20,339	20,972	115,543	156,853	5,385	609	5,872	11,867	168,720	1,053,025
2011	20,734	21,996	123,226	165,956	5,786	661	5,872	12,319	178,275	1,113,721
2012	22,996	22,315	129,387	174,698	3,805	399	16,378	20,583	195,281	1,175,282
2013	23,499	23,353	136,928	183,780	3,190	322	16,378	19,890	203,670	1,234,731
2014	24,929	23,264	143,580	191,773	4,433	445	16,378	21,257	213,029	1,292,306
2015	25,676	25,862	152,783	204,322	3,726	380	16,378	20,484	224,806	1,348,564
2016	26,411	26,745	158,126	211,283	3,761	376	19,920	24,057	235,340	1,403,095

[1] GE 7EA SC added in 2004, GE 7EA CC in 2012, and GE 6B SC in 2016.

Table J-3
Economic Cost of Joint Expansion

Year	Operating Costs				Other Costs				Total	
	O&M				Start	Shut				
	Fixed	Variable	Fuel	Total	Up	Down	Capital[1]	Total	Costs	CPWC
	('000 $)	('000 $)	('000 $)	('000 $)	('000 $)	('000 $)	('000 $)	('000 $)	('000 $)	('000 $)
1997	13,109	10,896	60,969	84,973	3,870	631		4,501	89,475	89,475
1998	13,835	11,885	68,001	93,721	3,118	494		3,611	97,333	179,598
1999	14,250	12,426	71,396	98,071	3,631	552		4,183	102,255	267,264
2000	14,677	12,947	70,464	98,089	2,125	377		2,502	100,591	347,116
2001	14,985	13,802	74,291	103,077	2,774	425		3,199	106,276	425,233
2002	15,571	14,205	77,074	106,850	3,256	491		3,747	110,598	500,503
2003	16,036	14,972	81,870	112,878	3,480	535		4,015	116,893	574,166
2004	16,556	15,218	87,763	119,537	2,880	466		3,346	122,883	645,867
2005	17,096	16,716	90,656	124,468	3,322	469		3,791	128,259	715,161
2006	17,608	17,382	93,684	128,675	4,325	533		4,857	133,532	781,961
2007	17,771	18,225	100,507	136,503	4,379	547		4,926	141,428	847,469
2008	18,681	19,156	104,247	142,083	4,525	566		5,092	147,175	910,590
2009	19,241	19,273	111,326	149,841	4,667	571		5,238	155,079	972,174
2010	19,818	20,976	115,462	156,256	4,998	568		5,566	161,823	1,031,676
2011	20,198	21,953	124,991	167,141	5,491	640		6,131	173,272	1,090,668
2012	20,174	23,251	141,740	185,165	5,457	652		6,109	191,274	1,150,966
2013	20,593	24,435	158,981	204,009	5,660	655		6,315	210,323	1,212,357
2014	21,935	24,915	175,690	222,540	6,537	742		7,278	229,819	1,274,470
2015	23,197	26,698	154,840	204,735	6,385	744	5,755	12,884	217,619	1,328,929
2016	23,364	27,458	177,944	228,765	6,550	781	5,755	13,086	241,852	1,384,969

[1] GE 7EA SC on oil added in 2015.

Appendix K
POWRPRO Input Manual

POWRPRO-PRODUCTION COSTING MODEL
USER MANUAL

Introduction

POWRPRO is a computer based, chronological production costing model developed for use in power supply systems planning. It was developed to enable more detailed study of systems than is possible with simulations based on load duration curves. The effect of time related features may be examined, such as ramp rates, startup and shutdown times and costs and minimum uptimes and downtimes. This in turn means that the roles of generation unit types (baseload, peaking, etc.) can be more realistically defined than is possible with load duration based models.

Since POWRPRO models details which many other programs do not, it requires additional input data. POWRPRO has been designed with the flexibility to operate in a simpler mode which uses default values for some of the data. In this mode, POWRPRO performs similar to other existing models. This flexibility to use either minimal or detailed input in the same framework makes POWRPRO a powerful tool for a wide range of system planning.

The computer program for the model is written in FORTRAN language and adheres to 1978 ANSI Standards (FORTRAN 77). Versions are executable on mainframe, mini, and desktop computers.

The production costing model simulates the operation of a power supply system over periods of up to 30 years. Unit commitment and dispatch are explicitly treated at each hour. Unscheduled outages are randomly assigned. Maintenance periods may be user specified or automatically scheduled by the model Unit commitment decisions employ unit priority ordering. A nominal ordering is calculated based on average cost of energy at a user specified fraction of maximum capacity. The average cost may include energy only or energy plus variable operation and maintenance. When capacity must be added on-line the nominal ordering is modified to reflect the effects of current hourly demand shape, startup costs, ramp rates, and minimum up- and downtimes as well as a look ahead for future load requirements. Power sources are dispatched based on the criterion of equal incremental cost operation. The incremental cost may be fuel only or fuel plus variable O&M cost.

Overview

The production costing model simulates the hour by hour operation of a power supply system over a period of up to 30 years. Each hour is analyzed in detail. The on-line commitment of the previous hour is examined to determine whether units

should be replaced by more efficient off line units that have become available. If the capacity of the on-line commitment exceeds demand and spinning reserve requirements the feasibility of taking units off line is evaluated. If the on-line capacity must be increased a priority ordering is calculated for the available off-line units to guide the selection of capacity additions. Calculation of the priority ordering takes account of how long the additional capacity is needed, startup and shutdown costs, ramp rates, and other time associated factors.

The governing model criterion is identification of the least cost way to operate the system to meet hourly demands and reserve requirements while simultaneously satisfying all constraints. The considered cost is fuel plus startup and shutdown costs; optionally, variable operation and maintenance cost may be included.

The simulation allows for the use of substantial data input. Generating unit data includes fuel type and burn rate characteristics, ramp rates and other time related features, maintenance requirements, etc. If the user desires or if more detailed data are not available, simplified data can be used such as a single heat rate for a unit instead of a heat rate curve and dynamic time related features such as ramp rates and startup times can be eliminated by setting the ramp rates very high and setting startup times to zero. The result of using simplified data is that the model will then function in a manner similar to less sophisticated load duration curve based models. Fuel prices and hourly demands must be provided for the entire simulation period. Unit start and retirement times must be given and purchase availability times specified if applicable. Data variations such as seasonal changes in generator capacity may be described.

Simulation output consists of summary reports. An annual report is always prepared, consisting of a breakdown by unit of generation amounts, fuel costs, operation and maintenance costs, and hours on-line. Optional reports include startup and shutdown summaries and pollutant emission summaries. There are options to obtain these same reports by month or by arbitrary time periods.

The principle parts of the model are:

- Input processing.
- Forced outage handling.
- Maintenance scheduling.
- System parameter updating.
- Unit commitment and dispatch.
- Output reports.

Input preprocessing consists of scanning the input data file for errors and inconsistencies, and logging the commercial operation and retirement of power sources. A data echo is optionally printed.

Forced outages are simulated by causing units to be unavailable for service at randomly selected intervals in periods of 1 to 4 days.

Maintenance periods may be explicitly scheduled or the program will schedule an annual period of requested length.

Generating unit and purchase parameters may be updated during the simulation period. Updates are scheduled by date and become effective the first hour of a day.

Hour by hour unit commitment and dispatch, including the impact of pumped storage plants and fuel limits, are processed as described above.

A summary flow chart of model logic is shown on Figure 1.

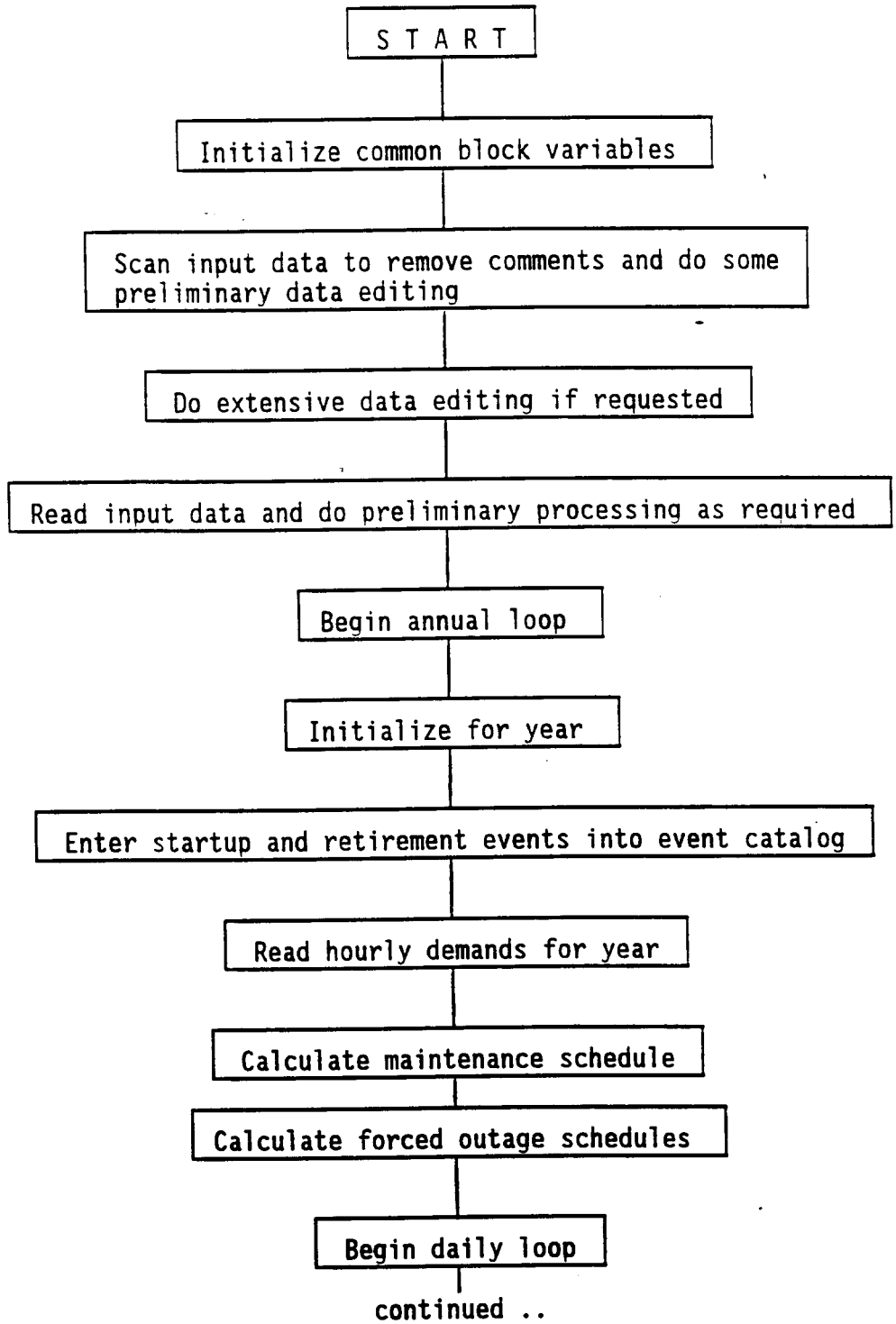


Figure 1 - Model Flowchart

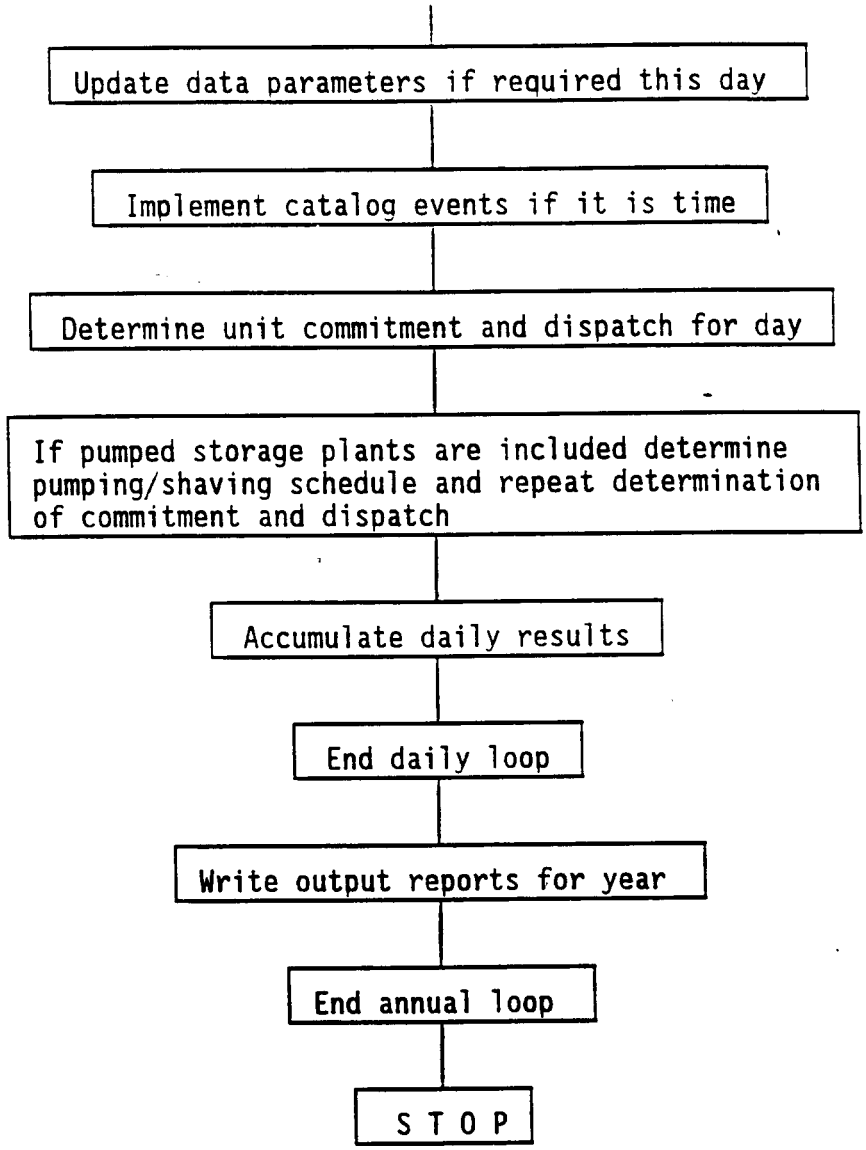


Figure 1 - Model Flowchart (Concluded)

Input/Output Summary

The following categories of input data are used by the production costing model:

- Run control parameters.
- Hourly demands.
- Generator descriptions.
- Purchase option descriptions.
- Fuel and purchase prices.
- Reserve requirements.
- Generator commercial operation and retirement schedule.
- Parameter updates.
- Pumped storage plant descriptions.
- Fuel limits parameters.
- Output requests.

Model output always includes an annual cost summary report. This report contains a breakdown by generator and purchase option of energy generated or purchased, fuel used, fuel or purchase cost, hours on-line, heat rate, variable and fixed O&M costs, and operating and average capacity factors. Optional output includes annual summaries of number and cost of startups and shutdowns, maintenance and outage hours, and emission amounts.

The same reports may be obtained on monthly intervals, or for arbitrary periods specified in the input.

There are also output options for obtaining specific data written to separate output files. These data include:

- System hourly incremental fuel cost.
- System hourly average fuel cost.
- Annual totals of summary data.
- Hourly generation by a specified generating unit.

INPUT DESCRIPTION

Input data for the POWRPRO program consists of the following blocks:

1. Run title
2. Run control and run options
3. Broker data
4. Pumped storage plant data
5. File names
6. Output report requests
7. Generator data
8. Purchase data
9. Fuel limits data
10. Fuel/purchase price table
11. Generator/purchase starts and retirements
12. Data updates

Some blocks must be entered and others may be required depending on the system being modeled. Blocks must be entered in order except Blocks 7 and 8 may be intermingled.

All data are read in free format so data items are not required to fit into fixed columnar fields. The data line items must be entered in the order shown and an entry is required for each item. In particular, zero values must be entered because blanks do not default to zero. Some character data must be enclosed in single quotes. If quotes are not indicated in the following description they must be omitted.

A data file record may be up to 132 characters long. Normally the data lines will fit within a record. If more space is required, or if it is more convenient, a data line may be entered on more than one file record so long as individual data items are not broken.

Data lines beginning with an asterisk (*) are assumed to be comment lines and skipped. Comment lines may be inserted anywhere in the data file.

The input data are described line by line within blocks. Data line items are denoted by +.

Block 1 - Run Title

A run title may be entered for printout at the top of output report pages. A title line may consist of up to 80 characters the first of which must be T to identify

it as a title line. There is no limit to the number of title lines which may be entered but only the first two are printed.

Block 2 - Run Control and Run Options

This block includes three lines of required data which define general features of the run.

Block 2 - Line 1

+ This item indicates whether to include an echo of input as part of the output and whether to print the progress of the run to the monitor screen.

  =0 no input echo - no printout of progress.

  <0 no input echo - print progress at hourly interval equal to absolute value of the entry.

  >0 input echo - print progress at hourly interval equal to entry.

  >8760 input echo - no printout of progress.

+ First month - the program assumes the simulation begins at the first hour of a month. Enter the beginning month number (e.g., 4 = April).

+ Number of days in a year (normally 365 but may be used to run short test cases).

+ Priority factor - generating units are prioritized based on the average energy cost at the fraction of rated capacity entered here.

+ Minimum number of units required to be online.

+ Variable O&M factor - if variable O&M is to be included in prioritizing and dispatch enter 1 - otherwise enter 0

+ Output selector - output reports consists of two parts one of which is always printed and one which is optional. The optional report has four forms as follows:

Output Selector	Optional Report
1	Summary of starts and stops
2	Summary of starts, stops, and emissions
3	Summary of emissions
4	Omitted

Enter the negative of the output selector to cause fuel and O&M costs to be printed in thousands of dollars in the output summary.

+ Spinning reserve parameters in the order A, B, where spinning reserve = A x demand + B (MW).
+ Operating reserve parameters in the order A,B, where operating reserve = A x demand + B (MW)
+ Pollutant emission penalty factor ($/ton)

Block 2 - Line 2

+ Broker selector - enter 1 if the run includes a broker, otherwise enter 0
+ Pumped storage selector - enter the number of pumped storage plants included in the run
+ Incremental cost output selector - enter 1 to have system hourly incremental cost written to an output file, otherwise enter 0
+ Commitment review selector - enter 1 to have hourly unit commitment reviewed for possibility of reducing cost by introducing low priority uncommitted units, otherwise enter 0.
+ Average cost output selector - enter 1 to have system hourly average fuel cost written to an output file, otherwise enter 0.
+ Annual summary output selector. Enter 1 to have annual summaries written to an output file, otherwise enter 0. The summary includes annual energy, fuel cost, variable and fixed O&M costs, startup and shutdown costs, and SO_2 and NO_x emission amounts.
+ Data edit selector - enter 0 (not implemented)
+ Fuel limits selector - enter 1 if run includes observation of fuel usage limits, otherwise enter 0.
+ Peaking hydro output selector - enter 1 if an output file from the peaking hydro model is to be read and summarized in output, otherwise enter 0.
+ Pumped storage intermediate file selector - if the run includes pumped storage plants a 1 entered here will cause hourly incremental costs before modification by the pumped storage plants and hourly demands after modification by the pumped storage plants to be written to files names BEFORINC.OUT and AFTERLOD.OUT respectively. Enter zero if there are no pumped storage plants or if these files are not wanted.
+ Generation output selector - if a unit ID number is entered here the hourly generation by that unit will be written to an output file. A name for the output file will be solicited on the screen. Enter zero if this special output is not wanted.

Block 2 - Line 3

+ First year of simulation
+ Last year of simulation
+ Name (enclosed in single quotes) of file containing hourly demands. 8760 hourly demands must be provided for each simulation year, plus one additional year to serve as a 'look ahead' buffer. The years must be consecutive and the data must be in EEI format including dates. The file may contain data for years prior to the first simulation year; the program will determine the correct starting place from the dates.

Block 3 - Broker Data - Peaking Hydro Filename

This block of data is required if the run includes a broker, or peaking hydro is to be summarized (block 2, line 2).

Block 3 - Line 1

+ Name (enclosed in single quotes) of file containing broker hourly price quotes. The file should have 12 price quotes per record in any convenient format. The file must include data for the same years included in the hourly demands file except the extra 'look ahead' year is not required.
+ Broker forced outage rate (decimal fraction).

Block 3 - Line 2

+ If peaking hydro output was selected (block 2, line 2) enter the name of the peaking hydro output file in single quotes. If peaking hydro output was not selected omit this line.

Block 4 - Pumped Storage Plant Data

This block of data is required if the run includes pumped storage plants (block 2, line 2). The first four lines of this block are repeated for each pumped storage plant.

Block 4 - Line 1

+ Plant I.D. number - a unique integer between 1 and 999.
+ Plant name - maximum of 12 characters enclosed in single quotes.
+ Rated maximum capacity (MW)
+ Rated minimum capacity (MW)
+ Pumping (in) efficiency (decimal fraction, e.g., 1.25)

+ Number of pumping blocks - the plant is capable of pumping at this number of capacity levels
+ The plant operates on a 1-day cycle (enter 1) or a 1-week cycle (enter 7).
+ Reservoir index number (1,2,...) for this plant (plants with the same number share the reservoir).
+ Initial status - one letter in single quotes
  'A' - unit is available for service at beginning of run
  'U' - unit is unavailable for service at beginning of run
+ Plant forced outage rate (decimal fraction)

Block 4 - Line 2

Variable and Fixed O&M cost rates obtained by escalation

Variable O&M cost for the pumped storage plant is calculated as the product of the variable O&M cost rate and the amount of generation by the plant (i.e., the amount of energy shaved). The cost rate given should therefore be inflated to include the variable O&M cost of pumping.

+ Variable O&M base rate ($/MWh)
+ Variable O&M escalation rate (decimal fraction)
+ Variable O&M base year for escalation
+ Fixed O&M base rate ($/MW-yr)
+ Fixed O&M escalation rate (decimal fraction)
+ Fixed O&M base year for escalation

Block 4 - Line 3

+ Pumping block capacities - enter pumping capacity as fraction of rated capacity for number of pumping blocks (block 4, line 1) - must be in order of increasing capacity, e.g., 0.25, 0.5, 1.0.

Block 4 - Line 4

+ Number of maintenance periods to be scheduled for plant (maximum of 2). Must be manually scheduled.

Additional data is required according to how many maintenance periods are requested.

+ Length of first period - (days)
+ Start date of first period - (month/day format, e.g., 0601 for first day of June)
+ Length of second period
+ Start date of second period

Block 4 - Line 5

+ Reservoir capacity (MWh) of reservoir index 1, 2,.... entered on block 4, line 1

Block 4 - Line 6

+ Initial level (MWh) of reservoir index 1, 2,...

Block 4 - Line 7

Include this line only if one or more plants operate on a weekly cycle.

+ Day of week of first day of year (Monday = 1, etc.)

Block 5 - File Names

Output filenames may need to be entered depending upon the options selected on block 2, line 2. Names may be a maximum of 40 characters enclosed in single quotes.

Block 5 - Line 1

+ Enter output filename for system hourly incremental costs if requested.

Block 5 - Line 2

+ Enter output filename for system hourly average fuel costs if requested.

Block 5 - Line 3

+ Enter output filename for annual summary data if requested.

Block 6 - Output Report Requests

This block includes output report requests. Annual summary reports are automatically printed.

To obtain monthly summary reports enter a line containing the letter M. Monthly summaries will be printed for each year of the run.

Special summary reports may be requested for arbitrary periods of consecutive days. To request a special report enter, on a separate line, the letter S followed by the dates (month/day) of the first and last day. For example the data line

S 0401 0407

will cause the first week of April to be summarized for each year.

Block 7 - Generator Data

This block of data must be entered for each generator to be modeled. All data are required.

Block 7 - Line 1

+ Line code - enter G for generator or GB if a broker is included in the run and purchases on the broker may be made against this unit.
+ Unique integer I.D. number. This may be any number between 1 and 999 with one exception. A combined cycle unit is modeled as three modes, the combustion turbine, a HRSG mode, and a supplemental firing mode. Each mode must be described as a generator and the I.D.numbers are used to associate the modes. The I.D. number of the HRSG mode must be 1000 plus the I.D. number of the combustion turbine. The I.D. number of the supplemental firing mode must be 2000 plus the I.D. number of the combustion turbine.
+ Generator name - maximum of 12 characters enclosed in single quotes.
+ Rated maximum capacity (MW)
+ Rated minimum capacity (MW)
+ Unit type - one letter in single quotes
  'M' - must run (unit will be online whenever available)
  'Q' - quick start (contributes to satisfying operating reserve requirement when offline)
  ' ' Neither of above types
+ Priority list positioner - Generators are arranged in a priority order based on average fuel cost at the fraction of rated capacity specified on Block 2 - line 1, plus (optionally) the variable O&M cost rate. A non-zero value entered here will replace the above priority cost measure for this unit.
+ Initial status - one letter enclosed in single quotes
  'A' - unit is available for service at beginning of run
  'U' ' unit is not available for service at beginning of run
+ Forced outage rate (decimal fraction)

Block 7 - Line 2

Fuel price may be entered as an index in a price table.

+ Table index number

Or fuel price may be obtained by escalation

+ Base price ($/MBtu)
+ Escalation rate (decimal fraction)
+ Base year for escalation

Block 7 - Line 3

Start-up fuel price - may be entered as an index number in a price table.

+ Table index number

Or start-up fuel price may be obtained by escalation

+ Base price ($/MBtu)
+ Escalation rate (decimal fraction)
+ Base year for escalation

Block 7 - Line 4

This line has alternate fuel price and is required only if the fuel limits option is selected (block 2, line 2). If it is included when the fuel limits option is not selected the line is skipped.

Alternate fuel price may be entered as an index in a price table.

+ Table index number

Or alternate fuel price may be obtained by escalation

+ Base price ($/MBtu)
+ Escalation rate (decimal fraction)
+ Base year for escalation

Block 7 - Line 5

Variable and fixed O&M cost rates obtained by escalation

+ Variable O&M base rate ($/MWh)
+ Variable O&M escalation rate (decimal fraction)
+ Variable O&M base year for escalation
+ Fixed O&M base rate ($/MW-yr)
+ Fixed O&M escalation rate (decimal fraction)
+ Fixed O&M base year for escalation

Block 7 - Line 6

Fuel burn rate - may be entered as the coefficients of a fuel burn rate equation

CO + C1 x MW + C2 x MW x MW

+ CO (MBtu/h)
+ C1 (MBtu/h-MW)
+ C2 (MBtu/h-MW-MW)

or fuel burn rate may be entered as a table of incremental burn rates and a reference rate.

+ Number N of incremental burn rates in table

N lines of the incremental table

+ Power level (MW)
+ Incremental burn rate (MBtu/h-MW)

A line with reference burn rate

+ Power level (MW)
+ Burn rate (MBtu/h)

The power level for which the reference burn rate is given must be within the rated minimum to maximum capacity range for the unit.

Block 7 - Line 7

Scheduled maintenance - automatic scheduling of one annual maintenance period may be requested.

+ Number of maintenance days to be scheduled

Alternately, up to two maintenance periods may be specified.

+ Number of maintenance periods
+ Length of first period - (days)
+ Start date of first period - (month/day format, e.g., 0601 for first day of June)
+ Length of second period if required
+ Start date of second period if required

Enter zero for no scheduled maintenance

Block 7 - Line 8

+ Ramp up rate (fraction of rated capacity/h)
+ Ramp down rate (fraction of rated capacity/h)
+ Required minimum online time (hrs) - if a unit is brought online it remains online at least this long
+ Required minimum offline time (hrs) - if a unit is taken offline it remains offline at least this long
+ SO_2 emission rate (lb. emitted per MBtu of fuel burned)
+ NO_x emission rate (lb. emitted per MBtu of fuel burned)
+ Indicator of whether unit uses limited fuel (this entry required only if fuel limits option is selected (block 2, line 2). Ignored if entered when not required.
  = 0 unit does not use limited fuel
  = 1 unit uses limited fuel

Block 7 - Line 9

+ Time to start from warm condition (hours)

+ Time to start from cold condition (hours)
+ Time to cool to warm condition (hours)
+ Generation capacity in first hour online (fraction of rated maximum capacity)

Block 7 - Line 10

+ Shut down cost ($)
+ Primary fuel used in cold start (MBtu)
+ Start-up fuel used in cold start (MBtu)
+ Start-up cost adder-base cost ($)
+ Start-up cost adder-escalation rate (decimal fraction)
+ Start-up cost adder-base year for escalation

Block 8 - Purchase Option Description

This block of data must be entered for each purchase option. Two types of purchase are allowed, ones with a fixed annual price and ones with prices that change from hour to hour.

Block 8 - Line 1

+ Line Code

  PR - purchase with annual price and cannot be bought against on the broker

  PRB -purchase with annual price and can be bought against on the broker

  PH - purchase with hourly prices and cannot be bought against on the broker

  PHB -purchase with hourly prices and can be bought against on the broker
+ Unique integer I.D. number between 1 and 999
+ Purchase name - maximum of 12 characters enclosed in single quotes
+ Maximum capacity (MW)
+ Minimum capacity (MW)
+ Type - (one letter in single quotes)

  'M' - must run (will be online whenever available)

  'Q' - quick start (contributes to satisfying operating reserve requirement when offline)

  ' ' Neither of above types

+ Priority list positioner - purchases are arranged in a priority order based on the purchase price ($/MWh). A non-zero value entered here will be used in place of the purchase price to determine the priority ordering
+ Initial status - (one letter in single quotes)
  'A' - purchase is available at beginning of run
  'U' - purchase is unavailable at beginning of run
+ Forced outage rate (decimal fraction)

Block 8 - Line 2

Purchase price - the data required here depends on whether the purchase has a single annual price or prices which vary from hour to hour.

Annual price may be entered as an index number in a price table.

+ Table index number

or the price may be obtained by escalation

+ Base price ($/MWh)
+ Escalation rate (decimal fraction)
+ Base year for escalation

For purchase with hourly prices

+ Name of file containing hourly prices. The file must have 12 prices per record in any convenient format. The file must include data for the same years included in the hourly demands file except the extra 'look ahead' year is not required.

Block 9 - Fuel Limits Data

This block of data is required if the fuel limits option is selected (block 2, line 2). (If the fuel limits option is selected and this block of data is omitted the run is processed without considering fuel limits. If the fuel limits option is not selected and this block of data is entered the data are ignored).

In a fuel limits run a subset of generation units are marked as using the limited fuel as primary (block 7, line 8). Fuel limits data specify the maximum amount (MBtu) of the limited fuel which may be used in specified periods. Five kinds of limits may be specified, annual, monthly, weekly, daily, and special period, in any combination. The limits may be entered in any order.

Block 9 - Line 1

+ The word LIMITS

Block 9 - Line 2

(a) To specify annual limits

+ The letter A
+ Annual limit - MBtu

(b) To specify monthly limits

+ The letter M
+ The number N of different monthly limits in the year (maximum of 12)
+ Limit for first month of run - MBTU

This line must be followed by N-1 lines to the following format (in chronological order)

+ Month number, counting from first month of run (e.g., if run begins in October, January is number 4), of monthly fuel limit change
+ New monthly fuel limit - MBtu

(c) To specify weekly limits

+ The letter W
+ The number N of different weekly limit values in the year (maximum of 52)
+ Limit for first week of run - MBtu

This line must be followed by N-1 lines to the following format (in chronological order)

+ Week number, counting from first week of run, of weekly fuel limit change
+ New weekly fuel limit - MBtu

(d) To specify daily limits

+ The letter D
+ The number N of different daily limit values in the year (maximum of 365)
+ Limit for first day of run-MBtu

This line must be followed by N-1 lines to the following format (in chronological order)

+ Date (month/day format) of daily fuel limit change
+ New daily fuel limit - MBtu

(e) To specify limits for special periods

+ The letter S

+ The number N of special periods for which limits are to be specified (maximum of 20)

This line must be followed by N lines to the following format

+ Date (month/day format) of first day of special period
+ Date (month/day format) of last day of special period
+ Fuel limit for period - MBtu

The special periods may be entered in any order and do not need to include the entire year.

Block 10 - Price Table

This block of data is required if any fuel or purchase price is defined by reference to a table index in blocks 7 and 8.

Block 10 - Line 1

+ The word PRICES

Block 10 - Line 2

+ Year
+ Index 1 price for year
+ Index 2 price for year

●
●
●
●

+ Index N price for year, where N is the highest table index reference in the generator and purchase input data. A price must be given for all indices 1 through N even if some of the indices are not referenced. If the prices must be carried over to more than one record the year should not be repeated.

A line 2 must be entered for each study year in chronological order. Prices may be entered for years preceding the first study year if desired. The program will determine the correct starting place.

Block 11 - Generator/Purchase Starts and Retirements

This block of data contains a schedule of starts and retirements for generators and purchases. It is omitted if starts and retirements are not required.

A start is entered on one line as follows:

+ The word START
+ I.D. number of generator or purchase
+ Year of start
+ Month and day of start in MMDD format

A retirement is coded in the same way except RETIRE replaces START. The schedule must be in chronological order.

Block 12 - Data Updates

This block of data is used to make changes in the original data as the simulation progresses. Much of the data may be updated, e.g., the rated capacity of a generator may be changed, burn rate characteristics may be modified, etc. The block is omitted if there are no data to be updated.

The general format of the update data is as follows:

+ YEAR YYYY
+ DAY MMDD
+ MOD

  ●
  ●
  ●

+ MOD

Where YYYY is the year the update is to be made and MMDD is the day of the update (in month/day format).

The MOD lines define the updates and are described below. After the updates for the specified year and day are entered a new day or a new year and day may be specified and additional updates entered. The updates must be entered in chronological order. There is no limit to the number of updates which may be entered.

Data updates are identified by code number as follows:

1 - Change rated maximum capacity of a generator and scale the unit
2 - Change rated maximum capacity of a generator or purchase without scaling

3 - Change rated minimum capacity of a generator or purchase
4 - Change forced outage rate of a generator or purchase
5 - Change priority list positions of generator or purchase
6 - Change fuel price group
7 - Change fuel price escalation parameters
8 - Change variable O&M cost data for generator
9 - Change fixed O&M cost data for generator
10 - Change burn rate equation coefficients (C0, C1, C2) for generator
11 - Change table of incremental burn rates for generator
12 - Change maintenance requirements for generator
13 - Change availability status of purchase
14 - Change ramp rates for generator
15 - Change required minimum online and offline time for generator
16 - Change time to start from warm and cold condition for generator
17 - Change time to cool to warm condition for generator
18 - Change cold start fuel usage and startup cost adder for generator
19 - Change shut down cost for generator
20 - Change generation capacity in first hour online for generator
21 - Not used
22 - Change startup fuel price group for generator
23 - Change startup fuel price escalation parameters for generator
24 - Change maximum and minimum capacity of pumped storage plant
25 - Change variable O&M cost rates for pumped storage plant
26 - Change fixed O&M cost rates for pumped storage plant
27 - Change pumping (in)efficiency of pumped storage plant
28 - Change pumping blocks of pumped storage plant
29 - Change cycle length for pumped storage plant
30 - Change capacity of a pumped storage reservoir
31 - Change annual fuel limits
32 - Change monthly, weekly, or daily fuel limits
33 - Change special period fuel limits

Most of the updates may be coded on one MOD line. Others require additional lines of data as described below.

1. Change rated maximum capacity of a generator and scale the unit

+ MOD
+ 1
+ I.D. number of generator
+ New rated maximum capacity (MW)

2. Change rated maximum capacity of a generator or purchase without scaling
   + MOD
   + 2
   + I.D. number of generator or purchase
   + New rated maximum capacity (MW)
3. Change rated minimum capacity of a generator or purchase
   + MOD
   + 3
   + I.D. number of generator or purchase
   + New rated minimum capacity (MW)
4. Change forced outage rate of a generator or purchase
   + MOD
   + 4
   + I.D. number of generator or purchase
   + New forced outage rate (decimal fraction)
5. Change priority list position of a generator or purchase
   + MOD
   + 5
   + I.D. number of generator or purchase
   + New priority list position
6. Change fuel price group
   + MOD
   + 6
   + I.D. number of generator or purchase
   + New fuel price group number
7. Change fuel price escalation parameters
   + MOD
   + 7
   + I.D. number of generator or purchase
   + New base price ($/MBtu)

+ New escalation rate (decimal fraction)
+ New base year for escalation

8. Change variable O&M cost data for a generator
   + MOD
   + 8
   + I.D. number of generator
   + New base cost rate ($/MWh)
   + New escalation rate (decimal fraction)
   + New base year for escalation

9. Change fixed O&M cost data for generator
   + MOD
   + 9
   + I.D. number of generator
   + New base cost rate ($/MW-yr)
   + New escalation rate (decimal fraction)
   + New base year for escalation

10. Change burn rate coefficients for generator
    + MOD
    + 10
    + I.D. number of generator
    + New value for CO coefficient (MBtu/h)
    + New value for C1 coefficient (MBtu/h-MW)
    + New value for C2 coefficient (MBtu/h-MW-MW)

11. Change table of incremental burn rates for a generator. It is not possible to change only part of a table. A complete new table must be entered.
    + MOD
    + 11
    + I.D. number of generator
    + Number N of incremental burn rates in table
    N Lines of the incremental table
    + Power level (MW)
    + Incremental burn rate (MBtu/h-Mw)

    A line with reference burn rate
    + Power level (MW)
    + Burn rate (MBtu/h)

The power level for which the reference burn rate is given must be within the rated minimum to maximum capacity range for the unit.

12. Change maintenance requirements for generator
    + MOD
    + 12
    + I.D. number of generator

    To request automatic maintenance scheduling
    + Number of maintenance days required (enter 0 to change to no scheduled maintenance)

    To request manually scheduled maintenance
    + Number of maintenance periods (maximum of two)
    + Length of first period (days)
    + Start date of first period (month/day format)
    + Length of second period if required
    + Start date of second period if required
13. Change availability status of purchase
    + MOD
    + 13
    + I.D. number of purchase
    + Availability status
      0 = unavailable
      1 = available
14. Change ramp rates for generator
    + MOD
    + 14
    + I.D. number of generator
    + Ramp up rate (fraction of rated capacity/h)
    + Ramp down rate (fraction of rated capacity/h)
15. Change required minimum online and offline time for generator
    + MOD
    + 15
    + I.D. number of generator
    + Required minimum online time (integer hours)
    + Required minimum offline time (integer hours)
16. Change time to start from warm and cold condition for generator

+ MOD
+ 16
+ I.D. number of generator
+ Time to start from warm condition (hours)
+ Time to start from cold condition (hours)

17. Change time to cool to warm condition for generator
    + MOD
    + 17
    + I.D. number of generator
    + time to cool to warm condition (hours)
18. Change cold start fuel use and cost adder for generator
    + MOD
    + 18
    + I.D. number of generator
    + Primary fuel used in cold start (MBtu)
    + Start-up fuel used in cold start (MBtu)
    + Start-up cost adder base year for escalation
    + Start-up cost adder escalation rate (decimal fraction)
    + Start-up cost adder base year for escalation
19. Change shut down cost for generator
    + MOD
    + 19
    + I.D. number of generator
    + shut down cost ($)
20. Change generation capacity in first hour online for generator
    + MOD
    + 20
    + I.D. number of generator
    + Generation capacity in first hour online (fraction of rated maximum capacity)
21. Not used
22. Change startup fuel price group for generator
    + MOD
    + 22
    + I.D. number of generator

+ Startup fuel index number in price table

23. Change startup fuel price escalation parameters for generator
    + MOD
    + 23
    + I.D. number of generator
    + Startup fuel base price ($/MBtu)
    + Startup fuel price escalation rate (decimal fraction)
    + Startup fuel price base year for escalation
24. Change maximum and minimum capacity for pumped storage plant
    + MOD
    + 24
    + I.D. number of pumped storage plant
    + Maximum capacity of plant (MW)
    + Minimum capacity of plant (MW)
25. Change variable O&M cost data for pumped storage plant
    + MOD
    + 25
    + I.D. number of pumped storage plant
    + New base cost rate ($/MWh)
    + New escalation rate (decimal fraction)
    + New base year for escalation
26. Change fixed O&M cost data for pumped storage plant
    + MOD
    + 26
    + I.D. number of pumped storage plant
    + New base cost rate ($/MW-yr)
    + New escalation rate (decimal fraction)
    + New base year for escalation
27. Change pumping (in)efficiency of pumped storage plant
    + MOD
    + 27
    + I.D. number of pumped storage plant
    + Pumping (in)efficiency of plant (decimal fraction)
28. Change pumping blocks for pumped storage plant
    This change may be made only at the first day of a year

+ MOD
+ 28
+ I.D. number of pumped storage plant
+ Number of pumping blocks for plant

One line to the following format

+ Size of first pumping block (fraction of rated maximum capacity)

  •
  •
  •

+ Size of last pumping block (fraction of rated maximum capacity)

This line containing pumping block capacities must be on <u>one</u> file record and the capacities must be entered in order of increasing magnitude, e.g., 0.25, 0.50, 1.0.

29. Change cycle length for pumped storage plant. This change may be made only at the first day of a year
    + MOD
    + 29
    + I.D. number of pumped storage plant
    + Cycle length for plant (must be 1-day or 1-week)
      = 1 for one day cycle
      = 7 for one week cycle
30. Change MWh capacity of a pumped storage reservoir
    + MOD
    + 30
    + Sequence number of reservoir (block 4, line 4)
    + Capacity of reservoir (MWh)
31. Change annual fuel limit
    + MOD
    + 31
    + Annual fuel limit (MBtu)
32. Change monthly, weekly, or daily fuel limits
    + MOD
    + 32
    + Number N of fuel limit changes in course of year
    + Fuel limit in first period (MBtu)

+ Fuel limit type code (in single quotes)
  'M' = monthly
  'W' = weekly
  'D' = daily

N lines to the following format (in chronological order)

+ Month, week, or day of change (see block 9, line 2)
+ New fuel limit (MBtu)

33. Change special period fuel limits

+ MOD
+ 33
+ Number N of special periods for which limits are to be specified

N lines to the following format (see block 9, line 2)

+ Date (month/day format) of first day of special period
+ Date (month/day format) of last day of special period
+ Fuel limit for period (MBtu)

If a set of data updates is to be repeated identically each year the set may be entered only once. To identify it as a repeating set it must be preceded by a data line containing DUP BEGIN and terminated with a line containing DUP END. A 'DAY' line must be the first line of the set. A repeating set may be entered anywhere in the updates data.

The data updates must be followed by a data line containing the word END to signal the end of data.

Appendix L
Multi-Area POWRPRO Description

Multi-Area POWRPRO

The latest enhancement to POWRPRO is multi-area capability. The program works through all possibilities of units and transmission trying to find the least cost operation. It accepts inputs such as transmission losses between areas, interchange capabilities between areas, and units that must run for voltage or security reasons. All single system capabilities and constraints are also available.

Multi-Area POWRPRO uses the same inputs and format as POWRPRO, but allows that information to be placed within user-defined transmission areas. A transmission area is a region relatively unconstrained by transmission capability. Each area is connected with adjoining areas through constrained transmission lines.

The Multi-Area POWRPRO input file looks very similar to the POWRPRO input file, with the addition of run control data and tie-line constraints. The new inputs in run control options of the Multi-Area POWRPRO model are as follows.

Block 1: Run Title

This is the same as in POWRPRO.

Block 2: Run Control and Run Options

This has the first seven options found in POWRPRO Block 2, Line 1, plus it requires the number of transmission areas to be simulated.

Block 3: Tie Line Data

This block is specific to Multi-Area POWRPRO and describes the tie line data between areas. The following data is needed for each tie line.

- Tie-line number: User-specified number to index the tie lines.
- From area: Each area is numbered chronologically. The first area listed is area number one, the second area described is number two, and so forth. Up to eight areas can be modeled. The "From" area is the area where the transmission starts.
- To area: The area to which the tie line connects.
- Tie Line Capacity: The MW capability of the tie line.
- Tie Line Power Loss: Power loss through the line can be described through a quadratic equation in the form

$$y = aX + bX^2$$

where the y-variable is the amount of line losses in MW and the x-variable is the amount of capacity, in MW, flowing through the line.

- Wheeling Cost: A wheeling charge for the line can also be specified on a $/MWh basis.

Block 4: Area Data

In this block of data, the area name is provided in single quotes. The hourly load file is also called out in single quotes. The spinning and operating reserves for the area are specified as outlined in the POWRPRO manual. The last section of this block outlines the connectivity data.

- Area the current area connects with.
- Number of tie lines in the connection path.
- Tie Line index numbers, placed in order from current area to connected area.

Block 5: Generator Data

The generator data block is the same as for POWRPRO. All generators and purchases for a specific area are placed in that area.

Block 6: Other Data

This last section of the input file contains the fuel and purchase price table, starts and retirements, and the change module section, as described in the POWRPRO manual.

Appendix L
Multi-Area POWRPRO Description

Multi-Area POWRPRO

The latest enhancement to POWRPRO is multi-area capability. The program works through all possibilities of units and transmission trying to find the least cost operation. It accepts inputs such as transmission losses between areas, interchange capabilities between areas, and units that must run for voltage or security reasons. All single system capabilities and constraints are also available.

Multi-Area POWRPRO uses the same inputs and format as POWRPRO, but allows that information to be placed within user-defined transmission areas. A transmission area is a region relatively unconstrained by transmission capability. Each area is connected with adjoining areas through constrained transmission lines.

The Multi-Area POWRPRO input file looks very similar to the POWRPRO input file, with the addition of run control data and tie-line constraints. The new inputs in run control options of the Multi-Area POWRPRO model are as follows.

Block 1: Run Title

This is the same as in POWRPRO.

Block 2: Run Control and Run Options

This has the first seven options found in POWRPRO Block 2, Line 1, plus it requires the number of transmission areas to be simulated.

Block 3: Tie Line Data

This block is specific to Multi-Area POWRPRO and describes the tie line data between areas. The following data is needed for each tie line.

- Tie-line number: User-specified number to index the tie lines.
- From area: Each area is numbered chronologically. The first area listed is area number one, the second area described is number two, and so forth. Up to eight areas can be modeled. The "From" area is the area where the transmission starts.
- To area: The area to which the tie line connects.
- Tie Line Capacity: The MW capability of the tie line.
- Tie Line Power Loss: Power loss through the line can be described through a quadratic equation in the form

$$y = aX + bX^2$$

where the y-variable is the amount of line losses in MW and the x-variable is the amount of capacity, in MW, flowing through the line.

- Wheeling Cost: A wheeling charge for the line can also be specified on a $/MWh basis.

Block 4: Area Data

In this block of data, the area name is provided in single quotes. The hourly load file is also called out in single quotes. The spinning and operating reserves for the area are specified as outlined in the POWRPRO manual. The last section of this block outlines the connectivity data.

- Area the current area connects with.
- Number of tie lines in the connection path.
- Tie Line index numbers, placed in order from current area to connected area.

Block 5: Generator Data

The generator data block is the same as for POWRPRO. All generators and purchases for a specific area are placed in that area.

Block 6: Other Data

This last section of the input file contains the fuel and purchase price table, starts and retirements, and the change module section, as described in the POWRPRO manual.