SUSITNA HYDROELECTRIC PROJECT

FEDERAL ENERGY REGULATORY COMMISSION
PROJECT No. 7114

HARZA-EBASCO
Susitna Joint Venture
Document Number
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RESPONSE TO FEDERAL ENERGY REGULATORY COMMISSION DATA REQUEST OF MARCH 27, 1985

HARZA-EBASCO
SUSITNA JOINT VENTURE

APRIL 19, 1985

ALASKA POWER AUTHORITY

SUSITNA HYDROELECTRIC PROJECT

FERC Project No. 7114

ALASKA POWER AUTHORITY

RESPONSE TO

FEDERAL ENERGY REGULATORY COMMISSION

DATA REQUEST

OF MARCH 27, 1985

HARZA-EBASCO SUSITNA JOINT VENTURE

APRIL 19, 1985

FERC DATA REQUEST
LETTER OF MARCH 27,1985

FEDERAL ENERGY REGULATORY COMMISSION
WASHINGTON, D.C. 20426

RECEIVED

MAR 28 1985

Pillsbury, Madison & Sutro

MAR 27 1985

OGC
Project No. 7114
Alaska Power Authority

Jane Drennan, Esquire
Pillsbury, Madison & Sutro
Suite 1100
1667 K Street, N.W.
Washington, D.C. 20036

Dear Ms. Drennan:

In light of APA's March 5, 1985 response to Staff's February 20, 1985 request for information, please provide the following further information as soon as possible:

1. The completed and verified cost estimate for the Nenana power plant referred to on page 4 of the March 5 response from APA.

2. The reference conditions and vendor data used in determining the changes in heat rate and costs for gas-fired units referred to on page 4 of the March 5 APA response.

3. The basis and justification for the second upward revision of the O&M costs for the coal, combined-cycle and gas-fired combustion turbine plants shown on Table 8-2 of the March 5 response document.

4. OGP-6 input data (data prep module) and the OGP-6 output for the APA DEIS analysis shown in Table 8-5 of the March 5 APA response.

5. a) A breakdown of the transmission costs, with associated technical data (e.g., voltage levels, miles of line, terminal characteristics and assumed reactive compensation) for the transmission costs included in the OGP-6 thermal alternative cost shown in the computer printouts forwarded in the March 5 APA response, (i.e., the $220 million and $117 million noted as First and Second transmission).

b) An explanation of the association of $220 million with the installation of the Nenana coal plant and $117 million with the installation of the Beluga coal plant in the latest case runs when prior runs showed $117 million with Nenana and $220 million with Beluga.

6. A breakdown of the material and installation costs for the transmission station included in account number 19 of the detailed Beluga coal plant estimates submitted by APA in response to question 3 of staff's October 24, 1984 request for additional information. The separation and identification of costs between the generating unit's connection to the generating station high voltage bus and the station costs for connecting the transmission line between the generating station high voltage bus and the proposed Lorraine switching station.

7. Identification of and an explanation for any source code modifications of the OGP-6 model made by APA.

8. The rationale and criteria used for the development of the rule curves and operation guidelines used to simulate Watana and Devil Canyon reservoir operation.

9. Referring to the model description, the algorithms for both the single and double reservoir operation and an explanation of the relationship between reservoir operation and power demand.

10. The estimated firm and average annual energy from the Watana and Devil Canyon developments for the "Case E-VI, Alternative Flow Regime".

Your prompt attention to this request will be appreciated.

Your very truly,

Donald H. Clarke
Deputy Assistant General Counsel
for Hydroelectric Licensing

cc: All parties
APA Project Manager

1.

Question:

The completed and verified cost estimate for the Nenana powerplant referred to on page 4 of the March 5 response from APA.

Response:

The Nenana powerplant is considered to be a two-unit 400 MW plant, with an initial 200 MW unit and an extension 200 MW unit. A summary of capital costs (Exhibit 1.1), the basis of estimate (Exhibit 1.2), and detailed cost estimates for both the Nenana initial unit (Exhibit 1.3) and the extension unit (Exhibit 1.4) are attached. The detailed estimates are in 1983 dollars and are de-escalated to 1982 dollars on the Capital Cost Summary Sheet.

The detailed estimates for the two 200 MW units are significantly different. The second unit will be added some time after the initial unit. By taking advantage of an already cleared site, existing access roads, and shared facilities such as coal receiving, handling, and storage, the second unit is installed at a cost of $386,860,660 which is $232,288,829 less than the initial unit. The capital cost summary sheet presents these direct construction costs in 1982 dollars, adds owner's costs, land costs, spare parts, etc., and gives the unit costs in dollars per net kW of capacity.

Exhibit 1.1

NENANA COAL-FIRED POWER PLANT
CAPITAL COST SUMMARY

Direct Project Costs		
Unit 1 Estimate, APA 1707-M-1		
($1983)	$619,149,489	
Unit 1 Estimate; De-escalated to $1982 at 6.4%		$581,907,410
Unit 2 Estimate, APA 1707-M-1		
($1983)	$386,860,660	
Unit 2 Estimate; De-escalated to $1982 at 6.4%		363,590,850
Subtotal		$945,498,260
Items Not Included in Estimate		
Owners Cost (at 2.5% of Direct Project)		$ 23,645,560
Startup, Spare Parts, and Special Tools		10,000,000
Maintenance Shop Machinery, Laboratory Equipment, and Office Furniture		2,000,000
Land (200 acres at $10,000 per acre)		2,000,000
Subtotal		$ 37,645,560
Project Total Cost		$983,143,820
Average Cost per kW ($1982)1/		$2,458 2/

1/ Based on 400 MW net capacity for two 217 MW gross capacity units with 17 MW auxiliary load each.

2/ This is a correction to the cost of $2,450 reported in the March 5 document. The difference is due to rounding errors.

ALASKA POWER AUTHORITY
SUSITNA NEED FOR POWER STUDY
2 - 200 MW NENANA COAL - FIRED UNITS
ESTIMATE NO. APA 1707 M-1

BASIS OF ESTIMATE

GENERAL

The order of magnitude, plant investment cost estimates for the two unit facility were prepared in the Ebasco Fossil Code of Accounts. These overnight estimates have a base pricing level of January 1983 which is reflected in all detailed category costs. Neither escalation from January 1983 nor owner's costs have been addressed.

Principal references which impacted the development of the estimates include the following:

- the 8/25/84 request for estimate,
- the 6/21/84 Beluga coal-fired 200 MW initial unit estimate and basis of estimate as provided by Seattle Estimating,
- summary level, major equipment/system design descriptions written by Seattle Engineering (to solicit vendor budgetary quotations for the Beluga plant) and respondents' budgetary pricing,
- tel-cons between New York Estimating and Seattle Engineering and Estimating (to identify site specifics at the Nenana coal-fired plant, discuss similarities between Beluga and Nenana regarding fuel type and plant systems design, et cetera),
- drawings #APA 2592.140 M-SP-001, M-GA-002 and M-GA-003,
- the Ebasco coal-fired reference plant project estimate for 2-400MW units, and various conceptual estimating methodologies utilized to estimate balance of plant costs, especially bulk quantities.

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The capital cost estimate for the Nenana 200 MW initial unit parallels the Beluga 200 MW initial unit estimate in both format and development of detailed category costs, wherever practicable.

Identical material supply cost at Nenana is 5% less than at Beluga due to the base pricing date difference; installation costs of that material scope are similar due to the approximation allowed whereby craft wage scales for the two sites are identical, i.e., Nenana January 1983 composite wage rates equal Beluga January 1984 composite wage rates.

Adjustments for additional freight costs at Nenana are included in the direct construction costs, while the productivity influence for colder weather at Nenana appears as a one-line adder in the indirect construction costs.

Contract other markups parallel the Beluga estimate.

However, major expense items, namely formwork, are deescalated 5% from the Beluga estimate (except for premium pay as stated in indirect construction costs).

The basis of the plant investment cost estimates for 2 - 200 MW Nenana Coal-Fired units is identical to the Beluga estimate in the following areas:

Subcontract construction with 6-10s,

Labor productivity (before bottom line adjustment for direct manhours),

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Sufficient skilled labor availability,
Labor camp required,
Types of professional services provided by Ebasco,
Permanent town for plant operating personnel excluded,
Owner's costs excluded (land and land rights, A F U D C, administration, etc),
Operating and maintenance costs not included,
Contingency rates of 12% for material and 15% for installation,
Exclusion of sales/use taxes,
Spare parts and special tools not included,
Exclusion of startup costs, and
Exclusion of maintenance machinery,laboratory and office equipment.

The following cursory, estimating discipline descriptions refer to the initial 200 MW unit for Nenana coal. The extension unit scope and pricing methodology parallels the classification of common facilities (included with initial unit) as practised in the 400 MW CFRP Project Cost Estimate, wherever practicable.

BASIS FOR ESTIMATE

CIVIL

Site terrain was assumed similar to Beluga; however, the additional scope of coal and lime railroad unloading facilities necessitate a plant rail loop (and consequently larger site development). Rock subtrata and dewatering conditions were assumed similar to Beluga. An acceptable bearing stratum again requires 80 ft long H-piles; at this plant location, subsoil condiitions require permafrost-mitigative piling for nearly all equipment and structures. C.e.c.i. earth structures are sized in accordance with the site plan and recent c.f.r.p. estimate revisions.

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The circulating water system is identical to Beluga, and includes a 66,000 gpm rectangular multi-cell cooling tower.

Cubic yards of reinforced concrete foundations increase for the air quality control (limestone railroad unloading) and coal handling (coal railroad unloading) systems. Yard piping will be enclosed in prefabricated vaults.

Plant island buildings are similar to Beluga. The flue gas stack was sized w/ 2-11 ft diameter steel flues at 500 ft high, i.e., approximately 2.5 x boiler building height.

Other plant buildings are basically similar to Beluga.

The Ranney wellwater system is identical to Beluga; the 10 miles of access road and railroad spur both require permafrost-mitigative construction.

MECHANICAL

The steam turbine generator is an indoor type, tandem compound, condensing turbine, two-flow, single reheat, regenerative designed for operating steam conditions of 2400 psig and 1000 °F/1000 °F. The turbine design throttle flow will be 1,590,000 lb/hr. The maximum gross turbine output will be 220,000 kW with 2520 psig, 1000/1000 °F, 2.7/4.0 in. Hg absolute back pressure. The generator is 244,400 KVA @ 45 psig, 0.9 PF, 3-phase, 60 Hz, 24,000 V and 0.5 shortcircut ratio complete with an excitation system.

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SUSITNA NEED FOR POWER SUPPLY
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MECHANICAL (Cont'd)

The Nenana coal analysis was assumed similar to the Beluga coal analysis as advised, i.e., low sulfur, sub-bituminous coal with a heating value of 7,950 btu/lb. The pulverized, coal-fired steam generator and accessories are consequently identical to Beluga in supply scope and similar in pricing. Pricing is based on 1,590,000 lb/hr, 2650 psig and 1008 ^{o}F main steam; 1,351,000 lb/hr, 600 psig, 630 ^{o}F (@ inlet) reheat; and 525 ^{o}F feedwater.

The air quality control system @ Nenana includes an incremental cost (over Beluga estimate) for railroad unloading of lime (used in lieu of truck unloading). The baghouse filters 662,000 ACFM @ 300 ^{o}F, and includes 10 compartments @ 368 bags each, reverse gas cleaning, and auxiliary equipment. The dry SO_2 scrubbing system utilizes multi-cell sprayer absorbers with 85% SO_2 removal (70% guarantee). The system is rated @ 662,000 ACFM with a flue gas temperature of 300 ^{o}F and 20% excess air.

Other mechanical equipment is similar to the Beluga estimate in scope and includes a 105,000 ft^2 surface condenser. The condenser is a single-shell, single-pass, single-pressure type designed for 66,000 gpm and 27 ^{o}F temperature rise.

The Coal Handling System @ Nenana is similar to the Beluga system scope, except for the addition of a rotary railcar dumping facility (used in lieu of truck unloading). The railcar unloading rate allows emptying a 110-car unit train in less than 4 hours. The ash handling systems are identical to Beluga.

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PIPING AND INSULATION

Large bore and small bore piping sizing and quantities are downsized based on Ebasco's CFRP estimates. Pricing is based on recent quotations and historical pricing data from similar units. Insulation prices are based on Ebasco's CFRP estimates with an additional allowance for insulating yard systems.

ELECTRICAL

Estimating scope represents a scaled-down 2 x 400 MW c.f.r.p. estimate. Pricing is based on updating recent vendor quotations and discounted equipment pricing catalogs in accordance with representative historical escalation indices. As directed, the 230 KV transmission line was excluded at this juncture.

INDIRECT CONSTRUCTION COST

Indirect Construction Cost is priced in accordance with Ebasco experience based on a Contract job which does not include contractors' indirect costs. Included in Indirect Construction Costs are:

- Construction Management local hire personnel
- Casual premium pay (other than scheduled 60-hour week)
- Construction Management automotive equipment
- Construction Management office and expenses
- Temporary warehouse for prepurchased equipment
- Road maintenance equipment

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SUSITNA NEED FOR POWER SUPPLY
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ESTIMATE NO. APA 1707 M-1

INDIRECT CONSTRUCTION COSTS (Cont'd)

- Gravel air strip
- 15-mile 69 KV temporary power transmission line
- Labor camp, food service, housekeeping
- Security guard service
- Craft transportation to and from labor camp
- Final construction clean-up

Testing is assumed to be the contractors' responsibility and witnessed by Construction Management personnel. Temporary power is assumed to be furnished without cost to contractors.

PROFESSIONAL SERVICES

The Professional Services estimate is based on a standardized workday package for engineering, design, related services, consulting engineering, ESSE engineering and design and construction management services.

200MW NENANA COAL PLANTS

2 X 10 miles of 230 KV Line (Single Circ.)

Modifications from Beluga Estimate

1. T-Line 48 miles - 10 miles.
2. No off-site unloading / hauling at Nenana Plants.
3. 2 Unit substation including with Unit 1 rather than separately.
4. 5% Higher wage rates (Fairbanks vs. Anchorage).
5. 5% Productivity adjustment factor (5% more MH's).
6. Higher material prices to account for higher freight.
7. Railroad rather than truck deliver, add:
   a. Thaw Shed.
   b. (2) Rotary Car Dumpers [Lime, Coal].
   c. 45 AC larger site (fencing, gravel, insulation, roads).
   d. Larger coal handling system (piling, excavation, BF, Concrete conveyors).
   e. Site loop railroad, 10 mile access railroad from Alaska RR.
   f. 10 miles less access roads.
   g. Coal & lime unloading tunnels (excavation concrete backfill).
8. Utilidor for yard piping (increased concrete, yard piping).

UNIT 1

RAIL DELIVERY OF COAL/LIME

BY: WMP CHECKED: JDF

APA
NENANA1 200 MW COAL
ESTIMATE NO. APA 1707 M-1

DATE: 8-NOV-84 TIME: 16:22:42

SUMMARY
MATERIAL & INSTALLATION REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ TOT)	(TOTAL AMT)*	(TOT MATL)	(UN $MAT)*	(U $ INS)	(TOT INST)*	(TOT ESC)	(MAT ESC)	(INS ESC)
99.000000	TOTAL PROJECT COST	LS*	----	----	619149489*	223334672	---- *	----	395814817*	0	0	0
100.000000	CONTINGENCY	LS*	----	----	75556734*	23928714	---- *	----	51628020*	0	0	0
300.000000	TOTAL COST W/O CONT	LS*	----	----	543592755*	199405958	---- *	----	344186797*	0	0	0
1.000000	IMPROVEMNTS TO SITE	LS*	----	----	8119926*	2482949	---- *	----	5636977*	0	0	0
2.000000	EARTHWORK & PILING	LS*	----	----	40988717*	16582730	---- *	----	24405987*	0	0	0
3.000000	CIRC WATER SYSTEM	LS*	----	----	7995430*	3804180	---- *	----	4191250*	0	0	0
4.000000	CONCRETE	LS*	----	----	29956024*	6312745	---- *	----	23643279*	0	0	0
5.000000	STRCT STL/LFT EQP	LS*	----	----	29172149*	10958299	---- *	----	18213850*	0	0	0
6.000000	BUILDINGS	LS*	----	----	18648525*	5781135	---- *	----	12867390*	0	0	0
7.000000	TURBINE GENERATOR	LS*	----	----	18244900*	15580000	---- *	----	2664900*	0	0	0
8.000000	STM GENER & ACCESS	LS*	----	----	41700000*	22800000	---- *	----	18900000*	0	0	0
9.000000	AQCS	LS*	----	----	53975335*	29789635	---- *	----	24185700*	0	0	0
10.000000	OTHER MECHAN EQUIP	LS*	----	----	19568379*	14203110	---- *	----	5365269*	0	0	0
11.000000	COAL&ASH HNDL EQUIP	LS*	----	----	26358891*	15862965	---- *	----	10495926*	0	0	0
12.000000	PIPING	LS*	----	----	29158550*	9450512	---- *	----	19708038*	0	0	0
13.000000	INSULATION	LS*	----	----	8164700*	800000	---- *	----	7364700*	0	0	0
14.000000	INSTRUMENTATION	LS*	----	----	6742000*	6175000	---- *	----	567000*	0	0	0
15.000000	ELECTRICAL EQUIPMENT	LS*	----	----	61771929*	23859998	---- *	----	37911931*	0	0	0
16.000000	PAINTING	LS*	----	----	2386880*	159200	---- *	----	2227680*	0	0	0
17.000000	OFF-SITE FACILITIES	LS*	----	----	20361230*	7103500	---- *	----	13257730*	0	0	0
19.000000	SUBSTATION/T-LINE	LS*	----	----	10440400*	7700000	---- *	----	2740400*	0	0	0
71.000000	INDIRECT CONST COST	LS*	----	----	53788790*	0	---- *	----	53788790*	0	0	0
72.000000	PROFESSIONAL SERVCS	LS*	----	----	56050000*	0	---- *	----	56050000*	0	0	0

EXHIBIT 1.3

APA
NENANA1 200 MW COAL
ESTIMATE NO. APA 1707 M-1

BY: WMP CHECKED: JDF

DATE: 8-NOV-84 TIME: 16:22:42

SUMMARY
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EXHIBIT 1.3 (CONT'D)

APA
NENANA 200 MW COAL
ESTIMATE NO. APA 1707 M-1

BY: WMP CHECKED: JDF

DATE: 8-NOV-84 TIME: 16:22:42

DETAILED
MATERIAL & INSTALLATION REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ TOT)	(TOTAL AMT)*	(TOT MATL)	(UN $MAT)*	(U $ INS)	(TOT INST)*	(TOT ESC)	(MAT ESC)	(INS ESC)
99.000000	TOTAL PROJECT COST	LS*	----	----	619149489*	223334672	---- *	----	395814817*	0	0	0
100.000000	CONTINGENCY	LS*	----	----	75556734*	23928714	---- *	----	51628020*	0	0	0
300.000000	TOTAL COST W/O CONT	LS*	----	----	543592755*	199405958	---- *	----	344186797*	0	0	0
1.000000	IMPROVEMNTS TO SITE	LS*	----	----	8119926*	2482949	---- *	----	5636977*	0	0	0
1.100000	SITE PREPARATION	LS*	----	----	628762*	0	---- *	----	628762*	0	0	0
1.110000	CLEARING	AC*	150	4191.7	628762*	0	0.00*	4191.7	628762*	0	0	0
1.200000	ROADS,BRDG,WALKS	LS*	----	----	1018115*	336299	---- *	----	681816*	0	0	0
1.210000	ROADS	LS*	----	----	668846*	171000	---- *	----	497846*	0	0	0
1.213000	24' WIDE ROADS	SY*	45000	14.9	668846*	171000	3.80*	11.1	497846*	0	0	0
1.240000	FENCING	LS*	----	----	349269*	165299	---- *	----	183970*	0	0	0
1.241000	PROPERTY FENCE	LF*	11000	24.2	266586*	125399	11.40*	12.8	141187*	0	0	0
1.242000	SECURITY FENCE	LF*	3000	24.2	72705*	34200	11.40*	12.8	38505*	0	0	0
1.243000	GATES	EA*	8	1247.3	9978*	5700	712.50*	534.8	4278*	0	0	0
1.300000	SITE DRAINAGE	LS*	----	----	1849360*	840000	---- *	----	1009360*	0	0	0
1.500000	SEWAGE FACILITIES	LS*	----	----	382223*	142500	---- *	----	239723*	0	0	0
1.700000	RAILROAD	LS*	----	----	4241466*	1164150	---- *	----	3077316*	0	0	0
1.710000	TRACK	LF*	13000	230.9	3001050*	926250	71.25*	159.6	2074800*	0	0	0
1.720000	STACKER RECL TRCK	LF*	600	2067.4	1240416*	237900	396.50*	1670.9	1002516*	0	0	0
2.000000	EARTHWORK & PILING	LS*	----	----	40988717*	16582730	---- *	----	24405987*	0	0	0
2.200000	STRCTR & EQUIP EXC	LS*	----	----	18820841*	5540000	---- *	----	13280841*	0	0	0
2.210000	STATION AREA	LS*	----	----	13261105*	5540000	---- *	----	7721105*	0	0	0
2.212000	EARTH EXCAVATION	CY*	18700	29.1	545105*	0	0.00*	29.1	545105*	0	0	0
2.214000	SELECT BACKFILL	LS*	----	----	12716000*	5540000	---- *	----	7176000*	0	0	0

EXHIBIT 1.3 (CONT'D)

APA
NENANA1 200 MW COAL
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DETAILED
MATERIAL & INSTALLATION REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ TOT)	(TOTAL AMT)*	(TOT MATL)	(UN $MAT)*	(U $ INS)	(TOT INST)*	(TOT ESC)	(MAT ESC)	(INS ESC)
2.214100	7' GRAVEL PAD	CY*	650000	16.5	10751000*	4940000	7.60*	8.9	5811000*	0	0	0
2.214200	INSULATION BRD	SF*	2500000	0.8	1965000*	600000	0.24*	0.5	1365000*	0	0	0
2.220000	STACK FOUNDATIONS	LS*	----	----	221516*	0	---- *	----	221516*	0	0	0
2.222000	EARTH EXCAVATION	CY*	2300	23.3	53636*	0	0.00*	23.3	53636*	0	0	0
2.223000	ROCK EXCAVATION	CY*	2000	83.9	167880*	0	0.00*	83.9	167880*	0	0	0
2.230000	COAL HAND FDN	LS*	----	----	2888870*	0	---- *	----	2888870*	0	0	0
2.232000	EARTH EXCAVATION	CY*	58400	29.1	1702360*	0	0.00*	29.1	1702360*	0	0	0
2.233000	ROCK EXCAVATION	CY*	16200	73.2	1186510*	0	0.00*	73.2	1186510*	0	0	0
2.240000	OUTLY TKS EQP/STR	LS*	----	----	201135*	0	---- *	----	201135*	0	0	0
2.242000	EARTH EXCAVATION	CY*	6900	29.1	201135*	0	0.00*	29.1	201135*	0	0	0
2.250000	AQCS FDNS	LS*	----	----	2248215*	0	---- *	----	2248215*	0	0	0
2.252000	EARTH EXCAVATION	CY*	39900	29.1	1163085*	0	0.00*	29.1	1163085*	0	0	0
2.253000	ROCK EXCAVATION	CY*	14600	74.3	1085130*	0	0.00*	74.3	1085130*	0	0	0
2.300000	TRENCHING	LS*	----	----	2816531*	0	---- *	----	2816531*	0	0	0
2.310000	CIRC WATER COND	LS*	----	----	529178*	0	---- *	----	529178*	0	0	0
2.312000	EARTH EXCAVATION	CY*	13700	28.2	386091*	0	0.00*	28.2	386091*	0	0	0
2.313000	ROCK EXCAVATION	CY*	1800	79.5	143087*	0	0.00*	79.5	143087*	0	0	0
2.320000	YARD PIPING	LS*	----	----	1334289*	0	---- *	----	1334289*	0	0	0
2.322000	EARTH EXCAVATION	CY*	43400	30.7	1334289*	0	0.00*	30.7	1334289*	0	0	0
2.330000	SEWERS & DRAINS	LS*	----	----	953064*	0	---- *	----	953064*	0	0	0
2.332000	EARTH EXCAVATION	CY*	31000	30.7	953064*	0	0.00*	30.7	953064*	0	0	0
2.400000	EARTH STRUCTURES	CY*	5500	29.0	159698*	0	0.00*	29.0	159698*	0	0	0
2.500000	PILES (H PILES)	LS*	----	----	16159500*	10374000	---- *	----	5785500*	0	0	0

EXHIBIT 1.3 (CONT'D)

APA
NENANA1 200 MW COAL
ESTIMATE NO. APA 1707 M-1

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DETAILED
MATERIAL & INSTALLATION REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ TOT)	(TOTAL AMT)*	(TOT MATL)	(UN $MAT)*	(U $ INS)	(TOT INST)*	(TOT ESC)	(MAT ESC)	(INS ESC)
2.510000	STATION AREA	LF*	200000	57.7	11542500*	7410000	37.05*	20.7	4132500*	0	0	0
2.520000	AQCS AREA	LF*	80000	57.7	4617000*	2964000	37.05*	20.7	1653000*	0	0	0
2.700000	CECI-EXCV-ERTH STR	LS*	----	----	3032147*	668730	---- *	----	2363417*	0	0	0
2.710000	CL PL SEEP&RO CTR	LS*	----	----	1203169*	564100	---- *	----	639069*	0	0	0
2.711000	PVC LINER	SF*	400000	0.5	196919*	170800	0.43*	0.1	26119*	0	0	0
2.712000	SAND	CY*	23000	23.9	548550*	218500	9.50*	14.4	330050*	0	0	0
2.713000	GRAVEL	CY*	23000	19.9	457700*	174800	7.60*	12.3	282900*	0	0	0
2.720000	WST WTR TRMT AREA	LS*	----	----	1095208*	42700	---- *	----	1052508*	0	0	0
2.721000	PVC LINER	SF*	100000	0.5	49228*	42700	0.43*	0.1	6528*	0	0	0
2.722000	EXCAVATION	CY*	45000	17.9	804600*	0	0.00*	17.9	804600*	0	0	0
2.723000	BACKFILL	CY*	9000	26.8	241380*	0	0.00*	26.8	241380*	0	0	0
2.730000	SLD WST STK PILE	LS*	----	----	459940*	51240	---- *	----	408700*	0	0	0
2.731000	PVC LINER	SF*	120000	0.5	57640*	51240	0.43*	0.1	6400*	0	0	0
2.732000	EXCAVATION	CY*	15000	17.9	268200*	0	0.00*	17.9	268200*	0	0	0
2.733000	BACKFILL	CY*	5000	26.8	134100*	0	0.00*	26.8	134100*	0	0	0
2.740000	EMER WST BASIN	LS*	----	----	273830*	10690	---- *	----	263140*	0	0	0
3.000000	CIRC WATER SYSTEM	LS*	----	----	7995430*	3804180	---- *	----	4191250*	0	0	0
3.200000	INTK & DISC PIPING	LS*	----	----	2102659*	856235	---- *	----	1246424*	0	0	0
3.210000	CONCR PIPE: 60"	LF*	3400	346.3	1177522*	613700	180.50*	165.8	563822*	0	0	0
3.260000	BEDDING MATERIAL	CY*	2000	30.0	60000*	19000	9.50*	20.5	41000*	0	0	0
3.270000	CONCRET STRUCTURE	LS*	----	----	816823*	204915	---- *	----	611908*	0	0	0
3.271000	THRST & TRNS BLK	CY*	750	428.1	321093*	92625	123.50*	304.6	228468*	0	0	0
3.272000	CONDENS BLOCKS	CY*	400	897.0	358817*	79420	198.55*	698.5	279397*	0	0	0

EXHIBIT 1.3 (CONT'D)

APA
NENANA1 200 MW COAL
ESTIMATE NO. APA 1707 M-1

BY: WMP CHECKED: JDF

DATE: 8-NOV-84 TIME: 16:22:42

DETAILED
MATERIAL & INSTALLATION REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ TOT)	(TOTAL AMT)*	(TOT MATL)	(UN $MAT)*	(U $ INS)	(TOT INST)*	(TOT ESC)	(MAT ESC)	(INS ESC)
3.273000	PITOT TUBE PIT	CY*	200	684.6	136913*	32870	164.35*	520.2	104043*	0	0	0
3.280000	MISCELLAN STEEL	TN*	7	6902.0	48314*	18620	2660.00*	4242.0	29694*	0	0	0
3.400000	COOL TOWER FACIL	LS*	----	----	5892771*	2947945	---- *	----	2944826*	0	0	0
3.410000	TOWER BASIN	LS*	----	----	769115*	193800	---- *	----	575315*	0	0	0
3.411000	EXCAVATION	CY*	6500	22.4	145275*	0	0.00*	22.4	145275*	0	0	0
3.412000	CONC CW COOL TWR	CY*	1500	415.9	623840*	193800	129.20*	286.7	430040*	0	0	0
3.420000	PUMP CHAMBER	LS*	----	----	843815*	216695	---- *	----	627120*	0	0	0
3.422000	EXCAVATION	CY*	4500	22.4	100575*	0	0.00*	22.4	100575*	0	0	0
3.423000	CONCRETE	CY*	1500	463.3	694926*	198075	132.05*	331.2	496851*	0	0	0
3.424000	MISC STEEL	TN*	7	6902.0	48314*	18620	2660.00*	4242.0	29694*	0	0	0
3.430000	INTAKE EQUIPMENT	LS*	----	----	380410*	318250	---- *	----	62160*	0	0	0
3.433000	SCREENS	SF*	500	56.8	28390*	14250	28.50*	28.3	14140*	0	0	0
3.435000	STOP LOGS	SF*	500	71.1	35570*	28500	57.00*	14.1	7070*	0	0	0
3.436000	CRANE BRIDGE 15T	EA*	1	0.0	316450*	275500	---- *	0.0	40950*	0	0	0
3.440000	PMP HS SPR STRUCT	LS*	----	----	740943*	319200	---- *	----	421743*	0	0	0
3.441000	CRANE & HST SUPP	TN*	75	3075.4	230655*	114000	1520.00*	1555.4	116655*	0	0	0
3.442000	BUILDING SPRSTR	SF*	6000	85.0	510288*	205200	34.20*	50.8	305088*	0	0	0
3.450000	TOWER SPR STRUCT	LS*	----	----	3158488*	1900000	---- *	----	1258488*	0	0	0
4.000000	CONCRETE	LS*	----	----	29956024*	6312745	---- *	----	23643279*	0	0	0
4.100000	TURBINE BLDG CONCR	CY*	4700	831.4	3907801*	656355	139.65*	691.8	3251446*	0	0	0
4.200000	BOILER AREA CONCRT	CY*	1900	732.8	1392361*	265335	139.65*	593.2	1127026*	0	0	0
4.300000	SILO AREA CONCRETE	CY*	1700	765.7	1301644*	237404	139.65*	626.0	1064240*	0	0	0
4.400000	AOCS CONCRETE	CY*	12600	764.3	9630438*	1759589	139.65*	624.7	7870849*	0	0	0

EXHIBIT 1.3 (CONT'D)

APA
NENANA1 200 MW COAL
ESTIMATE NO. APA 1707 M-1

BY: WMP CHECKED: JDF DATE: 8-NOV-84 TIME: 16:22:42

DETAILED
MATERIAL & INSTALLATION REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ TOT)	(TOTAL AMT)*	(TOT MATL)	(UN $MAT)*	(U $ INS)	(TOT INST)*	(TOT ESC)	(MAT ESC)	(INS ESC)
4.500000	STACK FOUNDATION	CY*	1200	368.1	441726*	167580	139.65*	228.5	274146*	0	0	0
4.700000	CECI CONCRETE	CY*	400	522.8	209121*	55859	139.65*	383.2	153262*	0	0	0
4.800000	COAL HANDLG CONCRT	CY*	11100	869.9	9655532*	1550114	139.65*	730.2	8105418*	0	0	0
4.900000	MISCELL CONCRETE	LS*	----	----	3417401*	1620509	---- *	----	1796892*	0	0	0
4.910000	YARD PIPING VAULT	LS*	----	----	2685000*	1425000	---- *	----	1260000*	0	0	0
4.920000	OTHER MISC CONC	CY*	1400	523.1	732401*	195509	139.65*	383.5	536892*	0	0	0
5.000000	STRCT STL/LFT EQP	LS*	----	----	29172149*	10958299	---- *	----	18213850*	0	0	0
5.100000	TURBINE BUILDING	LS*	----	----	4092895*	1945505	---- *	----	2147390*	0	0	0
5.110000	MAIN STEEL	TN*	1200	2377.5	2853000*	1425000	1187.50*	1190.0	1428000*	0	0	0
5.120000	FRAMING	LS*	----	----	363300*	179550	---- *	----	183750*	0	0	0
5.121000	WALL FRAMING	TN*	105	3460.0	363300*	179550	1710.00*	1750.0	183750*	0	0	0
5.130000	MISC STEEL	LS*	----	----	557295*	122455	---- *	----	434840*	0	0	0
5.131000	GRATING 1-3/4"	SF*	12000	27.6	331800*	79800	6.65*	21.0	252000*	0	0	0
5.132000	CHECKERED PLATE	SF*	600	57.3	34410*	6270	10.45*	46.9	28140*	0	0	0
5.133000	HANDRAIL	LF*	1000	102.2	102225*	14725	14.73*	87.5	87500*	0	0	0
5.134000	LADDERS & STRWYS	TN*	12	7405.0	88860*	21660	1805.00*	5600.0	67200*	0	0	0
5.140000	LIFTING EQUIP	LS*	----	----	319300*	218500	---- *	----	100800*	0	0	0
5.141000	CRANE: 40 T CAP	LS*	----	----	319300*	218500	---- *	----	100800*	0	0	0
5.200000	STEAM GENERATOR	LS*	----	----	11849152*	4370982	---- *	----	7478170*	0	0	0
5.210000	MAIN STEEL	TN*	2300	2377.5	5468250*	2731250	1187.50*	1190.0	2737000*	0	0	0
5.220000	FRAMING	LS*	----	----	1899700*	632700	---- *	----	1267000*	0	0	0
5.221000	WALL FRAMING	TN*	330	5210.0	1719300*	564300	1710.00*	3500.0	1155000*	0	0	0
5.222000	ELEV FRAMING	TN*	40	4510.0	180400*	68400	1710.00*	2800.0	112000*	0	0	0

EXHIBIT 1.3 (CONT'D)

APA
NENANA1 200 MW COAL
ESTIMATE NO. APA 1707 M-1

BY: WMP CHECKED: JDF

DATE: 8-NOV-84 TIME: 16:22:42

DETAILED
MATERIAL & INSTALLATION REPORT

ACCT NO	DESCRIPTION,	UN*	(QTY)	(UN $ TOT)	(TOTAL AMT)*	(TOT MATL)	(UN $MAT)*	(U $ INS)	(TOT INST)*	(TOT ESC)	(MAT ESC)	(INS ESC)
5.230000	MISC STEEL	LS*	----	----	4242752*	888282	---- *	----	3354470*	0	0	0
5.231000	GRATING (1-3/4")	SF*	70000	27.6	1935500*	465500	6.65*	21.0	1470000*	0	0	0
5.232000	CHECKERED PLATE	SF*	1600	57.3	91760*	16720	10.45*	46.9	75040*	0	0	0
5.233000	HANDRAIL	LF*	12500	105.7	1321492*	184062	14.73*	91.0	1137430*	0	0	0
5.234000	LADDERS & STRWY	TN*	120	7450.0	894000*	222000	1850.00*	5600.0	672000*	0	0	0
5.240000	LIFTING EQUIP	LS*	----	----	238450*	118750	---- *	----	119700*	0	0	0
5.242000	ELEV EQUIPMENT	LS*	----	----	142000*	47500	---- *	----	94500*	0	0	0
5.243000	OTHER LIFT EQUIP	LS*	----	----	96450*	71250	---- *	----	25200*	0	0	0
5.243100	(3) 15 TON HST	LS*	----	----	96450*	71250	---- *	----	25200*	0	0	0
5.300000	SILO BAY	LS*	----	----	3533602*	1767712	---- *	----	1765890*	0	0	0
5.310000	MAIN STEEL	TN*	225	2377.5	534937*	267187	1187.50*	1190.0	267750*	0	0	0
5.320000	FRAMING	LS*	----	----	338650*	111150	---- *	----	227500*	0	0	0
5.321000	WALL FRAMING	TN*	65	5210.0	338650*	111150	1710.00*	3500.0	227500*	0	0	0
5.330000	MISC STEEL	LS*	----	----	337000*	190000	---- *	----	147000*	0	0	0
5.340000	LIFTING EQUIPMENT	LS*	----	----	74640*	57000	---- *	----	17640*	0	0	0
5.343000	OTHER LIFT EQUIP	LS*	----	----	74640*	57000	---- *	----	17640*	0	0	0
5.350000	SUPPORT STEEL	LS*	----	----	741750*	251750	---- *	----	490000*	0	0	0
5.351000	EQUIP SUPPORTS	TN*	100	7417.5	741750*	251750	2517.50*	4900.0	490000*	0	0	0
5.360000	STL SILO & CVR PL	LS*	----	----	1506625*	890625	---- *	----	616000*	0	0	0
5.361000	STEEL SILOS	TN*	170	6742.5	1146225*	670225	3942.50*	2800.0	476000*	0	0	0
5.362000	SS PLATES	TN*	40	9010.0	360400*	220400	5510.00*	3500.0	140000*	0	0	0
5.500000	CONCRETE STACKS	LS*	----	----	8415900*	2325000	---- *	----	6090900*	0	0	0
5.700000	CECI STEEL	LS*	----	----	67600*	36100	---- *	----	31500*	0	0	0

EXHIBIT 1.3 (CONT'D)

APA
NENANA1 200 MW COAL
ESTIMATE NO. APA 1707 M-1

BY: WMP CHECKED: JDF DATE: 8-NOV-84 TIME: 16:22:42

DETAILED
MATERIAL & INSTALLATION REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ TOT	(TOTAL AMT)*	(TOT MATL)	(UN $MAT)*	(U $ INS)	(TOT INST)*	(TOT ESC)	(MAT ESC)	(INS ESC)
5.900000	UNCLASS STEEL	TN*	200	6065.0	1213000*	513000	2565.00*	3500.0	700000*	0	0	0
6.000000	BUILDINGS	LS*	----	----	18648525*	5781135	---- *	----	12867390*	0	0	0
6.100000	TURBINE BUILDING	LS*	----	----	2080184*	826500	---- *	----	1253684*	0	0	0
6.110000	ARCHITECT FEATURE	LS*	----	----	956438*	285000	---- *	----	671438*	0	0	0
6.170000	HVAC	LS*	----	----	835040*	427500	---- *	----	407540*	0	0	0
6.180000	PLUMB & DRAINAGE	LS*	----	----	224360*	95000	---- *	----	129360*	0	0	0
6.190000	MISCELLANEOUS	LS*	----	----	64346*	19000	---- *	----	45346*	0	0	0
6.200000	STEAM GEN BUILDING	LS*	----	----	2517096*	905500	---- *	----	1611596*	0	0	0
6.210000	ARCHTITECT FEATRS	LS*	----	----	1246080*	361000	---- *	----	885080*	0	0	0
6.270000	HVAC	LS*	----	----	1106400*	475000	---- *	----	631400*	0	0	0
6.280000	PLUMB & DRAINAGE	LS*	----	----	72660*	31500	---- *	----	41160*	0	0	0
6.290000	MISCELLANEOUS	LS*	----	----	91956*	38000	---- *	----	53956*	0	0	0
6.300000	SILO BAY	LS*	----	----	764619*	267425	---- *	----	497194*	0	0	0
6.310000	ARCHITECT FEATRS	LS*	----	----	259118*	76000	---- *	----	183118*	0	0	0
6.370000	HVAC	LS*	----	----	343600*	114000	---- *	----	229600*	0	0	0
6.380000	PLUMB & DRAINAGE	LS*	----	----	147690*	71250	---- *	----	76440*	0	0	0
6.390000	MISCELLANEOUS	LS*	----	----	14211*	6175	---- *	----	8036*	0	0	0
6.400000	AQCS BUILDINGS	LS*	----	----	3667112*	904114	---- *	----	2762998*	0	0	0
6.410000	AQCS SWGR BLDG	SF*	1350	135.6	183046*	44887	33.25*	102.3	138159*	0	0	0
6.420000	AQCS CTRL BLDG	SF*	3600	171.1	615791*	160740	44.65*	126.4	455051*	0	0	0
6.430000	DIESEL GEN BLDG	SF*	850	146.4	124461*	28262	33.25*	113.2	96199*	0	0	0
6.440000	PUMP HOUSE	SF*	14000	147.4	2063264*	478800	34.20*	113.2	1584464*	0	0	0
6.450000	LIMESTN PREP BLDG	SF*	6500	104.7	680550*	191425	29.45*	75.3	489125*	0	0	0

EXHIBIT 1.3 (CONT'D)

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MATERIAL & INSTALLATION REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ TOT)	(TOTAL AMT)*	(TOT MATL)	(UN $MAT)*	(U $ INS)	(TOT INST)*	(TOT ESC)	(MAT ESC)	(INS ESC)
6.900000	MISC BUILDINGS	LS*	----	----	9619514*	2877596	---- *	----	6741918*	0	0	0
6.930000	ADMIN BUILDING	SF*	4000	265.0	1060000*	277400	69.35*	195.6	782600*	0	0	0
6.940000	CONTROL BUILDING	LS*	----	----	1223080*	446500	---- *	----	776580*	0	0	0
6.950000	WTR TRTMT BLDG	SF*	3250	221.4	719680*	191425	58.90*	162.5	528255*	0	0	0
6.990000	ALL OTHER	LS*	----	----	6616754*	1962271	---- *	----	4654483*	0	0	0
6.991000	PLANT MAINT	SF*	3500	148.7	520555*	172900	49.40*	99.3	347655*	0	0	0
6.992000	AUX BOILER	SF*	2000	237.3	474560*	125400	62.70*	174.6	349160*	0	0	0
6.993000	YD EQP MAINT BLD	SF*	2500	148.7	371825*	123500	49.40*	99.3	248325*	0	0	0
6.994000	CHLORINE BLDG	SF*	2250	149.4	336052*	85500	38.00*	111.4	250552*	0	0	0
6.995000	FIRE/SRV PUMP HS	SF*	800	158.1	126464*	34960	43.70*	114.4	91504*	0	0	0
6.996000	GUARD HOUSE	SF*	225	247.1	55597*	14962	66.50*	180.6	40635*	0	0	0
6.997000	WAREHOUSE NO. 1	SF*	23000	61.8	1420710*	589950	25.65*	36.1	830760*	0	0	0
6.998000	BULK GAS STR BLD	SF*	1200	147.5	176964*	43320	36.10*	111.4	133644*	0	0	0
6.999000	OTHER BUILDINGS	LS*	----	----	3134027*	771779	---- *	----	2362248*	0	0	0
6.999100	SWTH YD CTRL BL	SF*	800	144.5	115567*	28879	36.10*	108.4	86688*	0	0	0
6.999200	CONTROL & SWGR	SF*	2000	141.3	282580*	77900	38.95*	102.3	204680*	0	0	0
6.999300	SWER TRTMT BLDG	SF*	3000	145.6	436710*	102600	34.20*	111.4	334110*	0	0	0
6.999400	DEWTR & FIXTN	SF*	6000	133.7	1069520*	250800	31.35*	102.3	818720*	0	0	0
6.999600	CRSHING & SAMPL	SF*	2000	147.5	294940*	72200	36.10*	111.4	222740*	0	0	0
6.999700	WASTEWTR TRTMT	SF*	7000	133.5	934710*	239400	34.20*	99.3	695310*	0	0	0
7.000000	TURBINE GENERATOR	LS*	----	----	18244900*	15580000	---- *	----	2664900*	0	0	0
7.100000	TURBINE GENERATOR	LS*	----	----	18244900*	15580000	---- *	----	2664900*	0	0	0
8.000000	STM GENER & ACCESS	LS*	----	----	41700000*	22800000	---- *	----	18900000*	0	0	0

EXHIBIT 1.3 (CONT'D)

APA
NENANA1 200 MW COAL
ESTIMATE NO. APA 1707 M-1

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DETAILED
MATERIAL & INSTALLATION REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ TOT)	(TOTAL AMT)*	(TOT MATL)	(UN $MAT)*	(U $ INS)	(TOT INST)*	(TOT ESC)	(MAT ESC)	(INS ESC)
8.100000	STEAM GENERATOR	LS*	----	----	41700000*	22800000	---- *	----	18900000*	0	0	0
9.000000	AQCS	LS*	----	----	53975335*	29789635	---- *	----	24185700*	0	0	0
9.100000	BAGHOUSE	LS*	----	----	7806800*	3800000	---- *	----	4006800*	0	0	0
9.200000	FLUE GAS DESULFUR	LS*	----	----	37994600*	20297900	---- *	----	17696700*	0	0	0
9.210000	COMPONENTS	LS*	----	----	37994600*	20297900	---- *	----	17696700*	0	0	0
9.211000	DUCTWORK FOR FGD	LS*	----	----	3341600*	1451600	---- *	----	1890000*	0	0	0
9.213000	SO2 ABSORB MODULE	LS*	----	----	26944500*	14250000	---- *	----	12694500*	0	0	0
9.215000	LMST ULD,STR&RECL	LS*	----	----	4530850*	2514850	---- *	----	2016000*	0	0	0
9.216000	LIMESTN PREGENER	LS*	----	----	3177650*	2081450	---- *	----	1096200*	0	0	0
9.300000	WASTE DISPOSAL	LS*	----	----	6015200*	4062200	---- *	----	1953000*	0	0	0
9.310000	WASTE DISPOS SYS	LS*	----	----	6015200*	4062200	---- *	----	1953000*	0	0	0
9.311000	WASTE PROCESS EQ	LS*	----	----	6015200*	4062200	---- *	----	1953000*	0	0	0
9.400000	FANS	LS*	----	----	2158735*	1629535	---- *	----	529200*	0	0	0
9.410000	I.D. FANS	LS*	----	----	1345650*	1011750	---- *	----	333900*	0	0	0
9.420000	SILENCERS	LS*	----	----	813085*	617785	---- *	----	195300*	0	0	0
10.000000	OTHER MECHAN EQUIP	LS*	----	----	19568379*	14203110	---- *	----	5365269*	0	0	0
10.100000	PUMPS	LS*	----	----	3421832*	2888285	---- *	----	533547*	0	0	0
10.110000	BOILER PUMPS	LS*	----	----	2905950*	2515980	---- *	----	389970*	0	0	0
10.111000	BOILER FEED PUMPS	EA*	2	384305.0	768610*	612370	---- *	78120.0	156240*	0	0	0
10.112000	BF PUMP TURBINES	EA*	2	824900.0	1649800*	1523800	---- *	63000.0	126000*	0	0	0
10.113000	BF BOOSTER PUMPS	EA*	2	117080.0	234160*	177460	88730.00*	28350.0	56700*	0	0	0
10.114000	BF STRT UP/STD BY	LS*	----	----	253380*	202350	---- *	----	51030*	0	0	0
10.120000	FEEDWTR SYS PUMPS	LS*	----	----	9363*	7410	---- *	----	1953*	0	0	0

EXHIBIT 1.3 (CONT'D)

APA
NENANA1 200 MW COAL
ESTIMATE NO. APA 1707 M-1

BY: WMP CHECKED: JDF DATE: 8-NOV-84 TIME: 16:22:42

DETAILED
MATERIAL & INSTALLATION REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ TOT)	(TOTAL AMT)*	(TOT MATL)	(UN $MAT)*	(U $ INS)	(TOT INST)*	(TOT ESC)	(MAT ESC)	(INS ESC)
10.121000	CONDEN TRANSFER	LS*	----	----	9363*	7410	---- *	----	1953*	0	0	0
10.130000	SRV & COOL WTR PMP	LS*	----	----	69033*	39045	---- *	----	29988*	0	0	0
10.131000	SERVICE WATER	EA*	4	6666.0	26664*	14820	3705.00*	2961.0	11844*	0	0	0
10.132000	AIR HTR WASH PMPS	LS*	----	----	18547*	10735	---- *	----	7812*	0	0	0
10.133000	CLSD CYC COOL WSP	EA*	2	11911.0	23822*	13490	6745.00*	5166.0	10332*	0	0	0
10.140000	OIL PUMPS	LS*	----	----	56896*	43225	---- *	----	13671*	0	0	0
10.141000	LGT OIL UNLD PMPS	EA*	2	6988.0	13976*	10070	5035.00*	1953.0	3906*	0	0	0
10.142000	IGNITER OIL PUMPS	EA*	3	9838.0	29514*	23655	7885.00*	1953.0	5859*	0	0	0
10.143000	TURB LO TRANS PMP	LS*	----	----	6703*	4750	---- *	----	1953*	0	0	0
10.145000	LO COND PUMP	LS*	----	----	6703*	4750	---- *	----	1953*	0	0	0
10.150000	SUMP PUMPS	EA*	6	19690.0	118140*	110580	18430.00*	1260.0	7560*	0	0	0
10.160000	OTHER PUMPS	LS*	----	----	262450*	172045	---- *	----	90405*	0	0	0
10.161000	COOLING TOWER MU	LS*	----	----	72900*	37620	---- *	----	35280*	0	0	0
10.162000	OP CYC CLG WTR	EA*	2	23640.0	47280*	29640	14820.00*	8820.0	17640*	0	0	0
10.163000	FIRE PROTECT PMPS	EA*	3	37596.0	112788*	81225	27075.00*	10521.0	31563*	0	0	0
10.164000	AIR PREHTR GLY	EA*	2	14741.0	29482*	23560	11780.00*	2961.0	5922*	0	0	0
10.200000	CONDENSING PLANT	LS*	----	----	2389359*	1691760	---- *	----	697599*	0	0	0
10.210000	CONDENSER & AUXIL	LS*	----	----	1535900*	950000	---- *	----	585900*	0	0	0
10.220000	EQUIPMENT	LS*	----	----	853459*	741760	---- *	----	111699*	0	0	0
10.221000	CW PUMPS	EA*	2	142222.0	284444*	251180	---- *	16632.0	33264*	0	0	0
10.222000	CONDENSATE PUMPS	EA*	2	85924.0	171848*	140600	70300.00*	15624.0	31248*	0	0	0
10.223000	VACUUM PUMPS	EA*	2	80777.0	161554*	147820	73910.00*	6867.0	13734*	0	0	0
10.226000	COND CLEAN SYS	LS*	----	----	232900*	201400	---- *	----	31500*	0	0	0

EXHIBIT 1.3 (CONT'D)

APA
NENANA1 200 MW COAL
ESTIMATE NO. APA 1707 M-1

BY: WMP CHECKED: JDF

DATE: 8-NOV-84 TIME: 16:22:42

DETAILED
MATERIAL & INSTALLATION REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ TOT)	(TOTAL AMT)*	(TOT MATL)	(UN $MAT)*	(U $ INS)	(TOT INST)*	(TOT ESC)	(MAT ESC)	(INS ESC)
10.227000	COND COLL PUMP	LS*	----	----	2713*	760	---- *	----	1953*	0	0	0
10.300000	HEAT EXCHANGERS	LS*	----	----	1902743*	1720925	---- *.	----	181818*	0	0	0
10.310000	FEEDWATER HEATERS	EA*	7	172508.0	1207556*	1107890	---- *	14238.0	99666*	0	0	0
10.320000	DEAER/ VENT CONDEN	LS*	----	----	230845*	188005	---- *	----	42840*	0	0	0
10.330000	CLSD CYC COOL WHE	EA*	2	163475.0	326950*	295450	---- *	15750.0	31500*	0	0	0
10.340000	AIR PRHTR GLY HE	EA*	2	68696.0	137392*	129580	64790.00*	3906.0	7812*	0	0	0
10.400000	TANKS	LS*	----	----	857145*	316920	---- *	----	540225*	0	0	0
10.410000	WATER TANKS	LS*	----	----	590280*	191805	---- *	----	398475*	0	0	0
10.412000	CONDEN STRG TANK	LS*	----	----	197490*	51015	---- *	----	146475*	0	0	0
10.414000	FIRE&SRV WTR STRG	LS*	----	----	392790*	140790	---- *	----	252000*	0	0	0
10.430000	LGT OIL STRG TANK	LS*	----	----	124217*	38285	---- *	----	85932*	0	0	0
10.440000	OTHER FL OIL STRG	EA*	3	13962.0	41886*	22230	7410.00*	6552.0	19656*	0	0	0
10.450000	OTHER OIL TANKS	LS*	----	----	100762*	64600	---- *	----	36162*	0	0	0
10.452000	BATCH OIL TANK	LS*	----	----	34560*	18810	---- *	----	15750*	0	0	0
10.453000	CONT BLWDWN FL TK	LS*	----	----	6380*	3230	---- *	----	3150*	0	0	0
10.454000	INT BLWDWN FLH TK	LS*	----	----	22674*	16815	---- *	----	5859*	0	0	0
10.455000	COND COLL TANK	LS*	----	----	9363*	7410	---- *	----	1953*	0	0	0
10.456000	CLSD CYC CL WHT	LS*	----	----	9610*	6460	---- *	----	3150*	0	0	0
10.457000	AIR PREHT CL EX	LS*	----	----	18175*	11875	---- *	----	6300*	0	0	0
10.500000	MISCELLANEOUS EQUIP	LS*	----	----	3336870*	2640090	---- *	----	696780*	0	0	0
10.510000	CONPRESSED AIR EQP	LS*	----	----	425700*	293400	---- *	----	132300*	0	0	0
10.512000	STAT AIR COMPRESS	EA*	2	179375.0	358750*	232750	---- *	63000.0	126000*	0	0	0
10.513000	AIR DRYERS	LS*	----	----	66950*	60650	---- *	----	6300*	0	0	0

EXHIBIT 1.3 (CONT'D)

APA
NENANA1 200 MW COAL
ESTIMATE NO. APA 1707 M-1

BY: WMP CHECKED: JDF

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DETAILED
MATERIAL & INSTALLATION REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ TOT)	(TOTAL AMT)*	(TOT MATL)	(UN $MAT)*	(U $ INS)	(TOT INST)*	(TOT ESC)	(MAT ESC)	(INS ESC)
10.520000	WTR TREAT EQUIP	LS*	----	----	2911170*	2346690	---- *	----	564480*	0	0	0
10.521000	MKUP WTR TRTMT	LS*	----	----	1076345*	841985	---- *	----	234360*	0	0	0
10.522000	COND POL DEMINER	LS*	----	----	1046800*	812440	---- *	----	234360*	0	0	0
10.523000	CHLORINAT EQUIP	LS*	----	----	305060*	266000	---- *	----	39060*	0	0	0
10.524000	BOILER CHEM FEED	LS*	----	----	67735*	55765	---- *	----	11970*	0	0	0
10.525000	SAMPLING SYSTEM	LS*	----	----	186740*	169100	---- *	----	17640*	0	0	0
10.526000	BLK GAS STR&DISTR	LS*	----	----	228490*	201400	---- *	----	27090*	0	0	0
10.600000	AUXILIARY BOILER	LS*	----	----	704130*	546630	---- *	----	157500*	0	0	0
10.700000	CECI	LS*	----	----	2877000*	1995000	---- *	----	882000*	0	0	0
10.800000	EQUIP UNLOAD FACIL	LS*	----	----	1294500*	1168500	---- *	----	126000*	0	0	0
10.900000	TURBINE BYPASS	LS*	----	----	2784800*	1235000	---- *	----	1549800*	0	0	0
11.000000	COAL&ASH HNDL EQUIP	LS*	----	----	26358891*	15862965	---- *	----	10495926*	0	0	0
11.100000	COAL HANDLING	LS*	----	----	21648805*	13238305	---- *	----	8410500*	0	0	0
11.110000	THAWING FACILITY	LS*	----	----	2254710*	1939710	---- *	----	315000*	0	0	0
11.120000	UNLOADING FACILITY	LS*	----	----	3276810*	2300310	---- *	----	976500*	0	0	0
11.121000	ROTARY CAR DUMPER	LS*	----	----	2386310*	1882310	---- *	----	504000*	0	0	0
11.122000	CONVEYOR NO 1	LS*	----	----	890500*	418000	---- *	----	472500*	0	0	0
11.130000	STACKOUT SYSTEM	LS*	----	----	2469600*	1197000	---- *	----	1272600*	0	0	0
11.131000	CONVEYOR NO 2	LS*	----	----	2469600*	1197000	---- *	----	1272600*	0	0	0
11.140000	RECLAIM SYSTEM	LS*	----	----	6845545*	3897145	---- *	----	2948400*	0	0	0
11.141000	STACKER RECLAIMER	LS*	----	----	4421000*	2720000	---- *	----	1701000*	0	0	0
11.142000	CONVEYOR NO 5	LS*	----	----	797320*	381520	---- *	----	415800*	0	0	0
11.143000	EMER RECLM HOPPER	LS*	----	----	26565*	13965	---- *	----	12600*	0	0	0

EXHIBIT 1.3 (CONT'D)

APA
NENANA1 200 MW COAL
ESTIMATE NO. APA 1707 M-1

BY: WMP CHECKED: JDF

DATE: 8-NOV-84 TIME: 16:22:42

DETAILED
MATERIAL & INSTALLATION REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ TOT)	(TOTAL AMT)*	(TOT MATL)	(UN $MAT)*	(U $ INS)	(TOT INST)*	(TOT ESC)	(MAT ESC)	(INS ESC)
11.144000	CONVEYOR NO 6	LS*	----	----	629760*	289560	---- *	----	340200*	0	0	0
11.145000	CONVEYOR NO 7A&7B	EA*	2	485450.0	970900*	492100	---- *	239400.0	478800*	0	0	0
11.160000	CRUSH & TRANSF SYS	LS*	----	----	3594370*	1698070	---- *	----	1896300*	0	0	0
11.161000	CONVEYOR NO 8A&8B	EA*	2	808400.0	1616800*	760000	---- *	428400.0	856800*	0	0	0
11.162000	SURGE BIN	LS*	----	----	254875*	97375	---- *	----	157500*	0	0	0
11.163000	SAMPLING SYSTEM	LS*	----	----	932870*	428870	---- *	----	504000*	0	0	0
11.164000	COAL CRUSHERS	LS*	----	----	110600*	66500	---- *	----	44100*	0	0	0
11.165000	CONVEYOR NO 9A	LS*	----	----	679225*	345325	---- *	----	333900*	0	0	0
11.170000	MISC SYSTEMS	LS*	----	----	3207770*	2206070	---- *	----	1001700*	0	0	0
11.172000	FIRE PROTECTION	LS*	----	----	1381600*	751600	---- *	----	630000*	0	0	0
11.173000	TUNNEL VENT	LS*	----	----	43410*	11910	---- *	----	31500*	0	0	0
11.174000	INSTRUM & CONTROL	LS*	----	----	1048530*	985530	---- *	----	63000*	0	0	0
11.176000	MISC EQUIPMENT	LS*	----	----	734230*	457030	---- *	----	277200*	0	0	0
11.200000	BTM ASH HNDL SYSTEM	LS*	----	----	3053986*	1579660	---- *	----	1474326*	0	0	0
11.210000	FURN BTM ASH SYS	LS*	----	----	1117200*	638400	---- *	----	478800*	0	0	0
11.220000	PYRITE HNDL SYSTEM	LS*	----	----	111450*	60420	---- *	----	51030*	0	0	0
11.230000	ECONOMIZER ASH SYS	LS*	----	----	307100*	174800	---- *	----	132300*	0	0	0
11.240000	DEWTW BIN&SET TKS	LS*	----	----	1105250*	462650	---- *	----	642600*	0	0	0
11.250000	MAJOR PUMPS	EA*	3	76952.0	230856*	124260	41420.00*	35532.0	106596*	0	0	0
11.260000	BTM ASH INSTRUM	LS*	----	----	182130*	119130	---- *	----	63000*	0	0	0
11.400000	FLY ASH INST & CTL	LS*	----	----	1656100*	1045000	---- *	----	611100*	0	0	0
12.000000	PIPING	LS*	----	----	29158550*	9450512	---- *	----	19708038*	0	0	0
12.100000	LARGE BORE PIPING	TN*	944	20494.3	19346594*	8100464	8581.00*	11913.3	11246130*	0	0	0

EXHIBIT 1.3 (CONT'D)

APA
8 NENANA1 200 MW COAL
BY: WMP CHECKED: JDF ESTIMATE NO. APA 1707 M-1 DATE: 8-NOV-84 TIME: 16:22:42

DETAILED
MATERIAL & INSTALLATION REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ TOT)	(TOTAL AMT)*	(TOT MATL)	(UN $MAT)*	(U $ INS)	(TOT INST)*	(TOT ESC)	(MAT ESC)	(INS ESC)
12.200000	SMALL BORE PIPING	LF*	86100	114.0	9811956*	1350048	15.68*	98.3	8461908*	0	0	0
13.000000	INSULATION	LS*	----	----	8164700*	800000	---- *	----	7364700*	0	0	0
13.100000	INSULATION	LS*	----	----	8164700*	800000	---- *	----	7364700*	0	0	0
14.000000	INSTRUMENTATION	LS*	----	----	6742000*	6175000	---- *	----	567000*	0	0	0
14.100000	INSTRUMENTATION	LS*	----	----	6742000*	6175000	---- *	----	567000*	0	0	0
15.000000	ELECTRICAL EQUIPMENT	LS*	----	----	61771929*	23859998	---- *	----	37911931*	0	0	0
15.100000	TRANFORMERS	LS*	----	----	4201029*	3724998	---- *	----	476031*	0	0	0
15.110000	MAIN TRANSFORMER	EA*	1	0.0	1524200*	1400000	---- *	0.0	124200*	0	0	0
15.120000	START-UP XMFR	EA*	2	624150.0	1248300*	1200000	---- *	24150.0	48300*	0	0	0
15.130000	AUXILIARY XMFR	LS*	----	----	1428529*	1124998	---- *	----	303531*	0	0	0
15.131000	COMMON SERV XMFR	EA*	2	367250.0	734500*	700000	---- *	17250.0	34500*	0	0	0
15.132000	STATION SRV XMFR	EA*	6	52921.5	317529*	289998	48333.00*	4588.5	27531*	0	0	0
15.133000	LTG & MISC XMFR	EA*	50	3308.0	165400*	55000	1100.00*	2208.0	110400*	0	0	0
15.134000	FIRE PROTECTION	LT*	1	0.0	211100*	80000	80000.00*	0.0	131100*	0	0	0
15.200000	SWITCHGEARS	LS*	----	----	3855100*	3310000	---- *	----	545100*	0	0	0
15.300000	MOTORS	EA*	1	0.0	2235500*	1925000	---- *	0.0	310500*	0	0	0
15.400000	AQCS ELEC SYSTEM	LS*	----	----	4382000*	3830000	---- *	----	552000*	0	0	0
15.410000	STATION SERV XMFR	EA*	4	71900.0	287600*	260000	65000.00*	6900.0	27600*	0	0	0
15.420000	AQCS SWITCHGEAR	LS*	----	----	1547270*	1490000	---- *	----	57270*	0	0	0
15.421000	SWITCHGEARS	LS*	----	----	1204150*	1180000	---- *	----	24150*	0	0	0
15.422000	POWER CENTER	ST*	1	0.0	343120*	310000	---- *	0.0	33120*	0	0	0
15.430000	MOTORS	EA*	1	0.0	1028800*	1015000	---- *	0.0	13800*	0	0	0
15.440000	NON-SEGREGATED BUS	LS*	----	----	1518330*	1065000	---- *	----	453330*	0	0	0

EXHIBIT 1.3 (CONT'D)

APA
NENANA1 200 MW COAL
ESTIMATE NO. APA 1707 M-1

BY: WMP CHECKED: JDF

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DETAILED
MATERIAL & INSTALLATION REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(IN $ TOT)	(TOTAL AMT)*	(TOT MATL)	(UN $MAT)*	(U $ INS)	(TOT INST)*	(TOT ESC)	(MAT ESC)	(INS ESC)
15.500000	SWITCHBOARDS	LS*	----	----	1072500*	900000	---- *	----	172500*	0	0	0
15.600000	GENERATOR GEARS BUS	LS*	----	----	1567500*	1050000	---- *	----	517500*	0	0	0
15.700000	WIRING SYSTEM	LS*	----	----	36500000*	6868000	---- *	----	29632000*	0	0	0
15.800000	LIGHTING SYSTEM	LT*	1	0.0	3810000*	705000	---- *	0.0	3105000*	0	0	0
15.900000	AUX ELEC EQUIPMENT	LS*	----	----	4148300*	1547000	---- *	----	2601300*	0	0	0
16.000000	PAINTING	LS*	----	----	2386880*	159200	---- *	----	2227680*	0	0	0
16.100000	TURBINE BUILDING	LS*	----	----	648100*	47500	---- *	----	600600*	0	0	0
16.200000	STEAM GEN BLDG	LS*	----	----	1163250*	71250	---- *	----	1092000*	0	0	0
16.300000	SILO BAY	LS*	----	----	117750*	8550	---- *	----	109200*	0	0	0
16.900000	MISCELLANEOUS	LS*	----	----	457780*	31900	---- *	----	425880*	0	0	0
17.000000	OFF-SITE FACILITIES	LS*	----	----	20361230*	7103500	---- *	----	13257730*	0	0	0
17.100000	RANNEY WELL SYSTEM	LS*	----	----	3055200*	541500	---- *	----	2513700*	0	0	0
17.200000	ACCESS ROADS	MI*	10	511715.0	5117150*	2800000	---- *	231715.0	2317150*	0	0	0
17.300000	ACCESS RAILROAD	LF*	52800	230.9	12188880*	3762000	71.25*	159.6	8426880*	0	0	0
19.000000	SUBSTATION/T-LINE	LS*	----	----	10440400*	7700000	---- *	----	2740400*	0	0	0
19.100000	SUBSTATION	LS*	----	----	6627650*	5600000	---- *	----	1027650*	0	0	0
19.200000	230KV T-LINE:1 CIR	MI*	10	381275.0	3812750*	2100000	---- *	171275.0	1712750*	0	0	0
71.000000	INDIRECT CONST COST	LS*	----	----	53788790*	0	---- *	----	53788790*	0	0	0
71.100000	FIELD LOCAL HIRES	LS*	----	----	4472325*	0	---- *	----	4472325*	0	0	0
71.200000	CRAFT P/R FRINGES	LS*	----	----	3600000*	0	---- *	----	3600000*	0	0	0
71.210000	PREM PAY-CASUAL	LS*	----	----	2400000*	0	---- *	----	2400000*	0	0	0
71.220000	PREM PAY-SCHED	LS*	----	----	1200000*	0	---- *	----	1200000*	0	0	0
71.300000	CONSTR EQUIPT	LS*	----	----	171000*	0	---- *	----	171000*	0	0	0

EXHIBIT 1.3 (CONT'D)

APA
NENANA1 200 MW COAL
ESTIMATE NO. APA 1707 M-1

BY: WMP CHECKED: JDF

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DETAILED
MATERIAL & INSTALLATION REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ TOT)	(TOTAL AMT)*	(TOT MATL)	(UN $MAT)*	(U $ INS)	(TOT INST)*	(TOT ESC)	(MAT ESC)	(INS ESC)
71.310000	AUTOMOTIVE(C/M)	LS*	----	----	171000*	0	---- *	----	171000*	0	0	0
71.400000	CONSTRUCTION PLANT	LS*	----	----	31416262*	0	---- *	----	31416262*	0	0	0
71.410000	CONSTRUCTN BLDGS	LS*	----	----	1588500*	0	---- *	----	1588500*	0	0	0
71.420000	TEMP FACILITIES	LS*	----	----	29827762*	0	---- *	----	29827762*	0	0	0
71.421000	LABOR CAMP	LS*	----	----	10725000*	0	---- *	----	10725000*	0	0	0
71.422000	FOOD SERVICE	LS*	----	----	12225000*	0	---- *	----	12225000*	0	0	0
71.423000	TEMPORARY POWER	LS*	----	----	2389868*	0	---- *	----	2389868*	0	0	0
71.423100	69KV T-LINE	MI*	10	238986.8	2389868*	0	0.00*	238986.8	2389868*	0	0	0
71.424000	OTHER TEMP FACIL	LS*	----	----	4487894*	0	---- *	----	4487894*	0	0	0
71.600000	OFFICE/LABOR EXP	LS*	----	----	2056370*	0	---- *	----	2056370*	0	0	0
71.610000	OFFICE EXPENSE	LS*	----	----	147250*	0	---- *	----	147250*	0	0	0
71.620000	LABOR EXPENSE	LS*	----	----	691070*	0	---- *	----	691070*	0	0	0
71.630000	TESTING	LS*	----	----	756050*	0	---- *	----	756050*	0	0	0
71.640000	SECURITY GUARDS	LS*	----	----	462000*	0	---- *	----	462000*	0	0	0
71.800000	CONSTRUCTN CLEANUP	LS*	----	----	293368*	0	---- *	----	293368*	0	0	0
71.900000	PRODUCTIVITY ADJ	LS*	----	----	11779465*	0	---- *	----	11779465*	0	0	0
72.000000	PROFESSIONAL SERVCS	LS*	----	----	56050000*	0	---- *	----	56050000*	0	0	0

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EXHIBIT 1.3 (CONT'D)

UNIT 1
RAIL DELIVERY OF COAL/LIME

APA
NENANA1 200 MW COAL
ESTIMATE NO. APA 1707 M-1

BY: WMP CHECKED: JDF

DATE: 8-NOV-84 TIME: 16:22:42

SUMMARY
INSTALLATION BREAKOUT REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ INS)	(TOTL INS)	(PAYROLL)	(MAJ EXP)	(CONT OTH)*	(MH/UN)	($/MH)	(TOT MH)
99.000000	TOTAL PROJECT COST	LS*	----	----	395814817	160880388	85997410	97308999*	---	41.81	3847970
100.000000	CONTINGENCY	LS*	----	----	51628020	0	0	0*	---	0.00	0
300.000000	TOTAL COST W/O CONT	LS*	----	----	344186797	160880388	85997410	97308999*	---	41.81	3847970
1.000000	IMPROVEMNTS TO SITE	LS*	----	----	5636977	2985773	11400	2639804*	---	40.35	73990
2.000000	EARTHWORK & PILING	LS*	----	----	24405987	10143430	79300	14183257*	---	42.96	236095
3.000000	CIRC WATER SYSTEM	LS*	----	----	4191250	2795394	44460	1351396*	---	44.58	62709
4.000000	CONCRETE	LS*	----	----	23643279	16526094	422750	6694435*	---	44.08	374889
5.000000	STRCT STL/LFT EQP	LS*	----	----	18213850	10780850	256500	7176500*	---	48.66	221563
6.000000	BUILDINGS	LS*	----	----	12867390	9190995	0	3676395*	---	42.84	214559
7.000000	TURBINE GENERATOR	LS*	----	----	2664900	1776600	0	888300*	---	42.00	42300
8.000000	STM GENER & ACCESS	LS*	----	----	18900000	12600000	0	6300000*	---	42.00	300000
9.000000	AQCS	LS*	----	----	24185700	16123800	0	8061900*	---	42.00	383900
10.000000	OTHER MECHAN EQUIP	LS*	----	----	5365269	3576846	0	1788423*	---	42.00	85163
11.000000	COAL&ASH HNDL EQUIP	LS*	----	----	10495926	6997284	0	3498642*	---	42.00	166602
12.000000	PIPING	LS*	----	----	19708038	13138692	0	6569346*	---	42.00	312826
13.000000	INSULATION	LS*	----	----	7364700	4909800	0	2454900*	---	42.00	116900
14.000000	INSTRUMENTATION	LS*	----	----	567000	378000	0	189000*	---	42.00	9000
15.000000	ELECTRICAL EQUIPMENT	LS*	----	----	37911931	25207954	100000	12603977*	---	46.00	547999
16.000000	PAINTING	LS*	----	----	2227680	1591200	0	636480*	---	39.00	40800
17.000000	OFF-SITE FACILITIES	LS*	----	----	13257730	6173240	0	7084490*	---	40.56	152200
19.000000	SUBSTATION/T-LINE	LS*	----	----	2740400	1612000	0	1128400*	---	40.30	40000
71.000000	INDIRECT CONST COST	LS*	----	----	53788790	14372436	29033000	10383354*	---	30.81	466475
72.000000	PROFESSIONAL SERVCS	LS*	----	----	56050000	0	56050000	0*	---	0.00	0

EXHIBIT 1.3 (CONT'D)

APA
NENANA1 200 MW COAL
ESTIMATE NO. APA 1707 M-1

BY: WMP CHECKED: JDF

DATE: 8-NOV-84 TIME: 16:22:42

DETAILED
INSTALLATION BREAKOUT REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ INS)	(TOTL INS)	(PAYROLL)	(MAJ EXP)	(CONT OTH)*	(MH/UN)	($/MH)	(TOT MH)
99.000000	TOTAL PROJECT COST	LS*	----	----	395814817	160880388	85997410	97308999*	---	41.81	3847970
100.000000	CONTINGENCY	LS*	----	----	51628020	0	0	0*	---	0.00	0
300.000000	TOTAL COST W/O CONT	LS*	----	----	344186797	160880388	85997410	97308999*	---	41.81	3847970
1.000000	IMPROVEMNTS TO SITE	LS*	----	----	5636977	2985773	11400	2639804*	---	40.35	73990
1.100000	SITE PREPARATION	LS*	----	----	628762	279450	0	349312*	---	40.50	6900
1.110000	CLEARING	AC*	150	4191.75	628762	279450	0	349312*	46.00	40.50	6900
1.200000	ROADS,BRDG,WALKS	LS*	----	----	681816	312443	0	369373*	---	41.71	7490
1.210000	ROADS	LS*	----	----	497846	181035	0	316811*	---	44.70	4050
1.213000	24' WIDE ROADS	SY*	45000	11.06	497846	181035	0	316811*	0.09	44.70	4050
1.240000	FENCING	LS*	----	----	183970	131408	0	52562*	---	38.20	3440
1.241000	PROPERTY FENCE	LF*	11000	12.84	141187	100848	0	40339*	0.24	38.20	2640
1.242000	SECURITY FENCE	LF*	3000	12.84	38505	27504	0	11001*	0.24	38.20	720
1.243000	GATES	EA*	8	534.75	4278	3056	0	1222*	10.00	38.20	80
1.300000	SITE DRAINAGE	LS*	----	----	1009360	651200	0	358160*	---	40.70	16000
1.500000	SEWAGE FACILITIES	LS*	----	----	239723	154660	0	85063*	---	40.70	3800
1.700000	RAILROAD	LS*	----	----	3077316	1588020	11400	1477896*	---	39.90	39800
1.710000	TRACK	LF*	13000	159.60	2074800	1037400	0	1037400*	2.00	39.90	26000
1.720000	STACKER RECL TRCK	LF*	600	1670.86	1002516	550620	11400	440496*	23.00	39.90	13800
2.000000	EARTHWORK & PILING	LS*	----	----	24405987	10143430	79300	14183257*	---	42.96	236095
2.200000	STRCTR & EQUIP EXC	LS*	----	----	13280841	5683764	73600	7523477*	---	42.66	133235
2.210000	STATION AREA	LS*	----	----	7721105	34976.	0	4223485*	---	42.82	81675
2.212000	EARTH EXCAVATION	CY*	18700	29.15	545105	198220	0	346885*	0.25	42.40	4675
2.214000	SELECT BACKFILL	LS*	----	----	7176000	3299400	0	3876600*	---	42.85	77000

EXHIBIT 1.3 (CONT'D)

APA
NENANA1 200 MW COAL
ESTIMATE NO. APA 1707 M-1

BY: WMP CHECKED: JDF

DATE: 8-NOV-84 TIME: 16:22:42

DETAILED
INSTALLATION BREAKOUT REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ INS)	(TOTL INS)	(PAYROLL)	(MAJ EXP)	(CONT OTH)*	(MH/UN)	($/MH)	(TOT MH)
2.214100	7' GRAVEL PAD	CY*	650000	8.94	5811000	2324400	0	3486600*	0.08	44.70	52000
2.214200	INSULATION BRD	SF*	2500000	0.55	1365000	975000	0	390000*	0.01	39.00	25000
2.220000	STACK FOUNDATIONS	LS*	----	----	221516	91584	5700	124232*	---	42.40	2160
2.222000	EARTH EXCAVATION	CY*	2300	23.32	53636	19504	0	34132*	0.20	42.40	460
2.223000	ROCK EXCAVATION	CY*	2000	83.94	167880	72080	5700	90100*	0.85	42.40	1700
2.230000	COAL HAND FDN	LS*	----	----	2888870	1134200	27400	1727270*	---	42.40	26750
2.232000	EARTH EXCAVATION	CY*	58400	29.15	1702360	619040	0	1083320*	0.25	42.40	14600
2.233000	ROCK EXCAVATION	CY*	16200	73.24	1186510	515160	27400	643950*	0.75	42.40	12150
2.240000	OUTLY TKS EQP/STR	LS*	----	----	201135	73140	0	127995*	---	42.40	1725
2.242000	EARTH EXCAVATION	CY*	6900	29.15	201135	73140	0	127995*	0.25	42.40	1725
2.250000	AQCS FDNS	LS*	----	----	2248215	887220	40500	1320495*	---	42.40	20925
2.252000	EARTH EXCAVATION	CY*	39900	29.15	1163085	422940	0	740145*	0.25	42.40	9975
2.253000	ROCK EXCAVATION	CY*	14600	74.32	1085130	464280	40500	580350*	0.75	42.40	10950
2.300000	TRENCHING	LS*	----	----	2816531	941107	5700	1869724*	---	42.70	22040
2.310000	CIRC WATER COND	LS*	----	----	529178	178656	5700	344822*	---	42.70	4184
2.312000	EARTH EXCAVATION	CY*	13700	28.18	386091	128697	0	257394*	0.22	42.70	3014
2.313000	ROCK EXCAVATION	CY*	1800	79.49	143087	49959	5700	87428*	0.65	42.70	1170
2.320000	YARD PIPING	LS*	----	----	1334289	444763	0	889526*	---	42.70	10416
2.322000	EARTH EXCAVATION	CY*	43400	30.74	1334289	444763	0	889526*	0.24	42.70	10416
2.330000	SEWERS & DRAINS	LS*	----	----	953064	317688	0	635376*	---	42.70	7440
2.332000	EARTH EXCAVATION	CY*	31000	30.74	953064	317688	0	635376*	0.24	42.70	7440
2.400000	EARTH STRUCTURES	CY*	5500	29.04	159698	79849	0	79849*	0.34	42.70	1870
2.500000	PILES (H PILES)	LS*	----	----	5785500	2314200	0	3471300*	---	43.50	53200

EXHIBIT 1.3 (CONT'D)

BY: WMP CHECKED: JDF

APA
NENANA1 200 MW COAL
ESTIMATE NO. APA 1707 M-1

DATE: 8-NOV-84 TIME: 16:22:42

DETAILED
INSTALLATION BREAKOUT REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ INS)	(TOTL INS)	(PAYROLL)	(MAJ EXP)	(CONT OTH)*	(MH/UN)	($/MH)	(TOT MH)
2.510000	STATION AREA	LF*	200000	20.66	4132500	1653000	0	2479500*	0.19	43.50	38000
2.520000	AQCS AREA	LF*	80000	20.66	1653000	661200	0	991800*	0.19	43.50	15200
2.700000	CECI-EXCV-ERTH STR	LS*	----	----	2363417	1124510	0	1238907*	---	43.67	25750
2.710000	CL PL SEEP&RO CTR	LS*	----	----	639069	260419	0	378650*	---	40.82	6380
2.711000	PVC LINER	SF*	400000	0.07	26119	15239	0	10880*	0.00	38.10	400
2.712000	SAND	CY*	23000	14.35	330050	132020	0	198030*	0.14	41.00	3220
2.713000	GRAVEL	CY*	23000	12.30	282900	113160	0	169740*	0.12	41.00	2760
2.720000	WST WTR TRMT AREA	LS*	----	----	1052508	526799	0	525709*	---	44.64	11800
2.721000	PVC LINER	SF*	100000	0.07	6528	3809	0	2719*	0.00	38.10	100
2.722000	EXCAVATION	CY*	45000	17.88	804600	402300	0	402300*	0.20	44.70	9000
2.723000	BACKFILL	CY*	9000	26.82	241380	120690	0	120690*	0.30	44.70	2700
2.730000	SLD WST STK PILE	LS*	----	----	408700	205722	0	202978*	---	44.53	4620
2.731000	PVC LINER	SF*	120000	0.05	6400	4572	0	1828*	0.00	38.10	120
2.732000	EXCAVATION	CY*	15000	17.88	268200	134100	0	134100*	0.20	44.70	3000
2.733000	BACKFILL	CY*	5000	26.82	134100	67050	0	67050*	0.30	44.70	1500
2.740000	EMER WST BASIN	LS*	----	----	263140	131570	0	131570*	---	44.60	2950
3.000000	CIRC WATER SYSTEM	LS*	----	----	4191250	2795394	44460	1351396*	---	44.58	62709
3.200000	INTK & DISC PIPING	LS*	----	----	1246424	788214	17860	440350*	---	42.98	18340
3.210000	CONCR PIPE: 60"	LF*	3400	165.83	563822	322184	0	241638*	2.30	41.20	7820
3.260000	BEDDING MATERIAL	CY*	2000	20.50	41000	20500	0	20500*	0.25	41.00	500
3.270000	CONCRET STRUCTURE	LS*	----	----	611908	424320	17860	169728*	---	44.20	9600
3.271000	THRST & TRNS BLK	CY*	750	304.62	228468	159120	5700	63648*	4.80	44.20	3600
3.272000	CONDENS BLOCKS	CY*	400	698.49	279397	194480	7125	77792*	11.00	44.20	4400

EXHIBIT 1.3 (CONT'D)

BY: WMP CHECKED: JDF

APA
NENANA 200 MW COAL
ESTIMATE NO. APA 1707 M-1

DATE: 8-NOV-84 TIME: 16:22:42

DETAILED
INSTALLATION BREAKOUT REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ INS)	(TOTL INS)	(PAYROLL)	(MAJ EXP)	(CONT OTH)*	(MH/UN)	($/MH)	(TOT MH)
3.273000	PITOT TUBE PIT	CY*	200	520.22	104043	70720	5035	28288*	8.00	44.20	1600
3.280000	MISCELLAN STEEL	TN*	7	4242.00	29694	21210	0	8484*	60.00	50.50	420
3.400000	COOL TOWER FACIL	LS*	----	----	2944826	2007180	26600	911046*	---	45.24	44369
3.410000	TOWER BASIN	LS*	----	----	575315	356460	12350	206505*	---	44.28	8050
3.411000	EXCAVATION	CY*	6500	22.35	145275	58110	0	87165*	0.20	44.70	1300
3.412000	CONC CW COOL TWR	CY*	1500	286.69	430040	298350	12350	119340*	4.50	44.20	6750
3.420000	PUMP CHAMBER	LS*	----	----	627120	406155	14250	206715*	---	44.54	9119
3.422000	EXCAVATION	CY*	4500	22.35	100575	40230	0	60345*	0.20	44.70	900
3.423000	CONCRETE	CY*	1500	331.23	496851	344715	14250	137886*	5.20	44.20	7799
3.424000	MISC STEEL	TN*	7	4242.00	29694	21210	0	8484*	60.00	50.50	420
3.430000	INTAKE EQUIPMENT	LS*	----	----	62160	44400	0	17760*	---	46.74	950
3.433000	SCREENS	SF*	500	28.28	14140	10100	0	4040*	0.40	50.50	200
3.435000	STOP LOGS	SF*	500	14.14	7070	5050	0	2020*	0.20	50.50	100
3.436000	CRANE BRIDGE 15T	EA*	1	0.0	40950	29250	0	11700*	---	45.00	650
3.440000	PMP HS SPR STRUCT	LS*	----	----	421743	301245	0	120498*	---	46.70	6450
3.441000	CRANE & HST SUPP	TN*	75	1555.40	116655	83325	0	33330*	22.00	50.50	1650
3.442000	BUILDING SPRSTR	SF*	6000	50.85	305088	217920	0	87168*	0.80	45.40	4800
3.450000	TOWER SPR STRUCT	LS*	----	----	1258488	898920	0	359568*	---	45.40	19800
4.000000	CONCRETE	LS*	----	----	23643279	16526094	422750	6694435*	---	44.08	374889
4.100000	TURBINE BLDG CONCR	CY*	4700	691.80	3251446	2285140	52250	914056*	11.00	44.20	51700
4.200000	BOILER AREA CONCRT	CY*	1900	593.17	1127026	789412	21850	315764*	9.40	44.20	17860
4.300000	SILO AREA CONCRETE	CY*	1700	626.02	1064240	743886	22800	297554*	9.90	44.20	16830
4.400000	AQCS CONCRETE	CY*	12600	624.67	7870849	5513464	152000	2205385*	9.90	44.20	124739

EXHIBIT 1.3 (CONT'D)

APA
NENANA1 200 MW COAL
ESTIMATE NO. APA 1707 M-1

BY: WMP CHECKED: JDF

DATE: 8-NOV-84 TIME: 16:22:42

DETAILED
INSTALLATION BREAKOUT REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ INS)	(TOTL INS)	(PAYROLL)	(MAJ EXP)	(CONT OTH)*	(MH/UN)	($/MH)	(TOT MH)
4.500000	STACK FOUNDATION	CY*	1200	228.46	274146	185640	14250	74256*	3.50	44.20	4200
4.700000	CECI CONCRETE	CY*	400	383.15	153262	106080	4750	42432*	6.00	44.20	2400
4.800000	COAL HANDLG CONCRT	CY*	11100	730.22	8105418	5691192	137750	2276476*	11.60	44.20	128760
4.900000	MISCELL CONCRETE	LS*	----	----	1796892	1211280	17100	568512*	---	42.65	28400
4.910000	YARD PIPING VAULT	LS*	----	----	1260000	840000	0	420000*	---	42.00	20000
4.920000	OTHER MISC CONC	CY*	1400	383.49	536892	371280	17100	148512*	6.00	44.20	8400
5.000000	STRCT STL/LFT EQP	LS*	----	----	18213850	10780850	256500	7176500*	---	48.66	221563
5.100000	TURBINE BUILDING	LS*	----	----	2147390	1533850	0	613540*	---	49.74	30837
5.110000	MAIN STEEL	TN*	1200	1190.00	1428000	1020000	0	408000*	17.00	50.00	20400
5.120000	FRAMING	LS*	----	----	183750	131250	0	52500*	---	50.00	2625
5.121000	WALL FRAMING	TN*	105	1750.00	183750	131250	0	52500*	25.00	50.00	2625
5.130000	MISC STEEL	LS*	----	----	434840	310600	0	124240*	---	50.00	6212
5.131000	GRATING 1-3/4"	SF*	12000	21.00	252000	180000	0	72000*	0.30	50.00	3600
5.132000	CHECKERED PLATE	SF*	600	46.90	28140	20100	0	8040*	0.67	50.00	402
5.133000	HANDRAIL	LF*	1000	87.50	87500	62500	0	25000*	1.25	50.00	1250
5.134000	LADDERS & STRWYS	TN*	12	5600.00	67200	48000	0	19200*	80.00	50.00	960
5.140000	LIFTING EQUIP	LS*	----	----	100800	72000	0	28800*	---	45.00	1600
5.141000	CRANE: 40 T CAP	LS*	----	----	100800	72000	0	28800*	---	45.00	1600
5.200000	STEAM GENERATOR	LS*	----	----	7478170	5341550	0	2136620*	---	49.91	107021
5.210000	MAIN STEEL	TN*	2300	1190.00	2737000	1955000	0	782000*	17.00	50.00	39100
5.220000	FRAMING	LS*	----	----	1267000	905000	0	362000*	---	50.00	18100
5.221000	WALL FRAMING	TN*	330	3500.00	1155000	825000	0	330000*	50.00	50.00	16500
5.222000	ELEV FRAMING	TN*	40	2800.00	112000	80000	0	32000*	40.00	50.00	1600

EXHIBIT 1.3 (CONT'D)

BY: WM[illegible] JTF

APA
NENANA1 200 MW COAL
ESTIMATE NO. APA 1707 M-1

DATE: 8-NOV-84 TIME: 16:22:42

DETAILED
INSTALLATION BREAKOUT REPORT

ACCT [illegible]	[illegible]	UN*	(QTY)	(UN $ INS)	(TOTL INS)	(PAYROLL)	(MAJ EXP)	(CONT QTH)*	(MH/UN)	($/MH)	(TOT MH)
5.[illegible]	[illegible] STEEL	LS*	----	----	3354470	2396050	0	958420*	---	50.00	47921
5.[illegible]	[illegible] STEEL (1-2/4")	SF*	70000	21.00	1470000	1050000	0	420000*	0.30	50.00	21000
5.[illegible]	[illegible] PLATE	SF*	1600	46.90	75040	53600	0	21440*	0.67	50.00	1072
5.[illegible]	[illegible]	LF*	12500	90.99	1137430	812450	0	324980*	1.30	50.00	16249
5.[illegible]	[illegible] & STRWY	TN*	120	5600.00	672000	480000	0	192000*	80.00	50.00	9600
5.[illegible]	LIFTING EQUIP	LS*	----	----	119700	85500	0	34200*	---	45.00	1900
5.[illegible]	FLOW EQUIPMENT	LS*	----	----	94500	67500	0	27000*	---	45.00	1500
[illegible]	OTHER LIFT EQUIP	LS*	----	----	25200	18000	0	7200*	---	45.00	400
[illegible]	(3) 15 TON HST	LS*	----	----	25200	18000	0	7200*	---	45.00	400
[illegible]	SILO BAY	LS*	----	----	1765890	1261350	0	504540*	---	49.94	25255
[illegible]	MAIN STEEL	TN*	225	1190.00	267750	191250	0	76500*	17.00	50.00	3825
[illegible]	FRAMING	LS*	----	----	227500	162500	0	65000*	---	50.00	3250
[illegible]	WALL FRAMING	TN*	65	3500.00	227500	162500	0	65000*	50.00	50.00	3250
[illegible]	MISC STEEL	LS*	----	----	147000	105000	0	42000*	---	50.00	2100
[illegible]	LIFTING EQUIPMENT	LS*	----	----	17640	12600	0	5040*	---	45.00	280
[illegible]	OTHER LIFT EQUIP	LS*	----	----	17640	12600	0	5040*	---	45.00	280
[illegible]	SUPPORT STEEL	LS*	----	----	490000	350000	0	140000*	---	50.00	7000
5.351000	EQUIP SUPPORTS	TN*	100	4900.00	490000	350000	0	140000*	70.00	50.00	7000
5.360000	STL SILO & CVR PL	LS*	----	----	616000	440000	0	176000*	---	50.00	8800
5.361000	STEEL SILOS	TN*	170	2800.00	476000	340000	0	136000*	40.00	50.00	6800
5.362000	SS PLATES	TN*	40	3500.00	140000	100000	0	40000*	50.00	50.00	2000
5.500000	CONCRETE STACKS	LS*	----	----	6090900	2121600	256500	3712800*	---	44.20	48000
5.700000	CECI STEEL	LS*	----	----	31500	22500	0	9000*	---	50.00	450

EXHIBIT 1.3 (CONT'D)

BY: WMP CHECKED: JDF

APA
NENANA1 200 MW COAL
ESTIMATE NO. APA 1707 M-1

DATE: 8-NOV-84 TIME: 16:22:42

DETAILED
INSTALLATION BREAKOUT REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ INS)	(TOTL INS)	(PAYROLL)	(MAJ EXP)	(CONT OTH)*	(MH/UN)	($/MH)	(TOT MH)
5.900000	UNCLASS STEEL	TN*	200	3500.00	700000	500000	0	200000*	50.00	50.00	10000
6.000000	BUILDINGS	LS*	----	----	12867390	9190995	0	3676395*	---	42.84	214559
6.100000	TURBINE BUILDING	LS*	----	----	1253684	895489	0	358195*	---	42.46	21090
6.110000	ARCHITECT FEATURE	LS*	----	----	671438	479599	0	191839*	---	43.60	11000
6.170000	HVAC	LS*	----	----	407540	291100	0	116440*	---	41.00	7100
6.180000	PLUMB & DRAINAGE	LS*	----	----	129360	92400	0	36960*	---	42.00	2200
6.190000	MISCELLANEOUS	LS*	----	----	45346	32390	0	12956*	---	41.00	790
6.200000	STEAM GEN BUILDING	LS*	----	----	1611596	1151140	0	460456*	---	42.41	27140
6.210000	ARCHTITECT FEATRS	LS*	----	----	885080	632200	0	252880*	---	43.60	14500
6.270000	HVAC	LS*	----	----	631400	451000	0	180400*	---	41.00	11000
6.280000	PLUMB & DRAINAGE	LS*	----	----	41160	29400	0	11760*	---	42.00	700
6.290000	MISCELLANEOUS	LS*	----	----	53956	38540	0	15416*	---	41.00	940
6.300000	SILO BAY	LS*	----	----	497194	355139	0	142055*	---	42.08	8440
6.310000	ARCHITECT FEATRS	LS*	----	----	183118	130799	0	52319*	---	43.60	3000
6.370000	HVAC	LS*	----	----	229600	164000	0	65600*	---	41.00	4000
6.380000	PLUMB & DRAINAGE	LS*	----	----	76440	54600	0	21840*	---	42.00	1300
6.390000	MISCELLANEOUS	LS*	----	----	8036	5740	0	2296*	---	41.00	140
6.400000	AQCS BUILDINGS	LS*	----	----	2762998	1973571	0	789427*	---	43.00	45897
6.410000	AQCS SWGR BLDG	SF*	1350	102.34	138159	98685	0	39474*	1.70	43.00	2295
6.420000	AQCS CTRL BLDG	SF*	3600	126.40	455051	325037	0	130014*	2.10	43.00	7559
6.430000	DIESEL GEN BLDG	SF*	850	113.18	96199	68714	0	27485*	1.88	43.00	1598
6.440000	PUMP HOUSE	SF*	14000	113.18	1584464	1131760	0	452704*	1.88	43.00	26320
6.450000	LIMESTN PREP BLDG	SF*	6500	75.25	489125	349375	0	139750*	1.25	43.00	8125

EXHIBIT 1.3 (CONT'D)

APA
NENANA1 200 MW COAL
ESTIMATE NO. APA 1707 M-1

BY: WMP CHECKED: JDF

DATE: 8-NOV-84 TIME: 16:22:42

DETAILED
INSTALLATION BREAKOUT REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ INS)	(TOTL INS)	(PAYROLL)	(MAJ EXP)	(CONT OTH)*	(MH/UN)	($/MH)	(TOT MH)
6.900000	MISC BUILDINGS	LS*	----	----	6741918	4815656	0	1926262*	---	43.00	111992
6.930000	ADMIN BUILDING	SF*	4000	195.65	782600	559000	0	223600*	3.25	43.00	13000
6.940000	CONTROL BUILDING	LS*	----	----	776580	554700	0	221880*	---	43.00	12900
6.950000	WTR TRTMT BLDG	SF*	3250	162.54	528255	377325	0	150930*	2.70	43.00	8775
6.990000	ALL OTHER	LS*	----	----	4654483	3324631	0	1329852*	---	43.00	77317
6.991000	PLANT MAINT	SF*	3500	99.33	347655	248325	0	99330*	1.65	43.00	5775
6.992000	AUX BOILER	SF*	2000	174.58	349160	249400	0	99760*	2.90	43.00	5800
6.993000	YD EQP MAINT BLD	SF*	2500	99.33	248325	177375	0	70950*	1.65	43.00	4125
6.994000	CHLORINE BLDG	SF*	2250	111.36	250552	178966	0	71586*	1.85	43.00	4162
6.995000	FIRE/SRV PUMP HS	SF*	800	114.38	91504	65360	0	26144*	1.90	43.00	1520
6.996000	GUARD HOUSE	SF*	225	180.60	40635	29025	0	11610*	3.00	43.00	675
6.997000	WAREHOUSE NO. 1	SF*	23000	36.12	830760	593400	0	237360*	0.60	43.00	13800
6.998000	BULK GAS STR BLD	SF*	1200	111.37	133644	95460	0	38184*	1.85	43.00	2220
6.999000	OTHER BUILDINGS	LS*	----	----	2362248	1687320	0	674928*	---	43.00	39240
6.999100	SWTH YD CTRL BL	SF*	800	108.36	86688	61920	0	24768*	1.80	43.00	1440
6.999200	CONTROL & SWGR	SF*	2000	102.34	204680	146200	0	58480*	1.70	43.00	3400
6.999300	SWER TRTMT BLDG	SF*	3000	111.37	334110	238650	0	95460*	1.85	43.00	5550
6.999400	DEWTR & FIXTN	SF*	8000	102.34	818720	584800	0	233920*	1.70	43.00	13600
6.999600	CRSHING & SAMPL	SF*	2000	111.37	222740	159100	0	63640*	1.85	43.00	3700
6.999700	WASTEWTR TRTMT	SF*	7000	99.33	695310	496650	0	198660*	1.65	43.00	11550
7.000000	TURBINE GENERATOR	LS*	----	----	2664900	1776600	0	888300*	---	42.00	42300
7.100000	TURBINE GENERATOR	LS*	----	----	2664900	1776600	0	888300*	---	42.00	42300
8.000000	STM GENER & ACCESS	LS*	----	----	18900000	12600000	0	6300000*	---	42.00	300000

EXHIBIT 1.3 (CONT'D)

APA
NENANA1 200 MW COAL
ESTIMATE NO. APA 1707 M-1

BY: WMP CHECKED: JDF

DATE: 8-NOV-84 TIME: 16:22:42

DETAILED
INSTALLATION BREAKOUT REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ INS)	(TOTL INS)	(PAYROLL)	(MAJ EXP)	(CONT OTH)*	(MH/UN)	($/MH)	(TOT MH)
8.100000	STEAM GENERATOR	LS*	----	----	18900000	12600000	0	6300000*	---	42.00	300000
9.000000	AQCS	LS*	----	----	24185700	16123800	0	8061900*	---	42.00	383900
9.100000	BAGHOUSE	LS*	----	----	4006800	2671200	0	1335600*	---	42.00	63600
9.200000	FLUE GAS DESULFUR	LS*	----	----	17696700	11797800	0	5898900*	---	42.00	280900
9.210000	COMPONENTS	LS*	----	----	17696700	11797800	0	5898900*	---	42.00	280900
9.211000	DUCTWORK FOR FGD	LS*	----	----	1890000	1260000	0	630000*	---	42.00	30000
9.213000	SO2 ABSORB MODULE	LS*	----	----	12694500	8463000	0	4231500*	---	42.00	201500
9.215000	LMST ULD,STR&RECL	LS*	----	----	2016000	1344000	0	672000*	---	42.00	32000
9.216000	LIMESTN PREGENER	LS*	----	----	1096200	730800	0	365400*	---	42.00	17400
9.300000	WASTE DISPOSAL	LS*	----	----	1953000	1302000	0	651000*	---	42.00	31000
9.310000	WASTE DISPOS SYS	LS*	----	----	1953000	1302000	0	651000*	---	42.00	31000
9.311000	WASTE PROCESS EQ	LS*	----	----	1953000	1302000	0	651000*	---	42.00	31000
9.400000	FANS	LS*	----	----	529200	352800	0	176400*	---	42.00	8400
9.410000	I.D. FANS	LS*	----	----	333900	222600	0	111300*	---	42.00	5300
9.420000	SILENCERS	LS*	----	----	195300	130200	0	65100*	---	42.00	3100
10.000000	OTHER MECHAN EQUIP	LS*	----	----	5365269	3576846	0	1788423*	---	42.00	85163
10.100000	PUMPS	LS*	----	----	533547	355698	0	177849*	---	42.00	8469
10.110000	BOILER PUMPS	LS*	----	----	389970	259980	0	129990*	---	42.00	6190
10.111000	BOILER FEED PUMPS	EA*	2	78120.0	156240	104160	0	52080*	---	42.00	2480
10.112000	BF PUMP TURBINES	EA*	2	63000.0	126000	84000	0	42000*	---	42.00	2000
10.113000	BF BOOSTER PUMPS	EA*	2	28350.0	56700	37800	0	18900*	---	42.00	900
10.114000	BF STRT UP/STD BY	LS*	----	----	51030	34020	0	17010*	---	42.00	810
10.120000	FEEDWTR SYS PUMPS	LS*	----	----	1953	1302	0	651*	---	42.00	31

EXHIBIT 1.3 (CONT'D)

APA
NENANA1 200 MW COAL
ESTIMATE NO. APA 1707 M-1

BY: WMP CHECKED: JDF

DATE: 8-NOV-84 TIME: 16:22:42

DETAILED
INSTALLATION BREAKOUT REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ INS)	(TOTL INS)	(PAYROLL)	(MAJ EXP)	(CONT OTH)*	(MH/UN)	($/MH)	(TOT MH)
10.121000	CONDEN TRANSFER	LS*	----	----	1953	1302	0	651*	---	42.00	31
10.130000	SRV & COOL WTR PMP	LS*	----	----	29988	19992	0	9996*	---	42.00	476
10.131000	SERVICE WATER	EA*	4	2961.00	11844	7896	0	3948*	47.00	42.00	188
10.132000	AIR HTR WASH PMPS	LS*	----	----	7812	5208	0	2604*	---	42.00	124
10.133000	CLSD CYC COOL WSP	EA*	2	5166.00	10332	6888	0	3444*	82.00	42.00	164
10.140000	OIL PUMPS	LS*	----	----	13671	9114	0	4557*	---	42.00	217
10.141000	LGT OIL UNLD PMPS	EA*	2	1953.00	3906	2604	0	1302*	31.00	42.00	62
10.142000	IGNITER OIL PUMPS	EA*	3	1953.00	5859	3906	0	1953*	31.00	42.00	93
10.143000	TURB LO TRANS PMP	LS*	----	----	1953	1302	0	651*	---	42.00	31
10.145000	LO COND PUMP	LS*	----	----	1953	1302	0	651*	---	42.00	31
10.150000	SUMP PUMPS	EA*	6	1260.00	7560	5040	0	2520*	20.00	42.00	120
10.160000	OTHER PUMPS	LS*	----	----	90405	60270	0	30135*	---	42.00	1435
10.161000	COOLING TOWER MU	LS*	----	----	35280	23520	0	11760*	---	42.00	560
10.162000	OP CYC CLG WTR	EA*	2	8820.0	17640	11760	0	5880*	---	42.00	280
10.163000	FIRE PROTECT PMPS	EA*	3	10521.0	31563	21042	0	10521*	---	42.00	501
10.164000	AIR PREHTR GLY	EA*	2	2961.00	5922	3948	0	1974*	47.00	42.00	94
10.200000	CONDENSING PLANT	LS*	----	----	697599	465066	0	232533*	---	42.00	11073
10.210000	CONDENSER & AUXIL	LS*	----	----	585900	390600	0	195300*	---	42.00	9300
10.220000	EQUIPMENT	LS*	----	----	111699	74466	0	37233*	---	42.00	1773
10.221000	CW PUMPS	EA*	2	16632.0	33264	22176	0	11088*	---	42.00	528
10.222000	CONDENSATE PUMPS	EA*	2	15624.0	31248	20832	0	10416*	---	42.00	496
10.223000	VACUUM PUMPS	EA*	2	6867.0	13734	9156	0	4578*	---	42.00	218
10.226000	COND CLEAN SYS	LS*	----	----	31500	21000	0	10500*	---	42.00	500

EXHIBIT 1.3 (CONT'D)

APA
NENANA1 200 MW COAL
ESTIMATE NO. APA 1707 M-1

BY: WMP CHECKED: JDF

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DETAILED
INSTALLATION BREAKOUT REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ INS)	(TOTL INS)	(PAYROLL)	(MAJ EXP)	(CONT OTH)*	(MH/UN)	($/MH)	(TOT MH)
10.227000	COND COLL PUMP	LS*	----	----	1953	1302	0	651*	---	42.00	31
10.300000	HEAT EXCHANGERS	LS*	----	----	181818	121212	0	60606*	---	42.00	2886
10.310000	FEEDWATER HEATERS	EA*	7	14238.0	99666	66444	0	33222*	---	42.00	1582
10.320000	DEAER/ VENT CONDEN	LS*	----	----	42840	28560	0	14280*	---	42.00	680
10.330000	CLSD CYC COOL WHE	EA*	2	15750.0	31500	21000	0	10500*	---	42.00	500
10.340000	AIR PRHTR GLY HE	EA*	2	3906.00	7812	5208	0	2604*	62.00	42.00	124
10.400000	TANKS	LS*	----	----	540225	360150	0	180075*	---	42.00	8575
10.410000	WATER TANKS	LS*	----	----	398475	265630	0	132825*	---	42.00	6325
10.412000	CONDEN STRG TANK	LS*	----	----	146475	97650	0	48825*	---	42.00	2323
10.414000	FIRE&SRV WTR STRG	LS*	----	----	252000	168000	0	84000*	---	42.00	4000
10.430000	LGT OIL STRG TANK	LS*	----	----	85932	57288	0	28644*	---	42.00	1364
10.440000	OTHER FL OIL STRG	EA*	3	6552.0	19656	13104	0	6552*	---	42.00	312
10.450000	OTHER OIL TANKS	LS*	----	----	36162	24108	0	12054*	---	42.00	574
10.452000	BATCH OIL TANK	LS*	----	----	15750	10500	0	5250*	---	42.00	250
10.453000	CONT BLWDWN FL TK	LS*	----	----	3150	2100	0	1050*	---	42.00	50
10.454000	INT BLWDWN FLH TK	LS*	----	----	5859	3906	0	1953*	---	42.00	93
10.455000	COND COLL TANK	LS*	----	----	1953	1302	0	651*	---	42.00	31
10.456000	CLSD CYC CL WHT	LS*	----	----	3150	2100	0	1050*	---	42.00	50
10.457000	AIR PREHT CL EX	LS*	----	----	6300	4200	0	2100*	---	42.00	100
10.500000	MISCELLANEOUS EQUIP	LS*	----	----	696780	464520	0	232260*	---	42.00	11060
10.510000	CONPRESSED AIR EQP	LS*	----	----	132300	88200	0	44100*	---	42.00	2100
10.512000	STAT AIR COMPRESS	EA*	2	63000.0	126000	84000	0	42000*	---	42.00	2000
10.513000	AIR DRYERS	LS*	----	----	6300	4200	0	2100*	---	42.00	100

EXHIBIT 1.3 (CONT'D)

APA
NENANA1 200 MW COAL
ESTIMATE NO. APA 1707 M-1

BY: WMP CHECKED: JDF

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DETAILED
INSTALLATION BREAKOUT REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ INS)	(TOTL INS)	(PAYROLL)	(MAJ EXP)	(CONT OTH)*	(MH/UN)	($/MH)	(TOT MH)
10.520000	WTR TREAT EQUIP	LS*	----	----	564480	376320	0	188160*	---	42.00	8960
10.521000	MKUP WTR TRTMT	LS*	----	----	234360	156240	0	78120*	---	42.00	3720
10.522000	COND POL DEMINER	LS*	----	----	234360	156240	0	78120*	---	42.00	3720
10.523000	CHLORINAT EQUIP	LS*	----	----	39060	26040	0	13020*	---	42.00	620
10.524000	BOILER CHEM FEED	LS*	----	----	11970	7980	0	3990*	---	42.00	190
10.525000	SAMPLING SYSTEM	LS*	----	----	17640	11760	0	5880*	---	42.00	280
10.526000	BLK GAS STR&DISTR	LS*	----	----	27090	18060	0	9030*	---	42.00	430
10.600000	AUXILIARY BOILER	LS*	----	----	157500	105000	0	52500*	---	42.00	2500
10.700000	CECI	LS*	----	----	882000	588000	0	294000*	---	42.00	14000
10.800000	EQUIP UNLOAD FACIL	LS*	----	----	126000	84000	0	42000*	---	42.00	2000
10.900000	TURBINE BYPASS	LS*	----	----	1549800	1033200	0	516600*	---	42.00	24600
11.000000	COAL&ASH HNDL EQUIP	LS*	----	----	10495926	6997284	0	3498642*	---	42.00	166602
11.100000	COAL HANDLING	LS*	----	----	8410500	5607000	0	2803500*	---	42.00	133500
11.110000	THAWING FACILITY	LS*	----	----	315000	210000	0	105000*	---	42.00	5000
11.120000	UNLOADING FACILITY	LS*	----	----	976500	651000	0	325500*	---	42.00	15500
11.121000	ROTARY CAR DUMPER	LS*	----	----	504000	336000	0	168000*	---	42.00	8000
11.122000	CONVEYOR NO 1	LS*	----	----	472500	315000	0	157500*	---	42.00	7500
11.130000	STACKOUT SYSTEM	LS*	----	----	1272600	848400	0	424200*	---	42.00	20200
11.131000	CONVEYOR NO 2	LS*	----	----	1272600	848400	0	424200*	---	42.00	20200
11.140000	RECLAIM SYSTEM	LS*	----	----	2948400	1965600	0	982800*	---	42.00	46800
11.141000	STACKER RECLAIMER	LS*	----	----	1701000	1134000	0	567000*	---	42.00	27000
11.142000	CONVEYOR NO 5	LS*	----	----	415800	277200	0	138600*	---	42.00	6600
11.143000	EMER RECLM HOPPER	LS*	----	----	12600	8400	0	4200*	---	42.00	200

EXHIBIT 1.3 (CONT'D)

APA
NENANA1 200 MW COAL
ESTIMATE NO. APA 1707 M-1

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DETAILED
INSTALLATION BREAKOUT REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ INS)	(TOTL INS)	(PAYROLL)	(MAJ EXP)	(CONT OTH)*	(MH/UN)	($/MH)	(TOT MH)
11.144000	CONVEYOR NO 6	LS*	----	----	340200	226800	0	113400*	---	42.00	5400
11.145000	CONVEYOR NO 7A&7B	EA*	2	239400.0	478800	319200	0	159600*	---	42.00	7600
11.160000	CRUSH & TRANSF SYS	LS*	----	----	1896300	1264200	0	632100*	---	42.00	30100
11.161000	CONVEYOR NO 8A&8B	EA*	2	428400.0	856800	571200	0	285600*	---	42.00	13600
11.162000	SURGE BIN	LS*	----	----	157500	105000	0	52500*	---	42.00	2500
11.163000	SAMPLING SYSTEM	LS*	----	----	504000	336000	0	168000*	---	42.00	8000
11.164000	COAL CRUSHERS	LS*	----	----	44100	29400	0	14700*	---	42.00	700
11.165000	CONVEYOR NO 9A	LS*	----	----	333900	222600	0	111300*	---	42.00	5300
11.170000	MISC SYSTEMS	LS*	----	----	1001700	667800	0	333900*	---	42.00	15900
11.172000	FIRE PROTECTION	LS*	----	----	630000	420000	0	210000*	---	42.00	10000
11.173000	TUNNEL VENT	LS*	----	----	31500	21000	0	10500*	---	42.00	500
11.174000	INSTRUM & CONTROL	LS*	----	----	63000	42000	0	21000*	---	42.00	1000
11.176000	MISC EQUIPMENT	LS*	----	----	277200	184800	0	92400*	---	42.00	4400
11.200000	BTM ASH HNDL SYSTEM	LS*	----	----	1474326	982884	0	491442*	---	42.00	23402
11.210000	FURN BTM ASH SYS	LS*	----	----	478800	319200	0	159600*	---	42.00	7600
11.220000	PYRITE HNDL SYSTEM	LS*	----	----	51030	34020	0	17010*	---	42.00	810
11.230000	ECONOMIZER ASH SYS	LS*	----	----	132300	88200	0	44100*	---	42.00	2100
11.240000	DEWTW BIN&SET TKS	LS*	----	----	642600	428400	0	214200*	---	42.00	10200
11.250000	MAJOR PUMPS	EA*	3	35532.0	106596	71064	0	35532*	---	42.00	1692
11.260000	BTM ASH INSTRUM	LS*	----	----	63000	42000	0	21000*	---	42.00	1000
11.400000	FLY ASH INST & CTL	LS*	----	----	611100	407400	0	203700*	---	42.00	9700
12.000000	PIPING	LS*	----	----	19708038	13138692	0	6569346*	---	42.00	312826
12.100000	LARGE BORE PIPING	TN*	944	11913.3	11246130	7497420	0	3748710*	---	42.00	178510

EXHIBIT 1.3 (CONT'D)

APA
NENANA1 200 MW COAL
ESTIMATE NO. APA 1707 M-1

BY: WMP CHECKED: JDF

DATE: 8-NOV-84 TIME: 16:22:42

DETAILED
INSTALLATION BREAKOUT REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ INS)	(TOTL INS)	(PAYROLL)	(MAJ EXP)	(CONT OTH)*	(MH/UN)	($/MH)	(TOT MH)
12.200000	SMALL BORE PIPING	LF*	86100	98.28	8461908	5641272	0	2820636*	1.56	42.00	134316
13.000000	INSULATION	LS*	----	----	7364700	4909800	0	2454900*	---	42.00	116900
13.100000	INSULATION	LS*	----	----	7364700	4909800	0	2454900*	---	42.00	116900
14.000000	INSTRUMENTATION	LS*	----	----	567000	378000	0	189000*	---	42.00	9000
14.100000	INSTRUMENTATION	LS*	----	----	567000	378000	0	189000*	---	42.00	9000
15.000000	ELECTRICAL EQUIPMENT	LS*	----	----	37911931	25207954	100000	12603977*	---	46.00	547999
15.100000	TRANFORMERS	LS*	----	----	476031	317354	0	158677*	---	46.00	6899
15.110000	MAIN TRANSFORMER	EA*	1	0.0	124200	82800	0	41400*	---	46.00	1800
15.120000	START-UP XMFR	EA*	2	24150.0	48300	32200	0	16100*	---	46.00	700
15.130000	AUXILIARY XMFR	LS*	----	----	303531	202354	0	101177*	---	46.00	4399
15.131000	COMMON SERV XMFR	EA*	2	17250.0	34500	23000	0	11500*	---	46.00	500
15.132000	STATION SRV XMFR	EA*	6	4588.50	27531	18354	0	9177*	66.60	46.00	399
15.133000	LTG & MISC XMFR	EA*	50	2208.00	110400	73600	0	36800*	32.00	46.00	1600
15.134000	FIRE PROTECTION	LT*	1	0.0	131100	87400	0	43700*	---	46.00	1900
15.200000	SWITCHGEARS	LS*	----	----	545100	363400	0	181700*	---	46.00	7900
15.300000	MOTORS	EA*	1	0.0	310500	207000	0	103500*	---	46.00	4500
15.400000	AQCS ELEC SYSTEM	LS*	----	----	552000	368000	0	184000*	---	46.00	8000
15.410000	STATION SERV XMFR	EA*	4	6900.0	27600	18400	0	9200*	---	46.00	400
15.420000	AQCS SWITCHGEAR	LS*	----	----	57270	38180	0	19090*	---	46.00	830
15.421000	SWITCHGEARS	LS*	----	----	24150	16100	0	8050*	---	46.00	350
15.422000	POWER CENTER	ST*	1	0.0	33120	22080	0	11040*	---	46.00	480
15.430000	MOTORS	EA*	1	0.0	13800	9200	0	4600*	---	46.00	200
15.440000	NON-SEGREGATED BUS	LS*	----	----	453330	302220	0	151110*	---	46.00	6570

EXHIBIT 1.3 (CONT'D)

APA
NENANA1 200 MW COAL
ESTIMATE NO. APA 1707 M-1

BY: WMP CHECKED: JDF

DATE: 8-NOV-84 TIME: 16:22:42

DETAILED
INSTALLATION BREAKOUT REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ INS)	(TOTL INS)	(PAYROLL)	(MAJ EXP)	(CONT OTH)*	(MH/UN)	($/MH)	(TOT MH)
15.500000	SWITCHBOARDS	LS*	----	----	172500	115000	0	57500*	---	46.00	2500
15.600000	GENERATOR GEARS BUS	LS*	----	----	517500	345000	0	172500*	---	46.00	7500
15.700000	WIRING SYSTEM	LS*	----	----	29632000	19688000	100000	9844000*	---	46.00	428000
15.800000	LIGHTING SYSTEM	LT*	1	0.0	3105000	2070000	0	1035000*	---	46.00	45000
15.900000	AUX ELEC EQUIPMENT	LS*	----	----	2601300	1734200	0	867100*	---	46.00	37700
16.000000	PAINTING	LS*	----	----	2227680	1591200	0	636480*	---	39.00	40800
16.100000	TURBINE BUILDING	LS*	----	----	600600	429000	0	171600*	---	39.00	11000
16.200000	STEAM GEN BLDG	LS*	----	----	1092000	780000	0	312000*	---	39.00	20000
16.300000	SILO BAY	LS*	----	----	109200	78000	0	31200*	---	39.00	2000
16.900000	MISCELLANEOUS	LS*	----	----	425880	304200	0	121680*	---	39.00	7800
17.000000	OFF-SITE FACILITIES	LS*	----	----	13257730	6173240	0	7084490*	---	40.56	152200
17.100000	RANNEY WELL SYSTEM	LS*	----	----	2513700	1117200	0	1396500*	---	42.00	26600
17.200000	ACCESS ROADS	MI*	10	231715.0	2317150	842600	0	1474550*	---	42.13	20000
17.300000	ACCESS RAILROAD	LF*	52800	159.60	8426880	4213440	0	4213440*	2.00	39.90	105600
19.000000	SUBSTATION/T-LINE	LS*	----	----	2740400	1612000	0	1128400*	---	40.30	40000
19.100000	SUBSTATION	LS*	----	----	1027650	604500	0	423150*	---	40.30	15000
19.200000	230KV T-LINE:1 CIR	MI*	10	171275.0	1712750	1007500	0	705250*	---	40.30	25000
71.000000	INDIRECT CONST COST	LS*	----	----	53788790	14372436	29033000	10383354*	---	30.81	466475
71.100000	FIELD LOCAL HIRES	LS*	----	----	4472325	2475000	0	1997325*	---	16.50	150000
71.200000	CRAFT P/R FRINGES	LS*	----	----	3600000	0	3600000	0*	---	0.00	0
71.210000	PREM PAY-CASUAL	LS*	----	----	2400000	0	2400000	0*	---	30.75	0
71.220000	PREM PAY-SCHED	LS*	----	----	1200000	0	1200000	0*	---	30.75	0
71.300000	CONSTR EQUIPT	LS*	----	----	171000	0	171000	0*	---	0.00	0

EXHIBIT 1.3 (CONT'D)

APA
NENANA1 200 MW COAL
ESTIMATE NO. APA 1707 M-1

BY: WMP CHECKED: JDF DATE: 8-NOV-84 TIME: 16:22:42

DETAILED
INSTALLATION BREAKOUT REPORT.

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ INS)	(TOTL INS)	(PAYROLL)	(MAJ EXP)	(CONT OTH)*	(MH/UN)	($/MH)	(TOT MH)
71.310000	AUTOMOTIVE(C/M)	LS*	----	----	171000	0	171000	0*	---	0.00	0
71.400000	CONSTRUCTION PLANT	LS*	----	----	31416262	2851699	25005500	3559063*	---	43.60	65400
71.410000	CONSTRUCTN BLDGS	LS*	----	----	1588500	600000	712500	276000*	---	40.00	15000
71.420000	TEMP FACILITIES	LS*	----	----	29827762	2251699	24293000	3283063*	---	44.68	50400
71.421000	LABOR CAMP	LS*	----	----	10725000	0	10725000	0*	---	0.00	0
71.422000	FOOD SERVICE	LS*	----	----	12225000	0	12225000	0*	---	0.00	0
71.423000	TEMPORARY POWER	LS*	----	----	2389868	1260400	285000	844468*	---	46.00	27400
71.423100	69KV T-LINE	MI*	10	238986.8	2389868	1260400	285000	844468*	---	46.00	27400
71.424000	OTHER TEMP FACIL	LS*	----	----	4487894	991299	1058000	2438595*	---	43.10	23000
71.600000	OFFICE/LABOR EXP	LS*	----	----	2056370	1519750	256500	280120*	---	21.40	71000
71.610000	OFFICE EXPENSE	LS*	----	----	147250	0	147250	0*	---	0.00	0
71.620000	LABOR EXPENSE	LS*	----	----	691070	595750	0	95320*	---	23.83	25000
71.630000	TESTING	LS*	----	----	756050	462000	109250	184800*	---	42.00	11000
71.640000	SECURITY GUARDS	LS*	----	----	462000	462000	0	0*	---	13.20	35000
71.800000	CONSTRUCTN CLEANUP	LS*	----	----	293368	209549	0	83819*	---	38.10	5500
71.900000	PRODUCTIVITY ADJ	LS*	----	----	11779465	7316438	0	4463027*	---	41.91	174575
72.000000	PROFESSIONAL SERVCS	LS*	----	----	56050000	0	56050000	0*	---	0.00	0

EXHIBIT 1.3 (CONT'D)

UNIT 2
RAIL DELIVERY OF COAL/LIME

APA
NENANA2 200 MW COAL
ESTIMATE NO. APA 1707 M-1

BY: WMP CHECKED: JDF

DATE: 12-NOV-84 TIME: 14:03:21

SUMMARY
MATERIAL & INSTALLATION REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ TOT)	(TOTAL AMT)*	(TOT MATL)	(UN $MAT)*	(U $ INS)	(TOT INST)*	(TOT ESC)	(MAT ESC)	(INS ESC)
99.000000	TOTAL PROJECT COST	LS*	----	----	386860660*	154503037	---- *	----	232357623*	0	0	0
100.000000	CONTINGENCY	LS*	----	----	46861414*	16553896	---- *	----	30307518*	0	0	0
300.000000	TOTAL COST W/O CONT	LS*	----	----	339999246*	137949141	---- *	----	202050105*	0	0	0
1.000000	IMPROVEMNTS TO SITE	LS*	----	----	446206*	219100	---- *	----	227106*	0	0	0
2.000000	EARTHWORK & PILING	LS*	----	----	16040024*	8017050	---- *	----	8022974*	0	0	0
3.000000	CIRC WATER SYSTEM	LS*	----	----	7852357*	3730555	---- *	----	4121802*	0	0	0
4.000000	CONCRETE	LS*	----	----	15813078*	3518273	---- *	----	12294805*	0	0	0
5.000000	STRCT STL/LFT EQP	LS*	----	----	19778899*	8212449	---- *	----	11566450*	0	0	0
6.000000	BUILDINGS	LS*	----	----	9493920*	3287824	---- *	----	6206096*	0	0	0
7.000000	TURBINE GENERATOR	LS*	----	----	18514900*	15850000	---- *	----	2664900*	0	0	0
8.000000	STM GENER & ACCESS	LS*	----	----	42100000*	23200000	---- *	----	18900000*	0	0	0
9.000000	AQCS	LS*	----	----	40251635*	21131135	---- *	----	19120500*	0	0	0
10.000000	OTHER MECHAN EQUIP	LS*	----	----	13336497*	9545850	---- *	----	3790647*	0	0	0
11.000000	COAL&ASH HNDL EQUIP	LS*	----	----	6315436*	3496060	---- *	----	2819376*	0	0	0
12.000000	PIPING	LS*	----	----	26853092*	9521792	---- *	----	17331300*	0	0	0
13.000000	INSULATION	LS*	----	----	7231831*	792853	---- *	----	6438978*	0	0	0
14.000000	INSTRUMENTATION	LS*	----	----	6742000*	6175000	---- *	----	567000*	0	0	0
15.000000	ELECTRICAL EQUIPMENT	LS*	----	----	51925993*	18837300	---- *	----	33088693*	0	0	0
16.000000	PAINTING	LS*	----	----	2281300*	151900	---- *	----	2129400*	0	0	0
17.000000	OFF-SITE FACILITIES	LS*	----	----	3095700*	582000	---- *	----	2513700*	0	0	0
19.000000	SUBSTATION/T-LINE	LS*	----	----	3050200*	1680000	---- *	----	1370200*	0	0	0
71.000000	INDIRECT CONST COST	LS*	----	----	32876178*	0	---- *	----	32876178*	0	0	0
72.000000	PROFESSIONAL SERVCS	LS*	----	----	16000000*	0	---- *	----	16000000*	0	0	0

EXHIBIT 1.4

APA
NENANA2 200 MW COAL
ESTIMATE NO. APA 1707 M-1

BY: WMP CHECKED: JDF

DATE: 12-NOV-84 TIME: 14:03:21

DETAILED
MATERIAL & INSTALLATION REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ TOT)	(TOTAL AMT)*	(TOT MATL)	(UN $MAT)*	(U $ INS)	(TOT INST)*	(TOT ESC)	(MAT ESC)	(INS ESC)
99.000000	TOTAL PROJECT COST	LS*	----	----	386860660*	154503037	---- *	----	232357623*	0	0	0
100.000000	CONTINGENCY	LS*	----	----	46861414*	16553896	---- *	----	30307518*	0	0	0
300.000000	TOTAL COST W/O CONT	LS*	----	----	339999246*	137949141	---- *	----	202050105*	0	0	0
1.000000	IMPROVEMNTS TO SITE	LS*	----	----	446206*	219100	---- *	----	227106*	0	0	0
1.300000	SITE DRAINAGE	LS*	----	----	403872*	202000	---- *	----	201872*	0	0	0
1.500000	SEWAGE FACILITIES	LS*	----	----	42334*	17100	---- *	----	25234*	0	0	0
2.000000	EARTHWORK & PILING	LS*	----	----	16040024*	8017050	---- *	----	8022974*	0	0	0
2.200000	STRCTR & EQUIP EXC	LS*	----	----	1701895*	0	---- *	----	1701895*	0	0	0
2.2[illegible]000	STATION AREA	LS*	----	----	545105*	0	---- *	----	545105*	0	0	0
2.212000	EARTH EXCAVATION	CY*	18700	29.1	545105*	0	0.00*	29.1	545105*	0	0	0
2.240000	OUTLY TKS EQP/STR	LS*	----	----	169070*	0	---- *	----	169070*	0	0	0
2.242000	EARTH EXCAVATION	CY*	5800	29.1	169070*	0	0.00*	29.1	169070*	0	0	0
2.250000	AQCS FDNS	LS*	----	----	987720*	0	---- *	----	987720*	0	0	0
2.252000	EARTH EXCAVATION	CY*	15000	29.1	437250*	0	0.00*	29.1	437250*	0	0	0
2.253000	ROCK EXCAVATION	CY*	7400	74.4	550470*	0	0.00*	74.4	550470*	0	0	0
2.300000	TRENCHING	LS*	----	----	1469942*	0	---- *	----	1469942*	0	0	0
2.310000	CIRC WATER COND	LS*	----	----	529178*	0	---- *	----	529178*	0	0	0
2.312000	EARTH EXCAVATION	CY*	13700	28.2	386091*	0	0.00*	28.2	386091*	0	0	0
2.313000	ROCK EXCAVATION	CY*	1800	79.5	143087*	0	0.00*	79.5	143087*	0	0	0
2.320000	YARD PIPING	LS*	----	----	848532*	0	---- *	----	848532*	0	0	0
2.322000	EARTH EXCAVATION	CY*	27600	30.7	848532*	0	0.00*	30.7	848532*	0	0	0
2.330000	SEWERS & DRAINS	LS*	----	----	92232*	0	---- *	----	92232*	0	0	0
2.332000	EARTH EXCAVATION	CY*	3000	30.7	92232*	0	0.00*	30.7	92232*	0	0	0

EXHIBIT 1.4 (CONT'D)

APA
NENANA2 200 MW COAL
ESTIMATE NO. APA 1707 M-1

BY: WMP CHECKED: JDF

DATE: 12-NOV-84 TIME: 14:03:21

DETAILED
MATERIAL & INSTALLATION REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ TOT)	(TOTAL AMT)*	(TOT MATL)	(UN $MAT)*	(U $ INS)	(TOT INST)*	(TOT ESC)	(MAT ESC)	(INS ESC)
2.500000	PILES (H PILES)	LS*	----	----	12408187*	7965750	---- *	----	4442437*	0	0	0
2.510000	STATION AREA	LF*	155000	57.7	8945437*	5742750	37.05*	20.7	3202687*	0	0	0
2.520000	AQCS AREA	LF*	60000	57.7	3462750*	2223000	37.05*	20.7	1239750*	0	0	0
2.700000	CECI-EXCV-ERTH STR	LS*	----	----	460000*	51300	---- *	----	408700*	0	0	0
2.730000	SLD WST STK PILE	LS*	----	----	460000*	51300	---- *	----	408700*	0	0	0
2.731000	PVC LINER	SF*	120000	0.5	57700*	51300	0.43*	0.1	6400*	0	0	0
2.732000	EXCAVATION	CY*	15000	17.9	268200*	0	0.00*	17.9	268200*	0	0	0
2.733000	BACKFILL	CY*	5000	26.8	134100*	0	0.00*	26.8	134100*	0	0	0
3.000000	CIRC WATER SYSTEM	LS*	----	----	7852357*	3730555	---- *	----	4121802*	0	0	0
3.200000	INTK & DISC PIPING	LS*	----	----	1959586*	782610	---- *	----	1176976*	0	0	0
3.210000	CONCR PIPE: 60"	LF*	3000	346.3	1038990*	541500	180.50*	165.8	497490*	0	0	0
3.260000	BEDDING MATERIAL	CY*	1850	30.0	55459*	17575	9.50*	20.5	37884*	0	0	0
3.270000	CONCRET STRUCTURE	LS*	----	----	816823*	204915	---- *	----	611908*	0	0	0
3.271000	THRST & TRNS BLK	CY*	750	428.1	321093*	92625	123.50*	304.6	228468*	0	0	0
3.272000	CONDENS BLOCKS	CY*	400	897.0	358817*	79420	198.55*	698.5	279397*	0	0	0
3.273000	PITOT TUBE PIT	CY*	200	684.6	136913*	32870	164.35*	520.2	104043*	0	0	0
3.280000	MISCELLAN STEEL	TN*	7	6902.0	48314*	18620	2660.00*	4242.0	29694*	0	0	0
3.400000	COOL TOWER FACIL	LS*	----	----	5892771*	2947945	---- *	----	2944826*	0	0	0
3.410000	TOWER BASIN	LS*	----	----	769115*	193800	---- *	----	575315*	0	0	0
3.411000	EXCAVATION	CY*	6500	22.4	145275*	0	0.00*	22.4	145275*	0	0	0
3.412000	CONC CW COOL TWR	CY*	1500	415.9	623840*	193800	129.20*	286.7	430040*	0	0	0
3.420000	PUMP CHAMBER	LS*	----	----	843815*	216695	---- *	----	627120*	0	0	0
3.422000	EXCAVATION	CY*	4500	22.4	100575*	0	0.00*	22.4	100575*	0	0	0

EXHIBIT 1.4 (CONT'D)

APA
NENANA2 200 MW COAL
ESTIMATE NO. APA 1707 M-1

BY: WMP CHECKED: JDF

DATE: 12-NOV-84 TIME: 14:03:21

DETAILED
MATERIAL & INSTALLATION REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ TOT)	(TOTAL AMT)*	(TOT MATL)	(UN $MAT)*	(U $ INS)	(TOT INST)*	(TOT ESC)	(MAT ESC)	(INS ESC)
3.423000	CONCRETE	CY*	1500	463.3	694926*	198075	132.05*	331.2	496851*	0	0	0
3.424000	MISC STEEL	TN*	7	6902.0	48314*	18620	2660.00*	4242.0	29694*	0	0	0
3.430000	INTAKE EQUIPMENT	LS*	----	----	380410*	318250	---- *	----	62160*	0	0	0
3.433000	SCREENS	SF*	500	56.8	28390*	14250	28.50*	28.3	14140*	0	0	0
3.435000	STOP LOGS	SF*	500	71.1	35570*	28500	57.00*	14.1	7070*	0	0	0
3.436000	CRANE BRIDGE 15T	EA*	1	0.0	316450*	275500	---- *	0.0	40950*	0	0	0
3.440000	PMP HS SPR STRUCT	LS*	----	----	740943*	319200	---- *	----	421743*	0	0	0
3.441000	CRANE & HST SUPP	TN*	75	3075.4	230655*	114000	1520.00*	1555.4	116655*	0	0	0
3.442000	BUILDING SPRSTR	SF*	6000	85.0	510288*	205200	34.20*	50.8	305088*	0	0	0
3.450000	TOWER SPR STRUCT	LS*	----	----	3158488*	1900000	---- *	----	1258488*	0	0	0
4.000000	CONCRETE	LS*	----	----	15813078*	3518273	---- *	----	12294805*	0	0	0
4.100000	TURBINE BLDG CONCR	CY*	4500	831.4	3741485*	628425	139.65*	691.8	3113060*	0	0	0
4.200000	BOILER AREA CONCRT	CY*	1900	732.8	1392361*	265335	139.65*	593.2	1127026*	0	0	0
4.300000	SILO AREA CONCRETE	CY*	1700	765.7	1301644*	237404	139.65*	626.0	1064240*	0	0	0
4.400000	AQCS CONCRETE	CY*	8800	764.3	6726105*	1228920	139.65*	624.7	5497185*	0	0	0
4.900000	MISCELL CONCRETE	LS*	----	----	2651483*	1158189	---- *	----	1493294*	0	0	0
4.910000	YARD PIPING VAULT	LS*	----	----	1708810*	906820	---- *	----	801990*	0	0	0
4.920000	OTHER MISC CONC	CY*	1800	523.7	942673*	251369	139.65*	384.1	691304*	0	0	0
5.000000	STRCT STL/LFT EQP	LS*	----	----	19778899*	8212449	---- *	----	11566450*	0	0	0
5.100000	TURBINE BUILDING	LS*	----	----	4092895*	1945505	---- *	----	2147390*	0	0	0
5.110000	MAIN STEEL	TN*	1200	2377.5	2853000*	1425000	1187.50*	1190.0	1428000*	0	0	0
5.120000	FRAMING	LS*	----	----	363300*	179550	---- *	----	183750*	0	0	0
5.121000	WALL FRAMING	TN*	105	3460.0	363300*	179550	1710.00*	1750.0	183750*	0	0	0

EXHIBIT 1.4 (CONT'D)

APA
NENANA2 200 MW COAL
ESTIMATE NO. APA 1707 M-1

BY: WMP CHECKED: JDF

DATE: 12-NOV-84 TIME: 14:03:21

DETAILED
MATERIAL & INSTALLATION REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ TOT)	(TOTAL AMT)*	(TOT MATL)	(UN $MAT)*	(U $ INS)	(TOT INST)*	(TOT ESC)	(MAT ESC)	(INS ESC)
5.130000	MISC STEEL	LS*	----	----	557295*	122455	---- *	----	434840*	0	0	0
5.131000	GRATING 1-3/4"	SF*	12000	27.6	331800*	79800	6.65*	21.0	252000*	0	0	0
5.132000	CHECKERED PLATE	SF*	600	57.3	34410*	6270	10.45*	46.9	28140*	0	0	0
5.133000	HANDRAIL	LF*	1000	102.2	102225*	14725	14.73*	87.5	87500*	0	0	0
5.134000	LADDERS & STRWYS	TN*	12	7405.0	88860*	21660	1805.00*	5600.0	67200*	0	0	0
5.140000	LIFTING EQUIP	LS*	----	----	319300*	218500	---- *	----	100800*	0	0	0
5.141000	CRANE: 40 T CAP	LS*	----	----	319300*	218500	---- *	----	100800*	0	0	0
5.200000	STEAM GENERATOR	LS*	----	----	11849152*	4370982	---- *	----	7478170*	0	0	0
5.210000	MAIN STEEL	TN*	2300	2377.5	5468250*	2731250	1187.50*	1190.0	2737000*	0	0	0
5.220000	FRAMING	LS*	----	----	1899700*	632700	---- *	----	1267000*	0	0	0
5.221000	WALL FRAMING	TN*	330	5210.0	1719300*	564300	1710.00*	3500.0	1155000*	0	0	0
5.222000	ELEV FRAMING	TN*	40	4510.0	180400*	68400	1710.00*	2800.0	112000*	0	0	0
5.230000	MISC STEEL	LS*	----	----	4242752*	888282	---- *	----	3354470*	0	0	0
5.231000	GRATING (1-3/4")	SF*	70000	27.6	1935500*	465500	6.65*	21.0	1470000*	0	0	0
5.232000	CHECKERED PLATE	SF*	1600	57.3	91760*	16720	10.45*	46.9	75040*	0	0	0
5.233000	HANDRAIL	LF*	12500	105.7	1321492*	184062	14.73*	91.0	1137430*	0	0	0
5.234000	LADDERS & STRWY	TN*	120	7450.0	894000*	222000	1850.00*	5600.0	672000*	0	0	0
5.240000	LIFTING EQUIP	LS*	----	----	238450*	118750	---- *	----	119700*	0	0	0
5.242000	ELEV EQUIPMENT	LS*	----	----	142000*	47500	---- *	----	94500*	0	0	0
5.243000	OTHER LIFT EQUIP	LS*	----	----	96450*	71250	---- *	----	25200*	0	0	0
5.243100	(3) 15 TON HST	LS*	----	----	96450*	71250	---- *	----	25200*	0	0	0
5.300000	SILO BAY	LS*	----	----	3533602*	1767712	---- *	----	1765890*	0	0	0
5.310000	MAIN STEEL	TN*	225	2377.5	534937*	267187	1187.50*	1190.0	267750*	0	0	0

EXHIBIT 1.4 (CON T'D)

APA
NEWANA2 200 MW COAL
ESTIMATE NO. APA 1707 M-1

BY: WMP CHECKED: JDF

DATE: 12-NOV-84 TIME: 14:03:21

DETAILED
MATERIAL & INSTALLATION REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ TOT)	(TOTAL AMT)*	(TOT MATL)	(UN $MAT)*	(U $ INS)	(TOT INST)*	(TOT ESC)	(MAT ESC)	(INS ESC)
5.320000	FRAMING	LS*	----	----	338650*	111150	---- *	----	227500*	0	0	0
5.321000	WALL FRAMING	TN*	65	5210.0	338650*	111150	1710.00*	3500.0	227500*	0	0	0
5.330000	MISC STEEL	LS*	----	----	337000*	190000	---- *	----	147000*	0	0	0
5.340000	LIFTING EQUIPMENT	LS*	----	----	74640*	57000	---- *	----	17640*	0	0	0
5.343000	OTHER LIFT EQUIP	LS*	----	----	74640*	57000	---- *	----	17640*	0	0	0
5.350000	SUPPORT STEEL	LS*	----	----	741750*	251750	---- *	----	490000*	0	0	0
5.351000	EQUIP SUPPORTS	TN*	100	7417.5	741750*	251750	2517.50*	4900.0	490000*	0	0	0
5.360000	STL SILO & CVR PL	LS*	----	----	1506625*	890625	---- *	----	616000*	0	0	0
5.361000	STEEL SILOS	TN*	170	6742.5	1146225*	670225	3942.50*	2800.0	476000*	0	0	0
5.362000	SS PLATES	TN*	40	9010.0	360400*	220400	5510.00*	3500.0	140000*	0	0	0
5.900000	UNCLASS STEEL	TN*	50	6065.0	303250*	128250	2565.00*	3500.0	175000*	0	0	0
6.000000	BUILDINGS	LS*	----	----	9493920*	3287824	---- *	----	6206096*	0	0	0
6.100000	TURBINE BUILDING	LS*	----	----	2080184*	826500	---- *	----	1253684*	0	0	0
6.110000	ARCHITECT FEATURE	LS*	----	----	956438*	285000	---- *	----	671438*	0	0	0
6.170000	HVAC	LS*	----	----	835040*	427500	---- *	----	407540*	0		0
6.180000	PLUMB & DRAINAGE	LS*	----	----	224360*	95000	---- *	----	129360*	0	0	0
6.190000	MISCELLANEOUS	LS*	----	----	64346*	19000	---- *	----	45346*	0	0	0
6.200000	STEAM GEN BUILDING	LS*	----	----	2857636*	1052000	---- *	----	1805636*	0	0	0
6.210000	ARCHTITECT FEATRS	LS*	----	----	1246080*	361000	---- *	----	885080*	0	0	0
6.270000	HVAC	LS*	----	----	1106400*	475000	---- *	----	631400*	0	0	0
6.280000	PLUMB & DRAINAGE	LS*	----	----	413200*	178000	---- *	----	235200*	0	0	0
6.290000	MISCELLANEOUS	LS*	----	----	91956*	38000	---- *	----	53956*	0	0	0
6.300000	SILO BAY	LS*	----	----	764619*	267425	---- *	----	497194*	0	0	0

EXHIBIT 1.4 (CONT'D)

APA
NENANA2 200 MW COAL
ESTIMATE NO. APA 1707 M-1

BY: WMF CHECKED: JDF

DATE: 12-NOV-84 TIME: 14:03:21

DETAILED
MATERIAL & INSTALLATION REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ TOT)	(TOTAL AMT)*	(TOT MATL)	(UN $MAT)*	(U $ INS)	(TOT INST)*	(TOT ESC)	(MAT ESC)	(INS ESC)
6.310000	ARCHITECT FEATRS	LS*	----	----	259118*	76000	---- *	----	183118*	0	0	0
6.370000	HVAC	LS*	----	----	343600*	114000	---- *	----	229600*	0	0	0
6.380000	PLUMB & DRAINAGE	LS*	----	----	147690*	71250	---- *	----	76440*	0	0	0
6.390000	MISCELLANEOUS	LS*	----	----	14211*	6175	---- *	----	8036*	0	0	0
6.400000	AQCS BUILDINGS	LS*	----	----	2370771*	551949	---- *	----	1818822*	0	0	0
6.410000	AQCS SWGR BLDG	SF*	1350	135.6	183046*	44887	33.25*	102.3	138159*	0	0	0
6.430000	DIESEL GEN BLDG	SF*	850	146.4	124461*	28262	33.25*	113.2	96199*	0	0	0
6.440000	PUMP HOUSE	SF*	14000	147.4	2063264*	478800	34.20*	113.2	1584464*	0	0	0
6.900000	MISC BUILDINGS	LS*	----	----	1420710*	589950	---- *	----	830760*	0	0	0
6.990000	ALL OTHER	LS*	----	----	1420710*	589950	---- *	----	830760*	0	0	0
6.997000	WAREHOUSE NO. 1	SF*	23000	61.8	1420710*	589950	25.65*	36.1	830760*	0	0	0
7.000000	TURBINE GENERATOR	LS*	----	----	18514900*	15850000	---- *	----	2664900*	0	0	0
7.100000	TURBINE GENERATOR	LS*	----	----	18514900*	15850000	---- *	----	2664900*	0	0	0
8.000000	STM GENER & ACCESS	LS*	----	----	42100000*	23200000	---- *	----	18900000*	0	0	0
8.100000	STEAM GENERATOR	LS*	----	----	42100000*	23200000	---- *	----	18900000*	0	0	0
9.000000	AQCS	LS*	----	----	40251635*	21131135	---- *	----	19120500*	0	0	0
9.100000	BAGHOUSE	LS*	----	----	7806800*	3800000	---- *	----	4006800*	0	0	0
9.200000	FLUE GAS DESULFUR	LS*	----	----	30286100*	15701600	---- *	----	14584500*	0	0	0
9.210000	COMPONENTS	LS*	----	----	30286100*	15701600	---- *	----	14584500*	0	0	0
9.211000	DUCTWORK FOR FGD	LS*	----	----	3341600*	1451600	---- *	----	1890000*	0	0	0
9.213000	SO2 ABSORB MODULE	LS*	----	----	26944500*	14250000	---- *	----	12694500*	0	0	0
9.400000	FANS	LS*	----	----	2158735*	1629535	---- *	----	529200*	0	0	0
9.410000	I.D. FANS	LS*	----	----	1345650*	1011750	---- *	----	333900*	0.	0	0

EXHIBIT 1.4 (CONT'D)

BY: WMP CHECKED: JDF

NENANA2 200 MW COAL
ESTIMATE NO. APA 1707 M-1

DATE: 12-NOV-84 TIME: 14:03:21

DETAILED
MATERIAL & INSTALLATION REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ TOT)	(TOTAL AMT)*	(TOT MATL)	(UN $MAT)*	(U $ INS)	(TOT INST)*	(TOT ESC)	(MAT ESC)	(INS ESC)
9.420000	SILENCERS	LS*	----	----	813085*	617785	---- *	----	195300*	0	0	0
10.000000	OTHER MECHAN EQUIP	LS*	----	----	13336497*	9545850	---- *	----	3790647*	0	0	0
10.100000	PUMPS	LS*	----	----	3154723*	2689720	---- *	----	465003*	0	0	0
10.110000	BOILER PUMPS	LS*	----	----	2956170*	2566200	---- *	----	389970*	0	0	0
10.111000	BOILER FEED PUMPS	EA*	2	390420.0	780840*	624600	---- *	78120.0	156240*	0	0	0
10.112000	BF PUMP TURBINES	EA*	2	840100.0	1680200*	1554200	---- *	63000.0	126000*	0	0	0
10.113000	BF BOOSTER PUMPS	EA*	2	118850.0	237700*	181000	90500.00*	28350.0	56700*	0	0	0
10.114000	BF STRT UP/STD BY	LS*	----	----	257430*	206400	---- *	----	51030*	0	0	0
10.120000	FEEDWTR SYS PUMPS	LS*	----	----	9513*	7560	---- *	----	1953*	0	0	0
10.121000	CONDEN TRANSFER	LS*	----	----	9513*	7560	---- *	----	1953*	0	0	0
10.130000	SRV & COOL WTR PMP	LS*	----	----	24092*	13760	---- *	----	10332*	0	0	0
10.133000	CLSD CYC COOL WSP	EA*	2	12046.0	24092*	13760	6880.00*	5166.0	10332*	0	0	0
10.140000	OIL PUMPS	LS*	----	----	13606*	9700	---- *	----	3906*	0	0	0
10.143000	TURB LO TRANS PMP	LS*	----	----	6803*	4850	---- *	----	1953*	0	0	0
10.145000	LO COND PUMP	LS*	----	----	6803*	4850	---- *	----	1953*	0	0	0
10.160000	OTHER PUMPS	LS*	----	----	151342*	92500	---- *	----	58842*	0	0	0
10.161000	COOLING TOWER MU	LS*	----	----	73580*	38300	---- *	----	35280*	0	0	0
10.162000	OP CYC CLG WTR	EA*	2	23920.0	47840*	30200	15100.00*	8820.0	17640*	0	0	0
10.164000	AIR PREHTR GLY	EA*	2	14961.0	29922*	24000	12000.00*	2961.0	5922*	0	0	0
10.200000	CONDENSING PLANT	LS*	----	----	2423174*	1725575	---- *	----	697599*	0	0	0
10.210000	CONDENSER & AUXIL	LS*	----	----	1554900*	969000	---- *	----	585900*	0	0	0
10.220000	EQUIPMENT	LS*	----	----	868274*	756575	---- *	----	111699*	0	0	0
10.221000	CW PUMPS	EA*	2	144732.0	289464*	256200	---- *	16632.0	33264*	0	0	0

EXHIBIT 1.4 (CONT'D)

APA
NENANA2 200 MW COAL
ESTIMATE NO. APA 1707 M-1

BY: WMP CHECKED: JDF

DATE: 12-NOV-84 TIME: 14:03:21

DETAILED
MATERIAL & INSTALLATION REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ TOT)	(TOTAL AMT)*	(TOT MATL)	(UN $MAT)*	(U $ INS)	(TOT INST)*	(TOT ESC)	(MAT ESC)	(INS ESC)
10.222000	CONDENSATE PUMPS	EA*	2	87324.0	174648*	143400	71700.00*	15624.0	31248*	0	0	0
10.223000	VACUUM PUMPS	EA*	2	82267.0	164534*	150800	75400.00*	6867.0	13734*	0	0	0
10.226000	COND CLEAN SYS	LS*	----	----	236900*	205400	---- *	----	31500*	0	0	0
10.227000	COND COLL PUMP	LS*	----	----	2728*	775	---- *	----	1953*	0	0	0
10.300000	HEAT EXCHANGERS	LS*	----	----	1936978*	1755160	---- *	----	181818*	0	0	0
10.310000	FEEDWATER HEATERS	EA*	7	175638.0	1229466*	1129800	---- *	14238.0	99666*	0	0	0
10.320000	DEAER/ VENT CONDEN	LS*	----	----	234640*	191800	---- *	----	42840*	0	0	0
10.330000	CLSD CYC COOL WHE	EA*	2	166430.0	332860*	301360	---- *	15750.0	31500*	0	0	0
10.340000	AIR PRHTR GLY HE	EA*	2	70006.0	140012*	132200	66100.00*	3906.0	7812*	0	0	0
10.400000	TANKS	LS*	----	----	661182*	242295	---- *	----	418887*	0	0	0
10.410000	WATER TANKS	LS*	----	----	594075*	195600	---- *	----	398475*	0	0	0
10.412000	CONDEN STRG TANK	LS*	----	----	198475*	52000	---- *	----	146475*	0	0	0
10.414000	FIRE&SRV WTR STRG	LS*	----	----	395600*	143600	---- *	----	252000*	0	0	0
10.450000	OTHER OIL TANKS	LS*	----	----	67107*	46695	---- *	----	20412*	0	0	0
10.45[illegible]00	CONT BLWDWN FL TK	LS*	----	----	6445*	3295	---- *	----	3150*	0	0	0
10.454000	INT BLWDWN FLH TK	LS*	----	----	23009*	17150	---- *	----	5859*	0	0	0
10.455000	COND COLL TANK	LS*	----	----	9513*	7560	---- *	----	1953*	0	0	0
10.456000	CLSD CYC CL WHT	LS*	----	----	9740*	6590	---- *	----	3150*	0	0	0
10.457000	AIR FREHT CL EX	LS*	----	----	18400*	12100	---- *	----	6300*	0	0	0
10.500000	MISCELLANEOUS EQUIP	LS*	----	----	2350940*	1873400	---- *	----	477540*	0	0	0
10.510000	CONPRESSED AIR EQP	LS*	----	----	249900*	180600	---- *	----	69300*	0	0	0
10.512000	STAT AIR COMPRESS	EA*	1	0.0	181700*	118700	---- *	0.0	63000*	0	0	0
10.513000	AIR DRYERS	LS*	----	----	68200*	61900	---- *	----	6300*	0	0	0

EXHIBIT 1.4 (CONT'D)

BY: WMP CHECKED: JDF

NENANA2 200 MW COAL
ESTIMATE NO. APA 1707 M-1

DATE: 12-NOV-84 TIME: 14:03:21

DETAILED
MATERIAL & INSTALLATION REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ TOT)	(TOTAL AMT)*	(TOT MATL)	(UN $MAT)*	(U $ INS)	(TOT INST)*	(TOT ESC)	(MAT ESC)	(INS ESC)
10.520000	WTR TREAT EQUIP	LS*	----	----	2101040*	1692800	---- *	----	408240*	0	0	0
10.521000	MKUP WTR TRTMT	LS*	----	----	546580*	429400	---- *	----	117180*	0	0	0
10.522000	COND POL DEMINER	LS*	----	----	1063060*	828700	---- *	----	234360*	0	0	0
10.524000	BOILER CHEM FEED	LS*	----	----	68770*	56800	---- *	----	11970*	0	0	0
10.525000	SAMPLING SYSTEM	LS*	----	----	190140*	172500	---- *	----	17640*	0	0	0
10.526000	BLK GAS STR&DISTR	LS*	----	----	232490*	205400	---- *	----	27090*	0	0	0
10.900000	TURBINE BYPASS	LS*	----	----	2809500*	1259700	---- *	----	1549800*	0	0	0
11.000000	COAL&ASH HNDL EQUIP	LS*	----	----	6315436*	3496060	---- *	----	2819376*	0	0	0
11.100000	COAL HANDLING	LS*	----	----	1605350*	871400	---- *	----	733950*	0	0	0
11.160000	CRUSH & TRANSF SYS	LS*	----	----	707650*	370600	---- *	----	337050*	0	0	0
11.165000	CONVEYOR NO 9A	LS*	----	----	707650*	370600	---- *	----	337050*	0	0	0
11.170000	MISC SYSTEMS	LS*	----	----	897700*	500800	---- *	----	396900*	0	0	0
11.172000	FIRE PROTECTION	LS*	----	----	897700*	500800	---- *	----	396900*	0	0	0
11.200000	BTM ASH HNDL SYSTEM	LS*	----	----	3053986*	1579660	---- *	----	1474326*	0	0	0
11.210000	FURN BTM ASH SYS	LS*	----	----	1117200*	638400	---- *	----	478800*	0	0	0
11.220000	PYRITE HNDL SYSTEM	LS*	----	----	111450*	60420	---- *	----	51030*	0	0	0
11.230000	ECONOMIZER ASH SYS	LS*	----	----	307100*	174800	---- *	----	132300*	0	0	0
11.240000	DEWTW BIN&SET TKS	LS*	----	----	1105250*	462650	---- *	----	642600*	0	0	0
11.250000	MAJOR PUMPS	EA*	3	76952.0	230856*	124260	41420.00*	35532.0	106596*	0	0	0
11.260000	BTM ASH INSTRUM	LS*	----	----	182130*	119130	---- *	----	63000*	0	0	0
11.400000	FLY ASH INST & CTL	LS*	----	----	1656100*	1045000	---- *	----	611100*	0	0	0
12.000000	PIPING	LS*	----	----	26853092*	9521792	---- *	----	17331300*	0	0	0
12.100000	LARGE BORE PIPING	TN*	880	19828.4	17448992*	8190512	9307.40*	10521.0	9258480*	0	0	0

EXHIBIT 1.4 (CONT'D)

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NENANA2 200 MW COAL

BY: WMP CHECKED: JDF

ESTIMATE NO. APA 1707 M-1

DATE: 12-NOV-84 TIME: 14:03:21

DETAILED

MATERIAL & INSTALLATION REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ TOT)	(TOTAL AMT)*	(TOT MATL)	(UN $MAT)*	(U $ INS)	(TOT INST)*	(TOT ESC)	(MAT ESC)	(INS ESC)
12.200000	SMALL BORE PIPING	LF*	86000	109.3	9404100*	1331280	15.48*	93.9	8072820*	0	0	0
13.000000	INSULATION	LS*	----	----	7231831*	792853	---- *	----	6438978*	0	0	0
13.100000	INSULATION	LS*	----	----	7231831*	792853	---- *	----	6438978*	0	0	0
14.000000	INSTRUMENTATION	LS*	----	----	6742000*	6175000	---- *	----	567000*	0	0	0
14.100000	INSTRUMENTATION	LS*	----	----	6742000*	6175000	---- *	----	567000*	0	0	0
15.000000	ELECTRICAL EQUIPMENT	LS*	----	----	51925993*	18837300	---- *	----	33088693*	0	0	0
15.100000	TRANFORMERS	LS*	----	----	2583531*	2252400	---- *	----	331131*	0	0	0
15.110000	MAIN TRANSFORMER	EA*	1	0.0	1421780*	1310000	---- *	0.0	111780*	0	0	0
15.130000	AUXILIARY XMFR	LS*	----	----	1161751*	942400	---- *	----	219351*	0	0	0
15.131000	COMMON SERV XMFR	EA*	2	319760.0	639520*	606400	---- *	16560.0	33120*	0	0	0
15.132000	STATION SRV XMFR	EA*	6	47088.5	282531*	255000	42500.00*	4588.5	27531*	0	0	0
15.133000	LTG & MISC XMFR	EA*	40	3292.5	131700*	42000	1050.00*	2242.5	89700*	0	0	0
15.134000	FIRE PROTECTION	LT*	1	0.0	108000*	39000	39000.00*	0.0	69000*	0	0	0
15.200000	SWITCHGEARS	LS*	----	----	3027080*	2591000	---- *	----	436080*	0	0	0
15.300000	MOTORS	EA*	1	0.0	1869100*	1600000	---- *	0.0	269100*	0	0	0
15.400000	AQCS ELEC SYSTEM	LS*	----	----	3543862*	3067900	---- *	----	475962*	0	0	0
15.410000	STATION SERV XMFR	EA*	4	61133.0	244532*	221900	55475.00*	5658.0	22632*	0	0	0
15.420000	AQCS SWITCHGEAR	LS*	----	----	1199570*	1163000	---- *	----	36570*	0	0	0
15.421000	SWITCHGEARS	LS*	----	----	932270*	916400	---- *	----	15870*	0	0	0
15.422000	POWER CENTER	ST*	1	0.0	267300*	246600	---- *	0.0	20700*	0	0	0
15.430000	MOTORS	EA*	1	0.0	797230*	785500	---- *	0.0	11730*	0	0	0
15.440000	NON-SEGREGATED BUS	LS*	----	----	1302530*	897500	---- *	----	405030*	0	0	0
15.500000	SWITCHBOARDS	LS*	----	----	1005600*	840000	---- *	----	165600*	0	0	0

EXHIBIT 1.4 (CONT'D)

BY: WMP CHECKED: JDF

NENANA2 200 MW COAL
ESTIMATE NO. APA 1707 M-1

DATE: 12-NOV-84 TIME: 14:03:21

DETAILED
MATERIAL & INSTALLATION REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ TOT)	(TOTAL AMT)*	(TOT MATL)	(UN $MAT)*	(U $ INS)	(TOT INST)*	(TOT ESC)	(MAT ESC)	(INS ESC)
15.600000	GENERATOR GEARS BUS	LS*	----	----	1444200*	975000	---- *	----	469200*	0	0	0
15.700000	WIRING SYSTEM	LS*	----	----	32389000*	5586000	---- *	----	26803000*	0	0	0
15.800000	LIGHTING SYSTEM	LT*	1	0.0	2832700*	535000	---- *	0.0	2297700*	0	0	0
15.900000	AUX ELEC EQUIPMENT	LS*	----	----	3230920*	1390000	---- *	----	1840920*	0	0	0
16.000000	PAINTING	LS*	----	----	2281300*	151900	---- *	----	2129400*	0	0	0
16.100000	TURBINE BUILDING	LS*	----	----	648100*	47500	---- *	----	600600*	0	0	0
16.200000	STEAM GEN BLDG	LS*	----	----	1163250*	71250	---- *	----	1092000*	0	0	0
16.300000	SILO BAY	LS*	----	----	117750*	8550	---- *	----	109200*	0	0	0
16.900000	MISCELLANEOUS	LS*	----	----	352200*	24600	---- *	----	327600*	0	0	0
17.000000	OFF-SITE FACILITIES	LS*	----	----	3095700*	582000	---- *	----	2513700*	0	0	0
17.100000	RANNEY WELL SYSTEM	LS*	----	----	3095700*	582000	---- *	----	2513700*	0	0	0
19.000000	SUBSTATION/T-LINE	LS*	----	----	3050200*	1680000	---- *	----	1370200*	0	0	0
19.200000	230KV T-LINE:1 CIR	MI*	1	0.0	3050200*	1680000	---- *	0.0	1370200*	0	0	0
71.000000	INDIRECT CONST COST	LS*	----	----	32876178*	0	---- *	----	32876178*	0	0	0
71.100000	FIELD LOCAL HIRES	LS*	----	----	2683395*	0	---- *	----	2683395*	0	0	0
71.200000	CRAFT P/R FRINGES	LS*	----	----	2400000*	0	---- *	----	2400000*	0	0	0
71.210000	PREM PAY-CASUAL	LS*	----	----	1600000*	0	---- *	----	1600000*	0	0	0
71.220000	PREM PAY-SCHED	LS*	----	----	800000*	0	---- *	----	800000*	0	0	0
71.300000	CONSTR EQUIPT	LS*	----	----	114000*	0	---- *	----	114000*	0	0	0
71.310000	AUTOMOTIVE(C/M)	LS*	----	----	114000*	0	---- *	----	114000*	0	0	0
71.400000	CONSTRUCTION PLANT	LS*	----	----	18833177*	0	---- *	----	18833177*	0	0	0
71.410000	CONSTRUCTN BLDGS	LS*	----	----	386400*	0	---- *	----	386400*	0	0	0
71.420000	TEMP FACILITIES	LS*	----	----	18446777*	0	---- *	----	18446777*	0	0	0

EXHIBIT 1.4 (CONT'D)

APA
NENANA2 200 MW COAL
ESTIMATE NO. APA 1707 M-1

BY: WMP CHECKED: JDF

DATE: 12-NOV-84 TIME: 14:03:21

DETAILED
MATERIAL & INSTALLATION REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ TOT)	(TOTAL AMT)*	(TOT MATL)	(UN $MAT)*	(U $ INS)	(TOT INST)*	(TOT ESC)	(MAT ESC)	(INS ESC)
71.421000	LABOR CAMP	LS*	----	----	7500000*	0	---- *	----	7500000*	0	0	0
71.422000	FOOD SERVICE	LS*	----	----	8400000*	0	---- *	----	8400000*	0	0	0
71.424000	OTHER TEMP FACIL	LS*	----	----	2546777*	0	---- *	----	2546777*	0	0	0
71.600000	OFFICE/LABOR EXP	LS*	----	----	1370424*	0	---- *	----	1370424*	0	0	0
71.610000	OFFICE EXPENSE	LS*	----	----	98170*	0	---- *	----	98170*	0	0	0
71.620000	LABOR EXPENSE	LS*	----	----	461634*	0	---- *	----	461634*	0	0	0
71.630000	TESTING	LS*	----	----	501740*	0	---- *	----	501740*	0	0	0
71.640000	SECURITY GUARDS	LS*	----	----	308880*	0	---- *	----	308880*	0	0	0
71.800000	CONSTRUCTN CLEANUP	LS*	----	----	234696*	0	---- *	----	234696*	0	0	0
71.900000	PRODUCTIVITY ADJ	LS*	----	----	7240486*	0	---- *	----	7240486*	0	0	0
72.000000	PROFESSIONAL SERVCS	LS*	----	----	16000000*	0	---- *	----	16000000*	0	0	0

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EXHIBIT 1.4 (CONT'D)

UNIT 2

RAIL DELIVERY OF COAL/LIME

APA
NENANA2 200 MW COAL
ESTIMATE NO. APA 1707 M-1

BY: WMP CHECKED: JDF

DATE: 12-NOV-84 TIME: 14:03:21

SUMMARY
INSTALLATION BREAKOUT REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ INS)	(TOTL INS)	(PAYROLL)	(MAJ EXP)	(CONT OTH)*	(MH/UN)	($/MH)	(TOT MH)
99.000000	TOTAL PROJECT COST	LS*	----	----	232357623	108756317	35647680	57646108*	---	42.20	2577281
100.000000	CONTINGENCY	LS*	----	----	30307518	0	0	0*	---	0.00	0
300.000000	TOTAL COST W/O CONT	LS*	----	----	202050105	108756317	35647680	57646108*	---	42.20	2577281
1.000000	IMPROVEMNTS TO SITE	LS*	----	----	227106	146520	0	80586*	---	40.70	3600
2.000000	EARTHWORK & PILING	LS*	----	----	8022974	3128961	26700	4867313*	---	43.20	72423
3.000000	CIRC WATER SYSTEM	LS*	----	----	4121802	2755932	44460	1321410*	---	44.63	61751
4.000000	CONCRETE	LS*	----	----	12294805	8583922	223850	3487033*	---	44.06	194840
5.000000	STRCT STL/LFT EQP	LS*	----	----	11566450	8261750	0	3304700*	---	49.89	165613
6.000000	BUILDINGS	LS*	----	----	6206096	4432927	0	1773169*	---	42.63	103983
7.000000	TURBINE GENERATOR	LS*	----	----	2664900	1776600	0	888300*	---	42.00	42300
8.000000	STM GENER & ACCESS	LS*	----	----	18900000	12600000	0	6300000*	---	42.00	300000
9.000000	AQCS	LS*	----	----	19120500	12747000	0	6373500*	---	42.00	303500
10.000000	OTHER MECHAN EQUIP	LS*	----	----	3790647	2527098	0	1263549*	---	42.00	60169
11.000000	COAL&ASH HNDL EQUIP	LS*	----	----	2819376	1879584	0	939792*	---	42.00	44752
12.000000	PIPING	LS*	----	----	17331300	11554200	0	5777100*	---	42.00	275100
13.000000	INSULATION	LS*	----	----	6438978	4292652	0	2146326*	---	42.00	102206
14.000000	INSTRUMENTATION	LS*	----	----	567000	378000	0	189000*	---	42.00	9000
15.000000	ELECTRICAL EQUIPMENT	LS*	----	----	33088693	21992462	100000	10996231*	---	46.00	478097
16.000000	PAINTING	LS*	----	----	2129400	1521000	0	608400*	---	39.00	39000
17.000000	OFF-SITE FACILITIES	LS*	----	----	2513700	1117200	0	1396500*	---	42.00	26600
19.000000	SUBSTATION/T-LINE	LS*	----	----	1370200	806000	0	564200*	---	40.30	20000
71.000000	INDIRECT CONST COST	LS*	----	----	32876178	8254509	19252670	5368999*	---	30.09	274347
72.000000	PROFESSIONAL SERVCS	LS*	----	----	16000000	0	16000000	0*	---	0.00	0

EXHIBIT 1.4 (CONT'D)

APA
NENANA2 200 MW COAL
ESTIMATE NO. APA 1707 M-1

BY: WMP CHECKED: JDF

DATE: 12-NOV-84 TIME: 14:03:21

SUMMARY
INSTALLATION BREAKOUT REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ INS)	(TOTL INS)	(PAYROLL)	(MAJ EXP)	(CONT OTH)*	(MH/UN)	($/MH)	(TOT MH)

EXHIBIT 1.4 (CONT'D)

APA
NENANA2 200 MW COAL
ESTIMATE NO. APA 1707 M-1

BY: WMP CHECKED: JDF

DATE: 12-NOV-84 TIME: 14:03:21

DETAILED
INSTALLATION BREAKOUT REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ INS)	(TOTL INS)	(PAYROLL)	(MAJ EXP)	(CONT OTH)*	(MH/UN)	($/MH)	(TOT MH)
99.000000	TOTAL PROJECT COST	LS*	----	----	232357623	108756317	35647680	57646108*	---	42.20	2577281
100.000000	CONTINGENCY	LS*	----	----	30307518	0	0	0*	---	0.00	0
300.000000	TOTAL COST W/O CONT	LS*	----	----	202050105	108756317	35647680	57646108*	---	42.20	2577281
1.000000	IMPROVEMNTS TO SITE	LS*	----	----	227106	146520	0	80586*	---	40.70	3600
1.300000	SITE DRAINAGE	LS*	----	----	201872	130240	0	71632*	---	40.70	3200
1.500000	SEWAGE FACILITIES	LS*	----	----	25234	16280	0	8954*	---	40.70	400
2.000000	EARTHWORK & PILING	LS*	----	----	8022974	3128961	26700	4867313*	---	43.20	72423
2.200000	STRCTR & EQUIP EXC	LS*	----	----	1701895	654020	21000	1026875*	---	42.40	15425
2.210000	STATION AREA	LS*	----	----	545105	198220	0	346885*	---	42.40	4675
2.212000	EARTH EXCAVATION	CY*	18700	29.15	545105	198220	0	346885*	0.25	42.40	4675
2.240000	OUTLY TKS EQP/STR	LS*	----	----	169070	61480	0	107590*	---	42.40	1450
2.242000	EARTH EXCAVATION	CY*	5300	29.15	169070	61480	0	107590*	0.25	42.40	1450
2.250000	AQCS FDNS	LS*	----	----	987720	394320	21000	572400*	---	42.40	9300
2.252000	EARTH EXCAVATION	CY*	15000	29.15	437250	159000	0	278250*	0.25	42.40	3750
2.253000	ROCK EXCAVATION	CY*	7400	74.39	550470	235320	21000	294150*	0.75	42.40	5550
2.300000	TRENCHING	LS*	----	----	1469942	492244	5700	971998*	---	42.70	11528
2.310000	CIRC WATER COND	LS*	----	----	529178	178656	5700	344822*	---	42.70	4184
2.312000	EARTH EXCAVATION	CY*	13700	28.18	386091	128697	0	257394*	0.22	42.70	3014
2.313000	ROCK EXCAVATION	CY*	1800	79.49	143087	49959	5700	87428*	0.65	42.70	1170
2.320000	YARD PIPING	LS*	----	----	848532	282844	0	565688*	---	42.70	6624
2.322000	EARTH EXCAVATION	CY*	27600	30.74	848532	282844	0	565688*	0.24	42.70	6624
2.330000	SEWERS & DRAINS	LS*	----	----	92232	30744	0	61488*	---	42.70	720
2.332000	EARTH EXCAVATION	CY*	3000	30.74	92232	30744	0	61488*	0.24	42.70	720

EXHIBIT 1.4 (CONT'D)

APA
NENANA2 200 MW COAL
ESTIMATE NO. APA 1707 M-1

BY: WMP CHECKED: JDF

DATE: 12-NOV-84 TIME: 14:03:21

DETAILED
INSTALLATION BREAKOUT REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ INS)	(TOTL INS)	(PAYROLL)	(MAJ EXP)	(CONT OTH)*	(MH/UN)	($/MH)	(TOT MH)
2.500000	PILES (H PILES)	LS*	----	----	4442437	1776975	0	2665462*	---	43.50	40850
2.510000	STATION AREA	LF*	155000	20.66	3202687	1281075	0	1921612*	0.19	43.50	29450
2.520000	AQCS AREA	LF*	60000	20.66	1239750	495900	0	743850*	0.19	43.50	11400
2.700000	CECI-EXCV-ERTH STR	LS*	----	----	408700	205722	0	202978*	---	44.53	4620
2.730000	SLD WST STK PILE	LS*	----	----	408700	205722	0	202978*	---	44.53	4620
2.731000	PVC LINER	SF*	120000	0.05	6400	4572	0	1828*	0.00	38.10	120
2.732000	EXCAVATION	CY*	15000	17.88	268200	134100	0	134100*	0.20	44.70	3000
2.733000	BACKFILL	CY*	5000	26.82	134100	67050	0	67050*	0.30	44.70	1500
3.000000	CIRC WATER SYSTEM	LS*	----	----	4121802	2755932	44460	1321410*	---	44.63	61751
3.200000	INTK & DISC PIPING	LS*	----	----	1176976	748752	17860	410364*	---	43.08	17382
3.210000	CONCR PIPE: 60"	LF*	3000	165.83	497490	284280	0	213210*	2.30	41.20	6900
3.260000	BEDDING MATERIAL	CY*	1850	20.48	37884	18942	0	18942*	0.25	41.00	462
3.270000	CONCRET STRUCTURE	LS*	----	----	611908	424320	17860	169728*	---	44.20	9600
3.271000	THRST & TRNS BLK	CY*	750	304.62	228468	159120	5700	63648*	4.80	44.20	3600
3.272000	CONDENS BLOCKS	CY*	400	698.49	279397	194480	7125	77792*	11.00	44.20	4400
3.273000	PITOT TUBE PIT	CY*	200	520.22	104043	70720	5035	28288*	8.00	44.20	1600
3.280000	MISCELLAN STEEL	TN*	7	4242.00	29694	21210	0	8484*	60.00	50.50	420
3.400000	COOL TOWER FACIL	LS*	----	----	2944826	2007180	26600	911046*	---	45.24	44369
3.410000	TOWER BASIN	LS*	----	----	575315	356460	12350	206505*	---	44.28	8050
3.411000	EXCAVATION	CY*	6500	22.35	145275	58110	0	87165*	0.20	44.70	1300
3.412000	CONC CW COOL TWR	CY*	1500	286.69	430040	298350	12350	119340*	4.50	44.20	6750
3.420000	PUMP CHAMBER	LS*	----	----	627120	406155	14250	206715*	---	44.54	9119
3.422000	EXCAVATION	CY*	4500	22.35	100575	40230	0	60345*	0.20	44.70	900

EXHIBIT 1.4 (CONT'D)

APA
NENANA2 200 MW COAL
ESTIMATE NO. APA 1707 M-1

BY: WMP CHECKED: JDF

DATE: 12-NOV-84 TIME: 14:03:21

DETAILED
INSTALLATION BREAKOUT REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ INS)	(TOTL INS)	(PAYROLL)	(MAJ EXP)	(CONT OTH)*	(MH/UN)	($/MH)	(TOT MH)
3.423000	CONCRETE	CY*	1500	331.23	496851	344715	14250	137886*	5.20	44.20	7799
3.424000	MISC STEEL	TN*	7	4242.00	29694	21210	0	8484*	60.00	50.50	420
3.430000	INTAKE EQUIPMENT	LS*	----	----	62160	44400	0	17760*	---	46.74	950
3.433000	SCREENS	SF*	500	28.28	14140	10100	0	4040*	0.40	50.50	200
3.435000	STOP LOGS	SF*	500	14.14	7070	5050	0	2020*	0.20	50.50	100
3.436000	CRANE BRIDGE 15T	EA*	1	0.0	40950	29250	0	11700*	---	45.00	650
3.440000	PMP HS SPR STRUCT	LS*	----	----	421743	301245	0	120498*	---	46.70	6450
3.441000	CRANE & HST SUPP	TN*	75	1555.40	116655	83325	0	33330*	22.00	50.50	1650
3.442000	BUILDING SPRSTR	SF*	6000	50.85	305088	217920	0	87168*	0.80	45.40	4800
3.450000	TOWER SPR STRUCT	LS*	----	----	1258488	898920	0	359568*	---	45.40	19800
4.000000	CONCRETE	LS*	----	----	12294805	8583922	223850	3487033*	---	44.06	194840
4.100000	TURBINE BLDG CONCR	CY*	4500	691.79	3113060	2187900	50000	875160*	11.00	44.20	49500
4.200000	BOILER AREA CONCRT	CY*	1900	593.17	1127026	789412	21850	315764*	9.40	44.20	17860
4.300000	SILO AREA CONCRETE	CY*	1700	626.02	1064240	743886	22800	297554*	9.90	44.20	16830
4.400000	AQCS CONCRETE	CY*	8800	624.68	5497185	3850704	106200	1540281*	9.90	44.20	87120
4.900000	MISCELL CONCRETE	LS*	----	----	1493294	1012020	23000	458274*	---	43.01	23530
4.910000	YARD PIPING VAULT	LS*	----	----	801990	534660	0	267330*	---	42.00	12730
4.920000	OTHER MISC CONC	CY*	1800	384.06	691304	477360	23000	190944*	6.00	44.20	10800
5.000000	STRCT STL/LFT EQP	LS*	----	----	11566450	8261750	0	3304700*	---	49.89	165613
5.100000	TURBINE BUILDING	LS*	----	----	2147390	1533850	0	613540*	---	49.74	30837
5.110000	MAIN STEEL	TN*	1200	1190.00	1428000	1020000	0	408000*	17.00	50.00	20400
5.120000	FRAMING	LS*	----	----	183750	131250	0	52500*	---	50.00	2625
5.121000	WALL FRAMING	TN*	105	1750.00	183750	131250	0	52500*	25.00	50.00	2625

EXHIBIT 1.4 (CONT'D)

APA
NENANA2 200 MW COAL
ESTIMATE NO. APA 1707 M-1

BY: WMP CHECKED: JDF

DATE: 12-NOV-84 TIME: 14:03:21

DETAILED
INSTALLATION BREAKOUT REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ INS)	(TOTL INS)	(PAYROLL)	(MAJ EXP)	(CONT OTH)*	(MH/UN)	($/MH)	(TOT MH)
5.130000	MISC STEEL	LS*	----	----	434840	310600	0	124240*	---	50.00	6212
5.131000	GRATING 1-3/4"	SF*	12000	21.00	252000	180000	0	72000*	0.30	50.00	3600
5.132000	CHECKERED PLATE	SF*	600	46.90	28140	20100	0	8040*	0.67	50.00	402
5.133000	HANDRAIL	LF*	1000	87.50	87500	62500	0	25000*	1.25	50.00	1250
5.134000	LADDERS & STRWYS	TN*	12	5600.00	67200	48000	0	19200*	80.00	50.00	960
5.140000	LIFTING EQUIP	LS*	----	----	100800	72000	0	28800*	---	45.00	1600
5.141000	CRANE: 40 T CAP	LS*	----	----	100800	72000	0	28800*	---	45.00	1600
5.200000	STEAM GENERATOR	LS*	----	----	7478170	5341550	0	2136620*	---	49.91	107021
5.210000	MAIN STEEL	TN*	2300	1190.00	2737000	1955000	0	782000*	17.00	50.00	39100
5.220000	FRAMING	LS*	----	----	1267000	905000	0	362000*	---	50.00	18100
5.221000	WALL FRAMING	TN*	330	3500.00	1155000	825000	0	330000*	50.00	50.00	16500
5.222000	ELEV FRAMING	TN*	40	2800.00	112000	80000	0	32000*	40.00	50.00	1600
5.230000	MISC STEEL	LS*	----	----	3354470	2396050	0	958420*	---	50.00	47921
5.231000	GRATING (1-3/4")	SF*	70000	21.00	1470000	1050000	0	420000*	0.30	50.00	21000
5.232000	CHECKERED PLATE	SF*	1600	46.90	75040	53600	0	21440*	0.67	50.00	1072
5.233000	HANDRAIL	LF*	12500	90.99	1137430	812450	0	324980*	1.30	50.00	16249
5.234000	LADDERS & STRWY	TN*	120	5600.00	672000	480000	0	192000*	80.00	50.00	9600
5.240000	LIFTING EQUIP	LS*	----	----	119700	85500	0	34200*	---	45.00	1900
5.242000	ELEV EQUIPMENT	LS*	----	----	94500	67500	0	27000*	---	45.00	1500
5.243000	OTHER LIFT EQUIP	LS*	----	----	25200	18000	0	7200*	---	45.00	400
5.243100	(3) 15 TON HST	LS*	----	----	25200	18000	0	7200*	---	45.00	400
5.300000	SILO BAY	LS*	----	----	1765890	1261350	0	504540*	---	49.94	25255
5.310000	MAIN STEEL	TN*	225	1190.00	267750	191250	0	76500*	17.00	50.00	3825

EXHIBIT 1.4 (CONT'D)

APA
NENANA2 200 MW COAL
ESTIMATE NO. APA 1707 M-1

BY: WMP CHECKED: JDF

DATE: 12-NOV-84 TIME: 14:03:21

DETAILED
INSTALLATION BREAKOUT REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ INS)	(TOTL INS)	(PAYROLL)	(MAJ EXP)	(CONT OTH)*	(MH/UN)	($/MH)	(TOT MH)
5.320000	FRAMING	LS*	----	----	227500	162500	0	65000*	---	50.00	3250
5.321000	WALL FRAMING	TN*	65	3500.00	227500	162500	0	65000*	50.00	50.00	3250
5.330000	MISC STEEL	LS*	----	----	147000	105000	0	42000*	---	50.00	2100
5.340000	LIFTING EQUIPMENT	LS*	----	----	17640	12600	0	5040*	---	45.00	280
5.343000	OTHER LIFT EQUIP	LS*	----	----	17640	12600	0	5040*	---	45.00	280
5.350000	SUPPORT STEEL	LS*	----	----	490000	350000	0	140000*	---	50.00	7000
5.351000	EQUIP SUPPORTS	TN*	100	4900.00	490000	350000	0	140000*	70.00	50.00	7000
5.360000	STL SILO & CVR PL	LS*	----	----	616000	440000	0	176000*	---	50.00	8800
5.361000	STEEL SILOS	TN*	170	2800.00	476000	340000	0	136000*	40.00	50.00	6800
5.362000	SS PLATES	TN*	40	3500.00	140000	100000	0	40000*	50.00	50.00	2000
5.900000	UNCLASS STEEL	TN*	50	3500.00	175000	125000	0	50000*	50.00	50.00	2500
6.000000	BUILDINGS	LS*	----	----	6206096	4432927	0	1773169*	---	42.63	103983
6.100000	TURBINE BUILDING	LS*	----	----	1253684	895489	0	358195*	---	42.46	21090
6.110000	ARCHITECT FEATURE	LS*	----	----	671438	479599	0	191839*	---	43.60	11000
6.170000	HVAC	LS*	----	----	407540	291100	0	116440*	---	41.00	7100
6.180000	PLUMB & DRAINAGE	LS*	----	----	129360	92400	0	36960*	---	42.00	2200
6.190000	MISCELLANEOUS	LS*	----	----	45346	32390	0	12956*	---	41.00	790
6.200000	STEAM GEN BUILDING	LS*	----	----	1805636	1289740	0	515896*	---	42.37	30440
6.210000	ARCHTITECT FEATRS	LS*	----	----	885080	632200	0	252880*	---	43.60	14500
6.270000	HVAC	LS*	----	----	631400	451000	0	180400*	---	41.00	11000
6.280000	PLUMB & DRAINAGE	LS*	----	----	235200	168000	0	67200*	---	42.00	4000
6.290000	MISCELLANEOUS	LS*	----	----	53956	38540	0	15416*	---	41.00	940
6.300000	SILO BAY	LS*	----	----	497194	355139	0	142055*	---	42.08	8440

EXHIBIT 1.4 (CONT'D)

APA
NENANA2 200 MW COAL
ESTIMATE NO. APA 1707 M-1

BY: WMP CHECKED: JDF

DATE: 12-NOV-84 TIME: 14:03:21

DETAILED
INSTALLATION BREAKOUT REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ INS)	(TOTL INS)	(PAYROLL)	(MAJ EXP)	(CONT OTH)*	(MH/UN)	($/MH)	(TOT MH)
6.310000	ARCHITECT FEATRS	LS*	----	----	183118	130799	0	52319*	---	43.60	3000
6.370000	HVAC	LS*	----	----	229600	164000	0	65600*	---	41.00	4000
6.380000	PLUMB & DRAINAGE	LS*	----	----	76440	54600	0	21840*	---	42.00	1300
6.390000	MISCELLANEOUS	LS*	----	----	8036	5740	0	2296*	---	41.00	140
6.400000	AQCS BUILDINGS	LS*	----	----	1818822	1299159	0	519663*	---	43.00	30213
6.410000	AQCS SWGR BLDG	SF*	1350	102.34	138159	98685	0	39474*	1.70	43.00	2295
6.430000	DIESEL GEN BLDG	SF*	850	113.18	96199	68714	0	27485*	1.88	43.00	1598
6.440000	PUMP HOUSE	SF*	14000	113.18	1584464	1131760	0	452704*	1.88	43.00	26320
6.900000	MISC BUILDINGS	LS*	----	----	830760	593400	0	237360*	---	43.00	13800
6.990000	ALL OTHER	LS*	----	----	830760	593400	0	237360*	---	43.00	13800
6.997000	WAREHOUSE NO. 1	SF*	23000	36.12	830760	593400	0	237360*	0.60	43.00	13800
7.000000	TURBINE GENERATOR	LS*	----	----	2664900	1776600	0	888300*	---	42.00	42300
7.100000	TURBINE GENERATOR	LS*	----	----	2664900	1776600	0	888300*	---	42.00	42300
8.000000	STM GENER & ACCESS	LS*	----	----	18900000	12600000	0	6300000*	---	42.00	300000
8.100000	STEAM GENERATOR	LS*	----	----	18900000	12600000	0	6300000*	---	42.00	300000
9.000000	AQCS	LS*	----	----	19120500	12747000	0	6373500*	---	42.00	303500
9.100000	BAGHOUSE	LS*	----	----	4006800	2671200	0	1335600*	---	42.00	63600
9.200000	FLUE GAS DESULFUR	LS*	----	----	14584500	9723000	0	4861500*	---	42.00	231500
9.210000	COMPONENTS	LS*	----	----	14584500	9723000	0	4861500*	---	42.00	231500
9.211000	DUCTWORK FOR FGD	LS*	----	----	1890000	1260000	0	630000*	---	42.00	30000
9.213000	SO2 ABSORB MODULE	LS*	----	----	12694500	8463000	0	4231500*	---	42.00	201500
9.400000	FANS	LS*	----	----	529200	352800	0	176400*	---	42.00	8400
9.410000	I.D. FANS	LS*	----	----	333900	222600	0	111300*	---	42.00	5300

EXHIBIT 1.4 (CONT'D)

APA
NENANA2 200 MW COAL
ESTIMATE NO. APA 1707 M-1

BY: WMP CHECKED: JDF

DATE: 12-NOV-84 TIME: 14:03:21

DETAILED
INSTALLATION BREAKOUT REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ INS)	(TOTL INS)	(PAYROLL)	(MAJ EXP)	(CONT OTH)*	(MH/UN)	($/MH)	(TOT MH)
9.420000	SILENCERS	LS*	----	----	195300	130200	0	65100*	---	42.00	3100
10.000000	OTHER MECHAN EQUIP	LS*	----	----	3790647	2527098	0	1263549*	---	42.00	60169
10.100000	PUMPS	LS*	----	----	465003	310002	0	155001*	---	42.00	7381
10.110000	BOILER PUMPS	LS*	----	----	389970	259980	0	129990*	---	42.00	6190
10.111000	BOILER FEED PUMPS	EA*	2	78120.0	156240	104160	0	52080*	---	42.00	2480
10.112000	BF PUMP TURBINES	EA*	2	63000.0	126000	84000	0	42000*	---	42.00	2000
10.113000	BF BOOSTER PUMPS	EA*	2	28350.0	56700	37800	0	18900*	---	42.00	900
10.114000	BF STRT UP/STD BY	LS*	----	----	51030	34020	0	17010*	---	42.00	810
10.120000	FEEDWTR SYS PUMPS	LS*	----	----	1953	1302	0	651*	---	42.00	31
10.121000	CONDEN TRANSFER	LS*	----	----	1953	1302	0	651*	---	42.00	31
10.130000	SRV & COOL WTR PMP	LS*	----	----	10332	6888	0	3444*	---	42.00	164
10.133000	CLSD CYC COOL WSP	EA*	2	5166.00	10332	6888	0	3444*	82.00	42.00	164
10.140000	OIL PUMPS	LS*	----	----	3906	2604	0	1302*	---	42.00	62
10.143000	TURB LO TRANS PMP	LS*	----	----	1953	1302	0	651*	---	42.00	31
10.145000	LO COND PUMP	LS*	----	----	1953	1302	0	651*	---	42.00	31
10.160000	OTHER PUMPS	LS*	----	----	58842	39228	0	19614*	---	42.00	934
10.161000	COOLING TOWER MU	LS*	----	----	35280	23520	0	11760*	---	42.00	560
10.162000	OP CYC CLG WTR	EA*	2	8820.0	17640	11760	0	5880*	---	42.00	280
10.164000	AIR PREHTR GLY	EA*	2	2961.00	5922	3948	0	1974*	47.00	42.00	94
10.200000	CONDENSING PLANT	LS*	----	----	697599	465066	0	232533*	---	42.00	11073
10.210000	CONDENSER & AUXIL	LS*	----	----	585900	390600	0	195300*	---	42.00	9300
10.220000	EQUIPMENT	LS*	----	----	111699	74466	0	37233*	---	42.00	1773
10.221000	CW PUMPS	EA*	2	16632.0	33264	22176	0	11088*	---	42.00	528

EXHIBIT 1.4 (CONT'D)

APA
NENANA2 200 MW COAL
ESTIMATE NO. APA 1707 M-1

BY: WMP CHECKED: JDF

DATE: 12-NOV-84 TIME: 14:03:21

DETAILED
INSTALLATION BREAKOUT REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ INS)	(TOTL INS)	(PAYROLL)	(MAJ EXP)	(CONT OTH)*	(MH/UN)	($/MH)	(TOT MH)
10.222000	CONDENSATE PUMPS	EA*	2	15624.0	31248	20832	0	10416*	---	42.00	496
10.223000	VACUUM PUMPS	EA*	2	6867.0	13734	9156	0	4578*	---	42.00	218
10.226000	COND CLEAN SYS	LS*	----	----	31500	21000	0	10500*	---	42.00	500
10.227000	COND COLL PUMP	LS*	----	----	1953	1302	0	651*	---	42.00	31
10.300000	HEAT EXCHANGERS	LS*	----	----	181818	121212	0	60606*	---	42.00	2886
10.310000	FEEDWATER HEATERS	EA*	7	14238.0	99666	66444	0	33222*	---	42.00	1582
10.320000	DEAER/ VENT CONDEN	LS*	----	----	42840	28560	0	14280*	---	42.00	680
10.330000	CLSD CYC COOL WHE	EA*	2	15750.0	31500	21000	0	10500*	---	42.00	500
10.340000	AIR PRHTR GLY HE	EA*	2	3906.00	7812	5208	0	2604*	62.00	42.00	124
10.400000	TANKS	LS*	----	----	418887	279258	0	139629*	---	42.00	6649
10.410000	WATER TANKS	LS*	----	----	398475	265650	0	132825*	---	42.00	6325
10.412000	CONDEN STRG TANK	LS*	----	----	146475	97650	0	48825*	---	42.00	2325
10.414000	FIRE&SRV WTR STRG	LS*	----	----	252000	168000	0	84000*	---	42.00	4000
10.450000	OTHER OIL TANKS	LS*	----	----	20412	13608	0	6804*	---	42.00	324
10.453000	CONT BLWDWN FL TK	LS*	----	----	3150	2100	0	1050*	---	42.00	50
10.454000	INT BLWDWN FLH TK	LS*	----	----	5859	3906	0	1953*	---	42.00	93
10.455000	COND COLL TANK	LS*	----	----	1953	1302	0	651*	---	42.00	31
10.456000	CLSD CYC CL WHT	LS*	----	----	3150	2100	0	1050*	---	42.00	50
10.457000	AIR PREHT CL EX	LS*	----	----	6300	4200	0	2100*	---	42.00	100
10.500000	MISCELLANEOUS EQUIP	LS*	----	----	477540	318360	0	159180*	---	42.00	7580
10.510000	CONPRESSED AIR EQP	LS*	----	----	69300	46200	0	23100*	---	42.00	1100
10.512000	STAT AIR COMPRESS	EA*	1	0.0	63000	42000	0	21000*	---	42.00	1000
10.513000	AIR DRYERS	LS*	----	----	6300	4200	0	2100*	---	42.00	100

EXHIBIT 1.4 (CONT'D)

BY: WMP CHECKED: JDF

APA
NENANA2 200 MW COAL
ESTIMATE NO. APA 1707 M-1

DATE: 12-NOV-84 TIME: 14:03:21

DETAILED
INSTALLATION BREAKOUT REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ INS)	(TOTL INS)	(PAYROLL)	(MAJ EXP)	(CONT OTH)*	(MH/UN)	($/MH)	(TOT MH)
10.520000	WTR TREAT EQUIP	LS*	----	----	408240	272160	0	136080*	---	42.00	6480
10.521000	MKUP WTR TRTMT	LS*	----	----	117180	78120	0	39060*	---	42.00	1860
10.522000	COND POL DEMINER	LS*	----	----	234360	156240	0	78120*	---	42.00	3720
10.524000	BOILER CHEM FEED	LS*	----	----	11970	7980	0	3990*	---	42.00	190
10.525000	SAMPLING SYSTEM	LS*	----	----	17640	11760	0	5880*	---	42.00	280
10.526000	BLK GAS STR&DISTR	LS*	----	----	27090	18060	0	9030*	---	42.00	430
10.900000	TURBINE BYPASS	LS*	----	----	1549800	1033200	0	516600*	---	42.00	24600
11.000000	COAL&ASH HNDL EQUIP	LS*	----	----	2819376	1879584	0	939792*	---	42.00	44752
11.100000	COAL HANDLING	LS*	----	----	733950	489300	0	244650*	---	42.00	11650
11.160000	CRUSH & TRANSF SYS	LS*	----	----	337050	224700	0	112350*	---	42.00	5350
11.165000	CONVEYOR NO 9A	LS*	----	----	337050	224700	0	112350*	---	42.00	5350
11.170000	MISC SYSTEMS	LS*	----	----	396900	264600	0	132300*	---	42.00	6300
11.172000	FIRE PROTECTION	LS*	----	----	396900	264600	0	132300*	---	42.00	6300
11.200000	BTM ASH HNDL SYSTEM	LS*	----	----	1474326	982884	0	491442*	---	42.00	23402
11.210000	FURN BTM ASH SYS	LS*	----	----	478800	319200	0	159600*	---	42.00	7600
11.220000	PYRITE HNDL SYSTEM	LS*	----	----	51030	34020	0	17010*	---	42.00	810
11.230000	ECONOMIZER ASH SYS	LS*	----	----	132300	88200	0	44100*	---	42.00	2100
11.240000	DEWTW BIN&SET TKS	LS*	----	----	642600	428400	0	214200*	---	42.00	10200
11.250000	MAJOR PUMPS	EA*	3	35532.0	106596	71064	0	35532*	---	42.00	1692
11.260000	BTM ASH INSTRUM	LS*	----	----	63000	42000	0	21000*	---	42.00	1000
11.400000	FLY ASH INST & CTL	LS*	----	----	611100	407400	0	203700*	---	42.00	9700
12.000000	PIPING	LS*	----	----	17331300	11554200	0	5777100*	---	42.00	275100
12.100000	LARGE BORE PIPING	TN*	880	10521.0	9258480	6172320	0	3086160*	---	42.00	146960

EXHIBIT 1.4 (CONT'D)

APA
NENANA2 200 MW COAL
ESTIMATE NO. APA 1707 M-1

BY: WMP CHECKED: JDF

DATE: 12-NOV-84 TIME: 14:03:21

DETAILED
INSTALLATION BREAKOUT REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ INS)	(TOTL INS)	(PAYROLL)	(MAJ EXP)	(CONT OTH)*	(MH/UN)	($/MH)	(TOT MH)
12.200000	SMALL BORE PIPING	LF*	86000	93.87	8072820	5381880	0	2690940*	1.49	42.00	128140
13.000000	INSULATION	LS*	----	----	6438978	4292652	0	2146326*	---	42.00	102206
13.100000	INSULATION	LS*	----	----	6438978	4292652	0	2146326*	---	42.00	102206
14.000000	INSTRUMENTATION	LS*	----	----	567000	378000	0	189000*	---	42.00	9000
14.100000	INSTRUMENTATION	LS*	----	----	567000	378000	0	189000*	---	42.00	9000
15.000000	ELECTRICAL EQUIPMENT	LS*	----	----	33088693	21992462	100000	10996231*	---	46.00	478097
15.100000	TRANFORMERS	LS*	----	----	331131	220754	0	110377*	---	46.00	4799
15.110000	MAIN TRANSFORMER	EA*	1	0.0	111780	74520	0	37260*	---	46.00	1620
15.130000	AUXILIARY XMFR	LS*	----	----	219351	146234	0	73117*	---	46.00	3179
15.131000	COMMON SERV XMFR	EA*	2	16560.0	33120	22080	0	11040*	---	46.00	480
15.132000	STATION SRV XMFR	EA*	6	4588.50	27531	18354	0	9177*	66.60	46.00	399
15.133000	LTG & MISC XMFR	EA*	40	2242.50	89700	59800	0	29900*	32.50	46.00	1300
15.134000	FIRE PROTECTION	LT*	1	0.0	69000	46000	0	23000*	---	46.00	1000
15.200000	SWITCHGEARS	LS*	----	----	436080	290720	0	145360*	---	46.00	6320
15.300000	MOTORS	EA*	1	0.0	269100	179400	0	89700*	---	46.00	3900
15.400000	AQCS ELEC SYSTEM	LS*	----	----	475962	317303	0	158654*	---	46.00	6898
15.410000	STATION SERV XMFR	EA*	4	5658.00	22632	15088	0	7544*	82.00	46.00	328
15.420000	AQCS SWITCHGEAR	LS*	----	----	36570	24380	0	12190*	---	46.00	530
15.421000	SWITCHGEARS	LS*	----	----	15870	10580	0	5290*	---	46.00	230
15.422000	POWER CENTER	ST*	1	0.0	20700	13800	0	6900*	---	46.00	300
15.430000	MOTORS	EA*	1	0.0	11730	7820	0	3910*	---	46.00	170
15.440000	NON-SEGREGATED BUS	LS*	----	----	405030	270020	0	135010*	---	46.00	5870
15.500000	SWITCHBOARDS	LS*	----	----	165600	110400	0	55200*	---	46.00	2400

EXHIBIT 1.4 (CONT'D)

APA
NENANA2 200 MW COAL
ESTIMATE NO. APA 1707 M-1

BY: WMP CHECKED: JDF

DATE: 12-NOV-84 TIME: 14:03:21

DETAILED
INSTALLATION BREAKOUT REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ INS)	(TOTL INS)	(PAYROLL)	(MAJ EXP)	(CONT OTH)*	(MH/UN)	($/MH)	(TOT MH)
15.600000	GENERATOR GEARS BUS	LS*	----	----	419200	312800	0	156400*	---	46.00	6800
15.700000	WIRING SYSTEM	LS*	----	----	26803000	17802000	100000	8901000*	---	46.00	387000
15.800000	LIGHTING SYSTEM	LT*	1	0.0	2297700	1531800	0	765900*	---	46.00	33300
15.900000	AUX ELEC EQUIPMENT	LS*	----	----	1840920	1227280	0	613640*	---	46.00	26680
16.000000	PAINTING	LS*	----	----	2129400	1521000	0	608400*	---	39.00	39000
16.100000	TURBINE BUILDING	LS*	----	----	600600	429000	0	171600*	---	39.00	11000
16.200000	STEAM GEN BLDG	LS*	----	----	1092000	780000	0	312000*	---	39.00	20000
16.300000	SILO BAY	LS*	----	----	109200	78000	0	31200*	---	39.00	2000
16.900000	MISCELLANEOUS	LS*	----	----	327600	234000	0	93600*	---	39.00	6000
17.000000	OFF-SITE FACILITIES	LS*	----	----	2513700	1117200	0	1396500*	---	42.00	26600
17.100000	RANNEY WELL SYSTEM	LS*	----	----	2513700	1117200	0	1396500*	---	42.00	26600
19.000000	SUBSTATION/T-LINE	LS*	----	----	1370200	806000	0	564200*	---	40.30	20000
19.200000	230KV T-LINE:1 CIR	MI*	1	0.0	1370200	806000	0	564200*	---	40.30	20000
71.000000	INDIRECT CONST COST	LS*	----	----	32876178	8254509	19252670	5368999*	---	30.09	274347
71.100000	FIELD LOCAL HIRES	LS*	----	----	2683395	1485000	0	1198395*	---	16.50	90000
71.200000	CRAFT P/R FRINGES	LS*	----	----	2400000	0	2400000	0*	---	0.00	0
71.210000	PREM PAY-CASUAL	LS*	----	----	1600000	0	1600000	0*	---	0.00	0
71.220000	PREM PAY-SCHED	LS*	----	----	800000	0	800000	0*	---	0.00	0
71.300000	CONSTR EQUIPT	LS*	----	----	114000	0	114000	0*	---	0.00	0
71.310000	AUTOMOTIVE(C/M)	LS*	----	----	114000	0	114000	0*	---	0.00	0
71.400000	CONSTRUCTION PLANT	LS*	----	----	18833177	793404	16568000	1471773*	---	42.11	18840
71.410000	CONSTRUCTN BLDGS	LS*	----	----	386400	240000	36000	110400*	---	40.00	6000
71.420000	TEMP FACILITIES	LS*	----	----	18446777	553404	16532000	1361373*	---	43.10	12840

EXHIBIT 1.4 (CONT'D)

APA
NENANA2 200 MW COAL
ESTIMATE NO. APA 1707 M-1

BY: WMP CHECKED: JDF

DATE: 12-NOV-84 TIME: 14:03:21

DETAILED
INSTALLATION BREAKOUT REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ INS)	(TOTL INS)	(PAYROLL)	(MAJ EXP)	(CONT OTH)*	(MH/UN)	($/MH)	(TOT MH)
71.421000	LABOR CAMP	LS*	----	----	7500000	0	7500000	0*	---	0.00	0
71.422000	FOOD SERVICE	LS*	----	----	8400000	0	8400000	0*	---	0.00	0
71.424000	OTHER TEMP FACIL	LS*	----	----	2546777	553404	632000	1361373*	---	43.10	12840
71.600000	OFFICE/LABOR EXP	LS*	----	----	1370424	1013441	170670	186313*	---	21.38	47400
71.610000	OFFICE EXPENSE	LS*	----	----	98170	0	98170	0*	---	0.00	0
71.620000	LABOR EXPENSE	LS*	----	----	461634	397961	0	63673*	---	23.83	16700
71.630000	TESTING	LS*	----	----	501740	306600	72500	122640*	---	42.00	7300
71.640000	SECURITY GUARDS	LS*	----	----	308880	308880	0	0*	---	13.20	23400
71.800000	CONSTRUCTN CLEANUP	LS*	----	----	234696	167640	0	67056*	---	38.10	4400
71.900000	PRODUCTIVITY ADJ	LS*	----	----	7240486	4795024	0	2445462*	---	42.17	113707
72.000000	PROFESSIONAL SERVCS	LS*	----	----	16000000	0	16000000	0*	---	0.00	0

EXHIBIT 1.4 (CONT'D)

2.

Question:

The reference conditions and vendor data used in determining the changes in heat rate and costs for gas-fired units referred to on page 4 of the March 5 APA response.

Response:

Heat Rate

The reference conditions and vendor data used to determine heat rates for the subject gas-fired generating units are shown in Tables 2-1 and 2-2. These data confirm net capacity ratings of 229 MW for the combined cycle and 261 MW for the three- unit simple cycle plants when operating at design maximum load and ambient winter temperatures. The capacities and heat rates for the plants were developed from the data as shown on Exhibits 2.1 through 2.8.

Capital Cost Estimates

The estimated capital costs for combined cycle and simple cycle powerplants are attached. A simple-cycle powerplant is considered to be a three-unit 261 MW plant, with an initial 87 MW unit and two 87 MW extension units. The information is organized as follows:

Exhibit No.	Data
2.9	Capital Cost Summary, Combustion Turbine Powerplant
2.10	Basis of Estimate, Initial Simple Cycle Unit
2.11	Cost Estimate, Initial Simple Cycle Unit
2.12	Basis of Estimate, Simple Cycle Extension Unit
2.13	Cost Estimate, Simple Cycle Extension Plant
2.14	Capital Cost Summary, Combined Cycle Powerplant
2.15	Basis of Estimate, Combined Cycle Powerplant
2.16	Cost Estimate, Combined Cycle Powerplant

The estimates were prepared in 1983 dollars and de-escalated to 1982 dollars. The capital cost summary presents the direct project costs for all units at a rate de-escalated to 1982 dollars. Owner's cost and startup, spare parts, and special tools costs are added to give a total project cost. The unit cost in 1982 dollars per net kW for complete plants (a three-unit gas turbine plant and a combined cycle plant) are given.

Table 2-1

SIMPLE CYCLE COMBUSTION TURBINE PLANT
CAPACITY AND HEAT RATE ADJUSTMENTS

Capacity		
Gross Output at ISO	80,000 kW	1/ a/
Temperature Correction Factor for Operation at 30°F	1.10	2/
Water Injection Correction Factor	1.018	3/
Corrected Gross Output at 30°F	89,600 kW	
Auxiliary Loads		
Unit Parasitic Use (1% of Corrected Gross Output)	896 kW	
Station Loads (1/3 of 4000 kw total station load for lighting, a/c, etc.)	1,333 kW	
Estimated Capacity Loss between 30°F and 33°F	433 kW	
Net Unit Capacity at 33°F	86,900 kW	
Three-Unit Plant Capacity	260,700 kW (261 MW)	
Heat Rate		
Heat Rate at ISO	10,660 BTU/kWh	4/
Temperature Capacity Correction Factor	0.981	5/
Water Injection Correction Factor	1.015	6/
Corrected Heat Rate at 33°F	10,614 BTU/kWh	
Fuel Consumption (Corrected Gross Output x Corrected Heat Rate), LHV	950×10^6 BTU/hr	
Fuel Consumption (HHV = LHV x 1.1)	1045×10^6 BTU/hr	
Net Station Heat Rate at 33°F (Fuel Consumption/Net Unit Capacity)	12,000 BTU/kWh	b/

a/ Footnotes refer to computations detailed on Exhibit 2.1.
b/ Previous value used was 11,900 BTU/kWh, a difference of less than one percent.

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Table 2-2

COMBINED CYCLE PLANT
CAPACITY AND HEAT RATE ADJUSTMENTS

Capacity		
Gross Output at ISO		
Combustion Turbines (w/o HRSG)	80,000 kW	1/ a/
Temperature Correction Factor for Operation at 30°F	1.10	2/
Exhaust Pressure Correction for HRSG	0.995	3/
Water Injection Correction Factor	1.018	4/
Corrected Gross Output of Combustion Turbines, each at 30°F	89,100 kW	
Steam Turbine at ISO and at 30°F	59,100 kW	5/
Total Gross Output	237,300 kW	
Auxiliary Loads		
Combustion Turbines Parasitic Load, 891 kW each	1782 kW	
Steam Turbine Parasitic Load	2365 kW	
Station Loads	3300 kW	
Total Auxiliary Load	7447 kW	
Estimated Capacity Loss Between 30° and 33°F	870 kW	
Net Station Capacity	229,000 kW (229 MW)	
Heat Rate		
Combustion Turbine Heat Rate at ISO (LHV)	10,660 BTU/kWh	6/
Temperature Capacity Correction Factor	0.981	7/
Water Injection Correction Factor	1.015	8/
Exhaust Pressure Correction Factor	1.005	9/
Corrected Heat Rate at 33°F	10,667 BTU/kWh	
Fuel Consumption (Comb. Turbine Corrected Gross Output x Corrected Heat Rate) (LHV)	1900×10^6 BTU/hr	
Fuel Consumption (HHV = LLV x 1.1)	2110×10^6 BTU/hr	
Net Station Heat Rate at 33°F (Fuel Consumption/Net Station Capacity)	9200 BTU/kWh	b/

a/ Footnotes refer to computations detailed on Exhibit 2.2.
b/ The Net Station Heat Rate of 9200 BTU/kWh is different from that given in March (8770 BTU/kWh) due to the inclusion of station loads, reducing the net capacity from 236 MW to 229 MW as described above.

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SIMPLE CYCLE COMBUSTION TURBINE PLANT

1/ Gross output at ISO: Exhibit 2.3 (table at top of page); Design Output for Natural Gas; read 80,000 kW.

2/ Temperature Correction Factors: Exhibit 2.4; enter graph with compressor inlet temperature of 30°F; use curve labelled "Design Output;" read 110 % (Factor = 1.10).

3/ Water Injection Correction Factor, kW

Computed as $1 + \left(\frac{\% \text{ water injection} \times \text{kW/\% Water Injection}}{100}\right)$

$$\% \text{ water injection} = \frac{\text{lbs/hr water injection}}{\text{lbs/hr air}} \times 100$$

Exhibit 2.5; enter graph at LHV fuel consumption of 950×10^6 BTU/hr; use far right curve labelled "Collected Water Injection Reference;" read 17.2×10^3 lbs/hr water injection.

Exhibit 2.3 (table at top of page); Design Air Flow; read 2280×10^3 lb/hr.

Correct air flow for inlet temperature. Exhibit 2.4; enter graph with compressor inlet temperature of 30°F; use dashed curve labeled "Design Airflow;" read 106.4% (Factor = 1.064).

lbs/hr air = $2280 \times 10^3 \times 1.064 = 2426 \times 10^3$ lb/hr

3/ Water Injection Correction Factor (Cont.)

$$\% \text{ Water Injection} = \frac{17{,}200 \text{ lb/hr water}}{2426 \times 10^3 \text{ lb/hr air}} \times 100$$

$$= 0.708\%$$

Exhibit 2.6; top curve; enter graph with compressor inlet temperature of 30°F; read kW/% W.I. = 2.53

$$\text{Factor} = 1 + \frac{0.708 \times 2.53}{100} = \underline{1.018}$$

4/ Heat Rate at ISO: Exhibit 2.3; table at top of page; Design Heat Rate (LHV) for Natural Gas; read <u>10660 BTU/kWh</u>.

5/ Temperature Capacity Correction Factor: Exhibit 2.4; enter graph with compressor inlet temperature of 30°F; use curve labelled "Design Heat Rate;" read 98.1 percent (Factor = <u>0.981</u>).

6/ Water Injection Correction Factor: Same methodology as described above for 3/, except use bottom curve of Exhibit 2.6 to get heat rate/% water injection. For 30°F; read 2.04

$$\text{Factor} = 1 + \frac{0.708 \times 2.04}{100} = \underline{1.015}$$

COMBINED CYCLE PLANT

1/ Gross output at ISO: See Exhibit 2.1, Item 1.

2/ Temperature Correction Factors: See Exhibit 2.1, Item 2.

3/ Exhaust Pressure Correction for HRSG:

Exhibit 2.3; table at middle of page; additional pressure drop effects; % effect on output, 4 inches water, exhaust = -0.45%

$$\text{Factor} = 1 + \frac{-0.45}{100} = \underline{0.995}$$

4/ Water Injection Correction Factor: See Exhibit 2.1, Item 3.

5/ Steam Turbine Output:

Exhibit 2.7; line 47; Steam Capacity = 254,993 lb/hr.

Exhibit 2.7; bottom; Steam Capacity = 509,986 lb/hr for full load at 30°F with 2 gas turbines operating.

Exhibit 2.8; boiler outlet capacity of 509,982 lb/hr yields HRSG power output of 59,125 kW. Round-off to <u>59,100kW</u>.

6/ Heat Rate: See Exhibit 2.1, Item 4.

7/ Temperature Capacity Correction Factor: See Exhibit 2.1, Item 5.

8/ Water Injection Correction Factor: See Exhibit 2.1, Item 6.

9/ Exhaust Pressure Correction Factor:

Exhibit 2.3; table at middle of page; additional pressure drop effects; % effect on heat rate, 4 inches water, exhaust = 0.45%

$$\text{Factor} = 1 + \frac{0.45}{100} = \underline{1.005}$$

GENERAL ELECTRIC MODEL PG7111 GAS TURBINE E

ESTIMATED PERFORMANCE- CONFIGURATION: NAT. GAS/DISTILLATE

COMPRESSOR INLET TEMPERATURE 59. F (15. C)

ATMOSPHERIC PRESSURE 14.70 PSIA (1.013 BAR)

FUEL		NATURAL GAS	DISTILLATE
DESIGN OUTPUT	KW	80000.	78450.
DESIGN HEAT RATE (LHV)	BTU (KJ) /KW HR	10680. (11250.)	10760. (11350.)
DESIGN HEAT CONS (LHV) 10^6	BTU (KJ) /HR	852.8 (900.0)	844.1 (890.4)
DESIGN AIR FLOW 10^3	LB (KG) /HR	2280. (1034.)	2280. (1034.)

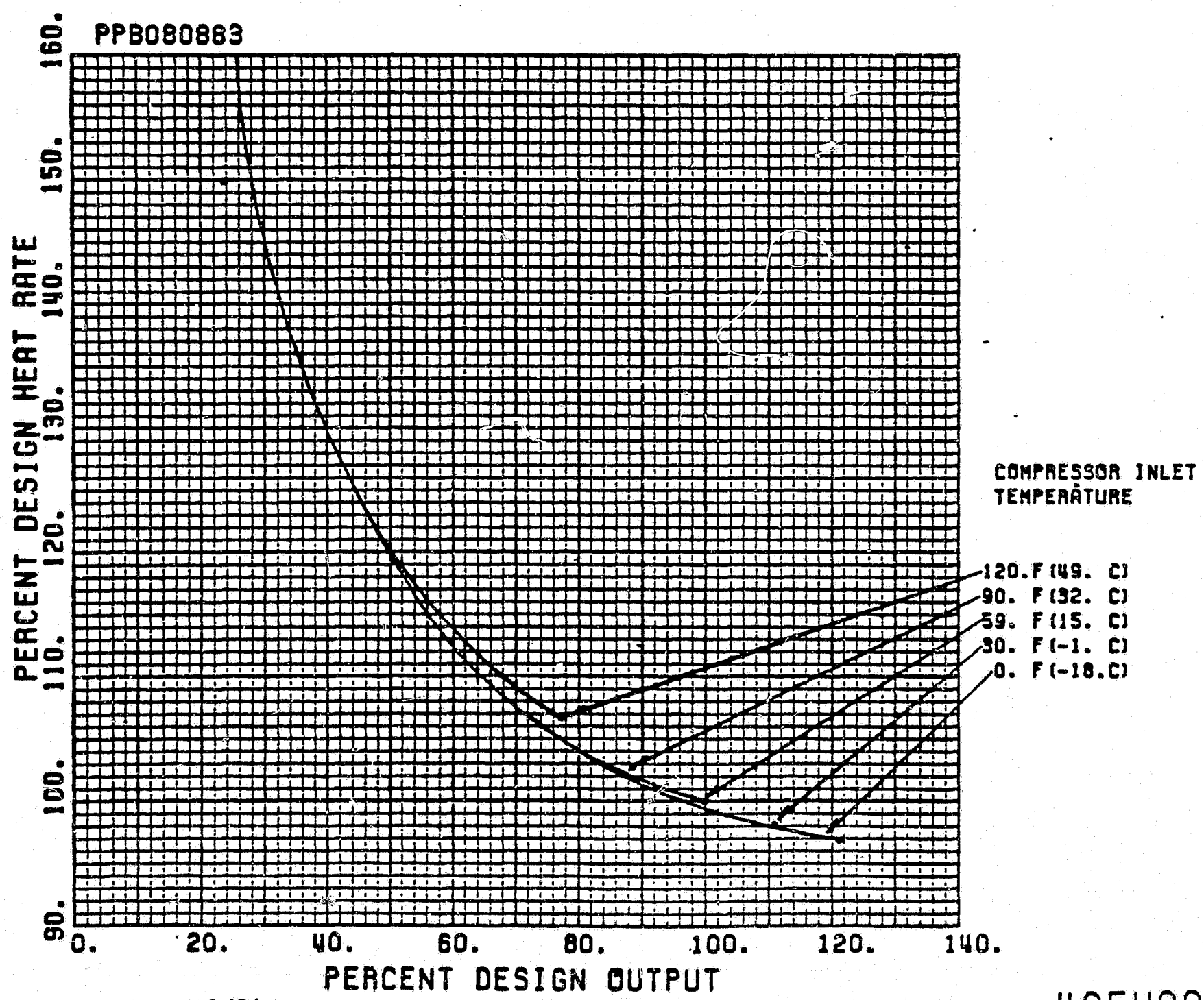
MODE: BASE LOAD

NOTES:

1. ALTITUDE CORRECTION ON CURVE %18HA682
2. AMBIENT TEMPERATURE CORRECTION ON CURVE %95HA930
3. PLANT PERFORMANCE IS MEASURED AT THE GENERATOR TERMINALS AND INCLUDES ALLOWANCES FOR EXCITATION POWER AND 4.0 IN. WATER (10.0 MBAR) INLET AND 5.5 IN. WATER (13.7 MBAR) EXHAUST PRESSURE DROP
4. ADDITIONAL PRESSURE DROP EFFECTS

	% EFFECT ON OUTPUT	% EFFECT ON HEAT RATE	▲ EFFECT ON EXHAUST TEMP
4. IN. WATER (10.0 MBAR) INLET	-1.45	0.45	2.0 F (1.1 C)
4. IN. WATER (10.0 MBAR) EXHAUST	-0.45	0.45	2.0 F (1.1 C)

5. HYDROGEN-COOLED GENERATOR



DATE: 2/21/84 D W GEILING 495HA940

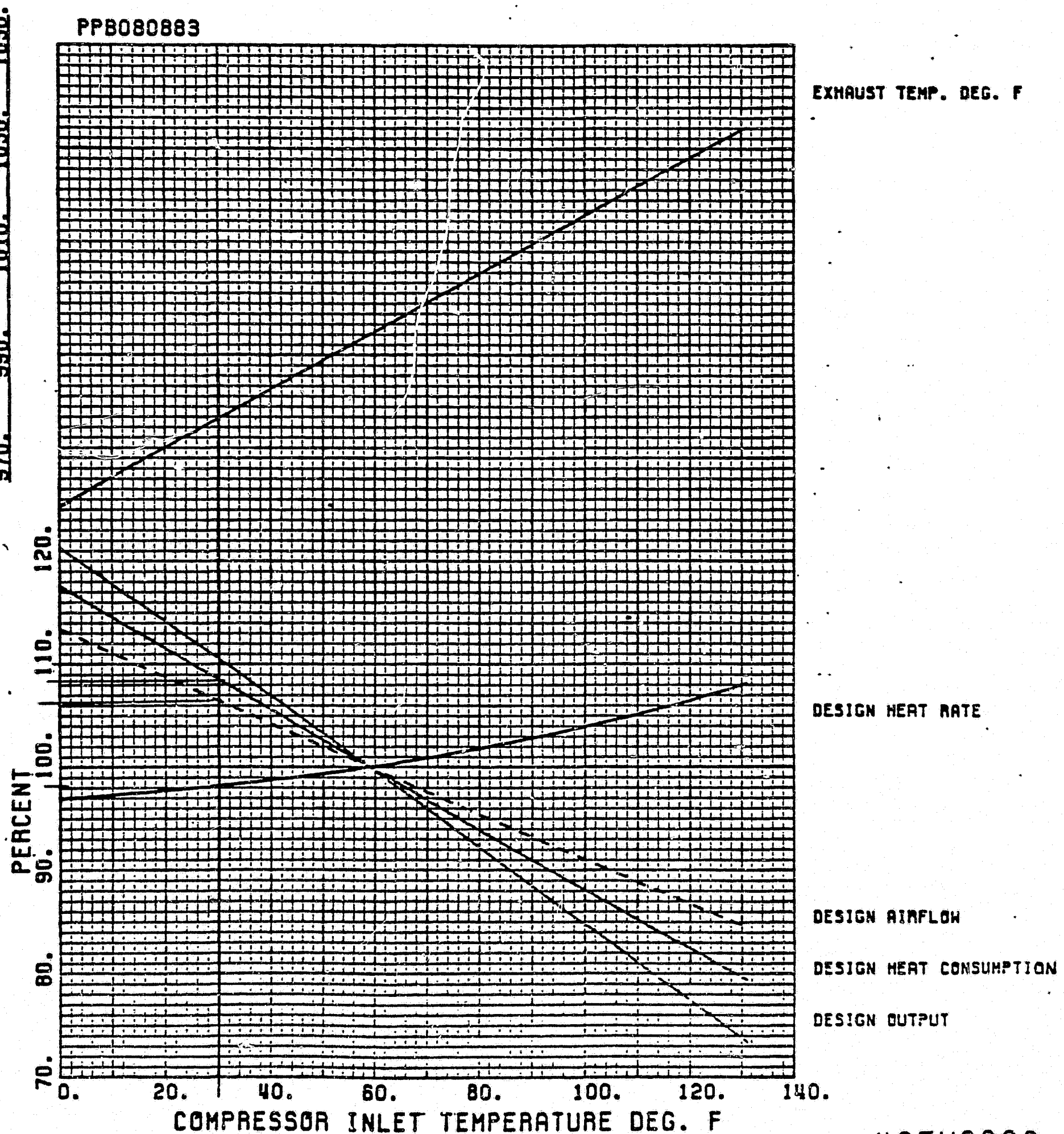
EXHIBIT 2.4

GENERAL ELECTRIC MODEL PG7111 GAS TURBINE E

EFFECT OF COMPRESSOR INLET TEMPERATURE ON
MAXIMUM OUTPUT, HEAT RATE, HEAT CONSUMPTION,
AIRFLOW AND EXHAUST TEMPERATURE AT 100% SPEED

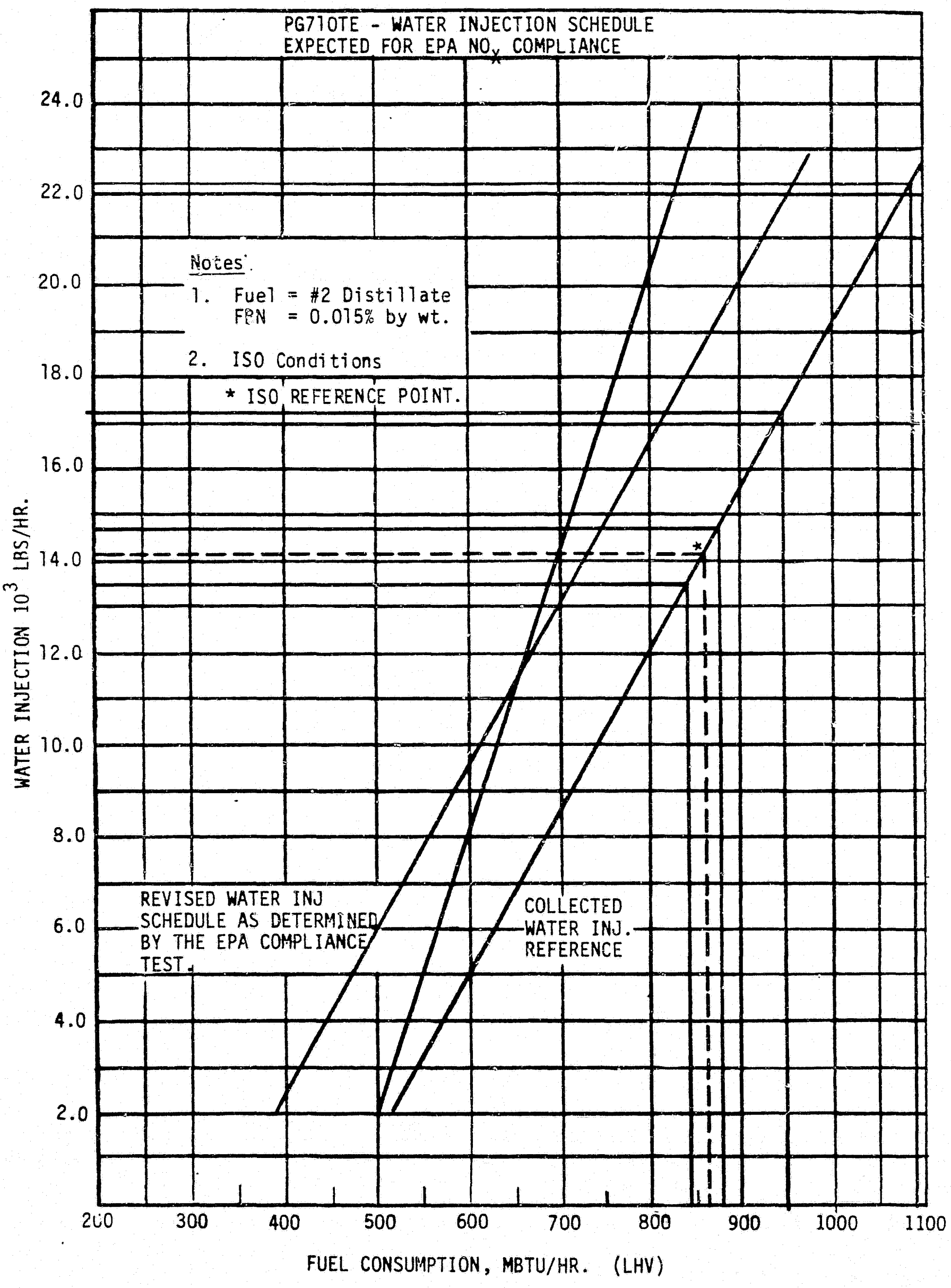
FUELS: NATURAL GAS AND DISTILLATE OIL
MODE: BASE LOAD

PPB080883

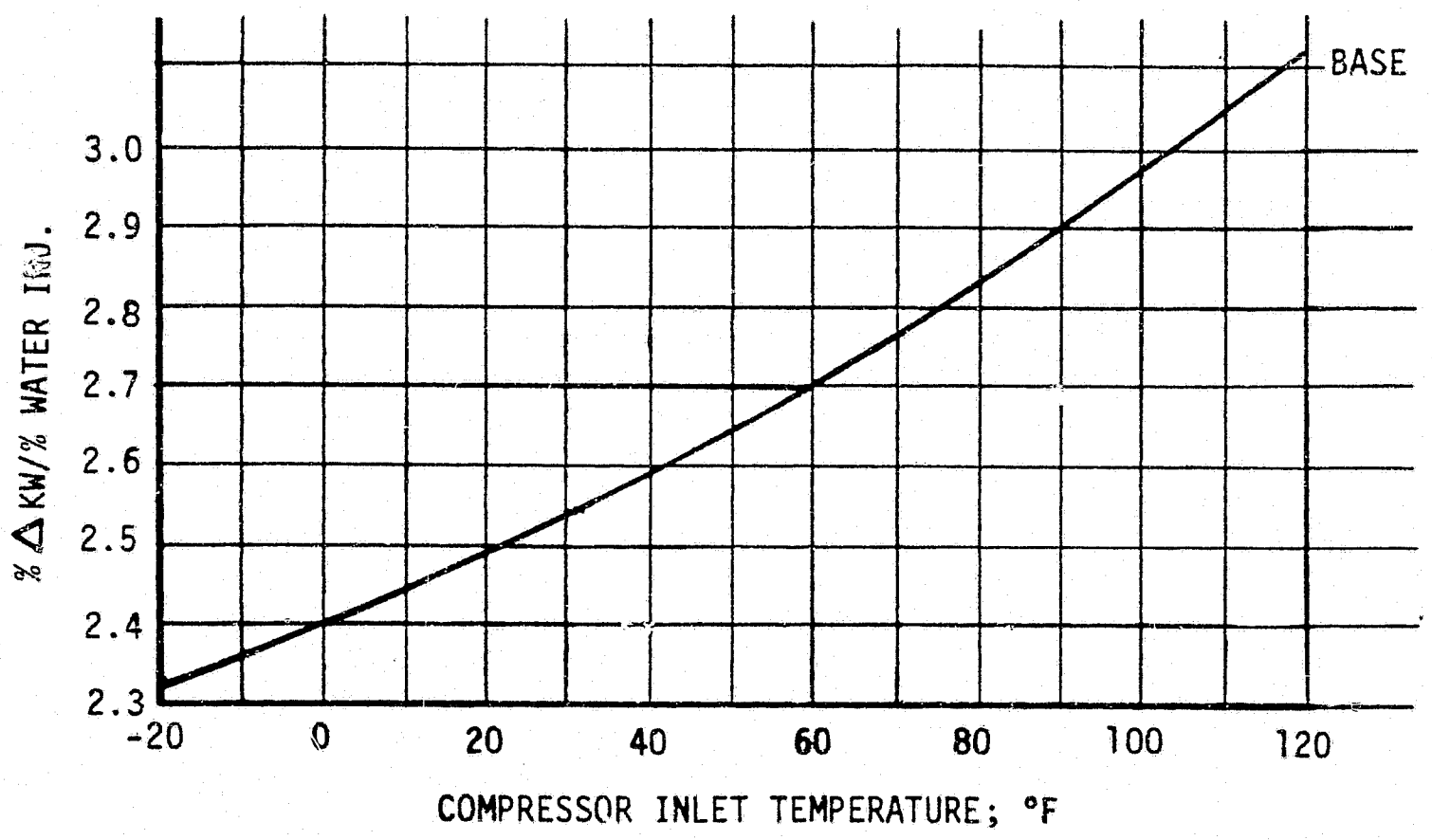


DATE: 2/21/84 D W GEILING 495HA930

EXHIBIT 2.5


PG710TE - WATER INJECTION SCHEDULE
EXPECTED FOR EPA NO_x COMPLIANCE
Notes
1. Fuel = #2 Distillate
FBN = 0.015% by wt.
2. ISO Conditions
* ISO REFERENCE POINT.
REVISED WATER INJ SCHEDULE AS DETERMINED BY THE EPA COMPLIANCE TEST.
COLLECTED WATER INJ. REFERENCE
WATER INJECTION 10^3 LBS/HR.
24.0
22.0
20.0
18.0
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
200
300
400
500
600
700
800
900
1000
1100
FUEL CONSUMPTION, MBTU/HR. (LHV)

GAS TURBINE PERFORMANCE CORRECTION CURVES
FOR MODIFIED WATER INJECTION RATES
MODEL PG 7101E



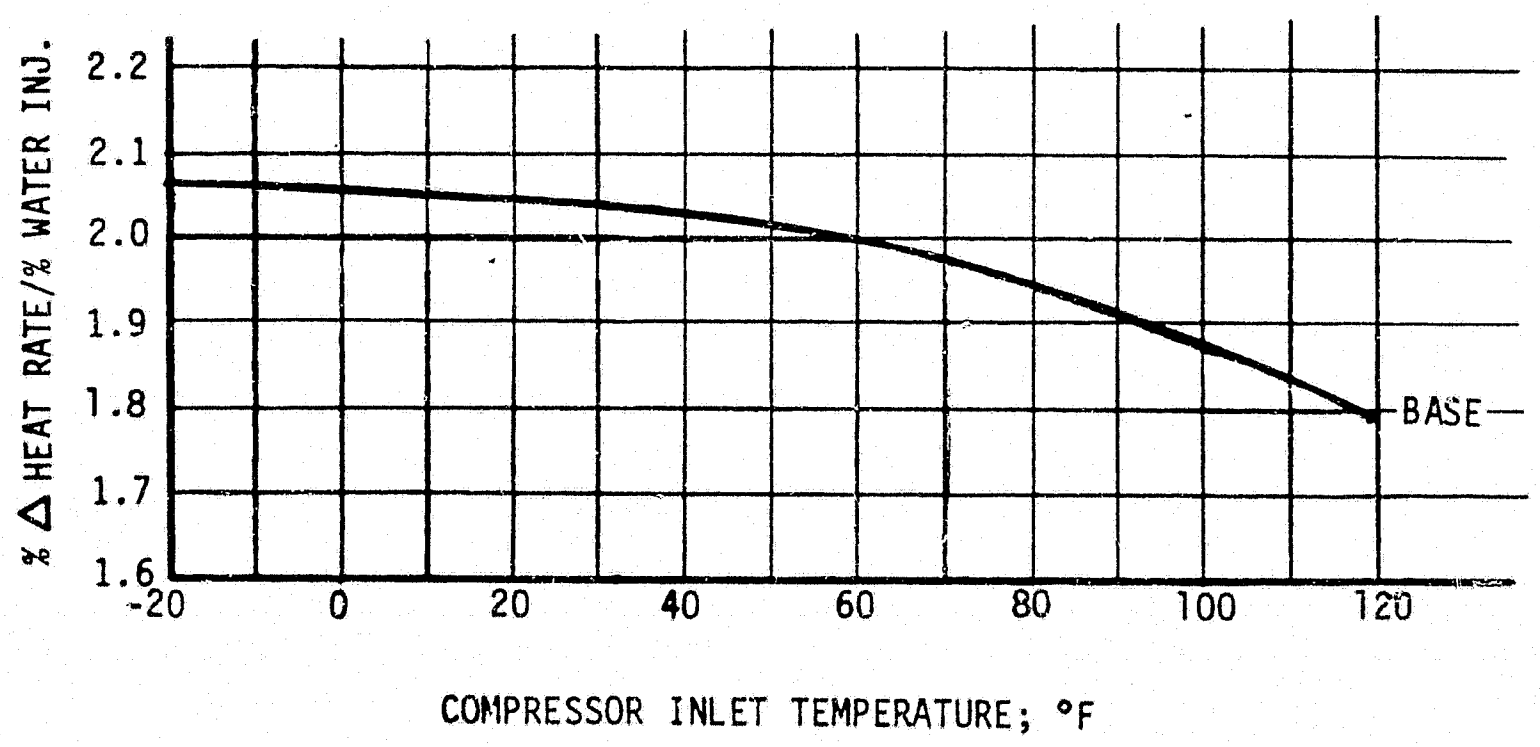


EXHIBIT 2.7

HEAT RECOVERY STEAM GENERATOR
SINGLE PRESSURE UNIT

PROJECT: SUSITNA
FILE: SUSHR30F

GAS : GAS TURB
MFR : GE 7111E

LINE							DATE 19-Dec-84
1		SUPPLEMENTAL FUEL - NONE			CONDITIONS BY SPECIFICATION		
2	HRSG GAS ANALYSIS	SUPPLEMENTAL FUEL ANALYSIS					
3							
4	ULTIMATE, % BY WT	ULTIMATE, % BY WT			HSRG INLET GAS TEMPERATURE (T1)	F	977.00
5	N2	75.00% ←	N2	0.00%	GAS FLOW	PPH	2,488,120
6	O2	15.71% ←	O2	0.00%	MINIMUM STACK GAS TEMPERATURE	F	300.00
7	H2O	4.46% ←	H2O	0.00%	STACK HEIGHT	FT	30.00
8	CO	0.00% ←	CO		BOILER FEEDWATER TEMPERATURE	F	250.00
9	CO2	4.83% ←	CO2	0.00%	ECONOMIZER APPROACH TEMPERATURE	F	30.00
10	SO2	0.00%	SO2		STEAM SUPPLY PRESSURE	PSIA	915.00
11					STEAM SUPPLY TEMPERATURE	F	955.00
12	TOTAL:	100.00%	TOTAL:	0.00%	REQUIRED STEAM FLOW	PPH	400,000
13			HEATING VALUE:	0	SUPERHEATER DIFFERENTIAL PRESSURE	%	10.00%
14					BOILER BLOWDOWN (% OF STEAM FLOW)	%	1.00%
15					DESIGN BOILER PINCH POINT (T4-Tsat)	F	30.00
16					MAXIMUM BURNER HEAT DUTY	BTU/HR	6,000,000
17					MISCELLANEOUS HSRG LOSSES	%	8.00%
18	BOILER SATURATION CONDITIONS						
19	BOILER SATURATION STEAM PRESSURE (Psat)					PSIA	1005.50
20	BOILER SATURATION STEAM TEMPERATURE (Tsat)					F	545.20
21	BOILER SURFACE AREA RATIO						
22	CASE 1						
23							
24	BOILER INLET GAS TEMPERATURE (T1)					F	977.00
25	BOILER PINCH POINT (T4-Tsat)					F	30.00
26	BOILER OUTLET GAS TEMPERATURE (T4)					F	575.20
27	BOILER EFFECTIVENESS						0.9305
28	NUMBER OF THERMAL TRANSFER UNITS (NTU)						2.67
29	CASE 2						
30							
31	BOILER INLET GAS TEMPERATURE (T1)					F	977.00
32	BOILER PINCH POINT (T4-Tsat)					F	60.00
33	BOILER OUTLET GAS TEMPERATURE (T4)					F	605.20
34	BOILER EFFECTIVENESS						0.6610
35	NUMBER OF THERMAL TRANSFER UNITS (NTU)						1.97
36	BOILER SURFACE AREA RATIO						35.12%
37	HRSG AVAILABLE ENERGY						
38	HSRG INLET GAS TEMPERATURE (T1)					F	977.00
39	HSRG INLET GAS ENTHALPY					BTU/LB	369.06
40	HSRG BOILER OUTLET GAS TEMPERATURE (T4)					F	575.20
41	HSRG BOILER OUTLET GAS ENTHALPY					BTU/LB	260.27
42	HSRG BOILER AVERAGE SPECIFIC HEAT					BTU/LB-F	0.2706
43	AVAILABLE EXHAUST HEAT FOR BOILER AND SUPERHEATER					BTU/HR	249,036,114
44	SUPERHEATER STEAM SIDE ENTHALPY DIFFERENCE					BTU/LB	290.64
45	BOILER WATER SIDE ENTHALPY DIFFERENCE					BTU/LB	685.76
46	ECONOMIZER WATER SIDE ENTHALPY DIFFERENCE					BTU/LB	267.58
47	STEAM CAPACITY					LB/HR	254,993
48	HRSG ECONOMIZER GAS CONDITIONS						
49	ECONOMIZER GAS SIDE ENERGY DIFFERENCE					BTU/HR	73,330,348
50	ECONOMIZER OUTLET GAS TEMPERATURE (T5)					F	462.55
51	ECONOMIZER OUTLET GAS ENTHALPY					BTU/LB	230.80
52	ECONOMIZER AVERAGE SPECIFIC HEAT					BTU/LB-F	0.2625
53	ECONOMIZER OUTLET GAS TEMPERATURE VERIFICATION						NA

Note: Based on computed Gas Flow of 2,488,120 ppH (Line 5), resulting steam capacity for full load with one gas turbine plus HRSG at 30°F equals 254,993 lb/hr (Line 47). Use 254,993 x 2 gas turbines = 509,986 lb/hr steam flow for heat balance computations.

EXHIBIT 2.8

*** PROJECT NAME: SUSITNA 30 F @ 100 %*** DATE: 04-15-1985
*** HEAT BALANCE: 915 PSIA/ 955 F BOILER *** FILE: SUS VER 2.0
CONDENSING STEAM CYCLE

DESCRIPTION	(POINT NO.)	M (LBM/HR)	P (PSIA)	T (F)	H (BTU/LBM)	V (FT3/LBM)	NOTES
BOILER OUTLET	(27)	509982	915	955	1482.39	.8771235	SUPERHEAT = 421.0583 F
BOILER BLOWDOWN	(26)	5099.82	915	533.9417	529.0217	.0212897	BLOWDOWN PERCENT= 1 %
FLASH TANK STM OUT	(21)	1673.581	30	250.3322	1164.087	13.74555	BLOWDOWN RECOVERED= 32.81647 %
FLASH TANK DRAIN	(20)	3426.239	30	250.3322	218.8176	1.700534E-02	
TURBINE THROTTLE	(33)	509982	869.25	952.3792	1482.39	.9236331	SUPERHEAT = 424.4965 F
TURBINE GLAND SEAL	(30)	2549.91	15	900.259	1482.39	53.96193	PERCENT = .5 %
TURBINE EXTRACTION	(2)	53502.56	32	345.6434	1211.284	14.77421	QUALITY = 100 %
TURBINE EXHAUST	(1)	453929.5	1.96	125.3383	1060.73	167.513	QUALITY = 94.60529 %
CONDENSER OUTLET	(8)	456479.4	1.96	125.3383	93.25006	1.622676E-02	
CONDENSATE PUMP OUT	(9)	456479.4	30	125.4667	93.37843		
GS COND OUTLET	(12)	456479.4	30	132.6474	100.6474	1.625829E-02	
GS COND DRAIN	(31)	2549.91	15	213.0342	181.1096	1.672298E-02	
DA HEATING STEAM	(4)	53502.56	30	344.8938	1211.284	15.75862	QUALITY = 100 %
DA MAKE-UP WATER	(10)	3426.239	30	35	3.057526	1.601926E-02	
DA TANK OUTLET	(18)	515081.8	30	250.3322	218.8176	1.700534E-02	
BLR FDPMP OUTLET	(19)	515081.8	1307.143	254.352	222.8374	1.700534E-02	

EQUIPMENT	EFFICIENCY (%)	POWER (KW)	NOTES
BOILER	1		1497.466 TONS/HR REQUIRED @ 21500 BTU/LBM
TURBINE	78	60331.24	
GENERATOR	98	59124.61	
BOILER FEEDPUMP	78	777.7815	
BFP TURBINE	0		
CONDENSATE PUMP	70	24.52652	
CIRC WATER PUMP	0	0	
AUXILIARY POWER(.04)		2364.984	
NET POWER		55957.32	

TURBINE HEAT RATE (BTU/KW-HR) = 10845.1 COOLING TOWER HEAT LOAD (BTU/HR) 4.393917E+08
GROSS STATION HEAT RATE (BTU/KW-HR) = 1085779 NET STATION HEAT RATE (BTU/KW-HR) = 1131508

SUMMARY TABLE OF HEAT BALANCES FOR VARIOUS LOAD LEVELS

Gas Turb. Load Pt.	Fuel Ratio	Steam	Throttle Ratio	Turbine	Power	Fuel	
100 %	1	509986	1	-	59125	1900	
83.7	.839	427878	.84	-.3	49441	1594	Steam Cycle with two gas turbines operating
70	.75	382490	.75	-.8	43950	1425	
50	.592	301912	.59	-1.7	34343	1125	
30	.421	214704	.42	-3.7	23870	800	

Exhibit 2.9

COMBUSTION TURBINE POWERPLANT
CAPITAL COST SUMMARY

Direct Project Costs	
Unit 1 Estimate, APA 1707-M-1 ($1983) $37,422,995	
Unit 1 Estimate; De-escalated to $1982 at 6.4%	$ 35,171,980
Unit 2 Estimate, APA 1707-M-1 ($1983) $29,551,357	
Unit 2 Estimate; De-escalated to $1982 at 6.4%	27,773,830
Unit 3 Estimate; APA 1707-M-1 ($1983) $29,551,357	
Unit 3 Estimate; De-escalated to $1982 at 6.4%	$ 27,773,830
Subtotal	$ 90,719,640 1/
Items Not Included in Estimate	
Owners Cost (at 1% of Direct Project)	907,200
Startup, Spare Parts, and Special Tools (at 0.5% of Direct Project)	453,600
Maintenance Shop Machinery, Laboratory Equipment, and Office Furniture (equipment already exists)	-0-
Land (installed at existing site)	-0-
Subtotal	$ 1,360,800
Project Total Cost	$ 92,080,440
Average Cost per kW ($1982) for 3 unit, 261 MW plant	$353

1/ The previous cost given was $90,719,640/261 MW which is $348/kW. Previous capital cost estimates did not include owner's cost or startup, spare parts, etc.

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Exhibit 2.9

COMBUSTION TURBINE POWERPLANT
CAPITAL COST SUMMARY

Direct Project Costs	
Unit 1 Estimate, APA 1707-M-1 ($1983) $37,422,995	
Unit 1 Estimate; De-escalated to $1982 at 6.4%	$ 35,171,980
Unit 2 Estimate, APA 1707-M-1 ($1983) $29,551,357	
Unit 2 Estimate; De-escalated to $1982 at 6.4%	27,773,830
Unit 3 Estimate; APA 1707-M-1 ($1983) $29,551,357	
Unit 3 Estimate; De-escalated to $1982 at 6.4%	$ 27,773,830
Subtotal	$ 90,719,640 1/
Items Not Included in Estimate	
Owners Cost (at 1% of Direct Project)	907,200
Startup, Spare Parts, and Special Tools (at 0.5% of Direct Project)	453,600
Maintenance Shop Machinery, Laboratory Equipment, and Office Furniture (equipment already exists)	-0-
Land (installed at existing site)	-0-
Subtotal	$ 1,360,800
Project Total Cost	$ 92,080,440
Average Cost per kW ($1982) for 3 unit, 261 MW plant	$353

1/ The previous cost given was $90,719,640/261 MW which is $348/kW. Previous capital cost estimates did not include owner's cost or startup, spare parts, etc.

400742
850419

ALASKA POWER AUTHORITY
SUSITNA NEED FOR POWER STUDY
SIMPLE CYCLE PLANT
KENAI SITE

ESTIMATE NO. APA 1707M-1

BASIS OF ESTIMATE

General

This conceptual estimate is prepared in the Ebasco Code of Accounts. The estimate is for a one unit facility and excludes owner's cost (including Land and AFUDC). This estimate has a base pricing level of January, 1983 working 60 hours per week.

The estimate is based on a scope that includes the facilities and systems required for self-sustaining unit.

The estimate is based on the following:

1. Wage rates applicable to Anchorage Union Agreements south of 63° latitude including Workmen's Compensation, FICA, and Public Liability Property Damage insurance rates as calculated by Ebasco.

2. A work week consisting of working 10 hours per day, 6 days per week.

3. Sufficient craftsmen available to meet project requirements without labor camps.

4. Professional services including Engineering, Design, Related Services, and Construction Management based on generic plant of comparable size.

5. Land and Land Rights not included.

6. Allowance for Funds Used During Construction (AFUDC) not included.

7. Client cost not included.

8. Permanent town for plant operating personnel not included.

9. Capital cost of gas pipeline not included.

10. Operating and maintenance costs not included.

11. Contingency included at the rate of 12% for material and 15% for installation.

12. Construction performed on a Contract basis.

13. Project being exempt from sales/use taxes.

14. Labor productivity being "average U.S." with no Alaska adjustment.

15. Spare parts and special tools not included.

16. Startup costs not included.

17. Maintenance machinery, laboratory, and office equipment not included.

Civil (Categories 1, 2, 4, 5, 6, 16, 17)

Clear and grub 75 acres based on scrub brush and trees up to 25 feet. No dewatering of excavated areas is assumed. No asphalt or concrete paving is included. A 1.5-mile access road is included. Fencing perimeter of 75 acres plant site plus interior security fencing as required. Simple cycle building 100 ft x 192 ft x 70 ft eave height.

Mechanical (Categories 7, 8, 9, 10, and 14)

General Electric provided a budgetary quotation for one 77 MW G.E. PG7111E gas turbine, and the necessary auxiliary equipment.

Piping and Insulation (Categories 12 and 13)

Large bore and small bore piping sizing and quantities are based on historical data from similar units.

Electrical (Categories 15 and 19)

Pricing is based on historical data from similar units and in accordance with representative historical inflation indices. The substation is sized for multiple units.

Indirect Construction Cost

Indirect construction cost is priced in accordance with Ebasco experience based on a contract job. Included in indirect costs are:

- Construction management local hire personnel
- Casual premium pay (other than scheduled 60-hour week)
- Construction management automotive equipment
- Construction management office and expenses
- Temporary warehouse for prepurchased equipment
- Road maintenance equipment
- Ten-mile 25 kV temporary transmission line
- Offsite unloading and hauling
- Security guard service
- Final construction cleanup

Testing is assumed to be the contractor's responsibility and witnessed by construction management personnel. Temporary power is assumed to be furnished without cost to contractors.

Professional Services

The professional services estimate is based on a standardized workday package for Engineering, Design, Related Services, Consulting Engineering, ESSE Engineering, and Design and Construction Management Services.

UNIT 1
SIMPLE CYCLE PLANT

APA
SUSITNA SIMPLE CYCLE
ESTIMATE NO. APA 1707 M-1

BY: WMP CHECKED: JDF

DATE: 27-NOV-84 TIME: 11:48:11

SUMMARY
MATERIAL & INSTALLATION REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ TOT)	(TOTAL AMT)*	(TOT MATL)	(UN $MAT)*	(U $ INS)	(TOT INST)*	(TOT ESC)	(MAT ESC)	(INS ESC)
99.000000	TOTAL PROJECT COST	LS*	----	----	37422995*	19975088	---- *	----	17447907*	0	0	0
100.000000	CONTINGENCY	LS*	----	----	4416002*	2140188	---- *	----	2275814*	0	0	0
300.000000	TOTAL COST W/O CONT	LS*	----	----	33006993*	17834900	---- *	----	15172093*	0	0	0
1.000000	IMPROVEMNTS TO SITE	LS*	----	----	1101585*	295080	---- *	----	806505*	0	0	0
2.000000	EARTHWORK & PILING	LS*	----	----	672088*	95050	---- *	----	577038*	0	0	0
4.000000	CONCRETE	LS*	----	----	1010338*	230400	---- *	----	779938*	0	0	0
5.000000	STRCT STL/LFT EQP	LS*	----	----	2020464*	1264000	---- *	----	756464*	0	0	0
6.000000	BUILDINGS	LS*	----	----	1732216*	672770	---- *	----	1059446*	0	0	0
7.000000	TURBINE GENERATOR	LS*	----	----	13083090*	12400000	---- *	----	683090*	0	0	0
10.000000	OTHER MECHAN EQUIP	LS*	----	----	972776*	625000	---- *	----	347776*	0	0	0
12.000000	PIPING	LS*	----	----	768077*	262000	---- *	----	506077*	0	0	0
13.000000	INSULATION	LS*	----	----	129329*	36000	---- *	----	93329*	0	0	0
14.000000	INSTRUMENTATION	LS*	----	----	159957*	100000	---- *	----	59957*	0	0	0
15.000000	ELECTRICAL EQUIPMENT	LS*	----	----	2744527*	1510000	---- *	----	1234527*	0	0	0
16.000000	PAINTING	LS*	----	----	209599*	44600	---- *	----	164999*	0	0	0
17.000000	OFF-SITE FACILITIES	LS*	----	----	1958879*	300000	---- *	----	1658879*	0	0	0
71.000000	INDIRECT CONST COST	LS*	----	----	4334068*	0	---- *	----	4334068*	0	0	0
72.000000	PROFESSIONAL SERVCS	LS*	----	----	2110000*	0	---- *	----	2110000*	0	0	0

EXHIBIT 2.11

APA
SUSITNA SIMPLE CYCLE
ESTIMATE NO. APA 1707 M-1

BY: WMP CHECKED: JDF DATE: 27-NOV-84 TIME: 11:48:11

DETAILED
MATERIAL & INSTALLATION REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ TOT)	(TOTAL AMT)*	(TOT MATL)	(UN $MAT)*	(U $ INS)	(TOT INST)*	(TOT ESC)	(MAT ESC)	(INS ESC)
99.000000	TOTAL PROJECT COST	LS*	----	----	37422995*	19975088	---- *	----	17447907*	0	0	0
100.000000	CONTINGENCY	LS*	----	----	4416002*	2140188	---- *	----	2275814*	0	0	0
300.000000	TOTAL COST W/O CONT	LS*	----	----	33006993*	17834900	---- *	----	15172093*	0	0	0
1.000000	IMPROVEMNTS TO SITE	LS*	----	----	1101585*	295080	---- *	----	806505*	0	0	0
1.100000	SITE PREPARATION	LS*	----	----	155763*	0	---- *	----	155763*	0	0	0
1.110000	CLEARING	AC*	75	2076.8	155763*	0	0.00*	2076.8	155763*	0	0	0
1.200000	ROADS,BRDG,WALKS	LS*	----	----	256381*	104080	---- *	----	152301*	0	0	0
1.210000	ROADS	LS*	----	----	89462*	34080	---- *	----	55382*	0	0	0
1.260000	FENCING	LS*	----	----	166919*	70000	---- *	----	96919*	0	0	0
1.300000	SITE DRAINAGE	LS*	----	----	414603*	110000	---- *	----	304603*	0	0	0
1.400000	WELLS PUMPING EQP	LS*	----	----	90228*	21000	---- *	----	69228*	0	0	0
1.500000	SEWAGE FACILITIES	LS*	----	----	184610*	60000	---- *	----	124610*	0	0	0
2.000000	EARTHWORK & PILING	LS*	----	----	672088*	95050	---- *	----	577038*	0	0	0
2.200000	STRCTR & EQUIP EXC	LS*	----	----	509150*	74050	---- *	----	435100*	0	0	0
2.210000	STATION AREA	LS*	----	----	509150*	74050	---- *	----	435100*	0	0	0
2.212000	EARTH EXCAVATION	CY*	4000	9.2	36951*	0	0.00*	9.2	36951*	0	0	0
2.213000	ROCK EXCAVATION	CY*	700	27.7	19398*	0	0.00*	27.7	19398*	0	0	0
2.214000	SELECT BACKFILL	LS*	----	----	79427*	24000	---- *	----	55427*	0	0	0
2.300000	TRENCHING	LS*	----	----	49560*	0	---- *	----	49560*	0	0	0
2.310000	CIRC WATER COND	LS*	----	----	49560*	0	---- *	----	49560*	0	0	0
2.312000	EARTH EXCAVATION	CY*	3200	15.5	49560*	0	0.00*	15.5	49560*	0	0	0
2.400000	EARTH STRUCTURES	CY*	4000	28.3	113378*	21000	5.25*	23.1	92378*	0	0	0
4.000000	CONCRETE	LS*	----	----	1010338*	230400	---- *	----	779938*	0	0	0

EXHIBIT 2.11 (CONT'D)

BY: WMP CHECKED: JDF

APA
SUSITNA SIMPLE CYCLE
ESTIMATE NO. APA 1707 M-1

DATE: 27-NOV-84 TIME: 11:48:11

DETAILED
MATERIAL & INSTALLATION REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ TOT)	(TOTAL AMT)*	(TOT MATL)	(UN $MAT)*	(U $ INS)	(TOT INST)*	(TOT ESC)	(MAT ESC)	(INS ESC)
4.100000	TURBINE BLDG CONCR	CY*	1600	631.5	1010338*	230400	144.00*	487.5	779938*	0	0	0
5.000000	STRCT STL/LFT EQP	LS*	----	----	2020464*	1264000	---- *	----	756464*	0	0	0
5.100000	TURBINE BUILDING	LS*	----	----	2020464*	1264000	---- *	----	756464*	0	0	0
5.110000	MAIN STEEL	TN*	500	2135.7	1067850*	585000	1170.00*	965.7	482850*	0	0	0
5.130000	MISC STEEL	LS*	----	----	202212*	81500	---- *	----	120712*	0	0	0
5.139000	MISC STEEL	LS*	----	----	14547*	6500	---- *	----	8047*	0	0	0
5.140000	LIFTING EQUIP	LS*	----	----	698760*	570000	---- *	----	128760*	0	0	0
5.141000	CRANE: 40 T CAP	LS*	----	----	698760*	570000	---- *	----	128760*	0	0	0
5.150000	SUPPORT STEEL	LS*	----	----	51642*	27500	---- *	----	24142*	0	0	0
5.151000	EQUIP SUPPORT	TN*	25	2065.7	51642*	27500	1100.00*	965.7	24142*	0	0	0
6.000000	BUILDINGS	LS*	----	----	1732216*	672770	---- *	----	1059446*	0	0	0
6.100000	TURBINE BUILDING	LS*	----	----	1057418*	372350	---- *	----	685068*	0	0	0
6.110000	ARCHITECT FEATURE	LS*	----	----	42752*	7500	---- *	----	35252*	0	0	0
6.120000	SIDING(UNINSULAT)	LS*	----	----	592524*	240000	---- *	----	352524*	0	0	0
6.130000	DOORS	LS*	----	----	67726*	36000	---- *	----	31726*	0	0	0
6.140000	ROOF & SHT METAL	LS*	----	----	226262*	50000	---- *	----	176262*	0	0	0
6.150000	FLOORS	LS*	----	----	90353*	29250	---- *	----	61103*	0	0	0
6.160000	CEILINGS	LS*	----	----	37801*	9600	---- *	----	28201*	0	0	0
6.200000	STEAM GEN BUILDING	LS*	----	----	674798*	300420	---- *	----	374378*	0	0	0
6.270000	HVAC	LS*	----	----	478815*	241920	---- *	----	236895*	0	0	0
6.272000	EQUIPMENT	LS*	----	----	478815*	241920	---- *	----	236895*	0	0	0
6.280000	PLUMB & DRAINAGE	LS*	----	----	195983*	58500	---- *	----	137483*	0	0	0
7.000000	TURBINE GENERATOR	LS*	----	----	13083090*	12400000	---- *	----	683090*	0	0	0

EXHIBIT 2.11 (CONT'D)

APA
SUSITNA SIMPLE CYCLE
ESTIMATE NO. APA 1707 M-1

BY: WMP CHECKED: JDF

DATE: 27-NOV-84 TIME: 11:48:11

DETAILED
MATERIAL & INSTALLATION REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ TOT)	(TOTAL AMT)*	(TOT MATL)	(UN $MAT)*	(U $ INS)	(TOT INST)*	(TOT ESC)	(MAT ESC)	(INS ESC)
7.100000	TURBINE GENERATOR	LS*	----	----	13083090*	12400000	---- *	----	683090*	0	0	0
7.110000	TURBINE GENERATORS	LS*	----	----	13083090*	12400000	---- *	----	683090*	0	0	0
7.111000	GAS TURB GEN	EA*	1	0.0	13083090*	12400000	---- *	0.0	683090*	0	0	0
10.000000	OTHER MECHAN EQUIP	LS*	----	----	972776*	625000	---- *	----	347776*	0	0	0
10.100000	PUMPS	LS*	----	----	131051*	100000	---- *	----	31051*	0	0	0
10.140000	OIL PUMPS	LS*	----	----	131051*	100000	---- *	----	31051*	0	0	0
10.141000	LGT OIL UNLD PMPS	EA*	1	0.0	131051*	100000	---- *	0.0	31051*	0	0	0
10.300000	HEAT EXCHANGERS	LS*	----	----	93472*	50000	---- *	----	43472*	0	0	0
10.310000	FEEDWATER HEATERS	EA*	1	0.0	93472*	50000	50000.00*	0.0	43472*	0	0	0
10.400000	TANKS	LS*	----	----	261627*	125000	---- *	----	136627*	0	0	0
10.410000	WATER TANKS	LS*	----	----	261627*	125000	---- *	----	136627*	0	0	0
10.500000	MISCELLANEOUS EQUIP	LS*	----	----	454206*	330000	---- *	----	124206*	0	0	0
10.510000	CONPRESSED AIR EQP	LS*	----	----	58631*	40000	---- *	----	18631*	0	0	0
10.520000	WTR TREAT EQUIP	LS*	----	----	64841*	40000	---- *	----	24841*	0	0	0
10.530000	GENERAL PLT EQUIP	LS*	----	----	330734*	250000	---- *	----	80734*	0	0	0
10.700000	CECI	LS*	----	----	32420*	20000	---- *	----	12420*	0	0	0
12.000000	PIPING	LS*	----	----	768077*	262000	---- *	----	506077*	0	0	0
12.300000	PIPING	LS*	----	----	206495*	86000	---- *	----	120495*	0	0	0
12.350000	CIRCULATING WATER	LS*	----	----	206495*	86000	---- *	----	120495*	0	0	0
12.400000	PIPING	LS*	----	----	261742*	81000	---- *	----	180742*	0	0	0
12.450000	FIRE PROTECTION	LS*	----	----	158445*	50000	---- *	----	108445*	0	0	0
12.460000	CO2 SYSTEM	LF*	1	0.0	103297*	31000	31000.00*	0.0	72297*	0	0	0
12.500000	PIPING	LS*	----	----	122420*	20000	---- *	----	102420*	0	0	0

EXHIBIT 2.11 (CONT'D)

APA
SUSITNA SIMPLE CYCLE
ESTIMATE NO. APA 1707 M-1

BY: WMP CHECKED: JDF

DATE: 27-NOV-84 TIME: 11:48:11

DETAILED
MATERIAL & INSTALLATION REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ TOT)	(TOTAL AMT)*	(TOT MATL)	(UN $MAT)*	(U $ INS)	(TOT INST)*	(TOT ESC)	(MAT ESC)	(INS ESC)
12.550000	INSTR AIR	LS*	----	----	122420*	20000	---- *	----	102420*	0	0	0
12.600000	PIPING	LS*	----	----	177420*	75000	---- *	----	102420*	0	0	0
12.630000	POTABLE WATER	LF*	1	0.0	177420*	75000	75000.00*	0.0	102420*	0	0	0
13.000000	INSULATION	LS*	----	----	129329*	36000	---- *	----	93329*	0	0	0
13.100000	PIPING INSULATION	SF*	15000	8.6	129329*	36000	2.40*	6.2	93329*	0	0	0
14.000000	INSTRUMENTATION	LS*	----	----	159957*	100000	---- *	----	59957*	0	0	0
14.100000	INSTRUMENTATION	LS*	----	----	159957*	100000	---- *	----	59957*	0	0	0
15.000000	ELECTRICAL EQUIPMENT	LS*	----	----	2744527*	1510000	---- *	----	1234527*	0	0	0
15.100000	TRANFORMERS	LS*	----	----	897169*	760000	---- *	----	137169*	0	0	0
15.110000	MAIN TRANSFORMER	EA*	1	0.0	826196*	700000	---- *	0.0	126196*	0	0	0
15.130000	AUXILIARY XMFR	LS*	----	----	70973*	60000	---- *	----	10973*	0	0	0
15.200000	SWITCHGEARS	LS*	----	----	283894*	240000	---- *	----	43894*	0	0	0
15.500000	SWITCHBOARDS	LS*	----	----	35486*	30000	---- *	----	5486*	0	0	0
15.700000	WIRING SYSTEM	LS*	----	----	1315058*	300000	---- *	----	1015058*	0	0	0
15.900000	AUX ELEC EQUIPMENT	LS*	----	----	212920*	180000	---- *	----	32920*	0	0	0
16.000000	PAINTING	LS*	----	----	209599*	44600	---- *	----	164999*	0	0	0
16.100000	TURBINE BUILDING	LS*	----	----	209599*	44600	---- *	----	164999*	0	0	0
16.110000	STRUCTURAL STEEL	LS*	----	----	167514*	33600	---- *	----	133914*	0	0	0
16.120000	MISC STEEL	LS*	----	----	14956*	3000	---- *	----	11956*	0	0	0
16.130000	WALLS & CEILINGS	LS*	----	----	8673*	1500	---- *	----	7173*	0	0	0
16.140000	EQUIPMENT	LS*	----	----	18456*	6500	---- *	----	11956*	0	0	0
17.000000	OFF-SITE FACILITIES	LS*	----	----	1958879*	300000	---- *	----	1658879*	0	0	0
17.200000	ACCESS ROADS	LS*	----	----	1958879*	300000	---- *	----	1658879*	0	0	0

EXHIBIT 2.11 (CONT'D)

APA
SUSITNA SIMPLE CYCLE
ESTIMATE NO. APA 1707 M-1

BY: WMP CHECKED: JDF

DATE: 27-NOV-84 TIME: 11:48:11

DETAILED
MATERIAL & INSTALLATION REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ TOT)	(TOTAL AMT)*	(TOT MATL)	(UN $MAT)*	(U $ INS)	(TOT INST)*	(TOT ESC)	(MAT ESC)	(INS ESC)
71.000000	INDIRECT CONST COST	LS*	----	----	4334068*	0	---- *	----	4334068*	0	0	0
71.100000	FIELD LOCAL HIRES	LS*	----	----	513864*	0	---- *	----	513864*	0	0	0
71.200000	CRAFT P/R FRINGES	LS*	----	----	205680*	0	---- *	----	205680*	0	0	0
71.210000	PREM PAY-CASUAL	LS*	----	----	137120*	0	---- *	----	137120*	0	0	0
71.220000	PREM PAY-SCHED	LS*	----	----	68560*	0	---- *	----	68560*	0	0	0
71.300000	CONSTR EQUIPT	LS*	----	----	22500*	0	---- *	----	22500*	0	0	0
71.310000	AUTOMOTIVE(C/M)	LS*	----	----	22500*	0	---- *	----	22500*	0	0	0
71.400000	CONSTRUCTION PLANT	LS*	----	----	2286794*	0	---- *	----	2286794*	0	0	0
71.410000	CONSTRUCTN BLDGS	LS*	----	----	240300*	0	---- *	----	240300*	0	0	0
71.420000	TEMP FACILITIES	LS*	----	----	2046494*	0	---- *	----	2046494*	0	0	0
71.600000	OFFICE/LABOR EXP	LS*	----	----	346030*	0	---- *	----	346030*	0	0	0
71.610000	OFFICE EXPENSE	LS*	----	----	9600*	0	---- *	----	9600*	0	0	0
71.620000	LABOR EXPENSE	LS*	----	----	57550*	0	---- *	----	57550*	0	0	0
71.630000	TESTING	LS*	----	----	60480*	0	---- *	----	60480*	0	0	0
71.640000	SECURITY GUARDS	LS*	----	----	218400*	0	---- *	----	218400*	0	0	0
71.700000	OFF-SITE UNLDG/HLG	LS*	----	----	903600*	0	---- *	----	903600*	0	0	0
71.800000	CONSTRUCTN CLEANUP	LS*	----	----	55600*	0	---- *	----	55600*	0	0	0
72.000000	PROFESSIONAL SERVCS	LS*	----	----	2110000*	0	---- *	----	2110000*	0	0	0

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EXHIBIT 2.11 (CONT'D)

UNIT 1

SIMPLE CYCLE PLANT

APA
SUSITNA SIMPLE CYCLE
ESTIMATE NO. APA 1707 M-1

BY: WMP CHECKED: JDF

DATE: 27-NOV-84 TIME: 11:48:11

SUMMARY
INSTALLATION BREAKOUT REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ INS)	(TOTL INS)	(PAYROLL)	(MAJ EXP)	(CONT OTH)*	(MH/UN)	($/MH)	(TOT MH)
99.000000	TOTAL PROJECT COST	LS*	----	----	17447907	7345672	4368521	3457900*	---	38.81	189268
100.000000	CONTINGENCY	LS*	----	----	2275814	0	0	0*	---	0.00	0
300.000000	TOTAL COST W/O CONT	LS*	----	----	15172093	7345672	4368521	3457900*	---	38.81	189268
1.000000	IMPROVEMNTS TO SITE	LS*	----	----	806505	448059	0	358446*	---	38.46	11650
2.000000	EARTHWORK & PILING	LS*	----	----	577038	228295	20000	328743*	---	37.86	6030
4.000000	CONCRETE	LS*	----	----	779938	527544	15000	237394*	---	38.79	13600
5.000000	STRCT STL/LFT EQP	LS*	----	----	756464	521700	0	234764*	---	44.40	11750
6.000000	BUILDINGS	LS*	----	----	1059446	730653	0	328793*	---	40.52	18032
7.000000	TURBINE GENERATOR	LS*	----	----	683090	471097	0	211993*	---	41.69	11300
10.000000	OTHER MECHAN EQUIP	LS*	----	----	347776	239848	0	107928*	---	42.83	5600
12.000000	PIPING	LS*	----	----	506077	349020	0	157057*	---	41.55	8400
13.000000	INSULATION	LS*	----	----	93329	64365	0	28964*	---	42.91	1500
14.000000	INSTRUMENTATION	LS*	----	----	59957	41350	0	18607*	---	41.35	1000
15.000000	ELECTRICAL EQUIPMENT	LS*	----	----	1234527	851400	0	383127*	---	37.84	22500
16.000000	PAINTING	LS*	----	----	164999	113794	0	51205*	---	41.23	2760
17.000000	OFF-SITE FACILITIES	LS*	----	----	1658879	648000	0	1010879*	---	43.20	15000
71.000000	INDIRECT CONST COST	LS*	----	----	4334068	2110547	2223521	0*	---	35.09	60146
72.000000	PROFESSIONAL SERVCS	LS*	----	----	2110000	0	2110000	0*	---	0.00	0

EXHIBIT 2.11 (CONT'D)

APA
SUSITNA SIMPLE CYCLE
ESTIMATE NO. APA 1707 M-1

BY: WMP CHECKED: JDF DATE: 27-NOV-84 TIME: 11:48:11

DETAILED
INSTALLATION BREAKOUT REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ INS)	(TOTL INS)	(PAYROLL)	(MAJ EXP)	(CONT OTH)*	(MH/UN)	($/MH)	(TOT MH)
99.000000	TOTAL PROJECT COST	LS*	----	----	17447907	7345672	4368521	3457900*	---	38.81	189268
100.000000	CONTINGENCY	LS*	----	----	2275814	0	0	0*	---	0.00	0
300.000000	TOTAL COST W/O CONT	LS*	----	----	15172093	7345672	4368521	3457900*	---	38.81	189268
1.000000	IMPROVEMNTS TO SITE	LS*	----	----	806505	448059	0	358446*	---	38.46	11650
1.100000	SITE PREPARATION	LS*	----	----	155763	86535	0	69228*	---	38.46	2250
1.110000	CLEARING	AC*	75	2076.84	155763	86535	0	69228*	30.00	38.46	2250
1.200000	ROADS,BRDG,WALKS	LS*	----	----	152301	84612	0	67689*	---	38.46	2200
1.210000	ROADS	LS*	----	----	55382	30768	0	24614*	---	38.46	800
1.260000	FENCING	LS*	----	----	96919	53844	0	43075*	---	38.46	1400
1.300000	SITE DRAINAGE	LS*	----	----	304603	169224	0	135379*	---	38.46	4400
1.400000	WELLS PUMPING EQP	LS*	----	----	69228	38460	0	30768*	---	38.46	1000
1.500000	SEWAGE FACILITIES	LS*	----	----	124610	69228	0	55382*	---	38.46	1800
2.000000	EARTHWORK & PILING	LS*	----	----	577038	228295	20000	328743*	---	37.86	6030
2.200000	STRCTR & EQUIP EXC	LS*	----	----	435100	178320	0	256780*	---	37.86	4710
2.210000	STATION AREA	LS*	----	----	435100	178320	0	256780*	---	37.86	4710
2.212000	EARTH EXCAVATION	CY*	4000	9.24	36951	15144	0	21807*	0.10	37.86	400
2.213000	ROCK EXCAVATION	CY*	700	27.71	19398	7950	0	11448*	0.30	37.86	210
2.214000	SELECT BACKFILL	LS*	----	----	55427	22716	0	32711*	---	37.86	600
2.300000	TRENCHING	LS*	----	----	49560	12115	20000	17445*	---	37.86	320
2.310000	CIRC WATER COND	LS*	----	----	49560	12115	20000	17445*	---	37.86	320
2.312000	EARTH EXCAVATION	CY*	3200	15.49	49560	12115	20000	17445*	0.10	37.86	320
2.400000	EARTH STRUCTURES	CY*	4000	23.09	92378	37860	0	54518*	0.25	37.86	1000
4.000000	CONCRETE	LS*	----	----	779938	527544	15000	237394*	---	38.79	13600

EXHIBIT 2.11 (CONT'D)

APA
SUSITNA SIMPLE CYCLE
ESTIMATE NO. APA 1707 M-1

BY: WMP CHECKED: JDF DATE: 27-NOV-84 TIME: 11:48:11

DETAILED
INSTALLATION BREAKOUT REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ INS)	(TOTL INS)	(PAYROLL)	(MAJ EXP)	(CONT OTH)*	(MH/UN)	($/MH)	(TOT MH)
4.100000	TURBINE BLDG CONCR	CY*	1600	487.46	779938	527544	15000	237394*	8.50	38.79	13600
5.000000	STRCT STL/LFT EQP	LS*	----	----	756464	521700	0	234764*	---	44.40	11750
5.100000	TURBINE BUILDING	LS*	----	----	756464	521700	0	234764*	---	44.40	11750
5.110000	MAIN STEEL	TN*	500	965.70	482850	333000	0	149850*	15.00	44.40	7500
5.130000	MISC STEEL	LS*	----	----	120712	83250	0	37462*	---	44.40	1875
5.139000	MISC STEEL	LS*	----	----	8047	5550	0	2497*	---	44.40	125
5.140000	LIFTING EQUIP	LS*	----	----	128760	88800	0	39960*	---	44.40	2000
5.141000	CRANE: 40 T CAP	LS*	----	----	128760	88800	0	39960*	---	44.40	2000
5.150000	SUPPORT STEEL	LS*	----	----	24142	16650	0	7492*	---	44.40	375
5.151000	EQUIP SUPPORT	TN*	25	965.68	24142	16650	0	7492*	15.00	44.40	375
6.000000	BUILDINGS	LS*	----	----	1059446	730653	0	328793*	---	40.52	18032
6.100000	TURBINE BUILDING	LS*	----	----	685068	472461	0	212607*	---	40.52	11660
6.110000	ARCHITECT FEATURE	LS*	----	----	35252	24312	0	10940*	---	40.52	600
6.120000	SIDING(UNINSULAT)	LS*	----	----	352524	243120	0	109404*	---	40.52	6000
6.130000	DOORS	LS*	----	----	31726	21880	0	9846*	---	40.52	540
6.140000	ROOF & SHT METAL	LS*	----	----	176262	121560	0	54702*	---	40.52	3000
6.150000	FLOORS	LS*	----	----	61103	42140	0	18963*	---	40.52	1040
6.160000	CEILINGS	LS*	----	----	28201	19449	0	8752*	---	40.52	480
6.200000	STEAM GEN BUILDING	LS*	----	----	374378	258192	0	116186*	---	40.52	6372
6.270000	HVAC	LS*	----	----	236895	163376	0	73519*	---	40.52	4032
6.272000	EQUIPMENT	LS*	----	----	236895	163376	0	73519*	---	40.52	4032
6.280000	PLUMB & DRAINAGE	LS*	----	----	137483	94816	0	42667*	---	40.52	2340
7.000000	TURBINE GENERATOR	LS*	----	----	683090	471097	0	211993*	---	41.69	11300

EXHIBIT 2.11 (CONT'D)

APA
SUSITNA SIMPLE CYCLE
ESTIMATE NO. APA 1707 M-1

BY: WMP CHECKED: JDF

DATE: 27-NOV-84 TIME: 11:48:11

DETAILED
INSTALLATION BREAKOUT REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ INS)	(TOTL INS)	(PAYROLL)	(MAJ EXP)	(CONT OTH)*	(MH/UN)	($/MH)	(TOT MH)
7.100000	TURBINE GENERATOR	LS*	----	----	683090	471097	0	211993*	---	41.69	11300
7.110000	TURBINE GENERATORS	LS*	----	----	683090	471097	0	211993*	---	41.69	11300
7.111000	GAS TURB GEN	EA*	1	0.0	683090	471097	0	211993*	---	41.69	11300
10.000000	OTHER MECHAN EQUIP	LS*	----	----	347776	239848	0	107928*	---	42.83	5600
10.100000	PUMPS	LS*	----	----	31051	21415	0	9636*	---	42.83	500
10.140000	OIL PUMPS	LS*	----	----	31051	21415	0	9636*	---	42.83	500
10.141000	LGT OIL UNLD PMPS	EA*	1	0.0	31051	21415	0	9636*	---	42.83	500
10.300000	HEAT EXCHANGERS	LS*	----	----	43472	29981	0	13491*	---	42.83	700
10.310000	FEEDWATER HEATERS	EA*	1	0.0	43472	29981	0	13491*	---	42.83	700
10.400000	TANKS	LS*	----	----	136627	94226	0	42401*	---	42.83	2200
10.410000	WATER TANKS	LS*	----	----	136627	94226	0	42401*	---	42.83	2200
10.500000	MISCELLANEOUS EQUIP	LS*	----	----	124206	85660	0	38546*	---	42.83	2000
10.510000	CONPRESSED AIR EQP	LS*	----	----	18631	12849	0	5782*	---	42.83	300
10.520000	WTR TREAT EQUIP	LS*	----	----	24841	17132	0	7709*	---	42.83	400
10.530000	GENERAL PLT EQUIP	LS*	----	----	80734	55679	0	25055*	---	42.83	1300
10.700000	CECI	LS*	----	----	12420	8566	0	3854*	---	42.83	200
12.000000	PIPING	LS*	----	----	506077	349020	0	157057*	---	41.55	8400
12.300000	PIPING	LS*	----	----	120495	83100	0	37395*	---	41.55	2000
12.350000	CIRCULATING WATER	LS*	----	----	120495	83100	0	37395*	---	41.55	2000
12.400000	PIPING	LS*	----	----	180742	124650	0	56092*	---	41.55	3000
12.450000	FIRE PROTECTION	LS*	----	----	108445	74790	0	33655*	---	41.55	1800
12.460000	CO2 SYSTEM	LF*	1	0.0	72297	49860	0	22437*	---	41.55	1200
12.500000	PIPING	LS*	----	----	102420	70635	0	31785*	---	41.55	1700

EXHIBIT 2.11 (CONT'D)

APA
SUSITNA SIMPLE CYCLE
ESTIMATE NO. APA 1707 M-1

BY: WMP CHECKED: JDF DATE: 27-NOV-84 TIME: 11:48:11

DETAILED
INSTALLATION BREAKOUT REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ INS)	(TOTL INS)	(PAYROLL)	(MAJ EXP)	(CONT OTH)*	(MH/UN)	($/MH)	(TOT MH)
12.550000	INSTR AIR	LS*	----	----	102420	70635	0	31785*	---	41.55	1700
12.600000	PIPING	LS*	----	----	102420	70635	0	31785*	---	41.55	1700
12.630000	POTABLE WATER	LF*	1	0.0	102420	70635	0	31785*	---	41.55	1700
13.000000	INSULATION	LS*	----	----	93329	64365	0	28964*	---	42.91	1500
13.100000	PIPING INSULATION	SF*	15000	6.22	93329	64365	0	28964*	0.10	42.91	1500
14.000000	INSTRUMENTATION	LS*	----	----	59957	41350	0	18607*	---	41.35	1000
14.100000	INSTRUMENTATION	LS*	----	----	59957	41350	0	18607*	---	41.35	1000
15.000000	ELECTRICAL EQUIPMENT	LS*	----	----	1234527	851400	0	383127*	---	37.84	22500
15.100000	TRANFORMERS	LS*	----	----	137169	94600	0	42569*	---	37.84	2500
15.110000	MAIN TRANSFORMER	EA*	1	0.0	126196	87032	0	39164*	---	37.84	2300
15.130000	AUXILIARY XMFR	LS*	----	----	10973	7568	0	3405*	---	37.84	200
15.200000	SWITCHGEARS	LS*	----	----	43894	30272	0	13622*	---	37.84	800
15.500000	SWITCHBOARDS	LS*	----	----	5486	3784	0	1702*	---	37.84	100
15.700000	WIRING SYSTEM	LS*	----	----	1015058	700040	0	315018*	---	37.84	18500
15.900000	AUX ELEC EQUIPMENT	LS*	----	----	32920	22704	0	10216*	---	37.84	600
16.000000	PAINTING	LS*	----	----	164999	113794	0	51205*	---	41.23	2760
16.100000	TURBINE BUILDING	LS*	----	----	164999	113794	0	51205*	---	41.23	2760
16.110000	STRUCTURAL STEEL	LS*	----	----	133914	92355	0	41559*	---	41.23	2240
16.120000	MISC STEEL	LS*	----	----	11956	8246	0	3710*	---	41.23	200
16.130000	WALLS & CEILINGS	LS*	----	----	7173	4947	0	2226*	---	41.23	120
16.140000	EQUIPMENT	LS*	----	----	11956	8246	0	3710*	---	41.23	200
17.000000	OFF-SITE FACILITIES	LS*	----	----	1658879	648000	0	1010879*	---	43.20	15000
17.200000	ACCESS ROADS	LS*	----	----	1658879	648000	0	1010879*	---	43.20	15000

EXHIBIT 2.11 (CONT'D)

APA
SUSITNA SIMPLE CYCLE
ESTIMATE NO. APA 1707 M-1

BY: WMP CHECKED: JDF

DATE: 27-NOV-84 TIME: 11:48:11

DETAILED
INSTALLATION BREAKOUT REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ INS)	(TOTL INS)	(PAYROLL)	(MAJ EXP)	(CONT OTH)*	(MH/UN)	($/MH)	(TOT MH)
71.000000	INDIRECT CONST COST	LS*	----	----	4334068	2110547	2223521	0*	---	35.09	60146
71.100000	FIELD LOCAL HIRES	LS*	----	----	513864	513864	0	0*	---	24.40	21060
71.200000	CRAFT P/R FRINGES	LS*	----	----	205680	0	205680	0*	---	0.00	0
71.210000	PREM PAY-CASUAL	LS*	----	----	137120	0	137120	0*	---	*****	0
71.220000	PREM PAY-SCHED	LS*	----	----	68560	0	68560	0*	---	39.13	0
71.300000	CONSTR EQUIPT	LS*	----	----	22500	0	22500	0*	---	0.00	0
71.310000	AUTOMOTIVE(C/M)	LS*	----	----	22500	0	22500	0*	---	0.00	0
71.400000	CONSTRUCTION PLANT	LS*	----	----	2286794	903203	1383591	0*	---	43.33	20846
71.410000	CONSTRUCTN BLDGS	LS*	----	----	240300	88000	152300	0*	---	40.00	2200
71.420000	TEMP FACILITIES	LS*	----	----	2046494	815203	1231291	0*	---	43.72	18646
71.600000	OFFICE/LABOR EXP	LS*	----	----	346030	333480	12550	0*	---	36.09	9240
71.610000	OFFICE EXPENSE	LS*	----	----	9600	0	9600	0*	---	0.00	0
71.620000	LABOR EXPENSE	LS*	----	----	57550	54600	2950	0*	---	35.00	1560
71.630000	TESTING	LS*	----	----	60480	60480	0	0*	---	42.00	1440
71.640000	SECURITY GUARDS	LS*	----	----	218400	218400	0	0*	---	35.00	6240
71.700000	OFF-SITE UNLDG/HLG	LS*	----	----	903600	308000	595600	0*	---	40.00	7700
71.800000	CONSTRUCTN CLEANUP	LS*	----	----	55600	52000	3600	0*	---	40.00	1300
72.000000	PROFESSIONAL SERVCS	LS*	----	----	2110000	0	2110000	0*	---	0.00	0

EXHIBIT 2.11 (CONT'D)

ALASKA POWER AUTHORITY
SUSITNA NEED FOR POWER STUDY
SIMPLE CYCLE EXTENSION PLANT
KENAI SITE

ESTIMATE NO. APA 1707M-1

BASIS OF ESTIMATE

General

This conceptual estimate is prepared in the Ebasco Code of Accounts. The estimate is for a one unit facility and excludes owner's cost (including Land and AFUDC). This estimate has a base pricing level of January, 1983 working 60 hours per week.

The estimate is based on a scope that includes the facilities and systems required for self-sustaining unit.

The estimate is based on the following:

1. Wage rates applicable to Anchorage Union Agreements south of 63° latitude including Workmen's Compensation, FICA, and Public Liability Property Damage insurance rates as calculated by Ebasco.

2. A work week consisting of working 10 hours per day, 6 days per week.

3. Sufficient craftsmen available to meet project requirements without labor camps.

4. Professional services including Engineering, Design, Related Services, and Construction Management based on generic plant of comparable size.

5. Land and Land Rights not included.

6. Allowance for Funds Used During Construction (AFUDC) not included.

7. Client cost not included.

8. Permanent town for plant operating personnel not included.

9. Capital cost of gas pipeline not included.

10. Operating and maintenance costs not included.

11. Contingency included at the rate of 12% for material and 15% for installation.

12. Construction performed on a Contract basis.

13. Project being exempt from sales/use taxes.

14. Labor productivity being "average U.S." with no Alaska adjustment.

15. Spare parts and special tools not included.

16. Startup costs not included.

17. Maintenance machinery, laboratory, and office equipment not included.

Civil (Categories 2, 4, 5, 6, and 16)

No dewatering of excavated areas is assumed. No asphalt or concrete paving is included. Simple cycle extension building 100 ft x 192 ft x 70 ft eave height.

Mechanical (Categories 7, 10, and 14)

General Electric provided a budgetary quotation for one 77 MW G.E. PG7111E gas turbine, and the necessary auxiliary equipment.

Piping and Insulation (Categories 12 and 13)

Large bore and small bore piping sizing and quantities are based on historical data from similar units.

Electrical (Category 15)

Pricing is based on historical data from similar units and in accordance with representative historical inflation indices. The substation is included with Unit 1.

Indirect Construction Cost

Indirect construction cost is priced in accordance with Ebasco experience based on a contract job. Included in indirect costs are:

- Construction management local hire personnel
- Casual premium pay (other than scheduled 60-hour week)
- Construction management automotive equipment
- Construction management office and expenses
- Temporary warehouse for prepurchased equipment
- Road maintenance equipment
- Offsite unloading and hauling
- Security guard service
- Final construction cleanup

Testing is assumed to be the contractor's responsibility and witnessed by construction management personnel. Temporary power is assumed to be furnished without cost to contractors.

Professional Services

The professional services estimate is based on a standardized workday package for Engineering, Design, Related Services, Consulting Engineering, ESSE Engineering, and Design and Construction Management Services.

UNIT 2

SIMPLE CYCLE EXTENSION PLANT

APA
SUSITNA SIMPLECYCEXT
ESTIMATE NO. APA 1707 M-1

BY: WMP CHECKED: JDF

DATE: 27-NOV-84 TIME: 14:48:25

SUMMARY
MATERIAL & INSTALLATION REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ TOT)	(TOTAL AMT)*	(TOT MATL)	(UN $MAT)*	(U $ INS)	(TOT INST)*	(TOT ESC)	(MAT ESC)	(INS ESC)
99.000000	TOTAL PROJECT COST	LS*	----	----	29551357*	19308598	---- *	----	10242759*	0	0	0
100.000000	CONTINGENCY	LS*	----	----	3404790*	2068778	---- *	----	1336012*	0	0	0
300.000000	TOTAL COST W/O CONT	LS*	----	----	26146567*	17239820	---- *	----	8906747*	0	0	0
2.000000	EARTHWORK & PILING	LS*	----	----	672088*	95050	---- *	----	577038*	0	0	0
4.000000	CONCRETE	LS*	----	----	1010338*	230400	---- *	----	779938*	0	0	0
5.000000	STRCT STL/LFT EQP	LS*	----	----	2020464*	1264000	---- *	----	756464*	0	0	0
6.000000	BUILDINGS	LS*	----	----	1732216*	672770	---- *	----	1059446*	0	0	0
7.000000	TURBINE GENERATOR	LS*	----	----	13083090*	12400000	---- *	----	683090*	0	0	0
10.000000	OTHER MECHAN EQUIP	LS*	----	----	972776*	625000	---- *	----	347776*	0	0	0
12.000000	PIPING	LS*	----	----	768077*	262000	---- *	----	506077*	0	0	0
13.000000	INSULATION	LS*	----	----	129329*	36000	---- *	----	93329*	0	0	0
14.000000	INSTRUMENTATION	LS*	----	----	159957*	100000	---- *	----	59957*	0	0	0
15.000000	ELECTRICAL EQUIPMENT	LS*	----	----	2113545*	1510000	---- *	----	603545*	0	0	0
16.000000	PAINTING	LS*	----	----	209599*	44600	---- *	----	164999*	0	0	0
71.000000	INDIRECT CONST COST	LS*	----	----	2011088*	0	---- *	----	2011088*	0	0	0
72.000000	PROFESSIONAL SERVCS	LS*	----	----	1264000*	0	---- *	----	1264000*	0	0	0

EXHIBIT 2.13

APA
SUSITNA SIMPLECYCEXT
ESTIMATE NO. APA 1707 M-1

BY: WMP CHECKED: JDF

DATE: 27-NOV-84 TIME: 14:48:25

DETAILED
MATERIAL & INSTALLATION REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ TOT)	(TOTAL AMT)*	(TOT MATL)	(UN $MAT)*	(U $ INS)	(TOT INST)*	(TOT ESC)	(MAT ESC)	(INS ESC)
99.000000	TOTAL PROJECT COST	LS*	----	----	29551357*	19308598	---- *	----	10242759*	0	0	0
100.000000	CONTINGENCY	LS*	----	----	3404790*	2068778	---- *	----	1336012*	0	0	0
300.000000	TOTAL COST W/O CONT	LS*	----	----	26146567*	17239820	---- *	----	8906747*	0	0	0
2.000000	EARTHWORK & PILING	LS*	----	----	672088*	95050	---- *	----	577038*	0	0	0
2.200000	STRCTR & EQUIP EXC	LS*	----	----	509150*	74050	---- *	----	435100*	0	0	0
2.210000	STATION AREA	LS*	----	----	509150*	74050	---- *	----	435100*	0	0	0
2.212000	EARTH EXCAVATION	CY*	4000	9.2	36951*	0	0.00*	9.2	36951*	0	0	0
2.213000	ROCK EXCAVATION	CY*	700	27.7	19398*	0	0.00*	27.7	19398*	0	0	0
2.214000	SELECT BACKFILL	LS*	----	----	79427*	24000	---- *	----	55427*	0	0	0
2.300000	TRENCHING	LS*	----	----	49560*	0	---- *	----	49560*	0	0	0
2.310000	CIRC WATER COND	LS*	----	----	49560*	0	---- *	----	49560*	0	0	0
2.312000	EARTH EXCAVATION	CY*	3200	15.5	49560*	0	0.00*	15.5	49560*	0	0	0
2.400000	EARTH STRUCTURES	CY*	4000	28.3	113378*	21000	5.25*	23.1	92378*	0	0	0
4.000000	CONCRETE	LS*	----	----	1010338*	230400	---- *	----	779938*	0	0	0
4.100000	TURBINE BLDG CONCR	CY*	1600	631.5	1010338*	230400	144.00*	487.5	779938*	0	0	0
5.000000	STRCT STL/LFT EQP	LS*	----	----	2020464*	1264000	---- *	----	756464*	0	0	0
5.100000	TURBINE BUILDING	LS*	----	----	2020464*	1264000	---- *	----	756464*	0	0	0
5.110000	MAIN STEEL	TN*	500	2135.7	1067850*	585000	1170.00*	965.7	482850*	0	0	0
5.130000	MISC STEEL	LS*	----	----	202212*	81500	---- *	----	120712*	0	0	0
5.139000	MISC STEEL	LS*	----	----	14547*	6500	---- *	----	8047*	0	0	0
5.140000	LIFTING EQUIP	LS*	----	----	698760*	570000	---- *	----	128760*	0	0	0
5.141000	CRANE: 40 T CAP	LS*	----	----	698760*	570000	---- *	----	128760*	0	0	0
5.150000	SUPPORT STEEL	LS*	----	----	51642*	27500	---- *	----	24142*	0	0	0

EXHIBIT 2.13 (CONT'D)

APA
SUSITNA SIMPLECYCEXT
ESTIMATE NO. APA 1707 M-1

BY: WMP CHECKED: JDF

DATE: 27-NOV-84 TIME: 14:48:25

DETAILED
MATERIAL & INSTALLATION REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ TOT)	(TOTAL AMT)*	(TOT MATL)	(UN $MAT)*	(U $ INS)	(TOT INST)*	(TOT ESC)	(MAT ESC)	(INS ESC)
5.151000	EQUIP SUPPORT	TN*	25	2065.7	51642*	27500	1100.00*	965.7	24142*	0	0	0
6.000000	BUILDINGS	LS*	----	----	1732216*	672770	---- *	----	1059446*	0	0	0
6.100000	TURBINE BUILDING	LS*	----	----	1057418*	372350	---- *	----	685068*	0	0	0
6.110000	ARCHITECT FEATURE	LS*	----	----	42752*	7500	---- *	----	35252*	0	0	0
6.120000	SIDING(UNINSULAT)	LS*	----	----	592524*	240000	---- *	----	352524*	0	0	0
6.130000	DOORS	LS*	----	----	67726*	36000	---- *	----	31726*	0	0	0
6.140000	ROOF & SHT METAL	LS*	----	----	226262*	50000	---- *	----	176262*	0	0	0
6.150000	FLOORS	LS*	----	----	90353*	29250	---- *	----	61103*	0	0	0
6.160000	CEILINGS	LS*	----	----	37801*	9600	---- *	----	28201*	0	0	0
6.200000	STEAM GEN BUILDING	LS*	----	----	674798*	300420	---- *	----	374378*	0	0	0
6.270000	HVAC	LS*	----	----	478815*	241920	---- *	----	236895*	0	0	0
6.272000	EQUIPMENT	LS*	----	----	478815*	241920	---- *	----	236895*	0	0	0
6.280000	PLUMB & DRAINAGE	LS*	----	----	195983*	58500	---- *	----	137483*	0	0	0
7.000000	TURBINE GENERATOR	LS*	----	----	13083090*	12400000	---- *	----	683090*	0	0	0
7.100000	TURBINE GENERATOR	LS*	----	----	13083090*	12400000	---- *	----	683090*	0	0	0
7.110000	TURBINE GENERATORS	LS*	----	----	13083090*	12400000	---- *	----	683090*	0	0	0
7.111000	GAS TURB GEN	EA*	1	0.0	13083090*	12400000	---- *	0.0	683090*	0	0	0
10.000000	OTHER MECHAN EQUIP	LS*	----	----	972776*	625000	---- *	----	347776*	0	0	0
10.100000	PUMPS	LS*	----	----	131051*	100000	---- *	----	31051*	0	0	0
10.140000	OIL PUMPS	LS*	----	----	131051*	100000	---- *	----	31051*	0	0	0
10.141000	LGT OIL UNLD PMPS	EA*	1	0.0	131051*	100000	---- *	0.0	31051*	0	0	0
10.300000	HEAT EXCHANGERS	LS*	----	----	93472*	50000	---- *	----	43472*	0	0	0
10.310000	FEEDWATER HEATERS	EA*	1	0.0	93472*	50000	50000.00*	0.0	43472*	0	0	0

EXHIBIT 2.13 (CONT'D)

APA
SUSITNA SIMPLECYCEXT
ESTIMATE NO. APA 1707 M-1

BY: WMP CHECKED: JDF DATE: 27-NOV-84 TIME: 14:48:25

DETAILED
MATERIAL & INSTALLATION REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ TOT)	(TOTAL AMT)*	(TOT MATL)	(UN $MAT)*	(U $ INS)	(TOT INST)*	(TOT ESC)	(MAT ESC)	(INS ESC)
10.400000	TANKS	LS*	----	----	261627*	125000	---- *	----	136627*	0	0	0
10.410000	WATER TANKS	LS*	----	----	261627*	125000	---- *	----	136627*	0	0	0
10.500000	MISCELLANEOUS EQUIP	LS*	----	----	454206*	330000	---- *	----	124206*	0	0	0
10.510000	CONPRESSED AIR EQP	LS*	----	----	58631*	40000	---- *	----	18631*	0	0	0
10.520000	WTR TREAT EQUIP	LS*	----	----	64841*	40000	---- *	----	24841*	0	0	0
10.530000	GENERAL PLT EQUIP	LS*	----	----	330734*	250000	---- *	----	80734*	0	0	0
10.700000	CECI	LS*	----	----	32420*	20000	---- *	----	12420*	0	0	0
12.000000	PIPING	LS*	----	----	768077*	262000	---- *	----	506077*	0	0	0
12.300000	PIPING	LS*	----	----	206495*	86000	---- *	----	120495*	0	0	0
12.350000	CIRCULATING WATER	LS*	----	----	206495*	86000	---- *	----	120495*	0	0	0
12.400000	PIPING	LS*	----	----	261742*	81000	---- *	----	180742*	0	0	0
12.450000	FIRE PROTECTION	LS*	----	----	158445*	50000	---- *	----	108445*	0	0	0
12.460000	CO2 SYSTEM	LF*	1	0.0	103297*	31000	31000.00*	0.0	72297*	0	0	0
12.500000	PIPING	LS*	----	----	122420*	20000	---- *	----	102420*	0	0	0
12.550000	INSTR AIR	LS*	----	----	122420*	20000	---- *	----	102420*	0	0	0
12.600000	PIPING	LS*	----	----	177420*	75000	---- *	----	102420*	0	0	0
12.630000	POTABLE WATER	LF*	1	0.0	177420*	75000	75000.00*	0.0	102420*	0	0	0
13.000000	INSULATION	LS*	----	----	129329*	36000	---- *	----	93329*	0	0	0
13.100000	PIPING INSULATION	SF*	15000	8.6	129329*	36000	2.40*	6.2	93329*	0	0	0
14.000000	INSTRUMENTATION	LS*	----	----	159957*	100000	---- *	----	59957*	0	0	0
14.100000	INSTRUMENTATION	LS*	----	----	159957*	100000	---- *	----	59957*	0	0	0
15.000000	ELECTRICAL EQUIPMENT	LS*	----	----	2113545*	1510000	---- *	----	603545*	0	0	0
15.100000	TRANFORMERS	LS*	----	----	1110089*	940000	---- *	----	170089*	0	0	0

EXHIBIT 2.13 (CONT'D)

APA
SUSITNA SIMPLECYCEXT
ESTIMATE NO. APA 1707 M-1

BY: WMP CHECKED: JDF DATE: 27-NOV-84 TIME: 14:48:25

DETAILED
MATERIAL & INSTALLATION REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ TOT)	(TOTAL AMT)*	(TOT MATL)	(UN $MAT)*	(U $ INS)	(TOT INST)*	(TOT ESC)	(MAT ESC)	(INS ESC)
15.110000	MAIN TRANSFORMER	EA*	1	0.0	826196*	700000	---- *	0.0	126196*	0	0	0
15.130000	AUXILIARY XMFR	LS*	----	----	283893*	240000	---- *	----	43893*	0	0	0
15.134000	FIRE PROTECTION	LT*	1	0.0	212920*	180000	---- *	0.0	32920*	0	0	0
15.200000	SWITCHGEARS	LS*	----	----	283894*	240000	---- *	----	43894*	0	0	0
15.500000	SWITCHBOARDS	LS*	----	----	35486*	30000	---- *	----	5486*	0	0	0
15.700000	WIRING SYSTEM	LS*	----	----	684076*	300000	---- *	----	384076*	0	0	0
16.000000	PAINTING	LS*	----	----	209599*	44600	---- *	----	164999*	0	0	0
16.100000	TURBINE BUILDING	LS*	----	----	209599*	44600	---- *	----	164999*	0	0	0
16.110000	STRUCTURAL STEEL	LS*	----	----	167514*	33600	---- *	----	133914*	0	0	0
16.120000	MISC STEEL	LS*	----	----	14956*	3000	---- *	----	11956*	0	0	0
16.130000	WALLS & CEILINGS	LS*	----	----	8673*	1500	---- *	----	7173*	0	0	0
16.140000	EQUIPMENT	LS*	----	----	18456*	6500	---- *	----	11956*	0	0	0
71.000000	INDIRECT CONST COST	LS*	----	----	2011088*	0	---- *	----	2011088*	0	0	0
71.100000	FIELD LOCAL HIRES	LS*	----	----	513864*	0	---- *	----	513864*	0	0	0
71.200000	CRAFT P/R FRINGES	LS*	----	----	167094*	0	---- *	----	167094*	0	0	0
71.210000	PREM PAY-CASUAL	LS*	----	----	111396*	0	---- *	----	111396*	0	0	0
71.220000	PREM PAY-SCHED	LS*	----	----	55698*	0	---- *	----	55698*	0	0	0
71.300000	CONSTR EQUIPT	LS*	----	----	22500*	0	---- *	----	22500*	0	0	0
71.310000	AUTOMOTIVE(C/M)	LS*	----	----	22500*	0	---- *	----	22500*	0	0	0
71.600000	OFFICE/LABOR EXP	LS*	----	----	348430*	0	---- *	----	348430*	0	0	0
71.610000	OFFICE EXPENSE	LS*	----	----	9600*	0	---- *	----	9600*	0	0	0
71.620000	LABOR EXPENSE	LS*	----	----	59950*	0	---- *	----	59950*	0	0	0
71.630000	TESTING	LS*	----	----	60480*	0	---- *	----	60480*	0	0	0

EXHIBIT 2.13 (CONT'D)

APA
SUSITNA SIMPLECYCEXT
ESTIMATE NO. APA 1707 M-1

BY: WMP CHECKED: JDF

DATE: 27-NOV-84 TIME: 14:48:25

DETAILED
MATERIAL & INSTALLATION REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ TOT)	(TOTAL AMT)*	(TOT MATL)	(UN $MAT)*	(U $ INS)	(TOT INST)*	(TOT ESC)	(MAT ESC)	(INS ESC)
71.640000	SECURITY GUARDS	LS*	----	----	218400*	0	---- *	----	218400*	0	0	0
71.700000	OFF-SITE UNLDG/HLG	LS*	----	----	903600*	0	---- *	----	903600*	0	0	0
71.800000	CONSTRUCTN CLEANUP	LS*	----	----	55600*	0	---- *	----	55600*	0	0	0
72.000000	PROFESSIONAL SERVCS	LS*	----	----	1264000*	0	---- *	----	1264000*	0	0	0

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EXHIBIT 2.13 (CONT'D)

UNIT 2

SIMPLE CYCLE EXTENSION PLANT

APA
SUSITNA SIMPLECYCEXT
ESTIMATE NO. APA 1707 M-1

BY: WMP CHECKED: JDF

DATE: 27-NOV-84 TIME: 14:48:25

SUMMARY
INSTALLATION BREAKOUT REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ INS)	(TOTL INS)	(PAYROLL)	(MAJ EXP)	(CONT OTH)*	(MH/UN)	($/MH)	(TOT MH)
99.000000	TOTAL PROJECT COST	LS*	----	----	10242759	4911250	2102744	1892753*	---	37.70	130272
100.000000	CONTINGENCY	LS*	----	----	1336012	0	0	0*	---	0.00	0
300.000000	TOTAL COST W/O CONT	LS*	----	----	8906747	4911250	2102744	1892753*	---	37.70	130272
2.000000	EARTHWORK & PILING	LS*	----	----	577038	228295	20000	328743*	---	37.86	6030
4.000000	CONCRETE	LS*	----	----	779938	527544	15000	237394*	---	38.79	13600
5.000000	STRCT STL/LFT EQP	LS*	----	----	756464	521700	0	234764*	---	44.40	11750
6.000000	BUILDINGS	LS*	----	----	1059446	730653	0	328793*	---	40.52	18032
7.000000	TURBINE GENERATOR	LS*	----	----	683090	471097	0	211993*	---	41.69	11300
10.000000	OTHER MECHAN EQUIP	LS*	----	----	347776	239848	0	107928*	---	42.83	5600
12.000000	PIPING	LS*	----	----	506077	349020	0	157057*	---	41.55	8400
13.000000	INSULATION	LS*	----	----	93329	64365	0	28964*	---	42.91	1500
14.000000	INSTRUMENTATION	LS*	----	----	59957	41350	0	18607*	---	41.35	1000
15.000000	ELECTRICAL EQUIPMENT	LS*	----	----	603545	416240	0	187305*	---	37.84	11000
16.000000	PAINTING	LS*	----	----	164999	113794	0	51205*	---	41.23	2760
71.000000	INDIRECT CONST COST	LS*	----	----	2011088	1207344	803744	0*	---	30.72	39300
72.000000	PROFESSIONAL SERVCS	LS*	----	----	1264000	0	1264000	0*	---	0.00	0

EXHIBIT 2.13 (CONT'D)

APA
SUSITNA SIMPLECYCEXT
ESTIMATE NO. APA 1707 M-1

BY: WMP CHECKED: JDF

DATE: 27-NOV-84 TIME: 14:48:25

DETAILED
INSTALLATION BREAKOUT REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ INS)	(TOTL INS)	(PAYROLL)	(MAJ EXP)	(CONT OTH)*	(MH/UN)	($/MH)	(TOT MH)
99.000000	TOTAL PROJECT COST	LS*	----	----	10242759	4911250	2102744	1892753*	---	37.70	130272
100.000000	CONTINGENCY	LS*	----	----	1336012	0	0	0*	---	0.00	0
300.000000	TOTAL COST W/O CONT	LS*	----	----	8906747	4911250	2102744	1892753*	---	37.70	130272
2.000000	EARTHWORK & PILING	LS*	----	----	577038	228295	20000	328743*	---	37.86	6030
2.200000	STRCTR & EQUIP EXC	LS*	----	----	435100	178320	0	256780*	---	37.86	4710
2.210000	STATION AREA	LS*	----	----	435100	178320	0	256780*	---	37.86	4710
2.212000	EARTH EXCAVATION	CY*	4000	9.24	36951	15144	0	21807*	0.10	37.86	400
2.213000	ROCK EXCAVATION	CY*	700	27.71	19398	7950	0	11448*	0.30	37.86	210
2.214000	SELECT BACKFILL	LS*	----	----	55427	22716	0	32711*	---	37.86	600
2.300000	TRENCHING	LS*	----	----	49560	12115	20000	17445*	---	37.86	320
2.310000	CIRC WATER COND	LS*	----	----	49560	12115	20000	17445*	---	37.86	320
2.312000	EARTH EXCAVATION	CY*	3200	15.49	49560	12115	20000	17445*	0.10	37.86	320
2.400000	EARTH STRUCTURES	CY*	4000	23.09	92378	37860	0	54518*	0.25	37.86	1000
4.000000	CONCRETE	LS*	----	----	779938	527544	15000	237394*	---	38.79	13600
4.100000	TURBINE BLDG CONCR	CY*	1600	487.46	779938	527544	15000	237394*	8.50	38.79	13600
5.000000	STRCT STL/LFT EQP	LS*	----	----	756464	521700	0	234764*	---	44.40	11750
5.100000	TURBINE BUILDING	LS*	----	----	756464	521700	0	234764*	---	44.40	11750
5.110000	MAIN STEEL	TN*	500	965.70	482850	333000	0	149850*	15.00	44.40	7500
5.130000	MISC STEEL	LS*	----	----	120712	83250	0	37462*	---	44.40	1875
5.139000	MISC STEEL	LS*	----	----	8047	5550	0	2497*	---	44.40	125
5.140000	LIFTING EQUIP	LS*	----	----	128760	88800	0	39960*	---	44.40	2000
5.141000	CRANE: 40 T CAP	LS*	----	----	128760	88800	0	39960*	---	44.40	2000
5.150000	SUPPORT STEEL	LS*	----	----	24142	16650	0	7492*	---	44.40	375

EXHIBIT 2.13 (CONT'D)

APA
SUSITNA SIMPLECYCEXT
ESTIMATE NO. APA 1707 M-1

BY: WMP CHECKED: JDF

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DETAILED
INSTALLATION BREAKOUT REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ INS)	(TOTL INS)	(PAYROLL)	(MAJ EXP)	(CONT OTH)*	(MH/UN)	($/MH)	(TOT MH)
5.151000	EQUIP SUPPORT	TN*	25	965.68	24142	16650	0	7492*	15.00	44.40	375
6.000000	BUILDINGS	LS*	----	----	1059446	730653	0	328793*	---	40.52	18032
6.100000	TURBINE BUILDING	LS*	----	----	685068	472461	0	212607*	---	40.52	11660
6.110000	ARCHITECT FEATURE	LS*	----	----	35252	24312	0	10940*	---	40.52	600
6.120000	SIDING(UNINSULAT)	LS*	----	----	352524	243120	0	109404*	---	40.52	6000
6.130000	DOORS	LS*	----	----	31726	21880	0	9846*	---	40.52	540
6.140000	ROOF & SHT METAL	LS*	----	----	176262	121560	0	54702*	---	40.52	3000
6.150000	FLOORS	LS*	----	----	61103	42140	0	18963*	---	40.52	1040
6.160000	CEILINGS	LS*	----	----	28201	19449	0	8752*	---	40.52	480
6.200000	STEAM GEN BUILDING	LS*	----	----	374378	258192	0	116186*	---	40.52	6372
6.270000	HVAC	LS*	----	----	236895	163376	0	73519*	---	40.52	4032
6.272000	EQUIPMENT	LS*	----	----	236895	163376	0	73519*	---	40.52	4032
6.280000	PLUMB & DRAINAGE	LS*	----	----	137483	94816	0	42667*	---	40.52	2340
7.000000	TURBINE GENERATOR	LS*	----	----	683090	471097	0	211993*	---	41.69	11300
7.100000	TURBINE GENERATOR	LS*	----	----	683090	471097	0	211993*	---	41.69	11300
7.110000	TURBINE GENERATORS	LS*	----	----	683090	471097	0	211993*	---	41.69	11300
7.111000	GAS TURB GEN	EA*	1	0.0	683090	471097	0	211993*	---	41.69	11300
10.000000	OTHER MECHAN EQUIP	LS*	----	----	347776	239848	0	107928*	---	42.83	5600
10.100000	PUMPS	LS*	----	----	31051	21415	0	9636*	---	42.83	500
10.140000	OIL PUMPS	LS*	----	----	31051	21415	0	9636*	---	42.83	500
10.141000	LGT OIL UNLD PMPS	EA*	1	0.0	31051	21415	0	9636*	---	42.83	500
10.300000	HEAT EXCHANGERS	LS*	----	----	43472	29981	0	13491*	---	42.83	700
10.310000	FEEDWATER HEATERS	EA*	1	0.0	43472	29981	0	13491*	---	42.83	700

EXHIBIT 2.13 (CONT'D)

APA
SUSITNA SIMPLECYCEXT
ESTIMATE NO. APA 1707 M-1

BY: WMP CHECKED: JDF

DATE: 27-NOV-84 TIME: 14:48:25

DETAILED
INSTALLATION BREAKOUT REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ INS)	(TOTL INS)	(PAYROLL)	(MAJ EXP)	(CONT OTH)*	(MH/UN)	($/MH)	(TOT MH)
10.400000	TANKS	LS*	----	----	136627	94226	0	42401*	---	42.83	2200
10.410000	WATER TANKS	LS*	----	----	136627	94226	0	42401*	---	42.83	2200
10.500000	MISCELLANEOUS EQUIP	LS*	----	----	124206	85660	0	38546*	---	42.83	2000
10.510000	CONPRESSED AIR EQP	LS*	----	----	18631	12849	0	5782*	---	42.83	300
10.520000	WTR TREAT EQUIP	LS*	----	----	24841	17132	0	7709*	---	42.83	400
10.530000	GENERAL PLT EQUIP	LS*	----	----	80734	55679	0	25055*	---	42.83	1300
10.700000	CECI	LS*	----	----	12420	8566	0	3854*	---	42.83	200
12.000000	PIPING	LS*	----	----	506077	349020	0	157057*	---	41.55	8400
12.300000	PIPING	LS*	----	----	120495	83100	0	37395*	---	41.55	2000
12.350000	CIRCULATING WATER	LS*	----	----	120495	83100	0	37395*	---	41.55	2000
12.400000	PIPING	LS*	----	----	180742	124650	0	56092*	---	41.55	3000
12.450000	FIRE PROTECTION	LS*	----	----	108445	74790	0	33655*	---	41.55	1800
12.460000	CO2 SYSTEM	LF*	1	0.0	72297	49860	0	22437*	---	41.55	1200
12.500000	PIPING	LS*	----	----	102420	70635	0	31785*	---	41.55	1700
12.550000	INSTR AIR	LS*	----	----	102420	70635	0	31785*	---	41.55	1700
12.600000	PIPING	LS*	----	----	102420	70635	0	31785*	---	41.55	1700
12.630000	POTABLE WATER	LF*	1	0.0	102420	70635	0	31785*	---	41.55	1700
13.000000	INSULATION	LS*	----	----	93329	64365	0	28964*	---	42.91	1500
13.100000	PIPING INSULATION	SF*	15000	6.22	93329	64365	0	28964*	0.10	42.91	1500
14.000000	INSTRUMENTATION	LS*	----	----	59957	41350	0	18607*	---	41.35	1000
14.100000	INSTRUMENTATION	LS*	----	----	59957	41350	0	18607*	---	41.35	1000
15.000000	ELECTRICAL EQUIPMENT	LS*	----	----	603545	416240	0	187305*	---	37.84	11000
15.100000	TRANFORMERS	LS*	----	----	170089	117304	0	52785*	---	37.84	3100

EXHIBIT 2.13 (CONT'D)

APA
SUSITNA SIMPLECYCEXT
ESTIMATE NO. APA 1707 M-1

BY: WMP CHECKED: JDF DATE: 27-NOV-84 TIME: 14:48:25

DETAILED
INSTALLATION BREAKOUT REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ INS)	(TOTL INS)	(PAYROLL)	(MAJ EXP)	(CONT OTH)*	(MH/UN)	($/MH)	(TOT MH)
15.110000	MAIN TRANSFORMER	EA*	1	0.0	126196	87032	0	39164*	---	37.84	2300
15.130000	AUXILIARY XMFR	LS*	----	----	43893	30272	0	13621*	---	37.84	800
15.134000	FIRE PROTECTION	LT*	1	0.0	32920	22704	0	10216*	---	37.84	600
15.200000	SWITCHGEARS	LS*	----	----	43894	30272	0	13622*	---	37.84	800
15.500000	SWITCHBOARDS	LS*	----	----	5486	3784	0	1702*	---	37.84	100
15.700000	WIRING SYSTEM	LS*	----	----	384076	264880	0	119196*	---	37.84	7000
16.000000	PAINTING	LS*	----	----	164999	113794	0	51205*	---	41.23	2760
16.100000	TURBINE BUILDING	LS*	----	----	164999	113794	0	51205*	---	41.23	2760
16.110000	STRUCTURAL STEEL	LS*	----	----	133914	92355	0	41559*	---	41.23	2240
16.120000	MISC STEEL	LS*	----	----	11956	8246	0	3710*	---	41.23	200
16.130000	WALLS & CEILINGS	LS*	----	----	7173	4947	0	2226*	---	41.23	120
16.140000	EQUIPMENT	LS*	----	----	11956	8246	0	3710*	---	41.23	200
71.000000	INDIRECT CONST COST	LS*	----	----	2011088	1207344	803744	0*	---	30.72	39300
71.100000	FIELD LOCAL HIRES	LS*	----	----	513864	513864	0	0*	---	24.40	21060
71.200000	CRAFT P/R FRINGES	LS*	----	----	167094	0	167094	0*	---	0.00	0
71.210000	PREM PAY-CASUAL	LS*	----	----	111396	0	111396	0*	---	*****	0
71.220000	PREM PAY-SCHED	LS*	----	----	55698	0	55698	0*	---	39.13	0
71.300000	CONSTR EQUIPT	LS*	----	----	22500	0	22500	0*	---	0.00	0
71.310000	AUTOMOTIVE(C/M)	LS*	----	----	22500	0	22500	0*	---	0.00	0
71.600000	OFFICE/LABOR EXP	LS*	----	----	348430	333480	14950	0*	---	36.09	9240
71.610000	OFFICE EXPENSE	LS*	----	----	9600	0	9600	0*	---	0.00	0
71.620000	LABOR EXPENSE	LS*	----	----	59950	54600	5350	0*	---	35.00	1560
71.630000	TESTING	LS*	----	----	60480	60480	0	0*	---	42.00	1440

EXHIBIT 2.13 (CONT'D)

APA
SUSITNA SIMPLECYCEXT
ESTIMATE NO. APA 1707 M-1

BY: WMP CHECKED: JDF

DATE: 27-NOV-84 TIME: 14:48:25

DETAILED
INSTALLATION BREAKOUT REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ INS)	(TOTL INS)	(PAYROLL)	(MAJ EXP)	(CONT OTH)*	(MH/UN)	($/MH)	(TOT MH)
71.640000	SECURITY GUARDS	LS*	----	----	218400	218400	0	0*	---	35.00	6240
71.700000	OFF-SITE UNLDG/HLG	LS*	----	----	903600	308000	595600	0*	---	40.00	7700
71.800000	CONSTRUCTN CLEANUP	LS*	----	----	55600	52000	3600	0*	---	40.00	1300
72.000000	PROFESSIONAL SERVCS	LS*	----	----	1264000	0	1264000	0*	---	0.00	0

EXHIBIT 2.13 (CONT'D)

Exhibit 2.14

COMBINED CYCLE POWERPLANT
CAPITAL COST SUMMARY

Direct Project Costs	
Unit 1 Estimate, APA 1707-M-1	
($1983) $141,431,520	
Unit 1 Estimate; De-escalated to $1982 at 6.4%	$132,924,360 1/
Items Not Included in Estimate	
Owners Cost (at 1.5% of Direct Project)	$ 1,993,900
Startup, Spare Parts, and Special Tools (at 0.75% of Direct Project)	996,900
Maintenance Shop Machinery, Laboratory Equipment, and Office Furniture (equipment already exists)	-0-
Land (installed at existing site)	-0-
Subtotal	$ 2,990,800
Project Total Cost	$135,915,160
Average Cost per kW ($1982) for 229 MW Plant	$594

1/ Previous capital cost estimates did not include owner's cost or startup, spare parts, and special tools. The previous cost given was $132,924,360/236 MW which is $564/kW.

400742
850419

ALASKA POWER AUTHORITY
SUSITNA NEED FOR POWER STUDY
COMBINED CYCLE PLANT
KENAI SITE

ESTIMATE NO. APA 1707M-1

BASIS OF ESTIMATE

General

This conceptual estimate is prepared in the Ebasco Code of Accounts. The estimate is for a two unit facility and excludes owner's cost (including Land and AFUDC). This estimate has a base pricing level of January, 1983 working 60 hours per week.

The estimate is based on a scope that includes the facilities and systems required for self-sustaining unit.

The estimate is based on the following:

1. Wage rates applicable to Anchorage Union Agreements south of 63° latitude including Workmen's Compensation, FICA, and Public Liability Property Damage insurance rates as calculated by Ebasco.

2. A work week consisting of working 10 hours per day, 6 days per week.

3. Sufficient craftsmen available to meet project requirements without labor camps.

4. Professional services including Engineering, Design, Related Services, and Construction Management based on generic plant of comparable size.

5. Land and Land Rights not included.

6. Allowance for Funds Used During Construction (AFUDC) not included.

7. Client cost not included.

8. Permanent town for plant operating personnel not included.

9. Capital cost of gas pipeline not included.

10. Operating and maintenance costs not included.

11. Contingency included at the rate of 12% for material and 15% for installation.

12. Construction performed on a Contract basis.

13. Project being exempt from sales/use taxes.

14. Labor productivity being "average U.S." with no Alaska adjustment.

15. Spare parts and special tools not included.

16. Startup costs not included.

17. Maintenance machinery, laboratory, and office equipment not included.

Civil (Categories 1, 2, 3, 4, 5, 6, 16, 17, and 18)

Clearing is assumed based on scrub brush and trees up to 25 feet. Some rock excavation is assumed in deep cuts. No dewatering of excavated areas is assumed. Waste would be trucked to disposal on an off-site facility. The capital cost of constructing the off-site facility is not included. No asphalt or concrete paving is included. A 1.5-mile access road is included. Air-cooled condenser used in lieu of cooling tower/circulating water lines.

Mechanical (Categories 7, 8, 9, 10, and 14)

General Electric provided a budgetary quotation for one 227 MW G.E. STAG 207E plant consisting of two MS 7001E gas turbines, two heat recovery steam generators, one steam turbine generator, and the necessary auxiliary equipment. Water treatment system pricing is based on a Illinois Water Treatment Company quotation. GEA Power Cooling Systems Inc. provided budgetary quotation for a direct air cooled condenser system.

Piping and Insulation (Categories 12 and 13)

Large bore and small bore piping sizing and quantities are based on historical data from similar units.

Electrical (Categories 15 and 19)

Pricing is based on historical data from similar units and in accordance with representative historical inflation indices.

Indirect Construction Cost

Indirect construction cost is priced in accordance with Ebasco experience based on a contract job. Included in indirect costs are:

- Construction management local hire personnel
- Casual premium pay (other than scheduled 60-hour week)
- Construction management automotive equipment
- Construction management office and expenses
- Temporary warehouse for prepurchased equipment
- Road maintenance equipment
- Ten-mile 25 kV temporary transmission line
- Offsite unloading and hauling
- Security guard service
- Final construction cleanup

Testing is assumed to be the contractor's responsibility and witnessed by construction management personnel. Temporary power is assumed to be furnished without cost to contractors.

Professional Services

The professional services estimate is based on a standardized workday package for Engineering, Design, Related Services, Consulting Engineering, ESSE Engineering, and Design and Construction Management Services.

APA
SUSITNA COMBINED CYC
ESTIMATE NO. APA 1707 M-1

BY: WMP CHECKED: JDF DATE: 12-OCT-84 TIME: 16:14:20

SUMMARY
MATERIAL & INSTALLATION REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ TOT)	(TOTAL AMT)*	(TOT MATL)	(UN $MAT)*	(U $ INS)	(TOT INST)*	(TOT ESC)	(MAT ESC)	(INS ESC)
99.000000	TOTAL PROJECT COST	LS*	----	----	141431520*	80932184	---- *	----	60499336*	0	0	0
100.000000	CONTINGENCY	LS*	----	----	16562523*	8671305	---- *	----	7891218*	0	0	0
300.000000	TOTAL COST W/O CONT	LS*	----	----	124868997*	72260879	---- *	----	52608118*	0	0	0
1.000000	IMPROVEMNTS TO SITE	LS*	----	----	1666463*	420360	---- *	----	1246103*	0	0	0
2.000000	EARTHWORK & PILING	LS*	----	----	1976563*	627840	---- *	----	1348723*	0	0	0
4.000000	CONCRETE	LS*	----	----	6983993*	1580040	---- *	----	5403953*	0	0	0
5.000000	STRCT STL/LFT EQP	LS*	----	----	7202073*	4044234	---- *	----	3157839*	0	0	0
6.000000	BUILDINGS	LS*	----	----	4781186*	1892256	---- *	----	2888930*	0	0	0
7.000000	TURBINE GENERATOR	LS*	----	----	35916416*	33740200	---- *	----	2176216*	0	0	0
8.000000	STM GENER & ACCESS	LS*	----	----	17595910*	13808800	---- *	----	3787110*	0	0	0
10.000000	OTHER MECHAN EQUIP	LS*	----	----	9324008*	6628720	---- *	----	2695288*	0	0	0
12.000000	PIPING	LS*	----	----	4394939*	1943842	---- *	----	2451097*	0	0	0
13.000000	INSULATION	LS*	----	----	1103310*	339879	---- *	----	763431*	0	0	0
14.000000	INSTRUMENTATION	LS*	----	----	2048630*	1808800	---- *	----	239830*	0	0	0
15.000000	ELECTRICAL EQUIPMENT	LS*	----	----	11588296*	4894400	---- *	----	6693896*	0	0	0
16.000000	PAINTING	LS*	----	----	881280*	212308	---- *	----	668972*	0	0	0
17.000000	OFF-SITE FACILITIES	LS*	----	----	1978079*	319200	---- *	----	1658879*	0	0	0
71.000000	INDIRECT CONST COST	LS*	----	----	10227851*	0	---- *	----	10227851*	0	0	0
72.000000	PROFESSIONAL SERVCS	LS*	----	----	7200000*	0	---- *	----	7200000*	0	0	0

EXHIBIT 2.16

APA
SUSITNA COMBINED CYC
ESTIMATE NO. APA 1707 M-1

BY: WMP CHECKED: JDF

DATE: 12-OCT-84 TIME: 16:14:20

DETAILED
MATERIAL & INSTALLATION REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ TOT)	(TOTAL AMT)*	(TOT MATL)	(UN $MAT)*	(U $ INS)	(TOT INST)*	(TOT ESC)	(MAT ESC)	(INS ESC)
99.000000	TOTAL PROJECT COST	LS*	----	----	141431520*	80932184	---- *	----	60499336*	0	0	0
100.000000	CONTINGENCY	LS*	----	----	16562523*	8671305	---- *	----	7891218*	0	0	0
300.000000	TOTAL COST W/O CONT	LS*	----	----	124868997*	72260879	---- *	----	52608118*	0	0	0
1.000000	IMPROVEMNTS TO SITE	LS*	----	----	1666463*	420360	---- *	----	1246103*	0	0	0
1.100000	SITE PREPARATION	LS*	----	----	207684*	0	---- *	----	207684*	0	0	0
1.110000	CLEARING	AC*	75	2769.1	207684*	0	0.00*	2769.1	207684*	0	0	0
1.200000	ROADS,BRDG,WALKS	LS*	----	----	395055*	159680	---- *	----	235375*	0	0	0
1.210000	ROADS	LS*	----	----	223656*	85200	---- *	----	138456*	0	0	0
1.260000	FENCING	LS*	----	----	171399*	74480	---- *	----	96919*	0	0	0
1.300000	SITE DRAINAGE	LS*	----	----	573944*	117040	---- *	----	456904*	0	0	0
1.400000	WELLS PUMPING EQP	LS*	----	----	181016*	42560	---- *	----	138456*	0	0	0
1.500000	SEWAGE FACILITIES	LS*	----	----	308764*	101080	---- *	----	207684*	0	0	0
2.000000	EARTHWORK & PILING	LS*	----	----	1976563*	627840	---- *	----	1348723*	0	0	0
2.200000	STRCTR & EQUIP EXC	LS*	----	----	1455784*	532000	---- *	----	923784*	0	0	0
2.210000	STATION AREA	LS*	----	----	1455784*	532000	---- *	----	923784*	0	0	0
2.300000	TRENCHING	LS*	----	----	179804*	32000	---- *	----	147804*	0	0	0
2.310000	CIRC WATER COND	LS*	----	----	179804*	32000	---- *	----	147804*	0	0	0
2.312000	EARTH EXCAVATION	CY*	5000	9.2	46189*	0	0.00*	9.2	46189*	0	0	0
2.313000	ROCK EXCAVATION	CY*	1000	27.7	27713*	0	0.00*	27.7	27713*	0	0	0
2.314000	SELECT BACKFILL	CY*	4000	26.5	105902*	32000	8.00*	18.5	73902*	0	0	0
2.400000	EARTH STRUCTURES	CY*	8000	42.6	340975*	63840	7.98*	34.6	277135*	0	0	0
4.000000	CONCRETE	LS*	----	----	6983993*	1580040	---- *	----	5403953*	0	0	0
4.100000	TURBINE BLDG CONCR	CY*	4800	635.0	3048088*	689472	143.64*	491.4	2358616*	0	0	0

EXHIBIT 2.16 (CONT'D)

APA
SUSITNA COMBINED CYC
ESTIMATE NO. APA 1707 M-1

BY: WMP CHECKED: JDF

DATE: 12-OCT-84 TIME: 16:14:20

DETAILED
MATERIAL & INSTALLATION REPORT

ACCT NO	DESCRIPTION	UN	(QTY)	(UN $ TOT)	(TOTAL AMT)*	(TOT MATL)	(UN $MAT)*	(U $ INS)	(TOT INST)*	(TOT ESC)	(MAT ESC)	(INS ESC)
4.200000	BOILER AREA CONCRT	CY*	4000	634.7	2538907*	574560	143.64*	491.1	1964347*	0	0	0
4.400000	AQCS CONCRETE	CY*	2200	635.0	1396998*	316008	143.64*	491.4	1080990*	0	0	0
5.000000	STRCT STL/LFT EQP	LS*	----	----	7202073*	4044234	---- *	----	3157839*	0	0	0
5.100000	TURBINE BUILDING	LS*	----	----	6802412*	3853808	---- *	----	2948604*	0	0	0
5.110000	MAIN STEEL	TN*	2500	2136.1	5340250*	2926000	1170.40*	965.7	2414250*	0	0	0
5.130000	MISC STEEL	LS*	----	----	577395*	239400	---- *	----	337995*	0	0	0
5.140000	LIFTING EQUIP	LS*	----	----	735240*	606480	---- *	----	128760*	0	0	0
5.141000	CRANE: 40 T CAP	LS*	----	----	735240*	606480	---- *	----	128760*	0	0	0
5.150000	SUPPORT STEEL	LS*	----	----	149527*	81928	---- *	----	67599*	0	0	0
5.151000	EQUIP SUPPORT	TN*	70	2136.1	149527*	81928	1170.40*	965.7	67599*	0	0	0
5.200000	STEAM GENERATOR	LS*	----	----	399661*	190426	---- *	----	209235*	0	0	0
5.250000	SUPPORT STEEL	LS*	----	----	89751*	41466	---- *	----	48285*	0	0	0
5.290000	OTHER S.G. BLD ST	TN*	100	3099.1	309910*	148960	1489.60*	1609.5	160950*	0	0	0
6.000000	BUILDINGS	LS*	----	----	4781186*	1892256	---- *	----	2888930*	0	0	0
6.100000	TURBINE BUILDING	LS*	----	----	2282485*	784260	---- *	----	1498225*	0	0	0
6.110000	ARCHITECT FEATURE	LS*	----	----	72054*	13300	---- *	----	58754*	0	0	0
6.120000	SIDING(UNINSULAT)	LS*	----	----	1064217*	447300	---- *	----	616917*	0	0	0
6.130000	DOORS	LS*	----	----	77812*	42560	---- *	----	35252*	0	0	0
6.140000	ROOF & SI T METAL	LS*	----	----	688386*	159600	---- *	----	528786*	0	0	0
6.150000	FLOORS	LS*	----	----	284012*	96000	---- *	----	188012*	0	0	0
6.160000	CEILINGS	LS*	----	----	96004*	25500	---- *	----	70504*	0	0	0
6.200000	STEAM GEN BUILDING	LS*	----	----	2498701*	1107996	---- *	----	1390705*	0	0	0
6.270000	HVAC	LS*	----	----	1449048*	744000	---- *	----	705048*	0	0	0

EXHIBIT 2.16 (CONT'D)

APA
SUSITNA COMBINED CYC
ESTIMATE NO. APA 1707 M-1

BY: WMP CHECKED: JDF

DATE: 12-OCT-84 TIME: 16:14:20

DETAILED
MATERIAL & INSTALLATION REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ TOT)	(TOTAL AMT)*	(TOT MATL)	(UN $MAT)*	(U $ INS)	(TOT INST)*	(TOT ESC)	(MAT ESC)	(INS ESC)
6.272000	EQUIPMENT	LS*	----	----	1449048*	744000	---- *	----	705048*	0	0	0
6.280000	PLUMB & DRAINAGE	LS*	----	----	615028*	192000	---- *	----	423028*	0	0	0
6.290000	MISCELLANEOUS	LS*	----	----	434625*	171996	---- *	----	262629*	0	0	0
7.000000	TURBINE GENERATOR	LS*	----	----	35916416*	33740200	---- *	----	2176216*	0	0	0
7.100000	TURBINE GENERATOR	LS*	----	----	35916416*	33740200	---- *	----	2176216*	0	0	0
7.110000	TURBINE GENERATORS	LS*	----	----	35916416*	33740200	---- *	----	2176216*	0	0	0
7.111000	GAS TURB GEN	EA*	2	*********	28557160*	27166800	---- *	695180.0	1390360*	0	0	0
7.112000	STEAM TURB GEN	EA*	1	0.0	7359256*	6573400	---- *	0.0	785856*	0	0	0
8.000000	STM GENER & ACCESS	LS*	----	----	17595910*	13808800	---- *	----	3787110*	0	0	0
8.100000	HEAT RECOV ST GEN	EA*	2	8797955.0	17595910*	13808800	---- *	1893555.0	3787110*	0	0	0
10.000000	OTHER MECHAN EQUIP	LS*	----	----	9324008*	6628720	---- *	----	2695288*	0	0	0
10.100000	PUMPS	LS*	----	----	998489*	824600	---- *	----	173889*	0	0	0
10.110000	BOILER PUMPS	LS*	----	----	998489*	824600	---- *	----	173889*	0	0	0
10.200000	CONDENSING PLANT	LS*	----	----	5035428*	3458000	---- *	----	1577428*	0	0	0
10.210000	CONDENSER & AUXIL	LS*	----	----	5035428*	3458000	---- *	----	1577428*	0	0	0
10.211000	SUPT/SRV ENG	LS*	----	----	5035428*	3458000	---- *	----	1577428*	0	0	0
10.300000	HEAT EXCHANGERS	LS*	----	----	518755*	425600	---- *	----	93155*	0	0	0
10.310000	FEEDWATER HEATERS	EA*	1	0.0	518755*	425600	---- *	0.0	93155*	0	0	0
10.400000	TANKS	LS*	----	----	603117*	292600	---- *	----	310517*	0	0	0
10.410000	WATER TANKS	LS*	----	----	603117*	292600	---- *	----	310517*	0	0	0
10.500000	MISCELLANEOUS EQUIP	LS*	----	----	2083968*	1574720	---- *	----	509248*	0	0	0
10.510000	COMPRESSED AIR EQP	LS*	----	----	122382*	85120	---- *	----	37262*	0	0	0
10.520000	WTR TREAT EQUIP	LS*	----	----	1136876*	851200	---- *	----	285676*	0	0	0

EXHIBIT 2.16 (CONT'D)

APA
SUSITNA COMBINED CYC
ESTIMATE NO. APA 1707 M-1

BY: WMP CHECKED: JDF

DATE: 12-OCT-84 TIME: 16:14:20

DETAILED
MATERIAL & INSTALLATION REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ TOT)	(TOTAL AMT)*	(TOT MATL)	(UN $MAT)*	(U $ INS)	(TOT INST)*	(TOT ESC)	(MAT ESC)	(INS ESC)
10.530000	GENERAL PLT EQUIP	LS*	----	----	824710*	638400	---- *	----	186310*	0	0	0
10.700000	CECI	LS*	----	----	84251*	53200	---- *	----	31051*	0	0	0
12.000000	PIPING	LS*	----	----	4394939*	1943842	---- *	----	2451097*	0	0	0
12.100000	PIPING	LS*	----	----	186790*	78225	---- *	----	108565*	0	0	0
12.130000	AUXIL STEAM	LF*	350	533.7	186790*	78225	223.50*	310.2	108565*	0	0	0
12.200000	PIPING	LS*	----	----	435699*	216520	---- *	----	219179*	0	0	0
12.230000	BOILER FEED	LF*	850	512.6	435699*	216520	254.73*	257.9	219179*	0	0	0
12.300000	PIPING	LS*	----	----	1113883*	457850	---- *	----	656033*	0	0	0
12.350000	CIRCULATING WATER	LS*	----	----	744427*	296850	---- *	----	447577*	0	0	0
12.380000	CONDENSATE	LF*	1000	369.5	369456*	161000	161.00*	208.5	208456*	0	0	0
12.400000	PIPING	LS*	----	----	1046822*	493270	---- *	----	553552*	0	0	0
12.430000	EXTRACT STEAM	LF*	275	882.8	242770*	168245	611.80*	271.0	74525*	0	0	0
12.450000	FIRE PROTECTION	LS*	----	----	483189*	159600	---- *	----	323589*	0	0	0
12.460000	CO2 SYSTEM	LF*	650	493.6	320863*	165425	254.50*	239.1	155438*	0	0	0
12.500000	PIPING	LS*	----	----	311359*	53200	---- *	----	258159*	0	0	0
12.550000	INSTR AIR	LS*	----	----	311359*	53200	---- *	----	258159*	0	0	0
12.600000	PIPING	LS*	----	----	800691*	348717	---- *	----	451974*	0	0	0
12.610000	MAIN STEAM	LF*	460	1164.4	535628*	278493	605.42*	559.0	257135*	0	0	0
12.630000	POTABLE WATER	LF*	550	481.9	265063*	70224	127.68*	354.3	194839*	0	0	0
12.700000	PIPING	LS*	----	----	339319*	212800	---- *	----	126519*	0	0	0
12.760000	TURBINE DRAINS	LS*	----	----	339319*	212800	---- *	----	126519*	0	0	0
12.800000	PIPING	LS*	----	----	60838*	31920	---- *	----	28918*	0	0	0
12.840000	AQCS PIPING	LS*	----	----	60838*	31920	---- *	----	28918*	0	0	0

EXHIBIT 2.16 (CONT'D)

APA
SUSITNA COMBINED CYC
ESTIMATE NO. APA 1707 M-1

BY: WMP CHECKED: JDF

DATE: 12-OCT-84 TIME: 16:14:20

DETAILED
MATERIAL & INSTALLATION REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ TOT)	(TOTAL AMT)*	(TOT MATL)	(UN $MAT)*	(U $ INS)	(TOT INST)	(TOT ESC)	(MAT ESC)	(INS ESC)
12.900000	PIPING	LS*	----	----	99538*	51340	---- *	----	48198*	0	0	0
12.910000	BOILER BLOWDOWN	LF*	500	199.1	99538*	51340	102.68*	96.4	48198*	0	0	0
13.000000	INSULATION	LS*	----	----	1103310*	339879	---- *	----	763431*	0	0	0
13.100000	PIPING INSULATION	SF*	29200	9.0	262564*	80884	2.77*	6.2	181680*	0	0	0
13.400000	AQCS INSULATION	LS*	----	----	840746*	258995	---- *	----	581751*	0	0	0
13.420000	AQCS EQUIPT INSUL	LS*	----	----	840746*	258995	---- *	----	581751*	0		0
13.421000	PRECIPITATOR INS	SF*	30000	9.0	269758*	83100	2.77*	6.2	186658*	0	0	0
13.423000	BREECHING INSUL	SF*	63500	9.0	570988*	175895	2.77*	6.2	395093*	0	0	0
14.000000	INSTRUMENTATION	LS*	----	----	2048630*	1808800	---- *	----	239830*	0	0	0
14.100000	INSTRUMENTATION	LS*	----	----	2048630*	1808800	---- *	----	239830*	0	0	0
15.000000	ELECTRICAL EQUIPMENT	LS*	----	----	11588296*	4894400	---- *	----	6693896*	0	0	0
15.100000	TRANFORMERS	LS*	----	----	2323374*	2021600	---- *	----	301774*	0	0	0
15.110000	MAIN TRANSFORMER	EA*	1	0.0	1921872*	1702400	---- *	0.0	219472*	0	0	0
15.130000	AUXILIARY XMFR	LS*	----	----	401502*	319200	---- *	----	82302*	0	0	0
15.200000	SWITCHGEARS	LS*	----	----	988370*	851200	---- *	----	137170*	0	0	0
15.600000	GENERATOR GEARS BUS	LS*	----	----	748136*	638400	---- *	----	109736*	0	0	0
15.610000	ISOLATED PHASE BUS	LS*	----	----	748136*	638400	---- *	----	109736*	0	0	0
15.700000	WIRING SYSTEM	LS*	----	----	7312280*	1276800	---- *	----	6035480*	0	0	0
15.900000	AUX ELEC EQUIPMENT	LS*	----	----	216136*	106400	---- *	----	109736*	0	0	0
16.000000	PAINTING	LS*	----	----	881280*	212308	---- *	----	668972*	0	0	0
16.100000	TURBINE BUILDING	LS*	----	----	805590*	188328	---- *	----	617262*	0	0	0
16.110000	STRUCTURAL STEEL	LS*	----	----	710013*	165984	---- *	----	544029*	0	0	0
16.120000	MISC STEEL	LS*	----	----	95577*	22344	---- *	----	73233*	0	0	0

EXHIBIT 2.16 (CONT'D)

BY: WMP CHECKED: JDF

APA
SUSITNA COMBINED CYC
ESTIMATE NO. APA 1707 M-1

DATE: 12-OCT-84 TIME: 16:14:20

DETAILED
MATERIAL & INSTALLATION REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ TOT)	(TOTAL AMT)*	(TOT MATL)	(UN $MAT)*	(U $ INS)	(TOT INST)*	(TOT ESC)	(MAT ESC)	(INS ESC)
16.200000	STEAM GEN BLDG	LS*	----	----	10470*	2700	---- *	----	7770*	0	0	0
16.230000	WALLS & CEILINGS	LS*	----	----	10470*	2700	---- *	----	7770*	0	0	0
16.300000	SILO BAY	LS*	----	----	65220*	21280	---- *	----	43940*	0	0	0
16.350000	PIPING	LS*	----	----	65220*	21280	---- *	----	43940*	0	0	0
17.000000	OFF-SITE FACILITIES	LS*	----	----	1978079*	319200	---- *	----	1658879*	0	0	0
17.200000	ACCESS ROADS	LS*	----	----	1978079*	319200	---- *	----	1658879*	0	0	0
71.000000	INDIRECT CONST COST	LS*	----	----	10227851*	0	---- *	----	10227851*	0	0	0
71.100000	FIELD LOCAL HIRES	LS*	----	----	944580*	0	---- *	----	944580*	0	0	0
71.200000	CRAFT P/R FRINGES	LS*	----	----	696126*	0	---- *	----	696126*	0	0	0
71.210000	PREM PAY-CASUAL	LS*	----	----	464084*	0	---- *	----	464084*	0	0	0
71.220000	PREM PAY-SCHED	LS*	----	----	232042*	0	---- *	----	232042*	0	0	0
71.300000	CONSTR EQUIPT	LS*	----	----	56000*	0	---- *	----	56000*	0	0	0
71.310000	AUTOMOTIVE(C/M)	LS*	----	----	56000*	0	---- *	----	56000*	0	0	0
71.400000	CONSTRUCTION PLANT	LS*	----	----	3437558*	0	---- *	----	3437558*	0	0	0
71.410000	CONSTRUCTN BLDGS	LS*	----	----	788043*	0	---- *	----	788043*	0	0	0
71.420000	TEMP FACILITIES	LS*	----	----	2649515*	0	---- *	----	2649515*	0	0	0
71.600000	OFFICE/LABOR EXP	LS*	----	----	1232783*	0	---- *	----	1232783*	0	0	0
71.610000	OFFICE EXPENSE	LS*	----	----	18900*	0	---- *	----	18900*	0	0	0
71.620000	LABOR EXPENSE	LS*	----	----	333563*	0	---- *	----	333563*	0	0	0
71.630000	TESTING	LS*	----	----	225120*	0	---- *	----	225120*	0	0	0
71.640000	SECURITY GUARDS	LS*	----	----	655200*	0	---- *	----	655200*	0	0	0
71.700000	OFF-SITE UNLDG/HLG	LS*	----	----	3756399*	0	---- *	----	3756399*	0	0	0
71.800000	CONSTRUCTN CLEANUP	LS*	----	----	104405*	0	---- *	----	104405*	0	0	0

EXHIBIT 2.16 (CONT'D)

APA
SUSITNA COMBINED CYC
ESTIMATE NO. APA 1707 M-1

BY: WMP CHECKED: JDF

DATE: 12-OCT-84 TIME: 16:14:20

DETAILED
MATERIAL & INSTALLATION REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ TOT)	(TOTAL AMT)*	(TOT MATL)	(UN $MAT)*	(U $ INS)	(TOT INST)*	(TOT ESC)	(MAT ESC)	(INS ESC)
72.000000	PROFESSIONAL SERVCS	LS*	----	----	7200000*	0	---- *	----	7200000*	0	0	0

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EXHIBIT 2.16 (CONT'D)

BY: WMP CHECKED: JDF

AFA
SUSITNA COMBINED CYC
ESTIMATE NO. AFA 1707 M-1

DATE: 12-OCT-84 TIME: 16:14:20

SUMMARY
INSTALLATION BREAKOUT REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ INS)	(TOTL INS)	(PAYROLL)	(MAJ EXP)	(CONT OTH)*	(MH/UN)	($/MH)	(TOT MH)
99.000000	TOTAL PROJECT COST	LS*	----	----	60499336	28054215	12640349	11913554*	---	39.17	716304
100.000000	CONTINGENCY	LS*	----	----	7891218	0	0	0*	---	0.00	0
300.000000	TOTAL COST W/O CONT	LS*	----	----	52608118	28054215	12640349	11913554*	---	39.17	716304
1.000000	IMPROVEMNTS TO SITE	LS*	----	----	1246103	692280	0	553823*	---	38.46	18000
2.000000	EARTHWORK & PILING	LS*	----	----	1348723	552756	0	795967*	---	37.86	14600
4.000000	CONCRETE	LS*	----	----	5403953	3626865	145000	1632088*	---	38.79	93500
5.000000	STRCT STL/LFT EQP	LS*	----	----	3157839	2177820	0	980019*	---	44.40	49050
6.000000	BUILDINGS	LS*	----	----	2888930	1992368	0	896562*	---	40.52	49170
7.000000	TURBINE GENERATOR	LS*	----	----	2176216	1500839	0	675377*	---	41.69	36000
8.000000	STM GENER & ACCESS	LS*	----	----	3787110	2611800	0	1175310*	---	43.53	60000
10.000000	OTHER MECHAN EQUIP	LS*	----	----	2695288	1858822	0	836466*	---	42.83	43400
12.000000	PIPING	LS*	----	----	2451097	1690416	0	760681*	---	41.55	40684
13.000000	INSULATION	LS*	----	----	763431	526505	0	236926*	---	42.91	12270
14.000000	INSTRUMENTATION	LS*	----	----	239830	165400	0	74430*	---	41.35	4000
15.000000	ELECTRICAL EQUIPMENT	LS*	----	----	6693896	4616480	0	2077416*	---	37.84	122000
16.000000	PAINTING	LS*	----	----	668972	461362	0	207610*	---	41.23	11190
17.000000	OFF-SITE FACILITIES	LS*	----	----	1658879	648000	0	1010879*	---	43.20	15000
71.000000	INDIRECT CONST COST	LS*	----	----	10227851	4932502	5295349	0*	---	33.45	147440
72.000000	PROFESSIONAL SERVCS	LS*	----	----	7200000	0	7200000	0*	---	0.00	0

EXHIBIT 2.16 (CONT'D)

BY: WMP CHECKED: JDF

APA
SUSITNA COMBINED CYC
ESTIMATE NO. APA 1707 M-1

DATE: 12-OCT-84 TIME: 16:14:20

DETAILED
INSTALLATION BREAKOUT REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ INS)	(TOTL INS)	(PAYROLL)	(MAJ EXP)	(CONT OTH)*	(MH/UN)	($/MH)	(TOT MH)
99.000000	TOTAL PROJECT COST	LS*	----	----	60499336	28054215	12640349	11913554*	---	39.17	716304
100.000000	CONTINGENCY	LS*	----	----	7891218	0	0	0*	---	0.00	0
300.000000	TOTAL COST W/O CONT	LS*	----	----	52608118	28054215	12640349	11913554*	---	39.17	716304
1.000000	IMPROVEMNTS TO SITE	LS*	----	----	1246103	692280	0	553823*	---	38.46	18000
1.100000	SITE PREPARATION	LS*	----	----	207684	115380	0	92304*	---	38.46	3000
1.110000	CLEARING	AC*	75	2769.12	207684	115380	0	92304*	40.00	38.46	3000
1.200000	ROADS,BRDG,WALKS	LS*	----	----	235375	130764	0	104611*	---	38.46	3400
1.210000	ROADS	LS*	----	----	138456	76920	0	61536*	---	38.46	2000
1.260000	FENCING	LS*	----	----	96919	53844	0	43075*	---	38.46	1400
1.300000	SITE DRAINAGE	LS*	----	----	456904	253836	0	203068*	---	38.46	6600
1.400000	WELLS PUMPING EQP	LS*	----	----	138456	76920	0	61536*	---	38.46	2000
1.500000	SEWAGE FACILITIES	LS*	----	----	207684	115380	0	92304*	---	38.46	3000
2.000000	EARTHWORK & PILING	LS*	----	----	1348723	552756	0	795967*	---	37.86	14600
2.200000	STRCTR & EQUIP EXC	LS*	----	----	923784	378600	0	545184*	---	37.86	10000
2.210000	STATION AREA	LS*	----	----	923784	378600	0	545184*	---	37.86	10000
2.300000	TRENCHING	LS*	----	----	147804	60576	0	87228*	---	37.86	1600
2.310000	CIRC WATER COND	LS*	----	----	147804	60576	0	87228*	---	37.86	1600
2.312000	EARTH EXCAVATION	CY*	5000	9.24	46189	18930	0	27259*	0.10	37.86	500
2.313000	ROCK EXCAVATION	CY*	1000	27.71	27713	11358	0	16355*	0.30	37.86	300
2.314000	SELECT BACKFILL	CY*	4000	18.48	73902	30288	0	43614*	0.20	37.86	800
2.400000	EARTH STRUCTURES	CY*	8000	34.64	277135	113580	0	163555*	0.38	37.86	3000
4.000000	CONCRETE	LS*	----	----	5403953	3626865	145000	1632088*	---	38.79	93500
4.100000	TURBINE BLDG CONCR	CY*	4800	491.38	2358616	1582632	63800	712184*	8.50	38.79	40800

EXHIBIT 2.16 (CONT'D)

APA
SUSITNA COMBINED CYC
ESTIMATE NO. APA 1707 M-1

BY: WMP CHECKED: JDF

DATE: 12-OCT-84 TIME: 16:14:20

DETAILED
INSTALLATION BREAKOUT REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ INS)	(TOTL INS)	(PAYROLL)	(MAJ EXP)	(CONT OTH)*	(MH/UN)	($/MH)	(TOT MH)
4.200000	BOILER AREA CONCRT	CY*	4000	491.09	1964347	1318860	52000	593487*	8.50	38.79	34000
4.400000	AQCS CONCRETE	CY*	2200	491.36	1080990	725373	29200	326417*	8.50	38.79	18700
5.000000	STRCT STL/LFT EQP	LS*	----	----	3157839	2177820	0	980019*	---	44.40	49050
5.100000	TURBINE BUILDING	LS*	----	----	2948604	2033520	0	915084*	---	44.40	45800
5.110000	MAIN STEEL	TN*	2500	965.70	2414250	1665000	0	749250*	15.00	44.40	37500
5.130000	MISC STEEL	LS*	----	----	337995	233100	0	104895*	---	44.40	5250
5.140000	LIFTING EQUIP	LS*	----	----	128760	88800	0	39960*	---	44.40	2000
5.141000	CRANE: 40 T CAP	LS*	----	----	128760	88800	0	39960*	---	44.40	2000
5.150000	SUPPORT STEEL	LS*	----	----	67599	46620	0	20979*	---	44.40	1050
5.151000	EQUIP SUPPORT	TN*	70	965.70	67599	46620	0	20979*	15.00	44.40	1050
5.200000	STEAM GENERATOR	LS*	----	----	209235	144300	0	64935*	---	44.40	3250
5.250000	SUPPORT STEEL	LS*	----	----	48285	33300	0	14985*	---	44.40	750
5.290000	OTHER S.G. BLD ST	TN*	100	1609.50	160950	111000	0	49950*	25.00	44.40	2500
6.000000	BUILDINGS	LS*	----	----	2888930	1992368	0	896562*	---	40.52	49170
6.100000	TURBINE BUILDING	LS*	----	----	1498225	1033260	0	464965*	---	40.52	25500
6.110000	ARCHITECT FEATURE	LS*	----	----	58754	40520	0	18234*	---	40.52	1000
6.120000	SIDING(UNINSULAT)	LS*	----	----	616917	425460	0	191457*	---	40.52	10500
6.130000	DOORS	LS*	----	----	35252	24312	0	10940*	---	40.52	600
6.140000	ROOF & SHT METAL	LS*	----	----	528786	364680	0	164106*	---	40.52	9000
6.150000	FLOORS	LS*	----	----	188012	129664	0	58348*	---	40.52	3200
6.160000	CEILINGS	LS*	----	----	70504	48624	0	21880*	---	40.52	1200
6.200000	STEAM GEN BUILDING	LS*	----	----	1390705	959108	0	431597*	---	40.52	23670
6.270000	HVAC	LS*	----	----	705048	486240	0	218808*	---	40.52	12000

EXHIBIT 2.16 (CONT'D)

APA
SUSITNA COMBINED CYC
ESTIMATE NO. APA 1707 M-1

BY: WMP CHECKED: JDF

DATE: 12-OCT-84 TIME: 16:14:20

DETAILED
INSTALLATION BREAKOUT REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ INS)	(TOTL INS)	(PAYROLL)	(MAJ EXP)	(CONT OTH)*	(MH/UN)	($/MH)	(TOT MH)
6.272000	EQUIPMENT	LS*	----	----	705048	486240	0	218808*	---	40.52	12000
6.280000	PLUMB & DRAINAGE	LS*	----	----	423028	291744	0	131284*	---	40.52	7200
6.290000	MISCELLANEOUS	LS*	----	----	262629	181124	0	81505*	---	40.52	4470
7.000000	TURBINE GENERATOR	LS*	----	----	2176216	1500839	0	675377*	---	41.69	36000
7.100000	TURBINE GENERATOR	LS*	----	----	2176216	1500839	0	675377*	---	41.69	36000
7.110000	TURBINE GENERATORS	LS*	----	----	2176216	1500839	0	675377*	---	41.69	36000
7.111000	GAS TURB GEN	EA*	2	695180.0	1390360	958869	0	431491*	---	41.69	23000
7.112000	STEAM TURB GEN	EA*	1	0.0	785856	541970	0	243886*	---	41.69	13000
8.000000	STM GENER & ACCESS	LS*	----	----	3787110	2611800	0	1175310*	---	43.53	60000
8.100000	HEAT RECOV ST GEN	EA*	2	1893555.0	3787110	2611800	0	1175310*	---	43.53	60000
10.000000	OTHER MECHAN EQUIP	LS*	----	----	2695288	1858822	0	836466*	---	42.83	43400
10.100000	PUMPS	LS*	----	----	173889	119924	0	53965*	---	42.83	2800
10.110000	BOILER PUMPS	LS*	----	----	173889	119924	0	53965*	---	42.83	2800
10.200000	CONDENSING PLANT	LS*	----	----	1577428	1087882	0	489546*	---	42.83	25400
10.210000	CONDENSER & AUXIL	LS*	----	----	1577428	1087882	0	489546*	---	42.83	25400
10.211000	SUPT/SRV ENG	LS*	----	----	1577428	1087882	0	489546*	---	42.83	25400
10.300000	HEAT EXCHANGERS	LS*	----	----	93155	64245	0	28910*	---	42.83	1500
10.310000	FEEDWATER HEATERS	EA*	1	0.0	93155	64245	0	28910*	---	42.83	1500
10.400000	TANKS	LS*	----	----	310517	214150	0	96367*	---	42.83	5000
10.410000	WATER TANKS	LS*	----	----	310517	214150	0	96367*	---	42.83	5000
10.500000	MISCELLANEOUS EQUIP	LS*	----	----	509248	351206	0	158042*	---	42.83	8200
10.510000	CONPRESSED AIR EQP	LS*	----	----	37262	25698	0	11564*	---	42.83	600
10.520000	WTR TREAT EQUIP	LS*	----	----	285676	197018	0	88658*	---	42.83	4600

EXHIBIT 2.16 (CONT'D)

APA
SUSITNA COMBINED CYC
ESTIMATE NO. APA 1707 M-1

BY: WMP CHECKED: JDF

DATE: 12-OCT-84 TIME: 16:14:20

DETAILED
INSTALLATION BREAKOUT REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ INS)	(TOTL INS)	(PAYROLL)	(MAJ EXP)	(CONT OTH)*	(MH/UN)	($/MH)	(TOT MH)
10.530000	GENERAL PLT EQUIP	LS*	----	----	186310	128490	0	57820*	---	42.83	3000
10.700000	CECI	LS*	----	----	31051	21415	0	9636*	---	42.83	500
12.000000	PIPING	LS*	----	----	2451097	1690416	0	760681*	---	41.55	40684
12.100000	PIPING	LS*	----	----	108565	74873	0	33692*	---	41.55	1802
12.130000	AUXIL STEAM	LF*	350	310.19	108565	74873	0	33692*	5.15	41.55	1802
12.200000	PIPING	LS*	----	----	219179	151158	0	68021*	---	41.55	3638
12.230000	BOILER FEED	LF*	850	257.86	219179	151158	0	68021*	4.28	41.55	3638
12.300000	PIPING	LS*	----	----	656033	452437	0	203596*	---	41.55	10889
12.350000	CIRCULATING WATER	LS*	----	----	447577	308674	0	138903*	---	41.55	7429
12.380000	CONDENSATE	LF*	1000	208.46	208456	143763	0	64693*	3.46	41.55	3460
12.400000	PIPING	LS*	----	----	553552	381761	0	171791*	---	41.55	9188
12.430000	EXTRACT STEAM	LF*	275	271.00	74525	51397	0	23128*	4.50	41.55	1237
12.450000	FIRE PROTECTION	LS*	----	----	323589	223165	0	100424*	---	41.55	5371
12.460000	CO2 SYSTEM	LF*	650	239.14	155438	107199	0	48239*	3.97	41.55	2580
12.500000	PIPING	LS*	----	----	258159	178041	0	80118*	---	41.55	4285
12.550000	INSTR AIR	LS*	----	----	258159	178041	0	80118*	---	41.55	4285
12.600000	PIPING	LS*	----	----	451974	311707	0	140267*	---	41.55	7502
12.610000	MAIN STEAM	LF*	460	558.99	257135	177335	0	79800*	9.28	41.55	4268
12.630000	POTABLE WATER	LF*	550	354.25	194839	134372	0	60467*	5.88	41.55	3234
12.700000	PIPING	LS*	----	----	126519	87255	0	39264*	---	41.55	2100
12.760000	TURBINE DRAINS	LS*	----	----	126519	87255	0	39264*	---	41.55	2100
12.800000	PIPING	LS*	----	----	28918	19944	0	8974*	---	41.55	480
12.840000	AQCS PIPING	LS*	----	----	28918	19944	0	8974*	---	41.55	480

EXHIBIT 2.16 (CONT'D)

APA
SUSITNA COMBINED CYC
ESTIMATE NO. APA 1707 M-1

BY: WMP CHECKED: JDF

DATE: 12-OCT-84 TIME: 16:14:20

DETAILED
INSTALLATION BREAKOUT REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ INS)	(TOTL INS)	(PAYROLL)	(MAJ EXP)	(CONT OTH)*	(MH/UN)	($/MH)	(TOT MH)
12.900000	PIPING	LS*	----	----	48198	33240	0	14958*	---	41.55	800
12.910000	BOILER BLOWDOWN	LF*	500	96.40	48198	33240	0	14958*	1.60	41.55	800
13.000000	INSULATION	LS*	----	----	763431	526505	0	236926*	---	42.91	12270
13.100000	PIPING INSULATION	SF*	29200	6.22	181680	125297	0	56383*	0.10	42.91	2920
13.400000	AQCS INSULATION	LS*	----	----	581751	401208	0	180543*	---	42.91	9350
13.420000	AQCS EQUIPT INSUL	LS*	----	----	581751	401208	0	180543*	---	42.91	9350
13.421000	PRECIPITATOR INS	SF*	30000	6.22	186658	128730	0	57928*	0.10	42.91	3000
13.423000	BREECHING INSUL	SF*	63500	6.22	395093	272478	0	122615*	0.10	42.91	6350
14.000000	INSTRUMENTATION	LS*	----	----	239830	165400	0	74430*	---	41.35	4000
14.100000	INSTRUMENTATION	LS*	----	----	239830	165400	0	74430*	---	41.35	4000
15.000000	ELECTRICAL EQUIPMENT	LS*	----	----	6693896	4616480	0	2077416*	---	37.84	122000
15.100000	TRANFORMERS	LS*	----	----	301774	208120	0	93654*	---	37.84	5500
15.110000	MAIN TRANSFORMER	EA*	1	0.0	219472	151360	0	68112*	---	37.84	4000
15.130000	AUXILIARY XMFR	LS*	----	----	82302	56760	0	25542*	---	37.84	1500
15.200000	SWITCHGEARS	LS*	----	----	137170	94600	0	42570*	---	37.84	2500
15.600000	GENERATOR GEARS BUS	LS*	----	----	109736	75680	0	34056*	---	37.84	2000
15.610000	ISOLATED PHASE BUS	LS*	----	----	109736	75680	0	34056*	---	37.84	2000
15.700000	WIRING SYSTEM	LS*	----	----	6035480	4162400	0	1873080*	---	37.84	110000
15.900000	AUX ELEC EQUIPMENT	LS*	----	----	109736	75680	0	34056*	---	37.84	2000
16.000000	PAINTING	LS*	----	----	668972	461362	0	207610*	---	41.23	11190
16.100000	TURBINE BUILDING	LS*	----	----	617262	425699	0	191563*	---	41.23	10325
16.110000	STRUCTURAL STEEL	LS*	----	----	544029	375193	0	168836*	---	41.23	9100
16.120000	MISC STEEL	LS*	----	----	73233	50506	0	22727*	---	41.23	1225

EXHIBIT 2.16 (CONT'D)

APA
SUSITNA COMBINED CYC
ESTIMATE NO. APA 1707 M-1

BY: WMP CHECKED: JDF

DATE: 12-OCT-84 TIME: 16:14:20

DETAILED
INSTALLATION BREAKOUT REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ INS)	(TOTL INS)	(PAYROLL)	(MAJ EXP)	(CONT OTH)*	(MH/UN)	($/MH)	(TOT MH)
16.200000	STEAM GEN BLDG	LS*	----	----	7770	5359	0	2411*	---	41.22	130
16.230000	WALLS & CEILINGS	LS*	----	----	7770	5359	0	2411*	---	41.23	130
16.300000	SILO BAY	LS*	----	----	43940	30304	0	13636*	---	41.23	735
16.350000	PIPING	LS*	----	----	43940	30304	0	13636*	---	41.23	735
17.000000	OFF-SITE FACILITIES	LS*	----	----	1658879	648000	0	1010879*	---	43.20	15000
17.200000	ACCESS ROADS	LS*	----	----	1658879	648000	0	1010879*	---	43.20	15000
71.000000	INDIRECT CONST COST	LS*	----	----	10227851	4932502	5295349	0*	---	33.45	147440
71.100000	FIELD LOCAL HIRES	LS*	----	----	944580	944580	0	0*	---	22.49	42000
71.200000	CRAFT P/R FRINGES	LS*	----	----	696126	0	696126	0*	---	0.00	0
71.210000	PREM PAY-CASUAL	LS*	----	----	464084	0	464084	0*	---	40.64	0
71.220000	PREM PAY-SCHED	LS*	----	----	232042	0	232042	0*	---	40.64	0
71.300000	CONSTR EQUIPT	LS*	----	----	56000	0	56000	0*	---	0.00	0
71.310000	AUTOMOTIVE(C/M)	LS*	----	----	56000	0	56000	0*	---	0.00	0
71.400000	CONSTRUCTION PLANT	LS*	----	----	3437558	1179934	2257624	0*	---	42.84	27540
71.410000	CONSTRUCTN BLDGS	LS*	----	----	788043	283043	505000	0*	---	41.26	6860
71.420000	TEMP FACILITIES	LS*	----	----	2649515	896891	1752624	0*	---	43.37	20680
71.600000	OFFICE/LABOR EXP	LS*	----	----	1232783	1211383	21400	0*	---	31.78	38120
71.610000	OFFICE EXPENSE	LS*	----	----	18900	0	18900	0*	---	0.00	0
71.620000	LABOR EXPENSE	LS*	----	----	333563	331063	2500	0*	---	23.58	14040
71.630000	TESTING	LS*	----	----	225120	225120	0	0*	---	42.00	5360
71.640000	SECURITY GUARDS	LS*	----	----	655200	655200	0	0*	---	35.00	18720
71.700000	OFF-SITE UNLDG/HLG	LS*	----	----	3756399	1497600	2258799	0*	---	40.00	37440
71.800000	CONSTRUCTN CLEANUP	LS*	----	----	104405	99005	5400	0*	---	42.31	2340

EXHIBIT 2.16 (CONT'D)

APA
SUSITNA COMBINED CYC
ESTIMATE NO. APA 1707 M-1

BY: WMP CHECKED: JDF

DATE: 12-OCT-84 TIME: 16:14:20

DETAILED
INSTALLATION BREAKOUT REPORT

ACCT NO	DESCRIPTION	UN*	(QTY)	(UN $ INS)	(TOTL INS)	(PAYROLL)	(MAJ EXP)	(CONT OTH)*	(MH/UN)	($/MH)	(TOT MH)
72.000000	PROFESSIONAL SERVCS	LS*	----	----	7200000	0	7200000	0*	---	0.00	0

EXHIBIT 2.16 (CONT'D)

3 4 5 6 7 8 9 10

3.

Question:

The basis and justification for the second upward revision of the O&M costs for the coal, combined-cycle and gas-fired combustion turbine plants shown on Table 8-2 of the March 5 response document.

Response:

The differences between the O&M costs presented in the APA's November 13, 1984 submittal and the March 5, 1985 submittal are due in large part to changing from 1983 price levels to 1982 price levels. A comparison of the downward revision of those costs is shown below.

	O&M Costs			
	Nov. 13, 1984 Submittal		March 5, 1985 Submittal	
	Fixed $/kW/yr	Variable $/MWh	Fixed $/kW/yr	Variable $/MWh
Coal-Fired Plant	59.80	3.93	55.60	3.89
Combined Cycle Plant	13.13	0.65	12.06	0.60
Combustion Turbine	8.99	0.46	7.96	0.53

The price level changes reflect a general downward revision of approximately 7 percent which are combined with other minor changes yielding the numbers given. It should be pointed out that these are not static fixed costs. Not only are these data subject to revision when better data becomes available, but also subject to change due to the ongoing negotiations for conditional power sales agreements. Significant revision to the data in the future is

not anticipated, but data will be revised as necessary to support APA agreements with the Railbelt utilities.

Three of the cost changes listed above bear further scrutiny. These are:

- the coal plant variable O&M cost which went up approximately one percent in spite of the downward revision to a 1982 cost basis;

- the combustion turbine fixed O&M cost which dropped 12.9 percent; and

- the combustion turbine variable O&M cost which rose 13.2 percent.

The coal plant variable O&M cost increase is due to an increase in the expected consumption of lime by the Flue Gas Desulfurization System (FGDS). With low sulfur coal, relatively higher molar ratios of Ca to SO_2 are required to ensure capture of the SO_2 than is the case with high sulfur coals. There is some uncertainty of the exact molar ratio required. The consumption was raised from approximately 800 lbs per hour to slightly over 900 lbs per hour. Since the lime is shipped to Alaska by barge, this has a significant impact on the FGDS variable O&M costs.

The change in the fixed and variable O&M costs for the combustion turbine plant involved some minor modifications and re-allocation of fixed costs to variable costs. This resulted in the fixed unit costs dropping by more than the 7 percent price level adjustment and, in one instance, the variable unit cost actually increasing. Based on a 261 MW plant operating at an 80 percent capacity factor, total O&M costs dropped from $3,187,770 per year to $3,046,976 per year. The decrease of 4.4 percent resulted from the minor modifications, cost re-allocation, and price level change.

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4.

Question:

OGP-6 input data (data prep module) and the OGP-6 output for the APA DEIS analysis shown in Table 8-5 of the March 5 APA response.

Response:

The OGP-6 output data were provided to FERC in Volume II, Apendix 1, "OGP-6 Output", of the "Alaska Power Authority Response to FERC Data Request of October 24, 1984" dated November 13, 1984. The input data for the generation planning model is echoed as part of the detailed OGP-6 output contained therein. The data prep input for the With-Susitna (Exhibit 4.1) and Without-Susitna (Exhibit 4.2) expansion plans are attached.

Please note that there is a typographical error in Table 8-5 of the March 5, 1985 response. The $8026 million figure for the cost of the Without-Susitna plan should read $8025 million, which agrees with the data previously submitted.

EXHIBIT 4.1

```
10 BRU *
20 BEN
30##NORM
40$:PROGRAM:RL43
50$:LIMITS:05,70K,,15K
60$:PRMFL:H*,E,R,AQ43093/.GP6DP
70$:PRMFL:01,R,S,AQ43682/LMNSDU
80$:PRMFL:02,R,S,AQ43682/GM84UP
90$:FILE:03,X35,10L
100$:DATA:15
110$:REMOTE:06
120$:REMOTE:07
130      N. PANSIC
140      HARZA-EBASCO SUSITNA JOINT VENTURE
150      711 H STREET
160      ANCHORAGE, ALASKA 99510
170 SINPUT
180 ID1=15HALASKA RAILBELT,
190 ID2=60HDEISSU3 N2185 IN 1993, LOLP 0.1, D&M COAL,SHCA GAS, EBASCO AL,
200 NSTART=1993,
210 NTOTAL=28,
220 NYCOST=1982,
230 NYPNTH=1982,
240 IDTYPE=48HNUCLEAR      COAL   STEAMNGAS TURBINEOIL GAS TURB,
250          24HDIESEL    ICCOM CYCLE CC,
260          48HCONV.  HYDROPUMP STORAGEENG STOR   2ENG STOR   3,
270 IDTONE=36HNUKE  COAL  NGASGTOIL GTDIESELCOMCYC,
280          24HHYDRO PSH   ES-2  ES-3  ,
290 NNMANY=1,
300 NNAHED=1,
310 KTTYPE=-1,0,2,2,2,1,
320 XSIZES(1,1)=1500,
330 MANFYR(1,1)=2050,
340 XSIZES(1,2)=200,
350 MANFYR(1,2)=1982,
360 XSIZES(1,3)=87,
370 MANFYR(1,3)=1982,
380 XSIZES(1,4)=87,
390 MANFYR(1,4)=1982,
400 XSIZES(1,5)=10,
410 MANFYR(1,5)=2050,
420 XSIZES(1,6)=228,
430 MANFYR(1,6)=1982,
440 DERHYD=0.95,0,0,0,
450 CAPMIN=0.1,
460 BTIMES=0,
470 ESIZEG=333,250,50,
480 ESIZEP=333,250,50,
490 ESIZES=3330,2500,500,
500 HRES(2)=4500,
510 PLCMW=750,200,87,87,10,228,
520 PLCOKW=1000,2552,479,479,869,616,
530 PLCOF=0.20,5*0,
540 PATPC(1,1)=1.000,
550 IYRPC(1,2)=1982,1990,1991,1992,
560 PATPC(1,2)=1.000,1.000,1.000,1.000,
570 PATPC(1,3)=1.000,1.000,1.000,1.000,
580 PATPC(1,4)=1.000,
```

EXHIBIT 4.1 (CONT'D)

```
3 590 PATPC(1,6)=1.000,1.000,1.000,1.000,
  600 IYRPC(1,5)=1982,1990,1991,1992,
  610 IYRPC(1,6)=1982,1990,1991,1992,
  620 PATPC(1,5)=1.000,
  630 PATHPC(1,1)=1.000,1.000,1.000,1.000,
  640 IYRHPC(1,1)=1982,1990,1991,1992,
  650 PATHPC(1,2)=3*1.000,
  660 FIXCHG(1,1)=4.93,
  670 FIXCHG(1,2)=5.69,
  680 FIXCHG(1,3)=7.29,
  690 FIXCHG(1,4)=7.29,
  700 FIXCHG(1,5)=7.29,
  710 FIXCHG(1,6)=5.69,
  720 HYDFCR(1,1)=4.36,
  730 HYDFCR(1,2)=16.05,
  740 HYDFCR(1,3)=16.86,
  750 NMFUEL=48HJ308        LBCOALH1    TONCOALH2    TONOIL#2G    GAL,
  760         48HOIL#2F    GALOIL#2G    GALNGAS1A    MCFNGAS2A    MCF,
  770         36HNGAS3A    MCFNGAS4A    MCFCOAL B    TON,
  780 FCOPT=1,
  790 FUCOST=100.,203.,203.,638.,0.,704.,3*334.,302.,203.,
  800 HVTAB=12+8,152+5,152+5,136000,136000,136000,1005+6,1005+6,1005+6,
  810        1005+6,15+6,
  820 IFTAB=1,11,7,4,6,10,
  830 IPATFC=6,2,2,3,3,3,1,1,1,5,4,
  840 PATFC(1,1)=1.000,1.0384,1.16598,1.0372,1.030,
  850 IYRFC(1,1)= 1982, 1993, 2007,  2008,  2010,
  860 PATFC(1,2)=1.000,1.01014,1.01001,1.01019,
  870 IYRFC(1,2)= 1982,  1993,   2000,   2010,
  880 PATFC(1,3)=1.000,1.040,1.030,
  890 IYRFC(1,3)=1982,1993,2010,
  900 PATFC(1,4)=1.000,1.01014,1.01015,1.00874,1.01491,
  910 IYRFC(1,4)=1982,  1993,   2000,   2001,   2010,
  920 PATFC(1,5)=1.000,1.0385,1.28779,1.0372,1.030,
  930 IYRFC(1,5)= 1982, 1993,  2007,  2008, 2010,
  940 OMMW=750,200,87,87,10,228,
  950 OMDKW=9,1,51,36,2*7.61,.55,11.75,
  960 OMDF=0.5,5*0.,
  970 OMDHR=.11,3.61,2*0.28,5.38,0.54,
  980 PATOM(1,1)=1.000,
  990 PATOM(1,2)=1.000,1.000,1.000,1.000,1.000,
 1000 IYROM(1,2)=1982,1983,1985,1986,1988,
 1010 PATOM(1,3)=1.000,1.000,1.000,1.000,1.000,
 1020 IYROM(1,3)=1982,1983,1985,1986,1988,
 1030 PATOM(1,4)=1.000,
 1040 PATOM(1,5)=1.000,
 1050 PATOM(1,6)=1.000,1.000,1.000,1.000,1.000,
 1060 IYROM(1,6)=1982,1983,1985,1986,1988,
 1070 OMHYD=27.3,0,0,0,
 1080 OMVHYD=0,0,0,0,
 1090 PATHOM(1,1)=1.000,1.000,1.000,1.000,1.000,
 1100 IYRHOM(1,1)=1982,1983,1985,1986,1988,
 1110 PATHOM(1,2)=1.000,
 1120 PATHOM(1,3)=1.000,
 1130 PATHOM(1,4)=1.000,
 1140 NYRET=40,30,20,20,20,30,30,50,50,50,
 1150 FORMW=500,1000,1500,150,200,250,3,87,80,3,87,80,
12 1160        2,5,10,150,228,250,
11 1170 FORATE=3*0.01,3*0.057,6*0.080,3*0.05,3*0.080,
```

EXHIBIT 4.1 (CONT'D)

```
1180 PORMH=500,1000,1500,150,200,250,3,87,80,3,87,80,
1190        2,5,10,150,228,250,
1200 PORATE=3*0.1,3*0.080,6*0.032,3*0.01,3*0.070,
1210 XHRDB=10500,10300,11060,11060,11500,8300,
1220 XPOW1=0.50,0.50,3*0.20,0.32,
1230 XFIN1=0.55,0.55,3*0.38,0.45,
1240 MONPR=0,
1245 IPATRN(1,1)=12*1,
1250 MSD=7,
1260 KPRINT=28*1,
1270 LPRINT=28*0,
1280 IPNAME=36HUNIT  TYPE 1UNIT  TYPE 2UNIT  TYPE 3,
1290        36HUNIT  TYPE 4UNIT  TYPE 5UNIT  TYPE 6,
1300 IREGN=6*1,
1310 IRNAME=12HALASKA      ,
1320 KPLANT=1,2,3,4,5,6,
1330 MANUAL=1,
1340 NREAD=18
1350 SINPUT
1360 IFTAB(4)=7,
1370 MRDB(4)=3,
1380 PMINDB(4)=0.32,
1390 FMINDB(4)=0.45,
1400 MRDB(10)=3,
1410 PMINDB(10)=0.32,
1420 FMINDB(10)=0.45,
1430 NREAD=23
1440 SINPUT
1450 MRDB(1)=1,
1460 MRDB(15)=3*1,3,1,
1470 NREAD=33
1480 SINPUT
1490 MRDB(12)=3*1,
1500 NREAD=03
1510 SINPUT
1520 IMAX=6,
1530 NAMEDB=
1540 12HBRADLEY LAKE,
1550 12HBELUGA TRANS,
1560 12HGRANT LAKE  ,
1570 12HCHAKACHAMNA ,
1580 12HNENANA TRANS,
1585 12HNENANA COAL1,
1590 INSTDB=88,121,88,121,121,121,
1600 KINDB=7,1,7,7,1,2,
1610 CAPDB(2)=1.,
1620 CAPDB(5)=1.,
1630 PMAXDB(2)=0.0000001,
1640 PMAXDB(5)=0.0000001,
1650 PORDB(2)=1,
1660 PORDB(5)=1,
1670 DKWDB(1)=4111,
1680 DKWDB(2)=220000,
1690 DKWDB(3)=3705,
1700 DKWDB(4)=4230,
1710 DKWDB(5)=117000,2434,
1720 KFTDB(2)=5,
1730 KFTDB(5)=5,11,
```

EXHIBIT 4.1 (CONT'D)

```
1733 MPATDB(2)=1,
1736 MPATDB(5)=1,
1738 HRDB(6)=11000,
1740 DMDB(6)=68,40,
1742 CAPDB(6)=150,
1744 DMVDB(6)=3,10,
1748 GMINDB(1,1)=12*0,
1750 GMAXDB(1,1)=12*90,
1760 ENGYDB(1,1)=31,27.7,28.2,23.4,26.4,26.6,30.2,31.7,
1770                 28.4,30.6,30.6,31.7,
1780 GMINDB(1,3)=12*0,
1790 GMAXDB(1,3)=12*7,
1800 ENGYDB(1,3)=2.0,2.0,1.0,4*2.0,2*3.0,3*2.0,
1810 GMINDB(1,4)=12*0,
1820 GMAXDB(1,4)=12*330,
1830 ENGYDB(1,4)=133.,114.,113.,98.,94.,96.,138.,228.,179.,126.,128.,144.,
1840 KMORE=0$
1850 $INPUT
1860 IMAX=5,
1870 NAMEDB=
1880      7HWATANA1,
1890      13HDEVIL CANYON1,
1900      7HWATANA2,
1910      13HDEVIL CANYON2,
1920      7HWATANA3,
1930 KRETDB(1)=2002,2010,2010,
1940 KINDB=5*7,
1950 INSTDB=93,102,102,110,110,
1960 DKWDB= 7289,3957,0,0,0,
1970 GMINDB(1,1)=396,342,254,194,186, 82,
1980                 109,421,380,266,405,490,
1990 GMAXDB(1,1)=466,428,355,336,304,259,
2000                 290,460,393,409,557,539,
2010 ENGYDB(1,1)=346,287,264,241,226,186,
2020                 215,342,283,304,401,400,
2030 GMINDB(1,2)=328,327,292,317,254,283,
2040                 248,257,302,229,301,354,
2050 GMAXDB(1,2)=398,393,334,318,325,328,
2060                 276,293,304,309,394,434,
2070 ENGYDB(1,2)=295,264,248,228,241,235,
2080                 205,218,219,229,283,323,
2090 GMINDB(1,3)=12*0,
2100 GMAXDB(1,3)=715,697,676,657,656,691,
2110                 735,762,774,773,760,740,
2120 ENGYDB(1,3)=326,285,262,229,190,163,
2130                 177,222,236,298,323,363,
2140 GMINDB(1,4)=320,319,286,367,252,278,
2150                 268,294,365,272,311,343,
2160 GMAXDB(1,4)=457,450,368,368,366,366,
2170                 323,363,366,333,457,503,
2180 ENGYDB(1,4)=340,302,273,265,272,263,
2190                 240,270,263,249,329,374,
2200 GMINDB(1,5)=12*0,
2210 GMAXDB(1,5)=693,667,643,619,615,650,
2220                 703,743,764,762,745,720,
2230 ENGYDB(1,5)=369,319,281,252,214,188,
2240                 180,249,264,350,371,417,
2250 KMORE=1$
```

EXHIBIT 4.2

```
100 BRU *
110 BEN
120 **NORM
130 $:PROGRAM:RLMS
140 $:LIMITS:05,70K,,15K
150 $:PRMFL:H*,E,R,AQ43093/,GP6DP
160 $:PRMFL:01,R,S,AQ43682/LMNSDU
170 $:PRMFL:02,R,S,AQ43682/GM84UP
180 $:FILE:03,X38,10L
190 $:DATA:15
200 $:REMOTE:06
210 $:REMOTE:07
220      N. PANSIC
230      HARZA-EBASCO SUSITNA JOINT VENTURE
240      711 H STREET
250      ANCHORAGE, ALASKA 99510
260 $INPUT
270 ID1=15HALASKA RAILBELT,
280 ID2=60HDEISTR7, NSD GAS/COAL, COAL: BBMM, SCHAGAS, EBASCOAL          ,
290 NSTART=1993,
300 NTOTAL=28,
310 NYCOST=1982,
320 NYPNTH=1982,
330 IDTYPE=48HNUCLEAR      COAL:   STEAMNGAS TURBINEOIL GAS TURB,
340          24HDIESEL:    ICCOM CYCLE CC,
350          48HCONV,  HYDROPUMP STORAGEENG STOR   2ENG STOR   3,
360 IDTONE=36HNUKE  COAL  NGASGTOIL GTDIESELCOMCYC,
370          24HHYDRO PSH    ES-2  ES-3  ,
380 NNMANY=1,
390 NNAHED=1,
400 KTTYPE=-1,0,2,2,2,1,
410 XSIZES(1,1)=1500,
420 MANFYR(1,1)=2050,
430 XSIZES(1,2)=200,
440 MANFYR(1,2)=1982,
450 XSIZES(1,3)=87,
460 MANFYR(1,3)=1982,
470 XSIZES(1,4)=87,
480 MANFYR(1,4)=1982,
490 XSIZES(1,5)=10,
500 MANFYR(1,5)=2050,
510 XSIZES(1,6)=228,
520 MANFYR(1,6)=1982,
530 DERHYD=0.95,0,0,0,
540 CAPMIN=0.1,
550 GTIMES=0,
560 EBIZEG=333,250,50,
570 EBIZEP=333,250,50,
580 EBIZES=3330,2500,500,
590 HRES(2)=4500,
600 PLCMW=750,200,87,87,10,228,
610 PLCDKW=1000,2552,479,479,869,616,
620 PLCDF=0,20,540,
630 PATPC(1,1)=1.000,
640 IYRPC(1,2)=1982,1990,1991,1992,
650 PATPC(1,2)=1.000,1.000,1.000,1.000,
660 PATPC(1,3)=1.000,1.000,1.000,1.000,
670 PATPC(1,4)=1.000,
680 PATPC(1,6)=1.000,1.000,1.000,1.000,
```

EXHIBIT 4.2 (CONT'D)

```
690  IYRPC(1,3)=1982,1990,1991,1992,
700  IYRPC(1,6)=1982,1990,1991,1992,
710  PATPC(1,5)=1.000,
720  PATHPC(1,1)=1.000,1.000,1.000,1.000,
730  IYRHPC(1,1)=1982,1990,1991,1992,
740  PATHPC(1,2)=3*1.000,
750  FIXCHG(1,1)=4.93,
760  FIXCHG(1,2)=5.69,
770  FIXCHG(1,3)=7.29,
780  FIXCHG(1,4)=7.29,
790  FIXCHG(1,5)=7.29,
800  FIXCHG(1,6)=5.69,
810  HYDFCR(1,1)=4.36,
820  HYDFCR(1,2)=16.05,
830  HYDFCR(1,3)=16.86,
840  NMFUEL=4HU308        LBCOALH1    TONCOALH2    TONOIL#2G    GAL,
850          4HOIL#2F    GALOIL#2C   GALNGAS1A    MCFNGAS2A    MCF,
860          3HNGAS3A    MCFNGAS4A   MCFCOAL B    TON,
870  FCOPT=1,
880  FUCOST=100.,203.,203.,638.,0.,704.,3*334.,302.,203.,
890  HVTAB=12+8,152+5,152+5,136000,136000,136000,1005+6,1005+6,1005+6,
900          1005+6,15+6,
910  IFTAB=1,11,7,4,6,10,
920  IPATFC=6,2,2,3,3,3,1,1,1,5,4,
930  PATFC(1,1)=1.000,1.0384,1.16598,1.0372,1.030,
940  IYRFC(1,1)= 1982, 1993, 2007,  2008,  2010,
950  PATFC(1,2)=1.000,1.01014,1.01001,1.01019,
960  IYRFC(1,2)= 1982,  1993,   2000,   2010,
970  PATFC(1,3)=1.000,1.040,1.030,
980  IYRFC(1,3)=1982,1993,2010,
990  PATFC(1,4)=1.000,1.01014,1.01015,1.00874,1.01491,
1000 IYRFC(1,4)=1982,  1993,   2000,   2001,   2010,
1010 PATFC(1,5)=1.000,1.0385,1.28779,1.0372,1.030,
1020 IYRFC(1,5)= 1982, 1993,  2007,  2008, 2010,
1030 OMMW=750,200,87,87,10,228,
1040 OMOKW=9.1,51.36,2*7.61,.55,11.75,
1050 OMOF=0.5,5*0.,
1060 OMOHR=.11,3.61,2*0.28,5.38,0.54,
1070 PATOM(1,1)=1.000,
1080 PATOM(1,2)=1.000,1.000,1.000,1.000,1.000,
1090 IYROM(1,2)=1982,1983,1985,1986,1988,
1100 PATOM(1,3)=1.000,1.000,1.000,1.000,1.000,
1110 IYROM(1,3)=1982,1983,1985,1986,1988,
1120 PATOM(1,4)=1.000,
1130 PATOM(1,5)=1.000,
1140 PATOM(1,6)=1.000,1.000,1.000,1.000,1.000,
1150 IYROM(1,6)=1982,1983,1985,1986,1988,
1160 OMHYD=27.3,0,0,0,
1170 OMVHYD=0,0,0,0,
1180 PATHOM(1,1)=1.000,1.000,1.000,1.000,1.000,
1190 IYRHOM(1,1)=1982,1983,1985,1986,1988,
1200 PATHOM(1,2)=1.000,
1210 PATHOM(1,3)=1.000,
1220 PATHOM(1,4)=1.000,
1230 NYRET=40,30,20,20,20,30,50,50,50,50,
1240 FORMW=500,1000,1500,150,200,250,3,87,80,3,87,80,
1250         2,5,10,150,228,250,
```

EXHIBIT 4.2 (CONT'D)

```
1260 FORATE=3*0.01,3*0.057,6*0.080,3*0.05,3*0.080,
1270 PORMW=500,1000,1500,150,200,250,3,87,80,3,87,80,
1280        2,5,10,150,228,250,
1290 PORATE=3*0.1,3*0.080,6*0.032,3*0.01,3*0.070,
1300 XHRDB=10500,10300,11000,11060,11500,8300,
1310 XPOW1=0.50,0.50,3*0.20,0.32,
1320 XFIN1=0.55,0.55,3*0.38,0.45,
1330 IPATRN(1,1)=12*1,
1340 MONPR=0,
1350 M3D=7,
1360 KPRINT=28*1,
1370 LPRINT=28*0,
1380 IPNAME=36HUNIT  TYPE 1UNIT  TYPE 2UNIT  TYPE 3,
1390         36HUNIT  TYPE 4UNIT  TYPE 5UNIT  TYPE 6,
1400 IREGN=6*1,
1410 IRNAME=12HALASKA      ,
1420 KPLANT=1,2,3,4,5,6,
1430 MANUAL=1,
1440 NREAD=19
1450 $INPUT
1460 IFTAB(1)=7,
1470 MRDB(1)=3,
1480 PMINDB(1)=0.32,
1490 FMINDB(1)=0.45,
1500 IFTAB(4)=10,
1510 MRDB(5)=3,
1520 PMINDB(5)=0.32,
1530 FMINDB(5)=0.45,
1540 NREAD=28
1550 $INPUT
1560 MRDB(1)=1,
1570 MRDB(15)=3*1,3,1,
1580 NREAD=38
1590 $INPUT
1600 MRDB(12)=3*1,
1610 NREAD=08
1620 $INPUT
1630 IMAX=7,
1640 NAMEDB=
1650 12HBRADLEY LAKE,
1660 12HFIRST  TRANS,
1670 12HGRANT LAKE  ,
1680 12HCHAKACHAMNA ,
1690 12HSECOND TRANS,
1692 12HNENANA COAL1,
1694 12HNENANA COAL2,
1700 INSTDB=88,93,88,121,105,93,96,
1710 KINDB=7,1,7,7,1,2,2,
1720 CAPDB(2)=1.,
1730 CAPDB(5)=1,200,200,
1740 PMAXDB(2)=0.0000001,
1750 PMAXDB(5)=0.0000001,
1760 PORDB(2)=1,
1770 PORDB(5)=1,
1780 DKWDB(1)=4111,
1790 DKWDB(2)=220000,
1800 DKWDB(3)=3705,
```

EXHIBIT 4.2 (CONT'D)

```
1810 DKWDB(4)=4230,
1820 DKWDB(5)=117000,
1830 KFTDB(2)=5,
1840 MPATDB(2)=1,
1845 DKWDB(6)=2*2607,
1847 KFTDB(6)=2,2,
1850 KFTDB(5)=5,
1860 MPATDB(5)=1,
1870 GMINDB(1,1)=12*0,
1880 GMAXDB(1,1)=12*90,
1890 ENGWDB(1,1)=31,27.7,28.2,23.4,26.4,26.6,30.2,31.7,
1900                 28.4,30.6,30.6,31.7,
1910 GMINDB(1,3)=12*0,
1920 GMAXDB(1,3)=12*7,
1930 ENGWDB(1,3)=2.0,2.0,1.0,4*2.0,2*3.0,3*2.0,
1940 GMINDB(1,4)=12*0,
1950 GMAXDB(1,4)=12*330,
1960 ENGYDB(1,4)=133.,114.,113.,98.,94.,96.,138.,228.,179.,126.,128.,144.,
1970 KMORE=18
```

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5.a)

Question:

A breakdown of the transmission costs, with associated technical data (e.g., voltage levels, miles of line, terminal characteristics and assumed reactive compensation) for the transmission costs included in the OGP-6 thermal alternative cost shown in the computer printouts forwarded in the March 5 APA response, (i.e., the $220 million and $117 million noted as First and Second transmission).

Response:

The Power Authority does not have a further breakdown of the transmission costs included in the thermal alternative costs. A check of the first and second phase estimated expenditures showed that, when added to the transission costs included with the individual thermal units (See response to Question 6), total transmission costs should approximate those which would be obtained from a detailed analysis. Also, the costs presented were deemed adequate for assessing the economic feasibility of the Susitna Project in relation to the thermal expansion plan.

In general terms the $220 million would include the upgrade of the existing intertie from 138 kV to 345 kV and extension to Fairbanks and Anchorage at 345 kV, and the construction of a second 345 kV line between the two load centers and associated substations. The $117 million would include additional 345 kV, 230 kV, and 115 kV transmission lines and substations which were not included in the powerplant cost estimates discussed in the response to Question 6.

The Power Authority is presently discussing thermal system additions and transmission system additions with Railbelt utilities as part of the negotiations for conditional power sales agreements. The Power Authority expects that, at the conclusion of these negotiations, final transmission system plans and costs (including a detailed breakdown) will be developed.

5.b)

Question:

An explanation of the association of $220 million with the installation of the Nenana coal plant and $117 million with the installation of the Beluga coal plant in the latest case runs when prior runs showed $117 million with Nenana and $220 million with Beluga.

Response:

The location and timing of coal-fired power plants and associated transmission line facilities in the Without-Susitna alternative of the License Application were reviewed and revised in the Power Authority's Comments on the DEIS.

In the License Application, the first coal-fired plant site was near the Beluga field followed by a coal-fired development at the Nenana site. In preparation of the Power Authority's DEIS Comments, the geographic location of existing sources of coal and the distribution of coal-fired generation in relation to the load centers was reexamined. These comparisons resulted in selection of an expansion plan with the initial coal-fired development located at the Nenana site near the existing producing coal field. Subsequent coal-fired power developments were sited at the Beluga coal field.

The License Application showed Without-Susitna transmission costs of $220 million and $117 million associated with the Beluga and Nenana coal-fired developments, respectively. However, the transmission lines and equipment provided by these two expenditures (see response to Question 5a) are more closely related to the development of the overall Railbelt transmission system than to the location of coal-fired plant develpments. Therefore, the amount of the transmission line expenditures is not specifically associated with either the Beluga or Nenana coal-fired plants.

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Question:

A breakdown of the material and installation costs for the transmission station included in account number 19 of the detailed Beluga coal plant estimates submitted by APA in response to question 3 of staff's October 24, 1984 request for additional information. The separation and identification of costs between the generating unit's connection to the generating station high voltage bus and the station costs for connecting the transmission line between the generating station high voltage bus and the proposed Lorraine switching station.

Response:

Please refer to the response to Question 3 in Volume 1 of APA's November 13, 1984 submittal. The detailed Beluga coal plant estimate presented therein includes the material and labor breakdown of both the substation and T-line costs.

A duplicate breakdown showing the material and installation costs for the 200 MW Beluga coal-fired initial unit is provided in the attached Table 6-1. The estimates given in November 1984 were prepared in 1983 dollars and have been de-escalated to 1982 dollars, assuming a 1982 inflation factor of 6.4 percent. The attached table shows the breakdown of transmission line and substation costs for the initial Beluga unit and the extension unit of the first 2-unit plant to be built at a Beluga site.

It was determined that installing a transmission line with the initial unit which would be capable of handling the output of two units is not justified at the time the first unit is installed. The second 200 MW unit will therefore include a second 230 kV T-line installed along a common right-of-way with the initial transmission line.

The attached table also presents the total capital costs of plant substations and transmission lines for the two Nenana units and the second two-unit plant at Beluga. The breakdown of these costs is identical in format to that shown in the Beluga cost accounts and is found in account No. 19 of the detailed estimates. The second two-unit Beluga plant assumes costs identical to the first two-unit plant. That is, a new right-of-way, or extensive expansion of the existing right-of-way, will be necessary for the transmission lines.

The substation and transmission line costs given for the Beluga coal-fired power plants are inclusive of all equipment necessary to take the generated energy from the generator bus to the station switchyard, through the step up transformers, and the transmission line to an assumed substation in the Lorraine area. Costs of the substation and any transformers at the substation are not included. This estimating philosophy is used for all the coal-fired plants. That is, the cost of Railbelt system substations and transmission is not included in the plant estimate. The capital cost of transmitting power to a point in the Railbelt system is included.

Table 6-1

200 MW COAL-FIRED POWER PLANTS
SUBSTATION AND TRANSMISSION LINE
CAPITAL COSTS
(1982$)

Beluga Site

Item		Account No.	Description	Total	Material	Labor
	First Two-Unit Plant					
1.	Initial Unit	19.00	Substation and T-Line (Total)	21,803,524	12,293,233	9,510,291
		19.01	Substation	3,491,118	2,819,548	671,570
		19.02	T-Line	18,312,406	9,473,685	8,838,721
2.	Extension Unit	19.00	Substation and T-Line (Total)	16,915,250	10,264,250	6,651,000
		19.01	Substation	3,154,950	2,685,300	469,650
		19.02	T-Line	13,760,300	7,578,950	6,181,350
3.	Second Two-Unit Plant (Total for Two Units)	19.00	Substation and T-Line (Total)	38,718,774	22,557,483	16,161,291
			Nenana Site			
4.	Initial Unit	19.00	Substation and T-Line (Total)	9,811,400	7,236,850	2,574,550
5.	Extension Unit	19.00	Substation and T-Line (Total)	2,866,700	1,578,950	1,287,750
	TOTAL FOR 6 UNITS (Items 1, 2, 3, 4, and 5)			90,115,648	53,930,766	36,184,882

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Question:

Identification of and an explanation for any source code modifications of the OGP-6 model made by APA.

Response:

The Optimized Generation Planning model source code is proprietary to the General Electric Company and therefore, cannot be modified by the Power Authority.

As a service to its customers, General Electric periodically makes enhancements and corrections to the program. Attached as Exhibit 7.1 is a letter from General Electric to the Power Authority dated April 4, 1985 which summarizes significant changes made by General Electric to the OGP model during the Susitna studies.

EXHIBIT 7.1

GENERAL ELECTRIC

ELECTRIC UTILITY SYSTEMS ENGINEERING DEPARTMENT
GENERAL ELECTRIC COMPANY • ONE RIVER ROAD • SCHENECTADY, NEW YORK 12345

(518) 385-4199

April 4, 1985

Mr. James Dischinger
Susitna Project Manager
Alaska Power Authority
334 West Fifth Avenue - 2nd Floor
Anchorage, Alaska 99501

Dear Mr. Dischinger:

At the request of Ed Carter, I am sending you the attached summary of the significant changes made to OGP-5 and OGP-6 since the programs were first used in the Susitna study. I have included only those changes affecting the program options being used in this study.

Sincerely,

G.E. Haringa
Application Engineer
GENERATION PLANNING & ECONOMICS

/cb
Enc.

cc: E. Carter - Harza
B.M. Kaupang - #2-637
W.E. Larson - Harza/Ebasco

Summary of Significant Changes to OGP-5

5/80 Option to print monthly reliability values on summary output.

Summary of Significant Changes From OGP-5 to OGP-6

2/82 Study period increased from 20 years to 30 years.

Option to retire, during the study, units automatically added by the program.

Option to design the system to an economic reserve margin determined by the program, rather than to an input percent reserve margin or loss-of-load probability.

Option to allow generating units with a 0 MW rating.

Option to override annual peak loads.

Option to transfer a maintenance schedule from one run to another.

Increased number of inflation multipliers in the inflation patterns.

Number of manual maintenance patterns increased from 12 to 25.

Summary of Significant Changes to OGP-6

5/82 Modeling of conventional hydro expanded to include the spilling or carrying forward of excess hydro energy.

8/82 Option to prorate the planned maintenance for a unit installed or retired in mid-year.

Option to install automatically added units in January, rather than the actual installation month, for calculating production costs and investment costs in the decision pass.

11/82 Option to allow annual override of fuel costs by fuel type.

Improved modeling of must-run units with the minimum section committed first and the commitment of the delta section determined by economics.

Summary of Significant Changes to OGP-6 (Continued)

5/83	Correct problem with printing of monthly reliability numbers when using economic overbuilding logic.
6/83	Modify modeling of conventional hydro to always spill the excess hydro energy due to the run-of-river portion of the units.
7/83	Correct problem with calculation of the optimum pass when overbuilding the system and designing to a percent reserve.
	Correct problem with printing of Summary 1 output.
9/83	Correct subscripting problem when committing units by cycling rules and all units have the same rule.
10/83	Correct problem with commitment of must-run units.
	Correct problem in calculation of off-peak excess when no units are committed.
11/83	Option to calculate levelized investment costs when comparing alternatives with different lives.
1/84	Calculate spinning reserve based on production cost peak load rather than reliability peak load.
	Test for and correct planned outage rate greater than 1.
2/84	Option to calculate marginal production costs.
4/84	Correct problem in determining largest unit not on maintenance for spinning reserve calculation.
12/84	Option to include variable O&M in the thermal dispatch order.
	Reinitialize hydro spill variable to zero between decision passes.
	Correct problem with fuel costs used when optimizing on system with no thermal units on the existing system.

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8.

Question:

The rationale and criteria used for the development of the rule curves and operation guidelines used to simulate Watana and Devil Canyon reservoir operation.

Response:

The Watana project will develop about 3.7 million acre-feet of storage, providing substantial seasonal regulation capability. Release of a large quantity of water would cause a relatively small change in the project head. Devil Canyon will have an active storage about one-tenth that of Watana and, hence, would lose considerably more head for the same volume of release. Consequently, the reservoir operation methodology attempts to keep the Devil Canyon reservoir close to its normal maximum operating level while using Watana's storage to provide the necessary seasonal regulation. The modeling effort in both the single and double reservoir operation is focused on the Watana development.

To simulate the operation of the Watana development, the Applicant has developed two approaches; a conventional rule curve, and an operating guide. The rule curve operation approach can be thought of as "predictive" because it attempts to achieve a target end-of-period elevation which presumes some knowledge of the expected reservoir inflow during that period (i.e., a monthly period). The historical record is used as a predictor of the inflow for the monthly period being simulated. The operating guide approach can be viewed as "nonpredictive" because its purpose is to achieve a specific discharge rate through the powerhouse based only upon the reservoir elevation at the beginning of the period. The operating guide is a family of rule curves, with each curve related to a powerhouse discharge rate. This simulation is done on a weekly basis.

The rule curve approach is easy to apply for simulation of the operation, but is operationally difficult to achieve because reservoir inflows are difficult to accurately forecast. The operating guide approach is more difficult to model, but it is more straightforward to apply operationally.

The two approaches yield similar results in terms of overall power and energy production. The operating guide approach is used for input to analyses of reservoir and river temperature, and downstream fisheries habitat because the operation guides more closely simulate the expected project releases. The rule curve approach is used for input to economic analyses because it is simpler and yields comparable power and energy production.

Rule Curve and Minimum Energy

Under the rule curve approach, the water surface elevation (WSEL) is compared to the specified rule curve elevation (RCEL)for the period. If the end-of-month WSEL is higher than the RCEL, the water stored between these two elevations is released to generate more energy up to the system energy demand.

The rule curve is a one-sided limit, representing an upper bound on the end-of month reservoir elevation. This limit controls the reservoir operation in normal and wet flow years.

In dry flow years, another constraint, the minimum energy requirement, is invoked. This constraint is a computational tool that ensures that the reservoir is drawn down to its minimum elevation in the most critical dry period of the simulation. The minimum energy production constraint governs when the other constraints yield less energy production than this minimum level. A "target" value of this minimum energy requirement is input to begin the simulation. The target is an annual energy which follows a specified monthly distribution. If the reservoir elevation does not reach the absolute minimum drawdown level during the simulation period, the minimum energy is increased. If the project does not meet the minimum energy requirement, the minimum energy is decreased. The model iterates until an acceptable convergence is achieved.

Rule Curve Development

The monthly rule curve is developed by trial and error. Exhibit 8.1 depicts an example rule curve for Watana. The drawdown season extends from the beginning of October through the end of April. During these months, the average natural inflow to the reservoir is less than the reservoir outflow, and the reservoir level decreases. The filling season extends from the beginning of May through the end of September. During these months, the average natural inflow to the reservoir exceeds the reservoir outflow, and the reservoir level increases. Hence, the general shape is as follows: at the end of the filling season the reservoir should be full, and at the end of the drawdown season the reservoir should be at the minimum rule curve elevation. This minimum is established by trial and error.

The higher the minimum rule curve elevation, the greater the firm energy production. This is because more water would be available during a drought resulting in higher energy output. Alternatively, the lower the rule curve, the greater the average energy production, because there is more storage available for regulation on an average annual basis. The minimum rule curve elevation is selected based on an operation which provides a reasonable trade-off between firm and average energy production.

Once the minimum and maximum rule curve elevations have been established, the rest of the rule curve is determined. The objectives of this procedure are to establish the monthly RCELs that distribute the hydroelectric energy such that the costs of thermal energy generation during the drawdown season are minimized. In this approach, equal quantities of thermal energy are produced during each month of the drawdown period. The same philosophy applies to the filling season. If done properly, the thermal energy requirement in each season will be "levelized" as depicted on Exhibit 8.2.

Operating Guide

The operating guide comprises three main elements:

- a set of weekly reference powerhouse discharge rates (cfs);

- a set of curves defining desired powerhouse discharge rates as a function of Wanana reservoir elevation and time of year. The curves, which are expressed in terms of a percentage of the reference discharge for each week, are used to decide whether or not the present rate of discharge should be increased (Exhibit 8.3a); and

- a second set of curves, as described above, which are used to decide whether or not the present rate of discharge should be decreased (Exhibit 8.3b).

The weekly reference discharges represent the average annual flow volume distributed through the year to minimize the costs of generating the thermal energy component of the system energy requirement. In this approach, equal quantities of thermal energy are produced during each week of the drawdown period and equal quantities of thermal energy are produced during each week of the filling period.

The operating guide can be viewed as a family of "rule curves". The guide is applied by comparing the current discharge rate to that prescribed by the guide based on the time of year and the water surface elevation. Half of the guide curves are "increasing" curves; if the water surface elevation is greater than the increasing curve elevation, the discharge should be increased to the rate on that curve. The other half are "decreasing" curves; if the water surface elevation is less than this elevation, the rate

will decrease to that curve's rate. The "increasing" curve rates which have been used are 140, 120, 100 and 80 percent of reference discharge; the "decreasing" curve rates are 120, 100, 80, and 64 percent. If the reservoir in the previous week was operating at 100%, the 120% "increasing" and the 80% "decreasing" curves are checked, restricting the rate of change of discharge to the difference in the rates assigned to the curves. If the water surface elevation does not cross either of these curves, the discharge rate will stay at 100%.

Exhibit 8.4 illustrates an example Watana operating guide . If the discharge in the previous week was 100% of the reference discharge and the WSEL is at Point A on Exhibit 8.4, then the discharge for the next week will be at 120% of the reference discharge in that week. If the WSEL is at Point B, the discharge will stay at 100%. If the WSEL is at Point C, the discharge will reduce to 80%. If the discharge was 120% of reference in the previous week, at Point A the discharge would remain the same; at Points B or C the discharge would drop to 100%.

Weekly Operating Guide Development

The operating guide development objectives are to:

- stay close to the reference discharge;
- maximize the energy production;
- keep discharge rates constant for several weeks at a time; and
- minimize releases through the valves.

The reference discharges are determined by first performing a monthly rule curve simulation. The discharges through the powerhouse are then plotted on a grid that is marked in both months and weeks. The weekly reference

discharges are estimated from the monthly discharges. The resulting weekly reference discharges will levelize the thermal energy requirement in the drawdown and filling seasons. It can be noted that, under average flow conditions, it would be optimal to always release at 100% of the weekly reference discharge. However, due to natural variations in reservoir inflow, the release rates must increase and decrease accordingly to optimize the power and energy production.

The development of the operating guide curves is an iterative process. The lowest decreasing curve (64%) is first produced by examining the drought periods. Sixty-four percent was estimated to be the highest percent discharge that would get the project through the most critical drought. The largest increasing curves (120 and 140%) are adjusted in order to generate more energy when streamflow is above average to use as much of the reservoir inflow as possible. The intermediate curves are adjusted in order to maintain adequate storage during the drought and to keep the discharge rate from oscillating.

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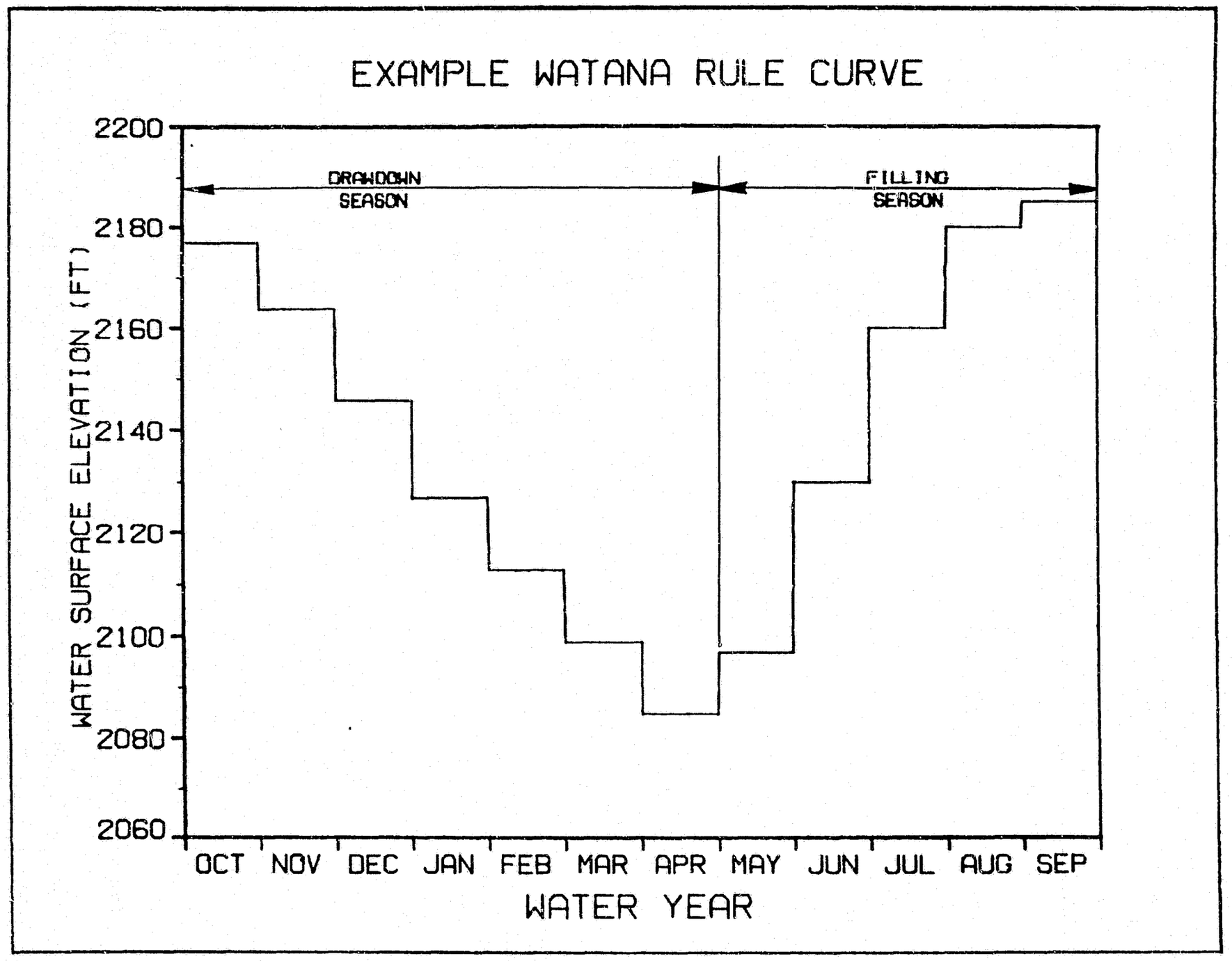

EXAMPLE WATANA RULE CURVE
DRAWDOWN SEASON
FILLING SEASON
WATER SURFACE ELEVATION (FT)
2200
2180
2160
2140
2120
2100
2080
2060
OCT
NOV
DEC
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
WATER YEAR

EXHIBIT 8.1

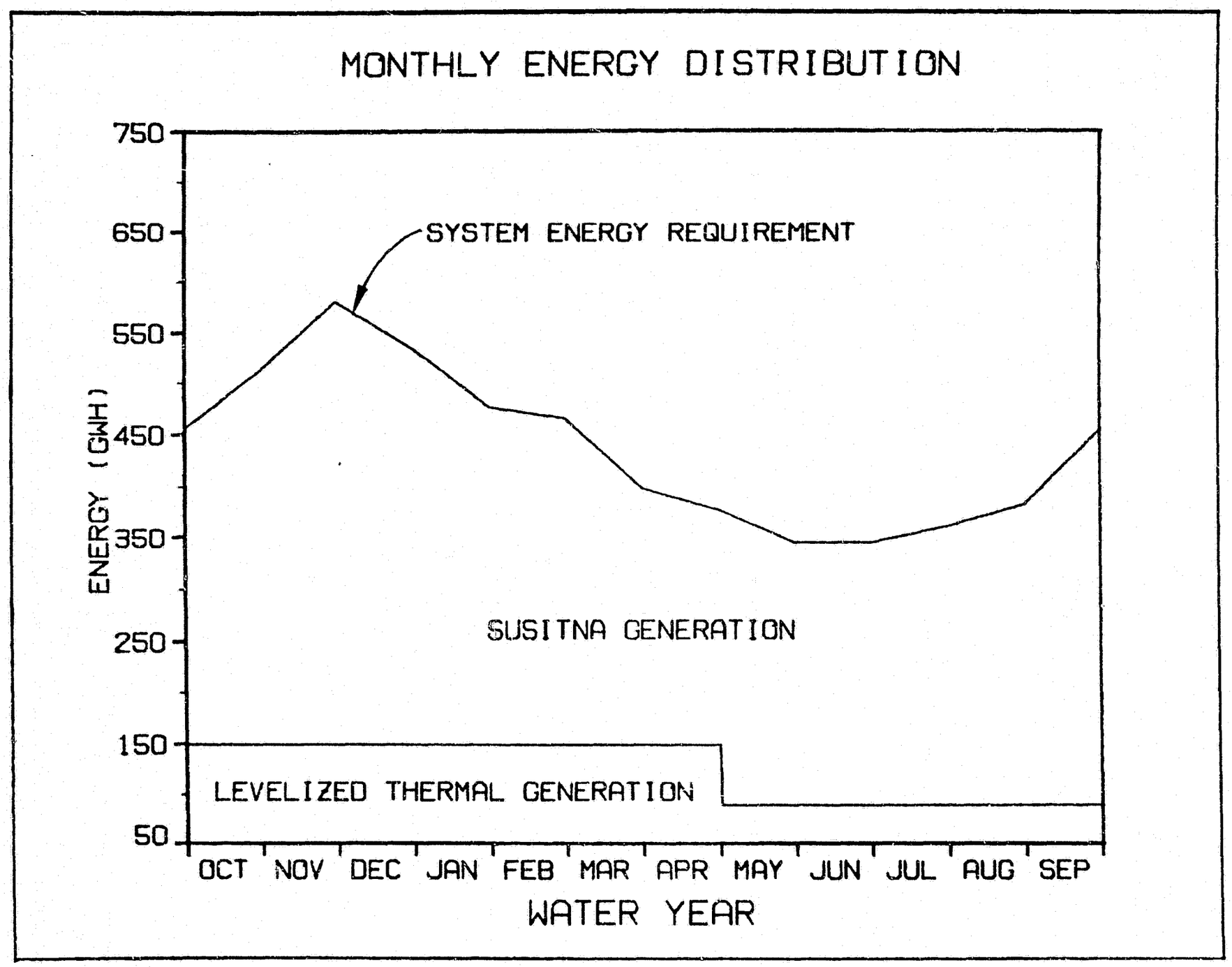

MONTHLY ENERGY DISTRIBUTION
750
650
550
450
350
250
150
50
ENERGY (GWH)
SYSTEM ENERGY REQUIREMENT
SUSITNA GENERATION
LEVELIZED THERMAL GENERATION
OCT
NOV
DEC
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
WATER YEAR

EXHIBIT 8.2

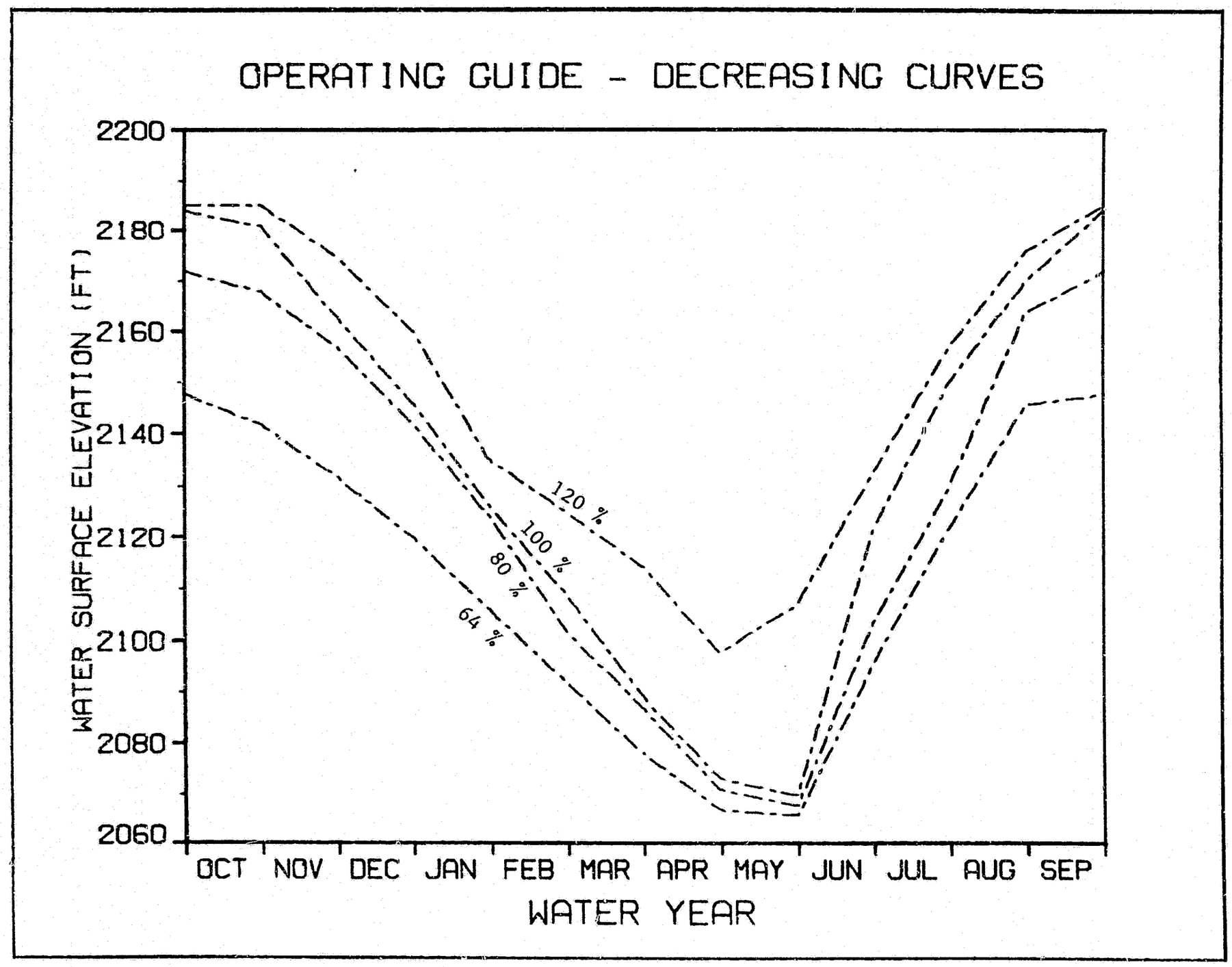

OPERATING GUIDE - DECREASING CURVES
2200
2180
2160
2140
2120
2100
2080
2060
WATER SURFACE ELEVATION (FT)
120 %
100 %
80 %
64 %
OCT
NOV
DEC
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
WATER YEAR

EXHIBIT 8.3a

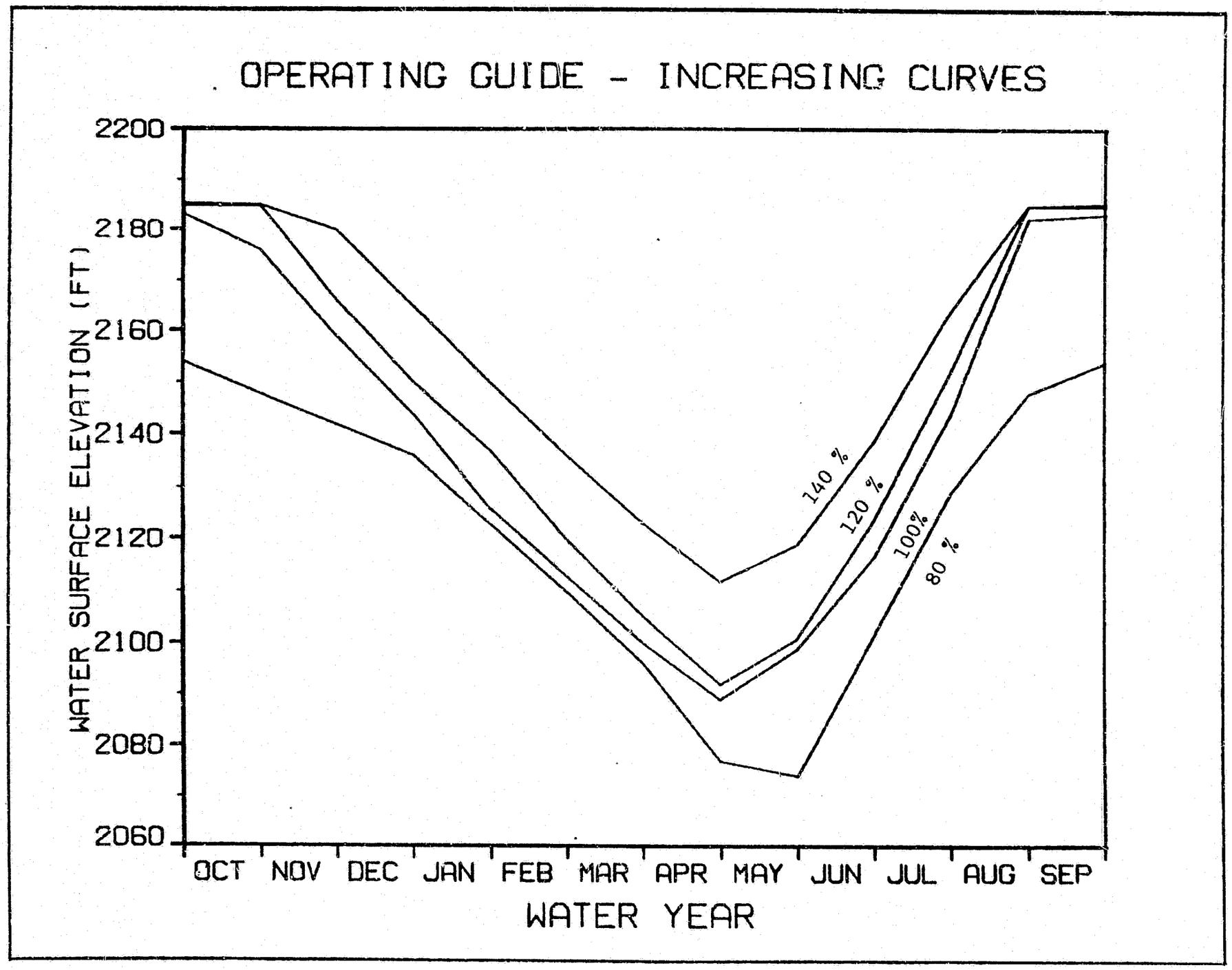

OPERATING GUIDE - INCREASING CURVES
2200
2180
2160
2140
2120
2100
2080
2060
WATER SURFACE ELEVATION (FT)
140 %
120 %
100%
80 %
OCT
NOV
DEC
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
WATER YEAR

EXHIBIT 8.3b

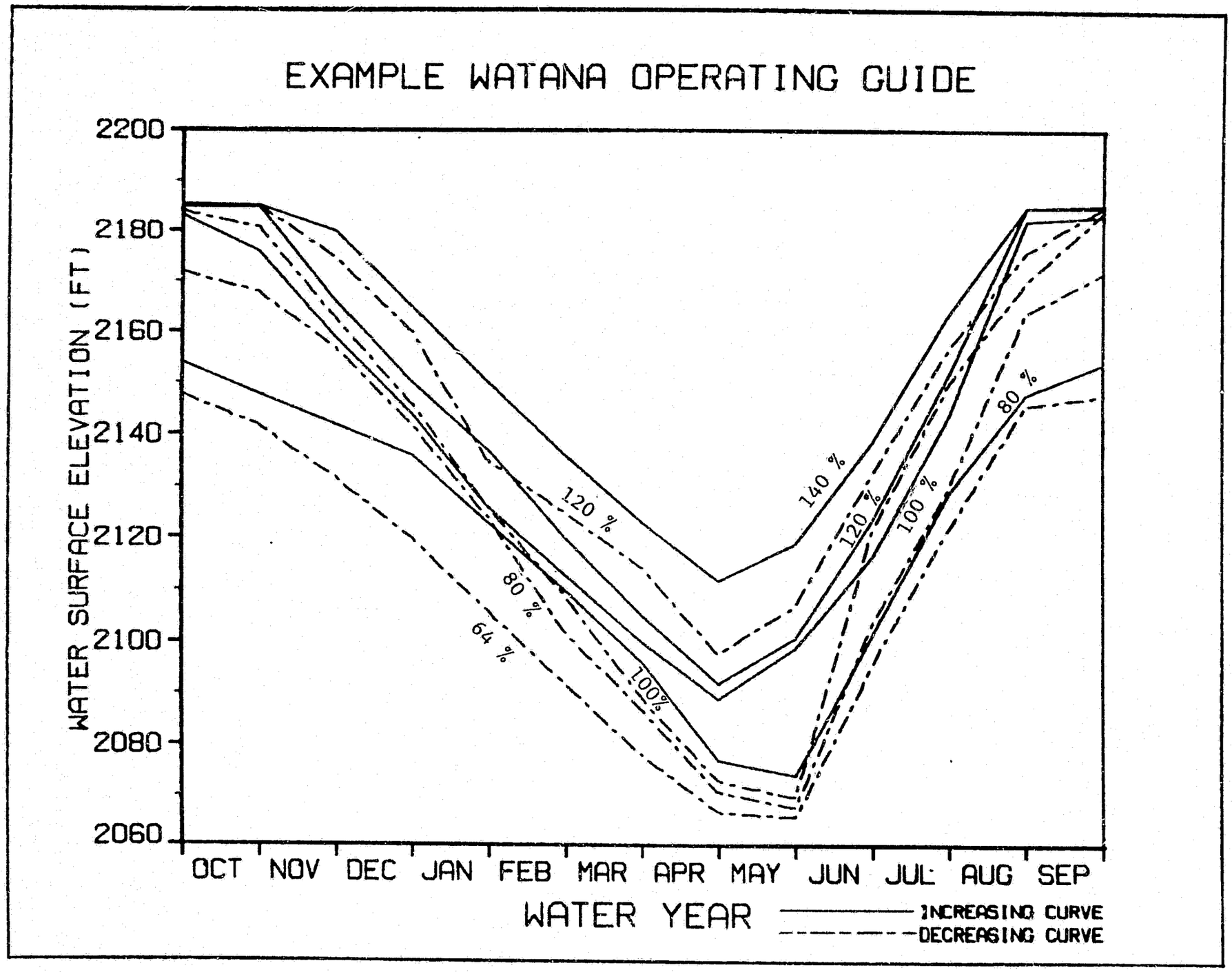

EXAMPLE WATANA OPERATING GUIDE
WATER SURFACE ELEVATION (FT)
2200
2180
2160
2140
2120
2100
2080
2060
OCT
NOV
DEC
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
WATER YEAR
140 %
120 %
80 %
64 %
100%
120 %
100 %
80 %
INCREASING CURVE
DECREASING CURVE

EXHIBIT 8.4

9

10

9.

Question:

Referring to the model description, the algorithm for both the single and double reservoir operation and an explanation of the relationship between reservoir operation and power demand.

Response:

Reservoir Operation Model

The reservoir operation model is used to simulate operation under historical streamflow conditions, given the physical parameters associated with the project developments. The model flowchart is attached as Exhibit 9.1, and the algorithm is discussed below. The following discussion addresses the Watana project operation. The double reservoir operation is discussed in relation to the single reservoir operation in the first paragraph of the response to Question 8. Each of the major headings below corresponds to a subroutine identified on Exhibit 9.1.

Input Data

The input data is read into the model, and data storage arrays are initialized. The data includes: 34 years of historical discharge at each development and at Gold Creek (used for computation of intervening flows); area and volume vs. elevation curves of the reservoirs; tailwater rating curves; powerplant performance curves; Railbelt system energy requirement and annual distribution; a rule curve or operating guide; and instream flow requirements at Gold Creek.

Initial Operation

The initial operation for each time step is done with either an operation guide or a minimum energy and rule curve. These alternatives are explained in detail in the response to Question 8.

Preliminary Demand Check

The system energy requirement is based on an annual number from a load forecast (e.g., the Power Authority Reference Case.) The reservoir operation model simulates one demand year per run. The energy requirement used for the model is net generation at plant, which includes line and distribution losses. Energy produced from existing hydro plants in the system is given priority, and is deducted from the total requirement.

After the initial operation, the energy generated is compared to the system energy demand for each time step. If the energy produced is greater than that which the system can use, the energy production is reduced. This is dor by decreasing the discharge through the Watana powerhouse and increasing the storage. If the reservoir is full, powerhouse discharge is diverted to the cone valves.

Instream Flow Requirements

A minimum flow requirement is prescribed at Gold Creek to ensure that the project will release flows for environmental purposes (e.g., Flow Regime E-VI). The historical intervening flow between the downstream development and Gold Creek is assumed to be available to supplement the project releases to meet these flow requirements. If the flow requirement is not met, more water is released through the downstream project powerhouse in order to meet the requirement. In a double reservoir case, the Devil Canyon reservoir will draw down. The only other time Devil Canyon would be drawn down is during a drought. In a single reservoir case, the release would be from Watana. At times when the hydraulic capacity of the powerhouse is limiting, the required water is released through the cone valves.

Final Demand Check

The instream flow requirement may cause more energy to be generated than the required amount. The powerhouse discharge must again be decreased. However, instead of reducing the total project outflow, discharge is diverted from the powerhouse to the cone valves.

Surcharge

In the event that a flood could not be passed through the powerhouse and cone valves, because of energy demand and hydraulic capacity limitations, the reservoir is allowed to surcharge above the normal maximum water surface elevation. This surcharging is done to avoid the use of the spillway for floods less than the 50-year event. A maximum surcharge level of El. 2193 is permitted before the spillway operates.

Output

Two levels of output data are provided. An annual printout provides the following data:

- reservoir inflow;
- powerhouse discharge;
- cone valve discharge;
- end-of-period (week or month) reservoir elevation;
- tailwater elevation;
- net head and plant efficiency;
- powerplant capability; and
- energy generation.

At the end of the 34-year simulation, a summary printout provides the following data (for each period of the 34-year record):

- reservoir inflow;
- powerhouse discharge;
- cone valve discharge;
- total project outflow;
- start-of-period reservoir elevation;
- net head;
- energy generation;
- intervening-area flows; and
- with-and without-project flows at Gold Creek;

Yearly and period averages are also provided for selected variables. A mass-balance computation is performed and printed out to check the simulation results.

Reservoir Operation and Power Demand

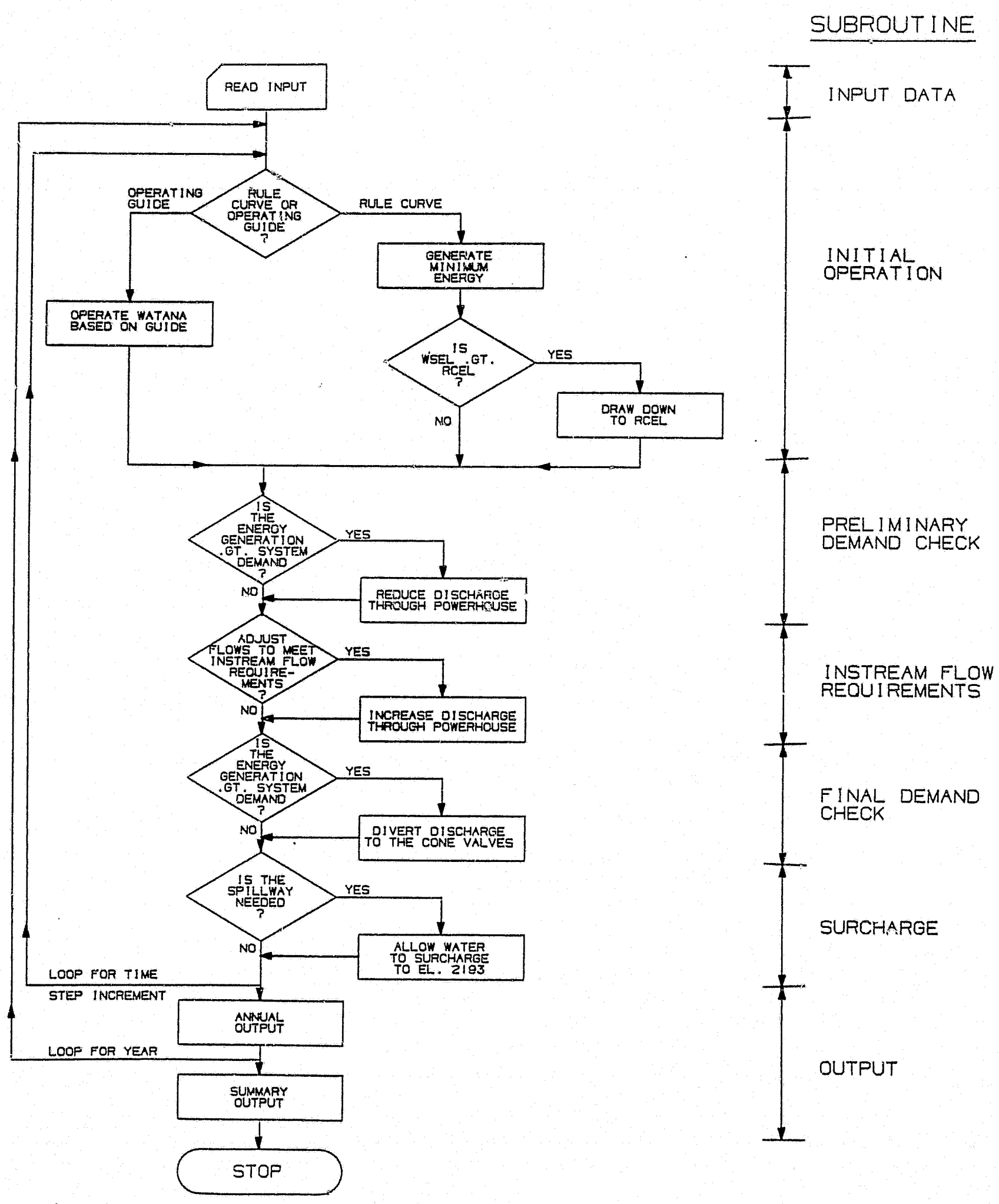
Reservoir operation is limited by the system energy requirement in each time increment as explained above. The energy requirement is related to the power demand by the load factor.

Output from the reservoir operation model is also used in specifying Susitna capacity as input to OGP. When the Watana development comes on line it must be base loaded because environmental constraints limit the project outflow fluctuation. The Watana power that is input into OGP is the energy divided by the number of hours in the month. This effectively limits the Watana project to a constant, 24-hour capacity level.

When Devil Canyon comes on-line, Watana can peak, with Devil Canyon regulating the fluctuations. Hence, the power output from Watana can be as large as the capability of the turbines, which is a function of head. Since Devil Canyon is the downstream project, it must operate as a base-load plant. The Devil Canyon power output used in OGP is computed as described above for Watana as a base-load plant.

EXHIBIT 9.1

RESERVOIR OPERATION FLOWCHART



0 0 2 6 7 3

10.

Question:

The estimated firm and average annual energy from the Watana and Devil Canyon developments for the "Case E-VI, Alternative Flow Regime."

Response:

The requested data is shown below.

Table 10-1

SUSITNA ENERGY GENERATION IN GWh

Month	Demand Year 2001		Demand Year 2020					
	Watana		Watana		Devil Canyon		Total	
	Firm	Avg.	Firm	Avg.	Firm	Avg.	Firm	Avg.
Jan	283	350	298	371	270	337	568	707
Feb	249	310	260	322	241	301	502	623
Mar	237	292	252	312	239	298	491	610
Apr	191	228	204	254	199	252	403	506
May	185	217	174	209	238	265	412	474
Jun	234	238	209	186	257	279	466	466
Jul	229	248	189	199	262	265	450	464
Aug	238	269	203	238	260	262	463	500
Sep	206	276	211	286	190	226	402	512
Oct	222	284	243	300	196	269	438	569
Nov	270	328	289	348	256	300	544	648
Dec	315	397	329	408	299	360	628	768
Annual	2858	3440	2861	3432	2907	3414	5768	6846