

SUSITNA HYDROELECTRIC PROJECT

EBASCO ESTIMATING PACKAGE

REVISION 1

DECEMBER 23, 1981

Prepared by:



ALASKA POWER AUTHORITY

SUSITNA HYDROELECTRIC PROJECT
EBASCO Estimating Package

December 23, 1981

1 - GENERAL

1.1 - Price Quotes From Mechanical and Electrical Vendors
and Manufacturers

1.2 - Revision 1 Discussion

2 - WATANA

2.1 - Estimate Computer Sheets - List of Items and Quantities
Revision 1

2.2 - List of Drawings

3 - DEVIL CANYON

3.1 - Estimate Computer Sheets - List of Items and Quantities
Revision 1

3.2 - List of Drawings

SUSITNA HYDROELECTRIC PROJECT
EBASCO Estimating Package

December 23 , 1981

- 1.1 The following letters have been received from mechanical/electrical vendors or manufacturers for preliminary estimating purposes:

DATE	FROM	SUBJECT
8/27/81	Allis-Chalmers	Turbine Technical Data and Quote
8/31/81	Combustion Engineering	Turbine Technical Data
9/10/81	Dominion Engineering	Turbine Technical Data and Quote
9/11/81	Siemens - Allis	Generator/Transformer Technical Data and Quote
9/16/81	Siemens - Allis	Transformer-Technical Data and Quote
9/23/81	Carl G. Brimmekamp	Turbine Technical Data & Quote
9/23/81	Voest - Alpine International Corporation	Turbine Technical Data
10/9/81	Mitsubishi International Corporation	Turbine Technical Data & Quote; Hollow Cone Valve Data
10/21/81	BICC Supertension Cables LTD.	345KV Cable Technical Data & Quote
12/11/81	Mitsubishi (Telex)	Technical Data

SUSITNA HYDROELECTRIC PROJECT
Revision 1 Discussion

1.2

1. The computer quantity listing has been revised to include the following:

- Revision and expansion of accounts 333, 334 and 335 with revised item listings.
- Revision and expansion of account 336 to include preliminary pioneer and access road quantities. Quantities for pioneer road have not yet been developed.
- Revision and expansion of account 63 to include preliminary construction camp and worker village quantities. Several items have been identified but no quantities have yet been developed (e.g. pioneer road camp).
- Revision of numerous quantities for Watana to include change of dam height to nominal El. 2205. Quantities changed are indicated by "1" in remarks column.
- Revision of description for Watana main dam (account 332.312). Up-stream shell will be constructed of river gravel. (1/2" min, 18" max gradation) Downstream shell will be constructed of useable rock from structure excavations and from unprocessed gravel. (18" Max, gradation)
- Several minor quantity revisions also indicated by "1".

2. The Devil Canyon Schedule has been revised to reflect new on-line date and to shorten duration by one year. A copy of SK-5700-M9-002 (revision 2) is included.

3. Emergency spillway and main (chute) spillway drawings have been essentially completed and are included. Quantity takeoffs have not yet been completed.

SUSITNA HYDROELECTRIC PROJECT
List of Drawings - Watana

December 23, 1981

2.2

DRAWING NUMBER

TITLE

SK-5700-C6-519

Watana Main Spillway
General Arrangement
Plan and Profile

SK-5700-C6-520A

Watana Main Spillway Sections

SK-3700-C6-521

Watana Main Spillway
Control Structure
Plan and Details

SK-5700-C6-522

Watana Emergency Spillway
General Arrangement
Plan, Profile and Sections

SUSITNA HYDROELECTRIC PROJECT
List of Drawings - Devil Canyon

December 23, 1981

3.2

DRAWING NUMBER

TITLE

SK-5700-C6-621

Devil Canyon
Main Spillway
General Arrangement
Plan and Profile

SK-5700-C6-622A

Devil Canyon
Main Spillway
Chute Section and Details

SK-5700-C6-622B

Devil Canyon
Main Spillway
Control Structure
Plan and Sections

SK-5700-C6-623A

Devil Canyon
Emergency Spillway
General Arrangement
Plan and Profile

SK-5700-C6-623B

Devil Canyon
Emergency Spillway
General Arrangement Sections



BOX 712 • YORK, PENNSYLVANIA 17405 / 717 792-3511

YORK PLANT
HYDRO-TURBINE DIVISION

August 27, 1981

Acres America
The Liberty Bank Building
Main at Court
Buffalo, New York 14202

ATTENTION: P. Rodrigue

SUBJECT: Susitna Hydro Project
Watana Turbine Selection
A-C Inquiry No. 6-30173

Gentlemen:

We are pleased to present preliminary pricing and dimensions for the Watana turbines in response to your inquiry of July 22, 1981.

The present day price for four (4) Francis turbines rated at 320,000 HP when operating at a speed of 225 RPM under a net head of 700 feet is
EIGHTEEN MILLION EIGHT HUNDRED THOUSAND DOLLARS.....\$18,800,000.00
220,000

The present day price for five (5) Francis turbines rated at ~~215,000~~ HP when operating at a speed of 240 RPM under a net head of 700 feet is
NINETEEN MILLION DOLLARS.....\$19,000,000.00
215,000

The present day price for six (6) Francis turbines rated at ~~160,000~~ HP when operating at a speed of 277 RPM under a net head of 700 feet is
NINETEEN MILLION FOUR HUNDRED THOUSAND DOLLARS.....\$19,400,000.00
160,000

The above prices include governors and are F.O.B. York, Pa. The estimated delivery schedule for units of this size is as follows in months after award of contract:

Draft Tube Liners	18
Remaining Embedded Parts	20 to 24
Completion Parts	24 to 28
Rotating Parts (Shaft, Runner and Governor	28 to 32

Additional units can be supplied in three (3) months intervals. For preliminary purposes it may be assumed that the installation price will be approximately 20 percent of the turbine price.

Please find enclosed the preliminary overall dimensions and settings relative to tailwater. You will note that the specified distributor settings are relative to tailwaters at the rated net head of 700 feet and not necessarily the minimum tailwater, since the information provided does not indicate the tailwater elevation versus net head relationship.

I trust this information will satisfy your requirements if you should need further assistance, please do not hesitate to contact us.

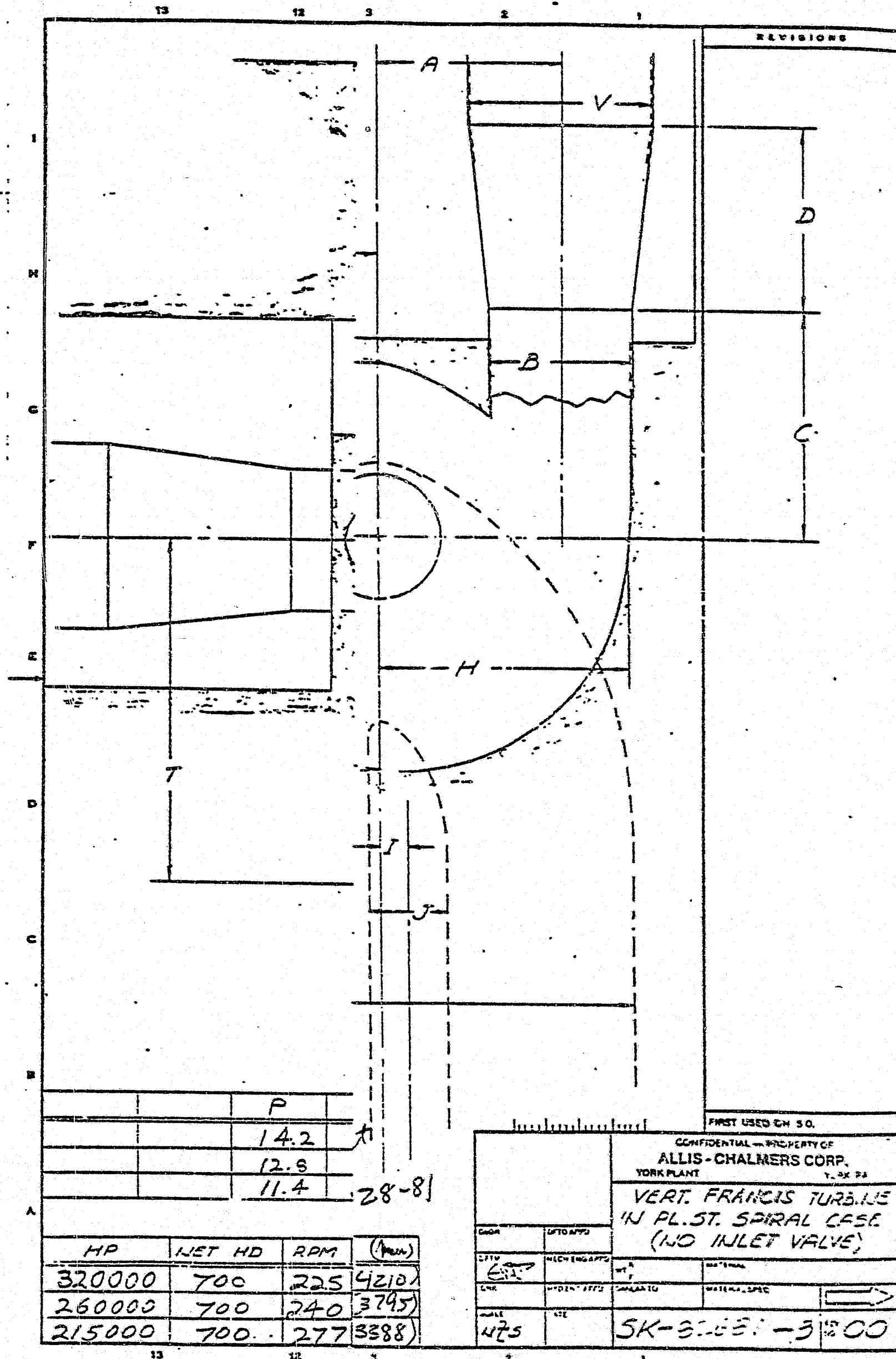
Yours Sincerely,

Alan Mead
Application Engineer

AM/cb

Encl: dimension sheet SK-82681-3

cc: Wiley Ford, York



Combustion Engineering/Neyrpic Hydro Power, Inc.
277 Park Avenue, 35th Floor
New York, N.Y. 10172

Tel. 212/486-8417
Telex: 96-5950

August 31, 1981

ACRES American Inc.
The Liberty Bank Building
Main at Court
Buffalo, New York 14202

Attention: Peter Rodrigue

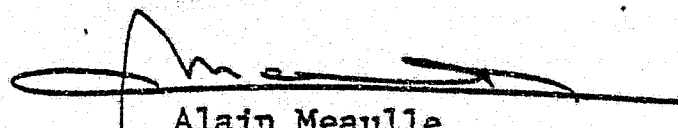
Subject: Susitna Hydro Project
Watana Turbine Selection

Referring to your letter dated July 22, 1981, reference P5700.18, we have pleasure in detailing hereunder the required information.

	Solution (A)	Solution (B)	Solution (C)
Number of units	4	5	6
Nominal Power (MW)	235	188	157
Speed (RPM)	225	257	277
Outlet Diameter (mm)	3550	3200	3550 2900 mm
Distributor Setting (ft)	1431	1430.5	1430.25
Spiral Case			
Outer Radius (mm)	6080	5480	4970
	5900	5320	4820
	5470	4930	4470
Draft Tube ^{Height} Length (mm)	10870	9800	8900
Draft Tube Length (mm)	18200	16400	14900
Width of Exit Section (mm)	11200	10500	9500
Approx. Weight/Unit (tons)	540	420	330

Our budget prices shall be forwarded to you in the very near future in a complementary telex.

Sincerely,


Alain Meaulle
Vice President

AM/ea/0122



Dominion
Engineering
Works

E-222-327

September 10th, 1981

Acres American Inc.,
Consulting Engineers,
The Liberty Bank Building
Buffalo, N.Y. 14202
U.S.A.

Att: P. Rodrigue

Re: Watana Project

Dear Sirs:

With reference to your 7/23/81 telex, we are pleased to submit the attached technical and commercial information for your feasibility study.

We hope this information is of assistance.

Yours very truly,

DOMINION ENGINEERING WORKS LTD.,

Ian McKay, P.Eng.,
Sales Manager - U.S.A.
Hydraulic Turbine Section

IM/mr.
Encl.

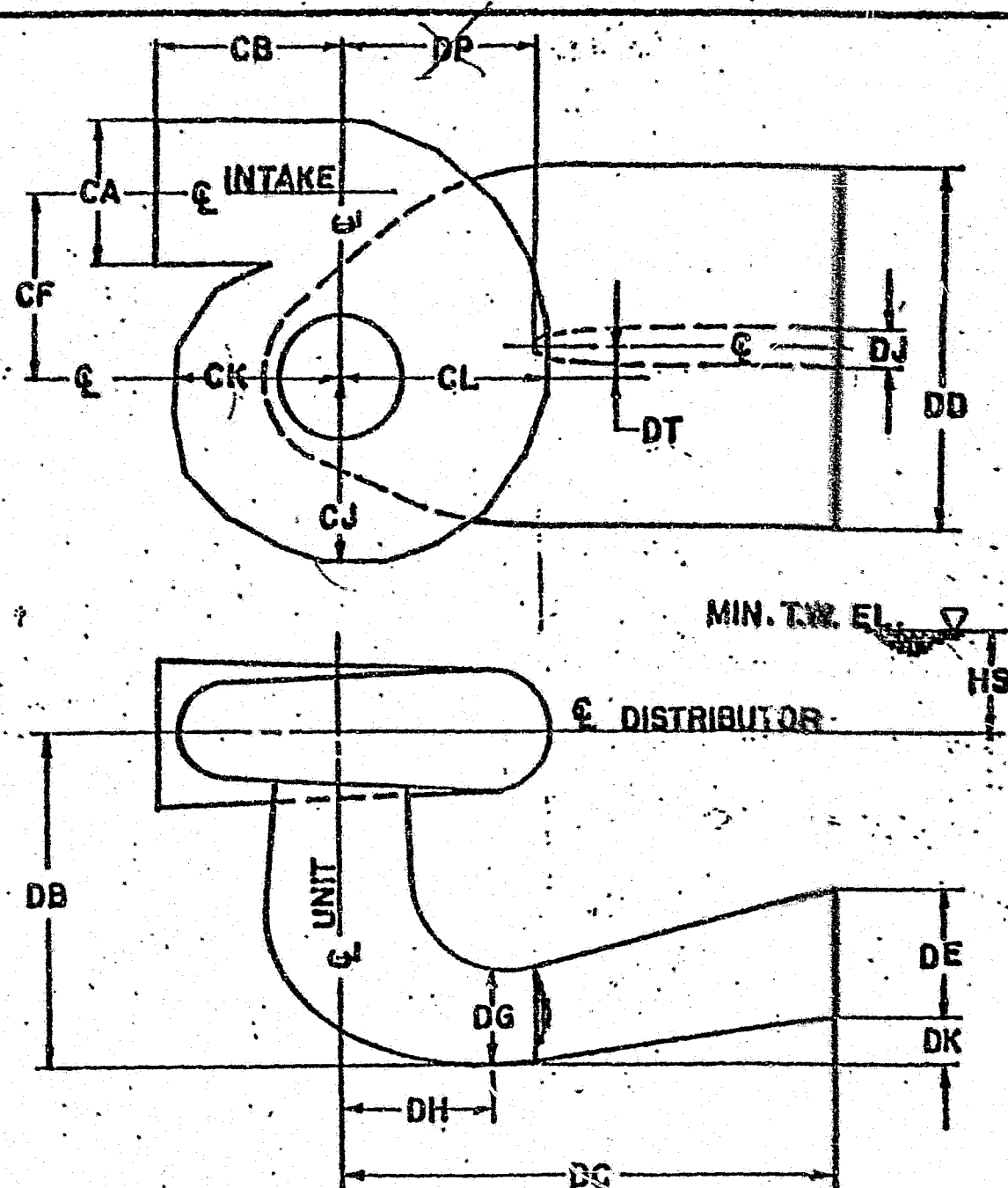
Dominion Engineering Works Limited

<u>ALTERNATIVE</u>	<u>ESTIMATED PRICES</u>		
	<u>A</u>	<u>B</u>	<u>C</u>
No. of Units	4	5	6
Power (HP)	320,000	260,000	215,000
Turbine & Governor Prices	\$17.5 million	17.7	17.4
Installation Price	5.3 ""	5.5	5.3

Budget Prices are in U.S. Funds, Duty included, F.O.B. Site.

HE-106-A

ALTERNATIVE			A	B	C			
No. OF UNITS			4	5	6			
TYPE			Francis	Francis	Francis			
TURBINE	RATING	POWER	HP	320,000	260,000	215,000		
		HEAD	FT	700	700	700		
		SPEED	RPM	240.0	257.14	276.92		
		NS		37.7	36.4	35.7		
		HS	FT	45.0	45.0	45.0		
RUNNER THROAT DIA		FT	11.583	10.417	9.5			
DIMENSIONS	CASING	CA	FT	12.64	11.36	10.36		
		CB		20.22	18.18	16.58		
		CF		15.97	14.36	13.10		
		CL		20.33	18.28	16.67		
		CJ		17.98	16.17	14.74		
		CK		14.71	13.23	12.07		
	DRAFT TUBE	DB		37.56	33.78	30.80		
		DC		83.40	75.00	68.40		
		DD		29.48	26.52	24.18		
		DE		19.38	17.43	15.89		
		DG		8.70	7.83	7.14		
		DH		18.53	16.67	15.20		
		DJ		—	—	—		
		DK		5.90	5.30	4.84		
		DP		—	—	—		
		DT		—	—	—		
		No. OF PIERS			None	None	None	



DOMINION ENGINEERING WORKS LTD.
HYDRAULIC TURBINE SECTION

Preliminary Hydraulic Outline for WATANA

REF. EST. No.
E-222-327
DATE
81-08-19
SKETCH No.
327-2

44-38861-106

P5700-18-00.

SIEMENS-ALLIS

Large Rotating Apparatus Division

Siemens-Allis, Inc.
Box 2168
Milwaukee, WI 53201

September 11, 1981

Mr. L. Pereira
Senior Electrical Engineer
Acres American, Inc.
The Liberty Bank Building
Main at Court
Buffalo, New York 14202

Subject: SUSITNA HYDROELECTRIC PROJECT
WATANA POWER PLANT GENERATOR
AND TRANSFORMER DATA.

Dear Mr. Pereira:

In answer to your letter of September 1, 1981, we offer the following preliminary prices:

Alt. No. 1, \$19.7 Million for (4) units total.

Alt. No. 2, \$20 Million for (5) units total.

Alt. No. 3, \$21.2 Million for (6) units total.

The unit cost increase per 10% increase in H constant is approximately 1% per 10%.

Add 5% for export packaging and freight to Alaska.

Add approximately 20% to 25% for installation cost.

See attached preliminary dimension sheets for principal dimensions.

Size and weight of largest and heaviest items are as follows:

Alt. No. 1, Estimated largest and heaviest for shipping:
1/4 section factory wound stator 25 feet long,
7.5 feet wide, 15 feet high, 175,000 lbs.

Estimated largest and heaviest for handling at
site: Assembled rotor, 27.5 feet diameter, 27 feet
high (including shaft) 1,400,000 lbs.

Alt. No. 2, Estimated largest and heaviest for shipping:
1/3 section factory wound stator 28 feet long,
10 feet wide, 13.5 feet high, 195,000 lbs.

Estimated largest and heaviest for handling at
site: Assembled rotor 25 feet diameter, 22.5 feet
high (including shaft) 1,160,000 lbs.

Acres American, Inc.
SUSITNA HYDROELECTRIC PROJECT

- 2 -

September 11, 1981

Alt. No. 3, Estimated largest and heaviest for shipping:
1/3 section factory wound stator 25 feet
long, 9.2 feet wide, 13 feet high, 160,000 lbs.

Estimated largest and heaviest for handling at site:
Assembled rotor 22 feet diameter, 20 feet long,
(including shaft) 940,000 lbs.

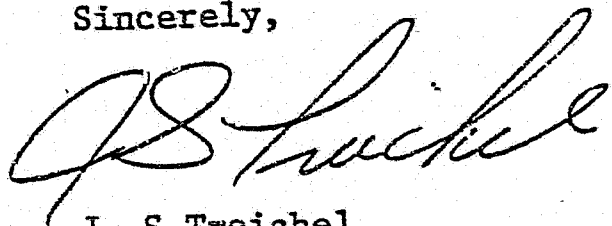
I've asked Mr. Norman Boon, Manager Project Applications, Siemens-Allis
Utility Sales Operation, to respond to the transformer data.

He has indicated he will respond directly to you.

Also included are two (2) outlines of approximately the same size machines
as Alt. No. 1.

If we can be of further assistance, please do not hesitate to ask.

Sincerely,



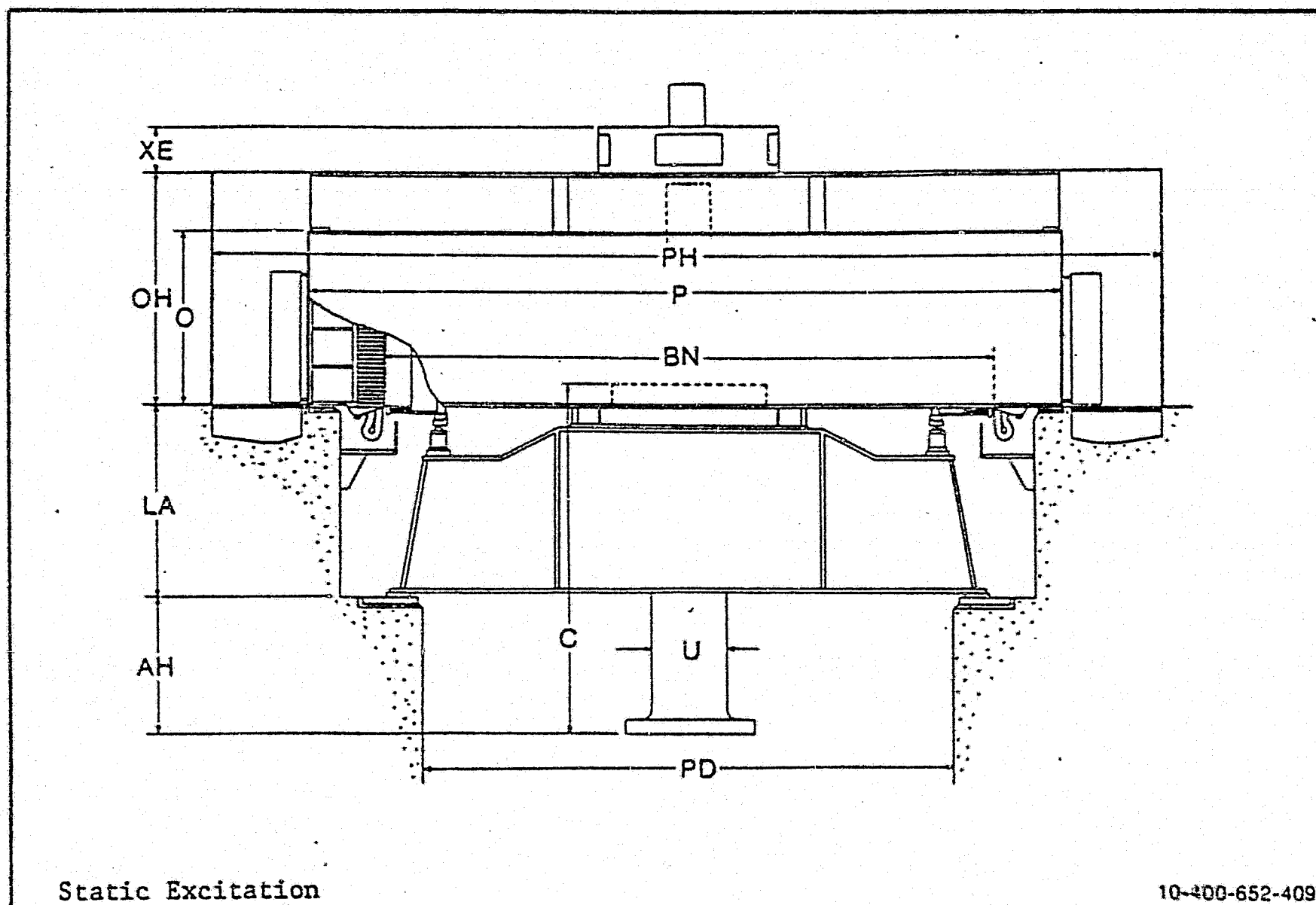
J. S. Treichel
Senior Application Engineer
Large Rotating Apparatus Division

JST/we

H constant : Confirmed by phone

H = 3.4.

MODIFIED UMBRELLA TYPE: INDOOR HOUSING



10-400-652-409

GENERATOR RATING								MOTOR RATING		
Kva	Volts	PF	Rpm	Hertz				Horsepower	Volts	PF
250,000	15,000	0.9	200	60				-	-	-

DIMENSIONS IN INCHES

* Minimum Valve

XE	OH	O	LA	AH	C	U	PD	BN	P	PH	
30	170	140	145	* 40	-	-	280	330	410	510	

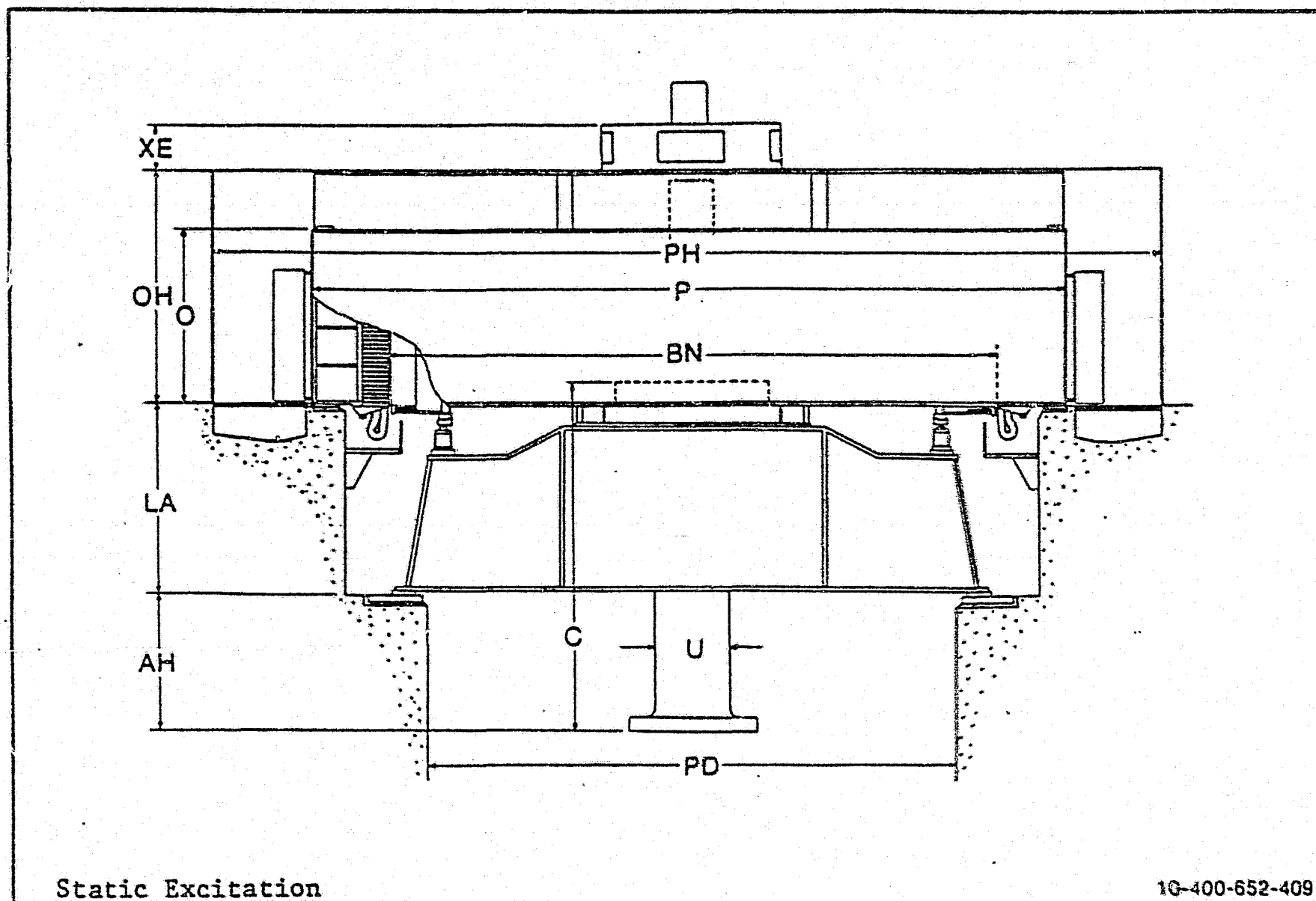
For Watana Project - Alaska Power Authority

Date 9-11-81

DO NOT USE FOR CONSTRUCTION PURPOSES. Dimensions subject to change without notice. Final corrected drawing will be furnished after signing contract and determining details. Mechanical details not necessarily as shown.

05D1084

MODIFIED UMBRELLA TYPE: INDOOR HOUSING



GENERATOR RATING					MOTOR RATING		
Kva	Volts	PF	Rpm	Hertz	Horsepower	Volts	PF
200,000	15,000	0.9	225	60	-	-	-

DIMENSIONS IN INCHES

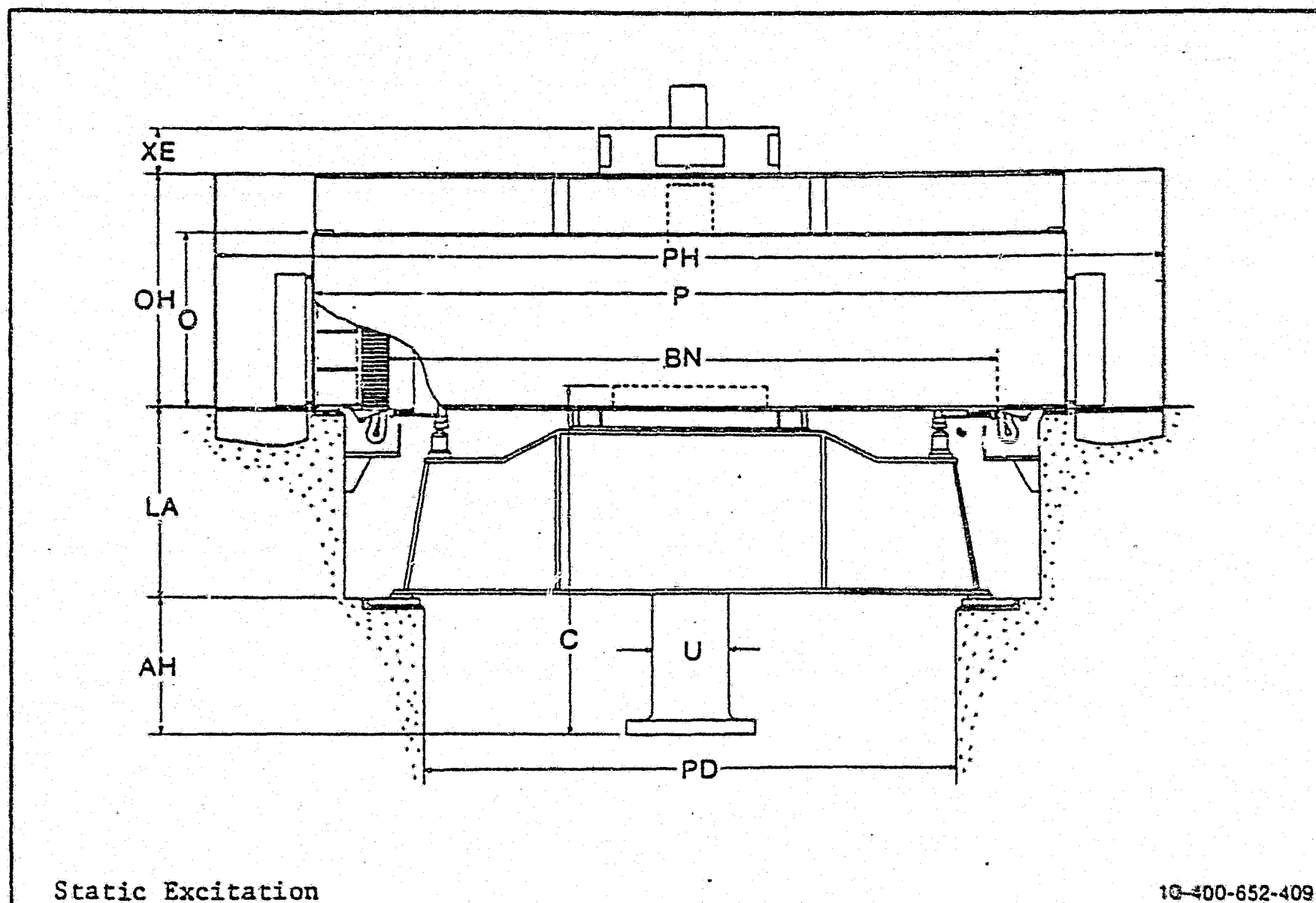
*Minimum Value											
XE	OH	O	LA	AH	C	U	PD	BN	P	PH	
30	155	125	125	* 40	-	-	250	300	380	480	

For Watana Project - Alaska Power Authority.....

Date...9-11-81

DO NOT USE FOR CONSTRUCTION PURPOSES. Dimensions subject to change without notice. Final corrected drawing will be furnished after signing contract and determining details. Mechanical details not necessarily as shown.

MODIFIED UMBRELLA TYPE: INDOOR HOUSING



GENERATOR RATING			MOTOR RATING				
Kva	Volts	PF	Rpm	Hertz	Horsepower	Volts	PF
166,700	15,000	0.9	257	60	-	-	-

DIMENSIONS IN INCHES

* Minimum Valve

XE	OH	O	LA	AH	C	U	PD	BN	P	PH	
30	150	120	110	* 40	-	-	210	260	340	440	

For Watana Project - Alaska Power Authority.....

Date 9-11-81

DO NOT USE FOR CONSTRUCTION PURPOSES. Dimensions subject to change without notice. Final corrected drawing will be furnished after signing contract and determining details. Mechanical details not necessarily as shown.

RECEIVED SEP 24 1981

JL
JH
R. Ibbotson
~~A. Ibbotson~~
File. ✓

Siemens-Allis, Inc.
Box 2168
Milwaukee, Wisconsin 53201
(414) 475-3856
Telex: 026-883

September 16, 1981

ALASKA POWER AUTHORITY SUSITNA			
FILE P5700 18			
SEQUENCE NO. 1945			
ACTION	INFORM.	DISTRIB.	INITIAL
		DCW	
		DCW	
		CAD	
		X LBG	9/23
		CJWH	
		JPS	
		IPGH	
		ENS	E-116
		SNT	
		DWL	
		MRV	
		HRC	
		...	
		...	
		FILE	

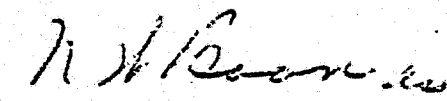
Acres American Inc.
Page Two
September 16, 1981

We do not believe a Schnabel car would be necessary as normally depressed center cars with sufficient axles are available for these loads. Also, a Schnabel car is not readily available to us. Transportation by road would probably only be possible on the smallest single phase units, and this would require extensive surveys to determine its feasibility.

I am attaching typical outline sketches for single and three phase, FOA type units. Cooler location, either FOA or FOW could be optional.

I hope this information will be helpful to you in your analysis. If there are further questions, please call us.

Yours very truly,

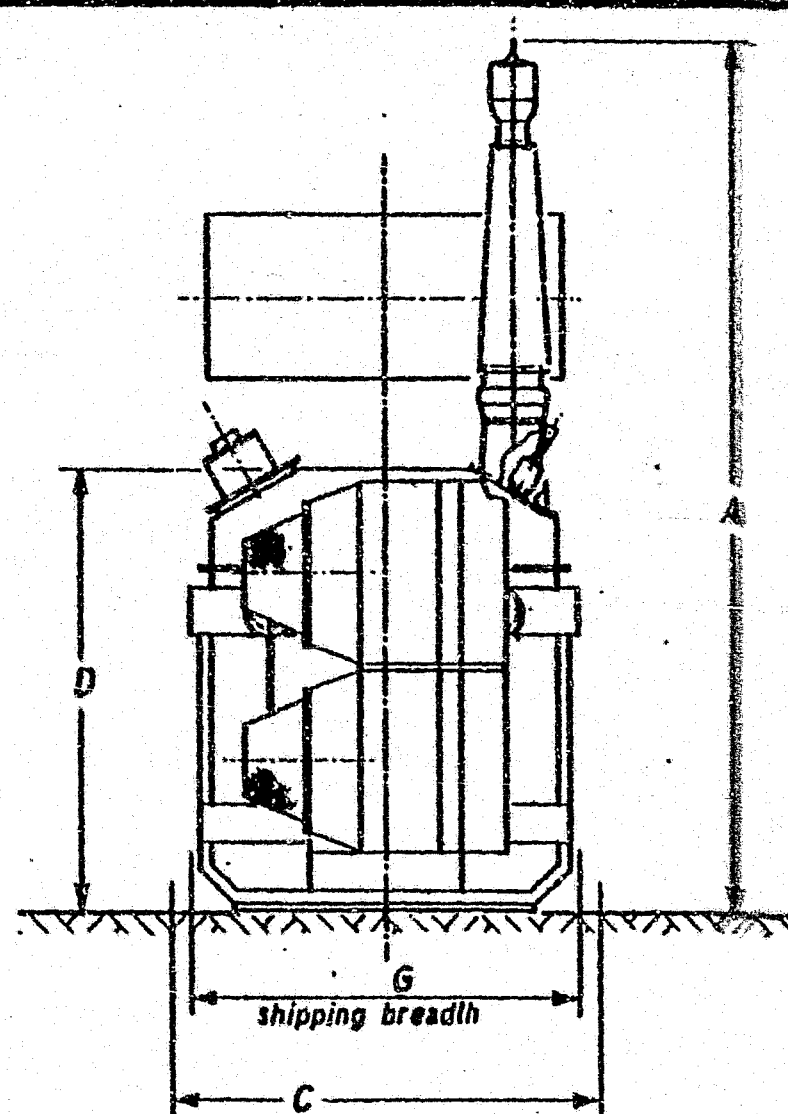
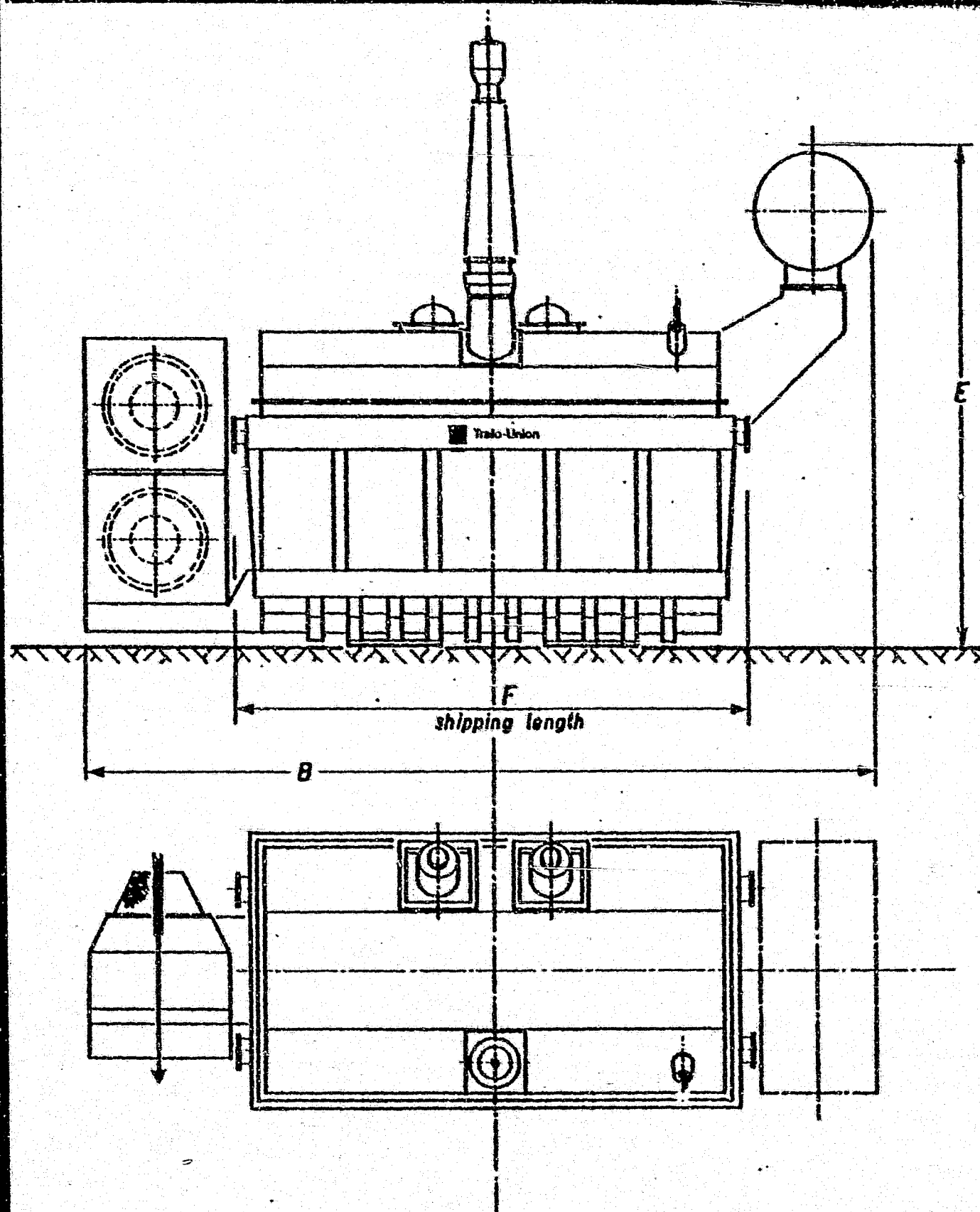

N. W. Boon, Manager
Product Application

ds
Attachments

cc: Mr. J. S. Treichel, LRAD Sales (HC)

Abgabe sowie Vervielfältigung dieser Unterlage, Erweiterung und Mitteilung ihres Inhaltes nicht gestattet, soweit nicht ausdrücklich zugestanden. Zuwiderhandlungen verpflichten zu Schadenersatz. Alle Rechte für den Fall der Patenterteilung oder G.M.-Eintragung vorbehalten.

Transformatoren-Union



not for construction

	Tag	Name		Maßstab
Bearb.	21.4.77	21.	OUTLINE - DRAWING	1/
Gepr.		h		
Transformatoren Union AG			TRO-USA GS-FOA 1	



CARL G. BRIMMEKAMP & COMPANY, INC.

460 Summer Street • Stamford, CT. 06901
Phone: (203) 325-4101 Telex: WUD 965955

September 23, 1981

Mr. P. Rodrigue
ACRES American Inc.
The Liberty Bank Building, Main at Court
Buffalo, New York 14202

Subject: Susitna Hydro Project
Watana Turbine Selection

Reference: Our P-40,093

Dear Mr. Rodrigue:

Further to our letter of July 29, we are pleased to offer on behalf of Vevey Engineering Works Ltd. the following main specs and budget prices for your three (3) alternatives.

<u>Alternative</u>	<u>1</u>	<u>2</u>	<u>3</u>
Turbine Output (HP)	320,000	260,000	215,000
Rated Net Head (FT)	700	700	700
Number of Units	4	5	6
Runner Outlet Dia. (FT)	12.4	10.8	9.8
Speed (RPM)	225	257.1	300
Distributor ϕ Setting from Min. TWL (FT)	-16	-16	-16
Budget Price, CIF Site	\$17.5 Million	\$18.25 Million	\$18.5 Million
Installation	\$2 Million	\$2.25 Million	\$2.5 Million



CARL G. BRIMMEKAMP & COMPANY, INC.

September 23, 1981
ACRES American Inc.
Page 2

The external dimensions of the turbines are given in the enclosed drawings. We would like to point out that, the 3 (three) alternatives are based on an existing scale model developed for the turbines Vevey has supplied in 1978 for the Langenegg Power Station (Austria). Vevey is also utilizing this scale model for the 4 (four) units of El Cajon (Honduras) which are at design stage. The witness tests on the scale model are scheduled for the beginning of October in Vevey's hydraulic laboratory.

We hope this information is of interest to you and look forward to receiving further details on this project as Vevey and we are very interested in cooperation with. Please feel free to contact us at any time.

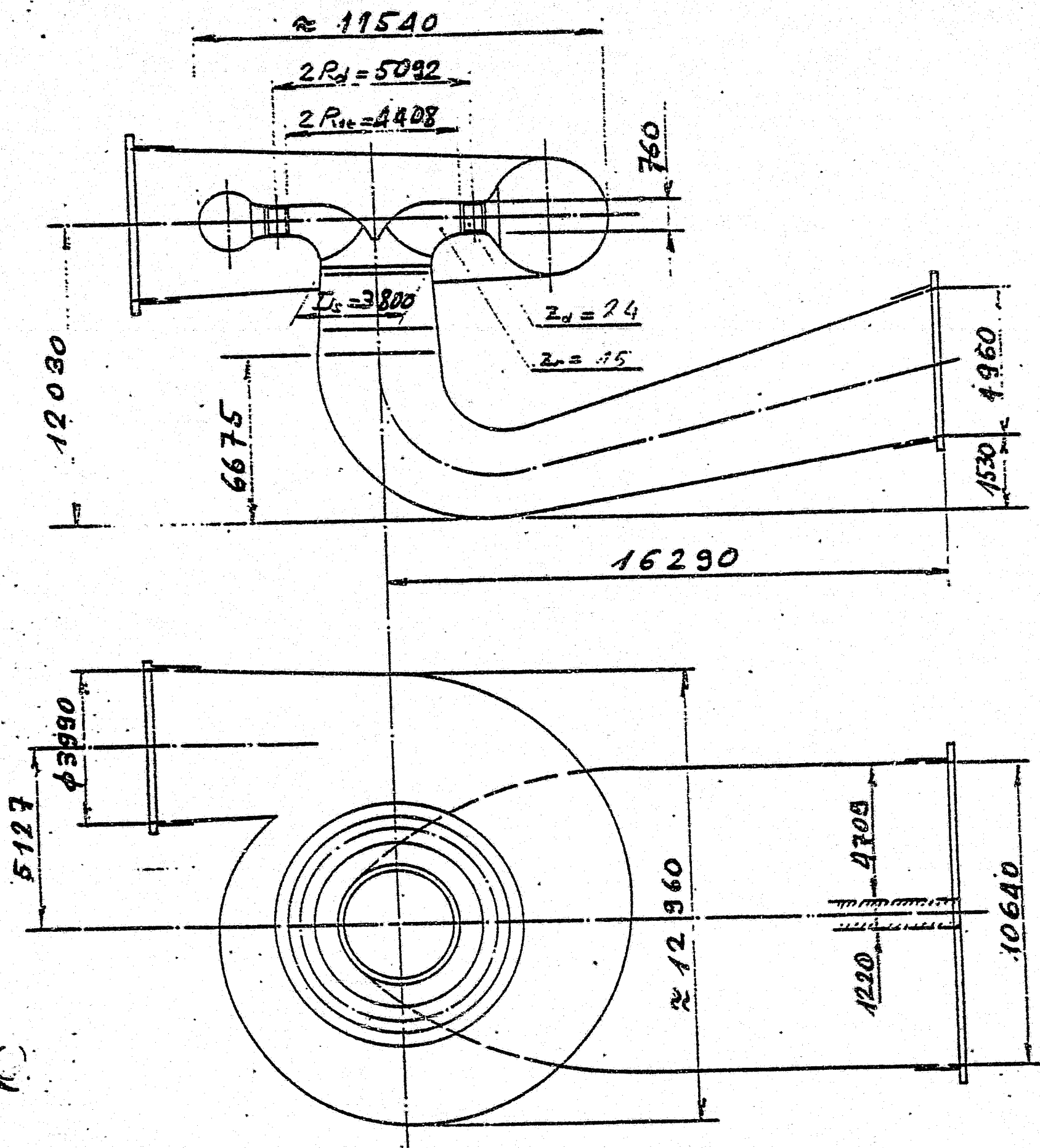
Sincerely,

CARL G. BRIMMEKAMP & COMPANY, INC.

Tom Brimmekamp

TB/ek

Enclosure



$$V_n = \frac{277}{1} = 1$$

$$2 R_{te} = 3.8 m$$

700 ft

320 000 HP

225 RPH

(en mm)		Echelle	dessiné			
<u>Dimensions principales (canal)</u>			%			
				vérifié		
				vu		
Groupe						

VOEST-ALPINE INTERNATIONAL CORP.

LINCOLN BUILDING

60 EAST 42nd STREET
NEW YORK, N. Y. 10165

Telephone (212) 661-1060
Cable Address VOESTIN NEWYORK
RCA Telex: 233228 VOET UR
WUI Telex: 666500
WU Telex 127048 VOEST INTER NYK

Acres American Incorp.
Consulting Engineers
The Liberty Bank Building, Main at Court
Buffalo, NY 14202

Attn: Mr. Peter Rodrigue

September 23, 1981
EK/iw

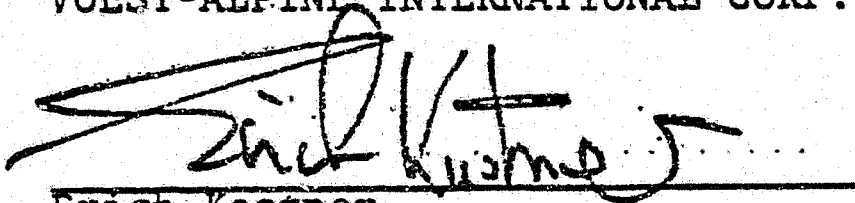
Subject: Your telex of August 19 + 20 regarding
SUSITNA Hydroelectric Project in Alaska

Dear Mr. Rodrigue:

In accordance with your request we have forwarded your project data to Voest-Alpine AG, Linz, Austria. Messrs. Voest-Alpine responded to us with their telex of 9-21-1981 as per copy attached.

We trust that this information will be helpful for your studies and remain,

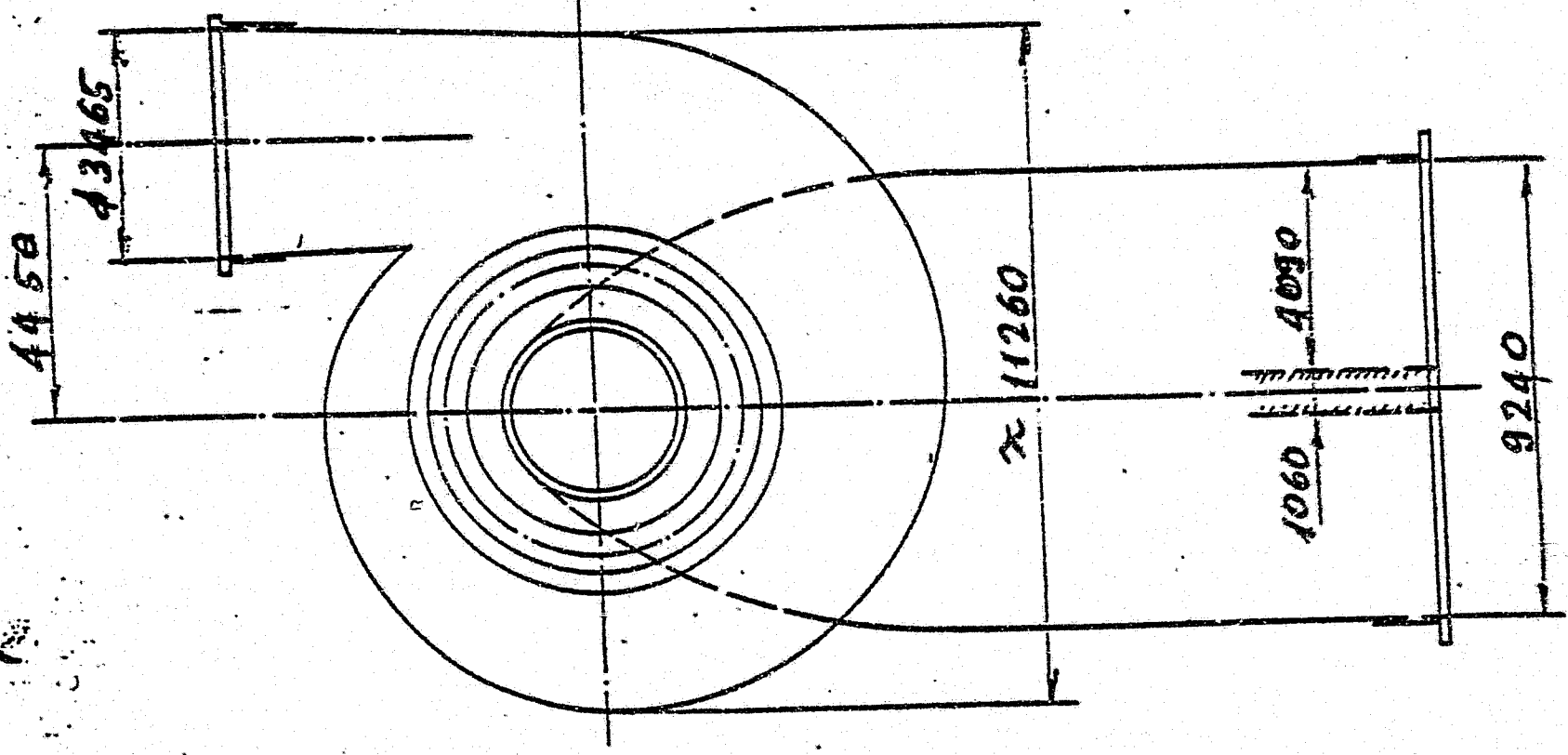
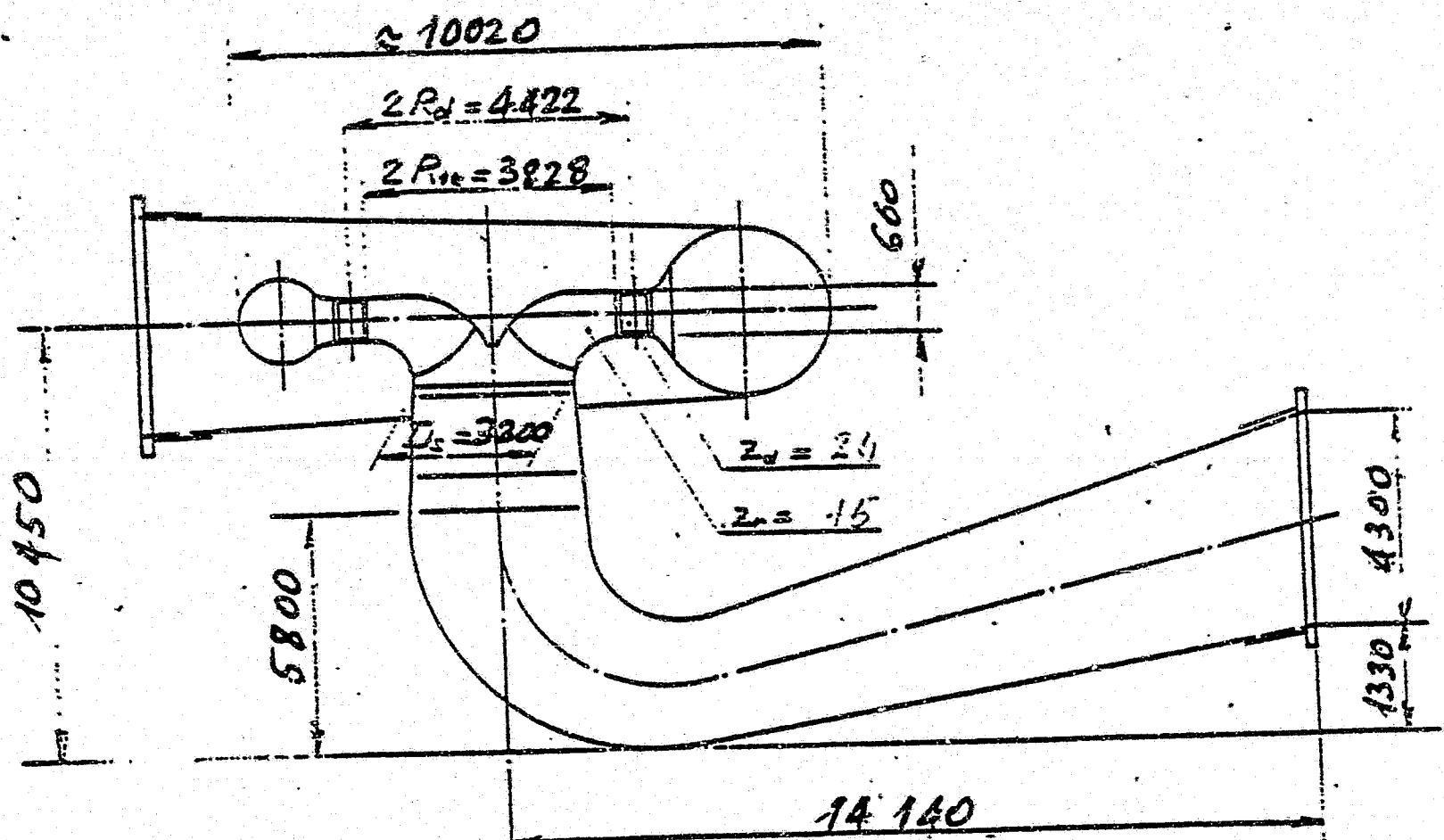
Very truly yours,
VOEST-ALPINE INTERNATIONAL CORP.



Erich Kastner
Sales Manager, Finished Products

encl.

cc: TVL 14 Ostheimer
TLM1 Jagersberger



$V_a = 2217.4$
 $2R_{ic} = 33.3m$

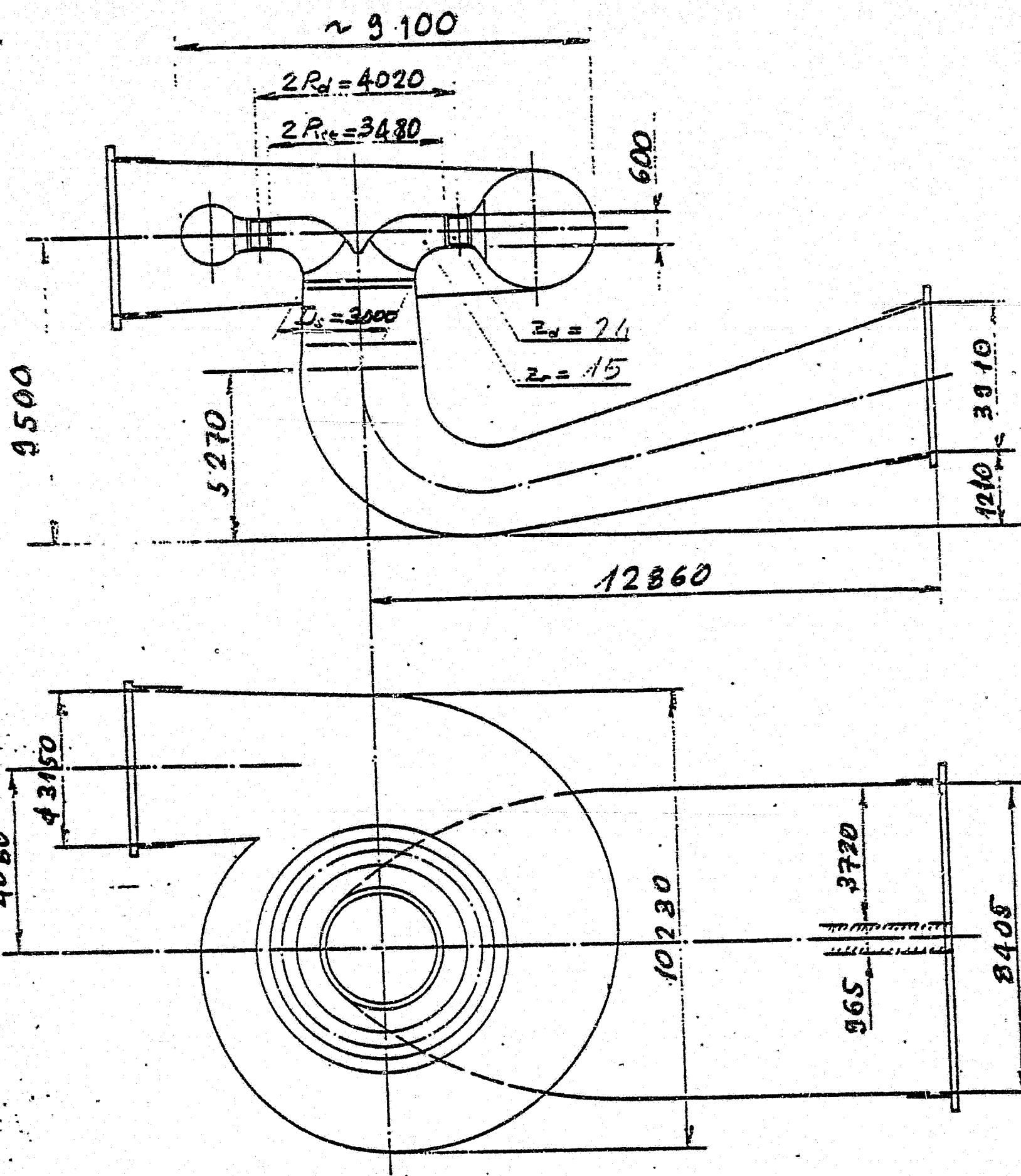
700 ft
 260000 HP
 257.1 RPM

Dimensions principales (canal)

Echelle	dessiné		
%	verifié		
	vu		

Groupe





$V_n = \underline{\hspace{2cm}}$

$2P_{te} = \underline{3.0\text{ m}}$

700 ft
215'000 HP
300 RPM

Dimensions principales (canal)		Echelle	dessiné		
Groupe		%			
			vérifié		
			vu		

233223A VOE UR
RCA SEP 21 0521Z
233223A VOE. UR

22380 VAL A

ATT.: MR. KASTNER
(MRS. WUNDERER)

SUBJ.: PROJ. SUSITNA/ALASKA
INQU. 0496/5644

- NUMBER OF TURBINES: 4 TURBINES OF 340000 HP EACH 2-in
- 5 " " 275000 HP " 2-in
- 6 " " 225000 HP " 1-in
- RUNNER INLET DIA ("): 167.2/148.7/134.7
- RUNNER THROAT DIA ("): 141.7/126.0/114.2
- SPEED (RPM): 225.0/257.4/276.9
- DISTRIBUTOR SETTING (FT): EL 1424/1410/1410
- SPIRAL INLET DIA ("): 157.5/139.8/126.8
- DIMENSIONS TO OUTSIDE OF SPIRAL CASE FROM VERTICAL CENTERLINE,
UPSTREAM DEFINED AS 12 O' CLOCK:
AT 3 O' CLOCK (FT): 23.8/21.2/19.2
- 6 " : 21.9/19.5/17.7
- 9 " : 19.7/17.5/15.9
- 12 " : 16.7/14.8/13.4
- DISTANCE FORM CENTERLINE TURBINE TO LOW POINT OF DRAFT TUBE
(FT): 39.4/35.1/31.8
- DISTANCE FORM CENTERLINE TURB. TO END OF DRAFT TUBE (FT):
73/65/59

PRELIMINARY ESTIMATE FOR INSTALLATION, SUPPLY AND DELIVERY
OF TURBINES + GOVERNORS WILL BE GIVEN SHORTLY.

RGDS, JAGERSBERGER

VOEST-ALPINE AG
FINISHED PRODUCTS DIV. LINZ
TLM 1

22380 VAL A FS/MB 6266 81-09-21 11,25 H DU 8
233223A VOE UR
HMM



MITSUBISHI INTERNATIONAL CORPORATION

CABLE ADDRESS:
MITSUBISHI NEWYORK

277 PARK AVENUE
NEW YORK, N. Y. 10172

TELEPHONE:
(212) 922-3700

DATE October 9, 1981

OUR REF. No.

Acres American Incorporated
Consulting Engineers
The Liberty Bank Building, Main at Court
Buffalo, NY 14202

Attention: Mr. Peter Rodrigue

Re: Susitana River Hydroelectric Project
Budgetary Quotation

Dear Mr. Rodrigue:

In reply to your request for estimated costs, your letter dated July 22, 1981, we are pleased to quote as follows:

Prices: F.O.B. Kobe

1. Case One

- (a) Type of Turbine: Vertical Francis
- (b) Number of Units: four sets
- (c) Turbine Output: 235,000 KW
- (d) Head: 213.4 M
- (e) Price: Four sets x Yen 944,000,000.-
= Yen 3,776,000,000.-

2. Case Two

- (a) vertical Francis
- (b) Five sets
- (c) 191,000 KW
- (d) 213.4 M
- (e) Five set. x Yen 768,000,000.- = Yen 3,840,000,000.-

3. Case Three

- (a) Vertical Francis
- (b) Six sets
- (c) 158,000 KW
- (d) 213.4 M
- (e) Six sets x Yen 635,000,000.- = Yen 3,810,000,000.-

Page Two
Mr. Rodrigue
October 9, 1981

Remarks:

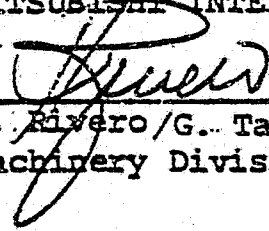
- (1) The above are budgetary prices only and valid up to November 5, 1981. Thereafter it is subject to our confirmation.
- (2) Delivery:
Case One and Two: F.O.B. Kobe 30 months
Case Three: F.O.B. Kobe 28 months
- (3) Payment shall be made in yen 100% upon shipment by an irrevocable, at sight letter of credit.
- (4) Scope of Supply: The above prices include turbine, governor, pressure oil supply equipment and permanent magnetic generator only.
- (5) Installations: Estimated cost is not as yet available, however we expect to have it shortly.

We trust that the foregoing will be of interest and look forward to our continued discussion on this matter.

Should you have any questions on this subject, please do not hesitate to contact the undersigned.

Very truly yours,

MITSUBISHI INTERNATIONAL CORPORATION


H. Rivero/G. Takaya
Machinery Division B

HR:mal

cc: MC - Tokyo (MM-K)

Attachement:

- (1) Brief specification of water turbine for this project.
- (2) Hollow Cone Valve Supply list.

WE-28989

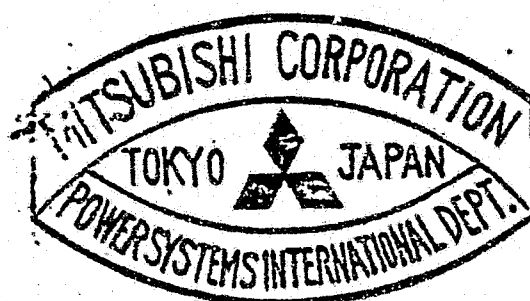
BRIEF SPECIFICATION

OF

WATER TURBINE

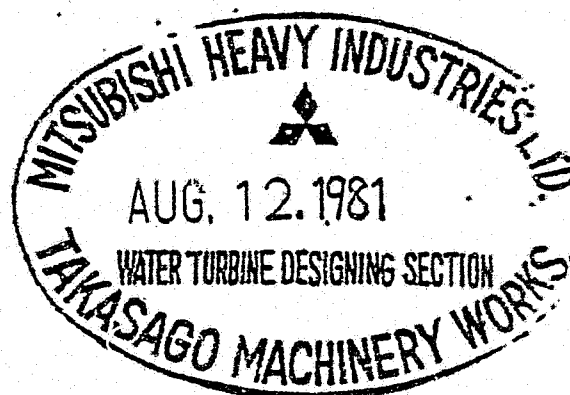
FOR

SUSITNA HYDRO PROJECT



SEP - 7 1981

DATE : Aug. 12, 1980



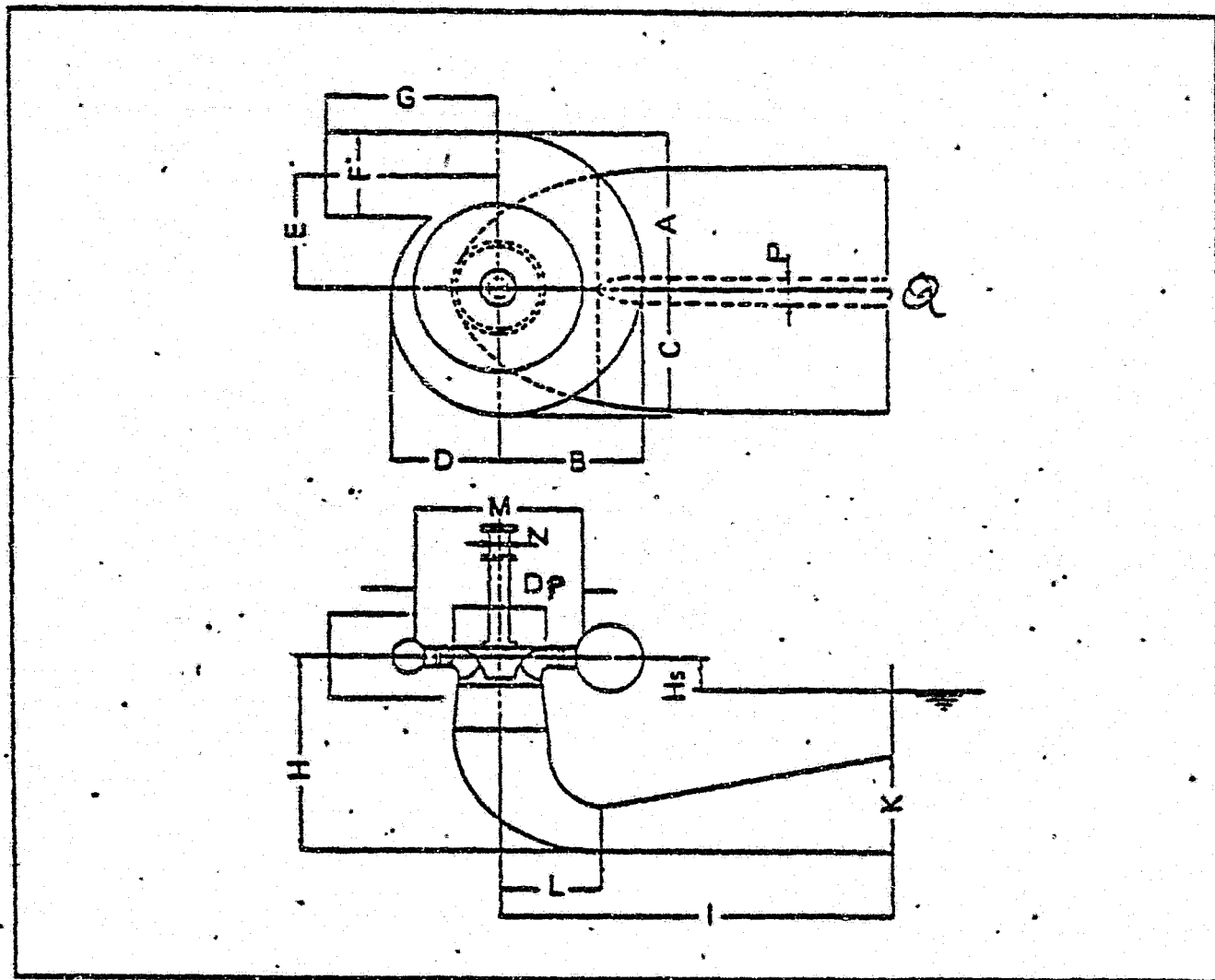
MITSUBISHI HEAVY INDUSTRIES, LTD.

TAKASAGO MACHINERY WORKS

1. DESIGN DATA

TYPE OF TURBINE		Vertical Francis Turbine		
NUMBER OF UNIT		PLAN (A)	PLAN (B)	PLAN (C)
		4	5	4
NET HEAD	m (ft)	700	700	700
TURBINE OUTPUT	HP (HP)	320,000	260,000	215,000
DISCHARGE	m³/sec cfs	4430	3600	2920
SPEED	RPM	200	225	240
SPECIFIC SPEED	m-KW	120	125	118
RUNAWAY SPEED	RPM	360	410	430
HEIGHT FROM TAIL WATER LEVEL TO TURBINE CENTER	m	-4.5	-4.5	-4.5
HYDRAULIC THRUST	Ton	450	350	320
WEIGHT OF ROTATING PARTS	Ton	100	75	65
INLET DIA OF RUNNER	mm	4500	4000	3750
OUTLET DIA OF RUNNER	mm	1235 3825	1115 3400	1047 3120
HEIGHT OF WICKET GATE	mm	810	720	675

OUTLINE DIMENSIONS



Unit : mm

	D ₁	A	B	C	D	E	F	G	H	I	J	K	L	M
PLAN (A)	4500	7260	6540	5800	4940	5320	3900	2500	8900	18000	11400	4520	4600	6100
PLAN (B)	4000	6510	5850	5180	4410	4760	3520	6700	8000	16000	10250	4010	4080	5500
PLAN (C)	3750	6010	5410	4800	4100	4420	3200	6200	7300	15000	9600	3760	3830	5200
	N	P												
PLAN (A)	1100	—												
PLAN (B)	1000	—												
PLAN (C)	910	—												

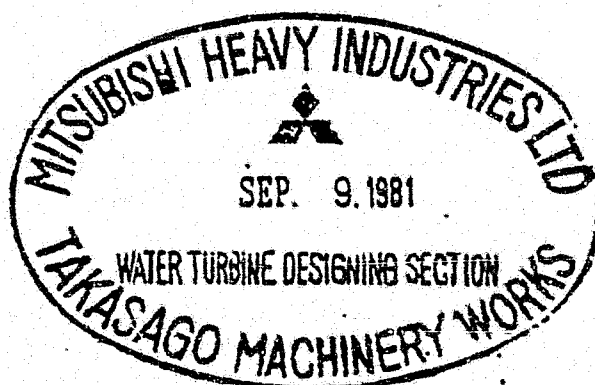
3825
3400
3190

Supply List

of

Hollow Cone Valve

SEP 14 1981



Supply List of Hollow Cone Valve

Year of Delivery	Name of Project Customer	Nos. of Valve	Bore (mm)	Head (m)	Discharge (m ³ /S)	Remark
1964	Mangla P/S, West Pakistan Water and Power Development Authority, West Pakistan	6	2600	126	129	Oil pressure operated
1967	Portage Mountain Project, British Colombia Hydro and Power Authority, Canada	4	2130	168	106	Motor operated
1967	Mangla P/S, West Pakistan Water and Power Development Authority, West Pakistan	2	2600	126	129	Oil pressure operated
1970	New Don Pedro Project, Turlock and Modesto Irrigation District, USA	3	1220	162	46.5	Oil pressure operated
1972	Pyramid Dam Project, State of California, USA	2	920	107	19	Motor operated
1972	Pyramid Dam Project, State of California, USA	1	410	107	3.88	Motor operated
1972	Pyramid Dam Project, State of California, USA	1	210	107	0.907	Motor operated
1973	Ukuwera P/S, Mahaweli Development Board, Sri Lanka (Ceylon)	1	1220	85	32.6	Oil pressure operated
1976	Ayvacik P/S, Ministry of Power and Natural Resources, Turkey	1	2400	125	160	Motor operated



Acres American Inc.,
BICC Reference EST/F.6762/RJCR

INSTALLATION DETAILS

As full details of the proposed cable route from the switchyard to the underground transformers in the cavern, were not available in the enquiry details, we have assumed that each cable circuit comprises a 50 foot horizontal run, 700 feet vertical drop followed by a further horizontal run of approximately 50 feet.

For the horizontal runs, we would recommend that the cables of each circuit be installed as a horizontal sagged system with cleat spacings of 4 metres with an initial cable sag of 120 mm and phase spacing of 300 mm: the cables in the vertical shaft would be installed as a waved system with fixed cleats especially designed to suit the installation conditions. The cleats would be spaced at 5 metre intervals with an offset of approximately 100 metres, the 5 metre interval representing one half of the size wave formed by the cables.

The cable cleats in the shaft would be firmly anchored to the walls of the shaft, with two circuits per shaft.

In addition, at the top and bottom of the shaft, where the cables change from the horizontal to the vertical, additional close cleating would be required at approximately 0.75 metres.

Short circuit straps will also be required for the horizontally installed cables only.

Installation and inspection of the cables may be facilitated by the erection of platforms in the shaft with levels coincident with the cleat positions and interconnected with access ladders between levels.

For the provision of expatriate staff for supervision of installation and carrying out jointing and testing of cables including provision of special tools and plant we estimate would cost \$345,000.00 for 4 circuits at 345kV and \$320,000.00 for 4 circuits at 161kV.

There are certain fixed costs incurred in these amounts, irrespective of the number of circuits required, and therefore dividing the cost equally will not be realistic. We have excluded costs for support steelwork and cable cleats as full details of the cable route are not available. We have also excluded local costs i.e. accommodation, messing, transport and shipping costs for plant and equipment and air fares for staff.

We must point out that our prices are purely budgetary and are for estimating purposes only.

Our Sketch No. ST/PD/A 3036 cable rating curve is enclosed.

Contd.



BICC Supertension Cables Limited

Sheet No. 3.

Continued

Date 21st October 1981

Acres American Inc.,
BICC Reference EST/F.6762/RJCR

Should you require any further information please do not hesitate to contact us.

Yours faithfully,
for Commercial Manager

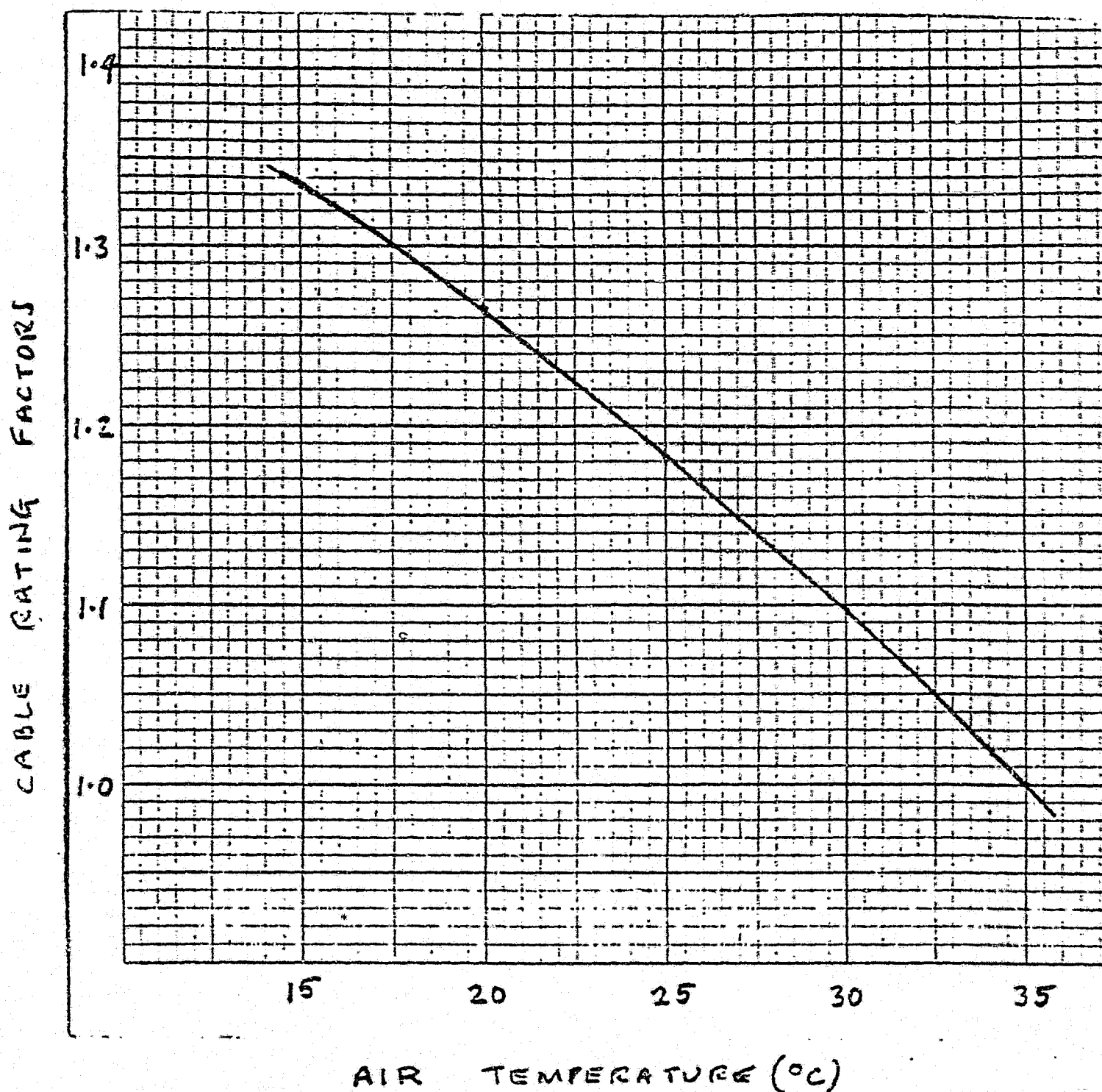
D. J. CLARKE

Marketing Manager

ACRES AMERICAN INCORPORATED

OUR REFERENCE F 6762

CABLE RATING V. AIR TEMPERATURE



CABLE RATING CURVE

BASED ON MAXIMUM CONDUCTOR
TEMPERATURE OF 70°C

rec'd 12/11/81
7:50am
PB

ACRES BUF

MITSUBISHI NYK

ZCZC DWA 130 DEC10 22:03GMT

NYCRT

.NYCMMMS DECEMBER 10

NYC / TELEX 91-6423 ACRES BUF ACRES AMERICAN INC.

BUFFALO, NY

ATTN: MR PETER RODRIQUE

RE: SUSITNA HYDRO POWER STATION ALASKA

DEAR MR RODRIQUE:

SORRY FOR OUR TARDINESS BUT WE RECENTLY RECEIVED FROM TOKYO

THE ROUGH ESTIMATE OF INSTALLATION FOR OUR EQUIPMT

AS FOLLOWS:

ITEM DESCRIPTION	MONTH
1. INSTALLATION OF DRAFT TUBE LINER	1
2. CONCRETING D/T LINER	0.5
3. INSTALLATION OF STAY RING AND SPIRAL CASE	3.5
4. INSTALLATION OF P/T LINER SERVOMOTOR SUPPORT ETC	1
5. CONCRETING OF SPIRAL CASE	2.5
6. INSTALLATION OF TURBINE MAIN PARTS	2
7. INSTALLATION OF GENERATOR PARTS	3
8. INSTALLATION GOVERNOR/AUX EQUIPMT	3
9. PIPING AND WIRING	2
10. PRELIMINARY AND OPERATIONAL TEST	1.5
TOTAL NUMBER OF MONTHS FOR INSTALLATION	18

WE HOPE THAT THIS INFORMATION WILL CLARIFY YOUR QUESTIONS ON INSTALLATION TIME. PLEASE ADVISE US OF THE PRESENT STATUS OF THIS PROJECT. THANK YOU

MR RIVERO HAS RESIGNED HIS POSITION WITH MITSUBISHI INTL AND I HAVE BEEN ASSIGNED TO THIS PROJECT.
BEST REGARDS,
WEST STEWART MCE
MITSUBISHI INTL CORP
NEW YORK NY

NNNN+

ACRES BUF

0

SUSITNA HYDROELECTRIC PROJECT
PRELIMINARY ESTIMATE - ACRES AMERICAN
WATANA - DAM CREST EL 2205 FT * REVISION 1 *

date: 23-DEC-81
file: WAEDS1.DAT:33
page: 1

ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	AMOUNT	TOTAL	REMARKS
				\$	\$ 000	\$ 000	
INTANGIBLE PLANT							
301	ORGANIZATION						
302	FRANCHISE & CONSENTS						
303	MISC INTANGIBLE PLANT						
PRODUCTION PLANT							
330	LAND & LAND RIGHTS						
.1	LAND	1	LS				
.2	LAND RIGHTS	0	LS				
.3	MISC CHARGES & CREDITS	0	LS				
331	POWERPLANT STRUCTURE IMPROVEMENTS						
.1	POWERHOUSE						
.11	POWERHOUSE & DRAFT TUBE						
.111	EXCAVATION	102,200	CY				
	POWERHOUSE VAULT ROCK	34,000	CY				
	DRAFT TUBE ROCK						
.113	FOUNDATION PREPARATION						
	POWERHOUSE						
	FOUNDATION PREP. (HORIZ.)	31,000	SF				
	DENTAL CONCRETE	0	CY				
	DRAFT TUBE						

SUSITNA HYDROELECTRIC PROJECT
PRELIMINARY ESTIMATE - ACRES AMERICAN
WATANA - DAM CREST EL 2205 FT * REVISION 1 *

date: 23-DEC-81
file: WAEB51.DAT#33
page: 2

ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	AMOUNT	TOTAL	REMARKS
				\$	\$ 000	\$ 000	
	FOUNDATION PREPARATION	0	SF				
	DENTAL CONCRETE	0	CY				
.114	CONCRETE						
	POWERHOUSE						
	CONCRETE	27,300	CY				
	REINFORCING STEEL	1,400	TON				
	DRAFT TUBE						
	CONCRETE	14,200	CY				
	REINFORCING STEEL	710	TON				
.115	SUPPORT						
	POWERHOUSE						
	ROCKBOLTS	80	TON				
	DRAFT TUBE						
	ROCKBOLTS	0	TON				
.116	SAFETY PROTECTION						
	POWERHOUSE						
	STEEL MESH	0	TON				
	ROCK BOLTS	0	TON				
	SHOTCRETE	0	SF				
.118	STEEL/METALWORK						
	POWERHOUSE						
	STRUCTURAL STEEL/CRANE RAILS	1	LS				
	METAL FABRICATIONS	0	TON				
	MISC	0	LS				
.119	ARCHITECTURAL						
	POWERHOUSE						
	INTERIOR PARTITIONS	1	LS				
	METAL DOORS/FRAMES	0	LS				
	PAINTING	0	LS				
	MISC	0	LS				
.11B	CONSTRUCTION ROADS						
	CONSTRUCTION ROADS	0	MILE				

SUSITNA HYDROELECTRIC PROJECT
PRELIMINARY ESTIMATE - ACRES AMERICAN
WATANA - DAM CREST EL 2205 FT * REVISION 1 *

date: 23-DEC-81
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ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	AMOUNT.	TOTAL	REMARKS
				\$	\$ 000	\$ 000	
.11C	MECHANICAL DRAFT TUBE GATES	1	LS				
.12	ACCESS TUNNELS & PORTALS						
.121	EXCAVATION						
	TUNNELS [MAIN]	91,000	CY				
	ROCK						
	TUNNELS [SECONDARY]	2,400	CY				
	ROCK						
	PORTALS						
	OVERBURDEN	6,000	CY				
	ROCK USEABLE	3,000	CY				
	ROCK WASTE	0	CY				
.123	FOUNDATION PREPARATION						
	PORTALS						
	HORIZONTAL	0	SF				
	INCLINED	0	SF				
.124	CONCRETE & SHOTCRETE						
	TUNNELS [MAIN]	3,500	CY				
	CONCRETE LINING						
	CONCRETE SLAB	0	CY				
	REINFORCING STEEL	138	TON				
	STEEL MESH	0	TON				
	SHOTCRETE	0	SF				
	TUNNELS [SECONDARY]	120	CY				
	CONCRETE LINING						
	CONCRETE SLAB	0	CY				
	REINFORCING STEEL	5	TON				
	STEEL MESH	0	TON				
	SHOTCRETE	0	SF				
	PORTALS						
	CONCRETE BASE SLAB	6,350	CY				
	CONCRETE WALLS	0	CY				
	REINFORCING STEEL	130	TON				
.125	SUPPORT						
	TUNNELS [MAIN]						

SUSITNA HYDROELECTRIC PROJECT
 PRELIMINARY ESTIMATE - ACRES AMERICAN
 WATANA - DAM CREST EL. 2205 FT * REVISION 1 *

date: 23-DEC-81
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ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	AMOUNT	TOTAL	REMARKS
				\$	\$ 000	\$ 000	
	ROCKBOLTS	110	TON				1
	STEEL SUPPORT	322	TON				1
	TUNNELS [SECONDARY]						
	ROCKBOLTS	7	TON				
	STEEL SUPPORT	25	TON				
	PORTALS						
	ROCKBOLTS	5	TON				
.126	SAFETY PROTECTION						
	PORTALS						
	STEEL MESH	0	TON				
	ROCKBOLTS	0	TON				
	SHOTCRETE	0	SF				
.129	ARCHITECTURAL						
	PORTAL DOORS	0	LB				
.12B	CONSTRUCTION ROADS						
	CONSTRUCTION ROADS	0	MILE				
.13	ACCESS SHAFTS						
.131	EXCAVATION						
	ROCK	10,450	CY				1
.134	CONCRETE & SHOTCRETE						
	CONCRETE LINING	5,700	CY				1
	REINFORCING STEEL	67	TON				1
	SHOTCRETE	0	SF				
	STEEL MESH	0	TON				
.135	SUPPORT						
	ROCKBOLTS	48	TON				1
.138	STEEL/METAL WORK						
	LADDERS, ETC.	0	LS				
	STRUCTURAL STEEL	38	TON				1

SUSITNA HYDROELECTRIC PROJECT
PRELIMINARY ESTIMATE - ACRES AMERICAN
WATANA - DAM CREST EL 2205 FT * REVISION 1 *

date: 23-DEC-81
file: WAEB51.DAT;33
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ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	AMOUNT	TOTAL	REMARKS
				\$	\$ 000	\$ 000	
.139	ARCHITECTURAL ENCLOSURES	0	LS				
.13C	MECHANICAL ELEVATORS	1	LS				
.14	FIRE PROTECTION HEADTANK						
.141	EXCAVATION ROCK	2,000	CY				
.144	CONCRETE & SHOTCRETE						
	CONCRETE BASE SLAB	340	CY				
	CONCRETE WALLS	0	CY				
	CONCRETE ROOF	0	CY				
	REINFORCING STEEL	17	TON				
	STEEL MESH	0	TON				
	SHOTCRETE	0	SF				
.145	SUPPORT						
	ROCKBOLTS	3	TON				
	STEEL SUPPORT	10	TON				
.148	STEEL/METAL WORK LADDERS, ETC.	0	LS				
.14C	MECHANICAL PIPING & VALVES	0	LS				
.15	BUS TUNNELS & SHAFTS						
.15A	EXCAVATION						
	ROCK HORIZONTAL	7,200	CY				
	ROCK INCLINED	0	CY				
	ROCK VERTICAL	0	CY				

SUSITNA HYDROELECTRIC PROJECT
PRELIMINARY ESTIMATE - ACRES AMERICAN
WATANA - DAM CREST EL 2205 FT * REVISION 1 *

date: 23-DEC-81
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ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	AMOUNT	TOTAL	REMARKS
				\$	\$ 000	\$ 000	
.154	CONCRETE						
	BASE SLAB HORIZONTAL	2,000	CY				
	BASE SLAB INCLINED	0	CY				
	WALLS	0	CY				
	ROOF SLAB	0	CY				
	REINFORCING STEEL	100	TON				
	STEEL MESH	0	TON				
	SHOTCRETE	0	SF				
.155	SUPPORT						
	ROCKBOLTS	26	TON				
	STEEL SUPPORT	0	TON				
.16	TRANSFORMER GALLERY						
.161	EXCAVATION						
	ROCK	39,000	CY				
.164	CONCRETE & SHOTCRETE						
	CONCRETE BASE SLAB	2,700	CY				
	CONCRETE WALLS	0	CY				
	CONCRETE ROOF	0	CY				
	REINFORCING STEEL	135	TON				
	SHOTCRETE	0	SF				
	STEEL MESH	0	TON				
.165	SUPPORT						
	ROCKBOLTS	64	TON				
	STEEL SUPPORT	0	TON				
.17	CABLE SHAFTS						
.171	EXCAVATION						
	ROCK	2,850	CY				

SUSITNA HYDROELECTRIC PROJECT
PRELIMINARY ESTIMATE - ACRES AMERICAN
WATANA - DAM CREST EL 2205 FT * REVISION 1 *

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ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	AMOUNT	TOTAL	REMARKS
				\$	\$ 000	\$ 000	
.174	CONCRETE & SHOTCRETE						
	CONCRETE LINING	1,800	CY				1
	REINFORCING STEEL	91	TON				1
	STEEL MESH	0	TON				
	SHOTCRETE	0	SF				
.175	SUPPORT ROCKBOLTS	48	TON				1
.178	STEEL/METALWORK, STRUCTURAL STEEL	9	TON				
.179	ARCHITECTURAL ENCLOSURES	0	LS				
.17C	MECHANICAL ELEVATOR	1	LB				
.2	MISC. BUILDINGS & STRUCTURES						
	MISC. BUILDINGS & STRUCTURES	1	LB				
.3	PERMANENT VILLAGE						
	PERMANENT VILLAGE	0	LB				
332	RESERVOIR, DAMS & WATERWAYS						
.1	RESERVOIR						
.11	CLEARING						
	CLEARING	1	LS				

SUSITNA HYDROELECTRIC PROJECT
PRELIMINARY ESTIMATE - ACRES AMERICAN
WATANA - DAM CREST EL 2205 FT * REVISION 1 *

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ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	AMOUNT	TOTAL	REMARKS
				\$	\$ 000	\$ 000	
.2	DIVERSION TUNNELS/COFFERDAMS						
.21	DIVERSION TUNNELS/PORTALS						
.211	EXCAVATION						
	TUNNELS						
	ROCK	377,000	CY				1
	REMOVE CONCRETE/PLUGS	2,500	CY				
	PORTAL UPSTREAM						
	OVERBURDEN-DRY	0	CY				
	ROCK USEABLE	240,000	CY				
	ROCK WASTE	172,000	CY				
	PORTAL DOWNSTREAM						
	OVERBURDEN-DRY	27,000	CY				
	UN SOUND ROCK WASTE	24,000	CY				
	UN SOUND ROCK USE	50,000	CY				
	SOUND ROCK USE	0	CY				
.213	FOUNDATION PREPARATION						
	PORTAL UPSTREAM						
	HORIZONTAL	0	SF				
	INCLINED	0	SF				
	PORTAL DOWNSTREAM						
	HORIZONTAL	0	SF				
	INCLINED	0	SF				
.214	CONCRETE & SHOTCRETE						
	TUNNELS						
	CONCRETE LINING	73,000	CY				1
	CONCRETE SLAB	0	CY				
	STEEL LINING	1,185	TON				1
	REINFORCING STEEL	0	TON				
	STEEL MESH	0	TON				
	SHOTCRETE	0	SF				
	PORTAL UPSTREAM						
	CONCRETE HEADWALL	4,800	CY				
	CONCRETE LINING	0	CY				
	CONCRETE SLAB	0	CY				
	CONCRETE PIER	600	CY				
	REINFORCING STEEL	195	TON				
	PORTAL DOWNSTREAM						
	CONCRETE HEADWALL	4,100	CY				
	REINFORCING STEEL	90	TON				
	CONCRETE PLUGS						
	CONCRETE PLUGS	5,200	CY				

SUSITNA HYDROELECTRIC PROJECT
 PRELIMINARY ESTIMATE - ACRES AMERICAN
 WATANA - DAM CREST EL 2205 FT * REVISION 1 *

date: 23-DFC-81
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ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	AMOUNT	TOTAL	REMARKS
				0	\$ 000	\$ 000	
.215	SUPPORT TUNNELS						
	ROCKBOLTS	350	TON				1
	STEEL SUPPORT	1,052	TON				1
PORTAL	UPSTREAM						
	ROCKBOLTS	100	TON				
	TIEBACKS	0	TON				
PORTAL	DOWNSTREAM						
	ROCKBOLTS	90	TON				
	TIEBACKS	0	TON				
.216	SAFETY PROTECTION						
PORTAL	UPSTREAM						
	STEEL MESH	0	TON				
	ROCKBOLTS	0	TON				
	SHOTCRETE	0	SF				
PORTAL	DOWNSTREAM						
	STEEL MESH	0	TON				
	ROCKBOLTS	0	TON				
	SHOTCRETE	0	SF				
.21B	CONSTRUCTION ROADS						
	CONSTRUCTION ROADS	0	MILE				
.21C	MECHANICAL						
	GATES & RACKS						
	UPSTREAM	1	LS				
	DOWNSTREAM	1	LS				
	LOW LEVEL RELEASES	1	LS				
.22	UPSTREAM COFFERDAM						
.221	EXCAVATION						
	OVERBURDEN	0	CY				
	ROCK	0	CY				
	REMOVAL OF COFFERDAM	0	CY				
.222	FILL						
	CORE	80,000	CY				

SUSITHA HYDROELECTRIC PROJECT
PRELIMINARY ESTIMATE - ACRES AMERICAN
WATANA - DAM CREST EL 2205 FT * REVISION 1 *

date: 23-DEC-81
file: WAEB91.DAT:33
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ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	AMOUNT	TOTAL	REMARKS
				\$	\$ 000	\$ 000	
	FINE/FILTER	39,000	CY				
	COARSE FILTER	54,000	CY				
	ROCK SHELL	77,000	CY				
	CLOSURE DIKE	43,000	CY				
	RIP RAP	14,000	CY				
.223	FOUNDATION PREP/GROUTING						
	CONSOLIDATION GROUT						
	HOLES	0	LF				
	GROUT	0	CF				
	GROUT CURTAIN						
	DRILL HOLES	0	LF				
	GROUT	0	CF				
	SLURRY WALL						
	SLURRY WALL	54,900	SF				
.22B	CONSTRUCTION ROADS						
	CONSTRUCTION ROADS	0	MTLE				
.22D	DEWATERING						
	DEWATERING	1	LS				
.23	DOWNSTREAM COFFERDAM						
.231	EXCAVATION						
	OVERBURDEN	0	CY				
	ROCK	0	CY				
	REMOVAL OF COFFERDAM	89,000	CY				
.232	FILL						
	FINE FILTER	35,000	CY				
	COARSE FILTER	12,000	CY				
	CLOSURE DIKE	42,000	CY				
.233	FOUNDATION PREP/GROUTING						
	CONSOLIDATION GROUT						
	HOLES	0	LF				
	GROUT	0	CF				

SUSITNA HYDROELECTRIC PROJECT
PRELIMINARY ESTIMATE - ACRES AMERICAN
WATANA - DAM CREST EL 2205 FT * REVISION 1 *

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ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	AMOUNT	TOTAL	REMARKS
					\$	\$ 000	\$ 000
	GROUT CURTAIN						
	DRILL HOLES	0	LF				
	GROUT	0	CF				
	SLURRY WALL						
	SLURRY WALL	27,800	SF				
.23B	CONSTRUCTION ROADS						
	CONSTRUCTION ROADS	0	MILE				
.23D	DEWATERING						
	DEWATERING	0	LS				
.3	MAIN DAM						
.31	MAIN DAM						
.311	EXCAVATION						
	OVERBURDEN	6,544,000	CY				1
	FUCK USEABLE	3,262,000	CY				1
	ROCK WASTE	0	CY				
.312	FILL						
	IMPERVIOUS CORE	6,966,000	CY				1
	FINE FILTER	2,249,000	CY				1
	COARSE FILTER	2,318,000	CY				1
	GRAVEL DOWNSTREAM SHELL	23,037,000	CY				1
	GRAVEL UPSTREAM SHELL	24,959,000	CY				1
	RIP RAP	1,331,000	CY				1
.313	FOUNDATION PREP/GROUTING						
	FOUNDATION PREP						
	INCLINED	5,009,000	SF				1
	HORIZONTAL	0	SF				
	DENTAL CONCRETE						
	DENTAL CONCRETE	0	CY				
	CONSOL. GROUT (SURFACE)						
	DRILL HOLES	872,000	LF				1
	GROUT	3,500,000	CF				1
	GROUT CURTAIN						
	DRILL HOLES	400,000	LF				1

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				\$	\$ 000	\$ 000	
	GROUT	800,000	CF				1
.315	SUPPORT ROCKBOLTS TIEBACKS	0 0	TON TON				
.316	SAFETY PROTECTION STEEL MESH ROCKBOLTS SHOTCRETE	0 0 0	TON TON SF				
.317	DRAINAGE HOLES	128,000	LF				1
.318	CONSTRUCTION ROADS CONSTRUCTION ROADS	0	MILE				
.32	GROUT GALLERIES/PORTALS						
.321	EXCAVATION TUNNELS/SHAFTS						
	ROCK HORIZONTAL	18,000	CY				1
	ROCK INCLINED	0	CY				
	ROCK VERTICAL	2,110	CY				1
	PORTALS						
	OVERBURDEN	0	CY				
	ROCK	0	CY				
.323	FOUNDATION PREPARATION PORTALS						
	HORIZONTAL	0	SF				
	INCLINED	0	SF				
.324	CONCRETE & SHOTCRETE TUNNELS						
	CONCRETE LINING	2,060	CY				1
	CONCRETE SLAB	0	CY				

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ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	AMOUNT	TOTAL	REMARKS
				\$	\$ 000	\$ 000	
	REINFORCING STEEL	85	TON				1
	STEEL MESH	180	TON				1
	SHOTCRETE	53,900	SF				1
SHAFTS	CONCRETE LINING	290	CY				1
	REINFORCING STEEL	0	TON				
	STEEL MESH	0	TON				
	SHOTCRETE	0	SF				
PORTALS	CONCRETE SLAB	0	CY				
	CONCRETE WALLS	0	CY				
	REINFORCING STEEL	0	TON				
.325	SUPPORT TUNNELS						
	ROCKBOLTS	22	TON				
	STEEL SUPPORT	345	TON				1
SHAFTS	ROCKBOLTS	0	TON				
PORTALS	ROCKBOLTS	0	TON				
.326	SAFETY PROTECTION						
	PORTALS						
	STEEL MESH	0	TON				
	ROCKBOLTS	0	TON				
	SHOTCRETE	0	SF				
.329	ARCHITECTURAL PORTAL DOORS	0	LS				
.32B	CONSTRUCTION ROADS						
	CONSTRUCTION ROADS	0	MILE				
.32C	MECHANICAL ELEVATORS	0	LS				

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ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	AMOUNT	TOTAL	REMARKS
				\$	\$ 000	\$ 000	
.4	SADDLE DAM & FILTER BLANKET						
.41	MAIN SADDLE DAM						
.411	EXCAVATION						
	OVERBURDEN	65,000	CY				1
	ROCK USEABLE	0	CY				
	ROCK WASTE	0	CY				
.412	FILL						
	IMPERVIOUS CORE	44,000	CY				1
	FILTER	12,000	CY				1
	SHELL	49,000	CY				1
	RIP RAP	14,000	CY				1
	HEEL ROCK	21,000	CY				1
	SHORE PROTECTION						
	RIP RAP	24,000	CY				1
	WASTE ROCK	24,000	CY				1
.413	FOUNDATION PREP & GROUTING						
	FOUNDATION PREPARATION						
	HORIZONTAL	37,000	SF				1
	INCLINED	0	SF				
.41B	CONSTRUCTION ROADS						
	CONSTRUCTION ROADS	0	MILE				
.44	CHANNEL FILTER BLANKET						.44 REVISED HDG
.442	FILL						.442 REVISED FILL
	COARSE FILTER	1,200,000	CY				1
	FINE FILTER	900,000	CY				1
	RIP RAP	75,000	CY				1
.443	FOUNDATION PREP						.443 HDG INSERTED
	CLEARING & GRUBBING	190	AC				1
	SURFACE GRADING	1,500,000	CY				1
.44B	CONSTRUCTION ROADS						
	CONSTRUCTION ROADS	0	MILE				

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ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	AMOUNT	TOTAL	REMARKS
				\$	\$ 000	\$ 000	
.5	SERVICE SPILLWAY VALVES						
.51	SERVICE SPILLWAY VALVES						
.511	EXCAVATION						
	INLET						
	OVERBURDEN	21,000	CY				
	ROCK USEABLE	167,000	CY				
	ROCK WASTE	0	CY				
	OUTLET						
	OVERBURDEN [DRY]	0	CY				
	OVERBURDEN [WET]	0	CY				
	ROCK USEABLE	0	CY				
	ROCK WASTE	0	CY				
	TUNNELS						
	ROCK HORIZONTAL	59,800	CY				1
	ROCK INCLINED	0	CY				
.512	FILL						
	BACKFILL	3,200	CY				
.513	FOUNDATION PREP/GROUTING						
	FOUNDATION PREP						
	INLET						
	HORIZONTAL	0	SF				
	INCLINED	0	SF				
	OUTLET						
	HORIZONTAL	0	SF				
	INCLINED	0	SF				
.514	CONCRETE & SHOTCRETE						
	INLET						
	CONCRETE BASE SLAB	6,300	CY				
	CONCRETE STRUCTURE	28,200	CY				
	REINFORCING STEEL	1,380	TON				
	OUTLET						
	CONCRETE BASE SLAB	0	CY				
	CONCRETE STRUCTURE	0	CY				
	REINFORCING STEEL	0	TON				
	TUNNELS						
	CONCRETE LINING	17,700	CY				1
	CONCRETE SLAB	0	CY				
	REINFORCING STEEL	705	TON				1
	STEEL MESH	0	TON				
	SHOTCRETE	0	SF				

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ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	AMOUNT	TOTAL	REMARKS
				\$	\$ 000	\$ 000	
.515	SUPPORT						
	INLET						
	ROCKBOLTS	28	TON				
	OUTLET						
	ROCKBOLTS	0	TON				
	TUNNELS						
	ROCKBOLTS	210	TON				1
	STEEL SUPPORT	118	TON				1
.516	SAFETY PROTECTION						
	INLET						
	STEEL MESH	0	TON				
	ROCKBOLTS	0	TON				
	SHOTCRETE	0	SF				
	OUTLET						
	STEEL MESH	0	TON				
	ROCKBOLTS	0	TON				
	SHOTCRETE	0	SF				
.518	STEEL/METALWORK						
	STEEL MANIFOLD LINER	2,250	TON				1
.51B	CONSTRUCTION ROADS						
	CONSTRUCTION ROADS	0	MILE				
.51C	MECHANICAL						
	INLET GATES & RACKS	1	LS				
	SERVICE VALVES	1	LS				
.52	AUXILLARY SPILLWAY CHUTE						
.521	EXCAVATION						
	APPROACH						
	OVERBURDEN	1,603,000	CY				1
	ROCK USEABLE	2,360,000	CY				1
	ROCK WASTE	0	CY				
	STRUCTURE & CHUTE						
	OVERBURDEN (DRY)	0	CY				
	ROCK USEABLE	0	CY				

SUSITHA HYDROELECTRIC PROJECT
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ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	AMOUNT	TOTAL	REMARKS
				\$	\$ 000	\$ 000	
	ROCK WASTE	0	CY				
	DRAIN TUNNEL						
	ROCK	0	CY				
	RIVER CHANNEL						
	ALLUVIUM EXCAVATION-DRY	760,000	CY				
	PLUNGE POOL EXCAVATION-WET	860,000	CY				
.523	FOUNDATION PREP/GROUTING						
	FOUNDATION PREP						
	APPROACH						
	HORIZONTAL	0	SF				
	INCLINED	0	SF				
	STRUCTURE CHUTE						
	ROCK HORIZONTAL	265,000	SF				1
	ROCK INCLINED	165,000	SF				1
	DENTAL CONCRETE	22,300	CY				1
	CONSOL. GROUT [SURFACE]						
	DRILL HOLES	34,800	LF				1
	GROUT	139,200	CF				1
	GROUT [DRAIN TUNNEL]						
	DRILL HOLES	0	LF				
	GROUT	0	CF				
	GROUT CURTAIN						
	DRILL HOLES	0	LF				
	GROUT	0	CF				
.524	CONCRETE & SHOTCRETE						
	CONCRETE WALLS						
	ONE FORM	55,400	CY				1
	TWO FORM	33,100	CY				1
	CONCRETE SLAB						
	APPROACH	9,600	CY				
	NO FORM	41,000	CY				1
	ONE FORM	5,300	CY				1
	TWO FORM	0	CY				
	CONCRETE GATE CHUTE						
	ONE FORM	2,200	CY				
	TWO FORM	4,700	CY				
	CONCRETE STRUCTURE						
	NO FORM	0	CY				
	ONE FORM	10,100	CY				
	TWO FORM	3,400	CY				
	CONCRETE TOP SLAB						
	BRIDGE	1,800	CY				

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ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	AMOUNT	TOTAL	REMARKS
				\$	\$ 000	\$ 000	
	REINFORCING STEEL						
	REINFORCING STEEL	4.950	TON				1
.525	SUPPORT						
	APPROACH						
	ROCKBOLTS	735	TON				1
	TIEBACKS	0	TON				
	STRUCTURE & CHUTE						
	ROCKBOLTS	0	TON				
	TIEBACKS	0	TON				
.526	SAFETY PROTECTION						
	APPROACH						
	STEEL MESH	0	TON				
	ROCKBOLTS	0	TON				
	SHOTCRETE	0	SF				
	STRUCTURE & CHUTE						
	STEEL MESH	0	TON				
	ROCKBOLTS	0	TON				
	SHOTCRETE	0	SF				
.527	DRAINAGE						
	DRILL HOLES	0	LF				
.51A	WINTERIZATION						
	WINTERIZATION	1	LS				
.52B	CONSTRUCTION ROADS						
	CONSTRUCTION ROADS	0	MILE				
.52C	MECHANICAL						
	GATES & RACKS	1	LS				
.52D	DEWATERING & COFFERDAM						
	DEWATERING & COFFERDAM	1	LS				

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ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	AMOUNT	TOTAL	REMARKS
				\$	\$ 000	\$ 000	
.53	EMERGENCY SPILLWAY						
.531	EXCAVATION						
	OVERBURDEN	3,551,000	CY				
	ROCK USEABLE	1,383,000	CY				
	ROCK WASTE	A 0	CY				
.532	FILL						
	FUSE PLUG	54,200	CY				
.536	SAFETY PROTECTION						
	ROCKBOLTS	0	TON				
	STEEL MESH	0	TON				
	SHOTCRETE	0	SF				
.53B	CONSTRUCTION ROADS						
	SERVICE BRIDGE	1	LS				
	CONSTRUCTION ROADS	0	MILE				
.6	INTAKES						
.61	INTAKE STRUCTURE						
.611	EXCAVATION						
	OVERBURDEN	148,000	CY				1
	ROCK USEABLE	1,308,500	CY				1
	ROCK WASTE	A 0	CY				
.612	FILL						
	BACKFILL	16,300	CY				1
.613	FOUNDATION PREPARATION						
	HORIZONTAL	0	SF				
	INCLINED	0	SF				
.614	CONCRETE & SHOTCRETE						
	STRUCTURE						
	CONCRETE STRUCTURE	142,800	CY				1
	CONCRETE MASS	31,600	CY				1

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ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	AMOUNT	TOTAL	REMARKS
				\$	\$ 000	\$ 000	
	REINFORCING STEEL	7,150	TON				1
	APPROACH						
	CONCRETE	0	CY				
	REINFORCING STEEL	0	TON				
.615	SUPPORT						
	APPROACH						
	ROCKBOLTS	0	TON				
	TIEBACKS	0	TON				
	STRUCTURE						
	ROCKBOLTS	142	TON				1
	TIEBACKS	0	TON				
.616	SAFETY PROTECTION						
	ROCKBOLTS	0	TON				
	STEEL MESH	0	TON				
	SHOTCRETE	0	SF				
.61A	WINTERIZATION						
	WINTERIZATION	0	LS				
.61B	CONSTRUCTION ROADS						
	CONSTRUCTION ROADS	0	MILE				
.61C	MECHANICAL						
	GATES & RACKS	1	LS				
.7	SURGE CHAMBER						
.71	SURGE CHAMBER						
.711	EXCAVATION						
	ROCK	75,000	CY				
.714	CONCRETE & SHOTCRETE						
	CONCRETE CHAMBER	2,000	CY				
	REINFORCING STEEL	100	TON				

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				\$	\$ 000	\$ 000	
.715	SUPPORT ROCKBOLTS	55	TON				
.71C	MECHANICAL GATES	1	LS				
.8	PENSTOCKS						
.81	PENSTOCKS EXCAVATION TUNNELS ROCK	56,200	CY				1
.814	CONCRETE & SHOTCRETE CONCRETE LINER REINFORCING STEEL	28,200 1,152	CY TON				1 1
.815	SUPPORT ROCKBOLTS SUPPORT STEEL	280 0	TON TON				1
.818	STEEL/METALWORK STEEL LINER	1,600	TON				
.9	TAILRACE WORKS						
.91	TAILRACE TUNNELS/PORTALS						
.911	EXCAVATION TUNNELS ROCK PORTALS	79,400	CY				1
	OVERBURDEN [DRY]	42,000	CY				
	OVERBURDEN [WET]	0	CY				
	ROCK USEABLE	0	CY				
	ROCK WASTE	15,000	CY				

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				\$	\$ 000	\$ 000	
.913	FOUNDATION PREPARATION						
	PORTALS						
	HORIZONTAL	0	SF				
	INCLINED	0	SF				
.914	CONCRETE & SHOTCRETE						
	TUNNELS						
	CONCRETE LINING	2,200	CY				
	CONCRETE SLAB	2,700	CY				
	CONCRETE PIERS	0	CY				
	REINFORCING STEEL	185	TON				
	STEEL MESH	4	TON				
	SHOTCRETE	4,400	SF				
	PORTALS						
	CONCRETE BASE SLAB	100	CY				
	CONCRETE WALLS	650	CY				
	REINFORCING STEEL	30	TON				
.915	SUPPORT						
	TUNNELS						
	ROCKBOLTS	A 78	TON				
	STEEL SUPPORT	210	TON				
	PORTALS						
	ROCKBOLTS	15	TON				
.916	SAFETY PROTECTION						
	PORTALS						
	ROCKBOLTS	A 0	TON				
	STEEL MESH	0	TON				
	SHOTCRETE	0	SF				
.91B	CONSTRUCTION ROADS						
	CONSTRUCTION ROADS	0	MILE				
.91C	MECHANICAL						
	GATES	1	LS				

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				\$	\$ 000	\$ 000	
333	WATERWHEELS, TURBINES & GENERATORS						333 REVISED
.1	TURBINES & GOVERNORS						
.11	TURBINES & GOVERNORS						
.111	SUPPLY	1	LS				
.112	INSTALL	1	LS				
.2	GENERATORS & EXCITERS						
.21	GENERATORS & EXCITERS						
.211	SUPPLY	1	LS				
.212	INSTALL	1	LS				
334	ACCESSORY ELECTRICAL EQUIPMENT						334 REVISED
.1	CONNECTION, SUPPORTS & STRUCT.						
.11	STRUCTURES						
.12	CONDUCTORS & INSULATORS						
.121	GENERATOR ISOLATED PHASE BUS	1	LS				
.122	HV POWER CABLES & ACCESS.	1	LS				
.123	LV POWER CABLES & ACCESS.	1	LS				
.124	CONTROL CABLES & ACCESSORIES	1	LS				
.125	GROUNDING SYSTEM	1	LS				
.13	CONDUITS & FITTINGS						
	CONDUITS & FITTINGS	1	LS				
.2	SWITCHGEAR & CONTROL EQUIPMENT						
.21	AUXILIARY TRANSFORMERS						
	AUXILIARY TRANSFORMERS	1	LS				
.22	CIRCUIT BREAKERS						
	CIRCUIT BREAKERS	1	LS				
.23	SURGE PROTECTION						
	SURGE PROTECTION	1	LS				
.24	SWITCHBOARDS						
	SWITCHBOARDS	1	LS				
.25	AUX. POWER EQUIPMENT						
	AUX. POWER EQUIPMENT	1	LS				

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				\$	\$ 000	\$ 000	
.3	CUBICLES & APPURTENANCES						
.31	CONTROL, RELAY & METER, BOARDS						
	CONTROL, RELAY & METER, BOARD	1	LS				
.32	COMPUTER CONTROL SYSTEM						
	COMPUTER CONTROL SYSTEM	1	LS				
.33	SUPERVIS. & TELEMET. SYSTEM						
	SUPERVIS. & TELEMET. SYS.	1	LS				
.4	POWER TRANSFORMERS						
.41	POWER TRANSFORMERS						
	POWER TRANSFORMERS	1	LS				
.5	LIGHTING SYSTEM						
.51	POWERHOUSE & TRANS. GALLERY						
	POWERHOUSE & TRANS. GALLERY	1	LS				
.52	ACCESS TUNNELS & ROADS						
	ACCESS TUNNELS & ROADS	1	LS				
.6	MISC. ELECTRICAL EQUIPMENT						
.61	MISC. ELECTRICAL EQUIPMENT						
	MISC. ELECTRICAL EQUIPMENT	1	LS				
335	MISC. POWERPLANT EQUIPMENT						335 REVISED
.1	AUXILIARY SYSTEMS						
.11	STATION WATER SYSTEMS						
	STATION WATER SYSTEMS	1	LS				
.12	FIRE PROTECTION SYSTEMS						
	FIRE PROTECTION SYSTEMS	1	LS				
.13	COMPRESSED AIR SYSTEMS						
	COMPRESSED AIR SYSTEMS	1	LS				
.14	OIL HANDLING SYSTEMS						
	OIL HANDLING SYSTEMS	1	LS				
.15	DRAINAGE & DEWATERING						
	DRAINAGE & DEWATERING	1	LS				
.16	HEAT., VENT. & COOLING SYS.						

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				\$	\$ 000	\$ 000	
.17	HEAT., VENT. & COOLING SYS. MISCELLANEOUS MISCELLANEOUS	1 1	LS LB				
.2	AUXILIARY EQUIPMENT						
.21	POWERHOUSE CRANES POWERHOUSE CRANES	1	LB				
.22	ELEVATORS ELEVATORS	1	LS				
.23	MISC. CRANES & HOIST MISC. CRANES & HOIST A	1	LB				
.3	GENERAL STATION EQUIPMENT GENERAL STATION EQUIPMENT	1	LB				
.4	COMMUNICATIONS EQUIPMENT COMMUNICATIONS EQUIPMENT	1	LB				
336	ROAD, RAIL & AIR FACILITIES						336 REVISED
.1	ROADS						
.11	PIONEER ROADS & BRIDGES						
.111	GOLD CREEK-DEVIL CANYON ROAD (15 MILES)	15	MILE				
	CLEARING A	0	AC				
	WASTE EXCAVATION A	0	CY				
	COMMON EXCAVATION A	0	CY				
	ROCK EXCAVATION A	0	CY				
	BORROW A	0	CY				
	18" CULVERTS A	0	LF				
	36" CULVERTS A	0	LF				
	BRIDGES A	0	SF				

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				\$	\$ 000	\$ 000	
	MAINTENANCE						
	MAINTENANCE	A	15	MILE			
.112	DEVIL CANYON-WATANA						
	ROAD (50 MILES)		50	MILE			
	CLEARING	A	0	AC			
	WASTE EXCAVATION	A	0	CY			
	COMMON EXCAVATION	A	0	CY			
	ROCK EXCAVATION	A	0	CY			
	BORROW	A	0	CY			
	18" CULVERTS	A	0	LF			
	36" CULVERTS	A	0	LF			
	BRIDGES	A	0	SF			
	MAINTENANCE						
	MAINTENANCE	A	50	MILE			
.113	DEVIL CANYON-TEMP. BRIDGE						
	TEMPORARY BRIDGE	A	1	SF			
.12	PERMANENT ROADS & BRIDGES						
.121	PARKS HWY-GOLD CREEK						
	R & M SEGMENT B-1 13.26 MILE						
	CLEARING		210	AC			
	WASTE EXCAVATION		575,480	CY			
	COMMON EXCAVATION		570,180	CY			
	ROCK EXCAVATION		35,850	CY			
	BORROW		126,600	CY			
	NFS SUBBASE MATERIAL		136,500	CY			
	GRADE "A" BASE MATERIAL		74,480	CY			
	D-1 BASE MATERIAL		31,080	TON			
	A. C. SURFACING		28,462	TON			
	GUARDRAIL		9,800	LF			
	18" CULVERTS		7,055	LF			
	36" + CULVERTS		1	LS			
	FABRIC		18,844	SF			
	THAW PIPES		7,555	LF			
	TOPSOIL & SEED		130	AC			
	TRAFFIC CONTROL DEVICES		13.3	MILE			

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ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	AMOUNT	TOTAL	REMARKS
				\$	\$ 000	\$ 000	
	BRIDGES	84,320	SF				
	MAINTENANCE						
	MAINTENANCE	13.3	MILE				
.122	GOLD CREEK -DEVIL CANYON						
	R & M SEGMENT B-2 12.31 MILE						
	MAIN ROAD						
	CLEARING	161	AC				
	WASTE EXCAVATION	422,890	CY				
	COMMON EXCAVATION	335,935	CY				
	ROCK EXCAVATION	23,625	CY				
	BORROW	445,200	CY				
	NFS SUBBASE MATERIAL	126,750	CY				
	GRADE "A" BASE MATERIAL	69,160	CY				
	D-1 BASE MATERIAL	28,860	TON				
	A. C. SURFACING	26,429	TON				
	GUARDRAIL	6,700	LF				
	18" CULVERTS	8,245	LF				
	36" + CULVERTS	1	LS				
	FABRIC	8,777	SY				
	THAW PIPES	7,555	LF				
	TOPSOIL & SEED	86	AC				
	TRAFFIC CONTROL DEVICES	12.3	MILE				
	BRIDGES	0	SF				
	MAINTENANCE						
	MAINTENANCE	12.3	MILE				
.123	DEVIL CANYON-WATANA						
	R & M SEGMENT A-2 41.25 MILE						
	MAIN ROAD						
	CLEARING	576	AC				
	WASTE EXCAVATION	1,536,500	CY				
	COMMON EXCAVATION	1,603,973	CY				
	ROCK EXCAVATION	146,527	CY				
	BORROW	156,700	CY				
	NFS SUBBASE MATERIAL	424,710	CY				
	GRADE "A" BASE MATERIAL	231,739	CY				
	D-1 BASE MATERIAL	96,704	TON				
	A. C. SURFACING	88,557	TON				
	GUARDRAIL	6,050	LF				

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				\$	\$ 000	\$ 000	
	18" CULVERTS	23,035	LF				
	36" + CULVERTS	1	LS				
	FABRIC	49,620	SY				
	THAW PIPES	24,335	LF				
	TOPSOIL & SEED	326	AC				
	TRAFFIC CONTROL DEVICES	41.3	MILE				
	BRIDGES	6,800	SF				
	MAINTENANCE						
	MAINTENANCE	41.3	MILE				
.124	DEVIL CANYON BRIDGE BRIDGE	1	LS				
.13	SITE ROADS						
	SITE ROADS	26	MILE				
	MAINTENANCE	26	MILE				
.2	RAIL FACILITIES						
.21	RAILHEAD-GOLD CREEK RAILHEAD	1	LS				
.3	AIRSTRIIP						
.31	AIRSTRIIP	1	LS				
	AIRSTRIIP						

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ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	AMOUNT	TOTAL	REMARKS
				\$	\$ 000	\$ 000	
	TRANSMISSION PLANT						
350	LAND & LAND RIGHTS LAND & LAND RIGHTS						
352	SUBSTATION & SWITCHING STATION SUBSTATION & SWITCHING STATION STRUCTURES & IMPROVEMENTS .1 SWITCHYARD .11 SWITCHYARD	1	LS				
353	SUBSTATION/SWITCHING STA EQUIP SUBSTATION/SWITCHING STA EQUIP						
354	STEEL TOWERS & FIXTURES STEEL TOWERS & FIXTURES						
356	OVERHEAD CONDUCTORS & DEVICES OVERHEAD CONDUCTORS & DEVICES						

SUSTIA HYDROELECTRIC PROJECT
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ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	AMOUNT	TOTAL	REMARKS
				\$	\$ 000	\$ 000	
359	ROADS & TRAILS ROADS & TRAILS	0					
	GENERAL PLANT						
389	LAND & LAND RIGHTS LAND & LAND RIGHTS						
390	STRUCTURES & IMPROVEMENTS STRUCTURES & IMPROVEMENTS						
391	OFFICE FURNITURE/EQUIPMENT OFFICE FURNITURE/EQUIPMENT						
392	TRANSPORTATION EQUIPMENT TRANSPORTATION EQUIPMENT						
393	STORES EQUIPMENT STORES EQUIPMENT						

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ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	AMOUNT	TOTAL	REMARKS
				\$	\$ 000	\$ 000	
394	TOOLS SHOP & GARAGE EQUIPMENT TOOLS SHOP & GARAGE EQUIPMENT						
395	LABORATORY EQUIPMENT LABORATORY EQUIPMENT						
396	POWER OPERATED EQUIPMENT POWER OPERATED EQUIPMENT						
397	COMMUNICATIONS EQUIPMENT COMMUNICATIONS EQUIPMENT						
398	MISCELLANEOUS EQUIPMENT MISCELLANEOUS EQUIPMENT						
399	OTHER TANGIBLE PROPERTY OTHER TANGIBLE PROPERTY						

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ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	AMOUNT	TOTAL	REMARKS
					\$	\$ 000	\$ 000
	INDIRECT COSTS						
61	TEMPORARY CONSTRUCTION FACILITIES TEMPORARY CONSTRUCTION FACILITIES						
62	CONSTRUCTION EQUIPMENT CONSTRUCTION EQUIPMENT						
63	MAIN CONSTRUCTION CAMP						63 REVISED
	.1 MAIN CONSTRUCTION CAMP						
	MAIN CONSTRUCTION CAMP	1	LS				
	.11 SITE PREPARATION						
	CLEARING & STRIPPING	163	AC				
	FINE GRADE	790,000	SY				
	INSTALL GRANULAR PAD	1,770,000	CY				
	CONSTRUCT ROADWAYS						
	MAIN ROADS IN CAMP [34']	10,200	LF				
	CONNECT. RD. TO ACCESS RD.	1,800	LF				
	DRAINAGE						
	DITCHING	27,000	LF				
	CULVERTS	1,200	LF				
	PERIMETER FENCING						
	PERIMETER FENCING	11,000	LF				
	PARKING AREAS						
	PARKING AREAS	1	LS				
	.12 BUILDINGS						
	BACHELOR DORMS-108 MAN COMPLX	48	EA				26' x 224'
	BACHELOR DORMS-MGMT-TYPE A	10	EA				28' x 120'
	BACHELOR DORMS-MGMT-TYPE B	14	EA				24' x 120'
	GUEST HOUSES-1 EA OWN/MGR/CON	3	EA				28' x 120'
	CAMP MANAGER'S OFFICES	3	EA				30' x 40'

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ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	AMOUNT	TOTAL	REMARKS
				\$	\$ 000	\$ 000	
	STAFF CLUBHOUSE	1	EA				50' x 80'
	DINING HALL	1	EA				120' x 80'
	DINING HALL	1	EA				140' x 120'
	RECREATION BLDG.	1	EA				120' x 160'
	RECREATION BLDG.	1	EA				120' x 200'
	GYMNASIUM	1	EA				200' x 200'
	SECURITY OFFICE	1	EA				40' x 60'
	FIRE STATION	1	EA				40' x 80'
	SOILS/MATERIALS LAB.	1	EA				40' x 80'
	MAINTENANCE BLDG.	1	EA				80' x 100'
	WAREHOUSE - MANAGERS	1	EA				120' x 160'
	WAREHOUSE - FOOD SERVICE	1	EA				100' x 120'
	COMMUNICATION BLDG.	1	EA				20' x 30'
	HOSPITAL	1	EA				140' x 160'
	ICE RINK	1	EA				150' x 300'
	BANK	1	EA				50' x 60'
	PUMP HOUSE	1	EA				20' x 20'
	STORE	1	EA				30' x 60'
	LAUNDRY	1	EA				20' x 30'
	SWIMMING POOL	1	EA				100' x 120'
	PERMAWALK						
	6 FEET WIDE	1,000	LF				
	10 FEET WIDE	3,000	LF				
	16 FEET WIDE	1,300	LF				
.13	UTILITIES						
	WATER						
	SUPPLY SYSTEM						
	INTAKE - 3.4 MG POND	1	LS				
	PUMP STA - 1200 GPM	1	LS				
	BOOSTER PUMP STA - 1200GPM	1	LS				
	SUPPLY LINE - 2 LINES - 1-6",	10,000	LF				1-8", UTILDR, HT
	TREATMENT PLANT - 1.7 MGD	1	LS				
	DISTRIBUTION						
	LINE TO CAMP - 2 LINES - 1 -	3,500	LF				6", 1-8", UTILDR, HT
	RESERVOIRS - 2 - 1 @ 1.7 MG &	1	LS				1 @ 1.4 MG
	PUMP STA - 5500GPM	1	LS				
	DISTRIBUTION SYSTEM						
	DISTRIBUTION LINES - BURIED	0	LF				
	12"	2,700	LF				
	6"	300	LF				
	DISTRIBUTION LINE UTILDR						
	12" DI	3,100	LF				
	6" DI	4,300	LF				
	4" DI	960	LF				

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ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	AMOUNT	TOTAL	REMARKS
				\$	\$ 000	\$ 000	
	HEAT TRACING						
	12" PIPE						
	6" PIPE	5,800	LF				
	4" PIPE	4,600	LF				
	VALVES	960	LF				
	VALVES						
	UTILIDORS	1	LS				
	UTILIDORS						
	SEWAGE	8,400	LS				
	COLLECTION SYSTEM - PIPE						
	4"						
	6"	1,900	LF				
	8"	1,600	LF				
	12"	3,300	LF				
	16"	2,300	LF				
	HEAT TRACING	1,200	LF				
	4"						
	6"	1,900	LF				
	8"	1,600	LF				
	12"	3,300	LF				
	16"	2,300	LF				
	UTILIDORS	1,200	LF				
	UTILIDORS						
	TREATMENT PLANT	1,200	LF				
	SKIMMING TANK						
	LAGOONS - (1 @ 385' x 205' &	1	EA				
	RBC's	5	EA				
	PHYS/CHEM UNIT	9	EA				
	CLARIFIER	1	EA				
	DISINFECTION	1	EA				
	HEAT PUMP	1	EA				
	THICKENER	1	EA				
	FILTER PRESS	0	EA				
	DRYING BEDS	1	EA				
	OUTFALL LINE (10")	2	EA				
	OUTFALL	2,000	LF				
	ELECTRICAL	1	EA				
	GENERATING STATIONS						
	BUILDINGS						
	GENERATORS (850 KW)	2	EA				
	DAY TANK	6	EA				
	FUEL STORAGE TANK	2	EA				
	SUBSTATION	2	EA				
	LIGHTING	2	EA				
	POLE MOUNTED LUMINAIRS						
	FLOOD LIGHTS	70	EA				
		25	EA				

4 @ 280' x 155'

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ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	AMOUNT	TOTAL	REMARKS
				\$	\$ 000	\$ 000	
	FIRE ALARM SYSTEM	1	LS				
	TELEPHONE SYSTEM	1	LS				
	TV/RADIO STATION	1	LS				
	SOLID WASTE FACILITY	1	LS				
	POL GARAGE/MAINTENANCE BLDG	1	EA				50' x 60'
	TANKS						
	50,000 GAL	4	EA				
	100,000 GAL	36	EA				
	EARTHWORK						
	CLEARING & GRUBBING	14	AC				
	BERMS	45,000	CY				
	PIPING	1	LS				
	FUEL STATION	1	LS				
.2	MAIN CONSTRUCTION VILLAGE						
	MAIN CONSTRUCTION VILLAGE	1	LS				
.21	SITE PREPARATION						
	CLEARING & STRIPPING	130	AC				TOTAL A=5,636,000 SF
	FINE GRADING	426,000	SY				DEPTH 8'
	INSTALL GRANULAR PAD	1,670,000	CY				
	CONSTRUCT ROADWAYS						
	ROADWAYS IN VILLAGE						ASPHALT PVMT
	MAIN ROAD 34' WIDE	2,200	LF				ASPHALT PVMT
	SECONDARY ROADS 24' WIDE	22,000	LF				VIL LMT-MN ACC A/C P
	CONNECTION TO ACCESS RD 34'	1,600	LF				
	DRAINAGE						RDWY TOT's (x) 2
	DITCHING	51,600	LF				@ 20' & 40' XING
	CULVERTS - 560 LOTS	13,200	LF				
	PERIMETER FENCING						
	PERIMETER FENCING	12,000	LF				
	PARKING AREAS						GRANULAR SURFACE
	PARKING AREAS	6,000	SF				
.22	BUILDINGS						
	SINGLE FAMILY UNIT - 2 BDRM	72	EA				14' x 60'
	SINGLE FAMILY UNIT - 3 BDRM	200	EA				14' x 60'

SUSITNA HYDROELECTRIC PROJECT
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ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	AMOUNT	TOTAL	REMARKS
				\$	\$ 000	\$ 000	
	SINGLE FAMILY UNIT - 2 BDRM	16	EA				24' x 50'
	SINGLE FAMILY UNIT - 3 BDRM	16	EA				24' x 50'
	SINGLE FAMILY UNIT - 4 BDRM	16	EA				28' x 50'
	MGR/OWNER OFFICES	1	LS				120' x 160'
	CONTRACTORS OFFICES	1	LS				120' x 160'
	SCHOOL - 34,000 SF	1	LS				
	GYMNASIUM	1	LS				100' x 100'
	SWIMMING POOL	1	LS				100' x 100'
	RECREATION CENTER	1	LS				80' x 100'
	STORE	1	LS				100' x 160'
	FIRE STATION	1	LS				30' x 40'
	GENERATING STATIONS	2	EA				20' x 30'
	GAS STATION (6 PUMP, 3-BAY w/	1	LS				2-10,000 GAL TANKS
	A						
.23 UTILITIES							
	WATER						
	SUPPLY LINE 6"	8,300	FT				TRTHT PLA TO VIL STA
	PUMP STATION	1	LS				E VILLAGE LIMIT
	WATER STOR TANK - 1.4 MG	1	EA				
	DISTRIBUTION LINES						
	6" DI	13,200	LF				
	8" DI	1,500	LF				
	10" DI	1,000	LF				
	12" DI	1,300	LF				
	HEAT TRACING						
	6" PIPE	21,500	LF				INCL SUPPLY RUN
	8" PIPE	1,500	LF				FROM VIL TO TREAT-
	10" PIPE	1,000	LF				MENT PLANT]
	12" PIPE	1,300	LF				
	VALVES						
	6"	20	EA				EST 1 VALVE/1000LF
	8"	2	EA				OF PIPE MIN.- 2 EA
	10"	2	EA				FOR EA SIZE PIPE
	12"	2	EA				
	HYDRANTS						
	IVALVES & STUBS INC - 1 EA	20	EA				@ APPROX 400']
	SEWERAGE						
	COLLECTION SYSTEM						
	6" PIPE	7,800	LF				
	8" PIPE	6,500	LF				
	10" PIPE	1,100	LF				
	12" PIPE	800	LF				
	14" PIPE	700	LF				
	HEAT TRACING						
	6" PIPE	21,600	LF				INCL FORCE MAIN
	8" PIPE	6,500	LF				FROM VIL TO MAIN
	10" PIPE	1,100	LF				CAMP WATER TREAT-

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ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	AMOUNT	TOTAL	REMARKS
				\$	\$ 000	\$ 000	
	12" PIPE	800	LF				HENT PLANTJ
	14" PIPE	700	LF				
	PUMPING SYSTEM						
	PUMP STATION	1	LS				VILLAGE TO HAIN CAMP
	6" FORCE MAIN	13,800	LF				TREATMENT PLANT
	ELECTRICAL						
	GENERATING STATIONS						
	BUILDINGS	2	EA				INCLUDES DRIVEWAYS
	GENERATORS 4 @ 850 KW, 2 @	2	EA				500 KW
	DAY TANKS	2	EA				
	FUEL STORAGE TANKS	2	EA				
	SUBSTATIONS	2	EA				
	WIRING	1	LS				
	DISTRIBUTION						
	DISTRIBUTION	1	LS				
	FIRE ALARM SYSTEM						
	FIRE ALARM SYSTEM	1	LS				
	TELEPHONE						
	TELEPHONE SYSTEM	1	LS				
	UTILIDORS						
	MAIN RUNS IN VILLAGE	16,900	LF				
	STREET CROSSING 50 LF EA	1,000	LF				
	PUMP STA TO TREATMENT PLANT	8,300	LF				
	STUBS TO HSE 560 LOTS @ 20'	11,200	LF				INCL 4" SVC, ETC.
	STUBS TO BLPGS - 10 @ 25'	250	LF				
	INTEGRATED OFFICE AREA						
	OWNER/MGRS OFFICE	1	EA				120' x 160'
	CONTRACTORS OFFICES	1	EA				120' x 160'
	PERMANENT TOWN	1	LS				
.14	CATERING & SUPPORT						
	CATERING & SUPPORT	5,750,000	HANDAY				1
.15	CONSTRUCTION POWER						
	CONSTRUCTION POWER	1	LS				
.2	PIONEER ROAD CAMP						
	CAMP FACILITIES	1	LS				
	CATERING & OPERATION SUPPORT		HANDAY				
.3	ACCESS ROAD/RAILHEAD CAMP						
	CAMP FACILITIES	1	LS				

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ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	AMOUNT	TOTAL	REMARKS
					\$ 000	\$ 000	
	CATERING & OPERATION SUPPORT		MANDAY				
64	LABOR EXPENSE LABOR EXPENSE						
65	SUPERINTENDENCE SUPERINTENDENCE						
66	INSURANCE INSURANCE						
69	FEES FEES						
	SUBTOTAL						
	CONTINGENCY						
	SUBTOTAL						

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ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	AMOUNT	TOTAL	REMARKS
				\$	\$ 000	\$ 000	
71	ENGINEERING		%				
72	LEGAL EXPENSES		%				
75	TAXES		%				
76	ADMINISTRATIVE & GEN. EXPENSES		%				
77	INTEREST		%				
80	EARNINGS/EXPENSES DURING CONSTR.		%				
TOTAL PROJECT COST							
\$							

SUSITNA HYDROELECTRIC PROJECT
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DEVIL CANYON - " REVISION 1 "

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ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	AMOUNT	TOTAL	REMARKS
				\$	\$ 000	\$ 000	
	INTANGIBLE PLANT						
301	ORGANIZATION						
302	FRANCHISE & CONSENTS						
303	MISC INTANGIBLE PLANT						
	PRODUCTION PLANT						
330	LAND & LAND RIGHTS						
.1	LAND						
	LAND	1	LS				
.2	LAND RIGHTS						
	LAND RIGHTS	0	LS				
.3	MISC CHARGES & CREDITS						
	MISC CHARGES & CREDITS	0	LS				
331	POWERPLANT STRUCTURE IMPROVEMENTS						
.1	POWERHOUSE						
.11	POWERHOUSE & DRAFT TUBE						
.111	EXCAVATION						
	POWERHOUSE VAULT ROCK	104,000	CY				

SUSITNA HYDROELECTRIC PROJECT
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ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	AMOUNT	TOTAL	REMARKS
				\$	\$ 000	\$ 000	
	DRAFT TUBE ROCK	33,000	CY				
.113	FOUNDATION PREPARATION						
	POWERHOUSE						
	FOUNDATION PREP (HORIZ)	30,000	SF				
	DENTAL CONCRETE	0	CY				
	DRAFT TUBE						
	FOUNDATION PREPARATION	0	SF				
	DENTAL CONCRETE	0	CY				
.114	CONCRETE						
	POWERHOUSE						
	CONCRETE	25,000	CY				
	REINFORCING STEEL	1,250	TON				
	DRAFT TUBE						
	CONCRETE	13,200	CY				
	REINFORCING STEEL	660	TON				
.115	SUPPORT						
	POWERHOUSE						
	ROCKBOLTS	60	TON				
	DRAFT TUBE						
	ROCKBOLTS	0	TON				
.116	SAFETY PROTECTION						
	POWERHOUSE						
	STEEL MESH	0	SF				
	ROCK BOLTS	0	TON				
	SHOTCRETE	0	SF				
.118	STEEL/METALWORK						
	POWERHOUSE						
	STRUCTURAL STEEL/CRANE RAILS	1	LS				
	METAL FABRICATIONS	0	TON				
	DRAFT TUBE LINER	0	TON				
	MISC	0	LS				
.119	ARCHITECTURAL						
	POWERHOUSE						
	INTERIOR PARTITIONS	1	LS				

SUSITNA HYDROELECTRIC PROJECT
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DEVIL CANYON - * REVISION 1 *

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ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	AMOUNT	TOTAL	REMARKS
				\$	\$ 000	\$ 000	
	METAL DOORS/FRAMES	A	0	EA			
	PAINTING	A	0	LS			
	MISC	A	0	LS			
.11B	CONSTRUCTION ROADS						
	CONSTRUCTION ROADS	0	MILE				
.11C	MECHANICAL						
	DRAFT TUBE GATES	1	LS				
.12	ACCESS TUNNELS & PORTALS						
.121	EXCAVATION						
	TUNNELS [MAIN]						
	ROCK	45,500	CY				
	TUNNELS [SECONDARY]						
	ROCK	2,900	CY				
	PORTALS						
	OVERBURDEN	6,000	CY				
	ROCK USEABLE	3,000	CY				
	ROCK WASTE	A	0	CY			
.123	FOUNDATION PREPARATION						
	PORTALS						
	HORIZONTAL	0	SF				
	INCLINED	0	SF				
.124	CONCRETE & SHOTCRETE						
	TUNNELS [MAIN]						
	CONCRETE LINING	1,750	CY				
	CONCRETE SLAB	A	0	CY			
	REINFORCING STEEL	70	TON				
	STEEL MESH	0	TON				
	SHOTCRETE	0	SF				
	TUNNELS [SECONDARY]						
	CONCRETE LINING	150	CY				
	CONCRETE SLAB	A	0	CY			
	REINFORCING STEEL	6	TON				
	STEEL MESH	0	TON				

SUSITNA HYDROELECTRIC PROJECT
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ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	AMOUNT	TOTAL	REMARKS
					\$ 000	\$ 000	
	SHOTCRETE	0	SF				
	PORTALS						
	CONCRETE BASE SLAB	3,175	CY				
	CONCRETE WALLS	0	CY				
	REINFORCING STEEL	65	TON				
.125	SUPPORT						
	TUNNELS [MAIN]						
	ROCKBOLTS	55	TON				
	STEEL SUPPORT	160	TON				
	TUNNELS [SECONDARY]						
	ROCKBOLTS	10	TON				
	STEEL SUPPORT	30	TON				
	PORTALS						
	ROCKBOLTS	5	TON				
.126	SAFETY PROTECTION						
	PORTALS						
	STEEL MESH	0	TON				
	ROCKBOLTS	0	TON				
	SHOTCRETE	0	SF				
.129	ARCHITECTURAL						
	PORTAL DOORS	0	LS				
.12B	CONSTRUCTION ROADS						
	CONSTRUCTION ROADS	0	MILE				
.13	ACCESS SHAFTS						
.131	EXCAVATION						
	ROCK	14,000	CY				
.134	CONCRETE & SHOTCRETE						
	CONCRETE LINING	7,650	CY				
	REINFORCING STEEL	90	TON				
	STEEL MESH	0	TON				
	SHOTCRETE	0	SF				

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ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	AMOUNT	TOTAL	REMARKS
				\$	\$ 000	\$ 000	
.135	SUPPORT ROCKBOLTS	65	TON				
.138	STEEL/METAL WORK LADDERS, ETC. STRUCTURAL STEEL	0 50	LB TON				
.139	ARCHITECTURAL ENCLOSURES	0	LS				
.13C	MECHANICAL ELEVATORS	1	LB				
.14	FIRE PROTECTION HEADTANK						
.141	EXCAVATION ROCK	2,000	CY				
.144	CONCRETE & SHOTCRETE CONCRETE BASE SLAB CONCRETE WALLS CONCRETE ROOF REINFORCING STEEL STEEL MESH SHOTCRETE	340 0 0 17 0 0	CY CY CY TON TON SF				
.145	SUPPORT ROCKBOLTS STEEL SUPPORT	3 10	TON TON				
.148	STEEL/METAL WORK LADDERS, ETC.	0	LS				
.14C	MECHANICAL PIPING & VALVES	0	LS				

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ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	AMOUNT	TOTAL	REMARKS
				\$	\$ 000	\$ 000	
.15	BUS TUNNELS & SHAFTS						
.151	EXCAVATION						
	ROCK HORIZONTAL	3,000	CY				
	ROCK INCLINED	2,000	CY				
	ROCK VERTICAL	0	CY				
.154	CONCRETE						
	BASE SLAB HORIZONTAL	1,950	CY				
	BASE SLAB INCLINED	0	CY				
	WALLS	0	CY				
	ROOF SLAB	0	CY				
	REINFORCING STEEL	0	CY				
	STEEL MESH	100	TON				
	SHOTCRETE	0	TON				
			SF				
.155	SUPPORT						
	ROCKBOLTS	16	TON				
	STEEL SUPPORT	0	TON				
.16	TRANSFORMER GALLERY						
.161	EXCAVATION						
	ROCK	32,000	CY				
.164	CONCRETE & SHOTCRETE						
	CONCRETE BASE SLAB	2,200	CY				
	CONCRETE WALLS	0	CY				
	CONCRETE ROOF	0	CY				
	REINFORCING STEEL	110	TON				
	STEEL MESH	0	TON				
	SHOTCRETE	0	SF				
.165	SUPPORT						
	ROCKBOLTS	55	TON				
	STEEL SUPPORT	0	TON				

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ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	AMOUNT	TOTAL	REMARKS
					\$ 000	\$ 000	
.17	CABLE SHAFTS						
.171	EXCAVATION ROCK	4,290	CY				
.174	CONCRETE & SHOTCRETE						
	CONCRETE LINING	2,800	CY				
	REINFORCING STEEL	135	TON				
	STEEL MESH	0	TON				
	SHOTCRETE	0	SF				
.175	SUPPORT ROCKBOLTS	72	TON				
.178	STEEL/METALWORK STRUCTURAL STEEL	13	TON				
.179	ARCHITECTURAL ENCLOSURES	0	LS				
.17C	MECHANICAL ELEVATOR	1	LS				
.2	MISC. BUILDINGS & STRUCTURES						
	MISC. BUILDINGS & STRUCTURES	1	LS				
.3	PERMANENT VILLAGE						
	PERMANENT VILLAGE	0	LS				

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				\$	\$ 000	\$ 000	
332	RESERVOIR, DAMS & WATERWAYS						
.1	RESERVOIR						
.11	CLEARING						
	CLEARING	1	LS				
.2	DIVERSION TUNNELS/COFFERDAMS						
.21	DIVERSION TUNNELS/PORTALS						
.211	EXCAVATION						
	TUNNELS						
	ROCK	57,000	CY				
	PORTAL UPSTREAM						
	OVERBURDEN-DRY	14,000	CY				
	ROCK USEABLE	4,000	CY				
	ROCK WASTE	9,000	CY				
	PORTAL DOWNSTREAM						
	OVERBURDEN-DRY	14,000	CY				
	ROCK USEABLE	49,000	CY				
	ROCK WASTE	29,000	CY				
.213	FOUNDATION PREPARATION						
	PORTAL UPSTREAM						
	HORIZONTAL	0	SF				
	INCLINED	0	SF				
	PORTAL DOWNSTREAM						
	HORIZONTAL	0	SF				
	INCLINED	0	SF				
.214	CONCRETE & SHOTCRETE						
	TUNNELS						
	CONCRETE LINING	10,800	CY				
	CONCRETE BASE SLAB	0	CY				
	REINFORCING STEEL	550	TON				
	STEEL MESH	0	TON				
	SHOTCRETE	0	SF				
	PORTAL UPSTREAM						
	CONCRETE PIER	500	CY				
	CONCRETE LINING	0	CY				
	CONCRETE BASE SLAB	0	CY				
	CONCRETE HEADWALL	3,000	CY				
	REINFORCING STEEL	60	TON				
	PORTAL DOWNSTREAM						

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				\$	\$ 000	\$ 000	
	CONCRETE HEADWALL	2,400	CY				
	REINFORCING STEEL	48	TON				
	CONCRETE PLUGS						
	CONCRETE PLUGS	4,000	CY				
.215	SUPPORT TUNNELS						
	ROCKBOLTS	80	TON				
	STEEL SUPPORT	220	TON				
	PORTAL UPSTREAM						
	ROCKBOLTS	10	TON				
	TIEBACKS	0	TON				
	PORTAL DOWNSTREAM						
	ROCKBOLTS	15	TON				
	TIEBACKS	0	TON				
.216	SAFETY PROTECTION						
	PORTAL UPSTREAM						
	STEEL MESH	0	TON				
	ROCKBOLTS	0	TON				
	SHOTCRETE	0	SF				
	PORTAL DOWNSTREAM						
	STEEL MESH	0	TON				
	ROCKBOLTS	0	TON				
	SHOTCRETE	0	SF				
.21B	CONSTRUCTION ROADS						
	CONSTRUCTION ROADS	0	MILE				
.21C	MECHANICAL						
	GATES & RACKS						
	UPSTREAM	1	LS				
	DOWNSTREAM	0	LS				
.22	UPSTREAM COFFERDAM						
.221	EXCAVATION						
	OVERBURDEN	0	CY				
	ROCK	0	CY				

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ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	AMOUNT	TOTAL	REMARKS
				\$	\$ 000	\$ 000	
	REMOVAL OF COFFERDAM	0	CY				
.222	FILL						
	CORE	9,000	CY				
	FINE/FILTER	9,000	CY				
	COARSE FILTER	52,000	CY				
	ROCK SHELL	80,000	CY				
	RIP RAP	5,000	CY				
	CLOSURE DIKE	0	CY				
.223	FOUNDATION PREP/GROUTING						
	CUTOFF & GROUT						
	HOLES	4,200	LF				
	GROUT	672,000	CF				
	CURTAIN						
	CURTAIN	0	SF				
.22B	CONSTRUCTION ROADS						
	CONSTRUCTION ROADS	0	MILE				
.22D	DEWATERING						
	DEWATERING	1	LS				
.23	DOWNSTREAM COFFERDAM						
.231	EXCAVATION						
	OVERBURDEN	0	CY				
	ROCK	0	CY				
	REMOVAL OF COFFERDAM	40,000	CY				
.232	FILL						
	CLOSURE DIKE & FILL	51,000	CY				
.233	FOUNDATION PREP/GROUTING						
	CUTOFF & GROUT						
	HOLES	4,700	LF				
	GROUT	752,000	CF				

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ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	AMOUNT	TOTAL	REMARKS
				\$	\$ 000	\$ 000	
	CURTAIN						
	CURTAIN	A	0	SF			
.23B	CONSTRUCTION ROADS						
	CONSTRUCTION ROADS		0	MILE			
.23D	DEWATERING						
	DEWATERING		0	LS			
.3	MAIN DAM						
.31	MAIN DAM						
.311	EXCAVATION						
	OVERBURDEN [DRY]		122,000	CY			
	ROCK USEABLE		854,000	CY			
	ROCK WASTE	A	0	CY			
.313	FOUNDATION PREP/GROUTING						
	FOUNDATION PREP						
	INCLINED		171,000	SF			
	HORIZONTAL	A	0	SF			
	DENTAL CONCRETE		0	CY			
	DENTAL CONCRETE		0	CY			
	CONSOL. GROUT [SURFACE]						
	DRILL HOLES		215,000	LF			
	GROUT		860,000	CF			
	GROUT CURTAIN [GALLERIES]						
	DRILL HOLES		142,000	LF			
	GROUT		284,000	CF			
.314	CONCRETE & SHOTCRETE						
	DAM						
	CONCRETE		1,676,000	CY			
	REINFORCING STEEL		5,900	TON			
	THRUSTBLOCKS						
	CONCRETE	A	0	CY			
	REINFORCING STEEL	A	0	TON			
	JOINT GROUTING						
	HOLES		1	LS			

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ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	AMOUNT	TOTAL	REMARKS
					\$ 000	\$ 000	
	GROUT	0	CF				
.315	SUPPORT ROCKBOLTS TIEBACKS	0	TON				
		0	TON				
.316	SAFETY PROTECTION STEEL MESH	0	TON				
	ROCKBOLTS	0	TON				
	SHOTCRETE	0	SF				
.317	DRAINAGE HOLES	120,000	LF				
.31A	WINTERIZATION WINTERIZATION	1	LS				
.31B	CONSTRUCTION ROADS CONSTRUCTION ROADS	0	MILE				
.32	GROUT GALLERIES/PORTALS						
.321	EXCAVATION TUNNELS/SHAFTS						
	ROCK HORIZONTAL	2,300	CY				
	ROCK INCLINED	3,700	CY				
	ROCK VERTICAL	1,500	CY				
	PORTALS						
	OVERBURDEN	0	CY				
	ROCK	0	CY				
.323	FOUNDATION PREPARATION PORTALS						
	HORIZONTAL	0	SF				
	INCLINED	0	SF				

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ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	AMOUNT	TOTAL	REMARKS
				\$	\$ 000	\$ 000	
.324	CONCRETE & SHOTCRETE TUNNELS	700	CY				
	CONCRETE LINING	0	CY				
	CONCRETE SLAB	30	TON				1
	REINFORCING STEEL	62	TON				1
	STEEL MESH		SF				1
	SHOTCRETE	18,400					
	SHAFTS	200	CY				
	CONCRETE LINING	0	TON				
	REINFORCING STEEL	0	TON				1
	STEEL MESH		SF				1
	SHOTCRETE	3,900					
	PORTALS	0	CY				
	CONCRETE BASE SLAB	0	CY				
	CONCRETE WALLS	0	TON				
	REINFORCING STEEL	0					
.325	SUPPORT TUNNELS	22	TON				
	ROCKBOLTS	0	TON				
	STEEL SUPPORT						
	SHAFTS	1	TON				
	ROCKBOLTS						
	PORTALS	0	TON				
	ROCKBOLTS						
.326	SAFETY PROTECTION PORTALS	0	TON				
	STEEL MESH	0	TON				
	ROCKBOLTS	0	SF				
	SHOTCRETE						
.329	ARCHITECTURAL PORTAL DOORS	0	LS				
.32B	CONSTRUCTION ROADS CONSTRUCTION ROADS	0	MILE				
.32C	MECHANICAL ELEVATORS	0	LS				

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ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	AMOUNT	TOTAL	REMARKS
				\$	\$ 000	\$ 000	
.4	SADDLE DAM & CUTOFFS						
.41	MAIN SADDLE DAM						
.411	EXCAVATION						
	OVERBURDEN [DRY]	810,000	CY				
	ROCK USEABLE	126,000	CY				
	ROCK WASTE	0	CY				
.412	FILL						
	IMPERVIOUS CORE	226,000	CY				
	FINE FILTER	151,000	CY				
	COARSE FILTER	163,000	CY				
	ROCK SHELL	1,203,000	CY				
	RIP RAP	113,000	CY				
	UNCLASSIFIED [BACKFILL]	0	CY				
.413	FOUNDATION PREP & GROUTING						
	FOUNDATION PREPARATION						
	HORIZONTAL	560,000	SF				
	INCLINED	0	SF				
	DENTAL CONCRETE	0	CY				
	DENTAL CONCRETE	0	CY				
	CONSOL. GROUT [SURFACE]						
	DRILL HOLES	46,900	LF				
	GROUT	187,600	CF				
	GROUT [GALLERIES]						
	DRILL HOLES	0	LF				
	GROUT	0	CF				
	GROUT CURTAIN						
	DRILL HOLES	70,200	LF				
	GROUT	140,400	CF				
.417	DRAINAGE						
	HOLES	16,000	LF				
	PIPES	0	LF				
.41B	CONSTRUCTION ROADS						
	CONSTRUCTION ROADS	0	MILE				

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				\$	\$ 000	\$ 000	
.42	GROUT GALLERIES/PORTALS						
.421	EXCAVATION						
	TUNNELS/SHAFTS						
	ROCK HORIZONTAL	3,600	CY				
	ROCK INCLINED	1,800	CY				
	ROCK VERTICAL	0	CY				
	PORTALS						
	OVERBURDEN	0	CY				
	ROCK	0	CY				
.423	FOUNDATION PREPARATION						
	PORTALS						
	HORIZONTAL	0	SF				
	INCLINED	0	SF				
.424	CONCRETE & SHOTCRETE						
	TUNNELS						
	CONCRETE LINING	500	CY				
	CONCRETE SLAB	0	CY				
	REINFORCING STEEL	0	TON				
	STEEL MESH	0	TON				
	SHOTCRETE	25	SF				
	SHAFTS						
	CONCRETE LINING	0	CY				
	REINFORCING STEEL	0	TON				
	STEEL MESH	0	TON				
	SHOTCRETE	0	SF				
	PORTALS						
	CONCRETE BASE SLAB	0	CY				
	CONCRETE WALLS	0	CY				
	REINFORCING STEEL	0	TON				
.425	SUPPORT						
	TUNNELS						
	ROCKBOLTS	22	TON				
	STEEL SUPPORT	0	TON				
	SHAFTS						
	ROCKBOLTS	0	TON				
	PORTALS						
	ROCKBOLTS	0	TON				

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				\$	\$ 000	\$ 000	
.426	SAFETY PROTECTION PORTALS						
	STEEL MESH	0	TON				
	ROCKBOLTS	0	TON				
	SHOTCRETE	0	SF				
.429	ARCHITECTURAL PORTAL DOORS	0	LS				
.42B	CONSTRUCTION ROADS	0	MILE				
.42C	MECHANICAL ELEVATORS	0	LS				
.5	SERVICE SPILLWAY VALVES						
.51	SERVICE SPILLWAY VALVES						
.51C	MECHANICAL SERVICE VALVES	1	LS				
.52	AUXILLARY SPILLWAY CHUTE						
.521	EXCAVATION APPROACH						
	OVERBURDEN	108,000	CY				
	ROCK USEABLE	772,000	CY				
	ROCK WASTE	0	CY				
	STRUCTURE & CHUTE						
	OVERBURDEN [DRY]	0	CY				
	OVERBURDEN [WET]	0	CY				
	ROCK USEABLE	0	CY				
	ROCK WASTE	0	CY				
	DRAIN TUNNEL	0	CY				
	ROCK	0	CY				
	RIVER CHANNEL						
	ALLUVIUM EXCAVATION-DRY	51,000	CY				

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				\$	\$ 000	\$ 000	
	PLUNGE POOL EXCAVATION-WET	398,000	CY				
.523	FOUNDATION PREP/GROUTING						
	FOUNDATION PREP						
	APPROACH						
	ROCK HORIZONTAL	87,500	SF				
	ROCK INCLINED	53,000	SF				
	STRUCTURE CHUTE						
	ROCK HORIZONTAL	0	SF				
	ROCK INCLINED	0	SF				
	DENTAL CONCRETE	10,000	CY				
	CONSOL. GROUT [SURFACE]						
	DRILL HOLES	17,300	LF				
	GROUT	69,200	CF				
	GROUT [DRAIN TUNNEL]						
	DRILL HOLES	0	LF				
	GROUT	0	CF				
	GROUT CURTAIN						
	DRILL HOLES	0	LF				
	GROUT	0	CF				
.524	CONCRETE & SHOTCRETE						
	CONCRETE WALLS						
	ONE FORM	12,200	CY				
	TWO FORM	10,900	CY				
	CONCRETE SLAB						
	APPROACH	0	CY				
	NO FORM	14,900	CY				
	ONE FORM	0	CY				
	TWO FORM	0	CY				
	CONCRETE GATE CHUTE						
	ONE FORM	8,700	CY				
	TWO FORM	3,400	CY				
	CONCRETE STRUCTURE						
	NO FORM	9,700	CY				
	ONE FORM	0	CY				
	TWO FORM	4,100	CY				
	REINFORCING STEEL						
	REINFORCING STEEL	2,500	TON				
	STEEL MESH						
	STEEL MESH	0	TON				
	SHOTCRETE						
	SHOTCRETE	0	SF				

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				\$	\$ 000	\$ 000	
.525	SUPPORT						
	APPROACH	284	TON				
	ROCKBOLTS	0	TON				
	TIE BACKS						
.526	SAFETY PROTECTION						
	APPROACH	0	TON				
	STEEL MESH	0	TON				
	ROCKBOLTS	0	SF				
	SHOTCRETE						
	STRUCTURE & CHUTE	0	TON				
	STEEL MESH	0	TON				
	ROCKBOLTS	0	SF				
	SHOTCRETE						
.527	DRAINAGE	0	LF				
	DRILL HOLES						
.52A	WINTERIZATION	1	LS				
	WINTERIZATION						
.52B	CONSTRUCTION ROADS	1	MILE				
	CONSTRUCTION ROADS						
.52C	MECHANICAL	1	LS				
	GATES & RACKS						
.52D	DEWATERING & COFFERDAM	1	LS				
	DEWATERING & COFFERDAM	36,000	CY				
	AUX. COFFERDAM & REMOVAL						
.53	EMERGENCY SPILLWAY						
.531	EXCAVATION	0	CY				
	OVERBURDEN	1,468,000	CY				
	ROCK USEABLE	0	CY				
	ROCK WASTE						

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ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	AMOUNT	TOTAL	REMARKS
				\$	\$ 000	\$ 000	
.532	FILL FUSE PLUG	43,000	CY				
.536	SAFETY PROTECTION ROCKBOLTS	0	TON				
	STEEL MESH	0	TON				
	SHOTCRETE	0	SF				
.538	CONSTRUCTION ROADS CONSTRUCTION ROADS	0	MILE				
.6	INTAKES						
.61	INTAKE STRUCTURE						
.611	EXCAVATION OVERBURDEN	43,500	CY				
	ROCK USEABLE	394,200	CY				
	ROCK WASTE	0	CY				
.612	FILL BACKFILL	4,200	CY				
.613	FOUNDATION PREPARATION HORIZONTAL	0	SF				
	INCLINED	0	SF				
.614	CONCRETE & SHOTCRETE STRUCTURE						
	CONCRETE STRUCTURE	38,000	CY				
	CONCRETE MASS	11,600	CY				
	REINFORCING STEEL	1,900	TON				
	APPROACH						
	CONCRETE	0	CY				
	REINFORCING STEEL	0	TON				
.615	SUPPORT STRUCTURE						

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				\$	\$ 000	\$ 000	
	ROCKBOLTS	48	TON				
	TIEBACKS	0	TON				
	APPROACH						
	ROCKBOLTS	0	TON				
	TIEBACKS	0	TON				
.616	SAFETY PROTECTION						
	ROCKBOLTS	0	TON				
	STEEL MESH	0	TON				
	SHOTCRETE	0	SF				
.61B	CONSTRUCTION ROADS						
	CONSTRUCTION ROADS	0	MILE				
.61C	MECHANICAL						
	GATES & RACKS	1	LS				
.7	SURGE CHAMBER						
.71	SURGE CHAMBER						
.711	EXCAVATION						
	ROCK	70,000	CY				
.714	CONCRETE & SHOTCRETE						
	CONCRETE CHAMBER	1,300	CY				
	REINFORCING STEEL	65	TON				
.715	SUPPORT						
	ROCKBOLTS	50	TON				
.71C	MECHANICAL						
	GATES	1	LS				

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ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	AMOUNT	TOTAL	REMARKS
				\$	\$ 000	\$ 000	
.8	PENSTOCKS						
.81	PENSTOCKS						
.811	EXCAVATION TUNNELS						
	ROCK HORIZONTAL	10,000	CY				
	ROCK INCLINED	37,000	CY				
.814	CONCRETE & SHOTCRETE CONCRETE LINER REINFORCING STEEL	21,100 850	CY TON				
.815	SUPPORT ROCKBOLTS SUPPORT STEEL	200 0	TON TON				
.818	STEEL/METALWORK STEEL LINER	1,600	TON				
.9	TAILRACE WORKS						
.91	TAILRACE TUNNELS/PORTALS						
.911	EXCAVATION TUNNELS [MAIN]						
	ROCK	271,000	CY				
	TUNNELS [SECONDARY]						
	ROCK	20,800	CY				
	PORTALS [MAIN]						
	OVERBURDEN-DRY	42,000	CY				
	OVERBURDEN-WET	0	CY				
	ROCK USEABLE	15,000	CY				
	ROCK WASTE	0	CY				
	PORTALS [SECONDARY]						
	OVERBURDEN-DRY	21,000	CY				
	OVERBURDEN-WET	0	CY				
	ROCK USEABLE	7,500	CY				
	ROCK WASTE	0	CY				
.913	FOUNDATION PREPARATION PORTALS						

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ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	AMOUNT	TOTAL	REMARKS
					\$ 000	\$ 000	
	HORIZONTAL	A	0	SF			
	INCLINED	A	0	SF			
.914	CONCRETE & SHOTCRETE						
	TUNNELS [MAIN]						
	CONCRETE LINING	17,700	CY				
	CONCRETE SLAB	A	0	CY			
	CONCRETE PIERS	A	0	CY			
	REINFORCING STEEL	355	TON				
	STEEL MESH	0	TON				
	SHOTCRETE	0	SF				
	TUNNELS [SECONDARY]						
	CONCRETE LINING	8,800	CY				
	CONCRETE SLAB	A	0	CY			
	CONCRETE PIERS	A	0	CY			
	REINFORCING STEEL	180	TON				
	STEEL MESH	0	TON				
	SHOTCRETE	A	0	SF			
	PORTALS [MAIN]						
	CONCRETE BASE SLAB	100	CY				
	CONCRETE WALLS	650	CY				
	REINFORCING STEEL	30	TON				
	PORTALS [SECONDARY]						
	CONCRETE BASE SLAB	50	CY				
	CONCRETE WALLS	400	CY				
	REINFORCING STEEL	15	TON				
.915	SUPPORT						
	TUNNELS [MAIN]						
	ROCKBOLTS	310	TON				
	STEEL SUPPORT	1,080	TON				
	TUNNELS [SECONDARY]						
	ROCKBOLTS	55	TON				
	STEEL SUPPORT	150	TON				
	PORTALS [MAIN]						
	ROCKBOLTS	15	TON				
	PORTALS [SECONDARY]						
	ROCKBOLTS	7	TON				
.916	SAFETY PROTECTION						
	PORTALS						
	ROCKBOLTS	A	0	TON			
	STEEL MESH	A	0	TON			

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ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	AMOUNT	TOTAL	REMARKS
				\$	\$ 000	\$ 000	
	SHOTCRETE	0	SF				
.91B	CONSTRUCTION ROADS						
	CONSTRUCTION ROADS						
	MAIN TUNNEL	0	MILE				
	SECONDARY TUNNEL	0	MILE				
.91C	MECHANICAL						
	GATES						
	MAIN	1	LS				
	SECONDARY	1	LS				
333	WATERWHEELS, TURBINES & GENERATORS						333 REVISED
.1	TURBINES & GOVERNORS						
.11	TURBINES & GOVERNORS						
	.111 SUPPLY	1	LS				
	.112 INSTALL	1	LS				
.2	GENERATORS & EXCITERS						
.21	GENERATORS & EXCITERS						
	.211 SUPPLY	1	LS				
	.212 INSTALL	1	LS				
334	ACCESSORY ELECTRICAL EQUIPMENT						334 REVISED
.1	CONNECTION, SUPPORTS & STRUCT.						
.11	STRUCTURES						
	STRUCTURES	1	LS				
.12	CONDUCTORS & INSULATORS						
	.121 GENERATOR ISOLATED PHASE BUS	1	LS				
	.122 HV POWER CABLES & ACCESS.	1	LS				

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ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	AMOUNT	TOTAL	REMARKS
				\$	\$ 000	\$ 000	
.123	LV POWER CABLES & ACCESS.	1	LS				
.124	CONTROL CABLES & ACCESSORIES	1	LS				
.125	GROUNDING SYSTEM	1	LS				
.13	CONDUITS & FITTINGS	1	LS				
	CONDUITS & FITTINGS						
.2	SWITCHGEAR & CONTROL EQUIPMENT						
.21	AUXILIARY TRANSFORMERS	1	LS				
	AUXILIARY TRANSFORMERS						
.22	CIRCUIT BREAKERS	1	LS				
	CIRCUIT BREAKERS						
.23	SURGE PROTECTION	1	LS				
	SURGE PROTECTION						
.24	SWITCHBOARDS	1	LS				
	SWITCHBOARDS						
.25	AUX. POWER EQUIPMENT	1	LS				
	AUX. POWER EQUIPMENT						
.3	CUBICLES & APPURTENANCES						
.31	CONTROL, RELAY & METER. BOARDS	1	LS				
	CONTROL, RELAY & METER. BOARD						
.32	COMPUTER CONTROL SYSTEM	1	LS				
	COMPUTER CONTROL SYSTEM						
.33	SUPERVIS. & TELEMET. SYSTEM	1	LS				
	SUPERVIS. & TELEMET. SYS.						
.4	POWER TRANSFORMERS						
.41	POWER TRANSFORMERS	1	LS				
	POWER TRANSFORMERS						
.5	LIGHTING SYSTEM						
.51	POWERHOUSE & TRANS. GALLERY	1	LS				
	POWERHOUSE & TRANS. GALLERY						
.52	ACCESS TUNNELS & ROADS	1	LS				
	ACCESS TUNNELS & ROADS						

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ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	AMOUNT	TOTAL	REMARKS
				\$	\$ 000	\$ 000	
.6	MISC. ELECTRICAL EQUIPMENT						
.61	MISC. ELECTRICAL EQUIPMENT						
	MISC. ELECTRICAL EQUIPMENT	1	LS				
335	MISC. POWERPLANT EQUIPMENT						335 REVISED
.1	AUXILIARY SYSTEMS						
.11	STATION WATER SYSTEMS						
	STATION WATER SYSTEMS	1	LS				
.12	FIRE PROTECTION SYSTEMS						
	FIRE PROTECTION SYSTEMS	1	LS				
.13	COMPRESSED AIR SYSTEMS						
	COMPRESSED AIR SYSTEMS	1	LS				
.14	OIL HANDLING SYSTEMS						
	OIL HANDLING SYSTEMS	1	LS				
.15	DRAINAGE & DEWATERING						
	DRAINAGE & DEWATERING	1	LS				
.16	HEAT., VENT. & COOLING SYS.						
	HEAT., VENT. & COOLING SYS.	1	LS				
.17	MISCELLANEOUS						
	MISCELLANEOUS	1	LS				
.2	AUXILIARY EQUIPMENT						
.21	POWERHOUSE CRANES						
	POWERHOUSE CRANES	1	LS				
.22	ELEVATORS						
	ELEVATORS	1	LS				
.23	MISC. CRANES & HOIST						
	MISC. CRANES & HOIST	1	LS				
.3	GENERAL STATION EQUIPMENT						
	GENERAL STATION EQUIPMENT	1	LS				
.4	COMMUNICATIONS EQUIPMENT						
	COMMUNICATIONS EQUIPMENT	1	LS				

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				\$	\$ 000	\$ 000	
336	ROADS						336 REVISED
.1	ROADS						
.12	SITE ROADS	6	MILE				
	SITE ROADS	6	MILE				
	MAINTENANCE						
	GOLD CREEK-DEVIL CANYON	1	LS				
	MAINTENANCE						
	TRANSMISSION PLANT						
350	LAND & LAND RIGHTS						
	LAND & LAND RIGHTS						
352	SUBSTATION & SWITCHING STATION						
	SUBSTATION & SWITCHING STATION						
	STRUCTURES & IMPROVEMENTS						
.1	SWITCHYARD						
.11	SWITCHYARD	1	LS				
	SWITCHYARD						
353	SUBSTATION/SWITCHING STA EQUIP						
	SUBSTATION/SWITCHING STA EQUIP						

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ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	AMOUNT	TOTAL	REMARKS
				\$	\$ 000	\$ 000	
354	STEEL TOWERS & FIXTURES STEEL TOWERS & FIXTURES						
356	OVERHEAD CONDUCTORS & DEVICES OVERHEAD CONDUCTORS & DEVICES						
359	ROADS & TRAILS ROADS & TRAILS						
	GENERAL PLANT						
389	LAND & LAND RIGHTS LAND & LAND RIGHTS						
390	STRUCTURES & IMPROVEMENTS STRUCTURES & IMPROVEMENTS						

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				\$	\$ 000	\$ 000	
391	OFFICE FURNITURE/EQUIPMENT OFFICE FURNITURE/EQUIPMENT						
392	TRANSPORTATION EQUIPMENT TRANSPORTATION EQUIPMENT						
393	STORES EQUIPMENT STORES EQUIPMENT						
394	TOOLS SHOP & GARAGE EQUIPMENT TOOLS SHOP & GARAGE EQUIPMENT						
395	LABORATORY EQUIPMENT LABORATORY EQUIPMENT						
396	POWER OPERATED EQUIPMENT POWER OPERATED EQUIPMENT						

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				\$	\$ 000	\$ 000	
397	COMMUNICATIONS EQUIPMENT COMMUNICATIONS EQUIPMENT						
398	MISCELLANEOUS EQUIPMENT MISCELLANEOUS EQUIPMENT						
399	OTHER TANGIBLE PROPERTY OTHER TANGIBLE PROPERTY						
	INDIRECT COSTS						
61	TEMPORARY CONSTRUCTION FACILITIES TEMPORARY CONSTRUCTION FACILITIES						
62	CONSTRUCTION EQUIPMENT CONSTRUCTION EQUIPMENT						

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ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	AMOUNT	TOTAL	REMARKS
				\$	\$ 000	\$ 000	
63	MAIN CONSTRUCTION CAMP						63 REVISED
.1	MAIN CONSTRUCTION CAMP	1	LB				
	MAIN CONSTRUCTION CAMP						
.11	SITE PREPARATION						
	CLEARING & STRIPPING	83	AC				
	FINE GRADE	399,000	SY				
	INSTALL GRANULAR PAD	1,063,000	CY				
	CONSTRUCT ROADWAYS						
	MAIN ROADS IN CAMP [34']	6,100	LF				
	CONNECT. RD. TO ACCESS RD.	7,200	LF				
	SECONDARY RD [24']	400	LF				
	DRAINAGE						
	DITCHING	31,400	LF				
	CULVERTS	640	LF				
	PERIMETER FENCING						
	PERIMETER FENCING	7,850	LF				
	PARKING AREAS						
	PARKING AREAS	37,000	SF				
.12	BUILDINGS						
	BACHELOR DORMS-108 MAN COMPLX	28	EA				26' x 224'
	BACHELOR DORMS-MGMT-TYPE A	6	EA				28' x 120'
	BACHELOR DORMS-MGMT-TYPE B	9	EA				24' x 120'
	GUEST HOUSES-1 EA QWN/MGR/CON	3	EA				28' x 120'
	CAMP MANAGER'S OFFICES	3	EA				30' x 40'
	STAFF CLUBHOUSE	1	EA				40' x 80'
	DINING HALL	1	EA				120' x 80'
	DINING HALL	1	EA				140' x 120'
	RECREATION BLDG.	1	EA				120' x 140'
	RECREATION BLDG.	1	EA				100' x 120'
	GYMNASIUM	1	EA				200' x 200'
	SECURITY OFFICE	1	EA				40' x 60'
	FIRE STATION	1	EA				40' x 80'
	SOILS/MATERIALS LAB.	1	EA				40' x 80'
	MAINTENANCE BLDG.	1	EA				80' x 100'
	WAREHOUSE - MANAGERS	1	EA				100' x 120'
	WAREHOUSE - FOOD SERVICE	1	EA				100' x 120'
	COMMUNICATION BLDG.	1	EA				20' x 30'
	HOSPITAL	1	EA				120' x 140'
	ICE RINK	1	EA				150' x 300'
	BANK	1	EA				50' x 60'
	PUMP HOUSE	1	EA				20' x 20'
	STORE	1	EA				30' x 60'
	LAUNDRY	1	EA				20' x 30'

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ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	AMOUNT	TOTAL	REMARKS
				\$	\$ 000	\$ 000	
	SWINKING POOL	1	EA				100' x 100'
	PERMAWALK	600	LF				
	6 FEET WIDE	2,250	LF				
	10 FEET WIDE	1,000	LF				
	16 FEET WIDE						
.13	UTILITIES						
	WATER						
	SUPPLY SYSTEM						
	INTAKE POOL & CRIB IN	1	LS				SUSITNA RIVER
	PUMP STA - 720 GPM	1	LS				
	BOOSTER PUMP STA - 720 GPM	1	LS				
	SUPPLY LINE - 2 LINES - 1-4"	4,500	LF				1-4", UTILDR, HT
	TREATMENT PLANT - 1.0 MGD	1	LS				
	RESERVOIR	2	LS				800,000 GAL
	DISTRIBUTION SYSTEM						
	DISTRIBUTION LINES - BURIED	0	LF				
	10"	800	LF				
	8"	240	LF				
	6"	100	LF				
	DISTRIBUTION LINE UTILDR						
	10" DI	1,800	LF				
	8" DI	2,500	LF				
	6" DI	2,000	LF				
	4" DI	1,800	LF				
	HEAT TRACING						
	10" PIPE	2,600	LF				
	8" PIPE	2,740	LF				
	6" PIPE	2,100	LF				
	4" PIPE	1,800	LF				
	PIPE FITTINGS						
	VALVES	1	LS				
	HYDRANTS	1	LS				
	UTILIDORS						
	UTILIDORS	8,100	LF				
	SEWAGE						
	COLLECTION SYSTEM [UTILDR]						
	4" PIPE	2,000	LF				
	6" PIPE	3,000	LF				
	8" PIPE	2,400	LF				
	10" PIPE	800	LF				
	12" PIPE	2,800	LF				
	HEAT TRACING						
	4"	2,000	LF				
	6"	3,000	LF				

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ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	AMOUNT	TOTAL	REMARKS
				\$	\$ 000	\$ 000	
	8"	2,400	LF				
	10"	800	LF				
	12"	2,800	LF				
	TREATMENT PLANT						
	SKIMMING TANK	1	EA				
	LAGOONS - (1 @ 385' x 205' &	3	EA				2 @ 280' x 155'
	RBC's	5	EA				
	PHYS/CHEM UNIT	1	EA				
	CLARIFIER	1	EA				
	DISINFECTION	1	EA				
	HEAT PUMP	1	EA				
	THICKENER	1	EA				
	FILTER PRESS	1	EA				
	DRYING BEDS	2	EA				
	OUTFALL LINE (10")	4,200	LF				
	UTILIDOR	1,100	LF				
	OUTFALL	1	EA				
	ELECTRICAL						
	GENERATING STATIONS						20' x 20'
	BUILDINGS	2	EA				
	GENERATORS (500 KW)	6	EA				
	DAY TANK	2	EA				
	FUEL STORAGE TANK	2	EA				
	SUBSTATION	2	EA				
	LIGHTING						
	POLE MOUNTED LUMINAIRES	14	EA				
	FLOOD LIGHTS	15	EA				
	FIRE ALARM SYSTEM						
	FIRE ALARM SYSTEM	1	LS				
	TELEPHONE SYSTEM						
	TELEPHONE SYSTEM	1	LS				
	TV/RADIO STATION						
	TV/RADIO STATION	1	LS				
	SOLID WASTE FACILITY						
	SOLID WASTE FACILITY	1	LS				
	POL						50' x 60'
	GARAGE/MAINTENANCE BLDG	1	EA				
	TANKS						
	50,000 GAL	4	EA				
	100,000 GAL	20	EA				
	EARTHWORK						
	CLEARING & GRUBBING	9	AC				
	BERMS	30,000	CY				
	PIPING	1	LS				
	FUEL STATION	1	LS				

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				\$	\$ 000	\$ 000	
.2	MAIN CONSTRUCTION VILLAGE						
	MAIN CONSTRUCTION VILLAGE	1	LS				
.21	SITE PREPARATION A						
	CLEARING & STRIPPING	111	AC				TOTAL A=5,636,000 SF
	FINE GRADING	538,000	BY				DEPTH 8'
	INSTALL GRANULAR PAD	1,435,000	CY				
	CONSTRUCT ROADWAYS						
	ROADWAYS IN VILLAGE						
	MAIN ROAD 34' WIDE	2,300	LF				ASPHALT PVMT
	SECONDARY ROADS 24' WIDE	19,600	LF				ASPHALT PVMT
	CONNECTION TO ACCESS RD 34'	4,000	LF				VIL LHT-MN ACC A/C P
	DRAINAGE						
	DITCHING	51,600	LF				RDWY TOT's (x) 2
	CULVERTS - 320 LOTS	7,440	LF				@ 20' & 40' XING (26
	PERIMETER FENCING						
	PERIMETER FENCING	9,100	LF				
	PARKING AREAS						
	PARKING AREAS	37,500	SF				GRANULAR SURFACE
.22	BUILDINGS A						
	SINGLE FAMILY UNIT - 2 BDRM	72	EA				14' x 60'
	SINGLE FAMILY UNIT - 3 BDRM	200	EA				14' x 60'
	SINGLE FAMILY UNIT - 2 BDRM	16	EA				24' x 50'
	SINGLE FAMILY UNIT - 3 BDRM	16	EA				24' x 50'
	SINGLE FAMILY UNIT - 4 BDRM	16	EA				28' x 50'
	SCHOOL (22,750 SF)	1	LS				(12 CLASSROOMS)
	GYMNASIUM	1	LS				100' x 100'
	SWIMMING POOL	1	LS				100' x 100'
	RECREATION CENTER	1	LS				80' x 100'
	STORE	1	LS				100' x 160'
	FIRE STATION	1	LS				30' x 40'
	GAS STATION & PUMP, 3-BAY w/	1	LS				2-10,000 GAL TANKS
.23	UTILITIES A						
	WATER						
	SUPPLY LINE 6"	4,900	FT				
	RESERVOIR (850,000 GAL)	1	EA				
	PUMP STATION 4500 GPH	1	EA				
	DISTRIBUTION SYSTEM						
	DISTRIBUTION LINE-BURIED						
	10" DI	850	LF				
	8" DI	305	LF				
	6" DI	260	LF				
	DISTRIBUTION LINE - UTLD						

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				\$	\$ 000	\$ 000	
	10"	7,650	LF				
	8"	2,750	LF				
	6"	2 50	LF				
	HEAT TRACING						
	10" PIPE	8,500	LF				
	8" PIPE	3,050	LF				
	6" PIPE	2,600	LF				
	VALVES						
	10", 8", & 6"	1	LS				
	HYDRANTS						
	VALVES & STUBS INC - 1 EA	21	EA				@ APPROX 400'
	SEWAGE						
	COLLECTION SYSTEM						
	6" PIPE	5,450	LF				
	8" PIPE	3,000	LF				
	10" PIPE	2,350	LF				
	12" PIPE	100	LF				
	HEAT TRACING						
	6" PIPE	5,450	LF				
	8" PIPE	3,000	LF				
	10" PIPE	2,350	LF				
	12" PIPE	100	LF				
	PUMPING SYSTEM						
	PUMP STATION	1	LS				
	6" FORCE MAIN	11,000	LF				VILLAGE TO MAIN CAMP TREATMENT PLANT
	ELECTRICAL						
	GENERATING STATIONS						
	BUILDINGS	2	EA				
	GENERATORS 650 KW	4	EA				
	DAY TANKS	2	EA				
	FUEL STORAGE TANKS	2	EA				
	SUBSTATIONS		EA				
	WIRING		LS				
	DISTRIBUTION						
	DISTRIBUTION	1	LS				
	FIRE ALARM SYSTEM						
	FIRE ALARM SYSTEM	1	LS				
	TELEPHONE SYSTEM						
	TELEPHONE SYSTEM	1	LS				
	UTILIDORS						
	MAIN RUNS IN VILLAGE	11,800	LF				
	STREET CROSSING 50 LF EA	1,200	LF				
	PUMP STA TO TREATMENT PLANT	5,500	LF				
	STUBS TO HSE LOTS 320 @ 20'	6,400	LF				
	STUBS TO BLDGS - 6 @ 25'	150	LF				
	INTEGRATED OFFICE AREA						

INCL 4" SVC, ETC.

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ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	AMOUNT	TOTAL	REMARKS
				\$	\$ 000	\$ 000	
	OWNER/MGRS OFFICE	1	LS				120' x 160'
	CONTRACTORS OFFICE	1	LS				120' x 160'
.4	CATERING & SUPPORT CATERING & SUPPORT	2,450,000	HANDAY				
.5	CONSTRUCTION POWER CONSTRUCTION POWER	1	LS				
64	LABOR EXPENSE LABOR EXPENSE						
65	SUPERINTENDENCE SUPERINTENDENCE						
66	INSURANCE INSURANCE						
69	FEES FEES						
	SUBTOTAL						

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ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	AMOUNT	TOTAL	REMARKS
					\$ 000	\$ 000	
	CONTINGENCY		X				
	SUBTOTAL						
71	ENGINEERING		X				
72	LEGAL EXPENSES		X				
75	TAXES		X				
76	ADMINISTRATIVE & GEN. EXPENSES		X				
77	INTEREST		X				
80	EARNINGS/EXPENSES DURING CONSTR.		X				
	TOTAL PROJECT COST						

TASK 9 - EBASCO ESTIMATING PACKAGE REVISION 1 Dec. 23, 1981
(drawings that go with report unable to be microfilmed
with report)

The following drawings can be found on drawing index for Drawings
being microfilmed)

- SK-5700-C6-519 Watana Main Spillway General Arrangement Plan & Profile
- SK-5700-C6-520A Watana Main Spillw-y Sections
- SK-5700-C6-521 Watana Main Spillway Control Structure General
- SK-5700-C6-522 ~~Arrangement~~ Watana Emergency Spillway General Arrangement Plan
Profile & Sections
- SK-570--C6-621 Devil Canyon Main Spillway General Arrangemeng Plan &
Profile
- SK-5700-C6-622A Devil Canyon Main Spillway Chute Sections & Details
- SK-5700-C6-622B Devil Canyon Main Spillway Control Structure Plan
and Sections
- SK-5700-C6-623A Devil Canyon Emergency Spillway General Arrangement
Plan & Profile
- SK-5700-C6-623B Devil Canyon Emergency Spillway Sections