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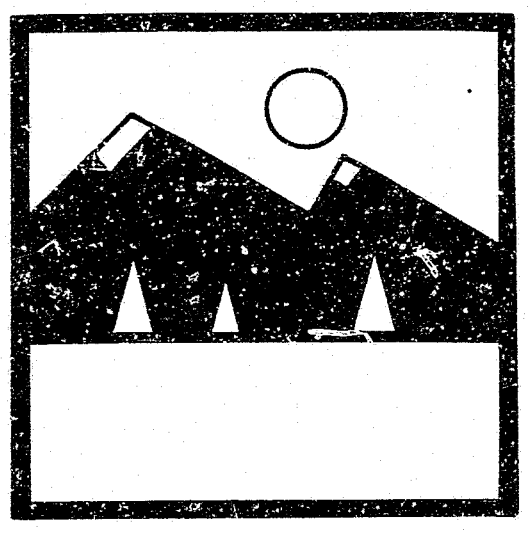
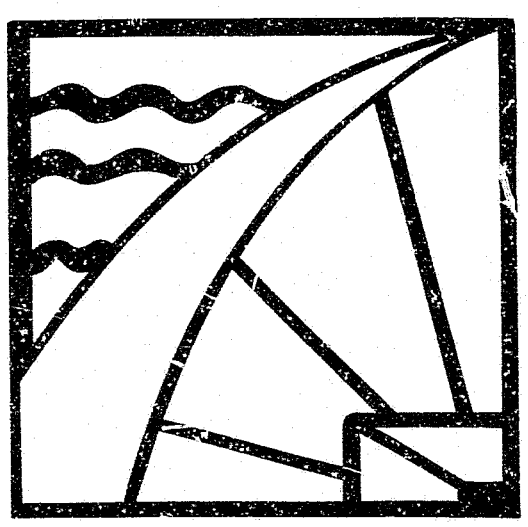
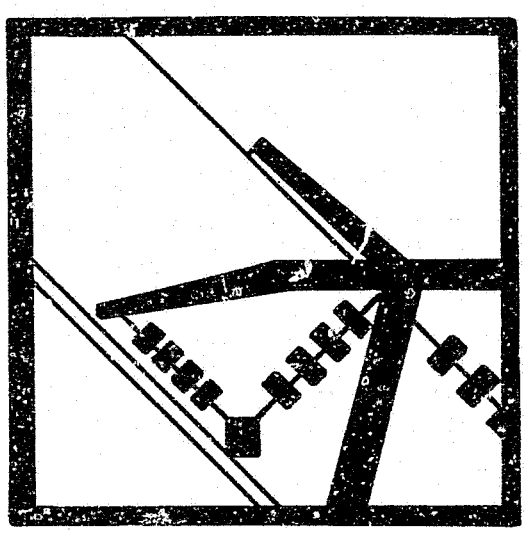


ALASKA POWER AUTHORITY



SUSITNA HYDROELECTRIC PROJECT



DESIGN TRANSMITTAL

TASK 2: ANALYSIS OF ALTERNATIVE TRANSPORTATION MODES FOR CAMP RESUPPLY

FEBRUARY 1980

ACRES

J. Lawrence
15700.15.201

ALASKA POWER AUTHORITY
SUSITNA HYDROELECTRIC PROJECT

DESIGN TRANSMITTAL

TASK 2: ANALYSIS OF ALTERNATIVE TRANSPORTATION MODES FOR CAMP RESUPPLY

FEBRUARY 1980

PREPARED BY: C. A. DEBELIUS
APPROVED BY: J. D. LAWRENCE

SUSITNA HYDROELECTRIC PROJECT

DESIGN TRANSMITTAL

TASK 2: ANALYSIS OF ALTERNATIVE TRANSPORTATION MODES FOR CAMP RESUPPLY

TABLE OF CONTENTS

1 - INTRODUCTION

This transmittal presents the results of an analysis to compare alternative transportation modes for resupply of camp facilities for the Susitna Hydroelectric Project at Watana Dam Site during the period March, 1980 through June, 1982.

The Plan of Study (POS) submitted to Alaska Power Authority (APA) on September 11, 1979, envisioned the construction early in Phase I of an airfield at the proposed field camp site so that fixed-wing aircraft could be used to resupply the camp with perishables, spare parts, and light consumables as well as to transport personnel back and forth to the camp site throughout the Project. Heavy resupply, particularly for fuel, would be accomplished in winter when overland transportation would be possible. The first concept had involved military forces for construction of the airfield as a tactical exercise. Subsequent to submission of the POS, it was agreed that ACRES would proceed on the assumption that military support would not be available.

On November 1, 1979, ACRES provided APA with a new estimate for Phase I camp resupply transportation. Several specific line items were pertinent at that time and have since been included in cost estimates submitted in support of the APA-ACRES contract documents. These items follow:

(a) Under Subtask 2.02:

- Transportation (the cost of air transportation to and from camp during the contract period)	$ 510,000

(b) Under Subtask 2.03:

- Design and construction management (including work by R & M and ACRES)	$ 33,000
- Construction	$1,123,800

(c) Total camp resupply by air $1,666,800

Certain assumptions were made in good faith in support of these costs:

(i) BLM would permit use of Rolligons during the summer months to permit removal of airfield construction equipment as soon as the airfield was completed, or Hercules Aircraft would be used to remove construction equipment.

(ii) 132,000 cubic yards of fill and 150,000 cubic yards of crushed rock will be required. (No actual site survey was then available to produce more precise quantity estimates.)

(iii) Food and lodging for construction personnel would be provided as a portion of the total camp operation cost.

2 - SUMMARY

Three alternatives for camp resupply have been considered:

- Use of large aircraft
- Use of light aircraft
- Use of helicopters

Cost comparisons indicate that the most cost-effective alternative is that of using helicopters, for at least the first year of camp operation, with a consequent savings in Phase I costs of approximately $100,000. However, some of this amount may be consumed by the additional requirements of warehousing and passenger scheduling services. Nevertheless, it is recommended that the camp be supplied using helicopters for the initial year of operation.

3 - PROBLEM

A field reconnaissance undertaken by CIRI/H & N suggests that significantly more cubic yards of material than had earlier been estimated would be required at the site of the proposed airstrip. In addition, BLM has now indicated that Rolligon transportation in the summer months is not likely to be permitted. The net result is that staggering increases in airfield construction cost estimates have now occurred. Indeed, the original FMA estimate (ATTACHMENT 1) supporting a cost of $1.1 to $1.4 million must now be compared to estimates by CIRI/H & N of $5.0 to $6.1 million (ATTACHMENT 2). Equipment rental alone, since no summer removal is possible by Rolligon and since Hercules removal would require a runway even longer than that proposed, would run on the order of $2.0 million.

In order to provide independent review and confirmation of the CIRI/H & N estimate, ACRES has asked FMA to prepare an evaluation (ATTACHMENT 3). A preliminary response from FMA suggests a potential reduction to $3.7 million (ATTACHMENT 3). For purposes of further analysis, we assume a cost of $4 million for constructing and instrumenting an airfield for large aircraft. Simply stated, the problem is as follows:

> AIR RESUPPLY OPERATIONS FOR THE CAMP SHOULD BE CONDUCTED IN SUCH A WAY THAT TOTAL COSTS OF THIS ACTIVITY ARE MINIMIZED AND, TO THE EXTENT POSSIBLE, KEPT WITHIN THE NOVEMBER 1, 1979 ESTIMATE.

4 - ALTERNATIVES FOR RESUPPLY

Three alternatives were considered for resupply. Each is described in succeeding paragraphs.

4.1 - Use of large Aircraft

This approach would involve continuation of the original concept, but at a significantly higher cost.

Cost includes:

(a) Phase I

- Design and construction management	$ 33,000
- Airfield construction	$4,000,000
- Air transportation 90 Hercules trips @ $4,000 (Note that a loaded Herc can land on a 5,300 foot runway and take off empty. A loaded Herc requires 6,300 feet to take off.)	$ 360,000
- 300 trips by light aircraft at $500/trip	$ 150,000
- Subtotal, Phase I	$4,543,000

(b) Phase II

- Air transportation	$ 510,000

(c) TOTAL, Phase I and II $5,053,000

4.2 - Use of Light Aircraft

This approach assumes construction of a 3,000-foot runway and total resupply by light aircraft. Precise cost estimates for such a strip have not been prepared, but it is clear they would substantiate the need for $2 million in equipment rentals and perhaps 3/5 of the remaining $2 million. Thus, costs are assumed as follows:

(a) Phase I

- Design and construction management	$ 33,000
- Airfield construction	3,200,000
- Air transportation Daily trips, say 800 @ $500	400,000
- Increased heavy lift by Rolligon in winter	250,000
- Subtotal, Phase I	$3,883,000

(b) Phase II

- Air transport	$ 400,000
- Rolligons	250,000
- Subtotal, Phase II	$ 650,000
(c) TOTAL, Phase I and II	$4,533,000

4.3 - Use of Helicopters

This approach assumes design and construction of a helicopter pad only. Construction would use some in-place equipment to construct camp gravel pad. Daily use of a large helicopter (such as a Bell 205A-1) in months of May through September is assumed and daily trips by a smaller helicopter (such as Bell 206B) are assumed in other months.

(a) Phase I

- Design and construction pad	$ 25,000
- Trips by Bell 205A-1 12 mos x 30 $\frac{dys}{mo}$ x 3 hrs x $890*	$ 961,200
- Trips by Bell 206B 16 mis x 30 $\frac{dys}{mo}$ x 3 hrs x $370*	532,800
- Increased heavy lift by Rolligon in winter	$ 250,000
- Assume non-flying days for weather @ 15%, or .15(961,200 + 532,800) rounded out	(225,000)
- Subtotal Phase I	$1,544,000
(b) Phase II (same less $25,000)	$1,519,000
(c) TOTAL Phases I and II	$3,063,000

*Rates provided by Sea Airmotive, Inc. Normally, a contract rate will be equivalent to three times the cost of an hourly rate, so that several trips may actually be made in any given day.

5 - ANALYSIS OF ALTERNATIVES

It must be kept in mind that a heavy-lift airfield is likely to be required by the time project construction commences. While such a cost can be deferred initially, it cannot be entirely avoided. A discussion of each alternative follows:

5.1 - Use of Large Aircraft

While the cost for this alternative is clearly greatest, it has the advantage of providing a facility available for use throughout the entire project period, including project construction and beyond through plant operation. It would ensure a heavy lift capability in summer for unforeseen emergencies. It also would offer the possiblility of better all-weather operation than the helicopter alternative. Disadvantages include:

(a) High cost,
(b) Requirement for a wetlands permit, which may cause some delay,
(c) Commitment to major capital cost prior to the Go-No-Go decision and
(d) Possible significant costs for snow clearing in winter.

5.2 - Use of Light Aircraft

While the initial cost for this approach is slightly less than for that for large aircraft, a significant cost for lengthening the original strip would have to be incurred later. All of the above disadvantages remain in force, but the unforeseen heavy-lift emergency can no longer be accommodated.

5.3 - Use of Helicopters

This approach was originally discounted on the ground that its $3.2 million cost for Phases I and II significantly exceeded the $2.2 million originally estimated for the work in Phase I and II. ($2.2 million is the sum of $1.7 million cited in Paragraph 1 (c) for Phase I and $0.5 million for air transportation during Phase II.) This approach offers certain advantages:

(a) The Phase I costs remain approximately the same as estimated.
(b) Operations can probably begin without a gravel pad, thereby avoiding wetland permit delay.
(c) Capital investment prior to Go-No-Go decision is minimized.
(d) An exclusive contract with a helicopter charter service could further reduce costs estimated for hourly rates.
(e) Some sharing of helicopter time for field support (such as drop-offs enroute to Talkeetna) could reduce pressure on tight field helicopter support estimates.
(f) The camp area is more easily restored to its original condition if no actual project is undertaken.

Disadvantages include:

(a) Loss of emergency heavy-lift capability for unforeseen events,

(b) Deferrment of capital costs which must ultimately be invested if a project is ever to be built,

(c) Greater sensitivity to poor weather conditions, and

(d) An increase in the costs originally estimated for Phase II (In the amount of approximately $1 million).

6 - RECOMMENDATIONS

It is recommended that:

(a) The helicopter alternative be selected as preferred for at least the first year of operation of the camp until the Go-No-Go decision is reached.

(b) This issue be reviewed prior to January 1981 so that equipment for airfield construction can be brought to the camp in February 1981 if necessary.

(c) No change be made in estimated costs for Phase I until operational experience proves up the possibility of saving approximately $100,000* in Phase I.

(d) APA approve these recommendations as soon as possible so that they can be incorporated in the revised POS.

Charles A. Debelius, P.E.
Study Director

*This cost may have to be incurred in the event that the helicopter charter service is unable to provide a receiving warehouse and passenger scheduling service. We are currently evaluating such a requirement and will attempt to include it as a work statement in helicopter subcontracting.

'HUCK DEEELIUS
ACRES AMERICAN, INC.

ATTACHMENT 1

FM . R. M. JENS

SUBJECT: SUSITNA AIRSTRIP COST ESTIMATE

SHOWN BELOW IS THE COST ESTIMATE YOU REQUESTED FOR CONSTRUCTION OF AN AIRSTRIP TO ALLOW HERCULES TAKEOFF AND LANDINGS AT THE WATANA DAMSITE. THE FOLLOWING ASSUMPTIONS WERE MADE IN FORMULATING THE COST ESTIMATE:

- THE LENGTH OF THE STRIP WAS ESTABLISHED AT 6300 TO ALLOW TAKEOFF OR LOADED AIRPLANES TO FACILITATE EQUIPMENT REMOVAL. IF ONLY LANDING OF LOADED AIRPLANES IS REQUIRED THEN THE STRIP CAN BE SHORTENED TO 5300 FEET.

- NO ALLOWANCE HAS BEEN MADE FOR DRILLING AND SHOOTING THE MATERIAL SITE. IT IS ASSUMED THAT D-8'S WITH RIPPERS CAN DEVELOP THE MATERIAL SITE.

- ALLOWANCES WERE MADE FOR THE CONSTRUCTION OF A MAXIMUM OF 10,000 FEET OF ACCESS ROAD FROM THE MATERIAL SITE TO THE AIRSTRIP SITE. IN REALITY, THE COST OF THIS ACCESS ROAD MAY BE ATTRIBUTABLE TO THE ENTIRE PROJECT AND NOT JUST FOR THE AIRSTRIP.

- ROOM AND BOARD AND PERSONNEL TRANSPORTATION COSTS WERE NOT INCLUDED IN THE FIGURES SHOWN.

SUSITNA AIRSTRIP - COST ESTIMATE

SIZE: 150' X 6300' WITH 100' X 200' LOAD/UNLOAD PAD
ACCESS ROAD: ASSUME MAXIMUM OF 10,000' X 30'

EMBANKMENT (3 FOOT DEPTH OF FILL)	110,000CY	AIRSTRIP & PAD
	22,000CY	ACCESS ROAD
TOTAL	132,000CY	
TOP COURSE (6" CRUSHED ROCK)	18,000CY	AIRSTRIP & PAD
TOTAL MATLS	150,000CY	

COSTS	
MATERIALS:	
- EMBANKMENT ($.75/CY)	$ 99,000
- TOP COURSE ($.75/CY)	13,500
- NAVIGATION AIDS (BEACON & VASI LIGHTING)	20,000
LABOR & EQUIPMENT:	
- PROCESS, LOAD, HAUL, PLACE EMBANKMENT ($6.00/CY)	792,000
- PROCESS, LOAD, HAUL, PLACE TOP COURSE ($12.50/CY)	225,000
MOBILIZATION/DEMOBILIZATION:	
- CAT TRAIN (DOZERS, LOADERS, .8S MECH TRUCKS, ETC.)	10,000
- HERC FLIGHTS (CRUSHER, DUMP TRUCKS, ROLLER, GRADER)	140,000
- EQUIPMENT SETUP & TEARDOWN (20 MDAY AT $250/MD)	5,000
TOTAL	$ 1,304,500

Reduced the estimate furnished to APA since plan was to build a shorter strip and [illegible] remove equipment by [illegible] in lieu of Hercules.

SUMMARY ESTIMATE SHEET

HOLMES & NARVER, INC.
ENGINEERS - CONSTRUCTORS

ACTION	BY	DATE	CHECKED	DATE
PRICED	RCP			
EXTENSIONS				

ACCT. NO.	DESCRIPTION	MANHOURS	LABOR	MATERIAL	SUB-CONTRACT	TOTAL COST
	RUNWAY CONSTRUCTION	42845	1 113 970	-	-	1 113 970
	TEMPORARY CONSTRUCTION	-	-	45 000	-	45 000
	SUPERVISION (SURVEYOR MH. ONLY)	6500	492 800	-	108 000	600 800
	MOBILIZATION & DE-MOBILIZATION	8000	208 000	42 000	455 000	705 000
	EQUIPMENT RENTAL	1000	26 000	2 324 000	-	2 350 000
	FIELD STAFF & LABOR EXPENSES	-	-	751 440	-	751 440
	SUB TOTAL	58345	1 840 770	3 167 440	563 000	5 546 430
	OH'D 10%					556 643
	SUB TOTAL					6 123 073
	FEE					
	SUB TOTAL					
	CONTINGENCY					
	TOTAL CONSTRUCTION					
	TOTAL					

FACILITY SUSITNA WATANA CAMP RUNWAY 150' X 5280' LOCATION ALASKA

OWNER ACRES AMERICA AREA $ F COST

TYPE OF ESTIMATE

ATTACHMENT 2 - page 1

DETAIL ESTIMATE SHEET

HOLMES & NARVER, INC.
ENGINEERS - CONSTRUCTORS

ACTION	BY	DATE	CHECKED	DATE
PRICED	RCP	12-12-79		
EXTENSIONS				

ACCT. NO.	DESCRIPTION	QUANTITY	UNIT	LABOR				MATERIAL		SUBCONTRACTS		TOTAL COST
				LABOR UNIT	TOTAL MHRS	RATE HR.	AMOUNT	COST UNIT	AMOUNT	COST UNIT	AMOUNT	
	TEMPORARY CONSTRUCTION											
	ANCHORAGE OFFICE	12	MOS						12 000			
	MARSHALL YARD / WHSE	4	MOS						8 000			
	TEL & TEL	12	MOS						18 000			
	FURNITURE & SUPPLIES	1	LS						7 000			
	SAFETY	1	LS						4 000			
	SUB TOTAL								45 000			45 000
	SUPERVISION (SUB CONTRACTOR)											
	PROJECT MGR	10	MOS		4700-		47 000					
	SUPT.	10	MOS		8800-		88 000					
	FOREMAN	6	MOS		8800-		52 800					
	BOOKKEEPER	10	MOS		3800-		38 000					
	SUPERVISION (H&N)											
	CONST. MGR	10	MOS		7000-		70 000					
	PERMITS	2	MOS		4000-		8 000					
	INSPECTOR	-	MOS	W/ SUB	CONTR.		-					
	CLERICAL	10	MOS		2000-		20 000					
	INSPECTION LAB. SERVICE	1	LS				-				108 000	
	SURVEYORS (3)	6500	MH.			26.02	169 000					
	SUB TOTAL						492 800				108 000	600 800

FACILITY WATANI CAMP RUNWAY

TYPE OF ESTIMATE AM; JOB NO. 9051.01 SHEET NO. 2 OF 6 PRINCIPAL SUB ACCT. NO.

11-32 OCT 70 REV

ATTACHMENT 2 - page 2

DETAIL ESTIMATE SHEET

HOLMES & NARVER, INC.
ENGINEERS - CONSTRUCTORS

ACTION	BY	DATE	CHECKED	DATE
PRICED	RCP	12-12-79		
EXTENSIONS				

ACCT. NO.	DESCRIPTION	QUANTITY	UNIT	LABOR				MATERIAL		SUBCONTRACTS		TOTAL COST
				LABOR UNIT	TOTAL MHRS	RATE HR.	AMOUNT	COST UNIT	AMOUNT	COST UNIT	AMOUNT	
	MOBILIZATION & DEMOB											
	TRUCK TO CANYON CREEK	1	LS								40 000	
	✓ TO ANCHORAGE - DE.MOB	1	LS								44 000	
	SNOW REMOVAL	1	LS								20 000	
	✓ ✓ - DE. MOB	1									22 000	
	CRANE @ STAGING 50T	2	MOS						12 000			
	✓ ✓ - DE. MOB	2	MOS						14 000			
	LIGHT PLANT	2	MOS						2 000			
	✓ ✓ DE MOB	2	MOS						2 000			
	SUBURBAN 4WD.	2	MOS						1 000			
	✓ ✓ DE-MOB	2	MOS						1 000			
	HUSKY MUSKEG 6 MAN	2	MOS					2500	5 000			
	✓ ✓ ✓ DE MOB	2	MOS					2500	5 000			
	CATCO TRIPS (1 PER DAY)	45	TRIPS					3000	120 000		120 000	
	✓ ✓ ✓ DEMOB	40	TRIPS					3500	140 000		140 000	
	CATCO MOBILIZER	3	EA					12000	36 000		36 000	
	✓ ✓ DEMOB	3	EA					12000	39 000		39 000	
	LABOR @ STAGING	2000	MH		2000	25	50 000					
	✓ ✓ DEMOB	2000	MH		2000	27	54 000					
	HELICOPTER TIME										120 000	
	LABOR @ CAMP	2000			2000	25	50 000					
	✓ ✓ DEMOB	2000			2000	27	54 000					
	SUB TOTAL						208 000		42 000		455 000	705 000

FACILITY WAINANA RUNWAY

TYPE OF ESTIMATE O.M. JOB NO. 9051.01 SHEET NO. 3 OF 6 PRINCIPAL SUB ACCT. NO.

ATTACHMENT 2 - page 3

DETAIL ESTIMATE SHEET

HOLMES & NARVER, INC.
ENGINEERS - CONSTRUCTORS

ACTION	BY	DATE	CHECKED	DATE
PRICED	RCP	12-12-79		
EXTENSIONS				

ACCT. NO.	DESCRIPTION	QUANTITY	UNIT	LABOR				MATERIAL		SUBCONTRACTS		TOTAL COST
				LABOR UNIT	TOTAL MHRS	RATE HR.	AMOUNT	COST UNIT	AMOUNT	COST UNIT	AMOUNT	
	EQUIPMENT RENTAL											
	CRUSHING PLANT 2000TPD	10	Mos					14,000-	140 000			
	FRONT END LOADER (2)	20	Mos					6000-	120 000			
	SCRAPERS 24 cy (4)	40	Mos					17,500-	700 000			
	DOZER - D-8 (2)	20	Mos					12,000-	240 000			
	SHEEPSFOOT SELF-PROPELLED (7)	70	Mos					2000-	140 000			
	GRADER (2)	20	Mos					5200-	104 000			
	TRUCKS 18 cy (2)	20	Mos					4600-	92 000			
	WATER TRUCK (2)	20	Mos					3000-	60 000			
	GENERATOR 150 KW	INCL. W/CRUSHER						-	-			
	BOB CAT (1)	10	Mos					1000-	10 000			
	MAINT./FUEL/LUBE TRUCK (1)	10	Mos					2000-	20 000			
	LIGHT PLANTS (4)	40	Mos					1000-	40 000			
	PUMPS W/HOSE 6" (2)	20	Mos					1250-	25 000			
	CREW BUS (1)	10	Mos					2000-	20 000			
	SUBURBAN 4 W.D. (2)	20	Mos					900-	18 000			
	FUEL STORAGE 230,000	GAL			1000		26 000		170 000			
	" " BERM	1	LS		"				60 000			
	SMALL TOOLS	1	LS						20 000			
	FUEL D.- 220,000 GAL CAT 10,000	230,000	GAL					1.5-	345 000			
	NOTE: FUEL TRANSPORTATION COST INCLUDED IN PRICE											
	SUBTOTAL						26 000		2 324 000			2 350 000

FACILITY WATANA CAMP RUNWAY

TYPE OF ESTIMATE O.M. JOB NO. 9051.01 SHEET NO. 4 OF 6 PRINCIPAL SUB ACCT. NO.

11-32 OCT 70 REV

ATTACHMENT 2 - page 4

DETAIL ESTIMATE SHEET

HOLMES & NARVER, INC.
ENGINEERS - CONSTRUCTORS

ACTION	BY	DATE	CHECKED	DATE
PRICED	RCP	12-12-79		
EXTENSIONS				

ACCT. NO.	DESCRIPTION	QUANTITY	UNIT	LABOR				MATERIAL		SUBCONTRACTS		TOTAL COST
				LABOR UNIT	TOTAL MNRS	RATE HR.	AMOUNT	COST UNIT	AMOUNT	COST UNIT	AMOUNT	
	FIELD STAFF & LABOR EXPENSE											
	PAYROLL TAX & INS. (FIELD LABOR)	1,517,000	¢					.18	273 060			
	" " (H&N)	INCL	-						-			
	SUBSISTENCE - FIELD (INCL CAMP)	5000	MD.					86	430 000			
	ANCHORAGE	10	MOS					4000	40 000			
	TRAVEL AIR (LA. TO ANCH.)	8	EA					450	3 600			
	TRAVEL ANCH. TO CANYON CREEK	1	LS						5 000			
	SUB TOTAL								751 660			751 660

FACILITY Wiseana Camp Runway

TYPE OF ESTIMATE OM JOB NO. 9051.01 SHEET NO. 5 OF 6 PRINCIPAL SUB ACCT. NO.

11-32 OCT 70 NRV

ATTACHMENT 2 - page 5

DETAIL ESTIMATE SHEET

HOLMES & NARVER, INC.
ENGINEERS - CONSTRUCTORS

ACTION	BY	DATE	CHECKED	DATE
PRICED	RCP	12-11-79		
EXTENSIONS				

ACCT. NO.	DESCRIPTION	QUANTITY	UNIT	LABOR				MATERIAL		SUBCONTRACTS		TOTAL COST
				LABOR UNIT	TOTAL MHRS	RATE HR.	AMOUNT	COST UNIT	AMOUNT	COST UNIT	AMOUNT	
Per/mach	RUNWAY											
	CLEAR & GRUB	70	Ac.	80.0	5600							
1000 cy/	SITE CUT	463,000	cy	.025	11,575							
500/0	SITE FILL - COMPACT	424,000	cy	.025	10,600							
1600 sy/0	FINISH GRADE	176,000	SY	.01	1760							
P 600 cy/0 C 500 cy/0	18" BASE COURSE 95% comp.	44,000	cy	.08	3520							
	WASTE - LOCALLY	39,000	cy	.01	390							
	CRUSHING PLANT LABOR 2000 TPD	60,000	TON		2200							
	SUPPORT LABOR											
	MASTER MECH. (1)	1800	MH.		1800							
	MECHANIC (1)	1800	}		1800							
	LABOR (1)	1800	}		1800							
	OILER (1)	1800	}		1800							
	SUB TOTAL				42845	26.00	1113970					

FACILITY WATANA CAMP RUNWAY - 150' x 5280'

TYPE OF ESTIMATE Q.M. JOB NO. 9051.01 SHEET NO. 6 OF 6 PRINCIPAL SUB ACCT. NO.

EA-32 OCT 70 REV

ATTACHMENT 2 - page 6

[redacted] SUMMARY ESTIMATE SHEET [redacted]

[redacted] ENGINEERS - CONSTRUCTORS

[redacted]	[redacted]	[redacted]	[redacted]
PRICED	RCP	12-12-79	
EXTENSIONS			

ACCT. NO.	DESCRIPTION	MANHOURS	LABOR	MATERIAL	SUB-CONTRACT	TOTAL COST
	RUNWAY CONSTRUCTION	29,000	754 000	—	—	754 000
	TEMP. CONSTRUCTION	-	—	45 000	—	45 000
	SUPERVISION	4500	493 000	—	108 000	601 000
	MOB & DE-MOB	8000	208 000	42 000	423 000	673 000
	EQUIP. RENTAL	1000	26 000	1 943 000	—	1 969 000
	FIELD STAFF & LABOR EXPENSES	—	—	575 000	—	575 000
	SUB TOTAL	44,500	1 481 000	2 605 000	531 000	$ 4 617 000
	OH'D. 10%					462 000
	SUB TOTAL					$ 5 079 000
	FEE					
	SUB TOTAL					
	CONTINGENCY					
	TOTAL CONSTRUCTION					
	TOTAL					

FACILITY SUSITNA CAMP RUNWAY 150' x 3,000' LOCATION ALASKA

OWNER ACRES AMERICAN AREA S F COST

TYPE OF ESTIMATE ORDER OF MAGNITUDE JOB NO. 9051.01 SHEET NO. 1 OF 3 BID ITEM NO.

DD OCT 78 REV

ATTACHMENT 2 - page 7

DETAIL ESTIMATE SHEET

HOLMES & NARVER, INC.
ENGINEERS - CONSTRUCTORS

ACTION	BY	DATE	CHECKED	DATE
PRICED	RCP	12-12-79		
EXTENSIONS				

ACCT. NO.	DESCRIPTION	QUANTITY	UNIT	LABOR				MATERIAL		SUBCONTRACTS		TOTAL COST
				LABOR UNIT	TOTAL MHRS	RATE HR.	AMOUNT	COST UNIT	AMOUNT	COST UNIT	AMOUNT	
	CONSTRUCTION											
	USE 60% LABOR + SUPPORT											
	LABOR	29,000	MH		29000	26.00	754 000					754 000
	TEMPORARY CONST.											
	USE 5280' RUNWAY	1	LS						45 000			45 000
	SUPERVISION											
	USE 5280' RUNWAY	1	LS		6500		493 000		—		108 000	601 000
	MOBILIZATION											
	USE 5280' RUNWAY LESS											
	5 CATCO TRIPS EACH WAY	1	LS		8000		208 000		42 000		423 000	673 000
	EQUIPMENT RENTAL											
	USE 5280' RUNWAY LESS											
	1 SCRAPER & 2 SHEEPSFOOTS											
	& 40% OF FUEL.	1	LS		1000		26 000		1 943 000			1 969 000

FACILITY WATANA RUNWAY 3000'

TYPE OF ESTIMATE ORDER OF MAG. JOB NO. 9051.01 SHEET NO. 2 OF 3 PRINCIPAL SUB ACCT. NO.

1-32 OCT 70 REV

DETAIL ESTIMATE SHEET

HOLMES & NARVER, INC.
ENGINEERS - CONSTRUCTORS

ACTION	BY	DATE	CHECKED	DATE
PRICED	RCP	12-12-79		
EXTENSIONS				

ACCT. NO.	DESCRIPTION	QUANTITY	UNIT	LABOR				MATERIAL		SUBCONTRACTS		TOTAL COST
				LABOR UNIT	TOTAL MHRS	RATE HR.	AMOUNT	COST UNIT	AMOUNT	COST UNIT	AMOUNT	
	FIELD STAFF & LABOR EXPENSE											
	PAYROLL TAX (FIELD LABOR)	1,157,000	$					.18	208 000			
	SUBSISTENCE FIELD-INCL CAMP	3700	MD					.08	318 000			
	✓ ANCHORAGE	10	Mos.						40 000			
	TRAVEL								9 000			
	SUB TOTAL								575 000			575 000

FACILITY WATANA RUNWAY 3000'

TYPE OF ESTIMATE ORDER OF MAG JOB NO. 9051.01 SHEET NO. 3 OF 3 PRINCIPAL SUB ACCT. NO.

11.32 OCT 79 REV

ATTACHMENT 3

December 18, 1979

Mr. Mike Jenns
Frank Moolin & Associates
3201 C Street
Suite 600
Anchorage, Alaska 99503

Dear Mike:

In connection with the construction of camp facilities in support of the Susitna Feasibility Study, CIRI/Holmes & Narver has prepared detailed estimates for construction of two alternative runways at the proposed camp site. As you can see from the attachments, these estimates range from just over $5 million to more than $6 million depending upon runway length. Needless to say, these amounts are significantly more than you had earlier estimated in connection with our representation to the Power Authority. I would very much appreciate your review of the CIRI work with a view toward either confirming that these estimates are reasonable or providing me with your latest opinion as to the cost of constructing a runway.

A particularly significant cost in the total described by CIRI has to do with equipment rental. It is the position of CIRI/H&N that any equipment brought in during the winter of 1980 cannot be removed from the camp site until the winter of 1981. The constraint appears to be on the ability to use rolligons during the summertime.

In the event that you consider these new estimates as correct or nearly so, it is clear to us that we need to consider the alternative of resupplying the camp by helipcoters. In this latter case, we would propose to bring a year's supply of fuel in by rolligon, and use helicopters to carry passengers in and out of the camp as well as to transport perishables and certain spare parts which may be needed in the course of the work. My initial analysis indicates that this could possibly be accomplished by planning one trip per day using Hueys from either Talketna or Anchorage. In the wintertime I suspect that this function could be performed using one Huey trip every two or three days to support the camp. I would appreciate it if you would get the latest rates from various charter services, particularly if we were to enter into a contract for an extended period for providing support of this type. This might be arranged either by contracting for a certain number of hours every month or by contracting for a certain number of trips each month. My own analysis supports the thought that in the event the runway exceeds about $1.3 million, the helicopter support approach becomes the favorite alternative. Would you be so kind as to give me your own views in this regard?

ACRES AMERICAN INCORPORATED
Consulting Engineers
Suite 329, The Clark Building
Columbia, Maryland 21044

Telephone 301-992-5300 Washington Line 301-596-5595

Other Offices: Buffalo, NY; Pittsburgh, PA; Raleigh, NC; Washington, DC

I would very much appreciate your response to these items within the next few days since the question of airfield construction significantly impacts upon the extent to which we arrange for rolligon transportation from Denali Highway to the proposed camp site.

It now appears that I will not be in Alaska again until sometime after the first of the year. Please accept my best wishes for a Merry Christmas and a Happy Holiday, and please do extend my regards to Frank as well. All of us wish him a speedy recovery.

Sincerely,

C. A. Debelius, P.E.
Deputy Project Manager

cc: J. D. Lawrence
J. G. Warnock
J. D. Gill

Attachments: as stated

CAD:jr

ATTACHMENT 4

Frank Moolin & Associates, Inc.
(An Alaska International Industries Company)

REVIEW OF HOLMES & NARVER ESTIMATE

ITEM	H&N ESTIMATE	FMA RE-ESTIMATE
RUNWAY CONST.	1,113,970	1,113,970
TEMP. CONST.	45,000	45,000
SUPERVISION	600,800	120,000 (1)
MOB & DEMOB	705,000	250,000 (2)
EQUIP. RENTAL	2,350,000	1,410,000 (3)
FIELD STAFF & LAB.	751,660	435,000 (4)
SUBTOTAL	5,566,430	3,373,970
OVERHEAD (10%)	556,643	337,399
TOTAL	$ 6,123,073	$ 3,711,369

(1) LARGE STAFF RECOMMENDED BY H&N SHOULD NOT BE REQUIRED. A PROJECT SUPERINTENDENT AND ADMINISTRATIVE ASSISTANT SHOULD BE ABLE TO HANDLE THE JOB WITH ONLY PART TIME HELP FROM THE HOME OFFICE STAFF.

(2) MOB & DEMOB CAN BE REDUCED SIGNIFICANTLY BY USING HERC-ABLE EQUIPMENT. IT IS ASSUMED THAT THIS EQUIPMENT WILL ALSO BE USED FOR OTHER PURPOSES AND THAT MOB/DEMOB COSTS WILL NOT BE BORNE TOTALLY BY THE AIRSTRIP PROJECT.

(3) USING HERCABLE EQUIPMENT REDUCES THE TIME REQUIRED FOR EQUIPMENT RENTAL AND THUS THE TOTAL COSTS.

(4) REESTIMATED BASED ON REDUCED SCOPE OF WORK AND TIME IN THE FIELD.

Frank Moolin & Associates, Inc.

AIRSTRIP ESTIMATE - COST COMPARISON

	[illegible]	[illegible]
SIZE OF AIRSTRIP		
• RUNWAY SURFACE	150' x 5200'	150' x 6300'
• CLEARING & GRUBBING	70 ACRES	MINIMAL
• CUT & FILL	450,000 C.Y.	MINIMAL
• EMBANKMENT	427,000 C.Y.	152,000 C.Y.
• SURFACE COURSE	44,000 C.Y.	18,000 C.Y.
MOBILIZATION	CAT TRAIN TO SITE OVER WINTER TRAIL. REMOVE THE FOLLOWING WINTER	HERC TO & FROM SITE. ASSUMED SOME EQUIPMENT ALREADY ON SITE.
EQUIPMENT RENTAL	INCLUDED COSTS FOR 10 MONTHS. USE OF NON-HERCABLE EQUIPMENT	RENTAL FOR CONSTRUCTION PERIOD ONLY. HERC IN AND HERC OUT.
SUPERVISION	5 FULL TIME & 3 PART TIME PERSONNEL.	2 FULL TIME & 1 PART TIME PERSONNEL
ROOM & BOARD	5200 MAN DAYS INCLUDED	NONE INCLUDED