(M) UNIT COSTS - BACKUP CALCULATIONS

MANPOWER COSTS/CASH FLOWS

Like Manpower Forecasts Book 1

Table 3 of the series was operative when.
If you don't have table 3 please phone Peter to discuss with him the numbers he has.

SUSITNA HYDRO PROJECT

TABLE 1 - ENGINEERING & ADMINISTRATION

ESTIMATED PERSONNEL EMPLOYED ON PROJECT IN ALASKA
(AVERAGE ANNUAL NUMBER OF PEOPLE EXCLUDING FAMILIES)

YEAR / ACTIVITY	82/83	83/84	84/85	85/86	86/87	87/88	88/89	89/90	90/91	91/92	92/93	93/94	94/95	95/96	96/97	97/98	98/99	99/00	00/01	01/02	
1. WATANA 400 MW (1993)																					
- Consultant's Planning & Engineering	50	110	110	110	90	50	40	30	30	20	30										
- Consultant's Management & Admin.(1)			90	190	230	250	220	190	170	90	40										
- Subcontractors (2)	80	140	60																		
- Environmental Monitoring(3)				20	30	30	30	30	20	20	10										
- APA Administration	27	49	55	55	64	55	55	47	40	23	23										Incl. Land Acquisition
2. WATANA 400 MW (1996)																					
- Consultant's Planning & Engineering									10	20	20	20	10	10							
- Consultant's Management & Admin.(1)										40	70	70	70	30							
- Environmental Monitoring(3)												10	10	10							
- APA Administration											10	23	23	23							
3. WATANA TRANSMISSION																					
- Engineering	1	2	20	20	20	40	30	20	10	10			10	10							
- Management & Administration(1)					40	50	60	60	60	60	30		10	10							
- Environmental Monitoring(3)							5	5	5	5	5		5	5							
- APA Administration	7	8	8	12	8	9	8	8	7	6	5		5	5							Incl. Land Acquisition
4. DEVIL CANYON 600 MW (2000)																					
- Consultant's Planning & Engineering								20	50	60	60	40	30	20	20	20	10	10			
- Consultant's Management & Admin.(1)										50	90	110	130	110	100	90	50	30			
- Subcontractors(2)								40	70	30											
- Environmental Monitoring(3)											10	10	20	20	10	10	10	10			
- APA Administration								16	29	31	28	32	28	27	23	20	12	11			Incl. Land Acquisition
5. DEVIL CANYON TRANSMISSION																					
- Engineering												5	5	5	5	5	5				
- Management & Administration(1)												5	7	7	7	7	7	5			
- Environmental Monitoring(3)															5	5	5	5			
- APA Administration														3	3	3	3	3			
TOTALS	165	309	343	407	482	484	448	466	501	465	431	325	363	295	173	160	102	74			

NOTES:

(1) Project Management, Administration During Construction, Purchasing & Expediting, Construction Supervision and Management, and Environmental Monitoring by the Consultant.
(2) Engineering Studies, Environmental Studies, Hydrology, Seismic, Geotechnical, Office Support, Site Facilities and Logistics and Design.
(3) By State/Federal Agencies.

SUSITNA HYDRO PROJECT

TABLE 2 - CONSTRUCTION

ESTIMATED PERSONNEL EMPLOYED ON PROJECT IN ALASKA
(AVERAGE ANNUAL NUMBER OF PEOPLE EXCLUDING FAMILIES)

YEAR / ACTIVITY	82/83	83/84	84/85	85/86	86/87	87/88	88/89	89/90	90/91	91/92	92/93	93/94	94/95	95/96	96/97	97/98	98/99	99/00	00/01	01/02	
1. WATANA 400 MW (1993)																					
- Construction Workers			470	770	2450	3660	3820	3720	3260	3260	1900										
- Supervisory Staff at Camp			50	50	70	80	80	80	70	70	60										
- Staff Families at Camp(1)					10	20	20	20	30	30	30										
- Support Staff at Camp			60	90	280	420	430	420	370	370	220										
2. WATANA 400 MW (1996)																					
- Construction Workers										250	330	360	210	30							
- Supervisory Staff at Camp										20	30	30	20	10							
- Staff Families at Camp(1)										10	10	10	10								
- Support Staff at Camp										30	40	40	30	10							
3. WATANA TRANSMISSION																					
- Construction Workers					200	300	300	300	270	270	160		160	40							15% at Camp
- Supervisory Staff at Camp					20	30	30	30	25	25	15		15	5							15% at Camp
- Staff Families at Camp(1)						5	5	5	5	5											
- Support Staff at Camp					10	10	10	10	10	10	5		5								
4. DEVIL CANYON 600 MW (2000)																					
- Construction Workers									180	290	970	1110	1440	2030	2030	1140	80				
- Supervisory Staff at Camp									20	30	50	60	60	70	70	60	20				
- Staff Families at Camp(1)												5	5	10	20	20	5				
- Support Staff at Camp									20	40	110	130	170	230	230	130	20				
5. DEVIL CANYON TRANSMISSION																					
- Construction Workers													20	100	100	100	60				5% at Camp
- Supervisory Staff at Camp													5	15	15	15	5				Maximum 2 at Camp
- Staff Families at Camp(1)													1	2	2	2	1				
- Support Staff at Camp													1	1	1	1	1				
TOTALS			580	910	3040	4525	4695	4586	4040	4571	3160	1570	1860	1797	2458	2468	1414	192			

NOTES:

(1) Worker and staff families not at camp excluded from these figures whether in Alaska or Lower 48.

ACRES

Calculations

SUBJECT:

JOB NUMBER
FILE NUMBER
SHEET OF
BY DATE
APP DATE

NOT FINAL FIGURES

Labour	D/C $\times 10^6$		W $\times 10^6$
Total Cp'tr Sht	302		722
35% of Indirects (271)	95	(619)	217
15% of Equipt (170)	26	(709)	106
5% of Matl (328)	16	(707)	35
	439		1080
Engr CM 3% (10.93)	33	(28.15)	84
	472		1164
Previous Estd *	461		1069

* Excluded offsite work.

Eng $18 x 1.5 x 1.7 = $46 33/hr ≈ 72%

Expenses –

FORM NO. 162 REV. 1

4

SUSITNA HYDROELECTRIC PROJECT

CONSTRUCTION CAMPS

WORK FORCE PLANNING LEVELS

WATANA

YEAR	SITE	TOTAL
1983	100	200
1984	200	400
1985	800	1100
1986	1500	1700
1987	2100	2300
1988	2600	2600
1989	2800	3000
1990	3100	3400
1991	3000	3300
1992	2300	2600
1993	800	900
1994	200	200

19,500 x .65 = 12,675 x 272 = 3.7 million man
19,500 @ 190 work days (avg) = 3.7 " "

DEVIL CANYON

YEAR	SITE	TOTAL
1994	100	100
1995	420	420
1996	940	940
1997	1330	1330
1998	1550	1550
1999	1550	1600
2000	1350	1450
2001	920	1100
2002	50	50

TABLE 2.1

ACRES 5

ACRES

Calculations DEVIL CANYON CASH FLOW - LABOR

SUBJECT: PEAK PERIODS (+ MILLION)

JOB NUMBER PS703.04
FILE NUMBER
SHEET 1 OF 1
BY WAK DATE 3/6/92
APP DATE

	93	94	95	96	97	98	99	00	01	02	03
YEAR											
PEAK PERIOD		4	4	4	3	3	3	3	2	1	
AMT.		7.5	9.3	25.1	60.8	69.9	67.0	61.5	60.1	2.3	
(+) ADJUSTMENTS (1/4 SHOWN ON SPREAD SHEET BY DM 2/27/92)											
ELECT. CAP COST		+.2	+.4								
H/U CAP COST			+.6								
CATER/SUPPORT											
H/U & ELEV OPER.		+.1	+.2	+.4	+.7	+1.0	+0.9	+0.8	+0.7		
CAMP CREDIT									+0.4		
(-) ADJUSTMENTS (NON LAB. FROM PRINTOUTS)											
332.11C P/H MECH.					−0.2	−0.2					
.21C DIV. TUN. MECH		−0.3	−0.3								
.32C GRD. GAL MECH			−0.1	−0.1							
.51C SPWY. MECH				−1.1	−1.1	−1.1					
.52C MAIN SPWY. MECH						−0.6	−0.6				
.61C INTAKES MECH						−0.6	−0.6				
333.11 TURBS / GOV'S					−1.1	−1.1	−1.1	−1.1			
.21 GENS / EXC.						..	−1.4	−1.4	−1.4		
334.1 .2 .4 .5 ELECT							−0.4	−0.4	−0.4		
							−0.1	−0.1	−0.1		
								−1.0	−1.0		
335.1 AUX SYS UNDGRD							−0.1	−0.1	−0.1		
.3 AUX EQPT. CRANES & MISC.							−0.6	−0.6	−0.6		
353.1 SUB/SWT STA EQPT						−0.2	−0.2	−0.2	−0.2		
.2 WILLOW EMS						−2.1	−2.1				
354.1 STEEL TWRS & FIX.						−0.1	−0.1				
356.1 OVHD CNDTRS								−2.8	−2.8		
399.1 OTHER TANG. PROPTY								−2.8			
									−2.5		
TOTAL		7.5	10.1	24.3	59.1	64.9	60.6	51.8	52.1	2.3	

60.04.01 Form 148A

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MANUAL
FEED

ACRES

Calculations DEVIL CANYON CASH FLOW - LABOR

SUBJECT: REF. CALCS BY DM 2/27/82

(4 MILLION)

JOB NUMBER P5700.09
FILE NUMBER
SHEET 1 OF 1
BY WAK DATE 3/2/82
APP DATE

Years	93	94	95	96	97	98	99	00	01	02	03
Sub total 963.5 from Comp 2/29/82		15.3	37.2	74.5	142.1	203.5	185.2	165.3	133.5	6.9	
Plus Items Below											
Cater / support 108.5		+ 1.7	+ 4.2	+ 8.4	+ 16.0	+ 22.9	+ 20.9	+ 18.6	+ 15.1	+ 0.7	
H & V OPERATION											
Elect. OPER- DIESEL 19.0		+ 0.3	+ 0.7	+ 1.4	+ 2.9	+ 4.0	+ 3.7	+ 3.2	+ 2.7	+ 0.1	
CAMP Credit									+ 1.7	+ 0.8	
MINUS MATERIAL COSTS Below											
331.11C PH MECH					- 0.4	- 0.8					
332.21C DIV. TUN MECH		- 0.3	- 1.2	- 0.3							
.32C GRT. GAL. MECH			- 0.1	- 0.6	- 0.1						
.51C SPWY MECH				- 1.1	- 4.5	- 4.5					
.52C MAIN SPWY MECH						- 1.8	- 2.4	- 0.6			
.61C INTAKES MECH						- 1.2	- 2.4	- 1.2			
333.11 TURBS / GOV'S					- 2.2	- 4.4	- 4.4	- 4.4			
.21 GEN / EXCIT.						- 1.4	- 5.7	- 5.7	- 4.2		
334.1							- 0.7	- 1.5	- 0.7		
.2							- 0.3	- 0.6	- 0.3		
.3							- 0.1	- 0.2	- 0.1		
.4 ELECT.								- 2.0	- 2.0		
.5							- 0.1	- 0.3	- 0.1		
.6								- 0.1			
.7							- 0.2	- 0.3	- 0.2		
335.1 AUX. SYS - UNDGRD							- 1.2	- 2.4	- 1.2		
.2 AUX. SYS - SURF FAC								- 0.1			
.3 AUX EQPT - CRANES & MISC						- 0.9	- 0.9	- 0.8	- 0.4		
353.1 SUB / SWT STA EQPT						- 2.4	- 8.5	- 2.1			
.2 WILLOW EMS						- 0.3	- 0.4	- 0.1			
354.1 STEEL TWRS / FIX								- 11.0	- 5.5		
356.1 OVHD CNDTRS							- 2.8	- 11.3	- 2.8		
399.1 other tang Prop'ty.									- 5.0		
TOTAL 967.7		17	40.8	82.3	153.8	212.7	179.7	142.4	130.5	8.5	7
% of tot.		2%	4%	9%	16%	22%	19%	15%	12%	1%	

60.04.01 Form 148A

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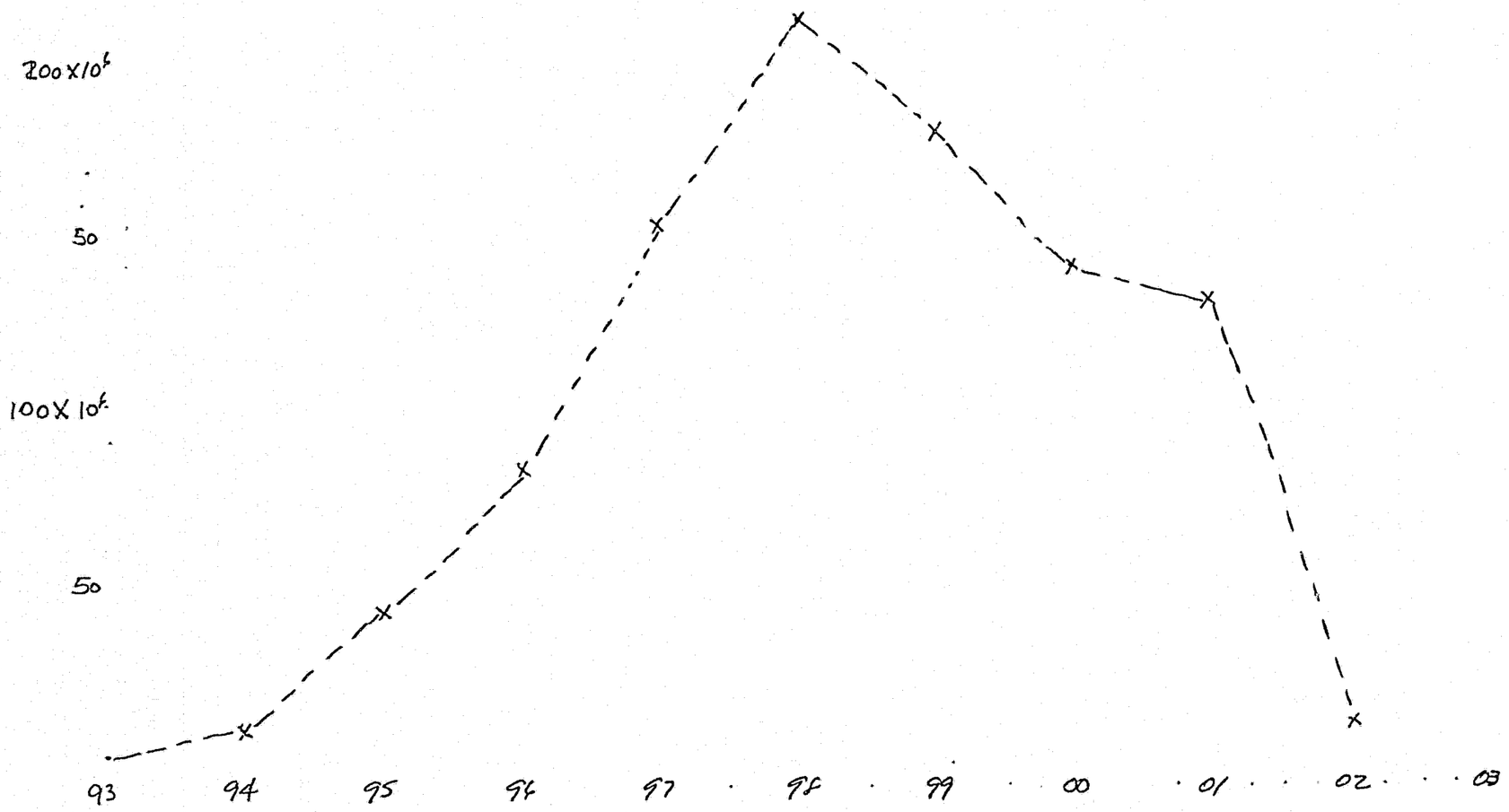
ACRES

Calculations DEVIL CANYON CASH FLOW - LABOR

SUBJECT:

JOB NUMBER PS700.09
FILE NUMBER
SHEET 1 OF 1
BY WGK DATE 3/3/92
APP DATE



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Calculations OEVIL CANYON CASH FLOW

SUBJECT: $000,000

JOB NUMBER PS700.09
FILE NUMBER
SHEET 1 OF 2
BY DMM DATE 27FEB82
APP WWK DATE 3/3/82

27 FEB 82	TOTAL	1993		1994		1995		1996		1997		1998		1999	
	HALF →	①	②	1	2	1	2	1	2	1	2	1	2	1	2
FROM COMPUTER	956.9 ✓			14.6		14.9	18.5	26.7	47.8	53.0	89.1	97.3	106.2	89.6	95.6
						33.4		74.5		142.1		203.5		185.2	
PERM TOWN	2.1														
ELEC POWER CAP COST	2.1			.7		.7	.7								
CONS. H&V CAP COST	2.4					1.2	1.2								
				1.58		1.74	2.11	2.77	4.96	5.50	9.26	10.71	11.02	9.30	9.93
SUBTOTAL	963.5 ✓			15.3		16.8	20.4	26.7	47.8	53.0	89.1	97.3	106.2	89.6	95.6
% OF SUBTOTAL						37.2		74.5		142.1		203.5		185.2	
CATER/SUPPORT	108.5 ✓			1.7		1.9	2.3	3.0	5.4	6.0	10.0	11.0	11.9	10.1	10.8
						4.2		8.4		14		22.9		20.9	
CONS. H/V OP.	7.6			.3		.3	.4	.6	.9	1.1	1.8	1.9	2.1	1.8	1.9
ELEC. OP.	11.5							1.5		2.9		4.0		3.7	
LAND	22.1	3.7	3.7	3.7	7.4	3.7	3.7	7.4	3.6						
BY YEAR →		3.7		24.7		49.5		88.0		161.0		230.4		209.8	
TOTAL	1113.2 ✓	3.7	3.7	21.0		22.7	26.8	33.9	54.1	60.1	100.9	110.2	120.2	101.5	108.3
DAT 83															
CHANGE IN MANPOWER ADDS $6.5M → PRORATE BY ABOVE % FOR YEAR				1.58		3.85		2.73		14.76		21.73		19.23	
				.1		.2		.5		1.0		1.5		1.2	
DAT 84 →	1119.7	3.7		24.8		49.7		80.5		162.0		231.9		211.0	

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ACRES

Calculations

SUBJECT: DEVIL CANYON CASH FLOW (CONT'D)

JOB NUMBER PS700.09
FILE NUMBER
SHEET 2 OF 3
BY DM DATE 27 FEB 92
APP WAIL DATE 3/3/92

	2000	2001	2002	2003
FROM COMPUTER	83.9 80.9 (164.8)	74.6 57.9 (132.5)	4.3 2.0 (6.3)	
PERM TOWN	.5	.5 1.0 .5	.6	
ELEC POWER (CAP)				
CONS HDV (CAP.)	(8.70) (8.45)	(7.80) (6.06)	(.51) (.20)	
SUBTOTAL	83.9 81.4 (165.3)	75.1 58.4 (133.5)	4.9 2.0 (6.9)	
CATER SUPPORT	9.4 9.2 (18.6)	8.5 6.6 (15.1)	.5 .2 (.7)	
CONS HDV OP.	1.6 1.6 (3.2)	1.5 1.2 (2.7)	.1 —	
ELEC. OP.				
LAND	(187.1)	(151.3)	(7.7)	
TOTAL	94.9 92.2	85.1 66.2	5.5 2.2	
	(17.15)	(13.86)	(.71)	
	1.1	.9	—	
	188.2	152.2	7.7	

60.04.01 Form 148A

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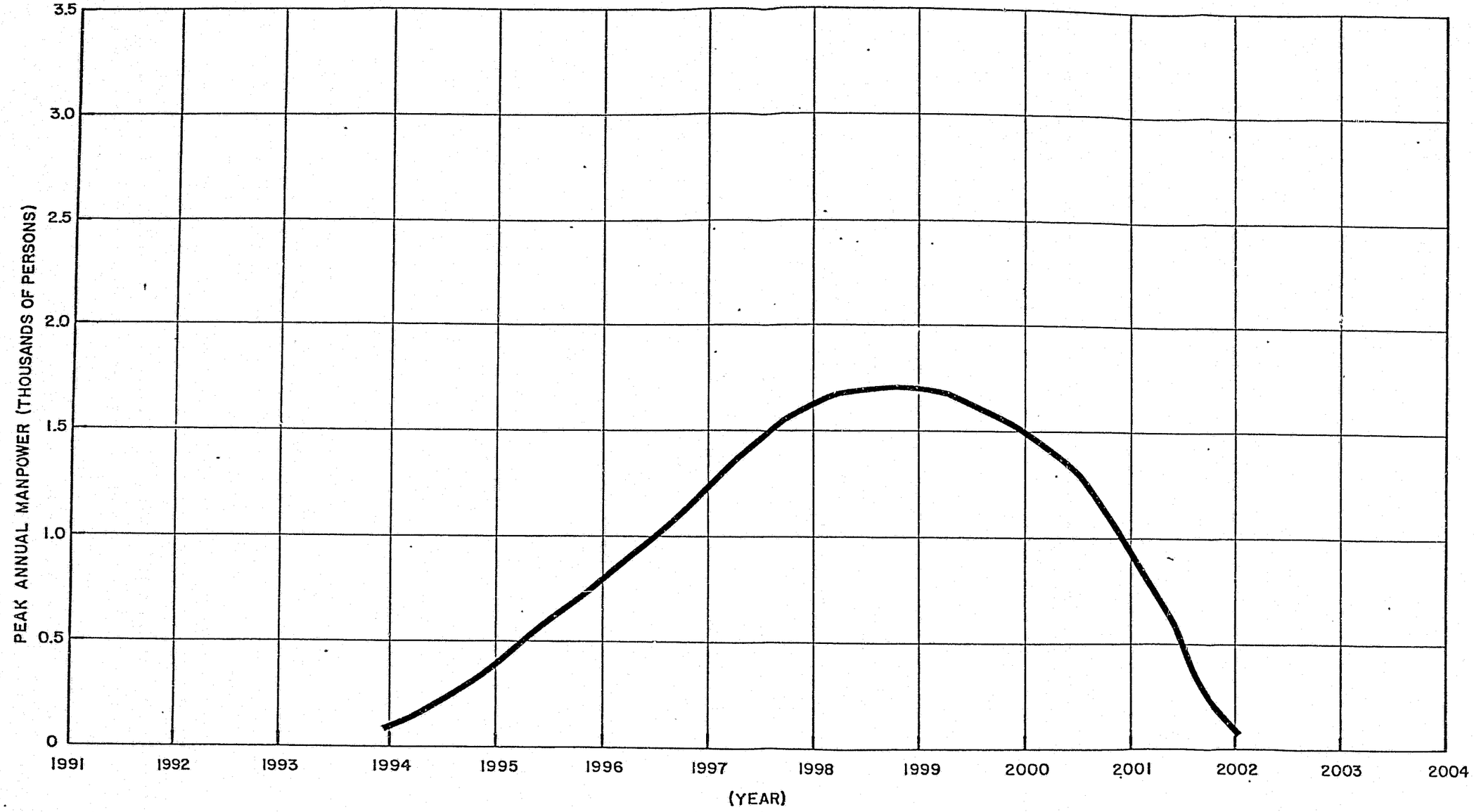
Calculations SUBJECT: D/C

JOB NUMBER P5700.09
FILE NUMBER
SHEET 1 OF 1
BY DATE
APP [illegible] DATE 3/3/02

	92	93	94	95	96	97	98	99	00	01	02	TOTALS
Cash Flow Run #84	0	3.7	24.8	49.7	88.5	162.0	231.9	211.0	188.2	152.2	7.7	1119.7
ADJUST CONC. PLACEMENTS							8.0	8.0	8.0	<24.0>		
Add 17.5% Contg'y.		.6	4.3	8.7	15.5	28.4	42.0	38.3	34.4	22.4	1.3	195.9
→		4.3	29.1	58.4	104.0	190.4	281.9	257.3	230.6	150.6	9.0	1315.6
Add Engr'g 4%		6.9	~~8.0~~	~~8.0~~	~~7.0~~	~~5.4~~	5.0	4.5	2.6	2.6	2.6	52.6
" CM + Proc. 6%		—	1.7	3.5	6.2	11.3	15.0	15.0	13.0	10.0	3.2	78.9
" Owner 2.5%		3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.2	32.9
							~~245.7~~	~~270.8~~	~~240.1~~	~~194.7~~	18	1480.0
							305.2	280.1	249.5	166.5		
							−12.8	2.0	5.8			

Final

		98	99	01
011	→	-.2	.8	
.52C		-.6	—	+.6
.61C		-.6		+.6
333 .21		-1.4.	+.2	.-2
335 - 3		-.5	+.5	
353.		-6.6	3.6	3.0
		9.7	5~~3~~	4.4



DEVIL . CANYON
MANPOWER LOADING CURVE

FIGURE C3.2

ACRES

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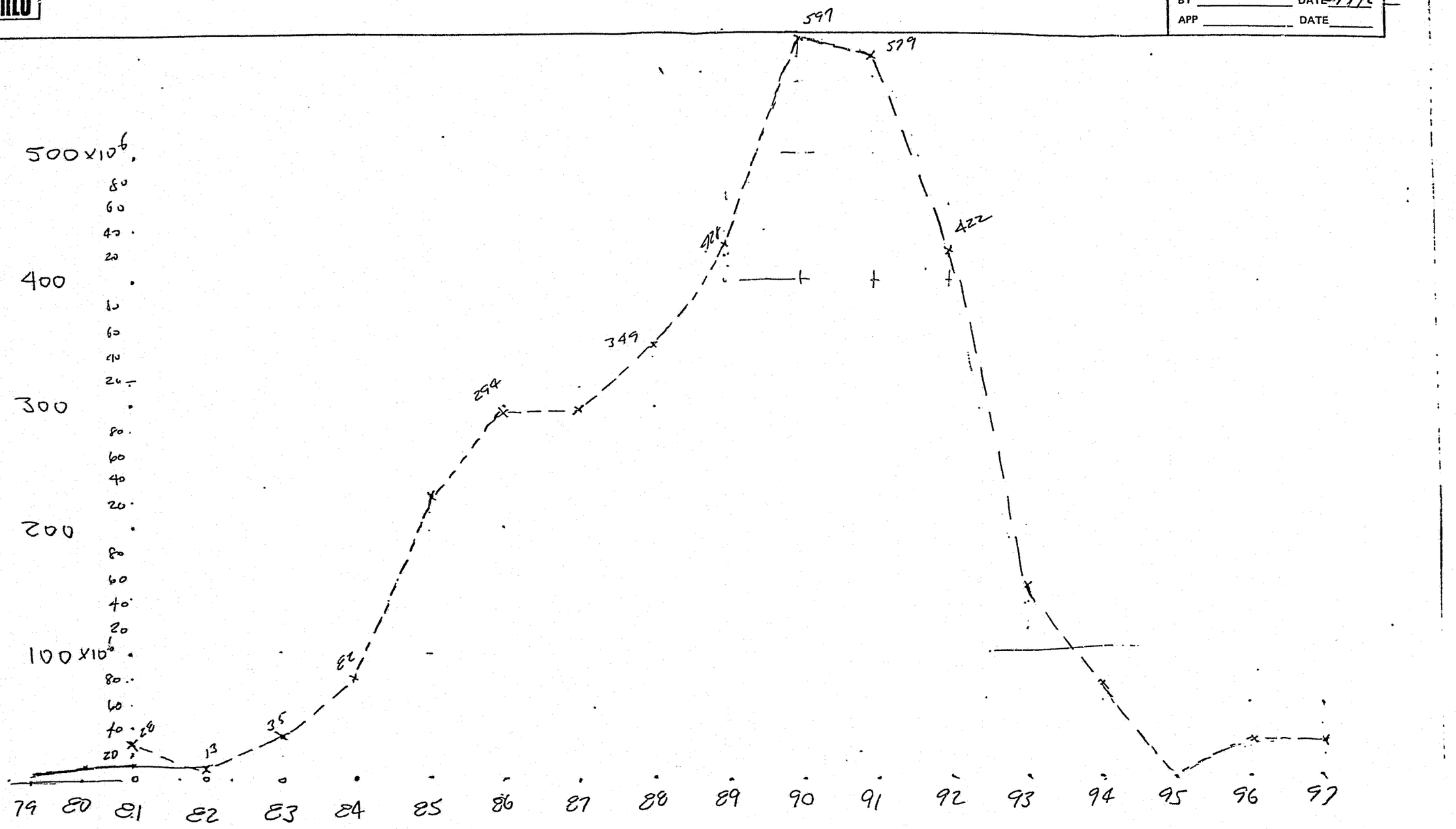
ACRES

Calculations

SUBJECT: WATANA — CASH FLOW

JOB NUMBER
FILE NUMBER
SHEET OF
BY DATE 3/11/87
APP DATE



60.04.01 Form 148A

ACRES

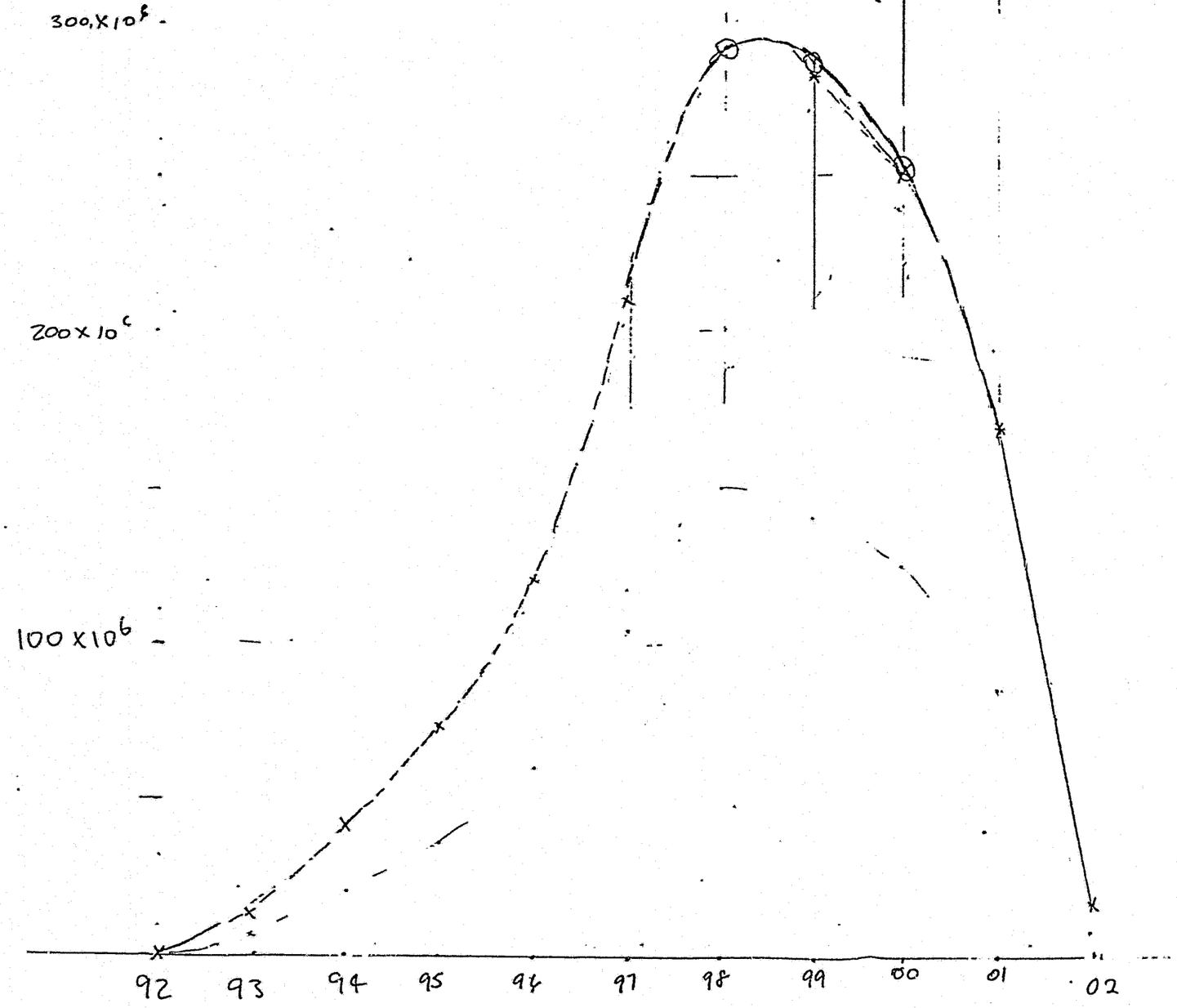
Calculations

SUBJECT:

D1C

JOB NUMBER
FILE NUMBER
SHEET OF
BY DATE 3/12
APP DATE

(98)



60.04.01 Form 148A

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ACRES

Calculations WATANA CASH FLOW (LABOR)

SUBJECT: PEAK PERIODS

($ MILLION)

JOB NUMBER PS70009
FILE NUMBER
SHEET 1 OF 2
BY WMK DATE 3/2/92
APP DATE

YEAR	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97
PEAK PERIOD	3	3	3	2	3	3	3	2	2	2	2	1			
AMT.	6.9	7.4	39.4	47.6	75.3	84.4	106.5	149.1	150.2	116.5	37.4	15.4			
ADJUSTMENTS (+) SHOWN ON SPREAD SHEET BY DM 2/28/92)															
ELEC. CAP COST															
H/V CAP COST															
ADJ. CONST. POWER	—	—	+1.8	+3.0	+1.3	—	—	~~2.5~~	~~2.5~~	—	—	—	—	—	—
ADJ. 1987 UNITS 5&6	—	—	—	—	—	—	—	—	—	—	—	—	—	~~+5.2~~	~~+5.2~~
CATER/SUPPORT	+1.2	+0.6	+3.7	+5.3	+6.1	+8.4	+12.7	12.0 ~~+11.3~~	11.6 ~~+10.9~~	+10.9	+4.2	+1.5	—	—	—
ELEC OPER DIESEL	—	—	+0.1	+0.2	+0.1	—	—	—	—	—	—	—	—	—	—
H&U OPER.	—	—	+0.1	+0.2	+0.2	+0.3	+0.3	+0.5	+0.5	0.3 ~~+0.2~~	+0.1	+0.1	—	—	—
ADJUSTMENTS (-) (NON LAB RELATED ITEMS FROM PRINTOUTS)															
332.21C DIV. TUN. MECH			-1.0	-1.0			-1.8	-1.8							
.51C TUN. SPLY MECH							-1.8	-1.8							
.52C MAIN SPLY MECH								-0.6	-0.6						
.61C INTAKES MECH						-1.2	-1.2	-1.2							
333.11 TURBS/GOVS.						-1.7	-1.7	-1.7	-1.7						
.21 GENS/EXCITERS								-2.1	-2.1	-2.1					
334.1 ELECT MISC. POWER EQUIP									-0.6	-0.6					
.2									-0.6	-0.6					
.4										-1.0					
.7									-0.1	-0.1					

60.04.01 Form 148A

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AUTO
MANUAL
FEED

ACRES

Calculations WATANA CASH FLOW (LABOR)

SUBJECT: PEAK PERIODS ($ MILLION)

JOB NUMBER PS700.09
FILE NUMBER
SHEET 2 OF 2
BY WDK DATE 3/24/92
APP DATE

YEAR	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97
PEAK PERIOD	3	3	3	2	3	3	3	2	2	2	2	1			
ADJ's (CON'T)															
335.1 AUX SYS-UNGRD									-0.8	-0.8					
.3 AUX EQPT-CRANES & MISC.							-0.2	-0.2	-0.1	-0.1					
353.1 SUBST/SWIT EQPT.								-10.4	-10.4						
354.1 STEEL TOW / FIX								-10.6	-10.6						
356.1 OVHD COND.									-7.5						
399.1 OTHER TANG PROP.										-0.6	-0.6				
TOTAL	8.1	8.0	44.1	55.3	83	90.2	112.8	135 ~~128~~ 131.2	131 ~~124~~	121.8 ~~124.7~~	41.1	17		5.6	5.6
								x 23							
PEAK MANPOWER	200	200	1000	1300	1900	2100	2600	3100	3000	2800	1000	400			

Calculations WATANA CASH FLOW

SUBJECT: Used CASH Flow By DM 2/25/82 (₮MILLION)

Subtotal {+(Cater/support, Elect. oper Diesel, H&U oper, Camp credit) / -(Non Labor items from comp. Printouts)

JOB NUMBER P5700.09
FILE NUMBER
SHEET OF
BY WWC DATE 3/1/82
APP DATE

YEAR	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97
from Comp. 2/28/82 Subtotal 2440	13.8	28.5	134.5	188.9	197	238.8	307.9 ~~297.9~~	445.4 ~~430.4~~	431.2 ~~416.2~~	306.7 ~~301.7~~	101.1	46.2	—	~~22.5~~	~~22.5~~
cater/support			12.9 ~~13.1~~	18.2 ~~18.4~~	18.9 ~~19.3~~	23.0 ~~23.2~~	29.4 ~~29.2~~	42.8 ~~42.1~~	41.4 ~~40.7~~	+29.4	9.7 ~~9.9~~	4.4 ~~4.4~~			
Elect oper Diesel			+ .6	+ .8	+ .4										
H&U oper.			+ .6	+ .8	+ .9	+1.0	+ 1.3	+ 1.9	+1.8	+ 1.3	+ .4	+ .2			
Camp credit										+9.0					
MINUS items below															
332 - .21C DIV TUN MECH			- 3.0	-4.0			-7.3	- 3.5							
.51C TUN-SPWY MECH			:	:			- 3.7	-7.5							
- .52C MAIN SPWY MECH							-	- 2.4	-2.4						
.61C INTAKES MECH						-2.3	-4.6	-4.6							
.91C TAILRACE MECH								-0.3							
333 - .11 TURBS/GOVERNORS						-3.3	-6.7	- 6.7	-6.7						
.21 GENS/EXCITERS							-2.1	-8.4	- 8.4	- 6.3					
331 - .11C PH MECH						-0.4	-0.9								
334 - .1								- 1.0	- 2.2	- 1.0					
.2								-1.0	- 2.2	-1.0					
.3 Elect.								- 0.1	-0.2	-0.1					
.4								..	-2.0	-2.0					
.5								- 0.1	- 0.3	- 0.2					
.6									-0.2						
.7								-0.2	-0.4	-0.2					
335 - .1 AUX SYS - UNDGRD								-1.6	-3.2	-1.6					
.2 AUX SYS - SURF									-0.1	-0.1					
.3 AUX EQPT - CRANES & MISC.							-0.9	-0.6	-0.4	- 1.8					
.4 COMM EQPT								-0.1							
353 - .1 SUBSTA/SWIT EQPT							-10.4	- 41.5	-41.5	-10.4					
354 - .1 steel tow/FIX							-10.6	-42.3	-21.1						
356 - .1 OVHD CONDCTR							-	- 7.5	-29.9	-7.5					
399 - .1 OTHER TANG PROPTY										-2.5	-2.5				
Total 2345	13.8	28.5	145.6 ~~145.8~~	204.7 ~~204.9~~	217.2 ~~217.6~~	256.8 ~~257.0~~	291.4 ~~287.2~~	360.6 ~~344.9~~	355.2 ~~339.5~~	311.7 ~~306.7~~	108.7 ~~108.9~~	50.8 ~~51~~		22.5	22.5
	1%	1%	6%	9%	9%	11%	12%	15%	14%	13%	5%	2%		+%	-%

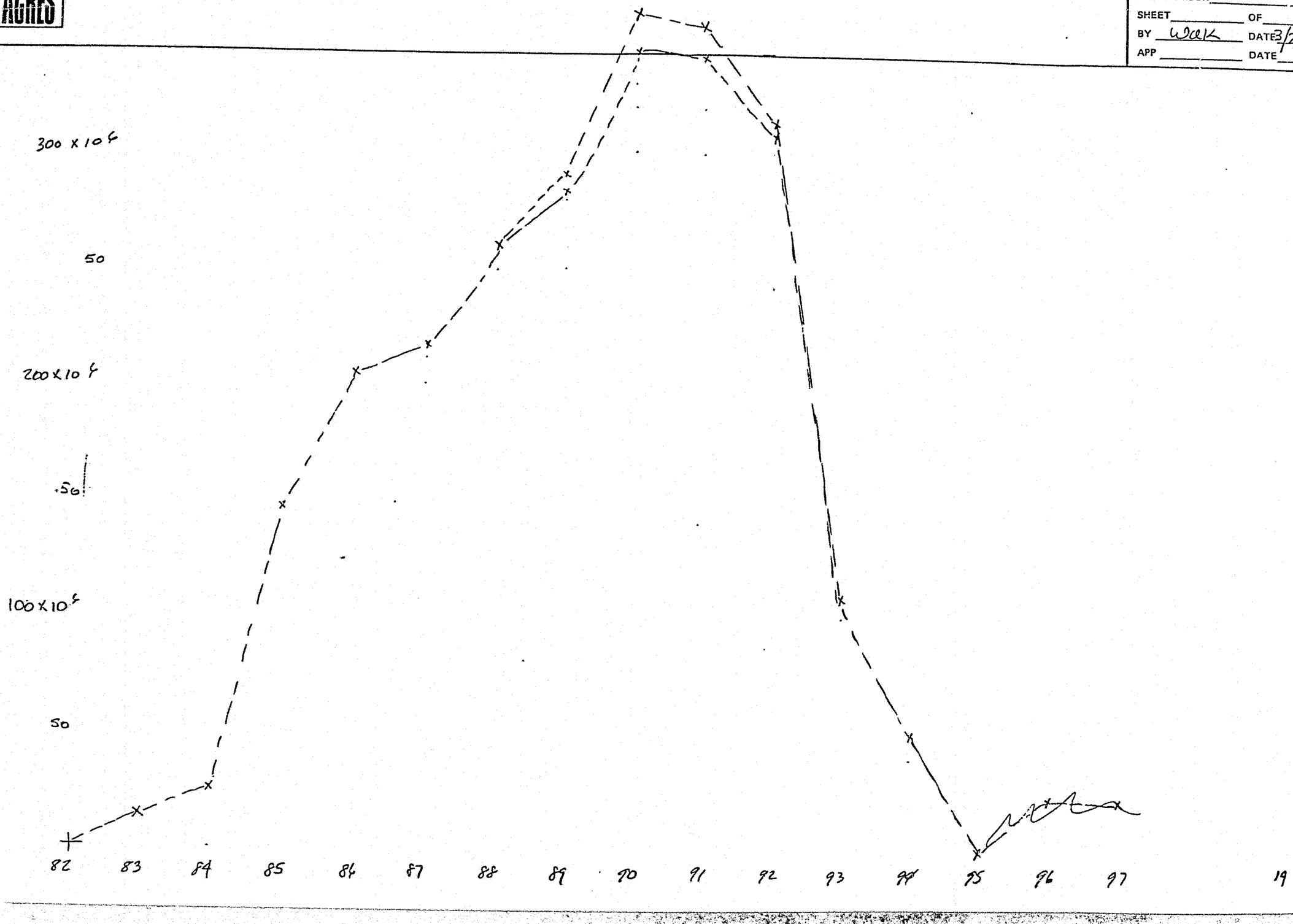
FOLD LENGTH
12 IN
11 IN
8.5 IN
8 IN
AUTO
MANUAL
FEED

ACRES

Calculations WATANA CASH FLOW—LABOR

SUBJECT:

JOB NUMBER P5700.09
FILE NUMBER
SHEET OF
BY WALK DATE 3/2/82
APP DATE



FOLD LENGTH
12 IN
11 IN
8.5 IN
8 IN

AUTO

MANUAL

FEED

ACRES

Calculations WATANA – CASH FLOW 28 FEB

SUBJECT: AE WACOST OAT 89

7000

JOB NUMBER P5700 09
FILE NUMBER
SHEET 1 OF 3
BY DMc DATE 28 FEB 82
APP WMK DATE 3/3/82

	TOTAL	11 83	84	85	86	87	88	89	90	91	92	93	94
FROM COMPUTER RUN	2435.706	13814	28526	127366	176746	191981	238776	307883	455412	441226	306701	101103	46172
ELEC CAP COST	2000			1000	1000								1997
H/V CAP COST	2306			1153	1153								45000
ADJ. CONST POWER (1)				5000	10000	5000			<10000	X10000>			
~~ADJ. 1987 UNIT 5+6 (2)~~								~~<10000~~	~~<45000~~	~~<45000~~	~~<5000~~		
SUBTOTAL	2440.012	13814	28526	134519	188899	196981	238776	~~297883~~ 307883	~~430412~~ 445412	~~446226~~ 431226	~~306701~~ 306701	101103	46172
LAND	51000	5000	15000	15000	10000	6000							
TRANS LAND	8260			12877	18165	18856	4260	4000					
CATER/SUPPORT	229949 (5)			~~13107~~	~~18396~~	~~19316~~	~~23226~~ 22995	~~29203~~ 29433	~~42080~~ 42771	~~40701~~ 41391	~~29433~~ 29433	~~9888~~ 9658	~~4599~~ 4370
ELEC OPER.													
DIESEL	1835 (3)			583	822	430							
INTERTIE	17825 { 9725 (4) 8100 }					~~909~~ 891	~~2210~~ 2156	~~2745~~ 2781	~~3974~~ 4011	~~3850~~ 3886	~~2782~~ 2763	~~927~~ 909	428
H & V OPER	10246 (5)			~~584~~ 574	~~819~~ 809	~~8601~~ 840	~~1036~~ 1025	~~1301~~ 1312	~~1875~~ 1906	~~1813~~ 1844	~~1312~~ 1311	~~441~~ 430	~~205~~ 195
TOTAL	2759 127	18814	43526	~~163793~~ 163553	~~218956~~ 218695	~~224496~~ 223998	~~269508~~ 269212	~~335132~~ 345409	~~478341~~ 494100	~~462590~~ 478347	~~335228~~ 340208	~~112359~~ 112100	~~51407~~ 51165
≈ 2759.170 WACOST OAT 89													~~+25000~~ ~~1997~~

(1) ADJUST CONST POWER – MOVE 20 M FROM '90 / 91 TO '85, '86, '87

(2) ~~MOVE COMPLETION OF UNIT 5 & 6 TO 1997, 5&7 45 M. FROM 12/18/81 ESTIMATE~~

(3) PROPORTIONAL TO CASH FLOW 85 86 1ST HALF 87 PRIOR TO INTERTIE POWER

85 . 134519 = 134519 .318
86 . 188899 = 188899 .448
[illegible] = [illegible]

3/3/82 20

revise UNIT 5&6 to original

60.04.01 Form 148A

FOLD LENGTH
12 IN
1 IN
8.5 IN
8 IN
AUTO
MANUAL
FEED

ACRES **Calculations** SUBJECT: WATANA CASH FLOW

JOB NUMBER PS70009
FILE NUMBER
SHEET 2 OF 3
BY DM DATE 28 FEB 82
APP DATE

(4) PROPORTIONAL TO CASH FLOW AFTER INTERTIE LINK COMPLETE

	87	98491	~~.051~~ .050
	88	238776	~~.124~~ .121
307 883	89	~~297 883~~	~~.154~~ .156
445 412	90	~~430 412~~	~~.223~~ .225
431 226	91	~~414 226~~	~~.216~~ .218
306 701	92	~~301 701~~	~~.156~~ .155
	93	101 103	~~.052~~ .051
	94	46172	~~.024~~ .024
1975 764		~~1930 764~~	1.00

(5) PROPORTIONAL TO CASH FLOW 85 – 94

	85	134 519	~~.057~~ .056
	86	188 899	~~.080~~ .079
	87	196 981	~~.084~~ .082
	88	238 776	~~.101~~ .100
307 883	89	~~297 883~~	~~.127~~ .128
445 412	90	~~430 412~~	~~.185~~ .186
431 226	91	~~414 226~~	~~.177~~ .180
306 701	92	~~301 701~~	~~.128~~ .128
	93	101 103	~~.043~~ .042
	94	46 172	~~.020~~ .019
		~~2 352 672~~	
		2 397 672	

ACRES

Calculations

SUBJECT: WATANA

JOB NUMBER P5700
FILE NUMBER
SHEET ____ OF ____
BY WJK DATE 3/3/82
APP ____ DATE ____

($ MILLION)

	TOTAL	81	82	83	84	85	86	87	88	89	90	91	92	93	94
DIRECT/ INDIRECT	(2759.1)	—	—	18.8	43.5	163.6	218.7	224.0	269.2	345.4	444.1	478.3	340.2	112.1	51.2
CONT @ 17.5%	(482.9)	—	—	3.3	7.6	28.6	38.3	39.2	47.1	60.5	86.5	83.7	59.5	19.6	9.0
SUBTOTAL	(3242)	—	—	22.1	51.1	192.2	257.0	263.2	316.3	405.9	580.6	562.0	399.7	131.7	60.2
Eng	(149)	25	11	18	22	17	15	11	7	5	5	4	4	3	2.3
Const. Man.	(17)			2	5	12	15	15	18	22	24	24	20	13	4
Owner	(80)	3	2	3	4	6	7	7	7	7	7	7	7	7	6
Total	(3647)	28	13	45.1	82.1	227.2	294	296.2	348.3	439.9	616.6	597	430.7	154.7	74.5
Acc. total		28	41	86.1	168.2	395.4	689.4	985.6	1333.9	1773.8	2390.4	2987.4	3418.1	3572.8	3647.3

FOLD LENGTH
12 IN
11 IN
8.5 IN
8 IN
AUTO
MANUAL
FEED

ACRES

Calculations

SUBJECT: $/M WATANA CASH FLOW W/ CONTINGENCY & OWNER COST & ENAR

JOB NUMBER P570009
FILE NUMBER
SHEET 3 OF 3
BY DM DATE 28 FEB 82
APP DATE

	TOTAL	82	83	84	85	86	87	88	89	90	91	92	93	94	97
DIRECT + INDIRECT	2759.1	✓	18.8	43.5	163.6 ~~163.8~~	218.7 ~~218.9~~	224.0 ~~224.6~~	269.2 ~~269.5~~	345.4 ~~345.1~~	494.1 ~~428.3~~	478.3 ~~462.6~~	340.2 ~~335.2~~	112.1 ~~112.4~~	51.2 ~~51.4~~	~~52.0~~
S. FOR CONT.	3242.0		22.1	51.1	192.5	257.2	263.9	316.7	393.7	562.0	543.6	393.8	132.1	60.4	~~53.7~~
	28.0	13 13 ✓	23 35 ✓	31 82 ✓	35 228 ✓	37 294 ✓	33 297 ✓	32 349 ✓	34 428 ✓	35 597 ✓	35 579 ✓	428 ~~425~~ 422	21 153 ~	14 74 ~	3/3 ~~59~~
DESIGN 4%															
@ 3.2% - 103.8		8.8	19.0	19.0	19.0	19.0	19.0								
@ .8% - 25.9								4.4	4.3	4.3	4.3	4.3	4.3		
CONSTMGR @ 6% - 194.5			16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	2.5
OWNER @ 2.5% - 81.1		6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	1.8
	3647.3	14.9	63.2	92.2	233.6	298.3	305.0	343.2	420.1	588.4	570.0	420.2	158.5	82.5	57.2

AGREES WITH WACOST OAT 89

TOTAL ANNUAL CASH FLOW

El

0 0 72.1

ZE 19 35.1

128

Superseded

23

FOLD LENGTH
12 IN
11 IN
8.5 IN
8 IN
AUTO
MANUAL
FEED

"FINAL" BOOK N1

ACRES

Calculations WATANA CASH FLOW MAR 4

SUBJECT: RE WACOST DAT 89

($ Million 1000.)

JOB NUMBER PS700.09
FILE NUMBER
SHEET OF
SY WAK DATE 3/4/82
APP DATE

	Total	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
FROM COMP RUN	2,435,706			13814	28526	127366	176746	191981	238776	307883	455412	441226	306701	101103	46172
Elec. CAP COST	2,000	/				1000	1000								
H/V CAP COST	2,306					1153	1153								
ADT. CONST. POW.						5000	10000	5000			<10000	X10000>			
SUB TOTAL	2,440,012			13814	28526	134519	188899	196981	238776	307883	445412	431226	306701	101103	46172
LAND	51000	/		5000	15000	15000	10000	6000							
TRANS. LAND	8260	X							4260	4000					
CATER/SUPPORT	229949	/				12877	18165	18856	22995	29433	42771	41391	29433	9658	4370
Elec. OPER Diesel	1835					583	822	430							
INTERTIE	17825							891	2156	2781	4011	3886	2763	909	428
H&V OPER	10246					574	809	840	1025	1318	1906	1844	1311	430	195
SUB TOTAL	2759127 *	(2759170 WA COST DAT 89)		18814	43526	163553	218695	223998	269212	345409	494100	478347	340208	112100	51165
	2759.1			18.8	43.5	163.6	218.7	224	269.2	345.4	494.1	478.3	340.2	112.1	51.2
CONT. @ 17.5%	482.9			3.3	7.6	28.6	38.3	39.2	47.1	60.5	86.5	83.7	59.5	19.6	9.0
SUB total	3242			2211	51.1	192.2	257	263.2	316.3	405.9	580.6	562	399.7	131.7	60.2
ENGINEERING	149.3	25	11	18	22	17	15	11	7	5	5	4	4	3	2.3
CONST. MAN	176			2	5	12	15	15	18	22	24	24	20	13	6
OWNER	80	3	2	3	4	6	7	7	7	7	7	7	7	7	6
						(18.21)	(14.40)	(12.54)	(10.12)						
TOTAL	3647.3	28	13	45.1	82.1	227.2	294	296.2	348.3	439.9	616.6	597	430.7	154.7	74.5

MILLIONS

* ERROR DUE TO ROUNDING
/ SMALL ERRORS COMPUTER LISTING

332.811	SHOULD BE	11733 NOT	11753	-20
335.1	" "	4255 NOT	4205	+50
336.12	SHOULD BE	77178 NOT	77158	+20

+50 ERROR

FEASIBILITY = 2,759,170
CASH FLOW = 2759127
DIFF. DUE 43 error

24

FOLD LENGTH
12 IN
11 IN
8.5 IN
8 IN
AUTO
MANUAL
FEED

"FINAL"

BOOK M

ACRES

Calculations SUBJECT: DEVIL CANYON CASH FLOW MAR 4

RE DE COST DAT 84

JOB NUMBER PS700.09
FILE NUMBER
SHEET OF
BY WORK DATE 3/4/82
APP DATE

$ MILLION

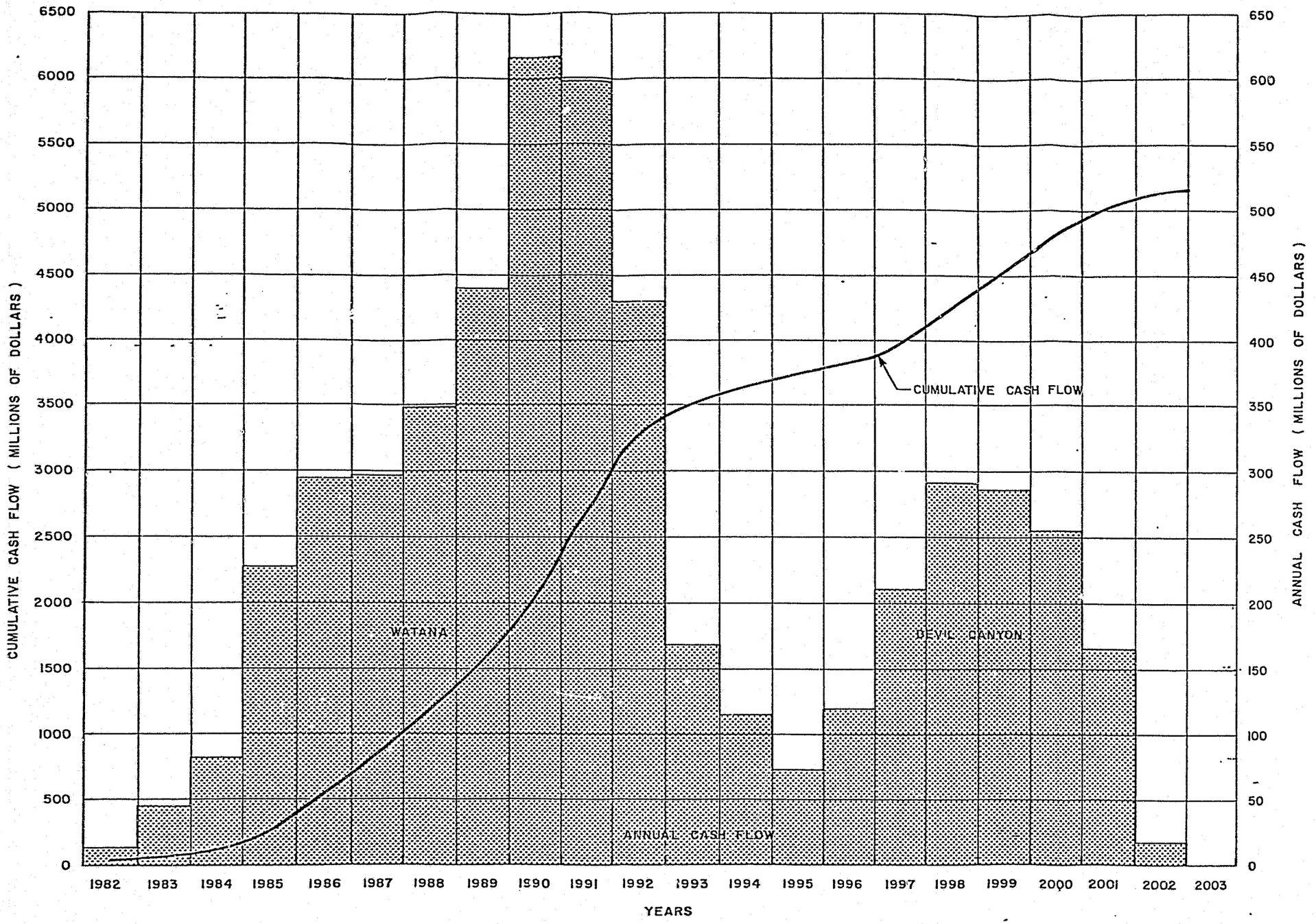
	Total	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
FROM COMP. RUN	956.9		14.4	33.4	74.5	142.1	203.5	185.2	164.8	132.5	4.3
PERM. TOWN	2.1								.5	1.0	.6
ELECT. CAP COST	2.1		.7	1.4							
H&V CAP COST	2.4			2.4							
SUB TOTAL	963.5		15.3	37.2	74.5	142.1	203.5	185.2	165.3	133.5	6.9
LAND	22.1	3.7	7.4	7.4	3.6						
WATER/SUPPORT	108.5		1.7	4.2	8.4	16.	22.9	20.9	18.6	15.1	.7
ELEC OPER DIESEL 7.6	19.1		.3	.7	1.5	2.9	4.0	3.7	3.2	2.7	.1
H/V OPER 11.5											
SUB TOTAL DAT 83	1113.2	3.7	24.7	49.5	88	161	230.4	209.8	187.1	151.3	7.7
CHANGE IN MANPOWER ADJ.	6.5		.1	.2	.5	1.0	1.5	1.2	1.1	.9	—
SUB TOTAL DAT 84	1119.7	3.7	24.8	49.7	88.5	162	231.9	211	188.2	152.2	7.7
ADJUST CONC. PLACMT (DAM)							8	8	8	<24>	
CONT. @ 17.5%	195.9	.6	4.3	8.7	15.5	28.4	42	38.3	34.4	22.4	1.3
SUB TOTAL	1315.6	4.3	29.1	58.4	104	190.4	281.9	257.3	230.6	150.6	9.
ENGINEERING	52.6	6.9	8	8	7	5.4	5	4.5	2.6	2.6	2.6
CONST. MGT.	76.9	—	1.7	3.5	6.2	11.3	15	15	13	10	3.2
OWNER	32.9	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.2
ADJ.		739.2	40.67	25.34%	15.67%	10.50%	-12.8	7	5.8		
							3.72%	11.58%	10.71	10.56	100.00
TOTAL	1480	14.5	42.1	73.2	120.5	210.4	292.4	287.1	255.3	166.5	18
											25

NOTE:
MINOR DIFFERENCES IN TOTALS MAY EXIST DUE TO

60.04.01 Form 146A

COLD LENGTH
12 IN
11 IN
8.5 IN
8 IN
AUTO
MANUAL
FEED

0 0 0 1 1 0

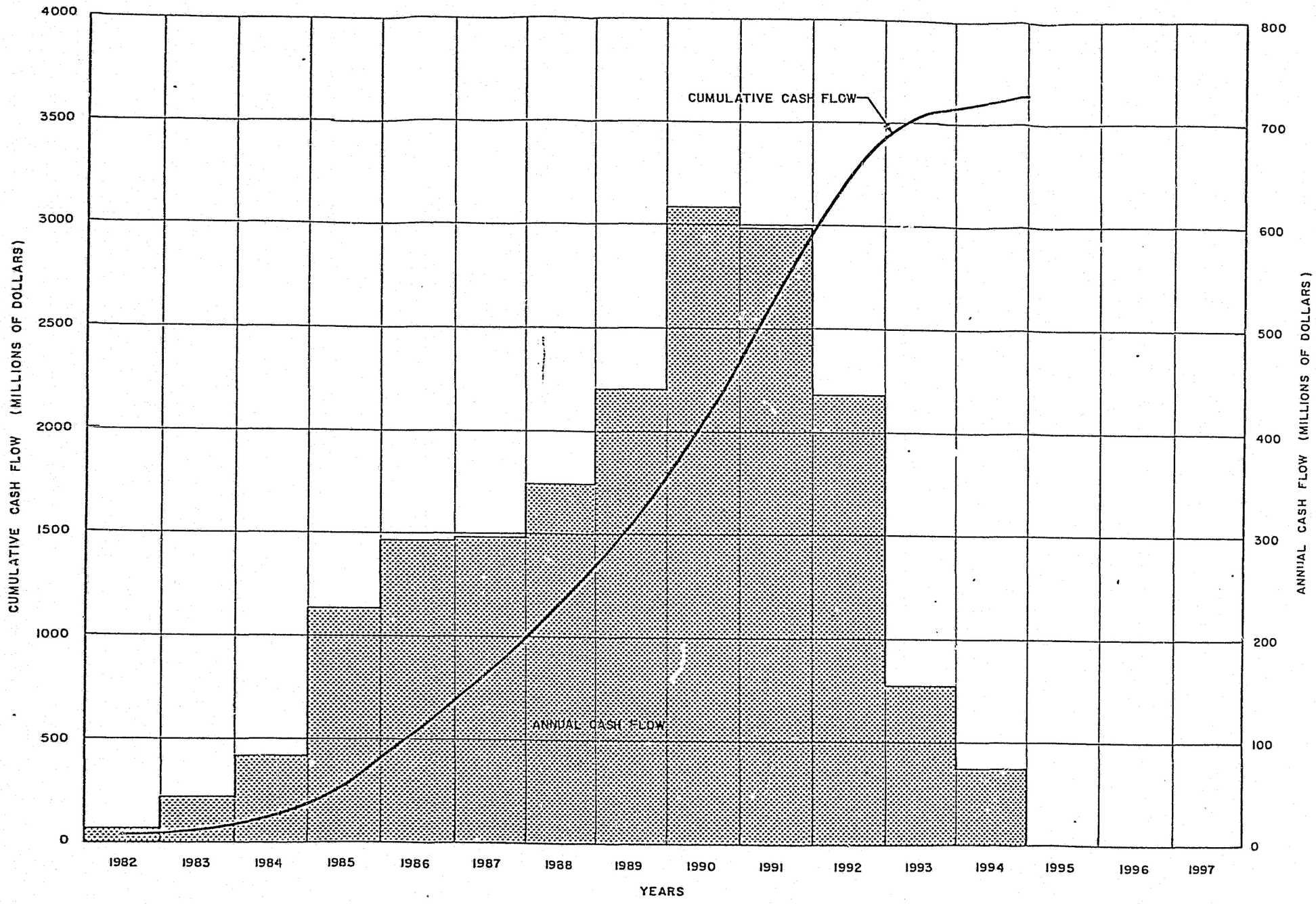


SUSITNA HYDROELECTRIC PROJECT
CUMULATIVE & ANNUAL CASH FLOW ENTIRE PROJECT
JANUARY, 1982 DOLLARS

FIGURE 16.3

ACRES

FOLD LENGTH
12 IN
11 IN
8.5 IN
8 IN
AUTO
MANUAL
FEED



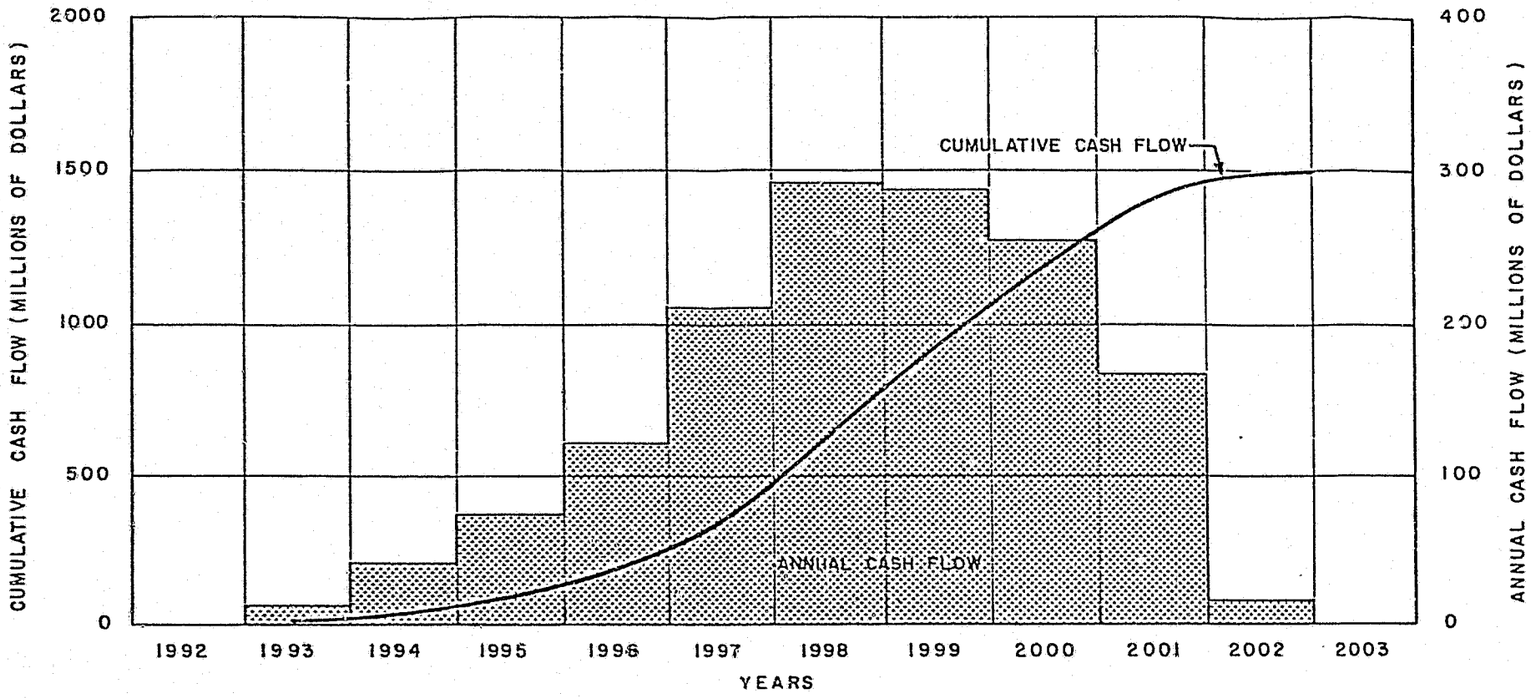
WATANA DEVELOPMENT
CUMULATIVE AND ANNUAL CASH FLOW
JANUARY, 1982 DOLLARS

FOLD
LENGTH
12 IN
11 IN
8.5 IN
8 IN

AUTO

MANUAL

FEED



DEVIL CANYON DEVELOPMENT
CUMULATIVE AND ANNUAL CASH FLOW
JANUARY, 1982 DOLLARS

FIGURE 16.2

ACRES

ACRES

Calculations

SUBJECT: D/C MANPOWER CALCS

JOB NUMBER _____

FILE NUMBER _____

SHEET _____ OF _____

BY _____ DATE _____

APP _____ DATE _____

FORM NO. 152 REV. 1

ACRES

Calculations

SUBJECT: D/C

JOB NUMBER _____
FILE NUMBER _____
SHEET _____ OF _____
BY JRP DATE 2/27/82
APP _____ DATE _____

TOTAL MAN-DAYS (See P. I-3 2/24/82)

1.1 –

a. Total 312 x 10⁶

b – 28

284

c – Add for Eq. Rp. 26

E.	0	79.2
E.	0	96.5
		175.7
		– 5.4
(15%)		170.3

26 — 26

d – Add Supery Staff
35% of Indirects

Total	1,113
	– 835
35%	(278)

99 — 97

e – ln (d)

f – Add 11

409 — 418 –

8 — 8

9 – +2%

1.2 Eng/Owner
Eng 4% of 1,113
Owner 1% " 1,113

44 — 56 –

M-D – 10^6 x 462 ÷ 297 = 1,623

Add Others 4%

61 — 61

1,684 x 10^3 M-Days

30

15EC FORM NO. 152 REV. 1

ACRES

Calculations

SUBJECT: DEVIL CANYON

JOB NUMBER
FILE NUMBER
SHEET 1 OF
BY JRP DATE
APP DATE

Yr	Pk CF	Adj for Sched.	Adj + Rch for Trans Line	Factor x28	
93	3	0			
94	11	3		E4	100
95	16	13		364	400
96	29	33	-	924	~~900~~ 910
97	44	43	-	1204	1200
98	56	56	+1	57 1596	1600
99	52	56	+2	58 1624	1700
00	46	50	+3	53 1484	1500
01	34	32	+2	34 952	900
02	3	3		E4	100

FORM NO. 152 REV. 1

4

31

ACRES

Calculations

SUBJECT: D/C MANPOWER

JOB NUMBER
FILE NUMBER
SHEET 2 OF
BY JRP DATE 2/24/82
APP DATE

	YR	CF	Adj for Sch				
	92	0	0				
	93	3	0				
	94	11	0				
1	95	16	11 (+4)	305 ✓	416	420	
2	96	29	30 (+4)	830	942	940	
3	97	44	44 (+4)	1220 ✓	1330	1330	
4	98	56	56 × 27.7	1550	1550	1550	
5	99	52	52 (+4)	1440	1550	1550	
6	00	46	46 (+4)	1270	1350	1350	
7	01	34	34 (-2)	940	920	920	
8	02	3		80	100	100	

(19)

FORM NO. 152 REV. 1

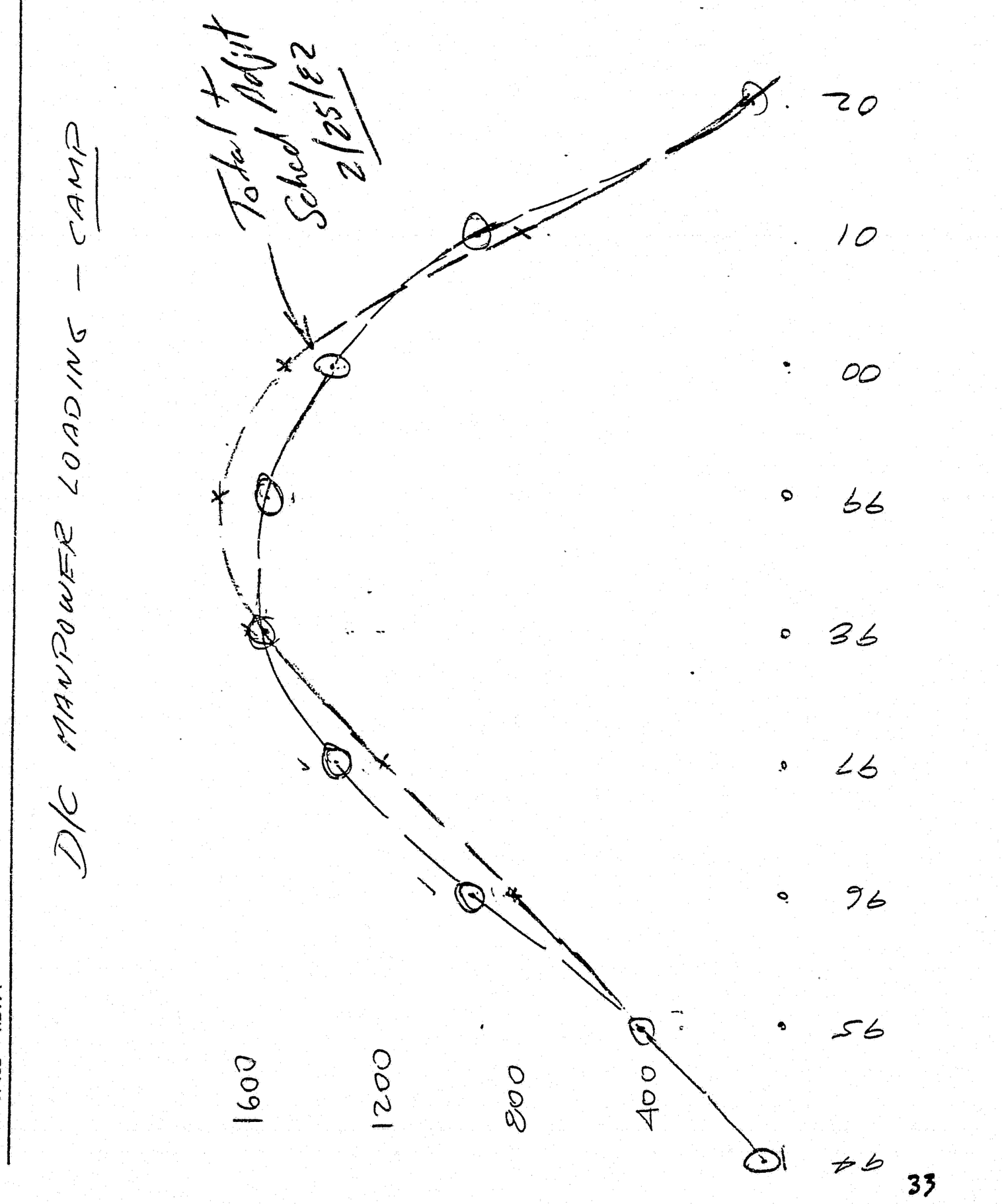
32

ACRES

Calculations

SUBJECT:

JOB NUMBER _____
FILE NUMBER _____
SHEET 3 OF _____
BY JRP DATE 2/24/82
APP _____ DATE _____



FORM NO. 152 REV. 1

DEVIL CANYON

1 - CONSTRUCTION TRADES & CONTRACTOR SUPERVISION	1103
2 - CAMP OPERATIONS & MAINTENANCE	
. Catering & Housekeeping	~~106~~ 88
. Maintenance	~~86~~ 77
- Transportation	5
. Other - Hospital, Education, etc.	~~127~~ 117
	~~312~~ 287
3 - MANAGEMENT	
. Construction Manager	108
. Owner	14
. Environmental & Other Agencies	10
	132
TOTAL PEAK MANPOWER	~~1567~~ 1522
Say	~~1550~~

ACRES

Calculations

SUBJECT: — DEVIL CANYON —

JOB NUMBER _____
FILE NUMBER _____
SHEET 1 OF _____
BY JRP DATE 2/24/82
APP _____ DATE _____

1 — TOTAL LABOUR COST Run #78

1-1 Contractors + Support

a - Total labour - computor sheets — 302 x10^6

b - Deduct trans. line labour — 28 x10^6

274 x10^6

c - Add Equip. Repair Labour

Equip. Ownership		78.7
" Operation		91.2
		169.9
Less Trans line equip	-	5.4
		164.5

Labour Part 15% of 164.5 = 25 x10^6

299 x10^6

d - Add Contractor's Supervisor Staff
30% of 299x10^6 = 90 x10^6

e - Add Repair Pt of d.
10% of 90x10^6 = 9 x10^6

f - Add for Transport, Handling part of materials ---- (See p. 2) = 11 x10^6

409 x10^6

g - Vendors, Equip't Suppliers, etc whose costs are part of matl, equip. 2% E

417 x10^6

(to p. 3)

FORM NO. 152 REV. 1

ACRES

Calculations

SUBJECT:

JOB NUMBER
FILE NUMBER
SHEET 2 OF
BY DATE
APP DATE

Material Cost — D/C

Job matl's	103
Perm "	225
	328 x 10⁶
Less Offsite Matl	
— trans line	−51.1
— camp bldg credit	+2.5
— owner's - gen'l plant	−5.0
	49
	279

Assume transport pt 8% of 279 = 22 x 10⁶
Assume labour pt 50% of 22 = 11 x 10⁶

For Pk assume 5 yr - 8 mons or 200 days

Labour cost/day $\frac{11 \times 10^6}{5(200)}$ = $11,000/day

Estd labour $\frac{11,000}{297}$ = 37

Civil/10
MEE 4

7/8 = 16/3

FORM NO. 152 REV. 1

ACRES

Calculations

SUBJECT:

JOB NUMBER _____
FILE NUMBER _____
SHEET 3 OF _____
BY _____ DATE _____
APP _____ DATE _____

1.2 Engr, Owner

Total direct + indirect costs $1,094 \times 10^6$

Engr Cost — 5% ÷ 2
Owner's " — 1% ÷ 2
} 3% + 1 = 33×10^6

4.17×10^6
11
450×10^6
11
461

1.3 Estd Man-Days

a- On-Site labour $\frac{461}{450} \times 10^6 \div 297 = 1,5\frac{52}{15} \times 10^3$

b- Adjustments

- Agencies 2%
- Visitors 1%
- Other 1%

} 4% 6×10^3

$\frac{1576}{1614} \times 10^3$

Say $1,580 \times 10^3$

FORM NO. 152 REV. 1

ACRES

Calculations

SUBJECT:

JOB NUMBER
FILE NUMBER
SHEET 4 OF
BY DATE
APP DATE

2 - ESTIMATE TOTAL SITE MANPOWER

2.1 CONTRACTORS

Ref. Calc 2/19/E2

Labour cost 48% (486×10^3) = 233×10^{-3}

a. Direct (cost) labour $233 \times 10^3 \div 297$ = 785

b. Sup'n " 30% $(233 \times 10^3) \div 297$ = 235

c. Add repair labr in b — 10% of b. = 24

d - Add lab. pt of transport (p. 2) = 37

1081

e. Add - Equip. Rep., Specialists etc 2% 22

1103

3506 Incl Cr. or 40

FORM NO. 152 REV. 1

ACRES

Calculations

SUBJECT:

JOB NUMBER
FILE NUMBER
SHEET 5 OF
BY DATE
APP DATE

1103

2.2 CAMP OP'S & M-

10%	a. Catering & Housekeeping	110
5	b. Bldg, Rds etc O&M	55
2	c- Transport	22
5	d- Rec, Med, Ed, Sec., Services	110+
	e-	
		297

2-3 MANAGEMENT

10%	a- Constn Mngr	110+
1%	b- Owner	11
2%	c- Environmental + Others	22
		143

Peak Forcasted Site Manpower - > 1543

Say 1,550

CAMP SIZE 1.1 X 1543 = 1700 < 1900 OK

39

FORM NO. 152 REV. 1

ACKES

Calculations

SUBJECT:

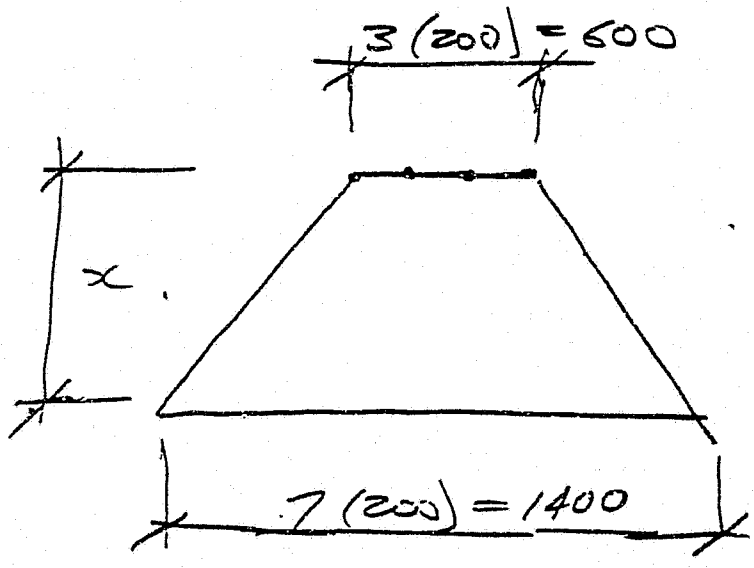
JOB NUMBER _____
FILE NUMBER _____
SHEET 6 OF _____
BY _____ DATE _____
APP _____ DATE _____

3- CAMP SIZE - MAN-DAYS Check

from Item 1 above

Adj: Contractor + Support
Engr/Owner

417×10^6
$\frac{33}{450 \times 10^6}$



$A = \frac{x}{2}(600 + 1400)$

$= 4$

Man-Days = $450 \times 10^6 \div 297 \$/day = 1,515 \times 10^3$

$\frac{x}{2}(600 + 1400) = 1515 \times 10^3$

$x = 1515$ ~ cp to 1543

FORM NO. 152 REV. 1

ACRES

Calculations

SUBJECT: DEVIL CANYON

JOB NUMBER _____
FILE NUMBER _____
SHEET _____ OF _____
BY JBP DATE 2/22/82
APP _____ DATE _____

Year	Peak Forcast Manpower		
94	0		
95	400		
96	900		
97	1400	+1	
98	1700		
99	1700	+1	
00	1400		
02	900	-1	
03	300	+2	Com'g / Demob.
		+4	

FORM NO. 152 REV. 1

ACRES **Calculations**

SUBJECT: DEVIL CANYON MANPOWER - CAMP SIZE

JOB NUMBER ____ FILE NUMBER ____ SHEET 1 OF ____ BY JRP DATE 2/19/82 APP DM DATE 2/19/82

1 - CASH FLOW

		Yrs 98	99	00
Acct				
Total Cash Flow - Max Q.		58.9	62.8	54.1
331.11C			+.2	
332.51C				
.52C		-.6	-.6	
.61C		-.6	-.6	
333.11		-1.8	-1.8	
.21			-1.9	-1.9
334		--	-2.0	-2.0
335			-1.9	-1.9
352	Swyd			
353			-2.0	-2.0
332.91C TAILRACE →		55.9	52.0	46.3
			4	4
			48.0	42.3

Net Cash Flow — 1 quarter 56×10^3

— per day $\frac{56 \times 10^3}{25} = 747 \times 10^3$

Direct Cost $65\% (747 \times 10^3) = 486 \times 10^3$

Labour Part $44\% (486 \times 10^3) = 214 \times 10^3$

Labour $214 \times 10^3 \div 297 = 721$

Staff $8\% (747 \times 10^3) \div 297 = 201$

923
92
1015
680
1695 ~~1900~~

Add 10% estg correction

Support .67 (1017)

Increase 1.11 ( ) = 1865 ⇒ 1900

FORM NO. 152 REV. 1

ACRES

Calculations

SUBJECT:

JOB NUMBER
FILE NUMBER
SHEET 2 OF
BY DATE
APP DATE

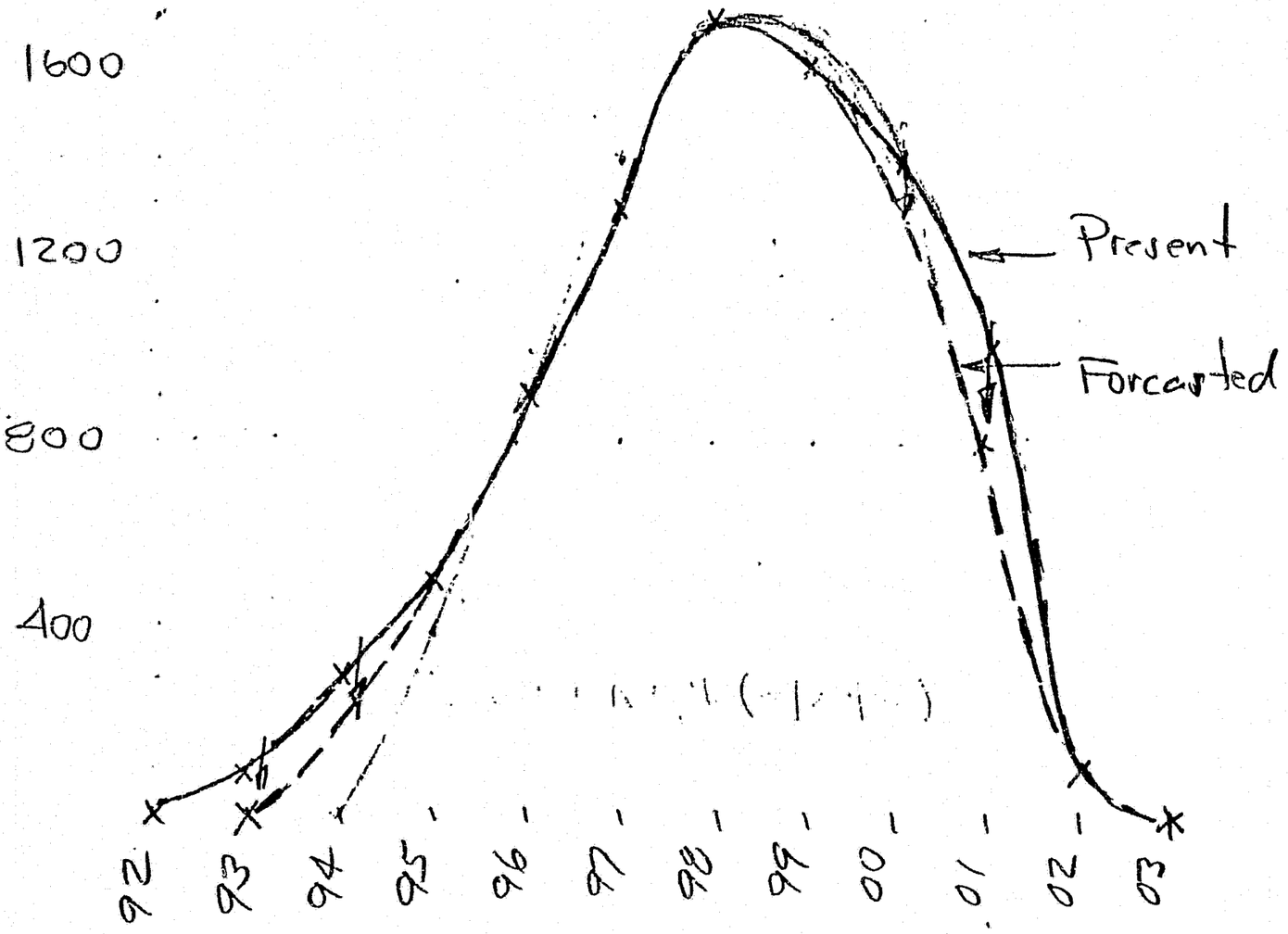
	Peak CF	Adj		
93	3		3	100
94	11		11	300
95	16		16	500
96	29		29	900
97	45	~1	44	1300
98	59	-3	56 (x30)	1700
99	63	-11	52	1600
00	54	-8	46	1400
01	70	-36	34	1000
02	3		3	100

FORM NO. 152 REV. 1

FORM NO. 152 REV. 1

D/C MANPOWER LOADING

Cash Flow 1/17/82
Est. #73



ACRES

Calculations
SUBJECT:

JOB NUMBER
FILE NUMBER
SHEET 3 OF
BY CRD DATE 1/20/82
APP DATE

44

ACRES

Calculations

SUBJECT:

JOB NUMBER _____
FILE NUMBER _____
SHEET _____ OF _____
BY _____ DATE _____
APP _____ DATE _____

SF MAIN DAM CONC

			Av Seasms	Plc Season x1.1
Say 5 mons				
2nd	37.5%	40%	22300	24,5
3rd	37.5%	40%	22300	24,5
4th	25.0%	—> 20%	11162	12.2
			56.	

93

Estimate Work Sheet

ACRES

ITEM REFERENCE No. | JOB No.

DESCRIPTION | SHEET / OF

PROJECT DEVIL CANYON RUN #73 | OPERATION No. | REF. | BY

CONTRACT | DESCRIPTION | CKD | DATE

DESCRIPTION AND BASIS OF ESTIMATE	QUANTITY	UNIT	LABOR UNIT COST	LABOR AMOUNT	JOB MATERIALS UNIT COST	JOB MATERIALS AMOUNT	PERM.MATERIALS UNIT COST	PERM.MATERIALS AMOUNT	SUBCONTRACTS UNIT COST	SUBCONTRACTS AMOUNT	EQPT.OWNERSHIP UNIT COST	EQPT.OWNERSHIP AMOUNT	EQPT.OPERATION UNIT COST	EQPT.OPERATION AMOUNT	Equiv UNIT	TOTAL AMOUNT
331 POWER PLANT	Amounts (%)			19.2 (39%)		10.2 (21%)		6.0 (12%)		—		5.9	19.4	7.6 (40%)		49.0
Repair Labour				2.9										15% (19.4)		
				22.1 (45%)												
332 MAIN DAM	Amounts (%)			147 (35%)		61 (15%)		98 (24%)		3		49	108	59 (26%)		417
Repair Lab				16										15 of 108		
				163 (39%)												
331 —				19.2								19.4		49.0		
Less M&E				—.8								—.2		— 3.0		
				18.4 (40%)								19.2 (42%)		46.0		
332 —				147								108		417		
Less M&E	9	8%		—7								—2		—30		
				140 (36%)								106 (27%)		387		
Repair Lab				16												
				156 (40%)												

Estimate Work Sheet

ACRES

ITEM REFERENCE No. | JOB No.

DESCRIPTION | SHEET 2 OF

PROJECT | OPERATION No. | REF. | BY

CONTRACT | DESCRIPTION | CKD | DATE

DESCRIPTION AND BASIS OF ESTIMATE	QUANTITY	UNIT	LABOR		JOB MATERIALS		PERM.MATERIALS		SUBCONTRACTS		EQPT.OWNERSHIP		EQPT.OPERATION			
			UNIT COST	AMOUNT	UNIT COST	AMOUNT	UNIT COST	AMOUNT	UNIT COST	AMOUNT	UNIT COST	AMOUNT	UNIT COST	AMOUNT	Equiv UNIT	TOTAL AMOUNT
336 ROADS				9.4		.5						8.3		9.3		27.5
				(34%)								17.6				
				2.6 ←								(64%)				
				12.0												
				(44%)												
63				87		65						14		11		177
				(49%)								25				
				3.8 ←								(14%)				
				90.8												
				(51%)												
PROJECT TOTAL DIRECTS				30E.		149		221		3		E0 92		92		E53
				(36%)								172				
				+26 ←						Repair Labour		(20%)		.15(172)		
				334								-26				
				(39%)								146				
												( )				
Less M&E Work				-46.				80% 134				-12				-192
				288.								160				661
[redacted]				[redacted]								134				
				(47%)												

ACRES

Calculations DEVIL CANYON CASH FLOW

SUBJECT:

JOB NUMBER P5200 09
FILE NUMBER
SHEET 1 OF 1
BY PM DATE 10 FEB 82
APP DATE

	1 TOTAL	93	94 → START	95	96	97	98	99	100	01	02	
		.011	.037	.053	.105	.122	.174	.186	.146	.162	.004	
			9000									
OMPUTER LIST	929175	10390	34251	48848	97127	113820	161538	172999	135635	150288	4226	
AND	22050	5513	5513	5512	5512	—	—	—	—	—	—	-5T
ATER/SUPPORT	117600	1294	4351	6233	12348	14348	20465	21874	17170	19051	470	117604
LEC POWER	31500	346	1165	1669	3308	3843	5481	5859	4599	5103	120	-31 893
H V	2											
	1100 327	17543	45280	62262	118295	132011	187484	200732	157404	174442	4816	1100 269
INT												
N&A OMIN												

ACRES

Calculations

SUBJECT: WIATANA CAMP
FROM. CASH FLOW

JOB NUMBER
FILE NUMBER
SHEET 1 OF
BY JRP DATE 2/18/82
APP DM DATE 2/19/82

Review CF

Acct		(-) 89	(+)	(-) 90	(+)	(-) 91	(+)
331.17			.5 ✓				
332 .21C				12.0 ✓		2.0 ✓	
332 .311			2.0				
.51C		2.0 ✓		12.0 ✓	2.0		—
.52C		.7		.7		—	
.513?						2.0	
.614		1.0 ✓		1.0 ✓			1.0 ✓
.61C		1.7 ✓					
333.11		2.1 ✓		2.4 ✓			
.21		—		3.0 ✓		3.0 ✓	
334.1--7		—		(3"ø) 3.7 ✓		(2"ø) 3.7 ✓	
335.		—	—	(") 2.4 ✓		2.4	
336.		2.6		2.6 ✓		2.6	
353	PH Sewer ≈ 2/3			8.0 ✓		8.0 ✓	
354	TOWER			13.0 ✓		13.0 ✓	
356	O/H COND			9.0 ✓		9.0 ✓	
359	Rds/Trails	1.7 ✓		1.7 ✓			
			- 9.3		48.5 49.2		42.3

117.5 ✓ − 9.3 = 108.2

170.5/167.8 ✓ − 48.5 49.2 = 119.3

156.3/145.0 ✓ − 42.3 = 114.0

115.6 ≈ 120M

Cash flow reduced by Offsite Works
" " does not include camp Ofc, Engr, Owner, or Land

FORM NO. 152 REV. 1

ACRES

Calculations

SUBJECT:

JOB NUMBER
FILE NUMBER
SHEET 2 OF
BY JRP DATE 2/16/82
APP Dm DATE 2/19/82

Net Cash Flow

— Quarter 120 x 10⁶
— Day ÷75 = 1600 x 10³ / 25 x 3 = 75

Direct Cost 69% (1600 x 10³) = $1104 x 10³ / DAY

Labour Part 40% (1104 x 10³) = $442 x 10³ / DAY

Av. Labour Cost $297/day

Estd direct labour $\frac{442 \times 10^3}{297}$ = 1488 MEN

Contractor's Staff
8% total (1600 x 10³) = 128
30% direct (442 x 10³) = 132

Estd Staff — $\frac{132 \times 10^3}{297}$ = 444 -

1932 -

Forcast Accuracy on Labour Part of value — ± 10% 193

2125 -

Support Staff
Camp; OEM
Owner, Eng'r . 67 (2125) 1424 -

Forcast Peak Labour 3549 → 3600

Add 10% to Camp for turnover vacation etc --- 360

3960 → 4000

69% 1.45

5% Ind

5% ~ 44

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ACRES

Calculations

SUBJECT:

JOB NUMBER _____
FILE NUMBER _____
SHEET 3 OF _____
BY _____ DATE _____
APP _____ DATE _____

B) BY LABOUR CONTENT

Labour value ×10⁶
Equip't labour value
— Equip. Owner
— " Op. _____

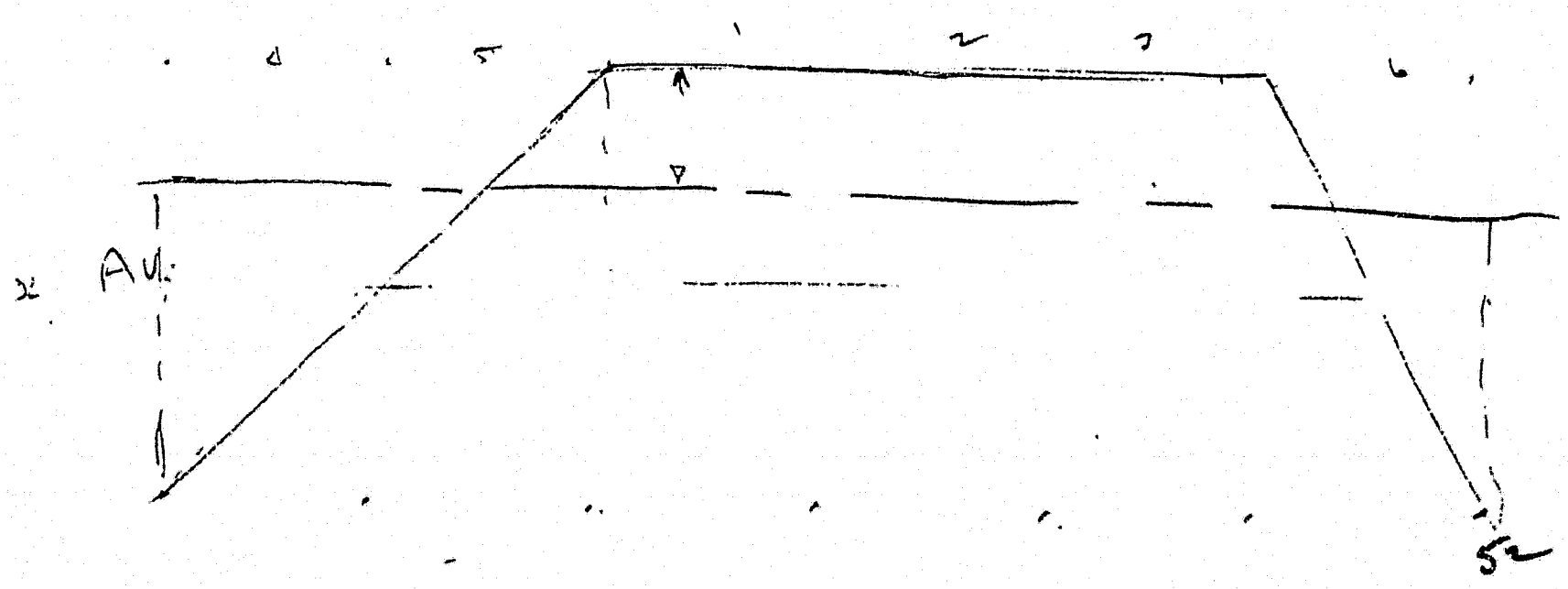
206 15% of _____ = _____

Indirect Labour 30% = _____

Average Labour Say 6 yrs =

Av wage 1782 hrs x 33 = $58,806
→ 60,000/yr.

Av. labour force _____ =
60,000



FORM NO. 152 REV. 1

ACRES

Calculations

SUBJECT: WATANGA

JOB NUMBER _____
FILE NUMBER _____
SHEET _____ OF _____
BY _____ DATE _____
APP _____ DATE _____

	x10^6	Total		
83	6 ~	180	200	
84	8	240	300	
5	40 -	1200	1200	9[illegible]
6	47 -	1410	1800	1[illegible]
7	84	2520	2500	2[illegible]
8	96	2880	2900	
9	108	3240	3200	
90	120	3600	3600	
1	114	3420	3400	
2	100	3000	3000	— [illegible]
3	60 -20	1800	1800	1200
4	3	120	200	

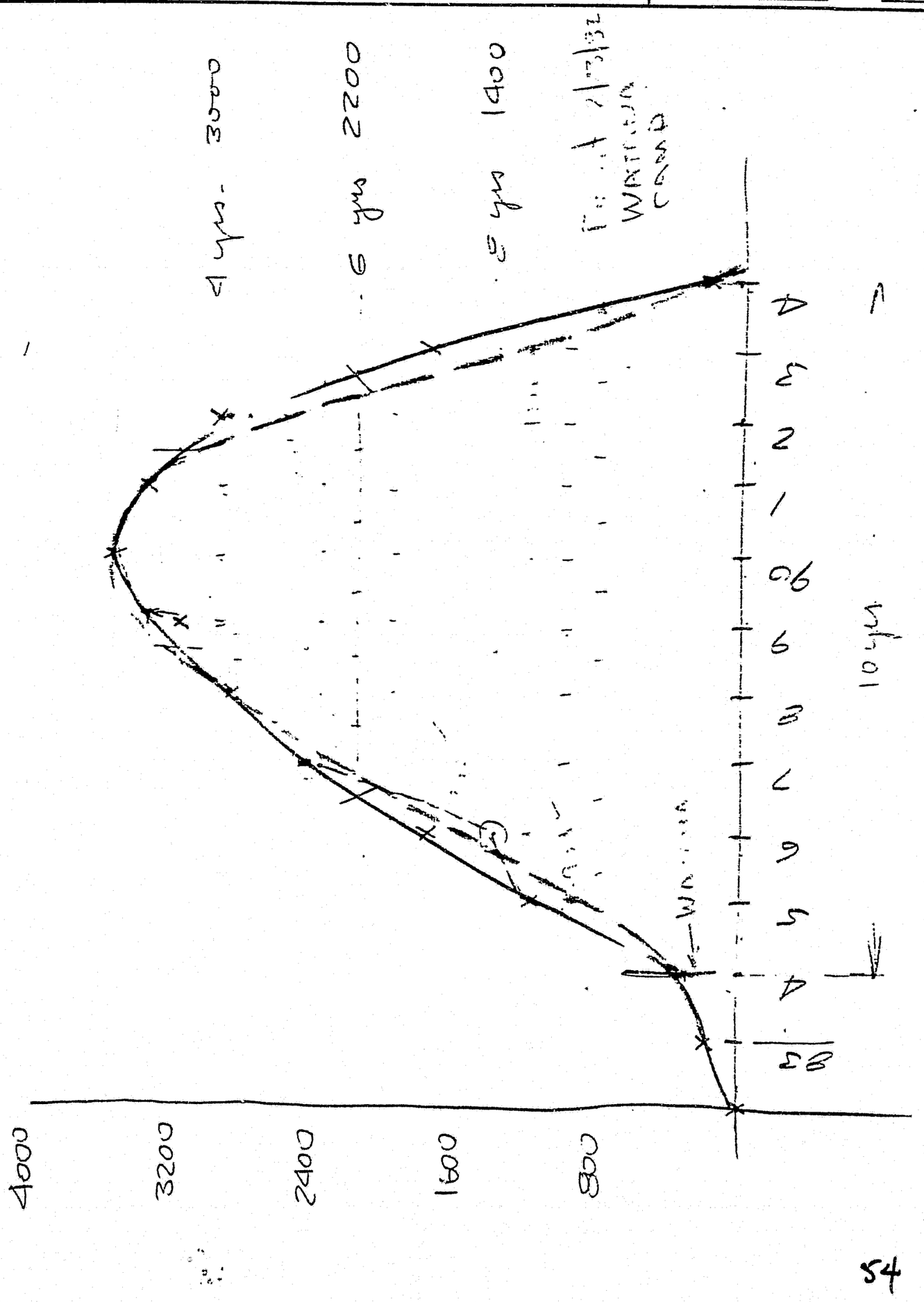
FORM NO. 152 REV. 1

ACRES

Calculations

SUBJECT:

JOB NUMBER _____
FILE NUMBER _____
SHEET _____ OF _____
BY _____ DATE _____
APP _____ DATE _____



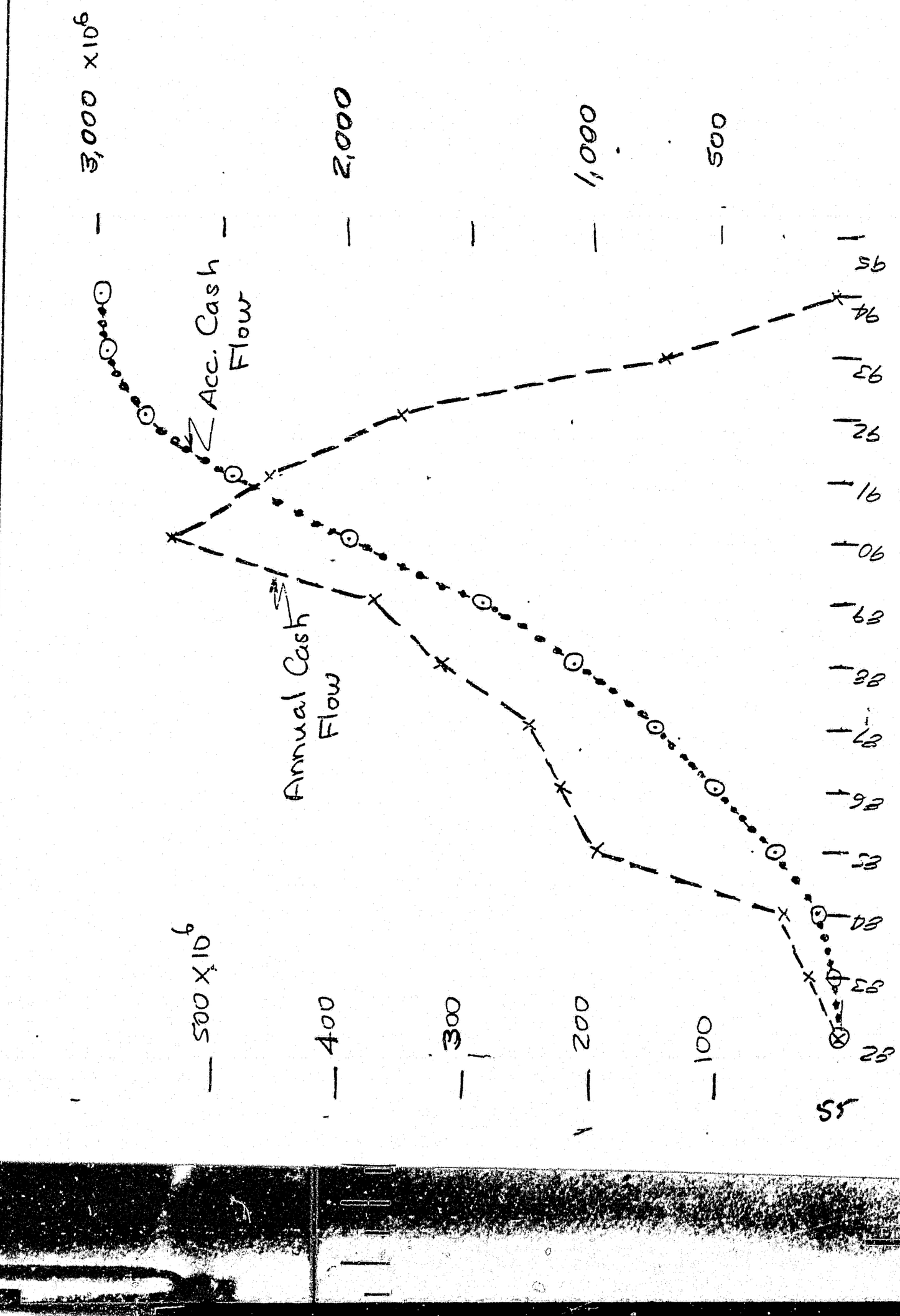
FORM NO. 152 REV. 1

ACRES

Calculations

SUBJECT: CASH FLOW
WATANA

JOB NUMBER _____
FILE NUMBER _____
SHEET _____ OF _____
BY JRP DATE 2/13/82
APP _____ DATE _____



FORM NO. 152 REV. 1

ACRES

Calculations

SUBJECT:

JOB NUMBER _____
FILE NUMBER _____
SHEET _____ OF _____
BY _____ DATE _____
APP _____ DATE _____

WATANA

YR	C.F per yr	C F ACC.
E2	0	
E3	24	24
E4	49	73
E5	196	269
E6	226	495
E7	249	744
E8	321	1065
E9	374	1439
90	539	1978
91	466.	2444
92	357	2801
93	144	2945
94	3	2948
95	0	

FORM NO. 152 REV. 1

ACRES

Calculations WATANA CASH FLOW

SUBJECT: $ 000

AE WAIOST OAT 66 6FEB82 # CASH FLOW RUN 10 FEB 82

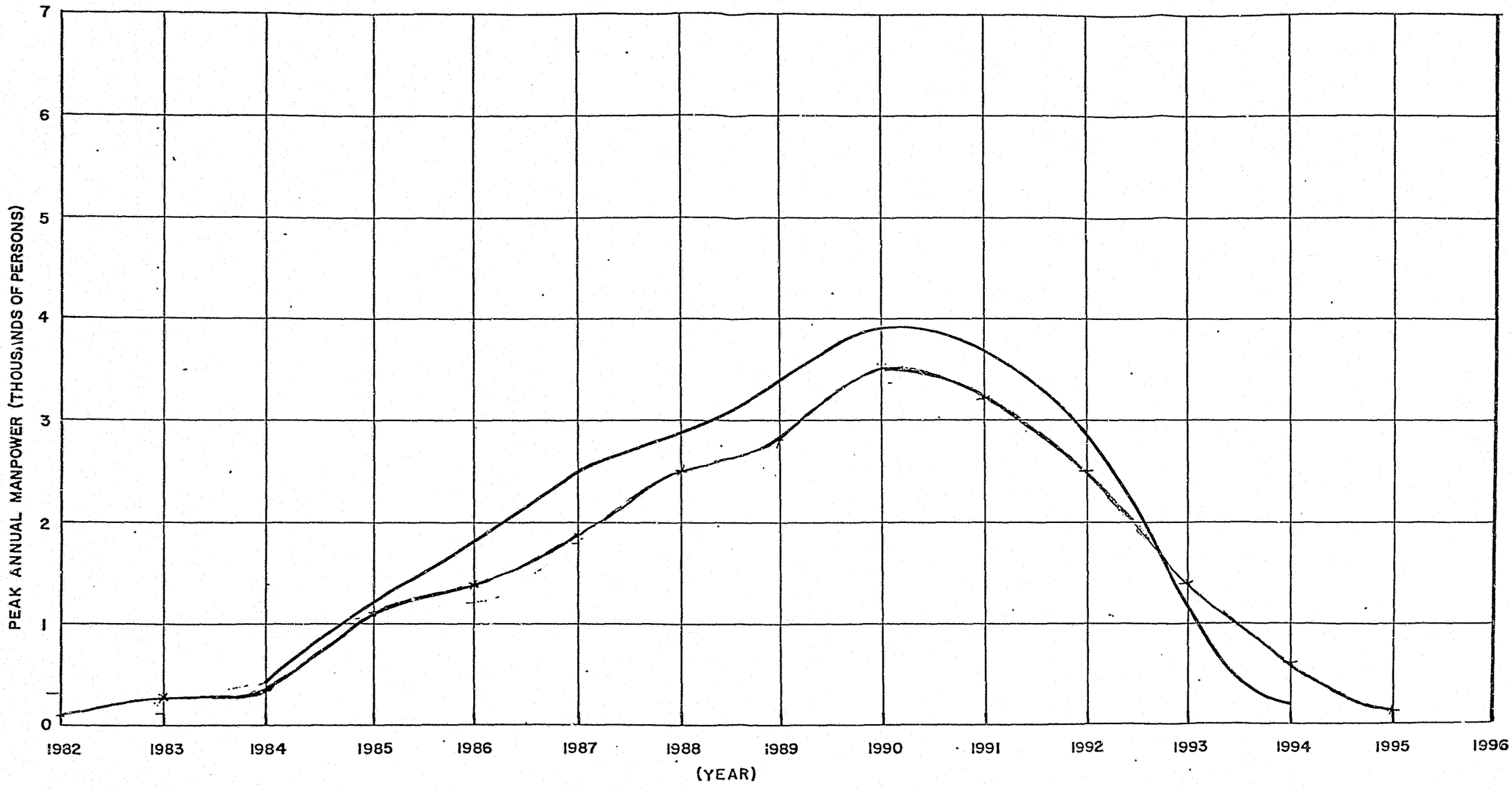
JOB NUMBER P570009
FILE NUMBER
SHEET 1 OF 1
BY NRM DATE 11FEB82
APP DATE

ITEM	TOTAL AMOUNT	82	83	84	85	86	87	88	89	90	91	92	93	94	
						% NE									
					5.877%	6.986%	8.390%	10.751%	12.684%	19.785%	17.101%	12.895%	5.427%	.105%	prior in computer listings
FROM COMPUTER LIST (10FEB82)	2634 539	—	23,950	48 800	150560	178 958	214 935	275 416	324 932	506 851	438 097	330 338	139 019	2683	243 PIONEER ROAD CAMP
	ERROR ADJ.		81	162											
SITE ADAO ADJUSTMENT move 90-93 into 85-89 DIVERSION MECH ADJ. →					9328	9328	9328	9328	9328	(11660)	(11660)	(11660)	(11660)		
					4487	4486			(2564)	(5128)	(1282)				← DISTRIB BY PROP TO ABOVE 85-94
6 CAMP SUPPORT	276 000				16 220	19281	23 157	29 673	35 007	54607	47 179	35 590	14 978	287	
7 345 KV ELEC DISTRIB.	2 000				1000	1000									
CAMP POWER CAP. COST	2 131				1131	1000									
OVER	15 841				931	1107	1329	1703	2009	3134	2709	2043	860	17	← DISTRIB BY PROP ABOVE 85-94
CONST POWER	8100				476	566	680	871	1027	1603	1385	1044	440	9	← " " "
8 CONST H&V	1590				1590										
350 TRANSMISSION LAND	8260								4260	4000					
(TEMP POWER ADJUSTMENT) →					10 000	10000				(10 000)	(10 000)				
SUBTOTAL	2948 461														
+ ERROR IN #	243														
TOTAL reconciled w/ OAT 66	2948 706 →				24 031	48 962	195 723	225 726	249 429	321 251	373 739	539 407	466 448	357 355	143 637 2998
2948 707															
CONT @ 0.20	516 024														
ENGR ADMIN @ 0.125	433 091														
	3897 789														

57

0.04.01 Form 148A

FOLD LENGTH
12 IN
11 IN
8.5 IN
8 IN
AUTO
MANUAL
FEED



WATANA
MANPOWER LOADING CURVE

58

FIGURE 16.4

ACRES

~~120~~ 125

ACRES **Calculations**

SUBJECT: WATANA CAMP FORCAST

JOB NUMBER _____
FILE NUMBER _____
SHEET 1 OF _____
BY JRP DATE 2/11/82
APP _____ DATE _____

CASH FLOW — Run ____ Date ____

1- Peak Quarters (2nd & 3rd) 1990 170 x 10^6
89 117
91 156

2- Deduct Off-Site Work

332	21C	Div. Mech	3.1X10^6
	51C	TUN SPWY. MECH	2.0 X 10^6
	52C	MAIN " "	.6
	61C	INTAKE "	1.7
333	.11	T/G	2.1
	.21	G/E	3.0
330	....	Elec.	3.6
335	—	Mech	2.4
336	—		
353	—	Trans Line 11:7-3.7=	8.0
354		" "	13.0
356		" "	9.0
359		" "	1.7
			50.2

Swyd. at Watana

3- Net Peak Cash Flow '90 170 − 50 = 120 x 10^6
" " " " 89 117 − 7 = 110 x 10^6
" " " " 91

FORM NO. 152 REV. 1

ACRES

Calculations

SUBJECT: CAMP – WATANA

JOB NUMBER _____
FILE NUMBER _____
SHEET 2 OF _____
BY _____ DATE _____
APP _____ DATE _____

Net Cash Flow
– quarter $120 x 10^6
– per day " ÷ 75 = $1600 x 10^3

Direct Cost ~ 71% (1600 x 10^3) = 1136 x 10^3

Labour part ~ 40% (1136 x 10^3) = 454 x 10^3

Av. Labour cost – 9 (33) = $297 /day

→ Est'd direct labour $\frac{454 \times 10^3}{297}$ = 1529

Contractor's Staff ~ 8% (1600 x 10^3) = 128 x 10^3

→ Est'd staff $\frac{128 \times 10^3}{297}$ = 431

Subtotal 1960

Support Staff – Camp Oth Engin'r Owner } .67 (1960) = 1313

3273

Forcast Accuracy Correction +3% 98

3371

Allow for Turnover, Vacation (5%, 10%) +15% 506

TOTAL 3877

FORM NO. 152 REV. 1

ACRES

Calculations

SUBJECT:

JOB NUMBER _____
FILE NUMBER _____
SHEET 3 OF _____
BY JRP DATE 2/13/82
APP _____ DATE _____

FORCAST ACCURACY CORRECTION

	Inc. +	Dec −
① Increased % Directs to a 74% (ie 35% In:/Dir.)	3%	—
② Increased Labour Part on Work resulting from equip decreases	2%	—
③ Increased Av. Labour Cost/Day at peak due to 10hr shifts Say 9.3 hrs/man/day	—	-3%
④ Decrease Staff Rate Due to Shorter Hrs – Lower Rates, Clerical etc..	1%	
⑤ Decrease in Cash Flow due to Adjustment for Change in Indirects from 55 to 40%		-5%
⑥ Cash System – ie st. line vs 'S' curve.	5%	
⑦ Other Factors – ?	◯	◯
	+11	-8

FORM NO. 152 REV. 1

ACRES

Calculations

SUBJECT:

JOB NUMBER _____
FILE NUMBER _____
SHEET 4 OF _____
BY JRD DATE 2/13/82
APP _____ DATE _____

MANPOWER DISTRIBUTION - WATANA

Assume 4000 Labour -

	Totals	1.22 Adj Totals	Trades	Prof. Tech.	Other
Direct Constn Labour	1529	1869	1969		
" " Staff	431	527		227	300
	1960	2396			
Support Staff					
Camp O&M	657	802	500	152	150
Mngr/Eng	657	802	—	400	402
		1604			
		4000	2369	879 ↑	852 ↑

FORM NO. 152 REV. 1

ACRES

Calculations

SUBJECT: MANPOWER

JOB NUMBER _____
FILE NUMBER _____
SHEET _____ OF _____
BY _____ DATE _____
APP _____ DATE _____

	W		D/C
Peak Manpower	~~3600~~	3900	1700
BREAKDOWN			
TRADES ~ Cont'rs	1700	1900	800
SUPERVISORY "	500	600	220
CAMP OFM	800	800	400
ENG'R, OWNER, ETC	600	600	280
	3600		1700

FORM NO. 152 REV. 1

JAN 21/82

CAMP SIZE/TRADES FORCAST

CHECK FORCAST

ACRES

Calculations

SUBJECT: WATANA – CAMP

JOB NUMBER ____
FILE NUMBER ____
SHEET 1 OF 2
BY JRP DATE 11/21/82
APP ____ DATE ____

Estimate developed from prelim. cash flow
ie without land costs, camp, access roads,
transmission line, engineering, contingency
—— in Dec '81.

A) SIZE

Peak cash flow – 3mons '90 $175,000 x10^3

" " " /day ÷ 75 days 2,333 x10^3

Est'd direct cost portion 65% 1,516 x10^3

" labour cost ≈ 50% 758 x10^3

Labour Cost/day
9 hrs @ 33.00 ÷ 297 –

Est'd labour force $\frac{758 \times 10^3}{297}$ = 2552

" support " " .67/1 = 1710

4262

Add –
Eng'r
Owner
Roads, Trans. Line etc } 300

4562

Add 10% turnover, vacation etc 456

5018

FORM NO. 152 REV. 1

ACRES

Calculations

SUBJECT:

JOB NUMBER _____
FILE NUMBER _____
SHEET 2 OF 2
BY _____ DATE _____
APP _____ DATE _____

B) MAN-DAYS

Peak accum. cash flow $2,100 x 10^6

Labour 50% of 65% $682 x 10^6

Labour Cost / day $297

No Working Man-Days $\frac{682 \times 10^6}{297} = 2,298 \times 10^3$

Add for 5 non working days per mon. $\frac{30}{25} \times 1.2$ 460

$2,758 \times 10^3$

Adjust for support staff. (67%) 1848

4606

Add for Eng'r, Owner etc 6% 276

" " Other Contractors 10% 461

5343×10^3

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OCT 81

— CAMP SIZE/TRADES —

VERY PRELIMARY FORCAST

Total Manpower			5600	
10% for turnover			560	
Camp Size		~	6200	

Manpower Breakdown

	By Attached ?		By Guidlines ?	
Trades (Direct Costs)	4320	>	3360	
Support	510	<	1120	2240
Hd Q - Engr/Owner	804	<	1120	
	5634		5600	

JOB NUMBER 85700 C9
FILE NUMBER
SHEET 1 OF 5
BY 12FT Lbm DATE 10/1/87
APP DATE

Calculations
SUBJECT: SUSITNA PEAK CAMP SIZE

ACRES

	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	2000	2001	2002
TRUCK DRIVERS (H)		1	8	40	115	160	160	160	160	120	90	90	90	90	90	60	20	8		
(L)	2	3	4	18	50	70	70	70	70	60	40	40	40	42	42	24	8	4		
RAIL TRANSPORT			2	3	7	10	10	10	10	8	5	5	5	6	6	4	2	2		
AIR TRANSPORT						6	6	6	6	6	3	3	3	4	4	2	1	1		
BUS DRIVER	2		2	2	4	12	12	12	12	10	6	6	6	7	7	5	2	1		
PUMPING.				3	8															
MAT'L HANDLING.				4	4	16	16	16	16	12	8	8	8	9	9	6	2	-		
MOVING & STORAGE	1	1	1	5	12	18	18	18	18	14	9	9	9	10	10	7	3	2		
DRILLING.			1	3	8	12	12	12	12	10	6	6	6	7	7	5	2	2		
BLASTING.			12	54	150	210	210	210	210	160	122	122	122	126	126	64	10	-		
STATIONARY EQ.			2	11	30	44	44	44	44	34	22	22	22	26	26	18	6	-		
EL POWER GEN.			1	3	8	12	12	12	12	10	6	6	6	7	7	5	2	2		
DISPOSAL OF WASTE		1	1	2	4	6	6	6	6	4	3	3	3	4	4	2	1	1		
RECREATION	1	1	1	3	8	10	10	10	10	8	5	5	5	6	6	4	2	1		
PHOTOGRAPHY				1	4	6	6	6	6	4	3	3	3	4	4	2	1	-		
STRUCTURAL STEEL	1	1	1	1	1	2	2	2	2	1	1	1	1	1	1	1	1	1		
SHEET METAL.				3	8	12	12	12	12	9	6	6	6	7	7	5	2	2		
BOILERMAKERS				2	6	8	8	8	8	6	4	4	4	5	5	3	2	-		
WELDERS		1	1	1	4	6	6	6	6	4	3	3	3	4	4	2	1	1		
ELECTRICAL TRANSMISSION		1	2	8	20	30	30	30	30	24	20	20	20	18	18	10	4	4		
ELECTRONICS				120	120	120	170	120	120	-	-	-	50	80	80	80	65	-		
ELECTRICIAN				5	14	20	20	20	20	15	-	-					6	2		
PAINT	1	1	1	10	28	40	40	40	40	34	20	20	20	24	24	14	5	3		
CEMENT WORKERS			1	4	10	14	14	14	14	10	7	7	7	8	8	5	2	2		
EXCAVATING.		2	3	20	56	80	80	80	80	60	40	40	40	48	48	36	20	20		
CARPENTERS	1	2	20	98	270	380	380	380	380	300	184	184	184	230	230	130	32	12		
BRICKLAYERS.	4	6	8	36	100	140	140	140	140	120	68	68	68	80	80	50	20	4		
PIPE FITERS				5	14	20	20	20	20	15	10	10	10	12	12	8	4	2		
LABOUR		2	2	7	18	26	26	26	26	20	13	13	13	16	16	10	4	4		
ROOFERS	20		155	738	2270	3200	3200	3200	3200	2400	1570	157	1570	1770	1770	1100	370	297		
MECHANICAL MACH.				1	3	4	4	4	4	3	2	2	2	1	1	1				
—/— AUTO	1	1	1	6	18	24	24	24	24	20	12	12	12	14	14	10	3	1		
—// — ENGINE		1	1	8	22	30	30	30	30	22	15	15	15	18	18	12	4	2		
BARTENDERS				3	8	12	12	12	12	10	6	6	6	7	7	5	2	1		
CHEFS				1	3	4	4	4	4	3	2	2	2	2	2	1	1	1		
COOKS	-			1	1	2	2	2	2	1	1	1	1	1	1	1	1	1		
KITCHEN WORKERS	1	1	1	3	8	12	12	12	12	9	6	6	6	7	7	4	2	1		
NURSES	3	4	4	24	64	90	90	90	90	70	50	50	50	54	54	36	20	6		
NURSERY			1	2	4	6	6	6	6	4	3	3	3	4	4	2	1	1		
LAUNDERING				1	3	4	4	4	4	3	2	2	2	2	2	2	1	1		
SECURITY	1	1	1	4	12	16	16	16	16	12	8	8	8	9	9	6	4	2		
FIRE FIGHTERS	1	2	2	4	24	32	32	32	32	24	16	16	16	20	20	12	8	2		
POLICE.				2	6	8	8	8	8	6	4	4	4	4	4	3	2	2		
JANITORS				1	4	5	5	5	5	4	3	3	3	4	4	2	2	2		
RADIO. TV. OP.	4	5	8	40	112	155	155	155	155	135	75	75	75	94	34	60	20	10		
PILOTS	1	1	1	1	3	4	4	4	4	3	2	2	2	2	2	2	1	1		
SECRETARY	2	2	2	2	2	3	3	3	3	2	2	2	2	2	2	2	2	2		
BOOKKEEPING.	1	1	2	9	26	35	35	35	35	30	17	17	17	20	20	14	6	3		
DATA PROCESSING.	1	1	1	5	14	20	20	20	20	15	10	10	10	12	12	8	4	2		
TELEPHONE OP.				2	6	8	8	8	8	6	4	4	4	5	5	3	2	1		
ACCOMODATION		1	1	3	8	12	12	12	12	10	6	6	6	7	7	5	2	1		
MEDICAL ASSISTANT	1		1	10	28	40	40	40	40	30	20	20	20	24	24	16	4	2		
TEACHER					2	3	3	3	3	2	2	2	2	2	2	1	-	-		
WRITER				1	2	3	3	3	3	2	2	2	2	2	2	1	-	-		
COMMERCIAL ART				1	1	2	2	2	2	1	1	1	1	1	1	1	-	-		
PHOTOGRAPHY.				1	3	4	4	4	4	3	2	2	2	2	2	1	-	-		
PURCHASING.				1	1	2	2	2	2	1	1	1	1	1	1	1	1	1		
OFFICE MGR.	1	1	2	6	18	26	26	26	26	20	14	14	14	16	16	10	4	2		
LANDSCAPE.	1	1	1	2	8	8	8	8	8	6	4	4	4	5	5	3	2	2		
				3	8	12	12	12	12	9	6	6	6	7	7	5	2	2		

FOLD LENGTH — 12 IN — 11 IN — 8.5 IN — 8 IN
AUTO FEED — MANUAL FEED

Calculations
SUBJECT:

ACRES

JOB NUMBER
FILE NUMBER
SHEET OF
BY DATE
APP DATE

JOB NUMBER
FILE NUMBER
SHEET OF
BY DATE
APP DATE

PUMPHOUSE
OFFICE MGR.
LANDSCAPE.

1 1 1 2 8 8 8 8 8 6 4 4 4 5 5 3 2 2
3 8 12 12 1 2 9 6 6 6 7 7 5 2 2

52 155 258 1358 3773 5316 5316 5316 5316 3944 2572 2572 2572 3000 3000 1886 700 429

Calculations
SUBJECT:
ACRES

ASSUMPTIONS

(1) NO CONSTRUCTION ACTIVITIES ON SITE UNTIL 1985

(2) WATANA - START WORK AT SITE 1985
FIRST POWER 1993
CREST EL 2240 '70 MCY DAM

DEVIL CANYON - START WORK AT SITE 1993
FIRST POWER 2000

(3) ABOVE NUMBERS ARE PEAK CAMP SIZE AND IS 10% ABOVE EXPECTED CAMP PEAK POPULATION (TO ALLOW FOR TURNOVER)

(4) PRELIMINARY - FOR PLANNING PURPOSES ONLY

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Calculations

SUBJECT: SUSITNA. PEAK CAMP SIZE

JOB NUMBER P5700 c7
FILE NUMBER
SHEET (1) 2 OF 5
BY BFT DATE 10/14/81
APP DATE

TRADE BREAKDOWN of WATANA & DEVIL CANYON DAMS
PEAK MANPOWER.

PROFESSIONAL

		83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	2006
ELECTRICAL ENG.	4			2	2	3	4	4	4	4	3	2	2	2	2	1	1	1	
—"— DRAFT	2			1	1	1	2	2	2	2	1	1	1	1	1	ø	ø	ø	
CIVIL ENG.	170	2	8	20	40	125	170	170	170	170	126	82	82	82	96	96	60	29	25
—"— DRAFT	30		4	6	6	20	30	30	30	30	22	15	15	15	17	17	11	5	5
MECH ENG.	12			1	2	8	12	12	12	12	9	6	6	6	7	7	4	2	2
—"— DRAFT	3			1	1	2	3	3	3	3	2	1	1	1	2	2	1	ø	ø
MINING ENG.	8			1	2	5	8	8	8	8	6	4	4	4	5	5	3	1	1
SURVEYING	125	4	6	32	30	89	125	125	125	125	94	61	61	61	71	71	44	21	18
GEOLOGYST	6	1	2	4	2	4	6	6	6	6	5	3	3	3	3	3	2	1	ø
GEOTECH	4	1	2	4	2	3	4	4	4	4	3	2	2	2	2	2	1	1	ø
HYDROLOGY	4			2	2	3	4	4	4	4	3	2	2	2	2	2	1	1	ø
ENVIROMENT	2			1	1	1	2	2	2	2	1	1	1	1	1	1	ø	ø	ø
MANAGERS	14			2	3	10	14	14	14	14	10	7	7	7	8	8	5	2	2
MISC PROFESSIONALS	500	3	65	120	350	500	500	500	500	500	371	241	241	241	283	283	136	86	19
TOTAL	884	12	25	142	214	627	880	880	880	880	655	428	428	428	500	500	314	171	

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ACRES

Calculations SUBJECT: SUSITNA PEAK CAMP SIZE PEAK YEAR

JOB NUMBER P5700 09
FILE NUMBER
SHEET 3 OF 5
BY AFT/ DATE 10/14/10
APP DATE

PROFESSIONAL — STAFF

ELECTRICAL ENG.	4
DRAFT	2
CIVIL ENG.	170
DRAFT	30
MECH ENG.	12
DRAFT	3
MINING ENG.	8
SURVEYING	125
GEOLOGIST	6
HYDROLOGY	4
GEOTECH.	4
ENVIROMENT	2
MANAGERS	14
MISC. PROF.	500
	884.

PEAK MANPOWER =

$\frac{884}{1.1} = 804$

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Calculations

SUBJECT: SUSITNA
PEAK CAMP SIZE
PEAK YEAR
NON PROFESSIONAL

JOB NUMBER 85700 09
FILE NUMBER
SHEET 4 OF 5
BY AFT DATE 10/14/8
APP DATE

TRUCK DRIVER (H)	160
TRUCK DRIVER (L)	70
RAIL TRANSPORT	10
AIR —»—	6
BUS DRIVER	12
PUMPING.	16
MAT'L HANDLING.	18
MOVING STORAGE	12
DRILLING.	210
BLASTING.	44
STATIONARY ENG.	12
ELECTRIC POWER GEN	6
DISPOSAL WASTE	10
RECREATION	6
PHOTOGRAPHY	2
STRUCTURAL STEEL	12
SHEET METAL	8
BOILERMAKERS	6
WELDERS	30
ELECTRICAL TRANSMISSION	120
ELECTRONICS	20
ELECTRICIANS	40
PAINT	14
CEMENT WORKERS	80
EXCAVATING.	380
CARPENTERS	140
BRICKLAYERS	20
PLUMBERS	40
PIPE FITERS	26
LABOUR	3200
ROOFERS	4
MECHANICAL MACH.	24
—»—|— AUTO	30
—•— ENGINE	12

BARTENDERS	4	
CHEFS	2	
COOKS	12	
KITCHEN WORKERS	90	
NURSES	6	
NURSERY	4	
LAUNDERING	16	
SECURITY	32	
FIRE FIGHTERS	8	
POLICE	5 + 2	
JANITORS	155	
RADIO TV. OP	4	
AIROPLANE PILOTS	3	
SECRETERIAL	35	
BOOK KEEPING.	20	
DATA PROCESSING	8	
TELEPHONE OP	12	
ACCOMODATION	40	
MEDICAL ASSISTANT	3	
TEACHERS	3 +	
WRITERS	2	
COMMERCIAL ART	4	
PHOTOGRAPHY	2	
PURCHASING.	26	
OFFICE MGR	8	
LANDSCAPE	12	56
	5316	4833
PROFESSIONAL	884	804
	6,200	5637

PEAK MAN POWER
CAMP PEAK
DIVIDE BY 1.1

72

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PEAK CAMP SIZE - VARIATIONS - CANYON

73

1000
2000
3000
4000
5000
6000

60 180 400 1000 1500 4400 6200 6200 6200 4600 3000 3000 3500 3500 2200 850 500

HAMPOWER INCLUDES 10% TURNOVER

B3 B4 B5 B6 B7 B8 B9 90 91 92 93 94 95 96 97 98 2000 2001

PEAK CAMP

ACTUAL PEAK
HAMPOWER —
DIVIDE PEAK CAMP BY
41
ACRES

B&S B-7 10/9/81

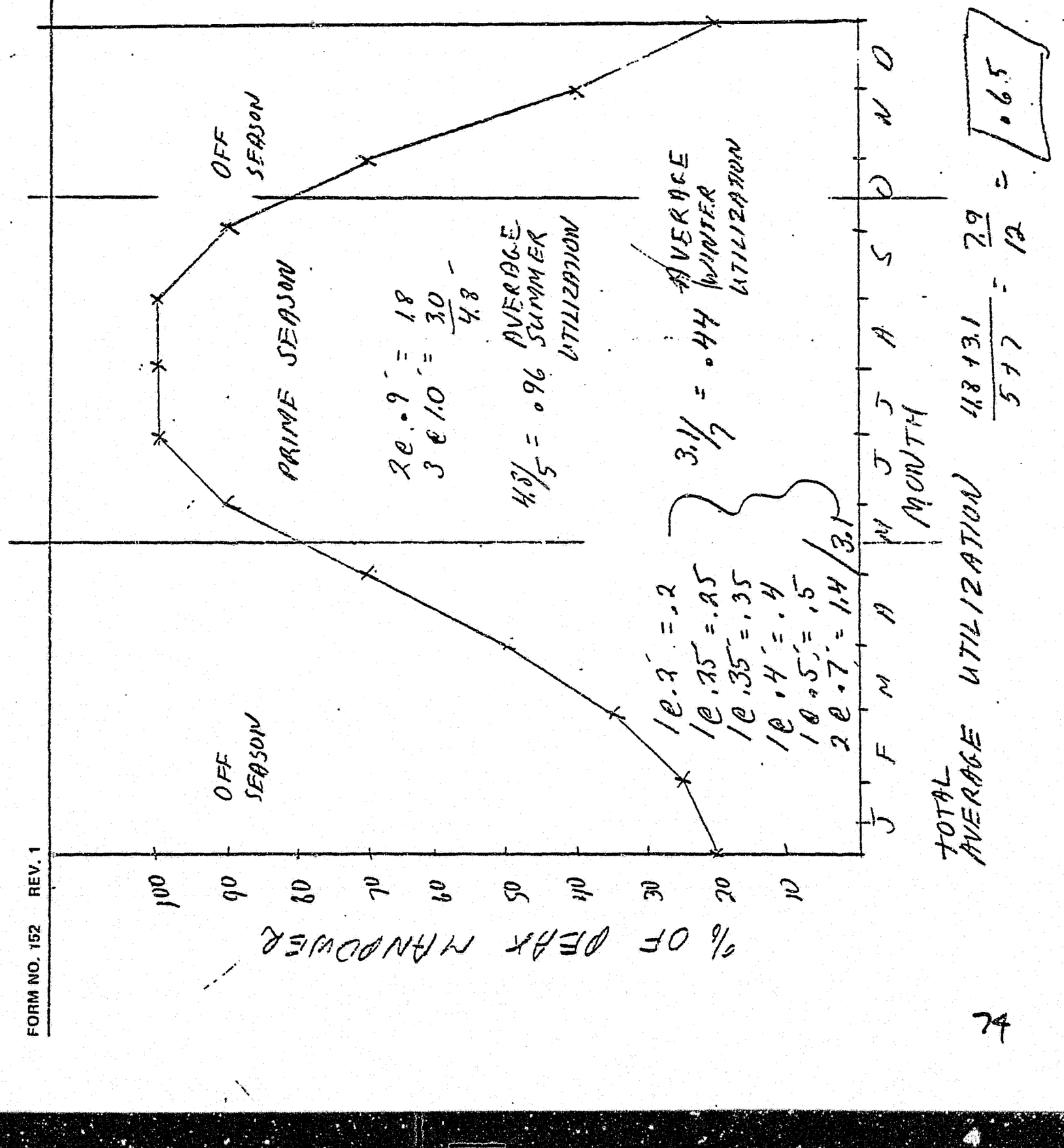
ACRES

Calculations

SUBJECT: SUSITNA TYPICAL YEAR MAN POWER DISTRIBUTION

JOB NUMBER P5700 09
FILE NUMBER
SHEET 1 OF 1
BY DM DATE OCT. 1 [illegible]
APP DATE

PRELIMINARY —



FORM NO. 152 REV. 1

ACRES

Calculations

SUBJECT: WATANA MANPOWER CALC'S

JOB NUMBER _____

FILE NUMBER _____

SHEET _____ OF _____

BY _____ DATE _____

APP _____ DATE _____

FORM NO. 152 REV. 1

ACRES

Calculations

SUBJECT: PEAK LABOUR (CAMP) WATANA

JOB NUMBER
FILE NUMBER
SHEET 1 OF
BY JRP DATE 3/2/82
APP DATE

CHECK USING FINAL CASH FLOW

		All Labour	No O&M of Camp
Net peak cash flow —			
— Quarter		135×10^6	123×10^6
— Day	÷ 75	1800×10^3	1640×10^3
Labour Cost			
— Est'd direct	x 69%		
— " labour	x 42%/40%	522×10^3	453×10^3
— Est'd labour	÷ 297	1756	1525
Supervisor Labour			
—	35% (.31)	195×10^3	178×10^3
—	÷ 297	657	599
Transport Labour	70+30	100	70
		2513	2194
Others —	Add 2%	50	44
		2563	2238

FORM NO. 152 REV. 1

ACRES

Calculations

SUBJECT:

JOB NUMBER _____
FILE NUMBER _____
SHEET _____ OF _____
BY _____ DATE _____
APP _____ DATE _____

325

	Inc O&M Comp	No O&M Comp
from p. 1	2563	2238

Adjustments

Comp O&M
- Quarter - 12×10^6
- Day ÷ 75 = 160×10^3
- Direct - 89% x = 142×10^3
- Labor 69% x = 98×10^3
- Direct labour $\frac{98 \times 10^3}{297}$ ⟶ = 331

Supervisor
- 35% (.11) $160 \times 10^3 \div 297$ ⟶ 21

	2563	2590
Other Personnel (Comp)	134 Inc Above	(45
Engineer		219
Owner		24
Agencies		24
		3036
		2936
		3000
		77

FORM NO. 152 REV. 1

ACRES

Calculations

SUBJECT:

JOB NUMBER
FILE NUMBER
SHEET 3 OF
BY JRP DATE 3/8/82
APP DATE

Check Use Run #29 Summary Breakdown

Peak C.F.
— Quarter 150×10^6
— Day ÷75 2×10^6

Labour estd 39% of total ~ say 40%.

Estd labour $.4(2 \times 10^6] \div 297$ = 2694

Others 312

3006

Estimate peak 3100 OK

FORM NO. 152 REV. 1

ACRES

Calculations

SUBJECT: [redacted]

JOB NUMBER
FILE NUMBER
SHEET OF
BY URP DATE 2/22/82
APP DATE

1.1 Contractors & Support (Lee 2/22/82)

a. Total – Run E2 710×10^6

b – Less Access Rd / Trans Line $- 143 \times 10^6$

567

c – Add Eq't. Rep. Lab.

E-	O-	322
E-	OP	384
		706
Less		65
15%		(641)

96

d – Add Supply

	2757
	− 2145
35%	(612)

214

e – In (d)

f – Add Metal Lab 25

902

g – Vendors etc 2% 18

920 $\times 10^6$

79

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ACRES

Calculations

SUBJECT:

JOB NUMBER _____
FILE NUMBER _____
SHEET _____ OF _____
BY _____ DATE _____
APP _____ DATE _____

920 x10^6

1.2 Owner/Engr 5% (2757) = 138

1058 x10^6

Total M-DAYS = 1058 ÷ 297 = 3,562 -

1.3 Other - 4% 142

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ACRES

Calculations

SUBJECT: [redacted]

JOB NUMBER _____
FILE NUMBER _____
SHEET _____ OF _____
BY URP DATE 2/25/82
APP _____ DATE _____

YR	CF Av-Pk	Cor'tin offsite	Cor'tin Onsite	Adj't CF	x26	Adj for C.M+Own	[redacted]
82						100	100
83	12	-5		7	182	160	300
84	12	-5		7	182	160	300
85	45	-5		40	1040	60	1100
86	46	0		46	1196	200	1400
87	84	0	-14	70	1820	80	1900
88	96/93	-		96	2496		2500
89	117/113	-6	-2	109	2834		2800
90	170/157	-34	-2	134	3500		3500
91	156/147	-30	-3	123	3198		3200
92	139/105	-28	-15	96-	2496		2500
93	65	+4	-20	49	1274		1300
94	3		+20	23	598		600
95	0			3	78		100

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81

ACRES

Calculations

SUBJECT:

JOB NUMBER _____
FILE NUMBER _____
SHEET _____ OF _____
BY _____ DATE _____
APP _____ DATE _____

W- Peak Labour

Using CF 120 → Total = 3100

Increase for OFFSITE $\frac{136}{120}$ 1.13 " = 3500

300

FORM NO. 152 REV. 1

p2

ACRES

Calculations

SUBJECT: WATANA - SITE

JOB NUMBER _____
FILE NUMBER _____
SHEET 1 OF 3
BY _____ DATE _____
APP _____ DATE _____

Year	Max C.F/Q	Adjustits Offsite	Other	Adj'd Site	
83	12	-7	-5 Land	0	
84	12	-7	-5 Land	0	
85	45	-9	-5	31	900
86	47	-7	+10	40	~~1200~~ → 1600
87	84	-7		77	2300
88	96				2900
89	117	-9	+10	108	3200
91	156	-42		114	3400
92	139	-40			~~3000~~ → 2600
93	65	-20			~~1300~~ → 1000
94	3				100 → 200

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ACRES

Calculations

SUBJECT:

JOB NUMBER _____
FILE NUMBER _____
SHEET 2 OF 3
BY JRP DATE 2/23/82
APP _____ DATE _____

	WATANA CAMP		Total WATANA
83	100*	+	200
4	200	+	400
5	900		1200
6	1600		1800
7	2300		2500
8	2900		2900
9	3200	+	3400
90	3600	+	3900
91	3400	+	3700
92	2600	+	2900
93	1000	+	1100
94	200		200

* Engr / Owner / Drillers etc at Site prior to Jan 1/85

FORM NO. 152 REV. 1

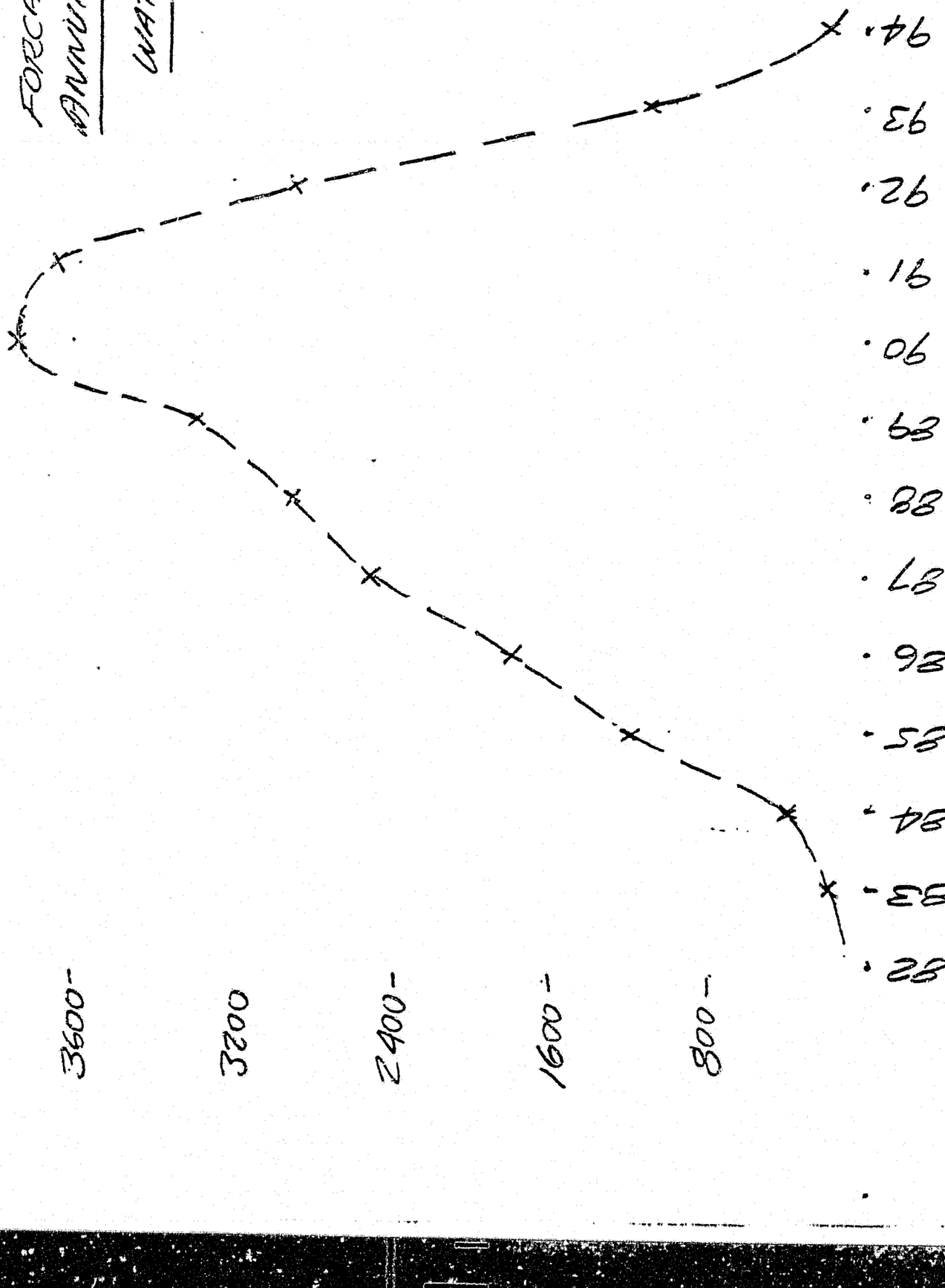
ACRES

Calculations

SUBJECT:

JOB NUMBER
FILE NUMBER
SHEET 3 OF 3
BY VRP DATE 2/23/82
APP DATE

FORECASTED PEAK ANNUAL MANPOWER
UNTAHA POINT



FORM NO. 152 REV. 1

WATANA
MANPOWER FORCAST

1	CONSTRUCTION TRADES & CONTRACTOR SUPERVISION	2291
2.	CAMP OPERATIONS & MAINTENANCE	
	· Catering & Housekeeping	~~163~~ 161
	· Maintenance	~~116~~ 110
	· Transportation	15
	· Other — Hospital, Education, etc	~~180~~ 179
		~~496~~ 465
3.	MANAGEMENT	
	· Construction Manager	219
	· Owner	24
	· Environmental & Other Agencies	24
		267
	TOTAL PEAK MANPOWER	~~3054~~ 3023
		31
		86

ACRES

Calculations

SUBJECT:

JOB NUMBER _____
FILE NUMBER _____
SHEET _____ OF _____
BY JRP DATE 2/25/82
APP _____ DATE _____

WATANA – Check Calc – PK Labor

Ref – Calc 2/11e/82

Direct Cost 69% (1600×10^3) = 1104×10^3

Labour Pt 44% (1104×10^3) = 486×10^3

a. Direct Cost Labour $486 \times 10^3 \div 297 = 16.36$

b. Indirect " "

i) 30% of $(486 \times 10^3) \div 297$ 146 — 491

ii) 35% (.31) $1600 \times 10^3 \div 297$ 174×10^3 — 585

Mean decline → 21-1-82

Len(i) Add 10% = 540

ii ——— 585 ——→ 585

Diff. 45 Within Accuracy!

11

c Add Mant. labor 70

2291

45

2336

Add – 2% others

Used 2300

Diff 2% 87

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ACRES

Calculations

SUBJECT: WATANA

JOB NUMBER _____
FILE NUMBER _____
SHEET _____ OF _____
BY _____ DATE _____
APP _____ DATE _____

EST'D TOTAL SITE MANPOWER

1 — CONTRACTORS

Ref Calc 2/18/82

Labour Cost ~ 44% (1104 x 10^3) = 486 x 10^6

Direct: a. Direct "Cost" labour 486 x 10^6 ÷ 297 = 1636

Indirect: b. Sup'r @ 30 (486 x 10^6) ÷ 297 = 491

c. Add repair labour in indirects ~ 10% of 6. = 49

d. Add Labour for transport and handling mat'ls (p. 1A) = 70 +

2246

e. Add for Equip Rep (for repair) site assembly specialist etc - 2% 45

TOTAL CONTRACTOR (SITE) 2291

Say 2300

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ACRES

Calculations

SUBJECT:

JOB NUMBER
FILE NUMBER
SHEET 1A OF
BY JRP DATE 2/23/82
APP DATE

MATERIAL COST

Civil + MEE at Watana ~ 500×10^6

Cost to handle, transport, etc ~ 10% or 50×10^6

Labour part ≈ 50% of 50 → 25×10^6

For peak assume 6 yrs – 8 mans on 200 days

Labour cost per day $\frac{25{,}000 \times 10^3}{6 \times 200} = \$20{,}833/d$

Estd Labour $\frac{20833}{297} = \underline{\underline{70}}$

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ACRES

Calculations

SUBJECT:

JOB NUMBER _____
FILE NUMBER _____
SHEET _____ OF _____
BY _____ DATE _____
APP _____ DATE _____

V2 - CAMP OPERATION & MAINTENANCE

10%	a. Catering & Housekeeping (1:10)	230
5%	b. Operation & Maintenance	115
1+%	c. Transport - Camp, Food etc -- (3% of total camp) Air	30 +20
5	d. Recreation, Education, Medical Security --, Bank, Stores etc	125
		500

V3 - MANAGEMENT

10%	a. Construction Manager	230 +30
1	b. Owner	24
2	c. Environmental & Other Agencies	46
		300

3100

TOTAL MANPOWER 3100

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ACRES

Calculations

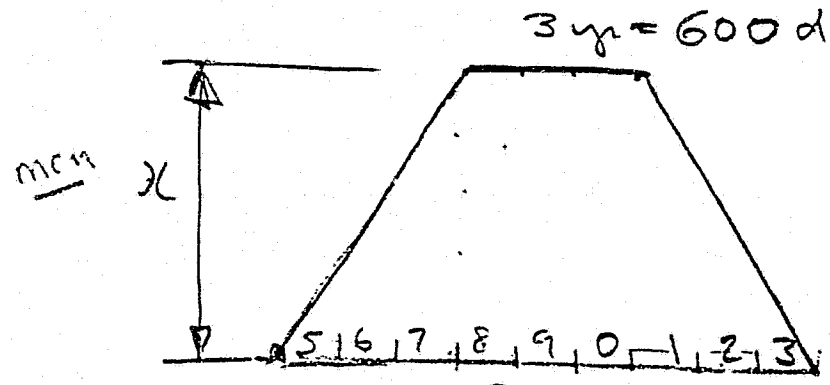
SUBJECT:

JOB NUMBER _____
FILE NUMBER _____
SHEET _____ OF _____
BY _____ DATE _____
APP _____ DATE _____

CHECK TOTAL SITE MANPOWER

TOTAL estd labour cost $1,100 \times 10^6$

" " " man-days ÷ 297 = $3,704 \times 10^3$



Area = 3704×10^3

$\frac{1}{2} x (1800 + 600) = 3704 \times 10^3$

$x = \frac{3704 \times 10^3}{1200}$

$= 3087$

Using 8 mon average year → 3100 peak

FORM NO. 152 REV. 1

ACRES

Calculations

SUBJECT: WATANA

JOB NUMBER
FILE NUMBER
SHEET OF
BY DATE
APP DATE

TOTAL LABOUR COST See Run 81

1 — CONTRACTORS

a - Total Site Labour — 581 x10⁶

b - Add Equip Repair Labour — 95 x10⁶

676 x10⁶

c - Supervy Lab 30% — 203 x10⁶

d - Repair on c. 10% — 20 x10⁶

e - Add for transport costs 5% of 495 x10⁶ = 25 x10⁶

924 x10⁶

f - Vendors, etc - - 2% — 18

942 x10⁶

2 - ENG. / OWNER

Eng - 4% of 2,815 x10³ } = 127 x10⁶
Owner - 0.5% " " }

1069 x10⁶

TOTAL M-DAYS 1069 x10⁶ ÷ 297 = 3,599 x10³

FORM NO. 152 REV. 1

MAN-DAY

WATANA — Run # 81

VEP

Feb 21/82

1- Total Labour Cost — $724 x10^6

(1.1) Less labour not at Site

50% ∘ Roads L-23.4 E-41.4

∘ Trans L-119.4 E-23.5

142.8 64.9

→ − 143 x10^6

581 x10^6

(1.2) Add Equip Repair Labour

Equipt Ownership 321 x10^6

" Oper't'n 376 x10^6

697 x10^6

Less Equip. Not at Site 65 x10^6

Las Part 15% of 632 x10^6 = 95 x10^6

676 x10^6

(1.3) Add Contractors Supervisor Staff

1 + 30% of 676 x10^6 203 x10^6

879 x10^6

(1.4) Add Eng'r, Owner, Agencies etc.

+ 5% + 1% + 1% of 879 = 62 x10^6

$941 x10^6

941 x10^6 / Estd No. Man-Days 941 x10^6 / 297 = 3,168 x10^3 93

WATANA TOTAL LABOUR

Total Run EI	$724 X10^6
Add repair labour	$95 X10^6$
" " " offsite 15% (649) =	$10 X10^6$
" Supervisor Staff	203
" Engr	62
	$1094 X10^6$
	Say $1,100 X10^6$

Man Days

Estd — p. 1	$3168 X10^6$
Add — forcast error 5%	158
— transport drivers	48 ✓
— Subcontractors, Vendors*	24 ✓
— Visitors — Official	12 ✓
— Specialists	6 ✓
	$3416 X10^6$

* Explosives, Tires,

DIRECT COSTS - W - (No M&E)

	L	M	E	T
Powerplant	21		14	47.
Main Dam	396		458	993
Roads 50%	28		35	76
Camp	185		25	370
TOTALS	630			1486
(%)	(42%)			(100%)
Less Camp	445			1116
	(40%)			

Estimate Work Sheet

ACRES

PROJECT WATANA

CONTRACT

ITEM REFERENCE No.

DESCRIPTION

OPERATION No. REF.

DESCRIPTION

JOB No.

SHEET OF

BY

CKD DATE

DESCRIPTION AND BASIS OF ESTIMATE	QUANTITY	UNIT	LABOR UNIT COST	LABOR AMOUNT	JOB MATERIALS UNIT COST	JOB MATERIALS AMOUNT	PERM.MATERIALS UNIT COST	PERM.MATERIALS AMOUNT	SUBCONTRACTS UNIT COST	SUBCONTRACTS AMOUNT	EQPT.OWNERSHIP UNIT COST	EQPT.OWNERSHIP AMOUNT	EQPT.OPERATION UNIT COST	EQPT.OPERATION AMOUNT	Equiv UNIT	TOTAL AMOUNT
331 POWER PLANT	~~19.4~~			19.4 (38%) +2.1 21.5 (42%)		5.2 10%		13.2		0 Repair Lab'r		6.2	13.7 27%	7.5		51.4
Deduct M&E				.8 20.7 (44%)				-3.8						-.2		-4.0 47.4
332 MAIN DAM				328 (31%) +82 410 (39%)		77		112		Repair Lab'r		248	(543) 50%	295 .15(543) 82 481		1062
Deduct M&E				-14 396 (40%)		77 ( )		-52 60 ( )		—				-3 458 (46%)		-69 993
336 ROADS				43.7 (29%) +12.4 56.1 (37%)		24						42.4		40.5 .15(82.9) 12.4 70.5		152 ~~225~~
337 CAMP				181 (49%) +4 185		161						12	29	17 29 4 25		370 94

57.02.02 Form 131 A

Estimate Work Sheet

ACRES

ITEM REFERENCE No. | JOB No.

DESCRIPTION | SHEET OF

PROJECT | OPERATION No. | REF. | BY

CONTRACT | DESCRIPTION | CKD | DATE

DESCRIPTION AND BASIS OF ESTIMATE	QUANTITY	UNIT	LABOR		JOB MATERIALS		PERM.MATERIALS		SUBCONTRACTS		EQPT.OWNERSHIP		EQPT.OPERATION			
			UNIT COST	AMOUNT	UNIT COST	AMOUNT	UNIT COST	AMOUNT	UNIT COST	AMOUNT	UNIT COST	AMOUNT	UNIT COST	AMOUNT	Equiv UNIT	TOTAL AMOUNT
331 – POWERPLANT (CIVIL)				19.8 (40%)		5.1 (10%)		10.2 (21%)		–		6.3		7.7 (28%)		49.2
332 – MAIN DAM (CIVIL)				319.6 (32%)		79.4 (8%)		53.9 (5%)		1.7		247.5		295.5		997.7
				£1.5								15% Labour		543.1 (54%)		
				401.1 (40%)										£1.5		
														461.6 (46%)		
63.1 & .2 CAMP				26.6 (27%)		59.1		–		–		7.0		4.7 (12%)		97.5
																97