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DATE : I SEPT , 1980

DEPARTMENT OF THE NAVY PROJECT ENGINEERING DOCUMENTATION

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DINING FACILITIES MODERNIZATION

(P-697)

FY 1982 MCON MARINE CORPS BASE CAMP LEJEUNE NORTH CAROLINA

ADMINISTERED BY: ATLANTIC DIVISION NAVAL FACILITIES ENGINEERING COMMAND NORFOLK, VA. 23511 PREPARED BY: ODELL ASSOCIATES, INC. 222 S. CHURCH ST. CHARLOTTE, N.C. 28202



MARINE CORPS B. CAMP LEJEUNE, PROGRAM ELEMENT	ASE		. PROJEC	TTITIE		J
MARINE CORPS B. CAMP LEJEUNE, T PROGRAM ELEMENT	ASE					
PROGRAM ELEMENT	NODEL OLDOT TITL	Sec. Sec. Sec.				
PROGRAM ELEMENT	NORTH CAROLINA		DINING	FACILITI	ES MODE	RNIZATION
	6. CATEGORY CODE	7. PROJECT	NUMBER	8. PROJ	ECT COST	(\$000)
	722-10	P-69	97	\$5	,600	
	9. CC	OST ESTIMATE	S			
Escalation 12%	ITEM Bid open I JANUARY	ing date 7 82	U/M	QUANTITY	UNIT	COST (\$000)
Dining Facility Buildings Built in equi Solar Systems Supporting Faci Utilities Site Improvem Subtotal Contingency (10) Cotal Contract Supervision Ins Cotal Request Cotal Request	Modernization pment lities ents %) Cost pection and Overhea Rounded)	ad (5.5%)	SF SF LS LS LS	102,975 102,975	\$ 44.14 38.55	\$4,482 (3,909) (512) (61) 353 (323) (30) \$4,835 484 \$5,319 292 \$5,611 \$5,600
quipment provid	ded from other appr	ropriation	s			(63)
nterior renovation of decoration of decoration of decoration reviding new location in the second state of	tions consisting of ive partitions, omi owered ceilings, ai llation of terrazzo oing, masonry, mech k. (Air conditioni CS: <u>25,946 PN.</u> ADE te the existing enl BA103. The alterations and problems of poor a out, maintenance an sed.	new wall t alterna ir conditi o and quar nanical wo ing -285 t QUATE: <u>17</u> isted din renovation tmosphere d cleanlin	cover: te wind oning, ry tile rk, par ons) ,230 PN ing fac ns are , perso ness, d	ings, new of lows in di insulation on floor inting, si . SUBSTAN cilities, considere onnel traf lurability	doors, in ining with on, fluc c, misce ite impo NDARD: I Buildin ed essen fic flo r and fl	nstalla- ings, prescent ellaneous rovements 10,118 PN ngs 1209, ntial to ww, ef- .exibility
URRENT SITUATIO ittle moderniza 11 condition and n environment f	N: The facilities tion since their c d configuration of or efficient or ma OVIDED: Continued	are in a onstruction the exist ximum ution use of in	genera on over ting fa lizatio neffici	al run-dow 37 years cilities on. .ent and o	n condi ago. does no utdated	tion with The over- t present dining

S/N 0102-LF-001-3910



1. COMPONENT

NAVY

FY 1982 MILITARY CONSTRUCTION PROJECT DATA

3. INSTALLATION AND LOCATION

MARINE CORPS BASE, CAMP LEJEUNE, NORTH CAROLINA

4. PROJECT TITLE

DINING FACILITIES MODERNIZATION

5. PROJECT NUMBER P 697

2 DATE

1 SEPT 80

Sec. 1

ENVIRONMENTAL IMPACT

The Environmental Impact Assessment has been reviewed, and where required, the design concepts give consideration to eliminating adverse environmental effects consistent with applicable directives.

PRESERVATION OF HISTORICAL SITES AND STRUCTURES

The project facilities do not directly or indirectly affect a district, site, building, structure, object or setting which is listed in the National Register or otherwise possesses a significant quality of American history.

FALLOUT SHELTER CONSTRUCTION

Fallout shelter excluded - - Shelter not economically feasible as part of this project.

FLOOD HAZARDS EVALUATION

Requirements of Executive Order No. 11988 (Flood plain Management) and Executive Order No. 11990 (Protection of Wetlands) are not applicable.

POLLUTION, PREVENTION, ABATEMENT AND CONTROL This project will not cause additional air or water pollution.

DESIGN FOR ACCESSIBILITY OF PHYSICALLY HANDICAPPED PERSONNEL

Provisions for physically handicapped personnel not required in preparation and service areas of the facilities, since its use is specifically restricted to able-bodied military personnel. However, a dining area in each building will be made accessible to the handicapped and public toilets will be outfitted for the handicapped.





Title: DINING FACILITIES MODERNIZATION Costs Escalated to: 1 JAN 82

Location: MARINE CORPS BASE, CAMP LEJEUNE, NORTH CAROLINAScalation: 14%

Prepared by: Odell Associates Inc. Date:1 July 80 Contingency: 10%

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ЗU	11	·T·	-10	N.

ILDINGS 1209, M424, 508 undation ab on Grade ructural Frame	, <u>RR-3</u> , <u>B</u> .379	A-103	102,975 SF			AQUITIMI
ILDINGS 1209, M424, 508 undation ab on Grade ructural Frame	, <u>RR-3</u> , <u>B</u> .379	4-103	102,975 SF			
undation ab on Grade ructural Frame	.379	1 17/1		and the second second second		
ab on Grade		I N/A	N/A	390000	39 000	0
ructural Framo	.447	N/A	N/A	46,000	46,000	0,
addedrar rialle	.767	N/A	N/A	79,000	79 000	0
pported Floor	0	N/A	N/A	0	0	0
of	.767	N/A	N/A ·	79.000	79 000	0
terior Walls	1.729	N/A	N/A	178 000	178,000	0
terior Walls	.719	N/A	N/A	74 000	74,000	0
terior Finishes	8.886	N/A	N/A	915 000	74,000	0
ors and Windows	2.593	N/A	N/A	267 000	915,000	0
ecialties	.923	N/A		05,000	267,000	0
umbing	4.758	N/A	N/A N/A	95,000	95,000	0
chanical	9 002	N/A		490,000	490,000	0
ectrical	7 000	N/A N/A		927,000	927,000	0
uipment	4 972	N/A N/A		720,000	/20,000	0
	4.772	N/A	N/A	512,000	0	512,000
SUBTOTAL						
ar Systems	60	50.90	1010 0 11 00			
	.00		1210 Coll.SF	61,000	61,000	0
	1.000	10				
-Total Building	43 53					
	terior Walls terior Finishes Drs and Windows ecialties imbing thanical ectrical iipment SUBTOTAL ar Systems	terior Walls .719 terior Finishes 8.886 Drs and Windows 2.593 acialties .923 imbing 4.758 chanical 9.002 actrical 7.000 iipment 4.972 SUBTOTAL ar Systems .60	terior Walls .719 N/A terior Finishes 8.886 N/A prs and Windows 2.593 N/A acialties .923 N/A imbing 4.758 N/A chanical 9.002 N/A ectrical 7.000 N/A impment 4.972 N/A SUBTOTAL -Total Building 43.53	terior Walls .719 N/A N/A terior Finishes 8.886 N/A N/A ors and Windows 2.593 N/A N/A acialties .923 N/A N/A mbing 4.758 N/A N/A chanical 9.002 N/A N/A actrical 7.000 N/A N/A ipment 4.972 N/A N/A SUBTOTAL	terior Walls .719 N/A N/A 178,000 terior Finishes 8.886 N/A N/A 74,000 prs and Windows 2.593 N/A N/A 915,000 acialties .923 N/A N/A 267,000 acialties .923 N/A N/A 95,000 mbing 4.758 N/A N/A 490,000 chanical 9.002 N/A N/A 927,000 chanical 7.000 N/A N/A 720,000 ipment 4.972 N/A N/A 512,000 SUBTOTAL	terior Walls .719 N/A N/A 178,000 178,000 terior Finishes 8.886 N/A N/A 915,000 915,000 ors and Windows 2.593 N/A N/A 915,000 267,000 ocialties .923 N/A N/A 95,000 95,000 mbing 4.758 N/A N/A 490,000 490,000 chanical 9.002 N/A N/A 927,000 927,000 chanical 9.002 N/A N/A 720,000 720,000 chanical 7.000 N/A N/A 512,000 0 sectrical 7.000 N/A N/A 512,000 0 subtrottal 60 50.80 1210 Coll.SF 61,000 61,000 ar Systems .60 50.80 1210 Coll.SF 61,000 61,000

1 Piling * 2 Elec. Substation & Dist. 2.93 N/A N/A 302,000 302,000 3 Not Used * Telephone & Fire Alarm 4 . Water Distribution 5 6 Sanitary Sewers N/A N/A 204 21,000 21,000 7 Roads, Parking, Sidewalks × Storm Sewers 8 × 9 Site Improvements N/A N/A 291 30,000 10 Demolition (In ea. sys. 30,000 * 11 above) 12 13 14 15 Sub-Total Supporting Facilities * \$ 353,000

> Total Estimated Contract Cost: 1 Jan 82 \$ 4,835,000 Contingency 10 % \$ 483,500 SION 5.5% \$ 292,517 Total Budget Cost \$ 5,611,017 Rounded \$ 5,600,000

> > *Asteric indicates these totals on 1391.



Title: DINING FACILIT	TES MODERNIZATION	Costs Escalated	to: 1 JAN	82

Location: MARINE CORPS BASE, CAMP LEJEUNE, NORTH CAROLINAScalation: 14%

Prepared by: Odell Associates Inc.

Date: 1 July 80 Contingency: 10%

BUILT-IN

	\$/SF	S/SYS	SYS QUAN	TOTAL	BUILDING	EQUIPMENT
BULLDING 1209						
Ecurdation			22,530 SF			
Foundation	.400	N/A	N/A	9,023	9,023	0 ;
Slab on Grade	.616	N/A	N/A	13,883	13,883	0
Structural Frame	.830	N/A	N/A	18,825	18,825	0
Supported Floor	0	N/A	N/A	0	0	0
Roof	768	N/A	N/A ·	17.298	17 298	0
Exterior Walls	1.953	N/A	N/A	43,995	43 995	0
Interior Walls	.881	N/A	N/A	19,855	19 855	0
Interior Finishes	9.742	N/A	N/A	219 488	219 / 88	
Doors and Windows	2,562	N/A	N/A	57 721	57 721	
Specialties	1,102	N/A		2/ 020	2/ 920	0
Plumbing	6.320	N/A		142 202	24,029	0.
Mechanical	10 013	N/A N/A		142,393	142,393	0
Electrical	7 54	N/A	N/A	225,585	225,585	0
Faudament	/.54	N/A	N/A	169,971	169,971	0
Equipment	4.701	N/A	N/A	105,928	0	105,928
SUBTOTAL		in an		· · ·		
Color C						1
Solar Systems	.80	47.69	380 Coll.SF	18,123	`18,123	0
		· ,	-			
Sub-Total Building	48.24			\$1.096.027	- C	0.41.05 0.00
	BUILDING 1209 Foundation Slab on Grade Structural Frame Supported Floor Roof Exterior Walls Interior Walls Interior Finishes Doors and Windows Specialties Plumbing Mechanical Electrical Equipment SUBTOTAL Solar Systems	\$/SF BUILDING 1209 Foundation .400 Slab on Grade .616 Structural Frame .836 Supported Floor 0 Roof .768 Exterior Walls 1.953 Interior Walls .881 Interior Finishes 9.742 Doors and Windows 2.562 Specialties 1.102 Plumbing 6.320 Mechanical 10.013 Electrical 7.54 Equipment 4.701 SUBTOTAL Solar Systems .80	\$/SF\$/SYSBUILDING 1209	\$/SF\$/SYS\$YS QUANBUILDING 120922,530 SFFoundation.400N/ASlab on Grade.616N/AN/AStructural Frame.836Supported Floor0N/ARoof.768N/AInterior Walls1.953N/AInterior Walls.881N/AN/AN/ASpecialties1.102N/APlumbing6.320N/AMechanical10.013N/ASubTOTALSub-Total Building48.24	\$/SF \$/SYS \$YS QUAN TOTAL BUILDING 1209 22,530 SF 22,530 SF Foundation .400 N/A N/A 9,023 Slab on Grade .616 N/A N/A 13,883 Structural Frame .836 N/A N/A 13,883 Supported Floor 0 N/A N/A 18,825 Supported Floor 0 N/A N/A 0 Roof .768 N/A N/A 17,298 Exterior Walls 1.953 N/A N/A 19,855 Interior Walls .881 N/A N/A 19,855 Interior Finishes 9.742 N/A N/A 219,488 Doors and Windows 2.562 N/A N/A 24,829 Plumbing 6.320 N/A N/A 142,393 Mechanical 10.013 N/A N/A 225,585 Electrical 7.54 N/A N/A 105,928 Subrotal	\$/SF S/SYS SYS QUAN TOTAL BUILDING BUILDING 1209 22,530 SF -<

Piling			0	TOT	0	1* 0
2 Elec. Substation & Dist.	2.75	N/A	N/A	62,000	62,000	0
3 Not Used	•		0	0		0
Telephone & Fire Alarm	Sector Sector		0		0	1 0
5 Water Distribution			1 0		0	0
6 Sanitary Sewers	106	NT / A	N/A	0	0	. 0
7 Roads, Parking, Sidewalks	.100	N/A	N/A	2,381	2,381	0
3 Storm Sewers		· · ·		0	0	* 0
Site Improvements	150		0	0	0	* 0
Demolition (In as	.150	N/A	N/A	3,371	3,371	0
bemoircion (in ea. sys.			0	0	0	* 0
above)						
	- Contraction of the	and some in	arter er so resta		and the second	
		•			The second second	1000
		19 19 19 19 19 19 19 19 19 19 19 19 19 1				
	. spranne a literation	and the second second				
Sub-Total Supporting Facil	itics		۱ې	0 67 752		

Total Estimated	Contract Cost: 1 Jan 82	\$ 1,154,679		
	Contingency 10 %	\$ 115,468		
	SIOH 5.5%	\$ 69,858		
	Total Budget Cost	\$ 1,340,005	0.0	
	Rounded	\$ 1,300,000	1209	

*Asteric indicates these totals on 1391.



SYS QU 22,530 N/A N/A N/A N/A N/A N/A N/A	BO Continger JAN TOTAL SF 12,036 13,883 22,275 0 20,496	BUILDING 12,036 13,883 22,275 0 20,496	BUILT-IN EQUIPMENT
SYS QU 22,530 N/A N/A N/A N/A N/A N/A	JAN TOTAL SF 12,036 13,883 22,275 0 20,496	BUILDING 12,036 13,883 22,275 0 20,496	BUILT-IN EQUIPMENT
22,530 N/A N/A N/A N/A N/A N/A	SF 12,036 13,883 22,275 0 20,496	12,036 13,883 22,275 0	
N/A N/A N/A N/A N/A N/A	12,036 13,883 22,275 0 20,496	12,036 13,883 22,275 0	0 0 0 0
N/A N/A N/A N/A N/A	13,883 22,275 0 20,496	12,030 13,883 22,275 0	0 0 0
N/A N/A N/A N/A	22,275 0 20,496	22,275	0
N/A N/A N/A	0	0	0
N/A N/A	20,496	20 /06	
N/A	20,470	1 /11 440	0
	47.787	47.787	0
N/A	20 814	20,814	0
N/A	218 320	218 320	1 0
N/A	73 007	73 007	0
N/A	28,016	28,016	0
N/A	145 682	145 682	0
N/A	225 585	225 585	0
N/A	200,564	200 564	0
N/A	148,680	0	148,680
	N/A N/A N/A N/A 380 Coll.	N/A 145,682 N/A 225,585 N/A 200,564 N/A 148,680	N/A 145,682 145,682 N/A 225,585 225,585 N/A 200,564 200,564 N/A 148,680 0 380 Coll. SF 18,123

Piling		1	0		0	1:	0
Elec. Substation & Dist.	2.80	N/A	N/A	63 000	63 000		0
Not Used			0	0,000	05,000		0
Telephone & Fire Alarm		•	0		0	-	0
Water Distribution			0		0		0
Sanitary Sewers	106	NI/A		2 201	0		0
Roads, Parking, Sidewalks	.100	N/A	N/A	2,301	2,381		0
Storm Sewers			0		0	×	0
Site Improvements	/21	NI / A	N/A	0 710	0	*	0
Demolition (In ea eve [.431	N/A	N/A	9,712	9,712		0
zhowo)			0	0	0	*	0
above)					And Street Area and	1.1	Sectores (1977)
						1 1996	Constant of the other
		المرجع العاقب المرجع الملك	and the second second second		Steel of the St.		
				1.000	Contract States and	1	1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1
		and the second second second	and the second second			1.000	1000

 Total Estimated Contract Cost:
 1 Jan
 82
 \$ 1,270,361

 Contingency
 10
 %
 \$ 127,036

 SIOH
 5.5%
 \$ 76,857

 Total Budget Cost
 \$ 1,474,254

 Rounded
 \$ 1,450,000
 \$ 474

53.05

Sub-Total Building

*Asteric indicates these totals on 1391.

\$1,195,268 \$*1,046,588

\$*148,680



Title:	DINING	FACILITIES	MODERNIZATION	Costs	Escalated	to:1	JA
				and the second se			

Location: MARINE CORPS BASE, CAMP LEJEUNE, NORTH CAROLINEscalation: 14%

Prepared by: Odell Associates Inc.

Date: 1 July 80 Contingency: 10%

1		\$/SF	S/SYS	SYS QUAN	TOTAL	BUILDING	BUILT-IN EQUIPMENT
	BUILDING 508			22 475 CE			
1	Foundation	. 378	N/A	1 22,4/J SF N/A	9 / 00	0 /00	
2	Slab on Grade	.381	N/A	N/A N/A	8 562	8 562	0
3	Structural Frame	.609	N/A	N/A	13 681	13 691	0
4	Supported Floor	0	N/A	N/A	13,001	1,001	0
5	Roof	.760	N/A	N/A ·	17 073	17 073	0
6	Exterior Walls	1.483	NI/A	21/21	22,075	33 336	0
7	Interior Walls	622	N/A N/A	N/A N/A	33,336	14 225	0
8	Interior Finishes	10.07/	N/A N/A	N/A	14,225	226 411	0
9	Doors and Windows	2 014	N/A N/A	N/A	226,411	220,411	0
0	Specialties	2.014	N/A	<u>N/A</u>	45,262	45,262	0
1	Plumbing	.744	N/A	N/A	16,720	16,720	0
2	Machanical	5.247	N/A	N/A	117,934	117,934	0
2	Flooted	1.761	N/A	N/A	174,428	174,428	0
2	Electrical	5.70	N/A	N/A	128,087	128.087	0
4	Equipment	3.744	N/A	N/A_	84,152	0	84,152
	SUBTOTAL						
5	Solar Systems	.45	56.03	180 SF	10,086	10,086	0
			·				
	Sub-Total Building	39.98			898,456	\$*814 304	\$*84,152

Piling			0	0	Ó	1*	0
Elec. Substation & Dist.	2.80	N/A	N/A	63,000	63 000		0
Not Used			0	0	0	1+	0
Telephone & Fire Alarm	March March	1960 - 10 AN	0	0	0	1-	0
Water Distribution		No. Sec.	0		0		0
Sanitary Sewers	530	N/A	N/A	11 905	11 005		0
Roads, Parking, Sidewalks		M/H	N/A 0	11,905	11,905	1-	0
Storm Sewers			0		0	*	0
Site Improvements	513	NI/A	U NI / A	11 500	0	×	0
Demolition (In ea sys		N/A	N/A	11,533	11,533	-	0
above)			0		0	*	0
	The state inter						
Sub-Total Supporting Facil	ities						

Total Estimated Contract Cost: 1 Jan 82 984,894 Ş Contingency 10 % \$ 98,489 SIOH 5.5% 59,586 \$ 508 Total Budget Cost \$1,142,969 Rounded \$1,150,000

> *Asteric indicates these totals on 1391.

N 82



Title: DINING 1	FACILITIES M	ODERNIZATION	Costs Escal	ated to:1	JAN 82
Location: MARINE	CORPS BASE,	CAMP LEJEUNE,	NORTH CAROLINEscalation:	14%	

Prepared by: Odell Associates Inc. Date:1 July 80 Contingency: 10%

BUILT-IN

3,		\$/SF	S/SYS	SYS QUAN	TOTAL	BUILDING	EOUIPMENT
		1			1	1	1
	BUILDING RR-3			22,475 SI	7		1
1	Foundation	.250	N/A	N/A	5,636	5,636	0
2	Slab on Grade	.140	N/A	N/A	3,155	3,155	0
3	Structural Frame	.747	N/A	N/A	16.785	16,785	0
+	Supported Floor	0	N/A	N/A	0	0	0
5	Roof	762	N/A	N/A ·	17.134	17,134	0
5	Exterior Walls	1.473	N/A	N/A	33.113	33,113	0
7	Interior Walls	.457	N/A	N/A	10 272	10 272	0
3	Interior Finishes	5.439	N/A	N/A	122,237	122 227	0
9	Doors and Windows	1.806	N/A	N/A	40,590	122,237	0
	Specialties	.588	N/A	N/A	13,210	12 210	0
	Plumbing	1,960	N/A	N/A	44 042	15,210	0
2	Mechanical	7.761	N/A	N/A	174 428	174,042	0
3	Electrical	5 70	N/A	N/A	128 087	129 097	0
	Equipment	3.603	N/A	N/A	80.971	128,087	80.971
-	SUBTOTAL						
-	CODICIAL						
	Solar Systems	.45	56.03	180 Coll.SF	10.086	10,086	0
_							
+		And the second second		1			
	Sub-Total Building	31 13			\$600 7/6	\$\$ (10 775	\$* 80 071

1 Piling 0 0 0 * 0 2 Elec. Substation & Dist. 2.80 N/A 63,000 63,000 0 3 Not Used 0 0 0 0 * 4 Telephone & Fire Alarm 0 0 0 0 5 Water Distribution 0 0 0 0 6 Sanitary Sewers N/A 2,381 .106 2,381 0 7 Roads, Parking, Sidewalks 0 Ó 0 0 × Storm Sewers 8 0 0 0 × 0 Site Improvements 9 .124 2,792 N/A 2,792 0 Demolition (In ea. sys. 0 0 0 0 0 * 1234 above) 5 Sub-Total Supporting Facilities * \$ 68,173

Total Estimated	Contract Cost: 1 Jan 82	Ş	767,919	
	Contingency 10 %	\$	76,792	
Bohor an the second	SIOH 5.5%	\$	46,459	2 7
	Total Budget Cost	Ś	891,170	7K-S
	Rounded	Ş	890,000	_ P.

*Asteric indicates these totals on 1391.



Title: DINING FACILITIES	MODERNIZATION	Contra	P 1		
	TIODERATEATION	COSES	rscalated	to:1	JAN 82

Location: MARINE CORPS BASE, CAMP LEJEUNE, NORTH CAROLINEscalation: 14%

Prepared by: Odell Associates Inc.

Date: 1 July 80 Contingency: 10%

BUILT-IN

_		\$/SF	S/SYS	SYS QUAN	TOTAL	BUILDING	EQUIPMENT
_	BUILDING BA-103			12,965 51	2		
1	Foundation	.299	N/A	N/A	3 880	3 880	
2	Slab on Grade	.527	N/A	N/A	6,837	6 837	0
3	Structural Frame	.603	N/A	N/A	7,816	7 816	0
4	Supported Floor	0	N/A	N/A	0	0	0
5	Roof	563	N/A	N/A ·	7 299	7 299	0
6	Exterior Walls	1.507	N/A	N/A	19 533	19 533	0
7	Interior Walls	.668	N/A	N/A	8,659	8,659	0
8	Interior Finishes	9.927	N/A	N/A	128,709	128 709	0
9	Doors and Windows	3.860	N/A	N/A	50.047	50.047	0
0	Specialties	.933	N/A	N/A	12 098	12 098	0
1	Plumbing	3.095	N/A	N/A	40 125	40 125	
2	Mechanical	9.812	N/A	N/A	127 210	127 210	0
3	Electrical	7.15	N/A	N/A	92 755	02 755	0
4	Equipment	6.780	N/A	N/A	87,904	0	87,904
	SUBTOTAL						
		Sec. Sec.					
5	Solar Systems	.39	56.03	90 Coll.SF	5,045	5,045	0
			. Mc.				
	Sub-Total Building	/6.10			2		
	indiad ting	40.12		1	<u>8597,917</u>	\$* 510,013	\$*87.904

Piling			0	1 0 1	0	1.	
Elec. Substation & Dist.	3.93	N/A	N/A	51 000	E1 000	1-	0
Not Used	No. of the local sector		0	1 51,000			0
Telephone & Fire Alarm	And Market		0	0	0	*	0
Water Distribution			0		0	-	0
Sanitary Sewers	10/	27./ 4	0		0		0
Roads, Parking Sidewalkd	.104	N/A	N/A	2,381	2,381		0
Storm Sewers			0	0	0	×	0
Cite I		and be added to be	0	0	0	*	0
Site improvements	.215	N/A	N/A	2,792	2.792	1	0
Demolition (In ea. sys.			0	0	0	*	0
above)		- the designed sectors	The state of the second second				
							and the second second
						-	
Sub-Total Supporting Facil			and he had a straight		the second second second		

FT . 7			
Total Estimated	Contract Cost: 1 Jan 82	Ş	654,090
a set for a first of	Contingency 10 %	\$	65,409
in the state of the	SIOII 5.5%	\$	39,572
	Total Budget Cost	\$	759,071 BA
	Rounded	Ś	760,000

*Asteric indicates these totals on 1391.



DESIGN CONCEPTS

Activity and Location: MARINE CORPS BASE, CAMP LEJEUNE, NORTH CAROLINA

Project Title: DINING FACILITIES MODERNIZATION (P-697)

Date: 1 JULY 1980

USE OF DEFINITIVES AND PREVIOUS DESIGNS

Although definitives for Dining Facilities have been superseded, Definitives 1286674, 75, 76, and 77 were used for reference during design of interior functions and equipment layout. The scope of the modernization of the facilities does not warrant use of existing definitives.

SPECIAL DESIGN CHARACTERISTICS

<u>Floor Plan</u>: Existing building layout limited modernization approach. However, new locations for entries, toilets, serving line equipment and sculleries are proposed in order to relieve present internal cross traffic patterns of inefficiency.

Ventilation: Heat, humidity and odors produced during facility use require new ventilation in following areas: Bakery, Pot Wash, Scullery, Food Service, Garbage Rooms, Toilets and Attics above air conditioned spaces.

Air Conditioning is provided for all dining areas, salad prep areas, and offices.

Finishes: Terrazzo floors and quarry tile floor and wainscots are planned for all major spaces not presently finished as such in order to create sanitary and easily maintainable surfaces.

ENERGY CONSERVATION AND SOLAR ENERGY

- 1. Energy Conservation: The following energy conservation measures were considered and analyzed for the design of this building:
 - a. Insulation in wall: The benefit/cost was computed for two (2) representative buildings, M424 and 508, using Trace computer program to determine the reduction in building heating and cooling loads due to installation of additional insulation in the wall. Results are tabulated in "Summary of Energy Conservation Analysis."



- b. Insulation in Attic: The benefit/cost was computed for two (2) representative buildings, M424 and 508, using Trace computer program to determine the reduction in building heating and cooling loads due to installation of additional insulation in the attic. Results are tabulated in "Summary of Energy Conservation Analysis."
- c. Exhaust Heat Recovery: A run around coil was considered for computing exhaust heat recovery from scullery to preheat outside air makeup for buildings M424 and 508. System CFM not of feasible capacity. Kitchen hoods use untempered makeup air with only 20 percent tempered air from dining.
- d. Hot Water Recovery: Heat recovery from pot sink and dish machines was considered for preheating make-up water for the hot water heater for building M424 and 508. The locations of the various hot water using equipment makes it impractical to collect waste hot water for reclaiming heat. Very long pipe runs, intermediate sumps and pumping to a central location close to the domestic hot water heater will have to be provided so that make-up water can be preheated. This conservation feature is, therefore, not considered feasible.
- e. Condensate Heat Recovery: Since condensate is returned back to central system, heat recovery at this use terminal would not be feasible. Condensate recovery would be considered more feasible at the central energy plant.
- f. Storm Windows for Existing Windows: Approximately 45 percent of the windows in the dining areas are removed and blocked up for other than energy savings reasons. The balance of the windows in occupied spaces were considered for adding storm windows and were determined to be feasible.
- g. Vestibules: Vestibules are proposed for all major entrances and exits by simply adding doors to 10 existing vestibule areas, adding two complete vestibules and maintaining six existing vestibules. No detail analysis was made, since the construction cost was so small.
- 2. Solar Energy: The feasibility of Solar Energy Systems for the five buildings was determined by the "Solcost" computer program. Two of the five buildings (508, M424), were run on the computer. Two buildings (RR-3, 1209) were nearly identical to the two run. Solar systems to BA-103 (similar shape to 508) were scaled down from building 508 sizes. Domestic hot water is based on people served while space heating is based on area of building.

Two alternatives were considered: (1) domestic hot water and (2) domestic hot water combined with space heating. The combined system was considered since the design will integrate both aspects into one system.



a.	Type system included:	DOMESTIC HOT WATER HEATING
ь.	Type collector:	Single glazed flat plate
с.	Area collector, all	
	buildings:	1,210 square feet
d.	Systems cost, all buildings:	\$61,463
e.	Annual energy savings:	Barrels of oil equivalent = 44.5
f.	Percent energy contribution	
	from solar system to	
	DHW Heat:	83%
g.	Payback:	9 years
h.	System design cost:	\$30,000

The combined domestic hot water and space heating system is not economically feasible.

3. An economic study was made to provide a basis for selection of an HVAC system. A Variable Temperature Constant Volume System was compared with a Variable Air Volume System with Reheat serving Dining Areas, Packaged Terminal Air Conditioning Units serving certain support areas and Perimeter Radiation serving total building except for areas served by Variable Air Volume System with Reheat.

Analysis proved that the Variable Temperature Constant Volume Systems will provide a lower present worth.

- 4. Energy Monitoring and Control System (EMCS):
 - a. Camp Lejeune's present EMCS is set up to operate or monitor the following:
 - 1) Stop and start of each air conditioning unit.
 - 2) Room supply air flow status.
 - 3) Room temperature of each area.
 - b. Telephone lines are used for transmission of signal from each building to the master monitoring unit (CPU).
 - c. Each building will require a field panel to be installed.
 - d. The electric power, steam and fire alarm system are not to be monitored at this time.
- 5. Energy Summary: The analysis of energy conserving measures (listed on Energy Analysis Summary) indicates feasibility of several features:
 - a. The following features are feasible and have been incorporated into the project, and the cost is included in the building costs:







- 1) Insulation of walls of AC space
- 2) Insulation of ceiling of AC space
- 3) Solar assisted domestic hot water heating
- 4) Storm windows
- b. The following features are not feasible and have not been incorporated into the project:
 - 1) Hot water recovery
 - 2) Exhaust air heat recovery
 - 3) Condensate heat recovery
 - 4) Solar space heating

POLLUTION ABATEMENT ASPECTS OF DESIGN

No pollution of air, water, noise, erosion, etc., is anticipated resulting from the work proposed in this project; therefore, no need for permits from authorities in this regard is anticipated.

Additional toilet fixtures added to each building will be tied into the existing building sewer, therefore negating the need to tie into sanitary sewer at additional connection points. The additional quantity of discharge for each building is anticipated as identified below:

1209	3240	GPD	
M424	3240	GPD	
508	1620	GPD	
RR3	1620	GPD	
BA103	810	GPD	
	1209 M424 508 RR3 BA103	12093240M42432405081620RR31620BA103810	1209 3240 GPD M424 3240 GPD 508 1620 GPD RR3 1620 GPD BA103 810 GPD

The additional discharge is anticipated to be absorbed within the existing sanitary sewers and the effluent is anticipated to be handled by existing treatment plant.

SITE APPROVAL

The five separate sites involved with this project have been approved as described in letter CMC, LFF-1-AJR:bab of January 11, 1980.

ECONOMIC ANALYSIS

Economic analyses were done on two Base Buildings M424 and 508 for the considerations mentioned in the ENERGY SUMMARY. Since Building 1209 is similar to M424, it is deduced that all energy conservation measures applicable to M424 can be used for Building 1209. Similarly, Building 508 measures are applicable to RR3. Since Building BA103 is also similar to 508 and half as large in area as 508, energy conservation measures are applied to this building, providing half the credit that can be obtained





from conservation and solar contributions. The building loads for the base buildings are calculated on a Trace program, and economic analyses of system type and equipment to be used for the heating, ventilating, and air conditioning for these base buildings are selected based on a TRACE computer program.

SPECIAL ENGINEERING SERVICES None Required.

CONTINGENCY ALLOWANCE

A 10% contingency allowance is considered as necessary at this phase of design since the project involves remodeling of (5) individual buildings over 30 years old.





ODELL ASSOCIATES, INC. ARCHITECTS CHARLOTTE, N. C.





ODELL ASSOCIATES, INC. CAMP LE JEUNE DINING FAC DATE JOB NO. 1412 ARCHITECTS CHARLOTTE, N. C. BUILDING M424 & 1209 BY TN SHEET OF



SUMMARY OF ENERGY CONSERVATION ANALYSIS

BUILDING BA 103

	MAI	RINE CORPS	BASE DI	NING FAC	ILITY MODERNIZA	TION (P-69	7) 1 JU	LY 80		
			E75 = 2054 x	10 ⁶ BTU/	Yr (Total annua	l energy c	onsumption.	75)		
	E Current =	= 1157 x 1	0 ⁶ BTU/Yr (To	tal annua	al energy consu	mption inc	orporating c	urrent c	riteria)	
	R = (1 - (1 - (1 - (1 - (1 - (1 - (1 - (1	E Current/	E75)) 100 =	43.8 (Pe: ex:	rcent reduction	n in energy on)	consumption	current	year vs.	
		ECC=	634,400 (Estim	ated con	struction cost	for curren	t criteria)			
	Barrels of (Oil Equiva	lent (B.O.E.)	= 153	*(Barrels of E 5,825,400 BT	Suel Oil Sa SU/B.O.E.	ved, Current	Design '	vs. 1975)	
(1	L) (2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Prior	rity Description Of Measure	10 ⁶ BTUs Saved/Yr	Life Cycle Cost (\$1000) Expressed as present worth	(3)/(4)	10 ⁶ BTUs Consumption/ Yr E	% Energy Reduction of Measure R	(6) Annual Consumption Bldg. Square Footage BTU/SF/Yr	Cumula- tive % Reduc- tion	First Cost of Measure (\$1000)	Total Construc- tion Cost (10) + ECC (\$1000)
1. 1	Insulate Walls	129	-24.	5.38	1,925	.6.3	148,476	6.3	7.2	641.6
2. I	Insulate Ceiling	692	-154.	4.49	1,233	33.7	95,102	40.0	6.0	647.6
.3. S	Storm Windows	57	-23.	2.47	1,176	2.8	90,706	42.8	1.4	649
4 9	Solar Domestic HW	19	= 28.	0.67	1,157	1.0	89,240	43.8	5.0	654



SUMMARY OF ENERGY CONSERVATION ANALYSIS

BUILDINGS 1209, M424, 508, RR-3 AND BA103

MAI	RINE CORPS	S BASE DI	NING FAC	ILITY MODERNIZA	TION (P-69	7) 1 JU	LY 80		
	E75	$= 17,200 \times 10$	⁶ BTU/Yr	(Total annual	energy cor	sumption, 75	;)		
E Current	= 9467 x 1	LO ⁶ BTU/Yr (To	tal annua	al energy consu	mption inc	orporating c	urrent c	riteria)	
R = (1 - (1 - (1 - (1 - (1 - (1 - (1 - (1	E Current,	'E75)) 100 = 4	44,9 (Per ex:	rcent reduction isting situation	n in energy on)	consumption	current	year vs.	
	ECC=4	,604,900(Estima	ated cons	struction cost	for curren	t criteria)			
Barrels of (Dil Equiva	alent (B.O.E.)	= 1360	*(Barrels of F 5,825,400 B1	Suel Oil Sa TU/B.O.E.	ved, Current	Design	vs. 1975)	
(1) (2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Priority Description Of Measure	10 ⁶ BTUs Saved/Yr	Life Cycle Cost (\$1000) Expressed as present worth	(3)/(4)	10 ⁶ BTUs Consumption/ Yr E	% Energy Reduction of Measure R	(6) Annual Consumption Bldg. Square Footage BTU/SF/Yr	Cumula- tive % Reduc- tion	First Cost of Measure (\$1000)	Total Construc- tion Cost (10) + ECC (\$1000)
1. Insulate Walls	1,189	-204.	5.82	16011	6.9	155,484	6.9	82.1	4,687
2. Insulate Ceiling	5,694	-1262.	4.51	10317	33.1	100,189	40.0	69.2	4,757
3. Storm Windows	591	-139.	4.25	9726	3.4	94,450	43.4	15.5	4,773.5
4. Solar Domestic HW	259	- 384	67	9467	1 5	91 934	44 9	61 5	4,835

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BUILDING 1209

1 JULY 80 DINING FACILITY MODERNIZATION (P-697) MARINE CORPS BASE $E75 = 3708 \times 10^{6} BTU/Yr$ (Total annual energy consumption, 75) E Current = 2179 x 10⁶ BTU/Yr (Total annual energy consumption incorporating current criteria) R = (1 - (E Current/E75)) 100 = 41.2 (Percent reduction in energy consumption current year vs. existing situation) ECC =1,094,700 (Estimated construction cost for current criteria) *(Barrels of Fuel Oil Saved, Current Design vs. 1975) Barrels of Oil Equivalent (B.O.E.) = 295 5,825,400 BTU/B.O.E. (9) (10)(5) (7) (8) (2) (3) (4) (6) 10⁶ BTUs Priority Description 10⁶ BTUs Life Cycle (3)/(4)% Energy (6) Annual Cumula- First Cost Cost (\$1000) Consumption/ of Measure Reduction Consumption tive % Saved/Yr Of Measure Bldg. Reducof Expressed Yr tion as present E Measure Square R Footage worth BTU/SF/Yr

(1)

(11)

Construc-

Total

tion Cost (\$1000)(10) +ECC (\$1000)1. Insulate Walls 272 -42. 6.47 3,436 7.3 152,507 7.3 23.2 1,117.9 154 4.1 4.3 Storm Windows - 33. 4.66 3,282 1,122.2 2. 145,672 11.4 -3. Insulate Ceiling 1,022 - 224. 2,260 14.7 4.56 27.5 100,310 38.9 1,136.9 18.1 Solar Domestic HW 81 -121. .67 2,179 2.2 96,715. 41.2 1,155 4.



BUILDING M424

MARINE CORPS BASE DINING FACILITY MODERNIZATION (P-697) 1 JULY 80 E75 = 3900 x 10⁶ BTU/Yr (Total annual energy consumption, 75) E Current = 2179 x 10⁶ BTU/Yr (Total annual energy consumption incorporating current criteria)

R = (1 - (E Current/E75)) 100 = 44.1 (Percent reduction in energy consumption current year vs. existing situation)

ECC=1,207,000(Estimated construction cost for current criteria)

Barrels of Oil Equivalent (B.O.E.) = 295 *(Barrels of Fuel Oil Saved, Current Design vs. 1975) 5,825,400 BTU/B.O.E.

	(1) (2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Pri	ority Description Of Measure	10 ⁶ BTUs Saved/Yr	Life Cycle Cost (\$1000) Expressed as present worth	(3)/(4)	10 ⁶ BTUs Consumption/ Yr E	% Energy Reduction of Measure R	(6) Annual <u>Consumption</u> Bldg. Square Footage BTU/SF/Yr	Cumula- tive % Reduc- tion	First Cost of Measure (\$1000)	Total Construc- tion Cost (10) + ECC (\$1000)
1.	Insulate Walls	272	- 42.	6.47	3,628	7.0	161,030	7.0	23:2	1,230.2
2.	Storm Windows	154	- 33.	4.66	3,474	3.9	154,194	10.9	4.3	1,234.5
-3.	Insulate Ceiling	1,214	-266.	4.56	2,260	31.1	100,311	42.0	17.4	1,251.9
4.	Solar Domestic HW	81	- 121.	.67	2,179	2.1	96,715	44.1	18.1	1,270

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BUILDING 508

	MAI	RINE CORPS	BASE DI	NING FAC	ILITY MODERNIZA	TION (P-69	7) 1 JU	LY 80		
		alan seriat serieta Alan serieta esta esta esta esta esta esta esta e	E75 = 3769 x	10 ⁶ BTU/	Yr (Total annu	al energy o	consumption,	75)		
	E Current =	=1976 x 1	.0 ⁶ BTU/Yr (To	tal annua	al energy consu	mption inc	orporating c	urrent c	riteria)	
	R = (1 - (1	E Current/	(E.75)) 100 = 4	47.5 (Per ex:	rcent reduction isting situation	n in energy on)	consumption	current	year vs.	
		ECC=	942,400 (Estima	ated cons	struction cost	for curren	t criteria)			
	Barrels of (Dil Equiva	lent (B.O.E.)	=307	*(Barrels of F 5,825,400 BT	Fuel Oil Sa TU/B.O.E.	ved, Current	Design	vs. 1975)	
	(1) (2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Pri	iority Description Of Measure	10 ⁶ BTUs Saved/Yr	Life Cycle Cost (\$1000) Expressed as present worth	(3)/(4)	10 ⁶ BTUs Consumption/ Yr E	% Energy Reduction of Measure R	(6) Annual Consumption Bldg. Square Footage BTU/SF/Yr	Cumula- tive % Reduc- tion	First Cost of Measure (\$1000)	Total Construc- tion Cost (10) + ECC (\$1000)
1.	Insulate Walls	258	-48.	5.38	3,511	6.8	156,218	6.8	14.2	956.6
2.	Storm Windows	113	-25.	4.52	3,398	3.0	151,190	9.8	2.8	959.4
.3.	Insulate Ceiling	1,383	- 309.	4.47	2,015	36.7	89,655	46.5	15.5	974.9
4.	Solar Domestic HW	39	- 57.	.68	1,976	1.0	87,920	47.5	10.1	985



BUILDING RR-3

DINING FACILITY MODERNIZATION (P-697) 1 JULY 80 MARINE CORPS BASE $E75 = 3769 \times 10^6$ BTU/Yr (Total annual energy consumption, 75) E Current = 1976 x 10⁶ BTU/Yr (Total annual energy consumption incorporating current criteria) R = (1 - (E Current/E75)) 100 = 47.5 (Percent reduction in energy consumption current year vs. existing situation) ECC=725.400(Estimated construction cost for current criteria) Barrels of Oil Equivalent (B.O.E.) = 307 * (Barrels of Fuel Oil Saved, Current Design vs. 1975) 5,825,400 BTU/B.O.E. (9) (10)(11)(8) (5) (6) (7) (3) (4) (1) (2) Priority Description 10⁶ BTUs Life Cycle (3)/(4) 10⁶ BTUs (6) Annual Cumula- First Cost Total % Energy Reduction Consumption tive % of Measure Construc-Saved/Yr Cost (\$1000) Consumption/ Of Measure tion Cost of Bldg. Reduc-(\$1000)Expressed Yr (10) +Square tion Measure E as present ECC R Footage worth (\$1000) BTU/SF/Yr 5.38 3,511 156,218 6.8 14.2 739.6 1. Insulate Walls 258 -48.0 6.8 4.52 3,398 151,190 2.8 742.4 113 - 25. 3.0 9.8 Storm Windows 2. 46.5 2,015 89,655 15.5 757.9 36.7 1,383 - 309. 4.47 Insulate Ceiling . 3. 768 47.5 10.1 1,976 87,920 - 57.0 1.0 39 .68 Solar Domestic HW 4.



BUILDING 1209: BUILDING M424	DATE
MARINE CORPS BASE, CAMP LEJEUNE, NORTH CAROLINA	I JULY 80
PROJECT TITLE	P NO.
DINING FACILITIES MODERNIZATION	P=697

PROJECT COST PROJECTIONS BY ALTERNATIVES

ALTERNATIVE & Variable temp. constant volume split system, packaged terminal A/C and Fin. Rad. ECONOMIC 25 YRS.

DESCRIPTION AND YEAR	COS	STS (\$)	DISCOUNT	PRESENT	
	ONE TIME	RECURRING	FACTOR	VALUE (S)	
INVESTMENT OPERATIONS MAINTENANCE PERSONNEL TERMINAL VALUE OTHER:	\$101,181	\$51,794 25,502 2,321	18.049 20.050 9.524	\$101,181 934,830 511,315 22,105	
TOTAL PRESENT VALUE ALTERNATI	ve x · s1,569,4	31 ÷ 9	ISCOUNT FACTOR	UNIFORM ANNUAL COST \$164,787	

ALTERNATIVE 3 Variable air terminal A/C and Fin.	volume with r Rad.	eheat, package	ed ECON LIFE	OHIC YR3.	
DESCRIPTION AND YEAR	COST	5 (5)	DISCOUNT	PRESENT	
	ONE TIME	RECURAING	FACTOR	VALUE (S)	
INVESTMENT OPERATIONS HAINTEMANCE PERSONNEL TERMINAL VALUE OTHER:	\$163,601	\$52,183 25,372 2,453	18.049 20.050 9.524	\$163,601 941,851 508,709 23,362	
TOTAL PRESENT VALUE ALTERNATI	vɛ в · s 1,637,	523 ÷	9.524 =	UNIFORM ANNUAL COS \$171,936	
Alternative " Life Cycle Cos Alt. A - 1,569 Alt. B - 1,633 L.C.C 68	A" is feasible st 9,431 7,523 3,092	•	S.I.R. = $\frac{1}{1}$	<u>637,523</u> = 1.04	
- 68 x	10			Encl 7	



BUILDING 1209 and BUILDING M424 - VTCV/VAV DESIGN ANALYSIS

Investment Costs: From back-up estimates (PED level). 1. 2. Energy Cost: FY 80 FY 81 FY 82 Steam (0i1) - \$9.27/MIL x 1.04 x 1.14 x 1.14 = \$12.53/MIL BTU BTU - \$0.0296 Elec. x 1.04 x 1.13 x 1.13 = \$0.04/KWH Operating Expenses: From Energy Analysis 3. Alternate A (Page 18) Elec. - 1,294,853 KWH x \$0.04/KWH = \$51,794 Steam - 20,353 x 0.1 MIL BTUS/THERM x \$12.53/MIL = \$25,502 BTU Alternate B (Page 19) Elec. - 1,304,568 KWH x \$0.04/KWH = \$52,183 Steam - 20,249 THERMS x 0.1 MIL BTUS/THERM x 12.53/MIL = \$25,372 BTU 4. Maintenance: Alternate A - \$2,321 Alternate B = \$2,453

5. Uniform Annual Cost = TOTAL PRESENT VALUE 0% INFL. @ 10% DISC. FACTOR



		and the second second	DAT	E	
ACTIVITY (Name and Location)	M424			1 JULY 80	
MARINE CORPS BASE, CAMP	LEJEUNE, NOR	TH CAROLINA			
DINING FACILITIES MODERN	IZATION			P NO. P-697	
DESCRIPTION OF ALTERNATIVES			,		
				L	
	1. 1. 19				
		territoria de la const			
PROJECT COST PROJECTIONS BY AL	ERNATIVES				
ALTERNATIVE A Storm Windows			ECC		
			LIF	LIFE 25 YR	
DESCRIPTION AND YEAR	COS	TS (S) RECURRING	DISCOUNT FACTOR	PRESENT VALUE (S)	
INVESTMENT	\$4,293	Second Second		\$4 293	
OPERATIONS Steam		0	ALC: NO.	,255 .	
Elec.		0			
PERSONNEL			A Contract		
TERMINAL VALUE					
OTHER:					
		1	1	1	
TOTAL PRESENT VALUE ALTERNATIVE	· · · · 4,293	÷_9	.524	= \$451	
ALTERMATIVE B No Storm Win	dows	<u></u>	ECON LIFE	THIC 25 YRS	
	COST	S (S)	DISCOUNT	PRESENT	
DESCRIPTION AND YEAR	ONE TIME	RECURAING	FACTOR	VALUE (\$)	
DESCRIPTION AND YEAR	0	\$1 440	20.05	0	
DESCRIPTION AND YEAR		1 31.447	18 049	8,176	
DESCRIPTION AND YEAR INVESTMENT OPERATIONS Steam Savings Elec. Savings		453	10.045	and the second second second	
DESCRIPTION AND YEAR INVESTMENT OPERATIONS Elec. Savings HAINTENANCE		453	10.045		
DESCRIPTION AND YEAR INVESTMENT OPERATIONS Elec. Savings HAINTENANCE PERSONNEL		453	10.049		
DESCRIPTION AND YEAR INVESTMENT OPERATIONS Steam Savings Elec. Savings MAINTENANCE PERSONNEL TERMINAL YALUE		453	10.045		
DESCRIPTION AND YEAR INVESTMENT OPERATIONS Steam Savings Elec. Savings MAINTENANCE PERSONNEL TERMINAL YALUE OTHER:		453			
DESCRIPTION AND YEAR INVESTMENT OPERATIONS Steam Savings Elec. Savings MAINTENANCE PERSONNEL TERMINAL VALUE OTHER: TOTAL PRESENT VALUE ALTERNATIVE	B · S 37 088	453 ÷ 0	SCOUNT FACTOR	UNIFORM ANNUAL CO	
DESCRIPTION AND YEAR INVESTMENT OPERATIONS Steam Savings Elec. Savings MAINTENANCE PERSONNEL TERMINAL VALUE OTHER: TOTAL PRESENT VALUE ALTERNATIVE	^{B · S} <u>37,088</u>	453 	SCOUNT FACTOR	UNIFORM ANNUAL CO	



BUILDING 1209 and BUILDING M424 - STORMS

Total Window Area (Heating) = 1,596 SF (Cooling) = 1.281 SFSavings from Storm Windows 1. Winter Savings Reduction in Infiltration x ΔT x 1.08 x SF Window + Reduction in Transmission x AT x SF Window = 0.5(1.6 - 0.8) CFM/SF x (68 - 23) x 1.08 x 1,596 SF + (1.04 - 0.54) x (68 - 23) x 1,596 SF = 66,936 BTUH Annual Savings in BTU's 2901 HDD x 24 x 66,936 = 115.07 MIL BTU/YR. (68 - 23) x .90(Effy.) Annual Dollar Savings \$12.53/MIL BTUS x 115.07 MIL BTU/YR. = \$1,442 2. Summer Savings Reduction in Infiltration x AH x 4.45 x SF Window + Reduction in Transmission x ΔT x SF Window = 0.5(0.8 - 0.4) CFM/SF x 12. x 4.45 x 1,281 SF + (1.04 - 0.54) x (90 - 78) x 1,281 SF = 21,367 BTUH Annual Savings in BTU's 1810 CDD x 21,367 BTUH = 11,331 KWH 3,413 KWH/BTU or 38.67 MIL BTU/YR Annual Dollar Savings \$0.04/KWH x 11,331 KWH = \$453 3. Total Annual Savings from Storm Windows \$1,442 + \$453 = \$1,8954. Cost of Storm Windows Jan 80 Jun 80 Jan 82 \$2.27/SF x 1.036 x 1.143 = \$2.69 represents cost to add storms to proposed cost for screens under equipment section. Installation Cost of Storm Windows $1,596 \text{ SF} \times \$2.69/\text{SF} = \$4,293$ 5. Discount Factor - Use 20.050 for 25 years for oil, 8%; and use

18.049 for 25 years for electricity, 7%.



	DATE
BUILDING M424	1 JULY 80
MARINE CORPS BASE, CAMP LEJEUNE, NORTH CAROLINA	
PROJECT TITLE	P NO.
DINING FACILITIES MODERNIZATION	P=697

PROJECT COST PROJECTIONS BY ALTERNATIVES

ALTERMATIVE & Add insulation above ceiling

COSTS (S) DISCOUNT FACTOR DESCRIPTION AND YEAR PRESENT VALUE (S) ONE TIME RECURRING INVESTMENT \$17,437 \$17,437 OPERATIONS HAINTENANCE PERSONNEL TERMINAL VALUE OTHER: DISCOUNT FACTOR UNIFORM ANNUAL COST TOTAL PRESENT VALUE ALTERNATIVE A - \$ 17,437 ÷ 9.524 \$1,831 =

ALTERMATIVE & Continue to operate with current losses

DESCRIPTION AND YEAR	COST	5 (5)	DISCOUNT	PRESENT VALUE (\$)	
	ONE TIME	RECURAING	FACTOR		
INVESTHENT	0			0	
OPERATIONS Steam	and the second second	\$8,305	20.05	\$166,515	
HAINTENANCE		0,457	10.049	110,542	
PERSONNEL					
TERHINAL VALUE			and the second second		
OTHER:					
TOTAL PRESENT VALUE ALTERNATIN	283,05	7 ÷ °	9.524 =	UNIFORM ANNUAL COS \$29,720	
REMARKS Alternative "A"	is feasible du	ue to lower to	tal present va	lue.	
Life Cycle Cost Alt. A - \$ 17,43 Alt. B - 283.05	7		S.I.R. = $\frac{283}{17}$,	$\frac{057}{437} = 16.23$	
· L.C.C 265,62	0 3				
- 200 X	10			- 1 -	

ECONONIC

25

YRS.

YRS.



BUILDING M424

Additional insulation above Energy Saved:	ceiling
Winter = (^U Exist ^U New) x	∆T x Roof Area SF
Ш	over heated space
Summer = ([°] Exist [°] New) x	Solar Gain Factor x Roof Area SF over A/C space
UExist. = 0.44 BTU/HR ^O F.SF	UNew = 0.05 BTU/HR ^o F.SF
From Trace	
Heat Loss with UNew (.05) Heat Loss with Exist. (.44)	= 49,427 BTUH
<u>49,427 x .44</u> .05	= 434,958 BTUH
Winter Energy Saved	= 385,531 BTUH
Annual Savings in BTU's 2901 HDD x 24 x 385,531 BTUH	1
(68 - 23) x .90 (Effy.)	- = 662.77 MIL BTU/YR.
Annual Dollar Savings \$12.53/MIL BTUS x 662.77 MII	. BTUS/YR. = \$8,305
From Trace	
Heat Gain with UNew (.05) Heat Gain with Exist. (.44)	= 39,027 BTUH
$\frac{39,027 \times .44}{.05}$	= 343,438 BTUH
Summer Energy Saved	= 304,411 BTUH
Annual Savings in BTU's	
1810 CDD x 304,411 BTUH 3,413 KWH/BTU	= 161,437 KWH/YR. or 551 MIL BTU/YR.
Annual Dollar Savings	
\$0.04/KWH x 161,437 KWH	= \$6,457



ECONOMIC ANALYSIS OF SHORE FACILITY DATE BUILDING 1209 1 JULY 80 ACTIVITY (None and Location) MARINE CORPS BASE, CAMP LEJEUNE, NORTH CAROLINA PROJECT TITLE P NO. DINING FACILITIES MODERNIZATION P-697 DESCRIPTION OF ALTERNATIVES ,

PROJECT COST PROJECTIONS BY ALTERNATIVES

ALTERNATIVE A Add insulation above ceiling

COSTS (S) DESCRIPTION AND YEAR DISCOUNT PRESENT VALUE (5) ONE TIME RECURRING FACTOR INVESTMENT \$14,670 \$14,670 OPERATIONS HAINTENANCE PERSONNEL TERMINAL VALUE OTHER: UNIFORM ANNUAL COST DISCOUNT FACTOR TOTAL PRESENT VALUE ALTERNATIVE A . 5 14,670 9.524 = \$1,540

ALTERMATIVE & Continue to operate with current losses ECCNOHIC 25 TRS. LIFE

DESCRIPTION AND YEAR	COST	5 (3)	DISCOUNT	PRESENT VALUE (\$) 0 \$140,109 98,078	
	ONE TIME	RECURAING	FACTOR		
INVESTMENT OPERATIONS Elec. MAINTENANCE PERSONNEL TERMINAL VALUE OTHER:	0	\$6,988 5,434	20.05 18.049		
TOTAL PRESENT VALUE ALTERNATIV	٤ в · s _ 238,18	7 <u>÷</u> °	SCOUNT FACTOR 9.524 =	UNIFORM ANNUAL COS	
REMARKS Alternative "A" Life Cycle Cost Alt. A - \$ 14,67 Alt. B - 238,18 L.C.C 223,51 - 224 x	is feasible d 0 7 7 10 ³	ue to lower to	tal present va $S.I.R. = \frac{238}{14},$	lue. $\frac{187}{670} = 16.24$	

Encl 7

ECCNONIC

25

YRS.



BUILDING 1209

1. Additional insulation above ceiling Energy Saved: Winter = (^UExist. - ^UNew) x **A**T x Roof Area SF over heated space Summer = (^UExist. - ^UNew) x Solar Gain Factor x Roof Area SF over A/C space UExist. = 0.44 BTU/HR^oF.SF UNew = 0.05 BTU/HR^oF.SF From Trace (for Bldg. M424) Heat Loss with ^UNew (.05) = 49,427 BTUH Heat Loss with UExist. (.44) 49,427 x .44 = 434,958 BTUH .05 Winter Energy Saved = 385,531 BTUH Annual Savings in BTU's 2901 HDD x 24 x 385,531 BTUH = 662.77 MIL BTU/YR. (68 - 23) x .90 (Effy.) or 12,736SF 15,136SF x 662.77 = 557.78 MIL BTU/YR. for Bldg. 1209 Annual Dollar Savings \$12.53/MIL BTUS x 557.68 MIL BTUS/YR. = \$6,988 From Trace Heat Gain with UNew (.05) Heat Gain with Exist. (.44) = 39,027 BTUH 39,027 x .44 = 343,438 BTUH .05 Summer Energy Saved = 304,411 BTUH Annual Savings in BTU's 1810 CDD x 304,411 BTUH = 161,437 KWH/YR. 3,413 KWH/BTU or $\frac{12,736SF}{15,136SF} \times 161,437$ = 135,839 KWH/YR. or 464 MIL BTU/YR. Annual Dollar Savings \$0.04/KWH x 135,839 KWH = \$5,434



BUILDING 1209; BUILI	DING M424		UAT	1 JULY 80
MARINE CORPS BASE, CA) MP LEJEUNE, NOI	RTH CAROLINA		1 5011 00
PROJECT TITLE	EDNIZATION			P NO.
DESCRIPTION OF ALTERNATIVES	ERNIZATION			P-697
PROJECT COST PROJECTIONS BY	ALTERNATIVES			
ALTERMATIVE A Insulate ex	terior walls		ECI	рконіс 25 у
DESCRIPTION AND YEAR	CO: ONE TIME	STS (S) RECURRING	DISCOUNT FACTOR	PRESENT VALUE (S)
INVESTMENT OPERATIONS	\$23,232			\$23,232
HAINTENANCE PERSONNEL				
TERMINAL VALUE OTHER:				
TOTAL PRESENT VALUE ALTERNAT	TIVE A . 5 23,232	:÷	DISCOUNT FACTOR	UNIFORM ANNUAL C = \$2,439
ALTERMATIVE B Continue to	operate with c	urrent losses	ECO)	OHIC 25 YRS
DESCRIPTION AND YEAR	COST ONE TIME	S (S) RECURAING	DISCOUNT	PRESENT VALUE (S)
INVESTMENT DPERATIONS HAINTENANCE PERSONNEL TERMINAL VALUE		\$2,468 882	20.05 18.049	\$49,483 15,919
		2 - 0	ISCOUNT FACTOR	UNIFORM ANNUAL CO
OTAL PRESENT VALUE ALTERNAT				



BUILDING 1209 and BUILDING M424

2.	Additional insulation in walls Energy Saved:						
	Winter = (^U Exist ^U New) x (∆T x W a	all Area SF cross heated space				
	Summer = (^U Exist ^U New) x S	Solar	Gain Factor x Wall Area SF across A/C space				
	UExist. = 0.35 BTU/HR ^O F.SF	U New	= 0.15 BTU/HR [°] F.SF				
	From Trace						
	Heat Loss with ^U New (.15) Heat Loss with ^U Exist. (.35)	=	85,932 BTUH				
	$\frac{85,932 \times .35}{.15}$	=	200,508 BTUH				
	Energy Saved for Heating		114,575 BTUH				
	Annual Energy Savings <u>2901 HDD x 24 x 114,575 BTUH</u> (68 - 23) x .90(Effy.)	=	196.97 MIL.BTU/YR.				
	Annual Dollar Savings \$12.53/MIL BTUS x 196.97 MIL	BTUS/	YR. = \$2,468				
	From Trace						
	Heat Gain with UNew (.15) Heat Gain with Exist. (.35)	=	31,166 BTUH				
	$\frac{31,166 \times .35}{.15}$	=	72,721 BTUH				
	Energy Saved for Cooling	=	41,555 BTUH				
	Annual Energy Savings						
	<u>1810 CDD x 41,555 BTUH</u> 3,413	-	22,038 KWH/YR or 75.22 MIL BTU/YR.				

Annual Dollar Savings \$0.04/KWH x 22,038 KWH = \$882



RTH CAROLINA	ECONOL LIFE DISCOUNT FACTOR 80.23 SCOUNT FACTOR	NO. P=697 P=697 PRESENT VALUE (S) 18,125 19,581 UNIFORM ANNUAL C
r 244 706	ECONOL LIFE DISCOUNT FACTOR 80.23 SCOUNT FACTOR	NO. P=697 HIC 25 YI PRESENT VALUE (S) 18,125 . 19,581 UNIFORM ANNUAL C
244	ECONOL LIFE 01 SCOUNT FACTOR 80.23 SCOUNT FACTOR	P=697
244	ECONOL LIFE DISCOUNT FACTOR 80.23 SCOUNT FACTOR	HIC 25 TI PRESENT VALUE (S) 18,125 19,581 UNIFORM ANNUAL C
244	ECONOL LIFE DISCOUNT FACTOR 80.23 SCOUNT FACTOR	HIC 25 YI PRESENT VALUE (S) 18,125 19,581 UNIFORM ANNUAL C
244	ECONOL LIFE DISCOUNT FACTOR 80.23 SCOUNT FACTOR	HIC 25 TI PRESENT VALUE (S) 18,125 19,581 UNIFORM ANNUAL C
244	ECONOL LIFE DISCOUNT FACTOR 80.23 SCOUNT FACTOR	HIC 25 YI PRESENT VALUE (S) 18,125 19,581 UNIFORM ANNUAL C
244	ECONOL LIFE DISCOUNT FACTOR 80.23	HIC 25 YI PRESENT VALUE (S) 18,125 . 19,581 UNIFORM ANNUAL C
244	ECONOL LIFE DISCOUNT FACTOR 80.23	UNIFORM ANNUAL C
244	ECONOL LIFE DISCOUNT FACTOR 80.23	UNIFORM ANNUAL C
244 706	BO.23	PRESENT VALUE (S) 18,125 19,581 UNIFORM ANNUAL C
244 244 206	BO. 23 SCOUNT FACTOR	PRESENT VALUE (S) 18,125 . 19,581 UNIFORM ANNUAL C
244 706 ÷ ^{D1}	80.23 SCOUNT FACTOR	18,125 . 19,581 UNIFORM ANNUAL C
244 706 ÷	80.23	UNIFORM ANNUAL C
706 ÷	SCOUNT FACTOR	UNIFORM ANNUAL C
706 ÷	SCOUNT FACTOR	UNIFORM ANNUAL C
706 ÷	SCOUNT FACTOR	UNIFORM ANNUAL C
706 ÷	SCOUNT FACTOR =	UNIFORM ANNUAL C
706 ÷	SCOUNT FACTOR	UNIFORM ANNUAL C
706 ÷	SCOUNT FACTOR	UNIFORM ANNUAL C
·	=	
	and the second	and the second second
	ECONOM LIFE	10 25 YRS
75 (\$)	DISCOUNT	PRESENT
RECURAING	FACTOR	VALUE (\$)
1,976	80.23	158, 534
		100,004
and the second second		
and the second		
534 <u>·</u> ^{DI}	SCOUNT FACTOR	UNIFORM ANNUAL CO
· ·		
Maria Statistica - S	no na native se inte	and the second second
	$S.T.R = \frac{11}{2}$	58,534 = 4.2
		37,706
		105
Pauhach - Invest	ment Cost 18	,125 - 10 5
,	,534 <u>÷</u> ⁰'	534 \div DISCOUNT FACTOR = S.I.R. = $\frac{1}{2}$

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BUILDING 1209 AND BUILDING M424 - SOLAR DHW SOLAR ANALYSIS

- Investment Cost: Back-up estimate esc. to 1 January 82. 1. 2. Energy Cost: FY 80 FY 81 FY 82 Steam (0il) \$9.27/Mil BTU x 1.04 x 1.14 x 1.14 = 12.53/Mil BTU Energy Consumption 3. Alternate A Auxiliary Energy Required = 19.44 MBTU/YR* Cost of Aux. Energy 19.44 x 12.53 = \$244 Alternate B Conventional Energy Required = 157.68 MBTU/YR* Cost of Conventional Energy = 157.68 x 12.53 = \$1,976 4. Discount Factor - Use 80.23 for 25 years for oil from enclosure 14 (FY 82)
- 5. Payback = $\frac{\text{Investment Cost}}{\text{Annual Savings}} = \frac{18,125}{1,732} = 10:5$

From Enclosure 14 = Less Than 8 years.

* Refer to SOLCOST analysis



ECONOMIC ANALYSIS OF SHORE FACILITY

BUILDING 508 and BUILDING RR3

DATE 1 JULY 80

P-697

P NO.

,

ACTIVITY (Name and Location) MARINE CORPS BASE, CAMP LEJEUNE, NORTH CAROLINA

PROJECT TITLE

DINING FACILITIES MODERNIZATION

DESCRIPTION OF ALTERNATIVES See Below

PROJECT COST PROJECTIONS BY ALTERNATIVES

ALTERNATIVE A Variable temperature constant volume split ECONONIC 25 YRS. system, packaged terminal A/C and Fin. Rad.

DESCRIPTION AND YEAR	TON AND YEAR COSTS (S)		DISCOUNT	PRESENT	
	ONE TIME	RECURRING	FACTOR	VALUE (S)	
INVESTMENT OPERATIONS ALINTENANCE PERSONNEL TERMINAL VALUE OTHER:	\$87,249	\$51,836 21,914 2,213	18.049 20.050 9.524	\$ 87,249 935,588 439,376 21,077	
TOTAL PRESENT VALUE ALTERNATIV	E A - s 1,483,	290 ÷	1SCOUNT FACTOR =	UNIFORM ANNUAL COST \$155,742	

ALTERNATIVE & Variable air air cooled chiller, pac	volume with a kaged termina	ceheat al A/C and Fin.	Rad.	OHIC 25 YRS.
DESCRIPTION AND YEAR	COS	TS (3)	DISCOUNT	PRESENT
INVESTMENT OPERATIONS HAINTENANCE PERSONNEL TERMINAL VALUE OTHER:	\$145,487	\$52,801 21,891 2,397	18.049 20.050 9.524	\$145,487 953,005 438,915 22,829
TOTAL PRESENT VALUE ALTERNATIN	^{(E B · S} 1,560,	236 ÷	9.524 =	UNIFORM ANNUAL COST \$163,822
REMARKS Alternative "A" is Life Cycle Cost Alt. A - \$1,483,2 Alt. B - 1,560,2 L.C.C \$ 76,9 - 77 x 10	s feasible. 290 236 246 3		S.I.R. $=\frac{1}{1}$,	$\frac{560,236}{483,290} = 1.05$



BUILDING 508; BUILDING RR-3 - VTCV/VAV DESIGN ANALYSIS

1.	Investment Costs: From back-up estimates (PED Level).
2.	Energy Cost: FY 80 FY 81 FY 82 Steam (Oil) \$9.27/MIL X 1.04 X 1.14 X 1.14 = \$12.53/MIL BTU PTU
	Elec. \$0.0296 X 1.04 X 1.13 X 1.13 = \$0.04/KWH
3.	Operating Expenses: From Energy Analysis
	Alternate A: Elec 1,295,902 KWH X \$0.04/KWH = \$51,836 Steam - 17,489 Therms X 0.1 MIL BTU/THERM X \$12.53/MIL = \$21,914
	Alternate B: Flec = 1.320.024 MJH X \$0.04/MJH = \$52.901
	Steam - 17,471 THERMS X 0.1 MIL BTU/THERM X 12.53/MIL = \$21,891 BTU
4.	Maintenance:
	Alternate A - \$2,213
	Alternate B - \$2,397
5.	Uniform Annual Cost = $\frac{\text{TOTAL PRESENT VALUE}}{0\% \text{ INFL. @ 10\% DISC. FACTOR}}$


	CILITY			
BUILDING 508; BUILDIN	IG RR-3		DATE	
MARINE CORPS BASE, CA) MP LEIFUNE NOR	TH CAPOLINA		1 3011 80
PROJECT TITLE	in hore, nor	CIN CAROLINA		» NO.
DINING FACILITIES MOD DESCRIPTION OF ALTERNATIVES	ERNIZATION			P - 697
			· · · ·	<u> </u>
PROJECT COST PROJECTIONS BY	ALTERNATIVES			
ALTERNATIVE ASTORM Wind	OWS		LIFE	TOHIC 25 YRS.
DESCRIPTION AND YEAR	COS	STS (\$)	DISCOUNT	PRESENT
INVESTHENT	\$2,763			\$2 763
PERATIONS				,705
A INTERANCE	a Maria and		Section of States	
PERSONNEL	and the street of	and the second	Same States	
TERMINAL VALUE	· · · · · · · · · · · · · · · · · · ·			
DTHER:			Section 24	
TOTAL PRESENT VALUE ALTERNAT	IVE A . \$ 2 762	, 	ISCOUNT FACTOR	UNIFORM ANNUAL COST
	_2,703		9.524 =	290
LTERNATIVE B No Storm	Vindows		ECONO	NIC 25 YRS.
DESCRIPTION AND YEAR	COST	5 (5)	DISCOUNT	
	ONE TIME	RECURAING	FACTOR	VALUE (\$)
WVECTUENT		\$1,143	20.05	\$22.017
arcainen1		254	18.049	4,584
PERATIONS	a second s		a construction of the	an and a straight
PERATIONS	Section Supervised and sections	and the second		
PERATIONS AINTENANCE ERSONNEL			엄마, 안동 집, 감독 다양 것이 다 가지 않는 것이 다.	
PERATIONS AINTENANCE ERSONNEL ERMINAL VALUE				
PERATIONS AINTENANCE ERSONNEL ERMINAL VALUE THER:				
PERATIONS AINTEMANCE ERSONNEL ERMINAL VALUE THER: OTAL PRESENT VALUE ALTERNAT	IVE B - 5 _ 27,501		ISCOUNT FACTOR 9.524 =	UNIFORM ANNUAL COST 2,886

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BUILDING 508 and BUILDING RR-3 - Storms

TOTAL WINDOW AREA (Heating) = 1,027 SF (Cooling) = 759 SF SAVINGS FROM STORM WINDOWS 1. Winter Savings: Reduction in Infiltration x AT x 1.08 x SF Window + Reduction in Transmission x ΔT x SF Window = 0.5(2.4 - 1.2) CFM/SF x (68 - 23) x 1.08 x 1,027 $+ (1.04 - 0.54) \times (68 - 23) \times 1,027$ SF = 53,055 BTUH ANNUAL SAVINGS IN BTU's 2901 HDD x 24 x 53,055 = 91.21 MIL BTU/YR. (68 - 23) x .90(Effy.) ANNUAL DOLLAR SAVINGS \$12.53/MIL BTU's x 91.21 MIL BTU/YR. = \$1,143 Summer Savings: Reduction in Infiltration x AH x 4.45 x SF Window + Reduction in Transmission x ∆T x SF Window = 0.5(1.2 - 0.6) CFM/SF x 12 x 4.45 x 759 SF + (1.04 - 0.54) x (68 - 23) x 759 SF = 11,958 BTUH ANNUAL SAVINGS IN BTU'S 1810 CDD x 11,958 BTUH _ 6,342.KWH 3,413 KWH/BTU or 21.6 MIL BTU/YR. ANNUAL DOLLAR SAVINGS \$0.04/KWH x 6,342 KWH = \$254 Total Annual Savings from Storm Windows 3. \$1,143 + \$254 = \$1,397

Cost of Storm Windows 4. Jan 80 Jun 80 Jan 82 \$2.27/SF x 1.036 x 1.142 = \$2.69 represents cost to add storms to proposed cost for screens under equipment section.

INSTALLATION COST OF STORM WINDOWS 1,027 SF x \$2.69/SF = \$2,763

Discount Factor - Use 20.050 for 25 years for oil, 8%; and use 5. 18.049 for 25 years for electricity, 7%.

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CONOMIC ANALYSIS OF SHORE FAC	ILITY		a period and the	
BUILDING 508; BUILDING	G RR-3	di si su tari	DATI	
ACTIVITY (Name and Location) MARINE CORPS BASE, CAN	1P LEJEUNE, NO	RTH CAROLINA		I JULI 80
PROJECT TITLE				P NO.
DESCRIPTION OF ALTERNATIVES	RNIZATION			P-697
•	· · · · · · · · · · · · · · · · · · ·			
				_
				1.2.1
PROJECT COST PROJECTIONS BY	ALTERNATIVES			
ALTERNATIVE Add incula	tion in coili		Fro	NOVIC
Add Insula	ICION IN CEITI	ng	LIF	E 25 YRS.
DESCRIPTION AND YEAR	CO ONE TIME	STS (5)	DISCOUNT	PRESENT
INVESTMENT	\$15 529			
09604T1044	\$15,538			\$15,538 .
		a state and the second	and the second	
HATNTENANCE				
PERSONNEL			Salar 2 -	
TERMINAL VALUE				
OTHER:				
TOTAL PRESENT VALUE ALTERNAT	IVE A - 5 15,538	3 ÷ _ 9	SCOUNT FACTOR	UNIFORM ANNUAL COST \$1,631
UTERNITIVE & Continue to	onomete with		Frax	
Continue to	operate with	current losses	LIFE	25 YRS.
DESCRIPTION AND YEAR		S (S)	DISCOUNT	PRESENT
INVESTMENT		ACCORTING		VALUE (\$)
Steam (oil)	Contraction of the	\$8,915	20.05	\$182,758
Elec.		7,874	18.049	142,118
AA IN ICHANCE	n all all a second		a produce of Spinishering and	
PERSONNEL		for the second second		
ERHINAL VALUE				a na tar
THER:				
TOTAL PRESENT VALUE ALTERNATI	VE 8 · 5 324,87	6 ÷ 9	SCOUNT FACTOR =	UNIFORM ANNUAL COST \$34,111
REMARKS				
	is feasible.		2	2/ 07/
Alternative "A"				14 X/h
Alternative "A" Life Cycle Cost	alatela i desintetesi tetaga. Aga i tadi sa tata dala		S.I.R. = -	$\frac{24,070}{15,538} = 20.91$
Alternative "A" Life Cycle Cost Alt. A - \$ 15,53	38		S.I.R. = -	$\frac{24,070}{15,538} = 20.91$
Alternative "A" Life Cycle Cost Alt. A - \$ 15,53 Alt. B - 324,87 L.C.C \$309.33	38 76 38		S.I.R. = -	$\frac{24,070}{15,538} = 20.91$

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BUILDING 508 and BUILDING RR-3

Additional insulation above ceiling 1. Energy Saved: Winter = (U Exist. - U New) x Δ T x Roof Area SF over heated space Summer: = (^UExist. - ^UNew) x Solar Gain Factor x Roof Area SF over A/C space UExist. = 0.44 BTU/HR^oF. SF UNew = 0.05 BTU/HR^oF. SF From Trace Heat Loss with U_{U}^{New} (.05) Heat Loss with Exist. (.44) = 53,060 BTUH 53,060 x .44 = 466,928 BTUH .05 = 413,868 BTUH Winter Energy Saved Annual Savings in BTU's 2901 HDD x 24 x 413,868 BTUH = 711.48 MIL BTU/YR. (68 - 23) x .90(Effy.) Annual Dollar Savings \$12.53/MIL BTUS x 711.48 MIL BTUS/YR. = \$8,915 From Trace Heat Gain with New (.05) = 47.588 BTUH Heat Gain with Exist. (.44) 47,588 x .44 = 418,774 BTUH .05 Summer Energy Saved = 371,186 BTUH Annual Savings in BTU's 1810 CDD x 371,186 BTUH = 196,850 KWH/YR. 3,413 KWH/BTU or 671.85 MIL BTU/YR.

Annual Dollar Savings \$0.04/KWH x 196,850 KWH = \$7,874





BUILDING 508: BUILDING	RR-3		DATE	
ACTIVITY (Name and Location)				1 JULY 80
MARINE CORPS BASE, CAM	P LEJEUNE, NO	RTH CAROLINA		
PROJECT TITLE	an Stand and	In the second second	1	NO.
DINING FACILITIES MODE	RNIZATION			P-697
CESCATFITION OF ALTERNATIVES	Carloren - Marting		,	and the second
		and the second second		Ŀ
		California a sur a s		
	personal second second second			
				and the second second
PROJECT COST PROJECTIONS BY	ALTERNATIVES			
ALTERNATIVE A Add insulat	ion in walls		ECO) LIFE	OHIC 25 YRS
DESCRIPTION AND YEAR	co	STS (3)	01550007	
	ONE TIME	RECURRING	FACTOR	VALUE (S)
INVESTHENT	\$14,206		1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1	\$14 206
OPERATIONS			and the second	,200 .
		a standard and	a service and the	
HAINTENANCE	- With the set	e en en entre en		
PERSONNEL		Standard State	a sheeting the	
TERMINAL VALUE	a agree a well-ready or	and a second second	and the second second second second	
OTHER:	Charles and the second			· · · ·
	1		1	1
TOTAL PRESENT VALUE ALTERNATI	VE 1/ 204	- D	SCOUNT FACTOR	UNIFORM ANNUAL COS
		·	9.324 =	\$1,492
	1.0		Sec. Sec. Sec. Sec.	
ALTERMATIVE B Continue to	operate with	current losses	ECONO LIFE	HIC 25 YRS.
			and the second	
	COST	5 (5)		
DESCRIPTION AND YEAR	ONE TIME	S (S) RECURAING	DISCOUNT	PRESENT VALUE (\$)
DESCRIPTION AND YEAR	ONE TIME	S (S) RECURRING	DISCOUNT FACTOR	PRESENT VALUE (\$)
DESCRIPTION AND YEAR	COST ONE TIME	\$2,252	DISCOUNT FACTOR	PRESENT VALUE (\$) \$45,153
DESCRIPTION AND YEAR INVESTMENT OPERATIONS Elec.	COST ONE TIME	\$2,252 922	20.05 18.049	PRESENT VALUE (\$) \$45,153 16,641
DESCRIPTION AND YEAR INVESTMENT OPERATIONS Elec. HAINTENANCE	COST ONE TIME	\$2,252 922	01 SCOUNT FACTOR 20.05 18.049	PRESENT VALUE (\$) \$45,153 16,641
DESCRIPTION AND YEAR INVESTMENT OPERATIONS Elec. HAINTENANCE PERSONNEL	COST ONE TIME	\$2,252 922	01 SCOUNT FACTOR 20.05 18.049	PRESENT VALUE (\$) \$45,153 16,641
DESCRIPTION AND YEAR INVESTMENT Steam (oil) Elec. MAINTENANCE PERSONNEL TERMINAL YALUE	COST ONE TIME	\$2,252 922	01 SCOUNT FACTOR 20.05 18.049	PRESENT VALUE (\$) \$45,153 16,641
DESCRIPTION AND YEAR INVESTMENT OPERATIONS Elec. HAINTENANCE PERSONNEL TERMINAL VALUE	COST ONE TIME	\$2,252 922	01 SCOUNT FACTOR 20.05 18.049	PRESENT VALUE (\$) \$45,153 16,641
DESCRIPTION AND YEAR INVESTMENT OPERATIONS Elec. HAINTENANCE PERSONNEL TERMINAL VALUE DTHER:	COST ONE TIME	\$2,252 922	01 SCOUNT FACTOR 20.05 18.049	PRESENT VALUE (\$) \$45,153 16,641
DESCRIPTION AND YEAR INVESTMENT OPERATIONS Elec. HAINTENANCE PERSONNEL TERMINAL VALUE DTHER: TOTAL PRESENT VALUE ALTERNATIV	COST ONE TIME	\$2,252 922	DI SCOUNT FACTOR 20.05 18.049	PRESENT VALUE (\$) \$45,153 16,641
DESCRIPTION AND YEAR INVESTMENT OPERATIONS ELEC. HAINTENANCE PERSONNEL TERMINAL VALUE DTHER: TOTAL PRESENT VALUE ALTERNATIV	COST ONE TIME VE B - 5 61,794	(5) RECURRING \$2,252 922 922 ÷ 9	DI SCOUNT FACTOR 20.05 18.049	PRESENT VALUE (\$) \$45,153 16,641 UNIFORM ANNUAL COST \$6,488
DESCRIPTION AND YEAR INVESTMENT Steam (oil) DPERATIONS Elec. HAINTENANCE PERSONNEL TERMINAL YALUE DTHER: TOTAL PRESENT VALUE ALTERNATIV REMARKS Alternative "A" d	COST ONE TIME /E B · 3 61,794	S (S) RECURRING \$2,252 922 922 ÷ 9	DI SCOUNT FACTOR 20.05 18.049	PRESENT VALUE (\$) \$45,153 16,641 UNIFORM ANNUAL COST \$6,488
DESCRIPTION AND YEAR INVESTMENT Steam (oil) DPERATIONS Elec. HAINTENANCE PERSONNEL IERMIMAL VALUE ITHER: TOTAL PRESENT VALUE ALTERNATIV REMARKS Alternative "A" i Life Cycle Cost	COST ONE TIME VE B · 3 61,794 Is feasible.	S (S) RECURRING \$2,252 922 922 ÷ 9	01 SCOUNT FACTOR 20.05 18.049	PRESENT VALUE (\$) \$45,153 16,641 UNIFORM ANNUAL COST \$6,488
DESCRIPTION AND YEAR INVESTMENT Steam (oil) Elec. MAINTENANCE VERSONNEL TERMIMAL VALUE THER: OTAL PRESENT VALUE ALTERNATIV TEMARKS Alternative "A" f Life Cycle Cost Alt. A - \$14,206	COST ONE TIME VE B · 5 61,794 Is feasible.	(5) <u>RECUARING</u> \$2,252 922 922 ÷ 9	$\begin{array}{r} \text{DISCOUNT} \\ \text{FACTOR} \\ 20.05 \\ 18.049 \\ \hline \\ \text{ISCOUNT FACTOR} \\ .524 \\ \text{S.I.R.} = \frac{61.7}{14.2} \end{array}$	PRESENT VALUE (\$) \$45,153 16,641 UNIFORM ANNUAL COST \$6,488 94 06 = 4.35
DESCRIPTION AND YEAR INVESTMENT Steam (oil) Elec. MAINTENANCE PERSONNEL TERMIMAL VALUE OTAL PRESENT VALUE ALTERNATION REMARKS Alternative "A" i Life Cycle Cost Alt. A - \$14,206 Alt. B - 61,794	COST ONE TIME VE B · 3 61,794 Is feasible.	S (S) RECUARING \$2,252 922 	$\begin{array}{r} 015COUNT \\ FACTOR \end{array}$ $\begin{array}{r} 20.05 \\ 18.049 \end{array}$ $\begin{array}{r} 15COUNT \\ 524 \end{array} = \\ S.I.R. = \frac{61.7}{14.2} \end{array}$	PRESENT VALUE (\$) \$45,153 16,641 UNIFORM ANNUAL COS \$6,488 <u>94</u> 06 = 4.35
DESCRIPTION AND YEAR INVESTMENT Steam (oil) DERATIONS Elec. HAINTENANCE PERSONNEL TERMIMAL YALUE NTHER: NOTAL PRESENT VALUE ALTERNATIV REMARKS Alternative "A" f Life Cycle Cost Alt. A - \$14,206 Alt. B - 61,794 L.C.C \$47,588	COST ONE TIME VE B · S 61,794 US feasible.	S (S) RECURRING \$2,252 922 922 ÷ 9 9	$\begin{array}{r} 0.1 \text{ SCOUNT} \\ FACTOR \\ 20.05 \\ 18.049 \\ \hline \\ 18.049 \\ \hline \\ 5.24 \\ = \\ S.I.R. = \frac{61.7}{14.2} \end{array}$	PRESENT VALUE (\$) \$45,153 16,641 UNIFORM ANNUAL COST \$6,488 94 06 = 4.35

Encl 7



BUILDING 508 and BUILDING RR-3

2. Additional insulation in walls Energy Saved: Winter = (U Exist. - U New) x Δ T x Wall Area SF across heated space Summer = (^UExist. - ^UNew) x Solar Gain Factor x Wall Area SF across A/C space UExist. = 0.35 BTU/HR^oF.SF. UNew = 0.15 BTU/HR^oF.SF. From Trace From Trace Heat Loss with UNew (.15) Heat Loss with Exist. (.35) = 78,402 BTUH 78,402 x .35 = 182,938 BTUH .15 Energy Saved for Heating = 104,536 BTUH Annual Energy Savings 2901 HDD x 24 x 104,586 BTUH = 179.71 MIL BTU/YR. (68 - 23) x .90(Effy.) Annual Dollar Savings \$12.53/MIL BTUS x 179.71 MIL BTU/YR. = \$2,252 From Trace Heat Gain with UNew (.15) Heat Gain with Exist. (.35) = 32,586 BTUH 32,586 x .35 = 76,034 BTUH .15 Energy Saved for Cooling = 43,448 BTUH Annual Energy Savings 1810 CDD x 43,448 BTU = 23,042 KWH/YR. 3,413 78.64 MIL BTU/YR. Annual Dollar Savings

 $$0.04/KWH \times 23,042 KWH = 922



Building 508 and Buil	line DD2		DATE	
CLIVITY (Mana and Location)	aing KR3			1 JULY 80
ARINE CORPS BASE, CAN	P LEJEUNE, NOF	RTH CAROLINA		
ROJECT TITLE	Carlo Carlo Antonio Antonio		I P	NO.
INING FACILITIES MODE	ERNIZATION			P-697
ESCRIPTION OF ALTERNATIVES				1.007
	And the second second			
			and the second	
and the second		and the second		
	9			10 - C - C - C - C - C - C - C - C - C -
ROJECT COST PROJECTIONS BY	ALTERNATIVES			
				And a second
LTERNATIVE A Solar Domes	stic Hot Water	Heating	ECON LIFE	OHIC 25 YRS
		COSTS (\$)		
DESCRIPTION AND YEAR	COS	STS (\$)	DISCOUNT	
DESCRIPTION AND YEAR	ONE TIME	RECURRING	DISCOUNT	PRESENT VALUE (S)
DESCRIPTION AND YEAR	0NE TIME	RECURRING	DISCOUNT	PRESENT VALUE (S)
DESCRIPTION AND YEAR	0NE TIME 10,087	RECURRING	DISCOUNT FACTOR	PRESENT VALUE (S) 10,087
DESCRIPTION AND YEAR YESTHENT ERATIONS	0NE TIME	RECURRING 149	B0.23	PRESENT VALUE (S) 10,087 11,954
DESCRIPTION AND YEAR	0NE TIME	RECURRING 149	BO.23	PRESENT VALUE (5) 10,087 11,954
DESCRIPTION AND YEAR WESTHENT ERATIONS INTENANCE	0NE TIME	149	BO.23	PRESENT VALUE (S) 10,087 11,954
DESCRIPTION AND YEAR IVESTMENT PERATIONS LINTENANCE IRSONNEL	0NE TIME	RECURRING 149	B0.23	PRESENT VALUE (S) 10,087 11,954
DESCRIPTION AND YEAR VESTMENT ERATIONS INTENANCE RSONNEL RMINAL YALUE	0NE TIME	149	B0.23	PRESENT VALUE (\$) 10,087 11,954
DESCRIPTION AND YEAR VESTMENT ERATIONS INTENANCE RSONNEL RMINAL VALUE HER:	0NE TIME	149	BO.23	PRESENT VALUE (S) 10,087 11,954
DESCRIPTION AND YEAR IVESTMENT PERATIONS WINTENANCE ERSONNEL ERMINAL YALUE THER:	0NE TIME	149	BO.23	PRESENT VALUE (5) 10,087 11,954
DESCRIPTION AND YEAR YESTHENT ERATIONS INTENANCE RSONNEL RMINAL YALUE HER:	0NE TIME	149	BO.23	PRESENT VALUE (5) 10,087 11,954
DESCRIPTION AND YEAR YESTHENT ERATIONS INTENANCE RSONNEL RMINAL YALUE HER: DTAL PRESENT VALUE ALTERNAT	ONE TIME 10,087	149	SCOUNT FACTOR	UNIFORM ANNUAL CO
DESCRIPTION AND YEAR VESTHENT ERATIONS INTENANCE RSONNEL RMINAL YALUE HER: DTAL PRESENT VALUE ALTERNAT	ONE TIME 10,087 IVE A - 5 22,041	149	SCOUNT FACTOR	UNIFORM ANNUAL CO
DESCRIPTION AND YEAR VESTMENT ERATIONS INTENANCE RSONNEL RMINAL YALUE HER: DTAL PRESENT VALUE ALTERNAT	ONE TIME 10,087	149	SCOUNT FACTOR	PRESENT VALUE (S) 10,087 11,954
DESCRIPTION AND YEAR VESTMENT ERATIONS INTENANCE RSONNEL RMINAL YALUE HER: DTAL PRESENT VALUE ALTERNAT IERNATIVE B Operate Dome	ONE TIME 10,087 IVE A - 5 22,041 estic Hot Water	L49 System with Ho	SCOUNT FACTOR	PRESENT VALUE (S) 10,087 11,954 UNIFORM ANNUAL COS

RECURRING 988	80.23	79,267
988	80.23	79,267
988	80.23	79,267
	and the second second	and the second se
the second se	A Date of the state of the stat	Andrews will be a
and a state of the state of the		
67 <u>-</u> ⁰¹	SCOUNT FACTOR	UNIFORM ANNUAL COST
	67 ÷ ⁰¹	67 DISCOUNT FACTOR =

Alternate "A" is feasible. Life Cycle Cost Alt. A - \$22,041 Alt. B - 79,269 L.C.C. - 57,228 - \$57 x 10³

S.I.R. = $\frac{79,267}{22,041}$ = 3.60 Payback = $\frac{\text{Investment Cost}}{\text{Annual Savings}}$ = $\frac{5043}{419}$ = 12.02

From Enclosure 14 = Less than 9 years. 7



BUILDING 508 AND BUILDING RR3 - SOLAR DHW SOLAR ANALYSIS

Investment cost: Back-up estimate esc. to 1 January 82. 1. 2. Energy Cost: FY 80 FY 81 FY 82 Steam (oil) \$9.27/MIL BTU x 1.04 x 1.14 x 1.14 = 12.53/MIL BTU. Energy Consumption 3. Alternate A Auxiliary Energy Required = 11.93 MBTU/YR* Cost of Aux. Energy = 11.93 x 12.53 = \$149 Alternate B Conventional Energy Required = 78.84 MBTU/YR* Cost of Conventional Energy = 78.84 x 12.53 = \$988 Discount Factor - use 80.23 for 25 years for oil from enclosure 4. 14 (FY 82). 5. Payback = Investment Cost = 10,087 Annual Savings = 839 = 12.02

= Less than 9 years.

* Refer to SOLCOST analysis.

From Enclosure 14



RITTDINC PA-102				and the second second second second
ACTIVITY (Name and Location)			and the second second	1 JULY 80
MARINE CORPS BASE, CAM	P LEJEUNE, NOI	RTH CAROLINA		A State of the second second
DINING FACTITUTES MODE	NT7ATTON			» NO.
DESCRIPTION OF ALTERNATIVES	UIZATION			P-697
PROJECT COST PROJECTIONS BY A	LTERNATIVES			
ALTERNATIVE A Add Storm V	lindows		ECO LIFE	оніс <u>25</u> тя
DESCRIPTION AND YEAR	CO ONE TIME	STS (S) RECURRING	DISCOUNT FACTOR	PRESENT VALUE (S)
INVESTMENT	and the second	\$1,383		\$1.383
OPERATIONS			- Artes - Artes - Artes	
HAINTENANCE			a and a street	
PERSONNEL				
TERMINAL VALUE	Sector And Made States			
OTHER:		and the second se		
				1
TOTAL PRESENT VALUE ALTERNATIV	/E A · S _ 1,383	÷	ISCOUNT FACTOR 9.524 =	UNIFORM ANNUAL CO = \$145
TOTAL PRESENT VALUE ALTERNATIV	/E A · S _ 1,383	÷	ISCOUNT FACTOR 9.524 = ECONO LIFE	UNIFORM ANNUAL CO \$145 DHIC 25 YRS.
TOTAL PRESENT VALUE ALTERNATIV	/E A · S _ 1,383	→	ECOND ECOND ECOND	UNIFORM ANNUAL CO \$145 DHIC 25 YRS.
TOTAL PRESENT VALUE ALTERNATION ALTERNATIVE B DESCRIPTION AND YEAR	COST	→	DISCOUNT DISCOUNT FACTOR ECONO LIFE	UNIFORM ANNUAL CO \$145 HIC 25 YRS. PRESENT VALUE (\$)
TOTAL PRESENT VALUE ALTERNATIV	VE A - 5 1,383	5 (5) RECURAING	ISCOUNT FACTOR 9.524 = ECONO LIFE DISCOUNT FACTOR	UNIFORM ANNUAL CO \$145 HIC 25 YRS. PRESENT VALUE (3)
TOTAL PRESENT VALUE ALTERNATIV ALTERMATIVE B DESCRIPTION AND YEAR INVESTMENT OPERATIONS Steam (oil) Elec.	(E A · S _ 1,383	5 (5) RECURAING \$572 703	20.05 18.049	UNIFORM ANNUAL CO \$145 UNIC 25 YRS. PRESENT VALUE (\$) \$11,526 12,699
TOTAL PRESENT VALUE ALTERNATION ALTERNATIVE B DESCRIPTION AND YEAR INVESTMENT Steam (oil) OPERATIONS Elec. HAINTENANCE	VE A - 5 1,383	S (S) RECURAING \$572 703	15COUNT FACTOR 9.524 = ECONULIFE 015COUNT FACTOR 20.05 18.049	UNIFORM ANNUAL CO \$145 DHIC 25 VRS. PRESENT VALUE (\$) \$11,526 12,688
TOTAL PRESENT VALUE ALTERNATIV ALTERNATIVE B DESCRIPTION AND YEAR INVESTMENT DPERATIONS Elec. HAINTENANCE PERSONNEL	(E A - S _ 1,383 	S (5) RECURATING \$572 703	ISCOUNT FACTOR 9.524 ECONCLIFE DISCOUNT FACTOR 20.05 18.049	UNIFORM ANNUAL CO \$145 HIC 25 YRS. PRESENT VALUE (\$) \$11,526 12,688
TOTAL PRESENT VALUE ALTERNATION ALTERNATIVE B DESCRIPTION AND YEAR INVESTMENT OPERATIONS ELEC. HAINTENANCE PERSONNEL TERMINAL VALUE	COST	S (5) RECURATING \$572 703	15COUNT FACTOR 9.524 = ECONULIFE DISCOUNT FACTOR 20.05 18.049	UNIFORM ANNUAL CO \$145 DHIC 25 YRS. PRESENT VALUE (\$) \$11,526 12,688
TOTAL PRESENT VALUE ALTERNATIV ALTERNATIVE B DESCRIPTION AND YEAR INVESTMENT OPERATIONS Elec. HAINTENANCE PERSONNEL TERMINAL VALUE DTHER:	(E A - 5 _ 1,383	S (5) RECURAING \$572 703	ECONT 9.524 = ECONT LIFE 015COUNT FACTOR 20.05 18.049	UNIFORM ANNUAL CO \$145 HIC 25 YRS. PRESENT VALUE (S) \$11,526 12,688
TOTAL PRESENT VALUE ALTERNATIV ALTERNATIVE B DESCRIPTION AND YEAR INVESTMENT OPERATIONS Elec. HAINTENANCE PERSONNEL TERMINAL VALUE OTHER:	(E A · S _ 1, 383	5 (5) RECURAING \$572 703	20.05 18.049	UNIFORM ANNUAL CO \$145 UNIC 25 YRS. PRESENT VALUE (\$) \$11,526 12,688
TOTAL PRESENT VALUE ALTERNATIV ALTERNATIVE B DESCRIPTION AND YEAR INVESTMENT OPERATIONS Elec. HAINTENANCE PERSONNEL TERMINAL VALUE OTHER: TOTAL PRESENT VALUE ALTERNATIV	COST ONE TIME	÷	SCOUNT FACTOR 20.05 18.049 SCOUNT FACTOR 524 =	UNIFORM ANNUAL CO \$145 HIC 25 YRS. PRESENT VALUE (S) \$11,526 12,688 UNIFORM ANNUAL COS \$2,542
TOTAL PRESENT VALUE ALTERNATIV ALTERNATIVE B DESCRIPTION AND YEAR INVESTMENT OPERATIONS ELEC. HAINTENANCE PERSONNEL TERMINAL VALUE DTHER: TOTAL PRESENT VALUE ALTERNATIV REMARKS Alternative "A" j	COST COST ONE TIME E B · S 24,214 .s feasible.	÷ 9.	SCOUNT FACTOR 20.05 18.049 SCOUNT FACTOR 524 =	UNIFORM ANNUAL CO \$145 HIC 25 YRS. PRESENT VALUE (\$) \$11,526 12,688 UNIFORM ANNUAL COS \$2,542
TOTAL PRESENT VALUE ALTERNATIV ALTERNATIVE B DESCRIPTION AND YEAR INVESTMENT OPERATIONS ELEC. HAINTENANCE PERSONNEL TERMIMAL VALUE DTHER: TOTAL PRESENT VALUE ALTERNATIV REMARKS ALTERNATIVE "A" i Life Cycle Cost	COST COST ONE TIME E 8 - 5 24,214 .s feasible.	S (5) RECURATING \$572 703 ÷ 9. S.1 S.1	$\frac{13COUNT FACTOR}{9.524} = \frac{ECONT}{17Fe}$	UNIFORM ANNUAL CO \$145 HIC 25 VRS. PRESENT VALUE (\$) \$11,526 12,688 UNIFORM ANNUAL COS \$2,542 = 17.51
TOTAL PRESENT VALUE ALTERNATIV ALTERMATIVE B DESCRIPTION AND YEAR INVESTMENT OPERATIONS ELEC. HAINTENANCE PERSONNEL TERMINAL VALUE DTHER: TOTAL PRESENT VALUE ALTERNATIV REMARKS Alternative "A" i Life Cycle Cost Alt. A - \$ 1,383 Alt. B - 24 214	COST COST ONE TIME E 8 - 5 24,214 .s feasible.	÷ 9.	$\frac{13COUNT FACTOR}{9.524} = \frac{ECOND}{LIFE}$ $\frac{015COUNT}{FACTOR}$ $\frac{20.05}{18.049}$ $\frac{3000}{18.049} = 1000$	UNIFORM ANNUAL CO \$145 HIC 25 VR3. PRESENT VALUE (\$) \$11,526 12,688 UNIFORM ANNUAL COS \$2,542 = 17.51
TOTAL PRESENT VALUE ALTERNATIV ALTERMATIVE B DESCRIPTION AND YEAR INVESTMENT DPERATIONS Elec. HAINTENANCE PERSONNEL TERMIMAL VALUE ITHER: TOTAL PRESENT VALUE ALTERNATIV REMARKS Alternative "A" f Life Cycle Cost Alt. A - \$ 1,383 Alt. B - 24,214 L.C.C 22,831	<u>Cost</u> <u>Cost</u> <u>ONE TIME</u> <u>E 8 · 5 24,214</u> s feasible.	÷ 9.	$\frac{13COUNT FACTOR}{9.524} = \frac{ECONT}{11FE}$	UNIFORM ANNUAL CO \$145 HIC 25 YRS. PRESENT VALUE (3) \$11,526 12,688 UNIFORM ANNUAL COS \$2,542 = 17.51

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STATUTE AND A

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BUILDING BA-103 - STORMS (Glazed Area Considered 1/2 of Building 508)

Total Window Area (Heating) 514 SF = (Cooling) = 380 SF Savings From Storm Windows 1. Winter Savings Reduction in Infiltration x AT x 1.08 x SF Window + Reduction in Transmission x AT x SF Window = 0.5(2.4 - 1.2) CFM/SF x (68 - 23) x 1.08 x 514 SF $+ (1.04 - 0.54) \times (68 - 23) \times 514$ SF = 26,553 BTUH Annual Savings in BTU's 2901 HDD x 24 x 26,553 = 45.65 MIL BTU/YR. (68 - 23) x .90 (Effy.) Annual Dollar Savings \$12.53/MIL BTUS x 45.65 MIL BTU/YR. = \$572 2. Summer Savings Reduction in Infiltration x AH x 4.45 x SF Window + Reduction in Transmission x AT x SF Window = 0.5(1.2 - 0.6) CFM/SF x 12 x 4.45 x 380 SF $+ (1.04 - 0.54) \times (68 - 23) \times 380 \text{ SF}$ = 6,174 BTUH Annual Savings in BTU's 1810 CDD x 6,174 BTUH = 3,274 KWH 3,413 KWH/BTU or 11.17 MIL BTU/YR. Annual Dollar Savings \$0.04/KWH x 3,274 KWH = \$131 3. Total Annual Savings from Storm Windows \$572 + \$131 = \$7034. Cost of Storm Windows Jan 80 Jun 80 Jan 82 $$2.27/SF \times 1.036 \times 1.142 = 2.69 represents cost to add storms to proposed cost for screens under equipment section.

Installation Cost of Storm Windows
514 SF x \$2.69/SF = \$1,383

 Discount Factor - Use 20.050 for 25 years for oil, 8%; and use 18.049 for 25 years for electricity, 7%.



ECONOMIC ANALYSIS OF SHORE FACT	LITY	and the second	DATE	and a second	
ACTIVITY (Name and Lasarian)			1	JULY 80	
MARINE CORPS BASE, CAM	P LEJEUNE, NOR	TH CAROLINA			1. 1. 1. 1.
PROJECT TITLE	States and the		PN	0.	
DINING FACILITIES MODE	RNIZATION			P-697	
DESCRIPTION OF ALTERNATIVES					
· ·					
					-
			and the second		
	Sec. 2 Marganetical and				
				eners, esti dere	
PROJECT COST PROJECTIONS BY	LTERNATIVES				
ALTERMATIVE A Add insulat	ion above ceil	ing	ECONOMI LIFE	c 25	YRS.
	1				S. Spart
DESCRIPTION AND YEAR	CUS	115 (3)	DISCOUNT	PRESEN	T

				PRESENT.
	ONE TIME	RECURRING	FACTOR	VALUE (S)
INVESTHENT	\$6,027			\$6.027
OPERATIONS				
HAINTENANCE			and the second	
PERSONNEL				
TERMINAL VALUE				
OTHER:				And Adda
		D1	SCOUNT FACTOR	UNIFORM ANNUAL COST
IUTAL PRESENT VALUE ALTERNAT	IVE A - 5 6,027	÷ 9	.524 =	633

ECONONIC ALTERMATIVE & Operate with existing losses 25 TRS. COSTS (S) DISCOUNT FACTOR DESCRIPTION AND YEAR PRESENT VALUE (\$) ONE TIME RECURAING INVESTMENT Steam (oil) \$4,457 \$89,363 20.05 OPERATIONS Elec. 3,937 18.049 71,059 HAINTENANCE

PERSONNEL TERMINAL VALUE OTHER: DISCOUNT FACTOR UNIFORM ANNUAL COST TOTAL PRESENT VALUE ALTERNATIVE 8 - 5 160,422 9.524 \$16,844 -. . REMARKS Alternative "A" is feasible. S.I.R. = $\frac{160,422}{6,027}$ = 26.62 Life Cycle Cost Alt. A - \$ 6,027 Alt. B - 160,422L.C.C. - 154,395- $$154 \times 10^3$

Encl 7



BUILDING BA-103

1.	Additional insulation above co Energy Saved:	eili	ıg
	Winter = (^U Exist ^U New) x \varDelta	r x 1	Roof Area SF
	Summer = (^U Exist ^U New) x So	olar	over heated space Gain Factor x Roof Area SF
	U _{Exist.} = 0.44 BTU/HR ^o F.SF	UNE	w = 0.05 BTU/HR ^o F.SF
	From Trace Heat Loss with UNew (.05) Heat Loss with Exist. (.44)	=	26,530 BTUH
	$\frac{26,530 \text{ x} .44}{.05}$	=	233,464 BTUH
	Winter Energy Saved	=	206,934 BTUH
	Annual Savings in BTU's <u>2901 HDD x 24 x 206,934 BTUH</u> (68 - 23) x .90(Effy.)	=	355.74 MIL BTU/YR.
	Annual Dollar Savings \$12.53/MIL BTUS x 355.74 MIL B	TUS/	YR. = \$4,457
	From Trace Heat Gain with UNew (.05) Heat Gain with United (.06)	=	23,794 BTUH
	$\frac{23,794 \text{ x } .44}{05}$	=	209,387 BTUH
	Summer Energy Saved	=	185,593 BTUH
	Annual Savings in BTU's 1810 CDD x 185,593 BTUH 3,413 KWH/BTU	-	98,425 KWH/YR. or 335.92 MIL BTU/YR.
	Annual Dollar Savings \$0.04/KWH x 161,437 KWH	-	\$3,937



BUTLDING BA-103			DATE	
ACTIVITY (Name and Location)	A STATE OF STREET			I JULY 80
PROJECT TITLE	P LEJEUNE, NOI	RTH CAROLINA	······	and the second second
DINING FACILITIES MODE	RNIZATION			P-697
DESCRIPTION OF ALTERNATIVES				
ALIFENATIVE A TREVILATE OF	topion wells		FCO	
<u>Insulate ex</u>	terior walls		LIF	25 YR
DESCRIPTION AND YEAR	CO ONE TIME	STS (\$) RECURRING	DI SCOUNT FACTOR	PRESENT VALUE (S)
INVESTHENT	\$7,225		11 1 10	\$7 225
OPERATIONS		The second second	1.20	· · · · ·
HAINTENANCE			a shekar she	
PE3 (0446)	146 P + P +			a second and a
	· Law and road in	Constant Section		
TERMINAL VALUE	and the second	and the state of the	1.45° (2005)	
OTAEK:	1			
TOTAL PRESENT VALUE ALTERNATI	VE A - 5 7,225	÷ 9.	SCOUNT FACTOR	UNIFORM ANNUAL CO \$759
ALTERMATIVE B Operate with e	existing losse	s.	ECON	DHIC 25 YRS.
	Cost	5 (5)	0.000	
DESCRIPTION AND YEAR	ONE TIME	RECURAING	FACTOR	VALUE (\$)
INVESTMENT			a construction of the state	
OPERATIONS Elec.		\$1,126	20.05	\$22,576
HAINTENANCE		401	10.049	8,321
ERSONNEL		and the second		
TERHINAL VALUE	The second second			Same Control (A.)
Turp.	A Strange Strange		and the second second	and the second sec
VINEX;	and a state of the			
TOTAL PRESENT VALUE ALTERNATIV	иев · s _ 30,897	$\dot{\cdot} \stackrel{\circ}{\underline{\cdot}} \stackrel{\circ}{\underline{\cdot}} \stackrel{\circ}{\underline{\cdot}} \stackrel{\circ}{\underline{\cdot}}$	524 =	UNIFORM ANNUAL CO \$3,244
REMARKS Alternative "A"	is feasible.	na sala a salati salati	a and a second	
Life Cycle Cost			STD _ 30	,897 _ / 28
Alt. $B = 30.897$			3.1.K. = 7	,225 - 4.28
$L_{1}C_{1}C_{2} = 23.672$				
2.0.0. 25,072				



BUILDING BA-103

2. Additional insulation in walls Energy Saved: Winter = (^UExist. - ^UNew) x ∆T x Wall Area SF across heated space Summer = $\begin{pmatrix} U \\ Exist. - & New \end{pmatrix}$ x Solar Gain Factor x Wall Area SF across A/C space UExist. = 0.35 BTU/HR^oF.SF UNew = 0.15 BTU/HR^oF.SF From Trace Heat Loss with UNew (.15) Heat Loss with Exist. (.35) = 39,201 BTUH 39,201 x .35 = 91,469 BTUH .15 Energy Saved for Heating = 52,268 BTUH Annual Energy Savings 2901 HDD x 24 x 52,268 BTUH = 89.86 MIL BTU/YR. (68 - 23) x .90(Effy.) Annual Dollar Savings \$12.53/MIL BTUS x 89.86 MIL BTUS/YR. = \$1,126 From Trace Heat Gain with UNew (.15) Heat Gain with Exist. (.35) = 16,293 BTUH 16,293 x .35 = 38,017 BTUH .15 Energy Saved for Cooling = 21,724 BTUH Annual Energy Savings 1810 CDD x 21,724 BTUH = 11,521 KWH/YR. 3413 or 39.32 MIL BTU/YR.

Annual Dollar Savings \$0.04/KWH x 22,038 KWH = \$461



CONOMIC ANALYSIS OF SHORE FACILITY		
BUILDING BA-103	DATE	111 V 80
MARINE CORPS BASE, CAMP LEJEUNE, NORTH CAROLINA		
PROJECT TITLE DINING FACILITIES MODERNIZATION	P NO.	P-697

PROJECT COST PROJECTIONS BY ALTERNATIVES

ALTERNATIVE & Solar Domestic Hot Water

COSTS (\$) DISCOUNT FACTOR PRESENT VALUE (S) DESCRIPTION AND YEAR ONE TIME RECURRING \$5,043 INVESTHENT \$5,043 OPERATIONS \$75 80.23 6,017 HAINTENANCE PERSONNEL TERMINAL VALUE OTHER: DISCOUNT FACTOR UNIFORM ANNUAL COST TOTAL PRESENT VALUE ALTERNATIVE A - S 11,060

generator usi	ng steam				
DESCRIPTION AND YEAR	COSTS (S)		DISCOUNT	PRESENT	
	ONE TIME	RECURAING	FACTOR	VALUE (\$)	
INVESTMENT			and a start of the second	and the second	
OPERATIONS		\$4.90	00.00	000 000	
		\$409	00.23	\$39,232	
HAINTENANCE		a contraction of the second		and the second second	
PERSONNEL			La service and the		
			A Second Second		
			and the second sec	and the second	
OTHER:					
TOTAL PRESENT VALUE ALTERNATIV	E	. 01	SCOUNT FACTOR	UNIFORM ANNUAL COS	
		<u> </u>		and the second	
REMARKS Alternative "A" is	s feasible.		39 232		
Life Cycle Cost		S.I	$R. = \frac{33,232}{11,060}$	= 3.55	
Alt. A - \$11,060		and preserve the second second		State Stat	
Alt. B - 39,232		Pavback = Inv	estment Cost	$=\frac{10,087}{12.02}$	
L.C.C 28,172	and the second	Ann	ual Savings	839	
- \$28 - 10-	From	Englacura 1/ -	Toos then 0		

From Enclosure 14 = Less than 9 years. Encl 7

ECONONIC LIFE

25

YRS.



BUILDING BA-103 - SOLAR DHW

Investment Cost: Back-up estimate escalates to 1 JAN 82. 1. 2. Energy Cost: FY 80 FY 81 FY 82 Steam (oil) R9.27/MIL x 1.04 x 1.14 x 1.14 = 12.53/MIL BTU BTU 3. Energy Consumption: Alternate A: Auxiliary Energy Required = 5.97 MIL BTU/YR* Cost of Auxiliary Energy = $5.97 \times 12.53 = 75 Alternate B: Conventional Energy Required = 39.42 MIL BUT/YR* Cost of Conventional Energy = 39.42x 12.53 = \$494 Discount Factor - Use 80.23 for 25 years for oil from 4. enclosure 14(FY 82). 5. Payback = Investment Cost 5,043 = 12.02 Annual Savings 419

From Enclosure 14 = Less Than 9 years.

*Refer to Solcost Analysis.



COLLATERAL EQUIPMENT REQUIREMENTS (Initial Outfitting) 5ND LANTDIV 4-11010/6 (NEW 2-79)

DATE 1 JULY 80

1. ACTIVITY (Name and Location)

MARINE CORPS BASE, CAMP LEJEUNE, NORTH CAROLINA 2. PROJECT TITLE

DINING FACILITIES MODERNIZATION				P. NO. P-697	
COG. SYMBOL AND FED. STOCK NO. OR OTHER SOURCE	ITEM/EQUIPMENT DESCRIPTION	QUAN- TITY		M + L + MV UNIT PRICE	TOTAL COST
1. BUILT-IN EQUIPMENT TO BE MCON FUNDED	*Intercom system amplifiers	5	EA	876	4,380
	4D			00/	
	*Drinking water coolers	16	EA	804	12,864
	*Venetian blinds	340	EA	138	46,920
	*Window screens	340	EA	37	12,580
	*Serving line vent hood	2	EA	19,106	38,212
	*Soiled ware handling system	6	EA	56,268	337,608
	1 - ea. Bldg. BA-103 1 - ea. Bldg. 1209 1 - ea. Bldg. RR-3 2 - ea. Bldg. M-424 1 - ea. Bldg. 508				
	*Convection oven	6	EA	4,495	26,972
	2 - ea. Bldg. BA-103 2 - ea. Bldg. RR-3 2 - ea. Bldg. M-424				
	*Ice machine	3	EA	3,439	10,318
	1 - ea. Bldg. RR-3 2 - ea. Bldg. M-424				
	*Walk-in cooler doors	8	EA	2,768	22,144
and the second	SUBTOTAL (To 1391)				511,998
2. <u>EXPENSE ITEMS</u>	*Equipment with associated inst escalation to JAN 82 <u>Building BA-103</u>	allation	i cost	and mark	ups and
Wasserstorm	Refrigerated display case	1	EA	3,355	3,355
Keating	Grill, electric, 6 ft.	1	EA	2,508	2,508
American Warehouse	Hot food table, mobile	2	EA	1,425	2,850
Keating	Deep fat fryer	1	EA	1,164	1,164
Hobart	Vertical cutter, mixer	1	EA	2.778	2,778

Page

1 of 2



COLLATERAL EQUIPMENT	REQUIREMENTS (Initial	Outfitting)
5ND LANTDIV 4-11010/6 (NEW 2-79)		······································

1. ACTIVITY (Name and Location)		1 JULY 80			
MARINE CORPS BASE, CAM	P LEJEUNE, NORTH CAROLINA			a subre	
DINING FACILITIES MODERNIZATION P. NO. 69					P. NO. 697
COG. SYMBOL AND FED. STOCK NO. OR OTHER SOURCE	ITEM/EQUIPMENT DESCRIPTION	QUAN- TITY		UNIT	TOTA COST
	SUBTOTAL				12,655
Hobart	Building 1209 Vertical cutter, mixer	1	EA	2,777	2,777
and the second	SUBTOTAL				2,777
Hobart	Building RR-3 Vertical cutter, mixer	1	EA	2,778	2,778
Wasserstorm	Cold food counters w/sneeze gua	rds4	EA	1,837	7,348
Keating	Grill, electric, 6 ft.	2	EA	2,508	_5,016
	SUBTOTAL				15,142
Wasserstorm	Building M-424 Cold food counter w/sneeze guar	ds 4	EA	1,837	7,348
Keating	Grill, electric, 6 ft.	4	EA	2,508	10,032
State State State	SUBTOTAL				17,380
Keating	Building 508 Griddle, electric, 6 ft.	2	EA	2,508	5,016
Victory	Reefer, reach in	1	EA	2,310	2,310
	SUBTOTAL				7,326
	Fire Extinguishers for all blds.	24	EA	75	1,800
	TOTAL EXPENSE ITEMS				57,080
	Shipping, packing, handling, installation charges and con- tingencies - 10%				5,700
3. INVESTMENT ITEMS	NONE				
4. APA EQUIPMENT	NONE				
5. TRAINING EQUIPMENT	NONE				
6. OTHER EXPENSES	NONE .				
7. EQUIPMENT ON HAND	NONE				
8. <u>SUMMARY</u>	Expense Cost				62 700

Page 2 of 2


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ATLANTIC DIVISION NAVAL FACILITIES ENGINEERING COMMAND

Const. Contr. No. 0.8 VIII

			NC	DRFOLK, VIR	GINIA		DATE _	1 JULY	80	
PROJECT DINING FACE	LITIES MODERNI	ZATION		LOCATI	MARINE CO	DRPS BASE EUNE, NORTH	CAROLINA	PRE	LIM. 🛛 I	FINAL
DESCRIPTION	REMARKS	BENEFIT/ COST	e/c	YEAR PAYBACK	CURRENT WORKING ESTIMATE	ANNUAL SAVINGS	TOTAL MBTU/YR	() MBTU/YR	() MBTU/YR	(MBTU,
BUILDING 1209										
1. Storm Windows		·		3	4,293	1,895				
2. Ceiling Insulatio	n			2	14,670	12,422	1,021.68			
3. Wall Insulation			3.58	7	23,232	3,350	272.19			1918
4. Solar Dom. HW.				8	18,123	1732	81.29			
5. Solar Htg. & DHW	Solcost calcu	lations p	roved no	t feasib	e.				1.446	
6. HW. Recovery	Not practical	•			· · · ·	-				
7. Exhaust Air Heat	Not practical	(analys:	s not ma	de).						
Recovery	<u> </u>					And the second second				
8. Condensate	Condensate is	recovere	d and is	pumped t	0		1 8 8 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			
	Central Energ	y plant	analysis	not made).		1			
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ATLANTIC DIVISION NAVAL FACILITIES ENGINEERING COMMAND

Const. Contr. No.

			ИС	RFOLK, VIR	GINIA		DATE		00	
PROJECT DINING FACI	LITIES MODERNI	ZATION		LOCATI	ON CAMP LEJI	EUNE, NORTH	CAROLINA	PRE	LIM. XI	FINAL
DESCRIPTION	REMARKS	BENEFIT/ COST	E/C	YEAR PAYBACK	CURRENT WORKING ESTIMATE	ANNUAL SAVINGS	TOTAL MBTU/YR	() MBTU/YR	() MBTU/YR	(MBTI
BUILDING M424										
1. Storm Windows				3	4,293	1,895	153.74			
2. Ceiling Insulatio	n			1	17,437	14,762	1213.77	_		
3. Wall Insulation				7	23,232	3,350	272.19	1.100.00		
4. Solar Dom. HW.				8	18,123	1,732	81.29			
5. Solar Htg. & DHW	Solcost_Calcu	lation p	oved not	feasible	alay tan					
6. HW. Recovery	Not_practical					-				
7. Exhaust Air Heat Recovery	Not practical	(analys	s not ma	de)			· .			
8. Condensate	Condensate is	recovere	ed and is	pumped 1	:0					
	Central Energ	y plant	analysis	not made	2)					
CLOSUR				••••••••••••••••••••••••••••••••••••••				•		
<u>о</u>										
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ATLANTIC DIVISION NAVAL FACILITIES ENGINEERING COMMAND

Const. Contr. No.

DIECT DINING FACIL	ITIES MODERNI	ZATION		LOCATI	ON CAMP LEJE	UNE, NORTH	CAROLINA	PRE	LIM. 🖾 I	FINAL
DESCRIPTION	REMARKS	BENEFIT/ COST	e/c	YEAR PAYBACK	CURRENT WORKING FSTIMATE	ANNUAL SAVINGS	TOTAL MBTU/YR	() MBTU/YR	() MBTU/YR	(MBTL
UILDING 508							40 	and the second states		
Storm Windows		•		3	2,763	1,397	112.85			
Ceiling Insulation				1	15,538	16,789	1383.			
Wall Insulation				5	14,206	3,174	258.			
Solar Dom. HW.				9	10,086	839	39.15			·
Solar Htg. & DHW	Sølcost calc	ulations	proved n	ot practi	cal.	1.000000				
HW. Recovery	Not_practical	•								
Exhaust Air Heat	Not practical	(analysi	s not ma	de).						
Recovery .										
Condensate	Condensate is	recovere	d and is	pumped t	0					
in and the second second	Central Energ	y plant (analysis	not made).					
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ATLANTIC DIVISION NAVAL FACILITIES ENGINEERING COMMAND

Const. Contr. No. _

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			N	ORFOLK, VIR	GINIA		DATE		80	
PROJECT DINING FACI	LITIES MODERNI	ZATION		LOCATI	MARINE CO ON CAMP LEJH	DRPS BASE EUNE, NORTH	CAROLINA	PRE	LIH. XI	FINAL
DESCRIPTION	REMARKS	BENEFIT/ COST	e/c	YEAR PAYBACK	CURRENT WORKING ESTIMATE	ANNUAL SAVINGS	TOTAL MBTU/YR	() MBTU/YR	() MBTU/YR	(Mbtu,
BUILDING RR-3									**************************************	
1. Storm Windows				3	2,763	1,397	112.85			
2. Ceiling Insulatio	n			1	15,538	16,789	1383.			
3. Wall Insulation				5	14,206	3,174	258 .			
4. Solar Dom. HW.				9	10,086	839	39.15			
5. Solar Htg. & DHW	<u>SolCost calcu</u>	lations p	roved no	t_practio	al					
6. HW. Recovery	_Not_practical									
7. Exhaust Air Heat Recovery	Not practical	(analys:	s not ma	de)						
8. Condensate	Condensate is	recovere	d and is	pumped						
	to Central En	ergy plan	t (analy	sis not n	ade)					in a second

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ENERGY ANALYSIS

ATLANTIC DIVISION NAVAL FACILITIES ENGINEERING COMMAND Const. Contr. No. _

DINING FACIL	TTIES MODERNI	ZATION		Locat	MARINE CO	RPS BASE	CADOL TNA			EINIAL
PROJECT DIMING INCL		BENEFIT/	R/C	YEAR	CURRENT WORKING	ANNUAL	TOTAL MBTU/YR	() MBTU/YR	MBTU/YR	(MBTI
BUILDING PA 102	REMARKS	COST	E/C	PATBACK	ESTIMATE.	SAVENOS				
BA 103										-
1. Storm Windows				3	1,383	699	56			·
2. Ceiling Insulation	ı			1	6,007	8,395	692	_		
3. Wall Insulation				5	7,225	1,587	129			
4. Solar Dom. HW.				9	5,045	420	20			
5. Solar Htg. & DHW	Solcost calcu	lations	proved	not prac		2.361		_		
6. HW. Recovery	<u>Not practical</u>					and the second second				
7. Exhaust Air Heat Recovery	Not practical	(analysi	s_not_ma	de)			· .			
8. Condensate	Condensate is	recover		numped		and the second s		-		
	to Central Er	ergy plan	it (analy	sis not	nade)					
VCLOSU										
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DEPARTMENT OF THE NAVY PROJECT ENGINEERING DOCUMENTATION

DINING FACILITIES MODERNIZATION

(P-697)

FY 1982 MCON MARINE CORPS BASE CAMP LEJEUNE NORTH CAROLINA

ADMINISTERED BY: ATLANTIC DIVISION NAVAL FACILITIES ENGINEERING COMMAND NORFOLK, VA. 23511

PREPARED BY: ODELL ASSOCIATES, INC. 222 S. CHURCH ST. CHARLOTTE, N.C. 28202



-	EVI	0 82 MILITARY C	ONSTRUC	TION	PRO	DIFCT DAT	2. D.	ATE
NAVY	FT	9 <u>0</u> WILLIART C	UNSTRUC				1 J	ULY 8
3. INSTALLATION	AND LOC	ATION	General Content	4. PROJ	JECT	TITLE		-
MARINE COR CAMP LEJEU	IPS BASI	E RTH CAROLINA		DIŅI	NG	FACILITIE	S MODER	NIZAT
5. PROGRAM ELEN	MENT	6. CATEGORY CODE	7. PROJEC	TNUMB	ER	8. PROJE	CT COST ((000
		722-10	P-0	697		\$5	,706-	
		9. C	OST ESTIMA	TES			Cover Service	
Escalation	14%	I JANUARY	ing date Y 82	U)/М	QUANTITY	UNIT COST	CO: (\$00
Dining Faci	ility M	odernization		S	SF	102,975	s 44.14	\$4.4
Buildings	3	oucentracton		5	SF	102,975	38.55	(3.9
Built in	equipm	ent		T	LS		and the second	(5
Solar Svs	stems			Т	LS		(malam)	(
Supporting	Facili	ties				Same Select		3.
Utilities	5		ander fakteren. Setteren	I	LS			(3
Site Impr	rovemen	ts		I	LS			(
0.1						1. Sec. 20		\$4 8
Subtotal	(10%)							44,0
Contingency	y (10%)						adres 1	\$5 3
Total Conti	ract Co	St	ad (E E%)					2,5
Supervision	inspe	ction and overne	au (3.3%	/		and the second		\$5 6
Total Reque	est (De	unded)					Sec. 1	\$5.6
TOTAL REQUE		unden						
Equipment p	provide	d from other app	ropriati	ons		1. Sugar	in the second	(
10. DESCRIPTION	OF PROPO	DED CONSTRUCTION	1.1.1.1.1		<u>6</u> -4			. 1
Interior re	enovati	ons consisting o	of new wa	11 cov	ver	ings, new	doors, i	nstal
tion of dec	corativ	e partitions, om	it alter	nate w	v1n	dows in di	ining w	ings,
providing 1	new low	ered ceilings, a	ir condi	tionii	ng,	insulation floor	mico	ollan
fixtures:	install	ation of terrazz	o and qu	arry t			ito imp	rouem
Timearco,	plumbi	.ng, masonry, mec	hanical	tons)	ра)	inting, s	rte imp	Iovem
carpentry, and related	d work.	(Alf condition	ing; 205					
and related	d work.	: 25.946 PN. AD	EOUATE:	17,230	O PN	. SUBSTA	NDARD:	10,11
carpentry, and related 11. REQUIN PROJECT: Re	d work. REMENTS	: <u>25,946 PN.</u> AD	DEQUATE:	17,230 ining	0 PN fa	. SUBSTA	NDARD: Buildi	10,11 ngs 1
carpentry, and related 11. REQUIN PROJECT: Re M424 508	d work. REMENTS enovate RR3 R	: <u>25,946 PN.</u> AD the existing en	EQUATE:	17,230 ining	<u>O PN</u> fa	I. SUBSTA cilities,	NDARD: Buildi	10,11 ngs 1
carpentry, and related 11. REQUIN PROJECT: Re M424, 508, REQUIREMENT	d work. REMENTS enovate RR3, B	: <u>25,946 PN.</u> AD the existing en Al03.	EQUATE: listed d	17,230 ining ions a	<u>O PN</u> fa	I. SUBSTAL cilities, consider	NDARD: Buildin	10,11 ngs 13
carpentry, and related 11. REQUIN PROJECT: Re M424, 508, REQUIREMENT	d work. REMENTS enovate RR3, B <u>T:</u> The	: <u>25,946 PN.</u> AD the existing en Al03. alterations and roblems of poor	EQUATE: listed d renovat atmosphe	17,230 ining ions a re, pe	<u>O PN</u> fa are	I. SUBSTA cilities, considere onnel tra	NDARD: Buildin ed essen ffic flo	10,11 ngs 1: ntial ow, e:
carpentry, and related 11. REQUIN PROJECT: Re M424, 508, REQUIREMENT solve the r	d work. REMENTS enovate RR3, B <u>T:</u> The major p f layou	(Alf condition : <u>25,946 PN.</u> AD the existing en Al03. alterations and roblems of poor t. maintenance a	EQUATE: listed d renovat atmosphe nd clean	17,230 ining ions a re, pe liness	<u>O PN</u> fa are ers	I. SUBSTAU cilities, consider onnel tra: durability	NDARD: Buildin ed essen ffic flo y and f	10,11 ngs 1 ntial ow, e lexib
carpentry, and related 11. REQUIN PROJECT: Re M424, 508, REQUIREMENT solve the r ficiency of of facility	d work. REMENTS enovate RR3, B <u>I:</u> The major p f layou ies use	(Alf condition : <u>25,946 PN.</u> AD the existing en Al03. alterations and roblems of poor t, maintenance a	EQUATE: listed d renovat atmosphe nd clean	17,230 ining ions a re, pe liness	0 PM fa are ers s,	I. SUBSTAN cilities, considere onnel tra durability	NDARD: Buildin ed essen ffic flo y and f	10,11 ngs 1 ntial ow, e lexib
carpentry, and related 11. REQUIN PROJECT: Re M424, 508, REQUIREMENT solve the t ficiency of of facilit:	d work. REMENTS enovate RR3, B <u>T:</u> The major p f layou ies use	(Alf Condition : <u>25,946 PN.</u> AD the existing en Al03. alterations and roblems of poor it, maintenance a	EQUATE: listed d renovat atmosphe nd clean	17,230 ining ions a re, pe liness	<u>O PN</u> fa are ers s,	I. SUBSTA cilities, considere onnel tra durability	NDARD: Buildi ed essen ffic flo y and f	10,11 ngs 1 ntial ow, e lexib
carpentry, and related 11. REQUIN PROJECT: Re M424, 508, REQUIREMENT solve the r ficiency of of facilit:	d work. REMENTS enovate RR3, B <u>I:</u> The major p f layou ies use	(Alf condition : <u>25,946 PN.</u> AD the existing en Al03. alterations and roblems of poor it, maintenance a d.	EQUATE: listed d renovat atmosphe and clean	17,230 ining ions a re, pe liness	0 PN fa are ers s,	SUBSTANCI CILITIES, considere onnel tra durability	NDARD: Buildin ed essen ffic flo y and f	10,11 ngs 1 ntial ow, e lexib
carpentry, and related 11. REQUIN PROJECT: Re M424, 508, REQUIREMENT solve the t ficiency of of facilit:	d work. REMENTS enovate RR3, B <u>T:</u> The major p f layou ies use	(Alf Condition : <u>25,946 PN.</u> AD the existing en Al03. alterations and roblems of poor it, maintenance a d. : The facilitie	DEQUATE: listed d renovat atmosphe ind clean	17,230 ining ions a re, pe liness a gen	<u>O PN</u> fa are ers s,	 SUBSTANCI SUBSTANCI SUB	NDARD: Buildined essent ffic flo y and f wn cond	10,11 ngs 1 ntial ow, e lexib ition
carpentry, and related 11. REQUIN PROJECT: Re M424, 508, REQUIREMENT solve the r ficiency of of facilit: CURRENT SIT	d work. REMENTS enovate RR3, B <u>T:</u> The major p f layou ies use <u>TUATION</u> ernizat	(Alf condition : <u>25,946 PN.</u> AD the existing en Al03. alterations and roblems of poor it, maintenance a d. : The facilitie ion since their	DEQUATE: listed d renovat atmosphe and clean es are in construc	17,230 ining ions a re, pe liness a gen tion o	<u>O PN</u> fa are ers s, ner	 SUBSTAT cilities, considered onnel tra: durability al run-do r 37 year 	NDARD: Buildined essent ffic flo y and f wn cond s ago.	10,11 ngs 1 ntial ow, e lexib ition The
carpentry, and related 11. REQUIN PROJECT: Re M424, 508, REQUIREMENT solve the r ficiency of of facilit: CURRENT SIT little mode all condit:	d work. REMENTS enovate RR3, B <u>T:</u> The major p f layou ies use <u>TUATION</u> ernizat ion and	(Alf Condition : <u>25,946 PN.</u> AD the existing en Al03. alterations and roblems of poor it, maintenance a d. : The facilitie ion since their configuration of	EQUATE: listed d renovat atmosphe and clean es are in construc of the ex	17,230 ining ions a re, pe liness a gen tion o isting	0 PN fa are ers s, ner ove g ff	 SUBSTANCILITIES, considered connel transdurability al run-down al run-down ar an acilities 	NDARD: Buildin ed essen ffic flo y and f wn cond s ago. does n	10,11 ngs 1 ntial ow, e lexib lexib ition The ot pr
carpentry, and related 11. REQUIN PROJECT: Re M424, 508, REQUIREMENT solve the r ficiency of of facilit: CURRENT SIT little mode all condit: an environ	d work. REMENTS enovate RR3, B <u>T:</u> The major p f layou ies use <u>TUATION</u> ernizat ion and ment fo	(Alf condition : <u>25,946 PN.</u> AD the existing en Al03. alterations and roblems of poor t, maintenance a d. : The facilitie ion since their configuration of r efficient or m	EQUATE: listed d renovat atmosphe and clean es are in construc of the ex maximum u	17,230 ining ions a re, pe liness a gen tion o isting tiliza	0 PN fa are ers s, ner ove g ff ati	I. SUBSTAU cilities, considered onnel trai durability al run-do r 37 year acilities on. iont cod	NDARD: Buildin ed essen ffic flo y and f wn cond s ago. does n	10,11 ngs 1 ntial ow, e lexib ition The ot pr
carpentry, and related 11. REQUIN PROJECT: Re M424, 508, REQUIREMENT solve the r ficiency of of facilit: CURRENT SIT little mode all condit: an environm IMPACT IF N	d work. REMENTS enovate RR3, B <u>I:</u> The major p f layou ies use <u>TUATION</u> ernizat ion and ment for NOT PRO	(Alf condition : <u>25,946 PN.</u> AD the existing en Al03. alterations and roblems of poor t, maintenance a d. : The facilitie ion since their configuration of pr efficient or m <u>VIDED:</u> Continue	EQUATE: listed d renovat atmosphe and clean es are in construc of the ex maximum u ed use of	17,230 ining ions a re, pe liness a gen tion o isting tiliza inefi	0 PN fa are ers s, ner ove g f ati fic	I. SUBSTAU cilities, considere onnel tra durability al run-do r 37 year acilities on. ient and	NDARD: Buildin ed essen ffic flo y and f wn cond s ago. does n outdate	<u>10,11</u> ngs 1 ntial ow, e lexib ition The ot pr d din
carpentry, and related 11. REQUIN PROJECT: Re M424, 508, REQUIREMENT solve the t ficiency of of facilit: <u>CURRENT SIT</u> little mode all condit: an environt IMPACT IF M facilities	d work. REMENTS enovate RR3, B <u>T:</u> The major p f layou ies use <u>TUATION</u> ernizat ion and ment fo NOT PRC	(Alf Condition : <u>25,946 PN.</u> AD the existing en Al03. alterations and roblems of poor it, maintenance a d. : The facilitie ion since their configuration of r efficient or m <u>WIDED:</u> Continue	EQUATE: listed d renovat atmosphe and clean es are in construc of the ex maximum u ed use of	17,230 ining ions a re, pe liness a gen tion o isting tiliza inefi	0 PN fa are ers s, ner ove g fi fic	 SUBSTANCI ILLES considered onnel transdurability al run-door 37 year acilities on. ient and 	NDARD: Buildin ed essen ffic flo y and f wn cond s ago. does n outdate	10,11 ngs 1 ntial ow, e lexib ition The ot pr d din
carpentry, and related 11. REQUIN PROJECT: Re M424, 508, REQUIREMENT solve the r ficiency of of facilit: CURRENT SIT little mode all condit: an environm IMPACT IF I facilities	d work. REMENTS enovate RR3, B <u>I:</u> The major p f layou ies use <u>TUATION</u> ernizat ion and ment fo NOT PRC	(Alf condition : <u>25,946 PN.</u> AD the existing en Al03. alterations and roblems of poor it, maintenance a d.	EQUATE: listed d renovat atmosphe and clean es are in construc of the ex maximum u ed use of	17,230 ining ions a re, pe liness a gen tion o isting tiliza ineff	0 PN fa are ers s, ner g fi fic	I. SUBSTAU cilities, considere onnel tra: durability al run-do r 37 year acilities on. ient and	NDARD: Buildin ed essen ffic flo y and f wn cond s ago. does n outdate	10,11 ngs 1 ntial ow, e lexib ition The ot pr d din

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1. COMPONENT	FY 19 82 MILITARY CONSTRUCTION PROJECT DA	ТА	2. DATE 1 JULY 80
3. INSTALLATION	AND LOCATION		an an galain
MARINE CORPS	5 BASE, CAMP LEJEUNE, NORTH CAROLINA		
4. PROJECT TITLE	5.	PROJE	CT NUMBER
DINING FACII	LITIES MODERNIZATION	P 6	597
ENVIRONMENT The Environ the design mental effe PRESERVATIO The project site, build National Re American hi FALLOUT SHE Fallout she this project FLOOD HAZAR Requirement Executive O POLLUTION, This project	AL IMPACT mental Impact Assessment has been reviewed, and concepts give consideration to eliminating adve cts consistent with applicable directives. N OF HISTORICAL SITES AND STRUCTURES facilities do not directly or indirectly affecting, structure, object or setting which is list gister or otherwise possesses a significant qua- story. LITER CONSTRUCTION Elter excluded Shelter not economically fease t. DS EVALUATION is of Executive Order No. 11988 (Flood plain Mar order No. 11990 (Protection of Wetlands) are no PREVENTION, ABATEMENT AND CONTROL it will not cause additional air or water pollu ACCESSIBILITY OF PHYSICALLY HANDICAPPED PERSON	d wheerse	ere required environ- district, in the y of e as part of ment) and plicable.
Provisions tion and se restricted each buildi will be out	for physically handicapped personnel not require ervice areas of the facilities, since its use i to able-bodied military personnel. However, a ing will be made accessible to the handicapped fitted for the handicapped.	red s sp din and	in prepara- ecifically ing area in public toile

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Titly: DINING FACILITIES MC ERNIZATION Costs scalated to: 1 JAN 82

Location: MARINE CORPS BASE, CAMP LEJEUNE, NORTH CAROLINAScalation: 14%

Prepared by: Odell Associates Inc.

Date: 1 July 80 Contingency: 10%

						BUILI-IN	284
	\$/SF	S/SYS	SYS QUAN	TOTAL	BUILDING	EQUIPMENT	1.20
BUILDINGS 1209, M424, 508	, RR-3, BA	-103	102,975 SF				1000
Foundation	.379	N/A	N/A	39,0000	39,000	0,	riun.u
Slab on Grade	.447	N/A	N/A	46,000	46,000	0 "	· 14
Structural Frame	.767	N/A	N/A	79,000	79,000	0	A CONTRACTOR
Supported Floor	0	N/A	N/A	0	0	0	· 6.2
Roof	.767	N/A	N/A ·	79,000	79,000	0	Carden .
Exterior Walls	1.729	N/A	N/A	178,000	178,000	0	Numero
Interior Walls	.719	N/A	N/A	74,000	74,000	0	
Interior Finishes	8.886	N/A	N/A	915,000	915,000	0	Anne
Doors and Windows	2.593	N/A	N/A	267,000	267,000	0	Prepa 1
Specialties	.923	N/A	N/A	95,000	95,000	0 •	1985
Plumbing	4.758	N/A	N/A	490,000	490,000	0	
Mechanical	9.002	N/A	N/A	927,000	927,000	0	1
Electrical	7.000	N/A	N/A	720,000	720,000	0	Said
Equipment	4.972	N/A	N/A	512,000	0	512,000	
CUDTOTAL		in a success of		<u> </u>			-
SUBIUIAL							
Solar Systems	.60	50.80	1210 Coll.SF	61,000	61,000	0	
		· .					-
Sub-Total Building	43.53			\$4,482,00	0\$*3,970,000	\$*512,000	-

Diling			Γ	· · · · · · · · · · · · · · · · · · ·		*
Flog Substation & Dist	2 03	N/A	N/A	302 000	302 000	
Net Head	2.95		11/11	502,000	502,000	4
Not Used						~
Telephone & Fire Alarm						
Water Distribution						
Sanitary Sewers	.204	N/A	N/A	21,000	21,000	
Roads, Parking, Sidewalks		and the second second				*
Storm Sewers						*
Site Improvements	.291	N/A	N/A	30,000	30,000	
Demolition (In ea. sys.						*
above)			Carlos y Romanne			
					en fan ingeneeksender der	and the second second
-					and present the last	
		enter contraction				
and the second						
Sub-Total Supporting Faci	litics	and the second second	3	\$ \$ 353,000		

Sub-Total Supporting Facilities

Total Estimated Contract Cost: 1 Jan 82 4,835,000 Ş Contingency 10 % 483,500 Ś SION 5.5% \$ 292,517 Total Budget Cost \$ 5,611,017 Rounded 5,600,000

> *Asteric indicates these totals on 1391.



Titly: DINING FACILITIES MERNIZATION

scalated to:1 JAN 82 Ċosts

Location: MARINE CORPS BASE, CAMP LEJEUNE, NOR'H CAROLINAscalation: 14%

Prepared by: Odell Associates Inc.

Date:1 July 80 Contingency: 10%

	\$/SF	s/sys	SYS QUAN	TOTAL	BUILDING	BUILT-IN EQUIPMENT	
				and the second	Set of the set of the set of the		
BUILDING 1209	and the second second	100 100 100 100 100 100 100 100 100 100	22,530 SF				CTARS -
Foundation	.400	N/A	N/A	9,023	9,023	0.	一件
Slab on Grade	.616	N/A	N/A	13,883	13,883	0 .	12
Structural Frame	.836	N/A	N/A	18,825	18,825	0	1.2
Supported Floor	0	N/A	N/A	0	0	0	· .
Roof	768	N/A	N/A ·	17,298	17,298	0	
Exterior Walls	1.953	N/A	N/A	43,995	43,995	0	A NOW
Interior Walls	.881	N/A	N/A	19,855	19,855	0	14
Interior Finishes	9.742	N/A	N/A	219,488	219,488	0	
Doors and Windows	2.562	N/A	N/A	57,731	57,731	0	Am
Specialties	1.102	N/A	N/A	24,829	24,829	0 -	
Plumbing	6.320	N/A	N/A	142,393	142,393	0	C. C. C.
Mechanical	10.013	N/A	N/A	225,585	225,585	0	
Electrical	7.54	N/A	N/A	169,971	169,971	0	
Equipment	4.701	N/A	N/A	105,928	0	105,928	
- SUBTOTAL						· · · · · · · · · · · · · · · · · · ·	
Solar Systems	.80	47.69	380 Coll.SF	18,123	18,123	0	_
		· · · ·					_
Sub-Total Building	48.24		1	\$1,086,927	\$*980,999	\$*105,928	

		0	0	0	*	0
2.75	N/A	N/A	62,000	62,000		0
		0	0	0	*	0
	Sec. Sec. Sec.	0	0	0		0
Contract of the second		0	0	0	1	0
.106	N/A	N/A	2,381	2,381		0
		0	0	0	×	0
Sec. Sec.		0	0	0	*	0
.150	N/A	N/A	3,371	3,371		0
	de la construcción de la	0	0	0	*	0
a new second	an an grant a	and the second second				
	•			and a constant	here	a sandrage to a
	.106	2.75 N/A .106 N/A .150 N/A	0 2.75 N/A N/A 0 0 0 0 .106 N/A N/A 0 0 0 .106 N/A N/A 0 0 0 .150 N/A N/A 0 0 0	$\begin{array}{c c c c c c c c c c c c c c c c c c c $	$\begin{array}{c c c c c c c c c c c c c c c c c c c $	$\begin{array}{c c c c c c c c c c c c c c c c c c c $

Total Estimated Contract Cost: 1 Jan 82 Ş 1,154,679 Contingency 10 % 115,468 \$ SIOII 5.5% 69,858 \$ Total Budget Cost 1,340,005 \$ \$ 1,300,000 Rounded

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Location: MARINE CORPS I Prepared by: Odell Ass	BASE, CAMP	LEJEUNE, M	e:1 July 80 (Scalatio Contingen	n: 14% cy: 10%	
	\$/SF	s/sys	SYS QUAN	TOTAL	BUILDING	BUILT-IN EQUIPMENT
BUILDING M424			22,530 SF			
Foundation	.534	N/A	N/A	12,036	12,036	0.
Slab on Grade	.616	N/A	N/A	13,883	13,883	0 "
Structural Frame	.989	N/A	N/A	22,275	22,275	0
Supported Floor	0	N/A	N/A	0	0	0
Roof	.910	N/A	N/A ·	20,496	20,496	0
Exterior Walls	2.121	N/A	N/A	47,787	47,787	0
Interior Walls	.924	N/A	N/A	20.814	20,814	0
Interior Finishes	9,690	N/A	N/A	218,320	218,320	0
Doors and Windows	3.240	N/A	N/A	73,007	73,007	0
Specialties	1.243	N/A	N/A	28,016	28,016	0.
Plumbing	6.466	N/A	N/A	145,682	145,682	0
Mechanical	10.013	N/A	N/A	225,585	225,585	0
Electrical	8.90	N/A	N/A	200,564	200,564	0
Equipment	6.599	N/A	N/A	148,680	0	148,680
SUBTOTAL						
Golar Systems	.80	47.69	380 Coll. SF	18,123	18,123	0
			-			
Sub-Total Building	53.05			\$1,195,268	\$*1046588	\$*148 680
			-			1 140,000
);1;jno (
Elec. Substation & Dist	2 80	NI/A	N/A	63,000	63 000	0
Not Used	2.00	N/A	0	0,000	0	* 0
Telephone & Fire Alarm			0	0	0	0
Vater Distribution		1.1.1	0	0	0	0
Sanitary Sewers	.106	N/A	N/A	2,381	2,381	0
Roads, Parking, Sidewalks	.100		0	0	0	* 0
torm Sewers	1	1	0	0	0	* 0
ite Improvements	.431	N/A	N/A	9,712	9,712	0
Demolition (In ea. sys.			0	0	0	* 0
above)			a construction of the second			
		in the second				
1			The second second			
		and the second state of the second state	the second se			

SION 5.5% Total Budget Cost Rounded

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\$ 127,036 \$ 127,036 \$ 76,857 \$ 1,474,254 \$ 1,450,000

> *Asteric indicates these totals on 1391.

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Title: DINING FACILITIES MODERNIZATION

Costs Escalated to: 1 JAN 82

Location: MARINE CORPS BASE, CAMP LEJEUNE, NORTH CAROLINAscalation: 14%

Prepared by: Odell Associates Inc.

Date:1 July 80 Contingency: 10%

	¢/cF	c/cvc	SVS OUAN	י. זעדעינ	BULLDING	FOUL PMENT	and the
	\$7.51	57515	JIS QUAN	TOTAL	BUIEDING	I I I I I I I I I I I I I I I I I I I	-
BUILDING 508	and the second states of	a la seguerare	22,475 SF				
Foundation	.378	N/A	N/A	8,499	8,499	0	A STATE
Slab on Grade	.381	N/A	N/A	8,562	8,562	0	
Structural Frame	.609	N/A	N/A	13,681	13,681	0	k in
Supported Floor	0	N/A	N/A	0	0	0	
Roof	.760	N/A	N/A ·	17,073	17,073	0	17
Exterior Walls	1.483	N/A	N/A	33.336	33,336	0	N.M.
Interior Walls	.633	N/A	N/A	14.225	14,225	0	
Interior Finishes	10.074	N/A	N/A	226,411	226,411	0	
Doors and Windows	2.014	N/A	N/A	45,262	45,262	0	1000
Specialties	.744	N/A	N/A	16,720	16,720	0	
Plumbing	5.247	N/A	N/A	117,934	117,934	0	
Mechanical	7.761	N/A	N/A	174.428	174,428	0 .	101
Electrical	5.70	N/A	N/A	128,087	128,087	0	127
Equipment	3.744	N/A	N/A	84,152	0	84,152	Luck.
SUBTOTAL						·	
Solar Systems	.45	56.03	180 SF	10,086	10,086	0	
		• •					-
Sub-Total Building	39.98		1	\$898,456	\$*814,304	\$*84,152	

Piling			0	0	Ó	* 0
Elec. Substation & Dist.	2.80	N/A	N/A	63,000	63,000	0
Not Used			0	0	0	* 0
Telephone & Fire Alarm		•	0	0	0	0
Water Distribution			0	0	0	. 0
Sanitary Sewers	.530	N/A	N/A	11,905	11,905	0
Roads, Parking, Sidewalks			0	0	0	* 0
Storm Sewers			0	0	0	* 0
Site Improvements	.513	N/A	N/A	11,533	11,533	0
Demolition (In ea. sys.		1	0	0	0	* 0
above)						
	we constant	and a state of the				
		•	and a second second		State State State	and a second second and
	and a second					
	and the second					
Sub-Total Supporting Facil	itics		*	\$ 86 438	en la la seconda de la seco	

Total Estimated Contract Cost: 1 Jan 82

Contingency 10 %

SIOH 5.5% Total Budget Cost Rounded

984,894 98,489 59,586 \$1,142,969 \$1,150,000

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*Asteric indicates these totals on 1391.

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Title: DINING FACILITIES MERNIZATION

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Location: MARINE CORPS BASE, CAMP LEJEUNE, NORTH CAROLINAscalation: 14%

Prepared by: Odell Associates Inc. Date:1 July 80 Contingency: 10%

	\$/SF	S/SYS	SYS QUAN	TOTAL	BUILDING	EQUIPMENT	
RUITIDINC PP_3			22 475 SF				-
Foundation	250	N/A	N/A	5,636	5.636	0	1000
Slab on Grade	.140	N/A	N/A	3,155	3,155	0 "	-
Structural Frame	747	N/A	N/A	16 785	16,785	0	- Kali
Supported Floor	0	N/A	N/A	0	0	0	- Cista
Roof	.762	N/A	N/A ·	17.134	17,134	0	-
Exterior Walls	1.473	N/A	N/A	33,113	33,113	0	
Interior Walls	457	N/A	N/A	10,272	10 272	0	- Mine
Interior Finishes	5,439	N/A	N/A	122,237	122 237	0	
Doors and Windows	1.806	N/A	N/A	40.590	40 590	0	
Specialties	.588	N/A	N/A	13.210	13,210	0	design.
Plumbing	1 960	N/A	N/A	44.042	44.042	0	
Mechanical	7 761	N/A	N/A	174,428	174,428	0	
Electrical	5 70	N/A	N/A	128,087	128,087	0	
Fauipment	3 603	N/A	N/A	80,971	0	80,971	
Idelphene	5.005						
SUBTOTAL	a transfer and the						Prace.
					}	A State	
Solar Systems	.45	56.03	180 Coll.SF	10,086	10,086	0	12 V873 Lat
							and Marine
		• •					Cart State
Sub-Total Building	31.13			\$699,746	\$* 618,775	\$* 80,971	and the second second
		la de la sec	· · · · · · · · ·				And and a second
			a state a state			5. (1960). 1960).	A Start
Piling			0	0	0	* 0	-
Elec. Substation & Dist.	2.80		N/A	63,000	63,000	0	-
Not Used			0	0	0	* 0	the second
Telephone & Fire Alarm		· · ·	0	0	0	0	- Carton La
Water Distribution			0	0	0	0	_
Sanitary Sewers	.106		N/A	2,381	2,381	0	and an and
Roads, Parking, Sidewalks			0	0	0	* 0	Paral Paral
Storm Sewers			0	0	0	* 0	1
Site Improvements	.124		N/A	2,792	2,792	0	
Demolition (In ea. sys.			0	0	0	* 0	and the second
above)							. I mail
	and the second of the second		and the second		No. of the original sector		1
-					and the second second	and the second second	1
			-				and the second
						1.	Ster.
ub-Total Supporting Facil	itics		*	\$ 68,17	73		1.263
 A second s							State of the local state of the

Total Estimated Contract Cost: 1 Jan 82 767,919 Ş Contingency 10 % 76,792 \$ 46,459 SIOH 5.5% Ŝ 891,170 Total Budget Cost \$ 890,000 Rounded

> *Asteric indicates these totals on 1391.



Titles, DINING FACILITIES MODERNIZATION

Costs Escalated to: 1 JAN 82

in the

Location: MARINE CORPS BASE, CAMP LEJEUNE, NORTH CAROLIN&scalation: 14%

Prepared by: Odell Associates Inc. Date:1 July 80 Contingency: 10%

	\$/SF	S/SYS	SYS QUAN	TOTAL	BUILDING	BUILT-IN EQUIPMENT
			10.045	-		
BUILDING BA-103			12,965 SF			
Foundation	.299	N/A	<u>N/A</u>	3,880	3,880	0
Slab on Grade	.527	N/A	N/A	6,837	6,837	0
Structural Frame	.603	<u>N/A</u>	N/A	7,816	7,816	0
Supported Floor	0	N/A	N/A	0	0	0
Roof	.563	N/A	N/A ·	7,299	7,299	0
Exterior Walls	1.507	N/A	N/A	19,533	19,533	0
Interior Walls	.668	N/A	N/A	8,659	8,659	0
Interior Finishes	9.927	N/A	N/A	128,709	128,709	0
Doors and Windows	3.860	N/A	N/A	50,047	50,047	0
Specialties	.933	N/A	N/A	12,098	12,098	0 .
Plumbing	3.095	N/A	N/A	40,125	40,125	0
Mechanical	9.812	N/A	N/A	127,210	127,210	0 .
Electrical	7.15	N/A	N/A	92,755	92,755	0
Equipment	6.780	N/A	N/A	87,904	0	87,904
SUBTOTAL						
Solar Systems	20	56.02	00 Coll SE	F 0/5	5.015	0
			90 0011.31	5,045	5,045	
Sub-Total Building	46.12			\$597,917	\$*510,013	\$*87,904
Piling		(4) 4 (4) (4) (4) (4) (4) (4) (4) (4) (4	0	0		× 0
Elec. Substation & Dist.	3 93	N/A	N/A	51 000	51 000	0
Not Used	5.75	M/A	0	0	0	* 0
Telephone & Fire Alarm			0	0	0	0
Water Distribution			0	0	0	0
Sanitary Sewers	19/	NI/A	N/A	2 291	2 381	0
Roads Parking Sidewalks	.104	N/A		2,301	2,501	* 0
Storm Sewers			0	0	0	* 0
Site Improvements	215	N/A	NT / A	2 702	2 702	0
Demolition (In en eve	.215	IN/A	N/A	2,192	2,192	* 0
above)						
abovej			-			
			-			
	<u> </u>			-		
ub-Total Supporting Facil	itics		*	\$ 56,17	3	
Total Estimated Co	ontract Co	st: 1 Jan	82 \$ 65	54 090		7
(local mounded of	Conting	ency 10	× × v	65 409		
	STOIL 5	5% 10	e e	39.572	New Street	
	Total B	udget Cost	. ¢ 70	59 071		
	Rounded	unger tost	\$ 71	60,000		
			Y /(

*Asteric indicates these totals on 1391.

DESIGN CONCEPTS

Activity and Location: <u>MARINE CORPS BASE, CAMP LEJEUNE, NORTH CAROLINA</u> Project Title: DINING FACILITIES MODERNIZATION (P-697)

Date: 1 JULY 1980

USE OF DEFINITIVES AND PREVIOUS DESIGNS

Although definitives for Dining Facilities have been superseded, Definitives 1286674, 75, 76, and 77 were used for reference during design of interior functions and equipment layout. The scope of the modernization of the facilities does not warrant use of existing definitives.

SPECIAL DESIGN CHARACTERISTICS

<u>Floor Plan</u>: Existing building layout limited modernization approach. However, new locations for entries, toilets, serving line equipment and sculleries are proposed in order to relieve present internal cross traffic patterns of inefficiency.

Ventilation: Heat, humidity and odors produced during facility use require new ventilation in following areas: Bakery, Pot Wash, Scullery, Food Service, Garbage Rooms, Toilets and Attics above air conditioned spaces.

Air Conditioning is provided for all dining areas, salad prep areas, and offices.

<u>Finishes</u>: Terrazzo floors and quarry tile floor and wainscots are planned for all major spaces not presently finished as such in order to create sanitary and easily maintainable surfaces.

ENERGY CONSERVATION AND SOLAR ENERGY

- 1. Energy Conservation: The following energy conservation measures were considered and analyzed for the design of this building:
 - a. Insulation in wall: The benefit/cost was computed for two (2) representative buildings, M424 and 508, using Trace computer program to determine the reduction in building heating and cooling loads due to installation of additional insulation in the wall. Results are tabulated in "Summary of Energy Conservation Analysis."

- b. Insulation in Attic: The benefit/cost was computed for two (2) representative buildings, M424 and 508, using Trace computer program to determine the reduction in building heating and cooling loads due to installation of additional insulation in the attic. Results are tabulated in "Summary of Energy Conservation Analysis."
- c. Exhaust Heat Recovery: A run around coil was considered for computing exhaust heat recovery from scullery to preheat outside air makeup for buildings M424 and 508. System CFM not of feasible capacity. Kitchen hoods use untempered makeup air with only 20 percent tempered air from dining.
- d. Hot Water Recovery: Heat recovery from pot sink and dish machines was considered for preheating make-up water for the hot water heater for building M424 and 508. The locations of the various hot water using equipment makes it impractical to collect waste hot water for reclaiming heat. Very long pipe runs, intermediate sumps and pumping to a central location close to the domestic hot water heater will have to be provided so that make-up water can be preheated. This conservation feature is, therefore, not considered feasible.
- e. Condensate Heat Recovery: Since condensate is returned back to central system, heat recovery at this use terminal would not be feasible. Condensate recovery would be considered more feasible at the central energy plant.
- f. Storm Windows for Existing Windows: Approximately 45 percent of the windows in the dining areas are removed and blocked up for other than energy savings reasons. The balance of the windows in occupied spaces were considered for adding storm windows and were determined to be feasible.
- g. Vestibules: Vestibules are proposed for all major entrances and exits by simply adding doors to 10 existing vestibule areas, adding two complete vestibules and maintaining six existing vestibules. No detail analysis was made, since the construction cost was so small.
- 2. Solar Energy: The feasibility of Solar Energy Systems for the five buildings was determined by the "Solcost" computer program. Two of the five buildings (508, M424), were run on the computer. Two buildings (RR-3, 1209) were nearly identical to the two run. Solar systems to BA-103 (similar shape to 508) were scaled down from building 508 sizes. Domestic hot water is based on people served while space heating is based on area of building.

Two alternatives were considered: (1) domestic hot water and (2) domestic hot water combined with space heating. The combined system was considered since the design will integrate both aspects into one system.

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Each building was determined to be feasible within the limits of Government criteria for solar assisted Domestic Hot Water heating only. See charts indicating Solar Collector Sizing. Listed below is statistical information (totals for all buildings).

a.	Type system included:	DOMESTIC HOT WATER HEATING
Ъ.	Type collector:	Single glazed flat plate
c.	Area collector, all	
	buildings:	1,210 square feet
d.	Systems cost, all buildings:	\$61,463
e.	Annual energy savings:	Barrels of oil equivalent = 44.5
f.	Percent energy contribution from solar system to	
	DHW Heat:	83%
g.	Payback:	9 years
h.	System design cost:	\$30,000

The combined domestic hot water and space heating system is not economically feasible.

3. An economic study was made to provide a basis for selection of an HVAC system. A Variable Temperature Constant Volume System was compared with a Variable Air Volume System with Reheat serving Dining Areas, Packaged Terminal Air Conditioning Units serving certain support areas and Perimeter Radiation serving total building except for areas served by Variable Air Volume System with Reheat.

Analysis proved that the Variable Temperature Constant Volume Systems will provide a lower present worth.

- 4. Energy Monitoring and Control System (EMCS):
 - a. Camp Lejeune's present EMCS is set up to operate or monitor the following:
 - 1) Stop and start of each air conditioning unit.
 - 2) Room supply air flow status.
 - 3) Room temperature of each area.
 - b. Telephone lines are used for transmission of signal from each building to the master monitoring unit (CPU).
 - c. Each building will require a field panel to be installed.
 - d. The electric power, steam and fire alarm system are not to be monitored at this time.
- 5. Energy Summary: The analysis of energy conserving measures (listed on Energy Analysis Summary) indicates feasibility of several features:
 - a. The following features are feasible and have been incorporated into the project, and the cost is included in the building costs:

- 1) Insulation of walls of AC space
- 2) Insulation of ceiling of AC space
- 3) Solar assisted domestic hot water heating
- 4) Storm windows
- b. The following features are not feasible and have not been incorporated into the project:
 - 1) Hot water recovery
 - 2) Exhaust air heat recovery
 - 3) Condensate heat recovery
 - 4) Solar space heating

POLLUTION ABATEMENT ASPECTS OF DESIGN

No pollution of air, water, noise, erosion, etc., is anticipated resulting from the work proposed in this project; therefore, no need for permits from authorities in this regard is anticipated.

Additional toilet fixtures added to each building will be tied into the existing building sewer, therefore negating the need to tie into sanitary sewer at additional connection points. The additional quantity of discharge for each building is anticipated as identified below:

Building	1209	3240	GPD	
Building	M424	3240	GPD	
Building	508	1620	GPD	
Building	RR3	1620	GPD	
Building	BA103	810	GPD	

The additional discharge is anticipated to be absorbed within the existing sanitary sewers and the effluent is anticipated to be handled by existing treatment plant.

SITE APPROVAL

The five separate sites involved with this project have been approved as described in letter CMC, LFF-1-AJR:bab of January 11, 1980.

ECONOMIC ANALYSIS

Economic analyses were done on two Base Buildings M424 and 508 for the considerations mentioned in the ENERGY SUMMARY. Since Building 1209 is similar to M424, it is deduced that all energy conservation measures applicable to M424 can be used for Building 1209. Similarly, Building 508 measures are applicable to RR3. Since Building BA103 is also similar to 508 and half as large in area as 508, energy conservation measures are applied to this building, providing half the credit that can be obtained

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from conservation and solar contributions. The building loads for the base buildings are calculated on a Trace program, and economic analyses of system type and equipment to be used for the heating, ventilating, and air conditioning for these base buildings are selected based on a TRACE computer program.

SPECIAL ENGINEERING SERVICES None Required.

CONTINGENCY ALLOWANCE

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A 10% contingency allowance is considered as necessary at this phase of design since the project involves remodeling of (5) individual buildings over 30 years old.









ODELL ASSOCIATES, INC. CMAP LE JEUNE DINING FAC, DATE JOB NO. 1412 ARCHITECTS CHARLOTTE, N. C. BUILDING M42441203 BY TN SHEET OF



BUILDINGS 1209, M424, 508, RR-3 AND BA103

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	MAR	INE CORPS	BASE DIN	ING FACI	LITY MODERNIZA	TION (P-697) 1 JUI	Y 80		
		E75	$= 17,2002 \times 10$	6 BTU/Yr	(Total annual	energy con	sumption, 75)		
	E Current =	9467 x 1	0 ⁶ BTU/Yr (Tot	al annua	l energy consu	mption inco	orporating cu	irrent ci	riteria)	
	R = (1 - (E	Current/	E75)) 100 = 4	44,9 (Per exi	cent reduction sting situatio	in energy n)	consumption	current	year vs.	
		ECC=4,	253,700(Estima	ated cons	truction cost	for current	criteria)			
	Barrels of O	il Equiva	lent (B.O.E.)	= 1360	*(Barrels of F 5,825,400 BT	uel Oil Sav U/B.O.E.	ved, Current	Design '	vs. 1975)	
	(1) (2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Pri	iority Description Of Measure	10 ⁶ BTUs Saved/Yr	Life Cycle Cost (\$1000) Expressed as present worth	(3)/(4)	10 ⁶ BTUs Consumption/ Yr E	% Energy Reduction of Measure R	(6) Annual Consumption Bldg. Square Footage BTU/SF/Yr	Cumula- tive % Reduc- tion	First Cost of Measure (\$1000)	Total Construc- -tion Cost (10) + ECC (\$1000)
4		1 100		5.00		()	155 /0/	: 6.0	82 1	, 687
1.	Insulate Walls	1,189	204.	5.82	16011	6.9	155,484	0.9	02.1	4,007
2.	Insulate Ceiling	5,694	1262.	4.51	10317	33.1	100,189	40.0	69.2	4,757 -
3.	Storm Windows	591	139.	4.25	9726	3.4	94,450	43.4	15.5	4,773.5
4.	Solar Domestic HW	259	384.	.67	9467	1.5	91,934	44.9	61.5	4,835



BUILDING 1209

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	. MAR	INE CORPS	BASE DIN	NING FACI	LITY MODERNIZA	TION (P-697) 1 JUI	LY 80		
		E7.	$5 = 3708 \times 10^6$	6 BTU/Yr	(Total annual	energy cons	sumption, 75)			
	E Current =	2179 x 10	0 ⁶ BTU/Yr (Tot	tal annua	1 energy consu	mption inco	orporating cu	irrent ci	riteria)	
	R = (1 - (E	Current/	E75)) 100 = 4	41.2 (Per exi	cent reduction sting situatio	in energy n)	consumption	current	year vs.	
		ECC =1,	026,700(Estima	ated cons	truction cost	for current	t criteria)			
	Barrels of C)il Equiva	lent (B.O.E.)	= 295	*(Barrels of F 5,825,400 BT	uel Oil Sav U/B.O.E.	ved, Current	Design	vs. 1975)	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Priority	Description Of Measure	10 ⁶ BTUs Saved/Yr	Life Cycle Cost (\$1000) Expressed as present worth	(3)/(4)	10 ⁶ BTUs Consumption/ Yr E	% Energy Reduction of Measure R	<pre>(6) Annual Consumption Bldg. Square Footage BTU/SF/Yr</pre>	Cumula- tive % Reduc- tion	First Cost of Measure (\$1000)	Total Construc- tion Cost (10) + ECC (\$1000)
1. Insul	, ate Walls	272	42.	6.47	3,436	7.3	152,507	7.3	23.2	1,117.9
2. Stor	m Windows	154	33.	4.66	3,282	4.1	145,672	11.4	4.3	1,122.
3. Insul	ate Ceiling	1,022	224.	4.56	2,260	27.5	100,310	38.9	14.7	1,136.9
4. Sola	r Domestic HW	81	, 121.	.67	2,179	2.2	96,715	41.2	18.1	1,155



BUILDING M424

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. MARI	INE CORPS	BASE DIN	NING FACI	LITY MODERNIZA	TION (P-697) 1 JUL	Y 80		
	.E7	$5 = 3900 \times 10^6$	⁵ BTU/Yr	(Total annual	energy cons	umption, 75)			
E Current =	2179 x 10	0 ⁶ BTU/Yr (Tot	tal annua	l energy consu	mption inco	prporating cu	irrent ci	riteria)	
R = (1 - (E	Current/	E75)) 100 = 4	44.1 (Per exi	cent reduction sting situatio	in energy n)	consumption	current	year vs.	
Permete of O	ECC=1,	132,000(Estima	ated cons = 295	truction cost *(Barrels of F	for current uel Oil Sav	c criteria) ved, Current	Design	vs. 1975)	•
				5,825,400 BT	U/B.O.E.			(10)	(11)
(1) (2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Priority Description Of Measure	10 ⁶ BTUs Saved/Yr	Life Cycle Cost (\$1000) Expressed as present worth	(3)/(4)	10 ⁶ BTUs Consumption/ Yr E	% Energy Reduction of Measure R	(6) Annual Consumption Bldg. Square Footage BTU/SF/Yr	Cumula- tive % Reduc- tion	First Cost of Measure (\$1000)	Total Construc- tion Cost (10) + ECC (\$1000)
, 1 Insulate Walls	272	42.	6.47	3,628	7.0	161,030	7.0	23:2	1,230.2
 Storm Windows 	154	33.	4.66	3,474	3.9	154,194	10.9	4.3	1,234.5
3. Insulate Ceiling	1,214	266.	4.56	2,260	31.1	100,311	42.0	17.4	1,251.9
4 Solar Domestic HW	81	121.	.67	2,179	2.1	96,715	44.1	18.1	1,270



BUILDING 508

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. MAR	INE CORPS	BASE DIN	NING FACÌ	LITY MODERNIZA	TION (P-697	') 1 JUI	LY 80		
		E75 = 3769 x	10 ⁶ BTU/	Yr (Total annua	al energy c	onsumption,	75)		Mar Ar
E Current =	=1976 x 1	0 ⁶ BTU/Yr (Tot	tal annua	1 energy consu	mption inco	orporating cu	irrent ci	riteria)	
R = (1 - (E	E Current/	E(75)) 100 = 4	47.5 (Per exi	cent reduction sting situatio	in energy n)	consumption	current .	year vs.	
Barrels of C	ECC= Dil Equiva	855,400(Estima lent (B.O.E.)	ated cons =307	truction cost *(Barrels of F 5.825.400 BT	for current uel Oil Sa U/B.O.E.	t criteria) ved, Current	Design [.]	vs. 1975)	•
(1) (2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Priority Description Of Measure	10 ⁶ BTUs Saved/Yr	Life Cycle Cost (\$1000) Expressed as present worth	(3)/(4)	10 ⁶ BTUs Consumption/ Yr E	% Energy Reduction of Measure R	(6) Annual Consumption Bldg. Square Footage BTU/SF/Yr	Cumula- tive % Reduc- tion	First Cost of Measure (\$1000)	Total Construc- tion Cost (10) + ECC (\$1000).
, 1. Insulate Walls	258	48.	5.38	3,511	6.8	156,218	.6.8	14.2	956.6
2. Storm Windows	113	25.	4.52	3,398	3.0	151,190	9.8	2.8	959.4
3. Insulate Ceiling	1,383	309.	4.47	2,015	36.7	89,655	46.5	15.5	974.9
4. Solar Domestic HW	39	57.	.68	1,976	1.0	87,920	47.5	10.1	985



BUILDING RR-3

	. MAR	INE CORPS	BASE DIN	NING FACI	LITY MODERNIZA	TION (P-697	') 1 JUI	Y 80		
		I	$E75 = 3769 \times 1$	0 ⁶ BTU/Y	r (Total annual	L energy co	nsumption, 7	5)		
	E Current =	1976 x 1	0 ⁶ BTU/Yr (Tot	tal annua	al energy consu	mption inco	orporating cu	irrent c	riteria)	
	R = (1 - (E	Current/	E75)) 100 =	47.5 (Per exi	ccent reduction Isting situatio	in energy n)	consumption	current	year vs.	
		ECC=	657,400(Estima	ated cons	struction cost	for curren	t criteria)			
	Barrels of O	il Equiva	lent (B.O.E.)	= 307	*(Barrels of F 5,825,400 BT	uel Oil Sa U/B.O.E.	ved, Current	Design	vs. 1975)	
	(1) (2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Pri	ority Description Of Measure	10 ⁶ BTUs Saved/Yr	Life Cycle Cost (\$1000) Expressed as present worth	(3)/(4)	10 ⁶ BTUs Consumption/ Yr E	% Energy Reduction of Measure R	(6) Annual Consumption Bldg. Square Footage BTU/SF/Yr	Cumula- tive % Reduc- tion	First Cost of Measure (\$1000)	Total Construc- tion Cost (10) + ECC (\$1000).
1.	, Insulate Walls	258	48.0	5.38	3,511	6.8	156,218	6.8	14.2	739.6
2.	Storm Windows	113	25.	4.52	3,398	3.0	151,190	9.8	2.8	742.4
3.	Insulate Ceiling	1,383	309.	4.47	2,015	36.7	89,655	46.5	15.5	757.9
4.	Solar Domestic HW	39	57.0	.68	1,976	1.0	87,920	47.5	10.1	768



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BUILDING BA 103

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	MAR	INE CORPS	BASE DIN	NING FACI	LITY MODERNIZA	TION (P-697) 1 JUI	Y 80		
	E Current =	1157 x 1	E75 = 2054 x 1 0 ⁶ BTU/Yr (Tot	10 ⁶ BTU/Y tal annua	r (Total annua 1 energy consu	l energy co mption inco	nsumption, 7 prporating cu	5) irrent ci	riteria)	
	R = (1 - (E	Current/	E75)) 100 = 4	43.8 (Per exi	cent reduction sting situatio	in energy n)	consumption	current	year vs.	
	Barrels of O	ECC= il Equiva	578,400(Estima lent (B.O.E.)	ated cons = 153	truction cost *(Barrels of F 5,825,400 BT	for current Tuel Oil Sav TU/B.O.E.	criteria) ved, Current	Design ,	vs. 1975)	•
	(1) (2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Pric	ority Description Of Measure	10 ⁶ BTUs Saved/Yr	Life Cycle Cost (\$1000) Expressed as present worth	(3)/(4)	10 ⁶ BTUs Consumption/ Yr E	% Energy Reduction of Measure R	(6) Annual Consumption Bldg. Square Footage BTU/SF/Yr	Cumula- tive % Reduc- tion	First Cost of Measure (\$1000)	Total Construc- tion Cost (10) + ECC (\$1000).
	, Inculate Walls	129	. 24.	5.38	1,925	6.3	148,476	6.3	7.2	641.6
1. 2	Insulate Ceiling	692	154.	4.49	1,233	33.7	95,102	40.0	6.0	647.6
2 ·	Storm Windows	57	23.	2.47	1,176	2.8	90,706	42.8	1.4	649
4.	Solar Domestic HW	19	28.	0.67	1,157	1.0	89,240	43.8	5.0	654



BUILDING 1209; BUILDING M424	DA	1 JULY 80
ACTIVITY (None and Location) MARINE CORPS BASE, CAMP LEJEUNE, NORTH CAROLINA		
PROJECT TITLE		P NO.
DINING FACILITIES MODERNIZATION DESCRIPTION OF ALTERNATIVES		P-697
DESCRIPTION OF ALTERNATIVES	1	

PROJECT COST PROJECTIONS BY ALTERNATIVES

DESCRIPTION AND YEAR	COS	TS (\$)	DISCOUNT	PRESENT	
	ONE TIME RECURRING		FACTOR	VALUE (S)	
NYESTMENT. Elec. IPERATIONS Steam (oil) WINTENANCE PERSONNEL TERMINAL VALUE DTHER:	\$101,181	\$51,794 25,502 2,321	18.049 20.050 9.524	\$101,181 934,830 511,315 22,105	

ALTERMATIVE B Variable air terminal A/C and Fin. R	volume with r ad.	eheat, package	d ÉCOXI	DHICYRS.
DESCRIPTION AND YEAR	COST	5 (\$)	DISCOUNT	PRESENT
	ONE TIME	RECURAING	FACTOR	VALUE (\$)
INVESTMENT OPERATIONS HAINTEMANCE PERSONNEL - TERMINAL VALUE OTHER:	\$163 , 601	\$52,183 25,372 2,453	18.049 20.050 9.524	\$163,601 941,851 508,709 23,362
TOTAL PRESENT VALUE ALTERNATIV REMARKS Alternative "A Life Cycle Cos	^{E B} · ^s 1,637, " is feasible	523 ÷ _ ⁰	$\frac{1}{9.524} = \frac{1}{1}$	$\frac{1}{\$171,936}$ $\frac{637,523}{569,431} = 1.04$

Alternative "A" is feasible. Life Cycle Cost Alt. A - 1,569,431 Alt. B - 1,637,523 L.C.C. - 68,092 - 68 x 10



BUILDING 1209 and BUILDING M424 - VTCV/VAV DESIGN ANALYSIS

- 1. Investment Costs: From back-up estimates (PED level).
- 2. Energy Cost: FY 80 FY 81 FY 82 Steam (0i1) - \$9.27/MIL x 1.04 x 1.14 x 1.14 = \$12.53/MIL BTU Elec. - \$0.0296 x 1.04 x 1.13 x 1.13 = \$0.04/KWH
- 3. Operating Expenses: From Energy Analysis

Alternate A (Page 18) Elec. - 1,294,853 KWH x \$0.04/KWH = \$51,794 Steam - 20,353 x 0.1 MIL BTUS/THERM x \$12.53/MIL = \$25,502 BTU

Alternate B (Page 19) Elec. - 1,304,568 KWH x \$0.04/KWH = \$52,183 Steam - 20,249 THERMS x 0.1 MIL BTUS/THERM x 12.53/MIL = \$25,372 BTU

4. Maintenance:

Alternate A - \$2,321 Alternate B - \$2,453

5. Uniform Annual Cost = TOTAL PRESENT VALUE 0% INFL. @ 10% DISC. FACTOR



CONVICT ANALISIS OF SHORE FACIL		Providence Providence	DATE	
BUILDING 1209; BUILDING	M424		UNIE	L JULY 80
ACTIVITY (Name and Location) MARINE CORPS BASE, CAMP	LEJEUNE, NOP	RTH CAROLINA		
DINING FACILITIES MODER	NTZATION		P	NO. D 607
DESCRIPTION OF ALTERNATIVES				F=097
				-
PROJECT COST PROJECTIONS BY AL	TERNATIVES	an a		
ALTERNATIVE A Storm Window	S		ECONO LIFE	DHIC 25 YR
DESCRIPTION AND YEAR	CO ONE TIME	STS (S) RECURRING	DISCOUNT FACTOR	PRESENT VALUE (S)
INVESTMENT.	\$4,293			\$4 293
Steam	1.,225	0		Y7,275 .
Elec.		0	Contraction of the	the design of the
HAINTENANCE		The states of the second		
PERSONNEL				
TERMINAL VALUE				
				· ·
		and the second states for the ball the second second	and the second	
TOTAL PRESENT VALUE ALTERNATIV	EA-5 4,293	ام 3 ÷ 9	scount factor 524 =	UNIFORM ANNUAL CO \$451
TOTAL PRESENT VALUE ALTERNATIV	EA.S 4,293	ام 9	SCOUNT FACTOR .524 =	UNIFORM ANNUAL CO \$451
TOTAL PRESENT VALUE ALTERNATIV ALTERNATIVE B No Storm W1:	e • • • 4,293 ndows	3 ÷ 9	1 SCOUNT FACTOR 0.524 = ECOND LIFE	 UNIFORM ANNUAL CO \$451 ніс ² 25 укз.
TOTAL PRESENT VALUE ALTERNATIV	e A · s 4,293 ndows	D1 3 ÷ 9 T5 (\$) ■ RECURAING	1 SCOUNT FACTOR 0.524 = ECOND LIFE DISCOUNT FACTOR	HIC 25 YRS.
TOTAL PRESENT VALUE ALTERNATIV	E A - S _ 4,293 adows	DI 3 ÷ 9 TS (S) RECURAING	I SCOUNT FACTOR J.524 = ECOND LIFE DISCOUNT FACTOR	HIC 25 YRS.
TOTAL PRESENT VALUE ALTERNATIV ALTERNATIVE B NO STORM WI DESCRIPTION AND YEAR INVESTMENT	E A - 5 4,293 ndows COS ONE TIME 0	DI DI DI DI DI DI DI DI DI DI	LIFE	HIC 25 YRS.
TOTAL PRESENT VALUE ALTERNATIV ALTERNATIVE B NO Storm Wi DESCRIPTION AND YEAR INVESTMENT OPERATIONS Steam Savings Elec. Savings	E A - 5 4,293 ndows COS ONE TIME O	DI DI DI P P P P P P P P P P P P P	1 SCOUNT FACTOR 0.524 = ECOND LIFE DISCOUNT FACTOR 20.05 18.0/9	UNIFORM ANNUAL CO \$451 HIC" 25 YRS. PRESENT VALUE (\$) 0 \$28,912 8,176
TOTAL PRESENT VALUE ALTERNATIV ALTERNATIVE B NO STORM WIT DESCRIPTION AND YEAR INVESTMENT OPERATIONS Steam Savings Elec. Savings HAINTENANCE	E A - 5 4,293 adows Cos ONE TIME 0	3 ÷ 9 T5 (5) RECURAING \$1,442 453	1 SCOUNT FACTOR 0.524 = ECONO LIFE DISCOUNT FACTOR 20.05 18.049	UNIFORM ANNUAL CO \$451 HIC" 25 YRS. PRESENT VALUE (\$) 0 \$28,912 8,176
TOTAL PRESENT VALUE ALTERNATIV ALTERNATIVE B NO STORM WI DESCRIPTION AND YEAR INVESTMENT OPERATIONS Steam Savings Elec. Savings HAINTENANCE	E A - 5 4,293 adows COS ONE TIME 0	DI 3 ÷ 9 T5 (5) RECURAING \$1,442 453	1 SCOUNT FACTOR 0.524 = ECOND LIFE DISCOUNT FACTOR 20.05 18.049	UNIFORM ANNUAL CO \$451 HIC 25 YRS. PRESENT VALUE (\$) 0 \$28,912 8,176
TOTAL PRESENT VALUE ALTERNATIV ALTERNATIVE B NO STORM WIN DESCRIPTION AND YEAR INVESTMENT OPERATIONS Steam Savings Elec. Savings MAINTENANCE PERSONNEL	E A - 5 4,293 ndows COS ONE TIME 0	D1 3 ÷ 9 T5 (5) RECURRING \$1,442 453	1 SCOUNT FACTOR 0.524 = ECOND LIFE DISCOUNT FACTOR 20.05 18.049	UNIFORM ANNUAL CO \$451 HIC" 25 YRS. PRESENT VALUE (\$) 0 \$28,912 8,176
TOTAL PRESENT VALUE ALTERNATIV ALTERMATIVE B NO STORM WIT DESCRIPTION AND YEAR INVESTMENT OPERATIONS Steam Savings Elec. Savings HAIHTENANCE PERSONNEL TERMIMAL VALUE	E A - 5 _ 4,293 adows COS ONE TIME 0	3 ÷ 9 T5 (5) RECURAING \$1,442 453	1 SCOUNT FACTOR 0.524 = ECONO LIFE DISCOUNT FACTOR 20.05 18.049	UNIFORM ANNUAL CO \$451 HIC" 25 YRS. PRESENT VALUE (\$) 0 \$28,912 8,176
TOTAL PRESENT VALUE ALTERNATIV ALTERNATIVE B NO STORM WIT DESCRIPTION AND YEAR INVESTMENT OPERATIONS Steam Savings HAINTENANCE PERSONNEL TERMIMAL VALUE OTHER:	E A - 5 4,293 ndows COS ONE TIME 0	D1 3 ÷ 9 T5 (5) RECURRING \$1,442 453	1 SCOUNT FACTOR 0.524 = ECOND LIFE DISCOUNT FACTOR 20.05 18.049	UNIFORM ANNUAL CO \$451 HIC" 25 YRS. PRESENT VALUE (\$) 0 \$28,912 8,176
TOTAL PRESENT VALUE ALTERNATIV ALTERNATIVE B NO STORM WIT DESCRIPTION AND YEAR INVESTMENT OPERATIONS Steam Savings Elec. Savings HAINTENANCE PERSONNEL TERNIMAL VALUE OTHER: TOTAL PRESENT VALUE ALTERNATIV	E A - S _ 4,293 adows Cos ONE TIME 0 Cos 0 Cos 0 0 0 0 0 0 0 0 0 0 0 0 0	D1 3 ÷ 9 T5 (5) RECURRING \$1,442 453 0 0 0 0	SCOUNT FACTOR 20.05 1 ECOND LIFE 20.05 18.049 SCOUNT FACTOR 524	UNIFORM ANNUAL CO \$451 HIC" 25 YRS. PRESENT VALUE (\$) 0 \$28,912 8,176 UNIFORM ANNUAL CO
TOTAL PRESENT VALUE ALTERNATIV ALTERMATIVE B NO STORM WIT DESCRIPTION AND YEAR INVESTMENT OPERATIONS Steam Savings Elec. Savings HAINTENANCE PERSONNEL TERNIMAL VALUE OTHER: TOTAL PRESENT VALUE ALTERNATIV	E A - 5 4,293 adows COS ONE TIME 0 COS ONE TIME 0 COS ONE TIME 0	$\frac{3}{\div 9}$ $\frac{1}{3}$ $\frac{1}{5}$	1 SCOUNT FACTOR 0.524 = ECOND LIFE DISCOUNT FACTOR 20.05 18.049 SCOUNT FACTOR .524	UNIFORM ANNUAL CO \$451 HIC ² 25 YRS. PRESENT VALUE (\$) 0 \$28,912 8,176 UNIFORM ANNUAL CO \$3,894
TOTAL PRESENT VALUE ALTERNATIV ALTERNATIVE B NO STORM WIT DESCRIPTION AND YEAR INVESTMENT OPERATIONS Steam Savings Elec. Savings MAINTENANCE PERSONNEL TERMINAL VALUE OTHER: TOTAL PRESENT VALUE ALTERNATIV REMARKS Alternative "A"	E A · S 4,293 adows COS ONE TIME 0 COS ONE TIME 0 COS ONE TIME 0 COS ONE TIME 0 COS COS COS COS COS COS COS COS	$\frac{1}{3} \qquad \begin{array}{c} & & & \\ & & \\ \hline & & \\ \hline \\ \hline \\ \hline \\ \hline \\ \hline$	1 SCOUNT FACTOR 0.524 ECOND LIFE DISCOUNT FACTOR 20.05 18.049 SCOUNT FACTOR .524 = al present val	UNIFORM ANNUAL CO \$451 HIC ² 25 YRS. PRESENT VALUE (\$) 0 \$28,912 8,176 UNIFORM ANNUAL CO \$3,894 Lue than "B".
TOTAL PRESENT VALUE ALTERNATIV ALTERNATIVE B NO STORM Wind DESCRIPTION AND YEAR INVESTMENT OPERATIONS Steam Savings Elec. Savings HAINTENANCE PERSONNEL TERNIMAL VALUE OTHER: TOTAL PRESENT VALUE ALTERNATIV REMARKS Alternative "A" Life Cycle Cost	E A - 5 4,293 adows Cos ONE TIME 0 E B - 5 37,088 Is feasible of	$\frac{1}{3} \qquad \stackrel{\text{D1}}{\div 9}$ $\frac{1}{3} \qquad \stackrel{\text{P1}}{\div 9}$ $\frac{1}{3} \qquad \stackrel{\text{P1}}{\leftarrow 9}$ $\frac{1}{3} \qquad \stackrel{\text{P1}}{\leftarrow 9}$ Hue to lower tot	1 SCOUNT FACTOR 0.524 ECOND LIFE DISCOUNT FACTOR 20.05 18.049 SCOUNT FACTOR .524 al present val 37	UNIFORM ANNUAL CO \$451 HIC ² 25 YRS. PRESENT VALUE (\$) 0 \$28,912 8,176 UNIFORM ANNUAL CO \$3,894 Lue than "B".
TOTAL PRESENT VALUE ALTERNATIV ALTERMATIVE B NO STORM WIT DESCRIPTION AND YEAR INVESTMENT OPERATIONS Steam Savings Elec. Savings HAIHTENANCE PERSONNEL TERNIMAL VALUE OTHER: TOTAL PRESENT VALUE ALTERNATIV REMARKS Alternative "A" Life Cycle Cost Alt. A - 4,293	E A - 5 4,293 adows COS ONE TIME 0 E B - 5 37,088 is feasible of	$\frac{1}{3} \qquad \div \qquad 9$ $\frac{1}{3} \qquad \div \qquad 9$ $\frac{1}{3} \qquad \vdots \qquad 9$ $\frac{1}{3} \qquad \vdots \qquad 9$ $\frac{1}{3} \qquad \vdots \qquad 0$	$\frac{1}{500000000000000000000000000000000000$	UNIFORM ANNUAL CO \$451 HIC ² 25 YRS. PRESENT VALUE (\$) 0 \$28,912 8,176 UNIFORM ANNUAL CO \$3,894 Lue than "B". .088 .293 = 8.64
TOTAL PRESENT VALUE ALTERNATIV ALTERMATIVE B NO STORM Wind DESCRIPTION AND YEAR INVESTMENT OPERATIONS Steam Savings Elec. Savings HAINTENANCE PERSONNEL TERNIMAL VALUE OTHER: TOTAL PRESENT VALUE ALTERNATIV REMARKS Alternative "A" Life Cycle Cost Alt. A - 4,293 Alt. B - 37,088	E A - 5 4,293 adows COS ONE TIME 0 E B - 5 37,088 is feasible of	$\frac{3}{\div 9}$ $\frac{5}{9}$ $\frac{75 (5)}{\text{RECURAING}}$ $\frac{$1,442}{453}$ $\frac{$1,442}{453}$ $\frac{$1,442}{9}$ Hue to lower tot	$\frac{1}{\frac{524}{524}} = \frac{1}{\frac{524}{524}}$	UNIFORM ANNUAL CO \$451 HIC 25 YRS. PRESENT VALUE (\$) 0 \$28,912 8,176 UNIFORM ANNUAL CO \$3,894 Lue than "B". ,088 ,293 = 8.64
TOTAL PRESENT VALUE ALTERNATIV ALTERNATIVE B NO STORM Wind DESCRIPTION AND YEAR INVESTMENT OPERATIONS Steam Savings Elec. Savings HAINTENANCE PERSONNEL TERMINAL VALUE OTHER: TOTAL PRESENT VALUE ALTERNATIV REMARKS Alternative "A" Life Cycle Cost Alt. A - 4,293 Alt. B - 37,088 L.C.C 32,795 33 * 10	E A - 5 4,293 adows Cos ONE TIME 0 E B - 5 37,088 is feasible of	$\frac{1}{3} \qquad \div \qquad 9$ $\frac{1}{3} \qquad \div \qquad 9$ $\frac{1}{3} \qquad \vdots \qquad 9$	$\frac{1}{\frac{524}{524}} = \frac{1}{\frac{1}{524}}$	UNIFORM ANNUAL CO \$451 HIC ² 25 YRS. PRESENT VALUE (\$) 0 \$28,912 8,176 UNIFORM ANNUAL CO \$3,894 Lue than "B". .088 .088 = 8.64

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BUILDING 1209 and BUILDING M424 - STORMS

Total Window Area (Heating) = 1,596 SF (Cooling) = 1,281 SF Savings from Storm Windows

1. Winter Savings
Reduction in Infiltration x ∆T x 1.08 x SF Window
+ Reduction in Transmission x ∆T x SF Window
= 0.5(1.6 - 0.8) CFM/SF x (68 - 23) x 1.08 x 1,596 SF
+ (1.04 - 0.54) x (68 - 23) x 1,596 SF
= 66,936 BTUH
Annual Savings in BTU's
<u>2901 HDD x 24 x 66,936</u>
(68 - 23) x .90(Effy.) = 115.07 MIL BTU/YR.

Annual Dollar Savings \$12.53/MIL BTUS x 115.07 MIL BTU/YR. = \$1,442

2. Summer Savings Reduction in Infiltration x \triangle H x 4.45 x SF Window + Reduction in Transmission x \triangle T x SF Window = 0.5(0.8 - 0.4) CFM/SF x 12. x 4.45 x 1,281 SF + (1.04 - 0.54) x (90 - 78) x 1,281 SF = 21,367 BTUH Annual Savings in BTU's <u>1810 CDD x 21,367 BTUH</u> 3,413 KWH/BTU = 11,331 KWH or 38.67 MIL BTU/YR Annual Dollar Savings

\$0.04/KWH x 11,331 KWH = \$453

- 3. Total Annual Savings from Storm Windows
 \$1,442 + \$453 = \$1,895
- 4. Cost of Storm Windows Jan 80 Jun 80 Jan 82 \$2.27/SF x 1.036 x 1.143 = \$2.69 represents cost to add storms to proposed cost for screens under equipment section. Installation Cost of Storm Windows 1,596 SF x \$2.69/SF = \$4,293
- 5. Discount Factor Use 20.050 for 25 years for oil, 8%; and use 18.049 for 25 years for electricity, 7%.



interest of onone fac	ILITY		DATE	
UILDING M424	·			1 JULY 80
ARINE CORPS BASE, CAN	MP LEJEUNE, NORT	'H CAROLINA	1.1.1	
ROJECT TITLE	FRNIZATION	a de la com	· · · · · · · · · · · · · · · · · · ·	P NO.
ESCRIPTION OF ALTERNATIVES	SIGURATION			r * 037
ROJECT COST PROJECTIONS BY	ALTERNATIVES	andere en		
LTERMATIVE & Add insulat	ion above ceilin	ng	ECO LIF	ноніс 25 YRS.
DESCRIPTION AND YEAR	COST	S (\$)	DISCOUNT	PRESENT
NYESTHENT	\$17 437			\$17.437
PERATIONS	Ş17,457			
AINTENANCE				
FRSONNEL				
FRAINAL VALUE	a service and		and states	
THER:		and have been a	1	
			SCOUNT FACTOR	UNIFORM ANNUAL COST
TOTAL PRESENT VALUE ALTERNAT	TIVE A - \$ 17,437	÷	9.524	= \$1,831
			5005	
LTERMATIVE B Continue to	operate with cu	irrent losses	ECON LIFE	OHIC" 25 YRS.
DESCRIPTION AND YEAR	operate with cu costs	(5) RECURAING	DISCOUNT FACTOR	PRESENT VALUE (\$)
DESCRIPTION AND YEAR	operate with cu costs ONE TIME 0	(S) RECURAING	DISCOUNT FACTOR	OHIC" 25 YRS. PRESENT VALUE (\$) O
DESCRIPTION AND YEAR NVESTMENT PERATIONS FLOC	Operate with cu COSTS ONE TIME 0	(5) RECURAING \$8,305 6 457	DISCOUNT FACTOR 20.05	OHIC" 25 YRS. PRESENT VALUE (\$) 0 \$166,515 116,542
DESCRIPTION AND YEAR NVESTHENT PERATIONS Elec. AINTENANCE	operate with cu costs one time 0	(5) RECURRING \$8,305 6,457	DISCOUNT FACTOR 20.05 18.049	DHIC 25 YRS. PRESENT VALUE (S) 0 \$166,515 116,542
LTERMATIVE B <u>Continue to</u> DESCRIPTION AND YEAR NVESTMENT PERATIONS ELEC. AINTENANCE ERSONNEL	Operate with cu COSTS ONE TIME O	(5) RECURAING \$8,305 6,457	DISCOUNT FACTOR 20.05 18.049	OHIC" 25 YRS. PRESENT VALUE (\$) 0 \$166,515 116,542
LTERMATIVE B <u>Continue to</u> DESCRIPTION AND YEAR NVESTMENT PERATIONS Elec. AINTEMANCE ERSONNEL ERNIMAL YALUE	Operate with cu COSTS ONE TIME 0	(5) RECURAING \$8,305 6,457	DISCOUNT FACTOR 20.05 18.049	DHIC" 25 YRS. PRESENT VALUE (\$) 0 \$166,515 116,542
LTERNATIVE B <u>Continue to</u> DESCRIPTION AND YEAR NVESTMENT PERATIONS Elec. AINTENANCE ERSONNEL ERMINAL VALUE THER:	operate with cu COSTS ONE TIME 0	(5) RECURAING \$8,305 6,457	DISCOUNT FACTOR 20.05 18.049	DHIC" 25 YRS. PRESENT VALUE (\$) 0 \$166,515 116,542
DESCRIPTION AND YEAR DESCRIPTION AND YEAR INVESTMENT DPERATIONS ELEC. MAINTENANCE VERSONNEL TERMINAL VALUE ITHER: OTAL PRESENT VALUE ALTERNAT	Operate with cu COSTS ONE TIME 0 1 1 VE B - 5 283,057	(5) RECURAING \$8,305 6,457 	DISCOUNT FACTOR 20.05 18.049 SCOUNT FACTOR 9.524 =	UNIFORM ANNUAL COST \$29,720
LTERMATIVE B <u>Continue to</u> DESCRIPTION AND YEAR NVESTMENT PERATIONS ELEC. AINTEMANCE ERSONNEL ERMINAL VALUE THER: OTAL PRESENT VALUE ALTERNAT EMARKS Alternative WAL	Operate with cu COSTS ONE TIME 0 CONE TIME 0 CONE TIME 0 COSTS COSTS 0 COSTS C	(5) RECURRING \$8,305 6,457 01 	COUNT FACTOR 20.05 18.049 SCOUNT FACTOR 9.524 =	DHIC" 25 YRS. PRESENT VALUE (\$) 0 \$166,515 116,542 UNIFORM ANNUAL COST \$29,720
DESCRIPTION AND YEAR NVESTMENT PERATIONS ELEC. MINTENANCE ERSONNEL THER: OTAL PRESENT VALUE ALTERNAT NEMARKS Alternative "A' Life Cycle Cost	Operate with cu COSTS ONE TIME 0 1/VE B - 5 283,057 " is feasible du t	(5) RECURAING \$8,305 6,457 \div The to lower tot	COUNT FACTOR 20.05 18.049 SCOUNT FACTOR 9.524 = cal present va	DHIC" 25 YRS. PRESENT VALUE (\$) 0 \$166,515 116,542 UNIFORM ANNUAL COST \$29,720 alue.
DESCRIPTION AND YEAR NVESTMENT Steam Elec. MINTENANCE ERSONNEL ERMINAL VALUE THER: OTAL PRESENT VALUE ALTERNAT NEMARKS Alternative "A' Life Cycle Cost Alt. A - \$ 17,4	Operate with cu	(5) RECURRING \$8,305 6,457 	ECON LIFE DISCOUNT FACTOR 20.05 18.049 SCOUNT FACTOR 9.524 = Cal present value S.I.R. = $\frac{283}{17}$	DHIC" 25 YRS. PRESENT VALUE (\$) 0 \$166,515 116,542 UNIFORM ANNUAL COST \$29,720 alue. $\frac{057}{437} = 16.23$
DESCRIPTION AND YEAR DESCRIPTION AND YEAR INVESTMENT Steam PERATIONS Elec. MAINTENANCE PERSONNEL TERMIMAL YALUE ITHER: TOTAL PRESENT VALUE ALTERNAT REMARKS Alternative "A" Life Cycle Cost Alt. A - \$ 17,4 Alt. B - 283,0 L C C - 265 4	Operate with cu COSTS ONE TIME 0 IVE B · S 283,057 I is feasible du t 437 057 620	(5) RECURAING \$8,305 6,457 	ECON LIFE DISCOUNT FACTOR 20.05 18.049 SCOUNT FACTOR 9.524 = cal present value S.I.R. = $\frac{283}{17}$	$\frac{25}{\text{VRS.}}$ $\frac{25}{\text{VRS.}}$ $\frac{25}{\text{VRS.}}$ $\frac{1000}{1000}$ $\frac{1000}{1$

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BUILDING M424

1. Additional insulation above ceiling Energy Saved: Winter = (^UExist. - ^UNew) x ∆T x Roof Area SF over heated space Summer = (^UExist. - ^UNew) x Solar Gain Factor x Roof Area SF over A/C space $U_{\text{Exist.}} = 0.44 \text{ BTU/HR}^{\circ} \text{F.SF}$ $U_{\text{New}} = 0.05 \text{ BTU/HR}^{\circ} \text{F.SF}$ From Trace Heat Loss with UNew (.05) Heat Loss with Exist. (.44) = 49,427 BTUH 49,427 x .44 = 434,958 BTUH .05 Winter Energy Saved = 385,531 BTUH Annual Savings in BTU's 2901 HDD x 24 x 385,531 BTUH = 662.77 MIL BTU/YR. (68 - 23) x .90 (Effy.) Annual Dollar Savings \$12.53/MIL BTUS x 662.77 MIL BTUS/YR. = \$8,305 From Trace Heat Gain with UNew (.05) Heat Gain with Exist. (.44) = 39,027 BTUH 39,027 x .44 = 343,438 BTUH .05 = 304,411 BTUH Summer Energy Saved Annual Savings in BTU's 1810 CDD x 304,411 BTUH = 161,437 KWH/YR. 3,413 KWH/BTU or 551 MIL BTU/YR. Annual Dollar Savings \$0.04/KWH x 161,437 KWH = \$6,457



UNUMIC ANALISIS OF SHURE FAC	DATE	DATE			
ACTIVITY (Nere and Location		1 JULY 80			
MARINE CORPS BASE, CA	MP LEJEUNE, NOR	TH CAROLINA			
DINING FACILITIES MOD	ERNIZATION		P	P_607	
DESCRIPTION OF ALTERNATIVES		Contraction of the second	<u>·</u>	14057	
				r	
				-	
PROJECT COST PROJECTIONS BY	ALTERNATIVES			and American a statistical factor	
ALTERNATIVE & Add insulat	Add insulation above ceiling			ECONOMIC 25 YRS.	
DESCRIPTION AND YEAR	COS ONE TIME	TS (S)	DISCOUNT FACTOR	PRESENT YALUF (S)	
INVESTMENT	\$14 670			\$1/ 670	
OPERATIONS	\$14,670			914,070 .	
HAINTENANCE		and the second second			
DEDROVALI					
TENUNAL VILLE		and the second second	Contraction of the second		
OTHER:		Carlos States	e Standard		
	1				
TOTAL PRESENT VALUE ALTERNA	TIVE A - 5 14,670) ÷ _ 9	SCOUNT FACTOR	\$ 1,540	
ALTERMATIVE B Continue to	operate with c	urrent losses	ECON LIFE	OHIC YRS.	
DESCRIPTION AND YEAR	COSTS (S)		DISCOUNT	PRESENT	
	ONE TIME	RECURAING	FACTOR	VALUE (\$)	
Steam	0	\$6,988	20.05	0 \$140 100	
OPERATIONS Elec.		5,434	18.049	98,078	
HAINTENANCE		Contraction of the	1. Carlos		
PERSONNEL	a second and a second second				
TERMINAL VALUE		1.1.1.1.1.2.0.1			
OTHER:					
TOTAL PRESENT VALUE ALTERNAT	IVE B · \$ 238,18	7 <u>÷</u> ^{D1}	9.524 =	UNIFORM ANNUAL COST \$25,009	
REMARKS Alternative "A	" is feasible d	ue to lower tot	al present va	lue.	
Life Cycle Cos	t		238.	187 16 24	
Alt. $A = \$ 14$, Alt. $B = 238$	670 187		$S.I.R. = \frac{14}{14}$	670 = 16.24	
· L.C.C 223,	517 3				
- 224	x 10	Concernance		Facl 7	

Encl 7



BUILDING 1209

1. Additional insulation above ceiling Energy Saved: Winter = (^UExist. - ^UNew) x AT x Roof Area SF over heated space Summer = (^UExist. - ^UNew) x Solar Gain Factor x Roof Area SF over A/C space $U_{\text{New}} = 0.05 \text{ BTU/HR}^{\circ} \text{F.SF}$ $U_{\text{Exist.}} = 0.44 \text{ BTU/HR}^{\circ} \text{F.SF}$ From Trace (for Bldg. M424) Heat Loss with UNew (.05) 49,427 BTUH Heat Loss with UExist. (.44) 49.427 x .44 434,958 BTUH .05 Winter Energy Saved 385,531 BTUH Annual Savings in BTU's 2901 HDD x 24 x 385,531 BTUH 662.77 MIL BTU/YR. (68 - 23) x .90 (Effy.) or 12,736SF 15,136SF x 662.77 557.78 MIL BTU/YR. for Bldg. 1209 Annual Dollar Savings \$12.53/MIL BTUS x 557.68 MIL BTUS/YR. = \$6,988 From Trace Heat Gain with UNew (.05) Heat Gain with Exist. (.44) 39,027 BTUH 39,027 x .44 343,438 BTUH .05 = 304,411 BTUH Summer Energy Saved Annual Savings in BTU's 1810 CDD x 304,411 BTUH = 161,437 KWH/YR. 3,413 KWH/BTU or $\frac{12,736SF}{15,136SF} \times 161,437$ = 135,839 KWH/YR. or 464 MIL BTU/YR. Annual Dollar Savings = \$5,434 \$0.04/KWH x 135,839 KWH



BUILDING 1209. BUILD		strates in the states	DATE	
bornbrid 1207, bornbr	ING M424		1	JULY 80
CTIVITY (Name and Location) MARINE CORPS BASE, CAM	IP LEJEUNE, NOR	TH CAROLINA		
DINING FACILITIES MODE ESCRIPTION OF ALTERNATIVES	RNIZATION		P ,	P ~ 697
				-
PROJECT COST PROJECTIONS BY	ALTERNATIVES			
LIERMATIVE A Insulate ext	ECONO LIFE	nic 25 yrs.		
DESCRIPTION AND YEAR	COS	TS (\$)	DISCOUNT	PRESENT
NVESTUENT	0NE TIME	RECURAING	FACTOR	VALUE (\$)
PERATIONS	<i>423,232</i>			923,252
LINTENANCE		1.4		
ERSONNEL				
THER:				
TOTAL PRESENT VALUE ALTERNAT	TIVE A - 5 23,232	ہ ÷ 9	SCOUNT FACTOR	UNIFORM ANNUAL COST \$2,439
LTERMATIVE B Continue to	operate with c	urrent losses	ECONDH LIFE	IC" 25 YRS.
DESCRIPTION AND YEAR	COST	S (S) RECURRING	DISCOUNT	PRESENT VALUE (\$)
NVESTHENT		\$2.468	20.05	\$49.483
Elec.		882	18.049	15,919
AINTENANCE	C. S. Sandar	The state of the second		
ERSONNEL				n frankriger om sån
ERMINAL VALUE				an a
and the second second statistical second				
THER:	Second and the second second second	. D	ISCOUNT FACTOR	UNIFORM ANNUAL COST
OTAL PRESENT VALUE ALTERNAT	IVE B - 5 65,40	2 - 9	.524 -	<i>vvvvvvvvvvvvv</i>

4 April

A CAR AND A


BUILDING 1209 and BUILDING M424

2. Additional insulation in walls Energy Saved: Winter = (^UExist. - ^UNew) x ∆T x Wall Area SF across heated space Summer = (U Exist. - U New) x Solar Gain Factor x Wall Area SF across A/C space U_{Exist.} = 0.35 BTU/HR^oF.SF U_{New} = 0.15 BTU/HR^oF.SF From Trace Heat Loss with UNew (.15) Heat Loss with Exist. (.35) = 85,932 BTUH 85,932 x .35 = 200,508 BTUH .15 = 114,575 BTUH Energy Saved for Heating Annual Energy Savings 2901 HDD x 24 x 114,575 BTUH = 196.97 MIL.BTU/YR. (68 - 23) x .90(Effy.) Annual Dollar Savings \$12.53/MIL BTUS x 196.97 MIL BTUS/YR. = \$2,468 From Trace Heat Gain with UNew (.15) Heat Gain with Exist. (.35) 31,166 BTUH 31,166 x .35 72,721 BTUH .15 Energy Saved for Cooling 41,555 BTUH Annual Energy Savings 1810 CDD x 41,555 BTUH 22,038 KWH/YR 3.413 or 75.22 MIL BTU/YR.

Annual Dollar Savings \$0.04/KWH x 22,038 KWH = \$882



ONOMIC ANALYSIS OF SHORE FACILI		1.	DATE	
BUILDING 1209 and BUILD	LNG M424		1	JULY 80
MARINE CORPS BASE, CAMP	LEJEUNE, NORT	H CAROLINA		
PROJECT TITLE	NTZATION		PI	D 607
DESCRIPTION OF ALTERNATIVES	NIZALION			P=097
				<u>.</u>
				-
		1999		
PROJECT COST PROJECTIONS BY AL	TERNATIVES			
ALTERNATIVE A Solar Domest	tic Hot Water		ECONO LIFE	41C 25 YRS.
DESCRIPTION AND YEAR	COST	rs (\$)	DISCOUNT	PRESENT
	ONE TIME	RECURRING	FACTOR	VALUE (\$)
INVESTHENT	18,125			18,125 .
OPERATIONS Oil (Steam)		244	80.23	19,581
HAINTEHANCE		and the second second		
PERSONNEL				
		and the second	and the second	Markey of the South
ATHER		a sel segura a	Section and states	
OTHER:			a la constantina de la	
TOTAL PRESENT VALUE ALTERNATIV	EA. 3 37,70	601	SCOUNT FACTOR	UNIFORM ANNUAL COST
		·		
Conventional	Steam		ECONON	1°C 25 YBC
ALTERNATIVE B			LIFE	163.
DESCRIPTION AND YEAR	COSTS	5 (5)	DISCOUNT	PRESENT
	ONE TIME	RECORATING		
INVESTMENT				
OPERATIONS Oil (Steam)		1,976	80.23	158,534
HAINTENANCE				1 Alexandre
PERSONNEL				
TERMINAL- VALUE				
OTHER:				
		DI	SCOUNT FACTOR	UNIFORM ANNUAL COST
TOTAL PRESENT VALUE ALTERNATIV	Ев· s 158,5	34 ÷	=	
REMARKS				
Alternate A is feasible.	and the second fraction in the		стр _ 1	58,534 _ / 2
Life Cycle Cost			5.1.K. = -	37,706 = 4.2
Alt. A = $\$ 37,706$	and the second second	Inves	tment Cost 18	3,125 - 10 5
AIL. D 10,007	P	avback =	1 0 1	-722 = 10.5



BUILDING 1209 AND BUILDING M424 - SOLAR DHW SOLAR ANALYSIS

- 1. Investment Cost: Back-up estimate esc. to 1 January 82.
- 2. Energy Cost: FY 80 FY 81 FY 82
 Steam (0il) \$9.27/Mil BTU x 1.04 x 1.14 x 1.14 = 12.53/Mil BTU
- 3. Energy Consumption Alternate A Auxiliary Energy Required = 19.44 MBTU/YR* Cost of Aux. Energy 19.44 x 12.53 = \$244
 - Alternate B Conventional Energy Required = 157.68 MBTU/YR* Cost of Conventional Energy = 157.68 x 12.53 = \$1,976
- Discount Factor Use 80.23 for 25 years for oil from enclosure 14 (FY 82)
- 5. Payback = $\frac{\text{Investment Cost}}{\text{Annual Savings}} = \frac{18,125}{1,732} = 10.5$

From Enclosure 14 = Less Than 8 years.

* Refer to SOLCOST analysis



	DATE
BUILDING 508 and BUILDING RR3	1 JULY 80
MARINE CORPS BASE, CAMP LEJEUNE, NORTH CAROLINA	
PROJECT TITLE	P NO.
DINING FACILITIES MODERNIZATION	P-697
DESCRIPTION OF ALTERNATIVES See Below	,

PROJECT COST PROJECTIONS BY ALTERNATIVES

	COS	STS (\$)	1 01000	
DESCRIPTION AND YEAR	ONE TIME	RECURRING	FACTOR	VALUE (S)
INVESTMENT. OPERATIONS HAINTENANCE PERSONNEL TERMINAL VALUE OTHER:	\$87,249	\$51,836 21,914 2,213	18.049 20.050 9.524	\$ 87,249 935,588 439,376 21,077

ALTERMATIVE B Variable air volume with reheat ECONOHIC 25 YRS. air cooled chiller, packaged terminal A/C and Fin. Rad.

DESCRIPTION AND YEAR	COS	TS (S)	DISCOUNT	PRESENT
	ONE TIME	RECURAING	FACTOR	VALUE (\$)
INVESTMENT OPERATIONS Elec. Steam (oil) MAINTENANCE PERSONNEL TERMINAL VALUE OTHER:	\$145,487	\$52,801 21,891 2,397	18.049 20.050 9.524	\$145,487 953,005 438,915 22,829
TOTAL PRESENT VALUE ALTERNATIVE	· · · <u>1,560</u> ,	236 ÷	9.524 =	UNIFORM ANNUAL COST \$163,822
REMARKS Alternative "A" is Life Cycle Cost Alt. A - \$1,483,29 Alt. B - 1,560,23 L.C.C \$ 76,99 - 77 x 10	s feasible. 90 36 46		S.I.R. $=\frac{1}{1}$	$\frac{560,236}{483,290} = 1.05$



BUILDING 508; BUILDING RR-3 - VTCV/VAV DESIGN ANALYSIS

- 1. Investment Costs: From back-up estimates (PED Level).
- 2. Energy Cost: FY 80 FY 81 FY 82 Steam (Oil) \$9.27/MIL X 1.04 X 1.14 X 1.14 = \$12.53/MIL BTU BTU BTU Elec. \$0.0296 X 1.04 X 1.13 X 1.13 = \$0.04/KWH
- 3. Operating Expenses: From Energy Analysis

Alternate A: Elec. - 1,295,902 KWH X \$0.04/KWH = \$51,836 Steam - 17,489 Therms X 0.1 MIL BTU/THERM X \$12.53/MIL = \$21,914 BTU

Alternate B: Elec. - 1,320,024 KWH X \$0.04/KWH = \$52,801 Steam - 17,471 THERMS X 0.1 MIL BTU/THERM X 12.53/MIL = \$21,891 BTU

4. Maintenance:

Alternate A - \$2,213

Alternate B - \$2,397

5. Uniform Annual Cost = $\frac{\text{TOTAL PRESENT VALUE}}{0\% \text{ INFL. @ 10\% DISC. FACTOR}}$



ONOMIC ANALYSIS OF SHORE FAC	ILITY	1	DATE	
BUILDING 508; BUILDING	G RR-3	441000		1 JULY 80
MARINE CORPS BASE, CAN	1P LEJEUNE, NORT	TH CAROLINA		
PROJECT TITLE			P	NO.
DINING FACILITIES MODE DESCRIPTION OF ALTERNATIVES	CRNIZATION			P-697
PROJECT COST PROJECTIONS BY	ALTERNATIVES			an a
			And the second se	
ALTERMATIVE & Storm Windo	DWS		ECONO	DHIC 25 YPS.
			LIFE	
DESCRIPTION AND YEAR	ONE TIME	RECURRING	FACTOR	PRESENT VALUE (S)
INVESTMENT.	\$2,763			\$2,763
DPERATIONS				
HAINTENANCE				
PERSONNEL				
TERMINAL VALUE				요. 그 가격했는지
ITHER:	and see here		1 . Same and a general section of	
		1		UNLEDEM ANNUAL COST
TOTAL PRESENT VALUE ALTERNAT	IVE A - \$ 2,763	÷	9.524 =	290
				0.5
ALTERMATIVE B No Storm V	Vindows		ECONDI LIFE	HIC 25 YRS-
ALTERNATIVE B NO STORM V	Vindows	5 (5)	DISCOUNT	PRESENT
ALTERNATIVE B NO STORM V DESCRIPTION AND YEAR	Vindows COSTS ONE TIME	5 (S) RECURAING	DISCOUNT FACTOR	PRESENT VALUE (\$)
DESCRIPTION AND YEAR	COSTS ONE TIME	5 (5) RECURAING \$1,143	DISCOUNT FACTOR 20.05	PRESENT VALUE (\$) \$22,917
ALTERNATIVE B No Storm V DESCRIPTION AND YEAR INVESTMENT OPERATIONS	COSTS ONE TIME	\$ (\$) RECURAING \$1,143 254	DISCOUNT FACTOR 20.05 18.049	PRESENT VALUE (\$) \$22,917 4,584
ALTERNATIVE B No Storm W DESCRIPTION AND YEAR INVESTMENT OPERATIONS HAINTENANCE	COSTS ONE TIME	\$1,143 254	DISCOUNT FACTOR 20.05 18.049	PRESENT YRS. \$22,917 4,584
ALTERNATIVE B NO Storm W DESCRIPTION AND YEAR INVESTMENT OPERATIONS HAINTENANCE PERSONNEL	COSTS COSTS ONE TIME	\$ (5) RECURAING \$1,143 254	ECONDI LIFE 	PRESENT VALUE (\$) \$22,917 4,584
ALTERNATIVE B NO Storm W DESCRIPTION AND YEAR INVESTMENT OPERATIONS MAINTENANCE PERSONNEL TERMINAL VALUE	COSTS ONE TIME	\$1,143 254	ECONDI LIFE DISCOUNT FACTOR 20.05 18.049	PRESENT VALUE (\$) \$22,917 4,584
ALTERMATIVE B NO Storm W DESCRIPTION AND YEAR INVESTMENT OPERATIONS MAINTENANCE PERSONNEL TERMIMAL VALUE DTHER:	COSTS ONE TIME	\$1,143 254	DISCOUNT FACTOR 20.05 18.049	PRESENT VALUE (\$) \$22,917 4,584
ALTERMATIVE B NO Storm W DESCRIPTION AND YEAR INVESTMENT OPERATIONS MAINTENANCE PERSONNEL TERMINAL VALUE OTHER: TOTAL PRESENT VALUE ALTERNAT	COSTS ONE TIME ONE TIME	\$ (5) RECURAING \$1,143 254 L	DISCOUNT FACTOR 20.05 18.049	VNIFORM ANNUAL COST 2,886
DESCRIPTION AND YEAR DESCRIPTION AND YEAR INVESTMENT OPERATIONS MAINTENANCE PERSONNEL TERMINAL YALUE OTHER: TOTAL PRESENT VALUE ALTERNAT	COSTS ONE TIME IVE B - 3 27,501	5 (5) RECURAING \$1,143 254 L	ECONDILIFE DISCOUNT FACTOR 20.05 18.049	PRESENT VALUE (\$) \$22,917 4,584 UNIFORM ANNUAL COST 2,886
DESCRIPTION AND YEAR DESCRIPTION AND YEAR INVESTMENT IPERATIONS IAINTENANCE TERSONNEL TERNIMAL YALUE ITHER: TOTAL PRESENT VALUE ALTERNAT REMARKS Alternative A fill	COSTS ONE TIME ONE TIME IVE B - 3 27,501 Is feasible due	s (s) RECURAING \$1,143 254 L - 0 to lower pres	ECONDILIFE DISCOUNT FACTOR 20.05 18.049	PRESENT VALUE (\$) \$22,917 4,584 UNIFORM ANNUAL COST 2,886 B.
LTERNATIVE B <u>No Storm W</u> DESCRIPTION AND YEAR NVESTMENT PERATIONS AINTENANCE ERSONNEL ERNIMAL YALUE THER: OTAL PRESENT VALUE ALTERNAT TEMARKS Alternative A is Life Cycle Cost Alt. A - \$ 2,76	COSTS ONE TIME ONE TIME IVE B - 3 27,501 Is feasible due	5 (5) RECURAING \$1,143 254 1	ECONDILIFE DISCOUNT FACTOR 20.05 18.049 ISCOUNT FACTOR 9.524 = ent value than	PRESENT VALUE (\$) \$22,917 4,584 UNIFORM ANNUAL COST 2,886 B.

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BUILDING 508 and BUILDING RR-3 - Storms

TOTAL WINDOW AREA (Heating) = 1,027 SF (Cooling) = 759 SF SAVINGS FROM STORM WINDOWS

1. Winter Savings:

Reduction in Infiltration x $\Delta T \ge 1.08 \ge SF$ Window + Reduction in Transmission $\ge \Delta T \ge SF$ Window = 0.5(2.4 - 1.2) CFM/SF $\ge (68 - 23) \ge 1.08 \ge 1,027$ + (1.04 - 0.54) $\ge (68 - 23) \ge 1.027$ SF = 53,055 BTUH ANNUAL SAVINGS IN BTU'S <u>2901 HDD $\ge 24 \ge 53,055$ </u> (68 - 23) $\ge .90(Effy.)$ ANNUAL DOLLAR SAVINGS $\le 12.53/MIL$ BTU'S ≥ 91.21 MIL BTU/YR. = \$1,143

2. Summer Savings:

Reduction in Infiltration x Δ H x 4.45 x SF Window + Reduction in Transmission x Δ T x SF Window = 0.5(1.2 - 0.6) CFM/SF x 12 x 4.45 x 759 SF + (1.04 - 0.54) x (68 - 23) x 759 SF = 11,958 BTUH ANNUAL SAVINGS IN BTU'S 1810 CDD x 11,958 BTUH 3,413 KWH/BTU = 6,342.KWH or 21.6 MIL BTU/YR. ANNUAL DOLLAR SAVINGS \$0.04/KWH x 6,342 KWH = \$254

- 3. Total Annual Savings from Storm Windows \$1,143 + \$254 = \$1,397
- 4. Cost of Storm Windows Jan 80 Jun 80 Jan 82 \$2.27/SF x 1.036 x 1.142 = \$2.69 represents cost to add storms to proposed cost for screens under equipment section. INSTALLATION COST OF STORM WINDOWS 1,027 SF x \$2.69/SF = \$2,763
- 5. Discount Factor Use 20.050 for 25 years for oil, 8%; and use 18.049 for 25 years for electricity, 7%.



ONOMIC ANALYSIS OF SHORE FACI	LITY	1	DATE	
BUILDING 508; BUILDING	RR-3		and the second second	1 JULY 80
MARINE CORPS BASE, CAM	P LEJEUNE, NOI	RTH CAROLINA		
PROJECT TITLE	PNT ZATION	a Manganan da s	P	NO.
DESCRIPTION OF ALTERNATIVES	KINTZAT LON			P=097
·				
				a ostal kalendar ha r -
		a destination		
PROJECT COST PROJECTIONS BY	ALTERNATIVES			
ALTERNATIVE A Add insula	tion in ceili	ng	ECOM	OHIC 25 YRS.
	and the prose	8	LIFE	
DESCRIPTION AND YEAR	ONE TIME	RECURRING	FACTOR	PRESENT VALUE (S)
INVESTMENT	\$15,538			\$15,538
OPERATIONS	,,			,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
UN INTENANCE				
MATRIERANVE				
PERSONNEL				
TERMINAL VALUE				d
OTHER:			and the second second	
TOTAL PRESENT VALUE ALTERNAT	IVE A . \$ 15 53	8 -	9 524 -	UNIFORM ANNUAL COS
		··		·
ALTERNATIVE B Continue to	operate with	current losses	ECONI	DHIC 25 YRS.
	COS	TS (S)	DISCOUNT	PRESENT
DESCRIPTION AND TEAR	ONE TIME	RECURAING	FACTOR	VALUE (\$)
INVESTMENT Steam (oil)		\$8:915	20.05	\$182 758
OPERATIONS Elec.		7,874	18.049	142,118
HAINTENANCE		in second and the second	Sector Sector Sector	Same See Dig Mich .
PERSONNEL				
TERMINAL VALUE		and market and a	and the second	- Palaser Level 19
ATUCD:	and the second	and the second second		and the second
VIICA.				
TOTAL PRESENT VALUE ALTERNAT	VE B . 5 324,8	76 ÷	9.524 =	\$34,111
REMARKS		and the second second		
Alternative "A"	is feasible.		0 T D 3	324,876 _ 20.01
Life Cycle Cost	20		5.1.K. = -	15,538 = 20.91
	18			
Alt. A - \$ 15,5 • Alt. B - 324.8	76	and strengthered and the set		
Alt. A - \$ 15,5 • Alt. B - 324,8 L.C.C \$309,3	76 38 2			Fact 7

12.48

tart the start



BUILDING 508 and BUILDING RR-3

Additional insulation above ceiling Energy Saved: Winter = (U Exist. - U New) x \wedge T x Roof Area SF over heated space Summer = (^UExist. - ^UNew) x Solar Gain Factor x Roof Area SF over A/C space U_{Exist.} = 0.44 BTU/HR^oF. SF U_{New} = 0.05 BTU/HR^oF. SF From Trace Heat Loss with UNew (.05) Heat Loss with Exist. (.44) = 53,060 BTUH 53,060 x .44 = 466,928 BTUH .05 = 413,868 BTUH Winter Energy Saved Annual Savings in BTU's 2901 HDD x 24 x 413,868 BTUH = 711.48 MIL BTU/YR. (68 - 23) x .90(Effy.) Annual Dollar Savings \$12.53/MIL BTUS x 711.48 MIL BTUS/YR. = \$8,915 From Trace Heat Gain with ^UNew (.05) 47,588 BTUH Heat Gain with ^UExist. (.44) 47,588 x .44 = 418,774 BTUH .05 Summer Energy Saved 371,186 BTUH Annual Savings in BTU's 1810 CDD x 371,186 BTUH 196,850 KWH/YR. 3,413 KWH/BTU or 671.85 MIL BTU/YR.

and the second second

Annual Dollar Savings \$0.04/KWH x 196,850 KWH = \$7,874

1.



DULLDING FOO BULLDING			DATE	
BUILDING 508; BUILDING	F RR-3			1 JULY 80
MARINE CORPS BASE, CAM	P LEJEUNE, NOR	TH CAROLINA		
PROJECT TITLE	RNIZATION		,	P NO.
DESCRIPTION OF ALTERNATIVES	Intra Anti Tok		L	P=097
				The second s
		· ·		
PROJECT COST PROJECTIONS BY	ALTERNATIVES		an pair an an an an an a	
ALTERNATIVE A Add insulat	ion in walls		ECO	NONIC 25 YRS.
	1	15 (1)		
DESCRIPTION AND YEAR	ONE TIME	RECURRING	FACTOR	PRESENT VALUE (S)
INVESTMENT	\$14,206			\$14,206
PERATIONS				
WINTENANCE				
ERSONNEL				
TERMINAL VALUE	and the line.	1		
JINER:				
				UNIFORM ANNUAL COST
TOTAL PRESENT VALUE ALTERNAT	IVE A - 5 14,206		DISCOUNT FACTOR 9.524 :	UNIFORM ANNUAL COST = \$1,492
TOTAL PRESENT VALUE ALTERNAT	IVE A - 5 14,206	÷_	DISCOUNT FACTOR 9.524	UNIFORM ANNUAL COST = \$1,492
TOTAL PRESENT VALUE ALTERNAT	operate with o	÷÷	DISCOUNT FACTOR 9.524	UNIFORM ANNUAL COST = \$1,492 OHIC_ 25_ YRS.
TOTAL PRESENT VALUE ALTERNAT	operate with c	current losses	DISCOUNT FACTOR 9.524 3. ECON LIFE	UNIFORM ANNUAL COST = \$1,492 OHIC_ 25_ YRS.
TOTAL PRESENT VALUE ALTERNAT ALTERNATIVE B <u>Continue to</u> DESCRIPTION AND YEAR	operate with c	current losses	DISCOUNT FACTOR 9.524	UNIFORM ANNUAL COST = \$1,492 OHIC 25 YRS. PRESENT VALUE (S)
TOTAL PRESENT VALUE ALTERNAT ALTERMATIVE B <u>Continue to</u> DESCRIPTION AND YEAR	operate with c	current losses	DISCOUNT FACTOR 9.524 SECON LIFE DISCOUNT FACTOR	UNIFORM ANNUAL COST = \$1,492 ONIC_ 25 YRS. PRESENT VALUE (\$)
TOTAL PRESENT VALUE ALTERNAT ALTERNATIVE B <u>Continue to</u> DESCRIPTION AND YEAR INVESTMENT Steam (oil) DERATIONS Elec.	operate with c	÷÷ current losses 5 (5) RECURAING \$2,252 922	DISCOUNT FACTOR 9.524 SECON ECON LIFE 20.05 18.049	UNIFORM ANNUAL COST = \$1,492 OHIC_ 25 YRS. PRESENT VALUE (\$) \$45,153 16,641
TOTAL PRESENT VALUE ALTERNAT ALTERNATIVE B <u>Continue to</u> DESCRIPTION AND YEAR INVESTMENT Steam (oil) PPERATIONS Elec. MAINTENANCE	operate with c	÷ current losses 5 (5) RECURAING \$2,252 922	DISCOUNT FACTOR 9.524	UNIFORM ANNUAL COST = \$1,492 OHIC_ 25_ YRS. PRESENT VALUE (\$) \$45,153 16,641
TOTAL PRESENT VALUE ALTERNAT ALTERMATIVE B <u>Continue to</u> DESCRIPTION AND YEAR INVESTMENT Steam (oil) DPERATIONS Elec. MAINTENANCE PERSONNEL	operate with c	÷ current losses 5 (5) RECURAING \$2,252 922	DISCOUNT FACTOR 9.524 SECON LIFE DISCOUNT FACTOR 20.05 18.049	UNIFORM ANNUAL COST = \$1,492 OHIC_ 25 YRS. PRESENT VALUE (\$) \$45,153 16,641
TOTAL PRESENT VALUE ALTERNAT ALTERNATIVE B <u>Continue to</u> DESCRIPTION AND YEAR INVESTMENT STEAM (OIL) DPERATIONS ELEC. HAINTENANCE PERSONNEL TERMINAL VALUE	Operate with c	÷; current losses 5 (5) RECURAING \$2,252 922	DISCOUNT FACTOR 9.524 S ECON LIFE DISCOUNT FACTOR 20.05 18.049	UNIFORM ANNUAL COST = \$1,492 OHIC_ 25 YRS. PRESENT VALUE (\$) \$45,153 16,641
TOTAL PRESENT VALUE ALTERNAT ALTERNATIVE B <u>Continue to</u> DESCRIPTION AND YEAR NVESTMENT Steam (oil) PERATIONS Elec. MINTENANCE PERSONNEL	Operate with costs	÷ current losses 5 (5) RECURAING \$2,252 922	DISCOUNT FACTOR 9.524 SECON LIFE 20.05 18.049	UNIFORM ANNUAL COST = \$1,492 OHIC_ 25 YRS. PRESENT VALUE (\$) \$45,153 16,641
TOTAL PRESENT VALUE ALTERNAT ALTERNATIVE B <u>Continue to</u> DESCRIPTION AND YEAR INVESTMENT Steam (oil) PERATIONS Elec. MAINTENANCE PERSONNEL FERMINAL VALUE DTHER: TOTAL PRESENT VALUE ALTERNAT	Operate with costs	÷ current losses 5 (5) RECURAING \$2,252 922	DISCOUNT FACTOR 9.524 ECON DISCOUNT FACTOR 20.05 18.049 DISCOUNT FACTOR	UNIFORM ANNUAL COST = \$1,492 OHIC_ 25 YRS. PRESENT VALUE (\$) \$45,153 16,641 UNIFORM ANNUAL COST
TOTAL PRESENT VALUE ALTERNAT LTERMATIVE B <u>Continue to</u> DESCRIPTION AND YEAR NVESTMENT PERATIONS ELEC. AINTENANCE ERSONNEL ERMINAL VALUE THER: OTAL PRESENT VALUE ALTERNAT	IVE A - S 14,206 operate with c COSTS ONE TIME ONE TIME ONE TIME	÷; current losses 5 (5) RECURAING \$2,252 922 922 ÷ 5	DISCOUNT FACTOR 9.524 SECON LIFE DISCOUNT FACTOR 20.05 18.049 DISCOUNT FACTOR 0.524 =	UNIFORM ANNUAL COST = \$1,492 OHIC_ 25 YRS. PRESENT VALUE (\$) \$45,153 16,641 UNIFORM ANNUAL COST \$6,488
TOTAL PRESENT VALUE ALTERNAT ALTERMATIVE B <u>Continue to</u> DESCRIPTION AND YEAR INVESTMENT Steam (oil) DPERATIONS Elec. MAINTENANCE PERSONNEL TERMINAL VALUE DTHER: TOTAL PRESENT VALUE ALTERNAT REMARKS Alternative "A"	IVE A - 5 14,206 operate with of COSTS ONE TIME ONE TIME ONE B - 5 61,794 is feasible.	÷; current losses 5 (5) RECURRING \$2,252 922 922 ÷ 5	DISCOUNT FACTOR 9.524 SECON CONSCOUNT FACTOR 20.05 18.049 DISCOUNT FACTOR 0.524 ECON E	UNIFORM ANNUAL COST =
TOTAL PRESENT VALUE ALTERNAT ALTERMATIVE B <u>Continue to</u> DESCRIPTION AND YEAR INVESTMENT Steam (oil) DERATIONS Elec. HAINTENANCE PERSONNEL TERMINAL VALUE DIHER: TOTAL PRESENT VALUE ALTERNAT REMARKS Alternative "A" Life Cycle Cost	IVE A - S 14,206 operate with of COSTS ONE TIME IVE B - S 61,794 is feasible.	÷; current losses (5) RECURAING \$2,252 922 922 ÷ 0	DISCOUNT FACTOR 9.524 S ECON LIFE DISCOUNT FACTOR 20.05 18.049 DISCOUNT FACTOR 0.524 S.I.R. = <u>61</u> ,	UNIFORM ANNUAL COST = \$1,492 OHIC_ 25 YRS. PRESENT VALUE (\$) \$45,153 16,641 UNIFORM ANNUAL COST \$6,488 794 = 4.35
TOTAL PRESENT VALUE ALTERNAT ALTERNATIVE B <u>Continue to</u> DESCRIPTION AND YEAR INVESTMENT Steam (oil) DPERATIONS Elec. HAINTENANCE PERSONNEL TERMINAL VALUE DTHER: NOTAL PRESENT VALUE ALTERNAT REMARKS Alternative "A" Life Cycle Cost Alt. A - \$14,206 Alt. B - 61.794	IVE A - S 14,206 operate with of COSTS ONE TIME IVE B - S 61,794 is feasible.	÷	DISCOUNT FACTOR 9.524 S ECON LIFE DISCOUNT FACTOR 20.05 18.049 DISCOUNT FACTOR 0.524 S.I.R. = $\frac{61}{14}$,	UNIFORM ANNUAL COST = <u>\$1,492</u> OHIC <u>25</u> YRS. PRESENT VALUE (S) \$45,153 16,641 UNIFORM ANNUAL COST \$6,488 <u>794</u> = 4.35
TOTAL PRESENT VALUE ALTERNAT ALTERMATIVE B <u>Continue to</u> DESCRIPTION AND YEAR INVESTMENT Steam (oil) DPERATIONS Elec. HAINTENANCE PERSONNEL IERMINAL VALUE DTHER: TOTAL PRESENT VALUE ALTERNAT REMARKS Alternative "A" Life Cycle Cost Alt. B - 61,794 L.C.C \$47,588	IVE A - S 14,206 operate with of COSTS ONE TIME VE B - S 61,794 is feasible.	÷	DISCOUNT FACTOR 9.524 S ECON DISCOUNT FACTOR 20.05 18.049 DISCOUNT FACTOR 0.524 S.I.R. = $\frac{61}{14}$,	UNIFORM ANNUAL COST = $\frac{$1,492}{}$ OHIC_ 25 YRS. PRESENT VALUE (S) \$45,153 16,641 UNIFORM ANNUAL COST \$6,488 $\frac{794}{206} = 4.35$



BUILDING 508 and BUILDING RR-3

Additional insulation in walls Energy Saved: Winter = (^UExist. - ^UNew) x ∆T x Wall Area SF across heated space Summer = (U Exist. - U New) x Solar Gain Factor x Wall Area SF across A/C space UExist. = 0.35 BTU/HR^oF.SF. UNew = 0.15 BTU/HR^oF.SF. From Trace From Trace Heat Loss with UNew (.15) Heat Loss with Exist. (.35) = 78,402 BTUH 78,402 x .35 = 182,938 BTUH .15 = 104,536 BTUH Energy Saved for Heating Annual Energy Savings 2901 HDD x 24 x 104,586 BTUH = 179.71 MIL BTU/YR. (68 - 23) x .90(Effy.) Annual Dollar Savings \$12.53/MIL BTUS x 179.71 MIL BTU/YR. = \$2,252 From Trace Heat Gain with UNew (.15) Heat Gain with Exist. (.35) = 32,586 BTUH 32,586 x .35 = 76,034 BTUH .15 Energy Saved for Cooling = 43,448 BTUH Annual Energy Savings 1810 CDD x 43,448 BTU = 23,042 KWH/YR. 3,413 78.64 MIL BTU/YR.

a sala to the standing

Annual Dollar Savings \$0.04/KWH x 23,042 KWH = \$922

2.







DATE

ECONOMIC

25

YRS.

ECONOMIC ANALYSIS OF SHORE FACILITY

Building 508 and Building RR3	1 JULY 80
MARINE CORPS BASE, CAMP LEJEUNE, NORTH CAROLINA	
PROJECT TITLE	P NO.
DINING FACILITIES MODERNIZATION	P-697
DESCRIPTION OF ALTERNATIVES	

PROJECT COST PROJECTIONS BY ALTERNATIVES

ALTERNATIVE A Solar Domestic Hot Water Heating

DESCRIPTION AND YEAR	COSTS (S)		DISCOUNT	PRESENT	
	ONE TIME	RECURRING	FACTOR	VALUE (S)	
INVESTMENT. OPERATIONS	10,087	149	80.23	10,087 11,954	
HAINTENANCE PERSONNEL					
TERMINAL VALUE OTHER:					

TOTAL PRESENT VALUE ALTERNATIVE A . \$ 22,041

ALTERNATIVE B Operate Domestic Hot Water System with Hot Water Generator Using Steam ECONDHIC 25 YRS.

DESCRIPTION AND YEAR	COST	rs (.s)	DISCOUNT	PRESENT
DESCRIPTION AND TEAR	ONE TIME	RECURRING	FACTOR	VALUE (\$)
INVESTMENT				
OPERATIONS	a standard and a	988	80.23	79,267
• HAINTENANCE PERSONNEL				
- TERMINAL VALUE OTHER:				
- TOTAL PRESENT VALUE ALTERNATIVE	в. 5 79,267	·	SCOUNT FACTOR	UNIFORM ANNUAL COST
REMARKS Alternate "A" is Life Cycle Cost Alt. A - \$22,041 Alt. B - 79,269 L.C.C 57,228	feasible.	S.I.R. Payback = Ir Ar	$= \frac{79,267}{22,041} = 3$ nvestment Cost nual Savings	.60 $= \frac{5043}{419} = 12.02$
- \$57 x 1	0,	From Enclosur	e 14 = Less t	han 9 vears 7







BUILDING 508 AND BUILDING RR3 - SOLAR DHW SOLAR ANALYSIS

- 1. Investment cost: Back-up estimate esc. to 1 January 82.
- 2. Energy Cost: FY 80 FY 81 FY 82
 Steam (oil) \$9.27/MIL BTU x 1.04 x 1.14 x 1.14 = 12.53/MIL BTU.
- 3. Energy Consumption Alternate A Auxiliary Energy Required = 11.93 MBTU/YR* Cost of Aux. Energy = 11.93 x 12.53 = \$149
 - Alternate B Conventional Energy Required = 78.84 MBTU/YR* Cost of Conventional Energy = 78.84 x 12.53 = \$988
- 4. Discount Factor use 80.23 for 25 years for oil from enclosure 14 (FY 82).
- 5. Payback = <u>Investment Cost</u> = <u>10,087</u> Annual Savings = <u>839</u> = 12.02

From Enclosure 14

= Less than 9 years.

* Refer to SOLCOST analysis.



	•••		• •••	
CONOMIC ANALYSIS OF SHORE FACIL	ITY	· · · · · ·		
BUILDING BA-103			DATE	1 1111. 9 80
ACTIVITY (Name and Location) MADINE CODDE DACE . (AND	LE DUNU NOU		in the second	1 3011 00
PROJECT TITLE	LEJEUNE; NOR	CIH CAROLINA	P	NO.
DINING FACILITIES MODER	NIZATION			P - 697
DESCRIPTION OF ALTERNATIVES				
PROJECT COST PROJECTIONS BY AL	TERNATIVES			
ALTERNATIVE A Add Storm W	indows		ECON	OHIC 25 M
DESCRIPTION AND YEAR	COS	STS (\$)	DISCOUNT	PRESENT
	UNE TIME	\$1 383		¢1 292
	di sa sigak	91,505		^{91,303} .
PERSONNEL				
PERSUNNEL				3
OTHER:				
TOTAL PRESENT VALUE ALTERNATIV	YEA-5 1,383	۱ ۵ ÷	I ISCOUNT FACTOR - 9.524 =	UNIFORM ANNUAL C \$145
ALTERNATIVE B			LIFE	DHIC 25 YRS
DESCRIPTION AND YEAR	COST ONE TIME	S (S) RECURAING	DISCOUNT	PRESENT VALUE (\$)
INVESTMENT		4570		
OPERATIONS Elec.		\$5/2	20.05	\$11,526
HAINTENANCE				,
PERSONNEL				and the second second
TERMINAL VALUE				
OTHER:		and the second second		
TOTAL PRESENT VALUE ALTERNATIV	св. 5 24,214	÷_9	ISCOUNT FACTOR .524 =	UNIFORM ANNUAL C \$2,542
REMARKS Alternative "A"	is feasible.			
Life Cycle Cost		S.	I.R. = $\frac{24,214}{1,383}$	= 17.51
Alt. $B = 24,214$			1,505	
· L.C.C 22,831	.3			
- 23 x 10)			Encl 7

Encl 7







BUILDING BA-103 - STORMS (Glazed Area Considered 1/2 of Building 508)

Total Window Area (Heating) = 514 SF (Cooling) = 380 SF Savings From Storm Windows

1. Winter Savings
Reduction in Infiltration x ∆T x 1.08 x SF Window
+ Reduction in Transmission x ∆T x SF Window
= 0.5(2.4 - 1.2) CFM/SF x (68 - 23) x 1.08 x 514 SF
+ (1.04 - 0.54) x (68 - 23) x 514 SF
= 26,553 BTUH
Annual Savings in BTU's
2901 HDD x 24 x 26,553
(68 - 23) x .90 (Effy.) = 45.65 MIL BTU/YR.

Annual Dollar Savings \$12.53/MIL BTUS x 45.65 MIL BTU/YR. = \$572

2. Summer Savings Reduction in Infiltration x \triangle H x 4.45 x SF Window + Reduction in Transmission x \triangle T x SF Window = 0.5(1.2 - 0.6) CFM/SF x 12 x 4.45 x 380 SF + (1.04 - 0.54) x (68 - 23) x 380 SF = 6,174 BTUH Annual Savings in BTU's <u>1810 CDD x 6,174 BTUH</u> 3,413 KWH/BTU = 3,274 KWH or 11.17 MIL BTU/YR. Annual Dollar Savings

\$0.04/KWH x 3,274 KWH = \$131

- 3. Total Annual Savings from Storm Windows
 \$572 + \$131 = \$703
- 4. Cost of Storm Windows
 Jan 80 Jun 80 Jan 82
 \$2.27/SF x 1.036 x 1.142 = \$2.69 represents cost to add storms to proposed
 cost for screens under equipment section.

Installation Cost of Storm Windows
514 SF x \$2.69/SF = \$1,383

5. Discount Factor - Use 20.050 for 25 years for oil, 8%; and use 18.049 for 25 years for electricity, 7%.



BUILDING BA-103		1 JULY 80
CTIVITY (Name and Location) MARINE CORPS BASE, CAMP LEJEUNE, NORTH CAROLINA		
ROJECT TITLE		P NO.
DINING FACILITIES MODERNIZATION	a de la deserve	P-697
ESCRIPTION OF ALTERNATIVES		
		κ.

PROJECT COST PROJECTIONS BY ALTERNATIVES

ALTERNATIVE A _____ Add insulation above ceiling

ALTERMATIVE AAdd insulati	on above ceil:	ing	ECONON LIFE	11c 25 YRS.
DESCRIPTION AND YEAR	COSTS (\$)		DISCOUNT	PRESENT
	ONE TIME	RECURRING	FACTOR	VALUE (S)
INVESTMENT OPERATIONS MAINTENANCE	\$6,027			\$6,027
PERSONNEL TERMINAL VALUE OTHER:				

ECONOHIG 25 ALTERMATIVE B Operate with existing losses YRS.

DESCRIPTION AND YEAR	COST	COSTS (S)		PRESENT
DESCRIPTION AND TEAM	ONE TIME	RECURAING	FACTOR	VALUE (\$)
INVESTMENT OPERATIONS Elec.)	\$4,457 3,937	20.05 18.049	\$89,363 71,059
HAINTENANCE PERSONNEL _ TERMINAL VALUE OTHER:				
TOTAL PRESENT VALUE ALTERN.	ATIVE 8 . 5 160,4	422 ÷	9.524 =	UNIFORM ANNUAL COST \$16,844
REMARKS Alternative ' Life Cycle Co Alt. A - \$ 6 Alt. B - 160 L.C.C 154	A" is feasible. st ,027 ,422 .395		S.I.R. = $\frac{160}{6}$	<u>,422</u> ,027 = 26.62
- \$154	x 10 ³	the second second second second		Encl 7



BUILDING BA-103

1921

1. Additional insulation above ceiling Energy Saved: Winter = (^UExist. - ^UNew) x (T x Roof Area SF over heated space Summer = (^UExist. - ^UNew) x Solar Gain Factor x Roof Area SF over A/C space U_{Exist.} = 0.44 BTU/HR^oF.SF U_{New} = 0.05 BTU/HR^oF.SF From Trace Heat Loss with UNew (.05) Heat Loss with Exist. (.44) 26,530 BTUH 26,530 x .44 = 233,464 BTUH .05 Winter Energy Saved = 206,934 BTUH Annual Savings in BTU's 2901 HDD x 24 x 206,934 BTUH = 355.74 MIL BTU/YR. (68 - 23) x .90(Effy.) Annual Dollar Savings \$12.53/MIL BTUS x 355.74 MIL BTUS/YR. = \$4,457 From Trace Heat Gain with UNew (.05) Heat Gain with Exist. (.44) 23,794 BTUH 23,794 x .44 = 209,387 BTUH .05 Summer Energy Saved = 185,593 BTUH Annual Savings in BTU's 1810 CDD x 185,593 BTUH = 98,425 KWH/YR. 3,413 KWH/BTU or 335.92 MIL BTU/YR. Annual Dollar Savings \$0.04/KWH x 161,437 KWH \$3,937



ECONOMIC ANALYSIS OF SHORE FACIL	ITY	Contraction of the second			
BUILDING BA-103	E				
ACTIVITY (Name and Location)			<u> </u>	1 3011 80	
PROJECT TITLE	LEJEUNE, NOF	CTH CAROLINA		NQ-	
DINING FACILITIES MODER	NIZATION	processore in the second state of the second state of the second state of the second state of the second state In the second state of the second		P-697	
DESCRIPTION OF ALTERNATIVES			in the second		
PROJECT COST PROJECTIONS BY AL	TERNATIVES				
ALTERNATIVE AInsulate ext	LIFE LIFE LIFE				
DESCRIPTION AND YEAR	CO	STS (\$)	DISCOUNT	PRESENT	
	07.00F	ALCONATING		Theor (3)	
INVESTMENT.	\$7,225		and the second	\$7,225	
OPERATIONS					
HAINTENANCE				월 20일 - 19일 - 1 19일 - 19일 - 19g - 19g - 19g - 19g - 19g - 1 19g - 19g	
PERSONNEL	State States	a state and the second			
TEOMINAL VILLE			a destand	a star star star	
OTHER:			10.1 (S. 1983)		
		DI	SCOUNT FACTOR	UNIFORM ANNUAL CO	
TOTAL PRESENT VALUE ALTERNATIV	re A - \$ 7,225	÷ <u>9.</u>	524=	\$759	
ALTERMATIVE B Operate with e	xisting losse	:S•	ECONO LIFE	ніс <u>25</u> укз.	
ALTERMATIVE BOperate with e	xisting losse	:S. TS (5)	ECONO LIFE DISCOUNT	HIC 25 YRS.	
ALTERMATIVE BOperate with e	cost ONE TIME	IS (S) RECURAING	DISCOUNT FACTOR	PRESENT VALUE (\$)	
ALTERNATIVE BODErate with e: DESCRIPTION AND YEAR	xisting losse COSI	S.	DISCOUNT FACTOR	HIC 25 VRS.	
ALTERNATIVE BOperate with es DESCRIPTION AND YEAR INVESTMENT OPERATIONS Floo	cos	25. T5 (5) RECURAING \$1,126 461	DISCOUNT FACTOR 20.05	PRESENT VALUE (\$) \$22,576	
ALTERNATIVE BODErate with es DESCRIPTION AND YEAR INVESTMENT OPERATIONS Elec.	xisting losse COS ONE TIME	25. T5 (5) RECURAING \$1,126 461	ECONO LIFE DISCOUNT FACTOR 20.05 18.049	HIC 25 VRS.	
ALTERNATIVE BOPERATE with end DESCRIPTION AND YEAR INVESTMENT OPERATIONS Elec. HAINTENANCE	xisting losse cos	25. TS (5) RECURAING \$1,126 461	ECONO LIFE DISCOUNT FACTOR 20.05 18.049	NIC 25 TRS.	
ALTERNATIVE BOPERATE with e. DESCRIPTION AND YEAR INVESTMENT OPERATIONS ELEC. MAINTENANCE PERSONNEL	COS COS	25. T5 (5) RECURAING \$1,126 461	ECONO LIFE DISCOUNT FACTOR 20.05 18.049	HIC 25 YRS. PRESENT VALUE (\$) \$22,576 8,321	
ALTERNATIVE BODERATE with e DESCRIPTION AND YEAR INVESTMENT OPERATIONS Elec. MAINTENANCE PERSONNEL - TERMINAL VALUE	xisting losse <u>cos</u> ONE TIME	25. TS (5) RECURAING \$1,126 461	ECONO LIFE DISCOUNT FACTOR 20.05 18.049	HIC 25 YRS. PRESENT VALUE (\$) \$22,576 8,321	
ALTERNATIVE BODERATE with e DESCRIPTION AND YEAR INVESTMENT OPERATIONS Elec. MAINTENANCE PERSONNEL - TERMINAL VALUE OTHER:	xisting losse COS ONE TIME	25. T5 (5) RECURAING \$1,126 461	ECONO LIFE DISCOUNT FACTOR 20.05 18.049	HIC 25 VRS.	
ALTERNATIVE BODERATE WITH E DESCRIPTION AND YEAR INVESTMENT OPERATIONS Elec. MAINTENANCE PERSONNEL - TERMINAL VALUE OTHER: TOTAL PRESENT VALUE ALTERNATIV	xisting losse COS ONE TIME E B · S - 20 00	25. T5 (5) RECURAING \$1,126 461 0	ECONO LIFE DISCOUNT FACTOR 20.05 18.049	HIC 25 YRS.	
ALTERNATIVE BODERATE WITH E	E B • 5 _ 30,89	2:5. T5 (5) RECURAING \$1,126 461 7 9	ECONO LIFE DISCOUNT FACTOR 20.05 18.049 SCOUNT FACTOR .524 =	HIC 25 TRS. PRESENT VALUE (S) \$22,576 8,321 UNIFORM ANNUAL COS \$3,244	
ALTERNATIVE BOPERATE with end DESCRIPTION AND YEAR INVESTMENT OPERATIONS ELEC. MAINTENANCE PERSONNEL - TERMINAL VALUE OTHER: TOTAL PRESENT VALUE ALTERNATIV REMARKS Alternative "A"	E B · S30,89	25. T5 (5) RECURAING \$1,126 461 7 ÷ 9	ECONO LIFE DISCOUNT FACTOR 20.05 18.049 SCOUNT FACTOR .524 =	HIC 25 YRS. PRESENT VALUE (\$) \$22,576 8,321 UNIFORM ANNUAL COS \$3,244	
ALTERNATIVE BOPERATE with end DESCRIPTION AND YEAR INVESTMENT OPERATIONS ELEC. MAINTENANCE PERSONNEL - TERMINAL VALUE OTHER: TOTAL PRESENT VALUE ALTERNATIV REMARKS Alternative "A" Life Cycle Cost	E B · S	25. T5 (5) RECURAING \$1,126 461 7 $\dot{-}$ 9	ECONO LIFE DISCOUNT FACTOR 20.05 18.049 SCOUNT FACTOR .524 =	HIC 25 YRS.	
ALTERNATIVE BOPERATE WITH EN DESCRIPTION AND YEAR INVESTMENT OPERATIONS Elec. HAINTENANCE PERSONNEL - TERMINAL YALUE OTHER: TOTAL PRESENT VALUE ALTERNATIV REMARKS Alternative "A" Life Cycle Cost Alt. A - \$ 7,225	E B · S	2:5. T5 (5) RECURAING \$1,126 461 7 → 9	ECONOLIFE DISCOUNT FACTOR 20.05 18.049 SCOUNT FACTOR .524 = S.I.R. = $\frac{30}{7}$	HIC 25 TRS. PRESENT VALUE (3) \$22,576 8,321 UNIFORM ANNUAL COS \$3,244 .897 225 = 4.28	
ALTERNATIVE BOPERATE with end DESCRIPTION AND YEAR INVESTMENT OPERATIONS ELEC. HAINTENANCE PERSONNEL - TERMINAL YALUE OTHER: TOTAL PRESENT VALUE ALTERNATIV REMARKS Alternative "A" Life Cycle Cost Alt. A - \$ 7,225 Alt. B - 30,897	cos ONE TIME E B · S30,89 is feasible.	25. T5 (5) RECURAING \$1,126 461 7 ÷ 9	ECONO LIFE DISCOUNT FACTOR 20.05 18.049 SCOUNT FACTOR .524 = S.I.R. = $\frac{30}{7}$	HIC 25 YRS. PRESENT VALUE (3) \$22,576 8,321 UNIFORM ANNUAL COS \$3,244 $\frac{897}{225} = 4.28$	

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BUILDING BA-103

•	Additional insulation in walls Energy Saved:	
	Winter = (^U Exist ^U New) x ΔT	x Wall Area SF across heated space
	Summer = (^U Exist ^U New) x So.	lar Gain Factor x Wall Area SF across A/C space
	U _{Exist.} = 0.35 BTU/HR ^o F.SF	UNew = 0.15 BTU/HR ^o F.SF
	From Trace Heat Loss with UNew (.15) Heat Loss with Exist. (.35)	= 39,201 BTUH
	$\frac{39,201 \times .35}{15}$	= 91,469 BTUH
•	Energy Saved for Heating	= 52,268 BTUH
	Annual Energy Savings <u>2901 HDD x 24 x 52,268 BTUH</u> (68 - 23) x .90(Effy.)	= 89.86 MIL BTU/YR.
	Annual Dollar Savings \$12.53/MIL BTUS x 89.86 MIL BTU	US/YR. = \$1,126
	From Trace Heat Gain with UNew (.15) Heat Gain with Exist. (.35)	= 16,293 BTUH
	$\frac{16,293 \text{ x} \cdot 35}{15}$	= 38,017 BTUH
	Energy Saved for Cooling	= 21,724 BTUH
	Annual Energy Savings 1810 CDD x 21,724 BTUH 3413	= 11,521 KWH/YR. or 39.32 MIL BTU/YR.

Annual Dollar Savings \$0.04/KWH x 22,038 KWH = \$461



UNOTIC ANALISIS OF SHORE TAG	ILITY	and a second product on a	DATE	
BUILDING BA-103		· · ·	1	JULY 80
MARINE CORPS BASE, CAN	MP LEJEUNE, NOR'	UII CAROLINA		
PROJECT TITLE			P	NO.
DINING FACILITIES MODI	ERNIZATION			P-697
· · · · · · · · · · · · · · · · · · ·				
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	<u>.</u>			
a de la complete de la				
PROJECT COST PROJECTIONS BY	ALTERNATIVES			
ALTERNATIVE & Solar Domes	tic Hot Water	land and size and so the	ECONO LIFE	HIC 25 YRS
	COS	TS (S)	DISCOUNT	DECENT
DESCRIPTION AND TEAM	ONE TIME	RECURRING	FACTOR	VALUE (S)
INVESTMENT	\$5,043			\$5,043
OPERATIONS		\$75	80.23	6,017
HAINTENANCE				
PERSONNEL				
TERMINAL VALUE			Contra Mariana	
OTHER:				Sec. and the second
-			SCOUNT FACTOR	UNIFORM ANNUAL CO
TOTAL PRESENT VALUE ALTERNA	TIVE A - \$ 11,0)60 ÷	=	
			and a second	
ALTERMATIVE B Operate dome	estic hot water	system with ho	t water ECONON	11C 25 YRS.
ALTERNATIVE B Operate dome generator us	estic hot water	system with ho	t water ECONON	11 C YRS
ALTERNATIVE B Operate dome generator us DESCRIPTION AND YEAR	estic hot water sing steam COST	system with ho	t water ECONON LIFE DISCOUNT FACTOR	PRESENT VALUE (\$)
ALTERNATIVE B Operate dome generator us DESCRIPTION AND YEAR	estic hot water sing steam COST ONE TIME	system with ho	t water ECONOR LIFE DISCOUNT FACTOR	PRESENT VALUE (S)
ALTERNATIVE B Operate dome generator us DESCRIPTION AND YEAR INVESTMENT OPERATIONS	estic hot water sing steam COST ONE TIME	system with ho	t water ECONON LIFE	PRESENT VALUE (\$) \$39,232
ALTERNATIVE B Operate dome generator us DESCRIPTION AND YEAR INVESTMENT OPERATIONS MAINTENANCE	estic hot water sing steam COST	system with ho	t water ECONON LIFE DISCOUNT FACTOR 80.23	PRESENT VALUE (\$) \$39,232
ALTERNATIVE B Operate dome generator us DESCRIPTION AND YEAR INVESTMENT OPERATIONS MAINTENANCE PERSONHEL	estic hot water sing steam COST ONE TIME	system with ho	t water ECONON LIFE DISCOUNT FACTOR 80.23	PRESENT VALUE (\$) \$39,232
ALTERNATIVE B Operate dome generator us DESCRIPTION AND YEAR INVESTMENT OPERATIONS MAINTENANCE PERSONNEL TERNIMAL VALUE	estic hot water sing steam COST	system with ho	t water ECONON LIFE DISCOUNT FACTOR 80.23	PRESENT VALUE (\$) \$39,232
ALTERNATIVE B Operate dome generator us DESCRIPTION AND YEAR INVESTMENT OPERATIONS MAINTENANCE PERSONNEL TERMINAL VALUE OTHER:	estic hot water sing steam COST ONE TIME	system with ho	t water ECONDA LIFE DISCOUNT FACTOR 80.23	PRESENT VALUE (\$) \$39,232
ALTERNATIVE B Operate dome generator us DESCRIPTION AND YEAR INVESTMENT OPERATIONS MAINTENANCE PERSONNEL TERMINAL VALUE OTHER:	estic hot water sing steam COST ONE TIME	system with ho	t water ECONON DISCOUNT FACTOR 80.23	PRESENT VALUE (\$) \$39,232
ALTERNATIVE B Operate dome generator us DESCRIPTION AND YEAR INVESTMENT OPERATIONS MAINTENANCE PERSONNEL TERNIMAL VALUE OTHER: TOTAL PRESENT VALUE ALTERNAT	COST ONE TIME	system with ho	t water ECONON LIFE DISCOUNT FACTOR 80.23 SCOUNT FACTOR	UNIFORM ANNUAL COS
ALTERNATIVE B Operate dome generator us DESCRIPTION AND YEAR INVESTMENT OPERATIONS MAINTENANCE PERSONNEL TERMINAL VALUE OTHER: TOTAL PRESENT VALUE ALTERNAT	COST ONE TIME	system with ho	t water ECONON DISCOUNT FACTOR 80.23 SCOUNT FACTOR =	UNIFORM ANNUAL CO
ALTERNATIVE B Operate dome generator us DESCRIPTION AND YEAR INVESTMENT OPERATIONS MAINTENANCE PERSONNEL TERMINAL VALUE OTHER: TOTAL PRESENT VALUE ALTERNAT REMARKS Alternative "A" Life Cycle Cost	estic hot water sing steam COST ONE TIME TIVE B - S 39,23 is feasible.	system with ho	t water ECONON DISCOUNT FACTOR 80.23 SCOUNT FACTOR $=$ $R. = \frac{39,232}{11,060} =$	PRESENT VALUE (S) \$39,232 UNIFORM ANNUAL COS
ALTERNATIVE B Operate dome generator us DESCRIPTION AND YEAR INVESTMENT OPERATIONS MAINTENANCE PERSONNEL TERMINAL VALUE OTHER: TOTAL PRESENT VALUE ALTERNAT REMARKS Alternative "A" Life Cycle Cost Alt. A - \$11,060	estic hot water sing steam COST ONE TIME (IVE B - 5 39,23) is feasible.	system with ho 5 (5) RECURAING \$489 32 ÷ 01 5.I	t water E_{LIFE}^{CONOP} DISCOUNT FACTOR 80.23 SCOUNT FACTOR = .R. = $\frac{39,232}{11,060}$ =	UNIFORM ANNUAL CO



BUILDING BA-103 - SOLAR DHW

- 1. Investment Cost: Back-up estimate escalates to 1 JAN 82.
- 2. Energy Cost:

FY 80 FY 81 FY 82 Steam (oil) R9.27/MIL x 1.04 x 1.14 x 1.14 = 12.53/MIL BTU BTU

3. Energy Consumption:

Alternate A: Auxiliary Energy Required = 5.97 MIL BTU/YR* Cost of Auxiliary Energy = 5.97 x 12.53 = \$75

Alternate B: Conventional Energy Required = 39.42 MIL BUT/YR* Cost of Conventional Energy = 39.42 x 12.53 = \$494

- Discount Factor Use 80.23 for 25 years for oil from enclosure 14(FY 82).
- 5. Payback = Investment Cost Annual Savings = $\frac{5,043}{419}$ = 12.02

From Enclosure 14 = Less Than 9 years.

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*Refer to Solcost Analysis.



LLATERAL EQUIPMENT REQUIREMENT IN CONTINUES (Continue)

D LANTDIV 4-11010/6 (NEW 2-79)	,			1 JULY 80		
ACTIVITY (Name and Location)						
DINING FACILITIES MOD	ERNIZATION				P. NO. P-697	
COG. SYMBOL AND FED. STOCK NO. OR OTHER SOURCE	ITEM/EQUIPMENT DESCRIPTION	QUAN- TITY	UNIT OF ISSUE	M + L + M UNIT PRICE	тос	
BUILT-IN EQUIPMENT	*Intercom system amplifiers	5	EA	876	4,3	
	*Drinking water coolers	16	EA	804	12,8	
	*Venetian blinds	340	EA	138	46,9	
	*Window screens	340	EA	37	12,5	
	*Serving line vent hood	2	EA	19,106	38,2	
	*Soiled ware handling system	6	EA	56,268	337,6	
-	1 - ea. Bldg. BA-103 1 - ea. Bldg. 1209 1 - ea. Bldg. RR-3 2 - ea. Bldg. M-424 1 - ea. Bldg. 508					
	*Convection oven	6	EA	4,495	26,9	
	2 - ea. Bldg. BA-103 2 - ea. Bldg. RR-3 2 - ea. Bldg. M-424					
	*Ice machine	3	EA	3,439	10,3	
	1 - ea. Bldg. RR-3 2 - ea. Bldg. M-424					
	*Walk-in cooler doors	. 8	EA	2,768	22,1	
	SUBTOTAL (To 1391)	1	3		511,9	
. EXPENSE ITEMS	*Equipment with associated insta escalation to JAN 82 <u>Building BA-103</u>	allatio	n cost	and mark	ups and	
asserstorm	Refrigerated display case	1	EA	3,355	3,3	
eating	Grill, electric, 6 ft.	1	EA	2,508	2,5	

Hot food table, mobile

Vertical cutter, mixer

Deep fat fryer

merican Warehouse

eating

obart



TOTAL COST

4,380

12,864

46,920

12,580

38,212

337,608 .

26,972

10,318

22,144

511,998

3,355

2,508

2,850

1,164

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1,425

1,164

2.778

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DLLATERAL'EQUIPMENT REQUIREMENTS (Initial Outfitting) DLANTDIV 4-11010/6 (NEW 2-79)

ACTIVITY (Name and Location)

MARINE CORPS BASE, CAMP LEJEUNE, NORTH CAROLINA

DATE 1 JULY 80

DINING FACILITIES MODERN	NIZATION				697
COG. SYMBOL AND FED. STOCK NO. OR OTHER SOURCE	ITEM/EQUIPMENT DESCRIPTION	QUAN- TITY	UNIT OF ISSUE	UNIT	TOTAL
	SUBTOTAL	and the second		a la	12,655
Hobart	Building 1209 Vertical cutter, mixer	1	EA	2,777	2,777
	SUBTOTAL				2,777
Hobart	Building RR-3 Vertical cutter, mixer	1	EA	2,778	2,778
Wasserstorm	Cold food counters w/sneeze gua	ds4	EA	1,837	7,348
Keating	Grill, electric, 6 ft.	2	EA	2,508	5,016
	SUBTOTAL				15,142
Wasserstorm	Building M-424 Cold food counter w/sneeze guar	ds 4	EA	1,837	7,348
Keating	Grill, electric, 6 ft.	4	EA	2,508	10,032
	SUBTOTAL				17,380
Keating	Building 508 Griddle, electric, 6 ft.	2	EA	2,508	5,016
Victory	Reefer, reach in	1	EA	2,310	2,310
	SUBTOTAL			•	7,326
	Fire Extinguishers for all blds.	. 24	EA	75	1,800
	TOTAL EXPENSE ITEMS				57,080
	Shipping, packing, handling, installation charges and con- tingencies - 10%				5,700
3 INVESTMENT ITEMS	NONE				
4. APA EQUIPMENT	NONE				
5. TRAINING EQUIPMENT	NONE				
6. OTHER EXPENSES	NONE ,				
7. EQUIPMENT ON HAND	NONE				
8. <u>SUMMARY</u>	Expense Cost				62 780

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ENERGY ANALYSIS SUMMARY

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ATLANTIC DIVISION NAVAL FACILITIES ENGINEERING COMMAND

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PRO	DIECT DINING FACIL	ITIES MODERNIZ	ZATION		LOCATI	ON CAMP LEJE	UNE, NORTH	CAROLINA	PRE		INAL
1	DESCRIPTION	REMARKS	BENEFIT/ COST	e/c	YEAR PAYBACK	CURRENT WORKING ESTIMATE	ANNUAL SAVINGS	TOTAL MBTU/YR	() MBTU/YR	() MBTU/YR	MBTI
BI	UILDING 1209							-			
1. 5	Storm Windows	·····			3	4,293	1,895	153.74		-	
2. (Ceiling Insulation	ı <u></u>			1	14,670	12,422	1,021.68			
3. 1	Wall Insulation				8	23,232	3,350	272.19			8
4. 9	Solar Dom. HW.				8	18,123	1732	81.29			
5.	Solar Htg. & DHW	Solcost calcu	lations j	roved no	t feasibi	.e.					
6.	HW. Recovery	Not practical					-				-
7.	Exhaust Air Heat	Not practical	(analys:	s not ma	de).						
		<u> </u>							· ·		
8.	Condensate	Central Energ	y plant	analysis	not made).					
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PROJECT DINING FACIL	ITIES MODERNIZ	ZATION		LOCATIO	MARINE CO N CAMP LEJE	UNE, NORTH	CAROLINA	PRE	LIM. 💟 F	INAL
DESCRIPTION	REMARKS	BENEFIT/ COST	E/C	YEAR PAYBACK	CURRENT WORKING ESTIMATE	ANNUAL SAVINGS	TOTAL MBTU/YR	() MBTU/YR	(MBTU/YR	(MBTU
BUILDING M424									* .	-
								_	1. S.	
1. Storm Windows				3	4,293	1,895	153.74		1	
									1	
2. Ceiling Insulation	1			1	17,437	14,762	1213.77			
							· · · · · · · · · · · · · · · · · · ·		1	
3. Wall Insulation				8	23,232	3,350	272.19			1
			and the second					1		
4. Solar Dom. HW.				8	18,123	1,732	81.29			-
		·····		Line III				k		
5. Solar Htg. & DHW	Solcost Calcu	lation pr	coved not	feasible				_		
									-	-
6. HW. Recovery	Not_practical							-		
7. Exhaust Air Heat	Not practical	(analys:	s not ma	de)			·	-		,
Recovery	<u> </u>									
						-		· · ·		-
8. Condensate	Condensate is	recover	ed and is	pumped	to			_		1
	Central Energ	y plant '	analysis	not made)					-
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PROJECT DINING FACIL	LITIES MODERNIZ	CATION		LOCATI	MARINE CO ON CAMP LEJE	RPS BASE UNE, NORTH C	CAROLINA	PREI		FINAL
DESCRIPTION	REMARKS	BENEFIT/ COST	e/c	YEAR PAYBACK	CURRENT WORKING ESTIMATE	ANNUAL SAVINGS	TOTAL MBTU/YR	() MBTU/YR	()' MBTU/YR	(Metu,
BUILDING 508										
1. Storm Windows	server, s			3	2,763	1,397	112.85	-		
2. Ceiling Insulation	n			1	15,538	16,789	1383.			
3. Wall Insulation				6	14,206	3,174	258.			[·
4. Solar Dom. HW.				9	10,086	839	39.15			
5. Solar Htg. & DHW	Solcost calc	ulations	proved n	ot pract:	ical.		<u>.</u>	_	-	
<u>6. HW. Recovery</u>	Not practical									
7. Exhaust Air Heat Recovery	Not practical	(analysi	s not ma	de).						
8. Condensate	Condensate is Central Energ	recovere y plant (d and is	pumped not made						-
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PROJECT DINING FACIL	ITIES MODERNIZ	ZATION		LOCATI	ON CAMP LEJE	UNE, NORTH	CAROLINA	PREL	. Ц.	FINA
DESCRIPTION	REMARKS	BENEFIT/ COST	E/C	YEAR PAYBACK	CURRENT WORKING ESTIMATE	ANNUAL SAVINGS	TOTAL MBTU/YR	() MBTU/YR	(') MBTU/YR	(MB1
BUILDING RR-3				<u> </u>			-		••	-
1. Storm Windows				3	2,763	1,397	112.85			-
2. Ceiling Insulation	ı		·	1	15,538	16,789	1383.			
3. Wall Insulation				6	14,206	3,174	258			1
4. Solar Dom. HW.				9	10,086	839	39.15			
5. Solar Htg. & DHW	SolCost calcu	lations p	roved no	<u>t practi</u>	a1	-		_		
6. HW. Recovery	_Not_practical									
7. Exhaust Air Heat Recovery	Not practical	(analys:	s not ma	de)						
8. Condensate	Condensate is	recovere	d and is	pumped						-
	to Central En	ergy plan	t (analy	sis not 1	ade)				· · · ·	-
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PROJECT DINING FACIL	ITIES MODERNIZ	ZATION		LOCATI	MARINE CO ON CAMP LEJE	URPS BASE EUNE, NORTH	CAROLINA	PRE	LIH. TIFI	NAL
DESCRIPTION	REMARKS	BENEFIT/ COST	E/C	YEAR PAYBACK	CURRENT WORKING ESTIMATE	ANNUAL SAVINGS	TOTAL MBTU/YR	() MBTU/YR	() METU/YR	(MBT
BUILDING BA 103									•.	
1. Storm Windows				3	1,383	699	56			
2. Ceiling Insulation	ı			1	6,007	8,395	692			
3. Wall Insulation				6	7,225	1,587	129			
4. Solar Dom. HW.				9	5,045	420	20			
5. Solar Htg. & DHW	Solcost calcu	lations	proved	not prac						
6. HW. Recovery	Not practical	·				-	-			
7. Exhaust Air Heat Recovery	Not practical	(analys	is not ma	de)			·		· · · · · · · · · · · · · · · · · · ·	
8. Condensate	Condensate is	recover	ed and is	pumped						<u> </u>
	to Central Er	ergy pla	nt (analy	sis not	nade)					
CLOS								•		
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		-		No. 12		-				
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ODELL ASSOCIATES INC.

PLANNING ARCHITECTURE ENGINEERING

222 SOUTH CHURCH STREET · CHARLOTTE, NORTH CAROLINA 28202 704-377-5941

December 5, 1980

Public Works Department Building 1005 Marine Corps Base Camp Lejeune, North Carolina 28542

Attention: Commanding Officer

Re: Dining Facilities Modernization Camp Lejeune North Carolina Buildings 1209, M424, 508, RR3, BA103

Gentlemen:

According to the instructions of our Contract, we are transmitting herewith the thirty-five percent (35%) design submittal including sketch drawings, basis of design, outline specifications, tabulation of gross floor areas and cost estimate all dated December 3, 1980.

Please review the enclosed information and forward your comments to Department of the Navy, Atlantic Division, Attention: Mr. M. L. Bryant, by December 19, 1980, and forward a copy to our office.

We understand that this concludes our efforts in connection with the thirty-five percent (35%) design and will await your review, approval and notice to proceed from the Naval Facilities Engineering Command before proceeding with the final drawing phase.

Very truly yours,

ODELL ASSOCIATES INC Thomas phen D.

E-1412

Encl.: 35% design submittal (2 cys.)

cc: DON - Bryant



and the second second





ODELL ASSOCIATES INC.

PLANNING ARCHITECTURE ENGINEERING

222 South Church Street · Charlotte, North Carolina 28202 704-377-5941

December 5, 1980

Public Works Department Building 1005 Marine Corps Base Camp Lejeune, North Carolina 28542

Attention: Commanding Officer

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Very truly yours,

ASSOCIATE8 ODEL INC phen D. Thomas

E-1412

Encl.: 35% design submittal (2 cys.)

cc: DON - Bryant

) DEC 8 A10: 30

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P-697

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7 NOV 1981

From: Commanding General To: Commandant of the Marine Corps (LFF)

Subj: Supplemental Information Requested by Congress for FY-82 Military Construction Program; submittal of

Ref: (a) CNC !tr LFF-1-AN:apm of 16 Oct 1930

- Encl: (1) DD Form 1390, Supplemental Data for FY-82 MCON Program (2) DD Form 1391c, Supplemental Data for FY-82 MCON Project P-526, Combat Vehicle Maintenance Shop, w/work sheets
 - (3) DD Form 1391c, Supplemental Data for FY-S2 MCON Project P-175, Communications/Electronics Maintenance Shop, w/work sheets
 - (4) DD Form 1391c, Supplemental Data for FY-82 MCON Project P-414, Unaccompanied Enlisted Personnel Housing, w/work sheets
 - (5) DD Form 1391c, Supplemental Data for FY-82 MCON Project P-697, Modernize Enlisted Dining Facilities B8-103, 1209, M-424, & 508, w/work sheets

1. Reference (a) provided guidance for submission of supplemental. information for our FY-82 Military Construction Program, as requested by Congress. Accordingly, enclosures (1) through (5) are hereby forwarded for your continuing action.

> R. P. MILLICE, Jr. By direction

Blind copy to: (w/encls) AC/S, Fac

Return Par Planing Brench



DD F 1390 SUPPLEMENTAL DATA FY-82 MILITARY CONSTRUCTION PROGRAM

Navy COMPONENT

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MCB Camp Lejeune NC INSTALLATION/LOCATION

Marine Corps COMMAND

P-697

(\$000)

***NOTE**

A. ESTIMATED COST OF BACKLOG REAL PROPERTY MAINTENANCE (BMAR):

Permanent Facilities: Temporary Facilities:

B. SIMILAR UNUSED SPACE:

Quantity/Unit of Measure Real Property Categories: 214-XX, COMBAT VEHICLE MAINTENANCE SHOP **0 SF ***0. SF 217-XX, COMMUNICATIONS/ELECTRONICS MAINTENANCE SHOP 721-XX, UNACCOMPANIED ENLISTED PERSONNEL HOUSING ****52,291 SF 722-XX. DINING FACILITY ****0 SF OUTSTANDING POLLUTION AND SAFETY (OSHA) DEFICIENCIES (\$000): С. 1. Air Pollution ***NOTE** 2. Water Pollution ***NOTE *NOTE** Safety and Occupational Health

NOTES:

*CMC (Code LFF) will complete.

- **Combat Ven Maint Shops (reference P-526) located in substandard WW-II
 Butler-type metal buildings constructed in 1952 which do not meet the
 standards used today and cannot be economically rehabilitated.
- ***Comm/Elec Maint Shops (reference P-175) are located in makeshift temporary metal and semi-permanent wood/concrete block facilities that were constructed for warehousing.
- ****The vacant UEPH facilities were constructed in 1943 as emergency multiuse facilities (Admin, Storage, and UEPH). Construction consists of concrete foundation, concrete slab, masonry walls, wood trusses, and asphalt shingles; minimum electric power and detached toilet facilities.
- ****The overall appearance, condition, and layout of the existing Dining
 Facilities being modernized (reference P-697) are inefficient, underutilized, and do not permit a favorable environment while personnel are
 dining.



MARINE CORPS BASE.	CAMP LEJEUNE, NORTH CAN	ROLINA 28542	
4. PROJECT TITLE MODERNIZE ENLISTED	DINING FACILITIES BB-10	03, 1209;	р-697
11-12+, a 300 /	SLIPPI EMENTAL	DATA	
	AL COST TO ODEDATE THE		186
A. ESTIMATED ANNUL	AL CUST TO OPERATE THE	PROPOSED FACILITI	(\$000
B. NUMBER OF ADDI THE FUNCTION O	F THE PROPOSED FACILITY	ARY IU CARRY UUI	0
C. ESTIMATED LIFE	-CYCLE COST TO OPERATE	AND MAINTAIN THE	(PEOPI
PROPOSED FACIL	ΙΤΥ	••••••	·
D. ESTIMATED LIFE	-CYCLE COST TO OPERATE	AND MAINTAIN THE A REPLACEMENT	. N/A
	stimated): **NOTE		(\$00
E. DESIGN DATA (E			•
I. STATUS			
a. Date D b. Percen c. Fercen d. Date D	esign Started t Complete as of 1 Jan t Complete as of 1 Oct esign Complete	19 19	:
2. BASIS			
a. Standa b. Where	rd or Definitive Design Design was Most Recentl	n: Yes No y Used:	
3. COST (Tota	1) = $c = a+b$ and $d+e$		(\$00
a. Produc	tion of Plans and Speci	fications	
D. All Ot c. Total.	ner Design Costs		:
d. Contra e. In-Hou	ct se		: {
the second s	ON START		. Sealt
4. CONSTRUCTI			(mont
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 4. CONSTRUCTI F. EQUIPMENT ASSO FROM OTHER APP 	CIATED WITH THIS PROJEC ROPRIATIONS: *NOTE	CT WHICH WILL BE PROV	1020
 4. CONSTRUCTI F. EQUIPMENT ASSO FROM OTHER APP Equipment 	CIATED WITH THIS PROJEC ROPRIATIONS: *NOTE Procuring	Fiscal Year Appropriated	Cos

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1. COMPONENT Navy	FY 19 82 MILITARY CONSTRUCTION PROJECT DATA	2. DATE 5 NOV 1980
MARINE CORPS	BASE, CAMP LEJEUNE, NORTH CAROLINA 28542	
MODERNIZE EN M-424, & 508	LISTED DINING FACILITIES BB-103, 1209,	JECT NUMBER P-697

NOTES :

*These Dining Facilities are inadequate and are being modernized to bring them up to standards that are required to support today's all volunteer Marine Corps. A cost analysis has been made for feasibility and cost effectiveness, and it was found to be in the best interests of the Government to rehabilitate these facilities.

**CMC (Code LFF) will complete.



PREVIOUS EDITIONS MAY BE USED INTERNALLY UNTIL EXHAUSTED

U.S. GOVERNMENT PRINTING OFFICE: 1978-703-173/34312-1



WORK SHEETS

P-697, MODERNIZE ENLISTED DINING FACILITIES

A. Annual Maintenance Cost:

- 3

Inventory of Like Facilities = 433,312 SF Cost/Yr of Existing Facilities = \$274,109Cost/SF $\frac{$274,109}{433,312}$ = \$.63/SFProposed Facility = 95,433 SF 95,433 SF X \$.63 = \$60,123SOURCE: Base Historical Data

- B. Utility Costs:
 - 1. Electricity: 1,200,000 KWH/YR X .0353/KWH = \$42,360
 - 2. Steam: 18,090,900 LBS/YR X .01007/LB = \$182,175
 - 3. Water & Sewage: 65 gal per pn per day:

(a) Annual Water Cost: 4,036 pn X 65 gal/day X \$.6438/1000 gal

X 365 days = \$61,646

(b) Annual Sewage Cost: 4,036 pn X 65 gal/day X \$.4673/1000 gal

X 365 days = \$44,746

4. Summary of Utility Costs (Annual):

Electricity:	\$ 42,360
Steam:	\$182,175
Water & Sewage:	\$106,392
TOTAL:	\$330,927

C. Other Engineering Support:

Trash Disposal:	\$11,050
Pest Control:	\$ 5,344
Misc. Services:	\$10,000
TOTAL:	\$26,394

Page (1) of (2)



WORK SHEETS, P-697, MODERNIZE ENLISTED DINING FACILITIES

D. <u>Summary of Costs</u>: (escalated to FY-82) Maintenance & Repair: \$ 60,123 \$ 69,983 Utilities: \$330,927 \$385,199 Other Engr. Support: <u>\$ 26,394</u> <u>\$ 30,723</u> TOTAL: \$417,444 \$485,905

Escalation Factor for Above:

80-81 - 8.3% 81-82 = 7.5%

EF = 1.083 X 1.075 = 1.164


PHO:408: CNB: bb P-697 7 Aug 1980 40%

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From: Base Commander To: Commandant of the Marine Corps (LFS-3)

Subj: FY-82 MCON Project P-697, Dining Facilities Modernization; update of collateral equipment for

Ref: (a) MCO P11000.12

Encl: (1) LANTDIV 4-11010/6 Forms, Collateral Equipment Requirements for P-697, Dining Facilities Modernization, dtd 30 Jul 1980

1. Reference (a) provided detailed instruction for the preparation of Collateral Equipment Requirements lists. In accordance with reference (a), the collateral equipment requirements for the subject project have been updated and are hereby submitted as enclosure (1).

V. PODBIELSKI By direction

Blind copy to: (w/encl) AC/S, Fac AC/S, Sup Serv BFS0

Pls network to PN Planning Branch



Nomone principal with out martin E19

COLLATERAL EQUIPMENT REQUIREMENTS (Initial Outfitting) 5ND LANTDIV 4-11010/6 (NEW 2-79)

DATE JULY 1980

1: ACTIVITY (Name and Location)

MARINE CORPS BASE, CAMP LEJEUNE, NORTH CAROLINA 28542

2. PRODECTIVE FACILITY MODERNIZATION, BLDG BA-103					P. NO. P-697	
	COG. SYMBOL AND FED. STOCK NO. OR OTHER SOURCE	ITEM/EQUIPMENT DESCRIPTION	QUAN- TITY	UNIT OF ISSUE	UNIT PRICE	TOTA
•	Built-in Equipment to be MCON Funded	and the second				
		<pre>*Heating, ventilating, and air- conditioning installations *Fire alarm and intercom systems</pre>		EA EA		
		*Venetian Blinds and Window Screens *Serving line vent bood		EA		
	•	*Soiled ware handling system *Deep fat fryer *Convection oven		EA EA EA		
Eq	uipment with associat	*Vertical cutter, mixer ed installation cost.		EA		
•	Expense Items					
	Wasserstorm 2 Keating American Warehouse	Refrigerated display case Grill, electric, 6 ft. Hot food table, mobile Beverage island Subtotal	1 1 2 1	EA EA EA EA	3,355 2,508 1,425 2,500	3,355 2,508 2,850 2,500 11,213
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					an a	1.2



COLLATERAL EQUIPMENT REQUIREMENTS (Initial Outfitting) 5ND LANTDIV 4-11010/6 (NEW 2-79)

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DATE 30 JULY 1980

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of 5

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2. PROJECT TITLE DINING FACILITY MODERNIZATION, BLDG 1209					
COG. SYMBOL AND FED. STOCK NO. OR OTHER SOURCE	ITEM/EQUIPMENT DESCRIPTION	QUAN- TITY	UN!T OF ISSUE	UNIT PRICE	TOTA
• Built-in Equipment to be MCON funded	*Heating, Ventilating, and air- conditioning installations		EA		
	*Fire alarm and intercom systems *Drinking water coolers *Venetian blinds and window screens *Dishwasher, flight type *Ventilation hood, serving line *Soiled ware handling system *Vertical cutter mixer	8	EA EA EA EA EA EA		
Equipment with associa	ted installation cost.				Prage 1
• Expense Items					
	Subtotal	3	EA	2,500	7,500



COLLATERAL EQUIPMENT REQUIREMENTS (Initial Outfitting) 5ND LANTDIV 4-11010/6 (NEW 2-79)

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DATE 30 JULY 1980

1: ACTIVITY (Name and Location)

MARINE CORPS BASE, CAMP LEJEUNE, NORTH CAROLINA 28542

2. PROJECT TITLE DINING FACILITY MODERNIZATION, BLDG. RR-3						P. NO. P-697	
	COG. SYMBOL AND FED. STOCK NO. OR OTHER SOURCE	ITEM/EQUIPMENT DESCRIPTION	QUAN- TITY	UNIT OF ISSUE	UNIT	TOTAL	
Eq	Built-in Equipment to be MCON Funded	<pre>*Heating, ventilating, and air- conditioning installations *Fire alarm and intercom systems *Drinking water coolers *Venetian blinds and window screens *Pot washer *Vertical cutter, mixer *Convection oven *Soiled ware handling system ted installation cost.</pre>		EA EA EA EA EA EA EA EA			
•	Expense Items		299.				
	Wasserstorm Keating Lern	Cold food counters w/sneeze guards Grill, electric, 6 ft. Ice machine Beverage island Subtotal	4 2 1 2	EA EA EA EA	1,837 2,508 1,980 2,500	7,348 5,016 1,980 <u>5,000</u> 19,344	
		х			- 24.5 - 24.5 - 24.5		



COLLATERAL EQUIPMENT REQUISED MENTS (Initial Outfitting) 5ND LANTDIV 4-11010/6 (NEW 2-79)

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DATE 30 JULY 1980

1. ACTIVITY (Name and Location)

MARINE CORPS BASE, CAMP LEJEUNE, NORTH CAROLINA 28542

		2. PROJECT TILE DINING FACILITY MODERNIZATION, BLDG M-424				
F	COG. SYMBOL AND ED. STOCK NO. OR OTHER SOURCE	ITEM/EQUIPMENT DESCRIPTION	QUAN- TITY	UNIT OF ISSUE	UNIT PRICE	TOTA COST
Bu to	uilt-in Equipment o be MCON Funded	*Heating, ventilating, and air				
		conditioning installation *Fire alarm and intercom system *Drinking water coolers *Venetian blinds and window screens *Pot washer	3	EA EA EA EA EA		-
		*Soiled ware handling system *Ice dispenser *Convection oven		EA EA EA		
Equi	pment with associat	ed installation costs.				
• <u>E</u> :	xpense Items					
ĸ	eating	Cold food counter w/sneeze guard Grill, electric, 6 ft. Beverage island Subtotal	4 4 4	EA EA EA	1,837 2,508 2,500	7,348 10,032 <u>10,000</u> 27,380
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			c.:-			
		and the second		- 10		



COLL'ATERAL EQUIPMENT REQUIREMENTS (Initial Outfitting) 5ND LANTDIV 4-11010/6 (NEW 2-79)

DATE 30 July 1980'

P. NO.

1: ACTIVITY (Name and Location)

MARINE CORPS BASE, CAMP LEJEUNE, NORTH CAROLINA 28542

2. PROJECT TITLE

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DI	DINING FACILITY MODERNIZATION, BLDG 508					
	COG. SYMBOL AND FED. STOCK NO. OR OTHER SOURCE	ITEM/EQUIPMENT DESCRIPTION	QUAN- TITY	UNIT OF ISSUE	UNIT PRICE	TOTAL COST
1.	Built-in Equipment to be MCON Funded	and the second				
		*Heating, ventilating and air+ conditioning installation		EA	1.	
		*Drinking water coolers *Venetian blinds and window screen	s	EA EA		
		*Pot washer *Reefer, reach-in *Soiled ware handling system *Serving line vent hood		EA EA EA EA		
Eq	uipment with associat	ed installation costs.				
•	Expense Items					
	Keating	Griddle, electric, 6 ft. Beverage island Subtotal	2 2	EA EA	2,508 2,500	5,016 5,000 10,016
						e og konstandel Mod Anter er er Anter er er
		Bldg BA-103 Bldg 1209 Bldg RR-3 Bldg M-424 Bldg 508				$ \begin{array}{r} 11,213 \\ 7,500 \\ 19,344 \\ 27,380 \\ \underline{10,016} \\ 75,453 \\ \end{array} $
		Total Expense Items	11/13			73,433
		installation charges, con- tingencies (10%)				7,545
		Grand Total				82,998
						1.11.22
						, · · · ·
			June .			

Page 5 of 5



1 AUG 1980

ARCHITECTURAL BRANCH CONTRACT PRIORITY LIST

Contract No.	Title	Completion Date
2025	IMPROVE ENL CLUBS, BLDGS 62 & M-134	1 AUG 80
2092	REROOF PORTION BLDG . H-14	1 AUG 80
2040	ADDN TO'ENL CLUB, FRENCH CREEK	15 AUG 80
2090	STAINED GLASS WINDOWS	22 AUG 80
2111	ADDITION/ALTERATIONS TO NCO CLUB, 2	5 SEP 80
2099	CONSTRUCT DETENTION CELL, PMO, BLDG AS-122	5 SEP 80
2109	DISBURSING IMPROVEMENTS	19 SEP 80
2108	HELICOPTER INTERNAL STORES	3 OCT 80
2106	MOD TO COMM CENTER	17 OCT 80
2107	BATTERY SHOP	31 OCT 80
2077	GYM FLOORS	14 NOV 80
2076	REROOF 1200 & 1500	28 NOV 80

BLPG 14.

10ct.

