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N-SPRINGS ERA ALTERNATIVES

Alternative: Freeze Wall

Capitol Cost: (installed)

Freeze wall, subcontractor installed	$4,000,000
Testing (including engineering)	$50,000
Engineering @ 10%	$400,000
Project Management @ 11%	$440,000
SUB-TOTAL:	$4,890,000
Contingency @ 30%	$1,467,000
TOTAL Capital Cost	**$6,357,000**

O & M Cost: (annual)

Operating Labor (2.5 FTE)	$375,000
Maintenance (1.5 FTE)	$250,000
Electric Power (8 Million KwH @ $0.035)	$280,000
Annual O & M Cost	$905,000
Present Worth, Annaul O&M 10 Yrs @ 10%	**$5,560,000**
PRESENT WORTH	**$11,917,000**

NOTE:

freezeWALL, Inc., actually quoted a higher cost for installation of pipes. In the Alternate 3, Vertical Barrier comparison, only one year of O&M cost was included (@ $459,000). If the Present Worth of the cost would have been added, it would have added $2,820,000 to the cost, giving a Total Present Worth cost of $9,853,400, not $7,492,400.

9413288.1407

HNFD: N-Springs Freeze Wall
Rough budget estimate for a
Freeze wall, 2,800 LF x 50' D

Designed By:
Estimated By: Clendenon

Prepared By: USACE NPW Cost Engineering

Preparation Date: 04/24/94
Effective Date of Pricing: 03/22/94
Est Construction Time: 180 Days

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This estimate is an order of magnitude budget estimate for installation of a freeze wall along the river shore at the N-Reactor site. This wall is assumed 2,800 LF x 50' deep, the freeze wall being about 25' wide when fully formed. 4" D vibratory driven steel pipe piles are assumed used in the freeze wall system, a 2" D pvc supply pipe being inserted into each of about 930 holes, 6' o.c. and 15' apart. The holes are connected with a pipe manifold system to initially six (6) refrigeration plants for forming the freeze wall, then to three (3) refrigeration plants for maintaining the wall in its fozen state. Costs for installation of the freeze wall system were supplied by freezeWall, Inc., Rockaway, NJ.

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For comparing with other alternatives will use:

Engineering @ 10%
Project Management @ 11%

Contingency @ 30%

O & M Cost: 10 years @ 10% discount rate == 6.14457 factor x Annual cost

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9413288.1411

U.S. Army Corps of Engineers - D.O. 94 - Final
PROJECT NSFRZW: HNFD: N-Springs Freeze Wall - Rough budget estimate for a
Budget estimate for freeze wall, N-springs
** PROJECT OWNER SUMMARY - WastSite (Rounded to 10's) **

	QUANTITY UOM	CONTRACT	Engr	ProjMngt	CONTINGN	TOTAL COST	UNIT COST	NOTES
1 Freeze Wall, 50' D, 25' W		3,996,450	399,640	483,570	1,463,900	6,343,560		
TOTAL HNFD: N-Springs Freeze Wall	140000.00 SF	3,996,450	399,640	483,570	1,463,900	6,343,560	45.31	

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	QUANTITY UOM	CONTRACT	Engr	ProjMngt	CONTINGN	TOTAL COST	UNIT COST	NOTES
1 Freeze Wall, 50' D, 25' W								
1-01 Mob, DeMob, & Prepwork		50,000	5,000	6,050	18,310	79,360		
1-02 Site Work		3,946,450	394,650	477,520	1,445,590	6,264,200		
TOTAL Freeze Wall, 50' D, 25' W		3,996,450	399,640	483,570	1,463,900	6,343,560		
TOTAL HNFD: N-Springs Freeze Wall	140000.00 SF	3,996,450	399,640	483,570	1,463,900	6,343,560	45.31	

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	QUANTITY UOM	DIRECT	FOOH	HOOH	PROF	BOND	B&O TAX	TOTAL COST	UNIT COST
1 Freeze Wall, 50' D, 25' W		3,610,920	178,640	68,480	115,040	7,770	15,610	3,996,450	
TOTAL HNFD: N-Springs Freeze Wall	140000.00 SF	3,610,920	178,640	68,480	115,040	7,770	15,610	3,996,450	28.55

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	QUANTITY UOM	DIRECT	FOOH	HOOH	PROF	BOND	B&O TAX	TOTAL COST	UNIT COST
1 Freeze Wall, 50' D, 25' W									
1-01 Mob, DeMob, & Prepwork		37,770	5,670	2,170	3,650	250	500	50,000	
1-02 Site Work		3,573,150	172,970	66,310	111,390	7,520	15,110	3,946,450	
TOTAL Freeze Wall, 50' D, 25' W		3,610,920	178,640	68,480	115,040	7,770	15,610	3,996,450	
TOTAL HNFD: N-Springs Freeze Wall	140000.00 SF	3,610,920	178,640	68,480	115,040	7,770	15,610	3,996,450	28.55

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	DIRECT	FOOH	HOOH	PROF	BOND	B&O TAX	TOTAL COST	UNIT COST
AA 50' Deep, General Contractor								
PD Pile Driving Subcontractor	924,150	92,410	40,660	84,580	0	0	1,141,800	
Subtotal Subcontract Work	924,150	92,410	40,660	84,580	0	0	1,141,800	
Indirect on Subcontracts	1,141,800	171,270	65,650	110,300	7,450	14,960	1,511,440	
Indirect on Own Work	49,110	7,370	2,820	4,740	320	640	65,010	
AA 50' Deep, General Contractor	1,190,920	178,640	68,480	115,040	7,770	15,610	1,576,450	
AB No Mark Items	2,420,000	0	0	0	0	0	2,420,000	

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1-01. Mob, DeMob, & Prepwork	QUANTY	UOM	CREW ID	OUTPUT	MHRS	LABR	EQUIP	MAT	OTHER	TOTAL COST	UNIT COST
1. Freeze Wall, 50' D, 25' W 2,800 LF, 50' deep, Freeze wall, placed using 4" steel pipe piles at 6' o.c. and 15' apart creating a 25' wide freeze zone wall. 1-01. Mob, DeMob, & Prepwork											
1-01 01. Mobilization This covers equipment mobiliztion.											
CIV AA <01505 1401 > Mob, Crane, 25-50 Ton, Mech, Trk Mtd, 100' boom, 100-mi Rad	5.00	EA	N/A	0.00	0.00 0	0.00 0	625.00 3,125	0.00 0	0.00 0	625.00 3,125	625.00
CIV AA <01505 8532 > Mob, Pile Extractor, 40 Ton, Line Pull, 100-mi Rad	2.00	EA	N/A	0.00	0.00 0	0.00 0	375.00 750	0.00 0	0.00 0	375.00 750	375.00
CIV AA <01505 8534 > Mob, Pile Leads, 10"x37", 60' L, 100-mi Rad	10.00	EA	N/A	0.00	0.00 0	0.00 0	350.00 3,500	0.00 0	0.00 0	350.00 3,500	350.00
CIV AA <01505 8561 > Mob, Pile Hammer, Vib, 40 Ton Max Driving Force, 100-mi Rad	5.00	EA	N/A	0.00	0.00 0	0.00 0	175.00 875	0.00 0	0.00 0	175.00 875	175.00
CIV AA <01505 8101 > Mob, Air Comp, 100- 250 CFM, Quiet, Portable, 100-mi Rad	5.00	EA	N/A	0.00	0.00 0	0.00 0	75.00 375	0.00 0	0.00 0	75.00 375	75.00
CIV AA <01505 5202 > Mob, Motor Grader, 126-150 HP, Art. Fr, Pwr Shift, 100-mi Rad	1.00	EA	N/A	0.00	0.00 0	0.00 0	475.00 475	0.00 0	0.00 0	475.00 475	475.00
CIV AA <01505 6115 > Mob, Dozer, Crawler, 176-225 HP w/blade, Incl Setup, 100-mi Rad	1.00	EA	N/A	0.00	0.00 0	0.00 0	700.00 700	0.00 0	0.00 0	700.00 700	700.00
CIV AA <01505 7114 > Mob, Truck, 10,000-30,000 GVW, w/ 8'x 16' Flat Bed, 100-mi Rad	5.00	EA	N/A	0.00	0.00 0	0.00 0	85.00 425	0.00 0	0.00 0	85.00 425	85.00
CIV AA <01505 8516 > Mob, Misc Small Equip, < 2,750# Haul w/small flatbed, 100-mi Rad	10.00	EA	N/A	0.00	0.00 0	0.00 0	75.00 750	0.00 0	0.00 0	75.00 750	75.00
USR AA < > Mobilization of Field Offices	2.00	EA		0.00	0.00 0	250.00 500	200.00 400	53.90 108	0.00 0	503.90 1,008	503.90
TOTAL Mobilization					0	500	11,375	108	0	11,983	
1-01 02. Prep Work: Surveying & Allowance											
CIV AA <01330 1142 > Survey Party, 3-Man & Suburban Vehicle	10.00	DAY	USURB	0.13	24.00 240	424.64 4,246	62.13 621	0.00 0	0.00 0	486.77 4,868	486.77
CIV AA <01330 1144 > Surveying Data & Drafting	40.00	HR	UFLDA	1.00	1.25 50	21.18 847	0.35 14	0.00 0	0.00 0	21.53 861	21.53
USR AA <01310 > Prepwork/Submittals Allowance	240.00	HR		0.00	0.00 0	30.00 7,200	2.50 600	1.08 259	0.00 0	33.58 8,059	33.58

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1-01. Mob, DeMob, & Prepwork	QUANTY UOM CREW ID	OUTPUT	MHRS	LABR	EQUIP	MAT	OTHER	TOTAL COST	UNIT COST
TOTAL Prep Work: Surveying & Allowance			290	12,294	1,235	259	0	13,788	
1-01 03. DeMobilization									
Assume Demob at 100% of Mob.									
TOTAL DeMobilization			0	0	12,000	0	0	12,000	
TOTAL Mob, DeMob, & Prepwork			290	12,294	24,610	367	0	37,770	

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1-02. Site Work	QUANTY	UOM	CREW ID	OUTPUT	MHRS	LABR	EQUIP	MAT	OTHER	TOTAL COST	UNIT COST
1-02. Site Work											
1-02 01. Site Prep - Work Platform Assume a work platform will need to be prepared. Platform will be constructed using a D-7 dozer, G-12 grader, and water truck (6K gal). Assume about 15'-20' wide platform, no new fill needed, 5 days to prepare. There is a existing roadway which could be used or widened, but assume above work will still be needed.											
L USR AA <02210 1005 > Rough Grade Small Area w/Dozer Cat D-7, 215 HP. Allow 5 days for dozer to rough grade platform for pile driving and grouting work.	40.00	HR	CODTH	1.00	2.00 80	54.75 2,190	62.82 2,513	0.00 0	0.00 0	117.57 4,703	117.57
L USR AA <02210 2001 > Grade platform	6.00	MSY	COFGA	0.25	8.00 48	219.00 1,314	111.25 668	0.00 0	0.00 0	330.25 1,982	330.25
USR AA <02223 1001 > Compaction/Dust control Water, from river	40.00	HR	COFWK	1.00	1.75 70	49.33 1,973	67.15 2,686	0.00 0	0.00 0	116.47 4,659	116.47
TOTAL Site Prep - Work Platform	2800.00	LF			198	5,477	5,866	0	0	11,343	4.05
1-02 02. Steel pipe pile installation This covers cost for a 930 EA + 56 EA + extra allowance, 4" D x 55 VLF steel pipe pile, assume using thick wall pipe, placed by vibratory driver. By placing wall close to river, it is assumed the wall will miss the large cobble/boulder layer associated with the Hanford formation. For this number of piles, 4-5 pile driver units would be needed in order to complete in a timely matter (1-2 months). Assume a Pile Driver Subcontractor will be used to place pipe piles.											
B USR PD <02316 2001 > 4" D, Non-Filled Pipe Piles Steel, thick walled. 930 ea @ 55 vlf = 51,150 vlf add 5% for extras = 2,550 vlf add 56 @ 55 vlf = 3,080 vlf (for monitoring) Total: 56,780 vlf USE: 56,800 vlf	56800	VLF	CPIDC	30.00	0.27 15,149	7.34 514,766	3.42 239,790	4.58 321,518	0.00 0	15.33 1,076,074	18.94
B MIL PD <02316 3201 > 4" D, Pipe Pile Point Standard, Steel 930 ea points + 56 ea (monitor) + 44 ea for extras == 1,030 ea	1030.00	EA	SIWWA	1.00	1.25 1,288	39.15 49,822	1.72 2,190	10.78 13,718	0.00 0	51.65 65,730	63.82
TOTAL Steel pipe pile installation	51150	VLF			16,436	564,588	241,979	335,237	0	1,141,804	22.32

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1-02. Site Work	QUANTY UOM CREW ID	OUTPUT	MHRS	LABR	EQUIP	MAT	OTHER	TOTAL COST	UNIT COST
1-02 03. Permanent Equipment, 3 plants Permanent Equipment costs includes: 3 plants, data monitoring system, and refrigeration material (Freon/ ammonia; oil; Ca Cl2) Quote from: freezeWALL, Inc., Bernd Braun, Rockway, NJ (4/22/94) TOTAL Permanent Equipment, 3 plants			0	0	1,100,000	0	0	1,100,000	
1-02 04. Install System w/ Mob Install System w/ Mob cost includes: Surface piping material, labor & supervision (40% labor & Superv. and 60% materials and misc.) Quote from: freezeWALL, Inc., Bernd Braun (4/22/94) TOTAL Install System w/ Mob			0	370,000	0	550,000	0	920,000	
1-02 05. Form freeze wall Form freeze wall cost includes: 3.6 million KwHrs @ 0.05/KwHr, plus labor, supervision, and equipment (using 6 refrigeration plants to form freeze wall, about 3 month period) Quote from: freezeWALL, Inc., Bernd Braun (4/22/94) TOTAL Form freeze wall			0	150,000	20,000	50,000	180,000	400,000	
TOTAL Site Work			16,634	1,090,065	1,367,846	935,237	180,000	3,573,147	
TOTAL Freeze Wall, 50' D, 25' W			16,924	1,102,859	1,392,456	935,603	180,000	3,610,918	
TOTAL HNFD: N-Springs Freeze Wall	140000 SF		16,924	1,102,859	1,392,456	935,603	180,000	3,610,918	25.79

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SRC	ITEM ID	DESCRIPTION	NO.	UOM	RATE	**** LABOR **** HOURS	COST	**** EQUIP **** HOURS	COST	TOTAL COST				
	CODTH	1 B-eqoprmed + 1 Dozer, Cat D-7H, 215 Hp+Laborer	PROD = 100%						CREW HOURS =	40				
MIL	B-LABORER L	Laborer (Semi-Skilled)	1.00	HR	25.64	1.00	25.64			25.64				
MIL	B-EQOPRMEDF	Eq Oper, Medium	1.00	HR	29.11	1.00	29.11			29.11				
MIL	T10CA013 E	BLADE, UNIVERSAL,HYDR,FOR D7	1.00	HR	5.72			1.00	5.72	5.72				
MIL	T15CA013 E	DOZER,CWLR,D-7H,PS,(ADD BLADE)	1.00	HR	57.10			1.00	57.10	57.10				
	TOTAL					2.00	54.75	2.00	62.82	117.57	0	0	3,996,450	28.55
	COFGA	1 B-eqoprmed + 1 Grader, Cat 12g, 135 Hp	PROD = 100%						CREW HOURS =	24				
MIL	B-LABORER L	Laborer (Semi-Skilled)	1.00	HR	25.64	1.00	25.64			25.64				
MIL	B-EQOPRMEDF	Eq Oper, Medium	1.00	HR	29.11	1.00	29.11			29.11				
MIL	G15CA003 E	GRADER,MOTOR,CAT12-G, ARTIC	1.00	HR	27.81			1.00	27.81	27.81				
	TOTAL					2.00	54.75	1.00	27.81	82.56				
	COFWK	1 B-trkdvrhvl+ 1 Water Wagon,6000 Gal + 6" Pump	PROD = 100%						CREW HOURS =	40				
MIL	B-EQOPRLT F	Eq Oper, Light	0.25	HR	28.18	0.25	7.05			7.05				
MIL	B-TRKDVRHVL	Truck Drivers, Heavy	1.00	HR	28.44	1.00	28.44			28.44				
MIL	B-EQOPRLT L	Eq Oper, Light	0.50	HR	27.68	0.50	13.84			13.84				
MIL	P55GR004 E	PUMP,WATER,SUB,6",1950GPM/40'HD	1.00	HR	5.68			1.00	5.68	5.68				
MIL	T60KI002 E	TRK,WTR,OFF-HWY, 6000GAL,CAT621	1.00	HR	61.46			1.00	61.46	61.46				
	TOTAL					1.75	49.33	2.00	67.15	116.47				
	CPIDC	5 B-piledrvr + 1 SingleAction PileHammr/40TCrane	PROD = 100%						CREW HOURS =	1893				
MIL	A15XX014 E	AIR COMPR, 900 CFM, 100 PSI	1.00	HR	24.17			1.00	24.17	24.17				
MIL	B-EQOPRCRNL	Eq Oper, Crane/Shovl	2.00	HR	29.37	2.00	58.74			58.74				
MIL	B-EQOPROILL	Eq Oper, Oilers	1.00	HR	26.68	1.00	26.68			26.68				
MIL	B-PILEDRVRF	Pile Drivers	1.00	HR	29.66	1.00	29.66			29.66				
MIL	B-PILEDRVRA	Pile Drivers	2.00	HR	23.33	2.00	46.66			46.66				
MIL	B-PILEDRVRL	Pile Drivers	2.00	HR	29.16	2.00	58.32			58.32				
MIL	C80PH004 E	CRANE,HYD,TRK MTD,40T W/106'BOO	1.00	HR	51.28			1.00	51.28	51.28				
MIL	P10XX002 E	PILE LEADS, 8"X26", 60' LENGTH	1.00	HR	6.26			1.00	6.26	6.26				
MIL	XMIXX020 E	Small Tools	0.90	HR	1.39			0.90	1.25	1.25				
MIL	P25VU002 E	PILE HAMR,SNG,19500FT-#,ADD COM	1.00	HR	15.43			1.00	15.43	15.43				
MIL	A20XX007 E	AIR HOSE, 3.0", 50', HARDROCK	2.00	HR	2.06			2.00	4.12	4.12				
	TOTAL					8.00	220.06	6.90	102.51	322.56				
	SIWWA	1 B-welders + 1 Electrical Welding Machine	PROD = 100%						CREW HOURS =	1030				
MIL	B-WELDERS L	Welders, Struct Steel	1.00	HR	31.22	1.00	31.22			31.22				
MIL	B-WELDERS F	Welders, Struct Steel	0.25	HR	31.72	0.25	7.93			7.93				
MIL	XMIXX020 E	Small Tools	0.21	HR	1.39			0.21	0.29	0.29				
MIL	W35XX009 E	ELEC DRIVE,WELDER,300 AMP,SKID	1.00	HR	1.43			1.00	1.43	1.43				
	TOTAL					1.25	39.15	1.21	1.72	40.87				

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SRC	ITEM ID		DESCRIPTION	NO.	UOM	RATE	**** LABOR **** HOURS	**** LABOR **** COST	**** EQUIP **** HOURS	**** EQUIP **** COST	TOTAL COST
	UFLDA		Field Draftsman			PROD = 100%				CREW HOURS =	40
FOP *	FC-FLDRT	L	Field Draftsman	1.00	HR	15.00	1.00	15.00			15.00
FOP *	FC-FLDER	F	Field Engineer	0.25	HR	24.73	0.25	6.18			6.18
MIL *	XMIXX020	E	Small Tools	0.25	HR	1.39			0.25	0.35	0.35
	TOTAL						1.25	21.18	0.25	0.35	21.53
	USURB		3 FC-suryr + 4x4 Suburban + Small Tools			PROD = 100%				CREW HOURS =	80
FOP *	FC-SURYC	L	Surveyor, Chief	1.00	DAY	147.68	8.00	147.68			147.68
FOP *	FC-SURYR	L	Surveyor	2.00	DAY	138.48	16.00	276.96			276.96
MIL *	XMIXX020	E	Small Tools	1.00	DAY	11.12			8.00	11.12	11.12
MIL *	T50GM005	E	TRK,HWY,4X4 SUBURBAN, 8600 GVW	0.75	DAY	68.01			6.00	51.01	51.01
	TOTAL						24.00	424.64	14.00	62.13	486.77

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SRC	LABOR ID	DESCRIPTION	BASE	OVERTM	TXS/INS	FRNG	TRVL	RATE	UOM	UPDATE	**** TOTAL **** DEFAULT	HOURS
MIL	B-EQOPRCRN	Equip. Operators, Crane/Shovel	29.37	0.0%	0.0%	0.00	0.00	29.37	HR	03/15/94	21.20	3787
MIL	B-EQOPRLT	Equip. Operators, Light	27.68	0.0%	0.0%	0.00	0.00	27.68	HR	03/15/94	17.02	30
MIL	B-EQOPRMED	Equip. Operators, Medium	28.61	0.0%	0.0%	0.00	0.00	28.61	HR	03/15/94	17.15	64
MIL	B-EQOPROIL	Equip. Operators, Oilers	26.68	0.0%	0.0%	0.00	0.00	26.68	HR	03/15/94	11.00	1893
MIL	B-LABORER	Laborers, (Semi-Skilled)	25.64	0.0%	0.0%	0.00	0.00	25.64	HR	03/15/94	12.86	64
MIL	B-PILEDRVR	Pile Drivers	29.16	0.0%	0.0%	0.00	0.00	29.16	HR	03/15/94	23.05	9467
MIL	B-TRKDVRHV	Truck Drivers, Heavy	28.44	0.0%	0.0%	0.00	0.00	28.44	HR	03/15/94	10.49	40
MIL	B-WELDERS	Welders, Structural Steel	31.22	0.0%	0.0%	0.00	0.00	31.22	HR	03/15/94	24.06	1288
FOP	FC-FLDER	Field Engineers	24.23	0.0%	0.0%	0.00	0.00	24.23	HR	05/01/92	24.23	10
FOP	FC-FLDRT	Field Draftsmen	15.00	0.0%	0.0%	0.00	0.00	15.00	HR	05/01/92	15.00	40
FOP	FC-SURYC	Surveyors, Chief	18.46	0.0%	0.0%	0.00	0.00	18.46	HR	05/01/92	18.46	80
FOP	FC-SURYR	Surveyors	17.31	0.0%	0.0%	0.00	0.00	17.31	HR	05/01/92	17.31	160

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SRC	EQUIP ID	DESCRIPTION	DEPR	CAPT	FUEL	FOG	EQ REP	TR WR	TR REP	TOTAL	UOM	TOTAL HOURS
MIL	A15XX014	AIR COMPR, 900 CFM, 100 PSI	5.57	2.27	7.68	2.1	6.29	0.19	0.03	24.17	HR	1893
MIL	A20XX007	AIR HOSE, 3", 50',HARDROCK	0.71	0.09			1.26			2.06	HR	3787
MIL	C80PH004	CRANE,HYD,TRK MTD,40T W/106'BOOM	17.04	8.72	6.64	1.7	15.98	1.02	0.15	51.28	HR	1893
MIL	G15CA003	GRADER,MOTOR,CAT12-G, ARTIC	8.89	4.25	3.65	1.2	9.10	0.58	0.09	27.81	HR	24
MIL	P10XX002	PILE LEADS, 8"X26", 60' LENGTH	1.58	0.49		2.0	2.19			6.26	HR	1893
MIL	P25VU002	PILE HAMR,SNG,19500FT-#,ADD COMP	4.90	1.53		0.5	8.50			15.43	HR	1893
MIL	P55GR004	PUMP,WATER,SUB,6",1950GPM/40'HD	0.95	0.38	2.43	1.0	0.84			5.68	HR	40
MIL	T10CA013	BLADE, UNIVERSAL,HYDR,FOR D7	2.31	0.82		0.0	2.51			5.72	HR	40
MIL	T15CA013	DOZER,CWLR,D-7H,PS,(ADD BLADE)	15.18	6.00	6.88	2.4	26.56			57.10	HR	40
MIL	T50GM005	TRK,HWY,4X4 SUBURBAN, 8600 GVW	1.80	0.53	3.22	0.9	1.82	0.21	0.03	8.50	HR	60
MIL	T60K1002	TRK,WTR,OFF-HWY, 6000GAL,CAT621E	17.19	8.05	9.74	3.1	17.48	5.12	0.77	61.46	HR	40
MIL	W35XX009	ELEC DRIVE,WELDER,300 AMP,SKID	0.34	0.09	0.54	0.2	0.25			1.43	HR	1030
MIL	XMIXX020	Small Tools	0.46	0.17	0.13	0.0	0.57			1.39	HR	2010

FREEZE WALL O&M COSTS

1. GENERAL

freezeWALL, Inc. submitted Annual O&M costs as follows:

Operating labor (OL)	$153,000
Maintenance (M)	$ 66,000
Electric Power (EP)	$240,000
Total:	$459,000

The OL was basically 1 FTE, however, in talking with Paul Valcich of WHC, he said that would not work at Hanford. Based on current practices with the groundwater pump-n-treat systems, which, would be "similar" to the freeze system, Mr. Valcich stated that 2 FTE operators would be required per shift, as well as Supervision. For M, Mr. Valcich also stated that 2 FTE craft personnel would be need, as well as Supervision and Safety.

2. ESTIMATE FREEZE WALL O&M COSTS

Assumptions: 1 FTE = $150,000, Only day shift operation - no freezing during off shifts.

OL: 2 FTE operators + 0.25 FTE Supervision and 0.25 FTE Safety = 2.5 FTEs
2.5 FTE x $150,000 = $375,000

M: 2 FTE craft workers, but only needed 1/2 time, use 1.5 FTEs
1.5 FTE x $150,000 = $225,000 + $25,000 (materials/supplies) = $250,000

EP: $240,000 based on $0.03 Kw/Hr, use $0.035 Kw/Hr = $280,000

Annual costs:

OL =	$375,000
M =	$250,000
EP =	$280,000
Total:	$905,000

N-Springs ERA Proposal document used 10 years and a 10% discount rate for comparing alternatives. This computes to a 6.14457 factor.

Therefore, the Present Worth for the freeze wall option would equal:

$905,000 x 6.14457 = $5,560,835

USE: PW O&M = $5,560,000