

STUDY 1 - ALTERNATIVE STORAGE SYSTEMS FOR DUAL PURPOSE CANISTERS

COST DETAILS

ALTERNATIVE 1 - C-PAD, PILOT, LOW SEISMIC

LIFE CYCLE COST SUMMARIES



Interim Storage Facility
Pilot Storage Facility (5,000 MTU)

Project: C-PAD Pilot (5,000 MTU)

PILOT Project - C-PAD 60/40 Vertical/Horizontal - Low Seismic

Separate CHB

Annual Escalation Factor 1.90%

Life Cycle Costs (40 Year Life)	Capital	Operations	Transport	Decommissioning	Escalation	Total Costs
Design & Construction	\$779,581,409					\$779,581,409
Operations & Maintenance (40 Year Life)		\$566,213,291				\$566,213,291
Cask Handling		\$38,508,689				\$38,508,689
Transportation Equipment	\$0					\$0
Transport Operations		\$0	\$0			\$0
Repackaging	\$0	\$0				\$0
Transport to Repository	\$0		\$0			\$0
D&D				\$91,292,445		\$91,292,445
Escalation					\$701,752,643	<i>\$701,752,643</i>
Total Costs (40 year Life)						\$2,177,348,477
Present Value						\$1,226,480,689
Life Cycle Costs (90 Year Life)	Capital	Operations	Transport	Docommissioning	Eccalation	Total Costs
Life Cycle Costs (80 Year Life)	Capital	Operations	Transport	Decommissioning	Escalation	Total Costs
Design & Construction	Capital \$779,581,409	·	Transport	Decommissioning	Escalation	\$779,581,409
Design & Construction Operations & Maintenance (80 Year Life)	•	\$1,031,946,410	Transport	Decommissioning	Escalation	\$779,581,409 \$1,031,946,410
Design & Construction Operations & Maintenance (80 Year Life) Cask Handling	\$779,581,409	·	Transport	Decommissioning	Escalation	\$779,581,409 \$1,031,946,410 \$38,508,689
Design & Construction Operations & Maintenance (80 Year Life) Cask Handling Transportation Equipment	•	\$1,031,946,410 \$38,508,689	·	Decommissioning	Escalation	\$779,581,409 \$1,031,946,410 \$38,508,689 \$0
Design & Construction Operations & Maintenance (80 Year Life) Cask Handling Transportation Equipment Transport Operations	\$779,581,409 \$0	\$1,031,946,410 \$38,508,689 \$0	Transport \$0	Decommissioning	Escalation	\$779,581,409 \$1,031,946,410 \$38,508,689 \$0 \$0
Design & Construction Operations & Maintenance (80 Year Life) Cask Handling Transportation Equipment Transport Operations Repackaging	\$779,581,409 \$0 \$0	\$1,031,946,410 \$38,508,689	\$0	Decommissioning	Escalation	\$779,581,409 \$1,031,946,410 \$38,508,689 \$0 \$0 \$0
Design & Construction Operations & Maintenance (80 Year Life) Cask Handling Transportation Equipment Transport Operations	\$779,581,409 \$0	\$1,031,946,410 \$38,508,689 \$0	·		Escalation	\$779,581,409 \$1,031,946,410 \$38,508,689 \$0 \$0 \$0 \$0
Design & Construction Operations & Maintenance (80 Year Life) Cask Handling Transportation Equipment Transport Operations Repackaging Transport to Repository	\$779,581,409 \$0 \$0	\$1,031,946,410 \$38,508,689 \$0	\$0	Decommissioning \$91,292,445	Escalation \$2,310,737,337	\$779,581,409 \$1,031,946,410 \$38,508,689 \$0 \$0 \$0 \$0 \$0 \$91,292,445
Design & Construction Operations & Maintenance (80 Year Life) Cask Handling Transportation Equipment Transport Operations Repackaging Transport to Repository D&D	\$779,581,409 \$0 \$0	\$1,031,946,410 \$38,508,689 \$0	\$0			\$779,581,409 \$1,031,946,410 \$38,508,689 \$0 \$0 \$0 \$0
Design & Construction Operations & Maintenance (80 Year Life) Cask Handling Transportation Equipment Transport Operations Repackaging Transport to Repository D&D	\$779,581,409 \$0 \$0	\$1,031,946,410 \$38,508,689 \$0	\$0			\$779,581,409 \$1,031,946,410 \$38,508,689 \$0 \$0 \$0 \$0 \$0 \$91,292,445
Design & Construction Operations & Maintenance (80 Year Life) Cask Handling Transportation Equipment Transport Operations Repackaging Transport to Repository D&D Escalation	\$779,581,409 \$0 \$0	\$1,031,946,410 \$38,508,689 \$0	\$0			\$779,581,409 \$1,031,946,410 \$38,508,689 \$0 \$0 \$0 \$0 \$91,292,445 \$2,310,737,337



STUDY 1 - ALTERNATIVE STORAGE SYSTEMS FOR DUAL PURPOSE CANISTERS

COST DETAILS

ALTERNATIVE 1 - C-PAD, PILOT, LOW SEISMIC

CAPITAL COST SUMMARIES



Pilot Storage Facility (5,000 MTU)

Project: C-PAD Pilot (5,000 MTU)

PILOT Project - C-PAD 60/40 Vertical/Horizontal - Low Seismic

Separate CHB

Level 3 Cost Sumr	mary - First of A kin	nd module			
Level 1	Level 2	Level 3 Descrip	otion		Level 3 Total
C-PAD EX 01	2010. 2	•	storage Facility and transportation Project		2010.0100.0
	C-PAD EX 01.01			\$471,759,814	
		C-PAD EX 01.01.01	Storage Pads		\$0
		C-PAD EX 01.01.02	Cask Handling (Transfer) Facility		\$135,175,719
		C-PAD EX 01.01.03	Horizontal Dry Storage Modules		\$95,969,797
		C-PAD EX 01.01.04	Vertical Dry Storage Module		\$81,475,136
		C-PAD EX 01.01.05	Storage Cask Fabrication Facility		\$0
		C-PAD EX 01.01.06	Cask Maintenance Facility		\$0
		C-PAD EX 01.01.07	Concrete Batch Plant		\$1,850,000
		C-PAD EX 01.01.08	Visitor Center/ Auditorium		\$0
		C-PAD EX 01.01.09	Administration Building		\$3,140,000
		C-PAD EX 01.01.10	Security		\$24,148,975
		C-PAD EX 01.01.11	Rail Spur/ Receiving Yard		\$58,752,800
		C-PAD EX 01.01.12	Utilities		\$18,682,150
		C-PAD EX 01.01.13 C-PAD EX 01.01.14	Roads		\$18,212,737
		C-PAD EX 01.01.14 C-PAD EX 01.01.15	Parking Site Work		\$735,000
		C-PAD EX 01.01.15	Warehouse		\$23,417,500
					\$10,200,000
		C-PAD EX 01.01.17 C-PAD EX 01.01.18	Maintenance Facility		\$0 \$0
		C-PAD EX 01.01.18	Waste management Facility		ŞU
		01.01.01.xx	(Add Further Breakdown as needed)		\$0
			,		•
	C-PAD EX 01.02		Expanded Interim Storage Facility	\$0	
		C-PAD EX 01.02.01	Expanded Storage Pads and Dry Cask Storage System	ms	\$0
		C-PAD EX 01.02.02	Expanded Cask Handling Facility (if required)		\$0
		C-PAD EX 01.02.03	Horizontal Dry Storage Modules		\$0
		C-PAD EX 01.02.04	Vertical Dry Storage Casks		\$0
		C-PAD EX 01.02.05	Storage Cask Fabrication Facility (Expanded)		\$0
		C-PAD EX 01.02.06	Cask Maintenance Facility (Expanded)		\$0
		C-PAD EX 01.02.07	Concrete Batch Plant (Expanded if needed)		\$0
		C-PAD EX 01.02.08	Visitor Center/ Auditorium (expanded if needed)		\$0
		C-PAD EX 01.02.09	Administration Building (Expanded if needed)		\$0
		C-PAD EX 01.02.10	Security (Expanded)		\$0
		C-PAD EX 01.02.11	Rail Spur/ Receiving Yard (Expanded)		\$0
		C-PAD EX 01.02.12	Utilities Expanded as needed)		\$0
		C-PAD EX 01.02.13	Roads (Expanded)		\$0
		C-PAD EX 01.02.14	Parking (Expanded as needed)		\$0 \$0
		C-PAD EX 01.02.15	Site Work (Expanded)		\$0 \$0
		C-PAD EX 01.02.16	Warehouse (Expanded if Needed)		\$0 \$0
		C-PAD EX 01.02.17	Maintenance Facility (Expanded if needed)		\$0 \$0
		C-PAD EX 01.02.18 C-PAD EX 01.02.19	Waste management Facility (Expanded if needed) Hot Cell / Laboratories		\$0 \$0
		C-PAD EX 01.02.19 C-PAD EX 01.02.20	·		\$0 \$0
		C-PAD EX 01.02.20 C-PAD EX 01.02.21	Pool Packaging Facility Standardized Storage System		\$0 \$0
		C-PAD EX 01.02.21 C-PAD EX 01.02.22	Standardized Storage System Standardized Disposal Canister		\$0 \$0
		C-PAD EX 01.02.22 C-PAD EX 01.02.23	Canister Repackaging Facility (For Repository		\$0 \$0
	C-PAD EX 01.03	C-PAD EX 01.02.23	Transportation Equipment	\$0	ŞU
	C-1 AD LX 01.03	C-PAD EX 01.03.01	Transportation Casks	ŞŪ	\$0
		C-PAD EX 01.03.02	Rail Equipment		\$0 \$0
		C-PAD EX 01.03.03	Rail Maintenance Facility		\$0 \$0
		C-PAD EX 01.03.04	Transportation Systems Services		\$0 \$0
	C-PAD EX 01.04	0.040.57.01.01.01	Pre-Construction Capitalized Costs	\$60,265,000	A4 000 000
		C-PAD EX 01.04.01	Land or Land Leases		\$1,920,000
		C-PAD EX 01.04.02	Site Licensing		\$200,000
		C-PAD EX 01.04.03	Site Licensing Plant Permits		\$6,240,000 \$0
		C-PAD EX 01.04.05 C-PAD EX 01.04.06			\$0 \$750,000
		C-FAD EX U1.U4.UD	Planning and Alternative Studies		\$750,000



	C-PAD EX 01.04.07	Research and Dev	velopment		\$0
	C-PAD EX 01.04.08	Design			\$23,955,000
	C-PAD EX 01.04.09	Other Pre-constru	uction Costs		\$17,200,000
	C-PAD EX 01.04.10	Pre-construction of	contingencies		\$10,000,000
	C-PAD EX 01.04.xx	(Add Further Brea	akdown as needed)		\$0
C-PAD EX 01.05		Indirect Capitalized Costs		\$63,180,000	
	C-PAD EX 01.05.01	Project Managem	ent		\$2,700,000
	C-PAD EX 01.05.02	Construction Man	nagement		\$3,600,000
	C-PAD EX 01.05.03	Field indirect serv	rices		\$11,880,000
	C-PAD EX 01.05.04	Design Services in	support of Construction		\$5,400,000
	C-PAD EX 01.05.05	QA/QC			\$12,600,000
	C-PAD EX 01.05.06	Commissioning ar	nd Startup		\$1,200,000
	C-PAD EX 01.05.07	Home office Engir	neering support to Construction		\$7,200,000
	C-PAD EX 01.05.08	Document Contro	ol		\$2,700,000
	C-PAD EX 01.05.09	Project Controls			\$3,600,000
	C-PAD EX 01.05.10	Construction Test	ing		\$2,700,000
	C-PAD EX 01.05.11	Inspections			\$3,600,000
	C-PAD EX 01.05.12	Startup and Testir	ng		\$3,000,000
	C-PAD EX 01.05.13	Commissioning			\$3,000,000
C-PAD EX 01.06		Site Selection		\$0	
	C-PAD EX 01.06.01	Site Selection			\$0
	C-PAD EX 01.06.02	Public Information	n Process		\$0
C-PAD EX 01.07		Decontamination and Dec	onstruction	\$0	
	C-PAD EX 01.07.01	Decommissioning			\$0
	C-PAD EX 01.07.02	Decontamination			\$0
	C-PAD EX 01.07.03	Deconstruction			\$0
	C-PAD EX 01.07.04				\$0
	C-PAD EX 01.07.05				\$0
C-PAD EX 01.08		Project Financial Costs		\$79,757,445	
	C-PAD EX 01.08.01	Contractor Fees			\$47,616,385
	C-PAD EX 01.08.02	Escalation Costs			\$32,141,060
	C-PAD EX 01.08.03	Interest Payments	s		\$0
	C-PAD EX 01.08.04	Indirect costs to s	upport shipments to repository		\$0
	C-PAD EX 01.08.05				\$0
	C-PAD EX 01.08.xx	(Add Further Brea	akdown as needed)		\$0
C-PAD EX 01.09		Project Contingencies		\$104,619,150	
	C-PAD EX 01.09.01	Management Res	erve - Contractor Held		\$33,748,113
	C-PAD EX 01.09.02	Contingency - DO	E held		\$70,871,037
C-PAD EX 01.10					
	C-PAD EX 01.10.01	Other Direct Costs		\$0	
	C-PAD EX 01.10.02	DOE Project Oper	ations		\$0
	C-PAD EX 01.10.03	DOE TM&E			\$0
	C-PAD EX 01.10.04	Host site Operation			\$0
	C-PAD EX 01.10.05	Miscellaneous OD	OC .		\$0
C-PAD EX 01.11		Operational Costs		0	
	C-PAD EX 01.11.01	Operations Costs			\$0
	C-PAD EX 01.11.02	Transportation Co			\$0
	C-PAD EX 01.11.03	Escalation (Opera	tions/Transportation)		\$0
		T 50	/All Discort 9 in division Co. 1. 100	Facelette ()	¢700 740 070
		TEC TPC	(All Direct & indirect Costs, MR, (TEC plus Contingency, ODCs)	, Escalation)	\$708,710,372 \$779,581,409
		IPC	All Capitol, Operation, Transpor	rtation.	405,405,405 روز روز
		1.00	Free letter		6770 504 400



STUDY 1 - ALTERNATIVE STORAGE SYSTEMS FOR DUAL PURPOSE CANISTERS

COST DETAILS

ALTERNATIVE 1 - C-PAD, PILOT, LOW SEISMIC

LIFE CYCLE COST - 40 YEAR OPERATING LIFE

\$ 2,203,154,561



Interim Storage Facility

Pilot Storage Facility (5,000 MTU)

Project: C-PAD Pilot (5,000 MTU)

PILOT Project - C-PAD 60/40 Vertical/Horizontal - Low Seismic

Separate CHB

Separa	te CHB							۸nr	ual Escalation			Dic	count Rate
40 Yea	r Operating life							AIII	1.90%			פוט	3.00%
YEAR	Design/Const		O&M	C	ask Handling		D&D		Escalation	An	nual Expense		Cumulative
1	\$ 10,000,000	\$	-	\$	-	\$	-	Ś	190,000	\$	10,190,000	\$	10,190,000
2	\$ 10,000,000	\$	_	ς ς	_	\$	_	\$	383,610	\$	10,383,610	\$	20,573,610
3	\$ 20,000,000	\$	_	\$	_	\$	_	\$	1,161,797	\$	21,161,797	\$	41,735,407
4	\$ 20,000,000	\$	_	\$	_	\$	_	\$	1,563,871	\$	21,563,871	\$	63,299,279
5	\$ 20,000,000	\$	_	ς ,	_	\$	_	\$	1,973,585	\$	21,973,585	\$	85,272,863
6	\$ 20,000,000	\$	_	ς ς	_	\$	_	\$	2,391,083	\$	22,391,083	\$	107,663,946
7	\$ 27,888,399	ς ς	_	ς ς	_	ς ,	_	ς ς	3,927,403	\$	31,815,802	\$	139,479,748
8	\$ 200,000,000	ς ς	_	ς ς	_	ς ,	_	ς ς	32,500,273	\$	232,500,273	\$	371,980,021
9	\$ 200,000,000	\$	28,054,945	٠ \$	_	ς ,	_	ς ς	42,096,410	\$	270,151,354	ς ς	642,131,376
10	\$ 273,071,660	\$	26,453,185	¢	_	¢	_	ب د	62,030,422	\$	361,555,266	ب خ	1,003,686,642
11	Ç 2/3,0/1,000	ب خ	26,967,342	ب خ	12,836,230	ب خ	_	ċ	9,156,052	\$	48,959,623	ب خ	1,052,646,265
12	ċ	ې د	26,967,342	ې د	12,836,230	ې د	_	ې د	10,086,284	۶ \$	49,889,856	ې د	1,102,536,121
13	\$ -	ې د	26,967,342	ې د		ې د	_	ې د	11,034,192	۶ \$	50,837,763	ې د	1,153,373,884
14	၃ - င	ې د		ې خ	12,836,230	ې خ	_	ې خ	3,510,268		•	ې خ	
	၃ - င်	ې خ	11,643,328	ې خ	-	ې خ	_	ې خ	• •	\$	15,153,596	ې د	1,168,527,480
15 16	\$ -	Ş	11,643,328	Ş	-	ې خ	-	Ş	3,798,186	\$	15,441,514	Ş	1,183,968,994
16	\$ -	\$ ¢	11,643,328	<u>ې</u>	-	Ş	-	<u>ې</u>	4,091,575	\$	15,734,903	<u>ې</u>	1,199,703,898
17	\$ -	\$	11,643,328	\$	-	\$	-	\$	4,390,538	\$	16,033,866	\$	1,215,737,764
18	\$ -	\$	11,643,328	\$	-	\$	-	\$	4,695,182	\$	16,338,510	\$	1,232,076,274
19	\$ -	\$	11,643,328	\$	-	\$	-	\$	5,005,614	\$	16,648,942	\$	1,248,725,215
20	\$ -	\$	11,643,328	\$	-	\$	-	\$	5,321,943	\$	16,965,271	\$	1,265,690,487
21	\$ -	\$	11,643,328	\$	-	\$	-	\$	5,644,284	\$	17,287,612	\$	1,282,978,098
22	\$ -	\$	11,643,328	\$	-	\$	-	\$	5,972,748	\$	17,616,076	\$	1,300,594,174
23	\$ -	\$	11,643,328	\$	-	\$	-	\$	6,307,454	\$	17,950,782	\$	1,318,544,956
24	\$ -	\$	11,643,328	\$	-	\$	-	\$	6,648,518	\$	18,291,846	\$	1,336,836,803
25	\$ -	\$	11,643,328	\$	-	\$	-	\$	6,996,064	\$	18,639,392	\$	1,355,476,194
26	\$ -	\$	11,643,328	\$	-	\$	-	\$	7,350,212	\$	18,993,540	\$	1,374,469,734
27	\$ -	\$	11,643,328	\$	-	\$	-	\$	7,711,089	\$	19,354,417	\$	1,393,824,151
28	\$ -	\$	11,643,328	\$	-	\$	-	\$	8,078,823	\$	19,722,151	\$	1,413,546,303
29	\$ -	\$	11,643,328	\$	-	\$	-	\$	8,453,544	\$	20,096,872	\$	1,433,643,175
30	\$ -	\$	11,643,328	\$	-	\$	-	\$	8,835,385	\$	20,478,713	\$	1,454,121,887
31	\$ -	\$	11,643,328	\$	-	\$	-	\$	9,224,480	\$	20,867,808	\$	1,474,989,696
32	\$ -	\$	11,643,328	\$	-	\$	-	\$	9,620,969	\$	21,264,297	\$	1,496,253,992
33	\$ -	\$	11,643,328	\$	-	\$	_	\$	10,024,990	\$	21,668,318	\$	1,517,922,310
34	\$ -	\$	11,643,328	\$	-	\$	_	\$	10,436,688	\$	22,080,016	\$	1,540,002,326
35	\$ -	\$	11,643,328	\$	_	\$	_	\$	10,856,209	\$	22,499,537	\$	1,562,501,863
36	, \$ -	\$	11,643,328	\$	_	\$	_	\$	11,283,700	\$	22,927,028	\$	1,585,428,891
37	\$ -	\$	11,643,328	\$	_	Ś	_	\$	11,719,313	\$	23,362,641	\$	1,608,791,532
38	\$ -	\$	11,643,328	Ś	_	Ś	_	Ś	12,163,203	\$	23,806,531	Ś	1,632,598,063
39	\$ -	\$	11,643,328	Ś	_	Ś	_	Ś	12,615,528	\$	24,258,856	Ś	1,656,856,919
40	\$ -	\$	11,643,328	ς	_	\$	_	\$	13,076,446	\$	24,719,774	ς ,	1,681,576,693
41	\$ -	\$	11,643,328	ς ,	_	ς	_	\$	13,546,121	ς ,	25,189,449	ς ,	1,706,766,142
42	٠ •	¢	11,643,328	¢	_	¢	_	¢	14,024,721	¢	25,668,049	¢	1,732,434,191
43	၃ - င	ب خ	11,643,328	ب خ	_	ې د	_	ې د	14,512,414	ب خ	26,155,742	ب خ	1,758,589,933
43 44	၃ - င	ب خ	11,643,328	ب خ	_	ې د	_	ې د	15,009,373	۶ \$	26,652,701	ب خ	
44 45	၃ - င်	ې خ		ې خ	-	ې خ	_	ې خ				ې د	1,785,242,634
	၃ - င်	ې خ	11,643,328	ې خ	-	ې خ	_	ې خ	15,515,774	\$	27,159,102	ې د	1,812,401,737
46	\$ -	Ş	11,643,328	Ş	-	ې خ	-	Ş	16,031,797	ې د	27,675,125	Ş	1,840,076,862
47	\$ -	Ş	11,643,328	Ş	-	ې خ	-	Ş	16,557,625	ې د	28,200,953	Ş	1,868,277,815
48	\$ -	Ş	11,643,328	Ş	-	٠ ک	-	ې د	17,093,443	۶ ۲	28,736,771	ې د	1,897,014,585
49	\$ -	\$ \$	11,643,328	\$ \$	-	\$ \$	-	\$ \$	17,639,441	\$ \$	29,282,769	\$ \$	1,926,297,355
50	\$ -	\$ \$	11,643,328	\$ \$	-	\$ \$	-	\$ \$	18,195,814	\$ \$	29,839,142	\$ \$	1,956,136,497
51	\$ -	\$	-	\$	-	\$	21,175,000	\$	34,122,666	\$	55,297,666	\$	2,011,434,163
52	\$ -	\$	-	\$	-	\$	20,000,000	\$	33,221,556	\$	53,221,556	\$	2,064,655,719
53	\$ -	\$	-	\$	-	\$	16,705,815	\$	28,594,312	\$	45,300,127	\$	2,109,955,846
54	Ş -	\$	-	\$	-	\$	16,705,815	\$	29,455,015	\$	46,160,830	\$	2,156,116,675
55	\$ -	\$	-	\$	-	\$	16,705,815	\$	30,332,070	\$	47,037,885	\$	2,203,154,561
56	\$ -	\$	-	\$	-	\$	-	\$	-	\$	-	\$	2,203,154,561
57	\$ -	\$	-	\$	-	\$	-	\$	-	\$	-	\$	2,203,154,561
58	\$ -	\$	-	\$	-	\$	-	\$	-	\$	-	\$	2,203,154,561
59	\$ -	\$	-	\$	-	\$	-	\$	-	\$	-	\$	2,203,154,561
60	\$ -	\$	-	\$	-	\$	-	\$	-	\$	-	\$	2,203,154,561
	Total		Total				Total		Total				Total
	Design/Const		O&M				D&D		Escalation				Life Cycle
	\$ 800.960.059	\$	566.213.291	\$	38.508.689	\$	91.292.445	\$	706.180.078			\$	2.203.154.561

\$ 800,960,059 \$ 566,213,291 \$ 38,508,689 \$ 91,292,445 \$ 706,180,078



STUDY 1 - ALTERNATIVE STORAGE SYSTEMS FOR DUAL PURPOSE CANISTERS

COST DETAILS

ALTERNATIVE 1 - C-PAD, PILOT, LOW SEISMIC

LIFE CYCLE COST - 80 YEAR OPERATING LIFE



Pilot Storage Facility (5,000 MTU)

Project: C-PAD Pilot (5,000 MTU)

PILOT Project - C-PAD 60/40 Vertical/Horizontal - Low Seismic

Separate CHB

80 Year Operating Life

80 Yea	r Operating Life										
								A	nnual Escalation		Discount Rate
									1.90%	Annual	3.00%
YEAR	Design/Const		O&M		Cask Handling		D&D		Escalation	Expense	Cumulative
1	\$ 10,000,000	\	OCIVI	¢	-	\$	-	ç		\$10,190,000	\$10,190,000
2	\$ 10,000,000	\$	_	ς ,	_	ς ς	_		383,610	\$10,383,610	\$20,573,610
3	\$ 20,000,000	\$	_	¢	_	¢	_	2	1,161,797	\$21,161,797	\$41,735,407
4	\$ 20,000,000	ċ		ç	_	ب خ			1,563,871	\$21,563,871	\$63,299,279
5	\$ 20,000,000	\$		ç	_	ب خ			1,973,585	\$21,973,585	\$85,272,863
6	\$ 20,000,000	ې د	-	ې د	-	ې د	-	4	2,391,083	\$21,973,383	\$107,663,946
7	\$ 27,888,399	ې د	-	ې خ	-	ې د	-	4	3,927,403	\$31,815,802	\$139,479,748
	\$ 200,000,000	۶ \$	-	ې د	-	ې د	-	4	32,500,273	\$31,813,802	\$371,980,021
8	\$ 200,000,000	۶ \$	20 054 045	ې خ	-	ې د	-	4			
9		-	28,054,945	ې خ	-	ې خ	-	7	42,096,410	\$270,151,354	\$642,131,376
10	\$ 273,071,660	\$	26,453,185	ې خ	12 026 220	ې د	-	7	62,030,422	\$361,555,266	\$1,003,686,642
11	ć	\$	26,967,342	<u>۲</u>	12,836,230	\$ ¢	-	7	9,156,052	\$48,959,623	\$1,052,646,265
12	\$ -	\$	26,967,342	\$	12,836,230	\$ \$	-	7	10,086,284	\$49,889,856	\$1,102,536,121
13	\$ -	\$	26,967,342	\$	12,836,230	\$	-	7	11,034,192	\$50,837,763	\$1,153,373,884
14	\$ -	\$	11,643,328	\$	-	\$	-	7	3,510,268	\$15,153,596	\$1,168,527,480
15	\$ -	\$	11,643,328	\$	-	\$	-	,	3,798,186	\$15,441,514	\$1,183,968,994
16	\$ -	\$	11,643,328	\$	-	\$	-	,	4,091,575	\$15,734,903	\$1,199,703,898
17	\$ -	\$	11,643,328	\$	-	\$	-	,	4,390,538	\$16,033,866	\$1,215,737,764
18	\$ -	\$	11,643,328	\$	-	\$	-	ç	4,695,182	\$16,338,510	\$1,232,076,274
19	\$ -	\$	11,643,328	\$	-	\$	-	ç	5,005,614	\$16,648,942	\$1,248,725,215
20	\$ -	\$	11,643,328	\$	-	\$	-	ç	5,321,943	\$16,965,271	\$1,265,690,487
21	\$ -	\$	11,643,328	\$	-	\$	-	ç	5,644,284	\$17,287,612	\$1,282,978,098
22	\$ -	\$	11,643,328	\$	-	\$	-	ç	5,972,748	\$17,616,076	\$1,300,594,174
23	\$ -	\$	11,643,328	\$	-	\$	-	ç	6,307,454	\$17,950,782	\$1,318,544,956
24	\$ -	\$	11,643,328	\$	-	\$	-	Ç	6,648,518	\$18,291,846	\$1,336,836,803
25	\$ -	\$	11,643,328	\$	-	\$	-	Ç	6,996,064	\$18,639,392	\$1,355,476,194
26	\$ -	\$	11,643,328	\$	-	\$	-	ç	7,350,212	\$18,993,540	\$1,374,469,734
27	\$ -	\$	11,643,328	\$	-	\$	-	ç	7,711,089	\$19,354,417	\$1,393,824,151
28	\$ -	\$	11,643,328	\$	-	\$	-	ç	8,078,823	\$19,722,151	\$1,413,546,303
29	\$ -	\$	11,643,328	\$	-	\$	-	Ç	8,453,544	\$20,096,872	\$1,433,643,175
30	\$ -	\$	11,643,328	\$	-	\$	-	ç	8,835,385	\$20,478,713	\$1,454,121,887
31	\$ -	\$	11,643,328	\$	-	\$	-	Ç	9,224,480	\$20,867,808	\$1,474,989,696
32	\$ -	\$	11,643,328	\$	-	\$	-	Ç	9,620,969	\$21,264,297	\$1,496,253,992
33	\$ -	\$	11,643,328	\$	-	\$	-	Ç	10,024,990	\$21,668,318	\$1,517,922,310
34	\$ -	\$	11,643,328	\$	-	\$	-	Ç	10,436,688	\$22,080,016	\$1,540,002,326
35	\$ -	\$	11,643,328	\$	-	\$	-	Ç	10,856,209	\$22,499,537	\$1,562,501,863
36	\$ -	\$	11,643,328	\$	-	\$	-	Ç	11,283,700	\$22,927,028	\$1,585,428,891
37	\$ -	\$	11,643,328	\$	-	\$	-	Ç	11,719,313	\$23,362,641	\$1,608,791,532
38	\$ -	\$	11,643,328	\$	-	\$	-	Ç	12,163,203	\$23,806,531	\$1,632,598,063
39	\$ -	\$	11,643,328	\$	-	\$	-	Ç	12,615,528	\$24,258,856	\$1,656,856,919
40	\$ -	\$	11,643,328	\$	-	\$	-	Ç	13,076,446	\$24,719,774	\$1,681,576,693
41	\$ -	\$	11,643,328	\$	-	\$	-	Ç	13,546,121	\$25,189,449	\$1,706,766,142
42	\$ -	\$	11,643,328	\$	-	\$	-	Ç	14,024,721	\$25,668,049	\$1,732,434,191
43	\$ -	\$	11,643,328	\$	-	\$	-	Ç	14,512,414	\$26,155,742	\$1,758,589,933
44	\$ -	\$	11,643,328	\$	-	\$	-	Ç	15,009,373	\$26,652,701	\$1,785,242,634
45	\$ -	\$	11,643,328	\$	-	\$	-	Ç	15,515,774	\$27,159,102	\$1,812,401,737
46	\$ -	\$	11,643,328	\$	-	\$	-	Ç	16,031,797	\$27,675,125	\$1,840,076,862
47	\$ -	\$	11,643,328	\$	-	\$	-	Ç	16,557,625	\$28,200,953	\$1,868,277,815
48	\$ -	\$	11,643,328	\$	-	\$	-	Ç	17,093,443	\$28,736,771	\$1,897,014,585
49	\$ -	\$	11,643,328	\$	-	\$	-	Ç	17,639,441	\$29,282,769	\$1,926,297,355
50	\$ -	\$	11,643,328	\$	-	\$	-	Ç	18,195,814	\$29,839,142	\$1,956,136,497
51	\$ -	\$	11,643,328	\$	-	\$	-	Ç	18,762,758	\$30,406,086	\$1,986,542,583
52	\$ -	\$	11,643,328	\$	-	\$	-	Ç	19,340,473	\$30,983,801	\$2,017,526,384
53	\$ -	\$	11,643,328	\$	-	\$	-	Ç	19,929,166	\$31,572,494	\$2,049,098,878
54	\$ -	\$	11,643,328	\$	-	\$	-	Ç	20,529,043	\$32,172,371	\$2,081,271,249
55	\$ -	\$	11,643,328	\$	-	\$	-	Ç	21,140,318	\$32,783,646	\$2,114,054,895
56	\$ -	\$	11,643,328	\$	-	\$	-	Ç	21,763,207	\$33,406,535	\$2,147,461,430
57	\$ -	\$	11,643,328	\$	-	\$	-	ç		\$34,041,259	\$2,181,502,689
58	\$ -	\$	11,643,328	\$	-	\$	-	Ç		\$34,688,043	\$2,216,190,733
59	\$ -	\$	11,643,328	\$	-	\$	-		23,703,788	\$35,347,116	\$2,251,537,849

\$800,960,059

\$1,031,946,410

\$38,508,689

\$91,292,445

\$4,277,872,375



60	\$	-	\$ 11,643,328	\$	-	\$ -	\$ 24,375,383	\$36,018,711	\$2,287,556,561
61	\$	-	\$ 11,643,328	\$	-	\$ -	\$ 25,059,739	\$36,703,067	\$2,324,259,627
62	\$	-	\$ 11,643,328	\$	-	\$ -	\$ 25,757,097	\$37,400,425	\$2,361,660,053
63	\$	-	\$ 11,643,328	\$	-	\$ -	\$ 26,467,705	\$38,111,033	\$2,399,771,086
64	\$	-	\$ 11,643,328	\$	-	\$ -	\$ 27,191,815	\$38,835,143	\$2,438,606,229
65		\$0	\$ 11,643,328	\$	-	\$ -	\$ 27,929,683	\$39,573,011	\$2,478,179,240
66		\$0	\$ 11,643,328	\$	-	\$ -	\$ 28,681,570	\$40,324,898	\$2,518,504,138
67		\$0	\$ 11,643,328	\$	-	\$ -	\$ 29,447,743	\$41,091,071	\$2,559,595,208
68		\$0	\$ 11,643,328	\$	-	\$ -	\$ 30,228,473	\$41,871,801	\$2,601,467,010
69		\$0	\$ 11,643,328	\$	-	\$ -	\$ 31,024,038	\$42,667,366	\$2,644,134,375
70		\$0	\$ 11,643,328	\$	-	\$ -	\$ 31,834,717	\$43,478,045	\$2,687,612,421
71		\$0	\$ 11,643,328	\$	-	\$ -	\$ 32,660,800	\$44,304,128	\$2,731,916,549
72		\$0	\$ 11,643,328	\$	-	\$ -	\$ 33,502,579	\$45,145,907	\$2,777,062,456
73		\$0	\$ 11,643,328	\$	-	\$ -	\$ 34,360,351	\$46,003,679	\$2,823,066,135
74		\$0	\$ 11,643,328	\$	-	\$ -	\$ 35,234,421	\$46,877,749	\$2,869,943,884
75		\$0	\$ 11,643,328	\$	-	\$ -	\$ 36,125,098	\$47,768,426	\$2,917,712,310
76		\$0	\$ 11,643,328	\$	-	\$ -	\$ 37,032,698	\$48,676,026	\$2,966,388,336
77		\$0	\$ 11,643,328	\$	-	\$ -	\$ 37,957,543	\$49,600,871	\$3,015,989,207
78		\$0	\$ 11,643,328	\$	-	\$ -	\$ 38,899,959	\$50,543,287	\$3,066,532,494
79		\$0	\$ 11,643,328	\$	-	\$ -	\$ 39,860,282	\$51,503,610	\$3,118,036,104
80		\$0	\$ 11,643,328	\$	-	\$ -	\$ 40,838,850	\$52,482,178	\$3,170,518,282
81		\$0	\$ 11,643,328	\$	-	\$ -	\$ 41,836,012	\$53,479,340	\$3,223,997,622
82		\$0	\$ 11,643,328	\$	-	\$ -	\$ 42,852,119	\$54,495,447	\$3,278,493,069
83		\$0	\$ 11,643,328	\$	-	\$ -	\$ 43,887,533	\$55,530,861	\$3,334,023,929
84		\$0	\$ 11,643,328	\$	-	\$ -	\$ 44,942,619	\$56,585,947	\$3,390,609,876
85		\$0	\$ 11,643,328	\$	-	\$ -	\$ 46,017,752	\$57,661,080	\$3,448,270,956
86		\$0	\$ 11,643,328	\$	-	\$ -	\$ 47,113,312	\$58,756,640	\$3,507,027,597
87		\$0	\$ 11,643,328	\$	-	\$ -	\$ 48,229,689	\$59,873,017	\$3,566,900,613
88		\$0	\$ 11,643,328	\$	-	\$ -	\$ 49,367,276	\$61,010,604	\$3,627,911,217
89		\$0	\$ 11,643,328	\$	-	\$ -	\$ 50,526,477	\$62,169,805	\$3,690,081,023
90		\$0	\$ 11,643,328	\$	-	\$ -	\$ 51,707,704	\$63,351,032	\$3,753,432,055
91				\$	-	\$ 21,175,000	\$ 96,226,640	\$117,401,640	\$3,870,833,695
92				\$	-	\$ 20,000,000	\$ 92,993,881	\$112,993,881	\$3,983,827,575
93				\$	-	\$ 16,705,815	\$ 79,470,201	\$96,176,016	\$4,080,003,591
94				\$	-	\$ 16,705,815	\$ 81,297,545	\$98,003,360	\$4,178,006,951
95				\$	-	\$ 16,705,815	\$ 83,159,609	\$99,865,424	\$4,277,872,375
96						\$ -	\$ -	\$0	\$4,277,872,375
97						\$ -	\$ -	\$0	\$4,277,872,375
98							\$ -	\$0	\$4,277,872,375
99							\$ -	\$0	\$4,277,872,375
100							\$ -	\$0	\$4,277,872,375
			-						
	Total		Total		Total	Total	Total		Total
	Design/Co	onst	O&M	Cask	Handling	D&D	Escalation		Life Cycle

\$2,315,164,772



STUDY 1 - ALTERNATIVE STORAGE SYSTEMS FOR DUAL PURPOSE CANISTERS

COST DETAILS

ALTERNATIVE 2 - C-PAD, PILOT, HIGH SEISMIC

LIFE CYCLE COST SUMMARIES



Pilot Storage Facility (5,000 MTU)

Project: C-PAD Pilot (5,000 MTU)

PILOT Project - C-PAD 60/40 Vertical/Horizontal - High Seismic

Separate CHB

Annual Escalation Factor 1.90% Discount Rate 3.40%

Life Cycle Costs (40 Year Life)	Capital	Operations	Transport	Decommissioning	Escalation	Total Costs
Design & Construction	\$862,827,226					\$862,827,226
Operations & Maintenance (40 Year Life)		\$564,151,464				\$564,151,464
Cask Handling		\$38,508,689				<i>\$38,508,689</i>
Transportation Equipment	\$0					\$0
Transport Operations		\$0	\$0			\$0
Repackaging	\$0	\$0				\$0
Transport to Repository	\$0		\$0			\$0
D&D				\$103,606,960		\$103,606,960
Escalation					\$740,233,214	\$740,233,214
Total Costs (40 year Life)						\$2,309,327,553
Present Value						\$1,229,220,278

Life Cycle Costs (80 Year Life) Design & Construction	Capital <i>\$862,827,226</i>	Operations	Transport	Decommissioning	Escalation	Total Costs \$862,827,226
Operations & Maintenance (80 Year Life)		\$1,029,884,584				\$1,029,884,584
Cask Handling		\$38,508,689				\$38,508,689
Transportation Equipment	\$0					\$0
Transport Operations		\$0	\$0			\$0
Repackaging	\$0	\$0				\$0
Transport to Repository	\$0		\$0			\$0
D&D				\$103,606,960		\$103,606,960
Escalation					\$2,387,437,595	<i>\$2,387,437,595</i>

 Total Costs (80 Year Life)
 \$4,422,265,054

 Present Value
 \$1,376,686,520



STUDY 1 - ALTERNATIVE STORAGE SYSTEMS FOR DUAL PURPOSE CANISTERS

COST DETAILS

ALTERNATIVE 2 - C-PAD, PILOT, HIGH SEISMIC

CAPITAL COST SUMMARY



Pilot Storage Facility (5,000 MTU)

Project: C-PAD Pilot (5,000 MTU)

PILOT Project - C-PAD 60/40 Vertical/Horizontal - High Seismic

Separate CHB

Level 1	Level 2	Level 3 Descri		Level 3 Total
PAD LE 01		Interi	m Storage Facility and transportation Project	
	C-PAD LE 01.01		Pilot ISF Facility \$529,557,398	
		C-PAD LE 01.01.01	Storage Pads	
		C-PAD LE 01.01.02	Cask Handling (Transfer) Facility	\$163,293,9
		C-PAD LE 01.01.03	Horizontal Dry Storage Modules	\$113,041,9
		C-PAD LE 01.01.04	Vertical Dry Storage Module	\$94,082,3
		C-PAD LE 01.01.05	Storage Cask Fabrication Facility	1 - 7 - 7 -
		C-PAD LE 01.01.06	Cask Maintenance Facility	
		C-PAD LE 01.01.07	Concrete Batch Plant	\$1,850,0
		C-PAD LE 01.01.08	Visitor Center/ Auditorium	Ψ=,000,
		C-PAD LE 01.01.09	Administration Building	\$3,140,0
		C-PAD LE 01.01.10	Security	\$24,148,9
		C-PAD LE 01.01.11	Rail Spur/ Receiving Yard	\$58,752,8
		C-PAD LE 01.01.11	Utilities	\$18,682,1
		C-PAD LE 01.01.13	Roads	\$18,212,7
		C-PAD LE 01.01.14	Parking	\$735,0
		C-PAD LE 01.01.14	Site Work	
				\$23,417,5
		C-PAD LE 01.01.16	Warehouse	\$10,200,0
		C-PAD LE 01.01.17	Maintenance Facility	
		C-PAD LE 01.01.18	Waste management Facility	
		C-PAD LE 01.01.01.xx	(Add Further Breakdown as needed)	
		01.01.01.	(Add Fulfiler breakdown as needed)	
	C-PAD LE 01.02		Expanded Interim Storage Facility \$0	
	C-PAD LE 01.02	C-PAD LE 01.02.01	Expanded Interim Storage Facility Expanded Storage Pads and Dry Cask Storage Systems	
		C-PAD LE 01.02.02	Expanded Cask Handling Facility (if required)	
		C-PAD LE 01.02.03	Horizontal Dry Storage Modules	
		C-PAD LE 01.02.04	Vertical Dry Storage Casks	
		C-PAD LE 01.02.05	Storage Cask Fabrication Facility (Expanded)	
		C-PAD LE 01.02.06	Cask Maintenance Facility (Expanded)	
		C-PAD LE 01.02.07	Concrete Batch Plant (Expanded if needed)	
		C-PAD LE 01.02.08	Visitor Center/ Auditorium (expanded if needed)	
		C-PAD LE 01.02.09	Administration Building (Expanded if needed)	
		C-PAD LE 01.02.10	Security (Expanded)	
		C-PAD LE 01.02.11	Rail Spur/ Receiving Yard (Expanded)	
		C-PAD LE 01.02.12	Utilities Expanded as needed)	
		C-PAD LE 01.02.13	Roads (Expanded)	
		C-PAD LE 01.02.14	Parking (Expanded as needed)	
		C-PAD LE 01.02.15	Site Work (Expanded)	
		C-PAD LE 01.02.16	Warehouse (Expanded if Needed)	
		C-PAD LE 01.02.17	Maintenance Facility (Expanded if needed)	
		C-PAD LE 01.02.18	Waste management Facility (Expanded if needed)	
		C-PAD LE 01.02.19	Hot Cell / Laboratories	
		C-PAD LE 01.02.20	Pool Packaging Facility	
		C-PAD LE 01.02.21	Standardized Storage System	
		C-PAD LE 01.02.22	Standardized Disposal Canister	
		C-PAD LE 01.02.23	Canister Repackaging Facility (For Repository	
	C-PAD LE 01.03	C 1 AD LL 01.02.23	Transportation Equipment \$0	
	C-FAD LL 01.03	C-PAD LE 01.03.01	Transportation Casks	
			·	
		C-PAD LE 01.03.02	Rail Equipment	
		C-PAD LE 01.03.03 C-PAD LE 01.03.04	Rail Maintenance Facility Transportation Systems Services	
	C-PAD LE 01.04		Pre-Construction Capitalized Costs \$66,025,000	
	C 1 / 1D LL 01.04	C-PAD LE 01.04.01	Land or Land Leases	\$7,680,
		C-PAD LE 01.04.01		
			Site permits	\$200,0 \$6,240,0
		C-PAD LE 01.04.03 C-PAD LE 01.04.05	Site Licensing Plant Permits	\$6,240,0



	C-PAD LE 01.04.07	Research and De	velopment		\$0
	C-PAD LE 01.04.08	Design			\$23,955,000
	C-PAD LE 01.04.09	Other Pre-constr	uction Costs		\$17,200,000
	C-PAD LE 01.04.10	Pre-construction	contingencies		\$10,000,000
	C-PAD LE 01.04.xx	(Add Further Bre	akdown as needed)		\$0
C-PAD LE 01.05		Indirect Capitalized Costs		\$63,180,000	
	C-PAD LE 01.05.01	Project Managen	nent		\$2,700,000
	C-PAD LE 01.05.02	Construction Ma	nagement		\$3,600,000
	C-PAD LE 01.05.03	Field indirect serv	vices		\$11,880,000
	C-PAD LE 01.05.04	Design Services in	n support of Construction		\$5,400,000
	C-PAD LE 01.05.05	QA/QC			\$12,600,000
	C-PAD LE 01.05.06	Commissioning a	nd Startup		\$1,200,000
	C-PAD LE 01.05.07	Home office Engi	neering support to Construction		\$7,200,000
	C-PAD LE 01.05.08	Document Contro	ol		\$2,700,000
	C-PAD LE 01.05.09	Project Controls			\$3,600,000
	C-PAD LE 01.05.10	Construction Tes	ting		\$2,700,000
	C-PAD LE 01.05.11	Inspections			\$3,600,000
	C-PAD LE 01.05.12	Startup and Testi	ing		\$3,000,000
	C-PAD LE 01.05.13	Commissioning			\$3,000,000
C-PAD LE 01.06		Site Selection		\$0	
	C-PAD LE 01.06.01	Site Selection			\$0
	C-PAD LE 01.06.02	Public Informatio	on Process		\$0
C-PAD LE 01.07		Decontamination and Dec	construction	\$0	
	C-PAD LE 01.07.01	Decommissioning	g		\$0
	C-PAD LE 01.07.02	Decontamination	1		\$0
	C-PAD LE 01.07.03	Deconstruction			\$0
	C-PAD LE 01.07.04				\$0
	C-PAD LE 01.07.05				\$0
C-PAD LE 01.08		Project Financial Costs		\$88,274,161	
	C-PAD LE 01.08.01	Contractor Fees			\$52,700,992
	C-PAD LE 01.08.02	Escalation Costs			\$35,573,169
	C-PAD LE 01.08.03	Interest Payment	ts		\$0
	C-PAD LE 01.08.04	Indirect costs to	support shipments to repository		\$0
	C-PAD LE 01.08.05				\$0
	C-PAD LE 01.08.xx	(Add Further Bre	akdown as needed)		\$0
0.040.15.04.00				4445 700 667	
C-PAD LE 01.09	C DAD 15 04 00 04	Project Contingencies	Control to the H	\$115,790,667	627.254.626
	C-PAD LE 01.09.01	-	serve - Contractor Held		\$37,351,828
	C-PAD LE 01.09.02	Contingency - DC	JE neid		\$78,438,839
C-PAD LE 01.10					
	C-PAD LE 01.10.01	Other Direct Costs		\$0	
	C-PAD LE 01.10.02	DOE Project Ope	rations	, -	\$0
	C-PAD LE 01.10.03	DOE TM&E			\$0
	C-PAD LE 01.10.04	Host site Operati	onal Costs Miscellaneous		\$0
	C-PAD LE 01.10.05	Miscellaneous OI			\$0
C-PAD LE 01.11		Operational Costs		0	
	C-PAD LE 01.11.01	Operations Costs			\$0
	C-PAD LE 01.11.02	Transportation C			\$0
	C-PAD LE 01.11.03	Escalation (Opera	ations/Transportation)		\$0
		TEC	(All Direct & indirect Costs, MR	, Escalation)	\$784,388,387
		TPC	(TEC plus Contingency, ODCs)		\$862,827,226

Project Total



STUDY 1 - ALTERNATIVE STORAGE SYSTEMS FOR DUAL PURPOSE CANISTERS

COST DETAILS

ALTERNATIVE 2 - C-PAD, PILOT, HIGH SEISMIC

LIFE CYCLE COST - 40 YEAR OPERATING LIFE



Discount Rate

Interim Storage Facility

Pilot Storage Facility (5,000 MTU)

Project: C-PAD Pilot (5,000 MTU)

PILOT Project - C-PAD 60/40 Vertical/Horizontal - High Seismic

Separate CHB

									Anı	nual Escalation			DISC	count Rate
40 Yea	r Op	perating life								1.90%				3.40%
YEAR		Design/Const		O&M	Ca	ask Handling		D&D		Escalation	An	nual Expense		Cumulative
1	\$	10,000,000	\$	-	\$	-	\$	_	\$	190,000	\$	10,190,000	\$	10,190,000
2	Ś	10,000,000	Ś	_	Ś	_	\$	_	Ś	383,610	\$	10,383,610	\$	20,573,610
3	Ś	20,000,000	Ś	_	Ś	_	Ś	_	Ś	1,161,797	\$	21,161,797	\$	41,735,407
4	ς	20,000,000	ς	_	ς	_	ς	_	ς ,	1,563,871	ς	21,563,871	\$	63,299,279
5	¢	20,000,000	ć	_	ç	_	ç	_	ć	1,973,585	\$	21,973,585	ć	85,272,863
6	ç	20,000,000	ċ		ċ	_	ب خ	_	ب خ	2,391,083	\$	22,391,083	\$	107,663,946
	ې خ		ې خ	-	ب	-	ب	-	ې خ					
7	Ş	27,888,399	Ş	-	γ	-	Ş	-	Ş	3,927,403	\$	31,815,802	\$	139,479,748
8	\$ \$	200,000,000	\$	-	\$	-	\$	-	\$	32,500,273	\$	232,500,273	\$	371,980,021
9	\$	200,000,000	\$	27,647,777	\$	-	\$	-	\$	42,021,251	\$	269,669,028	\$	641,649,050
10	\$	334,938,827	Ş	26,046,017	Ş	-	\$	-	Ş	74,758,547	\$	435,743,390	\$	1,077,392,440
11			\$	26,551,511	\$	12,836,230	\$	-	\$	9,060,398	\$	48,448,139	\$	1,125,840,579
12	\$	-	\$	26,551,511	\$	12,836,230	\$	-	\$	9,980,912	\$	49,368,653	\$	1,175,209,232
13	\$	-	\$	26,551,511	\$	12,836,230	\$	-	\$	10,918,917	\$	50,306,658	\$	1,225,515,890
14	\$	-	\$	11,643,328	\$	-	\$	-	\$	3,510,268	\$	15,153,596	\$	1,240,669,486
15	\$	-	\$	11,643,328	\$	-	\$	-	\$	3,798,186	\$	15,441,514	\$	1,256,111,001
16	\$	-	\$	11,643,328	\$	-	\$	-	\$	4,091,575	\$	15,734,903	\$	1,271,845,904
17	\$	-	\$	11,643,328	\$	-	\$	-	\$	4,390,538	\$	16,033,866	\$	1,287,879,770
18	\$	-	\$	11,643,328	\$	_	\$	_	\$	4,695,182	\$	16,338,510	\$	1,304,218,280
19	Ś	_	Ś	11,643,328	Ś	_	Ś	_	Ś	5,005,614	\$	16,648,942	Ś	1,320,867,221
20	ς	_	ς	11,643,328	\$	_	ς	_	ς	5,321,943	\$	16,965,271	\$	1,337,832,493
21	¢	_	¢	11,643,328	¢	_	¢	_	¢	5,644,284	\$	17,287,612	¢	1,355,120,104
22	ċ	_	ب خ	11,643,328	ç	_	ب خ	_	ب خ	5,972,748	\$	17,616,076	ب خ	1,372,736,181
23	ې خ	-	ې خ		ب	-	ب	-	ې خ				ې خ	
	\$ \$	-	Ş	11,643,328	<u>۲</u>	-	\$ \$	-	<u>ې</u>	6,307,454	\$	17,950,782	\$ \$	1,390,686,962
24	\$	-	\$	11,643,328	\$	-	\$	-	\$	6,648,518	\$	18,291,846	\$	1,408,978,809
25	\$	-	\$	11,643,328	\$	-	\$	-	\$	6,996,064	\$	18,639,392	\$	1,427,618,200
26	\$	-	Ş	11,643,328	Ş	-	\$	-	Ş	7,350,212	\$	18,993,540	\$	1,446,611,740
27	\$	-	\$	11,643,328	\$	-	\$	-	Ş	7,711,089	\$	19,354,417	\$	1,465,966,158
28	\$	-	\$	11,643,328	\$	-	\$	-	\$	8,078,823	\$	19,722,151	\$	1,485,688,309
29	\$	-	\$	11,643,328	\$	-	\$	-	\$	8,453,544	\$	20,096,872	\$	1,505,785,181
30	\$	-	\$	11,643,328	\$	-	\$	-	\$	8,835,385	\$	20,478,713	\$	1,526,263,894
31	\$	-	\$	11,643,328	\$	-	\$	-	\$	9,224,480	\$	20,867,808	\$	1,547,131,702
32	\$	-	\$	11,643,328	\$	-	\$	_	\$	9,620,969	\$	21,264,297	\$	1,568,395,998
33	\$	-	\$	11,643,328	\$	_	\$	_	\$	10,024,990	\$	21,668,318	\$	1,590,064,316
34	Ś	_	Ś	11,643,328	Ś	_	Ś	_	Ś	10,436,688	Ś	22,080,016	Ś	1,612,144,333
35	Ś	_	Ś	11,643,328	Ś	_	Ś	_	Ś	10,856,209	Ś	22,499,537	Ś	1,634,643,869
36	ς	_	ς	11,643,328	ς	_	ς	_	ς	11,283,700	\$	22,927,028	ς	1,657,570,897
37	ς	_	ς	11,643,328	ς	_	ς	_	ς ,	11,719,313	ς	23,362,641	ς	1,680,933,538
38	¢	_	¢	11,643,328	¢	_	¢	_	¢	12,163,203	¢	23,806,531	¢	1,704,740,070
39	ċ	_	ب خ	11,643,328	ç	_	ب خ	_	ب خ	12,615,528	ر خ	24,258,856	ب خ	1,728,998,925
40	٠ ک	_	ب خ		<u>ب</u>	_	ب خ	_	ب خ		ب خ		ب خ	
	Ş	-	Ş	11,643,328	γ	-	Ş	-	Ş	13,076,446	\$	24,719,774	ې خ	1,753,718,699
41	<u>۲</u>	-	Ş	11,643,328	<u>۲</u>	-	\$ ¢	-	<u>ک</u>	13,546,121	\$ ¢	25,189,449	\$ ¢	1,778,908,148
42	\$	-	\$	11,643,328	\$	-	\$	-	\$	14,024,721	\$	25,668,049	\$	1,804,576,197
43	\$	-	\$	11,643,328	\$	-	\$	-	\$	14,512,414	\$	26,155,742	\$	1,830,731,939
44	\$	-	\$	11,643,328	\$	-	\$	-	\$	15,009,373	\$	26,652,701	\$	1,857,384,640
45	\$	-	\$	11,643,328	\$	-	\$	-	\$	15,515,774	\$	27,159,102	\$	1,884,543,743
46	\$	-	\$	11,643,328	\$	-	\$	-	\$	16,031,797	\$	27,675,125	\$	1,912,218,868
47	\$	-	\$	11,643,328	\$	-	\$	-	\$	16,557,625	\$	28,200,953	\$	1,940,419,821
48	\$	-	\$	11,643,328	\$	-	\$	-	\$	17,093,443	\$	28,736,771	\$	1,969,156,591
49	\$	-	\$	11,643,328	\$	-	\$	-	\$	17,639,441	\$	29,282,769	\$	1,998,439,361
50	\$	-	\$	11,643,328	\$	-	\$	-	\$	18,195,814	\$	29,839,142	\$	2,028,278,503
51	\$	-	\$	-	\$	-	\$	21,175,000	\$	34,122,666	\$	55,297,666	\$	2,083,576,169
52	\$	-	\$	-	\$	-	\$	20,000,000	\$	33,221,556	\$	53,221,556	\$	2,136,797,725
53	\$	-	\$	-	\$	-	\$	20,810,653	\$	35,620,311	\$	56,430,964	\$	2,193,228,689
54	\$	-	\$	-	\$	_	\$	20,810,653	\$	36,692,499	\$	57,503,152	\$	2,250,731,841
55	Ś	-	\$	-	\$	_	Ś	20,810,653	Ś	37,785,059	Ś	58,595,712	\$	2,309,327,553
56	ς ,	-	ζ	-	¢	_	¢	_ = , = = 0,000	ς ,		ς ,	- 5,000,7 +2	¢	2,309,327,553
57	¢	-	¢	-	¢	_	¢	_	ب د	_	¢		ر د	2,309,327,553
58	¢	-	ç	-	ç	_	¢	_	¢	_	¢	_	ب خ	2,309,327,553
58 59	ې خ	-	ې خ	-	ې خ	-	ب خ	-	ې خ	-	ې خ	-	ې خ	
	Ş	-	Ş	-	γ	-	Ş	-	Ş	-	Ş	-	ې خ	2,309,327,553
60	Þ	-	>	-	>	-	>	-	>	-	>	-	\$	2,309,327,553
		Total		Total				Total		Total				Total
	г	Design/Const		0&M				D&D		Escalation				Life Cycle
		-	_			20 500 600							_	•
	\$	862,827,226	\$	564,151,464	\$	38,508,689	\$	103,606,960	\$	740,233,214			\$	2,309,327,553

Annual Escalation



STUDY 1 - ALTERNATIVE STORAGE SYSTEMS FOR DUAL PURPOSE CANISTERS

COST DETAILS

ALTERNATIVE 2 - C-PAD, PILOT, HIGH SEISMIC

LIFE CYCLE COST - 80 YEAR OPERATING LIFE



Pilot Storage Facility (5,000 MTU)

Project: C-PAD Pilot (5,000 MTU)

PILOT Project - C-PAD 60/40 Vertical/Horizontal - High Seismic

Separate CHB

80 Year Operating Life

		-							Annual Escalation				Discount Rate
											1.90%		3.40%
YEAR	_	Design/Const		0&M	C	ask Handling		D&D			Escalation	Annual Expense	Cumulative
1	\$	10,000,000	\$	OQIVI -	ς ς	ask Hallullig	\$	DQD -		\$	190,000	\$10,190,000	\$10,190,000
2	\$	10,000,000	\$	_	\$	_	\$	_		\$	383,610	\$10,383,610	\$20,573,610
3	\$	20,000,000	\$	_	\$	_	\$	_		\$	1,161,797	\$21,161,797	\$41,735,407
4	\$	20,000,000	\$	_	\$	_	\$	_		\$	1,563,871	\$21,563,871	\$63,299,279
5	\$	20,000,000	\$	_	\$	_	\$	_		\$	1,973,585	\$21,973,585	\$85,272,863
6	\$	20,000,000	\$	_	\$	_	\$	_		\$	2,391,083	\$22,391,083	\$107,663,946
7	\$	27,888,399	\$	_	\$	_	\$	_		\$	3,927,403	\$31,815,802	\$139,479,748
8	\$	200,000,000	\$	_	\$	_	\$	_		\$	32,500,273	\$232,500,273	\$371,980,021
9	\$	200,000,000	\$	27,647,777	\$	_	\$	_		\$	42,021,251	\$269,669,028	\$641,649,050
10	\$	334,938,827	\$	26,046,017	\$	_	\$	_		\$	74,758,547	\$435,743,390	\$1,077,392,440
11	,	.,,	Ś	26,551,511	\$	12,836,230	\$	-		Ś	9,060,398	\$48,448,139	\$1,125,840,579
12	\$	_	\$	26,551,511	\$	12,836,230	\$	_		\$	9,980,912	\$49,368,653	\$1,175,209,232
13	\$	_	\$	26,551,511	\$	12,836,230	\$	_		\$	10,918,917	\$50,306,658	\$1,225,515,890
14	\$	_	\$	11,643,328	\$	-	\$	_		\$	3,510,268	\$15,153,596	\$1,240,669,486
15	\$	_	Ś	11,643,328	\$	_	\$	-		Ś	3,798,186	\$15,441,514	\$1,256,111,001
16	\$	_	Ś	11,643,328	\$	_	\$	-		Ś	4,091,575	\$15,734,903	\$1,271,845,904
17	\$	_	Ś	11,643,328	\$	_	\$	-		Ś	4,390,538	\$16,033,866	\$1,287,879,770
18	\$	_	Ś	11,643,328	\$	_	\$	-		Ś	4,695,182	\$16,338,510	\$1,304,218,280
19	\$	_	\$	11,643,328	\$	_	\$	_		\$	5,005,614	\$16,648,942	\$1,320,867,221
20	\$	_	\$	11,643,328	\$	_	\$	_		\$	5,321,943	\$16,965,271	\$1,337,832,493
21	\$	_	\$	11,643,328	\$	_	\$	-		\$	5,644,284	\$17,287,612	\$1,355,120,104
22	\$	_	\$	11,643,328	\$	_	\$	_		\$	5,972,748	\$17,616,076	\$1,372,736,181
23	\$	_	\$	11,643,328	\$	_	\$	_		\$	6,307,454	\$17,950,782	\$1,390,686,962
24	\$	_	\$	11,643,328	\$	_	\$	_		\$	6,648,518	\$18,291,846	\$1,408,978,809
25	\$	_	\$	11,643,328	\$	_	\$	_		\$	6,996,064	\$18,639,392	\$1,427,618,200
26	\$	_	\$	11,643,328	\$	_	\$	_		\$	7,350,212	\$18,993,540	\$1,446,611,740
27	\$	_	\$	11,643,328	\$	_	\$	_		\$	7,711,089	\$19,354,417	\$1,465,966,158
28	\$	_	\$	11,643,328	\$	_	\$	_		\$	8,078,823	\$19,722,151	\$1,485,688,309
29	\$	_	\$	11,643,328	\$	_	\$	-		\$	8,453,544	\$20,096,872	\$1,505,785,181
30	\$	_	\$	11,643,328	\$	_	\$	-		\$	8,835,385	\$20,478,713	\$1,526,263,894
31	\$	-	\$	11,643,328	\$	-	\$	-		\$	9,224,480	\$20,867,808	\$1,547,131,702
32	\$	-	\$	11,643,328	\$	-	\$	-		\$	9,620,969	\$21,264,297	\$1,568,395,998
33	\$	-	\$	11,643,328	\$	_	\$	-		\$	10,024,990	\$21,668,318	\$1,590,064,316
34	\$	-	\$	11,643,328	\$	_	\$	-		\$	10,436,688	\$22,080,016	\$1,612,144,333
35	\$	-	\$	11,643,328	\$	_	\$	-		\$	10,856,209	\$22,499,537	\$1,634,643,869
36	\$	-	\$	11,643,328	\$	_	\$	-		\$	11,283,700	\$22,927,028	\$1,657,570,897
37	\$	-	\$	11,643,328	\$	_	\$	-		\$	11,719,313	\$23,362,641	\$1,680,933,538
38	\$	_	\$	11,643,328	\$	_	\$	-		\$	12,163,203	\$23,806,531	\$1,704,740,070
39	\$	_	\$	11,643,328	\$	_	\$	-		\$	12,615,528	\$24,258,856	\$1,728,998,925
40	\$	_	\$	11,643,328	\$	_	\$	-		\$	13,076,446	\$24,719,774	\$1,753,718,699
41	\$	_	\$	11,643,328	\$	_	\$	-		\$	13,546,121	\$25,189,449	\$1,778,908,148
42	\$	_	\$	11,643,328	\$	_	\$	-		\$	14,024,721	\$25,668,049	\$1,804,576,197
43	\$	_	\$	11,643,328	\$	_	\$	-		\$	14,512,414	\$26,155,742	\$1,830,731,939
44	\$	-	\$	11,643,328	\$	_	\$	-		\$	15,009,373	\$26,652,701	\$1,857,384,640
45	\$	-	\$	11,643,328	\$	_	\$	-		\$	15,515,774	\$27,159,102	\$1,884,543,743
46	\$	-	\$	11,643,328	\$	_	\$	-		\$	16,031,797	\$27,675,125	\$1,912,218,868
47	\$	-	\$	11,643,328	\$	_	\$	-		\$	16,557,625	\$28,200,953	\$1,940,419,821
48	\$	-	\$	11,643,328	\$	_	\$	-		\$	17,093,443	\$28,736,771	\$1,969,156,591
49	\$	-	\$	11,643,328	\$	_	\$	-		\$	17,639,441	\$29,282,769	\$1,998,439,361
50	\$	-	\$	11,643,328	\$	_	\$	-		\$	18,195,814	\$29,839,142	\$2,028,278,503
51	\$	_	\$	11,643,328	\$	-	\$	-		\$	18,762,758	\$30,406,086	\$2,058,684,589
52	\$	_	\$	11,643,328	\$	-	\$	-		\$	19,340,473	\$30,983,801	\$2,089,668,390
53	\$	_	\$	11,643,328	\$	-	\$	-		\$	19,929,166	\$31,572,494	\$2,121,240,884
54	\$	-	\$	11,643,328	\$	-	\$	-		\$	20,529,043	\$32,172,371	\$2,153,413,255
55	\$	-	\$	11,643,328	\$	-	\$	-		\$	21,140,318	\$32,783,646	\$2,186,196,901
56	\$	-	\$	11,643,328	\$	-	\$	-		\$	21,763,207	\$33,406,535	\$2,219,603,436
57	\$	-	\$	11,643,328	\$	-	\$	-		\$	22,397,931	\$34,041,259	\$2,253,644,696
58	\$	_	\$	11,643,328	\$	-	\$	-		\$	23,044,715	\$34,688,043	\$2,288,332,739
59	\$	-	\$	11,643,328	\$	-	\$	-		\$	23,703,788	\$35,347,116	\$2,323,679,855
	•		•	, , , -	•		•			-	, ,	. , , -	, ,

\$862,827,226

\$1,029,884,584

\$38,508,689

\$4,422,265,054



60	\$	-	\$ 11,643,328	\$	-	\$ -	\$ 24,375,383	\$36,018,711	\$2,359,698,567
61	\$	-	\$ 11,643,328	\$	-	\$ -	\$ 25,059,739	\$36,703,067	\$2,396,401,634
62	\$	-	\$ 11,643,328	\$	-	\$ -	\$ 25,757,097	\$37,400,425	\$2,433,802,059
63	\$	-	\$ 11,643,328	\$	-	\$ -	\$ 26,467,705	\$38,111,033	\$2,471,913,092
64	\$	-	\$ 11,643,328	\$	-	\$ -	\$ 27,191,815	\$38,835,143	\$2,510,748,235
65		\$0	\$ 11,643,328	\$	-	\$ -	\$ 27,929,683	\$39,573,011	\$2,550,321,246
66		\$0	\$ 11,643,328	\$	-	\$ -	\$ 28,681,570	\$40,324,898	\$2,590,646,144
67		\$0	\$ 11,643,328	\$	-	\$ -	\$ 29,447,743	\$41,091,071	\$2,631,737,215
68		\$0	\$ 11,643,328	\$	-	\$ -	\$ 30,228,473	\$41,871,801	\$2,673,609,016
69		\$0	\$ 11,643,328	\$	-	\$ -	\$ 31,024,038	\$42,667,366	\$2,716,276,381
70		\$0	\$ 11,643,328	\$	-	\$ -	\$ 31,834,717	\$43,478,045	\$2,759,754,427
71		\$0	\$ 11,643,328	\$	-	\$ -	\$ 32,660,800	\$44,304,128	\$2,804,058,555
72		\$0	\$ 11,643,328	\$	-	\$ -	\$ 33,502,579	\$45,145,907	\$2,849,204,462
73		\$0	\$ 11,643,328	\$	-	\$ -	\$ 34,360,351	\$46,003,679	\$2,895,208,141
74		\$0	\$ 11,643,328	\$	-	\$ -	\$ 35,234,421	\$46,877,749	\$2,942,085,890
75		\$0	\$ 11,643,328	\$	-	\$ -	\$ 36,125,098	\$47,768,426	\$2,989,854,316
76		\$0	\$ 11,643,328	\$	-	\$ -	\$ 37,032,698	\$48,676,026	\$3,038,530,342
77		\$0	\$ 11,643,328	\$	-	\$ -	\$ 37,957,543	\$49,600,871	\$3,088,131,213
78		\$0	\$ 11,643,328	\$	-	\$ -	\$ 38,899,959	\$50,543,287	\$3,138,674,500
79		\$0	\$ 11,643,328	\$	-	\$ -	\$ 39,860,282	\$51,503,610	\$3,190,178,110
80		\$0	\$ 11,643,328	\$	-	\$ -	\$ 40,838,850	\$52,482,178	\$3,242,660,288
81		\$0	\$ 11,643,328	\$	-	\$ -	\$ 41,836,012	\$53,479,340	\$3,296,139,628
82		\$0	\$ 11,643,328	\$	-	\$ -	\$ 42,852,119	\$54,495,447	\$3,350,635,075
83		\$0	\$ 11,643,328	\$	-	\$ -	\$ 43,887,533	\$55,530,861	\$3,406,165,936
84		\$0	\$ 11,643,328	\$	-	\$ -	\$ 44,942,619	\$56,585,947	\$3,462,751,882
85		\$0	\$ 11,643,328	\$	-	\$ -	\$ 46,017,752	\$57,661,080	\$3,520,412,962
86		\$0	\$ 11,643,328	\$	-	\$ -	\$ 47,113,312	\$58,756,640	\$3,579,169,603
87		\$0	\$ 11,643,328	\$	-	\$ -	\$ 48,229,689	\$59,873,017	\$3,639,042,620
88		\$0	\$ 11,643,328	\$	-	\$ -	\$ 49,367,276	\$61,010,604	\$3,700,053,224
89		\$0	\$ 11,643,328	\$	-	\$ -	\$ 50,526,477	\$62,169,805	\$3,762,223,029
90		\$0	\$ 11,643,328	\$	-	\$ -	\$ 51,707,704	\$63,351,032	\$3,825,574,061
91				\$	-	\$ 21,175,000	\$ 96,226,640	\$117,401,640	\$3,942,975,701
92				\$	-	\$ 20,000,000	\$ 92,993,881	\$112,993,881	\$4,055,969,581
93				\$	-	\$ 20,810,653	\$ 98,997,074	\$119,807,727	\$4,175,777,309
94				\$	-	\$ 20,810,653	\$ 101,273,421	\$122,084,074	\$4,297,861,383
95				\$	-	\$ 20,810,653	\$ 103,593,018	\$124,403,671	\$4,422,265,054
96						\$ -	\$ -	\$0	\$4,422,265,054
97						\$ -	\$ -	\$0	\$4,422,265,054
98							\$ -	\$0	\$4,422,265,054
99							\$ -	\$0	\$4,422,265,054
100							\$ -	\$0	\$4,422,265,054
	Tota	I	Total	То	tal	Total	Total		Total
	Design/C	Const	O&M	Cask H	andling	D&D	Escalation		Life Cycle

\$103,606,960

\$2,387,437,595



STUDY 1 - ALTERNATIVE STORAGE SYSTEMS FOR DUAL PURPOSE CANISTERS

COST DETAILS

ALTERNATIVE 3 - C-PAD, EXPANDED, LOW SEISMIC

LIFE CYCLE COST SUMMARIES



Expanded Storage Facility (5,000 MTU)

Project: C-PAD Expanded (5,000 MTU)

Expanded Project - C-PAD 60/40 Vertical/Horizontal - Low

Seismic

Separate CHB

Annual Escalation Factor 1.90% Discount Rate 3.40%

Life Cycle Costs (40 Year Life) Design & Construction	Capital \$1,094,242,205	Operations	Transport	Decommissioning	Escalation	Total Costs \$1,094,242,205
Operations & Maintenance (40 Year Life) Cask Handling	., , ,	<i>\$564,151,464</i> \$77,017,378				\$564,151,464 \$77,017,378
Transportation Equipment	\$0					\$0
Transport Operations		\$0	\$0			\$0
Repackaging	\$0	\$0				\$0
Transport to Repository	\$0		\$0			\$0
D&D Escalation				\$160,550,290	\$900,505,052	\$160,550,290 \$900,505,052
Total Costs (40 year Life) Present Value						\$2,796,466,389 \$1,486,056,761

Life Cycle Costs (80 Year Life)	Capital	Operations	Transport	Decommissioning	Escalation	Total Costs
Design & Construction	\$1,094,242,205					\$1,094,242,205
Operations & Maintenance (80 Year Life)		\$1,029,884,584				\$1,029,884,584
Cask Handling		\$77,017,378				<i>\$77,017,378</i>
Transportation Equipment	\$0					\$0
Transport Operations		\$0	\$0			\$0
Repackaging	\$0	\$0				\$0
Transport to Repository	\$0		\$0			\$0
D&D				\$160,550,290		\$160,550,290
Escalation					\$2,723,721,574	\$2,723,721,574

Total Costs (80 Year Life)
Present Value

\$5,085,416,030 \$1,622,035,739



STUDY 1 - ALTERNATIVE STORAGE SYSTEMS FOR DUAL PURPOSE CANISTERS

COST DETAILS

ALTERNATIVE 3 - C-PAD, EXPANDED, LOW SEISMIC

CAPITAL COST SUMMARY



Expanded Storage Facility (5,000 MTU)

Project: C-PAD Expanded (5,000 MTU)

Expanded Project - C-PAD 60/40 Vertical/Horizontal - Low Seismic

Separate CHB

Level 3 Cost Sumr	mary - First of A kin	d module		
Level 1	Level 2	Level 3 Descri	ption	Level 3 Total
C-PAD EX 01			n Storage Facility and transportation Project	
	C-PAD EX 01.01		Pilot ISF Facility \$486,894,56	53
		C DAD EV 04 04 04	Characa Park	60
		C-PAD EX 01.01.01	Storage Pads	\$0
		C-PAD EX 01.01.02	Cask Handling (Transfer) Facility	\$135,175,719
		C-PAD EX 01.01.03	Horizontal Dry Storage Modules	\$107,986,923
		C-PAD EX 01.01.04	Vertical Dry Storage Module	\$84,592,759
		C-PAD EX 01.01.05	Storage Cask Fabrication Facility	\$0
		C-PAD EX 01.01.06	Cask Maintenance Facility	\$0
		C-PAD EX 01.01.07	Concrete Batch Plant	\$1,850,000
		C-PAD EX 01.01.08	Visitor Center/ Auditorium	\$0
		C-PAD EX 01.01.09	Administration Building	\$3,140,000
		C-PAD EX 01.01.10	Security	\$24,148,975
		C-PAD EX 01.01.11	Rail Spur/ Receiving Yard	\$58,752,800
		C-PAD EX 01.01.12	Utilities	\$18,682,150
		C-PAD EX 01.01.13	Roads	\$18,212,737
		C-PAD EX 01.01.14	Parking	\$735,000
		C-PAD EX 01.01.15	Site Work	\$23,417,500
		C-PAD EX 01.01.16	Warehouse	\$10,200,000
		C-PAD EX 01.01.17	Maintenance Facility	\$0
		C-PAD EX 01.01.18	Waste management Facility	\$0
		C-PAD EX		
		01.01.01.xx	(Add Further Breakdown as needed)	\$0
	C-PAD EX 01.02		Expanded Interim Storage Facility \$219,346,51	12
		C-PAD EX 01.02.01	Expanded Storage Pads and Dry Cask Storage Systems	\$0
		C-PAD EX 01.02.02	Expanded Cask Handling Facility (if required)	\$0
		C-PAD EX 01.02.03	Horizontal Dry Storage Modules	\$107,986,923
		C-PAD EX 01.02.04	Vertical Dry Storage Casks	\$84,092,759
		C-PAD EX 01.02.05	Storage Cask Fabrication Facility (Expanded)	\$0
		C-PAD EX 01.02.06	Cask Maintenance Facility (Expanded)	\$0
		C-PAD EX 01.02.07	Concrete Batch Plant (Expanded if needed)	\$1,850,000
		C-PAD EX 01.02.08	Visitor Center/ Auditorium (expanded if needed)	\$745,000
		C-PAD EX 01.02.09	Administration Building (Expanded if needed)	\$0
		C-PAD EX 01.02.10	Security (Expanded)	\$10,074,488
		C-PAD EX 01.02.11	Rail Spur/ Receiving Yard (Expanded)	\$0
		C-PAD EX 01.02.12	Utilities Expanded as needed)	\$3,624,200
		C-PAD EX 01.02.13	Roads (Expanded)	\$83,142
		C-PAD EX 01.02.14	Parking (Expanded as needed)	\$03,142
		C-PAD EX 01.02.15	Site Work (Expanded)	\$10,890,000
		C-PAD EX 01.02.15	Warehouse (Expanded if Needed)	\$10,890,000
		C-PAD EX 01.02.17 C-PAD EX 01.02.18	Maintenance Facility (Expanded if needed)	\$0 \$0
			Waste management Facility (Expanded if needed)	\$0 \$0
		C-PAD EX 01.02.19	Hot Cell / Laboratories	\$0 \$0
		C-PAD EX 01.02.20	Pool Packaging Facility	\$0
		C-PAD EX 01.02.21	Standardized Storage System	\$0
		C-PAD EX 01.02.22	Standardized Disposal Canister	\$0
		C-PAD EX 01.02.23	Canister Repackaging Facility (For Repository	\$0
	C-PAD EX 01.03		·	
		C-PAD EX 01.03.01	Transportation Casks	\$0
		C-PAD EX 01.03.02	Rail Equipment	\$0
		C-PAD EX 01.03.03	Rail Maintenance Facility	\$0
		C-PAD EX 01.03.04	Transportation Systems Services	\$0
	C-PAD EX 01.04		Pre-Construction Capitalized Costs \$66,025,00	00
		C-PAD EX 01.04.01	Land or Land Leases	\$7,680,000
		C-PAD EX 01.04.02	Site permits	\$200,000
		C-PAD EX 01.04.03	Site Licensing	\$6,240,000
		C-PAD EX 01.04.05	Plant Permits	\$0
		C-PAD EX 01.04.06	Planning and Alternative Studies	\$750,000



TASK ORDER NO. 16 - GENERIC DESIGN ALTERNATIVES FOR DRY STORAGE OF USED NUCLEAR FUEL THE DEPARTMENT OF ENERGY - OFFICE OF NUCLEAR ENERGY

	C-PAD EX 01.04.07	Possarch and Davidonment	\$0
	C-PAD EX 01.04.07	Research and Development Design	\$23,955,000
	C-PAD EX 01.04.09	Other Pre-construction Costs	\$17,200,000
	C-PAD EX 01.04.09		\$10,000,000
	C-PAD EX 01.04.10	Pre-construction contingencies (Add Further Breakdown as needed)	\$10,000,000
C-PAD EX 01.05	C-PAD EX U1.U4.XX	,	•
C-PAD EX 01.03	C-PAD EX 01.05.01	Indirect Capitalized Costs \$63,180,000	
	C-PAD EX 01.05.01	Project Management	\$2,700,000
		Construction Management Field indirect services	\$3,600,000
	C-PAD EX 01.05.03		\$11,880,000
	C-PAD EX 01.05.04	Design Services in support of Construction	\$5,400,000
	C-PAD EX 01.05.05	QA/QC	\$12,600,000
	C-PAD EX 01.05.06	Commissioning and Startup	\$1,200,000
	C-PAD EX 01.05.07	Home office Engineering support to Construction	\$7,200,000
	C-PAD EX 01.05.08	Document Control	\$2,700,000
	C-PAD EX 01.05.09	Project Controls	\$3,600,000
	C-PAD EX 01.05.10	Construction Testing	\$2,700,000
	C-PAD EX 01.05.11	Inspections	\$3,600,000
	C-PAD EX 01.05.12	Startup and Testing	\$3,000,000
	C-PAD EX 01.05.13	Commissioning	\$3,000,000
C-PAD EX 01.06		Site Selection \$0)
	C-PAD EX 01.06.01	Site Selection	\$0
	C-PAD EX 01.06.02	Public Information Process	\$0
C-PAD EX 01.07		Decontamination and Deconstruction \$0	l
	C-PAD EX 01.07.01	Decommissioning	\$0
	C-PAD EX 01.07.02	Decontamination	\$0
	C-PAD EX 01.07.03	Deconstruction	\$0
	C-PAD EX 01.07.04		\$0
	C-PAD EX 01.07.05		\$0
C-PAD EX 01.08		Project Financial Costs \$111,949,774	,
	C-PAD EX 01.08.01	Contractor Fees	\$66,835,686
	C-PAD EX 01.08.02	Escalation Costs	\$45,114,088
	C-PAD EX 01.08.03	Interest Payments	\$0
	C-PAD EX 01.08.04	Indirect costs to support shipments to repository	\$0
	C-PAD EX 01.08.05		\$0
	C-PAD EX 01.08.xx	(Add Further Breakdown as needed)	\$0
C DAD EV 04 00		Project Continuousia	
C-PAD EX 01.09	C DAD EV 01 00 01	Project Contingencies \$146,846,356	
	C-PAD EX 01.09.01	Management Reserve - Contractor Held	\$47,369,792
	C-PAD EX 01.09.02	Contingency - DOE held	\$99,476,564
C-PAD EX 01.10			
C 1 / 10 L/1 01.10	C-PAD EX 01.10.01	Other Direct Costs \$0)
	C-PAD EX 01.10.01	DOE Project Operations	, \$0
	C-PAD EX 01.10.02	DOE Froject Operations DOE TM&E	\$0 \$0
	C-PAD EX 01.10.03	Host site Operational Costs Miscellaneous	\$0 \$0
	C-PAD EX 01.10.04 C-PAD EX 01.10.05	Miscellaneous ODC	\$0 \$0
	C-PAD EX 01.10.03	Miscellatieous ODC	ŞU
C-PAD EX 01.11		Operational Costs)
	C-PAD EX 01.11.01	Operations Costs	\$0
	C-PAD EX 01.11.02	Transportation Costs	, \$0
	C-PAD EX 01.11.03	Escalation (Operations/Transportation)	\$0
		, , , , , , , , , , , , , , , , , , ,	* 3
		TEO MANDE CONTRACTOR TO A SECOND STATE OF THE	60047656
		TEC (All Direct & indirect Costs, MR, Escalation) TPC (TEC plus Contingency, ODCs)	\$994,765,641 \$1,094,242,205

Project Total

TEC (All Direct & indirect Costs, MR, Escalation) \$994,765,641

TPC (TEC plus Contingency, ODCs) \$1,094,242,205

All Capitol, Operation, Transportation,

LCC Escalation \$1,094,242,205



STUDY 1 - ALTERNATIVE STORAGE SYSTEMS FOR DUAL PURPOSE CANISTERS

COST DETAILS

ALTERNATIVE 3 - C-PAD, EXPANDED, LOW SEISMIC

LIFE CYCLE COST - 40 YEAR OPERATING LIFE



Expanded Storage Facility (5,000 MTU)

Project: C-PAD Expanded (5,000 MTU)

Expanded Project - C-PAD 60/40 Vertical/Horizontal - Low Seismic

Separate CHB

Separa							Annual Escalation					Discount Rate		
	·	erating life								1.90%				3.40%
YEAR		Design/Const		O&M		ask Handling		D&D		Escalation		nual Expense		Cumulative
1	\$	10,000,000	\$	-	\$	-	\$	-	\$	190,000	\$	10,190,000	\$	10,190,000
2	\$	10,000,000	\$	-	\$	-	\$	-	\$	383,610	\$	10,383,610	\$	20,573,610
3	\$	20,000,000	\$	-	\$	-	\$	-	\$	1,161,797	\$	21,161,797	\$	41,735,407
4	\$	20,000,000	\$	-	\$	-	\$	-	\$	1,563,871	\$	21,563,871	\$	63,299,279
5	\$	20,000,000	\$	-	\$	-	\$	-	\$	1,973,585	\$	21,973,585	\$	85,272,863
6	\$	20,000,000	\$	-	\$	-	\$	-	\$	2,391,083	\$	22,391,083	\$	107,663,946
7	\$	27,888,399	\$	-	\$	-	\$	-	\$	3,927,403	\$	31,815,802	\$	139,479,748
8	\$	200,000,000	\$	-	\$	-	\$	-	\$	32,500,273	\$	232,500,273	\$	371,980,021
9	\$	200,000,000	\$	27,647,777	\$	-	\$	-	\$	42,021,251	\$	269,669,028	\$	641,649,050
10	\$	566,353,806	\$	26,046,017	\$	-	\$	-	\$	122,683,682	\$	715,083,505	\$	1,356,732,555
11			\$	26,551,511	\$	12,836,230	\$	-	\$	9,060,398	\$	48,448,139	\$	1,405,180,694
12	\$	-	\$	26,551,511	\$	12,836,230	\$	-	\$	9,980,912	\$	49,368,653	\$	1,454,549,347
13	\$	-	\$	26,551,511	\$	12,836,230	\$	-	\$	10,918,917	\$	50,306,658	\$	1,504,856,005
14	\$	-	\$	11,643,328	\$	12,836,230	\$	-	\$	7,380,176	\$	31,859,734	\$	1,536,715,738
15	\$	-	\$	11,643,328	\$	12,836,230	\$	-	\$	7,985,511	\$	32,465,069	\$	1,569,180,807
16	\$	-	\$	11,643,328	\$	12,836,230	\$	-	\$	8,602,347	\$	33,081,905	\$	1,602,262,712
17	\$	-	\$	11,643,328	\$	-	\$	-	\$	4,390,538	\$	16,033,866	\$	1,618,296,578
18	\$	-	\$	11,643,328	\$	-	\$	-	\$	4,695,182	\$	16,338,510	\$	1,634,635,088
19	\$	-	\$	11,643,328	\$	-	\$	-	\$	5,005,614	\$	16,648,942	\$	1,651,284,030
20	\$	-	\$	11,643,328	\$	-	\$	-	\$	5,321,943	\$	16,965,271	\$	1,668,249,301
21	\$	-	\$	11,643,328	\$	-	\$	-	\$	5,644,284	\$	17,287,612	\$	1,685,536,913
22	\$	-	\$	11,643,328	\$	-	\$	-	\$	5,972,748	\$	17,616,076	\$	1,703,152,989
23	\$	-	\$	11,643,328	\$	-	\$	-	\$	6,307,454	\$	17,950,782	\$	1,721,103,770
24	\$	-	\$	11,643,328	\$	-	\$	-	\$	6,648,518	\$	18,291,846	\$	1,739,395,617
25	\$	-	\$	11,643,328	\$	-	\$	-	\$	6,996,064	\$	18,639,392	\$	1,758,035,009
26	\$	-	\$	11,643,328	\$	-	\$	-	\$	7,350,212	\$	18,993,540	\$	1,777,028,549
27	\$	_	\$	11,643,328	\$	-	\$	-	\$	7,711,089	\$	19,354,417	\$	1,796,382,966
28	\$	_	\$	11,643,328	\$	-	\$	-	\$	8,078,823	\$	19,722,151	\$	1,816,105,117
29	\$	-	\$	11,643,328	\$	_	\$	-	\$	8,453,544	\$	20,096,872	\$	1,836,201,989
30	;	_	; \$	11,643,328	\$	_	Ś	_	, \$	8,835,385	\$	20,478,713	\$	1,856,680,702
31	\$	_	\$	11,643,328	\$	_	\$	_	\$	9,224,480	\$	20,867,808	\$	1,877,548,510
32	\$	_	\$	11,643,328	\$	_	\$	_	\$	9,620,969	\$	21,264,297	\$	1,898,812,806
33	\$	_	\$	11,643,328	\$	_	\$	_	\$	10,024,990	\$	21,668,318	\$	1,920,481,125
34	\$	_	\$	11,643,328	\$	_	\$	_	\$	10,436,688	\$	22,080,016	\$	1,942,561,141
35	\$	_	\$	11,643,328	\$	_	\$	_	\$	10,856,209	\$	22,499,537	\$	1,965,060,677
36	ς ,	_	ς ,	11,643,328	ς ,	_	ς ,	_	ς ς	11,283,700	\$	22,927,028	ς ,	1,987,987,705
37	ς ,	_	ς ,	11,643,328	ς ,	_	ς ,	_	ς ς	11,719,313	\$	23,362,641	\$	2,011,350,346
38	ς ,	_	ς ,	11,643,328	ς ,	_	ς ,	_	ς ς	12,163,203	\$	23,806,531	ς ,	2,035,156,878
39	ب ذ		¢	11,643,328	¢	_	Ċ	_	ب خ	12,615,528	\$	24,258,856	\$	2,059,415,733
40	ب ذ		¢	11,643,328	¢	_	Ċ	_	ب خ	13,076,446	\$	24,719,774	ب خ	2,084,135,507
41	ب ذ		¢	11,643,328	¢	_	Ċ	_	ب خ	13,546,121	\$	25,189,449	ب خ	2,109,324,957
42	٠ ز	_	٠ ر		ې د	_	ر ک	_	ب خ				\$ ¢	
	ې د	-	ې د	11,643,328	ې د	-	ې د	-	ې خ	14,024,721	\$ ¢	25,668,049	ې د	2,134,993,006
43	ې د	-	ې د	11,643,328	ې د	-	ې د	-	ې خ	14,512,414	\$	26,155,742	\$ c	2,161,148,747
44 45	ې د	-	ې د	11,643,328	ې د	-	ې د	-	ې خ	15,009,373	\$ ¢	26,652,701	ې د	2,187,801,449
45 46	\$ ¢	-	\$ ¢	11,643,328	<u>ک</u>	-	<u>۲</u>	-	<u>ې</u>	15,515,774	\$	27,159,102	\$ \$	2,214,960,551
46	\$ ¢	-	\$ \$	11,643,328	\$	-	\$ \$	-	\$ \$	16,031,797	\$ \$	27,675,125	\$	2,242,635,676
47	\$ ¢	-	\$ \$	11,643,328	\$	-	\$ \$	-	\$ \$	16,557,625	\$	28,200,953	\$	2,270,836,629
48	\$	-	\$	11,643,328	\$	-	\$	-	\$	17,093,443	\$	28,736,771	\$	2,299,573,400
49	\$	-	\$	11,643,328	\$	-	\$	-	\$	17,639,441	\$	29,282,769	\$	2,328,856,169
50	\$	-	\$	11,643,328	\$	-	\$	-	\$	18,195,814	\$	29,839,142	\$	2,358,695,311
51	\$	-	\$	-	\$	-	\$	21,175,000	\$	34,122,666	\$	55,297,666	\$	2,413,992,977
52	\$	-	\$	-	\$	-	\$	26,250,000	\$	43,603,292	\$	69,853,292	\$	2,483,846,269
53	\$	-	\$	-	\$	-	\$	37,708,430	\$	64,543,191	\$	102,251,621	\$	2,586,097,891
54	\$	-	\$	-	\$	-	\$	37,708,430	\$	66,485,972	\$	104,194,402	\$	2,690,292,293
55	\$	-	\$	-	\$	-	\$	37,708,430	\$	68,465,666	\$	106,174,096	\$	2,796,466,389
56	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	2,796,466,389
57	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	2,796,466,389
58	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	2,796,466,389
59	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	2,796,466,389
60	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	2,796,466,389
		T-+-!		T-4-1				Tatal		T-+-!				T-+-!
		Total		Total				Total		Total				Total
		Design/Const	۸.	0&M	,	77 047 272	,	D&D	,	Escalation			۸,	Life Cycle
	>	1,094,242,205	\$	564,151,464	\$	77,017,378	\$	160,550,290	\$	900,505,052			\$	2,796,466,389



STUDY 1 - ALTERNATIVE STORAGE SYSTEMS FOR DUAL PURPOSE CANISTERS

COST DETAILS

ALTERNATIVE 3 - C-PAD, EXPANDED, LOW SEISMIC

LIFE CYCLE COST - 80 YEAR OPERATING LIFE



Expanded Storage Facility (5,000 MTU)

Project: C-PAD Expanded (5,000 MTU)

Expanded Project - C-PAD 60/40 Vertical/Horizontal - Low Seismic

Separate CHB

80 Year Operating Life

00 TEa	r Op	erating Life								۸۰۰	ual Escalation		Discount Bata
										Anni	ual Escalation 1.90%		Discount Rate 3.40%
											1.50/0		3.1070
YEAR	D	esign/Const		O&M	C	ask Handling		D&D			Escalation	Annual Funding	Cumulative
1	\$	10,000,000	\$	-	\$	-	\$		-	\$	190,000	\$10,190,000	\$10,190,000
2	\$	10,000,000	\$	-	\$	-	\$		-	\$	383,610	\$10,383,610	\$20,573,610
3	\$	20,000,000	\$	-	\$	-	\$		-	\$	1,161,797	\$21,161,797	\$41,735,407
4	\$	20,000,000	\$	-	\$	-	\$		-	\$	1,563,871	\$21,563,871	\$63,299,279
5	\$	20,000,000	\$	-	\$	-	\$		-	\$	1,973,585	\$21,973,585	\$85,272,863
6	\$	20,000,000	\$	-	\$	-	\$		-	\$	2,391,083	\$22,391,083	\$107,663,946
7	\$	27,888,399	\$	-	\$	-	\$		-	\$ •	3,927,403	\$31,815,802	\$139,479,748
8	\$ \$	200,000,000	\$	-	\$	-	\$		-	\$ \$	32,500,273	\$232,500,273	\$371,980,021
9	\$ \$	200,000,000	\$	27,647,777	\$	-	\$		-	\$ \$	42,021,251	\$269,669,028	\$641,649,050
10	\$	566,353,806	\$	26,046,017	\$	-	\$ ¢		-	\$ ¢	122,683,682	\$715,083,505	\$1,356,732,555
11	ç		\$ \$	26,551,511	\$ \$	12,836,230	\$ ¢		-	۶ د	9,060,398	\$48,448,139	\$1,405,180,694 \$1,454,549,347
12 13	\$ \$	-	۶ \$	26,551,511 26,551,511	۶ \$	12,836,230	\$ \$		-	۶ \$	9,980,912 10,918,917	\$49,368,653 \$50,306,658	\$1,504,856,005
13 14	۶ \$	-	ې د	11,643,328	۶ \$	12,836,230 12,836,230	۶ \$		-	ې د	7,380,176	\$31,859,734	\$1,536,715,738
15	۶ \$	-	۶ \$	11,643,328	۶ \$	12,836,230	۶ \$		_	۶ د	7,985,511	\$32,465,069	\$1,569,180,807
16	\$	_	٠ \$	11,643,328	\$	12,836,230	\$		_	٠ د	8,602,347	\$32,403,003	\$1,602,262,712
17	\$	_	٠ \$	11,643,328	\$	12,830,230	\$		_	٠ د	4,390,538	\$16,033,866	\$1,618,296,578
18	\$	_	ς ς	11,643,328	\$	_	\$		_	٠ \$	4,695,182	\$16,338,510	\$1,634,635,088
19	\$	_	\$	11,643,328	\$	_	\$		_	\$	5,005,614	\$16,648,942	\$1,651,284,030
20	\$	-	\$	11,643,328	\$	_	\$		_	\$	5,321,943	\$16,965,271	\$1,668,249,301
21	\$	_	\$	11,643,328	\$	_	\$		_	\$	5,644,284	\$17,287,612	\$1,685,536,913
22	\$	-	\$	11,643,328	\$	-	\$		_	\$	5,972,748	\$17,616,076	\$1,703,152,989
23	\$	-	\$	11,643,328	\$	-	\$		-	, \$	6,307,454	\$17,950,782	\$1,721,103,770
24	\$	-	\$	11,643,328	, \$	-	\$		_	\$	6,648,518	\$18,291,846	\$1,739,395,617
25	\$	-	\$	11,643,328	\$	-	\$		-	\$	6,996,064	\$18,639,392	\$1,758,035,009
26	\$	-	\$	11,643,328	\$	-	\$		-	\$	7,350,212	\$18,993,540	\$1,777,028,549
27	\$	-	\$	11,643,328	\$	-	\$		-	\$	7,711,089	\$19,354,417	\$1,796,382,966
28	\$	-	\$	11,643,328	\$	-	\$		-	\$	8,078,823	\$19,722,151	\$1,816,105,117
29	\$	-	\$	11,643,328	\$	-	\$		-	\$	8,453,544	\$20,096,872	\$1,836,201,989
30	\$	-	\$	11,643,328	\$	-	\$		-	\$	8,835,385	\$20,478,713	\$1,856,680,702
31	\$	-	\$	11,643,328	\$	-	\$		-	\$	9,224,480	\$20,867,808	\$1,877,548,510
32	\$	-	\$	11,643,328	\$	-	\$		-	\$	9,620,969	\$21,264,297	\$1,898,812,806
33	\$	-	\$	11,643,328	\$	-	\$		-	\$	10,024,990	\$21,668,318	\$1,920,481,125
34	\$	-	\$	11,643,328	\$	-	\$		-	\$	10,436,688	\$22,080,016	\$1,942,561,141
35	\$	-	\$	11,643,328	\$	-	\$		-	\$	10,856,209	\$22,499,537	\$1,965,060,677
36	\$	-	\$	11,643,328	\$	-	\$		-	\$	11,283,700	\$22,927,028	\$1,987,987,705
37	\$	-	\$	11,643,328	\$	-	\$		-	\$	11,719,313	\$23,362,641	\$2,011,350,346
38	\$	-	\$	11,643,328	\$	-	\$		-	\$	12,163,203	\$23,806,531	\$2,035,156,878
39	Ş ,	-	\$	11,643,328	\$	-	\$		-	\$ •	12,615,528	\$24,258,856	\$2,059,415,733
40	\$	-	\$	11,643,328	\$	-	\$		-	\$	13,076,446	\$24,719,774	\$2,084,135,507
41	\$ \$	-	\$ \$	11,643,328	\$	-	\$		-	\$ \$	13,546,121	\$25,189,449	\$2,109,324,957
42	\$ ¢	-	\$ ¢	11,643,328	\$ ¢	-	\$ ¢		-	\$ ¢	14,024,721	\$25,668,049	\$2,134,993,006
43	<u>۲</u>	-	۶ ۲	11,643,328	<u>ک</u>	-	<u>ې</u>		-	۶ د	14,512,414	\$26,155,742	\$2,161,148,747
44 45	ې د	-	ې د	11,643,328	۶ د	-	۶ د		-	۶ د	15,009,373	\$26,652,701 \$27,159,102	\$2,187,801,449 \$2,214,960,551
45 46	ې د	-	ې د	11,643,328 11,643,328	ې د	_	ې د		-	ې د	15,515,774 16,031,797	\$27,139,102	\$2,242,635,676
47	ب ذ	_	ب ذ	11,643,328	ب ذ	_	٠ د		_	ب د	16,557,625	\$28,200,953	\$2,270,836,629
48	\$	_	\$	11,643,328	\$	_	\$		_	\$	17,093,443	\$28,736,771	\$2,299,573,400
49	\$	_	\$	11,643,328	\$	_	\$		_	\$	17,639,441	\$29,282,769	\$2,328,856,169
50	\$	_	\$	11,643,328	\$	_	\$		_	\$	18,195,814	\$29,839,142	\$2,358,695,311
51	\$	-	\$	11,643,328	\$	-	\$		_	\$	18,762,758	\$30,406,086	\$2,389,101,397
52	\$	-	\$	11,643,328	\$	-	\$		-	\$	19,340,473	\$30,983,801	\$2,420,085,198
53	\$	-	\$	11,643,328	\$	-	\$		-	\$	19,929,166	\$31,572,494	\$2,451,657,692
54	\$	-	\$	11,643,328	\$	-	\$		-	\$	20,529,043	\$32,172,371	\$2,483,830,063
55	\$	-	\$	11,643,328	\$	-	\$		-	\$	21,140,318	\$32,783,646	\$2,516,613,709
56	\$	-	\$	11,643,328	\$	-	\$		-	\$	21,763,207	\$33,406,535	\$2,550,020,244
57	\$	-	\$	11,643,328	\$	-	\$		-	\$	22,397,931	\$34,041,259	\$2,584,061,504
58	\$	-	\$	11,643,328	\$	-	\$		-	\$	23,044,715	\$34,688,043	\$2,618,749,547
59	\$	-	\$	11,643,328	\$	-	\$		-	\$	23,703,788	\$35,347,116	\$2,654,096,663
60	\$	-	\$	11,643,328	\$	-	\$		-	\$	24,375,383	\$36,018,711	\$2,690,115,375
61	\$	-	\$	11,643,328	\$	-	\$		-	\$	25,059,739	\$36,703,067	\$2,726,818,442
62	\$	-	\$	11,643,328	\$	-	\$		-	\$	25,757,097	\$37,400,425	\$2,764,218,867
								A6 - 29					

\$1,094,242,205

\$1,029,884,584

\$77,017,378



\$5,085,416,030

	Design/Co	nst		O&M	Cask Har	ndling		D&D		Escalation		Life Cycle	
	Total			Total	Tota	ıl		Total		Total		Total	
100									\$	-	\$0	\$5,085,416,030	
99									\$	-	\$0	\$5,085,416,030	
98									\$	-	\$0	\$5,085,416,030	
97							\$	-	\$	-	\$0	\$5,085,416,030	
96					•		\$	-	\$	-	\$0	\$5,085,416,030	
95					, \$	-	, \$	37,708,430	, \$	187,708,189	\$225,416,619	\$5,085,416,030	
94					, \$	_	\$	37,708,430	\$	183,505,131	\$221,213,561	\$4,859,999,411	
93					\$	_	\$	37,708,430	\$	179,380,443	\$217,088,873	\$4,638,785,850	
92					\$	_	\$	26,250,000	\$	122,054,468	\$148,304,468	\$4,421,696,977	
91		70	7	,5 .5,520	\$	_	\$	21,175,000	\$	96,226,640	\$117,401,640	\$4,273,392,509	
90		\$0	\$	11,643,328	\$	_	\$	-	\$	51,707,704	\$63,351,032	\$4,155,990,869	
89		\$0	\$	11,643,328	\$	_	\$	_	\$	50,526,477	\$62,169,805	\$4,092,639,837	
88		\$0	\$	11,643,328	\$	_	\$	_	\$	49,367,276	\$61,010,604	\$4,030,470,032	
87		\$0	\$	11,643,328	\$	_	\$	_	\$	48,229,689	\$59,873,017	\$3,969,459,428	
86		\$0	\$	11,643,328	\$	_	\$	_	\$	47,113,312	\$58,756,640	\$3,909,586,411	
85		\$0	\$	11,643,328	\$	_	\$	_	\$	46,017,752	\$57,661,080	\$3,850,829,771	
84		\$0	\$	11,643,328	\$	_	\$	_	\$	44,942,619	\$56,585,947	\$3,793,168,691	
83		\$0	\$	11,643,328	\$	_	\$	-	\$	43,887,533	\$55,530,861	\$3,736,582,744	
82		\$0	\$	11,643,328	\$	_	\$	_	\$	42,852,119	\$54,495,447	\$3,681,051,883	
81		\$0	\$	11,643,328	\$	_	\$	_	\$	41,836,012	\$53,479,340	\$3,626,556,436	
80		\$0	\$	11,643,328	\$	_	\$	_	\$	40,838,850	\$52,482,178	\$3,573,077,096	
79		\$0	\$	11,643,328	\$	_	\$	_	\$	39,860,282	\$51,503,610	\$3,520,594,918	
78		\$0 \$0	\$	11,643,328	\$	_	\$	-	\$	38,899,959	\$50,543,287	\$3,469,091,308	
70 77		\$0 \$0	\$	11,643,328	\$	_	\$	_	Ś	37,957,543	\$49,600,871	\$3,418,548,021	
76		\$0 \$0	\$	11,643,328	\$	_	ς ς	_	Ś	37,032,698	\$48,676,026	\$3,368,947,150	
7 4 75		\$0 \$0	۶ \$	11,643,328	\$	_	٠ ج	_	ب خ	36,125,098	\$47,768,426	\$3,320,271,124	
73 74		\$0 \$0	\$ \$	11,643,328 11,643,328	\$ \$	-	ې د	-	ې د	34,360,351 35,234,421	\$46,003,679 \$46,877,749	\$3,225,624,949 \$3,272,502,698	
72 73		\$0 \$0	\$ \$	11,643,328	\$ \$	-	ې خ	-	ې د	33,502,579	\$45,145,907	\$3,179,621,270	
71 72		\$0	\$	11,643,328	\$	-	>	-	\$ د	32,660,800	\$44,304,128	\$3,134,475,363	
70 71		\$0	\$	11,643,328	\$ ¢	-	\$ ¢	-	\$ ¢	31,834,717	\$43,478,045	\$3,090,171,235	
69 7 0		\$0	\$	11,643,328	\$	-	\$ ¢	-	\$ ¢	31,024,038	\$42,667,366	\$3,046,693,190	
68		\$0	\$	11,643,328	\$	-	\$ ¢	-	\$ ¢	30,228,473	\$41,871,801	\$3,004,025,824	
67		\$0	\$	11,643,328	\$	-	\$ ¢	-	\$ ¢	29,447,743	\$41,091,071	\$2,962,154,023	
66		\$0	\$	11,643,328	\$ ¢	-	\$ ¢	-	\$ ¢	28,681,570	\$40,324,898	\$2,921,062,952	
65		\$0	\$	11,643,328	\$	-	\$ ¢	-	\$ ¢	27,929,683	\$39,573,011	\$2,880,738,054	
64	\$	-	\$	11,643,328	\$	-	\$	-	\$	27,191,815	\$38,835,143	\$2,841,165,043	
				44 640 000					_		400 00= 440	40 0 44 46 0 40	

\$160,550,290

\$2,723,721,574



STUDY 1 - ALTERNATIVE STORAGE SYSTEMS FOR DUAL PURPOSE CANISTERS

COST DETAILS

ALTERNATIVE 4 - C-PAD, EXPANDED, HIGH SEISMIC

LIFE CYCLE COST SUMMARIES



Expanded Storage Facility (10,000 MTU)

Project: C-PAD Expanded (10,000 MTU)

Expanded Project - C-PAD 60/40 Vertical/Horizontal - High Seismic

Separate CHB

Annual Escalation Factor 1.90%
Discount Rate 3.40%

Life Cycle Costs (40 Year Life) Design & Construction Operations & Maintenance (40 Year Life) Cask Handling	Capital \$1,169,825,664	Operations <i>\$564,151,464 \$77,017,378</i>	Transport	Decommissioning	Escalation	Total Costs \$1,169,825,664 \$564,151,464 \$77,017,378
Transportation Equipment Transport Operations	\$0	\$0	\$0			\$0 \$0
Repackaging	\$0	\$0 \$0	γu			\$0 \$0
Transport to Repository	\$0	7 -	\$0			\$0
D&D Escalation				\$179,036,744	\$947,785,812	\$179,036,744 \$947,785,812
Total Costs (40 year Life) Present Value						\$2,937,817,062 \$1,559,890,067
Life Cycle Costs (80 Year Life) Design & Construction Operations & Maintenance (80 Year Life)	Capital \$1,169,825,664	Operations \$1,029,884,584	Transport	Decommissioning	Escalation	Total Costs \$1,169,825,664 \$1,029,884,584
Cask Handling	ćo	\$77,017,378				\$77,017,378
Transportation Equipment Transport Operations Banackaging	\$0 \$0	\$0 \$0	\$0			\$0 \$0 \$0
Repackaging Transport to Repository	\$0	Ş U	\$0	¢170 020 744		\$0
D&D Escalation				\$179,036,744	\$2,827,284,809	\$179,036,744 \$2,827,284,809
Total Costs (80 Year Life)						\$5,283,049,179



STUDY 1 - ALTERNATIVE STORAGE SYSTEMS FOR DUAL PURPOSE CANISTERS

COST DETAILS

ALTERNATIVE 4 - C-PAD, EXPANDED, HIGH SEISMIC

CAPITAL COST SUMMARY

\$10,000,000



Interim Storage Facility

Expanded Storage Facility (10,000 MTU)

Project: C-PAD Expanded (10,000 MTU)

Expanded Project - C-PAD 60/40 Vertical/Horizontal - High Seismic

Separate CHB

Level 3 Cost Summary - First of A kind module

Level 1	Level 2	Level 3 Description		Level 3 Total						
C-PAD LE EX 01	C DAD LE EV O		Interim Storage Facility and transportation Project							
	C-PAD LE EX 02	1.01	Pilot ISF Facility \$529,557,398							
		C-PAD LE EX 01.01.01	Storage Pads	\$0						
		C-PAD LE EX 01.01.02	Cask Handling (Transfer) Facility	\$163,293,960						
		C-PAD LE EX 01.01.03	Horizontal Dry Storage Modules	\$113,041,942						
		C-PAD LE EX 01.01.04	Vertical Dry Storage Module	\$94,082,334						
		C-PAD LE EX 01.01.05	Storage Cask Fabrication Facility	\$0						
		C-PAD LE EX 01.01.06	Cask Maintenance Facility	\$0						
		C-PAD LE EX 01.01.07	Concrete Batch Plant	\$1,850,000						
		C-PAD LE EX 01.01.08	Visitor Center/ Auditorium	\$0						
		C-PAD LE EX 01.01.09	Administration Building	\$3,140,000						
		C-PAD LE EX 01.01.10	Security	\$24,148,975						
		C-PAD LE EX 01.01.11	Rail Spur/ Receiving Yard	\$58,752,800						
		C-PAD LE EX 01.01.12	Utilities	\$18,682,150						
		C-PAD LE EX 01.01.13	Roads	\$18,212,737						
		C-PAD LE EX 01.01.14 C-PAD LE EX 01.01.15	Parking Site Work	\$735,000 \$33,417,500						
		C-PAD LE EX 01.01.15 C-PAD LE EX 01.01.16	Warehouse	\$23,417,500 \$10,200,000						
		C-PAD LE EX 01.01.16	Maintenance Facility	\$10,200,000						
		C-PAD LE EX 01.01.17	Waste management Facility	\$0 \$0						
		C-PAD LE EX 01.01.18	·	\$0 \$0						
			(100.00.00.00.00.00.00.00.00.00.00.00.00.	70						
	C-PAD LE EX 03		Expanded Interim Storage Facility \$234,391,105							
		C-PAD LE EX 01.02.01	Expanded Storage Pads and Dry Cask Storage Systems	\$0						
		C-PAD LE EX 01.02.02	Expanded Cask Handling Facility (if required)	\$0						
		C-PAD LE EX 01.02.03	Horizontal Dry Storage Modules	\$113,041,942						
		C-PAD LE EX 01.02.04	Vertical Dry Storage Casks	\$94,082,334						
		C-PAD LE EX 01.02.05	Storage Cask Fabrication Facility (Expanded)	\$0 \$0						
		C-PAD LE EX 01.02.06 C-PAD LE EX 01.02.07	Cask Maintenance Facility (Expanded) Concrete Batch Plant (Expanded if needed)	\$0 \$1,850,000						
		C-PAD LE EX 01.02.07	Visitor Center/ Auditorium (expanded if needed)	\$745,000						
		C-PAD LE EX 01.02.09	Administration Building (Expanded if needed)	\$743,000						
		C-PAD LE EX 01.02.10	Security (Expanded)	\$10,074,488						
		C-PAD LE EX 01.02.11	Rail Spur/ Receiving Yard (Expanded)	\$10,071,100						
		C-PAD LE EX 01.02.12	Utilities Expanded as needed)	\$3,624,200						
		C-PAD LE EX 01.02.13	Roads (Expanded)	\$83,142						
		C-PAD LE EX 01.02.14	Parking (Expanded as needed)	\$0						
		C-PAD LE EX 01.02.15	Site Work (Expanded)	\$10,890,000						
		C-PAD LE EX 01.02.16	Warehouse (Expanded if Needed)	\$0						
		C-PAD LE EX 01.02.17	Maintenance Facility (Expanded if needed)	\$0						
		C-PAD LE EX 01.02.18	Waste management Facility (Expanded if needed)	\$0						
		C-PAD LE EX 01.02.19	Hot Cell / Laboratories	\$0						
		C-PAD LE EX 01.02.20	Pool Packaging Facility	\$0						
		C-PAD LE EX 01.02.21	Standardized Storage System	\$0						
		C-PAD LE EX 01.02.22	Standardized Disposal Canister	\$0						
		C-PAD LE EX 01.02.23	Canister Repackaging Facility (For Repository	\$0						
	C-PAD LE EX 02		Transportation Equipment \$0							
		C-PAD LE EX 01.03.01	Transportation Casks	\$0						
		C-PAD LE EX 01.03.02 C-PAD LE EX 01.03.03	Rail Equipment	\$0 \$0						
		C-PAD LE EX 01.03.04	Rail Maintenance Facility Transportation Systems Services	\$0 \$0						
	C-PAD LE EX 0:	1.04	Pre-Construction Capitalized Costs \$66,025,000							
		C-PAD LE EX 01.04.01	Land or Land Leases	\$7,680,000						
		C-PAD LE EX 01.04.02	Site permits	\$200,000						
		C-PAD LE EX 01.04.03	Site Licensing	\$6,240,000						
		C-PAD LE EX 01.04.05	Plant Permits	\$0						
		C-PAD LE EX 01.04.06	Planning and Alternative Studies	\$750,000						
		C-PAD LE EX 01.04.07	Research and Development	\$0						
		C-PAD LE EX 01.04.08	Design	\$23,955,000						
		C-PAD LE EX 01.04.09	Other Pre-construction Costs	\$17,200,000						
		$C_{-}DADIFFY 01 04 10$	Pre-construction contingencies	\$10,000,000						

Pre-construction contingencies

C-PAD LE EX 01.04.10



(Add Further Breakdown as needed) Indirect Capitalized Costs \$63,180,000 Project Management Construction Management Field indirect services Design Services in support of Construction QA/QC Commissioning and Startup Home office Engineering support to Construction Document Control Project Controls Construction Testing Inspections Startup and Testing Commissioning Site Selection Public Information Process Decontamination and Deconstruction Decommissioning Deconstruction Peconstruction	\$0 \$2,700,000 \$3,600,000 \$11,880,000 \$5,400,000 \$1,200,000 \$1,200,000 \$2,700,000 \$3,600,000 \$3,600,000 \$3,000,000 \$3,000,000 \$3,000,000 \$0 \$0 \$0 \$0 \$0
Project Management Construction Management Field indirect services Design Services in support of Construction QA/QC Commissioning and Startup Home office Engineering support to Construction Document Control Project Controls Construction Testing Inspections Startup and Testing Commissioning Site Selection Public Information Process Decontamination and Deconstruction \$0 Decommissioning \$0 Decontamination	\$3,600,000 \$11,880,000 \$5,400,000 \$12,600,000 \$1,200,000 \$7,200,000 \$2,700,000 \$3,600,000 \$3,600,000 \$3,000,000 \$3,000,000 \$0 \$0
Construction Management Field indirect services Design Services in support of Construction QA/QC Commissioning and Startup Home office Engineering support to Construction Document Control Project Controls Construction Testing Inspections Startup and Testing Commissioning Site Selection Public Information Process Decontamination and Deconstruction \$0 Decommissioning \$0 Decontamination	\$3,600,000 \$11,880,000 \$5,400,000 \$12,600,000 \$1,200,000 \$7,200,000 \$2,700,000 \$3,600,000 \$3,600,000 \$3,000,000 \$3,000,000 \$0 \$0
Field indirect services Design Services in support of Construction QA/QC Commissioning and Startup Home office Engineering support to Construction Document Control Project Controls Construction Testing Inspections Startup and Testing Commissioning Site Selection Public Information Process Decontamination and Deconstruction \$0 Decommissioning \$0	\$11,880,000 \$5,400,000 \$12,600,000 \$1,200,000 \$7,200,000 \$2,700,000 \$3,600,000 \$3,600,000 \$3,000,000 \$3,000,000 \$3,000,000
QA/QC Commissioning and Startup Home office Engineering support to Construction Document Control Project Controls Construction Testing Inspections Startup and Testing Commissioning Site Selection Public Information Process Decontamination and Deconstruction Decommissioning Site Selection Public Information Process	\$5,400,000 \$12,600,000 \$1,200,000 \$7,200,000 \$2,700,000 \$3,600,000 \$3,600,000 \$3,000,000 \$3,000,000 \$0 \$0
QA/QC Commissioning and Startup Home office Engineering support to Construction Document Control Project Controls Construction Testing Inspections Startup and Testing Commissioning Site Selection Public Information Process Decontamination and Deconstruction Decommissioning Site Selection Public Information Process	\$12,600,000 \$1,200,000 \$7,200,000 \$2,700,000 \$3,600,000 \$3,600,000 \$3,000,000 \$3,000,000 \$3,000,000
Home office Engineering support to Construction Document Control Project Controls Construction Testing Inspections Startup and Testing Commissioning Site Selection Public Information Process Decontamination and Deconstruction Site Selection Decommissioning Decontamination	\$1,200,000 \$7,200,000 \$2,700,000 \$3,600,000 \$3,600,000 \$3,000,000 \$3,000,000 \$0 \$0 \$0
Document Control Project Controls Construction Testing Inspections Startup and Testing Commissioning Site Selection Public Information Process Decontamination and Deconstruction Decommissioning Decontamination	\$2,700,000 \$3,600,000 \$2,700,000 \$3,600,000 \$3,000,000 \$3,000,000 \$0 \$0
Document Control Project Controls Construction Testing Inspections Startup and Testing Commissioning Site Selection Public Information Process Decontamination and Deconstruction Decommissioning Decontamination	\$3,600,000 \$2,700,000 \$3,600,000 \$3,000,000 \$3,000,000 \$0 \$0
Construction Testing Inspections Startup and Testing Commissioning Site Selection Site Selection Public Information Process Decontamination and Deconstruction Decommissioning Decontamination	\$2,700,000 \$3,600,000 \$3,000,000 \$3,000,000 \$0 \$0 \$0
Inspections Startup and Testing Commissioning Site Selection Site Selection Public Information Process Decontamination and Deconstruction Decommissioning Decontamination	\$3,600,000 \$3,000,000 \$3,000,000 \$0 \$0 \$0
Startup and Testing Commissioning Site Selection \$0 Site Selection Public Information Process Decontamination and Deconstruction \$0 Decommissioning Decontamination	\$3,000,000 \$3,000,000 \$0 \$0 \$0 \$0
Commissioning Site Selection \$0 Site Selection Public Information Process Decontamination and Deconstruction \$0 Decommissioning Decontamination	\$3,000,000 \$3,000,000 \$0 \$0 \$0 \$0
Commissioning Site Selection \$0 Site Selection Public Information Process Decontamination and Deconstruction \$0 Decommissioning Decontamination	\$3,000,000 \$0 \$0 \$0 \$0
Site Selection Public Information Process Decontamination and Deconstruction \$0 Decommissioning Decontamination	\$0 \$0 \$0
Public Information Process Decontamination and Deconstruction \$0 Decommissioning Decontamination	\$0 \$0 \$0
Decontamination and Deconstruction \$0 Decommissioning Decontamination	\$0 \$0 \$0
Decommissioning Decontamination	\$0
Decontamination	\$0
Decontamination	\$0
Deconstruction	
	\$0
	\$0
Project Financial Costs \$119,682,569	
Contractor Fees	\$71,452,280
Escalation Costs	\$48,230,289
Interest Payments	\$0
Indirect costs to support shipments to repository	\$0
	\$0
(Add Further Breakdown as needed)	\$0
Project Contingencies \$156,989,591	
Management Reserve - Contractor Held	\$50,641,804
Contingency - DOE held	\$106,347,788
Other Direct Costs \$0	
DOE Project Operations	\$0
DOE TM&E	\$0
Host site Operational Costs Miscellaneous	\$0
Miscellaneous ODC	\$0
Operational Costs 0	
	\$0
Operations Costs	\$0
Operations Costs Transportation Costs	\$0
	Host site Operational Costs Miscellaneous Miscellaneous ODC Operational Costs 0 Operations Costs

Project Total

(All Direct & indirect Costs, MR,

TEC Escalation) \$1,063,477,876

TPC (TEC plus Contingency, ODCs) \$1,169,825,664
 All Capitol, Operation, Transportation,

LCC Escalation \$1,169,825,664



STUDY 1 - ALTERNATIVE STORAGE SYSTEMS FOR DUAL PURPOSE CANISTERS

COST DETAILS

ALTERNATIVE 4 - C-PAD, EXPANDED, HIGH SEISMIC

LIFE CYCLE COST - 40 YEAR OPERATING LIFE



Expanded Storage Facility (10,000 MTU)

Project: C-PAD Expanded (10,000 MTU)

Total

Design/Const

\$ 1,169,825,664

Total

0&M

\$ 564,151,464

\$ 77,017,378

Expanded Project - C-PAD 60/40 Vertical/Horizontal - High Seismic

Separate CHB

Зерага									Ann	ual Escalation			Disc	ount Rate
40 Yea	r Ope	erating life								1.90%				3.40%
YEAR		Design/Const		O&M	С	ask Handling		D&D		Escalation	Ar	nual Expense		Cumulative
1	\$	10,000,000	\$	-	\$	-	\$	-	\$	190,000	\$	10,190,000	\$	10,190,000
2	\$	10,000,000	\$	-	\$	-	\$	-	\$	383,610	\$	10,383,610	\$	20,573,610
3	\$	20,000,000	\$	-	\$	-	\$	-	\$	1,161,797	\$	21,161,797	\$	41,735,407
4	\$	20,000,000	\$	-	\$	-	\$	-	\$	1,563,871	\$	21,563,871	\$	63,299,279
5	\$	20,000,000	\$	-	\$	-	\$	-	\$	1,973,585	\$	21,973,585	\$	85,272,863
6	\$	20,000,000	\$	-	\$	-	\$	-	\$	2,391,083	\$	22,391,083	\$	107,663,946
7	\$	27,888,399	\$	-	\$	-	\$	-	\$	3,927,403	\$	31,815,802	\$	139,479,748
8	\$	200,000,000	\$	-	\$	-	\$	-	\$	32,500,273	\$	232,500,273	\$	371,980,021
9	\$	200,000,000	\$	27,647,777	\$	-	\$	-	\$	42,021,251	\$	269,669,028	\$	641,649,050
10	\$	641,937,265	\$	26,046,017	\$	-	\$	-	\$	138,336,720	\$	806,320,002	\$	1,447,969,052
11			\$	26,551,511	\$	12,836,230	\$	-	\$	9,060,398	\$	48,448,139	\$	1,496,417,190
12	\$	-	\$	26,551,511	\$	12,836,230	\$	-	\$	9,980,912	\$	49,368,653	\$	1,545,785,844
13	\$	-	\$	26,551,511	\$	12,836,230	\$	-	\$	10,918,917	\$	50,306,658	\$	1,596,092,501
14	\$	-	\$	11,643,328	\$	12,836,230	\$	-	\$	7,380,176	\$	31,859,734	\$	1,627,952,235
15	\$	-	\$	11,643,328	\$	12,836,230	\$	-	\$	7,985,511	\$	32,465,069	\$	1,660,417,304
16	\$	-	\$	11,643,328	\$	12,836,230	\$	-	\$	8,602,347	\$	33,081,905	\$	1,693,499,209
17	\$	-	\$	11,643,328	\$	-	\$	-	\$	4,390,538	\$	16,033,866	\$	1,709,533,075
18	\$	-	\$	11,643,328	\$	-	\$	-	\$	4,695,182	\$	16,338,510	\$	1,725,871,585
19	\$	-	\$	11,643,328	\$	-	\$	-	\$	5,005,614	\$	16,648,942	\$	1,742,520,526
20	\$	-	\$	11,643,328	\$	-	\$	-	\$	5,321,943	\$	16,965,271	\$	1,759,485,798
21	\$	-	\$	11,643,328	\$	-	\$	-	\$	5,644,284	\$	17,287,612	\$	1,776,773,409
22	\$	-	\$	11,643,328	\$	-	\$	-	\$	5,972,748	\$	17,616,076	\$	1,794,389,486
23	;	-	\$	11,643,328	Ś	_	; \$	_	Ś	6,307,454	, \$	17,950,782	\$	1,812,340,267
24	\$	_	\$	11,643,328	\$	_	\$	_	\$	6,648,518	\$	18,291,846	\$	1,830,632,114
25	\$	_	\$	11,643,328	\$	_	\$	_	\$	6,996,064	\$	18,639,392	\$	1,849,271,505
26	\$	_	\$	11,643,328	\$	_	\$	_	\$	7,350,212	\$	18,993,540	\$	1,868,265,045
27	\$	_	\$	11,643,328	\$	_	\$	_	\$	7,711,089	\$	19,354,417	\$	1,887,619,463
28	ς ς	_	\$	11,643,328	ς ς	_	ς ς	_	ς ς	8,078,823	\$	19,722,151	ς ς	1,907,341,614
29	ς .	_	ς ς	11,643,328	ς ,	_	ς ς	_	ς .	8,453,544	\$	20,096,872	ς ς	1,927,438,486
30	ς ,	_	ς ς	11,643,328	ς ,	_	ς ς	_	ς ς	8,835,385	\$	20,478,713	ς ς	1,947,917,198
31	¢	_	¢	11,643,328	¢	_	¢	_	¢	9,224,480	\$	20,867,808	¢	1,968,785,007
32	ب ذ		ب د	11,643,328	ب خ	_	ب خ	_	ر د	9,620,969	۶ \$	21,264,297	ب خ	1,990,049,303
33	٠ ر	_	ې د	11,643,328	ر خ	_	ب خ	_	ې د	10,024,990	٠ ر	21,668,318	ې د	2,011,717,621
34	ې د	-	ې د		ې خ	-	ې د	-	٠ ر	10,436,688	ې د	22,080,016	ې خ	2,033,797,638
	ې د	-	ې د	11,643,328	ې د	-	ې د	-	ې د		\$ ¢	22,499,537	ې خ	
35 36	ې د	-	ې د	11,643,328	ې د	-	ې د	-	ې د	10,856,209 11,283,700	ې د		ې د	2,056,297,174
	ې د	-	ې د	11,643,328	ې خ	-	ې د	-	٠ ر		\$ ¢	22,927,028	ې خ	2,079,224,202
37 20	ې د	-	ې د	11,643,328	ې د	-	ې د	-	ې د	11,719,313	ې د	23,362,641	ې خ	2,102,586,843
38	ې د	-	۶ د	11,643,328	ې د	-	ې خ	-	۶ ک	12,163,203	ې د	23,806,531	<u>خ</u>	2,126,393,374
39	ې د	-	۶ د	11,643,328	ې د	-	Ş	-	۶ ک	12,615,528	ې د	24,258,856	ې خ	2,150,652,230
40	<u>۲</u>	-	>	11,643,328	<u>۲</u>	-	۶ د	-	۶ ک	13,076,446	\$ ¢	24,719,774	\$ ¢	2,175,372,004
41	>	-	۶ د	11,643,328	\$ ¢	-	۶ د	-	۶ ک	13,546,121	\$ ¢	25,189,449	\$ ¢	2,200,561,453
42	\$ ¢	-	\$ ¢	11,643,328	\$ ¢	-	\$ ¢	-	>	14,024,721	\$ ¢	25,668,049	\$ ¢	2,226,229,502
43	\$ \$	-	\$ \$	11,643,328	\$ \$	-	\$ \$	-	>	14,512,414	\$ \$	26,155,742	\$ \$	2,252,385,244
44	\$	-	\$	11,643,328	\$	-	\$	-	\$ \$	15,009,373	\$	26,652,701	\$	2,279,037,945
45	\$	-	\$	11,643,328	\$	-	\$	-	\$ \$	15,515,774	\$	27,159,102	\$	2,306,197,048
46	\$	-	\$	11,643,328	\$	-	\$	-	\$ \$	16,031,797	\$	27,675,125	\$	2,333,872,173
47	\$	-	\$	11,643,328	\$	-	\$	-	\$ _	16,557,625	\$	28,200,953	\$	2,362,073,126
48	\$	-	\$	11,643,328	\$	-	\$	-	\$	17,093,443	\$	28,736,771	\$	2,390,809,896
49	Ş -	-	Ş	11,643,328	Ş	-	\$	-	Ş	17,639,441	\$	29,282,769	\$	2,420,092,666
50	Ş	-	\$	11,643,328	\$,	-	\$	-	\$	18,195,814	\$,	29,839,142	\$	2,449,931,808
51	\$	-	\$	-	\$	-	\$	21,175,000	\$	34,122,666	\$	55,297,666	\$	2,505,229,474
52	\$	-	\$	-	\$	-	\$	35,750,000	\$	59,383,531	\$	95,133,531	\$	2,600,363,005
53	\$	-	\$	-	\$	-	\$	40,703,915	\$	69,670,378	\$	110,374,293	\$	2,710,737,297
54	\$	-	\$	-	\$	-	\$	40,703,915	\$	71,767,489	\$	112,471,404	\$	2,823,208,701
55	\$	-	\$	-	\$	-	\$	40,703,915	\$	73,904,446	\$	114,608,361	\$	2,937,817,062
56	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	2,937,817,062
57	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	2,937,817,062
58	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	2,937,817,062
59	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	2,937,817,062
60	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	2,937,817,062
		Tatal		Tatal				Tatal		サーエー!				Tatal

Total

D&D

\$ 179,036,744

Total

Escalation

947,785,812

Total

Life Cycle

\$ 2,937,817,062



STUDY 1 - ALTERNATIVE STORAGE SYSTEMS FOR DUAL PURPOSE CANISTERS

COST DETAILS

ALTERNATIVE 4 - C-PAD, EXPANDED, HIGH SEISMIC

LIFE CYCLE COST - 80 YEAR OPERATING LIFE



Expanded Storage Facility (10,000 MTU)

Project: C-PAD Expanded (10,000 MTU)

Expanded Project - C-PAD 60/40 Vertical/Horizontal - High Seismic

Separate CHB

80 Year Operating Life

50 Tea	п Ор	rerating Life								Ann	ual Escalation 1.90%		Discount Rate 3.40%
YEAR	Г	Design/Const		O&M	(Cask Handling		D&D			Escalation	Annual Expense	Cumulative
1	\$	10,000,000	\$	-	\$	-	\$	DQD .	_	\$	190,000	\$10,190,000	\$10,190,000
2	\$	10,000,000	\$	_	¢	_	¢	_		¢	383,610	\$10,383,610	\$20,573,610
3	۶ \$	20,000,000	ې د	_	ې د	_	ې د		_	ې د	1,161,797	\$21,161,797	\$41,735,407
3 1	ې خ		ې خ	-	ې خ	-	ې خ	-	-	ې د			
4	ې د	20,000,000	ې خ	-	Ş	-	ې د	-	-	ې د	1,563,871	\$21,563,871	\$63,299,279
5	\$	20,000,000	\$	-	\$ \$	-	\$ ¢	-	-	\$ \$	1,973,585	\$21,973,585	\$85,272,863
6	\$	20,000,000	\$	-	\$	-	\$	-	-	\$	2,391,083	\$22,391,083	\$107,663,946
7	\$	27,888,399	\$	-	\$	-	\$	-	-	\$	3,927,403	\$31,815,802	\$139,479,748
8	Ş	200,000,000	Ş	-	\$	-	\$,	-	-	Ş	32,500,273	\$232,500,273	\$371,980,021
9	Ş	200,000,000	\$	27,647,777	Ş	-	\$	-	-	Ş	42,021,251	\$269,669,028	\$641,649,050
10	\$	641,937,265	\$	26,046,017	\$	-	\$	-	-	\$	138,336,720	\$806,320,002	\$1,447,969,052
11			\$	26,551,511	\$	12,836,230	\$	-	-	\$	9,060,398	\$48,448,139	\$1,496,417,190
12	\$	-	\$	26,551,511	\$	12,836,230	\$	-	-	\$	9,980,912	\$49,368,653	\$1,545,785,844
13	\$	-	\$	26,551,511	\$	12,836,230	\$	-	-	\$	10,918,917	\$50,306,658	\$1,596,092,501
14	\$	-	\$	11,643,328	\$	12,836,230	\$	-	-	\$	7,380,176	\$31,859,734	\$1,627,952,235
15	\$	-	\$	11,643,328	\$	12,836,230	\$	-	-	\$	7,985,511	\$32,465,069	\$1,660,417,304
16	Ś	_	Ś	11,643,328	Ś	12,836,230	Ś	_	_	Ś	8,602,347	\$33,081,905	\$1,693,499,209
17	ς	_	ς	11,643,328	\$		ς	_	_	ς	4,390,538	\$16,033,866	\$1,709,533,075
18	ç		ċ	11,643,328	ç		ç			ç	4,695,182	\$16,338,510	\$1,725,871,585
	<u>ب</u>	_	ب خ		ب خ	_	ب خ	_	_	ب ب			
19	Ş	-	Ş	11,643,328	ب	-	\$ ¢	-	-	۶ د	5,005,614	\$16,648,942	\$1,742,520,526
20	\$	-	\$	11,643,328	\$	-	\$	-	-	\$	5,321,943	\$16,965,271	\$1,759,485,798
21	Ş	-	Ş	11,643,328	Ş	-	Ş	-	-	Ş	5,644,284	\$17,287,612	\$1,776,773,409
22	\$	-	\$	11,643,328	\$	-	\$	-	-	\$	5,972,748	\$17,616,076	\$1,794,389,486
23	\$	-	\$	11,643,328	\$	-	\$	-	-	\$	6,307,454	\$17,950,782	\$1,812,340,267
24	\$	-	\$	11,643,328	\$	-	\$	-	-	\$	6,648,518	\$18,291,846	\$1,830,632,114
25	\$	-	\$	11,643,328	\$	-	\$	-	-	\$	6,996,064	\$18,639,392	\$1,849,271,505
26	\$	-	\$	11,643,328	\$	-	\$	-	_	\$	7,350,212	\$18,993,540	\$1,868,265,045
27	Ś	_	Ś	11,643,328	Ś	_	Ś	-	_	Ś	7,711,089	\$19,354,417	\$1,887,619,463
28	ς	_	ς	11,643,328	ς	_	ς	_	_	ς	8,078,823	\$19,722,151	\$1,907,341,614
29	¢	_	ć	11,643,328	ć	_	ç			ć	8,453,544	\$20,096,872	\$1,927,438,486
	ې خ	-	ې خ		ې خ	-	ې خ	-	-	ې د			
30	Ş	-	Ş	11,643,328	Ş	-	Ş	-	-	ې د	8,835,385	\$20,478,713	\$1,947,917,198
31	\$	-	\$	11,643,328	\$	-	\$	-	-	\$	9,224,480	\$20,867,808	\$1,968,785,007
32	Ş	-	\$	11,643,328	\$	-	\$	-	-	\$	9,620,969	\$21,264,297	\$1,990,049,303
33	\$	-	Ş	11,643,328	\$	-	\$	-	-	\$	10,024,990	\$21,668,318	\$2,011,717,621
34	\$	-	\$	11,643,328	\$	-	\$	-	-	\$	10,436,688	\$22,080,016	\$2,033,797,638
35	\$	-	\$	11,643,328	\$	-	\$	-	-	\$	10,856,209	\$22,499,537	\$2,056,297,174
36	\$	-	\$	11,643,328	\$	-	\$	-	-	\$	11,283,700	\$22,927,028	\$2,079,224,202
37	\$	-	\$	11,643,328	\$	-	\$	-	-	\$	11,719,313	\$23,362,641	\$2,102,586,843
38	\$	-	\$	11,643,328	\$	-	\$	_	-	\$	12,163,203	\$23,806,531	\$2,126,393,374
39	Ś	-	Ś	11,643,328	Ś	_	\$	_	_	Ś	12,615,528	\$24,258,856	\$2,150,652,230
40	Ś	_	Ś	11,643,328	Ś	_	Ś	_	_	Ś	13,076,446	\$24,719,774	\$2,175,372,004
41	\$	_	\$	11,643,328	Ś	_	Ś	-	_	Ś	13,546,121	\$25,189,449	\$2,200,561,453
42	ζ	_	ζ	11,643,328	ς ,	_	ς ,	_	_	ς .	14,024,721	\$25,668,049	\$2,226,229,502
43	ب خ		ر خ		ب خ		ċ			٠ خ	14,512,414	\$26,155,742	\$2,252,385,244
	ې د	-	ې خ	11,643,328	ې د	-	ې د		-	ې د			
44	Ş	-	Ş	11,643,328	Ş	-	Ş	-	-	ې د	15,009,373	\$26,652,701	\$2,279,037,945
45	\$	-	\$	11,643,328	\$	-	\$	-	-	>	15,515,774	\$27,159,102	\$2,306,197,048
46	Ş	-	Ş	11,643,328	Ş	-	\$	-	-	Ş	16,031,797	\$27,675,125	\$2,333,872,173
47	\$	-	\$	11,643,328	\$	-	\$	-	-	\$	16,557,625	\$28,200,953	\$2,362,073,126
48	\$	-	\$	11,643,328	\$	-	\$	-	-	\$	17,093,443	\$28,736,771	\$2,390,809,896
49	\$	-	\$	11,643,328	\$	-	\$	-	-	\$	17,639,441	\$29,282,769	\$2,420,092,666
50	\$	-	\$	11,643,328	\$	-	\$	-	-	\$	18,195,814	\$29,839,142	\$2,449,931,808
51	\$	-	\$	11,643,328	\$	-	\$	-	-	\$	18,762,758	\$30,406,086	\$2,480,337,894
52	\$	-	\$	11,643,328	\$	_	\$	-	_	\$	19,340,473	\$30,983,801	\$2,511,321,695
53	Ś	_	Ś	11,643,328	Ś	_	Ś	_	_	Ś	19,929,166	\$31,572,494	\$2,542,894,189
54	ς	_	ς	11,643,328	ς	_	ς	_	_	ς	20,529,043	\$32,172,371	\$2,575,066,560
55	ç	_	ç	11,643,328	¢	_	¢	_		¢	21,140,318	\$32,783,646	\$2,607,850,206
	ب خ	_	ب خ		ب خ	_	ب خ		_	ب خ	21,763,207	\$33,406,535	
56	ې د	-	ک ک	11,643,328	Ş	-	ې د	-	-	ې خ			\$2,641,256,741
57	\$	-	\$	11,643,328	\$	-	\$	-	-	>	22,397,931	\$34,041,259	\$2,675,298,001
58	Ş	-	Ş	11,643,328	\$	-	Ş	-	-	\$	23,044,715	\$34,688,043	\$2,709,986,044
59	\$	-	\$	11,643,328	\$	-	\$	-	-	\$	23,703,788	\$35,347,116	\$2,745,333,160
60	\$	-	\$	11,643,328	\$	-	\$	-	-	\$	24,375,383	\$36,018,711	\$2,781,351,872
61	\$	-	\$	11,643,328	\$	-	\$	-	-	\$	25,059,739	\$36,703,067	\$2,818,054,939
62	\$	-	\$	11,643,328	\$	-	\$	-	-	\$	25,757,097	\$37,400,425	\$2,855,455,364
63	\$	-	\$	11,643,328	\$	-	\$	-		\$	26,467,705	\$38,111,033	
64	\$	-	\$	11,643,328	\$	_	\$	-	_	\$	27,191,815	\$38,835,143	\$2,932,401,540
65	7	\$0	¢	11,643,328	\$	_	\$	-	_	\$	27,929,683	\$39,573,011	\$2,971,974,551
66		\$0 \$0	¢	11,643,328	\$	_	\$		_	ς ,	28,681,570	\$40,324,898	\$3,012,299,449
67		\$0 \$0	<u>ب</u>			-	۶ \$	-		ر ر			
			, S	11,643,328	\$	-		-	-	ب ک	29,447,743	\$41,091,071	\$3,053,390,520
68		\$0 \$0	>	11,643,328	\$	-	\$	-	-	۶ ک	30,228,473	\$41,871,801	\$3,095,262,321
69 7 0		\$0 \$0	\$	11,643,328	\$	-	\$	-	-	>	31,024,038	\$42,667,366	\$3,137,929,686
70		\$0	\$	11,643,328	\$	-	\$	-	-	\$	31,834,717	\$43,478,045	\$3,181,407,732



71	\$0	\$	11,643,328	\$	-	\$	-	\$	32,660,800	\$44,304,128	\$3,225,711,860
72	\$0	\$	11,643,328	\$	-	\$	-	\$	33,502,579	\$45,145,907	\$3,270,857,767
73	\$0	\$	11,643,328	\$	-	\$	-	\$	34,360,351	\$46,003,679	\$3,316,861,446
74	\$0	\$	11,643,328	\$	-	\$	-	\$	35,234,421	\$46,877,749	\$3,363,739,195
75	\$0	\$	11,643,328	\$	-	\$	-	\$	36,125,098	\$47,768,426	\$3,411,507,621
76	\$0	\$	11,643,328	\$	-	\$	-	\$	37,032,698	\$48,676,026	\$3,460,183,647
77	\$0	\$	11,643,328	\$	-	\$	-	\$	37,957,543	\$49,600,871	\$3,509,784,518
78	\$0	\$	11,643,328	\$	-	\$	-	\$	38,899,959	\$50,543,287	\$3,560,327,805
79	\$0	\$	11,643,328	\$	-	\$	-	\$	39,860,282	\$51,503,610	\$3,611,831,415
80	\$0	\$	11,643,328	\$	-	\$	-	\$	40,838,850	\$52,482,178	\$3,664,313,593
81	\$0	\$	11,643,328	\$	-	\$	-	\$	41,836,012	\$53,479,340	\$3,717,792,933
82	\$0	\$	11,643,328	\$	-	\$	-	\$	42,852,119	\$54,495,447	\$3,772,288,380
83	\$0	\$	11,643,328	\$	-	\$	-	\$	43,887,533	\$55,530,861	\$3,827,819,240
84	\$0	\$	11,643,328	\$	-	\$	-	\$	44,942,619	\$56,585,947	\$3,884,405,187
85	\$0	\$	11,643,328	\$	-	\$	-	\$	46,017,752	\$57,661,080	\$3,942,066,267
86	\$0	\$	11,643,328	\$	-	\$	-	\$	47,113,312	\$58,756,640	\$4,000,822,908
87	\$0	\$	11,643,328	\$	-	\$	-	\$	48,229,689	\$59,873,017	\$4,060,695,925
88	\$0	\$	11,643,328	\$	-	\$	-	\$	49,367,276	\$61,010,604	\$4,121,706,529
89	\$0	\$	11,643,328	\$	-	\$	-	\$	50,526,477	\$62,169,805	\$4,183,876,334
90	\$0	\$	11,643,328	\$	-	\$	-	\$	51,707,704	\$63,351,032	\$4,247,227,366
91				\$	-	\$	21,175,000	\$	96,226,640	\$117,401,640	\$4,364,629,006
92				\$	-	\$	35,750,000	\$	166,226,562	\$201,976,562	\$4,566,605,567
93				\$	-	\$	40,703,915	\$	193,630,078	\$234,333,993	\$4,800,939,561
94				\$	-	\$	40,703,915	\$	198,082,424	\$238,786,339	\$5,039,725,900
95				\$	-	\$	40,703,915	\$	202,619,365	\$243,323,279	\$5,283,049,179
96						\$	-	\$	-	\$0	\$5,283,049,179
97						\$	-	\$	-	\$0	\$5,283,049,179
98								\$	-	\$0	\$5,283,049,179
99								\$	-	\$0	\$5,283,049,179
100								\$	-	\$0	\$5,283,049,179
	Total		Total		Total		Total		Total		Total
	Design/Const	O&M		Cask Handling			D&D		Escalation		Life Cycle
	\$1,169,825,664	\$1,029,884,584			\$77,017,378		\$179,036,744		\$2,827,284,809		\$5,283,049,179