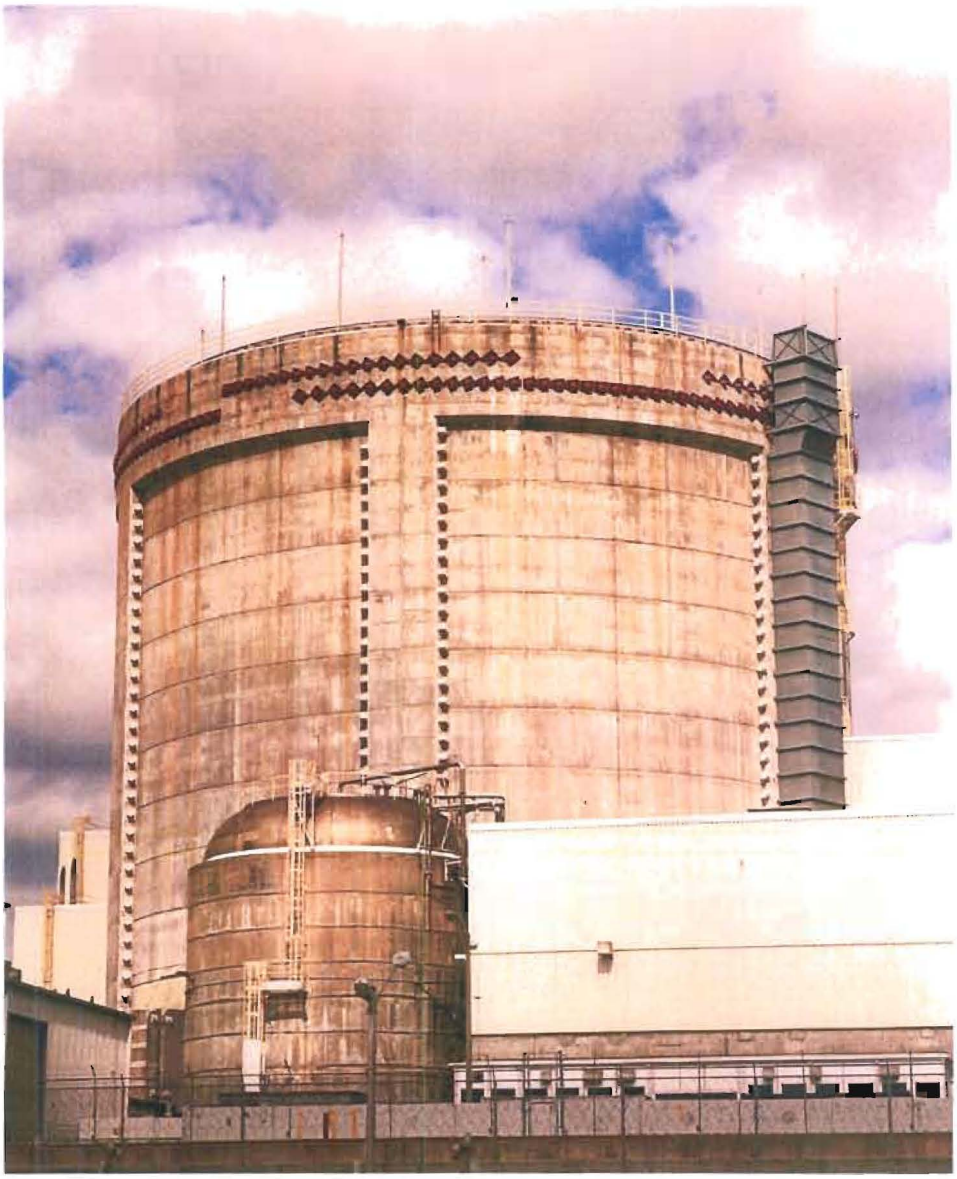
2010 UPDATE – 2008 DECOMMISSIONING COST ANALYSIS

CRYSTAL RIVER NUCLEAR PLANT, UNIT 3



DECEMBER 2010

Progress Energy

CRYSTAL RIVER NUCLEAR PLANT

2010 UPDATE - 2008 NUCLEAR DECOMMISSIONING COST STUDY

PROGRESS ENERGY

2010 UPDATE – 2008 NUCLEAR DECOMMISSIONING COST STUDY

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Section 1

Decommissioning Study Summary

PROGRESS ENERGY FLORIDA
2010 UPDATE- 2008 NUCLEAR DECOMMISSIONING COST STUDY
DECOMMISSIONING STUDY SUMMARY[1]

A site specific decommissioning cost study has been prepared by TLG Services, Inc. (TLG) for Crystal River Unit No. Three (CR3) which estimates the cost of decommissioning to be $818,263,839 in 2008 dollars. The costs can be categorized as follows:

	(in 000's) 2008 $'s	% of Total
Decontamination	$ 14,033	1.7%
Removal	95,411	11.7%
Packaging	14,625	1.8%
Shipping	13,539	1.7%
Burial	85,276	10.4%
Program Management	375,813	45.9%
Other	219,567	26.8%
	$ 818,264	100.0%

The cost estimate includes updated decommissioning assumptions from the cost study that was approved by the Florida Public Service Commission (FPSC) in 2005. The most significant changes are related to changes in program management and spent fuel storage. Comparative analyses detailing the factors that contributed to most significant cost changes between the 2005 and 2008 study are contained in Section 8.

ESCALATION RATE

The future cost of decommissioning CR3 is forecast by analyzing the individual cost categories from TLG's cost study as described above. The 2008 cost of each category is divided into components of labor, material, burial, transportation and other. These components are escalated by the estimated inflationary rates for wages, material, transportation and Gross Domestic Product as projected by Economy.com. Burial costs

[1] As described in PEF's Petition, pursuant to Commission Order No. PSC-10-0131-FOF-EI, the Commission decided to defer its consideration of PEF's March 20, 2009 nuclear decommissioning cost study submission until December of 2010 so it could address both Florida Power & Light's and PEF's nuclear decommissioning costs at the same time. The Commission decided that PEF was not required to prepare a new site-specific nuclear decommissioning study but should update the 2008 study with the most currently available escalation rates.

are escalated by a growth rate specific to low level radioactive waste burial costs. Section 3 contains schedules, which indicate the percentage allocations for each category and the applicable escalation rates. The cost estimate obtained by applying these rates yields the future cost of decommissioning CR3 using currently available technology and procedures.

The methodology used to determine the escalation rate for converting the current estimated decommissioning cost to future estimated decommissioning cost is the same as that approved in FPSC Order No. PSC-95-1531-FOF-EI dated December 12, 1995. An additional index was added in that study to capture the rate of escalation in low level radioactive waste burial cost, because burial cost had historically increased at a much faster rate than the other inflation indices that were used in the cost forecast. The resulting composite escalation rate is 2.80%.

The rate of increase in nuclear decommissioning costs has generally exceeded inflation. This is attributable primarily to increasing burial rates for low level radioactive waste and the impact of the delayed acceptance of high level radioactive waste by the Department of Energy. The delayed acceptance will, among other things, require Progress Energy Florida (PEF) to design, license and construct an independent spent fuel storage installation (ISFSI), including a dry cask storage pad, the purchase of multi purpose canisters, and the provision of on site management of the high level waste.

ASSUMED AND MINIMUM FUND EARNINGS RATE

The minimum fund earnings rate was determined using the same methodology specified in Order No. 21928 (long-term CPI over the next 25 years), which results in a minimum fund earnings rate, net of taxes and all other administrative costs charged to the trust fund, of 2.07%. See Section 4 for the detailed calculation.

PEF has developed an assumed fund earnings rate which recognizes that securities with higher risk and return are used in both the FPSC and FERC jurisdictional portions of the qualified fund. PEF has determined that an appropriate assumed earnings rate for the next five year review period would be 5.47% based on the projected long-term earnings rate of the current investment strategy, the expected taxes and administrative expenses of the trust, and market volatility over the next thirty years. See Section 4 for the calculation of the assumed fund earnings rate, and Section 5 for a summary of historical returns earned by the fund for the past five years compared to CPI and other indices.

CONTINGENCY ALLOWANCE

The overall contingency allowance of 25% approved in Order No. 21928 was reduced to 17% in the 1994 cost study. The contingency factor used in the 2000 study remained at 17%. The contingency factor used in the 2005 study was 17.3%. The contingency factor used in the 2008 study is approximately 17.2%. The reductions in the factor during the 1990s are based on improved study methodology and industry

experience over those used in Order No. 21928. A detailed explanation of the contingency allowance is contained in Subsection 3.3.1 of the TLG cost study Section 7.

CONCLUSION

The annual accrual amount requested for PEF's retail share of total decommissioning costs is $0. This is based on the assumptions of a total cost in 2008 dollars of $818,263,839, an escalation rate of 2.80%, and an assumed fund earnings rate of 5.47%. PEF requests that the annual accrual be effective January 1, 2011. Section 2 of this report provides the related assumptions and calculations. Section 6 contains a cash flow schedule, which shows that funding at the requested level would satisfy the future cost of decommissioning.

PARTIES OWNING AN INTEREST IN CR3

There are 9 participants other than PEF in the ownership of the CR3 nuclear unit. The total participant's share is 8.2194%. Participants are responsible for funding their individual portion of the total cost of decommissioning.

In 1990, PEF and the co-owners submitted a certification to the Nuclear Regulatory Commission (PEF letter 3F0790-05) that funds will be available to decommission the nuclear facility. Assurance was provided that PEF and each participant would fund their pro rata share of the decommissioning cost liability using an external trust fund. The NRC requires biennially that PEF and the participants provide an update on the funding status of the external trust fund. In the March 2009 report, PEF and the participants reported current funding balances, accrual rates, assumed cost escalation rates, and assumed fund earnings rates. PEF reported that funds were being accrued at a rate sufficient to meet the site specific cost study approved by the FPSC.

Participants	% Share	Costs in 2010 $'s	Required at 12/31/10 *	Balance at 10/31/10
City of Alachua	0.0779%	$ 656,403	$ 382,902	$ 549,056
City of Bushnell	0.0388%	326,938	190,714	272,497
City of Gainsville	1.4079%	11,863,290	6,920,253	9,725,756
City of Kissimmmee	0.6754%	5,691,076	3,319,794	4,935,835
City of Leesburg	0.8244%	6,946,584	4,052,174	5,700,422
City of Ocala	1.3333%	11,234,692	6,553,570	9,167,976
City of New Smyrna Beach	0.5608%	4,725,431	2,756,501	4,548,017
Orlando Utilities Commission	1.6015%	13,494,607	7,871,854	12,146,770
Seminole Electric Coop. Inc.	1.6994%	14,319,535	8,353,062	9,379,477
Total - Participants	8.2194%	69,258,556	$ 40,400,824	$ 56,425,806
Florida Power Corporation	91.7806%	773,364,444		
Total	100.0000%	$ 842,623,000		

* At 12/31/10, the funded amount should approximate 58% (35 years / 60 years) of the decomm costs.

IRS REQUIRED ISSUES

The following items require specific FPSC rulings to obtain Internal Revenue Service (IRS) approval of PEF's treatment of decommissioning costs for tax purposes. PEF seeks approval of:

1) Prompt Removal/Dismantling method of decommissioning, which is consistent with the last filing

2) Estimated cost of $818,263,839 in 2008 dollars needed to decommission CR3. This cost includes a contingency allowance of 17.2% for which we also seek approval

3) Estimated cost of decommissioning of $2,308,244,353 in future dollars based on the 17.2% contingency, PEF's assumed escalation rate of 2.80%, and an operating license termination date of December 3, 2036

4) Expenditure of funds accumulated in the Nuclear Decommissioning Trust in the years 2036 – 2073

5) Estimated future costs of decommissioning in each year in which decommissioning funds will be expended:

Year of Decomm.	Estimated Future Cost Crystal River Unit No. 3	Year of Decomm.	Estimated Future Cost Crystal River Unit No. 3
2036	$ 12,610,892	2055	20,649,748
2037	173,506,529	2056	21,286,101
2038	302,837,112	2057	21,822,323
2039	283,247,979	2058	22,433,348
2040	188,533,958	2059	23,061,482
2041	193,283,363	2060	23,772,157
2042	164,380,547	2061	24,371,005
2043	104,242,729	2062	25,053,393
2044	84,793,000	2063	25,754,888
2045	57,838,477	2064	26,548,564
2046	16,105,593	2065	27,217,354
2047	16,556,550	2066	27,979,440
2048	17,066,765	2067	28,762,864
2049	17,496,697	2068	29,649,235
2050	17,986,604	2069	30,396,135
2051	18,490,229	2070	31,247,227
2052	19,060,034	2071	32,122,149
2053	19,540,179	2072	106,418,791
2054	20,087,304	2073	32,033,608
			$ 2,308,244,353

6) Methodology of converting the estimated cost of decommissioning in current dollars to estimated cost of decommissioning in future dollars is accomplished by multiplying each year's expenditures by the composite escalation factor of 2.80% compounded by the number of years between 2010 and the year of expenditure

7) The assumed after-tax, net of administrative expenses, rate of return of 5.47%, to be earned by the amounts collected for decommissioning

8) Inclusion of $0 in cost of service each year, beginning January 1, 2011, until expiration of the operating license on December 3, 2036

9) Projected date Crystal River Unit No. 3 will no longer be included in rate base for ratemaking purposes of December 3, 2036

10) Affirmative statement that decommissioning costs in the amount of $0 be included in PEF's cost of service for ratemaking purposes.

OTHER ISSUES

Spent Nuclear Fuel Storage Costs

The Department of Energy's delay in acceptance of spent nuclear fuel has

impacted the overall cost of decommissioning. Additional costs will be incurred to fund, among other things, the design, licensing and construction of an independent spent fuel storage installation including the construction of a dry spent fuel storage pad, the purchase of multi purpose storage casks, and staffing to monitor the fuel during storage prior to DOE acceptance of the fuel. Section 7 of this document contains the CR3 decommissioning cost study which addresses the necessity of on-site spent fuel storage and its impact of the cost of decommissioning (Section 7, Executive Summary, page x and Subsections 1.3.1 and 3.4.1).

License Renewal Request Status

The NRC operating license held by PEF for CR3 currently expires in December 2016. On March 9, 2009, the NRC docketed, or accepted for review, PEF's application for a 20-year renewal on the operating license for CR3, which would extend the operating license through 2036, if approved. Docketing the application does not preclude additional requests for information as the review proceeds, nor does it indicate whether the NRC will renew the license. The license renewal application for CR3 is currently under review by the NRC with a decision expected in 2011.

Decommissioning Methodology Selection

The Nuclear Regulatory Commission (NRC) has defined three acceptable decommissioning methods: Prompt Removal/Dismantling (DECON); Safe Storage / Deferred Decontamination (SAFSTOR); and Entombment (ENTOMB). The study incorporates costs included in the definition of decommissioning by the NRC, as well as activities associated with the dismantling and demolition of buildings and facilities demonstrated to be free from contamination. The ENTOMB alternative is not considered practical for commercial reactors that generate significant amounts of long-lived radioactive material due to the 60-year restriction. Based on the comparison between the DECON and SAFSTOR alternatives, PEF selected the DECON method. This is consistent with the method last approved by the FPSC in Docket No. 050078, and when compared with the SAFSTOR alternative, allows for a lower cost and more efficient use of an already mobilized workforce.

Trust Fund Balances

The qualified and nonqualified fund balances for each year since the prior study are included in the following chart:

	Qualified	Non Qualified
	Fund Balance	**Fund Balance**
12/31/2006	309,178,809	83,516,899
12/31/2007	330,933,356	86,940,617
12/31/2008	318,223,430	91,414,821
12/31/2009	380,836,772	1,007,447

Section 2

Determination of Annual Accrual for Decommissioning

PROGRESS ENERGY FLORIDA
ESTIMATED COST OF DECOMMISSIONING
(COST INCLUDES 17.2% CONTINGENCY)

2010 SYSTEM
DETERMINATION OF ANNUAL ACCRUAL FOR DECOMMISSIONING

CRYSTAL RIVER #3 - NUCLEAR PLANT

YEAR	% OF 2008 COST TO BE SPENT	ESTIMATED 100% COST IN 2008 DOLLARS	(1) ESTIMATED COST IN YEAR INCURRED	(2) FPC SHARE IN YEAR INCURRED	100% * (2) QUALIFIED PLAN AMOUNT	(3) 2010 NPV OF QUALIFIED FUND		
2036	0.7113%	$ 5,820,209	$ 12,610,892	$ 11,574,352	$ 11,574,352	$ 2,898,305	28	26
2037	9.5197%	77,896,061	173,506,529	159,245,333	159,245,333	37,808,128	29	27
2038	16.1630%	132,256,083	302,837,112	277,945,718	277,945,718	62,567,600	30	28
2039	14.7057%	120,331,759	283,247,979	259,966,695	259,966,695	55,485,343	31	29
2040	9.5217%	77,912,998	188,533,958	173,037,598	173,037,598	35,016,449	32	30
2041	9.4957%	77,700,120	193,283,363	177,396,630	177,396,630	34,036,746	33	31
2042	7.8558%	64,281,281	164,380,547	150,869,452	150,869,452	27,445,746	34	32
2043	4.8461%	39,653,978	104,242,729	95,674,602	95,674,602	16,502,185	35	33
2044	3.8346%	31,376,744	84,793,000	77,823,524	77,823,524	12,727,020	36	34
2045	2.5444%	20,819,563	57,838,477	53,084,501	53,084,501	8,231,038	37	35
2046	0.6892%	5,639,471	16,105,593	14,781,810	14,781,810	2,173,129	38	36
2047	0.6892%	5,639,471	16,556,550	15,195,701	15,195,701	2,118,116	39	37
2048	0.6911%	5,654,922	17,066,765	15,663,979	15,663,979	2,070,152	40	38
2049	0.6892%	5,639,471	17,496,697	16,058,573	16,058,573	2,012,232	41	39
2050	0.6892%	5,639,471	17,986,604	16,508,213	16,508,213	1,961,292	42	40
2051	0.6892%	5,639,471	18,490,229	16,970,443	16,970,443	1,911,641	43	41
2052	0.6911%	5,654,922	19,060,034	17,493,414	17,493,414	1,868,353	44	42
2053	0.6892%	5,639,471	19,540,179	17,934,094	17,934,094	1,816,079	45	43
2054	0.6892%	5,639,471	20,087,304	18,436,248	18,436,248	1,770,105	46	44
2055	0.6892%	5,639,471	20,649,748	18,952,463	18,952,463	1,725,294	47	45
2056	0.6911%	5,654,922	21,286,101	19,536,511	19,536,511	1,686,225	48	46
2057	0.6892%	5,639,471	21,822,323	20,028,659	20,028,659	1,639,047	49	47
2058	0.6892%	5,639,471	22,433,348	20,589,461	20,589,461	1,597,554	50	48
2059	0.6892%	5,639,471	23,061,482	21,165,967	21,165,967	1,557,112	51	49
2060	0.6911%	5,654,922	23,772,157	21,818,228	21,818,228	1,521,851	52	50
2061	0.6892%	5,639,471	24,371,005	22,367,855	22,367,855	1,479,272	53	51
2062	0.6892%	5,639,471	25,053,393	22,994,154	22,994,154	1,441,824	54	52
2063	0.6892%	5,639,471	25,754,888	23,637,991	23,637,991	1,405,324	55	53
2064	0.6911%	5,654,922	26,548,564	24,366,431	24,366,431	1,373,501	56	54
2065	0.6892%	5,639,471	27,217,354	24,980,251	24,980,251	1,335,072	57	55
2066	0.6892%	5,639,471	27,979,440	25,679,698	25,679,698	1,301,275	58	56
2067	0.6892%	5,639,471	28,762,864	26,398,729	26,398,729	1,268,332	59	57
2068	0.6911%	5,654,922	29,649,235	27,212,246	27,212,246	1,239,611	60	58
2069	0.6892%	5,639,471	30,396,135	27,897,755	27,897,755	1,204,929	61	59
2070	0.6892%	5,639,471	31,247,227	28,678,892	28,678,892	1,174,426	62	60
2071	0.6892%	5,639,471	32,122,149	29,481,901	29,481,901	1,144,695	63	61
2072	2.2211%	18,174,354	106,418,791	97,671,805	97,671,805	3,595,626	64	62
2073	0.6504%	5,321,737	32,033,608	29,400,638	29,400,638	1,026,203	65	63
	100.0000%	$ 818,263,839	$ 2,308,244,353	$ 2,118,520,515	$ 2,118,520,515	$ 339,136,832		

	NONQUALIFIED	QUALIFIED	TOTAL
NPV @ 12/31/10	$ 0	$ 339,136,832	$ 339,136,832
CITY OF TALLAHASSEE'S PERMANENT RE-ALLOCATION (4)	$ 4,838,072	($ 4,838,072)	$ 0
ADJUSTED NET PRESENT VALUE	$ 4,838,072	$ 334,298,760	$ 339,136,832
LESS BOOK VALUE @ 10/31/10			
PROGRESS ENERGY FLORIDA	$ 997,780	$ 395,311,040	$ 396,308,820
CITY OF TALLAHASSEE	6,749,725	0	6,749,725
	$ 7,747,506	$ 395,311,040	$ 403,058,545
PV OF FUND REQUIREMENTS	($ 2,909,434)	($ 61,012,280)	($ 63,921,713)
MONTHLY FUND REQUIREMENT	$ 0	$ 0	$ 0
ANNUAL FUND REQUIREMENT	$ 0	$ 0	$ 0
MONTHLY ACCRUAL	$ 0	$ 0	$ 0
ANNUAL ACCRUAL - SYSTEM	$ 0	$ 0	$ 0

(1) ESTIMATED COST IN 2008 DOLLARS X (1 + INFLATION RATE) ^ (YEAR OF EXPENDITURE - 2008)
(2) ESTIMATED COST IN YEAR INCURRED * 91.7806% 91.7806%
(3) ESTIMATED ANNUAL DOLLARS / (1 + EARNINGS RATE) ^ (YEAR OF DECOMMISSIONING - CURRENT YEAR (2010))
(4) RE-ALLOCATION OF THE THEORETICAL QUAL PORTION OF THE CITY OF TALLAHASSEE'S ACQUIRED NDC FUND BALANCE OF $4,838,072 30 311

ASSUMPTIONS:

2008 COST -	$ 818,263,839
COST ESCALATION RATE -	2.800000%
EARNINGS RATE (AFTER TAX) - ANNUAL	5.470000%
- NOMINAL	5.337472%
FEDERAL TAX RATE	35.000000%
STATE TAX RATE	5.500000%

PROGRESS ENERGY FLORIDA
ESTIMATED COST OF DECOMMISSIONING
(COST INCLUDES 17.2% CONTINGENCY)

2010 RETAIL
DETERMINATION OF ANNUAL ACCRUAL FOR DECOMMISSIONING

CRYSTAL RIVER #3 - NUCLEAR PLANT

YEAR	% OF 2008 COST TO BE SPENT	ESTIMATED 100% COST IN 2008 DOLLARS	(1) ESTIMATED COST IN YEAR INCURRED	(2) FPC SHARE IN YEAR INCURRED	100% * (2) QUALIFIED PLAN AMOUNT	(3) 2010 NPV OF QUALIFIED FUND		
2036	0.7113%	$ 5,820,209	$ 12,610,892	$ 10,542,962	$ 10,542,962	$ 2,640,037	28	26
2037	9.5197%	77,896,061	173,506,529	145,054,982	145,054,982	34,439,046	29	27
2038	16.1630%	132,256,083	302,837,112	253,177,975	253,177,975	56,992,202	30	28
2039	14.7057%	120,331,759	283,247,979	236,801,062	236,801,062	50,541,044	31	29
2040	9.5217%	77,912,998	188,533,958	157,618,218	157,618,218	31,896,133	32	30
2041	9.4957%	77,700,120	193,283,363	161,588,817	161,588,817	31,003,732	33	31
2042	7.8558%	64,281,281	164,380,547	137,425,475	137,425,475	25,000,056	34	32
2043	4.8461%	39,653,978	104,242,729	87,149,038	87,149,038	15,031,675	35	33
2044	3.8346%	31,376,744	84,793,000	70,888,670	70,888,670	11,592,915	36	34
2045	2.5444%	20,819,563	57,838,477	48,354,141	48,354,141	7,497,571	37	35
2046	0.6892%	5,639,471	16,105,593	13,464,603	13,464,603	1,979,482	38	36
2047	0.6892%	5,639,471	16,556,550	13,841,612	13,841,612	1,929,371	39	37
2048	0.6911%	5,654,922	17,066,765	14,268,162	14,268,162	1,885,680	40	38
2049	0.6892%	5,639,471	17,496,697	14,627,594	14,627,594	1,832,922	41	39
2050	0.6892%	5,639,471	17,986,604	15,037,166	15,037,166	1,786,521	42	40
2051	0.6892%	5,639,471	18,490,229	15,458,207	15,458,207	1,741,295	43	41
2052	0.6911%	5,654,922	19,060,034	15,934,575	15,934,575	1,701,864	44	42
2053	0.6892%	5,639,471	19,540,179	16,335,986	16,335,986	1,654,248	45	43
2054	0.6892%	5,639,471	20,087,304	16,793,394	16,793,394	1,612,371	46	44
2055	0.6892%	5,639,471	20,649,748	17,263,609	17,263,609	1,571,553	47	45
2056	0.6911%	5,654,922	21,286,101	17,795,613	17,795,613	1,535,965	48	46
2057	0.6892%	5,639,471	21,822,323	18,243,905	18,243,905	1,492,992	49	47
2058	0.6892%	5,639,471	22,433,348	18,754,734	18,754,734	1,455,196	50	48
2059	0.6892%	5,639,471	23,061,482	19,279,867	19,279,867	1,418,357	51	49
2060	0.6911%	5,654,922	23,772,157	19,874,006	19,874,006	1,386,239	52	50
2061	0.6892%	5,639,471	24,371,005	20,374,655	20,374,655	1,347,454	53	51
2062	0.6892%	5,639,471	25,053,393	20,945,145	20,945,145	1,313,343	54	52
2063	0.6892%	5,639,471	25,754,888	21,531,609	21,531,609	1,280,095	55	53
2064	0.6911%	5,654,922	26,548,564	22,195,139	22,195,139	1,251,108	56	54
2065	0.6892%	5,639,471	27,217,354	22,754,261	22,754,261	1,216,104	57	55
2066	0.6892%	5,639,471	27,979,440	23,391,380	23,391,380	1,185,318	58	56
2067	0.6892%	5,639,471	28,762,864	24,046,338	24,046,338	1,155,311	59	57
2068	0.6911%	5,654,922	29,649,235	24,787,363	24,787,363	1,129,150	60	58
2069	0.6892%	5,639,471	30,396,135	25,411,786	25,411,786	1,097,558	61	59
2070	0.6892%	5,639,471	31,247,227	26,123,316	26,123,316	1,069,773	62	60
2071	0.6892%	5,639,471	32,122,149	26,854,769	26,854,769	1,042,691	63	61
2072	2.2211%	18,174,354	106,418,791	88,968,270	88,968,270	3,275,220	64	62
2073	0.6504%	5,321,737	32,033,608	26,780,747	26,780,747	934,758	65	63
	100.0000%	$ 818,263,839	$ 2,308,244,353	$ 1,929,739,151	$ 1,929,739,151	$ 308,916,350		

	NONQUALIFIED	QUALIFIED	TOTAL
NPV @ 12/31/10	$ 0	$ 308,916,350	$ 308,916,350
LESS BOOK VALUE @ 10/31/10			
PROGRESS ENERGY FLORIDA	$ 908,868	$ 360,084,873	$ 360,993,741
CITY OF TALLAHASSEE	0	0	0
	$ 908,868	$ 360,084,873	$ 360,993,741
PV OF FUND REQUIREMENTS	($ 908,868)	($ 51,168,523)	($ 52,077,391)
MONTHLY FUND REQUIREMENT	$ 0	$ 0	$ 0
ANNUAL FUND REQUIREMENT	$ 0	$ 0	$ 0
MONTHLY ACCRUAL	$ 0	$ 0	$ 0
ANNUAL ACCRUAL - RETAIL	$ 0	$ 0	$ 0

(1) ESTIMATED COST IN 2008 DOLLARS X (1 + INFLATION RATE) ^ (YEAR OF EXPENDITURE - 2008)
(2) ESTIMATED COST IN YEAR INCURRED X (.917806) X (.91089) 0.917806 0.91089
(3) ESTIMATED ANNUAL DOLLARS / (1 + EARNINGS RATE) ^ (YEAR OF DECOMMISSIONING - CURRENT YEAR (2010)) 311

ASSUMPTIONS:

2008 COST -	$ 818,263,839
COST ESCALATION RATE -	2.800000%
EARNINGS RATE (AFTER TAX) - ANNUAL	5.470000%
- NOMINAL	5.337472%
FEDERAL TAX RATE	35.000000%
STATE TAX RATE	5.500000%

PROGRESS ENERGY FLORIDA
ESTIMATED COST OF DECOMMISSIONING
(COST INCLUDES 17.2% CONTINGENCY)

2010 WHOLESALE
DETERMINATION OF ANNUAL ACCRUAL FOR DECOMMISSIONING

CRYSTAL RIVER #3 - NUCLEAR PLANT

YEAR	% OF 2008 COST TO BE SPENT	ESTIMATED 100% COST IN 2008 DOLLARS	(1) ESTIMATED COST IN YEAR INCURRED	(2) FPC SHARE IN YEAR INCURRED	100% * (2) QUALIFIED PLAN AMOUNT	(3) 2010 NPV OF QUALIFIED FUND		
2036	0.7113%	$ 5,820,209	$ 12,610,892	$ 1,031,390	$ 1,031,390	$ 258,268	28	26
2037	9.5197%	77,896,061	173,506,529	14,190,351	14,190,351	3,369,082	29	27
2038	16.1630%	132,256,083	302,837,112	24,767,743	24,767,743	5,575,399	30	28
2039	14.7057%	120,331,759	283,247,979	23,165,633	23,165,633	4,944,299	31	29
2040	9.5217%	77,912,998	188,533,958	15,419,380	15,419,380	3,120,316	32	30
2041	9.4957%	77,700,120	193,283,363	15,807,813	15,807,813	3,033,014	33	31
2042	7.8558%	64,281,281	164,380,547	13,443,977	13,443,977	2,445,690	34	32
2043	4.8461%	39,653,978	104,242,729	8,525,564	8,525,564	1,470,510	35	33
2044	3.8346%	31,376,744	84,793,000	6,934,854	6,934,854	1,134,105	36	34
2045	2.5444%	20,819,563	57,838,477	4,730,360	4,730,360	733,468	37	35
2046	0.6892%	5,639,471	16,105,593	1,317,207	1,317,207	193,648	38	36
2047	0.6892%	5,639,471	16,556,550	1,354,089	1,354,089	188,745	39	37
2048	0.6911%	5,654,922	17,066,765	1,395,817	1,395,817	184,471	40	38
2049	0.6892%	5,639,471	17,496,697	1,430,979	1,430,979	179,310	41	39
2050	0.6892%	5,639,471	17,986,604	1,471,047	1,471,047	174,771	42	40
2051	0.6892%	5,639,471	18,490,229	1,512,236	1,512,236	170,346	43	41
2052	0.6911%	5,654,922	19,060,034	1,558,839	1,558,839	166,489	44	42
2053	0.6892%	5,639,471	19,540,179	1,598,108	1,598,108	161,831	45	43
2054	0.6892%	5,639,471	20,087,304	1,642,854	1,642,854	157,734	46	44
2055	0.6892%	5,639,471	20,649,748	1,688,854	1,688,854	153,741	47	45
2056	0.6911%	5,654,922	21,286,101	1,740,898	1,740,898	150,259	48	46
2057	0.6892%	5,639,471	21,822,323	1,784,754	1,784,754	146,055	49	47
2058	0.6892%	5,639,471	22,433,348	1,834,727	1,834,727	142,358	50	48
2059	0.6892%	5,639,471	23,061,482	1,886,100	1,886,100	138,754	51	49
2060	0.6911%	5,654,922	23,772,157	1,944,222	1,944,222	135,612	52	50
2061	0.6892%	5,639,471	24,371,005	1,993,200	1,993,200	131,818	53	51
2062	0.6892%	5,639,471	25,053,393	2,049,009	2,049,009	128,481	54	52
2063	0.6892%	5,639,471	25,754,888	2,106,382	2,106,382	125,228	55	53
2064	0.6911%	5,654,922	26,548,564	2,171,292	2,171,292	122,393	56	54
2065	0.6892%	5,639,471	27,217,354	2,225,990	2,225,990	118,968	57	55
2066	0.6892%	5,639,471	27,979,440	2,288,318	2,288,318	115,957	58	56
2067	0.6892%	5,639,471	28,762,864	2,352,391	2,352,391	113,021	59	57
2068	0.6911%	5,654,922	29,649,235	2,424,883	2,424,883	110,462	60	58
2069	0.6892%	5,639,471	30,396,135	2,485,969	2,485,969	107,371	61	59
2070	0.6892%	5,639,471	31,247,227	2,555,576	2,555,576	104,653	62	60
2071	0.6892%	5,639,471	32,122,149	2,627,132	2,627,132	102,004	63	61
2072	2.2211%	18,174,354	106,418,791	8,703,535	8,703,535	320,406	64	62
2073	0.6504%	5,321,737	32,033,608	2,619,891	2,619,891	91,445	65	63
	100.0000%	$ 818,263,839	$ 2,308,244,353	$ 188,781,364	$ 188,781,364	$ 30,220,482		

	NONQUALIFIED	QUALIFIED	TOTAL
NPV @ 12/31/10	$ 0	$ 30,220,482	$ 30,220,482
CITY OF TALLAHASSEE'S PERMANENT RE-ALLOCATION (4)	$ 4,838,072	($ 4,838,072)	$ 0
ADJUSTED NET PRESENT VALUE	$ 4,838,072	$ 25,382,410	$ 30,220,482
LESS BOOK VALUE @ 10/31/10			
PROGRESS ENERGY FLORIDA	$ 88,912	$ 35,226,167	$ 35,315,079
CITY OF TALLAHASSEE	6,749,725	0	$ 6,749,725
	$ 6,838,638	$ 35,226,167	$ 42,064,804
PV OF FUND REQUIREMENTS	($ 2,000,566)	($ 9,843,757)	($ 11,844,322)
MONTHLY FUND REQUIREMENT	$ 0	$ 0	$ 0
ANNUAL FUND REQUIREMENT	$ 0	$ 0	$ 0
MONTHLY ACCRUAL	$ 0	$ 0	$ 0
ANNUAL ACCRUAL - WHOLESALE	$ 0	$ 0	$ 0

(1) ESTIMATED COST IN 2008 DOLLARS X (1 + INFLATION RATE) ^ (YEAR OF EXPENDITURE - 2008)
(2) QUAL. PLAN AMOUNTS (SYSTEM - RETAIL AMOUNTS), INCLUDES TALLAHASSEE WHOLESALE
(3) ESTIMATED ANNUAL DOLLARS / (1 + EARNINGS RATE) ^ (YEAR OF DECOMMISSIONING - CURRENT YEAR (2010))
(4) RE-ALLOCATION OF THE THEORETICAL QUAL PORTION OF THE CITY OF TALLAHASSEE'S ACQUIRED NDC FUND BALANCE OF $4,838,072.30

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ASSUMPTIONS:

2008 COST -	$ 818,263,839
COST ESCALATION RATE -	2.800000%
EARNINGS RATE (AFTER TAX) - ANNUAL	5.470000%
- NOMINAL	5.337472%
FEDERAL TAX RATE	35.000000%
STATE TAX RATE	5.500000%

Section 3

Calculation of Inflation Indices

PROGRESS ENERGY FLORIDA INDICES
(COST INCLUDES 17.2% CONTINGENCY)

PROGRESS ENERGY FLORIDA
2010 Update - 2008 NUCLEAR DECOMMISSIONING COST STUDY
CALCULATION OF INFLATION INDICES

	INFLATION INDICES (1)					DECONTAMINATION			REMOVAL			PACKAGING			SHIPPING	BURIAL	STAFFS	OTHER				CURRENT	Annual Weigted Inflation	Compound Average Annual
Year	Labor	Material	Burial	Trans portation	Other	Labor 52%	Material 48%	Total ($000)	Labor 40%	Material 60%	Total ($000)	Labor 24%	Material 76%	Total ($000)	Transport. (100%)	Burial (100%)	Labor (100%)	Labor 11%	Material 9%	Other 80%	TOTAL ($000)	DOLLAR TOTAL	Rate	Growth Rate
2008	Base	Base	Base	Base	Base	7,336	6,697	14,033	37,966	57,445	95,411	3,486	11,139	14,625	13,539	85,276	375,813	25,450	19,464	174,653	219,567	818,264		
2009	1.86%	-8.24%	5.00%	-7.79%	0.94%	7,473	6,145	13,618	38,673	52,710	91,383	3,551	10,221	13,772	12,484	89,540	382,808	25,924	17,860	176,302	220,086	823,691	0.66%	0.66%
2010	1.45%	6.39%	5.00%	7.06%	0.78%	7,581	6,538	14,119	39,233	56,077	95,310	3,602	10,874	14,476	13,365	94,017	386,351	26,299	19,001	177,685	222,985	842,823	2.30%	1.48%
2011	2.24%	1.90%	5.00%	0.61%	1.02%	7,751	6,662	14,413	40,112	57,143	97,255	3,683	11,081	14,764	13,473	98,718	397,056	26,888	19,362	179,503	225,753	861,432	2.23%	1.73%
2012	1.44%	2.92%	5.00%	1.00%	1.72%	7,862	6,856	14,718	40,689	58,810	99,499	3,736	11,404	15,140	13,608	103,654	402,765	27,275	19,927	182,584	229,786	879,170	2.06%	1.81%
2013	1.38%	2.75%	5.00%	1.52%	2.00%	7,971	7,044	15,015	41,252	60,427	101,679	3,788	11,717	15,505	13,815	108,837	408,341	27,653	20,475	186,228	234,356	897,548	2.09%	1.87%
2014	1.53%	2.04%	5.00%	1.87%	1.56%	8,093	7,188	15,281	41,882	61,662	103,544	3,846	11,956	15,802	14,073	114,279	414,573	28,075	20,893	189,142	238,110	915,662	2.02%	1.89%
2015	1.84%	1.52%	5.00%	1.78%	1.36%	8,242	7,297	15,539	42,654	62,598	105,252	3,917	12,138	16,055	14,323	119,993	422,216	28,593	21,210	191,712	241,515	934,893	2.10%	1.92%
2016	2.29%	1.47%	5.00%	1.71%	1.36%	8,431	7,404	15,835	43,630	63,516	107,146	4,007	12,316	16,323	14,568	125,993	431,880	29,247	21,521	194,313	245,081	956,826	2.35%	1.97%
2017	2.72%	1.47%	5.00%	1.71%	1.36%	8,660	7,513	16,173	44,817	64,450	109,267	4,116	12,497	16,613	14,817	132,293	443,628	30,043	21,837	196,958	248,838	981,629	2.59%	2.04%
2018	3.02%	1.47%	5.00%	1.73%	1.36%	8,921	7,624	16,545	46,169	65,400	111,569	4,240	12,681	16,921	15,074	138,908	457,011	30,949	22,159	199,637	252,745	1,008,773	2.77%	2.12%
2019	3.07%	1.45%	5.00%	1.73%	1.33%	9,195	7,735	16,930	47,586	66,350	113,936	4,370	12,865	17,235	15,334	145,653	471,035	31,899	22,481	202,302	256,682	1,037,005	2.80%	2.18%
2020	3.04%	1.45%	5.00%	1.77%	1.29%	9,474	7,847	17,321	49,032	67,315	116,347	4,503	13,052	17,555	15,605	153,146	485,346	32,868	22,808	204,907	260,583	1,065,903	2.79%	2.23%
2021	2.96%	1.45%	5.00%	1.80%	1.26%	9,755	7,961	17,716	50,486	68,291	118,777	4,637	13,241	17,878	15,885	160,803	499,735	33,842	23,139	207,494	264,475	1,095,269	2.76%	2.27%
2022	2.95%	1.44%	5.00%	1.80%	1.24%	10,042	8,076	18,118	51,973	69,276	121,249	4,774	13,432	18,206	16,172	168,843	514,457	34,839	23,473	210,077	268,389	1,125,434	2.75%	2.30%
2023	2.96%	1.43%	5.00%	1.81%	1.21%	10,340	8,191	18,531	53,513	70,265	123,778	4,915	13,624	18,539	16,464	177,285	529,703	35,871	23,808	212,629	272,308	1,156,608	2.77%	2.33%
2024	2.98%	1.39%	5.00%	1.81%	1.19%	10,648	8,305	18,953	55,106	71,242	126,348	5,061	13,814	18,875	16,762	186,149	545,472	36,939	24,139	215,154	276,232	1,188,791	2.78%	2.36%
2025	3.00%	1.32%	5.00%	1.84%	1.16%	10,967	8,415	19,382	56,758	72,182	128,940	5,213	13,996	19,209	17,070	195,456	561,823	38,046	24,458	217,652	280,156	1,222,036	2.80%	2.39%
2026	2.95%	1.31%	5.00%	1.85%	1.15%	11,291	8,525	19,816	58,433	73,129	131,562	5,367	14,180	19,547	17,385	205,229	578,400	39,169	24,779	220,152	284,100	1,256,039	2.78%	2.41%
2027	2.89%	1.34%	5.00%	1.86%	1.12%	11,618	8,639	20,257	60,123	74,106	134,229	5,522	14,369	19,891	17,708	215,490	595,129	40,302	25,110	222,623	288,035	1,290,739	2.76%	2.43%
2028	2.84%	1.36%	5.00%	1.85%	1.11%	11,948	8,756	20,704	61,828	75,112	136,940	5,679	14,564	20,243	18,036	226,265	612,008	41,445	25,451	225,097	291,993	1,326,169	2.75%	2.44%
2029	2.82%	1.38%	5.00%	1.87%	1.09%	12,285	8,877	21,162	63,572	76,146	139,718	5,839	14,764	20,603	18,373	237,578	629,272	42,614	25,801	227,558	295,973	1,362,679	2.75%	2.46%
2030	2.70%	1.40%	5.00%	1.87%	1.08%	12,617	9,001	21,618	65,269	77,211	142,500	5,997	14,970	20,967	18,717	249,457	646,263	43,765	26,162	230,019	299,946	1,399,466	2.70%	2.47%
2031	2.66%	1.42%	5.00%	1.89%	1.07%	12,955	9,129	22,084	67,040	78,310	145,350	6,158	15,183	21,341	19,070	261,930	663,592	44,939	26,535	232,469	303,943	1,437,310	2.70%	2.48%
2032	2.67%	1.44%	5.00%	1.89%	1.05%	13,301	9,261	22,562	68,831	79,440	148,271	6,323	15,402	21,725	19,431	275,027	681,321	46,140	26,918	234,908	307,966	1,476,303	2.71%	2.49%
2033	2.55%	1.46%	5.00%	1.89%	1.04%	13,640	9,396	23,036	70,587	80,599	151,186	6,484	15,627	22,111	19,798	288,778	698,705	47,317	27,311	237,352	311,980	1,515,594	2.66%	2.50%
2034	2.43%	1.49%	5.00%	1.89%	1.04%	13,972	9,536	23,508	72,305	81,802	154,107	6,642	15,860	22,502	20,173	303,217	715,711	48,469	27,719	239,813	316,001	1,555,219	2.61%	2.50%
2035	2.35%	1.52%	5.00%	1.90%	1.08%	14,301	9,681	23,982	74,007	83,043	157,050	6,798	16,101	22,899	20,556	318,378	732,559	49,610	28,140	242,413	320,163	1,595,587	2.60%	2.50%
2036	2.35%	1.55%	5.00%	1.92%	1.03%	14,638	9,831	24,469	75,748	84,329	160,077	6,958	16,350	23,308	20,950	334,297	749,796	50,777	28,576	244,919	324,272	1,637,169	2.61%	2.51%
2037	2.39%	1.56%	5.00%	1.93%	0.93%	14,987	9,986	24,973	77,556	85,662	163,218	7,124	16,608	23,732	21,353	351,012	767,697	51,989	29,028	247,204	328,221	1,680,206	2.63%	2.51%
2038	2.41%	1.61%	5.00%	1.91%	0.99%	15,348	10,147	25,495	79,423	87,044	166,467	7,296	16,876	24,172	21,762	368,563	786,179	53,241	29,496	249,653	332,390	1,725,028	2.67%	2.52%
2039	2.41%	1.66%	5.00%	1.91%	1.04%	15,719	10,315	26,034	81,341	88,485	169,826	7,472	17,155	24,627	22,177	386,991	805,161	54,526	29,984	252,239	336,749	1,771,565	2.70%	2.52%
2040	2.40%	1.74%	5.00%	1.91%	1.04%	16,096	10,494	26,590	83,289	90,021	173,310	7,651	17,453	25,104	22,600	406,341	824,448	55,832	30,504	254,853	341,189	1,819,582	2.71%	2.53%
2041	2.40%	1.74%	5.00%	1.91%	1.04%	16,482	10,676	27,158	85,284	91,584	176,868	7,834	17,756	25,590	23,031	426,658	844,197	57,169	31,034	257,494	345,697	1,869,199	2.73%	2.53%
2042	2.40%	1.74%	5.00%	1.91%	1.04%	16,877	10,861	27,738	87,327	93,174	180,501	8,022	18,064	26,086	23,470	447,991	864,419	58,538	31,573	260,162	350,273	1,920,478	2.74%	2.54%
2043	2.40%	1.74%	5.00%	1.91%	1.04%	17,281	11,050	28,331	89,419	94,791	184,210	8,214	18,378	26,592	23,918	470,391	885,125	59,940	32,121	262,858	354,919	1,973,486	2.76%	2.55%
2044	2.40%	1.74%	5.00%	1.91%	1.04%	17,695	11,242	28,937	91,561	96,436	187,997	6,411	18,697	27,108	24,374	493,911	906,327	61,376	32,679	265,582	359,637	2,028,291	2.78%	2.55%
2045	2.40%	1.74%	5.00%	1.91%	1.04%	18,119	11,437	29,556	93,754	98,110	191,864	8,612	19,022	27,634	24,839	518,607	926,037	62,846	33,246	268,334	364,426	2,084,963	2.79%	2.56%
2046	2.40%	1.74%	5.00%	1.91%	1.04%	18,553	11,636	30,189	96,000	99,813	195,813	8,818	19,352	28,170	25,313	544,537	950,267	64,351	33,823	271,115	369,289	2,143,578	2.81%	2.57%
2047	2.40%	1.74%	5.00%	1.91%	1.04%	18,997	11,838	30,835	98,300	101,546	199,846	9,029	19,688	28,717	25,796	571,764	973,030	65,892	34,410	273,925	374,227	2,204,215	2.83%	2.57%
2048	2.40%	1.74%	5.00%	1.91%	1.04%	19,452	12,043	31,495	100,655	103,309	203,964	9,245	20,030	29,275	26,288	600,352	996,338	67,470	35,007	276,764	379,241	2,266,953	2.85%	2.58%
2049	2.40%	1.74%	5.00%	1.91%	1.04%	19,918	12,252	32,170	103,066	105,102	208,168	9,466	20,378	29,844	26,790	630,370	1,020,204	69,086	35,615	279,632	384,333	2,331,879	2.86%	2.59%
2050	2.40%	1.74%	5.00%	1.91%	1.04%	20,395	12,465	32,860	105,535	106,926	212,461	9,693	20,732	30,425	27,301	661,889	1,044,642	70,741	36,233	282,530	389,504	2,399,082	2.88%	2.59%
2051	2.40%	1.74%	5.00%	1.91%	1.04%	20,884	12,681	33,565	108,063	108,782	216,845	9,925	21,092	31,017	27,822	694,983	1,069,665	72,436	36,862	285,458	394,756	2,468,653	2.90%	2.60%
2052	2.40%	1.74%	5.00%	1.91%	1.04%	21,384	12,901	34,285	110,652	110,670	221,322	10,163	21,458	31,621	28,353	729,732	1,095,288	74,171	37,502	288,416	400,089	2,540,690	2.92%	2.61%
2053	2.40%	1.74%	5.00%	1.91%	1.04%	21,896	13,125	35,021	113,303	112,591	225,894	10,406	21,830	32,236	28,894	766,219	1,121,525	75,948	38,153	291,405	405,506	2,615,295	2.94%	2.62%
2054	2.40%	1.74%	5.00%	1.91%	1.04%	22,420	13,353	35,773	116,017	114,545	230,562	10,655	22,209	32,864	29,445	804,530	1,148,390	77,767	38,815	294,425	411,007	2,692,571	2.95%	2.62%
2055	2.40%	1.74%	5.00%	1.91%	1.04%	22,957	13,585	36,542	118,796	116,533	235,329	10,910	22,595	33,505	30,007	844,757	1,175,899	79,630	39,489	297,476	416,595	2,772,634	2.97%	2.63%
2056	2.40%	1.74%	5.00%	1.91%	1.04%	23,507	13,821	37,328	121,642	118,556	240,198	11,171	22,987	34,158	30,580	886,995	1,204,066	81,537	40,174	300,559	422,270	2,855,595	2.99%	2.64%
2057	2.40%	1.74%	5.00%	1.91%	1.04%	24,070	14,061	38,131	124,556	120,614	245,170	11,439	23,386	34,825	31,163	931,345	1,232,908	83,490	40,871	303,674	428,035	2,941,577	3.01%	2.65%
2058	2.40%	1.74%	5.00%	1.91%	1.04%	24,647	14,305	38,952	127,540	122,708	250,248	11,713	23,792	35,505	31,758	977,912	1,262,441	85,490	41,580	306,821	433,891	3,030,707	3.03%	2.65%
2059	2.40%	1.74%	5.00%	1.91%	1.04%	25,237	14,553	39,790	130,595	124,838	255,433	11,994	24,205	36,199	32,364	1,026,808	1,292,682	87,538	42,302	310,001	439,841	3,123,117	3.05%	2.66%
2060	2.40%	1.74%	5.00%	1.91%	1.04%	25,842	14,806	40,648	133,723	127,005	260,728	12,281	24,625	36,906	32,982	1,078,148	1,323,647	89,635	43,036	313,214	445,885	3,218,944	3.07%	2.67%
2061	2.40%	1.74%	5.00%	1.91%	1.04%	26,461	15,063	41,524	136,926	129,210	266,136	12,575	25,052	37,627	33,611	1,132,055	1,355,354	91,782	43,783	316,460	452,025	3,318,332	3.09%	2.68%
2062	2.40%	1.74%	5.00%	1.91%	1.04%	27,095	15,324	42,419	140,206	131,453	271,659	12,876	25,487	38,363	34,252	1,188,658	1,387,820	93,981	44,543	319,740	458,264	3,421,435	3.11%	2.68%
2063	2.40%	1.74%	5.00%	1.91%	1.04%	27,744	15,590	43,334	143,564	133,735	277,299	13,184	25,929	39,113	34,906	1,248,091	1,421,064	96,232	45,316	323,054	464,602	3,528,409	3.13%	2.69%
2064	2.40%	1.74%	5.00%	1.91%	1.04%	28,409	15,861	44,270	147,003	136,056	283,059	13,500	26,379	39,879	35,572	1,310,496	1,455,104	98,537	46,103	326,402	471,042	3,639,422	3.15%	2.70%
2065	2.40%	1.74%	5.00%	1.91%	1.04%	29,090	16,136	45,226	150,524	138,418	288,942	13,823	26,837	40,660	36,251	1,376,021	1,489,960	100,897	46,903	329,785	477,585	3,754,645	3.17%	2.71%
2066	2.40%	1.74%	5.00%	1.91%	1.04%	29,787	16,416	46,203	154,130	140,821	294,951	14,154	27,303	41,457	36,943	1,444,822	1,525,650	103,314	47,717	333,203	484,234	3,874,260	3.19%	2.72%
2067	2.40%	1.74%	5.00%	1.91%	1.04%	30,501	16,701	47,202	157,822	143,265	301,087	14,493	27,777	42,270	37,648	1,517,063	1,562,195	105,789	48,545	336,656	490,990	3,998,455	3.21%	2.73%
2068	2.40%	1.74%	5.00%	1.91%	1.04%	31,232	16,991	48,223	161,602	145,752	307,354	14,840	28,259	43,099	38,366	1,592,916	1,599,616	108,323	49,388	340,145	497,856	4,127,430	3.23%	2.73%
2069	2.40%	1.74%	5.00%	1.91%	1.04%	31,980	17,286	49,266	165,473	148,282	313,755	15,195	28,750	43,945	39,096	1,672,562	1,637,933	110,918	50,245	343,670	504,833	4,261,392	3.25%	2.74%
2070	2.40%	1.74%	5.00%	1.91%	1.04%	32,746	17,586	50,332	169,437	150,856	320,293	15,559	29,249	44,808	39,844	1,756,190	1,677,168	113,575	51,117	347,232	511,924	4,400,559	3.27%	2.75%
2071	2.40%	1.74%	5.00%	1.91%	1.04%	33,530	17,891	51,421	173,496	153,475	326,971	15,932	29,757	45,689	40,604	1,844,000	1,717,343	116,296	52,004	350,830	519,130	4,545,158	3.29%	2.76%
2072	2.40%	1.74%	5.00%	1.91%	1.04%	34,333	18,202	52,535	177,652	156,139	333,791	16,314	30,274	46,588	41,379	1,936,200	1,758,480	119,082	52,907	354,466	526,455	4,695,428	3.31%	2.77%
2073	2.40%	1.74%	5.00%	1.91%	1.04%	35,155	18,518	53,673	181,907	158,849	340,756	16,705	30,800	47,505	42,169	2,033,010	1,800,603	121,934	53,625	358,139	533,698	4,851,614	3.33%	2.78%
2074	2.40%	1.74%	5.00%	1.91%	1.04%	35,997	18,839	54,836	186,264	161,606	347,870	17,105	31,335	48,440	42,974	2,134,661	1,843,735	124,855	54,759	361,851	541,465	5,013,981	3.35%	2.78%
2075	2.40%	1.74%	5.00%	1.91%	1.04%	36,859	19,166	56,025	190,726	164,411	355,137	17,515	31,879	49,394	43,794	2,241,394	1,887,900	127,846	55,710	365,601	549,157	5,182,601	3.37%	2.79%
2076	2.40%	1.74%	5.00%	1.91%	1.04%	37,742	19,499	57,241	195,295	167,265	362,560	17,935	32,432	50,367	44,630	2,353,464	1,933,123	130,908	56,677	369,390	556,975	5,358,360	3.39%	2.80%
COMPOUND ANNUAL GROWTH RATE FROM 2005								2.09%			1.98%			1.84%	1.77%	5.00%	2.44%				1.38%	2.80%		

(1) SOURCES OF INFORMATION TO COMPLETE THE INFLATION INDICIES:
INFLATION INDICES SOURCE: Economy.com

LABOR: Wages and Productivity in the Nonfarm Business Sector. Compensation per Hour. % change - Index 2005 = 100
MATERIAL: Producer Price Indexes - Stage of Processing - Intermediate Materials, Supplies, & Components. % change - Index 1982 = 100
TRANSPORTATION: CPI: Urban Consumer - Transportation, % change (1982-84=100, SA)
OTHER: GDP Chain-Weighted Price Index % change - Index 2005 = 100

BURIAL INDICES SOURCE: NUREG-1307 Revision 12 - Report on Waste Burial Charges, February 2007; Discussion with industry experts TLG Services; comparison of burial costs reported in 2005 and 2008 studies

Section 4

Calculation of Minimum Fund Earnings Rate and Assumed Fund Earnings Rate

PROGRESS ENERGY FLORIDA
2010 UPDATE - 2008 NUCLEAR DECOMMISSIONING COST STUDY
MINIMUM FUND EARNINGS RATE

LONG-TERM AVERAGE CPI

YEAR	ANNUAL PERCENT CHANGE
2010	1.59%
2011	1.54%
2012	2.52%
2013	2.91%
2014	2.47%
2015	2.27%
2016	2.25%
2017	2.22%
2018	2.20%
2019	2.18%
2020	2.15%
2021	2.13%
2022	2.10%
2023	2.05%
2024	2.01%
2025	1.98%
2026	1.96%
2027	1.95%
2028	1.94%
2029	1.93%
2030	1.92%
2031	1.90%
2032	1.89%
2033	1.88%
2034	1.87%

25 year average CPI = 2.07%

Source:
Consumer Price Indexes - All Urban Consumers (Economy.com)

PROGRESS ENERGY FLORIDA
2010 UPDATE - 2008 NUCLEAR DECOMMISSIONING COST STUDY
ASSUMED FUND EARNINGS RATE

	COMBINED	QUALIFIED	NONQUALIFIED
LCG ASSOCIATES STUDY AFTER-TAX RETURN (1)	6.93%	7.31%	5.00%
ESTIMATED EXPENSES:			
MANAGEMENT FEES			
FIXED INCOME	0.11%		
EQUITY	0.17%		
TRUSTEE FEES	0.04%		
OUTSIDE PROFESSIONAL SERVICES	0.01%		
TOTAL EXPENSES	0.33%		
NET RETURN AFTER TAXES AND FEES	6.60%		
LONG TERM CPI (page D.1)	2.07%		
DIFFERENCE	4.53%		
PROPOSED AFTER-TAX, AFTER EXPENSES ASSUMED FUND EARNINGS RATE	5.47% (2)		

(1) 2008 ESTIMATE OF EXPECTED AFTER-TAX RETURNS WAS DEVELOPED BY LCG ASSOCIATES INCORPORATED. RETURNS ARE FOR A THIRTY YEAR TIMEFRAME. THE ESTIMATED AFTER-TAX EXPENSES ARE BASED ON MARKET VALUE AT 12/31/07 PER SCHEDULE B-1.

(2) AVERAGE OF NET RETURN AFTER TAXES AND FEES AND LONG TERM CPI.
Formula = Long Term CPI + ((Net Return after Taxes and Fees - Long Term CPI) x 75%).
METHOD CONFIRMED AS REASONABLE BY HISTORICAL FUND AFTER-TAX RETURN SINCE INCEPTION OF 5.74% AS PRESENTED IN SECTION 5.

Section 5

Historical Fund Returns

PROGRESS ENERGY FLORIDA
TOTAL NUCLEAR DECOMMISSIONING TRUST FUND
TIME WEIGHTED RETURNS FOR THE PERIODS ENDED
30-Sep-10

				Annualized		
	Quarter	Year To-Date	One Year	Three Years	Five Years	Since Inception
Nuc Decom Trust Fund -Total*						
Before Tax Total Fund	8.13%	4.21%	7.08%	-4.31%	1.32%	7.32%
After Tax Total Fund	7.90%	3.74%	6.53%	-3.83%	1.36%	5.74%
Indices						
Barclays Capital Govt/Credit Bonds	3.28%	8.95%	8.73%	7.46%	6.15%	7.27%
S&P 500	11.29%	3.89%	10.16%	-7.16%	0.64%	8.10%
CPI	0.22%	1.15%	1.14%	1.57%	1.90%	2.69%

* Fund returns are net of investment management fees

Section 6

Cash Flow Schedule of Liability Funding

PROGRESS ENERGY FLORIDA
2010 UPDATE - 2008 NUCLEAR DECOMMISSIONING COST STUDY
CASH FLOW SCHEDULE

CURRENT YEAR YEARS REMAINING	2008 28	2009 27	2010 26	2011 25	2012 24	2013 23	2014 22	2015 21	2016 20	2017 19	2018 18	2019 17	2020 16	2021 15
ESTIMATED COST OF DECOMMISSIONING														
ESTIMATED 100% COST IN 2008 DOLLARS	$ 818,263,839													
OWNERSHIP PERCENT	91.7806%													
	751,007,461													
RETAIL SEPARATION PERCENT	91.0890%													
RETAIL - CURRENT DOLLARS (1)	$ 684,085,186	$ 703,239,571	$ 722,930,279	$ 743,172,327	$ 763,981,152	$ 785,372,624	$ 807,363,057	$ 829,969,223	$ 853,208,361	$ 877,098,195	$ 901,656,944	$ 926,903,338	$ 952,856,631	$ 979,536,617
SOURCE OF DECOMMISSIONING FUNDS														
FROM QUALIFIED FUND														
FROM NONQUALIFIED FUND														
FROM TAX SAVINGS														
ANNUAL EXPENDITURES		0	0	0	0	0	0	0	0	0	0	0	0	0
ADJUSTED ESTIMATED COST														
OF DECOMMISSIONING - RETAIL		$ 703,239,571	$ 722,930,279	$ 743,172,327	$ 763,981,152	$ 785,372,624	$ 807,363,057	$ 829,969,223	$ 853,208,361	$ 877,098,195	$ 901,656,944	$ 926,903,338	$ 952,856,631	$ 979,536,617
FUNDED RESERVE BEGINNING														
OF YEAR BALANCE - RETAIL		$ 0	$ 360,993,741	$ 364,212,206	$ 384,134,614	$ 405,146,778	$ 427,308,308	$ 450,682,073	$ 475,334,383	$ 501,335,175	$ 528,758,210	$ 557,681,285	$ 588,186,452	$ 620,360,252
ANNUAL EARNINGS ON BEGINNING FUND														
BALANCE (COMPOUNDED MONTHLY) (2)		0	3,218,465	19,922,408	21,012,164	22,161,530	23,373,765	24,652,310	26,000,792	27,423,035	28,923,075	30,505,167	32,173,800	33,933,707
ANNUAL PRINCIPAL DEPOSITS														
EARNINGS ON MONTHLY														
DEPOSITS COMPOUNDED MONTHLY														
FUNDS WITHDRAWN FOR DECOMMISSIONING														
FUND RESERVE END OF YEAR BALANCE		$ 0	$ 364,212,206	$ 384,134,614	$ 405,146,778	$ 427,308,308	$ 450,682,073	$ 475,334,383	$ 501,335,175	$ 528,758,210	$ 557,681,285	$ 588,186,452	$ 620,360,252	$ 654,293,959

ASSUMPTIONS

ESCALATION RATE	2.800000%
EARNINGS RATE - ANNUAL	5.470000%
EARNINGS RATE - MONTHLY	5.337472%

(1) PRIOR YEAR BALANCE X (1 + ESCALATION RATE), FPC RETAIL ONLY.
(2) ONLY TWO MONTHS OF RETURN CALCULATED FOR 2010 SINCE TRUST FUND BALANCE AS OF 10/31/10

PROGRESS ENERGY FLORIDA
2010 UPDATE - 2008 NUCLEAR DECOMMISSIONING
CASH FLOW SCHEDULE

CURRENT YEAR YEARS REMAINING	2022 14	2023 13	2024 12	2025 11	2026 10	2027 9	2028 8	2029 7	2030 6	2031 5	2032 4	2033 3	2034 2	2035 1
ESTIMATED COST OF DECOMMISSIONING														
ESTIMATED 100% COST IN 2008 DOLLARS														
OWNERSHIP PERCENT														
RETAIL SEPARATION PERCENT														
RETAIL - CURRENT DOLLARS (1)	$ 1,006,963,642	$ 1,035,158,624	$ 1,064,143,065	$ 1,093,939,071	$ 1,124,569,365	$ 1,156,057,307	$ 1,188,426,912	$ 1,221,702,866	$ 1,255,910,546	$ 1,291,076,041	$ 1,327,226,170	$ 1,364,388,503	$ 1,402,591,381	$ 1,441,863,940
SOURCE OF DECOMMISSIONING FUNDS														
FROM QUALIFIED FUND														
FROM NONQUALIFIED FUND														
FROM TAX SAVINGS														
ANNUAL EXPENDITURES	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ADJUSTED ESTIMATED COST														
OF DECOMMISSIONING - RETAIL	$ 1,006,963,642	$ 1,035,158,624	$ 1,064,143,065	$ 1,093,939,071	$ 1,124,569,365	$ 1,156,057,307	$ 1,188,426,912	$ 1,221,702,866	$ 1,255,910,546	$ 1,291,076,041	$ 1,327,226,170	$ 1,364,388,503	$ 1,402,591,381	$ 1,441,863,940
FUNDED RESERVE BEGINNING														
OF YEAR BALANCE - RETAIL	$ 654,293,959	$ 690,083,840	$ 727,831,427	$ 767,643,808	$ 809,633,926	$ 853,920,903	$ 900,630,378	$ 949,894,862	$ 1,001,854,113	$ 1,056,655,535	$ 1,114,454,595	$ 1,175,415,264	$ 1,239,710,481	$ 1,307,522,647
ANNUAL EARNINGS ON BEGINNING FUND														
BALANCE (COMPOUNDED MONTHLY) (2)	35,789,881	37,747,587	39,812,381	41,990,118	44,286,977	46,709,475	49,264,484	51,959,251	54,801,422	57,799,060	60,960,669	64,295,217	67,812,166	71,521,492
ANNUAL PRINCIPAL DEPOSITS														
EARNINGS ON MONTHLY														
DEPOSITS COMPOUNDED MONTHLY														
FUNDS WITHDRAWN FOR DECOMMISSIONING														
FUND RESERVE END OF YEAR BALANCE	$ 690,083,840	$ 727,831,427	$ 767,643,808	$ 809,633,926	$ 853,920,903	$ 900,630,378	$ 949,894,862	$ 1,001,854,113	$ 1,056,655,535	$ 1,114,454,595	$ 1,175,415,264	$ 1,239,710,481	$ 1,307,522,647	$ 1,379,044,139
ASSUMPTIONS														
ESCALATION RATE														
EARNINGS RATE - ANNUAL														
EARNINGS RATE - MONTHLY														

(1) PRIOR YEAR BALANCE X (1 + ESCALATION RATE), FPC RETAIL ONLY.
(2) ONLY TWO MONTHS OF RETURN CALCULATED TRUST FUND BALANCE AS OF 10/31/10

PROGRESS ENERGY FLORIDA
2010 UPDATE - 2008 NUCLEAR DECOMMISSIONING
CASH FLOW SCHEDULE

CURRENT YEAR	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049
YEARS REMAINING	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11	-12	-13
ESTIMATED COST OF DECOMMISSIONING														
ESTIMATED 100% COST IN 2008 DOLLARS														
OWNERSHIP PERCENT														
RETAIL SEPARATION PERCENT														
RETAIL - CURRENT DOLLARS (1)	$ 1,482,236,130	$ 1,512,900,577	$ 1,406,145,272	$ 1,185,250,381	$ 975,005,900	$ 840,274,537	$ 697,688,920	$ 575,950,821	$ 502,488,233	$ 443,684,351	$ 406,399,456	$ 403,937,029	$ 401,018,089	$ 397,578,925
SOURCE OF DECOMMISSIONING FUNDS														
FROM QUALIFIED FUND	10,542,962	145,054,982	253,177,975	236,801,062	157,618,218	161,588,817	137,425,475	87,149,038	70,888,670	48,354,141	13,464,603	13,841,612	14,268,162	14,627,594
FROM NONQUALIFIED FUND														
FROM TAX SAVINGS														
ANNUAL EXPENDITURES	10,542,962	145,054,982	253,177,975	236,801,062	157,618,218	161,588,817	137,425,475	87,149,038	70,888,670	48,354,141	13,464,603	13,841,612	14,268,162	14,627,594
ADJUSTED ESTIMATED COST														
OF DECOMMISSIONING - RETAIL	$ 1,471,693,168	$ 1,367,845,595	$ 1,152,967,297	$ 948,449,319	$ 817,387,682	$ 678,685,720	$ 560,263,445	$ 488,801,783	$ 431,599,563	$ 395,330,210	$ 392,934,853	$ 390,095,417	$ 386,749,927	$ 382,951,331
FUNDED RESERVE BEGINNING														
OF YEAR BALANCE - RETAIL	$ 1,379,044,139	$ 1,443,934,894	$ 1,377,863,154	$ 1,200,054,296	$ 1,028,896,207	$ 927,558,614	$ 816,707,255	$ 723,955,669	$ 676,407,008	$ 642,517,803	$ 629,309,387	$ 650,268,009	$ 671,996,058	$ 694,486,082
ANNUAL EARNINGS ON BEGINNING FUND														
BALANCE (COMPOUNDED MONTHLY) (2)	75,433,717	78,983,242	75,369,117	65,642,973	56,280,625	50,737,458	44,673,889	39,600,377	36,999,465	35,145,725	34,423,225	35,569,661	36,758,186	37,988,390
ANNUAL PRINCIPAL DEPOSITS														
EARNINGS ON MONTHLY														
DEPOSITS COMPOUNDED MONTHLY														
FUNDS WITHDRAWN FOR DECOMMISSIONING	(10,542,962)	(145,054,982)	(253,177,975)	(236,801,062)	(157,618,218)	(161,588,817)	(137,425,475)	(87,149,038)	(70,888,670)	(48,354,141)	(13,464,603)	(13,841,612)	(14,268,162)	(14,627,594)
FUND RESERVE END OF YEAR BALANCE	$ 1,443,934,894	$ 1,377,863,154	$ 1,200,054,296	$ 1,028,896,207	$ 927,558,614	$ 816,707,255	$ 723,955,669	$ 676,407,008	$ 642,517,803	$ 629,309,387	$ 650,268,009	$ 671,996,058	$ 694,486,082	$ 717,846,878

ASSUMPTIONS
ESCALATION RATE
EARNINGS RATE - ANNUAL
EARNINGS RATE - MONTHLY

(1) PRIOR YEAR BALANCE X (1 + ESCALATION RATE), FPC RETAIL ONLY.
(2) ONLY TWO MONTHS OF RETURN CALCULATED TRUST FUND BALANCE AS OF 10/31/10

PROGRESS ENERGY FLORIDA
2010 UPDATE - 2008 NUCLEAR DECOMMISSIONING
CASH FLOW SCHEDULE

CURRENT YEAR YEARS REMAINING	2050 -14	2051 -15	2052 -16	2053 -17	2054 -18	2055 -19	2056 -20	2057 -21	2058 -22	2059 -23	2060 -24	2061 -25	2062 -26	2063 -27
ESTIMATED COST OF DECOMMISSIONING														
ESTIMATED 100% COST IN 2008 DOLLARS														
OWNERSHIP PERCENT														
RETAIL SEPARATION PERCENT														
RETAIL - CURRENT DOLLARS (1)	$ 393,673,968	$ 389,238,632	$ 384,246,277	$ 378,624,430	$ 372,432,520	$ 365,597,022	$ 358,086,749	$ 349,819,288	$ 340,859,494	$ 331,123,693	$ 320,575,453	$ 309,121,088	$ 296,831,333	$ 283,611,001
SOURCE OF DECOMMISSIONING FUNDS														
FROM QUALIFIED FUND	15,037,166	15,458,207	15,934,575	16,335,986	16,793,394	17,263,609	17,795,613	18,243,905	18,754,734	19,279,867	19,874,006	20,374,655	20,945,145	21,531,609
FROM NONQUALIFIED FUND														
FROM TAX SAVINGS														
ANNUAL EXPENDITURES	15,037,166	15,458,207	15,934,575	16,335,986	16,793,394	17,263,609	17,795,613	18,243,905	18,754,734	19,279,867	19,874,006	20,374,655	20,945,145	21,531,609
ADJUSTED ESTIMATED COST														
OF DECOMMISSIONING - RETAIL	$ 378,636,802	$ 373,780,425	$ 368,311,702	$ 362,288,444	$ 355,639,126	$ 348,333,413	$ 340,291,136	$ 331,575,383	$ 322,104,760	$ 311,843,826	$ 300,701,447	$ 288,746,433	$ 275,886,188	$ 262,079,392
FUNDED RESERVE BEGINNING														
OF YEAR BALANCE - RETAIL	$ 717,846,878	$ 742,075,938	$ 767,209,286	$ 793,241,061	$ 820,295,363	$ 848,372,127	$ 877,514,475	$ 907,718,906	$ 939,127,227	$ 971,742,754	$ 1,005,617,218	$ 1,040,750,476	$ 1,077,304,874	$ 1,115,288,308
ANNUAL EARNINGS ON BEGINNING FUND														
BALANCE (COMPOUNDED MONTHLY) (2)	39,266,226	40,591,555	41,966,350	43,390,288	44,870,158	46,405,957	48,000,044	49,652,226	51,370,261	53,154,331	55,007,264	56,929,053	58,928,579	61,006,273
ANNUAL PRINCIPAL DEPOSITS														
EARNINGS ON MONTHLY														
DEPOSITS COMPOUNDED MONTHLY														
FUNDS WITHDRAWN FOR DECOMMISSIONING	(15,037,166)	(15,458,207)	(15,934,575)	(16,335,986)	(16,793,394)	(17,263,609)	(17,795,613)	(18,243,905)	(18,754,734)	(19,279,867)	(19,874,006)	(20,374,655)	(20,945,145)	(21,531,609)
FUND RESERVE END OF YEAR BALANCE	$ 742,075,938	$ 767,209,286	$ 793,241,061	$ 820,295,363	$ 848,372,127	$ 877,514,475	$ 907,718,906	$ 939,127,227	$ 971,742,754	$ 1,005,617,218	$ 1,040,750,476	$ 1,077,304,874	$ 1,115,288,308	$ 1,154,762,972
ASSUMPTIONS														
ESCALATION RATE														
EARNINGS RATE - ANNUAL														
EARNINGS RATE - MONTHLY														

(1) PRIOR YEAR BALANCE X (1 + ESCALATION RATE), FPC RETAIL ONLY.
(2) ONLY TWO MONTHS OF RETURN CALCULATED TRUST FUND BALANCE AS OF 10/31/10

PROGRESS ENERGY FLORIDA
2010 UPDATE - 2008 NUCLEAR DECOMMISSIONING
CASH FLOW SCHEDULE

CURRENT YEAR YEARS REMAINING	2064 -28	2065 -29	2066 -30	2067 -31	2068 -32	2069 -33	2070 -34	2071 -35	2072 -36	2073 -37	
ESTIMATED COST OF DECOMMISSIONING ESTIMATED 100% COST IN 2008 DOLLARS											
OWNERSHIP PERCENT											
RETAIL SEPARATION PERCENT											
RETAIL - CURRENT DOLLARS (1)	$ 269,417,615	$ 254,144,705	$ 237,869,376	$ 220,483,380	$ 201,937,279	$ 182,110,114	$ 161,085,881	$ 138,741,517	$ 115,019,577	$ 26,780,744	
SOURCE OF DECOMMISSIONING FUNDS											
FROM QUALIFIED FUND	22,195,139	22,754,261	23,391,380	24,046,338	24,787,363	25,411,786	26,123,316	26,854,769	88,968,270	26,780,747	$ 1,929,739,151
FROM NONQUALIFIED FUND											0
FROM TAX SAVINGS											0
ANNUAL EXPENDITURES	22,195,139	22,754,261	23,391,380	24,046,338	24,787,363	25,411,786	26,123,316	26,854,769	88,968,270	26,780,747	$ 1,929,739,151
ADJUSTED ESTIMATED COST OF DECOMMISSIONING - RETAIL	$ 247,222,476	$ 231,390,444	$ 214,477,996	$ 196,437,042	$ 177,149,916	$ 156,698,328	$ 134,962,565	$ 111,886,748	$ 26,051,307	($ 3)	
FUNDED RESERVE BEGINNING OF YEAR BALANCE - RETAIL	$ 1,154,762,972	$ 1,195,733,370	$ 1,238,385,727	$ 1,282,734,049	$ 1,328,853,266	$ 1,376,754,179	$ 1,426,650,849	$ 1,478,565,337	$ 1,532,588,095	$ 1,527,452,397	
ANNUAL EARNINGS ON BEGINNING FUND BALANCE (COMPOUNDED MONTHLY) (2)	63,165,537	65,406,618	67,739,702	70,165,555	72,688,276	75,308,456	78,037,804	80,877,527	83,832,572	83,551,649	$ 3,152,968,709
ANNUAL PRINCIPAL DEPOSITS											
EARNINGS ON MONTHLY DEPOSITS COMPOUNDED MONTHLY											
FUNDS WITHDRAWN FOR DECOMMISSIONING	(22,195,139)	(22,754,261)	(23,391,380)	(24,046,338)	(24,787,363)	(25,411,786)	(26,123,316)	(26,854,769)	(88,968,270)	(26,780,747)	($ 1,929,739,151)
FUND RESERVE END OF YEAR BALANCE	$ 1,195,733,370	$ 1,238,385,727	$ 1,282,734,049	$ 1,328,853,266	$ 1,376,754,179	$ 1,426,650,849	$ 1,478,565,337	$ 1,532,588,095	$ 1,527,452,397	$ 1,584,223,299	
ASSUMPTIONS ESCALATION RATE EARNINGS RATE - ANNUAL EARNINGS RATE - MONTHLY											

(1) PRIOR YEAR BALANCE X (1 + ESCALATION RATE), FPC RETAIL ONLY.
(2) ONLY TWO MONTHS OF RETURN CALCULATED I TRUST FUND BALANCE AS OF 10/31/10

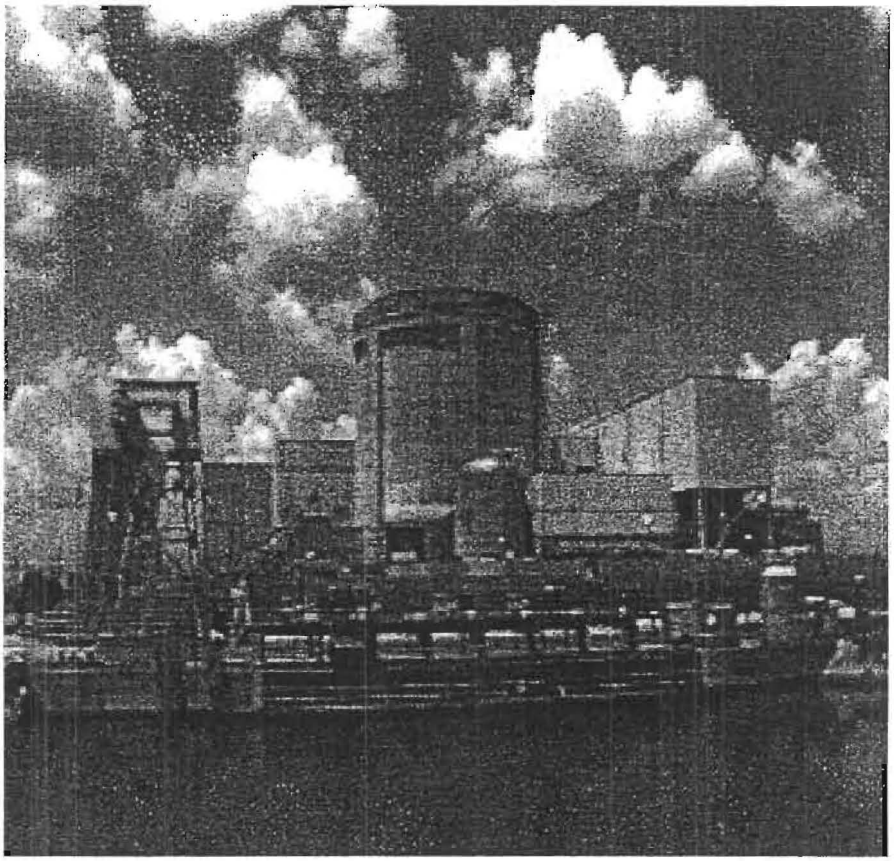
Section 7

TLG Services, Inc.
Decommissioning Cost Study

DECOMMISSIONING COST ANALYSIS

for the

CRYSTAL RIVER NUCLEAR PLANT, UNIT 3



prepared for

Progress Energy Service Company, LLC

prepared by

TLG Services, Inc.
Bridgewater, Connecticut

October 2008

APPROVALS

Project Manager	William A. Cloutier, Jr.	08 Oct 08 Date
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Technical Manager	for Francis W. Seymore	08 Oct 08 Date
Quality Assurance Manager	Joseph J. Adler	10/8/08 Date

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REVISION LOG

No.	CRA No.	Date	Item Revised	Reason for Revision
0		10-08-08		Original Issue

EXECUTIVE SUMMARY

This report presents estimates of the cost to decommission the Crystal River Nuclear Plant, Unit 3 (Crystal River) for the selected decommissioning scenarios following the scheduled cessation of plant operations. The analysis relies upon site-specific, technical information from an evaluation prepared in 2005,[1] updated to reflect current assumptions pertaining to the disposition of the nuclear unit and relevant industry experience in undertaking such projects. The current estimates are designed to provide Progress Energy Service Company, (Progress Energy) with sufficient information to assess its financial obligations, as they pertain to the eventual decommissioning of the nuclear unit.

The primary goal of the decommissioning is the removal and disposal of the contaminated systems and structures so that the plant's operating license can be terminated. The analysis recognizes that spent fuel will be stored at the site in the plant's storage pool and/or in an independent spent fuel storage installation (ISFSI) until such time that it can be transferred to the U.S. Department of Energy (DOE). Consequently, the estimates also include those costs to manage and subsequently decommission these interim storage facilities.

The currently projected cost to decommission the station, assuming the DECON alternative, is estimated at $818.3 million, as reported in 2008 dollars. An estimate for the SAFSTOR alternative is also provided.

The estimates are based on numerous fundamental assumptions, including regulatory requirements, project contingencies, low-level radioactive waste disposal practices, high-level radioactive waste management options, and site restoration requirements. The estimates incorporate a minimum cooling period for the spent fuel that resides in the storage pool when operations cease. Any residual fuel remaining in the pool after the cooling period is relocated to the ISFSI to await transfer to a DOE facility. The estimates also include the dismantling of site structures and non-essential facilities and the limited restoration of the site.

Alternatives and Regulations

The ultimate objective of the decommissioning process is to reduce the inventory of contaminated and activated material so that the license can be terminated. The Nuclear Regulatory Commission (NRC or Commission) provided initial decommissioning requirements in its rule adopted on June 27, 1988.[2] In this rule, the

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1 "Decommissioning Cost Analysis for the Crystal River Plant, Unit 3," Document No. P23-1518-002, Rev. 0, TLG Services, Inc., March 2005

2 U.S. Code of Federal Regulations, Title 10, Parts 30, 40, 50, 51, 70 and 72 "General Requirements for

NRC set forth financial criteria for decommissioning licensed nuclear power facilities. The regulations addressed planning needs, timing, funding methods, and environmental review requirements for decommissioning. The rule also defined three decommissioning alternatives as being acceptable to the NRC: DECON, SAFSTOR, and ENTOMB.

> DECON is defined as "the alternative in which the equipment, structures, and portions of a facility and site containing radioactive contaminants are removed or decontaminated to a level that permits the property to be released for unrestricted use shortly after cessation of operations."[3]
>
> SAFSTOR is defined as "the alternative in which the nuclear facility is placed and maintained in a condition that allows the nuclear facility to be safely stored and subsequently decontaminated (deferred decontamination) to levels that permit release for unrestricted use."[4] Decommissioning is to be completed within 60 years, although longer time periods will be considered when necessary to protect public health and safety.
>
> ENTOMB is defined as "the alternative in which radioactive contaminants are encased in a structurally long-lived material, such as concrete; the entombed structure is appropriately maintained and continued surveillance is carried out until the radioactive material decays to a level permitting unrestricted release of the property."[5] As with the SAFSTOR alternative, decommissioning is currently required to be completed within 60 years.
>
> The 60-year restriction has limited the practicality for the ENTOMB alternative at commercial reactors that generate significant amounts of long-lived radioactive material. In 1997, the Commission directed its staff to re-evaluate this alternative and identify the technical requirements and regulatory actions that would be necessary for entombment to become a viable option. The resulting evaluation provided several recommendations, however, rulemaking has been deferred pending the completion of additional research studies, for example, on engineered barriers.

Decommissioning Nuclear Facilities," Nuclear Regulatory Commission, Federal Register Volume 53, Number 123 (p 24018 et seq.), June 27, 1988.

3 Ibid. Page FR24022, Column 3.

4 Ibid.

5 Ibid. Page FR24023, Column 2.

In 1996, the NRC published revisions to the general requirements for decommissioning nuclear power plants to clarify ambiguities and codify procedures and terminology as a means of enhancing efficiency and uniformity in the decommissioning process.[6] The amendments allow for greater public participation and better define the transition process from operations to decommissioning. Regulatory Guide 1.184, issued in July 2000, further described the methods and procedures acceptable to the NRC staff for implementing the requirements of the 1996 revised rule relating to the initial activities and major phases of the decommissioning process. The costs and schedules presented in this analysis follow the general guidance and processes described in the amended regulations. The format and content of the estimates is also consistent with the recommendations of Regulatory Guide 1.202, issued in February 2005.[7]

Methodology

The methodology used to develop the estimates described within this document follows the basic approach originally presented in the cost estimating guidelines[8] developed by the Atomic Industrial Forum (now Nuclear Energy Institute). This reference describes a unit factor method for determining decommissioning activity costs. The unit factors used in this analysis incorporate site-specific costs and the latest available information on worker productivity in decommissioning.

The estimates also reflect lessons learned from TLG's involvement in the Shippingport Station decommissioning, completed in 1989, and the decommissioning of the Cintichem reactor, hot cells and associated facilities, completed in 1997. In addition, the planning and engineering for the Pathfinder, Shoreham, Rancho Seco, Trojan, Yankee Rowe, Big Rock Point, Maine Yankee, Humboldt Bay-3, Connecticut Yankee and San Onofre-1 nuclear units have provided additional insight into the process, the regulatory aspects, and technical challenges of decommissioning commercial nuclear units.

An activity duration critical path is used to determine the total decommissioning program schedule. The schedule is relied upon in calculating the carrying costs, which include program management, administration, field engineering, equipment rental, and support services, such as quality control and security.

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6 U.S. Code of Federal Regulations, Title 10, Parts 2, 50, and 51, "Decommissioning of Nuclear Power Reactors," Nuclear Regulatory Commission, Federal Register Volume 61, (p 39278 et seq.), July 29, 1996.

7 "Standard Format and Content of Decommissioning Cost Estimates of Decommissioning Cost Estimates for Nuclear Power Reactors," Regulatory Guide 1.202, U.S. Nuclear Regulatory Commission, February 2005

8 T.S. LaGuardia et al., "Guidelines for Producing Commercial Nuclear Power Plant Decommissioning Cost Estimates," AIF/NESP-036, May 1986.

Contingency

Consistent with cost estimating practice, contingencies are applied to the decontamination and dismantling costs developed as "specific provision for unforeseeable elements of cost within the defined project scope, particularly important where previous experience relating estimates and actual costs has shown that unforeseeable events which will increase costs are likely to occur."[9] The cost elements in the estimates are based on ideal conditions; therefore, the types of unforeseeable events that are almost certain to occur in decommissioning, based on industry experience, are addressed through a percentage contingency applied on a line-item basis. This contingency factor is a nearly universal element in all large-scale construction and demolition projects. It should be noted that contingency, as used in this analysis, does not account for price escalation and inflation in the cost of decommissioning over the remaining operating life of the station.

Contingency funds are expected to be fully expended throughout the program. As such, inclusion of contingency is necessary to provide assurance that sufficient funding will be available to accomplish the intended tasks.

Low-Level Radioactive Waste Disposal

The contaminated and activated material generated in the decontamination and dismantling of a commercial nuclear reactor is classified as low-level (radioactive) waste, although not all of the material is suitable for "shallow-land" disposal. With the passage of the "Low-Level Radioactive Waste Policy Act" in 1980,[10] and its Amendments of 1985,[11] the states became ultimately responsible for the disposition of low-level radioactive waste generated within their own borders.

Until recently, there were two facilities available to Progress Energy for the disposal of low-level radioactive waste generated by Crystal River. As of July 1, 2008, however, the facility in Barnwell, South Carolina was closed to generators outside the Atlantic Compact (comprised of the states of Connecticut, New Jersey and South Carolina). This leaves the facility in Clive, Utah, operated by EnergySolutions, as the only available destination for low-level radioactive waste requiring controlled disposal.

For the purpose of this analysis, the EnergySolutions' facility is used as the basis for estimating the disposal cost for the majority of the radioactive waste (Class A [12]).

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9 Project and Cost Engineers' Handbook, Second Edition, American Association of Cost Engineers, Marcel Dekker, Inc., New York, New York, p. 239.

10 "Low-Level Radioactive Waste Policy Act of 1980," Public Law 96-573, 1980.

11 "Low-Level Radioactive Waste Policy Amendments Act of 1985," Public Law 99-240, 1986.

12 U.S. Code of Federal Regulations, Title 10, Part 61, "Licensing Requirements for Land Disposal of Radioactive Waste"

EnergySolutions does not have a license to dispose of the more highly radioactive waste (Classes B and C), for example, generated in the dismantling of the reactor vessel. As a proxy, the disposal cost for this material is based upon the last published rate schedule for non-compact waste for the Barnwell facility.

The dismantling of the components residing closest to the reactor core generates radioactive waste considered unsuitable for shallow-land disposal (i.e., low-level radioactive waste with concentrations of radionuclides that exceed the limits established by the NRC for Class C radioactive waste (GTCC)). The Low-Level Radioactive Waste Policy Amendments Act of 1985 assigned the Federal Government the responsibility for the disposal of this material. The Act also stated that the beneficiaries of the activities resulting in the generation of such radioactive waste bear all reasonable costs of disposing of such waste. However, to date, the Federal Government has not identified a cost for disposing of GTCC or a schedule for acceptance. As such, the GTCC radioactive waste has been packaged and disposed of as high-level waste, at a cost equivalent to that envisioned for the spent fuel.

For purposes of this study, GTCC is packaged in the same canisters used for spent fuel. The GTCC material is either stored with the spent fuel at the ISFSI or shipped directly to a DOE facility as it is generated (depending upon the timing of the decommissioning and whether the spent fuel has been removed from the site prior to the start of decommissioning).

A significant portion of the waste material generated during decommissioning may only be potentially contaminated by radioactive materials. This waste can be analyzed on site or shipped off site to licensed facilities for further analysis, for processing and/or for conditioning/recovery. Reduction in the volume of low-level radioactive waste requiring disposal in a licensed low-level radioactive waste disposal facility can be accomplished through a variety of methods, including analyses and surveys or decontamination to eliminate the portion of waste that does not require disposal as radioactive waste, compaction, incineration or metal melt. The estimates for Crystal River reflect the savings from waste recovery/volume reduction.

High-Level Radioactive Waste Management

Congress passed the "Nuclear Waste Policy Act"[13] (NWPA) in 1982, assigning the federal government's long-standing responsibility for disposal of the spent nuclear fuel created by the commercial nuclear generating plants to the DOE. The NWPA provided that DOE would enter into contracts with utilities in which DOE would promise to take the utilities' spent fuel and high-level radioactive waste and utilities would pay

13 "Nuclear Waste Policy Act of 1982 and Amendments," DOE's Office of Civilian Radioactive Management, 1982.

the cost of the disposition services for that material. NWPA, along with the individual contracts with the utilities, specified that the DOE was to begin accepting spent fuel by January 31, 1998.

Since the original legislation, the DOE has announced several delays in the program schedule. By January 1998, the DOE had failed to accept any spent fuel or high level waste, as required by the NWPA and utility contracts. Delays continue and, as a result, generators have initiated legal action against the DOE in an attempt to obtain compensation for DOE's breach of contract.

Operation of DOE's yet-to-be constructed repository is contingent upon the review and approval of the facility's license application by the NRC and the successful resolution of pending litigation. The DOE submitted its license application to the NRC on June 3, 2008, seeking authorization to construct the repository at Yucca Mountain, Nevada. The NRC formally docketed the DOE's license application on September 8, 2008, triggering a three-year deadline, with a possible one-year extension, set by Congress for the NRC to decide on whether to authorize construction.

Construction, if adequately funded, could take five to six years after the DOE receives authorization to proceed. As such, the spent fuel management plan described in this section is predicated upon the DOE initiating the pickup of commercial fuel in the year 2020.[14]

It is generally necessary that spent fuel be actively cooled and stored for a minimum period at the generating site prior to transfer. As such, the NRC requires that licensees establish a program to manage and provide funding for the management of all irradiated fuel at the reactor until title of the fuel is transferred to the Secretary of Energy, pursuant to 10 CFR Part 50.54(bb).[15] This funding requirement is fulfilled through inclusion of certain cost elements in the decommissioning estimate, for example, associated with the isolation and continued operation of the spent fuel pool and ISFSI.

At shutdown, the spent fuel pool is expected to contain freshly discharged assemblies (from the most recent refueling cycles) as well as the final reactor core. Over the following five and one-half years the assemblies are packaged into multipurpose canisters for transfer to the ISFSI. It is assumed that this period provides the necessary cooling for the final core to meet the storage system requirements for decay heat.

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14 "Testimony of Edward Sproat, Director, Office of Civilian Radioactive Waste Management, before a U.S. House of Representatives subcommittee on the status of Yucca Mountain, July 15, 2008.

15 U.S. Code of Federal Regulations, Title 10, Part 50, "Domestic Licensing of Production and Utilization Facilities," Subpart 54 (bb), "Conditions of Licenses."

DOE's contracts with utilities generally order the acceptance of spent fuel from utilities based upon the oldest fuel receiving the highest priority. For purposes of this analysis, acceptance of commercial spent fuel by the DOE is expected to begin in 2020. The first assemblies removed from the Crystal River site are assumed to be in 2024. With an estimated rate of transfer of 3,000 metric tons of uranium (MTU)/year, completion of the removal of fuel from the site is projected to be in the year 2072. Consequently, costs are included within the estimates for the long-term caretaking of the spent fuel at the Crystal River site until the year 2072.

An ISFSI, which can be operated under a separate and independent license, is constructed to support plant operations and decommissioning. As such, the facility will be designed to accommodate the dry storage casks needed to off-load the wet storage pool so that dismantling activities can proceed. Once emptied, the Auxiliary Building can be either decontaminated and dismantled or prepared for long-term storage.

Progress Energy's position is that the DOE has a contractual obligation to accept Crystal River's fuel earlier than the projections set out above consistent with its contract commitments. No assumption made in this study should be interpreted to be inconsistent with this claim. However, at this time, including the cost of storing spent fuel in this study is the most reasonable approach because it insures the availability of sufficient decommissioning funds at the end of the station's life if, contrary to its contractual obligation, the DOE has not performed earlier.

Site Restoration

Prompt dismantling of site structures (once the facilities are decontaminated) is clearly the most appropriate and cost-effective option. It is unreasonable to anticipate that these structures would be repaired and preserved after the radiological contamination is removed. The cost to dismantle site structures with a work force already mobilized on site is more efficient than if the process is deferred. Site facilities quickly degrade without maintenance, adding additional expense and creating potential hazards to the public and the demolition work force. Consequently, this study assumes that site structures are removed to a nominal depth of three feet below the local grade level wherever possible. The site is then to be graded and stabilized.

Summary

The costs to decommission Crystal River assumes the removal of all contaminated and activated plant components and structural materials such that the owner may then have unrestricted use of the site with no further requirements for an operating license. Low-level radioactive waste, other than GTCC waste, is sent to a commercial processor for treatment/conditioning or to a controlled disposal facility.

Decommissioning is accomplished within the 60-year period required by current NRC regulations. In the interim, the spent fuel remains in storage at the site until such time that the transfer to a DOE facility is complete. Once emptied, the storage facilities are also decommissioned.

The decommissioning scenarios are described in Section 2. The assumptions are presented in Section 3, along with schedules of annual expenditures. The major cost contributors are identified in Section 6, with detailed activity costs, waste volumes, and associated manpower requirements delineated in Appendices C and D. The major cost components are also identified in the cost summary provided at the end of this section.

The cost elements in the estimates are assigned to one of three subcategories: NRC License Termination, Spent Fuel Management, and Site Restoration. The subcategory "NRC License Termination" is used to accumulate costs that are consistent with "decommissioning" as defined by the NRC in its financial assurance regulations (i.e., 10 CFR Part 50.75). In situations where the long-term management of spent fuel is not an issue, the cost reported for this subcategory is generally sufficient to terminate the unit's operating license.

The "Spent Fuel Management" subcategory contains costs associated with the containerization and transfer of spent fuel to the ISFSI and the management of the ISFSI until such time that the transfer of all fuel from this facility to an off-site location (e.g., geologic repository) is complete.

"Site Restoration" is used to capture costs associated with the dismantling and demolition of buildings and facilities demonstrated to be free from contamination. This includes structures never exposed to radioactive materials, as well as those facilities that have been decontaminated to appropriate levels. Structures are removed to a depth of three feet and backfilled to conform to local grade.

It should be noted that the costs assigned to these subcategories are allocations. Delegation of cost elements is for the purposes of comparison (e.g., with NRC financial guidelines) or to permit specific financial treatment (e.g., ARO determinations). In reality, there can be considerable interaction between the activities in the three subcategories. For example, an owner may decide to remove non-contaminated structures early in the project to improve access to highly contaminated facilities or plant components. In these instances, the non-contaminated removal costs could be reassigned from Site Restoration to an NRC License Termination support activity. However, in general, the allocations represent a reasonable accounting of those costs that can be expected to be incurred for the specific subcomponents of the total estimated program cost, if executed as described.

As noted within this document, the estimates were developed and costs are presented in 2008 dollars. As such, the estimates do not reflect the escalation of costs (due to inflationary and market forces) over the remaining operating life of the reactor or during the decommissioning period.

DECON COST SUMMARY
DECOMMISSIONING COST ELEMENTS
(thousands of 2008 dollars)

Cost Element	Cost
Decontamination	14,033
Removal	95,411
Packaging	14,624
Transportation	13,539
Waste Disposal	63,687
Off-site Waste Processing	21,589
Program Management [1]	375,813
Utility Site Indirect	14,005
Corporate Allocations	13,196
Spent Fuel Pool Isolation	10,819
Spent Fuel Management [2]	78,213
Insurance and Regulatory Fees	28,416
Energy	16,869
Characterization and Licensing Surveys	17,869
Property Taxes	33,469
Miscellaneous Equipment	6,712
Total [3]	818,264

Cost Element	
License Termination	547,328
Spent Fuel Management	222,873
Site Restoration	48,063
Total [3]	818,264

[1] Includes engineering and security costs
[2] Excludes program management costs (staffing) but includes costs for spent fuel loading/packaging/spent fuel pool O&M and EP fees
[3] Columns may not add due to rounding

SAFSTOR COST SUMMARY
DECOMMISSIONING COST ELEMENTS
(thousands of 2008 dollars)

Cost Element	Costs
Decontamination	11,821
Removal	93,391
Packaging	11,179
Transportation	10,286
Waste Disposal	41,588
Off-site Waste Processing	24,463
Program Management [1]	451,482
Utility Site Indirect	21,450
Corporate Allocations	18,776
Spent Fuel Pool Isolation	10,819
Spent Fuel Management [2]	70,015
Insurance and Regulatory Fees	52,084
Energy	28,444
Characterization and Licensing Surveys	19,384
Property Taxes	80,734
Miscellaneous Equipment	17,856
Total [3]	963,771

Cost Element	
License Termination	727,593
Spent Fuel Management	187,873
Site Restoration	48,306
Total [3]	963,771

[1] Includes engineering and security costs
[2] Excludes program management costs (staffing) but includes costs for spent fuel loading/packaging/spent fuel pool O&M and EP fees
[3] Columns may not add due to rounding

1. INTRODUCTION

This report presents estimates of the costs to decommission the Crystal River Nuclear Plant, Unit 3, (Crystal River) following a scheduled cessation of plant operations. The analysis relies upon site-specific, technical information from an earlier evaluation prepared in 2005,[1]* updated to reflect current assumptions pertaining to the disposition of the nuclear unit and relevant industry experience in undertaking such projects. The current estimates are designed to provide Progress Energy Service Company (Progress Energy), the plant's owner, with sufficient information to assess its financial obligations, as they pertain to the eventual decommissioning of the nuclear station. It is not a detailed engineering document, but a financial analysis prepared in advance of the detailed engineering that will be required to carry out the decommissioning.

1.1 OBJECTIVES OF STUDY

The objectives of this study were to prepare comprehensive estimates of the costs to decommission Crystal River, to provide a sequence or schedule for the associated activities, and to develop waste stream projections from the decontamination and dismantling activities.

The plant was issued its operating license in December 1976. The license currently expires in 2016. However, Progress Energy expects to apply for license renewal (and a 20 year extension) in 2009. So, for the purposes of this study, the final shutdown date (license expiration) is assumed to on December 3, 2036 or 60 years from the original license issue.

1.2 SITE DESCRIPTION

The Crystal River site is located in Citrus County, Florida, approximately 70 miles north of Tampa on the shore of the Gulf of Mexico. The generating site is comprised of four fossil units and one nuclear unit. The Gulf of Mexico provides the heat sink for both Units 1 and 2 fossil units, and the nuclear unit.

The nuclear steam supply system (NSSS) consists of a pressurized water reactor and a two-loop reactor coolant system, designed by Babcock & Wilcox. The generating unit has a reference core design of 2609 MWt (thermal), with a corresponding net dependable capability electrical rating of 850 megawatts (electric) with the reactor at rated power.

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* References provided in Section 7 of the document

The reactor coolant system is comprised of the reactor vessel and two heat transfer loops, each loop containing a vertical once-through type steam generator, and two single speed centrifugal reactor coolant pumps. In addition, the system includes an electrically heated pressurizer, a reactor coolant drain tank and interconnected piping. The system is housed within the reactor containment building, a seismic Category I reinforced concrete structure. The reactor containment building is a reinforced concrete structure composed of a vertical cylinder with a shallow dome and flat circular foundation slab. The cylinder wall is prestressed with a post-tensioning system in the vertical and horizontal directions. The dome roof is prestressed utilizing a three-way post-tensioning system. The foundation slab is reinforced with conventional mild steel. The inside surface of the reactor building is lined with a carbon steel liner to ensure a high degree of leak tightness during operating and accident conditions.

Heat produced in the reactor is converted to electrical energy by the steam and power conversion system. A turbine-generator system converts the thermal energy of steam produced in the steam generators into mechanical shaft power and then into electrical energy. The unit's turbine generator consists of high-pressure and low-pressure turbine sections driving a direct-coupled generator at 1800 rpm. The turbines are operated in a closed feedwater cycle, which condenses the steam; the heated feedwater is returned to the steam generators. Heat rejected in the main condensers is removed by the circulating water system. The condenser circulating water is taken from and returned to the Gulf of Mexico through the intake and discharge canals, respectively.

1.3 REGULATORY GUIDANCE

The Nuclear Regulatory Commission (NRC or Commission) provided initial decommissioning requirements in its rule "General Requirements for Decommissioning Nuclear Facilities," issued in June 1988.[2] This rule set forth financial criteria for decommissioning licensed nuclear power facilities. The regulation addressed decommissioning planning needs, timing, funding methods, and environmental review requirements. The intent of the rule was to ensure that decommissioning would be accomplished in a safe and timely manner and that adequate funds would be available for this purpose. Subsequent to the rule, the NRC issued Regulatory Guide 1.159, "Assuring the Availability of Funds for Decommissioning Nuclear Reactors,"[3] which provided additional guidance to the licensees of nuclear facilities on the financial methods acceptable to the NRC staff for complying with the requirements of the rule. The regulatory guide addressed the funding requirements and provided guidance on the content and form of the financial assurance mechanisms indicated in the rule.

The rule defined three decommissioning alternatives as being acceptable to the NRC: DECON, SAFSTOR, and ENTOMB. The DECON alternative assumes that any contaminated or activated portion of the plant's systems, structures and facilities are removed or decontaminated to levels that permit the site to be released for unrestricted use shortly after the cessation of plant operations. The rule also placed limits on the time allowed to complete the decommissioning process. For SAFSTOR, the process is restricted in overall duration to 60 years, unless it can be shown that a longer duration is necessary to protect public health and safety. The guidelines for ENTOMB are similar, providing the NRC with both sufficient leverage and flexibility to ensure that these deferred options are only used in situations where it is reasonable and consistent with the definition of decommissioning. At the conclusion of a 60-year dormancy period (or longer for ENTOMB if the NRC approves such a case), the site would still require significant remediation to meet the unrestricted release limits for license termination.

The ENTOMB alternative has not been viewed as a viable option for power reactors due to the significant time required to isolate the long-lived radionuclides for decay to permissible levels. However, with rulemaking permitting the controlled release of a site,[4] the NRC has re-evaluated this alternative. The resulting feasibility study, based upon an assessment by Pacific Northwest National Laboratory, concluded that the method did have conditional merit for some, if not most reactors. However, the staff also found that additional rulemaking would be needed before this option could be treated as a generic alternative. The NRC had considered rulemaking to alter the 60-year time for completing decommissioning and to clarify the use of engineered barriers for reactor entombments.[5] However, the NRC's staff has recommended that rulemaking be deferred, based upon several factors, e.g., no licensee has committed to pursuing the entombment option, the unresolved issues associated with the disposition of greater-than-Class C material (GTCC), and the NRC's current priorities, at least until after the additional research studies are complete. The Commission concurred with the staff's recommendation.

In 1996, the NRC published revisions to the general requirements for decommissioning nuclear power plants.[6] When the decommissioning regulations were adopted in 1988, it was assumed that the majority of licensees would decommission at the end of the facility's operating licensed life. Since that time, several licensees permanently and prematurely ceased operations. Exemptions from certain operating requirements were required once the reactor was defueled to facilitate the decommissioning. Each case was handled individually, without clearly defined generic requirements. The NRC amended the decommissioning regulations in 1996 to clarify ambiguities and

codify procedures and terminology as a means of enhancing efficiency and uniformity in the decommissioning process. The amendments allow for greater public participation and better define the transition process from operations to decommissioning.

Under the revised regulations, licensees will submit written certification to the NRC within 30 days after the decision to cease operations. Certification will also be required once the fuel is permanently removed from the reactor vessel. Submittal of these notices will entitle the licensee to a fee reduction and eliminate the obligation to follow certain requirements needed only during operation of the reactor. Within two years of submitting notice of permanent cessation of operations, the licensee is required to submit a Post-Shutdown Decommissioning Activities Report (PSDAR) to the NRC. The PSDAR describes the planned decommissioning activities, the associated sequence and schedule, and an estimate of expected costs. Prior to completing decommissioning, the licensee is required to submit an application to the NRC to terminate the license, which will include a license termination plan (LTP).

1.3.1 Nuclear Waste Policy Act

Congress passed the "Nuclear Waste Policy Act"[7] (NWPA) in 1982, assigning the federal government's long-standing responsibility for disposal of the spent nuclear fuel created by the commercial nuclear generating plants to the DOE. The NWPA provided that DOE would enter into contracts with utilities in which DOE would promise to take the utilities' spent fuel and high-level radioactive waste and utilities would pay the cost of the disposition services for that material. NWPA, along with the individual contracts with the utilities, specified that the DOE was to begin accepting spent fuel by January 31, 1998.

Since the original legislation, the DOE has announced several delays in the program schedule. By January 1998, the DOE had failed to accept any spent fuel or high level waste, as required by the NWPA and utility contracts. Delays continue and, as a result, generators have initiated legal action against the DOE in an attempt to obtain compensation for DOE's breach of contract.

Operation of DOE's yet-to-be constructed repository is contingent upon the review and approval of the facility's license application by the NRC and the successful resolution of pending litigation. The DOE submitted its license application to the NRC on June 3, 2008, seeking authorization to construct the repository at Yucca Mountain, Nevada. The NRC formally docketed the DOE's license application on September 8, 2008,

triggering a three-year deadline, with a possible one-year extension, set by Congress for the NRC to decide on whether to authorize construction.

Construction, if adequately funded, could take five to six years after the DOE receives authorization to proceed. As such, the spent fuel management plan described in this section is predicated upon the DOE initiating the pickup of commercial fuel in the year 2020.[8]

It is generally necessary that spent fuel be actively cooled and stored for a minimum period at the generating site prior to transfer. As such, the NRC requires that licensees establish a program to manage and provide funding for the management of all irradiated fuel at the reactor until title of the fuel is transferred to the Secretary of Energy, pursuant to 10 CFR Part 50.54(bb).[9] This funding requirement is fulfilled through inclusion of certain cost elements in the decommissioning estimate, for example, associated with the isolation and continued operation of the spent fuel pool and ISFSI.

At shutdown, the spent fuel pool is expected to contain freshly discharged assemblies (from the most recent refueling cycles) as well as the final reactor core. Over the following five and one-half years the assemblies are packaged into multipurpose canisters for transfer to the ISFSI. It is assumed that this period provides the necessary cooling for the final core to meet the storage system requirements for decay heat.

DOE's contracts with utilities generally order the acceptance of spent fuel from utilities based upon the oldest fuel receiving the highest priority. For purposes of this analysis, acceptance of commercial spent fuel by the DOE is expected to begin in 2020. The first assemblies removed from the Crystal River site are assumed to be in 2024. With an estimated rate of transfer of 3,000 metric tons of uranium (MTU)/year, completion of the removal of fuel from the site is projected to be in the year 2072. Consequently, costs are included within the estimates for the long-term caretaking of the spent fuel at the Crystal River site until the year 2072.

An ISFSI, which can be operated under a separate and independent license, is constructed to support plant operations and decommissioning. As such, the facility will be designed to accommodate the dry storage casks needed to off-load the wet storage pool so that dismantling activities can proceed. Once emptied, the Auxiliary Building can be either decontaminated and dismantled or prepared for long-term storage.

Progress Energy's position is that the DOE has a contractual obligation to accept Crystal River's fuel earlier than the projections set out above consistent with its contract commitments. No assumption made in this study should be interpreted to be inconsistent with this claim. However, at this time, including the cost of storing spent fuel in this study is the most reasonable approach because it insures the availability of sufficient decommissioning funds at the end of the station's life if, contrary to its contractual obligation, the DOE has not performed earlier.

1.3.2 Low-Level Radioactive Waste Acts

The contaminated and activated material generated in the decontamination and dismantling of a commercial nuclear reactor is classified as low-level (radioactive) waste, although not all of the material is suitable for "shallow-land" disposal. With the passage of the "Low-Level Radioactive Waste Policy Act" in 1980,[10] and its Amendments of 1985,[11] the states became ultimately responsible for the disposition of low-level radioactive waste generated within their own borders.

Until recently, there were two facilities available to Progress Energy for the disposal of low-level radioactive waste generated by Crystal River. As of July 1, 2008, however, the facility in Barnwell, South Carolina was closed to generators outside the Atlantic Compact (comprised of the states of Connecticut, New Jersey and South Carolina). This leaves the facility in Clive, Utah, operated by EnergySolutions, as the only available destination for low-level radioactive waste requiring controlled disposal.

For the purpose of this analysis, the EnergySolutions' facility is used as the basis for estimating the disposal cost for the majority of the radioactive waste (Class A[12]). EnergySolutions does not have a license to dispose of the more highly radioactive waste (Class B and C), for example, generated in the dismantling of the reactor vessel. As a proxy, the disposal costs for this material are based upon the last published rate schedule for non-compact waste for the Barnwell facility.

The dismantling of the components residing closest to the reactor core generates radioactive waste considered unsuitable for shallow land disposal (i.e., low-level radioactive waste with concentrations of radionuclides that exceed the limits established by the NRC for Class C radioactive waste (GTCC)). The Low-Level Radioactive Waste Policy Amendments Act of 1985 assigned the Federal Government the

responsibility for the disposal of this material. The Act also stated that the beneficiaries of the activities resulting in the generation of such radioactive waste bear all reasonable costs of disposing of such waste. However, to date, the Federal Government has not identified a cost for disposing of GTCC or a schedule for acceptance. As such, the GTCC radioactive waste has been packaged and disposed of as high-level waste, at a cost equivalent to that envisioned for the spent fuel.

For purposes of this study, GTCC is packaged in the same canisters used for spent fuel. The GTCC material is either stored with the spent fuel or shipped directly to a DOE facility as it is generated (depending upon the timing of the decommissioning and whether the spent fuel has been removed from the site prior to the start of decommissioning).

A significant portion of the waste material generated during decommissioning may only be potentially contaminated by radioactive materials. This waste can be analyzed on site or shipped off site to licensed facilities for further analysis, for processing and/or for conditioning/recovery. Reduction in the volume of low-level radioactive waste requiring disposal in a licensed low-level radioactive waste disposal facility can be accomplished through a variety of methods, including analyses and surveys or decontamination to eliminate the portion of waste that does not require disposal as radioactive waste, compaction, incineration or metal melt. The estimates for Crystal River reflect the savings from waste recovery/volume reduction.

1.3.3 Radiological Criteria for License Termination

In 1997, the NRC published Subpart E, "Radiological Criteria for License Termination,"[13] amending 10 CFR Part 20. This subpart provides radiological criteria for releasing a facility for unrestricted use. The regulation states that the site can be released for unrestricted use if radioactivity levels are such that the average member of a critical group would not receive a Total Effective Dose Equivalent (TEDE) in excess of 25 millirem per year, and provided that residual radioactivity has been reduced to levels that are As Low As Reasonably Achievable (ALARA). The decommissioning estimates assume that the Crystal River site will be remediated to a residual level consistent with the NRC-prescribed level.

It should be noted that the NRC and the Environmental Protection Agency (EPA) differ on the amount of residual radioactivity considered acceptable in site remediation. The EPA has two limits that apply to

radioactive materials. An EPA limit of 15 millirem per year is derived from criteria established by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund).[14] An additional and separate limit of 4 millirem per year, as defined in 40 CFR §141.16, is applied to drinking water.[15]

On October 9, 2002, the NRC signed an agreement with the EPA on the radiological decommissioning and decontamination of NRC-licensed sites. The Memorandum of Understanding (MOU)[16] provides that EPA will defer exercise of authority under CERCLA for the majority of facilities decommissioned under NRC authority. The MOU also includes provisions for NRC and EPA consultation for certain sites when, at the time of license termination, (1) groundwater contamination exceeds EPA-permitted levels; (2) NRC contemplates restricted release of the site; and/or (3) residual radioactive soil concentrations exceed levels defined in the MOU.

The MOU does not impose any new requirements on NRC licensees and should reduce the involvement of the EPA with NRC licensees who are decommissioning. Most sites are expected to meet the NRC criteria for unrestricted use, and the NRC believes that only a few sites will have groundwater or soil contamination in excess of the levels specified in the MOU that trigger consultation with the EPA. However, if there are other hazardous materials on the site, the EPA may be involved in the cleanup. As such, the possibility of dual regulation remains for certain licensees. The present study does not include any costs for this occurrence.

2. DECOMMISSIONING ALTERNATIVES

Detailed cost estimates were developed to decommission the Crystal River nuclear unit for the approved decommissioning alternatives: DECON and SAFSTOR. Although the alternatives differ with respect to technique, process, cost, and schedule, they attain the same result: the ultimate release of the site for unrestricted use.

The following sections describe the basic activities associated with each alternative. Although detailed procedures for each activity identified are not provided, and the actual sequence of work may vary, the activity descriptions provide a basis not only for estimating but also for the expected scope of work, i.e., engineering and planning at the time of decommissioning.

The conceptual approach that the NRC has described in its regulations divides decommissioning into three phases. The initial phase commences with the effective date of permanent cessation of operations and involves the transition of both plant and licensee from reactor operations (i.e., power production) to facility de-activation and closure. During the first phase, notification is to be provided to the NRC certifying the permanent cessation of operations and the removal of fuel from the reactor vessel. The licensee is then prohibited from reactor operation.

The second phase encompasses activities during the storage period or during major decommissioning activities, or a combination of the two. The third phase pertains to the activities involved in license termination. The decommissioning estimates developed for Crystal River are also divided into phases or periods; however, demarcation of the phases is based upon major milestones within the project or significant changes in the projected expenditures.

2.1 DECON

The DECON alternative, as defined by the NRC, is "the alternative in which the equipment, structures, and portions of a facility and site containing radioactive contaminants are removed or decontaminated to a level that permits the property to be released for unrestricted use shortly after cessation of operations." This study does not address the cost to dispose of the spent fuel residing at the site; such costs are funded through a surcharge on electrical generation. However, the study does estimate the costs incurred with the interim on-site storage of the fuel pending shipment by the DOE to an off-site disposal facility.

2.1.1 Period 1 - Preparations

In anticipation of the cessation of plant operations, detailed preparations are undertaken to provide a smooth transition from plant operations to site decommissioning. Through implementation of a staffing transition plan, the organization required to manage the intended decommissioning activities is assembled from available plant staff and outside resources. Preparations include the planning for permanent defueling of the reactor, revision of technical specifications applicable to the operating conditions and requirements, a characterization of the facility and major components, and the development of the PSDAR.

Engineering and Planning

The PSDAR, required within two years of the notice to cease operations, provides a description of the licensee's planned decommissioning activities, a timetable, and the associated financial requirements of the intended decommissioning program. Upon receipt of the PSDAR, the NRC will make the document available to the public for comment in a local hearing to be held in the vicinity of the reactor site. Ninety days following submittal and NRC receipt of the PSDAR, the licensee may begin to perform major decommissioning activities under a modified 10 CFR §50.59 procedure, i.e., without specific NRC approval. Major activities are defined as any activity that results in permanent removal of major radioactive components, permanently modifies the structure of the containment, or results in dismantling components (for shipment) containing GTCC, as defined by 10 CFR §61. Major components are further defined as comprising the reactor vessel and internals, large bore reactor coolant system piping, and other large components that are radioactive. The NRC includes the following additional criteria for use of the §50.59 process in decommissioning. The proposed activity must not:

- foreclose release of the site for possible unrestricted use,
- significantly increase decommissioning costs,
- cause any significant environmental impact, or
- violate the terms of the licensee's existing license.

Existing operational technical specifications are reviewed and modified to reflect plant conditions and the safety concerns associated with permanent cessation of operations. The environmental impact associated with the planned decommissioning activities is also considered.

Typically, a licensee will not be allowed to proceed if the consequences of a particular decommissioning activity are greater than that bounded by previously evaluated environmental assessments or impact statements. In this instance, the licensee would have to submit a license amendment for the specific activity and update the environmental report.

The decommissioning program outlined in the PSDAR will be designed to accomplish the required tasks within the ALARA guidelines (as defined in 10 CFR §20) for protection of personnel from exposure to radiation hazards. It will also address the continued protection of the health and safety of the public and the environment during the dismantling activity. Consequently, with the development of the PSDAR, activity specifications, cost-benefit and safety analyses, work packages and procedures, would be assembled to support the proposed decontamination and dismantling activities.

Site Preparations

Following final plant shutdown, and in preparation for actual decommissioning activities, the following activities are initiated:

- Characterization of the site and surrounding environs. This includes radiation surveys of work areas, major components (including the reactor vessel and its internals), internal piping, and primary shield cores.
- Isolation of the spent fuel storage pool and fuel handling systems, such that decommissioning operations can commence on the balance of the plant. The pool will remain operational for approximately 5½ years following the cessation of operations before the inventory resident at shutdown can be transferred to the ISFSI.
- Specification of transport and disposal requirements for activated materials and/or hazardous materials, including shielding and waste stabilization.
- Development of procedures for occupational exposure control, control and release of liquid and gaseous effluent, processing of radwaste (including dry-active waste, resins, filter media, metallic and non-metallic components generated in decommissioning), site security and emergency programs, and industrial safety.

2.1.2 Period 2 - Decommissioning Operations

This period includes the physical decommissioning activities associated with the removal and disposal of contaminated and activated components and structures, including the successful termination of the 10 CFR §50 operating license. Significant decommissioning activities in this phase include:

- Construction of temporary facilities and/or modification of existing facilities to support dismantling activities. This may include a centralized processing area to facilitate equipment removal and component preparations for off-site disposal.
- Reconfiguration and modification of site structures and facilities as needed to support decommissioning operations. This may include the upgrading of roads (on- and off-site) to facilitate hauling and transport. Modifications may be required to the containment structure to facilitate access of large/heavy equipment. Modifications may also be required to the refueling area of the building to support the segmentation of the reactor vessel internals and component extraction.
- Design and fabrication of temporary and permanent shielding to support removal and transportation activities, construction of contamination control envelopes, and the procurement of specialty tooling.
- Procurement (lease or purchase) of shipping canisters, cask liners, and industrial packages for the disposition of low-level radioactive waste.
- Decontamination of components and piping systems as required to control (minimize) worker exposure.
- Removal of piping and components no longer essential to support decommissioning operations.
- Removal of control rod drive housings and the head service structure from the reactor vessel head. Segmentation of the vessel closure head.
- Removal and segmentation of the upper internals assemblies. Segmentation will maximize the loading of the shielded transport casks, i.e., by weight and activity. The operations are conducted under water using remotely operated tooling and contamination controls.

- Disassembly and segmentation of the remaining reactor internals, including the core shroud and lower core support assembly. Some material is expected to exceed Class C disposal requirements. As such, the segments will be packaged in modified fuel storage canisters for geologic disposal.
- Segmentation of the reactor vessel. A shielded platform is installed for segmentation as cutting operations are performed in-air using remotely operated equipment within a contamination control envelope. The water level is maintained just below the cut to minimize the working area dose rates. Segments are transferred in-air to containers that are stored under water, for example, in an isolated area of the refueling canal.
- Removal of the activated portions of the concrete biological shield and accessible contaminated concrete surfaces. If dictated by the steam generator and pressurizer removal scenarios, those portions of the associated cubicles necessary for access and component extraction are removed.
- Removal of the steam generators and pressurizer for material recovery and controlled disposal. The generators will be moved to an on-site processing center and prepared for transport to the disposal site. To facilitate transport, the generators are cut in half, across the tube bundle. The exposed ends are capped and sealed. The segments can serve as their own burial containers provided that all penetrations are properly sealed and the internal contaminants are stabilized, e.g., with grout. Steel shielding will be added, as necessary, to those external areas of the package to meet transportation limits and regulations. The pressurizer is disposed of intact.

At least two years prior to the anticipated date of license termination, an LTP is required. Submitted as a supplement to the Final Safety Analysis Report (FSAR) or its equivalent, the plan must include: a site characterization, description of the remaining dismantling activities, plans for site remediation, procedures for the final radiation survey, designation of the end use of the site, an updated cost estimate to complete the decommissioning, and any associated environmental concerns. The NRC will notice the receipt of the plan, make the plan available for public comment, and schedule a local hearing. LTP approval will be subject to any conditions and limitations as deemed appropriate by the Commission. The licensee may then commence with the final remediation of site facilities and services, including:

- Removal of remaining plant systems and associated components as they become nonessential to the decommissioning program or worker health and safety (e.g., waste collection and treatment systems, electrical power and ventilation systems).
- Removal of the steel liners from refueling canal, disposing of the activated and contaminated sections as radioactive waste. Removal of any activated/ contaminated concrete.
- Surveys of the decontaminated areas of the containment structure.
- Remediation and removal of the contaminated equipment and material from the auxiliary building and any other contaminated facility. Radiation and contamination controls will be utilized until residual levels indicate that the structures and equipment can be released for unrestricted access and conventional demolition. This activity may necessitate the dismantling and disposition of most of the systems and components (both clean and contaminated) located within these buildings. This activity facilitates surface decontamination and subsequent verification surveys required prior to obtaining release for demolition.
- Routing of material removed in the decontamination and dismantling to a central processing area. Material certified to be free of contamination is released for unrestricted disposition, e.g., as scrap, recycle, or general disposal. Contaminated material is characterized and segregated for additional off-site processing (disassembly, chemical cleaning, volume reduction, and waste treatment), and/or packaged for controlled disposal at a low-level radioactive waste disposal facility.

Incorporated into the LTP is the Final Survey Plan. This plan identifies the radiological surveys to be performed once the decontamination activities are completed and is developed using the guidance provided in the "Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM)."[17] This document incorporates the statistical approaches to survey design and data interpretation used by the EPA. It also identifies state-of-the-art, commercially available instrumentation and procedures for conducting radiological surveys. Use of this guidance ensures that the surveys are conducted in a manner that provides a high degree of confidence that applicable NRC criteria are satisfied. Once the survey is complete, the results are provided to the NRC in a format that can be verified. The NRC then reviews and evaluates the information, performs an independent confirmation of radiological site conditions, and makes a determination on final termination of the license.

The NRC will terminate the operating license if it determines that site remediation has been performed in accordance with the LTP, and that the terminal radiation survey and associated documentation demonstrate that the facility is suitable for release.

2.1.3 Period 3 - Site Restoration

Following completion of decommissioning operations, site restoration activities will begin. Efficient removal of the contaminated materials and verification that residual radionuclide concentrations are below the NRC limits will result in substantial damage to many of the structures. Although performed in a controlled, safe manner, blasting, coring, drilling, scarification (surface removal), and the other decontamination activities will substantially degrade power block structures including the reactor, fuel handling, radioactive waste, solidification facility and condensate polishing buildings. Under certain circumstances, verifying that subsurface radionuclide concentrations meet NRC site release requirements will require removal of grade slabs and lower floors, potentially weakening footings and structural supports. This removal activity will be necessary for those facilities and plant areas where historical records, when available, indicate the potential for radionuclides having been present in the soil, where system failures have been recorded, or where it is required to confirm that subsurface process and drain lines were not breached over the operating life of the station.

Prompt dismantling of site structures is clearly the most appropriate and cost-effective option. It is unreasonable to anticipate that these structures would be repaired and preserved after the radiological contamination is removed. The cost to dismantle site structures with a work force already mobilized on site is more efficient than if the process were deferred. Site facilities quickly degrade without maintenance, adding additional expense and creating potential hazards to the public as well as to future workers. Abandonment creates a breeding ground for vermin infestation as well as other biological hazards.

This cost study presumes that non-essential structures and site facilities are dismantled as a continuation of the decommissioning activity. Foundations and exterior walls are removed to a nominal depth of three feet below grade. The three-foot depth allows for the placement of gravel for drainage, as well as topsoil, so that vegetation can be established for erosion control. Site areas affected by the dismantling activities are

restored and the plant area graded as required to prevent ponding and inhibit the refloating of subsurface materials.

Non-contaminated concrete rubble produced by demolition activities is processed to remove reinforcing steel and miscellaneous embedments. The processed material is then used on site to backfill foundation voids. Excess non-contaminated materials are trucked to an off-site area for disposal as construction debris.

2.1.4 ISFSI Operations and Decommissioning

The ISFSI will continue to operate under a separate and independent license (10 CFR §72) following the termination of the §50 operating license. Assuming the DOE starts accepting fuel in 2020, transfer of spent fuel from the ISFSI is anticipated to begin in 2024, and continue through the year 2072.

At the conclusion of the spent fuel transfer process, the ISFSI will be decommissioned. The Commission will terminate the §72 license if it determines that the remediation of the ISFSI has been performed in accordance with an ISFSI license termination plan and that the final radiation survey and associated documentation demonstrate that the facility is suitable for release. Once the requirements are satisfied, the NRC can terminate the license for the ISFSI.

The assumed design for the ISFSI is based upon the use of a multi-purpose canister and a horizontal concrete module for pad storage. For purposes of this cost analysis, it is assumed that once the inner canisters containing the spent fuel assemblies have been removed, any required decontamination performed on the storage modules (some minor activation is assumed), and the license for the facility terminated, the modules can be dismantled using conventional techniques for the demolition of reinforced concrete. The concrete storage pad is then removed and the area regraded.

2.2 SAFSTOR

The NRC defines SAFSTOR as "the alternative in which the nuclear facility is placed and maintained in a condition that allows the nuclear facility to be safely stored and subsequently decontaminated (deferred decontamination) to levels that permit release for unrestricted use." The facility is left intact (during the dormancy period), with structures maintained in a sound condition. Systems that are not required to support the spent fuel pool or site

surveillance and security are drained, de-energized, and secured. Minimal cleaning/removal of loose contamination and/or fixation and sealing of remaining contamination is performed. Access to contaminated areas is secured to provide controlled access for inspection and maintenance.

The engineering and planning requirements are similar to those for the DECON alternative, although a shorter time period is expected for these activities due to the more limited work scope. Site preparations are also similar to those for the DECON alternative. However, with the exception of the required radiation surveys and site characterizations, the mobilization and preparation of site facilities is less extensive.

2.2.1 Period 1 - Preparations

Preparations for long-term storage include the planning for permanent defueling of the reactor, revision of technical specifications appropriate to the operating conditions and requirements, a characterization of the facility and major components, and the development of the PSDAR.

The process of placing the plant in safe-storage includes, but is not limited to, the following activities:

- Isolation of the spent fuel storage services and fuel handling systems so that safe-storage operations may commence on the balance of the plant. This activity may be carried out by plant personnel in accordance with existing operating technical specifications. Activities are scheduled around the fuel handling systems to the greatest extent possible.
- Transfer of the spent fuel from the storage pool to the ISFSI pad for interim storage, following the minimum required cooling period in the spent fuel pool.
- Draining and de-energizing of the non-contaminated systems not required to support continued site operations or maintenance.
- Disposing of contaminated filter elements and resin beds not required for processing wastes from layup activities for future operations.
- Draining of the reactor vessel, with the internals left in place and the vessel head secured.
- Draining and de-energizing non-essential, contaminated systems with decontamination as required for future maintenance and inspection.

- Preparing lighting and alarm systems whose continued use is required; de-energizing portions of fire protection, electric power, and HVAC systems whose continued use is not required.
- Cleaning of the loose surface contamination from building access pathways.
- Performing an interim radiation survey of plant, posting warning signs where appropriate.
- Erecting physical barriers and/or securing all access to radioactive or contaminated areas, except as required for inspection and maintenance.
- Installing security and surveillance monitoring equipment and relocating security fence around secured structures, as required.

2.2.2 Period 2 - Dormancy

The second phase identified by the NRC in its rule addresses licensed activities during a storage period and is applicable to the dormancy phases of the deferred decommissioning alternatives. Dormancy activities include a 24-hour security force, preventive and corrective maintenance on security systems, area lighting, general building maintenance, heating and ventilation of buildings, routine radiological inspections of contaminated structures, maintenance of structural integrity, and a site environmental and radiation monitoring program. Resident maintenance personnel perform equipment maintenance, inspection activities, routine services to maintain safe conditions, adequate lighting, heating, and ventilation, and periodic preventive maintenance on essential site services.

An environmental surveillance program is carried out during the dormancy period to ensure that releases of radioactive material to the environment are prevented and/or detected and controlled. Appropriate emergency procedures are established and initiated for potential releases that exceed prescribed limits. The environmental surveillance program constitutes an abbreviated version of the program in effect during normal plant operations.

Security during the dormancy period is conducted primarily to prevent unauthorized entry and to protect the public from the consequences of its own actions. The security fence, sensors, alarms, and other surveillance equipment provide security. Fire and radiation alarms are also monitored and maintained.

Consistent with the DECON scenario, the spent fuel storage pool is emptied within 5½ years of the cessation of operations. The transfer of the spent fuel from the ISFSI to a DOE facility begins in 2024 and continues throughout the dormancy period until completed in 2072. Once emptied, the ISFSI is secured for storage and decommissioned along with the power block structures in Period 4.

After an optional period of storage (such that license termination is accomplished within 60 years of final shutdown), it is required that the licensee submit an application to terminate the license, along with an LTP (described in Section 2.1.2), thereby initiating the third phase.

2.2.3 Periods 3 and 4 - Delayed Decommissioning

Prior to the commencement of decommissioning operations, preparations are undertaken to reactivate site services and prepare for decommissioning. Preparations include engineering and planning, a detailed site characterization, and the assembly of a decommissioning management organization. Final planning for activities and the writing of activity specifications and detailed procedures are also initiated at this time.

Much of the work in developing a termination plan is relevant to the development of the detailed engineering plans and procedures. The activities associated with this phase and the follow-on decontamination and dismantling processes are detailed in Sections 2.1.1 and 2.1.2. The primary difference between the sequences anticipated for the DECON and this deferred scenario is the absence, in the latter, of any constraint on the availability of the fuel storage facilities for decommissioning.

Variations in the length of the dormancy period are expected to have little effect upon the quantities of radioactive wastes generated from system and structure removal operations. Given the levels of radioactivity and spectrum of radionuclides expected from fifty to sixty years of plant operation, no plant process system identified as being contaminated upon final shutdown will become releasable due to the decay period alone, i.e., there is no significant reduction in the waste generated from the decommissioning activities. However, due to the lower activity levels, a greater percentage of the waste volume can be designated for off-site processing and recovery.

The delay in decommissioning also yields lower working area radiation levels. As such, the estimate for this delayed scenario incorporates

reduced ALARA controls for the SAFSTOR's lower occupational exposure potential.

Although the initial radiation levels due to ^{60}Co will decrease during the dormancy period, the internal components of the reactor vessel will still exhibit sufficiently high radiation dose rates to require remote sectioning under water due to the presence of long-lived radionuclides such as ^{94}Nb, ^{59}Ni, and ^{63}Ni. Therefore, the dismantling procedures described for the DECON alternative would still be employed during this scenario. Portions of the biological shield will still be radioactive due to the presence of activated trace elements with long half-lives (^{152}Eu and ^{154}Eu). Decontamination will require controlled removal and disposal. It is assumed that radioactive corrosion products on inner surfaces of piping and components will not have decayed to levels that will permit unrestricted use or allow conventional removal. These systems and components will be surveyed as they are removed and disposed of in accordance with the existing radioactive release criteria.

2.2.4 Period 5 - Site Restoration

Following completion of decommissioning operations, site-restoration activities can begin. Dismantling, as a continuation of the decommissioning process, is clearly the most appropriate and cost-effective option, as described in Section 2.1.3. The basis for the dismantling cost in this scenario is consistent with that described for DECON, presuming the removal of structures and site facilities to a nominal depth of three feet below grade and the limited restoration of the site.

3. COST ESTIMATE

The cost estimates prepared for decommissioning Crystal River consider the unique features of the site, including the NSSS, power generation systems, support services, site buildings, and ancillary facilities. The basis of the estimates, including the sources of information relied upon, the estimating methodology employed, site-specific considerations, and other pertinent assumptions, is described in this section.

3.1 BASIS OF ESTIMATE

The estimates were developed using the site-specific, technical information from the 2005 analysis. This information was reviewed for the current analysis and updated as deemed appropriate. The site-specific considerations and assumptions used in the previous evaluation were also revisited. Modifications were incorporated where new information was available or experience from ongoing decommissioning programs provided viable alternatives or improved processes.

3.2 METHODOLOGY

The methodology used to develop the estimates follows the basic approach originally presented in the AIF/NESP-036 study report, "Guidelines for Producing Commercial Nuclear Power Plant Decommissioning Cost Estimates,"[18] and the DOE "Decommissioning Handbook."[19] These documents present a unit factor method for estimating decommissioning activity costs, which simplifies the estimating calculations. Unit factors for concrete removal ($/cubic yard), steel removal ($/ton), and cutting costs ($/inch) are developed using local labor rates. The activity-dependent costs are estimated with the item quantities (cubic yards and tons), developed from plant drawings and inventory documents. Removal rates and material costs for the conventional disposition of components and structures rely upon information available in the industry publication, "Building Construction Cost Data," published by R.S. Means.[20]

The unit factor method provides a demonstrable basis for establishing reliable cost estimates. The detail provided in the unit factors, including activity duration, labor costs (by craft), and equipment and consumable costs, ensures that essential elements have not been omitted. Appendix A presents the detailed development of a typical unit factor. Appendix B provides the values contained within one set of factors developed for this analysis.

This analysis reflects lessons learned from TLG's involvement in the Shippingport Station Decommissioning Project, completed in 1989, as well as the decommissioning of the Cintichem reactor, hot cells, and associated facilities, completed in 1997. In addition, the planning and engineering for the Pathfinder, Shoreham, Rancho Seco, Trojan, Yankee Rowe, Big Rock Point, Maine Yankee, Humboldt Bay-3, Oyster Creek, Connecticut Yankee, and San Onofre-1 nuclear units have provided additional insight into the process, the regulatory aspects, and the technical challenges of decommissioning commercial nuclear units.

Work Difficulty Factors

TLG has historically applied work difficulty adjustment factors (WDFs) to account for the inefficiencies in working in a power plant environment. WDFs are assigned to each unique set of unit factors, commensurate with the inefficiencies associated with working in confined, hazardous environments. The ranges used for the WDFs are as follows:

- Access Factor 10% to 20%
- Respiratory Protection Factor 10% to 50%
- Radiation/ALARA Factor 10% to 37%
- Protective Clothing Factor 10% to 30%
- Work Break Factor 8.33%

The factors and their associated range of values were developed in conjunction with the AIF/NESP-036 study. The application of the factors is discussed in more detail in that publication.

Scheduling Program Durations

The unit factors, adjusted by the WDFs as described above, are applied against the inventory of materials to be removed in the radiologically controlled areas. The resulting man-hours, or crew-hours, are used in the development of the decommissioning program schedule, using resource loading and event sequencing considerations. The scheduling of conventional removal and dismantling activities is based upon productivity information available from the "Building Construction Cost Data" publication.

An activity duration critical path is used to determine the total decommissioning program schedule. The schedule is relied upon in calculating the carrying costs, which include program management, administration, field

engineering, equipment rental, and support services such as quality control and security. This systematic approach for assembling decommissioning estimates ensures a high degree of confidence in the reliability of the resulting costs.

3.3 FINANCIAL COMPONENTS OF THE COST MODEL

TLG's proprietary decommissioning cost model, DECCER, produces a number of distinct cost elements. These direct expenditures, however, do not comprise the total cost to accomplish the project goal, i.e., license termination and site restoration.

Inherent in any cost estimate that does not rely on historical data is the inability to specify the precise source of costs imposed by factors such as tool breakage, accidents, illnesses, weather delays, and labor stoppages. In the DECCER cost model, contingency fulfills this role. Contingency is added to each line item to account for costs that are difficult or impossible to develop analytically. Such costs are historically inevitable over the duration of a job of this magnitude; therefore, this cost analysis includes funds to cover these types of expenses.

3.3.1 Contingency

The activity- and period-dependent costs are combined to develop the total decommissioning cost. A contingency is then applied on a line-item basis, using one or more of the contingency types listed in the AIF/NESP-036 study. "Contingencies" are defined in the American Association of Cost Engineers "Project and Cost Engineers' Handbook"[21] as "specific provision for unforeseeable elements of cost within the defined project scope; particularly important where previous experience relating estimates and actual costs has shown that unforeseeable events which will increase costs are likely to occur." The cost elements in this analysis are based upon ideal conditions and maximum efficiency; therefore, consistent with industry practice, contingency is included. In the AIF/NESP-036 study, the types of unforeseeable events that are likely to occur in decommissioning are discussed and guidelines are provided for percentage contingency in each category. It should be noted that contingency, as used in this analysis, does not account for price escalation and inflation in the cost of decommissioning over the remaining operating life of the station.

Contingency funds are an integral part of the total cost to complete the decommissioning process. Exclusion of this component puts at risk a

successful completion of the intended tasks and, potentially, subsequent related activities. For this study, TLG examined the major activity-related problems (decontamination, segmentation, equipment handling, packaging, transport, and waste disposal) that necessitate a contingency. Individual activity contingencies ranged from 10% to 75%, depending on the degree of difficulty judged to be appropriate from TLG's actual decommissioning experience. The contingency values used in this study are as follows:

• Decontamination	50%
• Contaminated Component Removal	25%
• Contaminated Component Packaging	10%
• Contaminated Component Transport	15%
• Low-Level Radioactive Waste Disposal	25%
• Reactor Segmentation	75%
• NSSS Component Removal	25%
• Reactor Waste Packaging	25%
• Reactor Waste Transport	25%
• Reactor Vessel Component Disposal	50%
• GTCC Disposal	15%
• Non-Radioactive Component Removal	15%
• Heavy Equipment and Tooling	15%
• Supplies	25%
• Engineering	15%
• Energy	15%
• Characterization and Termination Surveys	30%
• Construction	15%
• Taxes and Fees	10%
• Insurance	10%
• Staffing	15%

The contingency values are applied to the appropriate components of the estimates on a line item basis. A composite value is then reported at the end of each detailed estimate (as provided in Appendix C and D). For example, the composite contingency value reported for the DECON alternative in Appendix C is approximately 17.2%.

3.3.2 Financial Risk

In addition to the routine uncertainties addressed by contingency, another cost element that is sometimes necessary to consider when bounding decommissioning costs relates to uncertainty, or risk. Examples can include changes in work scope, pricing, job performance, and other variations that could conceivably, but not necessarily, occur. Consideration is sometimes necessary to generate a level of confidence in the estimate, within a range of probabilities. TLG considers these types of costs under the broad term "financial risk." Included within the category of financial risk are:

- Transition activities and costs: ancillary expenses associated with eliminating 50% to 80% of the site labor force shortly after the cessation of plant operations, added cost for worker separation packages throughout the decommissioning program, national or company-mandated retraining, and retention incentives for key personnel.
- Delays in approval of the decommissioning plan due to intervention, public participation in local community meetings, legal challenges, and national and local hearings.
- Changes in the project work scope from the baseline estimate, involving the discovery of unexpected levels of contaminants, contamination in places not previously expected, contaminated soil previously undiscovered (either radioactive or hazardous material contamination), variations in plant inventory or configuration not indicated by the as-built drawings.
- Regulatory changes, for example, affecting worker health and safety, site release criteria, waste transportation, and disposal.
- Policy decisions altering national commitments (e.g., in the ability to accommodate certain waste forms for disposition), or in the timetable for such, for example, the start and rate of acceptance of spent fuel by the DOE.
- Pricing changes for basic inputs such as labor, energy, materials, and disposal. Items subject to widespread price competition (such as materials) may not show significant variation; however, others such as waste disposal could exhibit large pricing uncertainties, particularly in markets where limited access to services is available.

It has been TLG's experience that the results of a risk analysis, when compared with the base case estimate for decommissioning, indicate

that the chances of the base decommissioning estimate's being too high is a low probability, and the chances that the estimate is too low is a higher probability. This is mostly due to the pricing uncertainty for low-level radioactive waste burial, and to a lesser extent due to schedule increases from changes in plant conditions and to pricing variations in the cost of labor (both craft and staff). This cost study, however, does not add any additional costs to the estimate for financial risk, since there is insufficient historical data from which to project future liabilities. Consequently, the areas of uncertainty or risk are revisited periodically and addressed through repeated revisions or updates of the base estimates.

3.4 SITE-SPECIFIC CONSIDERATIONS

There are a number of site-specific considerations that affect the method for dismantling and removal of equipment from the site and the degree of restoration required. The cost impact of the considerations identified below is included in this cost study.

3.4.1 Spent Fuel Management

The cost to dispose the spent fuel generated from plant operations is not reflected within the estimates to decommission Crystal River. Ultimate disposition of the spent fuel is within the province of the DOE's Waste Management System, as defined by the Nuclear Waste Policy Act. As such, the disposal cost is financed by a 1 mill/kWhr surcharge paid into the DOE's waste fund during operations. However, the NRC requires licensees to establish a program to manage and provide funding for the management of all irradiated fuel at the reactor until title of the fuel is transferred to the Secretary of Energy. This funding requirement is fulfilled through inclusion of certain high-level waste cost elements within the estimates, as described below.

Completion of the decommissioning process is highly dependent upon the DOE's ability to remove spent fuel from the site. The timing for removal of spent fuel from the site is based upon the DOE's most recently published annual acceptance rates of 400 MTU/year for year 1, 3,800 MTU total for years 2 through 4 and 3,000 MTU/year for year 5 and beyond.[22] The DOE contracts provide mechanisms for altering the oldest fuel first allocation scheme, including emergency deliveries, exchanges of allocations amongst utilities and the option of providing priority acceptance from permanently shutdown nuclear reactors. Because it is unclear how these mechanisms may operate once DOE

begins accepting spent fuel from commercial reactors, this study assumes that DOE will accept spent fuel in an oldest fuel first order.

ISFSI

The ISFSI, constructed to support plant operations, will continue to operate throughout decommissioning, and beyond the termination of the operating license in the DECON decommissioning scenario, until such time that the transfer of spent fuel to the DOE can be completed. Assuming that DOE commences repository operation in 2020, Crystal River fuel is projected to be removed from the site beginning in 2024. The process is expected to be completed by the year 2072, based upon the current shutdown date. The scenario is similar for the SAFSTOR alternative; however, based upon the expected completion date for fuel transfer, the ISFSI will be emptied prior to the commencement of decommissioning operations.

Operation and maintenance costs for the ISFSI are included within the estimate and address the cost for staffing the facility, as well as security, insurance, and licensing fees. The estimates include the costs to purchase, load, and transfer the fuel storage canisters. Costs are also provided for the final disposition of the facility once the transfer is complete.

Storage Canister Design

The design and capacity of the ISFSI is based upon the NUHOMS system, with a 32 fuel assembly capacity. A unit cost of $1,000,000 is used for pricing the internal multi-purpose canister (MPC) and the horizontal concrete storage module.

Canister Loading and Transfer

An average cost of $100,000 is used for the labor and equipment to seal each spent fuel canister once it is loaded. An additional cost of $200,000 is used for the labor to load/transport the spent fuel from the pool to the ISFSI pad. For estimating purposes, 50% of this cost is used to estimate the cost to transfer the fuel from the ISFSI into a DOE transport cask.

Operations and Maintenance

An annual cost (excluding labor) of approximately $745,000 and $85,000 are used for operation and maintenance of the spent fuel pool and the

ISFSI, respectively. Pool operations are expected to continue approximately 5½ years after the cessation of operations. ISFSI operating costs are based upon a 36 year period of operations following plant shutdown.

ISFSI Design Considerations

A multi-purpose (storage and transport) dry shielded storage canister with a horizontal, reinforced concrete storage module is used as a basis for the cost analysis. The final core off load, equivalent to 8 modules, are assumed to have some level of neutron-induced activation as a result of the long-term storage of the fuel (i.e., to levels exceeding free-release limits). The steel support structure is assumed to be removed from these modules for controlled disposal. The cost of the disposition of this material, as well as the demolition of the ISFSI facility, is included in the estimate.

GTCC

The dismantling of the reactor internals generates radioactive waste considered unsuitable for shallow land disposal (i.e., low-level radioactive waste with concentrations of radionuclides that exceed the limits established by the NRC for Class C radioactive waste (GTCC)). The Low-Level Radioactive Waste Policy Amendments Act of 1985 assigned the Federal Government the responsibility for the disposal of this material. The Act also stated that the beneficiaries of the activities resulting in the generation of such radioactive waste bear all reasonable costs of disposing of such waste. Although there are strong arguments that GTCC waste is covered by the spent fuel contact with DOE and the fees being paid pursuant to that contract, DOE has taken the position that GTCC waste is not covered by that contract or its fees and that utilities, including Progress Energy, will have to pay an additional fee for the disposal of their GTCC waste. However, to date, the Federal Government has not identified a cost for disposing of GTCC or a schedule for acceptance. As such, the GTCC radioactive waste has been packaged and disposed of as high-level waste, at a cost equivalent to that envisioned for the spent fuel.

For purposes of this study, GTCC is packaged in the same canisters used to store spent fuel. Disposal costs are based upon a cost equivalent to that envisioned for the spent fuel. It is not anticipated that the DOE would accept this waste prior to completing the transfer of spent fuel. Therefore, until such time the DOE is ready to accept GTCC waste, it is

reasonable to assume that this material would remain in storage with the spent fuel in the ISFSI at the Crystal River site (for the DECON alternative). In the SAFSTOR scenario, the GTCC material is shipped directly to a DOE facility as it is generated since the fuel has been removed from the site prior to the start of decommissioning and the ISFSI deactivated.

3.4.2 Reactor Vessel and Internal Components

The reactor pressure vessel and internal components are segmented for disposal in shielded, reusable transportation casks. Segmentation is performed in the refueling canal, where a turntable and remote cutter are installed. The vessel is segmented in place, using a mast-mounted cutter supported off the lower head and directed from a shielded work platform installed overhead in the reactor cavity. Transportation cask specifications and transportation regulations dictate the segmentation and packaging methodology.

Intact disposal of reactor vessel shells has been successfully demonstrated at several of the sites currently being decommissioned. Access to navigable waterways has allowed these large packages to be transported to the Barnwell disposal site with minimal overland travel. Intact disposal of the reactor vessel and internal components can provide savings in cost and worker exposure by eliminating the complex segmentation requirements, isolation of the GTCC material, and transport/storage of the resulting waste packages. Portland General Electric (PGE) was able to dispose of the Trojan reactor as an intact package (including the internals). However, its location on the Columbia River simplified the transportation analysis since:

- the reactor package could be secured to the transport vehicle for the entire journey, i.e., the package was not lifted during transport,
- there were no man-made or natural terrain features between the plant site and the disposal location that could produce a large drop, and
- transport speeds were very low, limited by the overland transport vehicle and the river barge.

As a member of the Northwest Compact, PGE had a site available for disposal of the package - the US Ecology facility in Washington State.

The characteristics of this arid site proved favorable in demonstrating compliance with land disposal regulations.

It is not known whether this option will be available when the Crystal River unit ceases operation. Future viability of this option will depend upon the ultimate location of the disposal site, as well as the disposal site licensee's ability to accept highly radioactive packages and effectively isolate them from the environment. Consequently, the study assumes the reactor vessel will require segmentation, as a bounding condition. With lower levels of activation, the vessel shell can be packaged more efficiently than the curie-limited internal components. This will allow the use of more conventional waste packages rather than shielded casks for transport.

3.4.3 Primary System Components

In the DECON scenario, the reactor coolant system components are assumed to be decontaminated using chemical agents prior to the start of cutting operations. This type of decontamination can be expected to have a significant ALARA impact, since in this scenario the removal work is done within the first few years of shutdown. A decontamination factor (average reduction) of 10 is assumed for the process. Disposal of the decontamination solution effluent is included within the estimate as a "process liquid waste" charge. In the SAFSTOR scenario, radionuclide decay is expected to provide the same benefit and, therefore, a chemical decontamination is not included.

The following discussion deals with the removal and disposition of the steam generators, but the techniques involved are also applicable to other large components, such as heat exchangers, component coolers, and the pressurizer. The steam generators' size and weight, as well as their location within the reactor building, will ultimately determine the removal strategy.

A trolley crane is set up for the removal of the generators. It can also be used to move portions of the steam generator cubicle walls and floor slabs from the reactor building to a location where they can be decontaminated and transported to the material handling area. Interferences within the work area, such as grating, piping, and other components are removed to create sufficient laydown space for processing these large components.

The generators are rigged for removal, disconnected from the surrounding piping and supports, and maneuvered into the open area where they are lowered onto a dolly. Each generator is rotated into the horizontal position for extraction from the containment and placed onto a multi-wheeled vehicle for transport to an on-site processing and storage area.

The generators are segmented on-site to facilitate transportation. Each unit is cut in half, across the tube sheet. The exposed ends are capped and sealed. The interior volume is filled with low-density cellular concrete for stabilization of the internal contamination. Each component is then loaded onto a rail car for transport to the disposal facility.

Reactor coolant piping is cut from the reactor vessel once the water level in the vessel (used for personnel shielding during dismantling and cutting operations in and around the vessel) is dropped below the nozzle zone. The piping is boxed and transported by shielded van. The reactor coolant pumps and motors are lifted out intact, packaged, and transported for processing and/or disposal.

3.4.4 Retired Component

The estimate includes the cost to dispose of the retired reactor closure head expected to be in storage at the site upon the cessation of plant operations. The component is segmented, with the segments placed in sea-land containers or custom containers for disposal.

3.4.5 Main Turbine and Condenser

The main turbine is dismantled using conventional maintenance procedures. The turbine rotors and shafts are removed to a laydown area. The lower turbine casings are removed from their anchors by controlled demolition. The main condensers are also disassembled and moved to a laydown area. Material is then prepared for transportation to an off-site recycling facility where it is surveyed and designated for either decontamination or volume reduction, conventional disposal, or controlled disposal. Components are packaged and readied for transport in accordance with the intended disposition.

3.4.6 Transportation Methods

Contaminated piping, components, and structural material other than the highly activated reactor vessel and internal components will qualify

as LSA-I, II or III or Surface Contaminated Object, SCO-I or II, as described in Title 49.[23] The contaminated material will be packaged in Industrial Packages (IP-1, IP-2, or IP-3, as defined in subpart 173.411) for transport unless demonstrated to qualify as their own shipping containers. The reactor vessel and internal components are expected to be transported in accordance with Part 71, as Type B. It is conceivable that the reactor, due to its limited specific activity, could qualify as LSA II or III. However, the high radiation levels on the outer surface would require that additional shielding be incorporated within the packaging so as to attenuate the dose to levels acceptable for transport.

Any fuel cladding failure that occurred during the lifetime of the plant is assumed to have released fission products at sufficiently low levels that the buildup of quantities of long-lived isotopes (e.g., ^{137}Cs, ^{90}Sr, or transuranics) has been prevented from reaching levels exceeding those that permit the major reactor components to be shipped under current transportation regulations and disposal requirements.

Transport of the highly activated metal, produced in the segmentation of the reactor vessel and internal components, will be by shielded truck cask. Cask shipments may exceed 95,000 pounds, including vessel segment(s), supplementary shielding, cask tie-downs, and tractor-trailer. The maximum level of activity per shipment assumed permissible was based upon the license limits of the available shielded transport casks. The segmentation scheme for the vessel and internal segments is designed to meet these limits.

The transport of large intact components (e.g., large heat exchangers and other oversized components) will be by a combination of truck, rail, and/or multi-wheeled transporter.

Transportation costs for material requiring controlled disposal are based upon the mileage to the EnergySolutions facility in Clive, Utah. Transportation costs for off-site waste processing are based upon the mileage to Memphis, Tennessee. Truck transport costs are estimated using published tariffs from Tri-State Motor Transit.[24]

3.4.7 Low-Level Radioactive Waste Disposal

To the greatest extent practical, metallic material generated in the decontamination and dismantling processes is processed to reduce the total cost of controlled disposal. Material meeting the regulatory and/or site release criterion, is released as scrap, requiring no further cost

consideration. Conditioning (preparing the material to meet the waste acceptance criteria of the disposal site) and recovery of the waste stream is performed off site at a licensed processing center. Any material leaving the site is subject to a survey and release charge, at a minimum. Based on TLG's experience, rates were assumed for off-site processing as well as survey and release.

The mass of radioactive waste generated during the various decommissioning activities at the site is shown on a line-item basis in the detailed Appendices C and D, and summarized in Section 5. The quantified waste summaries shown in these tables are consistent with 10 CFR Part 61 classifications. Commercially available steel containers are presumed to be used for the disposal of piping, small components, and concrete. Larger components can serve as their own containers, with proper closure of all openings, access ways, and penetrations. The volumes are calculated based on the exterior package dimensions for containerized material or a specific calculation for components serving as their own waste containers.

The more highly activated reactor components will be shipped in reusable, shielded truck casks with disposable liners. In calculating disposal costs, the burial fees are applied against the liner volume, as well as the special handling requirements of the payload. Packaging efficiencies are lower for the highly activated materials (greater than Type A quantity waste), where high concentrations of gamma-emitting radionuclides limit the capacity of the shipping canisters.

Disposal fees are based upon estimated charges, with surcharges added for the highly activated components, for example, generated in the segmentation of the reactor vessel. The cost to dispose of the majority of the material generated from the decontamination and dismantling activities is based upon the current cost for disposal at EnergySolutions facility in Clive, Utah. Disposal costs for the higher activity waste (Class B and C) were based upon the last available rate schedule for the Barnwell facility (as a proxy).

3.4.8 Site Conditions Following Decommissioning

The NRC will terminate (or amend) the site license if it determines that site remediation has been performed in accordance with the license termination plan, and that the terminal radiation survey and associated documentation demonstrate that the facility is suitable for release. The NRC's involvement in the decommissioning process will end at this

point. Local building codes and state environmental regulations will dictate the next step in the decommissioning process, as well as the owner's own future plans for the site.

The estimates presented herein include the dismantling of the major structures to just below ground level, backfilling and the collapsing of below grade voids, and general terra-forming such that the site upon which the power block and supplemental structures are located is transformed into a "grassy plain." Certain facilities, which have continued use or value (e.g., the switchyard) are left intact.

The estimates do not assume the remediation of any significant volume of contaminated soil. This assumption may be affected by continued plant operations and/or future regulatory actions, such as the development of site-specific release criteria. Costs are included, however, for the remediation of the firing range (i.e., removal of soil containing lead residue).

3.5 ASSUMPTIONS

The following are the major assumptions made in the development of the estimates for decommissioning the site.

3.5.1 Estimating Basis

The study follows the principles of ALARA through the use of work duration adjustment factors. These factors address the impact of activities such as radiological protection instruction, mock-up training, and the use of respiratory protection and protective clothing. The factors lengthen a task's duration, increasing costs and lengthening the overall schedule. ALARA planning is considered in the costs for engineering and planning, and in the development of activity specifications and detailed procedures. Changes to worker exposure limits may impact the decommissioning cost and project schedule.

3.5.2 Labor Costs

The craft labor required to decontaminate and dismantle the nuclear unit is acquired through standard site contracting practices. The current cost of labor at the site is used as an estimating basis.

Progress Energy, as the licensee, will continue to provide site operations support, including decommissioning program management, licensing,

radiological protection, and site security. A Decommissioning Operations Contractor (DOC) will provide the supervisory staff needed to oversee the labor subcontractors, consultants, and specialty contractors needed to perform the work required for the decontamination and dismantling effort. The DOC will also provide the engineering services needed to develop activity specifications, detailed procedures, detailed activation analyses, and support field activities such as structural modifications.

Personnel costs are based upon average salary information provided by Progress Energy. Overhead costs are included for site and corporate support, reduced commensurate with the staffing of the project.

Security, while reduced from operating levels, is maintained throughout the decommissioning for access control, material control, and to safeguard the spent fuel.

3.5.3 Design Conditions

Any fuel cladding failure that occurred during the lifetime of the plant is assumed to have released fission products at sufficiently low levels that the buildup of quantities of long-lived isotopes (e.g., ^{137}Cs, ^{90}Sr, or transuranics) has been prevented from reaching levels exceeding those that permit the major NSSS components to be shipped under current transportation regulations and disposal requirements.

The curie contents of the vessel and internals at final shutdown are derived from those listed in NUREG/CR-3474.[25] Actual estimates are derived from the curie/gram values contained therein and adjusted for the different mass of the Crystal River components, projected operating life, and different periods of decay. Additional short-lived isotopes were derived from CR-0130[26] and CR-0672,[27] and benchmarked to the long-lived values from CR-3474.

The control elements are disposed of along with the spent fuel, i.e., there is no additional cost provided for their disposal.

Activation of the containment building structure is confined to the biological shield. More extensive activation (at very low levels) of the interior structures within containment has been detected at several reactors and the owners have elected to dispose of the affected material at a controlled facility rather than reuse the material as fill on site or send it to a landfill. The ultimate disposition of the material removed

from the containment building will depend upon the site release criteria selected, as well as the designated end use for the site.

3.5.4 General

Transition Activities

Existing warehouses are cleared of non-essential material and remain for use by Progress Energy and its subcontractors. The plant's operating staff performs the following activities at no additional cost or credit to the project during the transition period:

- Drain and collect fuel oils, lubricating oils, and transformer oils for recycle and/or sale.
- Drain and collect acids, caustics, and other chemical stores for recycle and/or sale.
- Process operating waste inventories, i.e., the estimates do not address the disposition of any legacy wastes; the disposal of operating wastes during this initial period is not considered a decommissioning expense.

Scrap and Salvage

The existing plant equipment is considered obsolete and suitable for scrap as deadweight quantities only. Progress Energy will make economically reasonable efforts to salvage equipment following final plant shutdown. However, dismantling techniques assumed by TLG for equipment in this analysis are not consistent with removal techniques required for salvage (resale) of equipment. Experience has indicated that some buyers wanted equipment stripped down to very specific requirements before they would consider purchase. This required expensive rework after the equipment had been removed from its installed location. Since placing a salvage value on this machinery and equipment would be speculative, and the value would be small in comparison to the overall decommissioning expenses, this analysis does not attempt to quantify the value that an owner may realize based upon those efforts.

It is assumed, for purposes of this analysis, that any value received from the sale of scrap generated in the dismantling process would be more than offset by the on-site processing costs. The dismantling techniques assumed in the decommissioning estimates do not include the additional

cost for size reduction and preparation to meet "furnace ready" conditions. For example, the recovery of copper from electrical cabling may require the removal and disposition of any contaminated insulation, an added expense. With a volatile market, the potential profit margin in scrap recovery is highly speculative, regardless of the ability to free release this material. This assumption is an implicit recognition of scrap value in the disposal of clean metallic waste at no additional cost to the project.

Furniture, tools, mobile equipment such as forklifts, trucks, bulldozers, and other property is removed at no cost or credit to the decommissioning project. Disposition may include relocation to other facilities. Spare parts are also made available for alternative use.

Energy

For estimating purposes, the plant is assumed to be de-energized, with the exception of those facilities associated with spent fuel storage. Replacement power costs are used to calculate the cost of energy consumed during decommissioning for tooling, lighting, ventilation, and essential services.

Insurance

Costs for continuing coverage (nuclear liability and property insurance) following cessation of plant operations and during decommissioning are included and based upon current operating premiums. Reductions in premiums, throughout the decommissioning process, are based upon the guidance and the limits for coverage defined in the NRC's proposed rulemaking "Financial Protection Requirements for Permanently Shutdown Nuclear Power Reactors."[28] The NRC's financial protection requirements are based on various reactor (and spent fuel) configurations.

Taxes

Property taxes are included within the estimates. Taxes are included for the land and the ISFSI (during its operation), throughout the decommissioning timeframe. Taxes on plant systems and structures are included (at a reduced level) and further reduced as dismantling operations proceed.

Site Modifications

The perimeter fence and in-plant security barriers will be moved, as appropriate, to conform to the Site Security Plan in force during the various stages of the project.

3.6 COST ESTIMATE SUMMARY

Schedules of expenditures are provided in Tables 3.1 and 3.2. The tables delineate the cost contributors by year of expenditures as well as cost contributor (e.g., labor, materials, and waste disposal).

The cost elements are also assigned to one of three subcategories: "License Termination," "Spent Fuel Management," and "Site Restoration." The subcategory "License Termination" is used to accumulate costs that are consistent with "decommissioning" as defined by the NRC in its financial assurance regulations (i.e., 10 CFR §50.75). In situations where the long-term management of spent fuel is not an issue, the cost reported for this subcategory is generally sufficient to terminate the unit's operating license.

The "Spent Fuel Management" subcategory contains costs associated with the construction of an ISFSI, the containerization and transfer of spent fuel to the ISFSI over the five and one-half years of post-shutdown pool operations, and the management of the ISFSI until such time that the transfer of all fuel from this facility to an off-site location (e.g., geologic repository) is complete.

"Site Restoration" is used to capture costs associated with the dismantling and demolition of buildings and facilities demonstrated to be free from contamination. This includes structures never exposed to radioactive materials, as well as those facilities that have been decontaminated to appropriate levels. Structures are removed to a depth of three feet and backfilled to conform to local grade.

As discussed in Section 3.4.1, it is not anticipated that the DOE will accept the GTCC waste prior to completing the transfer of spent fuel. Therefore, the cost of GTCC disposal is shown in the final year of ISFSI operation. While designated for disposal at the geologic repository along with the spent fuel, GTCC waste is still classified as low-level radioactive waste and, as such, included as a "License Termination" expense.

Decommissioning costs are reported in 2008 dollars. Costs are not inflated, escalated, or discounted over the period of expenditure (or projected lifetime of the plant). The schedules are based upon the detailed activity costs reported in Appendices C and D, along with the timeline presented in Section 4.

TABLE 3.1
DECON ALTERNATIVE
SCHEDULE OF TOTAL ANNUAL EXPENDITURES
(thousands, 2008 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2036	3,693	249	199	3	1,676	5,820
2037	48,395	4,629	2,702	835	21,334	77,896
2038	60,217	23,147	3,494	22,540	22,858	132,256
2039	50,541	20,352	2,266	26,328	20,845	120,332
2040	43,579	7,692	1,883	7,635	17,125	77,913
2041	43,460	7,671	1,877	7,614	17,078	77,700
2042	36,560	7,383	1,371	6,336	12,631	64,281
2043	29,107	3,291	556	881	5,819	39,654
2044	18,963	9,449	251	0	2,713	31,377
2045	12,728	5,629	179	0	2,284	20,820
2046	3,764	129	75	0	1,672	5,639
2047	3,764	129	75	0	1,672	5,639
2048	3,774	129	75	0	1,677	5,655
2049	3,764	129	75	0	1,672	5,639
2050	3,764	129	75	0	1,672	5,639
2051	3,764	129	75	0	1,672	5,639
2052	3,774	129	75	0	1,677	5,655
2053	3,764	129	75	0	1,672	5,639
2054	3,764	129	75	0	1,672	5,639
2055	3,764	129	75	0	1,672	5,639
2056	3,774	129	75	0	1,677	5,655
2057	3,764	129	75	0	1,672	5,639
2058	3,764	129	75	0	1,672	5,639
2059	3,764	129	75	0	1,672	5,639
2060	3,774	129	75	0	1,677	5,655
2061	3,764	129	75	0	1,672	5,639
2062	3,764	129	75	0	1,672	5,639
2063	3,764	129	75	0	1,672	5,639
2064	3,774	129	75	0	1,677	5,655
2065	3,764	129	75	0	1,672	5,639
2066	3,764	129	75	0	1,672	5,639
2067	3,764	129	75	0	1,672	5,639

TABLE 3.1 (continued)
DECON ALTERNATIVE
SCHEDULE OF TOTAL ANNUAL EXPENDITURES
(thousands, 2008 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2068	3,774	129	75	0	1,677	5,655
2069	3,764	129	75	0	1,672	5,639
2070	3,764	129	75	0	1,672	5,639
2071	3,764	129	75	0	1,672	5,639
2072	3,769	457	75	2	13,872	18,174
2073	1,122	1,451	62	199	2,489	5,322
	450,051	94,745	16,869	72,372	184,228	818,264

Note: Columns may not add due to rounding

TABLE 3.1a
DECON ALTERNATIVE
SCHEDULE OF LICENSE TERMINATION EXPENDITURES
(thousands, 2008 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2036	3,608	135	199	3	848	4,794
2037	47,254	3,225	2,702	835	11,255	65,272
2038	58,265	21,789	3,494	22,540	16,693	122,781
2039	48,823	18,775	2,266	26,328	14,454	110,646
2040	42,560	5,967	1,883	7,635	9,898	67,941
2041	42,444	5,950	1,877	7,614	9,870	67,756
2042	35,847	5,804	1,371	6,336	9,407	58,764
2043	27,162	1,960	532	881	5,321	35,856
2044	121	0	0	0	505	626
2045	71	0	0	0	298	369
2046	0	0	0	0	0	0
2047	0	0	0	0	0	0
2048	0	0	0	0	0	0
2049	0	0	0	0	0	0
2050	0	0	0	0	0	0
2051	0	0	0	0	0	0
2052	0	0	0	0	0	0
2053	0	0	0	0	0	0
2054	0	0	0	0	0	0
2055	0	0	0	0	0	0
2056	0	0	0	0	0	0
2057	0	0	0	0	0	0
2058	0	0	0	0	0	0
2059	0	0	0	0	0	0
2060	0	0	0	0	0	0
2061	0	0	0	0	0	0
2062	0	0	0	0	0	0
2063	0	0	0	0	0	0
2064	0	0	0	0	0	0
2065	0	0	0	0	0	0
2066	0	0	0	0	0	0
2067	0	0	0	0	0	0

TABLE 3.1a (continued)
DECON ALTERNATIVE
SCHEDULE OF LICENSE TERMINATION EXPENDITURES
(thousands, 2008 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2068	0	0	0	0	0	0
2069	0	0	0	0	0	0
2070	0	0	0	0	0	0
2071	0	0	0	0	0	0
2072	0	330	0	0	12,192	12,522
2073	0	0	0	0	0	0
	306,156	63,936	14,324	72,171	90,740	547,328

Note: Columns may not add due to rounding

TABLE 3.1b
DECON ALTERNATIVE
SCHEDULE OF SPENT FUEL MANAGEMENT EXPENDITURES
(thousands, 2008 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2036	38	114	0	0	828	979
2037	468	1,404	0	0	10,080	11,952
2038	442	1,326	0	0	5,947	7,715
2039	511	1,533	0	0	6,097	8,140
2040	572	1,716	0	0	7,228	9,516
2041	571	1,712	0	0	7,208	9,490
2042	525	1,576	0	0	3,225	5,326
2043	500	435	0	0	427	1,362
2044	3,743	75	0	0	1,463	5,281
2045	3,745	97	31	0	1,546	5,419
2046	3,764	129	75	0	1,672	5,639
2047	3,764	129	75	0	1,672	5,639
2048	3,774	129	75	0	1,677	5,655
2049	3,764	129	75	0	1,672	5,639
2050	3,764	129	75	0	1,672	5,639
2051	3,764	129	75	0	1,672	5,639
2052	3,774	129	75	0	1,677	5,655
2053	3,764	129	75	0	1,672	5,639
2054	3,764	129	75	0	1,672	5,639
2055	3,764	129	75	0	1,672	5,639
2056	3,774	129	75	0	1,677	5,655
2057	3,764	129	75	0	1,672	5,639
2058	3,764	129	75	0	1,672	5,639
2059	3,764	129	75	0	1,672	5,639
2060	3,774	129	75	0	1,677	5,655
2061	3,764	129	75	0	1,672	5,639
2062	3,764	129	75	0	1,672	5,639
2063	3,764	129	75	0	1,672	5,639
2064	3,774	129	75	0	1,677	5,655
2065	3,764	129	75	0	1,672	5,639
2066	3,764	129	75	0	1,672	5,639
2067	3,764	129	75	0	1,672	5,639

TABLE 3.1b (continued)
DECON ALTERNATIVE
SCHEDULE OF SPENT FUEL MANAGEMENT EXPENDITURES
(thousands, 2008 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2068	3,774	129	75	0	1,677	5,655
2069	3,764	129	75	0	1,672	5,639
2070	3,764	129	75	0	1,672	5,639
2071	3,764	129	75	0	1,672	5,639
2072	3,769	127	75	2	1,679	5,652
2073	1,122	1,451	62	199	2,489	5,322
	113,922	14,909	2,122	201	91,720	222,873

Note: Columns may not add due to rounding

TABLE 3.1c
DECON ALTERNATIVE
SCHEDULE OF SITE RESTORATION EXPENDITURES
(thousands, 2008 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2036	47	0	0	0	0	47
2037	673	0	0	0	0	673
2038	1,510	32	0	0	218	1,760
2039	1,207	44	0	0	294	1,546
2040	447	9	0	0	0	456
2041	446	9	0	0	0	454
2042	188	4	0	0	0	192
2043	1,444	896	24	0	71	2,436
2044	15,099	9,374	251	0	745	25,469
2045	8,911	5,532	148	0	440	15,031
2046	0	0	0	0	0	0
2047	0	0	0	0	0	0
2048	0	0	0	0	0	0
2049	0	0	0	0	0	0
2050	0	0	0	0	0	0
2051	0	0	0	0	0	0
2052	0	0	0	0	0	0
2053	0	0	0	0	0	0
2054	0	0	0	0	0	0
2055	0	0	0	0	0	0
2056	0	0	0	0	0	0
2057	0	0	0	0	0	0
2058	0	0	0	0	0	0
2059	0	0	0	0	0	0
2060	0	0	0	0	0	0
2061	0	0	0	0	0	0
2062	0	0	0	0	0	0
2063	0	0	0	0	0	0
2064	0	0	0	0	0	0
2065	0	0	0	0	0	0
2066	0	0	0	0	0	0
2067	0	0	0	0	0	0

TABLE 3.1c (continued)
DECON ALTERNATIVE
SCHEDULE OF SITE RESTORATION EXPENDITURES
(thousands, 2008 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2068	0	0	0	0	0	0
2069	0	0	0	0	0	0
2070	0	0	0	0	0	0
2071	0	0	0	0	0	0
2072	0	0	0	0	0	0
2073	0	0	0	0	0	0
	29,972	15,900	423	0	1,768	48,063

Note: Columns may not add due to rounding

TABLE 3.2
SAFSTOR ALTERNATIVE
SCHEDULE OF TOTAL ANNUAL EXPENDITURES
(thousands, 2008 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2036	2,941	214	199	3	1,676	5,033
2037	37,548	3,584	2,503	415	21,109	65,159
2038	28,141	10,286	1,351	1,265	14,595	55,639
2039	10,498	1,948	501	27	10,598	23,571
2040	10,527	1,954	502	27	10,627	23,636
2041	10,498	1,948	501	27	10,598	23,571
2042	7,214	1,084	356	26	6,152	14,831
2043	4,818	453	250	25	2,907	8,452
2044	4,831	454	251	25	2,915	8,476
2045	4,818	453	250	25	2,907	8,452
2046	4,818	453	250	25	2,907	8,452
2047	4,818	453	250	25	2,907	8,452
2048	4,831	454	251	25	2,915	8,476
2049	4,818	453	250	25	2,907	8,452
2050	4,818	453	250	25	2,907	8,452
2051	4,818	453	250	25	2,907	8,452
2052	4,831	454	251	25	2,915	8,476
2053	4,818	453	250	25	2,907	8,452
2054	4,818	453	250	25	2,907	8,452
2055	4,818	453	250	25	2,907	8,452
2056	4,831	454	251	25	2,915	8,476
2057	4,818	453	250	25	2,907	8,452
2058	4,818	453	250	25	2,907	8,452
2059	4,818	453	250	25	2,907	8,452
2060	4,831	454	251	25	2,915	8,476
2061	4,818	453	250	25	2,907	8,452
2062	4,818	453	250	25	2,907	8,452
2063	4,818	453	250	25	2,907	8,452
2064	4,831	454	251	25	2,915	8,476
2065	4,818	453	250	25	2,907	8,452
2066	4,818	453	250	25	2,907	8,452
2067	4,818	453	250	25	2,907	8,452

TABLE 3.2 (continued)
SAFSTOR ALTERNATIVE
SCHEDULE OF TOTAL ANNUAL EXPENDITURES
(thousands, 2008 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2068	4,831	454	251	25	2,915	8,476
2069	4,818	453	250	25	2,907	8,452
2070	4,818	453	250	25	2,907	8,452
2071	4,818	453	250	25	2,907	8,452
2072	4,825	454	251	25	2,912	8,467
2073	2,755	285	250	24	1,999	5,313
2074	2,755	285	250	24	1,999	5,313
2075	2,755	285	250	24	1,999	5,313
2076	2,763	285	251	24	2,005	5,328
2077	2,755	285	250	24	1,999	5,313
2078	2,755	285	250	24	1,999	5,313
2079	2,755	285	250	24	1,999	5,313
2080	2,763	285	251	24	2,005	5,328
2081	2,755	285	250	24	1,999	5,313
2082	2,755	285	250	24	1,999	5,313
2083	2,755	285	250	24	1,999	5,313
2084	2,763	285	251	24	2,005	5,328
2085	2,755	285	250	24	1,999	5,313
2086	2,755	285	250	24	1,999	5,313
2087	2,755	285	250	24	1,999	5,313
2088	2,763	285	251	24	2,005	5,328
2089	2,755	285	250	24	1,999	5,313
2090	2,755	285	250	24	1,999	5,313
2091	5,106	384	417	25	2,377	8,309
2092	35,075	1,933	2,510	34	6,957	46,510
2093	42,672	16,021	2,432	14,593	15,783	91,501
2094	43,232	16,493	2,153	20,021	17,795	99,694
2095	41,699	7,383	1,877	13,209	10,188	74,356
2096	28,865	3,123	715	2,266	4,307	39,277
2097	16,044	9,912	250	0	679	26,886
2098	9,758	6,029	152	0	413	16,352
	524,077	101,014	28,444	53,114	257,122	963,771

TABLE 3.2a
SAFSTOR ALTERNATIVE
SCHEDULE OF LICENSE TERMINATION ANNUAL EXPENDITURES
(thousands, 2008 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2036	2,903	101	199	3	848	4,054
2037	37,078	2,173	2,503	415	11,029	53,198
2038	23,531	8,879	1,207	1,265	7,035	41,917
2039	2,755	315	250	27	2,020	5,367
2040	2,763	315	251	27	2,026	5,382
2041	2,755	315	250	27	2,020	5,367
2042	2,755	301	250	26	2,020	5,353
2043	2,755	292	250	25	2,020	5,342
2044	2,763	292	251	25	2,026	5,357
2045	2,755	292	250	25	2,020	5,342
2046	2,755	292	250	25	2,020	5,342
2047	2,755	292	250	25	2,020	5,342
2048	2,763	292	251	25	2,026	5,357
2049	2,755	292	250	25	2,020	5,342
2050	2,755	292	250	25	2,020	5,342
2051	2,755	292	250	25	2,020	5,342
2052	2,763	292	251	25	2,026	5,357
2053	2,755	292	250	25	2,020	5,342
2054	2,755	292	250	25	2,020	5,342
2055	2,755	292	250	25	2,020	5,342
2056	2,763	292	251	25	2,026	5,357
2057	2,755	292	250	25	2,020	5,342
2058	2,755	292	250	25	2,020	5,342
2059	2,755	292	250	25	2,020	5,342
2060	2,763	292	251	25	2,026	5,357
2061	2,755	292	250	25	2,020	5,342
2062	2,755	292	250	25	2,020	5,342
2063	2,755	292	250	25	2,020	5,342
2064	2,763	292	251	25	2,026	5,357
2065	2,755	292	250	25	2,020	5,342
2066	2,755	292	250	25	2,020	5,342
2067	2,755	292	250	25	2,020	5,342

TABLE 3.2a (continued)
SAFSTOR ALTERNATIVE
SCHEDULE OF LICENSE TERMINATION ANNUAL EXPENDITURES
(thousands, 2008 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2068	2,763	292	251	25	2,026	5,357
2069	2,755	292	250	25	2,020	5,342
2070	2,755	292	250	25	2,020	5,342
2071	2,755	292	250	25	2,020	5,342
2072	2,763	292	251	25	2,026	5,357
2073	2,755	285	250	24	1,999	5,313
2074	2,755	285	250	24	1,999	5,313
2075	2,755	285	250	24	1,999	5,313
2076	2,763	285	251	24	2,005	5,328
2077	2,755	285	250	24	1,999	5,313
2078	2,755	285	250	24	1,999	5,313
2079	2,755	285	250	24	1,999	5,313
2080	2,763	285	251	24	2,005	5,328
2081	2,755	285	250	24	1,999	5,313
2082	2,755	285	250	24	1,999	5,313
2083	2,755	285	250	24	1,999	5,313
2084	2,763	285	251	24	2,005	5,328
2085	2,755	285	250	24	1,999	5,313
2086	2,755	285	250	24	1,999	5,313
2087	2,755	285	250	24	1,999	5,313
2088	2,763	285	251	24	2,005	5,328
2089	2,755	285	250	24	1,999	5,313
2090	2,755	285	250	24	1,999	5,313
2091	5,060	384	417	25	2,377	8,263
2092	34,375	1,933	2,510	34	6,957	45,809
2093	40,998	15,986	2,432	14,593	15,726	89,735
2094	41,885	16,442	2,153	19,965	17,147	97,592
2095	40,811	7,344	1,877	13,085	8,868	71,986
2096	27,405	2,302	695	2,245	4,057	36,705
2097	121	0	0	0	369	490
2098	73	0	0	0	225	298
	397,606	70,673	27,020	52,913	179,381	727,593

TABLE 3.2b
SAFSTOR ALTERNATIVE
SCHEDULE OF SPENT FUEL MANAGEMENT ANNUAL EXPENDITURES
(thousands, 2008 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2036	38	114	0	0	828	979
2037	470	1,411	0	0	10,080	11,961
2038	4,611	1,408	144	0	7,560	13,722
2039	7,743	1,634	250	0	8,577	18,204
2040	7,764	1,638	251	0	8,601	18,254
2041	7,743	1,634	250	0	8,577	18,204
2042	4,459	782	106	0	4,131	9,479
2043	2,063	161	0	0	887	3,110
2044	2,068	162	0	0	889	3,119
2045	2,063	161	0	0	887	3,110
2046	2,063	161	0	0	887	3,110
2047	2,063	161	0	0	887	3,110
2048	2,068	162	0	0	889	3,119
2049	2,063	161	0	0	887	3,110
2050	2,063	161	0	0	887	3,110
2051	2,063	161	0	0	887	3,110
2052	2,068	162	0	0	889	3,119
2053	2,063	161	0	0	887	3,110
2054	2,063	161	0	0	887	3,110
2055	2,063	161	0	0	887	3,110
2056	2,068	162	0	0	889	3,119
2057	2,063	161	0	0	887	3,110
2058	2,063	161	0	0	887	3,110
2059	2,063	161	0	0	887	3,110
2060	2,068	162	0	0	889	3,119
2061	2,063	161	0	0	887	3,110
2062	2,063	161	0	0	887	3,110
2063	2,063	161	0	0	887	3,110
2064	2,068	162	0	0	889	3,119
2065	2,063	161	0	0	887	3,110
2066	2,063	161	0	0	887	3,110
2067	2,063	161	0	0	887	3,110

TABLE 3.2b (continued)
SAFSTOR ALTERNATIVE
SCHEDULE OF SPENT FUEL MANAGEMENT ANNUAL EXPENDITURES
(thousands, 2008 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2068	2,068	162	0	0	889	3,119
2069	2,063	161	0	0	887	3,110
2070	2,063	161	0	0	887	3,110
2071	2,063	161	0	0	887	3,110
2072	2,063	161	0	0	887	3,110
2073	0	0	0	0	0	0
2074	0	0	0	0	0	0
2075	0	0	0	0	0	0
2076	0	0	0	0	0	0
2077	0	0	0	0	0	0
2078	0	0	0	0	0	0
2079	0	0	0	0	0	0
2080	0	0	0	0	0	0
2081	0	0	0	0	0	0
2082	0	0	0	0	0	0
2083	0	0	0	0	0	0
2084	0	0	0	0	0	0
2085	0	0	0	0	0	0
2086	0	0	0	0	0	0
2087	0	0	0	0	0	0
2088	0	0	0	0	0	0
2089	0	0	0	0	0	0
2090	0	0	0	0	0	0
2091	0	0	0	0	0	0
2092	0	0	0	0	0	0
2093	0	0	0	0	0	0
2094	71	11	0	56	593	731
2095	158	24	0	124	1,320	1,627
2096	30	50	0	21	226	328
2097	43	563	0	0	26	631
2098	26	342	0	0	16	384
	95,076	14,445	1,001	201	77,149	187,873

TABLE 3.2c
SAFSTOR ALTERNATIVE
SCHEDULE OF SITE RESTORATION ANNUAL EXPENDITURES
(thousands, 2008 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2036	0	0	0	0	0	0
2037	0	0	0	0	0	0
2038	0	0	0	0	0	0
2039	0	0	0	0	0	0
2040	0	0	0	0	0	0
2041	0	0	0	0	0	0
2042	0	0	0	0	0	0
2043	0	0	0	0	0	0
2044	0	0	0	0	0	0
2045	0	0	0	0	0	0
2046	0	0	0	0	0	0
2047	0	0	0	0	0	0
2048	0	0	0	0	0	0
2049	0	0	0	0	0	0
2050	0	0	0	0	0	0
2051	0	0	0	0	0	0
2052	0	0	0	0	0	0
2053	0	0	0	0	0	0
2054	0	0	0	0	0	0
2055	0	0	0	0	0	0
2056	0	0	0	0	0	0
2057	0	0	0	0	0	0
2058	0	0	0	0	0	0
2059	0	0	0	0	0	0
2060	0	0	0	0	0	0
2061	0	0	0	0	0	0
2062	0	0	0	0	0	0
2063	0	0	0	0	0	0
2064	0	0	0	0	0	0
2065	0	0	0	0	0	0
2066	0	0	0	0	0	0
2067	0	0	0	0	0	0

TABLE 3.2c (continued)
SAFSTOR ALTERNATIVE
SCHEDULE OF SITE RESTORATION ANNUAL EXPENDITURES
(thousands, 2008 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2068	0	0	0	0	0	0
2069	0	0	0	0	0	0
2070	0	0	0	0	0	0
2071	0	0	0	0	0	0
2072	0	0	0	0	0	0
2073	0	0	0	0	0	0
2074	0	0	0	0	0	0
2075	0	0	0	0	0	0
2076	0	0	0	0	0	0
2077	0	0	0	0	0	0
2078	0	0	0	0	0	0
2079	0	0	0	0	0	0
2080	0	0	0	0	0	0
2081	0	0	0	0	0	0
2082	0	0	0	0	0	0
2083	0	0	0	0	0	0
2084	0	0	0	0	0	0
2085	0	0	0	0	0	0
2086	0	0	0	0	0	0
2087	0	0	0	0	0	0
2088	0	0	0	0	0	0
2089	0	0	0	0	0	0
2090	0	0	0	0	0	0
2091	46	0	0	0	0	46
2092	700	0	0	0	0	700
2093	1,675	35	0	0	57	1,767
2094	1,276	40	0	0	55	1,371
2095	729	14	0	0	0	743
2096	1,429	771	21	0	23	2,244
2097	15,881	9,349	250	0	284	25,764
2098	9,659	5,686	152	0	173	15,670
	31,395	15,896	423	0	592	48,306

4. SCHEDULE ESTIMATE

The schedules for the decommissioning scenarios considered in this study follow the sequences presented in the AIF/NESP-036 study, with minor changes to reflect recent experience and site-specific constraints. In addition, the scheduling has been revised to reflect the spent fuel management plan described in Section 3.4.1.

A schedule or sequence of activities for the DECON alternative is presented in Figure 4.1. The scheduling sequence assumes that fuel is removed from the spent fuel pool within 5½ years. The key activities listed in the schedule do not reflect a one-to-one correspondence with those activities in the cost tables, but reflect dividing some activities for clarity and combining others for convenience. The schedule was prepared using the "Microsoft Project Professional 2003" computer software.[29]

4.1 SCHEDULE ESTIMATE ASSUMPTIONS

The schedule reflects the results of a precedence network developed for the site decommissioning activities, i.e., a PERT (Program Evaluation and Review Technique) Software Package. The work activity durations used in the precedence network reflect the actual man-hour estimates from the cost table, adjusted by stretching certain activities over their slack range and shifting the start and end dates of others. The following assumptions were made in the development of the decommissioning schedule:

- The auxiliary building is isolated until such time that all spent fuel has been discharged from the spent fuel pool to the DOE and/or the ISFSI. Decontamination and dismantling of the storage pool is initiated once the transfer of spent fuel is complete (DECON option).
- All work (except vessel and internals removal) is performed during an 8-hour workday, 5 days per week, with no overtime. There are eleven paid holidays per year.
- Reactor and internals removal activities are performed by using separate crews for different activities working on different shifts, with a corresponding backshift charge for the second shift.
- Multiple crews work parallel activities to the maximum extent possible, consistent with optimum efficiency, adequate access for cutting, removal and laydown space, and with the stringent safety measures necessary during demolition of heavy components and structures.

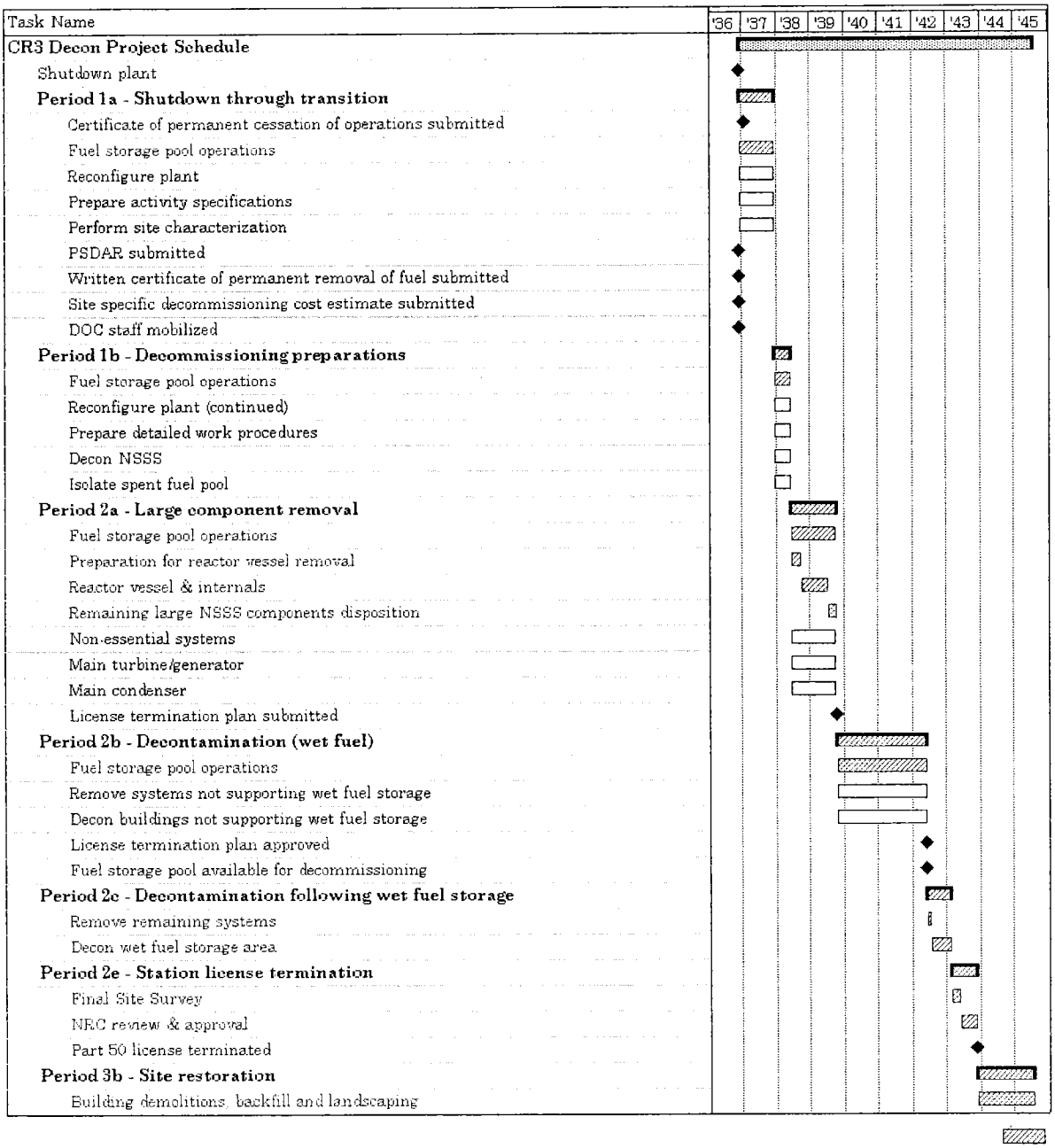
- For plant systems removal, the systems with the longest removal durations in areas on the critical path are considered to determine the duration of the activity.

4.2 PROJECT SCHEDULE

The period-dependent costs presented in the detailed cost tables are based upon the durations developed in the schedules for decommissioning. Durations are established between several milestones in each project period; these durations are used to establish a critical path for the entire project. In turn, the critical path duration for each period is used as the basis for determining the period-dependent costs. A second critical path is shown for the spent fuel storage period, which determines the release of the auxiliary building for final decontamination.

Project timelines are provided in Figures 4.2 and 4.3 with milestone dates based on a 2036 shutdown date. The fuel pool is emptied approximately 5½ years after shutdown, while ISFSI operations continue until the DOE can complete the transfer of assemblies to its geologic repository. Deferred decommissioning in the SAFSTOR scenarios is assumed to commence so that the operating license is terminated within a 60-year period from the cessation of plant operations.

FIGURE 4.1
ACTIVITY SCHEDULE



Legend:
1. Red text and/or shaded scheduling bars indicate critical path activities
2. Shaded scheduling bars associated with major decommissioning periods, e.g., Period 1a, indicate overall duration of that period
3. Blue text and/or diamond symbols indicate major milestones

FIGURE 4.2
DECOMMISSIONING TIMELINE
DECON
(not to scale)

Shutdown December 3, 2036

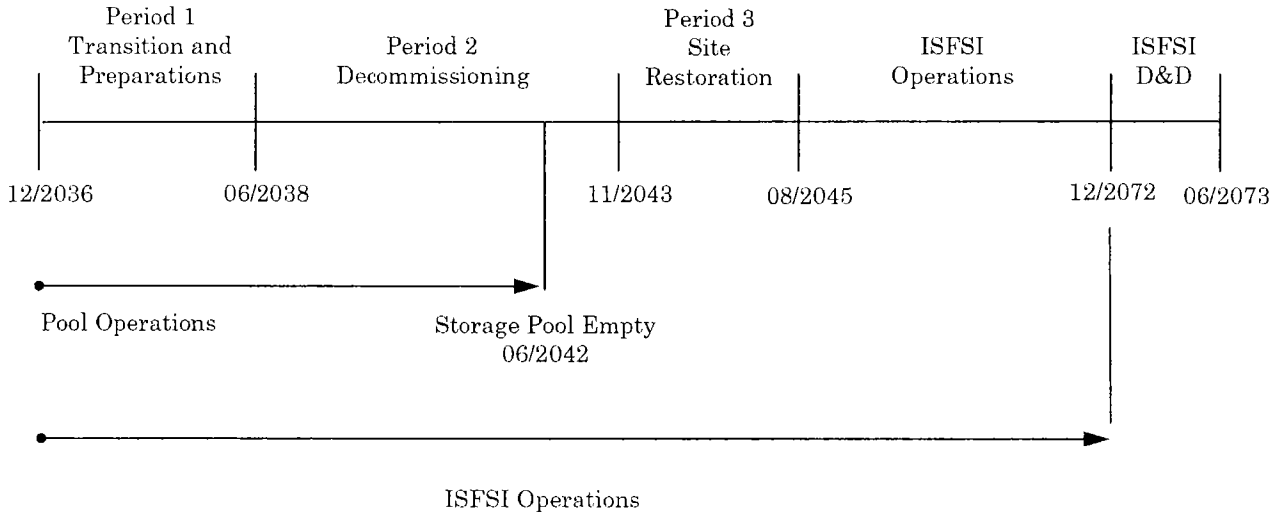
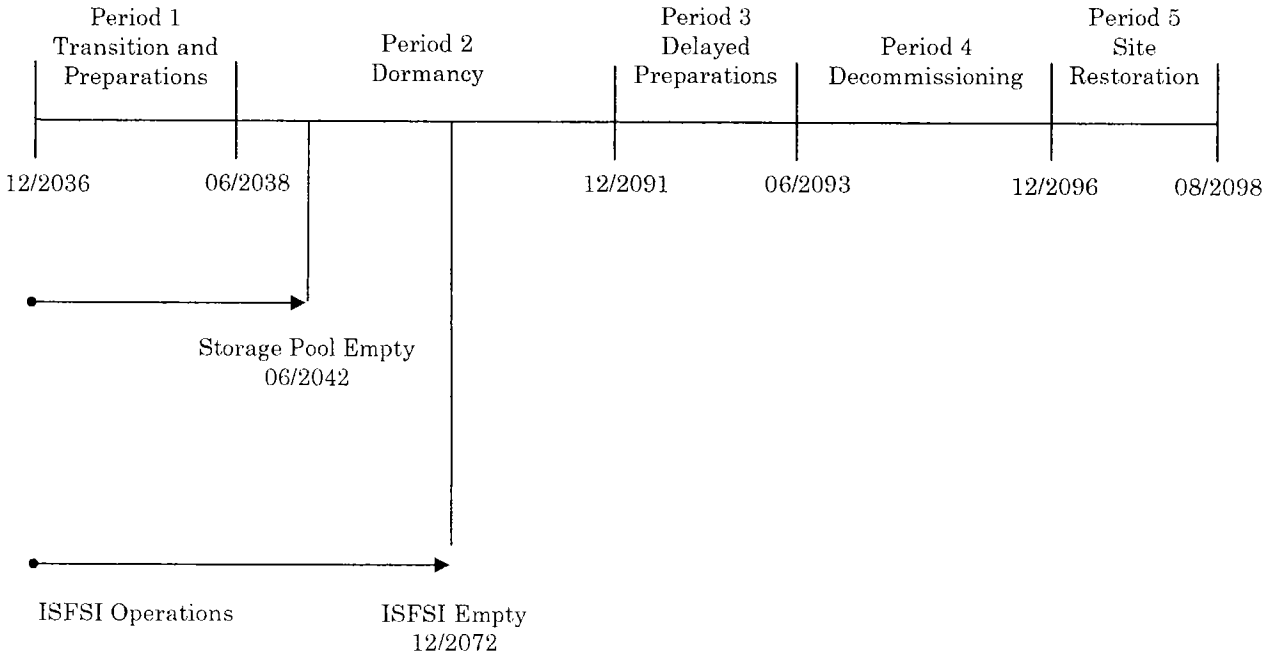


FIGURE 4.3
DECOMMISSIONING TIMELINE
SAFSTOR
(not to scale)

Shutdown December 3, 2036



5. RADIOACTIVE WASTES

The objectives of the decommissioning process are the removal of all radioactive material from the site that would restrict its future use and the termination of the NRC license. This currently requires the remediation of all radioactive material at the site in excess of applicable legal limits. Under the Atomic Energy Act,[30] the NRC is responsible for protecting the public from sources of ionizing radiation. Title 10 of the Code of Federal Regulations delineates the production, utilization, and disposal of radioactive materials and processes. In particular, Part 71 defines radioactive material as it pertains to transportation and Part 61 specifies its disposition.

Most of the materials being transported for controlled burial are categorized as Low Specific Activity (LSA) or Surface Contaminated Object (SCO) materials containing Type A quantities, as defined in 49 CFR Parts 173-178. Shipping containers are required to be Industrial Packages (IP-1, IP-2 or IP-3, as defined in 10 CFR §173.411). For this study, commercially available steel containers are presumed to be used for the disposal of piping, small components, and concrete. Larger components can serve as their own containers, with proper closure of all openings, access ways, and penetrations.

The volumes of radioactive waste generated during the various decommissioning activities at the site are shown on a line-item basis in Appendices C and D, and summarized in Tables 5.1 and 5.2. The quantified waste volume summaries shown in these tables are consistent with Part 61 classifications. The volumes are calculated based on the exterior dimensions for containerized material and on the displaced volume of components serving as their own waste containers.

The reactor vessel and internals are categorized as large quantity shipments and, accordingly, will be shipped in reusable, shielded truck casks with disposable liners. In calculating disposal costs, the burial fees are applied against the liner volume, as well as the special handling requirements of the payload. Packaging efficiencies are lower for the highly activated materials (greater than Type A quantity waste), where high concentrations of gamma-emitting radionuclides limit the capacity of the shipping canisters.

No process system containing/handling radioactive substances at shutdown is presumed to meet material release criteria by decay alone (i.e., systems radioactive at shutdown will still be radioactive over the time period during which the decommissioning is accomplished, due to the presence of long-lived radionuclides).

While the dose rates decrease with time, radionuclides such as ^{137}Cs will still control the disposition requirements.

The waste material produced in the decontamination and dismantling of the nuclear units is primarily generated during Period 2 of DECON and Period 4 of SAFSTOR. Material that is considered potentially contaminated when removed from the radiological controlled area is sent to processing facilities in Tennessee for conditioning and disposal. Heavily contaminated components and activated materials are routed for controlled disposal. The disposal volumes reported in the tables reflect the savings resulting from reprocessing and recycling.

For purposes of constructing the estimates, the cost for disposal at the EnergySolutions facility was used as a proxy for future disposal facilities. Separate rates were used for containerized waste and large components, including the steam generators and reactor coolant pump motors. Demolition debris including miscellaneous steel, scaffolding, and concrete was disposed of at a bulk rate. The decommissioning waste stream also included resins and dry active waste.

Since EnergySolutions is not currently able to receive the more highly radioactive components generated in the decontamination and dismantling of the reactor, disposal costs for the Class B and C material were based upon the last published rate schedule for non-compact waste for the Barnwell facility (as a proxy). Additional surcharges were included for activity, dose rate, and/or handling added as appropriate for the particular package.

TABLE 5.1
DECON ALTERNATIVE
DECOMMISSIONING WASTE SUMMARY

Waste	Cost Basis	Class [1]	Waste Volume (cubic feet)	Mass (pounds)
Low-Level Radioactive Waste (near-surface disposal)	EnergySolutions	A	113,496	10,921,656
	Barnwell	B	3,674	456,852
	Barnwell	C	517	61,605
Greater than Class C (geologic repository)	Spent Fuel Equivalent	GTCC	524	105,646
Processed/Conditioned (off-site recycling center)	Recycling Vendors	A	205,656	8,542,070
Total [2]			323,867	20,087,829

[1] Waste is classified according to the requirements as delineated in Title 10 CFR, Part 61.55

[2] Columns may not add due to rounding.

TABLE 5.2
SAFSTOR ALTERNATIVE
DECOMMISSIONING WASTE SUMMARY

Waste	Cost Basis	Class [1]	Waste Volume (cubic feet)	Mass (pounds)
Low-Level Radioactive Waste (near-surface disposal)	EnergySolutions	A	101,051	9,404,183
	Barnwell	B	2,824	294,791
	Barnwell	C	517	61,605
Greater than Class C (geologic repository)	Spent Fuel Equivalent	GTCC	524	105,646
Processed/Conditioned (off-site recycling center)	Recycling Vendors	A	232,559	9,615,394
Total [2]			337,475	19,481,619

[1] Waste is classified according to the requirements as delineated in Title 10 CFR, Part 61.55

[2] Columns may not add due to rounding.

6. RESULTS

The analysis to estimate the costs to decommission Crystal River relied upon the site-specific, technical information developed for a previous analysis prepared in 2005. While not an engineering study, the estimates provide Progress Energy with sufficient information to assess their financial obligations, as they pertain to the eventual decommissioning of the nuclear station.

The estimates described in this report are based on numerous fundamental assumptions, including regulatory requirements, project contingencies, low-level radioactive waste disposal practices, high-level radioactive waste management options, and site restoration requirements. The decommissioning scenarios assume continued operation of the station's spent fuel pool for a minimum of five and one half years following the cessation of operations for continued cooling of the assemblies. An ISFSI will be used to safeguard the spent fuel, once sufficiently cooled, until such time that the DOE can complete the transfer of the assemblies to its repository.

The cost projected to promptly decommission (DECON) Crystal River is estimated to be $818.3 million. The majority of this cost (approximately 66.9%) is associated with the physical decontamination and dismantling of the nuclear unit so that the operating license can be terminated. Another 27.2% is associated with the management, interim storage, and eventual transfer of the spent fuel. The remaining 5.9% is for the demolition of the designated structures and limited restoration of the site.

The cost projected for deferred decommissioning (SAFSTOR) is estimated to be $963.8 million. The majority of this cost (approximately 75.5%) is associated with placing the unit in storage, ongoing caretaking of the unit during dormancy, and the eventual physical decontamination and dismantling of the nuclear unit so that the operating license can be terminated. Another 19.5% is associated with the management, interim storage, and eventual transfer of the spent fuel. The remaining 5.0% is for the demolition of the designated structures and limited restoration of the site.

The primary cost contributors, identified in Tables 6.1 and 6.2, are either labor-related or associated with the management and disposition of the radioactive waste. Program management is the largest single contributor to the overall cost. The magnitude of the expense is a function of both the size of the organization required to manage the decommissioning, as well as the duration of the program. It is assumed, for purposes of this analysis, that Progress Energy will oversee the decommissioning program, using a DOC to manage the decommissioning labor force

and the associated subcontractors. The size and composition of the management organization varies with the decommissioning phase and associated site activities. However, once the operating license is terminated, the staff is substantially reduced for the conventional demolition and restoration of the site, and the long-term care of the spent fuel (for the DECON alternative).

As described in this report, the spent fuel pool will remain operational for a minimum of 5½ years following the cessation of operations. The pool will be isolated and an independent spent fuel island created. This will allow decommissioning operations to proceed in and around the pool area. Over the 5½-year period, the spent fuel will be packaged into transportable steel canisters for loading into a DOE-provided transport cask. The canisters will be stored in concrete modules at the ISFSI until the DOE is able to receive them. Dry storage of the fuel under a separate license provides additional flexibility in the event the DOE is not able to meet the current timetable for completing the transfer of assemblies to an off-site facility and minimizes the associated caretaking expenses.

The cost for waste disposal includes only those costs associated with the controlled disposition of the low-level radioactive waste generated from decontamination and dismantling activities, including plant equipment and components, structural material, filters, resins and dry-active waste. As described in Section 5, disposition of the low-level radioactive material required controlled disposal is at the EnergySolutions' facility. Highly activated components, requiring additional isolation from the environment, are packaged for geologic disposal. The cost of geologic disposal is based upon a cost equivalent for spent fuel.

A significant portion of the metallic waste is designated for additional processing and treatment at an off-site facility. Processing reduces the volume of material requiring controlled disposal through such techniques and processes as survey and sorting, decontamination, and volume reduction. The material that cannot be unconditionally released is packaged for controlled disposal at one of the currently operating facilities. The cost identified in the summary tables for processing is all-inclusive, incorporating the ultimate disposition of the material.

Removal costs reflect the labor-intensive nature of the decommissioning process, as well as the management controls required to ensure a safe and successful program. Decontamination and packaging costs also have a large labor component that is based upon prevailing union wages. Non-radiological demolition is a natural extension of the decommissioning process. The methods employed in decontamination and dismantling are generally destructive and indiscriminate in inflicting collateral damage. With a work force mobilized to support decommissioning operations, non-radiological demolition can be an integrated activity and a logical expansion of the work being performed in the process of

terminating the operating license. Prompt demolition reduces future liabilities and can be more cost effective than deferral, due to the deterioration of the facilities (and therefore the working conditions) with time.

The reported cost for transport includes the tariffs and surcharges associated with moving large components and/or overweight shielded casks overland, as well as the general expense, e.g., labor and fuel, of transporting material to the destinations identified in this report. For purposes of this analysis, material is primarily moved overland by truck.

Decontamination is used to reduce the plant's radiation fields and minimize worker exposure. Slightly contaminated material or material located within a contaminated area is sent to an off-site processing center, i.e., this analysis does not assume that contaminated plant components and equipment can be decontaminated for uncontrolled release in-situ. Centralized processing centers have proven to be a more economical means of handling the large volumes of material produced in the dismantling of a nuclear unit.

License termination survey costs are associated with the labor intensive and complex activity of verifying that contamination has been removed from the site to the levels specified by the regulating agency. This process involves a systematic survey of all remaining plant surface areas and surrounding environs, sampling, isotopic analysis, and documentation of the findings. The status of any plant components and materials not removed in the decommissioning process will also require confirmation and will add to the expense of surveying the facilities alone.

The remaining costs include allocations for heavy equipment and temporary services, as well as for other expenses such as regulatory fees and the premiums for nuclear insurance. While site operating costs are greatly reduced following the final cessation of plant operations, certain administrative functions do need to be maintained either at a basic functional or regulatory level.

TABLE 6.1
DECON ALTERNATIVE
DECOMMISSIONING COST ELEMENTS
(thousands of 2008 dollars)

Cost Element	Total	Percentage
Decontamination	14,033	1.7
Removal	95,411	11.7
Packaging	14,624	1.8
Transportation	13,539	1.7
Waste Disposal	63,687	7.8
Off-site Waste Processing	21,589	2.6
Program Management [1]	375,813	45.9
Utility Site Indirect	14,005	1.7
Corporate Allocations	13,196	1.6
Spent Fuel Pool Isolation	10,819	1.3
Spent Fuel Management [2]	78,213	9.6
Insurance and Regulatory Fees	28,416	3.5
Energy	16,869	2.1
Characterization and Licensing Surveys	17,869	2.2
Property Taxes	33,469	4.1
Miscellaneous Equipment	6,712	0.8
Total [3]	818,264	100

Cost Element	Total	Percentage
License Termination	547,328	66.9
Spent Fuel Management	222,873	27.2
Site Restoration	48,063	5.9
Total [3]	818,264	100

[1] Includes engineering and security costs
[2] Excludes program management costs (staffing) but includes costs for spent fuel loading/packaging costs/spent fuel pool O&M and EP fees
[3] Columns may not add due to rounding

TABLE 6.2
SAFSTOR ALTERNATIVE
DECOMMISSIONING COST ELEMENTS
(thousands of 2008 dollars)

Cost Element	Total	Percentage
Decontamination	11,821	1.2
Removal	93,391	9.7
Packaging	11,179	1.2
Transportation	10,286	1.1
Waste Disposal	41,588	4.3
Off-site Waste Processing	24,463	2.5
Program Management [1]	451,482	46.8
Utility Site Indirect	21,450	2.2
Corporate Allocations	18,776	1.9
Spent Fuel Pool Isolation	10,819	1.1
Spent Fuel Management [2]	70,015	7.3
Insurance and Regulatory Fees	52,084	5.4
Energy	28,444	3.0
Characterization and Licensing Surveys	19,384	2.0
Property Taxes	80,734	8.4
Miscellaneous Equipment	17,856	1.9
Total [3]	963,771	100

Cost Element	Total	Percentage
License Termination	727,593	75.5
Spent Fuel Management	187,873	19.5
Site Restoration	48,306	5.0
Total [3]	963,771	100

[1] Includes engineering and security costs
[2] Excludes program management costs (staffing) but includes costs for spent fuel loading/packaging costs/spent fuel pool O&M and EP fees
[3] Columns may not add due to rounding

7. REFERENCES

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APPENDIX A

UNIT COST FACTOR DEVELOPMENT

APPENDIX A
UNIT COST FACTOR DEVELOPMENT

Example: Unit Factor for Removal of Contaminated Heat Exchanger < 3,000 lbs.

1. SCOPE

Heat exchangers weighing < 3,000 lbs. will be removed in one piece using a crane or small hoist. They will be disconnected from the inlet and outlet piping. The heat exchanger will be sent to the waste processing area.

2. CALCULATIONS

Act ID	Activity Description	Activity Duration (minutes)	Critical Duration (minutes)*
a	Remove insulation	60	(b)
b	Mount pipe cutters	60	60
c	Install contamination controls	20	(b)
d	Disconnect inlet and outlet lines	60	60
e	Cap openings	20	(d)
f	Rig for removal	30	30
g	Unbolt from mounts	30	30
h	Remove contamination controls	15	15
i	Remove, wrap, send to waste processing area	60	60
	Totals (Activity/Critical)	355	255
Duration adjustment(s):			
+ Respiratory protection adjustment (50% of critical duration)			128
+ Radiation/ALARA adjustment (37% of critical duration)			95
Adjusted work duration			478
+ Protective clothing adjustment (30% of adjusted duration)			143
Productive work duration			621
+ Work break adjustment (8.33 % of productive duration)			52
Total work duration (minutes)			673

***** Total duration = 11.217 hr *****

* alpha designators indicate activities that can be performed in parallel

APPENDIX A
(continued)

3. LABOR REQUIRED

Crew	Number	Duration (hours)	Rate ($/hr)	Cost
Laborers	3.00	11.217	$25.46	$856.75
Craftsmen	2.00	11.217	$47.88	$1074.14
Foreman	1.00	11.217	$54.00	$605.72
General Foreman	0.25	11.217	$56.00	$157.04
Fire Watch	0.05	11.217	$25.46	$14.28
Health Physics Technician	1.00	11.217	$56.45	$633.20
Total Labor Cost				$3,341.13

4. EQUIPMENT & CONSUMABLES COSTS

Equipment Costs	none
Consumables/Materials Costs	
-Blotting paper 50 @ $0.57 sq ft [1]	$28.50
-Plastic sheets/bags 50 @ $0.17/sq ft [2]	$8.50
-Gas torch consumables 1 @ $10.30/hr x 1 hr [3]	$10.30
Subtotal cost of equipment and materials	$47.30
Overhead & profit on equipment and materials @ 16.00 %	$7.57
Total costs, equipment & material	$54.87

TOTAL COST:

Removal of contaminated **heat exchanger <3000 pounds:**	**$3,396.00**
Total labor cost:	$3,341.13
Total equipment/material costs:	$54.87
Total craft labor man-hours required per unit:	81.88

5. NOTES AND REFERENCES

- Work difficulty factors were developed in conjunction with the Atomic Industrial Forum's (now NEI) program to standardize nuclear decommissioning cost estimates and are delineated in Volume 1, Chapter 5 of the "Guidelines for Producing Commercial Nuclear Power Plant Decommissioning Cost Estimates," AIF/NESP-036, May 1986.

- References for equipment & consumables costs:

  1. McMaster-Carr, Item 7193T88, Spill Control
  2. R.S. Means (2008) Division 01 56, Section 13.60-0200, page 20
  3. R.S. Means (2008) Division 01 54 33, Section 40-6360, Reference-10

- Material and consumable costs were adjusted using the regional indices for Tampa, Florida.

APPENDIX B

UNIT COST FACTOR LISTING
(DECON: Power Block Structures Only)

APPENDIX B

UNIT COST FACTOR LISTING
(Power Block Structures Only)

Unit Cost Factor	Cost/Unit($)
Removal of clean instrument and sampling tubing, $/linear foot	0.33
Removal of clean pipe 0.25 to 2 inches diameter, $/linear foot	3.27
Removal of clean pipe >2 to 4 inches diameter, $/linear foot	4.95
Removal of clean pipe >4 to 8 inches diameter, $/linear foot	10.36
Removal of clean pipe >8 to 14 inches diameter, $/linear foot	19.24
Removal of clean pipe >14 to 20 inches diameter, $/linear foot	25.03
Removal of clean pipe >20 to 36 inches diameter, $/linear foot	36.82
Removal of clean pipe >36 inches diameter, $/linear foot	43.74
Removal of clean valve >2 to 4 inches	68.75
Removal of clean valve >4 to 8 inches	103.64
Removal of clean valve >8 to 14 inches	192.44
Removal of clean valve >14 to 20 inches	250.26
Removal of clean valve >20 to 36 inches	368.20
Removal of clean valve >36 inches	437.43
Removal of clean pipe hanger for small bore piping	21.93
Removal of clean pipe hanger for large bore piping	73.98
Removal of clean pump, <300 pound	174.86
Removal of clean pump, 300-1000 pound	502.34
Removal of clean pump, 1000-10,000 pound	1,958.07
Removal of clean pump, >10,000 pound	3,786.76
Removal of clean pump motor, 300-1000 pound	210.85
Removal of clean pump motor, 1000-10,000 pound	815.04
Removal of clean pump motor, >10,000 pound	1,833.85
Removal of clean heat exchanger <3000 pound	1,057.99
Removal of clean heat exchanger >3000 pound	2,663.01
Removal of clean feedwater heater/deaerator	7,460.81
Removal of clean moisture separator/reheater	15,279.01
Removal of clean tank, <300 gallons	224.91
Removal of clean tank, 300-3000 gallon	709.13
Removal of clean tank, >3000 gallons, $/square foot surface area	6.16

APPENDIX B

UNIT COST FACTOR LISTING
(Power Block Structures Only)

Unit Cost Factor	Cost/Unit($)
Removal of clean electrical equipment, <300 pound	95.22
Removal of clean electrical equipment, 300-1000 pound	343.29
Removal of clean electrical equipment, 1000-10,000 pound	686.59
Removal of clean electrical equipment, >10,000 pound	1,674.51
Removal of clean electrical transformer < 30 tons	1,162.92
Removal of clean electrical transformer > 30 tons	3,349.01
Removal of clean standby diesel generator, <100 kW	1,187.82
Removal of clean standby diesel generator, 100 kW to 1 MW	2,651.30
Removal of clean standby diesel generator, >1 MW	5,488.73
Removal of clean electrical cable tray, $/linear foot	8.91
Removal of clean electrical conduit, $/linear foot	3.89
Removal of clean mechanical equipment, <300 pound	95.22
Removal of clean mechanical equipment, 300-1000 pound	343.29
Removal of clean mechanical equipment, 1000-10,000 pound	686.59
Removal of clean mechanical equipment, >10,000 pound	1,674.51
Removal of clean HVAC equipment, <300 pound	95.22
Removal of clean HVAC equipment, 300-1000 pound	343.29
Removal of clean HVAC equipment, 1000-10,000 pound	686.59
Removal of clean HVAC equipment, >10,000 pound	1,674.51
Removal of clean HVAC ductwork, $/pound	0.34
Removal of contaminated instrument and sampling tubing, $/linear foot	1.21
Removal of contaminated pipe 0.25 to 2 inches diameter, $/linear foot	16.02
Removal of contaminated pipe >2 to 4 inches diameter, $/linear foot	27.61
Removal of contaminated pipe >4 to 8 inches diameter, $/linear foot	46.46
Removal of contaminated pipe >8 to 14 inches diameter, $/linear foot	87.89
Removal of contaminated pipe >14 to 20 inches diameter, $/linear foot	105.36
Removal of contaminated pipe >20 to 36 inches diameter, $/linear foot	145.42
Removal of contaminated pipe >36 inches diameter, $/linear foot	171.68
Removal of contaminated valve >2 to 4 inches	357.69
Removal of contaminated valve >4 to 8 inches	425.59

APPENDIX B

UNIT COST FACTOR LISTING
(Power Block Structures Only)

Unit Cost Factor	Cost/Unit($)
Removal of contaminated valve >8 to 14 inches	835.93
Removal of contaminated valve >14 to 20 inches	1,061.03
Removal of contaminated valve >20 to 36 inches	1,411.26
Removal of contaminated valve >36 inches	1,673.90
Removal of contaminated pipe hanger for small bore piping	85.31
Removal of contaminated pipe hanger for large bore piping	259.50
Removal of contaminated pump, <300 pound	759.13
Removal of contaminated pump, 300-1000 pound	1,766.69
Removal of contaminated pump, 1000-10,000 pound	5,505.10
Removal of contaminated pump, >10,000 pound	13,406.69
Removal of contaminated pump motor, 300-1000 pound	757.63
Removal of contaminated pump motor, 1000-10,000 pound	2,249.92
Removal of contaminated pump motor, >10,000 pound	5,051.42
Removal of contaminated heat exchanger <3000 pound	3,396.00
Removal of contaminated heat exchanger >3000 pound	9,856.89
Removal of contaminated tank, <300 gallons	1,263.53
Removal of contaminated tank, >300 gallons, $/square foot	24.70
Removal of contaminated electrical equipment, <300 pound	585.36
Removal of contaminated electrical equipment, 300-1000 pound	1,426.61
Removal of contaminated electrical equipment, 1000-10,000 pound	2,746.75
Removal of contaminated electrical equipment, >10,000 pound	5,430.91
Removal of contaminated electrical cable tray, $/linear foot	28.21
Removal of contaminated electrical conduit, $/linear foot	13.14
Removal of contaminated mechanical equipment, <300 pound	651.60
Removal of contaminated mechanical equipment, 300-1000 pound	1,576.96
Removal of contaminated mechanical equipment, 1000-10,000 pound	3,031.31
Removal of contaminated mechanical equipment, >10,000 pound	5,430.91
Removal of contaminated HVAC equipment, <300 pound	651.60
Removal of contaminated HVAC equipment, 300-1000 pound	1,576.96
Removal of contaminated HVAC equipment, 1000-10,000 pound	3,031.31

APPENDIX B

UNIT COST FACTOR LISTING
(Power Block Structures Only)

Unit Cost Factor	Cost/Unit($)
Removal of contaminated HVAC equipment, >10,000 pound	5,430.91
Removal of contaminated HVAC ductwork, $/pound	1.79
Removal/plasma arc cut of contaminated thin metal components, $/linear in.	3.06
Additional decontamination of surface by washing, $/square foot	6.11
Additional decontamination of surfaces by hydrolasing, $/square foot	30.79
Decontamination rig hook up and flush, $/ 250 foot length	5,522.88
Chemical flush of components/systems, $/gallon	16.24
Removal of clean standard reinforced concrete, $/cubic yard	116.52
Removal of grade slab concrete, $/cubic yard	147.65
Removal of clean concrete floors, $/cubic yard	312.41
Removal of sections of clean concrete floors, $/cubic yard	900.91
Removal of clean heavily rein concrete w/#9 rebar, $/cubic yard	213.75
Removal of contaminated heavily rein concrete w/#9 rebar, $/cubic yard	1,816.58
Removal of clean heavily rein concrete w/#18 rebar, $/cubic yard	270.37
Removal of contaminated heavily rein concrete w/#18 rebar, $/cubic yard	2,403.77
Removal heavily rein concrete w/#18 rebar & steel embedments, $/cubic yard	398.92
Removal of below-grade suspended floors, $/cubic yard	312.41
Removal of clean monolithic concrete structures, $/cubic yard	759.12
Removal of contaminated monolithic concrete structures, $/cubic yard	1,812.30
Removal of clean foundation concrete, $/cubic yard	597.51
Removal of contaminated foundation concrete, $/cubic yard	1,688.73
Explosive demolition of bulk concrete, $/cubic yard	27.24
Removal of clean hollow masonry block wall, $/cubic yard	73.69
Removal of contaminated hollow masonry block wall, $/cubic yard	277.89
Removal of clean solid masonry block wall, $/cubic yard	73.69
Removal of contaminated solid masonry block wall, $/cubic yard	277.89
Backfill of below-grade voids, $/cubic yard	26.88
Removal of subterranean tunnels/voids, $/linear foot	89.41
Placement of concrete for below-grade voids, $/cubic yard	144.09
Excavation of clean material, $/cubic yard	2.78

APPENDIX B

UNIT COST FACTOR LISTING
(Power Block Structures Only)

Unit Cost Factor	Cost/Unit($)
Excavation of contaminated material, $/cubic yard	38.25
Removal of clean concrete rubble (tipping fee included), $/cubic yard	223.92
Removal of contaminated concrete rubble, $/cubic yard	23.50
Removal of building by volume, $/cubic foot	0.27
Removal of clean building metal siding, $/square foot	0.77
Removal of contaminated building metal siding, $/square foot	3.25
Removal of standard asphalt roofing, $/square foot	1.53
Removal of transite panels, $/square foot	1.76
Scarifying contaminated concrete surfaces (drill & spall), $/square foot	12.66
Scabbling contaminated concrete floors, $/square foot	6.74
Scabbling contaminated concrete walls, $/square foot	17.02
Scabbling contaminated ceilings, $/square foot	57.67
Scabbling structural steel, $/square foot	5.88
Removal of clean overhead crane/monorail < 10 ton capacity	504.46
Removal of contaminated overhead crane/monorail < 10 ton capacity	1,545.20
Removal of clean overhead crane/monorail >10-50 ton capacity	1,210.72
Removal of contaminated overhead crane/monorail >10-50 ton capacity	3,707.82
Removal of polar crane > 50 ton capacity	5,165.71
Removal of gantry crane > 50 ton capacity	20,931.30
Removal of structural steel, $/pound	0.18
Removal of clean steel floor grating, $/square foot	3.89
Removal of contaminated steel floor grating, $/square foot	11.84
Removal of clean free standing steel liner, $/square foot	9.24
Removal of contaminated free standing steel liner, $/square foot	28.84
Removal of clean concrete-anchored steel liner, $/square foot	4.62
Removal of contaminated concrete-anchored steel liner, $/square foot	33.61
Placement of scaffolding in clean areas, $/square foot	15.37
Placement of scaffolding in contaminated areas, $/square foot	23.82
Landscaping with topsoil, $/acre	24,527.88
Cost of CPC B-88 LSA box & preparation for use	1,814.05

APPENDIX B

UNIT COST FACTOR LISTING
(Power Block Structures Only)

Unit Cost Factor	Cost/Unit($)
Cost of CPC B-25 LSA box & preparation for use	1,592.25
Cost of CPC B-12V 12 gauge LSA box & preparation for use	1,558.48
Cost of CPC B-144 LSA box & preparation for use	9,785.50
Cost of LSA drum & preparation for use	130.71
Cost of cask liner for CNSI 14 195 cask	135.23
Cost of cask liner for CNSI 8 120A cask (resins)	7,342.74
Cost of cask liner for CNSI 8 120A cask (filters)	736.45
Decontamination of surfaces with vacuuming, $/square foot	0.52

APPENDIX C

DETAILED COST ANALYSIS

DECON

Table C
Crystal River Nuclear Plant, Unit 3
DECON Decommissioning Cost Estimate
(thousands of 2008 dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt, Lbs.	Craft Manhours	Utility and Contractor Manhours
PERIOD 1a - Shutdown through Transition																					
Period 1a Direct Decommissioning Activities																					
1a.1.1	Prepare preliminary decommissioning cost	-	-	-	-	-	-	148	22	170	170	-	-	-	-	-	-	-	-	-	1,300
1a.1.2	Notification of Cessation of Operations									a											
1a.1.3	Remove fuel & source material									n/a											
1a.1.4	Notification of Permanent Defueling									a											
1a.1.5	Deactivate plant systems & process waste									a											
1a.1.6	Prepare and submit PSDAR	-	-	-	-	-	-	227	34	261	261	-	-	-	-	-	-	-	-	-	2,000
1a.1.7	Review plant dwgs & specs.	-	-	-	-	-	-	523	78	601	601	-	-	-	-	-	-	-	-	-	4,600
1a.1.8	Perform detailed rad survey									a											
1a.1.9	Estimate by-product inventory	-	-	-	-	-	-	114	17	131	131	-	-	-	-	-	-	-	-	-	1,000
1a.1.10	End product description	-	-	-	-	-	-	114	17	131	131	-	-	-	-	-	-	-	-	-	1,000
1a.1.11	Detailed by-product inventory	-	-	-	-	-	-	148	22	170	170	-	-	-	-	-	-	-	-	-	1,300
1a.1.12	Define major work sequence	-	-	-	-	-	-	853	128	980	980	-	-	-	-	-	-	-	-	-	7,500
1a.1.13	Perform SER and EA	-	-	-	-	-	-	352	53	405	405	-	-	-	-	-	-	-	-	-	3,100
1a.1.14	Perform Site-Specific Cost Study	-	-	-	-	-	-	568	85	654	654	-	-	-	-	-	-	-	-	-	5,000
1a.1.15	Prepare/submit License Termination Plan	-	-	-	-	-	-	466	70	535	535	-	-	-	-	-	-	-	-	-	4,096
1a.1.16	Receive NRC approval of termination plan									a											
Activity Specifications																					
1a.1.17.1	Plant & temporary facilities	-	-	-	-	-	-	559	84	643	579	-	64	-	-	-	-	-	-	-	4,920
1a.1.17.2	Plant systems	-	-	-	-	-	-	474	71	545	490	-	54	-	-	-	-	-	-	-	4,167
1a.1.17.3	NSSS Decontamination Flush	-	-	-	-	-	-	57	9	65	65	-	-	-	-	-	-	-	-	-	500
1a.1.17.4	Reactor internals	-	-	-	-	-	-	807	121	928	928	-	-	-	-	-	-	-	-	-	7,100
1a.1.17.5	Reactor vessel	-	-	-	-	-	-	739	111	850	850	-	-	-	-	-	-	-	-	-	6,500
1a.1.17.6	Biological shield	-	-	-	-	-	-	57	9	65	65	-	-	-	-	-	-	-	-	-	500
1a.1.17.7	Steam generators	-	-	-	-	-	-	355	53	408	408	-	-	-	-	-	-	-	-	-	3,120
1a.1.17.8	Reinforced concrete	-	-	-	-	-	-	182	27	209	105	-	105	-	-	-	-	-	-	-	1,600
1a.1.17.9	Main Turbine	-	-	-	-	-	-	45	7	52	-	-	52	-	-	-	-	-	-	-	400
1a.1.17.10	Main Condensers	-	-	-	-	-	-	45	7	52	-	-	52	-	-	-	-	-	-	-	400
1a.1.17.11	Plant structures & buildings	-	-	-	-	-	-	355	53	408	204	-	204	-	-	-	-	-	-	-	3,120
1a.1.17.12	Waste management	-	-	-	-	-	-	523	78	601	601	-	-	-	-	-	-	-	-	-	4,600
1a.1.17.13	Facility & site closeout	-	-	-	-	-	-	102	15	118	59	-	59	-	-	-	-	-	-	-	900
1a.1.17	Total	-	-	-	-	-	-	4,300	645	4,945	4,354	-	591	-	-	-	-	-	-	-	37,827
Planning & Site Preparations																					
1a.1.18	Prepare dismantling sequence	-	-	-	-	-	-	273	41	314	314	-	-	-	-	-	-	-	-	-	2,400
1a.1.19	Plant prep. & temp. svces	-	-	-	-	-	-	2,700	405	3,105	3,105	-	-	-	-	-	-	-	-	-	-
1a.1.20	Design water clean-up system	-	-	-	-	-	-	159	24	183	183	-	-	-	-	-	-	-	-	-	1,400
1a.1.21	Rigging/Cont. Cntrl Envlps/tooling/etc.	-	-	-	-	-	-	2,100	315	2,415	2,415	-	-	-	-	-	-	-	-	-	-
1a.1.22	Procure casks/liners & containers	-	-	-	-	-	-	140	21	161	161	-	-	-	-	-	-	-	-	-	1,230
1a.1	Subtotal Period 1a Activity Costs	-	-	-	-	-	-	13,183	1,978	15,161	14,570	-	591	-	-	-	-	-	-	-	73,753
Period 1a Collateral Costs																					
1a.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	1,657	249	1,906	-	1,906	-	-	-	-	-	-	-	-	-
1a.3.2	ISFSI Capital Expenditures	-	-	-	-	-	-	7,682	1,152	8,835	-	8,835	-	-	-	-	-	-	-	-	-
1a.3.3	Florida LLRW Inspection Fee	-	-	-	-	-	-	1	0	1	1	-	-	-	-	-	-	-	-	-	-
1a.3	Subtotal Period 1a Collateral Costs	-	-	-	-	-	-	9,340	1,401	10,742	1	10,740	-	-	-	-	-	-	-	-	-
Period 1a Period-Dependent Costs																					
1a.4.1	Insurance	-	-	-	-	-	-	1,369	137	1,506	1,506	-	-	-	-	-	-	-	-	-	-
1a.4.2	Property taxes	-	-	-	-	-	-	3,206	321	3,526	3,526	-	-	-	-	-	-	-	-	-	-
1a.4.3	Health physics supplies	-	476	-	-	-	-	-	119	595	595	-	-	-	-	-	-	-	-	-	-
1a.4.4	Heavy equipment rental	-	475	-	-	-	-	-	71	546	546	-	-	-	-	-	-	-	-	-	-
1a.4.5	Disposal of DAW generated	-	-	12	4	-	31	-	10	57	57	-	-	-	675	-	-	-	13,531	22	-

Table C
Crystal River Nuclear Plant, Unit 3
DECON Decommissioning Cost Estimate
(thousands of 2008 dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Period 1a Period-Dependent Costs (continued)																					
1a.4.6	Plant energy budget	-	-	-	-	-	-	2,177	327	2,503	2,503	-	-	-	-	-	-	-	-	-	-
1a.4.7	NRC Fees	-	-	-	-	-	-	706	71	776	776	-	-	-	-	-	-	-	-	-	-
1a.4.8	Emergency Planning Fees	-	-	-	-	-	-	570	57	627	-	627	-	-	-	-	-	-	-	-	-
1a.4.9	Utility Site Indirect	-	-	-	-	-	-	2,151	323	2,474	2,474	-	-	-	-	-	-	-	-	-	-
1a.4.10	Spent Fuel Pool O&M	-	-	-	-	-	-	745	112	857	-	857	-	-	-	-	-	-	-	-	-
1a.4.11	ISFSI Operating Costs	-	-	-	-	-	-	85	13	98	-	98	-	-	-	-	-	-	-	-	-
1a.4.12	Corporate Allocations	-	-	-	-	-	-	1,944	292	2,235	2,235	-	-	-	-	-	-	-	-	-	-
1a.4.13	INPO Fees	-	-	-	-	-	-	135	20	156	156	-	-	-	-	-	-	-	-	-	-
1a.4.14	Security Staff Cost	-	-	-	-	-	-	6,130	920	7,050	7,050	-	-	-	-	-	-	-	-	-	157,471
1a.4.15	Utility Staff Cost	-	-	-	-	-	-	21,171	3,176	24,347	24,347	-	-	-	-	-	-	-	-	-	423,400
1a.4	Subtotal Period 1a Period-Dependent Costs	-	951	12	4	-	31	40,388	5,966	47,352	45,770	1,581	-	-	675	-	-	-	13,531	22	580,871
1a.0	TOTAL PERIOD 1a COST	-	951	12	4	-	31	62,912	9,344	73,254	60,342	12,322	591	-	675	-	-	-	13,531	22	654,624
PERIOD 1b - Decommissioning Preparations																					
Period 1b Direct Decommissioning Activities																					
Detailed Work Procedures																					
1b.1.1.1	Plant systems	-	-	-	-	-	-	538	81	619	557	-	62	-	-	-	-	-	-	-	4,733
1b.1.1.2	NSSS Decontamination Flush	-	-	-	-	-	-	114	17	131	131	-	-	-	-	-	-	-	-	-	1,000
1b.1.1.3	Reactor internals	-	-	-	-	-	-	284	43	327	327	-	-	-	-	-	-	-	-	-	2,500
1b.1.1.4	Remaining buildings	-	-	-	-	-	-	153	23	176	44	-	132	-	-	-	-	-	-	-	1,350
1b.1.1.5	CRD cooling assembly	-	-	-	-	-	-	114	17	131	131	-	-	-	-	-	-	-	-	-	1,000
1b.1.1.6	CRD housings & ICI tubes	-	-	-	-	-	-	114	17	131	131	-	-	-	-	-	-	-	-	-	1,000
1b.1.1.7	Incore instrumentation	-	-	-	-	-	-	114	17	131	131	-	-	-	-	-	-	-	-	-	1,000
1b.1.1.8	Reactor vessel	-	-	-	-	-	-	413	62	475	475	-	-	-	-	-	-	-	-	-	3,630
1b.1.1.9	Facility closeout	-	-	-	-	-	-	136	20	157	78	-	78	-	-	-	-	-	-	-	1,200
1b.1.1.10	Missile shields	-	-	-	-	-	-	51	8	59	59	-	-	-	-	-	-	-	-	-	450
1b.1.1.11	Biological shield	-	-	-	-	-	-	136	20	157	157	-	-	-	-	-	-	-	-	-	1,200
1b.1.1.12	Steam generators	-	-	-	-	-	-	523	78	601	601	-	-	-	-	-	-	-	-	-	4,600
1b.1.1.13	Reinforced concrete	-	-	-	-	-	-	114	17	131	65	-	65	-	-	-	-	-	-	-	1,000
1b.1.1.14	Main Turbine	-	-	-	-	-	-	177	27	204	-	-	204	-	-	-	-	-	-	-	1,560
1b.1.1.15	Main Condensers	-	-	-	-	-	-	177	27	204	-	-	204	-	-	-	-	-	-	-	1,560
1b.1.1.16	Auxiliary building	-	-	-	-	-	-	310	47	357	321	-	36	-	-	-	-	-	-	-	2,730
1b.1.1.17	Reactor building	-	-	-	-	-	-	310	47	357	321	-	36	-	-	-	-	-	-	-	2,730
1b.1.1	Total	-	-	-	-	-	-	3,779	567	4,346	3,528	-	817	-	-	-	-	-	-	-	33,243
1b.1.2	Decon primary loop	431	-	-	-	-	-	-	216	647	647	-	-	-	-	-	-	-	-	1,067	-
1b.1	Subtotal Period 1b Activity Costs	431	-	-	-	-	-	3,779	782	4,992	4,175	-	817	-	-	-	-	-	-	1,067	33,243
Period 1b Additional Costs																					
1b.2.1	Spent Fuel Pool Isolation	-	-	-	-	-	-	9,407	1,411	10,819	10,819	-	-	-	-	-	-	-	-	-	-
1b.2.2	Site Characterization Survey	-	-	-	-	-	-	3,301	990	4,291	4,291	-	-	-	-	-	-	-	-	19,100	7,852
1b.2.3	Mixed Waste	-	-	2	552	24	648	-	245	1,470	1,470	-	-	122	2,160	-	-	-	1,540,574	-	-
1b.2.4	Hazardous Waste	-	-	1	1	2	-	-	-	3	3	-	-	374	-	-	-	-	-	-	-
1b.2	Subtotal Period 1b Additional Costs	-	-	2	553	26	648	12,708	2,646	16,583	16,583	-	-	496	2,160	-	-	-	1,540,574	19,100	7,852
Period 1b Collateral Costs																					
1b.3.1	Decon equipment	916	-	-	-	-	-	-	137	1,053	1,053	-	-	-	-	-	-	-	-	-	-
1b.3.2	DOC staff relocation expenses	-	-	-	-	-	-	1,322	198	1,520	1,520	-	-	-	-	-	-	-	-	-	-
1b.3.3	Process liquid waste	38	-	80	554	-	3,372	-	953	4,996	4,996	-	-	-	242	1,065	-	-	132,787	255	-
1b.3.4	Small tool allowance	-	2	-	-	-	-	-	0	2	2	-	-	-	-	-	-	-	-	-	-
1b.3.5	Pipe cutting equipment	-	1,000	-	-	-	-	-	150	1,150	1,150	-	-	-	-	-	-	-	-	-	-
1b.3.6	Decon rig	1,400	-	-	-	-	-	-	210	1,610	1,610	-	-	-	-	-	-	-	-	-	-

Table C
Crystal River Nuclear Plant, Unit 3
DECON Decommissioning Cost Estimate
(thousands of 2008 dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Period 1b Collateral Costs (continued)																					
1b.3.7	Spent Fuel Capital and Transfer	-	-	-	-	-	-	653	98	750	-	750	-	-	-	-	-	-	-	-	-
1b.3.8	ISFSI Capital Expenditures	-	-	-	-	-	-	2,016	302	2,319	-	2,319	-	-	-	-	-	-	-	-	-
1b.3.9	Florida LLRW Inspection Fee	-	-	-	-	-	-	9	1	9	9	-	-	-	-	-	-	-	-	-	-
1b.3	Subtotal Period 1b Collateral Costs	2,354	1,002	80	554	-	3,372	3,999	2,050	13,411	10,342	3,069	-	-	242	1,065	-	-	132,787	255	-
Period 1b Period-Dependent Costs																					
1b.4.1	Decon supplies	28	-	-	-	-	-	-	7	35	35	-	-	-	-	-	-	-	-	-	-
1b.4.2	Insurance	-	-	-	-	-	-	690	69	759	759	-	-	-	-	-	-	-	-	-	-
1b.4.3	Property taxes	-	-	-	-	-	-	1,746	175	1,920	1,920	-	-	-	-	-	-	-	-	-	-
1b.4.4	Health physics supplies	-	270	-	-	-	-	-	67	337	337	-	-	-	-	-	-	-	-	-	-
1b.4.5	Heavy equipment rental	-	239	-	-	-	-	-	36	275	275	-	-	-	-	-	-	-	-	-	-
1b.4.6	Disposal of DAW generated	-	-	7	2	-	19	-	6	34	34	-	-	-	399	-	-	-	7,988	13	-
1b.4.7	Plant energy budget	-	-	-	-	-	-	2,195	329	2,524	2,524	-	-	-	-	-	-	-	-	-	-
1b.4.8	NRC Fees	-	-	-	-	-	-	356	36	391	391	-	-	-	-	-	-	-	-	-	-
1b.4.9	Emergency Planning Fees	-	-	-	-	-	-	287	29	316	-	316	-	-	-	-	-	-	-	-	-
1b.4.10	Utility Site Indirect	-	-	-	-	-	-	1,089	163	1,253	1,253	-	-	-	-	-	-	-	-	-	-
1b.4.11	Spent Fuel Pool O&M	-	-	-	-	-	-	376	56	432	-	432	-	-	-	-	-	-	-	-	-
1b.4.12	ISFSI Operating Costs	-	-	-	-	-	-	43	6	49	-	49	-	-	-	-	-	-	-	-	-
1b.4.13	Corporate Allocations	-	-	-	-	-	-	985	148	1,132	1,132	-	-	-	-	-	-	-	-	-	-
1b.4.14	Security Staff Cost	-	-	-	-	-	-	3,090	464	3,554	3,554	-	-	-	-	-	-	-	-	-	79,383
1b.4.15	DOC Staff Cost	-	-	-	-	-	-	5,239	786	6,025	6,025	-	-	-	-	-	-	-	-	-	64,137
1b.4.16	Utility Staff Cost	-	-	-	-	-	-	10,744	1,612	12,356	12,356	-	-	-	-	-	-	-	-	-	214,491
1b.4	Subtotal Period 1b Period-Dependent Costs	28	509	7	2	-	19	26,840	3,988	31,393	30,595	797	-	-	399	-	-	-	7,988	13	358,011
1b.0	TOTAL PERIOD 1b COST	2,813	1,511	89	1,109	26	4,039	47,326	9,467	66,379	61,695	3,867	817	496	2,801	1,065	-	-	1,681,350	20,435	399,106
PERIOD 1 TOTALS		2,813	2,461	101	1,113	26	4,070	110,239	18,811	139,633	122,037	16,188	1,408	496	3,476	1,065	-	-	1,694,881	20,457	1,053,731
PERIOD 2a - Large Component Removal																					
Period 2a Direct Decommissioning Activities																					
Nuclear Steam Supply System Removal																					
2a.1.1.1	Reactor Coolant Piping	132	101	20	46	-	342	-	186	826	826	-	-	-	1,125	-	-	-	136,089	5,067	-
2a.1.1.2	Pressurizer Relief Tank	16	13	3	8	-	52	-	26	117	117	-	-	-	186	-	-	-	20,849	612	-
2a.1.1.3	Reactor Coolant Pumps & Motors	97	74	41	151	114	2,423	-	717	3,617	3,617	-	-	487	8,974	-	-	-	872,445	4,666	-
2a.1.1.4	Pressurizer	35	48	681	656	-	744	-	382	2,546	2,546	-	-	-	2,756	-	-	-	421,703	2,390	1,875
2a.1.1.5	Steam Generators	185	4,371	2,225	2,471	-	6,699	-	3,453	19,405	19,405	-	-	-	24,813	-	-	-	1,987,717	11,617	5,750
2a.1.1.6	CRDMs/ICIs/Service Structure Removal	150	89	257	98	-	240	-	198	1,032	1,032	-	-	-	4,040	-	-	-	95,738	4,708	-
2a.1.1.7	Reactor Vessel Internals	80	2,402	5,200	1,029	-	6,239	201	6,548	21,700	21,700	-	-	-	876	605	517	-	222,155	24,183	1,099
2a.1.1.8	Reactor Vessel	73	5,049	1,340	1,076	-	6,882	201	7,898	22,519	22,519	-	-	-	7,083	2,003	-	-	980,935	24,183	1,099
2a.1.1	Totals	768	12,146	9,769	5,534	114	23,621	402	19,407	71,760	71,760	-	-	487	49,855	2,608	517	-	4,737,631	77,427	9,824
Removal of Major Equipment																					
2a.1.2	Main Turbine/Generator	-	262	200	44	521	331	-	253	1,611	1,611	-	-	2,785	1,551	-	-	-	375,861	6,098	-
2a.1.3	Main Condensers	-	801	117	77	499	335	-	382	2,211	2,211	-	-	5,044	1,487	-	-	-	360,419	19,329	-
Cascading Costs from Clean Building Demolition																					
2a.1.4.1	Reactor	-	643	-	-	-	-	-	97	740	740	-	-	-	-	-	-	-	-	8,169	-
2a.1.4.2	Auxiliary Building	-	158	-	-	-	-	-	24	182	182	-	-	-	-	-	-	-	-	2,064	-
2a.1.4.3	Intermediate Bldg	-	42	-	-	-	-	-	6	49	49	-	-	-	-	-	-	-	-	569	-
2a.1.4.4	Machine Shop - Hot	-	3	-	-	-	-	-	0	4	4	-	-	-	-	-	-	-	-	57	-
2a.1.4.5	Rad Materials Storage & Processing Bldg	-	1	-	-	-	-	-	0	1	1	-	-	-	-	-	-	-	-	13	-
2a.1.4.6	Fuel Handling Area (Aux Bldg)	-	100	-	-	-	-	-	15	116	116	-	-	-	-	-	-	-	-	1,251	-
2a.1.4	Totals	-	948	-	-	-	-	-	142	1,091	1,091	-	-	-	-	-	-	-	-	12,123	-

Table C
Crystal River Nuclear Plant, Unit 3
DECON Decommissioning Cost Estimate
(thousands of 2008 dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Disposal of Plant Systems																					
2a.1.5.1	Auxiliary Steam	-	47	-	-	-	-	-	7	54	-	-	54	-	-	-	-	-	-	1,377	-
2a.1.5.2	Auxiliary Steam - RCA	-	27	1	2	34	-	-	12	76	76	-	-	376	-	-	-	-	15,255	594	-
2a.1.5.3	Chemical Addition - Cont	-	55	4	5	33	24	-	26	147	147	-	-	373	109	-	-	-	24,725	1,224	-
2a.1.5.4	Chemical Addition - Cont - Insulated	-	8	1	1	1	5	-	4	20	20	-	-	15	24	-	-	-	2,718	178	-
2a.1.5.5	Chemical Addition - Insulated - RCA	-	6	0	0	5	-	-	2	15	15	-	-	61	-	-	-	-	2,461	124	-
2a.1.5.6	Chemical Addition - RCA	-	43	1	4	59	-	-	20	127	127	-	-	658	-	-	-	-	26,704	903	-
2a.1.5.7	Chemical Feed Secondary Cycle	-	11	-	-	-	-	-	2	13	-	-	13	-	-	-	-	-	-	331	-
2a.1.5.8	Chemical Feed Secondary Cycle - RCA	-	5	0	0	5	-	-	2	12	12	-	-	51	-	-	-	-	2,067	106	-
2a.1.5.9	Chilled Water	-	53	-	-	-	-	-	8	61	-	-	61	-	-	-	-	-	-	1,520	-
2a.1.5.10	Chilled Water - RCA	-	57	1	4	60	-	-	24	145	145	-	-	672	-	-	-	-	27,273	1,199	-
2a.1.5.11	Circulating Water	-	82	-	-	-	-	-	12	94	-	-	94	-	-	-	-	-	-	2,318	-
2a.1.5.12	Cond Demin Regeneration	-	39	-	-	-	-	-	6	45	-	-	45	-	-	-	-	-	-	1,049	-
2a.1.5.13	Condensate	-	99	-	-	-	-	-	15	114	-	-	114	-	-	-	-	-	-	2,868	-
2a.1.5.14	Condensate & Demin Water Supply	-	21	-	-	-	-	-	3	24	-	-	24	-	-	-	-	-	-	606	-
2a.1.5.15	Condensate & Demin Water Supply - Cont	-	59	1	3	43	-	-	22	127	127	-	-	483	-	-	-	-	19,601	1,330	-
2a.1.5.16	Condensate & Demin Water Supply - RCA	-	82	1	5	78	-	-	33	199	199	-	-	875	-	-	-	-	35,538	1,730	-
2a.1.5.17	Condensate - Cont	-	170	4	18	289	-	-	89	570	570	-	-	3,236	-	-	-	-	131,415	3,949	-
2a.1.5.18	Condensate Demineralizer	-	84	-	-	-	-	-	13	97	-	-	97	-	-	-	-	-	-	2,482	-
2a.1.5.19	Condensate Demineralizer - Cont	-	130	8	15	94	64	-	65	375	375	-	-	1,048	287	-	-	-	67,953	2,979	-
2a.1.5.20	Condenser Air Removal & Priming	-	82	-	-	-	-	-	12	95	-	-	95	-	-	-	-	-	-	2,308	-
2a.1.5.21	Cycle Makeup Demin Water	-	54	-	-	-	-	-	8	62	-	-	62	-	-	-	-	-	-	1,472	-
2a.1.5.22	Cycle Makeup Demin Water - RCA	-	52	1	3	46	-	-	20	122	122	-	-	513	-	-	-	-	20,841	1,096	-
2a.1.5.23	Cycle Startup	-	8	-	-	-	-	-	1	9	-	-	9	-	-	-	-	-	-	222	-
2a.1.5.24	Cycle Startup - RCA	-	18	1	2	39	-	-	11	70	70	-	-	431	-	-	-	-	17,510	396	-
2a.1.5.25	Diesel Jacket Coolant	-	23	-	-	-	-	-	3	27	-	-	27	-	-	-	-	-	-	613	-
2a.1.5.26	Diesel-Air Cooler Coolant	-	4	-	-	-	-	-	1	4	-	-	4	-	-	-	-	-	-	108	-
2a.1.5.27	EDG FO & Compressed Air & Exhaust	-	38	-	-	-	-	-	6	44	-	-	44	-	-	-	-	-	-	1,028	-
2a.1.5.28	EDG Lube Oil	-	4	-	-	-	-	-	1	4	-	-	4	-	-	-	-	-	-	111	-
2a.1.5.29	EFP-3 Compressed and Starting Air	-	10	-	-	-	-	-	1	11	-	-	11	-	-	-	-	-	-	302	-
2a.1.5.30	EFP-3 Fuel Oil Transfer	-	15	-	-	-	-	-	2	17	-	-	17	-	-	-	-	-	-	444	-
2a.1.5.31	EFPB Sump Discharge	-	7	-	-	-	-	-	1	8	-	-	8	-	-	-	-	-	-	225	-
2a.1.5.32	Emergency Feedwater	-	63	-	-	-	-	-	9	72	-	-	72	-	-	-	-	-	-	1,668	-
2a.1.5.33	Emergency Feedwater - RCA	-	110	2	9	147	-	-	51	319	319	-	-	1,640	-	-	-	-	66,593	2,374	-
2a.1.5.34	Extraction Steam	-	103	-	-	-	-	-	15	118	-	-	118	-	-	-	-	-	-	2,916	-
2a.1.5.35	FW Heater Relief Vents & Drains	-	41	-	-	-	-	-	6	48	-	-	48	-	-	-	-	-	-	1,225	-
2a.1.5.36	FW Heater Relief Vents & Drains - Cont	-	53	0	2	33	-	-	19	107	107	-	-	366	-	-	-	-	14,864	1,229	-
2a.1.5.37	Feedwater	-	80	-	-	-	-	-	12	92	-	-	92	-	-	-	-	-	-	2,106	-
2a.1.5.38	Feedwater - Insulated	-	41	-	-	-	-	-	6	47	-	-	47	-	-	-	-	-	-	1,222	-
2a.1.5.39	Feedwater - Insulated - RCA	-	86	3	12	205	-	-	55	363	363	-	-	2,293	-	-	-	-	93,138	1,945	-
2a.1.5.40	Feedwater - RCA	-	21	1	3	51	-	-	13	89	89	-	-	572	-	-	-	-	23,243	449	-
2a.1.5.41	HVAC-Misc Outbldgs	-	15	-	-	-	-	-	2	17	-	-	17	-	-	-	-	-	-	464	-
2a.1.5.42	LP & HP Feedwater Drains & Vents	-	172	-	-	-	-	-	26	198	-	-	198	-	-	-	-	-	-	5,048	-
2a.1.5.43	LP & HP Feedwater Drains & Vents - Cont	-	204	3	13	210	-	-	85	514	514	-	-	2,346	-	-	-	-	95,269	4,732	-
2a.1.5.44	Liquid Sampling - Cont	-	66	4	4	6	28	-	26	135	135	-	-	69	126	-	-	-	14,095	1,555	-
2a.1.5.45	Liquid Sampling - RCA	-	50	0	2	30	-	-	17	100	100	-	-	336	-	-	-	-	13,655	1,100	-
2a.1.5.46	Lube Oil	-	10	-	-	-	-	-	1	11	-	-	11	-	-	-	-	-	-	256	-
2a.1.5.47	Main & Reheat Steam	-	76	-	-	-	-	-	11	87	-	-	87	-	-	-	-	-	-	2,230	-
2a.1.5.48	Main & Reheat Steam - Cont	-	550	30	124	2,035	-	-	464	3,203	3,203	-	-	22,779	-	-	-	-	925,077	13,103	-
2a.1.5.49	Main & Reheat Steam - RCA	-	13	0	1	20	-	-	6	41	41	-	-	226	-	-	-	-	9,182	275	-
2a.1.5.50	Misc Turbine Room Steam Drains	-	43	-	-	-	-	-	6	49	-	-	49	-	-	-	-	-	-	1,332	-
2a.1.5.51	Misc Turbine Room Steam Drains - Cont	-	184	2	8	126	-	-	66	386	386	-	-	1,405	-	-	-	-	57,049	4,080	-
2a.1.5.52	Nitrogen/Hydrogen/Carbon Dioxide	-	23	-	-	-	-	-	4	27	-	-	27	-	-	-	-	-	-	736	-
2a.1.5.53	Nuc Serv & Decay Heat Sea Water	-	42	-	-	-	-	-	6	49	-	-	49	-	-	-	-	-	-	1,172	-
2a.1.5.54	Nuc Serv & Decay Heat Sea Water - Cont	-	66	11	28	271	80	-	83	539	539	-	-	3,039	356	-	-	-	155,331	1,591	-
2a.1.5.55	Nuc Serv & Decay Heat Sea Water - RCA	-	64	3	14	224	-	-	52	356	356	-	-	2,504	-	-	-	-	101,697	1,443	-
2a.1.5.56	RC & Misc Waste Evaporator	406	382	32	57	421	228	-	430	1,955	1,955	-	-	4,709	1,279	-	-	-	281,979	16,924	-

Table C
Crystal River Nuclear Plant, Unit 3
DECON Decommissioning Cost Estimate
(thousands of 2008 dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Disposal of Plant Systems (continued)																					
2a.1.5.57	RC & Misc Waste Evaporator - Insulated	47	32	4	4	2	26	-	39	154	154	-	-	25	115	-	-	-	11,274	1,783	-
2a.1.5.58	Screen Wash Water	-	37	-	-	-	-	-	6	42	-	-	42	-	-	-	-	-	-	989	-
2a.1.5.59	Seal & Spray Water	-	3	-	-	-	-	-	1	4	-	-	4	-	-	-	-	-	-	99	-
2a.1.5.60	Seal & Spray Water - Cont	-	92	1	4	73	-	-	35	204	204	-	-	814	-	-	-	-	33,044	2,025	-
2a.1.5.61	Seal & Spray Water - RCA	-	66	1	4	70	-	-	28	169	169	-	-	783	-	-	-	-	31,811	1,362	-
2a.1.5.62	Secondary Cycle Sampling	-	19	-	-	-	-	-	3	22	-	-	22	-	-	-	-	-	-	622	-
2a.1.5.63	Secondary Cycle Sampling - Cont	-	9	0	0	5	-	-	3	17	17	-	-	60	-	-	-	-	2,419	188	-
2a.1.5.64	Secondary Cycle Sampling - Cont - Ins	-	3	0	0	2	-	-	1	6	6	-	-	20	-	-	-	-	810	63	-
2a.1.5.65	Secondary Cycle Sampling - Insulated	-	5	-	-	-	-	-	1	6	-	-	6	-	-	-	-	-	-	180	-
2a.1.5.66	Secondary Serv Closed Cycle Cooling	-	172	-	-	-	-	-	26	198	-	-	198	-	-	-	-	-	-	4,978	-
2a.1.5.67	Turb Bldg Sump & Oily Water Separator	-	17	-	-	-	-	-	3	20	-	-	20	-	-	-	-	-	-	491	-
2a.1.5.68	Turbine Generator Seal Oil	-	21	-	-	-	-	-	3	24	-	-	24	-	-	-	-	-	-	621	-
2a.1.5.69	Turbine Gland Steam & Drains	-	13	-	-	-	-	-	2	15	-	-	15	-	-	-	-	-	-	391	-
2a.1.5.70	Turbine Lube Oil	-	40	-	-	-	-	-	6	46	-	-	46	-	-	-	-	-	-	1,107	-
2a.1.5.71	Waste Drumming	18	14	2	2	1	11	-	16	62	62	-	-	10	49	-	-	-	4,770	702	-
2a.1.5.72	Waste Gas Disposal	320	259	24	34	159	175	-	300	1,270	1,270	-	-	1,776	875	-	-	-	141,997	12,657	-
2a.1.5	Totals	790	4,754	148	386	4,875	641	-	2,378	13,971	11,994	-	1,977	54,563	3,219	-	-	-	2,471,356	134,624	-
2a.1.6	Scaffolding in support of decommissioning	-	815	15	6	78	7	-	219	1,139	1,139	-	-	784	44	-	-	-	39,440	23,572	-
2a.1	Subtotal Period 2a Activity Costs	1,558	19,726	10,248	6,048	6,086	24,935	402	22,780	91,783	89,806	-	1,977	63,663	56,156	2,608	517	-	7,984,708	273,172	9,824
Period 2a Additional Costs																					
2a.2.1	RVCH Segmentation and Disposal	-	107	156	107	-	459	15	165	1,009	1,009	-	-	-	2,097	-	-	-	220,490	2,200	88
2a.2	Subtotal Period 2a Additional Costs	-	107	156	107	-	459	15	165	1,009	1,009	-	-	-	2,097	-	-	-	220,490	2,200	88
Period 2a Collateral Costs																					
2a.3.1	Process liquid waste	210	-	94	623	-	464	-	324	1,714	1,714	-	-	-	1,531	-	-	-	97,101	299	-
2a.3.2	Small tool allowance	-	230	-	-	-	-	-	34	264	238	-	26	-	-	-	-	-	-	-	-
2a.3.3	Spent Fuel Capital and Transfer	-	-	-	-	-	-	2,319	348	2,666	-	2,666	-	-	-	-	-	-	-	-	-
2a.3.4	ISFSI Capital Expenditures	-	-	-	-	-	-	5,403	810	6,213	-	6,213	-	-	-	-	-	-	-	-	-
2a.3.5	Florida LLRW Inspection Fee	-	-	-	-	-	-	256	26	282	282	-	-	-	-	-	-	-	-	-	-
2a.3.6	Survey and Release of Scrap Metal	-	-	-	-	-	-	1,494	224	1,718	1,718	-	-	-	-	-	-	-	-	-	-
2a.3	Subtotal Period 2a Collateral Costs	210	230	94	623	-	464	9,471	1,766	12,858	3,952	8,880	26	-	1,531	-	-	-	97,101	299	-
Period 2a Period-Dependent Costs																					
2a.4.1	Decon supplies	76	-	-	-	-	-	-	19	95	95	-	-	-	-	-	-	-	-	-	-
2a.4.2	Insurance	-	-	-	-	-	-	796	80	875	875	-	-	-	-	-	-	-	-	-	-
2a.4.3	Property taxes	-	-	-	-	-	-	4,656	466	5,121	4,609	-	512	-	-	-	-	-	-	-	-
2a.4.4	Health physics supplies	-	1,874	-	-	-	-	-	468	2,342	2,342	-	-	-	-	-	-	-	-	-	-
2a.4.5	Heavy equipment rental	-	3,082	-	-	-	-	-	462	3,544	3,544	-	-	-	-	-	-	-	-	-	-
2a.4.6	Disposal of DAW generated	-	-	85	30	-	225	-	69	409	409	-	-	-	4,846	-	-	-	97,106	159	-
2a.4.7	Plant energy budget	-	-	-	-	-	-	2,793	419	3,212	3,212	-	-	-	-	-	-	-	-	-	-
2a.4.8	NRC Fees	-	-	-	-	-	-	889	89	978	978	-	-	-	-	-	-	-	-	-	-
2a.4.9	Emergency Planning Fees	-	-	-	-	-	-	270	27	297	-	297	-	-	-	-	-	-	-	-	-
2a.4.10	Utility Site Indirect	-	-	-	-	-	-	2,105	316	2,421	2,421	-	-	-	-	-	-	-	-	-	-
2a.4.11	Spent Fuel Pool O&M	-	-	-	-	-	-	1,007	151	1,158	-	1,158	-	-	-	-	-	-	-	-	-
2a.4.12	Liquid Radwaste Processing Equipment/Services	-	-	-	-	-	-	253	38	291	291	-	-	-	-	-	-	-	-	-	-
2a.4.13	ISFSI Operating Costs	-	-	-	-	-	-	115	17	132	-	132	-	-	-	-	-	-	-	-	-
2a.4.14	Corporate Allocations	-	-	-	-	-	-	1,830	274	2,104	2,104	-	-	-	-	-	-	-	-	-	-
2a.4.15	Security Staff Cost	-	-	-	-	-	-	7,021	1,053	8,074	8,074	-	-	-	-	-	-	-	-	-	178,184
2a.4.16	DOC Staff Cost	-	-	-	-	-	-	16,856	2,528	19,384	19,384	-	-	-	-	-	-	-	-	-	214,103
2a.4.17	Utility Staff Cost	-	-	-	-	-	-	20,111	3,017	23,128	23,128	-	-	-	-	-	-	-	-	-	398,626
2a.4	Subtotal Period 2a Period-Dependent Costs	76	4,956	85	30	-	225	58,701	9,494	73,565	71,467	1,587	512	-	4,846	-	-	-	97,106	159	790,913
2a.0	TOTAL PERIOD 2a COST	1,843	25,018	10,582	6,808	6,086	26,084	68,589	34,204	179,215	166,233	10,466	2,515	63,663	64,630	2,608	517	-	8,399,404	275,830	800,825

Table C
Crystal River Nuclear Plant, Unit 3
DECON Decommissioning Cost Estimate
(thousands of 2008 dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt, Lbs.	Craft Manhours	Utility and Contractor Manhours
PERIOD 2b - Site Decontamination																					
Period 2b Direct Decommissioning Activities																					
Disposal of Plant Systems																					
2b.1.1.1	ACC Diesel Gen.	-	13	-	-	-	-	-	2	15	-	-	15	-	-	-	-	-	-	329	-
2b.1.1.2	Chemical Cleaning Steam Gen - Cont	-	21	0	1	14	-	-	7	43	43	-	-	151	-	-	-	-	6,141	466	-
2b.1.1.3	Chemical Cleaning Steam Gen - RCA	-	19	0	1	17	-	-	7	44	44	-	-	188	-	-	-	-	7,642	391	-
2b.1.1.4	Containment Monitoring	-	53	4	4	11	26	-	23	122	122	-	-	126	116	-	-	-	15,529	1,197	-
2b.1.1.5	Core Flooding	-	89	7	12	89	44	-	49	289	289	-	-	992	199	-	-	-	57,765	2,030	-
2b.1.1.6	Decay Heat Closed Cycle Cooling	-	304	32	70	578	250	-	239	1,472	1,472	-	-	6,466	1,115	-	-	-	362,167	7,049	-
2b.1.1.7	Decay Heat Removal	383	280	63	105	370	591	-	487	2,278	2,278	-	-	4,144	2,667	-	-	-	403,540	9,782	-
2b.1.1.8	Domestic Water	-	33	-	-	-	-	-	5	38	-	-	38	-	-	-	-	-	-	985	-
2b.1.1.9	Domestic Water - RCA	-	53	1	3	47	-	-	21	124	124	-	-	525	-	-	-	-	21,339	1,086	-
2b.1.1.10	Electrical - Clean	-	498	-	-	-	-	-	75	572	-	-	572	-	-	-	-	-	-	13,208	-
2b.1.1.11	Electrical - Contaminated	-	501	7	26	373	25	-	192	1,125	1,125	-	-	4,175	111	-	-	-	179,502	11,491	-
2b.1.1.12	Electrical - Decontaminated	-	3,084	58	227	3,725	-	-	1,369	8,463	8,463	-	-	41,690	-	-	-	-	1,693,054	68,485	-
2b.1.1.13	Fire Service Water	-	246	-	-	-	-	-	37	283	-	-	283	-	-	-	-	-	-	6,727	-
2b.1.1.14	Fire Service Water - RCA	-	442	10	39	637	-	-	213	1,340	1,340	-	-	7,126	-	-	-	-	289,375	9,566	-
2b.1.1.15	Floor & Equip Drains - Aux & Reac Bldg	-	170	24	43	152	244	-	135	770	770	-	-	1,705	1,086	-	-	-	166,620	3,881	-
2b.1.1.16	HVAC - Auxiliary Bldg	-	227	9	27	339	43	-	123	768	768	-	-	3,800	190	-	-	-	171,340	4,896	-
2b.1.1.17	HVAC - Clean Machine Shop	-	7	-	-	-	-	-	1	8	-	-	8	-	-	-	-	-	-	185	-
2b.1.1.18	HVAC - Control Complex	-	30	-	-	-	-	-	4	34	-	-	34	-	-	-	-	-	-	822	-
2b.1.1.19	HVAC - Diesel Gen Bldg	-	6	-	-	-	-	-	1	6	-	-	6	-	-	-	-	-	-	156	-
2b.1.1.20	HVAC - Fire Pump House	-	2	-	-	-	-	-	0	3	-	-	3	-	-	-	-	-	-	67	-
2b.1.1.21	HVAC - Hot Machine Shop	-	36	1	3	43	3	-	17	103	103	-	-	485	13	-	-	-	20,856	760	-
2b.1.1.22	HVAC - Intermediate Bldg	-	68	5	12	138	29	-	47	299	299	-	-	1,546	129	-	-	-	74,342	1,475	-
2b.1.1.23	HVAC - Maintenance Support	-	5	-	-	-	-	-	1	6	-	-	6	-	-	-	-	-	-	159	-
2b.1.1.24	HVAC - Office Bldg	-	6	-	-	-	-	-	1	7	-	-	7	-	-	-	-	-	-	168	-
2b.1.1.25	HVAC - Reactor Bldg	-	425	17	50	629	82	-	230	1,432	1,432	-	-	7,035	364	-	-	-	318,318	8,916	-
2b.1.1.26	HVAC - Turbine Bldg	-	95	-	-	-	-	-	14	109	-	-	109	-	-	-	-	-	-	2,992	-
2b.1.1.27	ICI Instrumentation	-	97	10	10	17	64	-	45	243	243	-	-	185	287	-	-	-	33,190	2,106	-
2b.1.1.28	Industrial Cooler Water	-	28	-	-	-	-	-	4	32	-	-	32	-	-	-	-	-	-	731	-
2b.1.1.29	Industrial Cooler Water - RCA	-	168	3	13	207	-	-	75	466	466	-	-	2,320	-	-	-	-	94,222	3,615	-
2b.1.1.30	Instrument & Station Service Air	-	63	-	-	-	-	-	9	72	-	-	72	-	-	-	-	-	-	1,884	-
2b.1.1.31	Instrument & Station Service Air - Cont	-	147	10	13	44	77	-	65	356	356	-	-	495	341	-	-	-	50,635	3,368	-
2b.1.1.32	Instrument & Station Service Air - RCA	-	241	3	11	180	-	-	89	523	523	-	-	2,012	-	-	-	-	81,728	5,095	-
2b.1.1.33	Leak Rate Test - Cont	-	80	4	8	31	43	-	37	204	204	-	-	343	193	-	-	-	31,210	1,843	-
2b.1.1.34	Leak Rate Test - RCA	-	70	1	5	84	-	-	31	192	192	-	-	945	-	-	-	-	38,385	1,533	-
2b.1.1.35	Liquid Waste Disposal	761	782	57	85	213	517	-	756	3,170	3,170	-	-	2,389	2,375	-	-	-	302,856	33,167	-
2b.1.1.36	Makeup & Purification	-	537	31	50	166	286	-	241	1,312	1,312	-	-	1,861	1,274	-	-	-	189,536	12,185	-
2b.1.1.37	Makeup & Purification - Insulated	-	136	7	11	31	68	-	58	312	312	-	-	348	302	-	-	-	41,216	3,135	-
2b.1.1.38	Nitrogen/Hydrogen/Carbon Dioxide - Cont	-	21	2	2	4	13	-	9	50	50	-	-	40	56	-	-	-	6,627	458	-
2b.1.1.39	Nitrogen/Hydrogen/Carbon Dioxide - RCA	-	70	1	4	58	-	-	27	158	158	-	-	644	-	-	-	-	26,153	1,394	-
2b.1.1.40	Noble Gas Effluent Monitoring - Cont	-	19	1	2	6	9	-	9	47	47	-	-	71	42	-	-	-	6,624	435	-
2b.1.1.41	Noble Gas Effluent Monitoring - RCA	-	14	0	1	14	-	-	6	35	35	-	-	152	-	-	-	-	6,172	299	-
2b.1.1.42	Nuc Serv Closed Cycle Cooling - Cont	-	632	52	108	754	444	-	403	2,393	2,393	-	-	8,438	1,971	-	-	-	519,414	14,535	-
2b.1.1.43	Nuc Serv Closed Cycle Cooling - RCA	-	509	22	85	1,395	-	-	351	2,362	2,362	-	-	15,611	-	-	-	-	633,983	11,179	-
2b.1.1.44	PASS Containment Monitoring - Cont	-	7	1	1	1	4	-	3	16	16	-	-	10	17	-	-	-	1,966	164	-
2b.1.1.45	PASS Containment Monitoring - RCA	-	15	0	1	11	-	-	5	32	32	-	-	128	-	-	-	-	5,207	306	-
2b.1.1.46	Post Accident Sampling - Cont	-	29	2	2	8	14	-	12	67	67	-	-	87	61	-	-	-	8,998	649	-
2b.1.1.47	Post Accident Sampling - RCA	-	25	0	1	21	-	-	10	57	57	-	-	237	-	-	-	-	9,629	520	-
2b.1.1.48	Post Accident Venting - Cont	-	32	2	4	21	20	-	17	97	97	-	-	239	88	-	-	-	17,545	735	-
2b.1.1.49	Post Accident Venting - RCA	-	11	0	1	14	-	-	5	32	32	-	-	162	-	-	-	-	6,581	231	-
2b.1.1.50	RB Penetration Cooling - RCA	-	97	1	5	86	-	-	38	228	228	-	-	960	-	-	-	-	39,005	2,105	-
2b.1.1.51	RCP Lube Oil - Cont	-	4	0	0	4	2	-	2	13	13	-	-	44	8	-	-	-	2,441	95	-
2b.1.1.52	RCP Lube Oil - RCA	-	3	0	0	5	-	-	2	10	10	-	-	58	-	-	-	-	2,361	66	-

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Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Disposal of Plant Systems (continued)																					
2b.1.1.53	Radwaste Demineralizer	25	29	2	3	12	17	-	27	116	116	-	-	138	76	-	-	-	12,394	1,191	-
2b.1.1.54	Reac Bldg Pressure Sensing & Test	-	2	-	-	-	-	-	0	2	-	-	2	-	-	-	-	-	-	55	-
2b.1.1.55	Reac Bldg Pressure Sensing & Test - RCA	-	34	0	2	26	-	-	13	74	74	-	-	293	-	-	-	-	11,905	673	-
2b.1.1.56	Reactor Building Spray	-	207	11	23	174	93	-	105	613	613	-	-	1,943	419	-	-	-	115,773	4,759	-
2b.1.1.57	Refueling Equipment	-	137	9	19	79	101	-	75	421	421	-	-	890	450	-	-	-	76,479	3,295	-
2b.1.1.58	Sewage	-	10	-	-	-	-	-	1	11	-	-	11	-	-	-	-	-	-	282	-
2b.1.1.59	Waste Gas Sampling	-	60	5	6	13	35	-	27	146	146	-	-	142	155	-	-	-	19,694	1,330	-
2b.1.1.60	Wet Layup/N2 Blanketing	-	3	-	-	-	-	-	1	4	-	-	4	-	-	-	-	-	-	112	-
2b.1.1.61	Wet Layup/N2 Blanketing - Cont	-	6	0	0	4	-	-	2	13	13	-	-	40	-	-	-	-	1,626	146	-
2b.1.1.62	Wet Layup/N2 Blanketing - RCA	-	3	0	0	2	-	-	1	6	6	-	-	24	-	-	-	-	978	61	-
2b.1.1	Totals	1,169	11,040	478	1,099	10,847	3,142	-	5,865	33,639	32,436	-	1,204	121,405	14,102	-	-	-	6,182,062	271,010	-
2b.1.2	Scaffolding in support of decommissioning	-	1,019	18	8	97	8	-	274	1,424	1,424	-	-	980	55	-	-	-	49,300	29,465	-
Decontamination of Site Buildings																					
2b.1.3.1	Reactor	940	802	149	310	203	1,087	-	1,034	4,524	4,524	-	-	2,269	8,454	-	-	-	898,178	37,877	-
2b.1.3.2	Auxiliary Building	326	185	34	74	44	102	-	256	1,023	1,023	-	-	497	1,885	-	-	-	207,380	11,220	-
2b.1.3.3	Intermediate Bldg	67	41	8	17	19	22	-	55	228	228	-	-	208	409	-	-	-	49,118	2,343	-
2b.1.3.4	Machine Shop - Hot	50	24	6	12	0	17	-	38	147	147	-	-	3	313	-	-	-	31,388	1,623	-
2b.1.3.5	RVCH Storage Building	4	3	0	1	2	1	-	4	16	16	-	-	27	21	-	-	-	3,176	158	-
2b.1.3.6	Rad Materials Storage & Processing Bldg	32	15	3	8	-	11	-	24	92	92	-	-	-	198	-	-	-	19,770	1,016	-
2b.1.3	Totals	1,420	1,069	200	421	268	1,240	-	1,411	6,030	6,030	-	-	3,004	11,280	-	-	-	1,209,010	54,237	-
2b.1	Subtotal Period 2b Activity Costs	2,589	13,128	696	1,528	11,212	4,390	-	7,550	41,094	39,890	-	1,204	125,389	25,438	-	-	-	7,440,372	354,712	-
Period 2b Additional Costs																					
2b.2.1	Asbestos Removal Program	-	34	18	19	2	213	-	65	350	350	-	-	500	500	-	-	-	25,000	940	-
2b.2	Subtotal Period 2b Additional Costs	-	34	18	19	2	213	-	65	350	350	-	-	500	500	-	-	-	25,000	940	-
Period 2b Collateral Costs																					
2b.3.1	Process liquid waste	146	-	132	899	-	903	-	447	2,525	2,525	-	-	-	2,153	-	-	-	188,860	420	-
2b.3.2	Small tool allowance	-	272	-	-	-	-	-	41	313	313	-	-	-	-	-	-	-	-	-	-
2b.3.3	Spent Fuel Capital and Transfer	-	-	-	-	-	-	5,258	789	6,046	-	6,046	-	-	-	-	-	-	-	-	-
2b.3.4	ISFSI Capital Expenditures	-	-	-	-	-	-	13,899	2,085	15,983	-	15,983	-	-	-	-	-	-	-	-	-
2b.3.5	Florida LLRW Inspection Fee	-	-	-	-	-	-	314	31	345	345	-	-	-	-	-	-	-	-	-	-
2b.3.6	Survey and Release of Scrap Metal	-	-	-	-	-	-	1,867	280	2,147	2,147	-	-	-	-	-	-	-	-	-	-
2b.3	Subtotal Period 2b Collateral Costs	146	272	132	899	-	903	21,337	3,672	27,361	5,331	22,030	-	-	2,153	-	-	-	188,860	420	-
Period 2b Period-Dependent Costs																					
2b.4.1	Decon supplies	877	-	-	-	-	-	-	219	1,096	1,096	-	-	-	-	-	-	-	-	-	-
2b.4.2	Insurance	-	-	-	-	-	-	1,561	156	1,717	1,717	-	-	-	-	-	-	-	-	-	-
2b.4.3	Property taxes	-	-	-	-	-	-	7,332	733	8,065	8,065	-	-	-	-	-	-	-	-	-	-
2b.4.4	Health physics supplies	-	2,843	-	-	-	-	-	711	3,554	3,554	-	-	-	-	-	-	-	-	-	-
2b.4.5	Heavy equipment rental	-	6,002	-	-	-	-	-	900	6,902	6,902	-	-	-	-	-	-	-	-	-	-
2b.4.6	Disposal of DAW generated	-	-	119	42	-	316	-	97	574	574	-	-	-	6,803	-	-	-	136,330	224	-
2b.4.7	Plant energy budget	-	-	-	-	-	-	4,325	649	4,974	4,974	-	-	-	-	-	-	-	-	-	-
2b.4.8	NRC Fees	-	-	-	-	-	-	1,744	174	1,918	1,918	-	-	-	-	-	-	-	-	-	-
2b.4.9	Emergency Planning Fees	-	-	-	-	-	-	530	53	582	-	582	-	-	-	-	-	-	-	-	-
2b.4.10	Utility Site Indirect	-	-	-	-	-	-	3,976	596	4,572	4,572	-	-	-	-	-	-	-	-	-	-
2b.4.11	Spent Fuel Pool O&M	-	-	-	-	-	-	1,975	296	2,271	-	2,271	-	-	-	-	-	-	-	-	-
2b.4.12	Liquid Radwaste Processing Equipment/Services	-	-	-	-	-	-	497	75	571	571	-	-	-	-	-	-	-	-	-	-
2b.4.13	ISFSI Operating Costs	-	-	-	-	-	-	225	34	259	-	259	-	-	-	-	-	-	-	-	-
2b.4.14	Corporate Allocations	-	-	-	-	-	-	3,437	516	3,953	3,953	-	-	-	-	-	-	-	-	-	-
2b.4.15	Security Staff Cost	-	-	-	-	-	-	13,771	2,066	15,837	15,837	-	-	-	-	-	-	-	-	-	349,501
2b.4.16	DOC Staff Cost	-	-	-	-	-	-	31,861	4,779	36,640	36,640	-	-	-	-	-	-	-	-	-	403,377
2b.4.17	Utility Staff Cost	-	-	-	-	-	-	37,880	5,682	43,562	43,562	-	-	-	-	-	-	-	-	-	748,734

Table C
Crystal River Nuclear Plant, Unit 3
DECON Decommissioning Cost Estimate
(thousands of 2008 dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
2b.4	Subtotal Period 2b Period-Dependent Costs	877	8,845	119	42	-	316	109,113	17,736	137,048	133,935	3,112	-	-	6,803	-	-	-	136,330	224	1,501,613
2b.0	TOTAL PERIOD 2b COST	3,612	22,279	965	2,488	11,214	5,822	130,450	29,023	205,852	179,506	25,142	1,204	125,889	34,894	-	-	-	7,790,563	356,296	1,501,613
PERIOD 2c - Decontamination Following Wet Fuel Storage																					
Period 2c Direct Decommissioning Activities																					
2c.1.1	Remove spent fuel racks	348	36	131	80	-	571	-	351	1,516	1,516	-	-	-	2,534	-	-	-	227,343	989	-
Disposal of Plant Systems																					
2c.1.2.1	HVAC - Fuel Handling Area	-	209	5	18	255	17	-	98	602	602	-	-	2,851	76	-	-	-	122,597	4,273	-
2c.1.2.2	Spent Fuel Cooling	351	314	33	62	195	358	-	385	1,698	1,698	-	-	2,184	1,589	-	-	-	231,247	10,068	-
2c.1.2	Totals	351	523	38	80	450	375	-	483	2,300	2,300	-	-	5,035	1,665	-	-	-	353,844	14,341	-
Decontamination of Site Buildings																					
2c.1.3.1	Fuel Handling Area (Aux Bldg)	782	674	32	74	391	85	-	654	2,691	2,691	-	-	4,376	1,392	-	-	-	315,700	31,542	-
2c.1.3	Totals	782	674	32	74	391	85	-	654	2,691	2,691	-	-	4,376	1,392	-	-	-	315,700	31,542	-
2c.1.4	Scaffolding in support of decommissioning	-	204	4	2	19	2	-	55	285	285	-	-	196	11	-	-	-	9,860	5,893	-
2c.1	Subtotal Period 2c Activity Costs	1,481	1,437	205	235	860	1,032	-	1,543	6,793	6,793	-	-	9,607	5,602	-	-	-	906,747	52,764	-
Period 2c Additional Costs																					
2c.2.1	License Termination Survey Program Management	-	-	-	-	-	-	1,106	332	1,438	1,438	-	-	-	-	-	-	-	-	-	12,460
2c.2	Subtotal Period 2c Additional Costs	-	-	-	-	-	-	1,106	332	1,438	1,438	-	-	-	-	-	-	-	-	-	12,460
Period 2c Collateral Costs																					
2c.3.1	Process liquid waste	118	-	97	662	-	648	-	330	1,855	1,855	-	-	-	1,589	-	-	-	135,566	310	-
2c.3.2	Small tool allowance	-	50	-	-	-	-	-	7	57	57	-	-	-	-	-	-	-	-	-	-
2c.3.3	Decommissioning Equipment Disposition	-	-	113	56	594	84	-	130	977	977	-	-	6,000	373	-	-	-	303,507	88	-
2c.3.4	Spent Fuel Capital and Transfer	-	-	-	-	-	-	1,262	189	1,451	-	1,451	-	-	-	-	-	-	-	-	-
2c.3.5	Florida LLRW Inspection Fee	-	-	-	-	-	-	49	5	54	54	-	-	-	-	-	-	-	-	-	-
2c.3.6	Survey and Release of Scrap Metal	-	-	-	-	-	-	373	56	429	429	-	-	-	-	-	-	-	-	-	-
2c.3	Subtotal Period 2c Collateral Costs	118	50	210	718	594	732	1,684	718	4,823	3,372	1,451	-	6,000	1,963	-	-	-	439,073	398	-
Period 2c Period-Dependent Costs																					
2c.4.1	Decon supplies	230	-	-	-	-	-	-	58	288	288	-	-	-	-	-	-	-	-	-	-
2c.4.2	Insurance	-	-	-	-	-	-	434	43	478	478	-	-	-	-	-	-	-	-	-	-
2c.4.3	Property taxes	-	-	-	-	-	-	1,552	155	1,708	1,708	-	-	-	-	-	-	-	-	-	-
2c.4.4	Health physics supplies	-	553	-	-	-	-	-	138	692	692	-	-	-	-	-	-	-	-	-	-
2c.4.5	Heavy equipment rental	-	1,670	-	-	-	-	-	250	1,920	1,920	-	-	-	-	-	-	-	-	-	-
2c.4.6	Disposal of DAW generated	-	-	31	11	-	83	-	26	151	151	-	-	-	1,790	-	-	-	35,877	59	-
2c.4.7	Plant energy budget	-	-	-	-	-	-	642	96	738	738	-	-	-	-	-	-	-	-	-	-
2c.4.8	NRC Fees	-	-	-	-	-	-	485	49	534	534	-	-	-	-	-	-	-	-	-	-
2c.4.9	Emergency Planning Fees	-	-	-	-	-	-	147	15	162	-	162	-	-	-	-	-	-	-	-	-
2c.4.10	Utility Site Indirect	-	-	-	-	-	-	822	123	945	945	-	-	-	-	-	-	-	-	-	-
2c.4.11	Liquid Radwaste Processing Equipment/Services	-	-	-	-	-	-	276	41	318	318	-	-	-	-	-	-	-	-	-	-
2c.4.12	ISFSI Operating Costs	-	-	-	-	-	-	63	9	72	-	72	-	-	-	-	-	-	-	-	-
2c.4.13	Corporate Allocations	-	-	-	-	-	-	674	101	775	775	-	-	-	-	-	-	-	-	-	-
2c.4.14	Security Staff Cost	-	-	-	-	-	-	2,148	322	2,470	2,470	-	-	-	-	-	-	-	-	-	51,110
2c.4.15	DOC Staff Cost	-	-	-	-	-	-	6,080	912	6,992	6,992	-	-	-	-	-	-	-	-	-	76,857
2c.4.16	Utility Staff Cost	-	-	-	-	-	-	7,706	1,156	8,861	8,861	-	-	-	-	-	-	-	-	-	146,797
2c.4	Subtotal Period 2c Period-Dependent Costs	230	2,223	31	11	-	83	21,029	3,495	27,103	26,869	234	-	-	1,790	-	-	-	35,877	59	274,764
2c.0	TOTAL PERIOD 2c COST	1,830	3,709	447	963	1,454	1,848	23,819	6,087	40,157	38,472	1,685	-	15,607	9,355	-	-	-	1,381,697	53,221	287,244

Table C
Crystal River Nuclear Plant, Unit 3
DECON Decommissioning Cost Estimate
(thousands of 2008 dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
PERIOD 2e - License Termination																					
Period 2e Direct Decommissioning Activities																					
2e.1.1	ORISE confirmatory survey	-	-	-	-	-	-	155	46	201	201	-	-	-	-	-	-	-	-	-	-
2e.1.2	Terminate license									a											
2e.1	Subtotal Period 2e Activity Costs	-	-	-	-	-	-	155	46	201	201	-	-	-	-	-	-	-	-	-	-
Period 2e Additional Costs																					
2e.2.1	License Termination Survey	-	-	-	-	-	-	5,880	1,764	7,644	7,644	-	-	-	-	-	-	-	-	117,057	6,240
2e.2	Subtotal Period 2e Additional Costs	-	-	-	-	-	-	5,880	1,764	7,644	7,644	-	-	-	-	-	-	-	-	117,057	6,240
Period 2e Collateral Costs																					
2e.3.1	DOC staff relocation expenses	-	-	-	-	-	-	1,322	198	1,520	1,520	-	-	-	-	-	-	-	-	-	-
2e.3.2	Spent Fuel Capital and Transfer	-	-	-	-	-	-	224	34	257	-	257	-	-	-	-	-	-	-	-	-
2e.3.3	Florida LLRW Inspection Fee	-	-	-	-	-	-	1	0	1	1	-	-	-	-	-	-	-	-	-	-
2e.3	Subtotal Period 2e Collateral Costs	-	-	-	-	-	-	1,546	232	1,778	1,521	257	-	-	-	-	-	-	-	-	-
Period 2e Period-Dependent Costs																					
2e.4.1	Insurance	-	-	-	-	-	-	398	40	438	438	-	-	-	-	-	-	-	-	-	-
2e.4.2	Property taxes	-	-	-	-	-	-	1,328	133	1,461	1,461	-	-	-	-	-	-	-	-	-	-
2e.4.3	Health physics supplies	-	806	-	-	-	-	-	202	1,008	1,008	-	-	-	-	-	-	-	-	-	-
2e.4.4	Disposal of DAW generated	-	-	7	2	-	18	-	6	33	33	-	-	-	389	-	-	-	7,792	13	-
2e.4.5	Plant energy budget	-	-	-	-	-	-	324	49	373	373	-	-	-	-	-	-	-	-	-	-
2e.4.6	NRC Fees	-	-	-	-	-	-	526	53	578	578	-	-	-	-	-	-	-	-	-	-
2e.4.7	Emergency Planning Fees	-	-	-	-	-	-	149	15	164	-	164	-	-	-	-	-	-	-	-	-
2e.4.8	Utility Site Indirect	-	-	-	-	-	-	515	77	593	593	-	-	-	-	-	-	-	-	-	-
2e.4.9	ISFSI Operating Costs	-	-	-	-	-	-	63	9	73	-	73	-	-	-	-	-	-	-	-	-
2e.4.10	Corporate Allocations	-	-	-	-	-	-	367	55	423	423	-	-	-	-	-	-	-	-	-	-
2e.4.11	Security Staff Cost	-	-	-	-	-	-	2,130	319	2,449	2,449	-	-	-	-	-	-	-	-	-	50,514
2e.4.12	DOC Staff Cost	-	-	-	-	-	-	4,780	717	5,497	5,497	-	-	-	-	-	-	-	-	-	56,731
2e.4.13	Utility Staff Cost	-	-	-	-	-	-	4,595	689	5,284	5,284	-	-	-	-	-	-	-	-	-	80,046
2e.4	Subtotal Period 2e Period-Dependent Costs	-	806	7	2	-	18	15,175	2,363	18,372	18,135	237	-	-	389	-	-	-	7,792	13	187,291
2e.0	TOTAL PERIOD 2e COST	-	806	7	2	-	18	22,756	4,406	27,995	27,502	494	-	-	389	-	-	-	7,792	117,070	193,531
PERIOD 2 TOTALS		7,285	51,613	12,900	10,261	18,754	33,771	245,614	73,720	453,219	411,713	37,787	3,719	205,160	109,267	2,608	517	-	17,579,460	802,417	2,783,213
PERIOD 3b - Site Restoration																					
Period 3b Direct Decommissioning Activities																					
Demolition of Remaining Site Buildings																					
3b.1.1.1	Reactor	-	3,790	-	-	-	-	-	568	4,358	-	-	4,358	-	-	-	-	-	-	47,823	-
3b.1.1.2	AAC Diesel Generator Building	-	18	-	-	-	-	-	3	21	-	-	21	-	-	-	-	-	-	223	-
3b.1.1.3	Auxiliary Building	-	1,436	-	-	-	-	-	215	1,651	-	-	1,651	-	-	-	-	-	-	19,011	-
3b.1.1.4	Control Complex	-	695	-	-	-	-	-	104	799	-	-	799	-	-	-	-	-	-	9,432	-
3b.1.1.5	Diesel Generator Bldg	-	267	-	-	-	-	-	40	307	-	-	307	-	-	-	-	-	-	4,335	-
3b.1.1.6	EFW Pump Building	-	115	-	-	-	-	-	17	133	-	-	133	-	-	-	-	-	-	1,711	-
3b.1.1.7	Fire Pumphouse	-	14	-	-	-	-	-	2	16	-	-	16	-	-	-	-	-	-	315	-
3b.1.1.8	Intake & Discharge Structures	-	389	-	-	-	-	-	58	447	-	-	447	-	-	-	-	-	-	6,051	-
3b.1.1.9	Intermediate Bldg	-	715	-	-	-	-	-	107	823	-	-	823	-	-	-	-	-	-	5,866	-
3b.1.1.10	Machine Shop - Cold	-	74	-	-	-	-	-	11	85	-	-	85	-	-	-	-	-	-	1,460	-
3b.1.1.11	Machine Shop - Hot	-	70	-	-	-	-	-	11	81	-	-	81	-	-	-	-	-	-	1,396	-
3b.1.1.12	Maintenance Support Bldg	-	49	-	-	-	-	-	7	56	-	-	56	-	-	-	-	-	-	1,077	-
3b.1.1.13	Misc Yard Structures & Foundations	-	1,377	-	-	-	-	-	207	1,584	-	-	1,584	-	-	-	-	-	-	12,067	-
3b.1.1.14	Outage Support Bldg	-	18	-	-	-	-	-	3	20	-	-	20	-	-	-	-	-	-	418	-
3b.1.1.15	RVCH Storage Building	-	68	-	-	-	-	-	10	78	-	-	78	-	-	-	-	-	-	1,090	-

Table C
Crystal River Nuclear Plant, Unit 3
DECON Decommissioning Cost Estimate
(thousands of 2008 dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Demolition of Remaining Site Buildings (continued)																					
3b.1.1.16	Rad Materials Storage & Processing Bldg	-	34	-	-	-	-	-	5	39	-	-	39	-	-	-	-	-	-	445	-
3b.1.1.17	Rusty Bldg	-	214	-	-	-	-	-	32	246	-	-	246	-	-	-	-	-	-	3,770	-
3b.1.1.18	Turbine Building	-	2,008	-	-	-	-	-	301	2,310	-	-	2,310	-	-	-	-	-	-	27,791	-
3b.1.1.19	Turbine Pedestal	-	411	-	-	-	-	-	62	473	-	-	473	-	-	-	-	-	-	4,730	-
3b.1.1.20	Warehouse Bldg (Maint) Mezzanine	-	142	-	-	-	-	-	21	163	-	-	163	-	-	-	-	-	-	2,786	-
3b.1.1.21	Fuel Handling Area (Aux Bldg)	-	947	-	-	-	-	-	142	1,089	-	-	1,089	-	-	-	-	-	-	12,441	-
3b.1.1	Totals	-	12,852	-	-	-	-	-	1,928	14,780	-	-	14,780	-	-	-	-	-	-	164,238	-
Site Closeout Activities																					
3b.1.2	BackFill Site	-	699	-	-	-	-	-	105	804	-	-	804	-	-	-	-	-	-	1,560	-
3b.1.3	Grade & landscape site	-	147	-	-	-	-	-	22	169	-	-	169	-	-	-	-	-	-	316	-
3b.1.4	Final report to NRC	-	-	-	-	-	-	177	27	204	204	-	-	-	-	-	-	-	-	-	1,560
3b.1	Subtotal Period 3b Activity Costs	-	13,698	-	-	-	-	177	2,081	15,957	204	-	15,753	-	-	-	-	-	-	166,114	1,560
Period 3b Additional Costs																					
3b.2.1	Intake Structure Cofferdam	-	265	-	-	-	-	-	40	305	-	-	305	-	-	-	-	-	-	2,531	-
3b.2.2	Discharge Structure Cofferdam	-	198	-	-	-	-	-	30	228	-	-	228	-	-	-	-	-	-	1,896	-
3b.2.3	Concrete Crushing	-	485	-	-	-	-	8	73	566	-	-	566	-	-	-	-	-	-	2,367	-
3b.2.4	Firing Range Closure	-	734	-	-	-	-	-	110	844	-	-	844	-	-	-	-	-	-	-	-
3b.2	Subtotal Period 3b Additional Costs	-	1,683	-	-	-	-	8	252	1,943	-	-	1,943	-	-	-	-	-	-	6,794	-
Period 3b Collateral Costs																					
3b.3.1	Small tool allowance	-	138	-	-	-	-	-	21	158	-	-	158	-	-	-	-	-	-	-	-
3b.3.2	Spent Fuel Capital and Transfer	-	-	-	-	-	-	147	22	169	-	169	-	-	-	-	-	-	-	-	-
3b.3	Subtotal Period 3b Collateral Costs	-	138	-	-	-	-	147	43	328	-	169	158	-	-	-	-	-	-	-	-
Period 3b Period-Dependent Costs																					
3b.4.1	Insurance	-	-	-	-	-	-	903	90	994	-	994	-	-	-	-	-	-	-	-	-
3b.4.2	Property taxes	-	-	-	-	-	-	1,563	156	1,720	(0)	464	1,255	-	-	-	-	-	-	-	-
3b.4.3	Heavy equipment rental	-	5,131	-	-	-	-	-	770	5,901	-	-	5,901	-	-	-	-	-	-	-	-
3b.4.4	Plant energy budget	-	-	-	-	-	-	368	55	423	-	-	423	-	-	-	-	-	-	-	-
3b.4.5	NRC ISFSI Fees	-	-	-	-	-	-	429	43	472	-	472	-	-	-	-	-	-	-	-	-
3b.4.6	Emergency Planning Fees	-	-	-	-	-	-	338	34	372	-	372	-	-	-	-	-	-	-	-	-
3b.4.7	Utility Site Indirect	-	-	-	-	-	-	299	45	344	344	-	-	-	-	-	-	-	-	-	-
3b.4.8	ISFSI Operating Costs	-	-	-	-	-	-	144	22	165	-	165	-	-	-	-	-	-	-	-	-
3b.4.9	Corporate Allocations	-	-	-	-	-	-	441	66	507	507	-	-	-	-	-	-	-	-	-	-
3b.4.10	Security Staff Cost	-	-	-	-	-	-	4,831	725	5,555	0	4,722	833	-	-	-	-	-	-	-	114,586
3b.4.11	DOC Staff Cost	-	-	-	-	-	-	10,463	1,569	12,033	-	-	12,033	-	-	-	-	-	-	-	119,874
3b.4.12	Utility Staff Cost	-	-	-	-	-	-	5,376	806	6,182	(0)	1,546	4,637	-	-	-	-	-	-	-	96,076
3b.4	Subtotal Period 3b Period-Dependent Costs	-	5,131	-	-	-	-	25,155	4,381	34,668	851	8,734	25,082	-	-	-	-	-	-	-	330,536
3b.0	TOTAL PERIOD 3b COST	-	20,650	-	-	-	-	25,487	6,758	52,895	1,055	8,903	42,936	-	-	-	-	-	-	172,908	332,096
PERIOD 3c - Fuel Storage Operations/Shipping																					
Period 3c Direct Decommissioning Activities																					
Period 3c Collateral Costs																					
3c.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	4,082	612	4,694	-	4,694	-	-	-	-	-	-	-	-	-
3c.3	Subtotal Period 3c Collateral Costs	-	-	-	-	-	-	4,082	612	4,694	-	4,694	-	-	-	-	-	-	-	-	-
Period 3c Period-Dependent Costs																					
3c.4.1	Insurance	-	-	-	-	-	-	14,636	1,464	16,100	-	16,100	-	-	-	-	-	-	-	-	-
3c.4.2	Property taxes	-	-	-	-	-	-	9,033	903	9,936	-	9,936	-	-	-	-	-	-	-	-	-
3c.4.3	Plant energy budget	-	-	-	-	-	-	1,788	268	2,057	-	2,057	-	-	-	-	-	-	-	-	-
3c.4.4	NRC ISFSI Fees	-	-	-	-	-	-	6,951	695	7,646	-	7,646	-	-	-	-	-	-	-	-	-

Table C
Crystal River Nuclear Plant, Unit 3
DECON Decommissioning Cost Estimate
(thousands of 2008 dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt, Lbs.	Craft Manhours	Utility and Contractor Manhours
Period 3c Period-Dependent Costs (continued)																					
3c.4.5	Emergency Planning Fees	-	-	-	-	-	-	5,474	547	6,021	-	6,021	-	-	-	-	-	-	-	-	-
3c.4.6	Utility Site Indirect	-	-	-	-	-	-	1,202	180	1,382	-	1,382	-	-	-	-	-	-	-	-	-
3c.4.7	ISFSI Operating Costs	-	-	-	-	-	-	2,325	349	2,674	-	2,674	-	-	-	-	-	-	-	-	-
3c.4.8	Corporate Allocations	-	-	-	-	-	-	1,770	265	2,035	-	2,035	-	-	-	-	-	-	-	-	-
3c.4.9	Security Staff Cost	-	-	-	-	-	-	66,797	10,019	76,816	-	76,816	-	-	-	-	-	-	-	-	1,542,240
3c.4.10	Utility Staff Cost	-	-	-	-	-	-	21,811	3,272	25,083	-	25,083	-	-	-	-	-	-	-	-	385,560
3c.4	Subtotal Period 3c Period-Dependent Costs	-	-	-	-	-	-	131,787	17,963	149,750	-	149,750	-	-	-	-	-	-	-	-	1,927,800
3c.0	TOTAL PERIOD 3c COST	-	-	-	-	-	-	135,869	18,576	154,444	-	154,444	-	-	-	-	-	-	-	-	1,927,800
PERIOD 3d - GTCC shipping																					
Period 3d Direct Decommissioning Activities																					
Nuclear Steam Supply System Removal																					
3d.1.1.1	Vessel & Internals GTCC Disposal	-	-	300	-	-	10,602	-	1,620	12,522	12,522	-	-	-	-	-	-	524	105,646	-	-
3d.1.1	Totals	-	-	300	-	-	10,602	-	1,620	12,522	12,522	-	-	-	-	-	-	524	105,646	-	-
3d.1	Subtotal Period 3d Activity Costs	-	-	300	-	-	10,602	-	1,620	12,522	12,522	-	-	-	-	-	-	524	105,646	-	-
Period 3d Collateral Costs																					
3d.3.1	Florida LLRW Inspection Fee	-	-	-	-	-	-	1	0	1	-	1	-	-	-	-	-	-	-	-	-
3d.3	Subtotal Period 3d Collateral Costs	-	-	-	-	-	-	1	0	1	-	1	-	-	-	-	-	-	-	-	-
Period 3d Period-Dependent Costs																					
3d.4.1	Insurance	-	-	-	-	-	-	20	2	23	-	23	-	-	-	-	-	-	-	-	-
3d.4.2	Property taxes	-	-	-	-	-	-	2	0	2	-	2	-	-	-	-	-	-	-	-	-
3d.4.3	Plant energy budget	-	-	-	-	-	-	3	0	3	-	3	-	-	-	-	-	-	-	-	-
3d.4.4	NRC ISFSI Fees	-	-	-	-	-	-	8	1	8	-	8	-	-	-	-	-	-	-	-	-
3d.4.5	Emergency Planning Fees	-	-	-	-	-	-	8	1	8	-	8	-	-	-	-	-	-	-	-	-
3d.4.6	Utility Site Indirect	-	-	-	-	-	-	2	0	2	-	2	-	-	-	-	-	-	-	-	-
3d.4.7	ISFSI Operating Costs	-	-	-	-	-	-	3	0	4	-	4	-	-	-	-	-	-	-	-	-
3d.4.8	Corporate Allocations	-	-	-	-	-	-	2	0	3	-	3	-	-	-	-	-	-	-	-	-
3d.4.9	Security Staff Cost	-	-	-	-	-	-	94	14	108	-	108	-	-	-	-	-	-	-	-	2,160
3d.4.10	Utility Staff Cost	-	-	-	-	-	-	31	5	35	-	35	-	-	-	-	-	-	-	-	540
3d.4	Subtotal Period 3d Period-Dependent Costs	-	-	-	-	-	-	172	24	196	-	196	-	-	-	-	-	-	-	-	2,700
3d.0	TOTAL PERIOD 3d COST	-	-	300	-	-	10,602	173	1,644	12,719	12,522	197	-	-	-	-	-	524	105,646	-	2,700
PERIOD 3e - ISFSI Decontamination																					
Period 3e Direct Decommissioning Activities																					
Period 3e Additional Costs																					
3e.2.1	ISFSI License Termination	-	234	3	216	-	160	1,642	378	2,634	-	2,634	-	-	753	-	-	-	707,847	6,943	2,560
3e.2	Subtotal Period 3e Additional Costs	-	234	3	216	-	160	1,642	378	2,634	-	2,634	-	-	753	-	-	-	707,847	6,943	2,560
Period 3e Collateral Costs																					
3e.3.1	Small tool allowance	-	4	-	-	-	-	-	1	5	-	5	-	-	-	-	-	-	-	-	-
3e.3.2	Florida LLRW Inspection Fee	-	-	-	-	-	-	1	0	2	-	2	-	-	-	-	-	-	-	-	-
3e.3	Subtotal Period 3e Collateral Costs	-	4	-	-	-	-	1	1	6	-	6	-	-	-	-	-	-	-	-	-
Period 3e Period-Dependent Costs																					
3e.4.1	Insurance	-	-	-	-	-	-	177	18	195	-	195	-	-	-	-	-	-	-	-	-
3e.4.2	Property taxes	-	-	-	-	-	-	3	0	4	-	4	-	-	-	-	-	-	-	-	-
3e.4.3	Heavy equipment rental	-	300	-	-	-	-	-	45	345	-	345	-	-	-	-	-	-	-	-	-
3e.4.4	Plant energy budget	-	-	-	-	-	-	36	5	41	-	41	-	-	-	-	-	-	-	-	-

Table C
Crystal River Nuclear Plant, Unit 3
DECON Decommissioning Cost Estimate
(thousands of 2008 dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt, Lbs.	Craft Manhours	Utility and Contractor Manhours
Period 3e Period-Dependent Costs (continued)																					
3e.4.5	NRC ISFSI Fees	-	-	-	-	-	-	65	7	72	-	72	-	-	-	-	-	-	-	-	-
3e.4.6	Utility Site Indirect	-	-	-	-	-	-	12	2	14	-	14	-	-	-	-	-	-	-	-	-
3e.4.7	Corporate Allocations	-	-	-	-	-	-	17	3	20	-	20	-	-	-	-	-	-	-	-	-
3e.4.8	Security Staff Cost	-	-	-	-	-	-	250	37	287	-	287	-	-	-	-	-	-	-	-	5,013
3e.4.9	Utility Staff Cost	-	-	-	-	-	-	224	34	258	-	258	-	-	-	-	-	-	-	-	3,803
3e.4	Subtotal Period 3e Period-Dependent Costs	-	300	-	-	-	-	786	151	1,236	-	1,236	-	-	-	-	-	-	-	-	8,816
3e.0	TOTAL PERIOD 3e COST	-	538	3	216	-	160	2,430	529	3,876	-	3,876	-	-	753	-	-	-	707,847	6,943	11,376
PERIOD 3f - ISFSI Site Restoration																					
Period 3f Direct Decommissioning Activities																					
Period 3f Additional Costs																					
3f.2.1	ISFSI Demolition	-	818	-	-	-	-	39	210	1,067	-	1,067	-	-	-	-	-	-	-	1,495	80
3f.2	Subtotal Period 3f Additional Costs	-	818	-	-	-	-	39	210	1,067	-	1,067	-	-	-	-	-	-	-	1,495	80
Period 3f Collateral Costs																					
3f.3.1	Small tool allowance	-	1	-	-	-	-	-	0	1	-	1	-	-	-	-	-	-	-	-	-
3f.3	Subtotal Period 3f Collateral Costs	-	1	-	-	-	-	-	0	1	-	1	-	-	-	-	-	-	-	-	-
Period 3f Period-Dependent Costs																					
3f.4.1	Insurance	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3f.4.2	Property taxes	-	-	-	-	-	-	6	1	7	-	7	-	-	-	-	-	-	-	-	-
3f.4.3	Heavy equipment rental	-	98	-	-	-	-	-	15	113	-	113	-	-	-	-	-	-	-	-	-
3f.4.4	Plant energy budget	-	-	-	-	-	-	18	3	21	-	21	-	-	-	-	-	-	-	-	-
3f.4.5	Utility Site Indirect	-	-	-	-	-	-	5	1	6	-	6	-	-	-	-	-	-	-	-	-
3f.4.6	Corporate Allocations	-	-	-	-	-	-	7	1	8	-	8	-	-	-	-	-	-	-	-	-
3f.4.7	Security Staff Cost	-	-	-	-	-	-	124	19	143	-	143	-	-	-	-	-	-	-	-	2,486
3f.4.8	Utility Staff Cost	-	-	-	-	-	-	97	15	112	-	112	-	-	-	-	-	-	-	-	1,543
3f.4	Subtotal Period 3f Period-Dependent Costs	-	98	-	-	-	-	258	53	409	-	409	-	-	-	-	-	-	-	-	4,029
3f.0	TOTAL PERIOD 3f COST	-	918	-	-	-	-	296	264	1,477	-	1,477	-	-	-	-	-	-	-	1,495	4,109
PERIOD 3 TOTALS		-	22,105	303	216	-	10,762	164,255	27,770	225,412	13,577	168,898	42,936	-	753	-	-	524	813,493	181,346	2,278,080
TOTAL COST TO DECOMMISSION		10,098	76,380	12,404	11,590	18,780	48,604	520,107	120,301	818,264	547,328	222,874	48,063	205,656	113,497	3,674	517	524	20,087,830	1,004,220	6,115,023

Table C
Crystal River Nuclear Plant, Unit 3
DECON Decommissioning Cost Estimate
(thousands of 2008 dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			

TOTAL COST TO DECOMMISSION WITH 17.24% CONTINGENCY:	$818,264	thousands of 2008 dollars
TOTAL NRC LICENSE TERMINATION COST IS 66.89% OR:	$547,328	thousands of 2008 dollars
SPENT FUEL MANAGEMENT COST IS 27.24% OR:	$222,873	thousands of 2008 dollars
NON-NUCLEAR DEMOLITION COST IS 5.87% OR:	$48,063	thousands of 2008 dollars
TOTAL LOW-LEVEL RADIOACTIVE WASTE VOLUME BURIED (EXCLUDING GTCC):	117,687	cubic feet
TOTAL GREATER THAN CLASS C RADWASTE VOLUME GENERATED:	524	cubic feet
TOTAL SCRAP METAL REMOVED:	37,772	tons
TOTAL CRAFT LABOR REQUIREMENTS:	1,004,220	man-hours

End Notes:
n/a - indicates that this activity not charged as decommissioning expense.
a - indicates that this activity performed by decommissioning staff.
0 - indicates that this value is less than 0.5 but is non-zero.
a cell containing " - " indicates a zero value

APPENDIX D

DETAILED COST ANALYSIS

SAFSTOR

Table D
Crystal River Nuclear Plant, Unit 3
SAFSTOR Decommissioning Cost Estimate
(thousands of 2008 dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes: Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
PERIOD 1a - Shutdown through Transition																					
Period 1a Direct Decommissioning Activities																					
1a.1.1	SAFSTOR site characterization survey	-	-	-	-	-	-	432	130	562	562	-	-	-	-	-	-	-	-	-	-
1a.1.2	Prepare preliminary decommissioning cost	-	-	-	-	-	-	148	22	170	170	-	-	-	-	-	-	-	-	-	1,300
1a.1.3	Notification of Cessation of Operations									a											
1a.1.4	Remove fuel & source material									n/a											
1a.1.5	Notification of Permanent Defueling									a											
1a.1.6	Deactivate plant systems & process waste									a											
1a.1.7	Prepare and submit PSDAR	-	-	-	-	-	-	227	34	261	261	-	-	-	-	-	-	-	-	-	2,000
1a.1.8	Review plant dwgs & specs.	-	-	-	-	-	-	148	22	170	170	-	-	-	-	-	-	-	-	-	1,300
1a.1.9	Perform detailed rad survey									a											
1a.1.10	Estimate by-product inventory	-	-	-	-	-	-	114	17	131	131	-	-	-	-	-	-	-	-	-	1,000
1a.1.11	End product description	-	-	-	-	-	-	114	17	131	131	-	-	-	-	-	-	-	-	-	1,000
1a.1.12	Detailed by-product inventory	-	-	-	-	-	-	171	26	196	196	-	-	-	-	-	-	-	-	-	1,500
1a.1.13	Define major work sequence	-	-	-	-	-	-	114	17	131	131	-	-	-	-	-	-	-	-	-	1,000
1a.1.14	Perform SER and EA	-	-	-	-	-	-	352	53	405	405	-	-	-	-	-	-	-	-	-	3,100
1a.1.15	Perform Site-Specific Cost Study	-	-	-	-	-	-	568	85	654	654	-	-	-	-	-	-	-	-	-	5,000
Activity Specifications																					
1a.1.16.1	Prepare plant and facilities for SAFSTOR	-	-	-	-	-	-	559	84	643	643	-	-	-	-	-	-	-	-	-	4,920
1a.1.16.2	Plant systems	-	-	-	-	-	-	474	71	545	545	-	-	-	-	-	-	-	-	-	4,167
1a.1.16.3	Plant structures and buildings	-	-	-	-	-	-	355	53	408	408	-	-	-	-	-	-	-	-	-	3,120
1a.1.16.4	Waste management	-	-	-	-	-	-	227	34	261	261	-	-	-	-	-	-	-	-	-	2,000
1a.1.16.5	Facility and site dormancy	-	-	-	-	-	-	227	34	261	261	-	-	-	-	-	-	-	-	-	2,000
1a.1.16	Total	-	-	-	-	-	-	1,842	276	2,119	2,119	-	-	-	-	-	-	-	-	-	16,207
Detailed Work Procedures																					
1a.1.17.1	Plant systems	-	-	-	-	-	-	135	20	155	155	-	-	-	-	-	-	-	-	-	1,183
1a.1.17.2	Facility closeout & dormancy	-	-	-	-	-	-	136	20	157	157	-	-	-	-	-	-	-	-	-	1,200
1a.1.17	Total	-	-	-	-	-	-	271	41	312	312	-	-	-	-	-	-	-	-	-	2,383
1a.1.18	Procure vacuum drying system	-	-	-	-	-	-	11	2	13	13	-	-	-	-	-	-	-	-	-	100
1a.1.19	Drain/de-energize non-cont. systems									a											
1a.1.20	Drain & dry NSSS									a											
1a.1.21	Drain/de-energize contaminated systems									a											
1a.1.22	Decon/secure contaminated systems									a											
1a.1	Subtotal Period 1a Activity Costs	-	-	-	-	-	-	4,512	742	5,254	5,254	-	-	-	-	-	-	-	-	-	35,890
Period 1a Collateral Costs																					
1a.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	1,657	249	1,906	-	1,906	-	-	-	-	-	-	-	-	-
1a.3.2	ISFSI Capital Expenditures	-	-	-	-	-	-	7,682	1,152	8,835	-	8,835	-	-	-	-	-	-	-	-	-
1a.3.3	Florida LLRW Inspection Fee	-	-	-	-	-	-	1	0	1	1	-	-	-	-	-	-	-	-	-	-
1a.3	Subtotal Period 1a Collateral Costs	-	-	-	-	-	-	9,340	1,401	10,742	1	10,740	-	-	-	-	-	-	-	-	-
Period 1a Period-Dependent Costs																					
1a.4.1	Insurance	-	-	-	-	-	-	1,369	137	1,506	1,506	-	-	-	-	-	-	-	-	-	-
1a.4.2	Property taxes	-	-	-	-	-	-	3,206	321	3,526	3,526	-	-	-	-	-	-	-	-	-	-
1a.4.3	Health physics supplies	-	476	-	-	-	-	-	119	595	595	-	-	-	-	-	-	-	-	-	-
1a.4.4	Heavy equipment rental	-	475	-	-	-	-	-	71	546	546	-	-	-	-	-	-	-	-	-	-
1a.4.5	Disposal of DAW generated	-	-	12	4	-	31	-	10	57	57	-	-	-	675	-	-	-	13,531	22	-
1a.4.6	Plant energy budget	-	-	-	-	-	-	2,177	327	2,503	2,503	-	-	-	-	-	-	-	-	-	-
1a.4.7	NRC Fees	-	-	-	-	-	-	706	71	776	776	-	-	-	-	-	-	-	-	-	-
1a.4.8	Emergency Planning Fees	-	-	-	-	-	-	570	57	627	-	627	-	-	-	-	-	-	-	-	-
1a.4.9	Utility Site Indirect	-	-	-	-	-	-	2,151	323	2,474	2,474	-	-	-	-	-	-	-	-	-	-
1a.4.10	Spent Fuel Pool O&M	-	-	-	-	-	-	745	112	857	-	857	-	-	-	-	-	-	-	-	-
1a.4.11	ISFSI Operating Costs	-	-	-	-	-	-	85	13	98	-	98	-	-	-	-	-	-	-	-	-
1a.4.12	Corporate Allocations	-	-	-	-	-	-	1,944	292	2,235	2,235	-	-	-	-	-	-	-	-	-	-

Table D
Crystal River Nuclear Plant, Unit 3
SAFSTOR Decommissioning Cost Estimate
(thousands of 2008 dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Period 1a Period-Dependent Costs (continued)																					
1a.4.13	INPO Fees	-	-	-	-	-	-	135	20	156	156	-	-	-	-	-	-	-	-	-	-
1a.4.14	Security Staff Cost	-	-	-	-	-	-	6,130	920	7,050	7,050	-	-	-	-	-	-	-	-	-	157,471
1a.4.15	Utility Staff Cost	-	-	-	-	-	-	21,171	3,176	24,347	24,347	-	-	-	-	-	-	-	-	-	423,400
1a.4	Subtotal Period 1a Period-Dependent Costs	-	951	12	4	-	31	40,388	5,966	47,352	45,770	1,581	-	-	675	-	-	-	13,531	22	580,871
1a.0	TOTAL PERIOD 1a COST	-	951	12	4	-	31	54,241	8,108	63,347	51,026	12,322	-	-	675	-	-	-	13,531	22	616,761
PERIOD 1b - SAFSTOR Limited DECON Activities																					
Period 1b Direct Decommissioning Activities																					
Decontamination of Site Buildings																					
1b.1.1.1	Reactor	924	-	-	-	-	-	-	462	1,387	1,387	-	-	-	-	-	-	-	-	21,630	-
1b.1.1.2	Auxiliary Building	308	-	-	-	-	-	-	154	462	462	-	-	-	-	-	-	-	-	7,527	-
1b.1.1.3	Fuel Handling Area (Aux Bldg)	769	-	-	-	-	-	-	384	1,153	1,153	-	-	-	-	-	-	-	-	16,150	-
1b.1.1.4	Intermediate Bldg	63	-	-	-	-	-	-	31	94	94	-	-	-	-	-	-	-	-	1,557	-
1b.1.1.5	Machine Shop - Hot	42	-	-	-	-	-	-	21	63	63	-	-	-	-	-	-	-	-	1,013	-
1b.1.1.6	RVCH Storage Building	4	-	-	-	-	-	-	2	6	6	-	-	-	-	-	-	-	-	89	-
1b.1.1.7	Rad Materials Storage & Processing Bldg	26	-	-	-	-	-	-	13	39	39	-	-	-	-	-	-	-	-	634	-
1b.1.1	Totals	2,136	-	-	-	-	-	-	1,068	3,203	3,203	-	-	-	-	-	-	-	-	48,599	-
1b.1	Subtotal Period 1b Activity Costs	2,136	-	-	-	-	-	-	1,068	3,203	3,203	-	-	-	-	-	-	-	-	48,599	-
Period 1b Additional Costs																					
1b.2.1	Mixed Waste	-	-	2	552	24	648	-	245	1,470	1,470	-	-	122	2,160	-	-	-	1,540,574	-	-
1b.2.2	Hazardous Waste	-	-	1	1	2	-	-	-	3	3	-	-	374	-	-	-	-	-	-	-
1b.2	Subtotal Period 1b Additional Costs	-	-	2	553	26	648	-	245	1,473	1,473	-	-	496	2,160	-	-	-	1,540,574	-	-
Period 1b Collateral Costs																					
1b.3.1	Decon equipment	916	-	-	-	-	-	-	137	1,053	1,053	-	-	-	-	-	-	-	-	-	-
1b.3.2	Process liquid waste	135	-	56	372	-	263	-	195	1,021	1,021	-	-	-	918	-	-	-	55,065	179	-
1b.3.3	Small tool allowance	-	40	-	-	-	-	-	6	46	46	-	-	-	-	-	-	-	-	-	-
1b.3.4	Spent Fuel Capital and Transfer	-	-	-	-	-	-	350	53	403	-	403	-	-	-	-	-	-	-	-	-
1b.3.5	ISFSI Capital Expenditures	-	-	-	-	-	-	1,008	151	1,159	-	1,159	-	-	-	-	-	-	-	-	-
1b.3.6	Florida LLRW Inspection Fee	-	-	-	-	-	-	8	1	9	9	-	-	-	-	-	-	-	-	-	-
1b.3	Subtotal Period 1b Collateral Costs	1,051	40	56	372	-	263	1,367	543	3,692	2,129	1,562	-	-	918	-	-	-	55,065	179	-
Period 1b Period-Dependent Costs																					
1b.4.1	Decon supplies	854	-	-	-	-	-	-	213	1,067	1,067	-	-	-	-	-	-	-	-	-	-
1b.4.2	Insurance	-	-	-	-	-	-	345	35	380	380	-	-	-	-	-	-	-	-	-	-
1b.4.3	Property taxes	-	-	-	-	-	-	874	87	961	961	-	-	-	-	-	-	-	-	-	-
1b.4.4	Health physics supplies	-	335	-	-	-	-	-	84	419	419	-	-	-	-	-	-	-	-	-	-
1b.4.5	Heavy equipment rental	-	120	-	-	-	-	-	18	138	138	-	-	-	-	-	-	-	-	-	-
1b.4.6	Disposal of DAW generated	-	-	12	4	-	31	-	10	56	56	-	-	-	666	-	-	-	13,353	22	-
1b.4.7	Plant energy budget	-	-	-	-	-	-	549	82	631	631	-	-	-	-	-	-	-	-	-	-
1b.4.8	NRC Fees	-	-	-	-	-	-	178	18	196	196	-	-	-	-	-	-	-	-	-	-
1b.4.9	Emergency Planning Fees	-	-	-	-	-	-	144	14	158	-	158	-	-	-	-	-	-	-	-	-
1b.4.10	Utility Site Indirect	-	-	-	-	-	-	542	81	623	623	-	-	-	-	-	-	-	-	-	-
1b.4.11	Spent Fuel Pool O&M	-	-	-	-	-	-	188	28	216	-	216	-	-	-	-	-	-	-	-	-
1b.4.12	ISFSI Operating Costs	-	-	-	-	-	-	21	3	25	-	25	-	-	-	-	-	-	-	-	-
1b.4.13	Corporate Allocations	-	-	-	-	-	-	490	73	563	563	-	-	-	-	-	-	-	-	-	-
1b.4.14	Security Staff Cost	-	-	-	-	-	-	1,545	232	1,777	1,777	-	-	-	-	-	-	-	-	-	39,691
1b.4.15	Utility Staff Cost	-	-	-	-	-	-	5,336	800	6,137	6,137	-	-	-	-	-	-	-	-	-	106,720
1b.4	Subtotal Period 1b Period-Dependent Costs	854	455	12	4	-	31	10,212	1,779	13,347	12,948	399	-	-	666	-	-	-	13,353	22	146,411
1b.0	TOTAL PERIOD 1b COST	4,040	495	70	929	26	942	11,578	3,635	21,715	19,754	1,961	-	496	3,744	-	-	-	1,608,992	48,800	146,411

Table D
Crystal River Nuclear Plant, Unit 3
SAFSTOR Decommissioning Cost Estimate
(thousands of 2008 dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
PERIOD 1c - Preparations for SAFSTOR Dormancy																					
Period 1c Direct Decommissioning Activities																					
1c.1.1	Prepare support equipment for storage	-	396	-	-	-	-	-	59	456	456	-	-	-	-	-	-	-	-	3,000	-
1c.1.2	Install containment pressure equal. lines	-	34	-	-	-	-	-	5	39	39	-	-	-	-	-	-	-	-	700	-
1c.1.3	Interim survey prior to dormancy	-	-	-	-	-	-	733	220	953	953	-	-	-	-	-	-	-	-	12,220	-
1c.1.4	Secure building accesses									a											
1c.1.5	Prepare & submit interim report	-	-	-	-	-	-	66	10	76	76	-	-	-	-	-	-	-	-	-	583
1c.1	Subtotal Period 1c Activity Costs	-	430	-	-	-	-	799	294	1,523	1,523	-	-	-	-	-	-	-	-	15,920	583
Period 1c Additional Costs																					
1c.2.1	Spent Fuel Pool Isolation	-	-	-	-	-	-	9,407	1,411	10,819	10,819	-	-	-	-	-	-	-	-	-	-
1c.2	Subtotal Period 1c Additional Costs	-	-	-	-	-	-	9,407	1,411	10,819	10,819	-	-	-	-	-	-	-	-	-	-
Period 1c Collateral Costs																					
1c.3.1	Process liquid waste	171	-	71	472	-	334	-	247	1,296	1,296	-	-	-	1,165	-	-	-	69,894	227	-
1c.3.2	Small tool allowance	-	4	-	-	-	-	-	1	4	4	-	-	-	-	-	-	-	-	-	-
1c.3.3	Spent Fuel Capital and Transfer	-	-	-	-	-	-	302	45	348	-	348	-	-	-	-	-	-	-	-	-
1c.3.4	ISFSI Capital Expenditures	-	-	-	-	-	-	1,008	151	1,159	-	1,159	-	-	-	-	-	-	-	-	-
1c.3.5	Florida LLRW Inspection Fee	-	-	-	-	-	-	3	0	3	3	-	-	-	-	-	-	-	-	-	-
1c.3	Subtotal Period 1c Collateral Costs	171	4	71	472	-	334	1,313	444	2,810	1,303	1,507	-	-	1,165	-	-	-	69,894	227	-
Period 1c Period-Dependent Costs																					
1c.4.1	Insurance	-	-	-	-	-	-	345	35	380	380	-	-	-	-	-	-	-	-	-	-
1c.4.2	Property taxes	-	-	-	-	-	-	872	87	959	959	-	-	-	-	-	-	-	-	-	-
1c.4.3	Health physics supplies	-	191	-	-	-	-	-	48	239	239	-	-	-	-	-	-	-	-	-	-
1c.4.4	Heavy equipment rental	-	120	-	-	-	-	-	18	138	138	-	-	-	-	-	-	-	-	-	-
1c.4.5	Disposal of DAW generated	-	-	3	1	-	8	-	2	14	14	-	-	-	170	-	-	-	3,411	6	-
1c.4.6	Plant energy budget	-	-	-	-	-	-	549	82	631	631	-	-	-	-	-	-	-	-	-	-
1c.4.7	NRC Fees	-	-	-	-	-	-	178	18	196	196	-	-	-	-	-	-	-	-	-	-
1c.4.8	Emergency Planning Fees	-	-	-	-	-	-	144	14	158	-	158	-	-	-	-	-	-	-	-	-
1c.4.9	Utility Site Indirect	-	-	-	-	-	-	542	81	623	623	-	-	-	-	-	-	-	-	-	-
1c.4.10	Spent Fuel Pool O&M	-	-	-	-	-	-	188	28	216	-	216	-	-	-	-	-	-	-	-	-
1c.4.11	ISFSI Operating Costs	-	-	-	-	-	-	21	3	25	-	25	-	-	-	-	-	-	-	-	-
1c.4.12	Corporate Allocations	-	-	-	-	-	-	490	73	563	563	-	-	-	-	-	-	-	-	-	-
1c.4.13	Security Staff Cost	-	-	-	-	-	-	1,545	232	1,777	1,777	-	-	-	-	-	-	-	-	-	39,691
1c.4.14	Utility Staff Cost	-	-	-	-	-	-	5,336	800	6,137	6,137	-	-	-	-	-	-	-	-	-	106,720
1c.4	Subtotal Period 1c Period-Dependent Costs	-	311	3	1	-	8	10,210	1,523	12,056	11,657	399	-	-	170	-	-	-	3,411	6	146,411
1c.0	TOTAL PERIOD 1c COST	171	744	74	474	-	342	21,730	3,673	27,208	25,302	1,906	-	-	1,335	-	-	-	73,305	16,153	146,995
PERIOD 1 TOTALS		4,211	2,189	156	1,407	26	1,316	87,549	15,416	112,270	96,081	16,188	-	496	5,754	-	-	-	1,695,828	64,975	910,168
PERIOD 2a - SAFSTOR Dormancy with Wet Spent Fuel Storage																					
Period 2a Direct Decommissioning Activities																					
2a.1.1	Quarterly Inspection									a											
2a.1.2	Semi-annual environmental survey									a											
2a.1.3	Prepare reports									a											
2a.1.4	Bituminous roof replacement	-	-	-	-	-	-	178	27	204	204	-	-	-	-	-	-	-	-	-	-
2a.1.5	Maintenance supplies	-	-	-	-	-	-	503	126	629	629	-	-	-	-	-	-	-	-	-	-
2a.1	Subtotal Period 2a Activity Costs	-	-	-	-	-	-	680	152	833	833	-	-	-	-	-	-	-	-	-	-
Period 2a Collateral Costs																					
2a.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	7,576	1,136	8,713	-	8,713	-	-	-	-	-	-	-	-	-
2a.3.2	ISFSI Capital Expenditures	-	-	-	-	-	-	19,301	2,895	22,197	-	22,197	-	-	-	-	-	-	-	-	-
2a.3.3	Florida LLRW Inspection Fee	-	-	-	-	-	-	4	0	4	4	-	-	-	-	-	-	-	-	-	-

Table D
Crystal River Nuclear Plant, Unit 3
SAFSTOR Decommissioning Cost Estimate
(thousands of 2008 dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
2a.3	Subtotal Period 2a Collateral Costs	-	-	-	-	-	-	26,881	4,032	30,913	4	30,909	-	-	-	-	-	-	-	-	-
Period 2a Period-Dependent Costs																					
2a.4.1	Insurance	-	-	-	-	-	-	2,357	236	2,593	2,279	313	-	-	-	-	-	-	-	-	-
2a.4.2	Property taxes	-	-	-	-	-	-	7,630	763	8,393	4,009	4,383	-	-	-	-	-	-	-	-	-
2a.4.3	Health physics supplies	-	442	-	-	-	-	-	110	552	552	-	-	-	-	-	-	-	-	-	-
2a.4.4	Disposal of DAW generated	-	-	32	11	-	85	-	26	154	154	-	-	-	1,828	-	-	-	36,637	60	-
2a.4.5	Plant energy budget	-	-	-	-	-	-	1,741	261	2,003	1,001	1,001	-	-	-	-	-	-	-	-	-
2a.4.6	NRC Fees	-	-	-	-	-	-	806	81	887	887	-	-	-	-	-	-	-	-	-	-
2a.4.7	Emergency Planning Fees	-	-	-	-	-	-	799	80	879	-	879	-	-	-	-	-	-	-	-	-
2a.4.8	Utility Site Indirect	-	-	-	-	-	-	1,600	240	1,840	478	1,363	-	-	-	-	-	-	-	-	-
2a.4.9	Spent Fuel Pool O&M	-	-	-	-	-	-	2,982	447	3,429	-	3,429	-	-	-	-	-	-	-	-	-
2a.4.10	ISFSI Operating Costs	-	-	-	-	-	-	340	51	391	-	391	-	-	-	-	-	-	-	-	-
2a.4.11	Corporate Allocations	-	-	-	-	-	-	1,513	227	1,740	385	1,354	-	-	-	-	-	-	-	-	-
2a.4.12	Security Staff Cost	-	-	-	-	-	-	17,748	2,662	20,410	7,018	13,391	-	-	-	-	-	-	-	-	444,257
2a.4.13	Utility Staff Cost	-	-	-	-	-	-	16,755	2,513	19,268	3,867	15,401	-	-	-	-	-	-	-	-	329,543
2a.4	Subtotal Period 2a Period-Dependent Costs	-	442	32	11	-	85	54,270	7,698	62,538	20,631	41,907	-	-	1,828	-	-	-	36,637	60	773,800
2a.0	TOTAL PERIOD 2a COST	-	442	32	11	-	85	81,832	11,882	94,284	21,468	72,816	-	-	1,828	-	-	-	36,637	60	773,800
PERIOD 2b - SAFSTOR Dormancy with Dry Spent Fuel Storage																					
Period 2b Direct Decommissioning Activities																					
2b.1.1	Quarterly Inspection									a											
2b.1.2	Semi-annual environmental survey									a											
2b.1.3	Prepare reports									a											
2b.1.4	Bituminous roof replacement	-	-	-	-	-	-	1,359	204	1,563	1,563	-	-	-	-	-	-	-	-	-	-
2b.1.5	Maintenance supplies	-	-	-	-	-	-	3,846	962	4,808	4,808	-	-	-	-	-	-	-	-	-	-
2b.1	Subtotal Period 2b Activity Costs	-	-	-	-	-	-	5,205	1,165	6,370	6,370	-	-	-	-	-	-	-	-	-	-
Period 2b Collateral Costs																					
2b.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	5,714	857	6,571	-	6,571	-	-	-	-	-	-	-	-	-
2b.3.2	Florida LLRW Inspection Fee	-	-	-	-	-	-	25	3	28	28	-	-	-	-	-	-	-	-	-	-
2b.3	Subtotal Penod 2b Collateral Costs	-	-	-	-	-	-	5,739	860	6,599	28	6,571	-	-	-	-	-	-	-	-	-
Period 2b Period-Dependent Costs																					
2b.4.1	Insurance	-	-	-	-	-	-	16,353	1,635	17,988	17,435	553	-	-	-	-	-	-	-	-	-
2b.4.2	Property taxes	-	-	-	-	-	-	38,753	3,875	42,628	30,669	11,959	-	-	-	-	-	-	-	-	-
2b.4.3	Health physics supplies	-	2,835	-	-	-	-	-	709	3,543	3,543	-	-	-	-	-	-	-	-	-	-
2b.4.4	Disposal of DAW generated	-	-	228	80	-	606	-	186	1,100	1,100	-	-	-	13,025	-	-	-	261,020	428	-
2b.4.5	Plant energy budget	-	-	-	-	-	-	6,660	999	7,659	7,659	-	-	-	-	-	-	-	-	-	-
2b.4.6	NRC Fees	-	-	-	-	-	-	6,165	617	6,782	6,782	-	-	-	-	-	-	-	-	-	-
2b.4.7	Emergency Planning Fees	-	-	-	-	-	-	6,115	612	6,727	-	6,727	-	-	-	-	-	-	-	-	-
2b.4.8	Utility Site Indirect	-	-	-	-	-	-	5,314	797	6,111	3,653	2,457	-	-	-	-	-	-	-	-	-
2b.4.9	ISFSI Operating Costs	-	-	-	-	-	-	2,598	390	2,987	-	2,987	-	-	-	-	-	-	-	-	-
2b.4.10	Corporate Allocations	-	-	-	-	-	-	4,687	703	5,390	2,948	2,443	-	-	-	-	-	-	-	-	-
2b.4.11	Security Staff Cost	-	-	-	-	-	-	74,628	11,194	85,823	53,686	32,136	-	-	-	-	-	-	-	-	1,723,063
2b.4.12	Utility Staff Cost	-	-	-	-	-	-	51,228	7,684	58,912	29,578	29,334	-	-	-	-	-	-	-	-	1,021,074
2b.4	Subtotal Period 2b Period-Dependent Costs	-	2,835	228	80	-	606	212,501	29,401	245,650	157,053	88,596	-	-	13,025	-	-	-	261,020	428	2,744,137
2b.0	TOTAL PERIOD 2b COST	-	2,835	228	80	-	606	223,445	31,426	258,619	163,452	95,167	-	-	13,025	-	-	-	261,020	428	2,744,137
PERIOD 2c - SAFSTOR Dormancy without Spent Fuel Storage																					
Period 2c Direct Decommissioning Activities																					
2c.1.1	Quarterly Inspection									a											
2c.1.2	Semi-annual environmental survey									a											
2c.1.3	Prepare reports									a											
2c.1.4	Bituminous roof replacement	-	-	-	-	-	-	841	126	967	967	-	-	-	-	-	-	-	-	-	-

Table D
Crystal River Nuclear Plant, Unit 3
SAFSTOR Decommissioning Cost Estimate
(thousands of 2008 dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes: Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt, Lbs.	Craft Manhours	Utility and Contractor Manhours
2c.1.5	Maintenance supplies	-	-	-	-	-	-	2,381	595	2,976	2,976	-	-	-	-	-	-	-	-	-	-
2c.1	Subtotal Period 2c Activity Costs	-	-	-	-	-	-	3,222	721	3,943	3,943	-	-	-	-	-	-	-	-	-	-
Period 2c Collateral Costs																					
2c.3.1	Florida LLRW Inspection Fee	-	-	-	-	-	-	15	2	17	17	-	-	-	-	-	-	-	-	-	-
2c.3	Subtotal Period 2c Collateral Costs	-	-	-	-	-	-	15	2	17	17	-	-	-	-	-	-	-	-	-	-
Period 2c Period-Dependent Costs																					
2c.4.1	Insurance	-	-	-	-	-	-	9,811	981	10,792	10,792	-	-	-	-	-	-	-	-	-	-
2c.4.2	Property taxes	-	-	-	-	-	-	17,258	1,726	18,984	18,984	-	-	-	-	-	-	-	-	-	-
2c.4.3	Health physics supplies	-	1,650	-	-	-	-	-	413	2,063	2,063	-	-	-	-	-	-	-	-	-	-
2c.4.4	Disposal of DAW generated	-	-	138	49	-	366	-	113	665	665	-	-	-	7,879	-	-	-	157,900	259	-
2c.4.5	Plant energy budget	-	-	-	-	-	-	4,123	618	4,741	4,741	-	-	-	-	-	-	-	-	-	-
2c.4.6	NRC Fees	-	-	-	-	-	-	3,456	346	3,802	3,802	-	-	-	-	-	-	-	-	-	-
2c.4.7	Utility Site Indirect	-	-	-	-	-	-	1,966	295	2,261	2,261	-	-	-	-	-	-	-	-	-	-
2c.4.8	Corporate Allocations	-	-	-	-	-	-	1,587	238	1,825	1,825	-	-	-	-	-	-	-	-	-	-
2c.4.9	Security Staff Cost	-	-	-	-	-	-	28,897	4,335	33,232	33,232	-	-	-	-	-	-	-	-	-	592,543
2c.4.10	Utility Staff Cost	-	-	-	-	-	-	15,921	2,388	18,309	18,309	-	-	-	-	-	-	-	-	-	345,650
2c.4	Subtotal Period 2c Period-Dependent Costs	-	1,650	138	49	-	366	83,019	11,452	96,674	96,674	-	-	-	7,879	-	-	-	157,900	259	938,193
2c.0	TOTAL PERIOD 2c COST	-	1,650	138	49	-	366	86,256	12,175	100,634	100,634	-	-	-	7,879	-	-	-	157,900	259	938,193
PERIOD 2 TOTALS		-	4,927	397	140	-	1,057	391,534	55,482	453,538	285,554	167,984	-	-	22,733	-	-	-	455,557	748	4,456,130
PERIOD 3a - Reactivate Site Following SAFSTOR Dormancy																					
Period 3a Direct Decommissioning Activities																					
3a.1.1	Prepare preliminary decommissioning cost	-	-	-	-	-	-	148	22	170	170	-	-	-	-	-	-	-	-	-	1,300
3a.1.2	Review plant dwgs & specs.	-	-	-	-	-	-	523	78	601	601	-	-	-	-	-	-	-	-	-	4,600
3a.1.3	Perform detailed rad survey									a											
3a.1.4	End product description	-	-	-	-	-	-	114	17	131	131	-	-	-	-	-	-	-	-	-	1,000
3a.1.5	Detailed by-product inventory	-	-	-	-	-	-	148	22	170	170	-	-	-	-	-	-	-	-	-	1,300
3a.1.6	Define major work sequence	-	-	-	-	-	-	853	128	980	980	-	-	-	-	-	-	-	-	-	7,500
3a.1.7	Perform SER and EA	-	-	-	-	-	-	352	53	405	405	-	-	-	-	-	-	-	-	-	3,100
3a.1.8	Perform Site-Specific Cost Study	-	-	-	-	-	-	568	85	654	654	-	-	-	-	-	-	-	-	-	5,000
3a.1.9	Prepare/submit License Termination Plan	-	-	-	-	-	-	466	70	535	535	-	-	-	-	-	-	-	-	-	4,096
3a.1.10	Receive NRC approval of termination plan									a											
Activity Specifications																					
3a.1.11.1	Re-activate plant & temporary facilities	-	-	-	-	-	-	838	126	963	867	-	96	-	-	-	-	-	-	-	7,370
3a.1.11.2	Plant systems	-	-	-	-	-	-	474	71	545	490	-	54	-	-	-	-	-	-	-	4,167
3a.1.11.3	Reactor internals	-	-	-	-	-	-	807	121	928	928	-	-	-	-	-	-	-	-	-	7,100
3a.1.11.4	Reactor vessel	-	-	-	-	-	-	739	111	850	850	-	-	-	-	-	-	-	-	-	6,500
3a.1.11.5	Biological shield	-	-	-	-	-	-	57	9	65	65	-	-	-	-	-	-	-	-	-	500
3a.1.11.6	Steam generators	-	-	-	-	-	-	355	53	408	408	-	-	-	-	-	-	-	-	-	3,120
3a.1.11.7	Reinforced concrete	-	-	-	-	-	-	182	27	209	105	-	105	-	-	-	-	-	-	-	1,600
3a.1.11.8	Main Turbine	-	-	-	-	-	-	45	7	52	-	-	52	-	-	-	-	-	-	-	400
3a.1.11.9	Main Condensers	-	-	-	-	-	-	45	7	52	-	-	52	-	-	-	-	-	-	-	400
3a.1.11.10	Plant structures & buildings	-	-	-	-	-	-	355	53	408	204	-	204	-	-	-	-	-	-	-	3,120
3a.1.11.11	Waste management	-	-	-	-	-	-	523	78	601	601	-	-	-	-	-	-	-	-	-	4,600
3a.1.11.12	Facility & site closeout	-	-	-	-	-	-	102	15	118	59	-	59	-	-	-	-	-	-	-	900
3a.1.11	Total	-	-	-	-	-	-	4,521	678	5,200	4,577	-	623	-	-	-	-	-	-	-	39,777
Planning & Site Preparations																					
3a.1.12	Prepare dismantling sequence	-	-	-	-	-	-	273	41	314	314	-	-	-	-	-	-	-	-	-	2,400
3a.1.13	Plant prep. & temp. svces	-	-	-	-	-	-	2,700	405	3,105	3,105	-	-	-	-	-	-	-	-	-	-
3a.1.14	Design water clean-up system	-	-	-	-	-	-	159	24	183	183	-	-	-	-	-	-	-	-	-	1,400
3a.1.15	Rigging/Cont. Cntrl Envlps/tooling/etc.	-	-	-	-	-	-	2,100	315	2,415	2,415	-	-	-	-	-	-	-	-	-	-

Table D
Crystal River Nuclear Plant, Unit 3
SAFSTOR Decommissioning Cost Estimate
(thousands of 2008 dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt, Lbs.	Craft Manhours	Utility and Contractor Manhours
3a.1.16	Procure casks/liners & containers	-	-	-	-	-	-	140	21	161	161	-	-	-	-	-	-	-	-	-	1,230
3a.1	Subtotal Period 3a Activity Costs	-	-	-	-	-	-	13,064	1,960	15,024	14,401	-	623	-	-	-	-	-	-	-	72,703
Period 3a Additional Costs																					
3a.2.1	Site Characterization Survey	-	-	-	-	-	-	3,301	990	4,291	4,291	-	-	-	-	-	-	-	-	19,100	7,852
3a.2	Subtotal Period 3a Additional Costs	-	-	-	-	-	-	3,301	990	4,291	4,291	-	-	-	-	-	-	-	-	19,100	7,852
Period 3a Collateral Costs																					
3a.3.1	Florida LLRW Inspection Fee	-	-	-	-	-	-	1	0	1	1	-	-	-	-	-	-	-	-	-	-
3a.3	Subtotal Period 3a Collateral Costs	-	-	-	-	-	-	1	0	1	1	-	-	-	-	-	-	-	-	-	-
Period 3a Period-Dependent Costs																					
3a.4.1	Insurance	-	-	-	-	-	-	518	52	570	570	-	-	-	-	-	-	-	-	-	-
3a.4.2	Property taxes	-	-	-	-	-	-	909	91	1,000	1,000	-	-	-	-	-	-	-	-	-	-
3a.4.3	Health physics supplies	-	416	-	-	-	-	-	104	520	520	-	-	-	-	-	-	-	-	-	-
3a.4.4	Heavy equipment rental	-	475	-	-	-	-	-	71	546	546	-	-	-	-	-	-	-	-	-	-
3a.4.5	Disposal of DAW generated	-	-	10	4	-	26	-	8	48	48	-	-	-	570	-	-	-	11,419	19	-
3a.4.6	Plant energy budget	-	-	-	-	-	-	2,177	327	2,503	2,503	-	-	-	-	-	-	-	-	-	-
3a.4.7	NRC Fees	-	-	-	-	-	-	249	25	274	274	-	-	-	-	-	-	-	-	-	-
3a.4.8	Utility Site Indirect	-	-	-	-	-	-	1,390	208	1,598	1,598	-	-	-	-	-	-	-	-	-	-
3a.4.9	Corporate Allocations	-	-	-	-	-	-	1,187	178	1,365	1,365	-	-	-	-	-	-	-	-	-	-
3a.4.10	Security Staff Cost	-	-	-	-	-	-	2,763	414	3,177	3,177	-	-	-	-	-	-	-	-	-	65,179
3a.4.11	Utility Staff Cost	-	-	-	-	-	-	12,952	1,943	14,895	14,895	-	-	-	-	-	-	-	-	-	258,629
3a.4	Subtotal Period 3a Period-Dependent Costs	-	891	10	4	-	26	22,145	3,421	26,497	26,497	-	-	-	570	-	-	-	11,419	19	323,807
3a.0	TOTAL PERIOD 3a COST	-	891	10	4	-	26	38,511	6,371	45,813	45,190	-	623	-	570	-	-	-	11,419	19,119	404,362
PERIOD 3b - Decommissioning Preparations																					
Period 3b Direct Decommissioning Activities																					
Detailed Work Procedures																					
3b.1.1.1	Plant systems	-	-	-	-	-	-	538	81	619	557	-	62	-	-	-	-	-	-	-	4,733
3b.1.1.2	Reactor internals	-	-	-	-	-	-	284	43	327	327	-	-	-	-	-	-	-	-	-	2,500
3b.1.1.3	Remaining buildings	-	-	-	-	-	-	153	23	176	44	-	132	-	-	-	-	-	-	-	1,350
3b.1.1.4	CRD cooling assembly	-	-	-	-	-	-	114	17	131	131	-	-	-	-	-	-	-	-	-	1,000
3b.1.1.5	CRD housings & ICI tubes	-	-	-	-	-	-	114	17	131	131	-	-	-	-	-	-	-	-	-	1,000
3b.1.1.6	Incore instrumentation	-	-	-	-	-	-	114	17	131	131	-	-	-	-	-	-	-	-	-	1,000
3b.1.1.7	Reactor vessel	-	-	-	-	-	-	413	62	475	475	-	-	-	-	-	-	-	-	-	3,630
3b.1.1.8	Facility closeout	-	-	-	-	-	-	136	20	157	78	-	78	-	-	-	-	-	-	-	1,200
3b.1.1.9	Missile shields	-	-	-	-	-	-	51	8	59	59	-	-	-	-	-	-	-	-	-	450
3b.1.1.10	Biological shield	-	-	-	-	-	-	136	20	157	157	-	-	-	-	-	-	-	-	-	1,200
3b.1.1.11	Steam generators	-	-	-	-	-	-	523	78	601	601	-	-	-	-	-	-	-	-	-	4,600
3b.1.1.12	Reinforced concrete	-	-	-	-	-	-	114	17	131	65	-	65	-	-	-	-	-	-	-	1,000
3b.1.1.13	Main Turbine	-	-	-	-	-	-	177	27	204	-	-	204	-	-	-	-	-	-	-	1,560
3b.1.1.14	Main Condensers	-	-	-	-	-	-	177	27	204	-	-	204	-	-	-	-	-	-	-	1,560
3b.1.1.15	Auxiliary building	-	-	-	-	-	-	310	47	357	321	-	36	-	-	-	-	-	-	-	2,730
3b.1.1.16	Reactor building	-	-	-	-	-	-	310	47	357	321	-	36	-	-	-	-	-	-	-	2,730
3b.1.1	Total	-	-	-	-	-	-	3,665	550	4,215	3,398	-	817	-	-	-	-	-	-	-	32,243
3b.1	Subtotal Period 3b Activity Costs	-	-	-	-	-	-	3,665	550	4,215	3,398	-	817	-	-	-	-	-	-	-	32,243
Period 3b Collateral Costs																					
3b.3.1	Decon equipment	916	-	-	-	-	-	-	137	1,053	1,053	-	-	-	-	-	-	-	-	-	-
3b.3.2	DOC staff relocation expenses	-	-	-	-	-	-	1,322	198	1,520	1,520	-	-	-	-	-	-	-	-	-	-
3b.3.3	Pipe cutting equipment	-	1,000	-	-	-	-	-	150	1,150	1,150	-	-	-	-	-	-	-	-	-	-
3b.3.4	Florida LLRW Inspection Fee	-	-	-	-	-	-	1	0	1	1	-	-	-	-	-	-	-	-	-	-
3b.3	Subtotal Period 3b Collateral Costs	916	1,000	-	-	-	-	1,323	486	3,724	3,724	-	-	-	-	-	-	-	-	-	-

Table D
Crystal River Nuclear Plant, Unit 3
SAFSTOR Decommissioning Cost Estimate
(thousands of 2008 dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Period 3b Period-Dependent Costs																					
3b.4.1	Decon supplies	28	-	-	-	-	-	-	7	35	35	-	-	-	-	-	-	-	-	-	-
3b.4.2	Insurance	-	-	-	-	-	-	299	30	329	329	-	-	-	-	-	-	-	-	-	-
3b.4.3	Property taxes	-	-	-	-	-	-	462	46	508	508	-	-	-	-	-	-	-	-	-	-
3b.4.4	Health physics supplies	-	232	-	-	-	-	-	58	291	291	-	-	-	-	-	-	-	-	-	-
3b.4.5	Heavy equipment rental	-	241	-	-	-	-	-	36	277	277	-	-	-	-	-	-	-	-	-	-
3b.4.6	Disposal of DAW generated	-	-	6	2	-	15	-	5	28	28	-	-	-	327	-	-	-	6,547	11	-
3b.4.7	Plant energy budget	-	-	-	-	-	-	1,103	165	1,269	1,269	-	-	-	-	-	-	-	-	-	-
3b.4.8	NRC Fees	-	-	-	-	-	-	126	13	139	139	-	-	-	-	-	-	-	-	-	-
3b.4.9	Utility Site Indirect	-	-	-	-	-	-	704	106	810	810	-	-	-	-	-	-	-	-	-	-
3b.4.10	Corporate Allocations	-	-	-	-	-	-	602	90	692	692	-	-	-	-	-	-	-	-	-	-
3b.4.11	Security Staff Cost	-	-	-	-	-	-	1,400	210	1,610	1,610	-	-	-	-	-	-	-	-	-	33,036
3b.4.12	DOC Staff Cost	-	-	-	-	-	-	4,798	720	5,518	5,518	-	-	-	-	-	-	-	-	-	59,200
3b.4.13	Utility Staff Cost	-	-	-	-	-	-	6,565	985	7,549	7,549	-	-	-	-	-	-	-	-	-	131,086
3b.4	Subtotal Period 3b Period-Dependent Costs	28	473	6	2	-	15	16,059	2,470	19,054	19,054	-	-	-	327	-	-	-	6,547	11	223,321
3b.0	TOTAL PERIOD 3b COST	944	1,473	6	2	-	15	21,047	3,506	26,993	26,176	-	817	-	327	-	-	-	6,547	11	255,564
PERIOD 3 TOTALS		944	2,364	16	6	-	42	59,558	9,877	72,806	71,366	-	1,440	-	896	-	-	-	17,965	19,129	659,926
PERIOD 4a - Large Component Removal																					
Period 4a Direct Decommissioning Activities																					
Nuclear Steam Supply System Removal																					
4a.1.1.1	Reactor Coolant Piping	23	89	20	24	137	171	-	103	567	567	-	-	563	563	-	-	-	130,499	2,704	-
4a.1.1.2	Pressurizer Relief Tank	3	11	3	4	23	26	-	15	85	85	-	-	94	94	-	-	-	20,849	333	-
4a.1.1.3	Reactor Coolant Pumps & Motors	19	74	41	151	114	2,423	-	678	3,500	3,500	-	-	487	8,974	-	-	-	809,683	4,304	-
4a.1.1.4	Pressurizer	6	48	487	645	-	744	-	347	2,277	2,277	-	-	-	2,756	-	-	-	362,236	1,830	1,500
4a.1.1.5	Steam Generators	33	4,371	1,779	2,454	-	3,163	-	2,446	14,245	14,245	-	-	-	11,714	-	-	-	1,889,167	10,254	4,500
4a.1.1.6	CRDMs/ICIs/Service Structure Removal	26	86	253	73	61	159	-	120	779	779	-	-	753	3,106	-	-	-	91,378	2,356	-
4a.1.1.7	Reactor Vessel Internals	53	2,120	3,839	790	-	3,758	158	4,676	15,393	15,393	-	-	-	1,514	250	517	-	223,135	18,367	867
4a.1.1.8	Vessel & Internals GTCC Disposal	-	-	-	-	-	10,602	-	1,590	12,192	12,192	-	-	-	-	-	-	524	105,646	-	-
4a.1.1.9	Reactor Vessel	-	4,767	938	497	-	3,380	158	5,647	15,387	15,387	-	-	-	7,148	2,573	-	-	986,490	18,367	867
4a.1.1	Totals	163	11,565	7,362	4,638	335	24,425	317	15,621	64,426	64,426	-	-	1,897	35,869	2,824	517	524	4,619,084	58,514	7,733
Removal of Major Equipment																					
4a.1.2	Main Turbine/Generator	-	225	200	44	521	331	-	244	1,564	1,564	-	-	2,785	1,551	-	-	-	375,861	5,215	-
4a.1.3	Main Condensers	-	699	117	77	499	335	-	357	2,084	2,084	-	-	5,044	1,487	-	-	-	360,419	16,801	-
Cascading Costs from Clean Building Demolition																					
4a.1.4.1	Reactor	-	643	-	-	-	-	-	97	740	740	-	-	-	-	-	-	-	-	8,169	-
4a.1.4.2	Auxiliary Building	-	158	-	-	-	-	-	24	182	182	-	-	-	-	-	-	-	-	2,064	-
4a.1.4.3	Fuel Handling Area (Aux Bldg)	-	100	-	-	-	-	-	15	116	116	-	-	-	-	-	-	-	-	1,251	-
4a.1.4.4	Intermediate Bldg	-	42	-	-	-	-	-	6	49	49	-	-	-	-	-	-	-	-	569	-
4a.1.4.5	Machine Shop - Hot	-	3	-	-	-	-	-	0	4	4	-	-	-	-	-	-	-	-	57	-
4a.1.4.6	Rad Materials Storage & Processing Bldg	-	1	-	-	-	-	-	0	1	1	-	-	-	-	-	-	-	-	13	-
4a.1.4	Totals	-	948	-	-	-	-	-	142	1,091	1,091	-	-	-	-	-	-	-	-	12,123	-
Disposal of Plant Systems																					
4a.1.5.1	Auxiliary Steam	-	47	-	-	-	-	-	7	54	-	-	54	-	-	-	-	-	-	1,377	-
4a.1.5.2	Auxiliary Steam - RCA	-	27	1	2	34	-	-	12	76	76	-	-	376	-	-	-	-	15,255	594	-
4a.1.5.3	Chemical Addition - Cont	-	49	1	3	52	-	-	21	126	126	-	-	581	-	-	-	-	23,576	1,073	-
4a.1.5.4	Chemical Addition - Cont - Insulated	-	7	0	0	5	-	-	3	16	16	-	-	61	-	-	-	-	2,461	156	-
4a.1.5.5	Chemical Addition - Insulated - RCA	-	6	0	0	5	-	-	2	15	15	-	-	61	-	-	-	-	2,461	124	-
4a.1.5.6	Chemical Addition - RCA	-	43	1	4	59	-	-	20	127	127	-	-	658	-	-	-	-	26,704	903	-
4a.1.5.7	Chemical Feed Secondary Cycle	-	11	-	-	-	-	-	2	13	-	-	13	-	-	-	-	-	-	331	-
4a.1.5.8	Chemical Feed Secondary Cycle - RCA	-	5	0	0	5	-	-	2	12	12	-	-	51	-	-	-	-	2,067	106	-
4a.1.5.9	Chilled Water	-	53	-	-	-	-	-	8	61	-	-	61	-	-	-	-	-	-	1,520	-

Table D
Crystal River Nuclear Plant, Unit 3
SAFSTOR Decommissioning Cost Estimate
(thousands of 2008 dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Disposal of Plant Systems (continued)																					
4a.1.5.10	Chilled Water - RCA	-	57	1	4	60	-	-	24	145	145	-	-	672	-	-	-	-	27,273	1,199	-
4a.1.5.11	Circulating Water	-	82	-	-	-	-	-	12	94	-	-	94	-	-	-	-	-	-	2,318	-
4a.1.5.12	Cond Demin Regeneration	-	39	-	-	-	-	-	6	45	-	-	45	-	-	-	-	-	-	1,049	-
4a.1.5.13	Condensate	-	99	-	-	-	-	-	15	114	-	-	114	-	-	-	-	-	-	2,868	-
4a.1.5.14	Condensate & Demin Water Supply	-	21	-	-	-	-	-	3	24	-	-	24	-	-	-	-	-	-	606	-
4a.1.5.15	Condensate & Demin Water Supply - Cont	-	52	1	3	43	-	-	20	119	119	-	-	483	-	-	-	-	19,601	1,146	-
4a.1.5.16	Condensate & Demin Water Supply - RCA	-	82	1	5	78	-	-	33	199	199	-	-	875	-	-	-	-	35,538	1,730	-
4a.1.5.17	Condensate - Cont	-	150	4	18	289	-	-	84	545	545	-	-	3,236	-	-	-	-	131,415	3,465	-
4a.1.5.18	Condensate Demineralizer	-	84	-	-	-	-	-	13	97	-	-	97	-	-	-	-	-	-	2,482	-
4a.1.5.19	Condensate Demineralizer - Cont	-	115	2	9	143	-	-	52	321	321	-	-	1,604	-	-	-	-	65,131	2,576	-
4a.1.5.20	Condenser Air Removal & Priming	-	82	-	-	-	-	-	12	95	-	-	95	-	-	-	-	-	-	2,308	-
4a.1.5.21	Cycle Makeup Demin Water	-	54	-	-	-	-	-	8	62	-	-	62	-	-	-	-	-	-	1,472	-
4a.1.5.22	Cycle Makeup Demin Water - RCA	-	52	1	3	46	-	-	20	122	122	-	-	513	-	-	-	-	20,841	1,096	-
4a.1.5.23	Cycle Startup	-	8	-	-	-	-	-	1	9	-	-	9	-	-	-	-	-	-	222	-
4a.1.5.24	Cycle Startup - RCA	-	18	1	2	39	-	-	11	70	70	-	-	431	-	-	-	-	17,510	396	-
4a.1.5.25	Diesel Jacket Coolant	-	23	-	-	-	-	-	3	27	-	-	27	-	-	-	-	-	-	613	-
4a.1.5.26	Diesel-Air Cooler Coolant	-	4	-	-	-	-	-	1	4	-	-	4	-	-	-	-	-	-	108	-
4a.1.5.27	EDG FO & Compressed Air & Exhaust	-	38	-	-	-	-	-	6	44	-	-	44	-	-	-	-	-	-	1,028	-
4a.1.5.28	EDG Lube Oil	-	4	-	-	-	-	-	1	4	-	-	4	-	-	-	-	-	-	111	-
4a.1.5.29	EFP-3 Compressed and Starting Air	-	10	-	-	-	-	-	1	11	-	-	11	-	-	-	-	-	-	302	-
4a.1.5.30	EFP-3 Fuel Oil Transfer	-	15	-	-	-	-	-	2	17	-	-	17	-	-	-	-	-	-	444	-
4a.1.5.31	EFPB Sump Discharge	-	7	-	-	-	-	-	1	8	-	-	8	-	-	-	-	-	-	225	-
4a.1.5.32	Emergency Feedwater	-	63	-	-	-	-	-	9	72	-	-	72	-	-	-	-	-	-	1,668	-
4a.1.5.33	Emergency Feedwater - RCA	-	110	2	9	147	-	-	51	319	319	-	-	1,640	-	-	-	-	66,593	2,374	-
4a.1.5.34	Extraction Steam	-	103	-	-	-	-	-	15	118	-	-	118	-	-	-	-	-	-	2,916	-
4a.1.5.35	FW Heater Relief Vents & Drains	-	41	-	-	-	-	-	6	48	-	-	48	-	-	-	-	-	-	1,225	-
4a.1.5.36	FW Heater Relief Vents & Drains - Cont	-	47	0	2	33	-	-	17	99	99	-	-	366	-	-	-	-	14,864	1,062	-
4a.1.5.37	Feedwater	-	80	-	-	-	-	-	12	92	-	-	92	-	-	-	-	-	-	2,106	-
4a.1.5.38	Feedwater - Insulated	-	41	-	-	-	-	-	6	47	-	-	47	-	-	-	-	-	-	1,222	-
4a.1.5.39	Feedwater - Insulated - RCA	-	88	3	12	205	-	-	55	363	363	-	-	2,293	-	-	-	-	93,138	1,945	-
4a.1.5.40	Feedwater - RCA	-	21	1	3	51	-	-	13	89	89	-	-	572	-	-	-	-	23,243	449	-
4a.1.5.41	HVAC-Misc Outbldgs	-	15	-	-	-	-	-	2	17	-	-	17	-	-	-	-	-	-	464	-
4a.1.5.42	LP & HP Feedwater Drains & Vents	-	172	-	-	-	-	-	26	198	-	-	198	-	-	-	-	-	-	5,048	-
4a.1.5.43	LP & HP Feedwater Drains & Vents - Cont	-	180	3	13	210	-	-	79	484	484	-	-	2,346	-	-	-	-	95,269	4,100	-
4a.1.5.44	Liquid Sampling - Cont	-	59	0	2	28	-	-	19	109	109	-	-	313	-	-	-	-	12,721	1,360	-
4a.1.5.45	Liquid Sampling - RCA	-	50	0	2	30	-	-	17	100	100	-	-	336	-	-	-	-	13,655	1,100	-
4a.1.5.46	Lube Oil	-	10	-	-	-	-	-	1	11	-	-	11	-	-	-	-	-	-	256	-
4a.1.5.47	Main & Reheat Steam	-	76	-	-	-	-	-	11	87	-	-	87	-	-	-	-	-	-	2,230	-
4a.1.5.48	Main & Reheat Steam - Cont	-	484	30	124	2,035	-	-	448	3,122	3,122	-	-	22,779	-	-	-	-	925,077	11,390	-
4a.1.5.49	Main & Reheat Steam - RCA	-	13	0	1	20	-	-	6	41	41	-	-	226	-	-	-	-	9,182	275	-
4a.1.5.50	Misc Turbine Room Steam Drains	-	43	-	-	-	-	-	6	49	-	-	49	-	-	-	-	-	-	1,332	-
4a.1.5.51	Misc Turbine Room Steam Drains - Cont	-	167	2	8	126	-	-	62	364	364	-	-	1,405	-	-	-	-	57,049	3,583	-
4a.1.5.52	Nitrogen/Hydrogen/Carbon Dioxide	-	23	-	-	-	-	-	4	27	-	-	27	-	-	-	-	-	-	736	-
4a.1.5.53	Nuc Serv & Decay Heat Sea Water	-	42	-	-	-	-	-	6	49	-	-	49	-	-	-	-	-	-	1,172	-
4a.1.5.54	Nuc Serv & Decay Heat Sea Water - Cont	-	58	5	20	334	-	-	88	486	486	-	-	3,740	-	-	-	-	151,890	1,376	-
4a.1.5.55	Nuc Serv & Decay Heat Sea Water - RCA	-	64	3	14	224	-	-	52	356	356	-	-	2,504	-	-	-	-	101,697	1,443	-
4a.1.5.56	RC & Misc Waste Evaporator	-	337	17	43	543	72	-	192	1,204	1,204	-	-	6,075	374	-	-	-	275,440	7,778	-
4a.1.5.57	RC & Misc Waste Evaporator - Insulated	-	30	3	3	6	21	-	14	78	78	-	-	62	96	-	-	-	11,065	623	-
4a.1.5.58	Screen Wash Water	-	37	-	-	-	-	-	6	42	-	-	42	-	-	-	-	-	-	989	-
4a.1.5.59	Seal & Spray Water	-	3	-	-	-	-	-	1	4	-	-	4	-	-	-	-	-	-	99	-
4a.1.5.60	Seal & Spray Water - Cont	-	82	1	4	73	-	-	32	193	193	-	-	814	-	-	-	-	33,044	1,768	-
4a.1.5.61	Seal & Spray Water - RCA	-	66	1	4	70	-	-	28	169	169	-	-	783	-	-	-	-	31,811	1,362	-
4a.1.5.62	Secondary Cycle Sampling	-	19	-	-	-	-	-	3	22	-	-	22	-	-	-	-	-	-	622	-
4a.1.5.63	Secondary Cycle Sampling - Cont	-	8	0	0	5	-	-	3	16	16	-	-	60	-	-	-	-	2,419	166	-
4a.1.5.64	Secondary Cycle Sampling - Cont - Ins	-	3	0	0	2	-	-	1	5	5	-	-	20	-	-	-	-	810	56	-
4a.1.5.65	Secondary Cycle Sampling - Insulated	-	5	-	-	-	-	-	1	6	-	-	6	-	-	-	-	-	-	180	-
4a.1.5.66	Secondary Serv Closed Cycle Cooling	-	172	-	-	-	-	-	26	198	-	-	198	-	-	-	-	-	-	4,978	-
4a.1.5.67	Turb Bldg Sump & Oily Water Separator	-	17	-	-	-	-	-	3	20	-	-	20	-	-	-	-	-	-	491	-

Table D
Crystal River Nuclear Plant, Unit 3
SAFSTOR Decommissioning Cost Estimate
(thousands of 2008 dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Disposal of Plant Systems (continued)																					
4a.1.5.68	Turbine Generator Seal Oil	-	21	-	-	-	-	-	3	24	-	-	24	-	-	-	-	-	-	621	-
4a.1.5.69	Turbine Gland Steam & Drains	-	13	-	-	-	-	-	2	15	-	-	15	-	-	-	-	-	-	391	-
4a.1.5.70	Turbine Lube Oil	-	40	-	-	-	-	-	6	46	-	-	46	-	-	-	-	-	-	1,107	-
4a.1.5.71	Waste Drumming	-	13	1	1	2	9	-	6	33	33	-	-	26	40	-	-	-	4,682	264	-
4a.1.5.72	Waste Gas Disposal	-	232	17	28	212	107	-	122	719	719	-	-	2,374	495	-	-	-	139,046	5,140	-
4a.1.5	Totals	-	4,494	106	346	5,212	210	-	1,848	12,216	10,240	-	1,977	58,334	1,005	-	-	-	2,452,528	111,414	-
4a.1.6	Scaffolding in support of decommissioning	-	723	15	6	78	7	-	196	1,025	1,025	-	-	784	44	-	-	-	39,440	21,047	-
4a.1	Subtotal Period 4a Activity Costs	163	18,655	7,799	5,112	6,645	25,307	317	18,409	82,406	80,429	-	1,977	68,844	39,956	2,824	517	524	7,847,332	225,114	7,733
Period 4a Additional Costs																					
4a.2.1	RVCH Segmentation and Disposal	-	107	156	107	-	459	15	165	1,009	1,009	-	-	-	2,097	-	-	-	220,490	2,200	88
4a.2	Subtotal Period 4a Additional Costs	-	107	156	107	-	459	15	165	1,009	1,009	-	-	-	2,097	-	-	-	220,490	2,200	88
Period 4a Collateral Costs																					
4a.3.1	Process liquid waste	23	-	11	74	-	52	-	37	196	196	-	-	-	182	-	-	-	10,913	35	-
4a.3.2	Small tool allowance	-	182	-	-	-	-	-	27	209	188	-	21	-	-	-	-	-	-	-	-
4a.3.3	Florida LLRW Inspection Fee	-	-	-	-	-	-	232	23	255	255	-	-	-	-	-	-	-	-	-	-
4a.3.4	Survey and Release of Scrap Metal	-	-	-	-	-	-	1,494	224	1,718	1,718	-	-	-	-	-	-	-	-	-	-
4a.3	Subtotal Period 4a Collateral Costs	23	182	11	74	-	52	1,726	311	2,378	2,357	-	21	-	182	-	-	-	10,913	35	-
Period 4a Period-Dependent Costs																					
4a.4.1	Decon supplies	63	-	-	-	-	-	-	16	78	78	-	-	-	-	-	-	-	-	-	-
4a.4.2	Insurance	-	-	-	-	-	-	660	66	726	726	-	-	-	-	-	-	-	-	-	-
4a.4.3	Property taxes	-	-	-	-	-	-	1,022	102	1,124	1,011	-	112	-	-	-	-	-	-	-	-
4a.4.4	Health physics supplies	-	1,529	-	-	-	-	-	382	1,911	1,911	-	-	-	-	-	-	-	-	-	-
4a.4.5	Heavy equipment rental	-	2,557	-	-	-	-	-	383	2,940	2,940	-	-	-	-	-	-	-	-	-	-
4a.4.6	Disposal of DAW generated	-	-	65	23	-	172	-	53	313	313	-	-	-	3,705	-	-	-	74,250	122	-
4a.4.7	Plant energy budget	-	-	-	-	-	-	2,317	348	2,665	2,665	-	-	-	-	-	-	-	-	-	-
4a.4.8	NRC Fees	-	-	-	-	-	-	737	74	811	811	-	-	-	-	-	-	-	-	-	-
4a.4.9	Utility Site Indirect	-	-	-	-	-	-	1,568	235	1,803	1,803	-	-	-	-	-	-	-	-	-	-
4a.4.10	Liquid Radwaste Processing Equipment/Services	-	-	-	-	-	-	420	63	483	483	-	-	-	-	-	-	-	-	-	-
4a.4.11	Corporate Allocations	-	-	-	-	-	-	1,341	201	1,542	1,542	-	-	-	-	-	-	-	-	-	-
4a.4.12	Security Staff Cost	-	-	-	-	-	-	3,096	464	3,560	3,560	-	-	-	-	-	-	-	-	-	73,036
4a.4.13	DOC Staff Cost	-	-	-	-	-	-	12,483	1,872	14,355	14,355	-	-	-	-	-	-	-	-	-	161,263
4a.4.14	Utility Staff Cost	-	-	-	-	-	-	14,586	2,188	16,774	16,774	-	-	-	-	-	-	-	-	-	292,143
4a.4	Subtotal Period 4a Period-Dependent Costs	63	4,085	65	23	-	172	38,230	6,448	49,086	48,974	-	112	-	3,705	-	-	-	74,250	122	526,441
4a.0	TOTAL PERIOD 4a COST	248	23,029	8,030	5,315	6,645	25,991	40,287	25,332	134,878	132,768	-	2,110	68,844	45,939	2,824	517	524	8,152,985	227,472	534,263
PERIOD 4b - Site Decontamination																					
Period 4b Direct Decommissioning Activities																					
4b.1.1	Remove spent fuel racks	308	36	131	80	-	571	-	331	1,457	1,457	-	-	-	2,534	-	-	-	227,343	989	-
Disposal of Plant Systems																					
4b.1.2.1	ACC Diesel Gen.	-	13	-	-	-	-	-	2	15	-	-	15	-	-	-	-	-	-	329	-
4b.1.2.2	Chemical Cleaning Steam Gen - Cont	-	18	0	1	14	-	-	7	40	40	-	-	151	-	-	-	-	6,141	402	-
4b.1.2.3	Chemical Cleaning Steam Gen - RCA	-	19	0	1	17	-	-	7	44	44	-	-	188	-	-	-	-	7,642	391	-
4b.1.2.4	Containment Monitoring	-	48	0	2	31	-	-	17	99	99	-	-	351	-	-	-	-	14,268	1,046	-
4b.1.2.5	Core Flooding	-	80	2	7	123	-	-	40	252	252	-	-	1,373	-	-	-	-	55,743	1,777	-
4b.1.2.6	Decay Heat Closed Cycle Cooling	-	268	12	47	773	-	-	191	1,291	1,291	-	-	8,651	-	-	-	-	351,308	6,079	-
4b.1.2.7	Decay Heat Removal	-	247	30	71	654	227	-	230	1,458	1,458	-	-	7,317	1,016	-	-	-	387,470	5,721	-
4b.1.2.8	Domestic Water	-	33	-	-	-	-	-	5	38	-	-	38	-	-	-	-	-	-	985	-
4b.1.2.9	Domestic Water - RCA	-	53	1	3	47	-	-	21	124	124	-	-	525	-	-	-	-	21,339	1,086	-
4b.1.2.10	Electrical - Clean	-	498	-	-	-	-	-	75	572	-	-	572	-	-	-	-	-	-	13,208	-
4b.1.2.11	Electrical - Contaminated	-	439	6	24	393	-	-	173	1,034	1,034	-	-	4,394	-	-	-	-	178,459	9,950	-

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Disposal of Plant Systems (continued)																					
4b.1.2.12	Electrical - Decontaminated	-	3,084	58	227	3,725	-	-	1,369	8,463	8,463	-	-	41,690	-	-	-	-	1,693,054	68,485	-
4b.1.2.13	Fire Service Water	-	246	-	-	-	-	-	37	283	-	-	283	-	-	-	-	-	-	6,727	-
4b.1.2.14	Fire Service Water - RCA	-	442	10	39	637	-	-	213	1,340	1,340	-	-	7,126	-	-	-	-	289,375	9,566	-
4b.1.2.15	Floor & Equip Drains - Aux & Reac Bldg	-	151	17	34	234	141	-	115	692	692	-	-	2,614	625	-	-	-	162,231	3,395	-
4b.1.2.16	HVAC - Auxiliary Bldg	-	201	6	23	373	-	-	110	712	712	-	-	4,174	-	-	-	-	169,500	4,229	-
4b.1.2.17	HVAC - Clean Machine Shop	-	7	-	-	-	-	-	1	8	-	-	8	-	-	-	-	-	-	185	-
4b.1.2.18	HVAC - Control Complex	-	30	-	-	-	-	-	4	34	-	-	34	-	-	-	-	-	-	822	-
4b.1.2.19	HVAC - Diesel Gen Bldg	-	6	-	-	-	-	-	1	6	-	-	6	-	-	-	-	-	-	156	-
4b.1.2.20	HVAC - Fire Pump House	-	2	-	-	-	-	-	0	3	-	-	3	-	-	-	-	-	-	67	-
4b.1.2.21	HVAC - Fuel Handling Area	-	186	4	16	268	-	-	90	564	564	-	-	3,001	-	-	-	-	121,884	3,682	-
4b.1.2.22	HVAC - Hot Machine Shop	-	32	1	3	46	-	-	15	96	96	-	-	511	-	-	-	-	20,735	656	-
4b.1.2.23	HVAC - Intermediate Bldg	-	60	2	10	161	-	-	41	274	274	-	-	1,799	-	-	-	-	73,076	1,272	-
4b.1.2.24	HVAC - Maintenance Support	-	5	-	-	-	-	-	1	6	-	-	6	-	-	-	-	-	-	159	-
4b.1.2.25	HVAC - Office Bldg	-	6	-	-	-	-	-	1	7	-	-	7	-	-	-	-	-	-	168	-
4b.1.2.26	HVAC - Reactor Bldg	-	377	10	42	693	-	-	205	1,327	1,327	-	-	7,751	-	-	-	-	314,790	7,688	-
4b.1.2.27	HVAC - Turbine Bldg	-	95	-	-	-	-	-	14	109	-	-	109	-	-	-	-	-	-	2,992	-
4b.1.2.28	ICI Instrumentation	-	89	1	4	66	-	-	33	193	193	-	-	740	-	-	-	-	30,061	1,853	-
4b.1.2.29	Industrial Cooler Water	-	28	-	-	-	-	-	4	32	-	-	32	-	-	-	-	-	-	731	-
4b.1.2.30	Industrial Cooler Water - RCA	-	168	3	13	207	-	-	75	466	466	-	-	2,320	-	-	-	-	94,222	3,615	-
4b.1.2.31	Instrument & Station Service Air	-	63	-	-	-	-	-	9	72	-	-	72	-	-	-	-	-	-	1,884	-
4b.1.2.32	Instrument & Station Service Air - Cont	-	131	2	6	104	-	-	49	292	292	-	-	1,160	-	-	-	-	47,115	2,920	-
4b.1.2.33	Instrument & Station Service Air - RCA	-	241	3	11	180	-	-	89	523	523	-	-	2,012	-	-	-	-	81,728	5,095	-
4b.1.2.34	Leak Rate Test - Cont	-	71	1	4	65	-	-	28	168	168	-	-	723	-	-	-	-	29,355	1,577	-
4b.1.2.35	Leak Rate Test - RCA	-	70	1	5	84	-	-	31	192	192	-	-	945	-	-	-	-	38,385	1,533	-
4b.1.2.36	Liquid Waste Disposal	-	692	44	73	315	386	-	332	1,843	1,843	-	-	3,528	1,732	-	-	-	297,136	15,315	-
4b.1.2.37	Makeup & Purification	-	475	6	24	389	-	-	181	1,075	1,075	-	-	4,355	-	-	-	-	176,876	10,459	-
4b.1.2.38	Makeup & Purification - Insulated	-	121	1	5	84	-	-	44	255	255	-	-	941	-	-	-	-	38,212	2,706	-
4b.1.2.39	Nitrogen/Hydrogen/Carbon Dioxide - Cont	-	19	0	1	13	-	-	7	40	40	-	-	148	-	-	-	-	6,028	401	-
4b.1.2.40	Nitrogen/Hydrogen/Carbon Dioxide - RCA	-	70	1	4	58	-	-	27	158	158	-	-	644	-	-	-	-	26,153	1,394	-
4b.1.2.41	Noble Gas Effluent Monitoring - Cont	-	17	0	1	14	-	-	7	38	38	-	-	152	-	-	-	-	6,172	380	-
4b.1.2.42	Noble Gas Effluent Monitoring - RCA	-	14	0	1	14	-	-	6	35	35	-	-	152	-	-	-	-	6,172	299	-
4b.1.2.43	Nuc Serv Closed Cycle Cooling - Cont	-	558	16	67	1,100	-	-	316	2,058	2,058	-	-	12,315	-	-	-	-	500,136	12,536	-
4b.1.2.44	Nuc Serv Closed Cycle Cooling - RCA	-	509	22	85	1,395	-	-	351	2,362	2,362	-	-	15,611	-	-	-	-	633,983	11,179	-
4b.1.2.45	PASS Containment Monitoring - Cont	-	7	0	0	4	-	-	2	13	13	-	-	44	-	-	-	-	1,777	144	-
4b.1.2.46	PASS Containment Monitoring - RCA	-	15	0	1	11	-	-	5	32	32	-	-	128	-	-	-	-	5,207	306	-
4b.1.2.47	Post Accident Sampling - Cont	-	26	0	1	18	-	-	9	55	55	-	-	205	-	-	-	-	8,339	567	-
4b.1.2.48	Post Accident Sampling - RCA	-	25	0	1	21	-	-	10	57	57	-	-	237	-	-	-	-	9,629	520	-
4b.1.2.49	Post Accident Venting - Cont	-	29	1	2	37	-	-	13	81	81	-	-	411	-	-	-	-	16,678	636	-
4b.1.2.50	Post Accident Venting - RCA	-	11	0	1	14	-	-	5	32	32	-	-	162	-	-	-	-	6,581	231	-
4b.1.2.51	RB Penetration Cooling - RCA	-	97	1	5	86	-	-	38	228	228	-	-	960	-	-	-	-	39,005	2,105	-
4b.1.2.52	RCP Lube Oil - Cont	-	4	0	0	5	-	-	2	11	11	-	-	58	-	-	-	-	2,361	83	-
4b.1.2.53	RCP Lube Oil - RCA	-	3	0	0	5	-	-	2	10	10	-	-	58	-	-	-	-	2,361	66	-
4b.1.2.54	Radwaste Demineralizer	-	26	2	3	16	13	-	13	71	71	-	-	177	56	-	-	-	12,193	569	-
4b.1.2.55	Reac Bldg Pressure Sensing & Test	-	2	-	-	-	-	-	0	2	-	-	2	-	-	-	-	-	-	55	-
4b.1.2.56	Reac Bldg Pressure Sensing & Test - RCA	-	34	0	2	26	-	-	13	74	74	-	-	293	-	-	-	-	11,905	673	-
4b.1.2.57	Reactor Building Spray	-	182	4	15	246	-	-	85	532	532	-	-	2,752	-	-	-	-	111,740	4,113	-
4b.1.2.58	Refueling Equipment	-	120	6	14	119	51	-	63	372	372	-	-	1,334	225	-	-	-	74,367	2,861	-
4b.1.2.59	Sewage	-	10	-	-	-	-	-	1	11	-	-	11	-	-	-	-	-	-	282	-
4b.1.2.60	Spent Fuel Cooling	-	275	22	48	310	211	-	177	1,044	1,044	-	-	3,470	936	-	-	-	224,924	6,334	-
4b.1.2.61	Waste Gas Sampling	-	55	1	2	40	-	-	20	117	117	-	-	443	-	-	-	-	18,005	1,167	-
4b.1.2.62	Wet Layup/N2 Blanketing	-	3	-	-	-	-	-	1	4	-	-	4	-	-	-	-	-	-	112	-
4b.1.2.63	Wet Layup/N2 Blanketing - Cont	-	6	0	0	4	-	-	2	12	12	-	-	40	-	-	-	-	1,626	129	-
4b.1.2.64	Wet Layup/N2 Blanketing - RCA	-	3	0	0	2	-	-	1	6	6	-	-	24	-	-	-	-	978	61	-
4b.1.2	Totals	-	10,910	298	949	13,237	1,028	-	5,038	31,460	30,256	-	1,204	148,163	4,590	-	-	-	6,426,424	246,114	-
4b.1.3	Scaffolding in support of decommissioning	-	1,085	22	9	116	10	-	295	1,537	1,537	-	-	1,176	66	-	-	-	59,160	31,570	-

Table D
Crystal River Nuclear Plant, Unit 3
SAFSTOR Decommissioning Cost Estimate
(thousands of 2008 dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Decontamination of Site Buildings																					
4b.1.4.1	Reactor	823	645	137	282	203	1,048	-	921	4,058	4,058	-	-	2,269	7,738	-	-	-	826,574	31,972	-
4b.1.4.2	Auxiliary Building	281	100	18	39	44	52	-	192	726	726	-	-	497	955	-	-	-	114,362	8,591	-
4b.1.4.3	Fuel Handling Area (Aux Bldg)	679	540	21	49	391	50	-	555	2,286	2,286	-	-	4,376	752	-	-	-	251,722	26,570	-
4b.1.4.4	Intermediate Bldg	58	22	4	9	19	12	-	42	165	165	-	-	208	209	-	-	-	29,024	1,785	-
4b.1.4.5	Machine Shop - Hot	43	10	3	6	0	8	-	28	99	99	-	-	3	157	-	-	-	15,752	1,210	-
4b.1.4.6	RVCH Storage Building	4	2	0	1	2	1	-	3	13	13	-	-	27	11	-	-	-	2,180	127	-
4b.1.4.7	Rad Materials Storage & Processing Bldg	27	7	2	4	-	5	-	17	62	62	-	-	-	99	-	-	-	9,900	757	-
4b.1.4	Totals	1,914	1,326	184	389	659	1,177	-	1,758	7,407	7,407	-	-	7,380	9,920	-	-	-	1,249,514	71,011	-
4b.1	Subtotal Period 4b Activity Costs	2,222	13,357	635	1,427	14,013	2,785	-	7,421	41,860	40,657	-	1,204	156,719	17,110	-	-	-	7,962,441	349,684	-
Period 4b Additional Costs																					
4b.2.1	ISFSI License Termination	-	234	3	216	-	160	1,642	378	2,634	-	2,634	-	-	753	-	-	-	707,847	6,943	2,560
4b.2.2	Asbestos Removal Program	-	34	18	19	2	213	-	65	350	350	-	-	500	500	-	-	-	25,000	940	-
4b.2.3	License Termination Survey Program Management	-	-	-	-	-	-	1,106	332	1,438	1,438	-	-	-	-	-	-	-	-	-	12,480
4b.2	Subtotal Period 4b Additional Costs	-	268	21	236	2	373	2,748	774	4,422	1,788	2,634	-	500	1,253	-	-	-	732,847	7,883	15,040
Period 4b Collateral Costs																					
4b.3.1	Process liquid waste	63	-	31	207	-	146	-	102	550	550	-	-	-	510	-	-	-	30,617	99	-
4b.3.2	Small tool allowance	-	279	-	-	-	-	-	42	321	321	-	-	-	-	-	-	-	-	-	-
4b.3.3	Decommissioning Equipment Disposition	-	-	113	56	594	84	-	130	977	977	-	-	6,000	373	-	-	-	303,507	88	-
4b.3.4	Florida LLRW Inspection Fee	-	-	-	-	-	-	368	37	404	404	-	-	-	-	-	-	-	-	-	-
4b.3.5	Survey and Release of Scrap Metal	-	-	-	-	-	-	2,241	336	2,577	2,577	-	-	-	-	-	-	-	-	-	-
4b.3	Subtotal Period 4b Collateral Costs	63	279	144	263	594	230	2,608	647	4,830	4,830	-	-	6,000	884	-	-	-	334,123	188	-
Period 4b Period-Dependent Costs																					
4b.4.1	Decon supplies	930	-	-	-	-	-	-	233	1,163	1,163	-	-	-	-	-	-	-	-	-	-
4b.4.2	Insurance	-	-	-	-	-	-	954	95	1,049	1,049	-	-	-	-	-	-	-	-	-	-
4b.4.3	Property taxes	-	-	-	-	-	-	1,389	139	1,528	1,528	-	-	-	-	-	-	-	-	-	-
4b.4.4	Health physics supplies	-	2,327	-	-	-	-	-	582	2,909	2,909	-	-	-	-	-	-	-	-	-	-
4b.4.5	Heavy equipment rental	-	3,668	-	-	-	-	-	550	4,218	4,218	-	-	-	-	-	-	-	-	-	-
4b.4.6	Disposal of DAW generated	-	-	106	38	-	283	-	87	514	514	-	-	-	6,093	-	-	-	122,103	200	-
4b.4.7	Plant energy budget	-	-	-	-	-	-	2,643	397	3,040	3,040	-	-	-	-	-	-	-	-	-	-
4b.4.8	NRC Fees	-	-	-	-	-	-	1,066	107	1,172	1,172	-	-	-	-	-	-	-	-	-	-
4b.4.9	Utility Site Indirect	-	-	-	-	-	-	2,157	324	2,480	2,480	-	-	-	-	-	-	-	-	-	-
4b.4.10	Liquid Radwaste Processing Equipment/Services	-	-	-	-	-	-	607	91	698	698	-	-	-	-	-	-	-	-	-	-
4b.4.11	Corporate Allocations	-	-	-	-	-	-	1,829	274	2,104	2,104	-	-	-	-	-	-	-	-	-	-
4b.4.12	Security Staff Cost	-	-	-	-	-	-	4,473	671	5,144	5,144	-	-	-	-	-	-	-	-	-	105,536
4b.4.13	DOC Staff Cost	-	-	-	-	-	-	17,593	2,639	20,232	20,232	-	-	-	-	-	-	-	-	-	226,269
4b.4.14	Utility Staff Cost	-	-	-	-	-	-	20,027	3,004	23,031	23,031	-	-	-	-	-	-	-	-	-	398,503
4b.4	Subtotal Period 4b Period-Dependent Costs	930	5,995	106	38	-	283	52,739	9,192	69,283	69,283	-	-	-	6,093	-	-	-	122,103	200	730,307
4b.0	TOTAL PERIOD 4b COST	3,216	19,899	906	1,963	14,609	3,672	58,096	18,035	120,395	116,558	2,634	1,204	163,219	25,340	-	-	-	9,151,515	357,955	745,347
PERIOD 4e - License Termination																					
Period 4e Direct Decommissioning Activities																					
4e.1.1	ORISE confirmatory survey	-	-	-	-	-	-	155	46	201	201	-	-	-	-	-	-	-	-	-	-
4e.1.2	Terminate license									a											
4e.1	Subtotal Period 4e Activity Costs	-	-	-	-	-	-	155	46	201	201	-	-	-	-	-	-	-	-	-	-
Period 4e Additional Costs																					
4e.2.1	License Termination Survey	-	-	-	-	-	-	5,880	1,764	7,644	7,644	-	-	-	-	-	-	-	-	117,057	6,240
4e.2	Subtotal Period 4e Additional Costs	-	-	-	-	-	-	5,880	1,764	7,644	7,644	-	-	-	-	-	-	-	-	117,057	6,240
Period 4e Collateral Costs																					
4e.3.1	DOC staff relocation expenses	-	-	-	-	-	-	1,322	198	1,520	1,520	-	-	-	-	-	-	-	-	-	-
4e.3.2	Florida LLRW Inspection Fee	-	-	-	-	-	-	1	0	1	1	-	-	-	-	-	-	-	-	-	-

Table D
Crystal River Nuclear Plant, Unit 3
SAFSTOR Decommissioning Cost Estimate
(thousands of 2008 dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes: Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
4e.3	Subtotal Period 4e Collateral Costs	-	-	-	-	-	-	1,323	198	1,521	1,521	-	-	-	-	-	-	-	-	-	-
Period 4e Period-Dependent Costs																					
4e.4.1	Insurance	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4e.4.2	Property taxes	-	-	-	-	-	-	584	58	643	643	-	-	-	-	-	-	-	-	-	-
4e.4.3	Health physics supplies	-	806	-	-	-	-	-	201	1,007	1,007	-	-	-	-	-	-	-	-	-	-
4e.4.4	Disposal of DAW generated	-	-	7	2	-	18	-	6	33	33	-	-	-	388	-	-	-	7,769	13	-
4e.4.5	Plant energy budget	-	-	-	-	-	-	327	49	376	376	-	-	-	-	-	-	-	-	-	-
4e.4.6	NRC Fees	-	-	-	-	-	-	530	53	583	583	-	-	-	-	-	-	-	-	-	-
4e.4.7	Utility Site Indirect	-	-	-	-	-	-	490	74	564	564	-	-	-	-	-	-	-	-	-	-
4e.4.8	Corporate Allocations	-	-	-	-	-	-	341	51	393	393	-	-	-	-	-	-	-	-	-	-
4e.4.9	Security Staff Cost	-	-	-	-	-	-	902	135	1,038	1,038	-	-	-	-	-	-	-	-	-	18,789
4e.4.10	DOC Staff Cost	-	-	-	-	-	-	4,815	722	5,537	5,537	-	-	-	-	-	-	-	-	-	57,149
4e.4.11	Utility Staff Cost	-	-	-	-	-	-	4,259	639	4,898	4,898	-	-	-	-	-	-	-	-	-	74,371
4e.4	Subtotal Period 4e Period-Dependent Costs	-	806	7	2	-	18	12,249	1,989	15,071	15,071	-	-	-	388	-	-	-	7,769	13	150,309
4e.0	TOTAL PERIOD 4e COST	-	806	7	2	-	18	19,606	3,997	24,437	24,437	-	-	-	388	-	-	-	7,769	117,070	156,549
PERIOD 4 TOTALS		3,465	43,734	8,943	7,281	21,254	29,681	117,989	47,364	279,710	273,763	2,634	3,313	232,063	71,667	2,824	517	524	17,312,270	702,497	1,436,159
PERIOD 5b - Site Restoration																					
Period 5b Direct Decommissioning Activities																					
Demolition of Remaining Site Buildings																					
5b.1.1.1	Reactor	-	3,790	-	-	-	-	-	568	4,358	-	-	4,358	-	-	-	-	-	-	47,823	-
5b.1.1.2	AAC Diesel Generator Building	-	18	-	-	-	-	-	3	21	-	-	21	-	-	-	-	-	-	223	-
5b.1.1.3	Auxiliary Building	-	1,436	-	-	-	-	-	215	1,651	-	-	1,651	-	-	-	-	-	-	19,011	-
5b.1.1.4	Control Complex	-	695	-	-	-	-	-	104	799	-	-	799	-	-	-	-	-	-	9,432	-
5b.1.1.5	Diesel Generator Bldg	-	267	-	-	-	-	-	40	307	-	-	307	-	-	-	-	-	-	4,335	-
5b.1.1.6	EFW Pump Building	-	115	-	-	-	-	-	17	133	-	-	133	-	-	-	-	-	-	1,711	-
5b.1.1.7	Fire Pumphouse	-	14	-	-	-	-	-	2	16	-	-	16	-	-	-	-	-	-	315	-
5b.1.1.8	Fuel Handling Area (Aux Bldg)	-	947	-	-	-	-	-	142	1,089	-	-	1,089	-	-	-	-	-	-	12,441	-
5b.1.1.9	Intake & Discharge Structures	-	389	-	-	-	-	-	58	447	-	-	447	-	-	-	-	-	-	6,051	-
5b.1.1.10	Intermediate Bldg	-	715	-	-	-	-	-	107	823	-	-	823	-	-	-	-	-	-	5,866	-
5b.1.1.11	Machine Shop - Cold	-	74	-	-	-	-	-	11	85	-	-	85	-	-	-	-	-	-	1,460	-
5b.1.1.12	Machine Shop - Hot	-	70	-	-	-	-	-	11	81	-	-	81	-	-	-	-	-	-	1,396	-
5b.1.1.13	Maintenance Support Bldg	-	49	-	-	-	-	-	7	56	-	-	56	-	-	-	-	-	-	1,077	-
5b.1.1.14	Misc Yard Structures & Foundations	-	1,377	-	-	-	-	-	207	1,584	-	-	1,584	-	-	-	-	-	-	12,067	-
5b.1.1.15	Outage Support Bldg	-	18	-	-	-	-	-	3	20	-	-	20	-	-	-	-	-	-	418	-
5b.1.1.16	RVCH Storage Building	-	68	-	-	-	-	-	10	78	-	-	78	-	-	-	-	-	-	1,090	-
5b.1.1.17	Rad Materials Storage & Processing Bldg	-	34	-	-	-	-	-	5	39	-	-	39	-	-	-	-	-	-	445	-
5b.1.1.18	Rusty Bldg	-	214	-	-	-	-	-	32	246	-	-	246	-	-	-	-	-	-	3,770	-
5b.1.1.19	Turbine Building	-	2,008	-	-	-	-	-	301	2,310	-	-	2,310	-	-	-	-	-	-	27,791	-
5b.1.1.20	Turbine Pedestal	-	411	-	-	-	-	-	62	473	-	-	473	-	-	-	-	-	-	4,730	-
5b.1.1.21	Warehouse Bldg (Maint) Mezzanine	-	142	-	-	-	-	-	21	163	-	-	163	-	-	-	-	-	-	2,786	-
5b.1.1	Totals	-	12,652	-	-	-	-	-	1,928	14,780	-	-	14,780	-	-	-	-	-	-	164,238	-
Site Closeout Activities																					
5b.1.2	BackFill Site	-	699	-	-	-	-	-	105	804	-	-	804	-	-	-	-	-	-	1,560	-
5b.1.3	Grade & landscape site	-	147	-	-	-	-	-	22	169	-	-	169	-	-	-	-	-	-	316	-
5b.1.4	Final report to NRC	-	-	-	-	-	-	177	27	204	204	-	-	-	-	-	-	-	-	-	1,560
5b.1	Subtotal Period 5b Activity Costs	-	13,698	-	-	-	-	177	2,081	15,957	204	-	15,753	-	-	-	-	-	-	166,114	1,560
Period 5b Additional Costs																					
5b.2.1	Intake Structure Cofferdam	-	265	-	-	-	-	-	40	305	-	-	305	-	-	-	-	-	-	2,531	-
5b.2.2	Discharge Structure Cofferdam	-	198	-	-	-	-	-	30	228	-	-	228	-	-	-	-	-	-	1,896	-
5b.2.3	Concrete Crushing	-	485	-	-	-	-	8	73	566	-	-	566	-	-	-	-	-	-	2,367	-
5b.2.4	Firing Range Closure	-	734	-	-	-	-	-	110	844	-	-	844	-	-	-	-	-	-	-	-

Table D
Crystal River Nuclear Plant, Unit 3
SAFSTOR Decommissioning Cost Estimate
(thousands of 2008 dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt. Lbs.	Craft Manhours	Utility and Contractor Manhours
Period 5b Additional Costs (continued)																					
5b.2.5	ISFSI Demolition	-	818	-	-	-	-	39	210	1,067	-	1,067	-	-	-	-	-	-	-	1,495	80
5b.2	Subtotal Period 5b Additional Costs	-	2,501	-	-	-	-	46	463	3,010	-	1,067	1,943	-	-	-	-	-	-	8,289	80
Period 5b Collateral Costs																					
5b.3.1	Small tool allowance	-	139	-	-	-	-	-	21	160	-	-	160	-	-	-	-	-	-	-	-
5b.3	Subtotal Period 5b Collateral Costs	-	139	-	-	-	-	-	21	160	-	-	160	-	-	-	-	-	-	-	-
Period 5b Period-Dependent Costs																					
5b.4.1	Insurance	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5b.4.2	Property taxes	-	-	-	-	-	-	436	44	480	-	-	480	-	-	-	-	-	-	-	-
5b.4.3	Heavy equipment rental	-	5,131	-	-	-	-	-	770	5,901	-	-	5,901	-	-	-	-	-	-	-	-
5b.4.4	Plant energy budget	-	-	-	-	-	-	368	55	423	-	-	423	-	-	-	-	-	-	-	-
5b.4.5	Utility Site Indirect	-	-	-	-	-	-	227	34	261	261	-	-	-	-	-	-	-	-	-	-
5b.4.6	Corporate Allocations	-	-	-	-	-	-	316	47	363	363	-	-	-	-	-	-	-	-	-	-
5b.4.7	Security Staff Cost	-	-	-	-	-	-	2,032	305	2,336	-	-	2,336	-	-	-	-	-	-	-	42,309
5b.4.8	DOC Staff Cost	-	-	-	-	-	-	10,463	1,569	12,033	-	-	12,033	-	-	-	-	-	-	-	119,874
5b.4.9	Utility Staff Cost	-	-	-	-	-	-	3,934	590	4,524	-	-	4,524	-	-	-	-	-	-	-	68,751
5b.4	Subtotal Period 5b Period-Dependent Costs	-	5,131	-	-	-	-	17,776	3,414	26,321	624	-	25,697	-	-	-	-	-	-	-	230,934
5b.0	TOTAL PERIOD 5b COST	-	21,469	-	-	-	-	18,000	5,979	45,448	828	1,067	43,552	-	-	-	-	-	-	174,403	232,574
PERIOD 5 TOTALS		-	21,469	-	-	-	-	18,000	5,979	45,448	828	1,067	43,552	-	-	-	-	-	-	174,403	232,574
TOTAL COST TO DECOMMISSION		8,620	74,683	9,512	8,833	21,279	32,095	674,630	134,119	963,771	727,593	187,873	48,306	232,559	101,051	2,824	517	524	19,481,620	961,751	7,694,956

TOTAL COST TO DECOMMISSION WITH 16.17% CONTINGENCY:	$963,771	thousands of 2008 dollars
TOTAL NRC LICENSE TERMINATION COST IS 75.49% OR:	$727,593	thousands of 2008 dollars
SPENT FUEL MANAGEMENT COST IS 19.49% OR:	$187,873	thousands of 2008 dollars
NON-NUCLEAR DEMOLITION COST IS 5.01% OR:	$48,306	thousands of 2008 dollars
TOTAL LOW-LEVEL RADIOACTIVE WASTE VOLUME BURIED (EXCLUDING GTCC):	104,391	cubic feet
TOTAL GREATER THAN CLASS C RADWASTE VOLUME GENERATED:	524	cubic feet
TOTAL SCRAP METAL REMOVED:	37,772	tons
TOTAL CRAFT LABOR REQUIREMENTS:	961,751	man-hours

End Notes:
n/a - indicates that this activity not charged as decommissioning expense.
a - indicates that this activity performed by decommissioning staff.
0 - indicates that this value is less than 0.5 but is non-zero.
a cell containing " - " indicates a zero value

Section 8

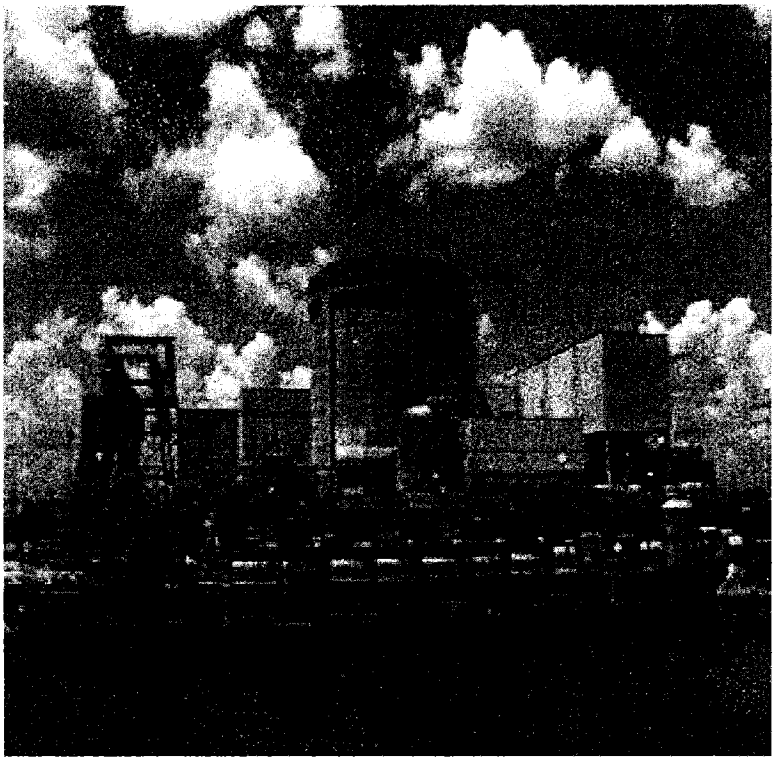
Comparative Analysis of Cost Studies

a) 2005 – 2008 Study

COMPARISON REPORT 2005 - 2008

for the

CRYSTAL RIVER NUCLEAR PLANT, UNIT 3



prepared for

Progress Energy Service Company, LLC

prepared by

TLG Services, Inc.
Bridgewater, Connecticut

December 2008

APPROVALS

Project Manager	William A. Cloutier, Jr.	12/08/08 Date
Project Engineer	Thomas J. Garrett	12/09/08 Date
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Quality Assurance Manager	Joseph J. Adler	12/16/08 Date

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REVISION LOG

No.	CRA No.	Date	Item Revised	Reason for Revision
0		12-16-2008		Original Issue

SUMMARY

This document provides comparative discussion on the decommissioning cost estimate prepared for the Crystal River Nuclear Plant, Unit 3 (Crystal River) in 2005 and the most recent estimate prepared in 2008 by TLG Services, Inc. (TLG). The 2008 analysis was prepared with the benefit of additional experience gained both from fieldwork in actual decommissioning programs and from plant-related decommissioning activities such as outages, retrofits, and change-out programs.

The 2008, or current estimate, was developed using the basic inventory and plant design information from the 2005 or previous cost model. The data, estimating assumptions and site-specific considerations were reviewed for the 2008 analysis. The cost model was modified where new information was available, updated site-specific information was obtained from the owner, or experience from ongoing decommissioning programs justified such changes.

Overall, the estimate to decommission Crystal River increased approximately 22% over the three year period (2005-2008 financial years). As can be seen in Table 1, the increase in the cost is primarily associated with program management (+$94.8 million), removal-related activities (+$19.0 million), and low-level radioactive waste disposal (+$9.4 million). A decrease in spent fuel management costs was realized by extending plant operations an additional 20 years, allowing a significant portion of the spent fuel to be transferred directly to the DOE and reducing the cost of on-site, interim storage by $21 million.

The rationale for specific changes in several major cost centers is discussed in more detail within the following narrative. Comparisons are focused on permutations in the technical work scope and modifications to assumptions that have affected the cost of decommissioning (inflationary effects are generally ignored for purposes of this analysis).

COMPARATIVE ANALYSIS

TLG completed a decommissioning cost analysis for Crystal River in 2005. The analysis provided Progress Energy Service Company (Progress Energy), the owner and operator of the plant, with the projected costs (in 2005 dollars) to completely decontaminate and dismantle the nuclear unit following the normal cessation of plant operations. For purposes of this comparison, this analysis is referred to as the 2005 estimate or analysis.

In 2008, TLG updated the cost analysis. The current analysis uses the physical plant inventory and design information from the previous analysis. This data was reviewed, along with the assumptions and other site-specific considerations, and modified or updated where new information was available or experience from ongoing decommissioning programs justified such changes.

Generally, escalation of the various cost components in a decommissioning analysis (with the exception of those costs associated with radioactive waste disposal), follows "standard" cost indices. However, such indices can only be applied successfully to a static model (i.e., where the bases against which the indices are applied have not undergone significant change). In the period between the two analyses (the years 2005 and 2008), new cost elements have been added and older cost elements revised. With this in mind, the following discussion encompasses the major areas of difference between the two estimates.

In 2005, the estimate to promptly decommissioning Crystal River was estimated at approximately $668.7 million (in 2005 dollars). The comparable cost in 2008 is $818.3 million (in 2008 dollars). Areas of change in the two estimates are shown in Table 1. The cost centers identified in the table were extracted from TLG documents Nos. P23-1518-002, "Decommissioning Cost Study for the Crystal River Plant - Unit 3," issued in March 2005 and P23-1597-002, "Decommissioning Cost Analysis for the Crystal River Nuclear Plant, Unit 3," issued in October 2008.

The overall decommissioning scope of the current cost estimate has not significantly changed from that presented in 2005. As described earlier, the majority of the 22% increase in the cost over the three-year period can be attributed to corresponding increases in the cost centers associated with program management and spent fuel storage. While the scope may not have changed, there are differences in the base assumptions between the two studies. These differences are identified in the discussion of the following cost elements.

1. Decontamination

The $2.2 million increase (19%) in decontamination-related activities in the 2008 estimate was due to an increase in the craft labor rates over the three year period, in particular, the skilled trades. General increases in equipment and material costs also contributed to the increase.

2. Removal

Consistent with the decontamination-related activities, the higher craft labor rates contributed to the increase in removal activities ($19.0 million total or 25%). Higher labor rates accounted for $6.3 million of the increase. In addition, higher costs for heavy equipment (including operating costs), supplies, and dismantling tooling and materials costs added $12.7 million to the estimate.

3. Packaging

The modest increase ($926 thousand or 7%) in the 2008 cost element for waste packaging is a result of increases in cost of waste containers and packaging materials.

4. Transportation

Higher transportation tariffs (due to rising fuel prices) over the three year period was the primary contributor to the $6.98 million (or 106%) increase in the 2008 transportation cost. It should be noted that, consistent with the 2005 estimate, low-level radioactive waste generated from the decontamination and dismantling of the nuclear unit was assumed to be shipped to Clive, Utah for disposal or some alternative facility at an equivalent distance.

5. Low-Level Radioactive Waste Disposal

For estimating purposes, and as a proxy for future disposal facilities, the EnergySolutions' facility in Clive, Utah was used as the basis for estimating the disposal cost for the majority of the radioactive waste (Class A) in both the 2005 and 2008 cost analyses. Since EnergySolutions does not have a license to dispose of the more highly radioactive waste (Class B and C), disposal costs for this material were based upon the last published rate schedule for non-compact waste for the Barnwell facility.

The total cost of low-level radioactive waste disposal increased $9.5 million in the 2008 estimate or 17%. The increase was due to 1) a 36% increase in the large component disposal rate, and 2) higher disposal rates at Barnwell and for selected waste forms (e.g., containerized waste) at Clive. Mitigating the increases were 1) a reduction in the assumed production of Class B resins, 2) lower bulk disposal rates at Clive and 3) lower rates for the disposal of dry-active waste at Clive.

6. Off-Site Waste Processing

The unit cost to process and condition low-level radioactive waste at a centralized, off-site facility decreased slightly in 2008 (approximately 2%). The rate decrease is consistent with the change in costs reported in Table 1 for this line item (a savings of $0.336 million or a 2% reduction).

7. Program Management (Staffing)

The organization identified to oversee the decommissioning program, operate the site and provide essential services, was further refined in 2008. Staffing levels were reduced (2%-4%) in several of the decommissioning periods. Offsetting the reduction in personnel, salaries in 2008 showed a modest increase (e.g., with engineering salaries rising between 5 to 8% over the three year period).

The large increase reported in the 2008 estimate for program management was due to a change in the assumptions pertaining to site security. In January 2007, the NRC approved a final rule that enhanced its security regulations governing the design basis threat (DBT). This rule imposed security requirements similar to those previously imposed by the Commission's April 29, 2003, DBT Orders. However, the new rule also modified and enhanced the DBT based on experience and insights gained by the Commission during implementation of the Orders, and extensive consideration of the factors specified in the Energy Policy Act of 2005.

Consequently, based upon the industry's response to the NRC's rulemaking, TLG modified its security cost model to increase the size of the security force during all phases of decommissioning (including ISFSI operations following the termination of the plant's operating license). The increase in the cost for security accounted for almost all of the $94 million increase (or 34%) from the 2005 estimate.

8. Utility Indirect

Fixed site operating costs (non-personnel related) included in the decommissioning cost model decreased significantly in 2008, contributing to the overall reduction of $3.9 million (22%).

9. Corporate Allocations

This new line item in the 2008 decommissioning estimate was added as a result on recent experience and review of utility budgets and charges regarding corporate charges to decommissioning projects. The cost for corporate support added $13.2 million to the 2008 estimate.

10. Spent Fuel Pool Isolation

There was no appreciable change in the cost (other than from the general escalation of materials and services) to isolate the spent fuel pool, install independent cooling, cleanup and power systems, and relocate the control room so that decommissioning operations can proceed in adjacent areas.

11. Spent Fuel Storage (ISFSI Related)

For purposes of generating a comprehensive post-shutdown cost, spent fuel generated over the operating life of Crystal River was assumed to be stored at the site until the DOE can complete the transfer of assemblies to its geologic repository. The projected storage period was based upon the latest information available from the DOE at the time the cost model was assembled, operating data for the nuclear unit, and some historical perspective on this ongoing government program to develop a national waste repository. The spent fuel management plans developed to support the 2005 and 2008 decommissioning estimates assumed that the DOE would not commence operation of its geologic repository until 2020. It was also assumed that spent fuel would be accepted for disposal from the nation's commercial nuclear plants, with limited exceptions, in the order (the "queue") in which it was removed from service.

The 2005 and 2008 analyses assumed that spent fuel could reside at the site for up to 36 years after the cessation of plant operations before the transfer to a DOE facility could be completed (if the oldest fuel allocation receives the highest priority and the geologic repository is able to achieve the DOE's stated annual rate of transfer - 3,000 metric tons of uranium per year).

In the 2005 analysis, the plant was expected to operate for 40 years, ceasing operations in 2016 (four years before DOE would begin receiving commercial spent fuel). As such, all the fuel generated during plant operations was relocated to an on-site Independent Spent Fuel Storage Installation (ISFSI) for interim storage. The 2005 estimate included the cost to offload the spent fuel pool into commercial dry storage modules.

The 2008 analysis assumed a 60-year operating period, with the plant ceasing operations in 2036, well after the startup of the geologic repository. As such, a significant number of spent fuel assemblies are transferred directly to the DOE without the need for interim storage at the site. This scenario avoids the large capital expense associated with dry storage (16 fewer modules were need for the 60-year scenario) with the cost savings reflected in the $21 million decrease in Spent Fuel Management line item shown in Table 1.

12. Insurance and Regulatory Fees

Insurance property premiums increased significantly (140%), accounting for $3.3 million of the increase. While regulatory licensing fees decreased (as published by the NRC) the hourly rate increased (53%), off-setting the decrease in licensing fees and contributing $2.7 million to the increase.

13. Energy

Energy costs increased significantly (88%) commensurate with the higher price of electricity (increasing from $0.055 per kilowatt hour in 2005 to $0.126 in 2008).

14. Characterization and Licensing Surveys

The 2008 analysis includes several new survey-related activities that contributed to the increase of $8.7 million. The survey and release of scrap metal located in controlled areas was added (at a cost of $4.3 million). Program management costs to support the final site survey were segregated from the final survey costs with additional man-hours assigned (at an additional cost of $1.4 million). The site characterization survey logic was also revised contributing $2.5 million to the increase in the 2008 estimate.

15. Property Taxes

Property tax information included within the 2005 estimate reflected a continuing, although annually decreasing, tax obligation over the life of the

decommissioning program. The tax model was updated by Progress Energy for use in the 2008 estimate. The changes in the tax model resulted in an increase of $4.3 million or 15% from the 2005 estimate.

16. Miscellaneous Equipment and Site Services

There was no appreciable change in the costs reported for the category between the 2005 and 2008 cost models (other than the general escalation in the cost of materials and services).

TABLE 1
COST COMPARISON
2008 vs. 2005
(thousands of dollars)

Activity	2008	2005	Delta	Change
Decontamination	14,033	11,789	2,245	19%
Removal	95,411	76,389	19,021	25%
Packaging	14,624	13,698	926	7%
Transportation	13,539	6,564	6,975	106%
Waste Disposal	63,687	54,233	9,453	17%
Off-site Waste Processing	21,589	21,925	-336	-2%
Program Management [1]	375,813	280,985	94,828	34%
Utility Site Indirect	14,005	17,954	-3,949	-22%
Corporate Allocations	13,196	0	13,196	
Spent Fuel Pool Isolation	10,819	9,900	918	9%
Spent Fuel Management	78,213	99,208	-20,995	-21%
Insurance and Regulatory Fees	28,416	22,373	6,043	27%
Energy	16,869	8,972	7,897	88%
Characterization and Surveys	17,869	9,170	8,699	95%
Property Taxes	33,469	29,196	4,273	15%
Miscellaneous Equipment	6,712	6,310	402	6%
Total [2]	818,264	668,668	149,596	22%
NRC License Termination	547,328	444,756	102,572	23%
Spent Fuel Management	222,874	180,374	42,499	24%
Site Restoration	48,063	43,538	4,525	10%

[1] Includes site security costs

[2] Columns may not add due to rounding

CONCLUSION

The areas of greatest change in the costs reported to decommission Crystal River were in the areas of program management (+$94.8 million), removal-related activities (+$19.0 million), and low-level radioactive waste disposal (+$9.4 million) and spent fuel management (-$21 million).

Program management cost increases were driven by revised security requirements. Removal-related activities increased as a result of higher craft labor rates and heavy equipment costs, tooling, supplies and other material costs. While site overhead costs (site indirects) decreased, corporate support costs were added to the 2008 cost estimate.

The costs for low-level radioactive waste disposal increased in the 2008 cost estimate due to higher costs at EnergySolutions' facility in Clive, Utah for large components (e.g., steam generators) and containerized waste, and at the Barnwell rate for Class B and C waste. The increases were partially offset by lower rates for bulk material and dry-active waste at the Clive facility.

The cost for spent fuel management in the 2008 estimate decreased from that reported in 2005 even though the assumptions on DOE acceptance were unchanged (2020 geologic repository start date and 36-year post-operation site residence time). The 2008 estimate, however, reflected a 60-year operating life verses a 40-year operating life in the 2005 estimate. The additional 20 years of operations allowed a significant number of spent fuel assemblies to be transferred directly to the DOE, avoiding the capital cost of storing the fuel at the site.

Overall, the cost increased 22.4% over the three year period or approximately 7% per year.