

7 Update of Site-Specific Decommissioning Costs

7.1 Introduction

In accordance with 10CFR50.82(a)(9)(ii)(F) and Regulatory Guide 1.179, the site specific cost estimates and funding plans are provided. Regulatory Guide 1.179 discusses the details of the information to be presented.

The License Termination Plan (LTP) must:

Provide an estimate of the remaining decommissioning costs, and compare the estimated costs with the present funds set aside for decommissioning. The financial assurance instrument required by 10CFR50.75 (Reference 7-1) must be funded to the amount of the cost estimate. If there is a deficit in the present funding, the LTP must indicate the means for ensuring adequate funds to complete the decommissioning.

The decommissioning cost estimate should include an evaluation of the following cost elements:

- Cost assumptions used, including contingency
- Major decommissioning activities and tasks
- Unit cost factors
- Estimated decontamination and equipment and structure removal
- Estimated cost of radioactive waste disposal including disposal surcharges
- Estimated final survey costs
- Estimated total costs

The cost estimate should focus on the remaining work, detailed activity by activity, including costs of labor, materials, equipment, energy, and services.

During plant operations, YAEC sold the entire electrical output of the Yankee Nuclear Power Station (YNPS) to wholesale power purchase contracts (i.e., Power Contracts) with the ten New England utilities that collectively own 100% of the common equity of YAEC (the “Customers”). Over YNPS’s operating life, YAEC recovered, and since the shutdown continues to recover, its costs of providing service (including the estimated costs of decommissioning YNPS) through a formula rate set forth in its Power Contracts. Collections for decommissioning have been placed in a trust established under Massachusetts law, with three separate funds—the Qualified Fund, a Non-Qualified A Fund, and a Non-Qualified B Fund.

The most recent cost estimate, submitted to the Federal Energy Regulatory Commission (FERC) on April 4, 2003, was prepared by Yankee Atomic Electric Company in accordance with 10 CFR 50.82(a)(8)(iii). [Reference 7-2] The assumed method of decommissioning anticipated a prompt decommissioning technique commonly referred to as DECON. FERC accepted the filing by its June 3, 2003 order, certified settlement on September 16, 2003 and granted approval on October 2, 2003.

In February 28, 2003, YAEC entered into a contract with a demolition contractor for completion of certain decommissioning activities including the completion of removing contaminated equipment and the demolition of structures above grade.

7.2 Decommissioning Cost Estimate

7.2.1 Cost Estimate Previously Docketed in Accordance with 10 CFR 50.82 and 10 CFR 50.75 Post Shutdown

The YNPS Decommissioning Plan was submitted to the NRC in December 1993 and was approved on February 14, 1995, and later became part of the FSAR. It described all activities associated with decommissioning the facility and included a cost study for those activities. The cost study was subsequently revised in October 1994 and updated in August 1995, December 1999, and most recently in April 2003.

In June 2001, YAEC elected to relocate pertinent information from the FSAR, including the cost estimate summary, to a PSDAR which conforms to the guidance in RG 1.185. This estimate was the basis for which YAEC collected its rates and its anticipated decommissioning expenses. This cost estimate was prepared by YAEC in accordance with 10CFR50.82(a)(8)(iii). It was prepared in sufficient detail to identify an activity by activity work breakdown complete with costs for radioactive waste, utility labor, contractor labor, energy, materials and equipment.

7.2.2 Summary of the Site Specific Decommissioning Cost Estimate

The current 2003 decommissioning cost estimate is based on the April 4, 2003, submittal to FERC. This estimate completely replaces and supercedes the 1999 “to-go” cost estimate. The filing was necessary due to cost increases due to continued DOE default in taking title of the spent fuel and GTCC waste, increased security measures, increased costs to implement transportable dry storage, additional waste disposal, the environmental site closure process, and investment market volatility. This most recent filing permits resumption of decommissioning and includes a fixed priced contract for the majority of remaining D&D activities as well as a market tracking mechanism to address investment market volatility. The filing also provides for a future filing requirement triggered by the outcome of the DOE litigation.

The D&D contractor work scope assumes YAEC continues to operate and maintain the spent fuel storage, hold the NRC license and provide oversight to the D&D contractor. Site-specific costs, such as insurance costs, property taxes, and decommissioning oversight costs, are the responsibility of YAEC. The D&D contractor is responsible for all other costs associated with decommissioning activities within the scope of the work with includes the removal of components and structures to grade elevation. An Integrated Project Schedule has been developed to mirror the costs expected to be expended during the completion of decommissioning. The schedules were also used to determine all other period dependent costs such as small tool allowances, health physics supplies, energy requirements and security. The

activity dependent and period dependent costs were added together and a contingency applied to arrive at the total decommissioning cost estimate.

Specific factors assessed were:

1. Staffing
2. Labor - Dismantlement of Contaminated Areas
3. Labor - Dismantlement of Non-contaminated Areas
4. Preparation, Packaging and Transportation of LLW
5. Disposal of Class A LLW (excluding soil and asphalt)
6. Disposal of Class B and C LLW (excluding soil and asphalt)
7. Preparation, Packaging and Transportation of Non-Radioactive Waste
8. Disposal of Non-Radioactive Waste*
9. Building and Structure Demolition*
10. Soil and Asphalt Remediation and Disposal
11. Final Status Survey and License Termination Plan
12. Site Restoration*
13. Administration, General and Overhead
14. Materials & Services
15. Fees, Licenses and Permits
16. Salvage of Equipment and Components
17. Transition to Dry Storage Implementation*
18. Other (Health Physics Supplies, Small Tools, Decon and Removal Materials and Environmental Surveys)
19. Security (administration & enhanced security)
20. Long Term ISFSI Operation*
21. D&D of ISFSI*
22. Environmental Site Closure

*Included but not part of NRC required decommissioning activities.

The decommissioning cost estimate uses the approach identified in the LTP.

Table 7-1 identifies, as of 1/1/2003, that the remaining cost to complete NRC required decommissioning activities is \$121.1 million (excluding contingency). The \$121.1 million is comprised of \$97.1 million for dismantlement and decontamination, \$20.0 million for radioactive waste disposal, and \$4.0 million for final status survey. This estimate is a subset of the FERC approved estimate (References 7-3 and 7-4) and excludes significant other expenditures approved in the FERC settlement such as decommissioning costs of \$347.9 million incurred prior to 2003, a contingency amount, and long-term spent fuel storage.

In addition to the \$121.1 million of NRC required decommissioning costs identified in Table 7-1, the FERC approved cost estimate includes: 1) contingency (\$37.9 million); 2) long term spent fuel storage costs through 2022 (\$129.2 million), and 3) site restoration (\$0.3 million). While approved by the FERC rate settlement, Table 7-1 presents the long-term spent fuel storage, site restoration, and final status survey costs, separately from the D&D cost.

The decommissioning cost estimate figures are in 2003 dollars. Collections to the trust fund are based on the following economic assumption: “average annual inflation adjustment of 2.2% for costs that are not subject to escalation (i.e., excluding the demolition contractor contract, already incurred costs, and other costs that are not subject to inflation).” As set forth in Table 7-2, the comparison of estimated forward costs to trust funds on hand has been done on an explicit year-by-year model. As such, each year's statement of expenditures, income, and trust fund balances is in that year's current dollars.

Table 7-1
Actual and Projected Decommissioning Expenditures
(\$ Millions)

<u>Cost Categories</u>	<u>Total</u>
<u>1992 – 2002 Dismantlement and Decontamination [A]</u>	\$ 347.9
<u>2003 FERC Approved "To-go" Decommissioning Cost Estimate: 2003 – 2022</u>	
<u>Cost Elements [B]:</u>	
(1) Dismantlement and Decontamination	\$ 97.1
(2) Radioactive Waste Costs	<u>\$ 20.0</u>
Subtotal Dismantlement and Decontamination and Waste (1+2)	\$ 117.1
(3) Long Term SNF Storage*	\$ 129.2
(4) Site Restoration*	\$ 0.3
(5) Final Status Survey (FSS)	<u>\$ 4.0</u>
Subtotal SNF Storage, Site Restoration and FSS (3+4+5)	\$ 133.5
(6) Contingency	<u>\$ 37.9</u>
<u>Total 2003 FERC Approved Decommissioning "To-go" Cost Estimate 2003 – 2022</u>	\$ 288.5
<u>Total Decommissioning Cost Including Incurred and Estimated Cost</u>	<u>\$ 636.4</u>

[A] 1992 – 2002 are stated in actual/nominal year dollars.

[B] "To-go" 2003 cost estimate is stated in year 2003 dollars.

* Included but not part of NRC required decommissioning activities.

Table 7-2
Decommissioning Trust Analysis
Total Funds (in \$1000)

Period Ending	Contributions	Decom ^[1]		Income Taxes	TOTAL	Cash	
		Expenses	Earnings			Non- Qualified	Qualified
31-Dec-02					64,042	8,062	55,979
31-Dec-03	32,453	(70,772)	2,959	(477)	28,205	3,407	24,798
31-Dec-04	55,634	(71,021)	1,286	(887)	13,217	5,300	7,917
31-Dec-05	55,634	(41,797)	1,205	(3,132)	25,127	8,317	16,810
31-Dec-06	14,005	(10,260)	1,872	(297)	30,447	1	30,446
31-Dec-07	14,005	(7,847)	2,555	1,774	40,935	1	40,934
31-Dec-08	14,005	(7,489)	3,328	178	50,958	1	50,957
31-Dec-09	14,005	(7,344)	4,076	(449)	61,247	1	61,246
31-Dec-10	14,005	(7,676)	4,832	(749)	71,660	0	71,660
31-Dec-11		(7,372)	5,098	(882)	68,505	0	68,505
31-Dec-12		(7,975)	4,839	(837)	64,532	0	64,532
31-Dec-13		(7,771)	4,548	(787)	60,523	0	60,523
31-Dec-14		(8,030)	4,238	(733)	55,998	0	55,998
31-Dec-15		(8,289)	3,889	(672)	50,926	0	50,926
31-Dec-16		(8,428)	3,503	(606)	45,396	0	45,396
31-Dec-17		(9,106)	3,063	(530)	38,824	0	38,824
31-Dec-18		(8,968)	2,576	(445)	31,986	0	31,986
31-Dec-19		(9,151)	1,850	(288)	24,397	0	24,397
31-Dec-20		(5,941)	1,286	(173)	19,569	0	19,569
31-Dec-21		(12,376)	703	(76)	7,820	0	7,820
31-Dec-22		(7,877)	73	(16)	0	0	0
31-Dec-23		0	0	0	0	0	0
	<u>\$213,748</u>	<u>(\$325,490)</u>	<u>\$57,779</u>	<u>(\$10,082)</u>			

TOTAL FUNDS AVAILABLE (\$0)

[1] Decommissioning expenses include contingency and escalation.

7.2.3 Dismantlement and Decontamination

The costs for the remaining dismantlement and decontamination activities include: utility oversight and project management, labor to remove contaminated and non-contaminated systems, structures and components, disposal of non-radiological waste, soil and asphalt disposal, materials, services, equipment, fees and permits, salvage credits, and spent fuel island transition. Also included are the costs associated with non-radiological remediation required by Federal and State agencies for such items as RCRA and TSCA closure, asbestos disposal, etc. These specific decommissioning activities which remain to be performed are described in Section 3 of this LTP. As provided in Table 7-1, the NRC-related decommissioning activities and funding amounts for those activities are separately identified.

7.2.4 Radiological Waste Disposal

Radiological waste disposal includes: preparation, packaging, transportation and disposal of all forms of low-level radioactive wastes. The quantity of radioactive waste remains bounded by the estimate of radioactive waste volume for a PWR provided in the FGEIS.

The large majority of the waste is Class A waste which is either sent to an approved waste processing facility or the Envirocare facility in Clive, Utah. The rates for these two facilities are comparable to or lower than the published rates for the Barnwell facility. The portion of the waste going to Barnwell consists mainly of Class B and C waste (e.g., resin liners).

7.2.5 Long-Term Spent Fuel Storage

In parallel with the final phase of decommissioning, an Independent Spent Fuel Storage Installation (ISFSI) was constructed on-site for the long-term storage of the spent nuclear fuel. Long-term fuel storage costs encompasses the completion of fuel transfer from the existing Spent Fuel Pit to the ISFSI, and ISFSI operational and maintenance expenditures from mid-year 2003 through 2022 when the Department of Energy (DOE) is assumed to honor its contract obligations for the spent fuel. ISFSI operations and maintenance include: YAEC oversight labor and benefits, insurance, regulatory fees, legal fees, maintenance materials, and other administrative and general expenditures.

7.2.6 Final Status Survey (FSS) and Site Restoration

The current estimate for site restoration includes the cost to perform the final site survey, perform final site grading and terminate the Part 50 license.

7.3 Decommissioning Funding

On July 25, 1990, YAEC submitted to the NRC a report as required by 10CFR50.75, indicating how reasonable assurance will be provided for funds to decommission the facility (Reference 7-5). The report described how YAEC has established an external sinking fund in 1981 to accumulate decommissioning funds. YAEC certified that each owner agreed to be financially responsible for its share of the decommissioning costs pursuant to the terms of the Power Contracts and Amendatory Agreements in accordance with the FERC regulations. These contracts have been filed with and approved by FERC. The Power Contracts and Amendatory Agreements were attached to the report.

On March 31, 2003, YAEC provided the most recent status report on the decommissioning fund to the NRC in accordance with 10CFR50.75 (Reference 7-6). This report restated the obligation that each wholesale power purchaser is responsible for its share of the facility decommissioning costs pursuant to the Power Contracts regardless of when the costs occur or the operational status of the facility.

Collections began in June 2003 at \$32.5 million, increase to \$55.6 million in years 2004 and 2005, and decrease to \$14.0 million annually from 2006 through 2010.

All decommissioning activities are scheduled for completion by January 2006. Assuming a SAFSTOR condition, decommissioning trust fund expenditures would be minimized to dry fuel storage activities only. Therefore, YAEC forecasts sufficient funding will exist should a SAFSTOR condition occur during the period 2003 through 2005.

All spent fuel has been transferred to the ISFSI and the existing Spent Fuel Pit Building is expected to be decommissioned by the end of 2004. The long term spent fuel storage costs after 2004 consist of the operation, and maintenance of the ISFSI, as well as decommissioning of the ISFSI. As shown in Table 7-2, sufficient funding will exist, based on YAEC's assumption that the DOE will assume responsibility to complete spent fuel storage and removal by 2022.

Finally, as demonstrated in Table 7-2, YAEC shows that sufficient funds will be available from current assets and future contributions to complete decommissioning. The availability of ongoing contributions to the trust funds provides reasonable assurance that decommissioning costs will be paid when incurred. This assurance is further founded on the power contract obligations of the owners of YAEC. Pursuant to 10CFR50.75 and 10CFR50.82 regulations, YAEC has demonstrated a financial plan which includes adequate reserves for the entire decommissioning and ISFSI-related costs, which therefore meet the requirements for decommissioning costs associated with decommissioning and dismantlement as defined by these regulations.

7.4 References

- 7-1 Code of Federal Regulations, Title 10, part 50.75, “Reporting and Recordkeeping for Decommissioning Planning.”
- 7-2 Letter, YAEC to FERC, Filing Revisions to Yankee’s Wholesale Power Contract, dated April 4, 2003, Docket No.ER03-704-000.
- 7-3 Letter, FERC to YAEC, “Certification of Uncontested Offer of Settlement,” dated September 16, 2003, Docket No. ER03-704-000.
- 7-4 Letter, FERC to YAEC, “Order Approving Uncontested Settlement,” dated October 2, 2003, Docket No. ER03-704-000.
- 7-5 Letter, YAEC to USNRC, “Decommissioning Financial Assurance Certification Report,” dated July 25, 1990, BYR 90-102.
- 7-6 Letter, YAEC to USNRC, “Decommissioning Funding Assurance,” dated March 31, 2003, BYR 2003-016.

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