Appendix C. Decommissioning of Nuclear Power Plants

Although most nuclear power plants are licensed by NRC to operate for 40 years, there is no absolute age at which they become unsafe or uneconomical to operate. In fact, it may be possible to economically refurbish and extend the operating lifetime of many reactors by replacing aging internal components (EPRI, 1987). Once a plant has been shut down, it can be decommissioned (e.g., dismantled) within a few years, placed in safe storage for 30 to 50 years prior to decommissioning, or permanently entombed (NRC, 1981). Reactor refurbishing will probably generate about the same amount of GTCC waste as "plant decommissioning.

There are two reasons for delaying decommissioning once a reactor has been shut down. First, the overall radioactivity of the LLW from decommissioning (at least 95 percent of which is contributed by GTCC waste) will decrease by 30 to 45 times, if decommissioning is deferred five decades (see Table 6). Deferral could therefore reduce worker risks and decrease dismantling costs. **Second,** the volumes of Class **A,** B, and C LLW generated from immediate decommissioning (97% of which is Class **A** waste) can be reduced by about 10 times if decommissioning is deferred five decades, thereby significantly decreasing LLW disposal costs unless these costs rise dramatically over this time (See Table 6).

Table 6. Effects of Delayed Decommissioning on the LLW Generated by Commercial Nuclear Power Plants

Plant type [1.175 GW(e)]	Radioactivity of all LLW in thousands of curies		
	No delay	30-year delay	50-year delay
Boiling-water	6,600	180	140
Pressurized- water	4,900	210	160
	Volume of all LLW in thousands of cubic feet		
	No delay	30-year delay	50-year delay
Boiling-water	670	670 *	60 •
Pressurized- water	630	630 *	65 *

* Includes wastes from both preparation for SAFESTOR and decommissioning.

Source: U.S. Department of Energy, "Integrated Data Base for 1987: Spent Fuel and Radioactive Waste Inventories, Projections, and Characteristics," DOE/RW-0006, Rev. 3, September 1987, p. 279.

For these reasons, many of the existing 110 nuclear plants, especially the 71 plants that are co-located with other units, could likely be placed in "SAFESTOR" for 5 decades prior to decommissioning. It is not clear, however, that decommissioning of all nuclear plants will be deferred. If costs for LLW disposal continue to rise as they have over the last 15 years, it may be more economical to immediately decommission some plants. Older plants (i.e., constructed prior to 1970) without well-documented designs and plants that are not co-located with multiple units may require decommissioning before plant engineers are reassigned or retired.

The NRC issued its final rule on decommissioning nuclear facilities in June 1988 (53 Federal Register 123).