Aging Nuclear Power Plants: Managing Plant Life and Decommissioning

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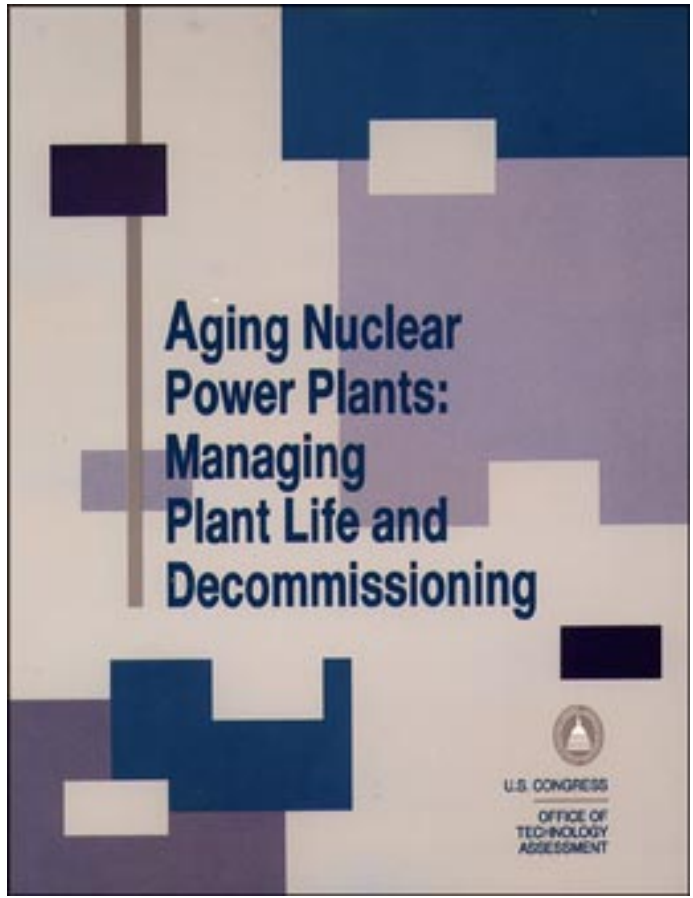

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Foreword

Currently, 107 operating nuclear power plants supply over 20 percent of the Nation's electricity. As these plants age, issues related to plant lives and decommissioning are likely to become much more visible and draw more public attention. This report examines the following: the outlook for safety management and economic life decisions for the Nation's existing nuclear power plants as they age, the prospects for decommissioning, and current and potential Federal efforts that could contribute to more timely and better informed decisions regarding plant life and decommissioning. This report is a product of a request by the Senate Committee on Governmental Affairs and the House Committee on Energy and Commerce and its Subcommittee on Energy and Power.

After many years of intensive efforts by the U.S. Nuclear Regulatory Commission and the nuclear power industry, no insurmountable industry-wide safety challenges related to plant aging have been identified. There are some notable uncertainties for the longer term, however, that require ongoing research and experience to address. More immediately, many nuclear power plants already face severe economic pressures in the increasingly competitive electric power industry. Regarding decommissioning, experience with decommissioning small reactors and with major maintenance activities at large plants suggests that the task can be performed with existing technologies. However, several issues such as waste disposal and site cleanup standards remain unresolved.

OTA appreciates the substantial assistance received from many organizations and individuals in the course of this study. Members of the advisory panel provided helpful guidance and advice. Reviewers of the draft report contributed greatly to its accuracy and completeness. Personnel at the case study facilities shared their valuable experiences and perspectives. To all of them goes the gratitude of OTA and the personal thanks of the project staff.

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NOTE: OTA appreciates and is grateful for the valuable assistance and thoughtful critiques provided by the advisory panel members, The panel does not, however, necessarily approve, disapprove, or endorse this report. OTA assumes full responsibility for the report and the accuracy of its contents.

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Abbreviations

ACRS:	Advisory Committee on Reactor Safeguards
AEA:	Atomic Energy Act of 1954, as Amended
ALARA:	as low as is reasonably achievable
ARDUTLR:	age-related degradation unique to license renewal
ASCE:	American Society of Civil Engineers
ASME:	American Society of Mechanical Engineers
BRC:	below regulatory concern
B&WOG:	Babcock and Wilcox Owners' Group
BWR:	boiling water reactor
CAAA:	Clean Air Act Amendments of 1990
CF:	capacity factor
CLB:	current licensing basis
DOE:	U.S. Department of Energy
DSM:	demand-side management
EEI:	Edison Electric Institute
EIA:	U.S. Energy Information Administration
EPA:	U.S. Environmental Protection Agency
EPACT:	Energy Policy Act of 1992
EPRI:	Electric Power Research Institute
EQ:	environmental qualification of electrical equipment
FERC:	Federal Energy Regulatory Commission
GSI:	generic safety issue
IAEA:	International Atomic Energy Agency
ICRP:	International Commission on Radiological Protection
IEEE:	Institute of Electrical and Electronics Engineers
INPO:	Institute of Nuclear Power Operations
IPA:	integrated plant assessment
IPE:	individual plant examinations
IRP:	integrated resource planning
ISFSI:	independent spent fuel storage installation
LLRWPAA:	Low-Level Radioactive Waste Policy Amendments Act of 1985
LLW:	low-level radioactive waste
MRS:	monitored retrievable storage for spent nuclear fuel
NDE:	nondestructive examination
NERC:	North American Electric Reliability Council
NPAR:	NRC's Nuclear Plant Aging Research program
NRC:	U.S. Nuclear Regulatory Commission
NUMARC:	Nuclear Management and Resources council
NWPA:	Nuclear Waste Policy Act of 1982
O&M:	operating and maintenance
PNL:	Pacific Northwest Laboratory
POL:	possession-only license
PRA:	probabilistic risk assessment
PWR:	pressurized water reactor
RPV:	reactor pressure vessel
SALP:	systematic assessment of licensee performance
SOC:	statement of considerations accompanying a promulgated regulation
SSCs:	systems, structures, and components

(for additional abbreviations see index)