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Liberation of Fluorine and Uranium Hexafluoride Gases -- Radiation Decomposition of Solid Uranium Hexafluoride -- Long-Term Effects of Leaving Plutonium in the Salt After Uranium Removal -- EXCESS OF REDUCING SPECIES IN THE SALT AND HAZARDS OF SIMPLE REMELTING -- 3-Fluoride Salt Chemistry, Partitioning, and System Corrosion -- CHEMISTRY RELEVANT TO THE PRESENT STATUS -- Chemical Consequences of Radiolysis -- PARTITIONING OF URANIUM FROM THE SALT -- PLUTONIUM PARTITIONING BY FLUORINATION -- NONFLUORINATION OPTION FOR PLUTONIUM SEPARATION -- SYSTEM CORROSION ISSUES -- Radiation-Induced Corrosion Questions -- 4-Preferred Technical Approach -- COMMENTS ON PROCESS STEPS -- DEVELOPMENT OF A PREFERRED APPROACH -- 5-Comments on Specific Separation Technologies -- FLUORINATION -- Direct Fluorination -- Hydrofluorination -- Alternative Fluorinating Agents -- ELECTROREFINING -- DISTILLATION OF MOLTEN SALT -- AQUEOUS DISSOLUTION AND SEPARATION -- Criticality Concerns in Aqueous Processing -- Fluoride Removal -- Conclusions on Aqueous Processing -- STABILIZATION TECHNOLOGIES -- 6-Nuclear Criticality Considerations -- CRITICALITY ISSUES IN PROCESSING -- CRITICALITY HAZARD OF REMELTING THE FLUORIDE SALTS IN THE DRAIN TANKS -- RATIONALE FOR TECHNICAL INSIGNIFICANCE OF A CRITICALITY EXCURSION -- CONCLUDING COMMENTS.
7-Strategic Alternatives -- PERMANENT DISPOSAL IN THE DRAIN TANKS -- DISPOSAL OF ALL KEY CONTAMINANTS IN THE FEDERAL REPOSITORY -- DISPOSAL OF KEY CONTAMINANTS IN THE SALT RESIDUE IN THE WASTE ISOLATION PILOT PLANT (WIPP) -- DISPOSAL OF KEY CONTAMINANTS IN SALT RESIDUE IN THE FEDERAL REPOSITORY -- REUSE OF THE SALT -- INTERIM STORAGE -- RATIONALE FOR REJECTING THE FIRST SIX ALTERNATIVES -- INTERIM VERSUS PERMANENT STORAGE AND DISPOSAL -- 8-Management of MSRE Hazards -- CURRENT HAZARDS -- HAZARD MANAGEMENT ACTIVITIES -- CRUCIAL ROLE OF FURTHER ACTIVITIES FOR CONDITION AND PROCESS ASSESSMENT -- MAJOR RECOMMENDATION CONCERNING HAZARDS -- DETAILED RECOMMENDATIONS REGARDING HAZARDS -- 9-Summary and Responses to Questions in Statement of Task -- TECHNICAL SUMMARY -- STRATEGY FOR REMEDIATION -- Where Is the Uranium? -- How Can a Condition Assessment Affect Remediation Plans? -- The Panel's Preferred Alternative -- Hazards -- RESPONSES TO QUESTIONS IN STATEMENT OF TASK -- Question 1 -- Question 2 -- The Consequences of Failure to Complete According to Plan -- Cost Estimates -- A Possible Strategy -- Question 3 -- PANEL PERSPECTIVE -- OVERALL CONCLUSION -- References -- Appendixes -- Appendix A-List of Materials Reviewed -- Appendix B-Alternative Fluorinating Agents -- Appendix C-Contamination Concerns Relating to Radon Gas Spread -- Appendix D-Use of a Nuclear Poison to Inhibit Nuclear Criticality -- Appendix E-Hazard Scoping of Major Actions for Remediation -- Appendix F-List of Acronyms and Abbreviations -- Appendix G-Glossary -- Appendix H-Biographical Sketches of Molten Salt Panel Members and Consultants -- Consultants.

Sommario/riassunto

This book discusses the technical alternatives for cleanup of radioactive fluoride salts that were the fuel for the Molten Salt Reactor Experiment, a novel nuclear reactor design that was tested in the 1960s at the Oak Ridge National Laboratory in Tennessee. These fluoride salts pose an unusual cleanup challenge. The book discusses alternatives for processing and removing the salts based on present knowledge of fluoride salt chemistry and nuclear reactions of the radioactive constituents.