NUREG-1714
Vol. 1

# Final Environmental Impact Statement

## for the Construction and Operation of an Independent Spent Fuel Storage Installation on the Reservation of the Skull Valley Band of Goshute Indians and the Related Transportation Facility in Tooele County, Utah

Docket No. 72-22
Private Fuel Storage, L.L.C.

**U.S. Nuclear Regulatory Commission**
**Office of Nuclear Material Safety and Safeguards**

**U.S. Bureau of Indian Affairs**
**U.S. Bureau of Land Management**
**U.S. Surface Transportation Board**

**December 2001**

# ABSTRACT

Private Fuel Storage, L.L.C. (PFS), proposes to construct and operate an independent spent fuel storage installation on the Reservation of the Skull Valley Band of Goshute Indians. The Reservation is located geographically within Tooele County, Utah. Spent nuclear fuel (SNF) would be transported by rail from existing U.S. commercial reactor sites to Skull Valley. To transport the SNF from the existing rail line to the proposed facility, PFS proposed to construct and operate a rail siding and a 51-km (32-mile) rail line from the existing rail line near Low, Utah, to the Reservation.

This final environmental impact statement evaluates the potential environmental impacts of the PFS proposal. The document discusses the purpose and need for the PFS proposed facility, describes the proposed action and its reasonable alternatives, describes the environment potentially affected by the proposal, presents and compares the potential environmental impacts resulting from the proposed action and its alternatives, and identifies mitigation measures that could eliminate or lessen the potential environmental impacts.

The PFS proposal requires approval from four federal agencies: the U. S. Nuclear Regulatory Commission, the U.S. Department of Interior's Bureau of Indian Affairs and Bureau of Land Management, and the U.S. Surface Transportation Board. The actions required of these agencies are administrative. The environmental issues that each of these agencies must evaluate pursuant to the National Environmental Policy Act of 1969 (NEPA) are interrelated; therefore; the agencies have cooperated in the preparation of this final environmental impact statement, and this document serves to satisfy each agency's statutory responsibilities under NEPA.

# TABLE OF CONTENTS

Page

ABSTRACT . . . . . iii

LIST OF FIGURES . . . . . xvii

LIST OF TABLES . . . . . xxi

ACRONYMS AND ABBREVIATIONS . . . . . xxv

EXECUTIVE SUMMARY . . . . . xxix

1. PURPOSE AND NEED . . . . . 1-1
   1.1 Introduction . . . . . 1-1
   1.2 The Proposed Action . . . . . 1-1
   1.3 Need for the Proposed Action . . . . . 1-6
   1.4 Scoping Process . . . . . 1-12
      1.4.1 Scoping for the Draft EIS . . . . . 1-12
      1.4.2 Comments on the Draft EIS . . . . . 1-15
   1.5 Cooperating Agencies . . . . . 1-15
      1.5.1 NRC Federal Action . . . . . 1-15
      1.5.2 BIA Federal Action . . . . . 1-16
      1.5.3 BLM Federal Action . . . . . 1-17
         1.5.3.1 Rights-of-Way and Resource Management Planning . . . . . 1-17
         1.5.3.2 Planning Consistency . . . . . 1-18
      1.5.4 STB Federal Action . . . . . 1-18
      1.5.5 Required Agency Consultation . . . . . 1-19
         1.5.5.1 Endangered Species Act Consultation . . . . . 1-19
         1.5.5.2 National Historic Preservation Act Section 106 Consultation . . . . . 1-20
   1.6 Federal, Tribal and State Authorities, Regulations, and Permits . . . . . 1-23
      1.6.1 Statutes and Regulations . . . . . 1-24
         1.6.1.1 Federal Laws and Regulations . . . . . 1-24
         1.6.1.2 Skull Valley Band of Goshute Indians Tribal Statutes and Regulations . . . . . 1-26
         1.6.1.3 State of Utah Statutes and Regulations . . . . . 1-27
      1.6.2 Required Permits and Approvals . . . . . 1-27
         1.6.2.1 Federal Permits and Approvals . . . . . 1-27
         1.6.2.2 Skull Valley Band of Goshute Indians Tribal Permits and Approvals . . . . . 1-28
         1.6.2.3 State of Utah Permits and Approvals for Activities Off the Reservation . . . . . 1-28

2. ALTERNATIVES INCLUDING THE PROPOSED ACTION . . . . . 2-1
2.1 Proposed Action . . . . . 2-1
2.1.1 Proposed Site and Description of Associated Facilities . . . . . 2-1
2.1.1.1 Site Description . . . . . 2-1
2.1.1.2 Facility Description . . . . . 2-3
2.1.1.3 New Rail Line . . . . . 2-14
2.1.1.4 Land Use Requirements . . . . . 2-17
2.1.2 Operation . . . . . 2-18
2.1.2.1 Transportation of Spent Fuel to the Proposed PFSF . . . . . 2-18
2.1.2.2 Proposed Storage Cask System . . . . . 2-26
2.1.3 Emissions, Effluents, and Solid Wastes . . . . . 2-26
2.1.4 Best Management Practices . . . . . 2-29
2.1.5 Monitoring Programs . . . . . 2-30
2.1.6 Facility Closure and Decommissioning . . . . . 2-32
2.1.6.1 Storage Cask Decommissioning . . . . . 2-33
2.1.6.2 Storage Pad Decommissioning . . . . . 2-33
2.1.6.3 Decommissioning of Buildings, Structures, and Other Improvements . . . . . 2-34
2.2 Alternatives . . . . . 2-35
2.2.1 Alternatives to the Proposed PFSF (Not Addressed Further in this DEIS) . . . . . 2-35
2.2.1.1 A Different Privately Owned ISFSI . . . . . 2-35
2.2.1.2 Shipment of SNF Between Reactor Sites . . . . . 2-36
2.2.1.3 Alternatives That, in Effect, Eliminate the Need for the Proposed PFSF . . . . . 2-36
2.2.2 Alternative Technology . . . . . 2-37
2.2.2.1 Dry Storage Systems . . . . . 2-37
2.2.2.2 Wet Storage Systems . . . . . 2-37
2.2.3 Alternative Sites . . . . . 2-39
2.2.3.1 Site A at the Reservation . . . . . 2-39
2.2.3.2 Site B at the Reservation . . . . . 2-40
2.2.3.3 Fremont County, Wyoming, Site . . . . . 2-40
2.2.4 Transportation Options . . . . . 2-40
2.2.4.1 National Transportation Options . . . . . 2-40
2.2.4.2 Local Transportation Options (in Skull Valley) . . . . . 2-40
2.2.5 No-Action Alternative . . . . . 2-51

3. POTENTIALLY AFFECTED ENVIRONMENT IN SKULL VALLEY, UTAH . . . . . 3-1
3.1 Geology, Minerals, and Soils . . . . . 3-1
3.1.1 Geology . . . . . 3-1
3.1.2 Seismic Setting . . . . . 3-3
3.1.3 Soils . . . . . 3-5
3.1.4 Mineral Resources . . . . . 3-6

3.2 Water Resources . . . . . 3-6
3.2.1 Surface Water Hydrology and Quality . . . . . 3-6
3.2.1.1 General Site Setting . . . . . 3-6
3.2.1.2 Flooding . . . . . 3-11
3.2.2 Groundwater Hydrology and Quality . . . . . 3-11
3.2.3 Water Use . . . . . 3-14
3.3 Climate and Air Quality . . . . . 3-16
3.3.1 Climate . . . . . 3-16
3.3.2 Air Quality . . . . . 3-20
3.4 Ecological Resources . . . . . 3-23
3.4.1 Terrestrial Resources . . . . . 3-23
3.4.1.1 Vegetation . . . . . 3-23
3.4.1.2 Wildlife . . . . . 3-26
3.4.2 Aquatic Resources . . . . . 3-28
3.4.2.1 Perennial and Ephemeral Streams . . . . . 3-28
3.4.2.2 Wetlands . . . . . 3-29
3.4.3 Threatened, Endangered, and Other Species of Special Concern . . . . . 3-29
3.4.3.1 Plants . . . . . 3-29
3.4.3.2 Wildlife . . . . . 3-32
3.5 Socioeconomic and Community Resources . . . . . 3-38
3.5.1 The Reservation . . . . . 3-38
3.5.2 Tooele County and Communities . . . . . 3-39
3.5.2.1 Land Use . . . . . 3-39
3.5.2.2 Population . . . . . 3-41
3.5.2.3 Employment and Economic Resources . . . . . 3-42
3.5.2.4 Community Resources . . . . . 3-45
3.6 Cultural Resources . . . . . 3-51
3.6.1 Cultural Background . . . . . 3-51
3.6.2 Archaeological, Native American, and Historic Properties . . . . . 3-51
3.6.2.1 Archaeological Properties . . . . . 3-51
3.6.2.2 Native American Properties . . . . . 3-54
3.6.2.3 Historic Properties . . . . . 3-55
3.6.3 Indian Trust Assets . . . . . 3-57
3.7 Background Radiological Characteristics . . . . . 3-57
3.8 Other Environmental Features . . . . . 3-61
3.8.1 Ambient Noise Levels . . . . . 3-61
3.8.2 Scenic Qualities . . . . . 3-61
3.8.3 Recreation . . . . . 3-64

4. ENVIRONMENTAL CONSEQUENCES OF CONSTRUCTING AND OPERATING THE PROPOSED PFSF . . . . . 4-1
4.1 Geology and Soils . . . . . 4-2
4.1.1 Construction Impacts at the Preferred Site (Site A) . . . . . 4-2
4.1.2 Impacts During Operations at the Preferred Site . . . . . 4-4
4.1.3 The Alternative Site (Site B) in Skull Valley . . . . . 4-4
4.1.4 Mitigation Measures . . . . . 4-4

4.2 Water Resources . . . . . 4-4
4.2.1 Construction Impacts at the Preferred Site (Site A) . . . . . 4-4
4.2.1.1 Surface Water . . . . . 4-4
4.2.1.2 Water Use . . . . . 4-6
4.2.1.3 Groundwater . . . . . 4-7
4.2.2 Impacts During Operations at the Preferred Site . . . . . 4-9
4.2.2.1 Surface Water . . . . . 4-9
4.2.2.2 Potential Impacts Related to Flooding . . . . . 4-10
4.2.2.3 Water Use . . . . . 4-11
4.2.2.4 Groundwater . . . . . 4-12
4.2.3 The Alternative Site (Site B) in Skull Valley . . . . . 4-14
4.2.4 Mitigation Measures . . . . . 4-14
4.3 Air Quality . . . . . 4-15
4.3.1 Construction Impacts at the Preferred Site (Site A) . . . . . 4-15
4.3.2 Impacts During Operations at the Preferred Site . . . . . 4-17
4.3.3 The Alternative Site (Site B) in Skull Valley . . . . . 4-18
4.3.4 Mitigation Measures . . . . . 4-18
4.4 Ecological Resources . . . . . 4-19
4.4.1 Construction Impacts at the Preferred Site (Site A) . . . . . 4-19
4.4.1.1 Vegetation . . . . . 4-19
4.4.1.2 Wildlife . . . . . 4-21
4.4.1.3 Wetlands . . . . . 4-22
4.4.2 Impacts During Operations at the Preferred Site . . . . . 4-22
4.4.2.1 Vegetation . . . . . 4-22
4.4.2.2 Wildlife . . . . . 4-23
4.4.2.3 Wetlands . . . . . 4-25
4.4.3 Impacts to Threatened, Endangered, and Other Species of Special Concern . . . . . 4-26
4.4.3.1 Plants . . . . . 4-26
4.4.3.2 Wildlife . . . . . 4-26
4.4.4 The Alternative Site (Site B) in Skull Valley . . . . . 4-27
4.4.5 Mitigation Measures . . . . . 4-27
4.4.5.1 Vegetation . . . . . 4-27
4.4.5.2 Wildlife . . . . . 4-29
4.5 Socioeconomics and Community Resources . . . . . 4-30
4.5.1 Construction Impacts at the Preferred Site (Site A) . . . . . 4-30
4.5.1.1 Population . . . . . 4-32
4.5.1.2 Housing . . . . . 4-33
4.5.1.3 Education . . . . . 4-33
4.5.1.4 Utilities . . . . . 4-34
4.5.1.5 Solid and Sanitary Wastes . . . . . 4-34
4.5.1.6 Transportation and Traffic . . . . . 4-34
4.5.1.7 Land Use . . . . . 4-35
4.5.1.8 Economic Structure . . . . . 4-36
4.5.2 Impacts During Operations at the Preferred Site . . . . . 4-36
4.5.2.1 Population . . . . . 4-37
4.5.2.2 Housing . . . . . 4-38

4.5.2.3 Education . . . . . 4-38
4.5.2.4 Utilities . . . . . 4-38
4.5.2.5 Solid and Sanitary Wastes . . . . . 4-38
4.5.2.6 Transportation and Traffic . . . . . 4-39
4.5.2.7 Land Use . . . . . 4-39
4.5.2.8 Economic Structure . . . . . 4-39
4.5.3 The Alternative Site (Site B) in Skull Valley . . . . . 4-40
4.5.4 Mitigation Measures . . . . . 4-40
4.6 Cultural Resources . . . . . 4-40
4.6.1 Construction Impacts at the Preferred Site (Site A) . . . . . 4-41
4.6.2 Impacts During Operations at the Preferred Site . . . . . 4-41
4.6.3 Native American Cultural Resources . . . . . 4-41
4.6.4 The Alternative Site (Site B) in Skull Valley . . . . . 4-42
4.6.5 Mitigation Measures . . . . . 4-42
4.7 Human Health Impacts . . . . . 4-43
4.7.1 Non-Radiological Impacts at the Proposed Site (Site A) . . . . . 4-43
4.7.1.1 Potential Worker Injuries During Construction . . . . . 4-44
4.7.1.2 Potential Worker Injuries During Operations . . . . . 4-45
4.7.2 Radiological Impacts at the Proposed Site (Site A) . . . . . 4-45
4.7.2.1 Estimated Dose to the General Public . . . . . 4-46
4.7.2.2 Estimated Dose to Occupational Personnel . . . . . 4-48
4.7.2.3 Estimated Doses from Off-Normal Operations and Accidents . . . . . 4-49
4.7.3 Impacts at the Alternative Site (Site B) in Skull Valley . . . . . 4-53
4.7.4 Mitigation Measures . . . . . 4-54
4.8 Other Impacts . . . . . 4-54
4.8.1 Noise . . . . . 4-54
4.8.1.1 Noise During Construction . . . . . 4-54
4.8.1.2 Noise During Operations . . . . . 4-55
4.8.2 Scenic Qualities . . . . . 4-55
4.8.2.1 BLM Perspective . . . . . 4-56
4.8.2.2 Visual Analysis . . . . . 4-56
4.8.2.3 Recreational Viewers . . . . . 4-59
4.8.2.4 Local Residential Viewers . . . . . 4-59
4.8.2.5 Motorists on Skull Valley Road . . . . . 4-59
4.8.2.6 The Alternative Site (Site B) in Skull Valley . . . . . 4-59
4.8.2.7 Conclusions Regarding Visual Qualities . . . . . 4-66
4.8.2.8 Mitigation Measures . . . . . 4-66
4.8.3 Recreation . . . . . 4-66
4.8.4 Wildfires . . . . . 4-67
4.9 Decommissioning and Closure . . . . . 4-68
4.9.1 Geology and Soils . . . . . 4-68
4.9.2 Surface Water and Groundwater . . . . . 4-69
4.9.3 Air Quality . . . . . 4-69
4.9.4 Ecological Resources . . . . . 4-69
4.9.5 Socioeconomic and Community Resources . . . . . 4-70
4.9.6 Cultural Resources . . . . . 4-70
4.9.7 Human Health . . . . . 4-70
4.9.8 Noise . . . . . 4-70

4.9.9 Scenic Qualities . . . . . 4-70
4.9.10 Recreation . . . . . 4-71

5. TRANSPORTATION IMPACTS OF THE PROPOSED ACTION . . . . . 5-1
5.1 Geology, Minerals, and Soils . . . . . 5-2
5.1.1 Construction Impacts . . . . . 5-2
5.1.1.1 New Rail Line from Skunk Ridge . . . . . 5-3
5.1.1.2 New ITF Near Timpie . . . . . 5-3
5.1.2 Impacts During Operations . . . . . 5-4
5.1.2.1 New Rail Line from Skunk Ridge . . . . . 5-4
5.1.2.2 New ITF Near Timpie . . . . . 5-4
5.1.3 Impacts at the Alternative Site B . . . . . 5-5
5.1.3.1 New Rail Line from Skunk Ridge . . . . . 5-5
5.1.3.2 New ITF Near Timpie . . . . . 5-5
5.1.4 Mitigation Measures . . . . . 5-5
5.1.4.1 New Rail Line from Skunk Ridge . . . . . 5-5
5.1.4.2 New ITF Near Timpie . . . . . 5-5
5.2 Water Resources . . . . . 5-5
5.2.1 Construction Impacts . . . . . 5-5
5.2.1.1 Surface Water . . . . . 5-5
5.2.1.2 Potential Impacts of Flooding . . . . . 5-6
5.2.1.3 Water Use . . . . . 5-7
5.2.1.4 Groundwater . . . . . 5-8
5.2.2 Impacts During Operations . . . . . 5-8
5.2.2.1 Surface Water . . . . . 5-8
5.2.2.2 Potential Impacts of Flooding . . . . . 5-9
5.2.2.3 Water Use . . . . . 5-10
5.2.2.4 Groundwater . . . . . 5-10
5.2.3 Impacts at the Alternative Site (Site B) . . . . . 5-11
5.2.4 Mitigation Measures . . . . . 5-11
5.3 Air Quality . . . . . 5-11
5.3.1 Construction Impacts . . . . . 5-11
5.3.1.1 New Rail Line from Skunk Ridge . . . . . 5-12
5.3.1.2 New ITF Near Timpie . . . . . 5-13
5.3.2 Impacts During Operations . . . . . 5-13
5.3.2.1 New Rail Line from Skunk Ridge . . . . . 5-13
5.3.2.2 New ITF Near Timpie . . . . . 5-13
5.3.3 Impacts at the Alternative Site B . . . . . 5-14
5.3.3.1 Construction Impacts . . . . . 5-14
5.3.3.2 Impacts During Operations . . . . . 5-14
5.3.4 Mitigation Measures . . . . . 5-14
5.3.4.1 Construction Impacts . . . . . 5-14
5.3.4.2 Impacts During Operations . . . . . 5-14
5.4 Ecological Resources . . . . . 5-15
5.4.1 Construction Impacts . . . . . 5-15
5.4.1.1 Vegetation . . . . . 5-15
5.4.1.2 Wildlife . . . . . 5-16
5.4.1.3 Wetlands . . . . . 5-17

5.4.1.4 Perennial and Ephemeral Streams . . . . . 5-17
5.4.1.5 Threatened and Endangered Species and Other Species of Special Concern . . . . . 5-17
5.4.2 Impacts During Operations . . . . . 5-19
5.4.2.1 Vegetation . . . . . 5-19
5.4.2.2 Wildlife . . . . . 5-19
5.4.2.3 Wetlands . . . . . 5-20
5.4.2.4 Perennial and Ephemeral Streams . . . . . 5-20
5.4.2.5 Threatened and Endangered Species and Other Species of Special Concern . . . . . 5-21
5.4.3 Impacts at the Alternative Site B . . . . . 5-21
5.4.3.1 Vegetation . . . . . 5-21
5.4.3.2 Wildlife . . . . . 5-21
5.4.3.3 Wetlands . . . . . 5-21
5.4.3.4 Perennial and Ephemeral Streams . . . . . 5-22
5.4.3.5 Threatened and Endangered Species and Other Species of Special Concern . . . . . 5-22
5.4.4 Mitigation Measures . . . . . 5-22
5.4.4.1 Vegetation . . . . . 5-22
5.4.4.2 Wildlife . . . . . 5-23
5.5 Socioeconomic and Community Resources . . . . . 5-23
5.5.1 Construction Impacts . . . . . 5-24
5.5.1.1 New Rail Line from Skunk Ridge . . . . . 5-24
5.5.1.2 New ITF Near Timpie . . . . . 5-28
5.5.2 Impacts During Operations . . . . . 5-30
5.5.2.1 New Rail Line From Skunk Ridge . . . . . 5-31
5.5.2.2 New ITF Near Timpie . . . . . 5-31
5.5.3 Impacts at the Alternative Site B . . . . . 5-32
5.5.4 Mitigation Measures . . . . . 5-32
5.6 Cultural Resources . . . . . 5-33
5.6.1 Construction Impacts . . . . . 5-33
5.6.1.1 New Rail Line from Skunk Ridge . . . . . 5-33
5.6.1.2 New ITF Near Timpie . . . . . 5-33
5.6.2 Impacts During Operations . . . . . 5-34
5.6.3 Impacts at the Alternative Site B . . . . . 5-34
5.6.4 Native American Cultural Resources . . . . . 5-34
5.6.5 Mitigation Measures . . . . . 5-34
5.7 Human Health Impacts of SNF Transportation . . . . . 5-35
5.7.1 Non-Radiological Impacts . . . . . 5-35
5.7.1.1 Potential Worker Injuries During Construction and Operation of Transportation Facilities . . . . . 5-35
5.7.1.2 Rail Traffic Accidents . . . . . 5-38
5.7.1.3 Latent Health Effects . . . . . 5-39
5.7.2 Radiological Impacts . . . . . 5-39
5.7.2.1 Summary of Findings . . . . . 5-41
5.7.2.2 Approach to Analysis . . . . . 5-42
5.7.2.3 Assumptions and Analysis as Compared to NUREG-0170 . . . . . 5-43
5.7.2.4 Shipments to PFS: Nationwide Incident-Free Impacts . . . . . 5-49

5.7.2.5 Shipments to PFS: Nationwide Transportation Accident Impacts . . . 5-51
5.7.2.6 Incident-Free and Accident Impacts of Intermodal Operations Near Reactor Sites . . . 5-53
5.7.2.7 Shipments form PFS: Incident-Free and Accident Impacts . . . 5-54
5.7.2.8 Utah and Regional Impacts . . . 5-57
5.7.2.9 Timpie, Utah, Intermodal Transfer Facility Option: Incident-Free and Accident Impacts . . . 5-58
5.7.2.10 Sabotage in Transportation . . . 5-63
5.7.5.11 Conclusions . . . 5-63
5.7.3 Mitigation Measures . . . 5-64
5.8 Other Impacts . . . 5-64
5.8.1 Noise . . . 5-64
5.8.1.1 Construction Impacts . . . 5-64
5.8.1.2 Impacts During Operations . . . 5-64
5.8.1.3 ITF and Use of Skull Valley Road . . . 5-65
5.8.1.4 Alternative Site B . . . 5-65
5.8.1.5 Mitigation Measures . . . 5-65
5.8.2 Scenic Qualities . . . 5-66
5.8.2.1 Recreational Viewers . . . 5-66
5.8.2.2 Local Residential Viewers . . . 5-66
5.8.2.3 Motorists on Interstate 80 . . . 5-68
5.8.2.4 Mitigation Measures . . . 5-68
5.8.3 Recreation . . . 5-68
5.8.3.1 Construction Impacts . . . 5-68
5.8.3.2 Impacts During Operations . . . 5-71
5.8.3.3 Alternative Site B . . . 5-72
5.8.3.4 Mitigation Measures . . . 5-72
5.8.4 Wildfires . . . 5-72
5.8.4.1 Mitigation Measures . . . 5-74
5.9 Decommissioning . . . 5-74
5.9.1 Skunk Ridge Rail Line Corridor . . . 5-74
5.9.2 New ITF Near Timpie . . . 5-75
5.9.3 Potential Worker Injuries During Decommissioning . . . 5-75

6. SUMMARY OF IMPACTS . . . 6-1
6.1 Impacts of the Proposed Action and Its Alternatives . . . 6-1
6.1.1 Geology, Minerals, and Soils . . . 6-1
6.1.1.1 Impacts of Alternative 1 . . . 6-3
6.1.1.2 Impacts of Alternative 2 . . . 6-4
6.1.1.3 Impacts of Alternative 3 . . . 6-4
6.1.1.4 Impacts of Alternative 4 . . . 6-4
6.1.2 Water Resources . . . 6-4
6.1.2.1 Impacts of Alternative 1 . . . 6-4
6.1.2.2 Impacts of Alternative 2 . . . 6-5
6.1.2.3 Impacts of Alternative 3 . . . 6-5
6.1.2.4 Impacts of Alternative 4 . . . 6-6

6.1.3 Air Quality . . . . . 6-6
6.1.3.1 Impacts of Alternative 1 . . . . . 6-6
6.1.3.2 Impacts of Alternative 2 . . . . . 6-6
6.1.3.3 Impacts of Alternative 3 . . . . . 6-6
6.1.3.4 Impacts of Alternative 4 . . . . . 6-7
6.1.4 Ecological Resources . . . . . 6-7
6.1.4.1 Impacts of Alternative 1 . . . . . 6-7
6.1.4.2 Impacts of Alternative 2 . . . . . 6-9
6.1.4.3 Impacts of Alternative 3 . . . . . 6-10
6.1.4.4 Impacts of Alternative 4 . . . . . 6-10
6.1.5 Socioeconomics and Community Resources . . . . . 6-10
6.1.5.1 Impacts of Alternative 1 . . . . . 6-11
6.1.5.2 Impacts of Alternative 2 . . . . . 6-12
6.1.5.3 Impacts of Alternative 3 . . . . . 6-12
6.1.5.4 Impacts of Alternative 4 . . . . . 6-14
6.1.6 Cultural Resources . . . . . 6-14
6.1.6.1 Impacts of Alternative 1 . . . . . 6-14
6.1.6.2 Impacts of Alternative 2 . . . . . 6-15
6.1.6.3 Impacts of Alternative 3 . . . . . 6-15
6.1.6.4 Impacts of Alternative 4 . . . . . 6-15
6.1.7 Human Health Impacts . . . . . 6-15
6.1.7.1 Impacts of Alternative 1 . . . . . 6-15
6.1.7.2 Impacts of Alternative 2 . . . . . 6-16
6.1.7.3 Impacts of Alternative 3 . . . . . 6-16
6.1.7.4 Impacts of Alternative 4 . . . . . 6-18
6.1.8 Other Impacts . . . . . 6-18
6.1.8.1 Noise . . . . . 6-18
6.1.8.2 Scenic Qualities . . . . . 6-19
6.1.8.3 Recreation . . . . . 6-20
6.2 Environmental Justice . . . . . 6-21
6.2.1 Impacts of Alternative 1 . . . . . 6-22
6.2.1.1 Demographics . . . . . 6-22
6.2.1.2 Assessment of Impacts . . . . . 6-26
6.2.2 Impacts of Alternative 2 . . . . . 6-32
6.2.3 Impacts of Alternative 3 . . . . . 6-33
6.2.4 Impacts of Alternative 4 . . . . . 6-33
6.3 Cumulative Impacts . . . . . 6-33
6.3.1 Geology, Minerals, and Soils . . . . . 6-33
6.3.2 Water Resources . . . . . 6-33
6.3.3 Air Quality . . . . . 6-34
6.3.4 Ecological Resources . . . . . 6-35
6.3.5 Socioeconomic and Community Resources . . . . . 6-36
6.3.6 Cultural Resources . . . . . 6-37
6.3.7 Human Health Impacts . . . . . 6-37
6.3.8 Other Impacts . . . . . 6-38
6.3.9 Environmental Justice . . . . . 6-39

6.4 Unavoidable Adverse Environmental Impacts . . . . . 6-39
6.4.1 Geology, Minerals, and Soils . . . . . 6-40
6.4.2 Water Resources . . . . . 6-40
6.4.3 Air Quality . . . . . 6-40
6.4.4 Ecological Resources . . . . . 6-40
6.4.5 Socioeconomics and Community Resources . . . . . 6-41
6.4.6 Cultural Resources . . . . . 6-41
6.4.7 Human Health Impacts . . . . . 6-42
6.4.8 Other Impacts . . . . . 6-42
6.4.8.1 Noise . . . . . 6-42
6.4.8.2 Scenic Qualities . . . . . 6-42
6.4.8.3 Recreation . . . . . 6-42
6.4.9 Environmental Justice . . . . . 6-42
6.5 Relationship Between Short-Term Uses of the Environment and Long-Term Productivity . . . . . 6-43
6.6 Irreversible and Irretrievable Commitment of Resources . . . . . 6-43
6.7 Potential Impacts of the No-Action Alternative . . . . . 6-44
6.7.1 Geology, Minerals, and Soils . . . . . 6-46
6.7.2 Water Resources . . . . . 6-46
6.7.3 Air Quality . . . . . 6-46
6.7.4 Ecological Resources . . . . . 6-46
6.7.5 Socioeconomic and Community Resources . . . . . 6-47
6.7.6 Cultural Resources . . . . . 6-47
6.7.7 Human Health Impacts . . . . . 6-47
6.7.8 Other Impacts . . . . . 6-47
6.7.8.1 Noise . . . . . 6-47
6.7.8.2 Scenic Qualities . . . . . 6-47
6.7.8.3 Recreation . . . . . 6-48
6.7.9 Environmental Justice . . . . . 6-48
6.7.10 Economic Costs of No Action . . . . . 6-48

7. EVALUATION OF AN ALTERNATIVE SITE IN WYOMING . . . . . 7-1
7.1 Site Selection Process . . . . . 7-1
7.2 Characteristics of the Wyoming Site . . . . . 7-5
7.3 Impacts of Constructing and Operating an SNF Storage Facility at the Wyoming Site . . . . . 7-8
7.3.1 Geology, Minerals, and Soils . . . . . 7-8
7.3.2 Water Resources . . . . . 7-9
7.3.3 Air Quality . . . . . 7-9
7.3.4 Ecological Resources . . . . . 7-10
7.3.5 Socioeconomic and Community Resources . . . . . 7-12
7.3.6 Cultural Resources . . . . . 7-13
7.3.7 Human Health Impacts . . . . . 7-14
7.3.8 Other Impacts . . . . . 7-15
7.3.8.1 Noise . . . . . 7-15
7.3.8.2 Scenic Qualities . . . . . 7-15
7.3.8.3 Recreation . . . . . 7-15

7.4 Impacts of Constructing and Operating SNF Transportation Facilities Near the Wyoming Site . . . 7-16
7.4.1 Ecological Resources . . . 7-16
7.4.2 Human Health Impacts . . . 7-17
7.4.2.1 Non-Radiological Impacts . . . 7-17
7.4.2.2 Radiological Impacts . . . 7-18
7.5 Environmental Justice Considerations Near the Wyoming Site . . . 7-25
7.5.1 Demographics . . . 7-25
7.5.1.1 Minority Populations . . . 7-25
7.5.1.2 Low-Income Populations . . . 7-29
7.5.2 Assessment of Impacts . . . 7-29
7.6 Comparison of the Skull Valley, Utah, and Wyoming Sites . . . 7-29

8. BENEFITS AND COSTS OF THE PROPOSED ACTION . . . 8-1
8.1 Economic Benefits and Costs of Constructing and Operating the Proposed Facility . . . 8-1
8.1.1 PFS's Model and Assumptions . . . 8-2
8.1.1.1 Projection of Spent Fuel Generation and Additional Storage Requirements . . . 8-3
8.1.1.2 Spent Fuel Acceptance Assumptions . . . 8-3
8.1.1.3 Estimating Costs . . . 8-4
8.1.1.4 Discounting . . . 8-4
8.1.1.5 PFS's Cost Assumptions . . . 8-5
8.1.2 Results . . . 8-6
8.1.2.1 Discussion of Key Assumptions and Sensitivity Analysis . . . 8-9
8.1.2.2 The Effects of the National Repository's Opening Date . . . 8-9
8.1.2.3 The Effects of Discounting . . . 8-9
8.1.2.4 Annual Post-Shutdown Pool Storage Costs . . . 8-9
8.1.2.5 On-Site Costs for Additional Spent Fuel Storage . . . 8-10
8.1.2.6 Costs for the Proposed PFSF . . . 8-10
8.1.2.7 Quantity of Spent Fuel Accepted at the Proposed PFSF . . . 8-10
8.1.3 Conclusion . . . 8-11
8.2 Environmental Benefits and Costs . . . 8-11
8.2.1 Socioeconomic Benefits of the Proposed Action . . . 8-11
8.2.2 Environmental Costs of the Proposed Action . . . 8-11
8.3 Other Societal Benefits and Costs . . . 8-12

9. COMPARISON OF ALTERNATIVES . . . 9-1
9.1 Introduction . . . 9-1
9.2 Federal Actions Covered in this DEIS . . . 9-1
9.2.1 NRC Action . . . 9-1
9.2.2 BIA Action . . . 9-1
9.2.3 BLM Action . . . 9-2
9.2.4 STB Action . . . 9-2
9.3 Comparison of Potential Impacts . . . 9-2
9.4 Conclusions of the Cooperating Agencies . . . 9-3
9.4.1 Summary of Potential Impacts . . . 9-3
9.4.1.1 The Proposed Action . . . 9-3

9.4.1.2 The Proposed Site (Site A) Versus the Alternative Site (Site B) in Skull Valley . . . . . 9-8
9.4.1.3 The ITF Transportation Option . . . . . 9-9
9.4.1.4 The Wyoming Alternative . . . . . 9-9
9.4.1.5 The No-Action Alternative . . . . . 9-10
9.4.2 Mitigation Measures . . . . . 9-12
9.4.3 Recommendation of the Preferred Alternative . . . . . 9-16

10. AGENCIES CONSULTED . . . . . 10-1
10.1 Federal . . . . . 10-1
10.2 Tribes . . . . . 10-1
10.3 State . . . . . 10-1

11. LIST OF PREPARERS AND COOPERATING AGENCY REVIEWERS . . . . . 11-1
11.1 Preparers . . . . . 11-1
11.2 Reviewers . . . . . 11-4

12. REFERENCES . . . . . 12-1

13. INDEX . . . . . 13-1

APPENDIX A: SCOPING FOR THIS DRAFT ENVIRONMENTAL IMPACT STATEMENT . . . . . A-1

APPENDIX B: CONSULTATION LETTERS . . . . . B-1

APPENDIX C: RAIL ROUTES TO THE PROPOSED PFSF SITE . . . . . C-1

APPENDIX D: TRANSPORTATION RISKS ANALYSIS . . . . . D-1

APPENDIX E: CENSUS BUREAU DATA AS USED IN ENVIRONMENTAL JUSTICE ANALYSES . . . . . E-1

APPENDIX F: SITE SELECTION/EVALUATION FORMS . . . . . F-1

VOLUME 2:

APPENDIX G: PUBLIC COMMENTS AND RESPONSES . . . . . G-1

APPENDIX H: INDEX OF COMMENTERS . . . . . H-1

# LIST OF FIGURES


Page

Figure ES.1 The proposed project area in Skull Valley, Utah . . . . . viii

Figure 1.1 Regional location of Skull Valley in Utah . . . . . 1-2
Figure 1.2 The proposed project area in Skull Valley, Utah . . . . . 1-3
Figure 1.3 Reactors which are owned by the PFS companies . . . . . 1-4
Figure 1.4 Projected loss of full core offload capability for U.S. commercial nuclear reactors . . . . . 1-9
Figure 1.5 Operating spent fuel storage sites (i.e., ISFSIs) as of October 2001 . . . . . 1-10

Figure 2.1 Location of the proposed site (i.e., Site A) for the PFSF on the Reservation . . . . . 2-2
Figure 2.2 Basic site plan and layout of structures and facilities at the proposed PFSF . . . . . 2-4
Figure 2.3 Storage pad detail . . . . . 2-9
Figure 2.4 Basic site plan and layout for the proposed rail siding near Skunk Ridge, Utah . . . . . 2-16
Figure 2.5 Typical cross-section for proposed new rail corridor . . . . . 2-17
Figure 2.6 Sequences of canister handling and transfer operations for the movement of spent nuclear fuel from existing reactor sites . . . . . 2-21
Figure 2.7 Potential rail routes for shipping spent nuclear fuel to Skull Valley, Utah . . . . . 2-22
Figure 2.8 Transfer operations for spent nuclear fuel (inside sealed canisters) at the proposed PFSF . . . . . 2-24
Figure 2.9 Type of storage cask transporter proposed for use at the PFSF . . . . . 2-25
Figure 2.10 HOLTEC Hi-Storm® storage cask . . . . . 2-27
Figure 2.11 Alternative site (i.e., Site B) for the proposed PFSF on the Reservation . . . . . 2-41
Figure 2.12 Location of an alternative ISFSI site in Fremont County, Wyoming . . . . . 2-42
Figure 2.13 Proposed location of an Intermodal Transfer Facility in Skull Valley . . . . . 2-44
Figure 2.14 Basic site plan and layout for the Intermodal Transfer Facility . . . . . 2-45
Figure 2.15 Typical heavy-haul tractor/trailer rig used for transporting spent nuclear fuel shipping casks . . . . . 2-48
Figure 2.16 Alternative rail route/alignment near the northern end of the Cedar Mountains . . . . . 2-50
Figure 2.17 Alternative route for a new road in the western portion of Skull Valley . . . . . 2-52

Figure 3.1 Mapped and interpreted surface and subsurface structural features in the immediate area of the proposed site . . . . . 3-4
Figure 3.2 Locations of potential sources of construction aggregate in Skull Valley . . . . . 3-7
Figure 3.3 Drainage channels and soils/surficial geology in Skull Valley . . . . . 3-10
Figure 3.4 Location of water wells within 8 km (5 miles) of the proposed PFSF . . . . . 3-15

Figure 3.5 Wind roses for Salt Lake City and for the location near the Pony Express convenience store in Skull Valley . . . . . 3-18
Figure 3.6 Vegetative micro-communities on the proposed PFSF site (Site A) and the alternative site (Site B) on the Reservation . . . . . 3-25
Figure 3.7 Critical mule deer habitat within Skull Valley . . . . . 3-27
Figure 3.8 Location of major springs in Skull Valley . . . . . 3-30
Figure 3.9 Winter roost sites for bald eagles in Skull Valley . . . . . 3-34
Figure 3.10 View from the proposed PFSF site looking east toward the Stansbury Mountains . . . . . 3-62
Figure 3.11 View from Skull Valley Road looking west toward the Cedar Mountains . . . . . 3-63
Figure 3.12 Wilderness study areas and unit areas recently inventoried for their wilderness characteristics . . . . . 3-66

Figure 4.1 Estimated water use during construction of the proposed PFSF . . . . . 4-8
Figure 4.2 Visual impact identified worksheet . . . . . 4-57
Figure 4.3 Artist's rendering of the daytime view of the proposed PFSF from Deseret Peak . . . . . 4-60
Figure 4.4 Artist's rendering of the nighttime view of the proposed PFSF from Deseret Peak . . . . . 4-61
Figure 4.5 Artist's rendering of the daytime view of the proposed PFSF from Skull Valley Road . . . . . 4-62
Figure 4.6 Artist's rendering of the daytime view of the proposed PFSF from the Goshute Tribal village . . . . . 4-63
Figure 4.7 Artist's rendering of the nighttime view of the proposed PFSF from the Goshute Tribal village . . . . . 4-64
Figure 4.8 Artist's rendering of the nighttime view of the proposed PFSF from Skull Valley road . . . . . 4-65

Figure 5.1 Rail route from the Maine Yankee nuclear power plant to the proposed PFSF in Skull Valley, Utah . . . . . 5-45
Figure 5.2 Rail route for shipping SNF from Skull Valley, Utah, toward a national repository . . . . . 5-47
Figure 5.3 Artist's rendering of the proposed Skunk Ridge rail line as viewed from the Cedar Mountains . . . . . 5-67
Figure 5.4 Artist's rendering of the proposed Skunk Ridge rail line as viewed from the Interstate 80 off-ramp at the Low interchange . . . . . 5-69
Figure 5.5 Artist's rendering of the proposed Intermodal Transfer Facility as viewed from the median of Interstate 80 . . . . . 5-70

Figure 6.1 Geographic distribution of minority census block groups near the proposed PFSF site in Skull Valley . . . . . 6-23
Figure 6.2 Geographic distribution of low-income census block groups near the proposed PFSF site in Skull Valley . . . . . 6-27

Figure 7.1 Possible location of an alternative spent fuel storage facility in Wyoming . . . . . 7-6
Figure 7.2 Possible site for a spent fuel storage facility near Shoshoni, Wyoming . . . . . 7-7
Figure 7.3 Potential cross-country rail route from the Maine Yankee nuclear power plant to Fremont County, Wyoming . . . . . 7-22

Figure 7.4 Potential rail route from the Fremont County, Wyoming, site to the Utah-Nevada border . . . . . 7-23
Figure 7.5 Potential rail routes for shipping spent nuclear fuel to Fremont County, Wyoming . . . . . 7-24
Figure 7.6 Geographic distribution of minority census block groups within 80 km (50 miles) of the alternative site in Fremont County, Wyoming . . . . . 7-28
Figure 7.7 Geographic distribution of low-income census block groups within 80 km (50 miles) of the alternative site in Fremont County, Wyoming . . . . . 7-30

# LIST OF TABLES


Page

Table ES.1 Summary of significance levels of the combined potential impacts for the Skull Valley site alternatives . . . xxxvi
Table ES.2 Summary and comparison of potential environmental impacts . . . lvi

Table 1.1 Site-specific reactor information for PFS member utilities . . . 1-11
Table 1.2 Critical elements identified by BLM and considered in this FEIS . . . 1-19

Table 2.1 Anticipated peak workforce requirements at the proposed PFSF and new rail corridor . . . 2-5
Table 2.2a Materials to be imported and used in the construction of the proposed PFSF and the Skunk Ridge rail line . . . 2-6
Table 2.2b Materials to be imported and used in the construction of SNF storage casks at the proposed PFSF . . . 2-7
Table 2.2c Total amounts of cement and concrete aggregate to be imported and used in the construction of the proposed PFSF and the SNF storage casks . . . 2-8
Table 2.3 Summary of water requirements during construction of the proposed PFSF . . . 2-13
Table 2.4 Potential land areas involved in construction of the proposed facility and the associated rail corridor . . . 2-18
Table 2.5 Characteristics of the HI-STORM canister . . . 2-28
Table 2.6 Characteristics of the HI-STORM storage cask system . . . 2-29
Table 2.7 Best management practices as proposed by PFS during the construction of the PFSF . . . 2-31
Table 2.8 Materials to be imported and used in the construction of an intermodal transfer facility (ITF) near Timpie, Utah . . . 2-46

Table 3.1 Geologic time scale . . . 3-2
Table 3.2 Types of construction materials and their quantities available in the vicinity of Skull Valley . . . 3-8
Table 3.3 Summary of air quality for the Skull Valley area for 1995–1999 . . . 3-21
Table 3.4 Skull Valley Federal and State species of special concern expected to use or be present at or near the proposed PFSF site or alternate Site B or along the Skunk Ridge rail corridor . . . 3-31
Table 3.5 Land in farms in the socioeconomic impact area . . . 3-40
Table 3.6 Population in Tooele County and incorporated areas . . . 3-43
Table 3.7 Historical population data for Tooele County . . . 3-43
Table 3.8 Population projections for incorporated areas in Tooele County . . . 3-43
Table 3.9 Employment and income for residents of Tooele County . . . 3-44
Table 3.10 Employment by economic sector in Tooele County . . . 3-44
Table 3.11 Agricultural activity in Tooele County . . . 3-45
Table 3.12 1990 housing data for Tooele County and incorporated areas . . . 3-47
Table 3.13 Building permits in Tooele County . . . 3-48

Table 3.14 Educational resources in the Tooele County School District (Fall 1997) . . . . . 3-48
Table 3.15 Traffic on highways potentially affected by the proposed action . . . . . 3-49
Table 3.16 Monthly and daily traffic on I-80, east of Delle Interchange . . . . . 3-51
Table 3.17 Generalized cultural sequence for the region including Skull Valley . . . . . 3-52
Table 3.18 Average annual effective dose equivalent of ionizing radiations to a member of the U.S. population . . . . . 3-58
Table 3.19 Radionuclides found in five soil samples from the proposed PFSF site . . . . . 3-60
Table 3.20 Radionuclides found in vegetation and rabbit flesh as part of the Envirocare environmental study . . . . . 3-61

Table 4.1 Comparison of PFSF construction material requirements with quantities of materials commercially available in the vicinity of Skull Valley . . . . . 4-3
Table 4.2 Effects of site construction on PM-10 concentrations at the nearest residences . . . . . 4-17
Table 4.3 Calculated doses for wildlife near the HI-STORM storage cask . . . . . 4-25
Table 4.4 Potential impacts to socioeconomic and community resources during the construction of the proposed PFSF . . . . . 4-31
Table 4.5 Potential impacts to socioeconomic and community resources during the operation of the proposed PFSF . . . . . 4-36
Table 4.6 Estimated probabilities of fatal and nonfatal occupational injuries for the construction and operation of the proposed PFSF . . . . . 4-44

Table 5.1 Comparison of transportation facility construction material requirements with quantities of materials commercially available in the vicinity of Skull Valley . . . . . 5-4
Table 5.2 Seed mixture for rehabilitation of the area cleared for the rail line . . . . . 5-16
Table 5.3 Potential impacts to socioeconomic and community resources during the construction and use of new transportation facilities in Skull Valley . . . . . 5-24
Table 5.4 Estimated probabilities of fatal and nonfatal occupational injuries for the construction and normal operations for the proposed rail line and the ITF . . . . . 5-36
Table 5.5 Annual incident-free SNF transportation doses . . . . . 5-41
Table 5.6 Annual expected latent cancer fatalities (LCFs) for incident-free SNF transport . . . . . 5-42
Table 5.7 Annual expected latent cancer fatalities (LCFs) for potential accident risk to the public during SNF transport . . . . . 5-42
Table 5.8 Spent fuel route data as used in this analysis and in NUREG-0170 . . . . . 5-44
Table 5.9 Incident free dose for SNF shipment from Maine Yankee to the proposed PFSF via rail . . . . . 5-51
Table 5.10 Incident free dose for SNF shipment from Maine Yankee to the proposed PFSF via an ITF near Timpie, Utah . . . . . 5-55
Table 5.11 Incident free dose for SNF shipment from Maine Yankee to the ITF via rail . . . . . 5-56
Table 5.12 Incident free doses for SNF shipment from the ITF to the PFSF via heavy-haul vehicle . . . . . 5-57

Table 5.13 Annual and cumulative 20-year campaign radiation doses associated with SNF shipment from the proposed PFSF to the Utah-Nevada border via rail . . . . . 5-57
Table 5.14 Annual and cumulative 20-year campaign radiation doses associated with intermodal SNF shipment from the PFSF to the Utah-Nevada border via an ITF near Timpie, Utah . . . . . 5-59
Table 5.15 Annual and cumulative 20-year campaign health risks associated with SNF shipment from the proposed PFSF to the Utah-Nevada border via rail . . . . . 5-59
Table 5.16 Annual and cumulative 20-year campaign health risks associated with intermodal SNF shipment from the proposed PFSF to the Utah-Nevada border via an ITF near Timpie, Utah . . . . . 5-61
Table 5.17 Number of fires and acres burned in BLM's Salt Lake District, 1989 through 1998 . . . . . 5-73

Table 6.1 Summary of significance levels of the combined potential impacts for Skull Valley alternatives addressed in this FEIS . . . . . 6-2
Table 6.2 Estimated fatal and nonfatal occupational injuries for the construction, normal operations, and decommissioning activities at the proposed PFSF and the Skunk Ridge rail line . . . . . 6-16
Table 6.3 Estimated fatal and nonfatal occupational injuries for the construction, normal operations, and decommissioning activities at the proposed PFSF and the ITF . . . . . 6-17
Table 6.4 Minority and low income block groups within 80 km (50 miles) of the preferred site . . . . . 6-24
Table 6.5 Potential impacts of the proposed action on minority and low-income populations . . . . . 6-29

Table 7.1 Potential host sites considered for the proposed PFSF . . . . . 7-2
Table 7.2 Occurrences of species of concern in Fremont County, Wyoming, T38N R94W S23, and buffer zone . . . . . 7-12
Table 7.3 Population in Fremont County and incorporated areas . . . . . 7-13
Table 7.4 Doses associated with SNF shipments from the Maine Yankee reactor to the alternative site in Wyoming . . . . . 7-19
Table 7.5 Radiological risks associated with SNF shipments from the Maine Yankee reactor to the alternative site in Wyoming . . . . . 7-19
Table 7.6 Doses associated with SNF shipments from the alternative site in Wyoming to the Utah-Nevada border . . . . . 7-20
Table 7.7 Radiological risks associated with SNF shipments from the alternative site in Wyoming to the Utah-Nevada border . . . . . 7-20
Table 7.8 Data characteristics for the route from the Maine Yankee reactor to the Wyoming site . . . . . 7-21
Table 7.9 Summary of the cumulative annual and 20-year campaign risks [as measured by latent cancer fatalities (LCFs)] for the shipment of spent nuclear fuel by rail to the alternative Wyoming ISFSI site . . . . . 7-26
Table 7.10 Minority and low-income block groups within 80 km (50 miles) of the alternative site in Fremont County, Wyoming . . . . . 7-27

Table 7.11 Summary and comparison of potential environmental impacts between an SNF storage facility at the Skull Valley, Utah, site and at the Fremont County, Wyoming site . . . . . 7-32

Table 8.1 PFS's at-reactor storage cost assumptions (1999 dollars) . . . . . 8-5
Table 8.2 Costs and benefits for alternative scenarios presented by PFS . . . . . 8-7
Table 8.3 Sensitivity of scenario net benefits to alternative assumptions at a 7 percent discount rate . . . . . 8-8

Table 9.1 Summary and comparison of potential environmental impacts . . . . . 9-18

# ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| °C | degrees Celsius |
| °F | degrees Fahrenheit |
| µCi | micro-curies |
| µg | microgram |
| | |
| ABS | automatic block system |
| ACE | U.S. Army Corps of Engineers |
| ACEC | area of critical environmental concern |
| ADT | average daily traffic |
| AIRS | Aerometric Information Retrieval System |
| ALAPCO | Association of Local Air Pollution Control Officials |
| ALARA | as low as reasonably achievable |
| APE | area of potential effect |
| APLIC | Avian Power Line Interaction Committee |
| | |
| BIA | Bureau of Indian Affairs |
| BLM | Bureau of Land Management |
| BLS | Bureau of Labor Statistics |
| BMP | best management practices |
| BNSF | Burlington Northern Santa Fe (Railway) |
| BWR | boiling-water reactor |
| | |
| CAA | Clean Air Act |
| CEQ | Council on Environmental Quality |
| CESQG | Conditionally Exempt Small Quantity Generator |
| CFR | Code of Federal Regulations |
| cfs | cubic feet per second |
| Ci | Curie |
| cm | centimeter |
| CO | carbon monoxide |
| CRUD | Chalk River unidentified deposits |
| CTC | centralized traffic control |
| CWA | Clean Water Act |
| | |
| dB(A) | decibels (on the A-weighted scale) |
| DEIS | draft environmental impact statement |
| DOD | U.S. Department of Defense |
| DOE | U.S. Department of Energy |
| DOI | U.S. Department of the Interior |
| DOT | U.S. Department of Transportation |
| | |
| EIS | environmental impact statement |
| EJ | environmental justice |

| | |
|---|---|
| EO | Executive Order |
| EPA | U.S. Environmental Protection Agency |
| ER | environmental report |
| ERI | Energy Resources International |
| ESA | Endangered Species Act |
| | |
| Fed. Reg. | Federal Register |
| FEIS | final environmental impact statement |
| FIFRA | Federal Insecticide, Fungicide, and Rodenticide Act |
| FLPMA | Federal Land Policy and Management Act |
| FR | Federal Register |
| ft | feet |
| FWS | U.S. Fish and Wildlife Service |
| | |
| g | gram |
| gal | gallons |
| GLO | Government Land Office |
| gpm | gallons per minute |
| | |
| ha | hectare |
| HHT | heavy haul truck |
| HMP | habitat management plan |
| hr | hour |
| | |
| IAEA | International Atomic Energy Agency |
| ICRP | International Commission on Radiological Protection |
| ISB | intermountain seismic belt |
| ISCST | Industrial Source Complex Short-Term (air dispersion model) |
| ISFSI | independent spent fuel storage installation |
| ITF | Intermodal Transfer Facility |
| | |
| kg | kilogram |
| km | kilometer |
| kW | kilowatt |
| | |
| L | liter |
| LCF | latent cancer fatality |
| L.L.C. | Limited Liability Company |
| LOS | level of service |
| | |
| m | meter |
| $m^3$ | cubic meters |
| MEI | maximally exposed individual |
| MGTM | million gross ton-miles per mile |
| min | minute |
| mph | miles per hour |
| mrem | millirem |
| MRS | monitored retrievable storage (facility) |

| | |
|---|---|
| MTU | metric tons of uranium [note: 1 metric ton = 2,200 pounds = 1.1 tons ] |
| mSv | milliSievert |
| MWD/MTU | megawatt-days per MTU |
| MY | Maine Yankee (nuclear plant) |
| | |
| NAAQS | National Ambient Air Quality Standards |
| NAS | National Academy of Sciences |
| NBS | National Biological Service |
| NCRP | National Council on Radiation Protection and Measurements |
| NEPA | National Environmental Policy Act of 1969 |
| NHPA | National Historic Preservation Act |
| NMFS | National Marine Fisheries Service |
| NMSS | Nuclear Material Safety and Safeguards |
| NOAA | National Oceanic and Atmospheric Administration |
| NOI | Notice of Intent |
| $NO_2$ | nitrogen oxide |
| NPDES | National Pollutant Discharge Elimination System |
| NRC | U.S. Nuclear Regulatory Commission |
| NRCS | Natural Resources Conservation Service |
| NRHP | National Register of Historic Places |
| NSC | National Safety Council |
| NWN | Nuclear Waste Negotiator |
| NWPA | Nuclear Waste Policy Act of 1982 |
| NWPAA | Nuclear Waste Policy Amendments Act of 1987 |
| | |
| $O_3$ | ozone |
| OCA | owner-controlled area |
| OFF | oldest fuel first |
| OGO | Ohngo Gaudadeh Devia |
| OHV | off-highway vehicle |
| OSHA | Occupational Safety and Health Administration |
| | |
| Pb | lead |
| pCi | pico-Curies |
| PFS | Private Fuel Storage, L.L.C. |
| PFSF | Private Fuel Storage Facility |
| pH | a unit of measure for acidity (lower numbers) and alkalinity (higher numbers) |
| PM-10 | particulate matter less than 10 microns in diameter |
| PM-2.5 | particulate matter less than 2.5 microns in diameter |
| PMF | probable maximum flood |
| PNL | Pacific Northwest Laboratory |
| ppm | parts per million |
| PSD | Prevention of Significant Deterioration |
| PSHA | probabilistic seismic hazard analysis |
| PWR | pressurized-water reactor |
| | |
| RA | restricted area |
| R8W | Range 8 West |

| | |
|---|---|
| RCRA | Resource Conservation and Recovery Act |
| RMP | resource management plan |
| ROD | Record of Decision |
| | |
| SAR | Safety Analysis Report |
| SDWA | Safe Drinking Water Act |
| SER | Safety Evaluation Report |
| SHPO | State Historic Preservation Office |
| SLCIA | Salt Lake City International Airport |
| SNF | spent nuclear fuel |
| $SO_2$ | sulfur dioxide |
| SPCC | spill prevention, control, and countermeasures |
| STAPPA | State and Territorial Air Pollution Program Administrators |
| STB | U.S. Surface Transportation Board |
| Sv | Sievert |
| | |
| TDS | total dissolved solids |
| TEDE | total effective dose equivalent |
| T5S | Township 5 South |
| THPO | Tribal Historic Preservation Office |
| TLD | thermoluminescent dosimeter |
| | |
| UAC | Utah Administrative Code |
| UDEQ | Utah Department of Environmental Quality |
| UDNR | Utah Department of Natural Resources |
| UNSCEAR | United Nations Scientific Committee on the Effects of Atomic Radiation |
| UPDES | Utah Pollution Discharge Elimination System |
| USC | United States Code |
| USDA | U.S. Department of Agriculture |
| UDWR | Utah Division of Wildlife Resources |
| UTTR | Utah Test and Training Range |
| | |
| VOCs | volatile organic compounds |
| | |
| WSA | wilderness study area |
| WHA | wildlife habitat area |
| | |
| $yd^3$ | cubic yards |
| yr | year |