Table of Contents

VOLUME 1 **Page**

Abstract i
Executive Summary iii
Table of Contents ix
List of Appendices - Volume 2 xvi
List of Figures xvii
List of Maps xviii
List of Tables xx
Abbreviations and Acronyms xxv

Chapter 1 – Introduction 1-1

1.1 Introduction 1-1
1.2 Regional Setting 1-4
1.3 PAPA EIS and ROD 1-5
1.4 Exceptions and Subsequent NEPA Documents Tiered to the PAPA EIS 1-6
1.5 Existing Development in the PAPA 1-8
1.6 Proposed Action 1-8
1.7 Purpose and Need 1-9
1.8 Relationship to NEPA and BLM Policy 1-10
1.9 Authorizing Actions, Relationships to Statutes and Regulations 1-11
1.10 Decisions to be Made Based on this NEPA Analysis 1-13

Chapter 2 – Public Participation, Existing Development and Alternatives 2-1

2.1 Introduction 2-1
2.2 Public Participation 2-1
2.2.1 Scoping, Consultation and Coordination 2-1
2.2.2 Summary of Concerns 2-2
2.3 Existing Development Within the PAPA 2-2
2.3.1 Limitations in the PAPA ROD 2-3
2.3.1.1 Project Components 2-3
2.3.1.2 Management Area Well Pad Thresholds 2-4
2.3.1.3 Air Quality Analysis Threshold 2-5
2.3.2 Surface Disturbance by Wellfield Component 2-5
2.3.2.1 Well Pads 2-7
2.3.2.2 Roads and Gas Gathering Pipelines 2-7
2.3.2.3 Gas Sales Pipelines 2-8
2.3.2.4 Compressor Stations 2-10
2.3.2.5 Stabilizer Facility 2-10
2.3.2.6 Anticline Disposal Facility 2-10
2.3.2.7 Storage Yards 2-11
2.3.3 Drilling Rigs 2-11
2.3.4 Other Approved Components 2-11
2.4 Alternatives 2-12
2.4.1 Alternatives Analyzed in the PAPA DEIS 2-12
2.4.1.1 Standard Stipulation Alternative 2-12
2.4.1.2 Resource Protection Alternative on Federal Lands and Minerals 2-12
2.4.1.3 Resource Protection Alternative on All Lands and Minerals 2-13
2.4.2 Alternatives Analyzed in Detail 2-13
2.4.2.1 Components Common to All Alternatives 2-13
2.4.2.2 Alternative A (No Action Alternative) 2-18

2.4.2.3 Alternative B (The Proposed Action) ... 2-23
2.4.2.4 Alternative C ... 2-29
2.4.2.5 Summary of Surface Disturbance for Alternatives Analyzed in Detail ... 2-37
2.4.3 Alternatives Considered but not Analyzed in Detail ... 2-38
2.4.3.1 Conservation Alternative ... 2-38
2.4.3.2 Maximum Development Alternative ... 2-39
2.4.3.3 Reduced Pace of Development Alternative ... 2-39
2.4.3.4 Alternative Pipeline Corridor and Sales Pipeline Alignment ... 2-40

Chapter 3 – Affected Environment ... 3-1

3.1 Introduction ... 3-1
3.2 Land and Mineral Ownership ... 3-2
3.3 Climate ... 3-4
3.4 Environmental Justice ... 3-6
3.5 Socioeconomic Resources ... 3-7
3.5.1 Socioeconomic Trends ... 3-7
3.5.2 Population ... 3-10
3.5.3 Employment and Income Level ... 3-11
3.5.4 Growth in Economic Sectors ... 3-14
3.5.5 Housing ... 3-17
3.5.6 Infrastructure ... 3-21
3.5.6.1 Transportation ... 3-21
3.5.6.2 Fire Protection Services ... 3-21
3.5.6.3 Law Enforcement ... 3-21
3.5.6.4 Medical Services ... 3-22
3.5.6.5 Lodging ... 3-23
3.5.6.6 Libraries ... 3-23
3.5.6.7 Schools ... 3-23
3.5.6.8 Communications ... 3-24
3.5.7 County and Local Government Revenues ... 3-24
3.5.8 Natural Gas Prices ... 3-26
3.6 Transportation ... 3-27
3.6.1 Development Within the PAPA ... 3-27
3.6.1.1 Traffic Volume ... 3-27
3.6.1.2 Vehicular Accidents ... 3-30
3.6.1.3 Maintenance ... 3-31
3.6.2 Pipeline Corridors and Gas Sales Pipelines ... 3-31
3.7 Land Use and Residential Areas ... 3-32
3.7.1 Development Within the PAPA ... 3-32
3.7.1.1 Land Use/Land Cover ... 3-32
3.7.1.2 Sublette County Comprehensive Plan and Zoning ... 3-34
3.7.1.3 Residential Areas and Subdivisions ... 3-37
3.7.2 Pipeline Corridors and Gas Sales Pipeline ... 3-37
3.8 Recreation Resources ... 3-37
3.8.1 Development Within the PAPA ... 3-37
3.8.1.1 Recreational Activities ... 3-37
3.8.1.2 Recreation Sites and Facilities ... 3-41
3.8.2 Pipeline Corridors and Gas Sales Pipeline ... 3-43
3.9 Visual Resources ... 3-43
3.9.1 Development Within the PAPA ... 3-43
3.9.2 Pipeline Corridors and Gas Sales Pipelines ... 3-47
3.10 Cultural and Historic Resources ... 3-47
3.10.1 Development Within the PAPA ... 3-47
3.10.1.1 Native American Concerns ... 3-48
3.10.1.2 Unexpected Discoveries ... 3-50

3.10.1.3 Major Finds ... 3-50
3.10.1.4 Lander Trail SRMZ ... 3-50
3.10.1.5 Programmatic Agreements ... 3-52
3.10.2 Pipeline Corridors and Gas Sales Pipelines ... 3-53
3.10.2.1 Cultural History Overview ... 3-53
3.10.2.2 Cultural Resource Inventory ... 3-53
3.10.2.3 Native American Concerns ... 3-54
3.11 Air Quality ... 3-54
3.11.1 Air Quality Monitoring Data ... 3-54
3.11.2 Impacts to Air Quality from Existing Wellfield Activities ... 3-62
3.12 Noise ... 3-64
3.13 Geology and Geologic Hazards ... 3-66
3.13.1 Development Within the PAPA ... 3-66
3.13.2 Pipeline Corridors and Gas Sales Pipelines ... 3-68
3.14 Paleontological Resources ... 3-69
3.14.1 Development Within the PAPA ... 3-69
3.14.2 Pipeline Corridors and Gas Sales Pipelines ... 3-70
3.15 Groundwater Resources ... 3-71
3.15.1 Development Within the PAPA ... 3-71
3.15.1.1 Aquifers ... 3-71
3.15.1.2 Recharge ... 3-72
3.15.1.3 Groundwater Quality ... 3-73
3.15.1.4 Groundwater Quantity ... 3-73
3.15.1.5 Groundwater Monitoring ... 3-76
3.15.2 Pipeline Corridors and Gas Sales Pipelines ... 3-76
3.16 Surface Water ... 3-77
3.16.1 Development Within the PAPA ... 3-77
3.16.1.1 Colorado River Basin Salinity Considerations ... 3-77
3.16.1.2 Surface Water Quality ... 3-79
3.16.1.3 Surface Water Quantity ... 3-80
3.16.1.4 Wellfield Development Effects ... 3-80
3.16.1.5 Watershed Modeling ... 3-80
3.16.1.6 Produced Water ... 3-82
3.16.1.7 Treated Sewage Water ... 3-82
3.16.1.8 Surface Water Withdrawals ... 3-82
3.16.2 Pipeline Corridors and Gas Sales Pipeline ... 3-83
3.17 Soil Resources ... 3-83
3.17.1 Development Within the PAPA ... 3-83
3.17.2 Pipeline Corridors and Gas Sales Pipelines ... 3-84
3.18 Vegetation Resources ... 3-86
3.18.1 Development Within the PAPA ... 3-86
3.18.2 Pipeline Corridors and Gas Sales Pipelines ... 3-89
3.19 Grazing Resources ... 3-90
3.19.1 Development Within the PAPA ... 3-90
3.19.2 Pipeline Corridors and Gas Sales Pipelines ... 3-93
3.20 Wetlands, Riparian Resources and Flood Plains ... 3-93
3.20.1 Development Within the PAPA ... 3-93
3.20.2 Pipeline Corridors and Gas Sales Pipelines ... 3-95
3.21 Threatened and Endangered Species and Special Status Species ... 3-97
3.21.1 Development Within the PAPA ... 3-97
3.21.1.1 Federally Listed, Proposed, and Candidate Species ... 3-97
3.21.1.2 Sensitive Species in the PAPA ... 3-100
3.21.2 Pipeline Corridors and Gas Sales Pipelines ... 3-103
3.22 Wildlife and Aquatic Resources ... 3-104
3.22.1 Development Within the PAPA ... 3-104
3.22.1.1 Big Game ... 3-105

3.22.1.2 Upland Game Birds 3-115
3.22.1.3 Small Game and Furbearing Mammals 3-119
3.22.1.4 Migratory Birds 3-120
3.22.1.5 Nongame Wildlife Species 3-121
3.22.1.6 Aquatic Resources 3-121
3.22.2 Pipeline Corridors and Gas Sales Pipelines 3-123
3.23 Hazardous Materials 3-125

Chapter 4 – Environmental Consequences 4-1

4.1 Introduction 4-1
4.1.1 Impact Analysis Related to the PAPA DEIS 4-3
4.1.2 Spatial Analysis of Future Surface Disturbance 4-4
4.1.2.1 Alternative A (No Action Alternative) 4-6
4.1.2.2 Alternative B (Proposed Action) 4-6
4.1.2.3 Alternative C 4-6
4.1.3 Relationship of Spatial Disturbance to Impact Assessment 4-12
4.1.4 Scoping Issues 4-13
4.2 Environmental Justice 4-14
4.3 Socioeconomic Resources 4-14
4.3.1 Scoping Issues 4-14
4.3.2 Impacts Considered in the PAPA DEIS 4-14
4.3.3 Alternative Impacts 4-16
4.3.3.1 Summary of Impacts Common to All Alternatives 4-16
4.3.3.2 Alternative A (No Action Alternative) 4-22
4.3.3.3 Alternative B (Proposed Action Alternative) and Alternative C 4-25
4.3.4 Cumulative Impacts 4-30
4.3.5 Alternative Impact Mitigation 4-30
4.4 Transportation 4-30
4.4.1 Scoping Issues 4-30
4.4.2 Impacts Considered in the PAPA DEIS 4-30
4.4.3 Alternative Impacts 4-31
4.4.3.1 Summary of Impacts Common to All Alternatives 4-31
4.4.3.2 Alternative A (No Action Alternative) 4-34
4.4.3.3 Alternative B (Proposed Action Alternative) 4-35
4.4.3.4 Alternative C 4-35
4.4.4 Cumulative Impacts 4-37
4.4.5 Alternative Impact Mitigation 4-37
4.5 Land Use and Residential Areas 4-37
4.5.1 Scoping Issues 4-37
4.5.2 Impacts Considered in the PAPA DEIS 4-37
4.5.3 Alternative Impacts 4-38
4.5.3.1 Summary of Impacts Common to All Alternatives 4-38
4.5.3.2 Alternative A (No Action Alternative) 4-40
4.5.3.3 Alternative B (Proposed Action Alternative) 4-41
4.5.3.4 Alternative C 4-41
4.5.4 Cumulative Impacts 4-42
4.5.5 Alternative Impact Mitigation 4-44
4.6 Recreation Resources 4-44
4.6.1 Scoping Issues 4-44
4.6.2 Impacts Considered in the PAPA DEIS 4-45
4.6.3 Alternative Impacts 4-46
4.6.3.1 Summary of Impacts Common to All Alternatives 4-46
4.6.3.2 Alternative A (No Action Alternative) 4-47
4.6.3.3 Alternative B (Proposed Action Alternative) 4-47
4.6.3.4 Alternative C 4-47

4.6.4 Cumulative Impacts ... 4-48
4.6.5 Alternative Impact Mitigation ... 4-49
4.7 Visual Resources ... 4-49
4.7.1 Scoping Issues ... 4-49
4.7.2 Impacts Considered in the PAPA DEIS ... 4-49
4.7.3 Alternative Impacts ... 4-50
4.7.3.1 Summary of Impacts Common to All Alternatives ... 4-50
4.7.3.2 Alternative A (No Action Alternative) ... 4-51
4.7.3.3 Alternative B (Proposed Action Alternative) ... 4-52
4.7.3.4 Alternative C ... 4-52
4.7.4 Cumulative Impacts ... 4-52
4.7.5 Alternative Impact Mitigation ... 4-53
4.8 Cultural and Historic Resources ... 4-53
4.8.1 Scoping Issues ... 4-53
4.8.2 Impacts Considered in the PAPA DEIS ... 4-54
4.8.3 Alternative Impacts ... 4-54
4.8.3.1 Summary of Impacts Common to All Alternatives ... 4-54
4.8.3.2 Alternative A (No Action Alternative) ... 4-56
4.8.3.3 Alternative B (Proposed Action Alternative) ... 4-57
4.8.3.4 Alternative C ... 4-58
4.8.4 Cumulative Impacts ... 4-59
4.8.5 Alternative Impact Mitigation ... 4-60
4.9 Air Quality ... 4-60
4.9.1 Scoping Issues ... 4-60
4.9.2 Impacts Considered in the PAPA DEIS ... 4-61
4.9.3 Alternative Impacts ... 4-61
4.9.3.1 Summary of Impacts Common to All Alternatives ... 4-61
4.9.3.2 Alternative A (No Action Alternative) ... 4-67
4.9.3.3 Alternative B (Proposed Action Alternative) ... 4-68
4.9.3.4 Alternative C ... 4-69
4.9.4 Cumulative Impacts ... 4-70
4.9.4.1 Alternative A (No Action Alternative) ... 4-71
4.9.4.2 Alternative B (Proposed Action Alternative) ... 4-72
4.9.4.3 Alternative C ... 4-73
4.9.5 Alternative Impact Mitigation ... 4-74
4.10 Noise ... 4-75
4.10.1 Scoping Issues ... 4-75
4.10.2 Impacts Considered in the PAPA DEIS ... 4-75
4.10.3 Alternative Impacts ... 4-76
4.10.3.1 Summary of Impacts Common to All Alternatives ... 4-76
4.10.3.2 Alternative A (No Action Alternative) ... 4-77
4.10.3.3 Alternative B (Proposed Action Alternative) ... 4-77
4.10.3.4 Alternative C ... 4-77
4.10.4 Cumulative Impacts ... 4-78
4.10.5 Alternative Impact Mitigation ... 4-78
4.11 Geology and Geologic Hazards ... 4-79
4.11.1 Scoping Issues ... 4-79
4.11.2 Impacts Considered in the PAPA DEIS ... 4-79
4.11.3 Alternative Impacts ... 4-79
4.11.3.1 Summary of Impacts Common to All Alternatives ... 4-79
4.11.4 Cumulative Impacts ... 4-80
4.11.5 Alternative Impact Mitigation ... 4-80
4.12 Paleontological Resources ... 4-80
4.12.1 Scoping Issues ... 4-80
4.12.2 Impacts Considered in the PAPA DEIS ... 4-80
4.12.3 Alternative Impacts ... 4-81

4.12.3.1 Summary of Impacts Common to All Alternatives 4-81
4.12.3.2 Alternative A (No Action Alternative) 4-81
4.12.3.3 Alternative B (Proposed Action Alternative) 4-81
4.12.3.4 Alternative C 4-81
4.12.4 Alternative Impact Mitigation 4-82
4.12.5 Cumulative Impacts 4-82
4.13 Groundwater Resources 4-82
4.13.1 Scoping Issues 4-82
4.13.2 Impacts Considered in the PAPA DEIS 4-82
4.13.3 Alternative Impacts 4-83
4.13.3.1 Summary of Impacts Common to All Alternatives 4-83
4.13.3.2 Alternative A (No Action Alternative) 4-85
4.13.3.3 Alternative B (Proposed Action Alternative) 4-85
4.13.3.4 Alternative C 4-85
4.13.4 Cumulative Impacts 4-86
4.13.5 Alternative Impact Mitigation 4-86
4.14 Surface Water 4-86
4.14.1 Scoping Issues 4-86
4.14.2 Impacts Considered in the PAPA DEIS 4-86
4.14.3 Alternative Impacts 4-87
4.14.3.1 Summary of Impacts Common to All Alternatives 4-87
4.14.3.2 Alternative A (No Action Alternative) 4-93
4.14.3.3 Alternative B (Proposed Action Alternative) 4-93
4.14.3.4 Alternative C 4-93
4.14.4 Cumulative Impacts 4-93
4.14.5 Alternative Impact Mitigation 4-94
4.15 Soil Resources 4-95
4.15.1 Scoping Issues 4-95
4.15.2 Impacts Considered in the PAPA DEIS 4-95
4.15.3 Alternative Impacts 4-96
4.15.3.1 Summary of Impacts Common to All Alternatives 4-96
4.15.3.2 Alternative A (No Action Alternative) 4-97
4.15.3.3 Alternative B (Proposed Action Alternative) 4-97
4.15.3.4 Alternative C 4-97
4.15.4 Alternative Impact Mitigation 4-98
4.15.5 Cumulative Impacts 4-98
4.16 Vegetation Resources 4-98
4.16.1 Scoping Issues 4-98
4.16.2 Impacts Considered in the PAPA DEIS 4-99
4.16.3 Alternative Impacts 4-99
4.16.3.1 Summary of Impacts Common to All Alternatives 4-99
4.16.3.2 Alternative A (No Action Alternative) 4-101
4.16.3.3 Alternative B (Proposed Action Alternative) 4-101
4.16.3.4 Alternative C 4101
4.16.4 Cumulative Impacts 4-102
4.16.5 Alternative Impact Mitigation 4-102
4.17 Grazing Resources 4-103
4.17.1 Scoping Issues 4-103
4.17.2 Impacts Considered in the PAPA DEIS 4-103
4.17.3 Alternative Impacts 4-104
4.17.3.1 Summary of Impacts Common to All Alternatives 4-104
4.17.3.2 Alternative A (No Action Alternative) 4-106
4.17.3.3 Alternative B (Proposed Action Alternative) 4-106
4.17.3.4 Alternative C 4-106
4.17.4 Cumulative Impacts 4-107
4.17.5 Alternative Impact Mitigation 4-108

4.18 Wetlands, Riparian Resources and Flood Plains 4-108
4.18.1 Scoping 4-108
4.18.2 Impacts Considered in the PAPA DEIS 4-108
4.18.3 Alternative Impacts 4-109
4.18.3.1 Summary of Impacts Common to All Alternatives 4-109
4.18.3.2 Alternative A (No Action Alternative) 4-110
4.18.3.3 Alternative B (Proposed Action Alternative) 4-110
4.18.3.4 Alternative C 4-111
4.18.4 Cumulative Impacts 4-111
4.18.5 Alternative Impact Analysis 4-112
4.19 Threatened and Endangered Species and Special Status Species 4-112
4.19.1 Scoping 4-112
4.19.2 Impacts Considered in the PAPA DEIS 4-112
4.19.3 Alternative Impacts 4-113
4.19.3.1 Summary of Impacts Common to All Alternatives 4-113
4.19.3.2 Alternative A (No Action Alternative) 4-121
4.19.3.3 Alternative B (Proposed Action Alternative) 4-121
4.19.3.4 Alternative C 4-122
4.19.4 Cumulative Impacts 4-123
4.19.5 Alternative Impact Mitigation 4-125
4.20 Wildlife and Aquatic Resources 4-125
4.20.1 Scoping Issues 4-125
4.20.2 Impacts Considered in the PAPA DEIS 4-126
4.20.3 Alternative Impacts 4-127
4.20.3.1 Summary of Impacts Common to All Alternatives 4-127
4.20.3.2 Alternative A (No Action Alternative) 4-138
4.20.3.3 Alternative B (Proposed Action Alternative) 4-139
4.20.3.4 Alternative C 4-140
4.20.4 Cumulative Impacts 4-143
4.20.5 Alternative Impact Mitigation 4-146
4.21 Hazardous Materials 4-147
4.21.1 Scoping Issues 4-147
4.21.2 Impacts Considered in the PAPA DEIS 4-147
4.21.3 Alternative Impacts 4-147
4.21.4 Cumulative Impacts 4-147
4.21.5 Alternative Impact Mitigation 4-147

Chapter 5 – Consultation and Coordination 5-1

5.1 List of Preparers and participants 5-1
5.2 Personnel contacted or consulted 5-2

Chapter 6 – References 6-1

Chapter 7 – Glossary 7-1

VOLUME 2 – LIST OF APPENDICES

APPENDIX A	AUTHORIZATIONS IN THE PAPA ROD
APPENDIX B	SCOPING COMMENTS
APPENDIX C	DEVELOPMENT PROCEDURES FOR WELLFIELD ACTIVITIES
APPENDIX D	PIPELINE DESIGN AND CONSTRUCTION PROCEDURES
APPENDIX E	PERFORMANCE BASED OBJECTIVES
APPENDIX F	COMPARISON OF IMPACT FOR ALL ALTERNATIVES
APPENDIX G	WYOMING PROTOCOL AGREEMENT
APPENDIX H	PROGRAMMATIC AGREEMENT SHELL/ULTRA
APPENDIX I	AIR QUALITY IMPACT TABLES YEAR 2005 MODELING
APPENDIX J	EROSION MODELING, SEDIMENT TRANSPORT MODELING, AND SALT LOADING TECHNICAL REPORT
APPENDIX K	WILDLIFE TECHNICAL REPORT
APPENDIX L	SPATIAL ANALYSIS OF FUTURE SURFACE DISTURBANCE
APPENDIX M	AIR QUALITY IMPACT TABLES PROJECT ALTERNATIVE MODELING
APPENDIX N	MODELS OF POTENTIAL IMPACTS TO GROUNDWATER
APPENDIX O	DRAFT PAPA WATER MONITORING PLAN

List of Figures

Chapter 3 – Affected Environment

Figure 3.5-1 Real Dividends, Interest, and Rent in Lincoln, Sweetwater, and Sublette Counties for the period 1980-2004 (U.S. Dept. of Commerce, 2006) 3-13
Figure 3.11-1 Standard Visual Range (SVR) for 20th % Cleanest Days, Pinedale Anticline Project Area, Sublette County, Wyoming (IMPROVE, 2006) 3-58
Figure 3.11-2 Standard Visual Range (SVR) for 20th % Middle Days, Pinedale Anticline Project Area, Sublette County, Wyoming (IMPROVE), 2006 3-59
Figure 3.11-3 Standard Visual Range (SVR) for 20th % Haziest Days, Pinedale Anticline Project Area, Sublette County, Wyoming (IMPROVE, 2006) 3-59
Figure 3.11-4 Mean Annual Total Sulfur Deposition near Pinedale, Wyoming 3-60
Figure 3.11-5 Mean Annual Total Nitrogen Deposition near Pinedale, Wyoming 3-61
Figure 3.13-1 Geological Cross Section of the Green River Basin and Pinedale Anticline Area 3-68
Figure 3.15-1 Relationship Between Major Formations and Aquifers 3-72
Figure 3.15-2 Relationship of Sulfate Concentrations to Total Dissolved Solids in Wasatch Groundwater 3-74
Figure 3.15-3 Distribution of pH in Wasatch Groundwater 3-74
Figure 3.15-4 Data from Drilling Supply Wells in the PAPA 3-75
Figure 3.22-1 Greater Sage-Grouse Harvested per Recreation-Day in SUGMA 3 and 7 Combined, 1982 to 2005. 3-115
Figure 3.22-2 Greater Sage-Grouse Average Male Attendance at Leks Censused on the Mesa, in the PAPA, and within 2 miles of the PAPA since 1999 3-117
Figure 3.22-3 Cottontail Rabbits Harvested per Recreation-Day in SUGMA 3 and 7 Combined, 1982 to 2005. 3-119

Chapter 4 – Environmental Consequences

Figure 4.3-1 Estimated Average Well Production Profile 4-18

List of Maps

Chapter 1 – Introduction

Map 1.1-1 General Location of the Pinedale Anticline Project Area 1-2
Map 1.1-2 Leaseholders 1-3

Chapter 2 – Public Participation, Existing Development and Alternatives

Map 2.3-1 Existing Wellfield Disturbance Through 2005 2-6
Map 2.3-2 Existing Road Network 2-9
Map 2.4-1 Proposed Corridors and Gas Sales Pipelines 2-15
Map 2.4-2 Management Areas Defined in the PAPA DEIS Applied to the No Action Alternative 2-19
Map 2.4-3 Alternative B – Proposed Action Alternative Concentrated Development Areas (2007 Through 2011) 2-24
Map 2.4-4 Alternative C Core Area with Oil and Gas Development Potential 2-31
Map 2.4-5 Alternative C Core Area with Development Areas 2-32
Map 2.4-6 Alternative C Development Areas in Relation to Big Game Crucial Winter Ranges 2-34
Map 2.4-7 Alternative C Development Areas in Relation to Greater Sage-Grouse Leks and Buffers 2-35

Chapter 3 – Affected Environment

Map 3.2-1 Existing Wellfield Disturbance in Relation to Surface and Mineral Ownership 3-3
Map 3.7-1 Existing Wellfield Disturbance in Relation to Land Use/Land Cover Types 3-33
Map 3.7-2 Existing Wellfield Disturbance in Relation to Sublette County Zoning Districts 3-36
Map 3.7-3 Existing Wellfield Disturbance in Relation to Residential Sensitive Resource Management Zone 3-38
Map 3.8-1 Existing Wellfield Disturbance in Relation to Off Highway Vehicle (OHV) Designations, Developed Recreation Sites, and Historic Points of Interest 3-42
Map 3.9-1 Existing Wellfield Disturbance in Relation to Visual Resource Management Classifications 3-45
Map 3.9-2 Existing Wellfield Disturbance in Relation to Sensitive Viewshed Sensitive Resource Management Zone 3-46
Map 3.10-1 Existing Wellfield Disturbance in Relation to the Lander Trail, Viewshed, Buffers, and Sensitive Resource Management Zone 3-51
Map 3.11-1 Air Quality Impact Assessment Area Showing Locations of Sensitive Areas, Midfield Communities and Monitoring Sites 3-56
Map 3.16-1 Existing Wellfield Disturbance in Relation to Hydrologic Sub-watersheds 3-78
Map 3.17-1 Existing Wellfield Disturbance in Relation to Sensitive Soils and Sensitive Resource Management Zone 3-85
Map 3.18-1 Existing Wellfield Disturbance in Relation to Vegetation Types 3-87
Map 3.19-1 Existing Wellfield Disturbance in Relation to Grazing Allotments 3-91
Map 3.20-1 Existing Wellfield Disturbance in Relation to Wetlands and Sensitive Resource Management Zone 3-94
Map 3.20-2 Existing Wellfield Disturbance in Relation to 100-Year Flood Plain and Sensitive Resource Management Zone 3-96
Map 3.22-1 Existing Wellfield Disturbance in Relation to Pronghorn Seasonal Ranges and Sensitive Resource Management Zone 3-106
Map 3.22-2 Existing Wellfield Disturbance in Relation to Mule Deer Seasonal Ranges and Sensitive Resource Management Zone 3-109

Map 3.22-3 Existing Wellfield Disturbance in Relation to Moose Seasonal Ranges and Sensitive Resource Management Zone 3-114
Map 3.22-4 Existing Wellfield Disturbance in Relation to Greater Sage-Grouse Leks, Nesting Habitat and Sensitive Resource Management Zone 3-116

Chapter 4 – Environmental Consequences

Map 4.1-1 Estimated Distribution of Wellfield Disturbance Through 2006 4-5
Map 4.1-2 Estimated Distribution of Wellfield Disturbances 2011 – Alternative A 4-7
Map 4.1-3 Estimated Distribution of Wellfield Disturbance 2011 – Alternative B 4-8
Map 4.1-4 Estimated Distribution of Wellfield Disturbance 2023 – Alternative B 4-9
Map 4.1-5 Estimated Distribution of Wellfield Disturbance 2011 – Alternative C 4-10
Map 4.1-6 Estimated Distribution of Wellfield Disturbance 2023 – Alternative C 4-11

List of Tables

Chapter 1 – Introduction

Table 1.9-1 Federal, State, and Local Permits, Approvals and Authorizing Actions Necessary for Construction, Operation, Maintenance, and Abandonment of Operators' Proposed Action and Alternatives 1-11

Chapter 2 – Public Participation, Existing Development and Alternatives

Table 2.3-1 Total Annual Production of Natural Gas, Condensate, and Produced Water in the PAPA Since 2000 2-3
Table 2.3-2 PAPA ROD Approved Components Compared to Development since the PAPA ROD 2-3
Table 2.3-3 Management Area Limitations and Current Status of Well Pads 2-4
Table 2.3-4 Estimated Total Surface Disturbance in the PAPA as a Result of Natural Gas Development through 2006 2-7
Table 2.3-5 Existing Roads within the PAPA by Road Category 2-8
Table 2.3-6 Compressor Stations, Existing Horsepower with Corresponding NO_x Emissions in the PAPA through 2006 2-10
Table 2.4-1 Comparison of Traffic (vehicles per day) During Development for all Alternatives in 2009 2-13
Table 2.4-2 Workforce Requirements Necessary to Develop a Single Well in the PAPA 2-13
Table 2.4-3 Estimated Initial and Life-of-Project Disturbance for Gas Sales Pipelines and Granger Gas Processing Plant 2-16
Table 2.4-4 Compressor Station Expansion Common to all Alternatives 2-17
Table 2.4-5 Estimated Initial and Life-of-Project Disturbance under the No Action Alternative through 2011 2-21
Table 2.4-6 Proposed Wells and Drilling Rigs by Year under the No Action Alternative 2-22
Table 2.4-7 Total Number of Well Pads Within each Management Area that have been Proposed by the Operators under the No Action Alternative 2-22
Table 2.4-8 Estimated Initial and Life-of-Project Disturbance under the Proposed Action Alternative through 2011 2-26
Table 2.4-9 Estimated Initial and Life-of-Project Disturbance under the Proposed Action Alternative through 2023 2-27
Table 2.4-10 Estimated Wells and Drilling Rigs by Year for the Proposed Action Alternative Through 2025 2-28
Table 2.4-11 Proposed Project Components and Estimated Initial and Life of Project Disturbance under Alternative C through 2011 2-37
Table 2.4-12 Proposed Project Components and Estimated Total and Life of Project) Disturbance under Alternative C through 2023 2-37
Table 2.4-13 Summary of Surface Disturbance for Alternatives Analyzed in Detail 2-38

Chapter 3 – Affected Environment

Table 3.2-1 Estimated Existing Wellfield Disturbance in Relation to Land and Mineral Ownership... 3-4
Table 3.3-1 Estimated Values of Climate Parameters since 2000 Compared to the 30-Year Average from Water Year 1970-1971 through Water Year 1999-2000 3-4
Table 3.3-2 Wind Direction Frequency Distribution in the Vicinity of the PAPA Averaged from 1999 through 2003 3-5
Table 3.3-3 Distribution of Wind Speeds in the Vicinity of the PAPA Averaged from 1999 through 2003 3-5
Table 3.3-4 Atmospheric Stability Class Distribution Averaged from 1999 through 2003 3-6
Table 3.4-1 Race and Poverty as a Percentage of Total Population in 2000 3-6

Table 3.5-1 Total Assessed Valuation and Assessed Valuation Indices, Southwestern Wyoming from 2000 to 2005 ... 3-7
Table 3.5-2 Per-Capita Assessed Valuation from Oil and Gas Production Facilities, Southwestern Wyoming from 2000 to 2005 ... 3-8
Table 3.5-3 Employment and Earnings Associated with Natural Gas Development from 2000 to 2005 ... 3-9
Table 3.5-4 Per-Capita Share of Total Regional Employment Including the Contribution by the PAPA ... 3-9
Table 3.5-5 Oil and Gas Production in Lincoln, Sublette, and Sweetwater Counties, 2004 ... 3-10
Table 3.5-6 Population Estimates in Southwestern Wyoming from 2000 to 2005 ... 3-10
Table 3.5-7 Population Forecasts for Selected Locations in Southwestern Wyoming from 2006 to 2020 ... 3-11
Table 3.5-8 Comparative Unemployment Levels (percent) in Southwestern Wyoming and the United States from 1999 to 2005 ... 3-12
Table 3.5-9 A Comparison of Household and Per-Capita Income Statistics for Southwestern Wyoming, and the United States in 2000 ... 3-12
Table 3.5-10 Average Wages per Job, in 2004 Dollars, for Lincoln, Sublette, and Sweetwater Counties, 1970 -2004 ... 3-12
Table 3.5-11 A Comparison of Cost of Living Index Statistics for Southwestern Wyoming and the State of Wyoming in the Fourth Quarter, 2005 ... 3-13
Table 3.5-12 Changes in Employment and Industry Earnings in Lincoln, Sublette, and Sweetwater Counties from 2001 to 2004 by NAICS Sector Classification ... 3-15
Table 3.5-13 Employment in Lincoln, Sublette, and Sweetwater Counties from 2001 to 2005 ... 3-17
Table 3.5-14 Housing Unit Estimates in Lincoln, Sublette, and Sweetwater Counties and Wyoming for 2000-2004 ... 3-18
Table 3.5-15 Lincoln, Sublette, and Sweetwater Counties Average Rental Housing Costs from 2000 to 2005 ... 3-18
Table 3.5-16 Semiannual (Year with a and b) Rental Vacancy Survey for Lincoln, Sublette, and Sweetwater Counties from 2001 to 2005 ... 3-19
Table 3.5-17 Building Permits and Valuation, Lincoln, Sublette, and Sweetwater Counties from 2000 to 2005 ... 3-20
Table 3.5-18 Trends in School Enrollment in Lincoln, Sublette, and Sweetwater Counties from 2000 to 2005 ... 3-24
Table 3.5-19 Production and Sales of Oil and Gas from the PAPA Natural Gas Wells used to Estimate Revenues ... 3-25
Table 3.5-20 Estimated Ad Valorem and Severance Tax Distributions to Sublette County from PAPA Natural Gas Wells from 2000 to 2005 ... 3-26
Table 3.5-21 Federal Mineral Royalties (FMR) to Wyoming from PAPA Natural Gas Wells ... 3-26
Table 3.5-22 Average Prices Paid at the Wellhead, in Wyoming 2000 to 2005 ... 3-26
Table 3.6-1 Existing Wellfield Roads Within the PAPA by Road Category ... 3-27
Table 3.6-2 Average Number of Vehicles Per Day on Highways Used to Access the PAPA ... 3-28
Table 3.6-3 Average Number of Vehicle Types Per Day Passing the ASU Access Station During Winter 2005-2006 ... 3-29
Table 3.6-4 Traffic Counter Locations, Traffic Volumes, and Wellfield Components Accessed Beyond Each Counter on the North Anticline Road from mid-January through March, 2006 ... 3-30
Table 3.6-5 Comparisons of Vehicle Traffic to Well Pads With and Without Liquid Gathering Systems and the Effects of Winter Drilling on Traffic Volume ... 3-30
Table 3.6-6 Number of Traffic Accidents on Roads Adjacent to the PAPA ... 3-30
Table 3.6-7 Highway Maintenance Expenditures (dollars) from 2000 through 2005 ... 3-31
Table 3.7-1 Estimated Existing Wellfield Disturbance in Relation to Land Use/Land Cover Types in the PAPA ... 3-34
Table 3.7-2 Wellfield Disturbance in Relation to Sublette County Zoning Districts ... 3-35
Table 3.8-1 Recreation Use Days in the BLM Pinedale Field Office Administrative Area October 1998 through September 2002 ... 3-39

Table 3.8-2 Resident and Non-Resident Recreation-Days of Hunting Big Game in the Vicinity of the PAPA from 2000 to 2005 ... 3-40
Table 3.8-3 Recreation-Days Spent Fishing, Hunting, and Viewing Wildlife in Wyoming During 1996 and 2001 ... 3-40
Table 3.8-4 Estimated Recreation-Days for Activities in Sublette County During 2001 and 2006 ... 3-41
Table 3.8-5 Estimated Existing Wellfield Disturbance in Relation to Public Recreation and OHV-Designated Areas in the PAPA ... 3-41
Table 3.9-1 Estimated Existing Wellfield Disturbance in Relation to Visual Resource Management Classifications in the PAPA ... 3-44
Table 3.10-1 Estimated Existing Wellfield Disturbance in Relation to the Lander Trail SMRZ and Viewshed ... 3-50
Table 3.11-1 Air Pollutant Background Concentrations and Wyoming and National Ambient Air Quality Standards (ug/m^3) ... 3-55
Table 3.11-2 Prevention of Significant Deterioration (PSD) Increments (ug/m^3) ... 3-57
Table 3.11-3 Monitored Background Conditions at Sensitive Lakes ... 3-61
Table 3.11-4 Pinedale Anticline Project Pollutant Emissions for Year 2005 ... 3-63
Table 3.11-5 Summary of 2005 Air Quality Impacts from Wellfield Activities in the PAPA ... 3-64
Table 3.12-1 Noise Measurements (dBA) at Three of ASU's Well Pads with Winter Drilling by Two Rigs per Pad During Winter 2006. ... 3-65
Table 3.12-2 Distances Noise Would Attenuate to Background (39 dBA) and PAPA ROD Limits at Noise-Sensitive Locations (49 dBA) from ASU Drilling Rigs ... 3-66
Table 3.16-1 Average Annual Flow Rates from Gauging Stations Near the PAPA ... 3-80
Table 3.16-2 Estimated Existing Surface Disturbance in Relation to Hydrologic Sub-watersheds in the PAPA ... 3-81
Table 3.17-1 Estimated Existing Wellfield Disturbance in Relation to Sensitive Soils in the PAPA ... 3-84
Table 3.18-1 Estimated Existing Wellfield Disturbance to Vegetation Types in the PAPA ... 3-88
Table 3.18-2 Wyoming Designated Noxious Weeds in Sublette County ... 3-89
Table 3.18-3 Invasive Nonnative Species Known to Occur in Sublette, Sweetwater, and Uinta Counties that May Occur Along the Proposed Corridor/Pipeline Alignments ... 3-90
Table 3.19-1 Estimated Existing Wellfield Disturbance in Relation to Grazing Allotments in the PAPA ... 3-92
Table 3.19-2 Grazing Allotments Potentially Crossed by the Proposed Corridor/Pipeline Alignments from North to South ... 3-93
Table 3.20-1 Estimated Existing Wellfield Disturbance in Relation to Wetlands, the Wetland SRMZ, and Flood Plains in the PAPA ... 3-95
Table 3.21-1 Estimated Existing Wellfield Disturbance in Relation to 1-Mile Buffer of Bald Eagle Habitats in the PAPA ... 3-98
Table 3.21-2 BLM Sensitive Fish and Wildlife Species and WGFD Species of Special Concern Not Listed Under ESA That Could Occur within the PAPA, Habitats, and Other Status Designations ... 3-101
Table 3.21-3 BLM-Sensitive Plant Species Not Listed Under ESA That Could Occur within the PAPA, Habitats, and Other Status Designations ... 3-103
Table 3.21-4 BLM Sensitive Fish, Wildlife, and Plant Species that, in addition to those in Table 3.21-2 and Table 3.21-3, Could Occur within the Vicinity of the Proposed Corridor/Pipeline Alignments ... 3-103
Table 3.22-1 Pronghorn Sublette Herd Unit Population, Productivity, and Harvest ... 3-107
Table 3.22-2 Pronghorn Northern Sublette Herd Unit Population, Productivity, and Harvest ... 3-107
Table 3.22-3 Estimated Existing Wellfield Disturbance in Relation to Pronghorn Seasonal Ranges in the PAPA ... 3-108
Table 3.22-4 Mule Deer Sublette Herd Unit Population, Productivity, and Harvest ... 3-110
Table 3.22-5 Estimated Existing Wellfield Disturbance in Relation to Mule Deer Seasonal Ranges in the PAPA ... 3-112
Table 3.22-6 Elk Green River Herd Unit Populations, Productivity, and Harvest ... 3-113
Table 3.22-7 Moose Sublette Herd Unit Populations, Productivity, and Harvest ... 3-113
Table 3.22-8 Estimated Existing Wellfield Disturbance to Sage Grouse Lek Buffers in the PAPA ... 3-118

Table 3.22-9 Harvest Data For Other Upland Game Birds and Derived Statistics in SUGMA 3 and 7 During 2005 ... 3-119
Table 3.22-10 Common Neotropical Migratory Birds in the Vicinity of the PAPA with Recent Trends Estimated from National Biological Survey Breeding Bird Survey Data from 1994 to 2003 ... 3-120
Table 3.22.11 Population Estimates of Game Fish Species in River Segments of the Green River and New Fork River Proximate to the PAPA ... 3-122
Table 3.22-12 Native, Non-Game Fish Documented in River Segments of the Green River Proximate to the PAPA. ... 3-123

Chapter 4 – Environmental Consequences

Table 4.1-1 Assumptions Utilized in the PAPA DEIS for Analyzing Impact ... 4-4
Table 4.1-2 Surface Disturbance in Relation to Land and Mineral Ownership by Alternative ... 4-12
Table 4.1-3 Cumulative Surface Disturbance in Relation to Land and Mineral Ownership by Alternative ... 4-13
Table 4.3-1 Economic Impact of PAPA Drilling ... 4-18
Table 4.3-2 Economic Impact of PAPA Production ... 4-19
Table 4.3-3 Royalties and Tax Revenues for a Typical Natural Gas Well in the PAPA in 2006 ... 4-20
Table 4.3-4 State of Wyoming Distribution of Federal Mineral Royalty for a Typical Gas Well in the PAPA in 2005 ... 4-20
Table 4.3-5 Distribution of Ad Valorem Tax Collected by Sublette County from a Typical PAPA Well during Production in 2005 ... 4-21
Table 4.3-6 Employment and Nominal Earnings associated with Drilling under the No Action Alternative (2007 through 2011) ... 4-22
Table 4.3-7 Employment and Nominal Earnings associated with Production under the No Action Alternative (2007 through 2051) ... 4-22
Table 4.3-8 Nominal Tax Revenues associated with Drilling (through 2011) and Production (through 2051) under the No Action Alternative ... 4-23
Table 4.3-9 Employment and Nominal Earnings associated with Drilling under the Proposed Action Alternative and Alternative C ... 4-25
Table 4.3-10 Employment and Nominal Earnings associated with Drilling under the Proposed Action Alternative and Alternative C ... 4-26
Table 4.3-11 Employment and Nominal Earnings associated with Production under the Proposed Action Alternative and Alternative C ... 4-26
Table 4.3-12 Nominal Tax Revenues associated with Drilling (through 2025) and Production (through 2065) under the Proposed Action Alternative and Alternative C ... 4-28
Table 4.4-1 Projected Traffic Volume in the PAPA (vehicles per day) During Development for all Alternatives in Summer 2009 ... 4-32
Table 4.4-2 Projected Traffic Volume in the PAPA (vehicles per day) during Development for all Alternatives in Winter 2009 ... 4-33
Table 4.5-1 Surface Disturbance in Relation to Land Use/Land Cover Types by Alternative ... 4-39
Table 4.5-2 Surface Disturbance in Relation to Sublette County Zoning Districts and the Residential SRMZ by Alternative ... 4-40
Table 4.5-3 Cumulative Surface Disturbance in Relation to Land Use/Land Cover Types by Alternative ... 4-43
Table 4.5-4 Cumulative Surface Disturbance in Relation to Sublette County Zoning Districts and the Residential SRMZ by Alternative ... 4-44
Table 4.6-1 Surface Disturbance in Relation to Public Recreation Areas by Alternative ... 4-46
Table 4.6-2 Cumulative Surface Disturbance in Relation to Public Recreation Areas by Alternative ... 4-49
Table 4.7-1 Surface Disturbance in Relation to VRMs and the Sensitive Viewshed SRMZ by Alternative ... 4-50
Table 4.7-2 Cumulative Surface Disturbance in Relation to VRMs and the Sensitive Viewshed SRMZ by Alternative ... 4-53

Table 4.8-1 Surface Disturbance in Relation to the Lander Trail SMRZ and 0.25-Mile Buffer by Alternative 4-55
Table 4.8-2 Cumulative Surface Disturbance in Relation to the Lander Trail SMRZ and 0.25-Mile Buffer Alternative 4-60
Table 4.9-1 Project and Non-Project Emissions (tpy) included in Far-field Analysis 4-66
Table 4.14-1 Estimated Surface Water Withdrawals from the New Fork River for Life of Project within the PAPA by Alternative 4-87
Table 4.14-2 Surface Disturbance in Relation to Sub-Watersheds by Alternative 4-88
Table 4.14-3 Modeled Average Annual Sediment Yields of Sub-Watersheds by Alternative 4-89
Table 4.14-4 Average Annual Sediment Yield Increase (%) above Current Conditions for Sub-Watersheds by Alternative 4-91
Table 4.14-5 Cumulative Surface Disturbance in Relation to Sub-Watersheds by Alternative 4-94
Table 4.15-1 Surface Disturbance in Relation to Sensitive Soils SMRZ by Alternative 4-96
Table 4.15-2 Cumulative Surface Disturbance in Relation to Sensitive Soils SMRZ by Alternative 4-98
Table 4.16-1 Surface Disturbance in Relation to Vegetation Types by Alternative 4-100
Table 4.16-2 Cumulative Surface Disturbance to Vegetation Types by Alternative 4-102
Table 4.17-1 Surface Disturbance in Relation to Grazing Allotments by Alternative 4-105
Table 4.17-2 Cumulative Surface Disturbance in Relation to Grazing Allotments by Alternative 4-107
Table 4.18-1 Surface Disturbance in Relation to Wetlands, the Wetland SRMZ, and Flood Plain SRMZ by Alternative 4-110
Table 4.18-2 Cumulative Surface Disturbance in Relation to Wetlands, the Wetland SRMZ, and Flood Plain SRMZ by Alternative 4-111
Table 4.19-1 Surface Disturbance in Relation to 1-Mile Buffer of Bald Eagle Habitats by Alternative 4-114
Table 4.19-2 Estimated Surface and Groundwater Withdrawals in the PAPA subject to the Recovery and Implementation Program for Endangered Fish Species by Alternative 4-117
Table 4.19-3 Surface Disturbance in Relation to Habitats used by Special Status Wildlife Species by Alternative 4-118
Table 4.19-4 Cumulative Surface Disturbance in Relation to 1-Mile Buffer of Bald Eagle Habitats by Alternative 4-124
Table 4.19-5 Cumulative Disturbance in Relation to Habitats used by Special Status Wildlife Species by Alternative 4-124
Table 4.20-1 Potential Edge Length Indicative of Fragmentation by Alternative 4-129
Table 4.20-2 Surface Disturbance in Relation to Pronghorn Seasonal Ranges by Alternative 4-130
Table 4.20-3 Surface Disturbance in Relation to Mule Deer Seasonal Ranges by Alternative 4-131
Table 4.20-4 Surface Disturbance to Moose and Elk Seasonal Ranges by Alternative 4-133
Table 4.20-5 Surface Disturbances to Greater Sage-Grouse Lek Buffers by Alternative 4-135
Table 4.20-6 Cumulative Existing and Potential Additional Edge Length Indicative of Fragmentation by Alternative 4-143
Table 4.20-7 Cumulative Surface Disturbance in Relation to Pronghorn Seasonal Ranges by Alternative 4-144
Table 4.20-8 Cumulative Surface Disturbance in Relation to Mule Deer Seasonal Ranges by Alternative 4-145
Table 4.20-9 Cumulative Surface Disturbance to Greater Sage-Grouse Lek Buffers by Alternative 4-146

Chapter 5 – Consultation and Coordination

Table 5.1-1 List of Preparers and Participants, Pinedale Anticline Draft SEIS October 2006 Personnel Contacted or Consulted 5-1
Table 5.1-2 Persons Contacted or Consulted During Preparation of the SEIS and Scoping Respondents 5-2

Abbreviations and Acronyms

AEM	adaptive environmental management
AQTSD	Air Quality Technical Support Document
ANC	acid neutralizing capacity
AO	Authorized Officer
APD	Application for Permit to Drill
AQD	Air Quality Division
AQRV	air quality related value
ARPA	Archeological Resources Protection Act
ASU	Anschutz, Shell and Ultra
AUM	animal unit month
BART	best available retrofit technology
bbl	barrel
BCC	Bird Canyon Corridor
BBS	Breeding Bird Survey
BFGC	Blacks Fork Granger Corridor
BLM	Bureau of Land Management
BOR	Bureau of Reclamation
BMP	best management practices
BP	before present
BTEX	benzene, toluene, ethylbenzene and xylene
BTNF	Bridger-Teton National Forest
CAPS	Cooperative Agricultural Pest Survey
CASTNET	Clean Air Status and Trends Network
CDA	concentrated development area
CDP	central delivery point
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CFS	cubic feet per second
CGF	central gathering facility
CIAA	cumulative impact assessment area
CO	carbon monoxide
COE	U.S. Army Corps of Engineers
C/OSPF	central off site production facility
CPF	centralized production facilities
CSD	consolidated school district
CX	categorical exclusions
DA	development areas
DATS	depositional analysis thresholds
dBA	decibel on the A-weighted scale
DOI	Department of the Interior
dv	deciview
DNA	Determination of NEPA Adequacy
EA	environmental assessment
EIS	environmental impact statement
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FEIS	final environmental impact statement
FLAG	Federal Land Managers' Air Quality Related Values Workgroup
FMR	federal mineral royalties
FONSI	Finding of No Significant Impact
FWS	U.S. Fish and Wildlife Service
g/hp-hr	grams per horsepower hour

gpm	gallons per minute
GTNP	Grand Teton National Park
HAPs	hazardous air pollutants
HDD	horizontal directional drilling
HMA	herd management area
hp	horsepower
HU	herd unit
HUC	hydrologic unit code
IDLH	immediately dangerous to life or health
ID Team	BLM Interdisciplinary Team
IMPROVE	Interagency Monitoring of Protected Visual Environments
ISD	independent school district
JGGC	Jonah Gas Gathering Company
JIDPA	Jonah Infill Drilling Project Area
KINIEROS2	Kinematic Runoff and Erosion Model-Version 2
kg/ha-yr	kilograms per hectare year
KOP	key observation point
lb/acre/yr	pounds per acre per year
LAC	level of acceptable change
LOC	level of concern
LOP	life of project
MA	management area
MCF	thousand cubic feet
mg/L	milligrams per liter
MGR	Mountain Gas Resources
MLE	most likely exposure
MMCF	million cubic feet
MMSCF/D	million standard cubic feet per day
MOU	memorandum of understanding
mph	miles per hour
MSCF	thousand standard cubic feet
NAAQS	National Ambient Air Quality Standards
NADP	National Acid Deposition Program
NAICS	North American Industry Classification System
ND	non-disclosure
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NIOSH	National Institute for Occupational Safety and Health
NO_x	nitrogen oxide
NO_2	nitrogen dioxide
NOI	Notice of Intent
NPS	National Parks Service
NRCS	Natural Resource Conservation Service
NRHP	National Register of Historic Places
NSO	no surface occupancy
NTN	National Trends Network
NWS	National Weather Service
O_3	ozone
OHV	off-highway vehicle
OMB	Office of Management and Budget
OPC	OpalPioneer Corridor
PA	Programmatic Agreement
PAPA	Pinedale Anticline Project Area
PAWSA	Pinedale Anticline Wildlife Study Area
PAWG	Pinedale Anticline Working Group
PBC	Paradise Bird Canyon

PCB	polychlorinated biphenol
PFO	Pinedale Field Office
PFYC	Probable Fossil Yield Classification
PILT	Payment In Lieu of Taxes
$PM_{2.5}$	particulate matter less than 2.5 microns in diameter
PM_{10}	particulate matter less than 10 microns in diameter
PRBP	Powder River Basin Project
PSD	Prevention of Significant Deterioration
PVFD	Pinedale Volunteer Fire Department
QGM	Questar Gas Management
Questar	Questar Market Resources
R6	Rendezvous Phase 6
RELs	reference exposure levels
RFCs	reference concentrations for chronic inhalations
RFD	reasonably foreseeable development
RFFA	reasonably foreseeable future actions
RGS	Rendezvous Gas Services
RMIS	Recreation Management Information System
RMG	Resource Management Group
RMP	Resource Management Plan
ROD	Record of Decision
ROW	right-of-way
RP	resource protection
RPO	Regional Planning Organization
SCCD	Sublette County Conservation District
SEIS	supplemental environmental impact statement
SEO	State Engineer's Office
Shell	Shell Exploration & Production Company
SHPO	State Historic Preservation Office
SO_2	sulfur dioxide
SPCC	Spill Prevention, Containment and Countermeasures
SRMA	Special Recreation Management Area
SRMZ	Sensitive Resource Management Zone
SUGMA	Small and Upland Game Management Area
SUV	sport utility vehicle
SVR	standard visual range
SWAT	Soil and Water Assessment Tool
SWPPP	Stormwater Pollution and Prevention Plan
TCPs	traditional cultural properties
TDS	total dissolved solids
tpy	tons per year
TSS	total suspended solids
*u*eq/l	microequivalents per liter
ug/m^3	micrograms per cubic meter
Ultra	Ultra Resources Inc.
URF	unit risk factor
USC	United States Code
USDA	United States Department of Agriculture
USFS	United States Forest Service
USGS	United States Geological Survey
VISTAS	Visibility Improvement State and Tribal Association of the Southeast
VRM	visual resource management
WAAQS	Wyoming Ambient Air Quality Standards
WDEQ	Wyoming Department of Environmental Quality
WGFD	Wyoming Game and Fish Department
WOGCC	Wyoming Oil and Gas Conservation Commission

WSII	Wyoming Stream Invertebrate Index
WYDOT	Wyoming Department of Transportation
YNP	Yellowstone National Park