

**PETRO SOURCE CARBON DIOXIDE PIPELINE PROJECT
ENVIRONMENTAL ASSESSMENT
EA NO. WY-060-01-033**

Prepared for:

**U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
CASPER FIELD OFFICE
Casper, Wyoming**

**U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
LANDER FIELD OFFICE
Lander, Wyoming**

**U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
BUFFALO FIELD OFFICE
Buffalo, Wyoming**

March 2001

CONTENTS

1.0 INTRODUCTION AND BACKGROUND.....	1-1
1.1 Introduction	1-1
1.2 Project History and Background	1-1
1.3 Purpose and Need for the Proposed Action	1-2
1.3.1 Value of Enhanced Oil Recovery	1-3
1.3.2 Use of CO ₂ in Enhanced Oil Recovery	1-4
1.4 Location of the Proposed Action.....	1-5
1.5 Authorizing Actions	1-5
1.6 Conformance with Land Use Plans	1-10
1.7 Project Interrelationships	1-10
1.7.1 Interrelated Projects	1-10
1.7.2 Special Management Areas	1-11
2.0 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES.....	2-1
2.1 Introduction	2-1
2.2 Proposed Action	2-3
2.2.1 Description of Facilities	2-3
2.2.1.1 CO ₂ Pipeline.....	2-3
2.2.1.2 Scraper Traps, Block Valves, and Takeoff Valves	2-6
2.2.1.3 Meter Terminal	2-6
2.2.1.4 Measurement Facilities and Supervisory Control and Data Acquisition (SCADA) System	2-10
2.2.1.5 Corrosion Protection	2-14
2.2.2 Construction.....	2-14
2.2.2.1 ROW Clearing and Grading	2-20
2.2.2.2 Trenching	2-22
2.2.2.3 Trench Backfilling.....	2-23
2.2.2.4 Blasting	2-23

CONTENTS (Cont'd)

2.2.2.5	Highway, Railroad, WSAs, and Trail Crossings	2-24
2.2.2.6	Stream and Wetland Crossings	2-25
2.2.2.7	Water Withdrawals for Hydrostatic Testing, Directional Drilling, and Dust Abatement	2-26
2.2.2.8	Cleanup and Restoration	2-26
2.2.2.9	Special Construction Areas.....	2-28
2.2.2.10	Hazardous Materials/Wastes	2-30
2.2.3	Operation	2-30
2.2.3.1	Rupture Scenario	2-30
2.2.4	Abandonment.....	2-31
2.3	No Action Alternative.....	2-31
2.4	Alternatives Considered but Eliminated From Detailed Analysis.....	2-32
2.4.1	Truck Transportation of CO ₂	2-32
2.4.2	Casper Alternative.....	2-32
2.4.3	Crooks Gap Alternative	2-32
2.4.4	Lateral Alternatives.....	2-33
2.5	Environmental Protection Measures	2-33
2.5.1	Air Quality.....	2-33
2.5.2	Geology and Soils	2-33
2.5.3	Water Resources and Wetlands	2-34
2.5.4	Vegetation and Agriculture	2-36
2.5.5	Wildlife, Fisheries, and Special Status Species	2-37
2.5.6	Recreation and Visual Resources.....	2-39
2.5.7	Socioeconomics	2-40
2.5.8	Cultural and Paleontological Resources	2-40
3.0	AFFECTED ENVIRONMENT	3-1
3.1	Air Quality	3-2
3.1.1	Climate.....	3-2
3.1.2	Air Quality.....	3-2
3.2	Geology and Soils.....	3-3
3.2.1	Geology	3-3
3.2.2	Soils	3-3

CONTENTS (Cont'd)

3.3 Mineral and Paleontological Resources	3-8
3.4 Water Resources	3-11
3.4.1 Surface Water	3-11
3.4.2 Groundwater	3-14
3.5 Vegetation, Wetlands, Agriculture, and Range Resources	3-15
3.5.1 Vegetation and Wetlands	3-15
3.5.2 Noxious Weeds	3-20
3.5.3 Agriculture and Range Resources	3-20
3.5.4 Threatened, Endangered, Candidate, and Sensitive Plant Species	3-21
3.6 Wildlife	3-23
3.6.1 Recreationally and Economically Important Species and Nongame Wildlife	3-23
3.6.1.1 Big Game Species	3-23
3.6.1.2 Small Game Species	3-25
3.6.1.3 Nongame Species	3-26
3.6.2 Threatened, Endangered, Candidate, and Sensitive Wildlife Species	3-28
3.6.2.1 Mammals	3-28
3.6.2.2 Birds	3-30
3.6.2.3 Other Sensitive Species.....	3-32
3.7 Aquatic Resources	3-32
3.7.1 Sweetwater River.....	3-33
3.7.2 Sheep Creek.....	3-33
3.7.3 Cottonwood Creek Tributaries and Dry Creek	3-34
3.7.4 Cooper and Horse Creeks	3-34
3.7.5 Poison Spider, Coyote, Middle Fork Casper, and Salt Creeks	3-34
3.7.6 Threatened, Endangered, and Sensitive Species.....	3-34
3.8 Land Use and Recreation.....	3-34
3.8.1 Land Use.....	3-34
3.8.2 Recreation.....	3-37
3.9 Wilderness	3-38
3.10 Visual Resources and Noise	3-41
3.10.1 Visual Resources	3-41

CONTENTS (Cont'd)

3.10.2 Noise	3-46
3.11 Socioeconomics	3-46
3.11.1 Population	3-47
3.11.2 Economic Conditions	3-47
3.11.3 Income	3-52
3.11.4 Employment	3-52
3.11.5 Housing	3-53
3.11.6 Local Government Facilities and Services	3-54
3.11.7 Local Fiscal Conditions	3-54
3.12 Environmental Justice	3-54
3.12.1 Minority Populations	3-55
3.12.2 Low-Income Populations	3-56
3.13 Transportation	3-56
3.14 Cultural Resources/Native American	3-58
3.14.1 Cultural Resources	3-58
3.14.2 Native American Consultation	3-62
4.0 ENVIRONMENTAL CONSEQUENCES	4-1
4.1 Air Quality	4-1
4.2 Geology and Soils	4-3
4.2.1 Geology	4-3
4.2.2 Soils	4-4
4.3 Mineral and Paleontological Resources	4-6
4.4 Water Resources	4-8
4.4.1 Surface Water	4-8
4.4.2 Groundwater	4-10
4.5 Vegetation, Wetlands, Agriculture, and Range Resources	4-10
4.5.1 Vegetation and Wetlands	4-10
4.5.2 Noxious Weeds	4-13
4.5.3 Agriculture and Range Resources	4-14

CONTENTS (Cont'd)

4.5.4 Threatened, Endangered, Candidate, and Sensitive Plant Species	4-14
4.6 Wildlife	4-14
4.6.1 Game and Nongame Wildlife Species	4-15
4.6.1.1 Big Game Species	4-15
4.6.1.2 Small Game Species	4-16
4.6.1.3 Nongame Species	4-18
4.6.2 Threatened, Endangered, and Sensitive Species.....	4-20
4.6.2.1 Mammals	4-20
4.6.2.2 Birds	4-22
4.6.2.3 Other Sensitive Species.....	4-24
4.7 Aquatic Resources	4-25
4.8 Land Use and Recreation.....	4-27
4.9 Wilderness	4-29
4.10 Visual Resources and Noise	4-29
4.10.1 Visual Resources	4-29
4.10.2 Noise.....	4-32
4.11 Socioeconomics	4-32
4.12 Environmental Justice	4-35
4.13 Transportation	4-35
4.14 Cultural Resources/Native American Concerns	4-36
4.14.1 Cultural Resources	4-36
4.14.2 Native American Consultation.....	4-39
4.15 No Action Alternative.....	4-39
5.0 RESIDUAL AND CUMULATIVE IMPACTS.....	5-1
5.1 Commitment of Resources	5-1
5.2 Residual Impacts	5-1

CONTENTS (Cont'd)

5.3 Cumulative Impacts	5-3
6.0 CONSULTATION AND COORDINATION.....	6-1
6.1 Scoping Process.....	6-1
6.2 Results of the Scoping Process.....	6-1
6.3 Coordination	6-1
6.4 Team Organization	6-3
6.5 EA Preparers	6-3
7.0 REFERENCES.....	7-1

APPENDIX A – PROGRAMMATIC AGREEMENT

APPENDIX B – WETLAND AND NOXIOUS WEED DATA

LIST OF TABLES

1-1	Federal, State and Local Permits, Approvals, and Reviews Required for Construction and Operation of the Proposed PSC CO ₂ Pipeline Project.....	1-7
1-2	Summary of Oil Production in the Salt Creek, Sussex, and Hartzog Draw Oil Fields	1-10
2-1	Acres Disturbed, Removed, and Reclaimed by the Proposed PSC CO ₂ Pipeline Project	2-2
2-2	Estimated Construction Worker Requirements for the Proposed PSC CO ₂ Pipeline Segment	2-2
2-3	Location of Scraper Traps, Block Valves, and Takeoff Valves for the Proposed PSC CO ₂ Pipeline	2-10
2-4	Major Pieces of Equipment Required for Construction of the Proposed PSC CO ₂ Pipeline	2-18
2-5	Access Road Summary.....	2-19
2-6	Summary of Construction Temporary Use Areas PSC CO ₂ Pipeline Project.....	2-21
2-7	Highway and Railroad Crossings for the Proposed PSC CO ₂ Pipeline	2-24
3-1	Potential Geologic Hazards Along the Proposed PSC CO ₂ Pipeline.....	3-4
3-2	Sensitive Soils Along the Proposed PSC CO ₂ Pipeline Route	3-6
3-3	Paleontological Sensitivity of Geologic Formations or Stratigraphic Units Crossed by the Proposed PSC CO ₂ Pipeline	3-10
3-4	Perennial Streams Crossed by the Proposed PSC CO ₂ Pipeline Project.....	3-13
3-5	Vegetation Types Identified Along the Proposed PSC CO ₂ Pipeline Project ¹	3-16
3-6	Special Status Plant Species Potentially Occurring in the Near the Proposed PSC CO ₂ Pipeline Project Study Area	3-22
3-7	Big Game Crucial Winter and Partuition Ranges Crossed by the Proposed PSC CO ₂ Pipeline Route	3-24
3-8	Special Status Wildlife Species Identified for the Proposed Petro Source CO ₂ Pipeline Project	3-28
3-9	Recreational Fisheries Crossed by the Proposed PSC CO ₂ Pipeline	3-33
3-10	Visual Resource Management Classes	3-42
3-11	Visual Resource Management Class Designations for the Proposed PSC CO ₂ Pipeline Route	3-45
3-12	Fremont County Economic/Demographic Profile for the Proposed PSC CO ₂ Pipeline Project	3-48
3-13	Natrona County Economic/Demographic Profile for the Proposed PSC CO ₂ Pipeline Project	3-49
3-14	Johnson County Economic/Demographic Profile for the Proposed PSC CO ₂ Pipeline Project	3-50

LIST OF TABLES (Cont'd)

3-15	Campbell County Economic/Demographic Profile for the Proposed PSC CO ₂ Pipeline Project	3-51
3-16	Average Weekly Wage for the Proposed PSC CO ₂ Pipeline Project	3-52
3-17	Temporary Housing Accommodations for the Proposed PSC CO ₂ Pipeline Project.....	3-53
3-18	Traffic Levels for Major Highways Crossed by the Proposed PSC CO ₂ Pipeline, 1998 .	3-57
3-19	Historic Trails Eligible to the NRHP Documented Along the Proposed PSC CO ₂ Pipeline Route	3-59
3-20	NRHP - Eligible Sites Located During the Class III Pedestrian Survey	3-60
4-1	Applicable Ambient Air Quality Standards for the Proposed PSC CO ₂ Pipeline Project..	4-1
4-2	Construction Emissions Estimates for the Proposed PSC CO ₂ Pipeline Project.....	4-2
4-3	Estimated Acreage of Vegetation Types Disturbed, Removed, and Reclaimed During Construction of the Proposed PSC CO ₂ Pipeline	4-10
4-4	Constraint Periods for Big Game Crucial Winter and Partuition Ranges Crossed by the Proposed PSC CO ₂ Pipeline Project.....	4-16
4-5	Constraint Periods for Breeding and Nesting Sage Grouse Along the Proposed PSC CO ₂ Pipeline Project.....	4-17
4-6	Prairie Dog Colonies That Would be Crossed by the Proposed.....	4-21
	Petro Source CO ₂ Pipeline Project.....	4-21
4-7	Contribution to Tax Base for the Proposed PSC CO ₂ Pipeline.....	4-34
4-8	Field Recommendations for Eligible Sites Located Along the Proposed PSC CO ₂ Pipeline Route	4-38
5-1	Resource Commitments Identified for the Proposed PSC CO ₂ Pipeline Project.....	5-2
5-2	Potential Impacts of Using CO ₂ Injection in EOR Activities	5-5
6-1	List of Preparers for the PSC CO ₂ Pipeline EA.....	6-4

LIST OF FIGURES

1-1	Proposed Petro Source CO ₂ Pipeline Route	1-6
2-1	Southern Portion of Proposed PSC CO ₂ Pipeline Route.....	2-4
2-2	Northern Portion of Proposed PSC CO ₂ Pipeline Route	2-5
2-3	Typical Scraper Trap Installation	2-7
2-4	Typical Block Valve Configuration	2-8
2-5	Typical Take Off Installation	2-9
2-6	Bairoil Measurement Facility.....	2-11
2-7	Salt Creek Measurement Facility.....	2-12
2-8	Sussex Measurement Facility.....	2-13
2-9	Typical Rural Construction Spread.....	2-16
2-10	Typical ROW Construction Configuration with Topsoil Salvage.....	2-17
3-1	Schematic Detailing Pipeline Alignment between Split Rock and Miller Springs WSAs	3-40
3-2	Typical Views of Study Area Landscape	3-43