2.0 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

2.1 Introduction

The Proposed Action analyzed in this EA consists of the extension of the existing Wyoming-Dakota CO_2 pipeline from the Bairoil Terminal to the Hartzog Draw Unit well field. A 7-mile lateral also would be constructed to the Salt Creek Unit near Midwest, Wyoming. Construction of the Proposed Action would require approximately 1,497 acres, an estimated 1,492 acres would be reclaimed immediately following project construction. No new disturbance would be required for the use of access roads. Table 2-1 provides information on land requirements for both the pipeline and temporary work areas, as part of the Proposed Action. All disturbance, with the exception of the block and take-off valves and the measurements facilities, would be reclaimed after abandonment.

Construction of the proposed CO_2 pipeline would be scheduled to occur beginning in August 2001 and ending in late January 2002 for MP 112 to MP 240. The north portion of the route (MP 240 to MP 267) would be constructed during the same period or completed 1 to 3 years later (same months). The spread would require an average of approximately 210 workers. Table 2-2 lists the construction worker requirements broken down by job classification. Most of the unskilled laborers (approximately 25 percent of the total work force) would be hired locally. The limited level of local workers is mainly due to demand for coal bed methane activities. Skilled laborers, such as pipeline welders, would be hired locally or brought in from outside the area, depending on availability.

Bus transportation is expected to be provided by the pipeline contractor from Casper. Local resident workers from other parts of the area would be expected to supply their own transportation to the work site; they would not be expected to report to Casper. It is assumed that up to 50 percent of the workers (98) would drive personal vehicles or work vehicles (e.g., welding truck, foreman's pickups) to the work site. At 1.8 persons per vehicle (BLM 1985a), 105 workers would generate 58 vehicle trips during the morning and afternoon peak hours. The remaining 105 workers would require 2 to 3 bus trips from Casper. Additional details on the transportation plan is provided in Appendix E in the POD.

The PSC CO_2 Pipeline Project would be designed and constructed in two phases. The first phase would involve constructing and operating the main route from MP 112 to MP 240 (Sussex Oil Field) and the lateral route. The second phase would include the north end of the route from MP 240 to MP 267 (Hartzog Draw Oil Field). The entire main route and lateral are analyzed in this EA.

Table 2-1
Acres Disturbed, Removed, and Reclaimed by the Proposed PSC CO_2 Pipeline Project

Component/Facility	Acres Disturbed	Acres Removed	Acres Reclaimed[1]
Main Route			
CO_2 Pipeline, 155 miles[2]	1,409.1	0.0	1,409.1
Block Valves and Take-off Valves, 9 @ 0.1 acre	0.9	0.9	0.0
Measurement Facilities with Scraper Traps, 4 @ 1 acre	4.0	4.0	0.0
Temporary Use Areas	21.0	0.0	21.0
Main Route Total	1,435.0	4.9	1430.1
Salt Creek Lateral			
CO_2 Supply Line - [6.8] miles[3]	61.8	0	61.8
Overall Total	1496.8	4.9	1,491.9

[1]These are acres reclaimed immediately following project construction; all areas would be reclaimed after abandonment.
[2]Assumes construction disturbance width of 75 feet: disturbance may be slightly wider on sidehill locations and narrower on flat ground using disturbance minimization techniques.
[3]Assumes construction disturbance width of 75 feet.

Table 2-2
Estimated Construction Worker Requirements for the Proposed PSC CO_2 Pipeline Segment

Worker Classification	August 2001- late January 2002
Pipeline Construction Spread	
Foreman	10
Machine Operators	60
Welders/Helpers	48
Mechanics	10
Surveyors	6
Technicians	12
Laborers	64
Total	210

2.2 Proposed Action

2.2.1 Description of Facilities

PSC (the applicant) of Houston, Texas, proposes to construct approximately 155 miles of 12-inch carbon dioxide pipeline from a point in Township 27 North (T27N), Range 92 West (R92W), Section 4 at the Bairoil Terminal of the existing Wyoming-Dakota CO_2 Pipeline segment to a point in the Hartzog Draw Field, T45N, R76W, Section 2. A 7-mile, 8-inch diameter lateral (MP L0 to L7) would be constructed from the main route at T41N, R80W, Section 25, to a point located near the Salt Creek Unit at T40N, R79W, Section 15. The proposed pipeline would transport CO_2 as a dense-phase fluid to the Sussex, Salt Creek, and Hartzog Draw fields for a proposed EOR project and to other delivery points when markets develop. Major components of the PSC CO_2 Pipeline Project include:

- CO_2 Pipeline;
- Scraper Traps, Block Valves, and Takeoff Valves; and
- CO_2 Measurement Facilities.

All facilities in this system would be designed, constructed, operated and maintained in accordance with Department of Transportation (DOT) Title 49 CFR Part 195, Transportation of Hazardous Liquids by Pipeline, and American National Standards Institute (ANSI) B31.4, Liquid Petroleum Gas, Anhydrous Ammonia, and Alcohols.

2.2.1.1 CO_2 Pipeline

The proposed route would parallel other pipelines, electric power distribution lines, or roads for approximately 50 miles or 31 percent of the total pipeline length. The proposed pipeline would traverse private, state, and federal lands. Approximately 24 percent of the route would be on private lands, 22 percent on state lands, and 54 percent on federal lands. An overview of the pipeline route is presented in Figure 1-1. Maps of the pipeline route shown at a scale of 1 to 500,000 are provided in Figures 2-1 and 2-2.

The CO_2 would be delivered to Hartzog Draw at a pressure ranging from 1,500 to 1,800 pounds per square inch (psi). The transported gas would be no less than 96 percent CO_2, contain not more than 30 pounds of water per 1,000,000 standard cubic feet (3 percent), and contain no more than 35 grains total sulfur per 100 standard cubic feet (less than 1 percent).

Initially, approximately 15 to 50 MMSCFD would be transported through the buried pipeline. Pipeline route markers would be installed at road crossings, water crossings, property boundaries, and other pipeline crossings in locations where such markers would not interfere with existing land uses. Aerial markers would be installed at intervals along the route and at turning points, where possible, to facilitate periodic aerial patrol of the pipeline.

Based on an analysis of gradient and flow requirements for transporting the CO_2 product, Universal Ensco determined that pumping facilities would not be required for Phase 1 or 2. A hydraulics model was used in this analysis.

A pipe yard work area would be used to store and potentially coat pipe prior to transport to the ROW. This 101-acre site, which is located 5.5 miles northwest of Casper, Wyoming (between NW 1/4 and SW 1/4 of Section 33, T35N, R80W), has been previously used as a pipe work area. Pipe would be transferred to the yard via the Burlington Northern railroad or truck. After the coating process is completed, the pipe would be transported to the ROW by truck using highways 20/26 (southern portion) and 25/87 (lateral and northern portion). Pipe transport would occur during a 2-month period. The estimated number of trucks per day for pipe transport would be 5 to 6 during a 2-month period.

2.2.1.2 Scraper Traps, Block Valves, and Takeoff Valves

Scraper traps, which include block valves, would be installed at the beginning of the pipeline, one at Sussex (to be relocated to Hartzog during Phase II), and one at each end of the Salt Creek lateral line. A scraper launcher would be installed at the Bairoil Terminal at MP 112. Additionally, a scraper receiver would be installed at the Hartzog Draw Terminal at MP 267. A typical scraper trap detail is shown in Figure 2-3. Block valves would be installed at approximately 20-mile intervals along the entire length of the pipeline. Figure 2-4 presents a typical block valve configuration. Additional takeoff valves would be installed at potential future delivery locations. Figure 2-5 illustrates a typical takeoff valve installation. Scraper traps, block valves, and/or takeoff vales would be located as shown in Table 2-3. Each scaper trap, block valve, and takeoff valve area would be graveled and enclosed using a chain link fence. The disturbance area at each site is listed in Table 2-1. Access would be year-round depending upon winter weather.

2.2.1.3 Meter Terminal

The Hartzog Draw Meter Terminal would be constructed on a 1-acre site located approximately 10 miles west of Savageton, Wyoming. The site would consist of a meter building (35 feet wide x 75 feet long x 24 feet height), receiving scrapers trap, flow control valve, communications and satellite dish, CO_2 vent, and an electric service pole with a pad-mounted transformer. A 72-inch

Table 2-3
Location of Scraper Traps, Block Valves, and Takeoff Valves for the Proposed PSC CO_2 Pipeline

Type	Mile Post	Location
Scraper Launch Trap at Bairoil Terminal/ Block Valve	112.4	NW 1/4, Sec 4, T27N, R92W
Block Valve	131.9	NW1/4, Sec 29, T29N, R89W
Block Valve	150.8	NW 1/4, Sec 27, T31N, R87W
Block Valve	169.0	SW 1/4, Sec 15, T33N, R85W
Block Valve	183.0	SE 1/4, Sec 4, T35N, R84W
Block Valve	206.5	NW 1/4, Sec 5, T37N, R82W
Block and Takeoff Valves	222.9	SW 1/4, Sec 21, T40N, R80W
Side-lateral Valve	229.0	NW 1/4, Sec 25, T41N, R80W
Block and Takeoff Valves	240.1	NE 1/4, Sec 13, T42N, R79W
Sussex Scraper Trap (temporary)	240.1	NE 1/4, Sec13, T42N, R79W
Block and Side Valve	259.6	NE 1/4, Sec 1, T44N, R77W
Scraper Receipt Trap at Hartzog Draw Terminal (moved from Sussex)	267.1	SW 1/4, Sec 2, T45N, R76W
Salt Creek Scraper Trap/Block Valve	L.0	NW 1/4, Sec 25, T41N, R80W
Salt Creek Scraper Trap/Block and Side Valve	L7.0	SE 1/4, Sec 15, T40N, R79W

high, brown, plastic-coated chain-link security fence would be installed around the facility. The meter building contains a control room, metering facilities, and a 5-ton crane. The control room contains equipment for local and remote operation of the system. A diagram of the facility is provided in the POD (Appendix A).

2.2.1.4 Measurement Facilities and Supervisory Control and Data Acquisition (SCADA) System

Measurement facilities would be built initially at Bairoil, Salt Creek, Sussex, and later at future intermediate delivery points as they are developed. Measurement facilities are shown in Figures 2-6, 2-7, and 2-8, which also are representative of future delivery facilities. Each measurement facility area would be graveled and enclosed with a chain-link security fence. The disturbance area would be approximately 1 acre at each of the facilities. Access would be year-round at 1 week intervals.

The SCADA System located at the measurement facilities would provide continuous operating data. Pressure, temperature, flow rate, totalizing flow, pressure alarms, and status alarms would be transmitted via satellite to the control center.

2.2.1.5 Corrosion Protection

The pipeline would be cathodically protected by the coating, rectifiers, and anodes. Rectifiers would be located near power distribution lines and mounted on a pole adjacent to the ROW; associated anodes would be buried. The exact locations of these cathodic protection devices cannot be determined until the pipeline is installed and the proper tests conducted. If possible, the rectifiers would be placed at the measurement facility sites. Test leads would be attached to the pipeline at fence lines, other pipeline crossings, roads, and highways to monitor the cathodic protection system. Each set of test leads would be brought to the junction box monitored nearby on a short post. The post and junction box would be installed where it would not interfere with existing land uses.

2.2.2 Construction

Pipeline construction techniques for a CO_2 pipeline are the same as for conventional pipelines. The pipeline would be laid in a continuous operation known as a spread, consisting of equipment and crews handling various phases of construction activities. It is anticipated two large spreads would be used to construct the PSC pipeline. Construction would be expected to progress at a total average rate of approximately 2.5 to 4 miles per day.

As part of the EA process, PSC has developed a detailed POD, which would become part of any ROW approved by the BLM. The POD addresses the specific details of the project construction, reclamation, and site-specific environmental protection measures along each mile of the route. This EA provides a discussion of project construction and operation, with reference to the POD.

The following is a list of major construction activities, in order of occurrence along the spread:

- ROW clearing and grading;
- Topsoil salvage;
- Trenching;
- Stringing;
- Welding, and radiographic examination;
- Joint coating and repair;
- Lowering in;
- Trench back-filling;

- Hydrostatic testing and final tie-ins;
- Cleanup and restoration; and
- Site rehabilitation.

Each of these operations is described in more detail later in this section. Figure 2-9 shows components of a typical spread. Figure 2-10 shows the typical ROW configuration for the CO_2 pipeline with the topsoil and trench spoil piles. Table 2-4 lists major pieces of equipment used for pipeline construction. Fuel consumption used for pipeline construction is estimated at approximately 6,000 gallons of diesel fuel per mile and 3,000 gallons of gasoline per mile.

Construction workers would live in permanent residences, local motels, rented houses or lodging, and personal trailers or pickup campers. Car pools, privately owned vehicles, and buses would be used to transport workers to the construction site.

Temporary headquarters for construction and a pipeline welding and storage yard would be located at or near Casper, Wyoming. Temporary headquarters would consist of an office trailer, one or more warehouse trailers (or suitable rented space, if available), and the storage yard for pipe, other major pipeline materials, and construction equipment.

The pipe and equipment would be shipped to an area northwest of Casper via trucks and/or railroad. Approximately 14,000 tons of 12-inch by 0.312-inch (average) and 415 tons of 8-inch by 0.250-inch (average) wall thickness pipe would be required for the project. An estimated 5,000 tons of other material (measurement facilities, valves, fittings, communications and control equipment, etc.) also would be needed. Distribution to construction sites would require an average of 15 to 20 truckloads per day during the period of peak activity. Pipe and equipment would be hauled from the welding and storage yard using various U.S. and state highways, county roads, private roads, and access roads to existing easements and ROW.

There are 35 existing access roads that intersect and parallel the proposed pipeline ROW, which can be used in their present condition for pipeline construction (Table 2-5). Of these, 12 are heavy duty road and 23 are light-duty roads (capable of use by ¾-ton trucks or less). Roads 1A, 1C, 2A, 3, and portions of 4 are considered 2-track trails. Additional maintenance activities would include application of magnesium chloride (surface stabilizer) on road 2 and replacement of damaged culverts on road 5A. The use of signs and markers on light-duty roads and maintenance activities would follow *BLM Manual 9113-Roads*.

Policies governing the use of access roads has been developed by PSC and stipulated to all contractors (see Appendix J in POD). Prior to construction, company and contractor employees would be counseled to use only designated access roads and the ROW for access. All off-road

Table 2-4
Major Pieces of Equipment Required for Construction of the Proposed PSC CO_2 Pipeline

Equipment	Number Required
D-8 Dozer with Ripper	1
D-7 Dozer with Winch and Angle Blade	4
D-7 Tow Tractor	4
572 Sideboom	7
Backhow (3/4-yard)	4
Ditching Machine	2
Backfiller	1
Clamshell Dragline (3/4-yard)	1
Dragline (3/4-yard)	1
Wagon Drill	2
Motor Drill	1
Motor Grader	2
Motor Crane	1
Bending Machine	1
Boring Machine	1
Air Compressor	2
Pipe Coating Trucks	1
Pumps	3
Flatbed Truck	33
Pickup	10
Stringing Truck	4
Bus	4
Skid Truck	1
Dump Truck	2
Tractor with Lowboy	2
Mechanic's Truck	2
Grease Truck	1
Fuel Truck	2
Water Truck with Sprinkler	1
Office Trailer	1
Warehouse Trailer	1
Welding Machines (200 amp, tractor-mounted)	2
Welders' Trucks (1 Ton)	20
Tractor (reclamation)	2-4
Disc ploughs (reclamation)	2-4
Chisel ploughs (reclamation)	2-4
Reseeding equipment (reclamation)	2-4

Table 2-5
Access Road Summary

Access Road Number	Location By Quadrangle Sheet	Description	Road Use	Ownership	Length of Road to be Used (miles)
0	Crooks Peak/Jeffrey City	Crooks Gap Road	Heavy	County	8.71
1	Crooks Peak/Jeffrey City	Big Eagle Mine Road	Heavy	Private/BLM	3.92
1A	Crooks Peak	2-Track Trail	Light	Private/BLM	2.39
1B	Jeffrey City	Sheeps Creek Road	Light	BLM	4.27
1C	Jeffrey City	2-Track Trail	Light	BLM	1.25
2	Split Rock NW	BLM Road 2411/Green Mountain Road	Heavy	BLM	5.53
2A	Split Rock NW	2-Track Trail	Light	BLM	1.61
3	Split Rock	2-Track Trail	Light	BLM	2.55
4	Split Rock/Bucklin Reservoirs/Lone Mountain/Miller Spring	Varies from Ditched/Crowned Ranch Road to 2-Track Trail	Light	Private/BLM	18.87
5	Saddle Rock	County Road 321/Dry Creek Road	Heavy	County	1.02
5A	Saddle Rock/Horse Creek Springs	Unimproved Road	Light	BLM	11.68
6	Eightmile Draw	County Road 201/Poison Spider Road	Heavy	County	0.83
7	Square Top Butte/Powder River	County Road 210/Strohecker Road	Heavy	County	2.70
7A	Square Top Buttle	Unimproved Road	Light	BLM	2.54
8	Natrona/Burlington Lake/Reynolds Reservoir	County Road 126/North Natrona Road	Heavy	County	10.17
8A	Natrona	Unimproved Road	Light	BLM	0.12
8B	Natrona	Unimproved Road	Light	County	0.36
8C	Burlington Lake	Unimproved Road	Light	BLM	0.22
8D	Reynolds Reservoir	Unimproved Road	Light	BLM	0.23
9	Merino/Camel Hump/Salt Canyon/Government Creek	County Road 110, 114 & 125/Dead Horse Road	Heavy	County	22.66
9A	Camel Hump	Unimproved Road	Light	BLM	0.28
9B	Camel Hump	Unimproved Road	Light	BLM	0.93
10	Government Creek	County Road 115/Smoky Gap Road	Heavy	County	7.84
10A	Government Creek	County Road 114/Long Canyon Road	Heavy	County	1.08
10B	Government Creek	Unimproved Road	Light	BLM	1.22
11	Dead Woman Crossing	Sussex Field Road	Light	Private/BLM	2.45
12	Government Creek	Unimproved Road	Light	Private	1.53
13	Midwest	Unimproved Road	Heavy	Private	1.46
13A	Midwest	Unimproved Road	Light	Private	1.19
14	Midwest	Unimproved Road	Heavy	Private	0.61
15	Dead Woman Crossing/Sussex	Unimproved Road	Light	Private	4.55
16	Sussex/House Creek	Unimproved Road	Light	Private	5.02
17	House Creek	Unimproved Road	Light	Private	5.31
18	Fort Reno/North Butte	Unimproved Road	Light	Private	7.95
19	Fats Draw	Unimproved Road	Light	Private	2.33

Note: Light duty road reflects pickup truck traffic (3/4 ton or less).
Heavy duty road reflects all traffic associated with construction.

driving would be prohibited, other than on the ROW. Signs would be established on approved access and used to identify roads where access is prohibited.

TUAs would be required for the Sweetwater River, highway and railroad crossings, steep slopes, and sharp ridges. The location and estimated disturbance area for the TUA are provided in Table 2-6. In calculating the disturbance, the ROW width (75 feet) was subtracted from the total TUA width to avoid duplication, since the pipeline disturbance area already accounted for the 75-foot ROW width. Engineering studies would be completed and reviewed with the BLM prior to the initiation of construction, as needed, prior to construction (see Section III.B in POD).

During construction of the pipeline, PSC would comply with existing federal, state, county, and private requirements developed to protect road networks. Load limit restrictions would be observed at all times to prevent damage to the road surface. Special arrangements would be made with the Wyoming Highway Department and county governments to transport oversize and heavy loads.

2.2.2.1 ROW Clearing and Grading

Normal pipeline construction begins by clearing and grading a pipeline ROW to prepare a smooth and unobstructed work pad for succeeding construction operations. A nominal working width of 75 feet would be required for construction (Figure 2-10). The degree of grading necessary is a function of the roughness of the terrain. For most of the proposed pipeline, clearing and grading is a simple operation with no cuts or fill required. The timing between clearing and trenching would require the ROW to be cleared approximately 2 weeks ahead of trenching. This would result in a cleared workable construction easement up to 25 miles ahead of the construction crew under the best conditions. Topsoil stripping would occur in all areas except historic trails, as described in Section III.G, of the POD. Where possible, brush beating would be considered as an alternative to grading in certain areas. Specific areas where brush beating could be used are the 5 historic trail crossings (see Section 2.3.5).

In areas where the proposed pipeline would parallel an existing pipeline, the new line would be kept at a distance of 25 to 35 feet away. A 10-foot-wide safety zone would be established next to the existing pipeline to protect it from construction activities.

Grading would be conducted so as to minimize interference with existing natural drainage. For vehicle safety on the ROW, temporary bridges or culverts would be constructed, when warranted, across creeks and gullies on the working side of the ROW. Any such crossings would be done in a manner that would not interfere with normal drainage patterns. In mountainous or hilly terrain where the slope runs across the ROW, a level work pad must be cut out of the hillside; this

Table 2-6
Summary of Construction Temporary Use Areas PSC CO_2 Pipeline Project

Description	Temporary Construction Area				
	MP	Width	Length	Area (Ft^2)	Acres
Bairoil Terminal	112.4	400	400	130,000	2.98
Green Mountain - Side Slope	114.4	100	1,700	42,500	0.98
	114.8	100	300	7,500	0.17
	115.0	100	900	22,500	0.52
	115.2	100	1,300	32,500	0.75
	115.5	100	1,000	25,000	0.57
	116.1	100	2,400	60,000	1.38
	116.6	100	900	22,500	0.52
	117.3	100	1,700	42,500	0.98
	117.8	100	1,500	37,500	0.86
	118.3	100	800	20,000	0.46
Test Station	119.8	100	200	5,000	0.11
Green Mountain - Side Slope	121.6	100	500	12,500	0.29
	121.8	100	1,200	30,000	0.69
	122.6	100	500	12,500	0.29
	125.0	100	700	17,500	0.40
US Highway - East Side	130.3	100	200	5,000	0.11
US Highway - West Side	130.3	100	200	5,000	0.11
Sweetwater River Block Valve - West Side	133.8	100	100	2,500	0.06
Sweetwater River - West Side	134.3	250	400	70,000	1.61
Sweetwater River - East Side	134.3	250	400	70,000	1.61
Test Station	137.3	90	200	3,000	0.07
Dry Creek Road Block Valve	150.8	100	200	5,000	0.11
Rattlesnake Hills	158.8	100	500	12,500	0.29
Side Valve	163.0	100	100	2,500	0.06
Test Station	163.8	100	200	5,000	0.11
Poison Spider Road - Block & Side Valve	169.0	100	100	2,500	0.06
US Highway 20/26 Trap & Side Valve	183.0	100	200	5,000	0.11
Test Station	186.0	100	200	5,000	0.11
US Highway 20/26 West Side	187.3	100	200	5,000	0.11
US Highway 20/26 East Side	187.3	100	200	5,000	0.11
Burlington Northern Railroad - South Side	188.4	100	200	5,000	0.11
Burlington Northern Railroad - North Side	188.4	100	200	5,000	0.11
Thirtythree Mile Road Block Valve	206.5	100	200	5,000	0.11
Smokey Gap Road Block & Side Valve	222.9	100	200	5,000	0.11
Interstate 25 West Side	228.1	100	200	5,000	0.11
Interstate 25 East Side	228.1	100	200	20,000	0.46
Sussex Road Block & Side Valve	240.1	100	100	2,500	0.06
State Highway 192 West Side	246.2	100	200	5,000	0.11
State Highway 192 East Side	246.2	100	200	5,000	0.11
Oil Field Road Block & Side Valve	259.6	100	100	2,500	0.06
Hartzog Draw Meter Terminal	267.1	400	400	130,000	2.98
TOTAL				913,000	**20.96**

Note: Area of TUA represents amount that is outside the ROW width. ROW area is accounted for in the pipeline disturbance area.

technique is referred to as a sidehill cut. Grading for sidehill cuts begins at the uphill end of the cuts and continues downward until the required working width is obtained. Spoil from the cut (uphill) is graded to fill the opposite (downhill) side of the bench where it forms part of the work pad, thereby minimizing the width of (uphill) is graded to fill the opposite (downhill) side of the bench where it forms part of the work pad, thereby minimizing the width of disturbed area. The slope of the cut (as well as the fill on the opposite side) depends on the angle of repose of the material being graded. The looser the material, the smaller the angle of repose and the larger the cut required for a given work pad width. Following construction, the fill material would be placed in the cut and the terrain contoured to its original condition for restoration.

Functional use of all livestock facilities and other public improvements would be maintained at all times. Fences would be adequately braced along both sides of the ROW before wires are cut and temporary gates installed. After construction, openings would be closed with fencing of the same specifications compared to the original. In some locations, permanent gates may be installed, with landowner permission, to provide access to the pipeline ROW. If a natural barrier used for livestock control were damaged during construction, the area would be adequately fenced to prevent the escape of livestock. No gates on established roads over public lands would be locked or blocked. Any cattle guards or gates damaged during construction would be repaired or replaced.

2.2.2.2 Trenching

Trenching would be used for all sections of the ROW except larger road and highway crossings, railroad crossings, and at the Sweetwater River. Boring techniques would be used at these areas, as described in Section 2.2.2.5. Once the working area is prepared, the trenching operation would begin. Normal trenching uses a ditching machine or backhoe in a double ditching operation with the first cut into the trench to remove topsoil and the later cuts to remove subsoil. The approximate width of the trench would be 2 feet. Trenching typically proceeds ahead of the construction activities. To reduce the likelihood of accidents, trenching operations would be timed so that the trench is not open for more than 14 days (in most cases). Where an open trench would interfere with livestock trails, driveways, or rural roads, temporary crossings such as plank bridges would be provided to allow safe and unobstructed passage across the ROW. Alternately, a portion of the trench could be left unexcavated to allow livestock or vehicles to pass. In areas of active livestock grazing or wildlife migratory pathways, unexcavated portions of the trench would be left at approximately 1-mile intervals or as requested by the livestock operator to provide passage.

During trenching, the contractor would excavate the ditch along the staked ditch line. The finished ditch would be free of rocks, hard clods, roots, or other debris, which could injure the coating when the pipe is lowered into the ditch. The bottom of the ditch would be graded and dressed so that the pipe would have a continuous and uniform bearing. The depth of the ditch would vary with the conditions encountered. The cover from the top of pipe to the ground level would be a minimum of 3 feet. In areas of consolidated rock, burial depth to the top of the pipe would be 1.5 feet (minimum) in accordance with DOT Part 195.

2.2.2.3 Trench Backfilling

Topsoil would be preserved subject to agreements with landowners and the federal land managing agency. Detailed information on topsoil stripping is provided in Section III.G of the POD. Typical topsoil salvage procedures are shown in Figure 2-10; topsoil salvage in special areas such as historic trails is provided in Drawing 203 (Appendix A, POD). Complete topsoil stripping across the entire width of the ROW is shown in Drawing 208 (Appendix A, POD). In areas of single line ROW configuration, the topsoil would be stockpiled at the edge of the working side of the ROW. The ditching machine would then cast the ditch spoil to the spoil side of the ROW. Topsoil and ditch soil would be separated in areas of parallel line ROW configuration, except the topsoil above the trench would be placed at the outer edge of the working area on the opposite side of the ditch from the line being paralleled. After construction is completed, the ditch would be backfilled, with the topsoil going in last, returning it to its original position. Any special reclamation techniques required for these areas also would be described. Topsoil salvage techniques other than double ditching may be used if approved in the POD.

PSC and its contractors would do everything reasonable within their power to prevent and suppress any wild fires (see Appendix H in the POD).

2.2.2.4 Blasting

Blasting would be required in areas that cannot be excavated or ripped by conventional means. If blasting is necessary, PSC would obtain the required permits and notify regulatory authorities as well as occupants of nearby buildings within 0.25 mile of the blast site. Ranchers or other property owners would be notified in sufficient time to protect livestock and property. In preparation for blasting, unconsolidated material would be removed from the ditch-line and a series of holes drilled by air-powered drills. The drills are generally suspended from a sideboom tractor, which also tows the compressor supplying the air. Self-propelled drills may be used if extensive blasting is required.

PSC would employ qualified personnel that are experienced in the handling of explosives. In areas of human use, shots would be blanketed with blasting mats to contain the blast. Before detonation, construction workers and local residents would be cleared from the blasting area. Scattered rock would be handled in accordance with the POD and either removed, buried, or spread across the ROW to conform with natural conditions. PSC would use extra precautions in blasting near telephone or electrical conduits, water lines, wells, pipelines, or other underground structures.

2.2.2.5 Highway, Railroad, WSAs, and Trail Crossings

At major paved highway and railroad crossings, the pipeline would be dry bored or directionally drilled to conform to requirements of the Wyoming Highway Department (Table 2-7). Current plans are to bore all established paved roads. Boring activities would not be conducted within the ROW limits but outside the paved highway or railroad width. PSC would keep all road surfaces free of dirt, rock, or other debris that could be a hazard to the public.

Table 2-7
Highway and Railroad Crossings for the Proposed PSC CO_2 Pipeline

Highway or Railroad	MP	Type of Surface	Road/Railroad ROW Width	Crossing Method
BLM 2411 (Green Mountain Road)	120.95	Dirt	70	Cut
US Highway 287	130.20	Asphalt	150	Bore
County Road 321 (Dry Creek Road)	150.70	Dirt	100	Cut/Bore
County Road 201 (Poison Spider Road)	169.06	Dirt	100	Cut/Bore
County Road 210 (Powder River Road) Oil Camp Road	181.02	Dirt	150	Cut/Bore
US Highway 20/26	187.50	Asphalt	100	Bore
Burlington Northern Railroad	188.58	Tracks	100	Bore
County Road 126 (N. Natrona Road)	190.80	Dirt	100	Cut
County Road 126 (N. Natrona Road)	191.85	Dirt	100	Cut
County Road 126 (N. Natrona Road)	193.70	Dirt	100	Cut
County Road 110 (33 Mile Road)	206.40	Asphalt	100	Bore
County Road 115 (Smokey Gap Road)	222.93	Dirt	100	Cut
I-25 (Southbound) and Service Road	228.07	Asphalt	210	Bore
I-25 (Northbound) and Northern Utilities	228.11	Asphalt	390	Bore
Oil Field Road	240.20	Dirt	70	Cut
Sussex Field Road	240.10	Dirt	70	Cut
State Hwy 192	246.35	Asphalt	70	Bore

Notes: All unidentified dirt roads would be open cut.
All small dirt roads and trails to be crossed by standard lay methods using standard wall pipe with 4-foot clearance above top of pipe unless otherwise specified in the contract documents or on the approved construction drawings.

Construction crews would locate existing pipelines in the field from maps or with the use of a metal detector to avoid damage during trenching. Special techniques, including some hand digging, may be required to avoid damage.

Historic trails would be crossed at 5 locations: Oregon/Mormon/Pony Express Trails (MPs 132.0, 132.2, and 132.3); Bridger Trail (MP 175.4); and Bozeman Trail (MP 253.0). All five trail crossings would be trenched and an archaeological monitor would be present during construction activities. Construction activities at each trail crossing would be conducted in accordance with the procedures detailed in the Programmatic Agreement (Appendix A).

If sufficient width is available between the Split Rock WSA and Millers Spring WSA, PSC would prefer to trench this area. Boring would be used if sufficient width is not available in this area.

2.2.2.6 Stream and Wetland Crossings

The proposed pipeline would cross the Sweetwater River at MP 134.3 and 10 other perennial streams (see Chapter 3.0, Table 3-4) located along the route. Other smaller or intermittent drainages also would be crossed. The ROW width would be reduced at stream crossings. The pipeline would be buried in a trench at the listed streams and would be horizontally directionally drilled at the Sweetwater River crossing. PSC has aligned the crossings to minimize impacts on riparian and wetland vegetation. A plan and profile of a typical crossing is shown in Appendix A of the POD. Vegetation would be cleared on each stream bank only as needed to provide enough work space and equipment storage. Brush beating would be considered at all major stream crossings. The directional drill construction method for the Sweetwater River crossing is shown in Appendix A of the POD.

Wetland crossings would be completed as described in Drawing 400 in Appendix A of the POD. Clearing for the minimum construction ROW width would be 50 feet or less, where practical. Wherever possible, TUAs would be located outside of wetland areas. In saturated wetlands, techniques would include the use of wide-track or balloon tires, or standard equipment operated on timber riprap or mats. Sediment barriers would be installed immediately upslope of the wetland boundary to minimize effects on any adjacent wetlands. Woody vegetation in wetlands would be cleared using the least disruptive method. Grass or herbaceous vegetation would not be removed except immediately over the ditch line or in rough/broken terrain. Topsoil would not be stripped from the ROW except over the trench line and where required to prepare a level work surface for pipe-laying equipment. Spoil material and topsoil from the trench would be segregated within the ROW. Topsoil salvage depths would be determined from the inventory of soil resources that would be completed by PSC prior to construction. If standing water and unstable soils interfere with construction, the trench may be dewatered by pumping. Trench water would be disposed of in accordance with the Wyoming Department of Environmental Quality (WDEQ) regulations. In saturated wetlands, soils would be protected from traffic impacts by the use of timber mats or other supportive material. Temporary fill would not be brought into the wetland to stabilize the working area. After the pipe is installed, the trench line would be backfilled and the topsoil replaced. No crown would be left over the trench. The salvaged topsoil, which would contain seeds and propagules from wetland species, would be reapplied to the areas from which it was stripped to maximize reclamation success.

In hilly areas, depending on the pipeline gradient, sacks filled with sand or smooth soil may then be placed in the trench as barriers, perpendicular to the pipe at regularly spaced intervals to prevent water from running down the trench during rain storms and from washing out the backfill. When these preparations are completed, the areas between and over the sack breakers may be backfilled with spoil and topsoil excavated from the trench.

2.2.2.7 Water Withdrawals for Hydrostatic Testing, Directional Drilling, and Dust Abatement

Once the pipe is in place, the system would be tested with pressurized water to locate any leaks or weak spots. The entire pipeline would be hydrostatically tested to at least 125 percent of maximum operating pressure. The test water would be obtained from the Sweetwater River through a Water Use Agreement with the State Engineer and negotiations with water rights owners. Initial discussions with the State Engineer's office indicated that water should be available through negotiations with a senior water rights holder (Barnes 2001). Test water would be reused in testing each section of the pipeline. Approximately 3.3 acre-feet of water would be required for testing. The test water would be shunted from section to section of the pipeline for testing and eventually disposed of in accordance with federal, state and local agency requirements. Hydrostatic test water would be discharged through straw bale structures and then released to the Sweetwater River (Drawing 512 in Appendix A of POD). Consumptive water use would be required for directional drilling and dust abatement. Approximately 3.1 acre-feet would be withdrawn from the Sweetwater River for mixing with bentonite during directional drilling at the river crossing and in the Split Rock area. Approximately 1.7 acre-feet of water would be obtained from irrigation companies or municipal sources for dust abatement.

2.2.2.8 Cleanup and Restoration

The last operation of pipeline construction is cleanup and restoration. Where the side hill slopes are gentle, the material graded from the working width would be replaced, contoured, and restored as nearly as practical to preconstruction conditions. Water bars would be constructed in steeper areas to prevent erosion. The surface of the filled-trench would be generally flat and compacted by the dozer tract. This method of restoration does not create a road, but does provide emergency access to the sidehill slopes for pipeline maintenance and repair. In general, a slight berm (approximately 4 inches high) may be needed in the trenched area.

PSC would implement an Erosion Control, Revegetation, and Restoration Plan as a part of the POD (Section VII) to be approved by the BLM. Rehabilitation procedures have been developed on a site-specific basis in that plan. In general, the procedures discussed below would be followed.

After backfilling and cleanup are complete, the soil would be chiseled with suitable equipment to ameliorate compaction and improve soil permeability. A firm and friable seed bed suitable for the establishment of vegetation would be provided. The seed bed also would be disked prior to planting. Mulch or other stabilizing materials would be placed on the disturbed area for erosion control, as needed (Appendices C and G in POD).

Revegetation of lands disturbed by construction would be in accordance with applicable regulations and permit requirements. Species and seeding rates effective in controlling erosion would be used to revegetate the disturbed areas. Species have been selected after consideration of climatic adaptation, species adaptation to soil texture, possible adverse conditions such as drought or saline soils, palatability to wildlife, and shrub cover for wildlife. Generally, commercially available native species, as approved by the landowner or surface management agency, would be used. A seed mixture has been formulated for general use along the ROW. However, specific seed mixes would be used for areas with sandy, loamy, and saline/sodic soils, as discussed in Appendix G of the POD. Seed would be planted by drilling or broadcasting. The use of a rangeland drill would be the preferred seeding method. Areas not accessible to a rangeland drill would be broadcast-seeded. Broadcast-seeding rates would be double compared to drill application. Seeding would be done during the appropriate period when the seeds would receive the benefit of both winter or spring moisture.

Commercial fertilizers would be applied, where appropriate, to soil areas with low inherent fertility to establish grass seedings. Application rates would depend on annual precipitation and other conditions. The use of all biochemicals, including fertilizers, would comply with all applicable laws regarding their use. The use of herbicides and pesticides is not planned at this time.

Suitable mulches and other soil stabilizing practices would be used where necessary to protect bare soil from wind and water erosion and to improve water infiltration. Cultivation and land preparation operations on steeply sloping areas would be done along the contour to minimize erosion. Areas with steep slopes are identified in Section, 2.3.9.

Disturbed and reseeded areas would be inspected periodically to monitor the success of erosion control measures and revegetation programs. The monitoring program would help identify problem areas and corrective measures to ensure vegetation cover and erosion control. In addition, a weed control program would be developed for disturbed areas (see POD, Appendix F). The BLM and local county authorities would be consulted to obtain the most appropriate weed control methods.

2.2.2.9 Special Construction Areas

The pipeline route was studied for sensitive areas which would require more extensive restoration and construction efforts. Additionally, the restoration efforts of the adjacent pipelines (i.e. Frontier Pipeline) were studied for applications on the proposed PSC Project. These special construction areas are discussed below.

Green Mountain (MP 114.2 to 118.3)

This area has side slopes (20 percent average) and, in addition, the Frontier Pipeline is immediately adjacent to the proposed line. The Frontier Pipeline would be staked the entire length and their representative would be notified prior to the initiation of construction. Construction activity would be limited over the Frontier Pipeline. Topsoil would be stripped from the surface and stockpiled separate from the spoil materials. The spoil materials would be placed on the working side of the ROW, as illustrated on the typical sidehill cut drawing (#206) in Appendix A of the POD. Covering procedures for benching operations would require placing spoil materials in the ditch first and then topsoil would be used to cover the disturbed area.

After installation of the pipe and backfilling, the graded areas would be returned as near as practical to their original contours. Prior to seeding, the contractor would distribute excess boulders (that resulted from this project) along the ROW so that the terrain would look as natural as practical. Where possible, the ROW would be disced to trap moisture and reduce erosion. When necessary, water bars would be installed as described in Section VII of the POD. Water bars would tie-in to Frontier's water bars, if appropriate. In areas where Frontier's water bars were not installed properly, PSC would rebuild them to properly protect the ROW. Those areas having steep slopes would be straw mulched at a 2-ton/acre rate.

These slopes would have the straw mulch disked in with the soil, where possible. Otherwise the mulch would be distributed on these slopes without discing to aid in retaining moisture. The cleared area would be seeded in accordance with the special seed mixture. The seed mixture would be applied by a drill equipped with a depth regulator. If this is impractical, the mixture would be broadcast. The seed mix is shown in Appendix G, Table G-3 of the POD.

Surface Slumping (MP 114.6)

This area would be studied in the detailed engineering phase of the project. Assuming the problem is shallow surface slumping, no action is planned at this site, since it is outside of PSC's construction ROW and would pose no threat to PSC's proposed project. If the problem is more severe than shallow surface slumping, a design would be developed, which would mitigate additional slumping that might be adverse to PSC's proposed project.

Bank Erosion (MP 117.8)

The banks of this drainage have sloughed off adjacent to the Frontier Pipeline ROW. When the PSC pipeline is constructed, the banks would be tapered to a more gradual slope than currently exist. Water bars would be installed in accordance with Section VII of the POD to eliminate the small abrupt changes in elevation that currently exist. The new gradual slope would taper to match the undisturbed terrain.

Highly Eroded Areas (MP 202.3 to Hartzog Draw)

Highly eroded terrain with steep banks are scattered throughout this part of the pipeline route. The soil has very little cohesion making restoration to original contours difficult. The pipeline ROW would be graded to blend into the adjacent terrain in this area.

Active Faults

Active faults along the pipeline ROW would be studied during the detailed engineering phase of the project. A design would be developed at that time which would mitigate the effects from fault movement.

Split Rock and Miller Springs WSA (MP 137.3 to MP138.0)

The limits of the construction ROW would be staked prior to construction. PSC would notify the BLM when staking is completed and then schedule a date for a field visit to review the corridor restriction. Additionally, BLM would be notified as to when the contractor would be constructing in this area. During construction the contractor would work within the restricted corridor, as defined by the disturbed areas along the most westerly side of the existing road and the Colorado Interstate Gas (CIG) ROW, and the most easterly side of the Frontier and CIG ROWs. A detailed drawing for this area is provided in Appendix A of the POD.

2.2.2.10 Hazardous Materials/Wastes

Hazardous materials that would be used during construction include gasoline, lubricants, motor oils, diesel fuel, hydraulic fluids, and pipe primer. Except for the primer, these materials would be used in the construction vehicles and equipment. The primer would be applied at the pipe yard located northwest of Casper, Wyoming. Primer also may be used on welded joints during construction.

2.2.3 Operation

A Communications and Control Center at one of PSC's facilities would monitor and control the pipeline operation. Computers would continuously monitor pipeline pressure and flow conditions at delivery points. The computers would be programmed to sound an alarm anytime there is a deviation in pressure or flow indicating abnormal condition in the pipeline system. No hazardous materials or wastes would be used or produced as part of project operation.

Specialists and technicians would be on-call to service the pipeline. The ROW would be periodically inspected by an aerial patrol. Surface traffic would be limited to workers performing pipeline and valve maintenance, periodic monitoring and inspection, and emergency repairs to the pipeline or associated equipment.

The permanent work force for pipeline operation would be an incremental increase of one full time position, probably stationed at Casper. Pipeline maintenance, as required, would be done with local contractors specializing in this type of work. The annual cost of pipeline operation and maintenance is expected to be approximately $100,000 to over $1.5 million per year, depending upon delivery volumes.

2.2.3.1 Rupture Scenario

There have been no reported leaks or accidents on ExxonMobil's CO_2 pipeline segment to Bairoil, which began operation in 1986. The frequency or size of leaks or ruptures for other CO_2 pipelines is largely unknown because there are few such pipelines for comparative analysis. The incidence of pipeline leaks or ruptures is most often caused by outside disturbances such as heavy equipment operating in the vicinity of the pipeline. Because of advances in pipeline technology and the rural nature of this line, the chances for rupture are assessed to be lower than average for the gas pipeline industry.

Since CO_2 is nonflammable, no explosion or fire would occur in the event of a rupture, however, flying soil and debris could be dangerous at the point of rupture. CO_2 concentration near the rupture would be high. The gas would be slightly heavier than air but would dissipate rapidly with wind currents. Public safety measures for possible leaks or ruptures are described in Section V of the POD.

If a CO_2 rupture occurred, hazards could exist in a localized area due to debris and broken pipe. CO_2 also could freeze or asphyxiate persons adjacent to the rupture. CO_2 is a respiratory stimulant and an asphyxiate (BLM 1989). Inhalation of air containing 50,000 ppm would stimulate respiration and could result in other acute effects such as headache, rapid beating of the heart, sweating, shortness of breath, and dizziness. At concentrations of 70,000 to 100,000 ppm, unconsciousness would occur within several minutes. In contrast, the normal CO_2 concentration in the atmosphere is about 320 ppm. The short-term exposure limit, which represents the maximum concentration to which workers can be exposed continuously for up to 15 minutes without suffering adverse health effects is 30,000 ppm (American Conference of Governmental Industrial Hygenists 1998).

A worst-case scenario for CO_2 release in the longest section of the PSC pipeline would be to assume that the pipeline was ruptured to the point where the full flow of that section could escape through the rupture. The longest segment between block valves is from MP 185.0 to MP 206.5. A rupture in this segment would result in the release of 40 million standard cubic feet of CO_2.

Pinhole leaks during operation of the pipeline could occur but would not be expected to be serious. The leak would probably cause a high-pitched sound made by the escaping gas and form a white frost spot on the ground. Periodic inspection would identify such leaks, and they would be repaired.

2.2.4 Abandonment

BLM standard stipulations would be followed as part of the abandonment process (see Section VIII in the POD). At project termination, all surface facilities would be removed, and the disturbed acreage would be rehabilitated. The product would be purged and aboveground structures could be removed. The pipe would be filled with inert nitrogen and the ends capped as part of pipeline removal. The areas would be reshaped to blend into adjoining areas to the extent permitted by existing conditions. All disturbed areas would be seeded with the appropriate seed mixture to ensure that an acceptable stand of vegetation is established.

2.3 No Action Alternative

The No Action Alternative would be the denial of the requested ROW. This means that the proposed project would not be authorized across federal lands.

2.4 Alternatives Considered but Eliminated From Detailed Analysis

2.4.1 Truck Transportation of CO_2

Truck transportation of CO_2 from Bairoil Terminal or the Shute Creek Gas Plant or other sources would require approximately 105 up to 450 trucks each day. Many of the existing roads could not accommodate the increased traffic volume and would need to be expanded. Transportation of CO_2 by truck would not provide a reasonable alternative to the Proposed Action. The large numbers of trucks, long distances involved, and the much greater costs inherent in this alternative would not offer reduced environmental or socioeconomic impacts nor offer other advantages.

2.4.2 Casper Alternative

The Casper alternative was originally examined in the Bairoil/Dakota CO_2 Projects EIS. This alternative would have followed the Frontier Pipeline corridor to Casper and then turned to the north instead of passing Casper at a distance to the west. This alternative would have made greater use of existing corridors as established in the BLM Platte River Resource Management Plan.

Constructing the 12-inch pipeline through Casper would cause several significant problems. The narrow existing corridor would require crossing other pipelines, power lines, telephone lines, roads, and public utility lines. Also, because of the size of the construction area required for the CO_2 line, the potential for crossing individual homesites would be high. Disruption of utility services, roads, and homesites would cause significant and unnecessary impacts.

2.4.3 Crooks Gap Alternative

An alternative pipeline alignment in the Green Mountain area proposed in the original Bairoil/Dakota CO_2 Projects EIS was presented as the Crooks Gap Option, an 18-mile-long segment through Crooks Gap that would replace a 13-mile-long segment of the proposed route that parallels the Frontier Pipeline through the Green Mountain area. This alternative was reexamined during a field reconnaissance on July 6, 2000, and eliminated for the following reasons:

- Construct ROW within an existing pipeline corridor and avoid 14 miles of new disturbance; and

- Fix problems with reclamation along the Frontier Pipeline ROW.

2.4.4 Lateral Alternatives

Two alternative routes were initially considered for the lateral. One route followed State Highway 259, while the other route was adjacent to the Burlington Northern Railroad. The railroad route was eliminated because it represented an historical site. The highway route was eliminated for two reasons: 1) safety concerns involving construction equipment near the highway and 2) additional length compared to the selected route.

2.5 Environmental Protection Measures

PSC has committed to specific environmental protection measures, as part of their proposed CO_2 Pipeline Project, to minimize potential impacts to natural resources during construction and operation. These protection measures are listed in Section III.P of the POD and described below by resource. For some of the resources (i.e., wetlands, cultural resources, sage grouse leks), field verifications would be conducted after the ROW centerline is staked to determine the appropriate resource protection measures, which could include ROW narrowing or realignment of the ROW to avoid the potentially affected resource.

2.5.1 Air Quality

1. Water or chemical soil binder (see Appendix G, Section 2.5.4 in the POD) would be used to control dust along the ROW and access roads during construction in accordance with federal, state, and local requirements. Any dust control water would be used only at the landowner's request. Any dust control water would be obtained by permits or purchased through contracts with owners with valid, existing water rights.

2.5.2 Geology and Soils

1. Soil erosion would be minimized by implementing procedures described in the Storm Water Pollution Prevention (SWPP) Plan (see Appendix C in the POD). These measures would include silt fences, erosion control fabric, fiber, or trench plugs. Protection measures for drainages are listed in Section 2.5.3.

2. In areas where interim soil stabilization would be needed (e.g., steep slopes and wind erosion areas), a chemical soil binder and/or mulches would be applied to minimize soil loss.

3. If construction occurred during a storm event, vehicle traffic and equipment would be restricted to prevent rutting in excess of approximately 4 inches deep, except in areas where topsoil has been stripped and saved for rehabilitation.

2.5.3 Water Resources and Wetlands

1. A biologist familiar with wetland and riparian identification techniques would accompany or immediately follow the survey crew during initial staking of the ROW. The biologist would identify wetland, riparian, or other sensitive surface waters that may have been missed during the initial surveys and make recommendations on modifying the proposed route to avoid sensitive areas, particularly around water features that were recommended for avoidance during the initial surveys. Wherever reasonably possible, riparian and wetland areas, including playas and forested wetlands, would be avoided by pipeline construction activities. The field biologist would be familiar with other resource constraints identified along the route, such as the locations of sage grouse leks and sensitive plant populations, and would take this information into consideration when suggesting reroutes around sensitive water resources. In addition, the appropriate cultural resources and sensitive species specialists would also be consulted on areas recommended for sensitive water feature reroutes.

2. Where crossings of riparian or wetland areas cannot be reasonably avoided, the construction ROW width would be reduced to 50 feet or less and the line would be routed in a manner that minimizes disturbance. Crossing techniques for wet and dry crossings of wetland and riparian areas may include fluming and trench dewatering techniques, and use of timber matting, or use of prefabricated equipment mats. Reclamation in these areas would be conducted as specified in the Reclamation Plan (Appendix G of the POD).

3. Topsoil in wetland and riparian areas would be stripped and stockpiled for use in reclamation as specified in the Reclamation Plan (see Appendix G of the POD). Topsoil from wetland, riparian, and waterbody crossings would be segregated from the areas disturbed by trenching. After backfilling has been completed, the segregated topsoil would be restored to its original location.

4. No refueling or lubricating would take place within 100 feet of wetlands and other waterbodies or drainages. Hazardous materials, chemicals, fuels, etc. would not be stored within 100 feet of wetlands or waters of the U.S.

5. Aboveground facilities and staging areas would not be located within wetlands, riparian areas, or other waters of the U.S., except as required by agency regulations.

6. If trench dewatering is required, the trench would be dewatered in a manner that would prevent silt-laden water from flowing into wetlands or waterbodies.

7. Application of herbicides or pesticides would follow these restrictions: boom and hand gun sprayers would not be used within 25 feet of surface water; broadcast backpack spraying would not occur within 10 horizontal feet of water; only wipe applications (or hand-directed spray using a backpack sprayer) would be allowed within 10 horizontal feet of surface water; and herbicides would not be mixed in an area where an accidental spill could enter a water body. Fertilizers, lime, or mulch would not be used in wetlands unless required by agencies.

8. An environmental inspector will be present during construction of the line in wetlands and other important surface water features to be sure that these areas are either avoided or sufficiently mitigated.

9. Stakes and flagging would be used to identify restricted access areas for protection of wetlands riparian areas and other sensitive surface water features as identified by the BLM.

10. Prior to construction of stream or wetland crossings, set-backs would be established to provide at least a 100-foot buffer for fueling and concrete-coating activities. Other buffers would include set backs of at least 50 feet for all equipment staging areas and 10 feet for temporary storage of spoil material.

11. Erosion control measures (e.g., waterbars; silt fences or check dams; riprap or gabions; erosion control fabric, fiber, or mats; trench plugs), as described in SWPP Plan (Section VII of the POD), would be constructed or installed to minimize storm water transport of sediment from disturbed areas to streams and wetlands.

12. Streams would be crossed during the low-flow period to minimize the extent of sedimentation effects on downstream areas.

13. Natural drainage patterns would be stabilized and restored as close to their original contours as practical (details provided in Appendix G of the POD).

14. Measures would be implemented to prevent the spill of hazardous material and to identify spill response procedures and training for project personnel (Section IV.D in the POD).

15. All project-related storm water and hydrostatic test water discharges would be in compliance with a National Pollutant Discharge Elimination System permit (see Appendix C in the POD).

2.5.4 Vegetation and Agriculture

1. Off-road driving would be restricted to the ROW corridor and approved temporary access roads. Signs would be used to identify approved and restricted (i.e., no access allowed) roads.

2. Woody species removed during construction in riparian and/or wetland areas would be replanted from nursery stock or cuttings, as outlined in the project's Reclamation Plan (Appendix G of the POD).

3. Revegetation seed mixes have been developed in coordination with the land management agencies for site-specific conditions regarding climate, soils, and vegetation to maximize vegetation success. The Reclamation Plan (Appendix G of the POD) outlines the procedures (e.g., recontouring, topsoil distribution, seedbed preparation, seed mix application, and follow-up monitoring) that would be followed to return the land to pre-existing vegetative cover and land uses.

4. The project's Noxious Weed Management Plan (Appendix F of the POD) would be implemented to prevent the spread of noxious weeds both during and following construction activities. These measures would include special handling of vegetation and soils stripped from the identified weed infestations, cleaning of equipment to prevent the transport of noxious weed seeds and propagules to other locations in the project area, the use of weed-free mulch and weed-free straw bales to control erosion, and follow-up monitoring and treatment methods that would be implemented following construction.

5. The project's Fire Suppression Plan (Appendix H of the POD) describes the fire prevention and suppression techniques that would be implemented to reduce the potential for a construction-related fire, which could potentially impact vegetation, agricultural resources, and wildlife.

6. Any range improvements such as fences, gates, cattle guards, and developed water sources located within disturbance or access routes would be repaired to the satisfaction of the BLM or private landowner.

7. Soft plugs would be installed at established livestock trails to allow livestock crossing of the trench. Ramps also would be installed at intervals, as needed, to allow livestock that enter the trench a way to exit.

8. If construction would disturb or destroy a natural barrier used for livestock control, the opening would be temporarily closed during construction and permanently closed following construction, as required by the BLM or private landowner.

2.5.5 Wildlife, Fisheries, and Special Status Species

For the items below that include seasonal stipulations (Items 2, 3, 6, 7, 8, and 15), PSC would coordinate with the BLM to determine the applicability of specific dates and areas where those stipulations would be implemented. Considerations could include variations in seasonal weather conditions, the type of activity (e.g., surveying, trenching, reclamation), proximity to the ROW (e.g., distance, visual shielding), and time frame of activity. If construction activities were to occur after January 31, 2002, PSC would coordinate with the BLM to determine if additional surveys would be required prior to the initiation of construction.

1. Prior to the initiation of construction, applicable biological surveys would be conducted through areas of suitable habitat for specific species during the appropriate season, as determined by the jurisdictional agencies (e.g., BLM and U.S. Fish and Wildlife Service [USFWS]). Limit stakes and flagging would be used to identify restricted areas for resource protection.

2. To prevent adverse impacts to big game species (e.g., mule deer, elk, pronghorn, and moose) seasonal construction constraints (November 15 to April 30) would be implemented in areas of crucial winter range. Exceptions or waivers to these seasonal construction constraints may be authorized in writing by the BLM's Field Manager on a case-by-case basis.

3. To prevent adverse impacts to elk during calving periods, seasonal construction constraints (May 1 to June 30) would be implemented in areas of elk parturition range. Exceptions or waivers to these seasonal construction constraints may be authorized in writing by the BLM's Field Manager on a case-by-case basis.

4. Raptor nests identified within the proposed disturbance areas would be avoided to prevent their removal. Attempts would be made to avoid trees 10 inches in diameter or greater during construction to protect potential future nest sites. If this were not feasible, PSC would coordinate with the BLM to determine alternative protection measures.

5. To prevent adverse impacts to potential future eagle roost sites along the Sweetwater River, construction would avoid trees 10 inches or greater in diameter at this crossing.

6. Prior to construction during the breeding season (February 1 to July 31), aerial and/or pedestrian breeding raptor surveys, as applicable, would be conducted through areas of

suitable habitat, in coordination with the jurisdictional agencies, to identify any potentially active nest sites in the project area. Appropriate protection measures, including seasonal constraints and establishment of buffer areas, would be implemented at active nest sites on a species-specific and site-specific basis, as necessary. The proposed construction schedule would avoid the raptor breeding period.

7. To prevent adverse impacts to sage grouse breeding sites and their associated habitat, a permanent 0.25-mile construction buffer area would be implemented around known lek sites, on a site-specific basis, as determined in coordination with the BLM. Prior to construction during the breeding season (March 1 to July 7), surveys would be conducted to identify active lek sites in the project area. To prevent adverse impacts to breeding and nesting sage grouse, a seasonal constraint would be implemented within a 2-mile radius of any active lek site. Exceptions or waivers to these seasonal construction constraints may be authorized in writing by the BLM's Field Manager on a case-by-case basis.

8. Prior to the initiation of construction, PSC, in coordination with the BLM, will field verify 6 sage grouse lek sites (31-87-13-01-N, 36-83-13-01-N, 36-83-13-02-N, 34-85-34-01-H, 34-85-34-02-H, and 43-78-34-01-H) that occur within 0.25 mile of the proposed project route. Appropriate protection measures including construction reroutes and/or narrowing the ROW width would be implemented on a site-by-site basis, as determined in coordination with the BLM. Potential effects to other sensitive resources, such as cultural resources, would be considered prior to any rerouting recommendations.

9. If construction were to occur during the mountain plover breeding season (April 10 to July 10), potentially suitable habitat would be delineated along the project ROW. PSC would then coordinate with the BLM to determine whether additional, breeding mountain plover surveys would be warranted to identify any potentially active nest sites in the project area. Appropriate protection measures, including seasonal constraints (April 1 to July 10) and establishment of buffer areas, would be implemented on a site-specific basis, if warranted.

10. If the mountain plover were listed as a federally threatened species, prior to, or during construction, PSC would determine the amount of potentially suitable nesting habitat crossed by the project, based on data from the Wyoming Gap areas. Specific revegetation seed mixes would be developed for areas identified as potentially suitable nesting habitat.

11. Prior to initiation of construction, black-footed ferret clearance surveys would be conducted in active white-tailed prairie dog colonies, and active black-tailed prairie dog colonies that have a burrow density of eight burrows per acre or greater, and that would be directly disturbed by the proposed project.

12. To minimize potential impacts to black-tailed prairie dog colonies, PSC would coordinate with the BLM to determine appropriate protection measures for those colonies that would be directly disturbed by the proposed project. Measures would be determined on a site-specific basis, and would depend on the size, activity status, and location of the colony or complex with respect to the ROW.

13. Measures listed for protection of water resources also would be used to reduce potential impacts to fisheries and their habitat.

14. In perennial streams crossed by trenching, stream banks would be stabilized with use of angular rock (generally 6 to 18 inches diameter or larger if necessary) or wire enclosed riprap structures. Riprap would be placed from the channel bottom to the top of the normal high water line on the bank.

15. In perennial sections of streams containing substrate for fall spawning species (i.e., brook trout in West Cottonwood, Middle Cottonwood, East Cottonwood, and Dry creeks), trenched construction would be avoided between October 1 and November 30.

16. At the temporary bridge crossing of the Sweetwater River, substrate and stream bank vegetation would be restored to pre-construction conditions.

2.5.6 Recreation and Visual Resources

1. Measures would be implemented to minimize the visual effects of construction on the Oregon Trail. These measures, as determined by the BLM, may include narrowing of the construction ROW to minimize surface disturbance, implementation of special soil recontouring and revegetation measures to minimize the contrast between the surrounding landscape and the ROW, and boring underneath trail segments.

2. Excavated boulders in the Green Mountain area near Green Mountain Road (MP 118.0 to 120.9 and MP 121.1 to 122.0) would be misted with a landscape varnish (Permeon) to eliminate visual impacts.

3. To prevent unauthorized use of the ROW by off-road vehicles (ORVs), and subsequent potential impacts to soil, vegetation, and wildlife resources, access would be blocked at locations specified by BLM representatives or private landowners. Methods that can be used to prevent access would include fencing, construction of rock barriers or earthen berms, and appropriate signage. Construction vehicles would be allowed access to the ROW.

2.5.7 Socioeconomics

1. Any irrigation ditches crossed by the project would be repaired to the landowner's satisfaction.

2.5.8 Cultural and Paleontological Resources

1. Prior to project construction, cultural resource inventories would be conducted on all previously uninventoried lands in proposed disturbance areas, in accordance with the Programmatic Agreement (Appendix A).

2. Measures would be implemented to minimize impacts to the Oregon/Mormon/Pony Express, Bridger, and Bozeman Trails. These measures, as determined by the BLM and State Historic Preservation Officer (SHPO), may include narrowing of the construction ROW to minimize surface disturbance, brush beating the ROW, implementation of special revegetation measures to minimize the contrast between the surrounding landscape and the ROW, and archaeological monitoring. All construction activities at trail crossing locations would be conducted in accordance with procedures detailed in the Programmatic Agreement (PA) (Appendix A).

3. Construction monitoring during topsoil stripping and ROW preparation would be conducted where the pipeline route crosses prehistoric site 48NA1060. Monitoring specifications and treatment of any cultural materials discovered during monitoring would be handled according to the procedures detailed in the POD (Appendix I) and PA developed for the project (Appendix A in this EA). This work would be done immediately following centerline staking and well in advance of the main construction effort to provide sufficient time to identify, evaluate, and treat any subsurface materials that might be exposed during topsoil stripping.

4. An open trench inspection would be conducted along the entire 155-mile length of the pipeline and 7-mile lateral. All newly discovered significant cultural resources located in the trench would be recorded and a datum established outside the pipeline construction ROW to assist in relocating the site. Pipe installation and covering would proceed through the area once preliminary documentation is completed. All open trench inspection activities and potential data recovery at significant site locations would be conducted in accordance with the procedures detailed in the POD and PA.

5. If human remains are discovered during construction activities, work would be immediately halted within 328 feet (100 meters) of the discovery, and the discovery reported to the BLM Authorized Officer. Treatment of any human remains would be conducted in accordance with the procedures detailed in the PA.

6. If significant fossiliferous deposits, specifically vertebrate fossil deposits, are located during construction, a paleontologist from the appropriate state or federal agency would be immediately contacted, and measures would be taken to identify and preserve the fossils. In areas where the potential for occurrence is high, a paleontologist would monitor the trench excavation and salvage potentially significant resources.

7. To minimize indirect impacts to cultural and paleontological resources, PSC would educate project-related personnel as to the sensitive nature of the resources; a strict policy of prohibiting collecting of these resources would be implemented.