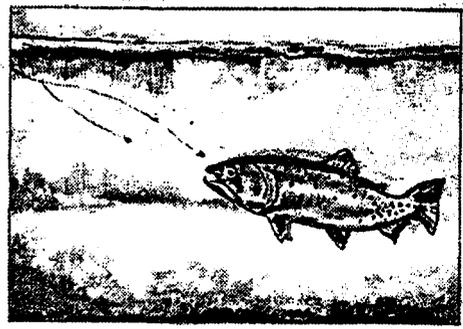
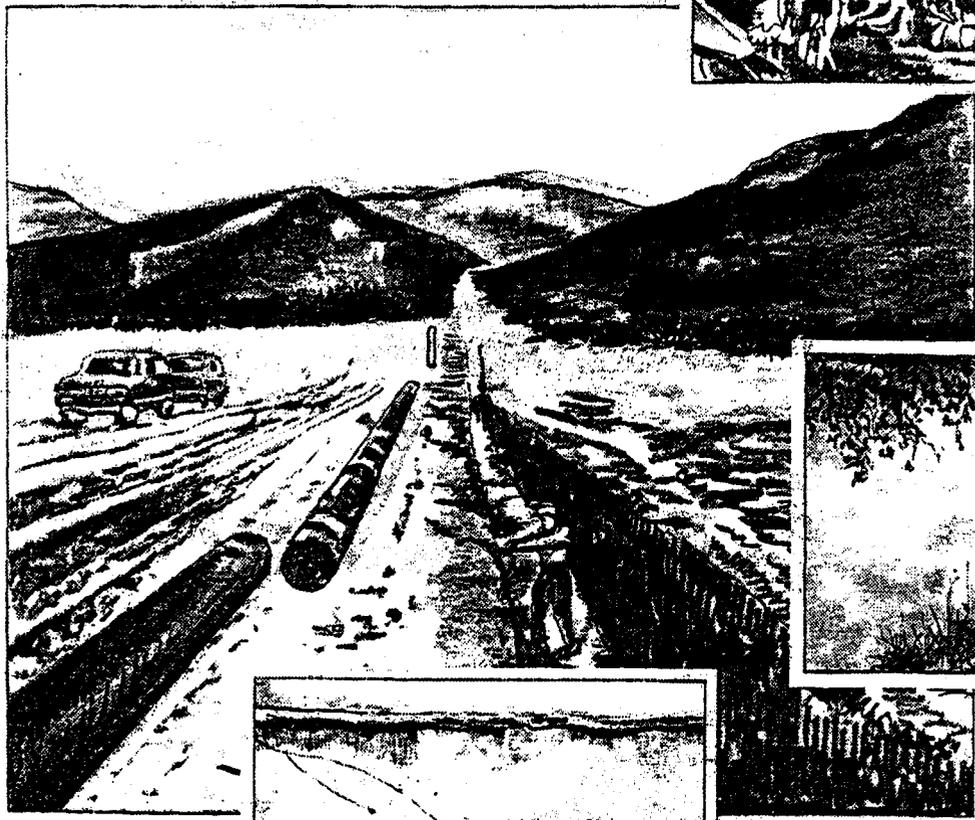
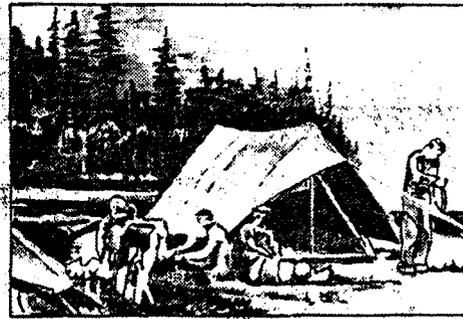


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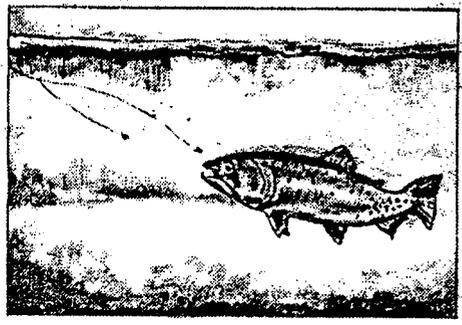
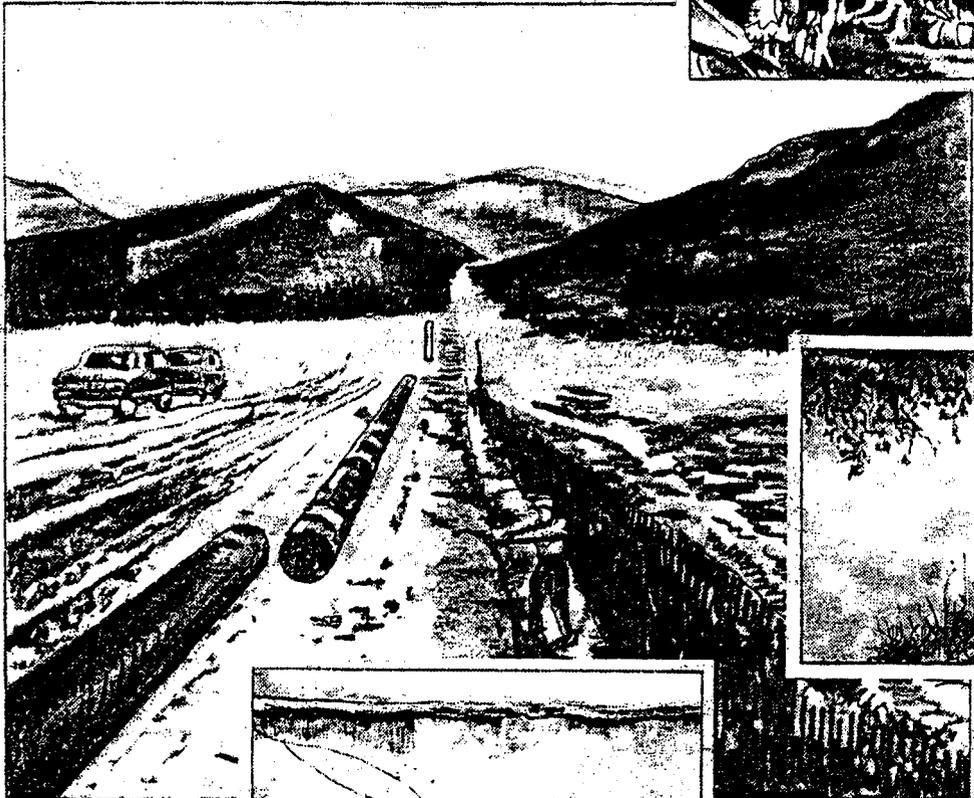
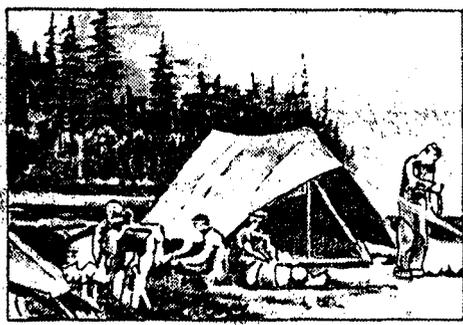
Main Line No. 41 Reroute at Skyline Mine
Final Environmental Impact Statement

US Department of Agriculture
Forest Service, Manti-La Sal National Forest

JULY 1990
Dames & Moore

Act 10071005

Questar Pipeline Company's



Main Line No. 41 Reroute at Skyline Mine

Final Environmental Impact Statement

US Department of Agriculture
Forest Service, Manti-La Sal National Forest

JULY 1990

Dames & Moore

FINAL ENVIRONMENTAL IMPACT STATEMENT

Questar Pipeline Company Main Line No. 41 Reroute Project

Lead Federal Agency: U.S. Department of Agriculture - Forest Service
Manti-La Sal National Forest
599 West Price River Drive
Price, Utah 84501

Cooperating Federal Agency: U.S. Department of the Interior
Bureau of Land Management
Moab District Office
82 East Dogwood
Moab, Utah 84532
Gene Nodine, District Manager

Responsible Official: George Morris
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Abstract:

Questar Pipeline Company has applied to the Forest Service for an amendment to a special use permit to allow relocation of a 4.25-mile section of a buried, 18-inch, natural-gas-transmission pipeline located on the Manti-La Sal National Forest. The existing pipeline, Main Line No. 41, which has been operating since 1953, crosses coal reserves that are proposed for mining beginning in the Fall of 1990 by Utah Fuel Company's Skyline Mine. Questar Pipeline Company is pursuing the project at the request of Utah Fuel Company to enable coal mining activities to proceed at the Skyline Mine. Relocating the pipeline would avoid potential damage and costly repairs that could be caused by the proposed coal-mining activities.

Alternatives include:

- A. No Action - leave pipeline in existing location, allow only limited mining, do not allow subsidence
- B. Leave pipeline in existing location, allow complete mining of reserves beneath, restore or repair subsidence-induced damage, protect against interruption of service
- C. Relocate to Burnout Canyon Route
- D. Relocate to Gooseberry Route
(Valley Camp Triangle Connectors - common to existing, Burnout Canyon, and Gooseberry routes)
- E. Relocate to Winter Quarters Route

The Forest Service's preferred alternative is Burnout Canyon Route (3), which includes Valley Camp Triangle Connector (1) and using modifications to the route presented in the draft environmental impact statement (DEIS), in the areas of the Connellville fault, mouth of Burnout Canyon, and near The Kitchen.

ENVIRONMENTAL IMPACT STATEMENT SUMMARY

PURPOSE OF AND NEED FOR ACTION

Questar Pipeline Company (Questar Pipeline) has applied to the Forest Service for an amendment to a special use permit to allow relocation of a 4.25-mile section of a buried, 18-inch, natural-gas-transmission pipeline, Main Line No. 41, located on the Manti-La Sal National Forest. The existing pipeline, which has been operating since 1953, crosses the Skyline Mine permit area affecting 14.9 million tons of recoverable coal reserves. Utah Fuel Company (Utah Fuel), owner of the Skyline Mine, proposes to begin mining these reserves in the Fall of 1990. Questar Pipeline is pursuing an amendment at the request of Utah Fuel to enable mining activities to proceed this Fall. Relocating the pipeline would avoid potential damage and costly repairs that could be caused by the proposed coal mining activities. The pipeline serves approximately 70,000 residential and commercial customers in the region consisting of Utah Valley south to St. George.

The Forest Supervisor of the Manti-La Sal National Forest is the official responsible for deciding on Questar Pipeline's application to amend its present special use permit to allow relocation of Main Line No. 41.

Forest Service personnel reviewed Questar Pipeline's application, initiated project scoping, and identified a number of potential issues that were included in the August 1989 scoping document. The Forest Service notified the public of the proposed project through a Federal Register notice, news articles, and letters in August 1989. The initial opportunity for the public to comment on the project was at a public scoping meeting on August 30, 1989, in Price, Utah.

Resulting comments further assisted to identify the scope of issues to be addressed during the environmental analysis for this environmental impact statement (EIS). Issues identified by the Forest Service and comments from the public are summarized below.

- potential for degradation of watershed, floodplain conditions, water quality (caused by sedimentation), streambank stability, vegetation (especially riparian vegetation along Upper Huntington Creek), and visual quality
- potential effects on grazing
- potential for disruption of recreation during construction
- potential damage to, safety conflicts with public uses on, and maintenance of State Highways 264 and 96, and Skyline Drive during construction
- potential impacts to livestock, wildlife, and fish caused from construction
- potential for pipeline construction inducing land failures in unstable areas
- the inclusion of affected landowners and agencies along alternative proposed routes in the evaluation process
- minimization of conflicts between pipeline protection and coal recovery to allow maximum coal recovery from Federal lands

- Questar Pipeline is concerned about rerouting into an area where it cannot legally preclude future mining-related subsidence
- the pipeline issue should be resolved in an economically viable way
- reroute should take place in an environmentally acceptable way and expeditiously to avoid curtailment of coal production and the consequent effects to the local economy
- if the pipeline is rerouted, preference was expressed to abandon the old line in place to prevent additional environmental disturbance
- rehabilitation of the abandoned right-of-way if the pipeline is relocated
- the schedule for rehabilitation and the schedule for decision and construction
- emergency response plan should be required
- location of pipeline is of critical concern for uninterrupted service

This environmental document was prepared by Dames & Moore under the close direction of the Forest Service, in cooperation with the Bureau of Land Management (BLM), to satisfy the requirements of the National Environmental Policy Act of 1969 (NEPA). The objectives of the environmental studies were to (1) comprehensively analyze the effects on the natural, human, and cultural environments that could be caused by the project; (2) explore the potential impacts of the alternatives; (3) select a preferred alternative; and (4) develop ways to avoid, reduce, or mitigate any potential impacts to sensitive features of the environment. A total of 52 miles of alternative pipeline route locations were studied.

PROPOSED ACTION AND ALTERNATIVES

Several alternatives and variations of those alternatives were developed and studied. (It is important to note that each route is composed of a combination of segments of the existing route, others are reroute segments in new locations.) The alternatives include:

Alternative A - No Action - leave and protect the pipeline in place, allow limited mining, do not allow subsidence

Alternative B - Leave in Place, Full Extraction Mining - leave pipeline in place, allow mining with provisions to assure restoration or repair of subsidence-induced damage, protect against interrupted gas service

Alternative C - Burnout Canyon Routes - (4 variations)

- (1) 14.9 miles entire route, 5.7 miles new pipeline
- (2) 15.1 miles entire route, 5.2 miles new pipeline
- (3) 15.1 miles entire route, 5.9 miles new pipeline
- (4) 15.3 miles entire route, 5.4 miles new pipeline

Alternative D - Gooseberry Route - 16.7 miles entire route, 12.6 miles new pipeline

Valley Camp Triangle Connectors - (common to Burnout Canyon and Gooseberry routes)

- (1) 1.0 mile entire connector, 0.6 mile of new pipeline
- (2) 0.9 mile entire connector, 0.6 mile of new pipeline
- (3) 0.5 mile entire connector, 0.5 mile of new pipeline

Alternative E - Winter Quarters Routes - (2 variations)

- (1) 16.1 (20.2*) miles entire route, 12.4 miles new pipeline
 - (2) 17.2 (20.2*) miles entire route, 12.2 miles new pipeline
- (*If either of the Alternative E routes are selected, sections of existing pipeline, not part of the routes, provide local service and could not be abandoned. Affects to resources are addressed as appropriate.)

The Forest Service's preferred alternative is Burnout Canyon Route (3), which includes Valley Camp Triangle Connector (1), using modifications to the route, presented in the DEIS, in the areas of the Connellville fault, mouth of Burnout Canyon, and near The Kitchen.

AFFECTED ENVIRONMENT

The project area is located north of Electric Lake in Sanpete, Carbon, and Emery counties in the State of Utah. The area lies at the western edge of the Wasatch Plateau, an area composed of coal-bearing strata of sandstone, siltstone, mudstone, and shale. Water is present in small perennial streams, reservoirs, and numerous springs and seeps. Soils are mostly clay loams, sandy loams, and loams located on steep hillslopes and ridges. Wet soils are present along perennial streams, marshes, springs, and seeps. Landslides and debris flows have occurred throughout the area and are primarily associated with weak clay layers, wet soil conditions, and local faults.

A number of different biological habitats are present, each with characteristic plant and animal communities. The existing and proposed routes involve crossing or paralleling riparian and associated wetland areas, important vegetation types, and habitat for big game and fish (Yellowstone cutthroat trout in Upper Huntington Creek are of particular note).

The project area is primarily rural. Land uses include agriculture (grazing), recreation, dispersed residential, and mining. There are private lands, as well as lands under the jurisdiction of the State of Utah and Forest Service (Manti-La Sal National Forest).

The overall setting of the area is pastoral and mountainous, features that are very appealing to recreation visitors. Highway 264 is proposed as a National Scenic Byway, and Skyline Drive in the western portion of the project area (along the Gooseberry Route) is a scenic backway.

Important or potentially important cultural resources along the proposed routes include a prehistoric camp site, an unused railroad track, three potentially sensitive historic localities, and four areas where there is a possibility of encountering buried Pleistocene vertebrate remains, which could be of both archaeological and paleontological importance.

ENVIRONMENTAL CONSEQUENCES

Impacts associated with each alternative are generally summarized below.

Alternative A - No Action - Leave and protect the pipeline in place, limited mining. The existing pipeline has been in place since 1953. Questar Pipeline anticipates the remaining life of the pipeline to be 30 to 40 years. If the pipeline is left in place, there would be no disturbance to surface environmental resources. It should be noted that as part of the existing environmental condition, the northwestern portion of the existing route crosses 2 areas of unstable soils, which are affected by and potentially could affect the existing pipeline. The length of pipeline under consideration in this document is 13.5 miles.

If the pipeline is left in place, a substantial amount of recoverable coal would be left unmined. Beneath the entire existing route, there are an estimated 27.6 million tons (mmt) of recoverable coal, which would generate approximately \$55.2 million in Federal royalties (8 percent) to Federal and State governments. Beneath the existing route within the Skyline Mine permit area, there are an estimated 14.9 mmt of recoverable coal worth approximately \$29.8 million in Federal royalties. If the pipeline is left in place, Utah Fuel could mine up to one-third of the recoverable coal, protecting the pipeline against subsidence, and leaving approximately 10 mmt of recoverable coal unmined (\$20 million in royalties). Also, revenue (salaries, goods, and services) to the local communities generated during construction activities would not be realized.

Alternative B - Leave pipeline in place, allow complete mining, protect against interruption of gas service, restore or repair subsidence-induced damage. With this alternative, all 14.9 mmt of recoverable coal beneath the existing pipeline within the Skyline Mine permit area of the 27.6 mmt along the entire route could be mined and \$29.8 million in Federal royalties would be realized. The life of this mining operation within the permit area is 15 to 20 years. However, subsidence of the ground's surface could cause severe damage to the pipeline which could interrupt service to approximately 70,000 commercial and residential customers. As a measure to reduce the potential for such interruption, the most reliable option would be construction of a 4.25-mile-long "redundant" surface pipeline. Strain gauges would be installed every 100 feet on the existing pipeline and every 500 feet on the surface redundant pipeline. Construction of the redundant pipeline would require about 40 days and cost (including the monitoring system) about \$3.3 million. Monitoring, maintaining, and repairing the system for the life of the project (15 to 20 years) would cost roughly \$146,650 annually which does not include costs that may be incurred for major pipeline replacement. These costs could amount to approximately \$2,627,400 for replacement following cessation of subsidence after mining.

This surface pipeline would be susceptible to vandalism and the reliability of the system could not be guaranteed. Failure of the system resulting in interruption of service is not an acceptable liability to Questar Pipeline or Utah Fuel.

Although the redundant pipeline would be placed unanchored on the surface, some impacts to the environment would occur. Excavation to install the strain gauges on the existing pipeline and to replace damaged sections of the pipeline would expose soils, making them susceptible to some erosion, and would interfere with other uses (e.g., grazing, recreation) in the area. Also, the surface pipeline and monitoring instrumentation would visually affect the outdoor experience to recreational visitors. Beneficial

impacts (services and goods) to the local economy could range from \$173,800 to \$294,800 from construction and about \$272,250 from installation of strain gauges for a total of \$567,050.

Alternative C - Burnout Canyon Routes. An estimated 14.7 mmt to 17.4 mmt of recoverable coal (\$29.4 million to \$34.8 million in Federal royalties) underlie the entire alternative routes. The length of this route varies from 14.9 to 15.3 miles depending upon the variation selected; 5.2 to 5.9 miles of new pipeline would be constructed. Construction would require approximately 40 days and probably could be completed this year. This proposed route would have little effect on current coal-mining operations. Approximately 2.6 mmt to 2.9 mmt of recoverable coal (\$5.2 million to \$5.8 million in Federal royalties) underlie the segments proposed for the new pipeline. Mining beneath a pipeline along Upper Huntington Creek and Burnout Creek, which the Burnout Canyon routes would parallel, is restricted to protect the perennial streams. The cost of construction and average reclamation is an estimated \$1,898,000 to \$3,060,200. Annual maintenance costs for the entire route would be \$26,820 to \$28,220. There would be no acquisition costs in regard to obtaining rights to the coal and surface area that would be committed to operation of the pipeline.

If a route on the east side of Highway 264 is selected, there is a potential for 10 pipeline stream crossings in Burnout and Upper Huntington Canyons, which could result in low-to-moderate impacts to wet soils from construction equipment compaction; low-to-moderate, short-term impacts to water quality from sedimentation (disturbance of banks and streambeds); and moderate-to-high impacts to the trout spawning areas. Also, adjacent riparian areas would be subject to short-term adverse impacts (until vegetation has regenerated). Existing impacts caused by unstable slopes occur along the northwestern portion of the route (existing pipeline). If a route on the west side of Highway 264 is selected, there would be, according to the Forest Service, 3 pipeline stream crossings.

Short-term moderate visual impacts would occur during construction along Highway 264, a proposed National Scenic Byway. A long-term moderate visual impact would occur where trees would be removed on the steep-sloped wall of Burnout Canyon, which is somewhat visible to travelers heading south on Highway 264. Roads would not be closed, but traffic flows would be reduced and delays would occur along Highway 264 during construction. Benefits from construction to the local economy could range from \$522,500 to \$1,235,000.

Alternative D - Gooseberry Route. The length of this route is about 16.7 miles, 12.6 miles of which would be new pipeline construction. Construction would require 80 to 90 days unless additional crews and equipment are used. The cost of construction and average reclamation is estimated at \$3,937,000 million. The route would not be entirely on Federal land and would require additional time and costs for acquisition of land. Also, there is a potential that Questar Pipeline would have to financially negotiate the rights for privately owned coal where its recovery would be impacted by the pipeline. Acquisition costs for surface rights-of-way and coal would be approximately \$4,612,800. Annual maintenance costs for the entire route would be approximately \$30,060.

An estimated 11.8 mmt of recoverable coal (approximately \$19 million in Federal royalties) underlie the entire route. Approximately 9.6 mmt of recoverable coal (\$14.6 million in Federal royalties) underlie the segments of proposed new pipeline.

The pipeline would cross some areas of unstable soils, which could affect and be affected by the pipeline. Six pipeline stream crossings would create low-to-moderate impacts on wet soils through compaction by construction equipment and cause low-to-moderate, short-term impacts to water quality from sedimentation.

During construction, no roads would close but traffic would experience delays along Skyline Drive and Highway 264. Visual impacts would occur from Gooseberry Campground (moderate-to-high impact), and along the proposed scenic backway, Skyline Drive (moderate impact). Short-term visual impacts would occur during construction along Highway 264, a proposed National Scenic Byway, and a visual impact would occur where trees would be removed up the steep-sloped wall of Burnout Canyon. Benefits from construction to the local economy could range from \$1,037,500 to \$1,971,500.

Valley Camp Triangle Connectors. The segments in the area of the Valley Camp Triangle would be common to the Burnout Canyon and Gooseberry routes, but are addressed separately to simplify review. The length of the entire connector would be 0.5 mile to 1.0 mile, depending on the variation selected, of which 0.5 mile to 0.6 mile would be new pipeline. Cost of construction and average reclamation would be an estimated \$240,500 to \$253,500. Annual maintenance costs for the entire connector could be \$900 to \$1,800. An estimated .06 mmt to 2.1 mmt of recoverable coal (\$1.2 million to \$4.2 million in Federal royalties) underlie the connectors, of which 0.0 mmt to 1.8 mmt of recoverable coal (\$2.8 to \$3.6 million in Federal royalties) underlies the segments of proposed new pipeline. Acquisition costs could range from \$0.0 (Connector (1)) to \$2.4 million (Connector (2)).

Within this small area, impacts are relatively minimal. Unstable slopes could result in high impacts along 2 of the 3 connectors. Moderate visual impacts would result where stands of trees would be removed.

Alternative E - Winter Quarters Routes. The length of this entire route would be 16.1 to 17.2 miles depending on the variation selected, of which 12.2 to 12.4 miles would be new pipeline construction. If Winter Quarters Routes (1) or (2) is selected, sections of the existing pipeline that are not part of these routes, but provide local service, could not be abandoned. Because these sections could not be abandoned, resources such as recoverable coal and associated royalties would be affected. (These affects are addressed where appropriate.)

Construction would require 80 to 90 days unless additional crews and equipment are used. The cost of construction and average reclamation would be an estimated \$4,141,600 to \$4,201,600. This route would not be entirely on Federal land, and acquisition of land would require additional time and costs. Also, Questar Pipeline would have to financially negotiate the rights for coal where its recovery would be impacted where the route crosses leases. Otherwise, Questar Pipeline faces the potential of relocating a portion (or portions) of the pipeline when future mining of these leases is implemented. Acquisition costs could range from \$6.3 million to \$11.5 million. Construction of this proposed route probably could not be completed this year unless negotiations for land and coal proceed without any delays. A construction delay until next year would impact the planned sequence of mining at the Skyline Mine. Annual maintenance costs for the entire route and associated existing pipeline sections would be \$36,000 to \$36,360.

An estimated 18.9 mmt to 24.7 mmt of recoverable coal (approximately \$29.2 million to \$42.4 million in Federal royalties) underlie the entire route and associated existing pipeline sections that could not be abandoned. Approximately 11.6 mmt to 17.4 mmt of recoverable coal (\$14.6 million to \$27.8 million in royalties) underlie the segments of proposed new pipeline.

New pipeline would cross Winter Quarters Creek and Mud Creek. The route would cross two riparian areas near Scofield that are already disturbed by grazing. Along the southern portion of the route, one variation (Segment 21) would parallel Mud Creek riparian areas that are in excellent condition (moderate-to-high impacts). During construction, no roads would close but traffic flows along Highway 96 would be reduced and delays of about 15 minutes could be anticipated. Construction disturbance would create moderate-to-high, short-term visual impacts to views from residences and Highway 96. High impacts would result from construction along Segment 21 where it descends the steep-sloped north ridge of Broads Canyon, openly visible from Highway 96. Also, existing impacts caused by unstable slopes occur along the northwestern portion of the route (existing pipeline). Benefits from construction to the local economy could range from \$1,037,500 to \$1,917,500.

PUBLIC REVIEW OF THE DEIS

Once the draft EIS (DEIS) was completed, a Notice of Availability of the DEIS was published by the Environmental Protection Agency (EPA) in the Federal Register on May 18, 1990, which initiated the 45-day public review period.

During the review period, on June 13 and 14, the Forest Service hosted an open house to discuss the DEIS, answer questions, and solicit comments on the DEIS. A news release announcing the open house was submitted to local newspapers, the Sun Advocate and Emery County Progress, and to the local radio station. Seventeen individuals attended the open house. No substantive comments were received.

A total of 89 letters were received during the review period. Generally, the comments supported the Burnout Canyon Route and emphasized the importance of the mining industry to the region.

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CHAPTER 1 - PURPOSE OF AND NEED FOR ACTION

INTRODUCTION

Questar Pipeline Company (Questar Pipeline), a subsidiary of Questar Corporation, proposes to relocate a 4.25-mile-long section of buried natural-gas-transmission pipeline located on the Manti-La Sal National Forest to avoid potential subsidence-caused damage by proposed underground coal-mining activities at the Skyline Mine. Questar Pipeline is pursuing the proposal at the request of Utah Fuel Company (Utah Fuel) to enable the company to proceed with mining activities that would result in surface subsidence along the existing right-of-way. The existing pipeline lies on Federal lands administered by the Manti-La Sal National Forest and is permitted under an existing Forest Service special use permit.

The proposed project, known as the Main Line No. 41 Reroute, is located north of Electric Lake in Sanpete, Carbon, and Emery counties, Utah (refer to Figure 1-1 and Appendices B and C). If approved, relocation of the pipeline would begin in the summer of 1990 and be completed in the Fall of 1990. The Forest Service is the lead Federal agency and will assure that Federal regulations are satisfied. The Bureau of Land Management (BLM), the Federal agency responsible for administering Federal coal leases, is designated as a cooperating agency.

In accordance with the National Environmental Policy Act of 1969 (NEPA), the Forest Service is responsible for overseeing the completion of environmental studies for the pipeline project and preparation of an environmental document. Through project scoping, the Forest Service decided that an Environmental Impact Statement (EIS) was most appropriate. The objective of this environmental analysis is to (1) comprehensively study the effects on the natural, human, and cultural environments that would be caused by the project; (2) explore the potential impacts of the alternatives; and (3) develop ways to avoid, reduce, or mitigate potential impacts to sensitive features of the environment. A total of 52 miles of alternative route locations were studied.

The environmental studies were conducted in two phases. First, information about the existing, or affected environment, was collected, compiled, and mapped. This is documented in Chapter 3.

The information was then assessed to identify potential impacts caused by any pipeline route alternative to area resources (Chapter 4). Once an alternative is approved, Questar Pipeline, in coordination with the Forest Service, will develop any new construction plans in the specificity needed (including site-specific mitigation measures) to satisfy the permitting requirements of the Forest Service.

PURPOSE OF AND NEED FOR ACTION

Questar Pipeline's southern natural-gas-transmission system extends from northwestern Colorado through northeastern Utah to an interconnection with Mountain Fuel Supply's (also a Questar Corporation subsidiary) gas-distribution system at Payson, Utah (Figure 1-2). At the Indianola gate station, the system serves as the sole source of supply to Mountain Fuel Supply's Southern Utah Pipeline, serving communities from Fairview south to St. George. The system consists of a single trunk line (ranging in diameter from 10 to 20 inches), a 2300-horsepower-compressor station located near Ouray, Utah, and

several branch lateral pipelines providing gas, or "feed", from local gas producers. A substantial portion of the natural-gas supply for the Wasatch Front is transported within Questar Pipeline's southern gas-transmission system. Proper operation of the system is crucial since no "redundant" supply system exists, and failure during periods of high demand would result in the disruption of service to Mountain Fuel Supply's approximately 70,000 residential and commercial customers in the region consisting of Utah Valley south to St. George. A failure of the system could jeopardize public health and safety. Substantial costs could be incurred to reestablish service (could exceed \$1 million), as well as liability costs.

A portion of Questar Pipeline's southern gas-transmission system currently traverses directly above the Skyline Mine permit area, the surface of which is administered by the Manti-La Sal National Forest. The 18-inch-diameter, buried pipeline, Main Line No. 41, has been operated and maintained in that location since 1953.

The Skyline Mine is operated by Utah Fuel, a wholly owned subsidiary of Coastal States Energy Company (Coastal States) that holds Federal coal leases (U-073120, U-0147570, U-042235, and portions of U-044076 and U-020305) issued by the BLM in the area of the pipeline. In accordance with the requirements of the Surface Mining Control and Reclamation Act of 1977 (SMCRA), the mining operation is subject to repermitting every 5 years. The most recent Mining and Reclamation Plan was approved by the Utah Division of Oil, Gas and Mining (DOG M) on December 21, 1989. Mining began in the Fall of 1981 on the east side of the mine permit area and has progressed generally toward the west.

As a part of the plan, Utah Fuel identified the land uses and resources that could be affected by underground mining activities. The Forest Service, BLM, and DOGM require Utah Fuel to protect, restore, or replace existing permitted surface uses in the mine permit area to provide for the continuance of current land uses, which may be lost or damaged as a result of mining activities. The present, approved Mining and Reclamation Plan provides for full-support mining only under the pipeline corridor in order to prevent subsidence that could damage the pipeline.

Full support mining could allow the extraction of up to 5 million tons of the estimated 14.9 million tons (mmt) of recoverable coal below the pipeline in the Skyline Mine permit area. Utah Fuel wishes to extract all of the recoverable coal; however, this could result in subsidence of as much as 24 feet of the topographic surface damaging the pipeline. Ten million tons or more of recoverable coal would be left unmined and Utah Fuel's mining operation would be impacted economically. The 8 percent royalty (\$29.8 million) to Federal and State governments, 4 percent to previous leaseholder, and local revenue from employment, goods, and services would not be realized.

For these reasons, Utah Fuel approached Questar Pipeline in 1983 to generally discuss the issue and later, in 1987, to request an evaluation of a means to reduce the impact of subsidence on Main Line No. 41. Because the coal industry and the BLM are mandated to maximize extraction of minable coal and Questar Pipeline cannot risk jeopardizing the reliability of its service, the alternative to protecting or maintaining the existing pipeline would be to relocate the pipeline to a compatible area not affected by mining activities. Utah Fuel and Questar Pipeline agreed in the Spring of 1989 that rerouting the affected section of Main Line No. 41 out of the subsidence zone in the mine permit area would be their most viable alternative.

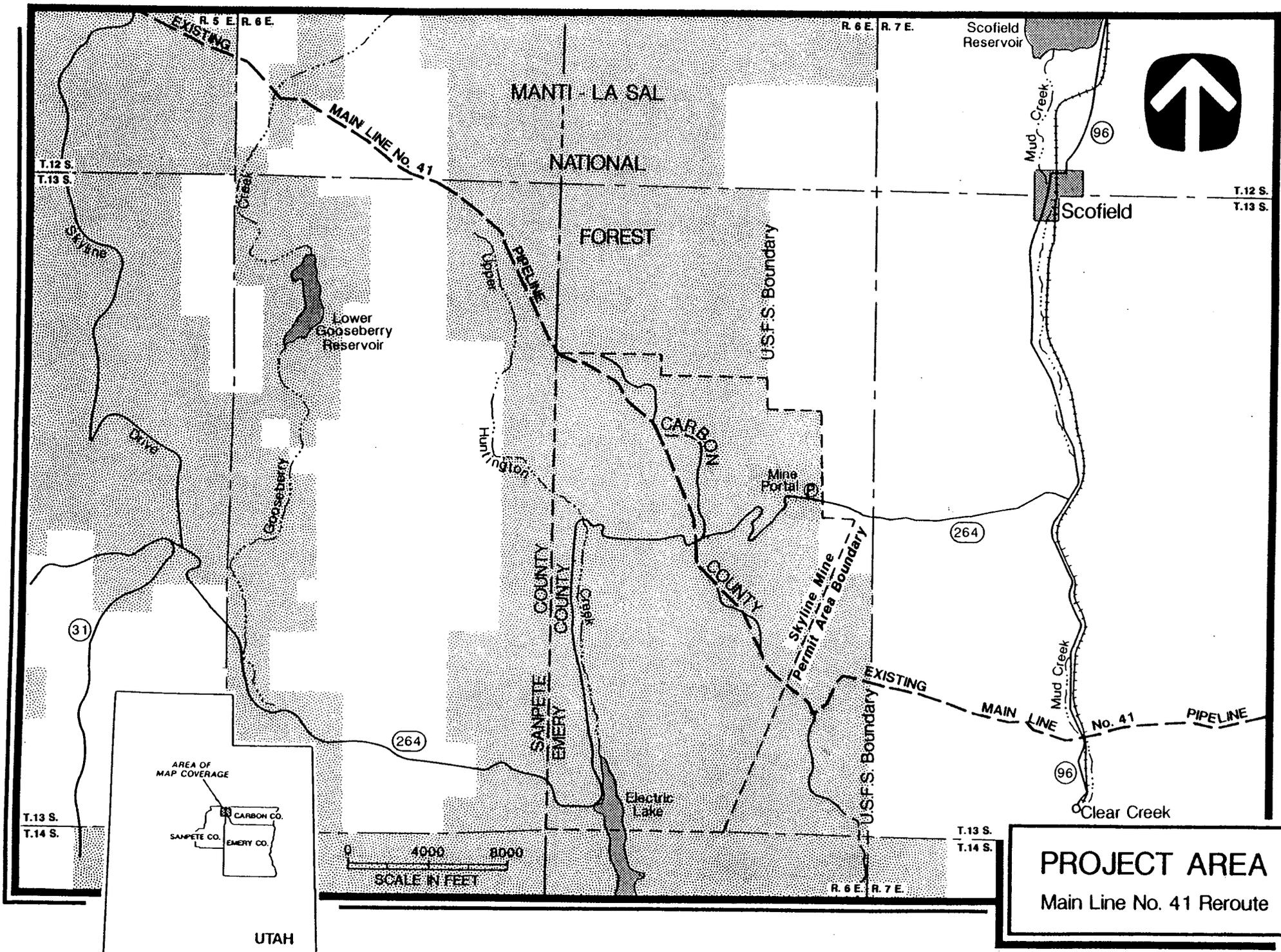
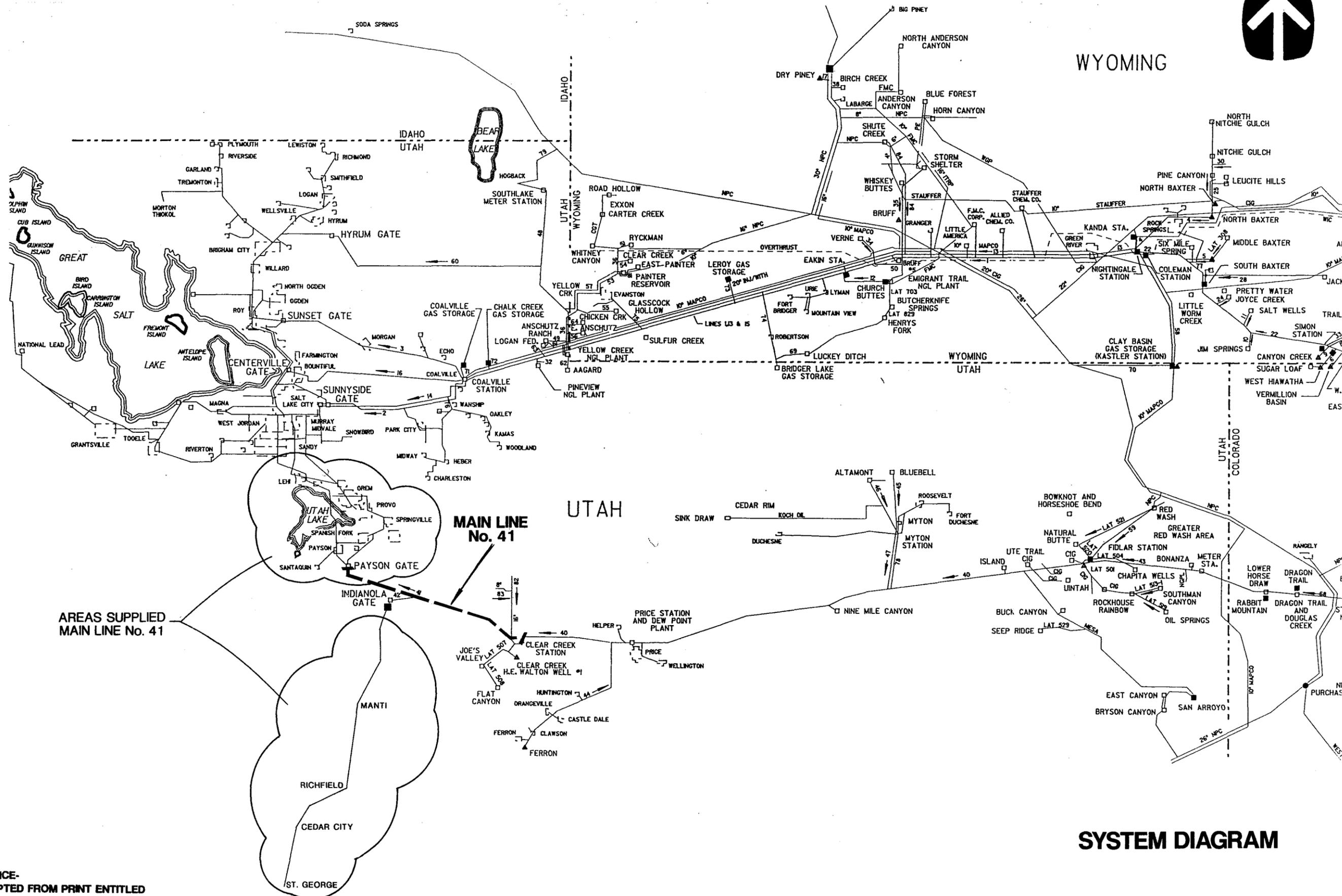


FIGURE 1-1



AREAS SUPPLIED
MAIN LINE No. 41

MAIN LINE
No. 41

SYSTEM DIAGRAM

REFERENCE-
ADAPTED FROM PRINT ENTITLED
"DIAGRAMMATIC MAP - GAS PIPELINE SYSTEM"
PREPARED BY QUESTAR PIPELINE COMPANY -
DRAWING NUMBER 9322, DATED 1/11/89.

Dames & Moore

FIGURE 1-2

After considerable evaluation and planning, Questar Pipeline applied to the Forest Service on August 2, 1989, to amend the present special use permit to allow relocation of a 4.25-mile section of the pipeline. If permitted, relocation of the pipeline is proposed to begin in the Summer of 1990 and be completed in the Fall of 1990. The affected coal reserves are proposed for mining beginning in the Fall of 1990.

DECISION NEEDED

The Forest Supervisor of the Manti-La Sal National Forest is the official responsible for deciding on Questar Pipeline's application to amend the present special-use permit to relocate Main Line No. 41. The Supervisor can decide (1) to deny the application for the amendment, or (2) grant the amendment to relocate the pipeline to the proposed Burnout Canyon Route, Gooseberry Route (including segments of the Valley Camp Triangle Connectors), or Winter Quarters Route for those portions that lie on National Forest System lands. The Forest Service decision will be based on the environmental analysis presented in this EIS. The decision will be presented in a separate document (Record of Decision) following completion of the final EIS.

The Project Scoping Document also identified the need to decide whether or not to revise the location of the Utility Corridor management unit presented in the Manti-La Sal National Forest Land and Resource Management Plan 1986, in the event that the selected alternative involves rerouting the pipeline. Upon further evaluation, it has been determined that revision of the existing Utility Corridor management unit would not be necessary since any rerouted pipeline segment would involve only a single utility use (Manti-La Sal National Forest Land and Resource Management Plan, Appendix D). The existing management emphasis (range, timber, riparian) would, therefore, remain unchanged. The existing bypassed route would remain as a Utility Corridor management unit for consideration of future utilities following mining.

IDENTIFYING THE ISSUES

Integral to the environmental process is project scoping, which involves the solicitation of comments from various Federal, State, and local agencies and interested organizations and individuals to assure that the most accurate and current environmental information and public issues are incorporated into planning and decision-making.

After reviewing Questar Pipeline's application, the Forest Service identified a number of potential issues and included these in the August 1989 scoping document. A Notice of Intent was published in the Federal Register on Friday, August 11, 1989, notifying the public of the project and inviting comments. The scoping document and an invitation to comment were sent to agencies, organizations, and individuals on a mailing list compiled by the Forest Service. Press releases were published in local newspapers in August 1989, notifying the public of the project and the public meeting and inviting comment.

Six individuals commented on the project during the public meeting held on August 30, 1989. Ten letters were received during the comment period. The comments received, both written and oral, further assisted the Forest Service in identifying the scope of issues to be addressed during the environmental studies in preparation of the EIS.

Issues Identified

- potential for degradation of watershed, floodplain conditions, water quality (caused by sedimentation), streambank stability, vegetation (especially riparian vegetation along Upper Huntington Creek), visual quality
- potential effects on grazing
- potential for disruption of recreation during construction
- potential damage to, safety conflicts with public uses on, and maintenance of State Highways 264 and 96, and Skyline Drive during construction
- potential impacts to livestock, wildlife, and fish caused from construction
- potential for pipeline construction inducing land failures in unstable areas
- the inclusion of affected landowners and agencies along alternative proposed routes in the evaluation process
- minimization of conflicts between pipeline protection and coal recovery to allow maximum coal recovery from Federal lands
- the pipeline issue should be resolved in an economically viable way
- reroute should take place in an environmentally acceptable way and expeditiously to avoid curtailment of coal production and the consequent effects to the local economy
- if the pipeline is rerouted, preference was expressed to abandon the old line in place to prevent disturbance
- rehabilitation of the abandoned right-of-way if the pipeline is relocated
- the schedule for rehabilitation and the schedule for decision and construction
- emergency response plan should be required
- location of pipeline is critical concern for uninterrupted natural gas service

Further discussion of public involvement and the issues is provided in Chapter 6, and Appendix D contains copies of the scoping document, Federal Register Notice of Intent, copies of news articles, and letters.

AUTHORIZING ACTIONS AND PERMITS

Land Use Plans

The Forest Service has completed a management plan, the Manti-La Sal National Forest Land and Resource Management Plan and Final EIS, 1986.

Permits and Other Regulations

Questar Pipeline would be required to obtain a number of permits and approvals from Federal, State, and local agencies for the project. Federal permits and approvals are listed in Table 1-1.

SCOPE OF THE ENVIRONMENTAL IMPACT STATEMENT

A systematic, interdisciplinary approach was used to analyze the affected environment, to estimate the environmental consequences, and to guide the preparation and completion of this EIS.

Chapter 2 describes the development of the alternatives. The description includes the alternatives that were considered and eliminated from further study and the alternatives evaluated in detail. Provided in Chapter 3 is a description of the affected environment; that is, the condition of the potentially affected environment prior to the proposed construction. Provided in Chapter 4 is a description of the potential consequences, or impacts to the affected environment of the no-action and proposed alternatives. Chapters 5, 6, 7, 8, and 9, respectively, include a list of preparers, consultation with others and public involvement, references consulted during the studies, a glossary, and an index. Appendices include (a) a copy of Questar Pipeline's Preliminary Construction, Operation, and Maintenance Plan, which contains an attachment describing construction stipulations, (b) description of the locations of each proposed alternative route, (c) project base map, and (d) public involvement information. In addition, a set of the resource maps showing the affected environment and environmental consequences is available for review at the office of the Manti-La Sal National Forest, 599 West Price River Drive, Price, Utah.

**TABLE 1-1
FEDERAL PERMITS AND OTHER LEGAL REQUIREMENTS
(if a reroute or redundant pipeline is the selected alternative)**

<u>Agency</u>	<u>Act or Regulation</u>	<u>Requirement</u>
Forest Service	NEPA (40 CFR 1500) 36 CFR 251.1	Environmental Impact Statement (EIS) Special Use Permit
Council on Environmental Quality	NEPA (40 CFR 1500)	EA
Advisory Council on Historical Preservation	National Historic Preservation Act, Section 106 Executive Order 11593, Section 2(b), (36 CFR 800)	Compliance with provisions of the act and executive order
Army Corps of Engineers	Federal Water Pollution Control Act Amendments of 1972 (FWPCA), Section 404 (33 CFR 323)	Project may be authorized by General Permit No. 40 (authorizing discharge of dredge and fill material provided Stream Channel Alteration Permit issued by State.
Fish and Wildlife Service	Endangered Species Act, Fish and Wildlife Coordination Act, Bald and Golden Eagles Protection Act, Executive Order 11190	Consultation and compliance with the acts and orders
Department of Transportation	Federal Mine Safety and Health Act as amended 1977 (27 CFR 181)	Permit to transport, store, and use explosives
Environmental Protection Agency	Clean Air Act, Federal Water Pollution Control Act	Compliance with provisions of the acts
Federal Energy Regulatory Commission (FERC), Office of Pipeline and Producer Regulation	Reroute: Natural Gas Act, Section 7c and automatic authorization per 18 CFR 157.208(a). Miscellaneous rearrangement as defined in 18 CFR Part 157.202 (b)(6)	Blanket Certificate
	Surface pipeline: Natural Gas Act, Section 7c 18 CFR Part 157.7	Prior authorization

CHAPTER 2 - PROPOSED ACTION AND ALTERNATIVES

This chapter is divided into five primary sections: (1) a description of the process used to formulate the alternatives; (2) a description of the alternatives that were considered, but that were not evaluated in detail; (3) a description of each alternative, including the proposed action; (4) a comparison of the alternatives; and (5) the identification of the Forest Service preferred alternative.

FORMULATION OF THE ALTERNATIVES

Generally, the alternatives were developed by considering the objectives of the proposed project, construction techniques (refer to Appendix A), and the issues identified during the scoping period in August and September 1989.

During the early discussions between Questar Pipeline and Utah Fuel, the focus was to develop a feasible way to protect the pipeline in-place during full-extraction, underground mining activities. Following detailed consideration of this alternative, Questar Pipeline and Utah Fuel were not confident that, even with all possible protections, the reliability of the pipeline would be adequate. In addition, repairs required because of subsidence-caused damage would be very costly over the 15 to 20 years of mining activity. If the pipeline were to fail during a time of year when access is relatively easy, the cost associated with the required repairs would be low, but reestablishing service after interruption is estimated at \$1 million. Should failure occur during the winter months, it is questionable that service could be restored promptly. During a mild winter, the large machinery required may be able to access much of the pipeline, but during harsh winter conditions it is virtually impossible. Service to customers could be interrupted for an extended period, potentially causing injury or death during cold periods and placing virtually unlimited liability on the companies involved. It became clear that to avoid jeopardizing the reliability of the southern gas-transmission system and avoid costly repairs, the alternative to relocate the pipeline deserved serious consideration. Relocation of the pipeline would allow for full extraction of recoverable coal reserves within the Skyline Mine permit area and reduce concern for subsidence. Any of the alternatives presented here cross unmined coal and the concerns mentioned above could again arise.

On August 2, 1989, Questar Pipeline submitted an application to the Forest Service for an amendment to their present special use permit to relocate Main Line No. 41. In this proposal Questar Pipeline presented its preferred alternative. The Forest Service and Questar Pipeline developed a wide range of alternative route locations including the no-action alternative and evaluated each to determine: (1) feasibility of construction; (2) geotechnical hazards such as areas of unstable slopes; (3) general location in regard to recoverable coal reserves; (4) construction time required; (5) length; (6) costs for construction, typical reclamation, and acquisition of coal and surface rights-of-way; and (7) environmental issues.

It should be noted that if the pipeline were rerouted entirely on National Forest System land, Questar Pipeline would have to acquire a special use permit for the surface right-of-way, but would not face costs of acquiring the right-of-way. Also, if the pipeline were rerouted over Federal unleased coal or within the Skyline Mine permit area, Questar Pipeline would not have to acquire the rights to the coal beneath the pipeline. Questar Pipeline would have to acquire rights to coal if the pipeline is relocated to

Federal lands where coal is already under lease (except for the Skyline Mine permit area). However, if the pipeline were rerouted across non-Federal land, Questar Pipeline would have to purchase the surface right-of-way (except for a small portion of State land along the Gooseberry Route. Also, Questar Pipeline would have to purchase the rights to the underlying recoverable coal or face the costs of relocating the pipeline again in the future so the underlying coal could be mined.

ALTERNATIVES EVALUATED BUT NOT FURTHER CONSIDERED

A number of alternatives were considered, but were eliminated from detailed study. A brief description of these alternatives and the reason for eliminating them follows. Refer to Figure 2-1.

James Canyon - The route would follow the abandoned road down James Canyon to Electric Lake, then follow the Huntington Creek drainage, State Route 264, and follow the ridge as it leaves the Skyline Mine permit area to the juncture with Main Line No. 41. This route would have little effect on the Skyline Mine coal reserves. However, problems with constructing on steep side hills and unstable slopes, primarily along the east side of Electric Lake, are considered critical and rendered this route unacceptable.

South Fork - This route extends along South Fork Canyon, across Eccles Canyon, and then northwest in the vicinity of the Skyline Mine permit area boundary. The route is unsuitable for pipeline construction due to steep and rocky terrain, landslide zones, and problems with crossing Eccles Canyon.

Box Canyon - A variation of the Winter Quarters Route (a route evaluated in detail) extending down Box Canyon and Winter Quarters Canyon was considered. At the top of Box Canyon, exposed rock and steep terrain made this route unsuitable for pipeline construction. Problems identified in Winter Quarters Canyon include: (1) the canyon is too narrow for pipeline construction, and (2) an old mining camp of possible historical importance would be disturbed.

Green Canyon - A second variation of the Winter Quarters Route through Green Canyon was considered. The terrain in this canyon was found to be steep, rocky, and unsuitable for pipeline construction.

Segment 11 - Segment 11 was originally developed to follow an igneous dike zone which cuts through the coal, making mining infeasible. However, in developing Segment 11, engineering constraints (e.g., topographic features and geologic hazards) dictated the location, and the resulting route exceeds the assumed boundaries of the igneous dike zone into areas planned for longwall mining. Coal would be left between the dike zone and the buffer zone under Segment 11 in some areas where the two are not parallel. This segment was eliminated from further study because it did not satisfy the intended developmental criteria.

ALTERNATIVES EVALUATED IN DETAIL

The 5 alternative routes and their variations are described below. Detailed descriptions of the route locations are contained in Appendix B. Locations of the proposed routes are illustrated on Figure 2-2. For ease of description and review, each proposed route is

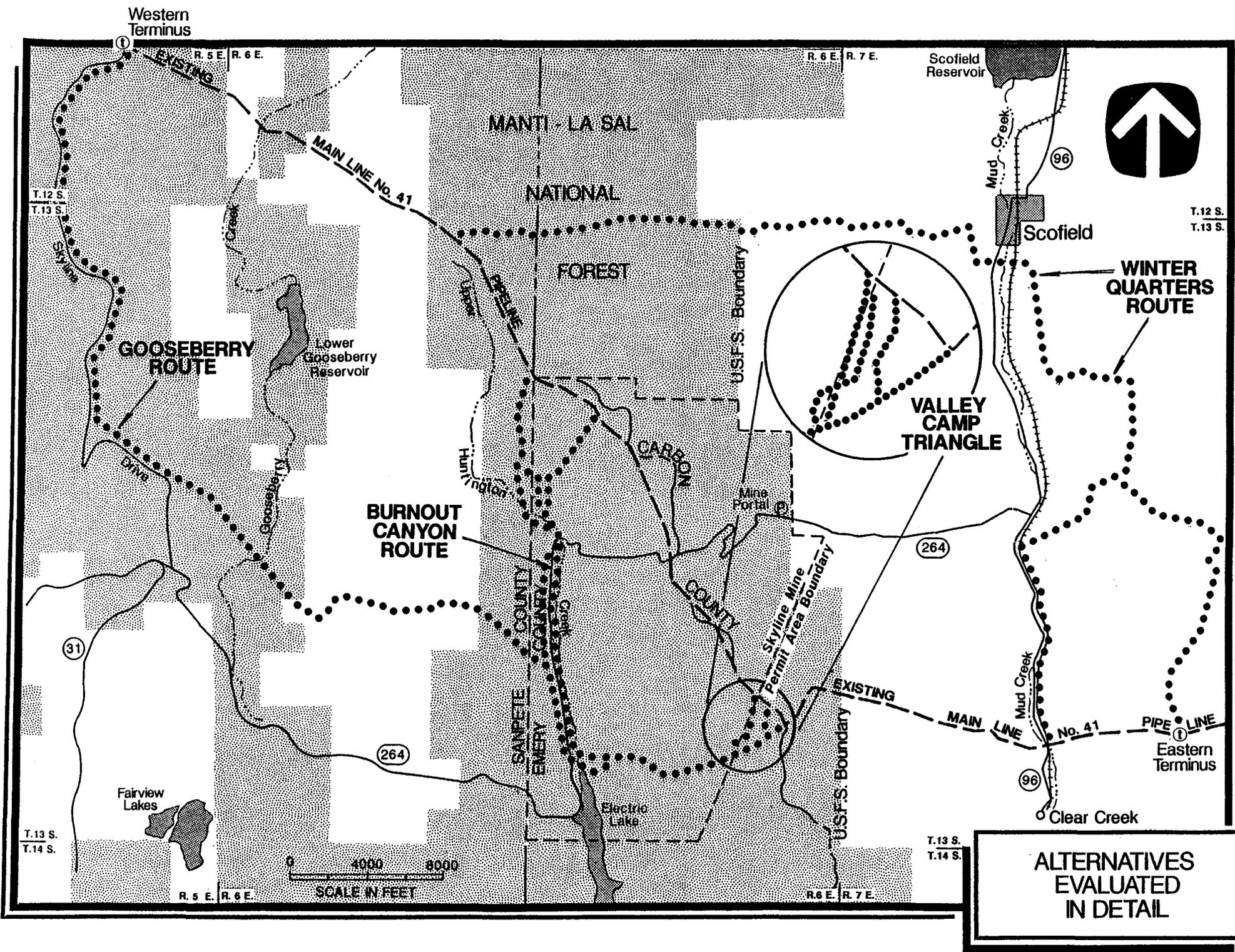


FIGURE 2-2

subdivided into segments (the terminus points of each being intersections with other segments) and labeled numerically. It is important to note that each route is composed of a combination of some of the segments that are part of the existing pipeline route (an asterisk following a segment number indicates that the segment is part of the existing route). Others are reroute segments in new locations. For each alternative route, the eastern terminus is the point where Segments 22 and 23* intersect, and the western terminus is the point where Segments 1 and 12* intersect. A list of the alternative routes and their segment combinations is provided on Table 2-1. The project base map provided in Appendix C shows routes and segments. Mitigation measures are provided as stipulations in Attachment A of Appendix A.

Alternative A - No Action - leave and protect pipeline in place, allow limited mining - If the no action alternative is selected and the Forest Service denies the application to amend the special-use permit, the pipeline would not be relocated and Utah Fuel would be responsible for protecting the pipeline in-place.

The existing route consists of Segments 12*, 13*, 17*, 18*, 7*, 10*, 19* and 23* with 13.5 miles between the eastern and western terminus points. Of this 13.5 miles, only about one third (4.25 miles) is located within the Skyline Mine permit area.

The existing pipeline has been in place since 1953. Questar Pipeline anticipates the remaining life of the pipeline to be 30 to 40 years.

Under its current mine plan, Utah Fuel is authorized to and could mine some coal under the pipeline using full-support, "room-and-pillar" mining. The pillars left in full-support mining are large enough to prevent subsidence; consequently preventing damage to the pipeline. Up to 5 million tons of recoverable coal could be extracted, but 9.9 to 14.9 mmt could be left unmined in the Skyline Mine permit area, decreasing production-related royalties and economic benefits to the local communities. Such limited mining is not considered to be economical at the present time. Utah Fuel would be responsible for the costs of protecting the pipeline to ensure no interruption of gas service. There would be no new costs to Questar Pipeline with this alternative.

No new mitigation measures are required as the existing terms of the special use permit, Federal coal leases and the Skyline Mining and Reclamation Plan would suffice.

Alternative B - Leave pipeline in place, allow complete mining, repair or restore subsidence-induced damage, protect against interruption of gas service - Utah Fuel would mine under the existing pipeline using longwall mining methods to maximize extraction of the 14.9 mmt of recoverable coal. Revenue and royalties would be generated, but as much as 24 feet of subsidence could occur. Consequent damages to the pipeline could interrupt gas service to the approximately 70,000 customers in the service area.

As a measure to reduce the potential for such interruption, a number of options to modify the system are considered. One option considered is to expose the existing pipeline to help relieve strain. Such action would allow the pipeline to move somewhat independently of the surrounding soil thus reducing subsidence-induced stresses. Strain gauges would be installed on the pipeline to enable stresses to be monitored telemetrically. The pipeline must be taken out of service for a 2-week period in order to install the strain gauges and enable excavation. Soil conditions and topography may not allow proper drainage of water from the trench so cutaway ditches would have to be constructed. Any accumulated water in the trench could cause the pipeline to float,

potentially inducing additional stress. The pipeline would be vulnerable to intentional or inadvertent damage from gunshots, vehicles, falling rocks, etc. Even with the pipeline uncovered, there are uncertainties regarding stresses resulting from subsidence. Finally, the remoteness of the area would delay repairs and increase maintenance costs in winter.

Another option considered was to construct within the existing right-of-way a new pipeline on above-ground adjustable supports. The new pipeline would be instrumented with strain gauges to enable telemetric monitoring of pipeline stresses. Upon detection of significant stresses, the supports would require adjustment to relieve the stresses. Disadvantages of this option include vulnerability to damage, continual monitoring and maintenance for support adjustment, access difficulties during winter, hazards to humans and wildlife, and visual impacts (to maintain initial line elevation it could ultimately span as high as 24 feet above the surface).

If the pipeline were left in place, the most reliable option appears to be construction of a 4.25-mile-long "redundant" pipeline. This would involve a 12.75-inch pipeline constructed along the surface within the existing right-of-way. The line would serve as a backup in case of failure of Main Line No. 41. Strain gauges would be installed on the existing pipeline at intervals of 100 feet (approximately 225 gauge locations) and every 500 feet (approximately 45 strain gauge locations) along the surface redundant pipeline to monitor stress caused by subsidence. Once the system is in place, the pipeline would be monitored telemetrically and when the stress reached a certain level, gas transmission would be switched to the redundant pipeline while the main pipeline is excavated and repaired. Constructing the redundant-pipeline and installing monitoring devices and equipment would cost about \$3.3 million and require about 40 days to complete. Monitoring, maintaining, and repairing the system for the life of the project (15 to 20 years) can be only roughly estimated (\$146,650 annually). The annual cost does not include any costs that may be incurred for major pipeline replacement during the period of mining activity. The northern 2.6 miles of the 4.25-mile-long section of pipeline overlie 1 seam of recoverable coal, would subside once following mining, and the section of pipeline would have to be replaced. The southern 1.65 miles overlie 3 seams of recoverable coal, would subside following mining in each of 3 seams, and the section of pipeline would have to be replaced following cessation of subsidence after mining in each of 3 seams. The estimated cost to replace these sections of pipeline is \$2,627,400. No costs for coal and surface acquisition would be incurred.

Implementation of this alternative may require an amendment to the present special use permit for the pipeline. A detailed Construction, Operation, and Maintenance Plan (COMP) and application for a special-use permit amendment would be submitted by Questar Pipeline that would describe the specifics of its proposal. Mitigation measures would be developed to use in the new COMP.

Alternative C - Burnout Canyon Routes closely follow the drainages of Burnout Canyon and Upper Huntington Creek. The proposed routes were located by Questar Pipeline so the majority or all of the new pipeline would be on the Skyline Mine permit area in areas where mining activities are restricted (e.g., beneath perennial streams and around igneous dikes and fault zones). These routes are located entirely on National Forest System lands to avoid the need to acquire non-Federal lands.

TABLE 2-1
PROPOSED ROUTES

<u>Routes and Segments</u>	<u>Total Miles/ Miles of Construction</u>
Alternative A - No Action 23*, 19*, 10*, 7*, 18*, 17*, 13*, 12*	13.5/0.0
Alternative B - Leave in Place, Full Extraction Mining 23*, 19*, 10*, 7*, 18*, 17*, 13*, 12*	13.5/4.25
Alternative C - Burnout Canyon Routes	
(1) 23*, 19*, (connector), 3a, 3b, 2, 16, 14, 13*, 12*	14.9/5.7
(2) 23*, 19*, (connector), 3a, 3b, 2, 16, 15, 17*, 13*, 12*	15.1/5.2
(3) 23*, 19*, (connector), 3b, 24, 14, 13*, 12*	15.1/5.9
(4) 23*, 19*, (connector), 3b, 24, 15, 17*, 13*, 12*	15.3/5.4
Alternative D - Gooseberry Route 23*, 19*, (connector), 3a, 3b, 2, 1	16.7/12.6
Valley Camp Triangle Connectors (common to Burnout Canyon and Gooseberry routes)	
(1) 5/6, 7*, 10*	1.0/0.6
(2) 4, 8, 10*	0.9/0.6
(3) 4, 9	0.5/0.5
Alternative E - Winter Quarters Routes**	
(1) 22, 20, 12* (with associated Segments 19* and 23*)	16.1/12.4 20.2/12.4
(2) 23*, 21, 20, 12* (with associated Segment 19*)	17.2/12.2 20.0/12.2

*Segment is part of existing route.

** If either of the Alternative E routes are selected, sections of existing pipeline, not part of the routes, provide local service and could not be abandoned. Affects to resources are addressed as appropriate.

Construction of any of these proposed routes would require an estimated 40 days (including the selected Valley Camp connector) and probably could be completed this year. Construction costs are estimated to be \$1,898,000 to \$2,953,200. These costs include consideration of typical reclamation. (Also, costs for reclamation of the abandoned right-of-way are excluded as those costs have not been determined at this time.) There would be no costs for acquisition of coal or surface rights-of-way.

Alternative C - Burnout Canyon Route (1) includes Segments 23*, 19*, (connector), 3a, 3b, 2, 16, 14, 13*, and 12*. This proposed route was developed by Questar Pipeline to take advantage of Utah Fuel's mining plan and areas where mining is restricted. Currently, room-and-pillar mining is planned for the eastern half of Segment 3 for a main entry, and longwall mining is planned for the western half of Segment 3. However, Utah Fuel has indicated that the current mine plan can be altered readily to extend the main entry under the western portion of the segment, thereby substantially reducing the potential for subsidence. Segments 2, 16, and Segment 3a follow Upper Huntington Creek, a perennial stream that must be protected from subsidence. Segment 14 is outside of the Skyline Mine permit area and lies above unleased Federal coal reserves.

This proposed route is approximately 14.9 miles in length, approximately 5.7 miles of which would be new pipeline. The cost of construction and typical reclamation would be \$2,197,000. The new pipeline along Burnout Canyon Route (1) would cross about 3.3 miles of sensitive riparian areas and make 10 stream crossings (Segments 3a, 3b, 2, 16).

Alternative C - Burnout Canyon Route (2) includes Segments 23*, 19*, (connector), 3a, 3b, 2, 16, 15, 17*, 13*, and 12*. The variation from Burnout Canyon Route (1), Segment 15, was suggested by the Forest Service to keep the proposed route within the boundaries of the Skyline Mine property. Refer to paragraph on Burnout Canyon Route (1) for discussion of the other segments.

This proposed route is approximately 15.1 miles in length, approximately 5.2 miles of which would be new pipeline. The cost of construction and typical reclamation would be \$1,898,000. The new pipeline along Burnout Canyon Route (2) would cross about 3.3 miles of sensitive riparian areas and make 10 stream crossings (Segments 3a 3b, 2, 16).

Alternative C - Burnout Canyon Route (3) includes Segments 23*, 19*, (connector), 3b, 24, 14, 13*, and 12*. This variation is parallel to and west of Highway 264 in the Upper Huntington Canyon area. Construction of the pipeline on the west side of the highway was considered by Questar Pipeline during the preliminary planning stage but was not considered further at that time because of construction problems including slope stability, blasting requirements, and more delays to area traffic. As a consequence of these construction problems, the alternative would be considerably more costly than the Burnout Canyon Routes (1) or (2). However, in March 1990, a decision was made to reevaluate the feasibility of construction in this location due to the environmental concerns that had been identified during the course of the studies.

This proposed route is approximately 15.1 miles in length, approximately 5.9 miles of which would be new pipeline. The cost of construction and typical reclamation would be \$2,953,200. New pipeline along Burnout Canyon Route (3) would cross 0.5 mile of sensitive riparian areas and, according to the Forest Service, make 3 perennial stream crossings (Segments 3b and 24).

Alternative C - Burnout Canyon Route (4) includes Segments 23*, 19*, (connector), 3b, 24, 15, 17*, 13*, and 12*. This variation uses Segment 15, similar to Burnout Canyon Route (2), as suggested by the Forest Service to keep the proposed route within the boundaries of the Skyline Mine property. Refer to paragraphs on Burnout Canyon Routes (1), (2), and (3) for discussion of other segments.

This proposed route is approximately 15.3 miles in length, approximately 5.4 miles of which would be new pipeline. The cost of construction and typical reclamation would be \$2,654,200. New pipeline along Burnout Canyon Route (4) would cross about 0.5 mile of sensitive riparian areas and make 3 perennial stream crossings (Segments 3b and 24).

Alternative D - Gooseberry Route includes Segments 23*, 19*, (connector), 3a, 3b, 2, and 1 and would position the pipeline south and west of its present alignment. Within the segments where construction would occur, the route would be engineered to follow upland elevations where possible. Exceptions along the route include the descents into Burnout Canyon and Upper Huntington Canyon along with the crossing of the Gooseberry graben. This proposed route was developed by the Forest Service considering the minimal potential for mining activities along the northern portion (about 75 percent) of Segment 1 and the opportunity to bypass 2 areas where unstable slopes are threatening the pipeline along the existing right-of-way in Segment 12*. Questar Pipeline formally expressed the desire to bypass these areas in 1984.

Construction of this proposed route would require 80 to 90 days (including the selected segments of the Valley Camp Triangle) unless additional crews and equipment are used. Some of this route is located on non-Federal lands. Therefore, acquisition of rights-of-way and private coal ownership would be required. These costs are estimated at \$4,612,800. Because of time constraints, construction could be completed this year only with additional manpower and costs. Construction costs, including typical reclamation, would be \$3,937,000. (Costs for reclamation of the abandoned right-of-way are excluded as those costs have not been determined at this time.)

This proposed route is approximately 16.7 miles in length, approximately 12.6 miles of which would be segments of the new proposed pipeline. New pipeline along the Gooseberry Route (1) would cross 1.9 miles of sensitive riparian area and make 6 stream crossings.

The Valley Camp Triangle Connectors - include combinations of segments common to both the Burnout Canyon and Gooseberry routes and are discussed separately to simplify review. Questar Pipeline would have to negotiate rights for coal on Federal leases other than those within the Skyline Mine permit area. There would be no riparian or stream crossings.

Valley Camp Triangle Connector (1) includes Segments 5/6, 7*, and 10*. This proposed connector is approximately 1.0 mile in length, approximately 0.6 mile of which would be new construction. The cost of construction and typical reclamation would be \$240,500. There would be no costs for acquisition of coal or surface rights-of-way.

Valley Camp Triangle Connector (2) includes Segments 4, 8, and 10*. This proposed connector is approximately 0.9 mile in length, approximately 0.6 mile of which would be new construction. The cost of construction and typical reclamation would be \$253,500. Acquisition costs for coal leased to Valley Camp of Utah are estimated at \$2,400,000. There would be no cost for acquisition of a surface right-of-way.

Valley Camp Triangle Connector (3) includes Segments 4 and 9. This proposed connector is approximately 0.5 mile in length, all of which would be new construction. The cost of construction and typical reclamation would be \$214,500. Acquisition costs for coal leased to Valley Camp of Utah are estimated at \$1,600,000. There would be no cost for acquisition of a surface right-of-way.

The **Winter Quarters Routes** would be located east of the existing pipeline. Construction of these proposed routes would require 80 to 90 days unless additional crews and equipment are used. Pipeline construction would occur entirely outside the Skyline Mine permit area, and the route would cross other Federal coal leases. Questar Pipeline would have to financially negotiate the rights for recoverable coal that would have to be left unmined to protect the pipeline from subsidence or they might face the potential of relocating portions of the pipeline again.

The majority of this route is located on non-Federal lands; therefore acquisition of surface rights-of-way and coal would be required. Acquisition costs for coal and surface rights-of-way are estimated at between \$6,264,000 and \$11,464,640. The cost of construction and typical reclamation would be \$4,092,000 to \$4,141,600. (Costs for reclamation of the abandoned right-of-way are excluded as those costs have not been determined at this time.) Because of time constraints, construction probably could not be completed this year.

Alternative E - Winter Quarters Route (1) includes Segments 22, 20, and 12*. If this route is selected, the existing pipeline of Segments 23* and 19* could not be abandoned. It would have to remain in service to backflow gas from compression facilities located at Clear Creek (at western end of Segment 23*) along Segment 23* to the intersection with Segment 22. The pipeline of Segment 19* would have to remain in service to supply gas to a tap line that joins with Main Line No. 41 at the western terminus of Segment 19*. (Because these segments of existing pipeline could not be abandoned, the environmental resources along Segments 23* and 19* are addressed not as part of Winter Quarters Route (1), but as segments associated with the route). Segment 22 was developed by the Forest Service to avoid effects to Mud Creek.

This proposed route is approximately 16.1 miles in length (20.2 miles including Segments 23* and 19*), approximately 12.4 miles of which would be new pipeline. The cost of construction and typical reclamation would be \$4,141,600. Acquisition costs for coal and surface rights-of-way were estimated at \$11,464,640. The new pipeline along this proposed route would have 2 stream crossings (1 crossing would be under an existing culvert which would cross 0.4 mile of sensitive riparian area).

Alternative E - Winter Quarters Route (2) includes Segments 23*, 21, 20, and 12*. If this route is selected, the existing pipeline of Segment 19* could not be abandoned. It would have to remain in service to supply gas to a tap line that joins with Main Line No. 41 at the western terminus of Segment 19*. (Because this segment of existing pipeline cannot be abandoned, the environmental resources along Segment 19* are addressed not as part of Winter Quarters Route (2), but as a segment associated with the route.)

This proposed route is 17.2 miles in length (20.2 miles including Segment 19*), approximately 12.2 miles of which would be new construction. The cost of construction and typical reclamation would be \$4,092,000. Acquisition costs for coal and surface rights-of-way are estimated at \$6,264,000. New pipeline along the Winter Quarters Route (2) would cross Winter Quarters Creek once and Mud Creek 4 times (one crossing would be

under an existing culvert), and generally parallel Mud Creek in the southern portion of the route. Segment 21 is below the coal horizon.

MITIGATION MEASURES

Forest Service mitigation measures developed for this project are listed as stipulations in Attachment A of Appendix A.

SUMMARY COMPARISON OF ALTERNATIVES

A detailed analysis of the environmental consequences or impacts, is provided in Chapter 4 and summarized on Table 4-1 by route. Table 2-2 in the pocket that follows is intended to be a summary to use in relatively comparing alternatives.

FOREST SERVICE'S PREFERRED ALTERNATIVE

The Forest Service's preferred alternative is Burnout Canyon Route (3), which includes Valley Camp Triangle Connector (1) and using modifications to the route presented in the draft environmental impact statement (DEIS), in the areas of the Connellville fault, mouth of Burnout Canyon, and near The Kitchen.

CHAPTER 3 - AFFECTED ENVIRONMENT

This chapter provides a description of the potentially affected natural, human, and cultural environments that could affect or be affected by the alternatives if implemented. Resources addressed include:

Natural Environment

- Earth Resources (geology, coal, paleontology, soils, water)
- Biological Resources (riparian, wetland, range, timber, aquatic resources, terrestrial wildlife)

Human Environment

- Recreation
- Visual Characteristics
- Socioeconomics

Cultural Environment

- Prehistory
- History
- Native American Concerns

In late September of 1989, members of the consulting study team visited the project area and reviewed the existing and proposed routes to gain familiarity with the area, gather initial information, and meet with the Forest Service Interdisciplinary Team to discuss the issues identified. Other agencies and organizations having jurisdiction and/or interest in the project area were contacted to inform them of the project, to collect environmental resource data, and to solicit comments. Data were gathered primarily from published and unpublished literature and maps. (References are provided in Chapter 7 of this document.) The data gathered were then compiled and transferred to copies of the project base map.

Where possible, information was mapped for the entire area. However, the inventory and analysis were conducted primarily along and adjacent to the routes. A set of black-and-white reproducible base maps illustrating the resource inventories and impact assessment results are on file for review at the Manti-La Sal National Forest Supervisor's Office in Price, Utah. Please refer to Table 2-1 and Appendix B for descriptions of routes by segments.

EARTH RESOURCES

This section addresses the earth resources in the project area including (1) geology, (2) coal, (3) paleontology, (4) soils, and (5) water. These studies were conducted using existing data to identify areas of particular concern to routing the pipeline and are not intended to provide detailed geotechnical data.

The project area is located on the Wasatch Plateau, an area containing coal-bearing strata of sandstone, siltstone, mudstone, and shale. Water is present in small perennial streams, reservoirs, and numerous springs and seeps. Generally, soils are mostly clay loams, sandy loams, and loams. Wet soils are present along perennial streams, marshes, springs, and seeps. Numerous landslide and debris flow deposits occur throughout the

area and are primarily associated with weak clay layers, steep slopes, and wet soil conditions.

Geology

The main geologic issues raised during the scoping process were slope stability and faulting. The pipeline must be located in stable areas to the extent possible. Unstable slopes have the potential to move and damage a pipeline. Cuts and fills and trenching for pipeline construction can disturb steep or wet slopes and old stabilized landslide deposits causing an area to become unstable. Known faults were identified and their hazards evaluated. Data pertaining to geologic formations, faults, and known areas of land failure were gathered from published and unpublished maps, reports, and on-the-ground reconnaissance. Subsidence was also identified as an issue and is discussed in the Coal Resources section of this document.

The project area is located on the Wasatch Plateau which represents the transition between the Colorado Plateau physiographic province to the east and the Basin and Range physiographic province to the west (Stokes 1986).

Strata exposed on the plateau in the project area are late Cretaceous to early Tertiary in age. The rocks are assigned to the following stratigraphic units (in ascending order):

- Mancos Shale
- Star Point Sandstone
- Blackhawk Formation
- Castlegate Sandstone
- Price River Formation
- North Horn Formation
- Flagstaff Limestone

The dip of the strata in this area is generally 6 degrees to the west.

Cretaceous - The Mancos Shale consists primarily of massive, blue-gray, slope-forming mudstone and shale containing several yellow-gray sandstone tongues. It is approximately 5,000 feet thick in this part of the Wasatch Plateau (Hintze 1988).

The Star Point Sandstone consists of several fine to medium-grained sandstone beds that are separated by a tongue of Mancos Shale. This formation also intertongues with the Blackhawk Formation in this area. Knowles (1985) divided the Star Point Sandstone into three members: the upper, middle, and lower. The middle and lower members are separated by the tongue of Mancos Shale.

The Blackhawk Formation consists of thick sandstones with intervening minor beds of shale, siltstone, and limestone. The Blackhawk Formation is about 1,300 feet thick in the Scofield area and contains several thick coal seams.

The Castlegate Sandstone is generally a fine-grained sandstone but is occasionally conglomeratic. Minor partings of shale occur throughout the section. The Upper Cretaceous Castlegate Sandstone was originally considered a member of the Price River Formation by Spieker and Reeside (1925). Fisher and others (1960) later raised the

Castlegate Sandstone to formation rank because of its lateral continuity and distinctive cliff-forming habit (Knowles 1985).

The Price River Formation is composed of very fine to coarse-grained, light yellow-brown sandstone with interbedded mudstone, shale, and siltstone. Flat-pebble conglomerates appear throughout the formation. The Price River Formation is about 310 feet thick in the type locality (Knowles 1985).

Cretaceous-Tertiary - The North Horn Formation contains variegated mudstone, silty claystone, silty sandstone, and limestone. The sandy, clayey siltstone beds are slightly calcareous and weather to a crumbly and splintery texture. Some sandstones are weakly to moderately cemented with calcite and limonite, which makes them more resistant than the others. The limestone beds are more numerous toward the top of the formation near the gradational contact with the overlying Flagstaff Limestone. A few coal seams, only a few inches thick, were encountered in exploratory borings in the North Horn Formation, but they are not exposed.

Tertiary - The Flagstaff Limestone contains thin beds of gray to light-yellowish-gray micro-crystalline limestone with thinly-bedded gray shale and silty claystone. The limestone beds are commonly fossiliferous (Oberhansley 1980).

Several igneous dikes cut the late Cretaceous rocks in the Scofield area. These dikes have been dated as being approximately 25 million years old and generally trend east-west (Tingey 1986). One to 5 feet of coal surrounding the dikes have been coked where the dike cut through the seams making the coal unusable (Coastal States Energy Company 1986). The alignment of Segment 11 (Burnout Canyon and Gooseberry routes) was designed to follow one of these igneous dike zones to minimize impacts to coal recovery.

Quaternary - Glacial deposits are restricted to the high valleys at the north end of the Skyline Mine permit area and near Flat Canyon west of Electric Lake.

Alluvial fans occur along the east wall of the Gooseberry graben east of Lower Gooseberry Reservoir. They are composed dominantly of clay and sand, but contain occasional small sandstone and limestone casts (Oberhansley 1980).

Alluvium is confined to most of the canyon floors and within the valley floors of the Gooseberry and Pleasant Valley grabens. The alluvium consists of fine-grained sand and clay, with pebbles and cobbles in the deeper canyons through which major streams flow.

Landslides - Many of the steep or wet areas within the project area show evidence of land instability. Landslides have originated from the Mancos Shale; the Blackhawk, Price River and North Horn Formations; and alluvial deposits in this area. The North Horn Formation is particularly susceptible to failure. This formation contains many clay beds that form planes of weakness when wet. When the beds within a formation dip (slope) in the same direction as the topography (adverse dip), the potential for land failure increases. Information on the landslide potential of the area was from conversation with specialists at the Forest Service (Price District) and with Questar Pipeline engineering personnel.

A landslide zone is present along the east slope of Upper Huntington Canyon. The slopes repose at angles of over 40 percent to the west, are underlain by the Blackhawk

Formation, and receive about 32 inches of precipitation annually, all adding to their unstable character (Knowles 1985). These landslide deposits can be attributed to a high proportion of clay layers within the Blackhawk Formation, a 6 percent dip of the strata toward the west, and a fault zone that creates planes of weakness in the Blackhawk Formation at the head of the landslide zone.

Debris flows and massive failures are present in the North Horn Formation along the slopes of Gooseberry Creek north of Lower Gooseberry Reservoir at the present pipeline location. A potentially unstable area exists along the relatively steep east-facing slopes east of Skyline Drive where seeps and springs are present in the North Horn Formation. An unstable slope is present east of Gooseberry Creek south of Gooseberry Campground. Debris flows and landslides are present in the North Horn and Price River Formations along the west-facing slopes east of the Gooseberry graben. Smaller areas of land instability include the hillslopes in the Blackhawk Formation in Burnout Canyon, Eccles Canyon, Mud Creek Canyon, and Winter Quarters Canyon.

Faults - Numerous faults are present in the project area. The major faults generally trend north-south and include (from east to west): the Pleasant Valley fault, the O'Connor fault, the Connellville fault, the East Gooseberry fault, the Fairview fault, and the West Gooseberry fault. The displacement on these faults generally ranges between 100 and 1,500 feet. Part of the Connellville fault zone (an area of faulting up to 1,000 feet in width) is present at the eastern edge of the Skyline Mine permit area.

Strata in the western part of the project area were relatively displaced downward between two faults, the East Gooseberry and West Gooseberry faults, creating an elongated valley called the Gooseberry graben. Maximum displacement is 1,200 feet along the East Gooseberry fault. Bureau of Reclamation seismotectonic studies indicate that fault movement has occurred in this area as recently as 10,000 to 20,000 years ago (Utah Division of Water Rights, 1990, written communication).

Specific Descriptions

Table 3-1 summarizes information regarding slope, known land instability, and seep areas.

Alternatives A and B - The existing pipeline along Segments 12* and 13* crosses approximately 5 miles of North Horn Formation as it traverses to the northwest corner of the Skyline Mine permit area. Approximately 0.5 mile of Price River Formation, Castlegate Sandstone, and Blackhawk Formation are crossed along the slopes on the east side of the Gooseberry graben. Within the Skyline Mine permit area, approximately 0.2 mile of North Horn Formation, 2 miles of Price River Formation and Castlegate Sandstone, and 2.1 miles of Blackhawk Formation are crossed. The remainder of the existing pipeline along Segments 7*, 10*, 19* and 23* crosses approximately 2.6 miles of Blackhawk Formation and 1.5 miles of the Star Point Sandstone. Approximately 0.7 mile of identified unstable slopes occur along Segment 12* in the North Horn Formation on the slopes adjacent to Gooseberry Creek and in the Price River Formation along the west-facing slopes east of the Gooseberry graben. Steep (greater than 30 percent) slopes exist along 5.0 miles of pipeline primarily in Segment 12* near Gooseberry Creek and the eastern edge of the Gooseberry graben and adjacent to Mud Creek along Segments 19* and 23*.

TABLE 3-1
SUMMARY OF GEOLOGICAL RESOURCES
(Miles of entire route/Miles of new pipeline)

Route	Total Miles	Known Land Instability	Known Seep Areas	Slopes Greater Than 60%	Slopes 30 % to 60 %	Slopes 8 % to 30 %	Slopes less than 8 %
Alternative A							
No-Action	13.5/NA	0.7/NA	0.0/NA	0.7/NA	4.3/NA	1.8/NA	6.7/NA
Alternative B							
Leave in Place, Full Extraction Mining	13.5/4.25	0.7/0.0	0.0/0.0	0.7/0.0	4.3/0.6	1.8/0.5	6.7/3.15
Alternative C							
Burnout Canyon (1)	14.9/5.7	0.9/0.2	0.0/0.0	0.7/0.0	4.2/0.6	1.2/0.3	8.8/4.8
Burnout Canyon (2)	15.1/5.2	0.9/0.2	0.0/0.0	0.7/0.0	4.5/0.9	1.1/0.2	8.8/4.1
Burnout Canyon (3)	15.1/5.9	2.6/1.9	0.0/0.0	0.7/0.0	4.7/1.1	2.8/1.9	6.9/2.9
Burnout Canyon (4)	15.3/5.4	2.6/1.9	0.0/0.0	0.7/0.0	5.0/1.4	2.7/1.8	6.9/2.2
Alternative D							
Gooseberry Route	16.7/12.6	0.6/0.6	0.2/0.2	0.6/0.6	3.4/2.0	2.2/1.3	10.5/8.7
Valley Camp Triangle Connectors							
(1)	1.0/0.6	0.0/0.0	0.4/0.4	0.1/0.1	0.2/0.2	0.7/0.3	0.0/0.0
(2)	0.9/0.6	0.0/0.0	0.4/0.4	0.0/0.0	0.0/0.0	0.8/0.5	0.1/0.1
(3)	0.5/0.5	0.0/0.0	0.0/0.0	0.0/0.0	0.0/0.0	0.4/0.4	0.1/0.1
Alternative E							
Winter Quarters (1)	16.1/12.4	0.7/0.0	0.0/0.0	0.7/0.0	2.3/0.3	2.4/2.4	10.7/9.7
(with Segments 19* and 23*)	20.2/12.4	0.7/0.0	0.0/0.0	0.7/0.0	3.3/0.3	3.3/2.4	12.9/9.7
Winter Quarters (2)	17.2/12.2	0.7/0.0	0.0/0.0	0.7/0.0	3.1/0.7	2.9/2.4	10.5/9.1
(with Segment 19*)	20.0/12.4	0.7/0.0	0.0/0.0	0.7/0.0	3.7/0.7	3.3/2.4	12.3/9.1

Alternative C - Burnout Canyon Route (1) - Refer to the discussion for the existing route regarding Segments 12*, 13*, 19*, and 23*. From the northern end of Segment 14, new pipeline would cross approximately 0.6 mile of North Horn Formation, 0.6 mile of Price River Formation, 0.1 mile of Castlegate Sandstone, and 0.2 mile of Blackhawk Formation. The pipeline would then cross approximately 3 miles of alluvium along Upper Huntington and Burnout canyons. The remainder of the route would cross the Blackhawk Formation. Approximately 0.2 mile of unstable land would be crossed on the slope north of Burnout Creek. The entire route would cross 4.9 miles of steep (greater than 30 percent) slopes, 0.6 mile of which would be crossed by new pipeline north of The Kitchen and in Burnout Canyon. The entire route would cross about 0.9 mile of unstable slopes, 0.2 mile of which would be crossed by new pipeline.

Alternative C - Burnout Canyon Route (2) - New pipeline construction would cross the same formations as Burnout Canyon (1) except the North Horn Formation would not be crossed and 0.7 mile of Price River Formation would be crossed. The entire route would cross about 5.2 miles of steep (greater than 30 percent) slopes of which about 0.7 mile is unstable. New pipeline would cross 0.2 mile of known instability in the Blackhawk Formation on the slopes east of Upper Huntington Creek. Approximately 0.9 mile of steep slopes greater than 30 percent would be crossed by new pipeline north of The Kitchen and on the slopes in Burnout Canyon.

Alternative C - Burnout Canyon Route (3) - This route would cross the same formations as Burnout Canyon Route (1) except along Upper Huntington Canyon where 2.3 miles of Blackhawk Formation would be crossed along Segment 24. The entire route would cross approximately 2.6 miles of potentially unstable land of which 1.9 miles would be crossed by new pipeline. Approximately 1.7 miles of the 1.9 miles would cross the bottom of an unstable area adjacent to Highway 264 west of Upper Huntington Creek where minor slumping of soils occur on the upper slopes. Approximately 0.2 mile of unstable land would be crossed on steep slopes north of Burnout Canyon. The entire route would cross 5.4 miles of steep slopes (greater than 30 percent) of which 1.1 miles would be crossed by new pipeline north of The Kitchen, west of Upper Huntington Creek, and in Burnout Canyon.

Alternative C - Burnout Canyon Route (4) - This route would cross the same formations as Burnout Canyon Route (2) except along Upper Huntington Canyon where 2.3 miles of Blackhawk Formation would be crossed along Segment 24. The unstable areas crossed by this route would be the same as Burnout Canyon Route (3). The entire route would cross 5.7 miles of steep slopes (greater than 30 percent) of which 1.4 miles would be crossed by new pipeline north of The Kitchen, west of Upper Huntington Creek, and in Burnout Canyon.

Alternative D - Gooseberry Route - Refer to the discussion for the existing route regarding Segments 19* and 23*. The proposed Gooseberry Route would cross approximately 5.8 miles of the Flagstaff Limestone and 1.5 miles of the North Horn Formation in the Gooseberry graben. Between the Gooseberry graben and Upper Huntington Canyon, the route would cross 2.8 miles of the Blackhawk Formation, Castlegate Sandstone, the Price River Formation, and the North Horn Formation. The remainder of the proposed new pipeline would cross the Blackhawk Formation and alluvium along Upper Huntington and Burnout canyons. New pipeline would cross 0.6 mile of unstable land immediately west of Gooseberry Creek, on the slopes east of the Gooseberry graben, and on the slopes north of Burnout Creek. Approximately 0.2 mile of seep areas are present on the slopes east of Skyline Drive. There are approximately 4.0

miles of steep (greater than 30 percent) slopes along the route, of which 2.6 miles would be crossed by new pipeline.

Valley Camp Triangle Connectors (1 through 3) - The segments in this area would cross the Blackhawk Formation. Unstable land has been identified in the area along Connector (1) and (2). Seeps and springs are present in the area. All of the segments would cross moderately steep (between 8 and 30 percent) and gentle slopes except Segment 5/6 which crosses 0.3 mile of steep slopes.

Alternative E - Winter Quarters Route (1) - Refer to the discussion for the existing route regarding Segment 12*. The route would cross 1.3 miles of North Horn Formation, 1.3 miles of the Price River Formation, 1 mile of the Castlegate Sandstone, and 2 miles of Blackhawk Formation along the ridge north of Winter Quarters Canyon. The remainder of the route would be in the Blackhawk Formation, except in Pleasant Valley where there is alluvium. No landslide deposits have been identified along the route. The entire route not including Segments 19* and 23* would cross approximately 3.0 miles of steep slopes (0.3 mile would be crossed by new pipeline). Segments 19* and 23* cross approximately 0.6 mile of Star Point Sandstone and 3.5 miles of Blackhawk Formation. Steep slopes are present along 1 mile on the slopes east and west of Mud Creek. No unstable land areas or seeps were identified along these segments.

Alternative E - Winter Quarters Route (2) - This route is similar to Winter Quarters Route (1), except the entire route not including Segment 19* would cross about 3.8 miles of steep slopes (greater than 30 percent) of which 0.7 mile is unstable (Segment 12*). New pipeline would cross 0.7 mile of steep slopes, none of which have been identified as unstable. Segment 19*, associated with this alternative, crosses approximately 0.5 mile of Star Point Sandstone and 2.3 miles of Blackhawk Formation. Steep slopes (greater than 30 percent) east of Mud Creek are present for 0.6 mile. No unstable land or seeps were identified along this segment.

Coal

The project area is located in the Wasatch Plateau coal field. Four minable coal seams are present in the Blackhawk Formation in the Skyline Mine permit area. They are, in ascending order, the Lower O'Connor "A" (0 to 24 feet thick), Lower O'Connor "B" (0 to 17 feet thick), Upper O'Connor (0 to 16 feet thick), and McKinnon (9 to 8 feet thick) (Coastal States Energy Company 1986). These coals are of high-volatile B rank and, in general, contain few partings. The McKinnon seam appears to be of minable thickness only in the southwest corner of the lease area. Other minor coal horizons exist in the area but are localized and rarely reach thicknesses that are economically worth extracting (Knowles 1985).

Little is known about the thickness or tonnages of coal west of Upper Huntington Canyon. The coal between the Gooseberry graben and Upper Huntington Creek is covered with 1,150 to 1,625 feet of overburden as measured in the canyon bottom. The East Gooseberry fault, the east boundary of the Gooseberry graben, displaces the strata and effectively terminates the economically recoverable coal-bearing units in the area. West of the fault, the coal is too deep (>3,000 feet) to mine using current mining methods and technology (Oberhansley 1980). However, within the life expectancy of the pipeline, future technology may allow mining.

The 3 seams being mined by the Skyline Mine on Federal Coal Leases U-073120, U-0147570, portions of U-044076, and U-020305 include the Upper O'Connor (Mine No. 1), Lower O'Connor "B" (Mine No. 2) and the Lower O'Connor "A" (Mine No. 3). The extent of these seams is variable within the bounds of the property. The recoverable coal in the Upper O'Connor seam and the Lower O'Connor "B" seam generally lies within the southern three-quarters of the permit area. The Lower O'Connor "A" seam contains recoverable coal in the northern half of the permit area.

Two geologic features affecting coal mining are present in the area. Numerous north-trending faults displace strata disrupting the continuity of the coal seams and making mining within or across a fault zone difficult or impractical. This is evident along the Connellville fault zone (up to 1000 feet wide) where mining is not feasible between the Skyline Mine and Valley Camp permit areas because of vertical displacement of the strata. Igneous dikes also cut across the coal seams in this area and prohibit coal mining in the dike zone. A poorly defined dike zone is oriented in an east-west direction and would be crossed by Segments 2, 6, and 10*. Dike zones and fault zones are preferred areas for the placement of the proposed pipeline since mining is not usually feasible within these zones.

The project issues regarding coal include:

- the effects that the sequence of mining would have on the operation of the Skyline Mine
- the effects of subsidence on the pipeline from underground coal mining activities by full extraction methods
- the amount of potentially recoverable coal that would need to be left in place along any of the alternative routes for the purpose of protecting the pipeline and the value of that recoverable coal

Sources of Information - In late September of 1989, the Forest Service requested that the BLM, the Federal agency responsible for administering coal leases on Federal lands, prepare a report, which would provide estimates of recoverable coal and other coal-related information for each of the alternative routes. The information provided by the BLM was supplemented with relevant coal information from other sources to prepare this section of the EIS. With the exception of the Skyline Mine permit area, there is a lack of sufficient data, which precluded detailed analysis. The confidential information used in this analysis is not specifically displayed. Other information is based on limited testing or is speculative.

Detailed information regarding recoverable-coal-seam thickness was provided by Utah Fuel for the Skyline Mine permit area. The Kanawha and Hocking Coal and Coke Company provided 1982 information for the Valley Camp Mine. The BLM provided locations and tonnages of recoverable coal in seams at least 5 feet thick along the alternative proposed routes. The number and actual thicknesses of seams is considered confidential.

Coal Mining - There are two methods of underground mining typically used in the region: room-and-pillar mining and longwall mining.

Room-and-pillar mining, which uses continuous mining machines (continuous miners), has been the standard method of underground mining in this country since the 19th century. The "rooms" are empty areas from which coal has been removed; the "pillars" are blocks of coal left in place to support the roof of the mine. This method can be used where the minable coal is a minimum of 5 feet thick. Room-and-pillar mining involves two stages. The first stage is development mining or first mining. Development mining is the driving or mining of mains and panels to access areas of coal in preparation for the second phase of room-and-pillar mining, recovery or second mining. This involves mining coal from the pillars and reducing their size in order to maximize recovery during retreat from a specific area or panel of coal, which will then be abandoned. Over a period of time, the roof of the abandoned area will usually fail causing subsidence of the surface.

Full-support mining involves leaving sufficient pillars in place, as needed, to prevent roof falls and subsidence. This type of mining is usually employed along mains and in areas beneath surface structures that must be protected. If only first mining is done, then only a limited amount of the recoverable coal in a seam can be extracted. Second mining allows more coal extraction.

Longwall mining is a more modern technology where continuous blocks of coal, usually 400 to 700 feet wide along the face and as much as 1 mile long, are mined. The minimum mining height for this method is 7 feet. Room-and-pillar mining is used for development of mains and entries and for blocking out longwall panels. The longwall machine is then set in place. The longwall shear advances back and forth parallel to the coal face cutting the coal and depositing it onto a chain conveyor. Movable hydraulic roof supports (shields) advance with the shear and support the roof over the immediate work area protecting the operators. This allows the roof behind the shields to immediately cave-in or "gob," which results in subsidence. The longwall method allows the most complete and safest mining of the coal. This method is highly productive and is time and cost efficient (approximately \$8.00 per ton less than room-and-pillar method). Subsidence over areas mined by the longwall method is usually more rapid and even than over areas mined by room-and-pillar methods.

According to Utah Fuel's mine plan, longwall mining will be the primary recovery method throughout the Skyline Mine and first mining will be used only in the areas of main entries (which must remain open) and other restricted areas such as under perennial streams and existing and operating surface uses (i.e., the pipeline). Segments under which longwall mining is currently planned in the Skyline Mine include 15, 17*, 18*, 3b, and a portion of 14.

Room-and-pillar mining is used in the Valley Camp Mine. No other leases are being mined in the project area.

Mining Sequence - Utah Fuel's mine plan describes the sequence in which recoverable coal reserves of the Skyline Mine will be mined. Longwall panels are planned sequentially across Mine No. 1 from east to west. After Mine No. 1 is completely mined, the same general sequence would occur in Mine No. 2 and then in Mine No. 3, which lie sequentially below Mine No. 1. A longwall panel is planned under a portion of Segment 18* for the Fall of 1990.

Subsidence - In an engineering study conducted for Utah Fuel Company, Ko and Associates (1989) state that subsidence from longwall-mining in the Skyline Mine lease area would be approximately 80 percent of the height of coal extracted (e.g., removal of

coal from a 5-foot seam could result in subsidence of the land's surface of up to 4 feet). Consequently, it has been estimated that subsidence in the area could range from 4 to 24 feet.

Ko and Associates (1989) used a computer-assisted model to predict timing, and Questar Pipeline evaluated the resulting potential stress to the pipeline. The results, although generalized for the entire length of the segment of pipeline, indicated that stress caused by subsidence of 10 feet or more could damage the pipeline. However, subsidence-induced stress would occur unevenly along the length because of geologic variations and discontinuities along the pipeline route. Subsidence and consequent stress could be greater in localized areas.

Subsidence cannot be quantified outside of the Skyline Mine lease area. Subsidence will occur in these areas if and when the recoverable coal reserves are mined. It can be assumed for the purpose of this analysis that any area mined could result in subsidence that could damage a pipeline.

A 1.65-mile section of the existing pipeline overlies the longwall panels in the south portions of Mine Nos. 1, 2 and 3 in the lease area. Due to the fact that there are 3 seams, the pipeline would be subsided 3 separate times requiring partial, if not complete replacement of the pipeline each time. Coal under this portion is projected to be mined during the periods 1990 to 1993, 1998 to 1999, and 2003 to 2004. The northern 2.6-mile portion of the pipeline overlies the Mine No. 3 seam, which is projected to be mined from about 1992 to 1996.

Reserve Estimates - The occurrence of recoverable coal, an important economic resource for the United States, Utah, and local communities, is widespread in this region. As a part of the environmental analysis, from both natural and economic resource perspectives, it is important to identify the amount of recoverable coal that would be crossed by the pipeline along any of the routes. As previously stated in other parts of this document, full extraction of recoverable coal resulting in subsidence would cause stress to an overlying pipeline. Limited mining below a pipeline would minimize subsidence. However, unmined coal represents a valuable resource lost. An alternative would be to construct a bypass pipeline in an area that would not be affected by future mining.

The BLM assessed the coal resources for each segment of the pipeline reroute project and analyzed the existing and proposed routes. The available coal information was evaluated in the vicinity of all segments (including Segment 11 which has since been eliminated from further consideration). This included reviewing geophysical data from approximately 75 drill holes and the mining and reclamation plans for the Skyline and Belina Mines. Additional information was also obtained from internal reports, confidential submissions, and professional publications.

Tables 3-2 and 4-3 (in Chapter 4) summarize this information regarding estimated coal reserves in place (minable coal) and estimated coal reserves that are recoverable, along with two qualifying factors; the confidence level of the data and the development potential. Recoverable reserves are generally calculated at 50 percent of the minable reserves. Recoverable reserves are only provided where there is a medium-to-high development potential. Coal reserve estimates are based on leaving a subsidence barrier zone in the coal under the pipeline to protect it. The thickness of this barrier was derived from data on the overburden assuming a 22 degree angle of draw. This angle of

draw has been observed to be accurate in subsidence studies in the Wasatch Plateau coal field. On this basis, the BLM generated reserve polygons along the segments by extrapolating the best available information on coal seam thicknesses.

Most segments within a coal lease or a producing mine have a high confidence level and a high development potential. For other areas where there is less data available, the confidence level is mentioned in association with the coal resource and the development potential is explained where appropriate. Where they have similar coal resource factors, the assessments of segments and portions of segments are combined for simplicity and are then referred to as sections.

Specific Descriptions

The brief descriptions below summarize available information about estimated coal reserves. Figures reflecting estimated reserves, values, and royalties for each route (entire route and new pipeline) are shown on Table 4-3 (in Chapter 4).

Alternative A - No Action - The existing route crosses approximately 27.6 million tons of recoverable coal and the area that would be affected within the Skyline Mine leasehold crosses approximately 14.9 million tons of recoverable coal.

Along Segment 13* and the southeasternmost 0.5-mile of Segment 12*, there is evidence of recoverable coal reserves. These unleased reserves are considered to have a medium-to-high potential for development. The remaining portion of Segment 12* overlies 20.9 million tons of implied minable coal, which is too deep to mine using present technology. Overburden in the Gooseberry graben approaches the upper limit of minability (3,000 feet). The nature and extent of coal along this portion of Segment 12* is largely unknown because of the sparse data available. Segments 18* and 17* diagonally cross through the central portion of the Skyline Mine permit area (leases U-073120, U-0147570, and U-044076 and U-020305 jointly held with Valley Camp). Most of the coal beneath Segment 7* is within the Connellville fault zone; however, a small amount of coal is recoverable from the Skyline Mine. An extensive igneous dike zone in the Belina Mine is projected under much of Segment 10* and would preclude coal development; however, there are some additional coal reserves recoverable from the Belina Mine.

The western portion of Segment 19* is within Federal Coal Lease U-020305 and is part of the Valley Camp Belina Mine permit area, an area considered to have a high potential for development. The eastern portion of Segment 19* is below the coal horizon and therefore, not affected by coal mining. The majority of Segment 23* is adjacent to or directly underlain by workings of the abandoned Clear Creek Mines. The only apparent remaining, recoverable reserves occur on the eastern portion of this segment where it crosses Federal Coal Lease SL-062605. Even though this lease has been extensively mined, the BLM considers these reserves to have a medium potential for development.

Although it is estimated that up to 5 million tons of the 14.9 million tons of recoverable reserves under the pipeline could be mined, the recoverable reserves that would be left in place are shown as 14.9 million tons on Tables 2-2 and 4-3. This was done for the purpose of assuring equitable comparison with the other routes where data are not sufficient to calculate how much could be mined using full support methods.

TABLE 3-2
COAL ESTIMATES BY SEGMENT

Segment	Estimated In Place Reserves (mmt)	Estimated Recoverable Reserves (mmt)	Confidence Level	Development Potential
1	90.7	9.1	Med	Med
2	2.7	0.0	Med	None
3 a	1.6	0.0	High	None
3 b	6.0	0.5	High	High
4	1.3	0.5	High	High
5	2.7	0.8	High	Low
6	1.4	0.7	High	High
7 *	1.1	0.3	High	High
8	3.2	1.3	High	High
9	1.8	0.9	High	High
10 *	1.7	0.3	High	High
11	8.7	3.5	High	High
12 *	31.1	5.1	Med to High	Med to High
13 *	9.6	4.8	Med	Med to High
14	5.3	2.1	High	Med to High
15	4.7	2.4	High	High
16	7.7	0.0	High	None
17 *	4.7	2.4	High	High
18 *	25.0	12.5	High	High
19 *	2.6	1.3	High	High
20	26.5	7.7 10.6 2.9	Med to High Med to High	Med to High Low to Med
21	2.1	1.0	High	Low to Med
22	13.5	6.8	Med to High	Low to Med
23 *	2.2	0.9	High	Med
24	10.4	0.0	High	None

SOURCE: Bureau of Land Management, January 1990

*Segment part of existing route.

Alternative B - Leave in Place, Full Extraction Mining - The description above for Alternative A applies here. However, under this alternative, the 14.9 million tons of recoverable coal would be mined.

Alternative C - Burnout Canyon Route (1) - The entire route (excluding the Valley Camp Triangle Connector) would cross approximately 14.7 million tons of recoverable coal, and the area that would be affected by construction of the pipeline would cross approximately 2.6 million tons of recoverable coal.

Refer to the description of Alternative A regarding Segments 23*, 19*, 13*, and 12*. Segments 16, 2, 3a, and the southern portion of Segment 14 would fall within the Skyline Mine permit area, but follow Huntington Creek. Although minable reserves are identified in this area, Huntington Creek is a perennial stream under which mining is severely restricted. The current Skyline Mine mine plan has been designed to accommodate this restriction. The northern portion of Segment 12* overlies coal too deep (>3,000 feet) to mine. The northern portion of Segment 14 would lie outside of the Skyline Mine property and would overlie unleased Federal coal that has a medium-to-high potential for development.

Alternative C - Burnout Canyon Route (2) - The entire route excluding the Valley Camp Triangle Connector would cross approximately 17.4 million tons of recoverable coal and the area of the proposed pipeline would cross approximately 2.9 million tons of recoverable coal. The difference between Burnout Canyon Routes (1) and (2) is the use of Segments 15 and 17* rather than Segment 14. Segments 15 and 17* would cross through the northwesternmost corner of the Skyline Mine property. Currently, Utah Fuel plans to longwall mine in that area.

Alternative C - Burnout Canyon Route (3) - The amount of recoverable coal crossed by this route would be the same as Burnout Canyon Route (1).

Alternative C - Burnout Canyon Route (4) - The amount of recoverable coal crossed by this route would be the same as Burnout Canyon Route (2).

Alternative D - Gooseberry Route - There are an estimated 11.8 million tons of recoverable coal beneath this entire route (excluding the Valley Camp Triangle Connector), 9.6 million tons of which underlie the area of the proposed new pipeline.

Segments 2 and 3a would lie within the Skyline Mine permit area and follow Huntington Creek. According to the BLM, these segments would overlie limited minable coal. However, Huntington Creek is a perennial stream and mining is severely restricted beneath it (refer to Alternative C - Burnout Canyon Route (1)). Segments 3a and 3b would be within the Skyline Mine lease area.

The first two miles of the eastern portion of Segment 1 are underlain by recoverable coal reserves except for the portion on the Skyline Mine permit area where mining is restricted beneath Upper Huntington Creek. The 9.1 mmt of coal reserves along Segment 1 are not leased, but could be accessed from the existing Skyline Mine and are considered to have a medium-to-high potential for development. Some privately owned coal reserves (approximately 2.3 mmt) are located along this segment. The nature and extent of the coal reserves under the remaining portions of Segment 1 are largely unknown because of the sparse data available. Minimal coal data exist west of Gooseberry Creek. This area is considered to have a low potential for development due

to the distance from any active coal mine and lack of data. Furthermore, part of the segment would be located in the Gooseberry graben where the thickness of overburden above any coal seams is at the limit of minability (3,000 feet). Coal under these segments could not be mined using present technology. The BLM estimates that 72.5 million tons of implied minable coal exists under this portion of Segment 1.

Valley Camp Triangle Connectors - All of these segments would be located at the junction of 3 Federal coal leases, U-020305, U-017354, and U-044076, through which trends the Connellville fault zone. Production from coal reserves west of the fault zone is from the Skyline Mine, and production from reserves east of the fault zone occurs from Valley Camp's Belina Mine. Mining within the fault zone is not feasible. The western portion of Segment 4, Segment 7*, and the northern portion of Segment 8 would be within the Connellville fault zone. An extensive igneous dike zone is present beneath Segment 10*. The eastern portion of Segment 4 and the southern portion of Segment 8 and Segment 9 would overlie recoverable coal reserves of the Belina Mine. Segment 5/6 would overlie recoverable coal reserves of the Skyline Mine. Estimated recoverable coal reserves that could be impacted by new pipeline for all connectors range from 1.4 mmt to 1.8 mmt.

Alternative E - Winter Quarters Route (1) - There are an estimated 22.5 million tons of coal beneath the entire route and 17.4 million tons beneath the area of proposed new pipeline. Beneath the existing pipeline of associated Segments 19* and 23*, which cannot be abandoned if this route is selected, there are an estimated 2.2 mmt of coal (a total of 24.7 mmt beneath the entire route and associated segments).

There are recoverable coal reserves beneath the westernmost 2.5 miles of Segment 20. These reserves are not within a Federal coal lease but are considered to have a medium-to-high potential for development because they could be accessed from the Skyline Mine. Limited data along the west-central part of this segment indicate the presence of recoverable coal reserves, but there is a low potential for development because of the remoteness of the area. Old abandoned mines characterize the central part of the segment and some areas have been mined out. Segment 20 would cross the abandoned Winter Quarters, Scofield, Pleasant Valley, and Utah No. 2 mines. These mines and the immediate surrounding area, which is partially below the coal horizon, have little or no potential for development. The remaining portion of Segment 20 would cross Federal Coal Lease U-47974 with recoverable reserves. This lease is not included in an operating mine and is considered to have a medium potential for development.

The northern portion of Segment 22 would cross Federal Coal Lease U-47974 and the southern portion would be in Federal Coal Lease SL-062605 (Kanawha and Hocking). In 1979, the central portion of this segment was delineated in the Gordon Creek coal lease tract. Two minable coal seams are expected to underlie the entire segment. The area on the lease has a moderate potential for development, and off the lease it has a low-to-medium potential. Segment 12* is described under Alternative A.

Alternative E - Winter Quarters Route (2) - There are an estimated 17.6 mmt of coal beneath the entire route and 1.3 mmt of coal beneath the existing pipeline of Segment 19*, which cannot be abandoned if this route is selected (a total of 18.9 mmt of coal beneath the entire route and associated Segment 19*). There are 11.6 mmt beneath the area of proposed new pipeline. Refer to the discussion for Winter Quarters Route (1) regarding Segment 20 and to Alternative A regarding Segments 12* and 23*. Most of Segment 21 would follow Mud Creek, which is below the coal horizon. The northernmost

3/4 mile of the Segment 21 would be adjacent to Federal Coal Lease U-47974, for which there is data that establishes the presence of recoverable reserves. The area has a low-to-medium potential for development.

Paleontology

The main issue pertaining to paleontological resources is the general concern for the preservation of certain fossils. Within the general region, scientifically important fossils such as dinosaur bones and mammoth and mastodon remains have been found. Trace, plant, and invertebrate fossils are the most numerous fossils present in the geologic formations in the study area. In the overview of paleontological resources that follows, the potential for yielding fossil remains is discussed. The following inventory has been compiled from literature and locality record searches.

Vertebrate fossils including dinosaurs, turtles, fish, birds, and crocodiles are found occasionally in the Flagstaff Limestone, the North Horn Formation, and coal beds of the Blackhawk Formation. Mammoth and mastodon remains have been found in sinkholes and glacial till deposits in the Wasatch Plateau.

In the Star Point Sandstone, the plant fossils found mainly along the Mud Creek drainage include numerous leaves and stems. Trace fossils include smooth tubes, large tubes, and plug-shaped burrows. Ostracodes, pelycepod, and foraminifera are also found in this formation.

The Blackhawk Formation contains numerous fossilized leaves, stems, and cones. A tooth from a small carnivorous dinosaur and dinosaur tracks have been found in the coal beds of the Blackhawk Formation near the Skyline Mine portals. The Castlegate Sandstone and the Price River Formation contain carbonized leaves.

The North Horn Formation contains fossils that include turtle-shell fragments, bone fragments, and fish scales and bones. Mammal and dinosaur bones have been collected from other North Horn localities, but none have been found in this area. Invertebrate fossils found include ostracodes, pelycepod, and gastropods. The Flagstaff Limestone contains clam and snail fossils along with vertebrate fossils such as turtles, crocodiles, and fish (Robison 1989).

A poorly preserved bone fragment of a large Pleistocene mammal was found in alluvial gravels at the mouth of Swens Canyon above the present stream level (Knowles 1985). A review of locality records housed at the Utah Division of State History reveals that three localities along the proposed routes have known plant fossils. These localities occur in the Price River Formation along Segment 17*, and in the Blackhawk Formation along Segments 9 and 18*.

All of the routes would cross formations that have the potential to yield fossils. The most sensitive fossils (mammoth and mastodon) would most likely occur in alluvium in the Gooseberry graben along Segment 1, and in alluvium in Upper Huntington Canyon along Segments 2, 3a and 16. These segments are part of the Gooseberry Route and the Burnout Canyon Route.

The potential for finding the most sensitive fossils (mammoth and mastodon) along each of the segments is presented in the cultural resources section.

Soils

The issues pertaining to soils are soil erosion and compaction from pipeline construction and maintenance. Erosion occurs from the bare soil surface after the soil has been placed over the buried pipeline. Compaction occurs from movement of heavy equipment across the soil surface.

Background

The soils in the study area are on mountain ridges and steep sideslopes, and in valleys with flat bottoms or rolling hills at an elevation range of 7,000 to 10,000 feet. On the mountain ridges and side slopes, the soils are generally deep or moderately deep, well-drained silt loams, clay loams, and loams. Rock fragments, gravel, stones, or boulders occur on the surface of much of the mountain soils, while dense litter covers the soil in forested areas. Rock outcrops occur occasionally on the sideslopes. The hazard of water erosion is high on most of the steep side slopes if vegetation is removed, and is moderate to low on the mountain ridges and valley bottoms.

The soils on the rolling hills and flat valley bottoms are generally shallow to very deep consisting of clay loams, or loams with gravel and cobbly rock occurring near canyon side slopes. The hazard of water erosion for these soils are generally moderate to low.

No prime farmland occurs in the study area.

The soils in the riparian areas are generally deep, fine loams overlying sands or sands containing gravels, cobbles, and some boulders. Wetland soils are present immediately adjacent to the streams and in about half the area of the flat-bottomed valley at the mouth of Winter Quarters Canyon and Mud Creek near Scofield. These wetland soils have a high potential for compaction and low soil stability during trenching activities. Most of the corridor right-of-way along Mud Creek north of Clear Creek and along Upper Huntington Creek is on the dry meadow areas outside the wet soil areas near the stream.

The inventory for the soils was obtained from soil descriptions prepared by the Forest Service and from the Soil Survey of the Carbon Area prepared by the Soil Conservation Service (SCS). The study area contains 36 soil map units of which 19 could be crossed by the alternative routes. Table 3-3 summarizes stream crossings, riparian areas crossed, erosion potential, and land instability by alternative.

Specific Descriptions

Alternatives A and B - The route crosses 4.4 miles of potential high erodible soils located along Segment 12* near Gooseberry Creek, along Segments 10* and 19* near the Valley Camp Triangle, and along the eastern part of Segments 19* and 23*. The remaining 8.8 miles of the route contain soils with a moderate potential for erosion, except along 0.3 mile at the western end of Segment 12* which has a low soil erosion potential. Approximately 0.7 mile of unstable land is located near Gooseberry Creek.

Alternative C - Burnout Canyon Route (1) - The entire route would cross 5.4 miles of potentially high erodible soils, of which only 3 miles would be crossed by new pipeline. Approximately 9.2 miles (2.7 miles would be crossed by new construction) of moderate

TABLE 3-3
SUMMARY OF SOIL AND WATER RESOURCES
(Miles of entire route/Miles of new pipeline)

Route	Total Miles	Number of Perennial Stream Crossings	Miles Within 500 feet of a Perennial Stream	Potential Hazard of Erosion			Known Land Instability and Seep Areas
				High	Moderate	Low	
Alternative A							
No-Action	13.5/NA	2 / NA	0.4/NA	4.4/NA	8.8/NA	0.3/NA	0.7/NA
Alternative B							
Leave in Place, Full Extraction Mining	13.5/4.25	2 / 0	0.4/0.0	4.4/0.4	8.8/3.85	0.3/0.0	0.7/0.0
Alternative C							
Burnout Canyon (1)	14.9/5.7	12 / 10	3.7/3.3	5.4/3.0	9.2/2.7	0.3/0.0	0.9/0.2
Burnout Canyon (2)	15.1/5.2	12 / 10	3.7/3.3	5.4/3.0	9.4/2.2	0.3/0.0	0.9/0.2
Burnout Canyon (3)	15.1/5.9	5 / 3	3.9/3.5	5.6/3.2	9.2/2.7	0.3/0.0	2.6/1.9
Burnout Canyon (4)	15.3/5.4	5 / 3	3.9/3.5	5.6/3.2	9.4/2.2	0.3/0.0	2.6/1.9
Alternative D							
Gooseberry Route	16.7/12.6	7 / 6	2.0/1.8	4.9/1.4	7.3/6.7	4.5/4.5	0.8/0.8
Valley Camp Triangle Connectors							
(1)	1.0/0.6	0 / 0	0.0/0.0	0.1/0.0	0.9/0.6	0.0/0.0	0.4/0.4
(2)	0.9/0.6	0 / 0	0.0/0.0	0.1/0.0	0.8/0.6	0.0/0.0	0.4/0.4
(3)	0.5/0.5	0 / 0	0.0/0.0	0.1/0.1	0.4/0.4	0.0/0.0	0.0/0.0
Alternative E							
Winter Quarters (1)	16.1/12.4	3 / 2	0.6/0.4	6.2/6.2	9.6/6.2	0.3/0.0	0.7/0.0
(with Segments 19* and 23*)	20.2/12.4	4 / 2	0.8/0.4	7.4/6.2	12.5/6.2	0.3/0.0	0.7/0.0
Winter Quarters (2)	17.2/12.2	6 / 5	2.6/2.2	5.7/5.7	11.2/6.5	0.3/0.0	0.7/0.0
(with Segment 19*)	20.0/12.2	7 / 5	2.8/2.2	6.4/5.7	13.3/6.5	0.3/0.0	0.7/0.0

potential erodible soils occur along the entire route. Approximately 0.7 mile of unstable land is located near Gooseberry Creek along the existing pipeline (Segment 12*), and 0.2 mile of unstable land occurs along the slope north of Burnout Canyon (Segment 3b) that would be crossed by new pipeline. This route would lie adjacent to approximately 2.7 miles of riparian area in Upper Huntington Canyon. Pipeline construction would occur across wetland soils near 10 stream crossings in the riparian areas (9 stream crossings in Upper Huntington Canyon, 1 across stream in Burnout Canyon). Approximately 100 feet of wet soils would be crossed near a spring located on the hillslope south of the stream in Burnout Canyon (Segment 3b).

Alternative C - Burnout Canyon Route (2) - Pipeline construction would cross the same amount of high potential erodible soils as Burnout Canyon Route (1). The entire route would cross 9.4 miles of moderately erodible soils, but approximately 2.2 miles of potentially moderate erodible soils would be crossed by new pipeline. The length of the riparian area, unstable land, and streams that would be crossed by new pipeline would be the same as in the Burnout Canyon Route (1).

Alternative C - Burnout Canyon Route (3) - This route would cross the same amount of potentially erodible soils as Burnout Canyon Route (1) with the addition of 0.2 mile of potentially high erodible soils along Segment 24 in Upper Huntington Canyon. Pipeline construction would occur across approximately 0.5 mile of riparian area. Wetland soils occur near 3 stream crossings (2 stream crossings in Upper Huntington Canyon, 1 stream crossing in Burnout Canyon). The entire route would cross approximately 2.6 miles of unstable land of which 1.9 miles would be crossed by new pipeline construction.

Alternative C - Burnout Canyon Route (4) - The entire route would cross the same amount of potentially erodible soils as Burnout Canyon Route (2), with the addition of 0.2 mile of potentially high erodible soils along the bottom of Upper Huntington Canyon. The amount of unstable land, riparian area, and wetland soils that would be crossed by new pipeline construction would be the same as Burnout Canyon Route (3).

Alternative D - Gooseberry Route - This entire route contains 4.9 miles of potentially high erodible soils of which 1.4 miles would be crossed by new pipeline construction. Approximately 6.7 miles of potentially moderate erodible soils would be crossed during pipeline construction. The pipeline would cross approximately 0.6 mile of unstable land on the slope east of the Gooseberry graben along Segment 1, and on the north slope of Burnout Canyon along Segment 3. Approximately 0.2 mile of seep area with wet soils would be crossed on a slope east of Skyline Drive along Segment 1. This route would lie adjacent to approximately 0.9 mile of riparian area in Upper Huntington Canyon. Pipeline would be constructed across wetland soils near 6 stream crossings in the riparian areas (4 stream crossings in Upper Huntington Canyon, 1 across stream in Burnout Canyon and 1 at Gooseberry Creek). Approximately 100 feet of wet soils would be crossed near a spring located on the hillslope south of the stream in Burnout Canyon (Segment 3b).

Valley Camp Triangle Connectors (1 through 3) - All of the connectors would cross approximately 0.1 mile of potentially high erodible soils at the east end of Segments 9 or 10*. The remainder of the area contains potentially moderate erodible soils. Springs and seeps are present. No riparian area or stream crossings would occur.

Alternative E - Winter Quarters Route (1) - Approximately 6.2 miles of potentially high erodible soils would be crossed during construction. There would be approximately 6.2

miles of potentially moderate erodible soils crossed by new pipeline. Approximately 0.7 mile of unstable land occurs along the existing pipeline near Gooseberry Creek along Segment 12*. No other unstable land areas or seeps would be crossed along this route. Wetland soils would be crossed along approximately 0.3 mile on pasture land south of Scofield and at the mouth of Winter Quarters Canyon. There would be 2 stream crossings by new pipeline. Associated Segments 19* and 23* cross approximately 1.2 miles of potentially high erodible soils and 2.9 miles of potentially moderate erodible soils. Wetland soils are present in the riparian area adjacent to Mud Creek. No unstable areas or seeps are present along these segments.

Alternative E - Winter Quarters Route (2) - This route would cross approximately 5.7 miles of potentially high erodible soils during construction. Approximately 6.5 miles of potentially moderate erodible soils would be crossed by new pipeline. No unstable land areas or seeps would be crossed by new pipeline. The length of wetland soils that would be crossed would be the same as Winter Quarters Route (1). There would be 5 stream crossings by new pipeline. Segment 19*, associated with this alternative, crosses approximately 0.7 mile of potentially high erodible soils and 2.1 miles of potentially moderate erodible soils. Wetland soils are present in the riparian area adjacent to Mud Creek. No unstable areas or seeps are present along this segment.

Water Resources

The issues concerning water resources are sedimentation, changes in water quality of streams, and possible changes in stream flow due to surface alteration resulting from vegetation removal and soil compaction. Intermittent and perennial streams, reservoirs, springs, and riparian areas were delineated from topographic maps and field surveys.

Background

The study area lies within two major drainage basins on the western edge of the Upper Colorado hydrologic region. Huntington Creek and its tributaries are within the Huntington Creek watershed. Mud Creek, Gooseberry Creek, and their tributaries are within the Price River watershed and are tributary to Scofield Reservoir.

The area has warm, dry summers and cold, relatively moist winters. Annual precipitation ranges from 16 to 30 inches and occurs primarily as snow and occasional summer thunderstorm events. The freeze-free period is between 20 and 100 days and snowfall occurs approximately 8 months of the year. Floods in the area are produced primarily by snow melt in the spring. Occasional high-intensity, summer thunderstorms cause localized flooding.

At the Straight Canyon Barometer Watershed, located approximately 30 miles south of the study area near Joes Valley Reservoir, the monthly average precipitation depth in the conifer-aspen areas from July to August ranges from about 1.2 to 1.3 inches, then decreases in September to about 0.8 inch. The number of storms greater than 0.1 inch and lasting longer than 1 hour follow the same trend. From July to August, the number of storms increases from 5 to 8 and decrease to about 3 in September.

The surface hydrology of the project area is characterized by numerous intermittent channels draining into small perennial streams forming a dendritic pattern. Numerous springs and seeps are present throughout the project area. The larger springs are located on the hillslopes east of Huntington Creek and along the west edge of Pleasant Valley. Wet areas are found along the east-facing slopes east of Skyline Drive. A large marsh is present southeast of Lower Gooseberry Reservoir. Reservoirs within the study area include Scofield Reservoir, Electric Lake, Beaver Dam Reservoir, Boulger Reservoir, and Lower Gooseberry Reservoir.

Most of the stream crossings (riparian areas) have sections along the stream banks that are slumping into the stream to some degree and are partially vegetated. The stream bottoms are generally composed of fine materials with gravels and cobbles. The stream bottoms along Mud Creek near Scofield and Gooseberry Creek have large areas of silts with no gravels or cobbles.

Studies in the Wasatch Plateau indicate that most recharge to the ground-water system is due to infiltration of rainfall and snow melt at higher elevations. Much of the water is discharged by springs that flow from the Flagstaff Limestone and the North Horn Formation only a short distance from recharge areas (Lines 1984). This also appears to be the case in the Blackhawk Formation along the hillslopes east of Huntington Creek. Many of these springs flow throughout the summer and fall months. In the eastern highland area of the Gooseberry graben, a few summer home owners have piped spring water into their homes. The water is used without treatment.

The dissolved solids in the ground water are estimated to be generally less than 250 milligrams per liter (mg/l). Chemical testing of the ground water shows small concentrations of trace elements that do not exceed maximum mandatory limits for public supply (Lines 1984).

Unpublished studies by the Manti-La Sal National Forest hydrologist indicate that phosphate concentrations appear to be higher in streams located near the Blackhawk Formation than in the North Horn and Flagstaff Formations. This indicates that eutrophication of Scofield Reservoir, attributed to increased phosphate concentrations, occurs naturally from phosphate in the Blackhawk Formation. None of the phosphate concentrations measured exceeded the State of Utah minimum water-quality standards.

Specific Descriptions

Descriptions of the water resources along each of the segments were obtained using topographic maps and limited field reconnaissance. Locations of the stream crossings were obtained from a field survey of riparian areas and are presented in Table 3-3.

Alternative A and B - The existing pipeline crosses beneath 2 perennial streams at Gooseberry Creek and Mud Creek. Intermittent streams are crossed just east of Gooseberry Creek and at the head of a drainage in Section 14 on the Skyline lease area. Approximately 0.4 mile of the pipeline route is within 500 feet of a perennial stream.

Alternative C - Burnout Canyon Route (1) - Along the entire Burnout Canyon route there would be 12 perennial stream crossings, 10 of which would be located along segments that could be affected by construction. Two perennial stream crossings occur along the existing right-of-way on Gooseberry Creek and on Mud Creek. The perennial stream

crossings that could be impacted by construction are located on Upper Huntington Creek (9 crossings) and on Burnout Creek (1 crossing). Three intermittent stream crossings would occur along the entire route: one east of Gooseberry Creek on the existing pipeline, one in the canyon north of The Kitchen, and one in the canyon northeast of The Kitchen. A small seep area with standing water would be crossed in Segment 2 at the toe of the road fill along the paved road just south of Swens Canyon. The pipeline route would cross through a small area of springs located on the hillslope south of Burnout Creek. No reservoirs or marshes would be crossed by any of the segments. Approximately 3.3 miles of the route would lie within 500 feet of a perennial stream.

Alternative C - Burnout Canyon Route (2) - The inventory along this route is the same as Burnout Canyon Route (1), except only 2 intermittent stream crossings would occur: 1 along the existing route and 1 in the canyon northeast of The Kitchen.

Alternative C - Burnout Canyon Route (3) - Along the entire route there would be 5 perennial stream crossings, 3 of which would be affected by construction. The 2 existing stream crossings would be the same as Burnout Canyon (1); the 3 perennial stream crossings affected by construction would occur on Upper Huntington Creek (2 crossings), and the stream in Burnout Canyon (1 crossing). This route would cross the same intermittent streams as Burnout Canyon Route (1). Approximately 3.5 miles of the route would lie within 500 feet of a perennial stream.

Alternative C - Burnout Canyon Route (4) - The inventory along this route would be the same as Burnout Canyon Route (3), except only 2 intermittent stream crossings would occur: 1 along existing Segment 12* and 1 along Segment 15 in the canyon northeast of The Kitchen.

Alternative D - Gooseberry Route - The entire Gooseberry Route would cross perennial streams at 7 locations, 6 of which are along the segments that would be crossed by new pipeline. One perennial stream crossing occurs along the existing pipeline on Mud Creek. Of the 6 new stream crossings, 1 would occur on Gooseberry Creek, 1 on Swens Canyon Creek, 3 on Upper Huntington Creek, and 1 on the stream in Burnout Creek. There were no intermittent streams identified that cross this route. A small area of springs would be crossed on the hillslope south of the stream in Burnout Canyon. Approximately 1.8 miles of the route would lie within 500 feet of a perennial stream.

Valley Camp Triangle Connectors (1) through (3) - Segment 5/6 (Connector 2) would cross 1 small spring and Segment 8 (Connector 2) would cross below a spring located on the hillslope that flows along the inside ditch of the dirt road. The connectors would not be within 500 feet of a perennial stream.

Alternative E - Winter Quarters Route (1) - Along the entire Winter Quarters Route, there would be 3 perennial stream crossings, 2 of which would be located along segments of new pipeline. One perennial stream crossing occurs along the existing line on Gooseberry Creek, the 2 other perennial stream crossings would be located on Winter Quarters Creek and Mud Creek near Scofield. Approximately 0.4 mile of the route would be within 500 feet of a perennial stream. Associated Segments 19* and 23* cross 1 perennial stream (Mud Creek along Segment 19*). No springs were identified along these segments.

Alternative E - Winter Quarters Route (2) - There would be 6 perennial stream crossings along the entire route, of which 5 would occur on segments of new pipeline. The 5

stream crossings would be located along Winter Quarters Creek (1 stream crossing), Mud Creek near Scofield between Broads Canyon and Magazine Canyon (3 stream crossings), and on Broads Canyon Creek (1 stream crossing). Approximately 2.2 miles of the route would be within 500 feet of a perennial stream. Segment 19*, associated with this alternative, crosses 1 perennial stream (Mud Creek). No springs were identified along the segment.

BIOLOGICAL RESOURCES

A number of different biological habitats, each with characteristic plant and animal communities, are present within the project area. There are 4 predominant vegetation types: aspen, mountain shrub, spruce-fir, and riparian (including wet and dry meadows). This section addresses the biological resources in the project area that are most relevant to this project including riparian vegetation, rangeland, timber, aquatic resources, and terrestrial wildlife. No special status species of plants or animals are known to occur in the area.

Biological resources data were obtained from reports, agency contacts, literature review and limited field reconnaissance. Two reports were used extensively. One was prepared by the Western Resource Development Corporation (WRDC) for UCO, Inc. as part of the Scofield Mine Project; the other was prepared by Coastal States Energy Company as part of the Skyline Mine Project.

On October 24, 1989, Dames & Moore personnel visited the project area for the purpose of characterizing the vegetation and estimating the influence of pipeline construction on vegetation and soils of 21 riparian and wetland sites. Also reported were observations on fish and wildlife resources. Information collected during this survey was reported in the document, Report for Questar Pipeline Company's Main Line No. 41 Reroute at Skyline Mine, Riparian Survey, and then incorporated by reference into this EIS.

In addition, on November 7, 1989, biologists from the Utah Division of Wildlife Resources (DWR) and Forest Service conducted an aerial survey to identify locations of raptor nests. The survey results indicated no raptor nesting sites within the proximity of any of the alternative locations.

Riparian/Wetlands

All routes involve crossing or paralleling riparian and associated wetland areas. Riparian and associated wetland areas have very sensitive vegetation and provide important habitat for fish and wildlife.

The riparian meadow and shrubland vegetation type is dominated by perennial grasses, or grass-like plants. Common species include Kentucky bluegrass (Poa pratensis), needlegrass (Stipa sp.), sedges (Carex rostrata), and rush (Juncus balticus). Shrubs are also quite common, particularly willow (Salix sp.). Other shrubs or woody plants include silver sagebrush (Artemisia cana), big sagebrush (A. tridentata), and tree species more commonly found in the upland areas (WRDC 1982 and field reconnaissance). Riparian

meadow and shrubland vegetation is found in valley bottoms (WRDC 1981). The plant species composition in riparian areas is quite variable and site specific.

The condition of riparian areas was described and rated during the October 24, 1989 site visit. The qualitative ratings were based on several well defined criteria, including (1) the amount of bare ground (percent of vegetative cover), (2) amount of vegetative litter, (3) presence or absence of noxious weeds, (4) species composition of forbs and grasses, and (5) condition of stream bank.

Information regarding these riparian areas is documented in the Biological Resources (pertaining to vegetation, wildlife, and fisheries) and Earth Resources (pertaining to soils and water) sections of this report.

Specific Descriptions

Alternatives A or B - The existing route crosses two riparian areas. Where Segment 19* crosses Mud Creek the vegetation is a mixture of silver sage, grasses, willow, aspen, and Engelmann spruce. The vegetation is in excellent condition, and the site showed no sign of over browsing of woody plants. Segment 12* crosses Gooseberry Creek.

Alternative C - Burnout Canyon Route (1) - High-quality riparian areas exist along this route on Segments 2, 3a, 3b, and 16. Where Segment 3b would cross Burnout Canyon there is a meandering stream. The vegetation here is 85 percent grasses and sedges, 6 percent shrubs, and 5 percent forbs. Some Engelmann spruce grows along portions of the stream. Algae, moss, and liverworts are found on the stream bank. Grasses, woody plants, and forbs are not heavily grazed. This area is in excellent condition.

Riparian areas in Upper Huntington Canyon that parallel Segments 2, 3a, 3b, and 16 consist of about 93 percent grasses and mixed sedges, 5 percent shrubs, and 2 percent forbs. Soils in this area are completely covered by vegetation. Good litter is present throughout the riparian areas. Thick vegetation covers overhanging stream banks and further indicates a high-quality riparian system. The upper end of this reach has drier soils on the western flank so that it supports a stand of big sage and phlox.

The rest of the Burnout Canyon Route segments where pipeline would be constructed are outside of riparian areas.

Alternative C - Burnout Canyon Route (2) - The description of this route is the same as Burnout Canyon Route (1).

Alternative C - Burnout Canyon Route (3) - Some high quality riparian areas exist along this route on Segments 3b (see above) and 24. Segment 24 would cross Swens Canyon, Little Swens Canyon, Upper Huntington Creek, and several small tributaries. Less than 0.4 mile of riparian area would be traversed by Segment 24.

Alternative C - Burnout Canyon Route (4) - The description of this route is the same as Burnout Canyon Route (3).

Alternative D - Gooseberry Route - A high-quality riparian and associated wetland area occurs where the proposed route would cross Gooseberry Creek. This area also contains a pond habitat consisting of dense stands of willows (Salix planifolia) beneath which lies a

carpet of dense grass. Ground litter is abundant and well dispersed. Soils in this area are completely covered by vegetation. Fifty percent of the cover consists of willow, 40 percent grass, and 5 percent forbs. Refer to the discussion on the Burnout Canyon Route for information on other segments that are also a part of the Gooseberry Route.

Valley Camp Triangle Connectors (1) through (3) - All segments comprising these connectors would cross within spruce-fir forest, no riparian areas occur along the connectors.

Alternative E - Winter Quarters Route (1) - Where Segment 20 would cross Winter Quarters Creek there is a heavily grazed meadow with no woody plants present. Only two forbs, yarrow (Achillea millifolium) and thistle (Cirsium spp.), are present. Grasses comprise roughly 95 percent of the cover. On the northern fringe of the riparian area is a stand of beaked sedge (Carex rostrata) which makes up the other 5 percent of the plant cover. Two to three inches of water flows through this stand.

Where Segment 20 would cross Pleasant Valley there is a heavily grazed stream-side community. The stream is shallow and about 4 or 5 feet wide. Grasses comprise about 95 percent of the vegetative cover with a mixture of forbs. No woody plants are present at the site.

Segment 21 would parallel Mud Creek north of the town of Clear Creek. Vegetation in this area consists of mixtures of silver sage, willow, grass, aspen, and Engelmann spruce. The side of the stream adjacent to State Route 96 is predominantly a mixture of willow, grasses, and sage. The side of the stream across from the road is characterized by steep, shaded slopes supporting stands of spruce and aspen along some of the stream's length and willow and sage along other portions. These riparian areas are in excellent condition.

Alternative E - Winter Quarters Route (2) - This alternative route would be similar to Winter Quarters Route (1) except Segment 22 was developed to avoid the riparian areas along Segment 21. Segment 22 would cross through mountain shrubland.

Mountain shrubland occurs on all slope aspects. Vasey big sagebrush (Artemisia tridentata ssp. vaseyana) is the most common shrub within this vegetation type. Sage is replaced by mountain snowberry (Symphoricarpos oreophilus) on some north-facing slopes.

Rangeland

Rangeland consists of areas with vegetation that are used for forage by livestock and wildlife. Although all vegetation types of the project area provide some forage, types containing a predominance of grasses and low-shrub species are most suitable. Distinctions between different vegetation types were determined by using the dominant overstory species.

The prevalent range condition on the Manti-La Sal National Forest is fair with no apparent up or downward trend according to the 1986 Final EIS (Forest Service 1986). There are 651,481 acres suitable for livestock grazing in the Manti-La Sal National Forest.

Rangelands of the project area have been inventoried by the Forest Service. They include aspen forest, coniferous forest, mountain shrub, sagebrush types, and wet and dry meadows.

Of the rangelands found in the project area, aspen forest occupies 43 percent, generally on upper elevations of south-facing slopes or recently disturbed sites. Conifer forest generally occupies north-facing slopes and occurs on about 12 percent of the project area (WRDC 1982). Forty-two percent is occupied by the mountain shrub type, which mostly occurs on south-facing slopes. The sagebrush type occurs on about 3 percent of the area in the drier portions of the project area and is generally in the mature stage providing good big-game winter range (Forest Service 1984). Wet and dry meadows occupy a relatively small proportion of the project area (less than one percent). Table 3-4 is a summary of allotments, livestock, and period of use.

Specific Descriptions

Alternatives A or B - The existing pipeline route and area proposed for the surface redundant pipeline cross primarily forested rangeland that consists of conifer timber (spruce-fir) and aspen forest. The existing route (Segments 7*, 10*, and 19*) crosses smaller areas of grassland.

Alternative C - Burnout Canyon Routes (1) through (4) - Rangeland on the Burnout Canyon Routes is comprised primarily of sagebrush, conifer, and aspen. Refer to the riparian section above that describes the riparian habitat type which is used for grazing.

Alternative D - Gooseberry Route - Segment 1 of the proposed Gooseberry Route would cross range types that include sagebrush, aspen, and coniferous forest.

Valley Camp Triangle Connectors (1) through (3) - All segments would pass through aspen and coniferous forest-dominated rangeland.

Alternative E - Winter Quarters Route (1) - This route would cross rangelands that include a mix of aspen and coniferous forest at the upper elevations (e.g., Segments 22 and 20), and sagebrush at the lower elevations. Areas of wet and dry meadows are prominent in the area where Segment 20 would cross the Mud Creek Valley south of Scofield.

Alternative E - Winter Quarters Route (2) - This description of this alternative route is the same as Winter Quarters Route (1) except areas of wet and dry meadows are prominent in the area along Segment 21 that occurs in the Mud Creek Valley.

Timber

Spruce-fir forest is dominated by subalpine fir (Abies lasiocarpus). Other tree species are Engelmann spruce (Picea engelmannii), aspen (Populus tremuloides), and some Douglas-fir (Psuedotsuga menziesii). Common shrub and subshrub species include Saskatoon serviceberry (Amelanchier alnifolia), Oregon-grape (Mahonia repens), boxwood (Pachistima myrsinites), mallow ninebark (Physocarpus malvaceus), wood's rose (Rosa woodsii), and mountain snowberry (Symphoricarpos oreophilus).

TABLE 3-4
SUMMARY OF ALLOTMENTS, LIVESTOCK, AND USE

<u>Route/Allotment</u>	<u>Livestock</u>	<u>Period of Use</u>
Existing Routes (A or B)		
Burnout S&G ¹	942	7/1 - 9/25
Eccles S&G	800	7/1 - 9/30
North Winter Quarters S&G	459	7/1 - 9/30
East Gooseberry S&G	1,014 **	7/1 - 10/10
Mansion S&G	999 **	7/1 - 10/10
Cabin Hollow S&G	1,050	7/1 - 9/30
"C" Canyon S&G*	1,250	7/1 - 9/30
	<u>6,514</u>	
Burnout Canyon Routes		
Burnout S&G	942	7/1 - 9/25
Eccles S&G	800	7/1 - 9/30
Swen's Canyon S&G*	959	7/1 - 9/30
North Winter Quarters S&G*	459	7/1 - 9/30 (variable season)
East Gooseberry S&G	1,014 **	7/1 - 10/10
Mansion S&G	999 **	7/1 - 10/10
Cabin Hollow S&G	1,050	7/1 - 9/30
"C" Canyon S&G*	1,250	7/1 - 9/30
	<u>7,473</u>	
Gooseberry Routes		
Burnout S&G	942	7/1 - 9/25
Swen's Canyon S&G	959	7/1 - 9/30
Beaver Dams S&G	1,100	7/6 - 10/05
Fairview C&H	500	7/1 - 9/30
Cabin Hollow S&G	1,050	7/1 - 9/30
South San Pitch S&G*	600	7/6 - 9/30
"C" Canyon S&G	1,250	7/1 - 9/30
	<u>6,401</u>	
Winter Quarters Routes		
Granger Ridge S&G	1,156	7/1 - 9/30
North Winter Quarters S&G	459	7/1 - 9/30
East Gooseberry S&G	1,014 **	7/1 - 10/10
Mansion S&G	999 **	7/1 - 10/10
Cabin Hollow S&G	1,050	7/1 - 9/30
"C" Canyon S&G	1,250	7/1 - 9/30
	<u>5,928</u>	

Table 3-4 (continued)
Summary of Allotments, Livestock, and Use

<u>Route/Allotment</u>	<u>Livestock</u>	<u>Period of Use</u>
Unknown private land use		

¹ S&G = sheep allotment
C&H = cattle allotment

* Adjacent allotments to the proposed Burnout Canyon Route (2) and (4)

** Includes private land permit

Spruce-fir (*Picea engelmannii* and *Abies lasiocarpas*) forest tends to occur on the north-facing slopes and in protected portions of small tributary drainages within the study area. The aspen (*Populus tremuloides*) forest is a successional stage to spruce-fir forest, except for marginal stands on south-facing slopes. The north, east, and west slopes show an understory of spruce-fir leading to eventual conifer dominance in these areas (WRDC 1982).

Spruce-fir and aspen sites occur predominantly along most of the proposed routes. Some routes cross timber sites planned for future harvest of sawtimber (trees greater or equal to 8 inches DBH (diameter at breast height)) and pole timber (trees 5 to 7.9 inches DBH) product size classes.

Generally, mixed conifer forests are in age classes where susceptibility to insects and diseases is high. The Engelmann spruce bark beetle is of particular concern because of its potential to attack and kill Engelmann spruce. Beetle populations are currently endemic.

Timber occurs in varying amounts on all the routes under consideration. However, not all of the area has been inventoried, and timber volumes are projected from data of 2 representative spruce-fir and 1 aspen site that were inventoried in 1982 and 1984 (Jackson 1990). The sites are located near Segments 3b and 14 of the Burnout Canyon Route. The following data indicate the ranges of timber volume (gross board feet or cubic feet per acre) that could be anticipated in spruce-fir and aspen timber sites:

Spruce-fir Sites

<u>Sawtimber</u>	<u>Gross Volume (board feet per acre)</u>
Live mixed conifer	
Engelmann spruce - subalpine fir	12,620 - 15,880
Dead mixed conifer	1,650 - 2,430
Live aspen	780 - 960
Dead aspen	210

<u>Pole Timber</u>	<u>Gross Volume (cubic feet per acre)</u>
Live mixed conifer	44 - 1559
Dead mixed conifer	56 - 57
Live aspen	22

Aspen Sites

<u>Sawtimber</u>	<u>Gross Volume (board feet per acre)</u>
Live aspen	10,180
Dead aspen	210
Live mixed conifer	3,890
Dead mixed conifer	380

<u>Pole Timber</u>	<u>Gross Volume (cubic feet per acre)</u>
Live aspen	48
Dead aspen	70

The timber volumes listed above for spruce-fir and aspen sites are shown by route on Tables 3-5 and 3-6. Volumes of pole timber have been converted from cubic feet to thousand board feet (MBF) in the tables for comparison.

Specific Descriptions

Alternatives A or B - Although the existing route passes through stands of timber (both aspen and spruce-fir forest sites) there are no trees on the existing right-of-way.

Alternative C - Burnout Canyon Route (1) - This route would cross stands of aspen forest sites (approximately 1.9 mile) and spruce-fir forest sites (1.6 miles), which represent a total of approximately 424 thousand board feet (mbf).

Alternative C - Burnout Canyon Route (2) - This route would cross through aspen forest sites (1.9 miles) and spruce-fir forest sites (1.5 miles), which represent a total of approximately 410.6 mbf.

Alternative C - Burnout Canyon Route (3) - This route would be the same as Burnout Canyon Route (1).

Alternative C - Burnout Canyon Route (4) - This route would be the same as Burnout Canyon Route (2).

Alternative D - Gooseberry Route - the Gooseberry Route would cross through about 4.4 miles of spruce forest sites and 1.9 miles of aspen forest sites, which represent a total of approximately 816.4 mbf.

Valley Camp Triangle Connectors (1) and (2) - These connectors would cross spruce-fir forest sites (0.9 mile), which represent a total of approximately 127 mbf.

Valley Camp Triangle Connector (3) - This connector would cross spruce-fir forest sites (0.5 mile), which represent a total of approximately 71.1 mbf.

Alternative E - Winter Quarters Route (1) - This route would cross spruce-fir forest sites (3.5 miles) and aspen forest sites (1.1 miles), which represent a total of approximately 607 mbf. Associated Segments 19* and 23* have no trees in the right-of-way.

Alternative E - Winter Quarters Route (2) - This route would cross spruce-fir forest sites (3.4 miles) and aspen forest sites (3.2 miles), which represent a total of approximately 811.9 mbf. Associated Segments 19* and 23* have no trees in the right-of-way.

**TABLE 3-5
TIMBER VOLUMES BY ROUTE
SPRUCE-FIR SITES**

ROUTE	ACRES	SAWTIMBER				POLE TIMBER		
		CONIFER		ASPEN		CONIFER	ASPEN	LIVE
		LIVE	DEAD	LIVE	DEAD	LIVE	DEAD	LIVE
AVERAGE BOARD FEET per ACRE		14,250	2,040	870	210			
AVERAGE CUBIC FEET per ACRE						802	57	22
Alternative A	-	-	-	-	-	-	-	-
Alternative B	-	-	-	-	-	-	-	-
Alternative C								
Burnout Canyon Route								
(1)	11.7	166.7	23.9	10.2	2.5	46.9	3.3	1.3
(2)	11.0	156.8	22.4	9.6	2.3	44.1	3.1	1.2
(3)	11.7	166.7	23.9	10.2	2.5	46.9	3.3	1.3
(4)	11.0	156.8	22.4	9.6	2.3	44.1	3.1	1.2
Alternative D								
Gooseberry Route	32.1	457.4	65.5	27.9	6.7	128.7	9.1	3.5
Valley Camp Triangle Connectors								
(1)	6.6	94.1	13.5	5.7	1.4	26.5	1.9	0.7
(2)	6.6	94.1	13.5	5.7	1.4	26.5	1.9	0.7
(3)	3.7	52.7	7.5	3.2	0.8	14.8	1.1	0.4
Alternative E								
Winter Quarters Route *								
(1)	25.6	364.8	52.2	22.3	5.4	102.7	7.3	2.8
(with Segments 19* & 23*)		364.8	52.2	22.3	5.4	102.7	7.3	2.8
(2)	24.8	353.4	50.6	21.6	5.2	99.4	7.1	2.7
(with Segment 19*)		353.4	50.6	21.6	5.2	99.4	7.1	2.7

* Associated Segments 19* and 23* have no trees in the right-of-way.

TABLE 3-6
ASPEN SITES

ROUTE	ACRES	SAWTIMBER				POLE TIMBER	
		ASPEN		CONIFER		ASPEN	
		LIVE	DEAD	LIVE	DEAD	LIVE	DEAD
AVERAGE BOARD FEET per ACRE		10,180	210	3,890	380		
AVERAGE CUBIC FEET per ACRE						48	70
Alternative A	-	-	-	-	-	-	-
Alternative B	-	-	-	-	-	-	-
Alternative C							
Burnout Canyon Route							
(1)	13.9	141.5	2.9	54.1	5.3	3.3	4.9
(2)	13.9	141.5	2.9	54.1	5.3	3.3	4.9
(3)	13.9	141.5	2.9	54.1	5.3	3.3	4.9
(4)	13.9	141.5	2.9	54.1	5.3	3.3	4.9
Alternative D							
Gooseberry Route	13.9	141.5	2.9	54.1	5.3	3.3	4.9
Valley Camp Triangle Connectors							
(1)	-	-	-	-	-	-	-
(2)	-	-	-	-	-	-	-
(3)	-	-	-	-	-	-	-
Alternative E							
Winter Quarters Route *							
(1)	8.0	81.4	1.7	31.1	3.0	1.9	2.8
(with Segments 19* & 23*)		81.4	1.7	31.1	3.0	1.9	2.8
(2)	23.4	238.2	4.9	91.0	8.9	5.6	8.2
(with Segment 19*)		238.2	4.9	91.0	8.9	5.6	8.2

* Associated Segments 19* and 23* have no trees in the right-of-way.

Aquatic Resources

Early in the scoping process, the Forest Service and DWR expressed particular concern for the Yellowstone cutthroat trout (Oncorhynchus clarki lewisi) fisheries of Upper Huntington Creek. The DWR plans to use Upper Huntington Creek as the Yellowstone cutthroat trout egg source for Utah. In addition to the Yellowstone cutthroat trout, the Forest Service has identified species of benthic macroinvertebrates within Upper Huntington Creek, which, by their habitat preference, indicate that this stream is capable of supporting a self-sustaining resident fishery. Issues identified at the August 30, 1989 scoping meeting focused on the potential effects of pipeline construction on riparian vegetation and water quality along Upper Huntington Creek, which, could in turn, adversely affect fish and wildlife habitat.

Yellowstone cutthroat trout and mottled sculpins (Cottus bairdi) are found in every perennial drainage within the project area and are dependent on healthy riparian systems for their survival. In addition, rainbow trout, mountain sucker (Catostomus platyrhynchus), and redbside shiners (Richardsonius balteatus) reside in the Fish Creek drainage below Lower Gooseberry Reservoir and in Lower Gooseberry Creek. Redside shiner and mountain sucker reside in the creeks in Winter Quarters and Broads Canyon.

Burnout Canyon Creek and Upper Huntington Creek are used exclusively as spawning and rearing streams by the Yellowstone cutthroat trout spawners coming out of Electric Lake. This creek is closed to fishing during spawning season, and is probably not fished significantly after it opens July 1 because most spawners have migrated back to Electric Lake.

Gooseberry Reservoir is stocked annually with 12,000 catchable rainbow trout. Creel census data show that 10 percent of the fish caught are wild Yellowstone cutthroat trout. The cutthroat trout run up Gooseberry Creek and spawn in the spring. It is estimated that Lower Gooseberry Reservoir receives approximately 2,200 Fishermen User Days (FUDs) per year (one FUD = 12 angling hours). The annual value of this fishery is approximately \$102,652.

Scofield Reservoir is one of Utah's most heavily fished reservoirs. Spawning trout from Scofield Reservoir, including both rainbow trout and cutthroat trout, migrate up Mud Creek to spawn. Scofield Reservoir receives approximately 27,000 FUDs and is stocked with 600,000 3-inch rainbow trout annually.

The DWR initiated a study in 1987 to evaluate Upper Huntington Creek as a potential egg source to replace Strawberry Reservoir which may be poisoned in the fall of 1990 to eliminate trash fish. The DWR is in the third year of a 3-year study to certify Electric Lake cutthroat trout as disease free so they can begin taking eggs. The DWR conducted a fishery survey in 1987 and determined that 2,629 spawners migrated up Upper Huntington Creek carrying a total of 1,629,045 eggs.

As is typical with most cutthroat trout species, the Yellowstone cutthroat trout begins to spawn during the spring, when water temperatures approach 50 degrees Fahrenheit, and usually continues through mid-June. The fertilized eggs incubate in the gravel through July with the "hatched" fry usually swimming up from the gravel by late August but this can occur as late as mid-September depending on water temperature.

Upper Huntington Creek is by far the most important spawning tributary to Electric Lake. It is estimated that 66 percent of the spawners in Electric Lake spawn in Upper Huntington Creek or its tributaries. Creel census data collected in 1985 (May to October) show that anglers spend a total of 24,314 hours fishing Electric Lake each year. These data were collected prior to the implementation to year-round fishing. It is estimated that this figure should be increased by 5,000 hours to include early spring fishing, late fall fishing, and winter ice fishing. The total of these two figures equals 2,443 FUDs per year. The annual value of the Electric Lake fishery is estimated to be \$127,231 (i.e., \$52.08 per FUD - 1990 dollars).

The DWR plans to take 1 million eggs from Upper Huntington Creek to meet the annual statewide demand of 600,000 fry. These eggs are worth approximately \$11,000. FUD's occur mainly in Electric Lake, but they are the result of spawning that takes place in Upper Huntington Creek. It is estimated that \$108,147 in FUD's can be attributed to Upper Huntington Creek for a total fishery value of \$119,147. The value of the fishery will increase dramatically when the DWR begins stocking other reservoirs and lakes with fry hatched from eggs taken from Upper Huntington Creek.

Specific Descriptions

Alternatives A and B - The existing route crosses Mud Creek (Segment 19*) and Gooseberry Creek (Segment 12*), both important habitat for fish. The areas of unstable slopes along Segment 12* result in some sedimentation to Gooseberry Creek and eventually to Lower Gooseberry Reservoir.

Alternative C - Burnout Canyon Routes (1) and (2) - Either variation of this alternative would generally parallel Upper Huntington Creek and would cross the creek at 9 locations. The stream is sensitive as it is considered the most important tributary to Electric Lake for Yellowstone cutthroat trout spawning. The stream in Burnout Canyon would be crossed at one location.

Alternative C - Burnout Canyon Routes (3) and (4) - Either variation of this alternative would cross the creek in Burnout Canyon (Segment 3b), cross Upper Huntington Creek and Highway 264, parallel Highway 264 on the west side, cross Swens Canyon Creek, then would cross Upper Huntington Creek at Little Swens Canyon south of The Kitchen (Segment 24).

Alternative D - Gooseberry Route - This route would cross Gooseberry Creek at 1 location downstream from Lower Gooseberry Reservoir, Swens Canyon Creek at 1 location, Upper Huntington Creek at 3 locations, and the stream in Burnout Canyon at 1 location.

Valley Camp Triangle Connectors (1) through (3) - No streams would be crossed by any of the connectors.

Alternative E - Winter Quarters Route (1) - This route would cross the stream in Winter Quarters Canyon east of Scofield and Mud Creek south of Scofield.

Alternative E - Winter Quarters Route (2) - This route would cross the 2 streams near Scofield as described above and would cross Mud Creek between Broads Canyon and Magazine Canyon at 3 locations.

Terrestrial Wildlife

Emphasis is placed on riparian areas likely to be affected by pipeline construction and maintenance. Riparian areas clearly provide the most important fish and wildlife habitat in the project area. Riparian areas in the region are generally designated by the DWR as important big game winter habitat.

Riparian areas provide habitat for several species of furbearers including beaver (Castor canadensis), muskrat (Ondatra zibethicus), and raccoon (Procyon lotor) (Coastal States Energy Company 1981; WRDC 1981). Many species of small mammals, birds, and amphibians are completely dependent on riparian areas for their existence.

Other habitat types are also important to wildlife. Upland-shrub and sage-brush habitat types provide important summer forage for mule deer and elk, while forested areas provide important cover. The study area provides yearlong habitat for blue grouse (Dendragapus obscurus) and ruffed grouse (Bonascus umbellus). Blue grouse use conifer-aspen-meadow mosaics on ridgetops and concentrate in spruce-fir forest in the winter. Ruffed grouse use a wide range of habitat types with aspen forest providing critical habitat during crucial mid-winter months (DWR 1981; WRDC 1981).

Specific Descriptions

Alternatives A and B - The existing route crosses 2 riparian areas. Where Segment 19* crosses Mud Creek the vegetation is important habitat for big game. This area is in excellent condition; there is no sign of over browsing of woody plants. Segment 12* crosses Gooseberry Creek, which is also important wildlife habitat. Most of these routes pass through mountain shrubland habitat. The remainder of the routes lie in aspen forest or spruce-fir forest habitats.

Alternative C - Burnout Canyon Routes (1) and (2) - The high-quality riparian habitat areas that exist along this route on Segments 2, 3a, 3b, and 16 in conjunction with adjacent aspen stands provide important big game habitat and cover. Segments 23* and 19* cross through aspen. Of the 2 routes, Burnout Canyon Route (1) would cross the least riparian habitat.

Alternative C - Burnout Canyon Route (3) and (4) - This route would lie mostly outside of riparian areas. Segment 24, which replaces 3a, 2 and 16, would be situated in Mountain Shrubland vegetation. This vegetation provides important summer forage for elk and mule deer; however, Segment 24 is adjacent to or near Highway 264.

Alternative D - Gooseberry Route - See the preceding discussion on the Burnout Canyon Route for information on Segments 2, 3, 19* and 23*. A high-quality riparian habitat area occurs along Segment 1 where the proposed route would cross Gooseberry Creek. Moose may use this area on a year-round basis (Coastal States Energy Company 1989). It also provides an important component of mule deer and elk habitat.

Valley Camp Triangle Connectors (1) through (3) - All segments comprising these connectors would be situated within spruce-fir and aspen forests and open areas.

Alternative E - Winter Quarters Route (1) - A large portion of Segment 20 would lie on a ridge top above Winter Quarters Canyon. The Winter Quarters and Mud Creek riparian

habitat areas that would be crossed by Segment 20 are of greatly diminished value to wildlife due to overgrazing and proximity to residential areas. Associated Segments 19* and 23* cross through aspen.

Alternative E - Winter Quarters Route (2) - The description of this route is the same as Winter Quarters Route (1) except Segment 21 (instead of Segment 22) would parallel and twice cross Mud Creek north of the town of Clear Creek. These riparian areas are in excellent condition for wildlife habitat. Associated Segment 19* crosses through aspen.

Special Status Species

No listed Threatened or Endangered plant species are known to occur within the project area. This conclusion is based on past surveys, information provided by agency personnel and literature reviews. Threatened or Endangered species are those listed by the U.S. Fish and Wildlife Service (USFWS). Sensitive species are those species that are candidates for Federal listing or proposed for Federal listing by the USFWS.

One sensitive species, Hymenoxys helenioides, a Federal candidate plant for listing (Category 2) is known to occur in the Scofield Reservoir region, and may occur within the project area (Thompson 1989). This species is described as occurring in mountain brush, sagebrush and aspen communities, often in meadows between 8,000 feet and 9,800 feet in Emery, Garfield, Sanpete and Sevier counties in Utah (Rutman 1989). Prior to construction, the Forest Service botanist will field-check any areas along the selected route where the plant could possibly occur.

No Threatened, Endangered or Sensitive faunal species or their habitats are known to reside within the study area. Threatened or Endangered species that may occur seasonally within the study area are the American peregrine falcon (Falco peregrinus anatum), arctic peregrine falcon (Falco peregrinus), and bald eagle (Haliaeetus leucocephalus). Bald eagles are known to occur in the study area as winter migrants. Two mature bald eagles were seen near the Gooseberry Route during the raptor survey conducted by the DWR during November 1989. Sightings of bald eagles are typical in the project area from November through March (Dalton 1989). Peregrine falcons are most likely to occur in the study area as rare spring and/or fall transients. Black-footed ferret (Mustela nigripes), an endangered species, might be found in the Wasatch Plateau east of the study area (Dalton et al. 1978). The possibility of this species occurring on the study area is remote (Coastal States Energy Company 1981).

AIR QUALITY

Air quality in the region is generally good due to the lack of major pollution sources. There are no Class I airsheds in the vicinity. Although monitored data are not available for the project area, there is no reason to expect that air quality attainment standards are being violated for any monitored pollutant.

The major local nonpoint sources of air emissions are vehicles on the highways and roads, which emit carbon monoxide and create fugitive dust (on dirt roads).

RECREATION

Developed recreation sites and dispersed recreation areas on the Manti-La Sal National Forest draw visitors from around the state. The Forest Service provides numerous opportunities to experience a "semi-primitive" recreation setting, in addition to providing developed recreation facilities. Further, the Scofield Lake State Recreation Area provides other water-based recreation opportunities. Though dispersed recreation occurs throughout the project area, the majority of use occurs in Forest management units that may provide semi-primitive recreation and emphasize undeveloped motorized recreation sites. In addition to these management units, semi-primitive recreation occurs in management units that emphasize other uses. Many of these units contain areas classified by the Recreation Opportunity Spectrum (ROS) as semi-primitive motorized (SPM) and semi-primitive non-motorized (SPNM). ROS is a system developed by the Forest Service to integrate recreation values into National Forest Plans, project designs, and management decisions.

The ROS class of SPNM recreation occurs in the study area within the SPR management unit that emphasizes semi-primitive recreation. However, this management unit is not crossed by any of the proposed pipeline routing alternatives. The utility corridor management unit, the existing route, bounds this semi-primitive recreation management unit.

Two management units that emphasize undeveloped motorized recreation sites are located within the project area--one in the vicinity of Gooseberry Creek, the other around Lower Gooseberry Reservoir. Gooseberry Campground has a capacity of 100 PAOT (persons at one time) with a usage of about 3,000 RVDs (recreation visitor days). Undeveloped recreation usage around Lower Gooseberry Reservoir is about 6,250 RVDs. Activities include watersports, fishing, off-road vehicle use, and primitive camping. Developed recreation sites are largely centered around the reservoirs and creeks. Generally, recreation activities include fishing, hunting, hiking, biking, camping, picnicking, cross-country skiing, boating, snowmobiling, and off-road vehicle use.

The Fish Creek National Recreation Trail would not be crossed directly by any of the proposed routes segments; however, two connecting access trails would be crossed by Segment 12*. State Highway 264 is a proposed National Scenic Byway. Skyline Drive is part of the basic planning corridor for the future development of the Great Western Trail. Usage along Skyline Drive is about 7,000 RVDs. Skyline Drive passes near dispersed rural residences on private lands and is also a proposed scenic backway, a designation for unpaved roads on public lands (Federal) designed to encourage recreational uses. Additionally, Skyline Drive is part of the Utah Adventure Highway System, a series of interpretive scenic routes that wind through Utah's National Forests past points of scenic geologic interest, cultural features, and recreation areas.

Specific Descriptions

Alternatives A and B - Segments 7*, 10*, 17*, and 18* parallel a recreation access road. Segment 13* passes adjacent to the site of a proposed campground (Crooked) and parallels a recreation access road. A connecting trail that provides access to the Fish Creek National Recreation Trail is crossed by Segment 12*. This segment also crosses an area with a ROS class of SPM recreation. Segments 19* and 23* are not adjacent to or do not cross any recreation uses.

Alternative C - Burnout Canyon Route (1) - Segments 12*, 13*, 19* and 23* are part of the existing route (see description for Alternatives A and B). Segments 3a, 3b, and 14 would cross areas with a ROS class of SPM recreation. Segment 14 also would pass adjacent to a proposed campground (Crooked). Segments 2 and 16 and a small portion of Segment 3 would parallel Upper Huntington Creek. Also, Segments 2, 3b, and 16 would parallel State Highway 264, which is used by recreationists. A connecting trail that provides access to the Fish Creek National Recreation Trail is crossed by Segment 12*. This segment also crosses an area with a ROS class of SPM recreation.

Alternative C - Burnout Canyon Route (2) - This route uses the same segments as described in the preceding route description, except Segment 14 is replaced by Segments 15 and 17*. Segment 17* is part of the existing route. Segment 15 would cross an area with a ROS class of SPM recreation.

Alternative C - Burnout Canyon Route (3) - Refer to description for Burnout Canyon Route (1) above. Segment 24 would parallel State Highway 264.

Alternative C - Burnout Canyon Route (4) - Refer to description for Burnout Canyon Route (2) above. Segment 24 would parallel State Highway 264.

Alternative D - Gooseberry Route - Segments 19* and 23* are not adjacent to or do not cross any recreation uses. Approximately 1 mile of Utah Highway 264 would be paralleled by portions of Segments 2 and 3 in Upper Huntington Canyon. Segment 3 would cross an area with a ROS class of SPM recreation. Segment 2 and a small portion of Segment 3b would parallel Upper Huntington Creek. Segment 1 would parallel Skyline Drive, a gravel road moderately travelled by recreationists and residents.

Two areas with a ROS class of SPM recreation would be crossed by Segment 1. Segment 1 would also pass near Gooseberry Campground in a Forest management unit that emphasizes undeveloped motorized recreation sites in the vicinity of Gooseberry Creek. This segment also would pass near a private church camp located in Little Swens Canyon.

Valley Camp Triangle Connectors (1) through (3) - Segments 7* and 10*, part of the existing route, parallel a recreation access road. Segment 5/6 also would parallel a recreation access road and would pass adjacent to an area with a ROS class of SPM recreation. Segment 8 would not be adjacent to or would not cross any recreation uses. Both Segments 4 and 9 would parallel a recreation access road.

Alternative E - Winter Quarters Route (1) - A connecting trail that provides access to the Fish Creek National Recreation Trail is crossed by Segment 12*. This segment also crosses an area with a ROS class of SPM recreation. Segments 20 and 22 would cross private lands that are not available for public recreation. A portion of this route would parallel State Highway 96, used to reach recreation areas. Associated Segments 19* and 23* are not adjacent to or do not cross any recreation uses.

Alternative E - Winter Quarters Route (2) - Segment 23* is part of the existing route and is not adjacent to or does not cross any recreation uses. Refer to the preceding route description for Segment 12*. Most of Segment 20 would cross private lands that are not available for public recreation. The portion of this segment on National Forest System lands would cross through the edge of an area with a ROS class of SPM recreation and would pass adjacent to a proposed campground (Dry Creek). A portion of this route

would parallel Utah Highway 96, used to reach recreation areas. Associated Segment 19* is not adjacent to or does not cross any recreation uses.

VISUAL CHARACTERISTICS

The visual resources analysis is based on detailed data inventories collected for the Manti-La Sal National Forest Plan (1986). These inventories include sensitive viewers, variety class, distance zones, visibility, vegetation cover, and topography (slope). The Forest Service's resource-management-planning process uses these data to establish Visual Quality Objectives (VQO) to manage the natural appearing landscapes on National Forest System lands.

Visual management classes from the Price River Resource Area of the Moab District of the BLM were used to inventory the existing visual landscape for private lands in Pleasant Valley. This analysis addresses the potential impacts of this project on visual landscapes in this valley using the same assessment criteria used for National Forest System lands.

High sensitivity viewpoints including highways, scenic roads, recreation trails, campgrounds, picnic areas, and residences are all considered for this assessment and are discussed in the following route descriptions.

Refer to Table 3-7, for mileages of segments that detail the following discussions.

Specific Descriptions

Alternatives A and B - Segments 19* and 23* of the existing pipeline right-of-way pass through areas managed with BLM visual resource management Class III. On National Forest System lands, Segments 10*, 7*, 18*, 17* and 13* are managed with a VQO of Partial Retention. A portion of Segment 12* passes through an area managed with a VQO of Modification, the remainder is Partial Retention.

The scenic quality for all of the segments of this route on National Forest System lands are rated at Variety Class A, except a small portion of Segment 12* rated Variety Class B. The distance zone for the segments of this route on the National Forest are foreground, except on portions of Segments 12* and 19*, which are middle ground.

Utah Highway 96 has open visibility of Segments 19* and 23* at their junction at the highway. The existing route is openly visible from Utah Highway 264 where Segment 18* crosses this proposed scenic byway. Two proposed campgrounds may view a portion of Segment 13* in the foreground.

Alternative C - Burnout Canyon Route (1) - Segments 19* and 23* (existing route) cross through an area of private lands into the edge of the National Forest, managed with BLM visual resource management Class III. The remainder of the segments in this route are managed with a VQO of Partial Retention.

Segments 2, 3a, and 16 would parallel Utah Highway 264 in the foreground distance zone through Upper Huntington Canyon. This canyon has a scenic quality classification of Variety Class A. Portions of Segments 3b and 14 would be openly visible in the foreground for short distances where they would approach the junctions of Segments 3a and 16, respectively. The remainder of these segments and Segments 12* and 13* would be in the middleground distance zone.

State Highway 264, a scenic byway nominated for national designation, has open views of Segments 2, 3a, and 16 where they would parallel the creek through Upper Huntington Canyon. Views from Utah Highway 264 are mostly screened where Segment 3b would climb a tree-covered ridge in Burnout Canyon. Segment 14 would traverse a ridge east of Upper Huntington Creek partially screened from Utah Highway 264 views.

Alternative C - Burnout Canyon Route (2) - This alternative route uses segments common to the preceding route description, except Segments 15 and 17* are used instead of Segment 14. The VQO for these 2 segments is Partial Retention.

The first portion of Segment 15 would climb a ridge east of Upper Huntington Creek openly visible to foreground views from Utah Highway 264. Once on top of the ridge, this segment would remain unseen from sensitive viewpoints. Segment 17*, part of the existing route, is in the foreground of a primitive road (two-track) along the right-of-way.

Alternative C - Burnout Canyon Route (3) - The visual conditions for Segments 23*, 19*, 14, 13*, 12*, and 3b are described in the preceding route alternative (1), except Segments 2, 3a, and 16 are replaced by Segment 24. Segment 24 would cross an area managed with a VQO of Partial Retention.

Views from Utah Highway 264 are open where Segment 24 would parallel the west side of the highway through Upper Huntington Canyon. Visibility could be somewhat more evident for this segment where it traverses along the west side of Highway 264.

Alternative C - Burnout Canyon Route (4) - The visual conditions for Segments 23*, 19*, 17*, 15, 13*, 12*, and 3b are described in the preceding route alternative (2). Segments 2, 3a, and 16 are replaced by Segment 24 for this route alternative. Segment 24 is described for Burnout Canyon Route (3) above.

Alternative D - Gooseberry Route - Segments 19* and 23* (existing route) cross through an area of private lands into the edge of the National Forest, managed as BLM visual resource management Class III. Segments 1, 2 and 3 are managed with VQO of Partial Retention. All of Segment 2 and portions of Segments 1 and 3 would parallel roads in the foreground distance zone. Other portions of these segments would be in the middle-ground. All of the segments of this route would pass through areas with scenic quality classified as Variety Class A.

Segment 2 would parallel Utah Highway 264, used largely by local residents and for recreation access. Utah Highway 264 has open views of Segment 2 where it would parallel the creek through Upper Huntington Canyon. Views from Utah Highway 264 are mostly screened where Segment 3b would climb a tree-covered ridge in Burnout Canyon.

**TABLE 3-7
SUMMARY OF VISUAL RESOURCES
(Miles Crossed)**

ROUTE	TOTAL MILES	VQO		VARIETY CLASS		VIEW SENSITIVITY			DISTANCE ZONE			VIEWPOINTS
		PR	M	A	B	1	2	3	Fg	Mg	Bg	
Alternative A	13.5	12.3	1.2	2.9	10.6	2.1	11.2	0.2	6.3	7.2	-	Two proposed campgrounds, Clear Creek; U- 264, (proposed National Scenic Byway)
Alternative B	13.5	12.3	1.2	2.9	10.6	2.1	11.2	0.2	6.3	7.2	-	Two proposed campgrounds, Clear Creek; U- 264
Alternative C												
Burnout Canyon Route												
(1)	14.9	13.7	1.2	11.4	2.5	11.3	3.6	-	6.4	8.5	-	U - 264
(2)	15.1	13.9	1.2	10.6	4.5	10.7	4.4	0.7	5.8	8.6	0.7	U - 264
(3)	15.1	13.9	1.2	11.6	2.5	11.5	3.6	-	6.4	8.5	-	U - 264
(4)	15.3	14.1	1.2	10.8	4.5	10.9	4.5	0.7	6.0	8.6	0.7	U - 264
Alternative D												
Gooseberry Route												
	16.7	16.7	-	12.8	3.9	15.7	0.2	0.8	9.2	6.7	0.8	U - 264, Skyline Drive (proposed scenic backway), Gooseberry campground
Valley Camp Triangle Connectors												
(1)	1.0	1.0	-	0.5	0.5	0.5	0.5	-	0.5	0.5	-	
(2)	0.9	0.9	-	0.5	0.4	0.5	0.4	-	0.4	0.5	-	
(3)	0.5	0.5	-	0.4	0.1	0.4	0.1	-	0.1	0.4	-	
Alternative E												
Winter Quarters Route												
(1)	16.1	14.9	1.2	14.0	2.1	14.2	1.9	-	1.3	14.8	-	U- 96; Scofield residences;
(with Segments 19* & 23*)	20.2	19.0	1.2	14.0	2.1	14.2	6.0	-	2.1	18.1	-	proposed campground
(2)	17.2	16.0	1.2	15.1	2.1	15.3	1.9	-	1.3	15.9	-	U- 96; Scofield residences;
(with Segment 19*)	20.0	18.3	1.2	15.1	2.1	15.3	4.7	-	1.8	18.2	-	proposed campground

Segment 1 would parallel Skyline Drive for about 4 miles along a ridge that overlooks Cabin Hollow and the Lower Gooseberry Reservoir. Most views from Gooseberry Campground, Mammoth Guard Station, and rural residences in the area will be partially-screened-to-fully-screened by vegetation and terrain. This segment would cross dissected mountain ridge slopes south into the upland basin of Gooseberry Creek.

Valley Camp Triangle Connectors - The segments described below are unseen from any sensitive viewpoints.

Valley Camp Triangle Connector (1) - This route includes Segment 5/6 in addition to the segments in route (1) described above. Segment 5/6 would extend into an area managed with a VQO of Partial Retention in the middleground. The scenic quality for this area is rated as Variety Class A. Segment 5/6 would parallel a primitive road along the up-hill slope.

Valley Camp Triangle Connector (2) - Segments 4 and 8 would traverse an area managed with a VQO of Partial Retention in the middleground. The scenic quality for this area is rated as Variety Class A. Segment 10* is described in route description (1).

Valley Camp Triangle Connector (3) - Similarly, Segments 4 and 9 would traverse an area managed with a VQO of Partial Retention in the middleground, except Segment 9 would extend into the foreground of a primitive road. The scenic quality for this area is rated as Variety Class A.

Alternative E - Winter Quarters Route (1) - The area traversed by Segment 12*, part of the existing route, is managed with VQO of Partial Retention and Modification. Portions of this segment are in both foreground and middleground. Scenic quality is both Variety Class A and B for this segment. Segment 12* is openly visible to views where it crosses a side trail that provides access to the Fish Creek National Recreation Trail.

Segment 22 and a portion of Segment 20 would traverse private lands in Pleasant Valley, managed with BLM visual resource management Class III. The scenic quality of this valley is approximately equivalent to Variety Class B. The distance zone along Segment 22 and a portion of Segment 20 is middleground.

Most of Segment 20 would be unseen from sensitive viewpoints. Where this segment would ascend the east end of Winter Quarters Ridge, Scofield residences have open views. Views remain open as this segment would cross Pleasant Valley and descend the western ridge of U P Canyon. At the intersection of Segments 20, 21 and 22, Segment 22 would continue south on the ridge top, unseen by Utah Highway 96, along a primitive road, to terminate at the existing pipeline (route Segment 23*). Associated Segments 19* and 23* cross through an area of private lands into the edge of the National Forest, managed as BLM visual resource management Class III.

Alternative E - Winter Quarters Route (2) - The visual conditions described in the preceding description also apply to this route. Segment 22 could be unseen by sensitive viewpoints. The end of existing route Segment 23* is openly visible from Utah Highway 96. Just south of the junction of Utah Highways 96 and 264 and an existing coal load-out facility, route Segment 21 would traverse a ridge from the narrow bottom of Mud Creek. This segment would then parallel Mud Creek adjacent to Utah Highway 96. Associated Segment 19* crosses through an area of private lands into the edge of the National Forest, managed as BLM visual resource management Class III.

NOISE

There are no established Federal, State, or local noise standards that apply to this area. Ambient noise consists of typical forest sounds and distant traffic on highways and roads. Ambient noise levels are estimated to be about 45 decibels (dBA), which is typical of such settings.

SOCIOECONOMICS

The area of influence for the proposed project includes Carbon, Emery, and Sanpete counties. The closest city of any size in this area is Price with a 1980 population of slightly more than 9,000.

Total baseline population is projected to be 627,869 for the three-county area of influence by the year 2000. There has been a net decline in population for both Carbon and Emery counties and an increase in population for Sanpete County from 1980 to 1988. All 3 counties have seen a rise and fall in their population base since 1960.

Demographics reveal a predominately white and native-born (to the region) population in the area, evenly split between male and female and somewhat younger, on average, than the State at large.

Carbon County has, by far, the strongest economy representing more than 50 percent of the total personal income in the three counties. Mining is the dominant earning factor in Carbon and Emery counties. Mining and transportation/utilities are the two dominant components of the economies in Carbon and Emery counties. Only in Sanpete County is there a significant farm component to the county economy.

Generally, the three-county area is experiencing an overall decline in its economic health according to the Utah Division of Business and Economic Development. Most employment activity is taking place in Carbon County.

Carbon County's nonfarm jobs in the second quarter of 1989 totaled 45 fewer than the previous year. The loss of jobs in coal mining (270 positions) was not offset by gains in services (110 positions), manufacturing (50 positions), and government (40 positions).

Emery County's nonfarm jobs increased by 50 positions over the same period in 1988. Most of these jobs were in heavy construction. Mining reported the only significant sector drop, losing 20 positions.

Sanpete County reported an increase of 260 positions in nonfarm jobs from the second quarter of 1982 to the second quarter of 1989. These jobs primarily were created by the construction of the new regional prison (which employs 215 workers). Manufacturing created 100 new jobs in food-products manufacturing.

From 1979 to 1986 average real output per Utah coal miner increased at an average rate of 7.6 percent per year because of increased use of longwall mining. This was higher than the national average of 6.97 percent and considerably higher than the period of 1969 to 1979 (0.96 percent per year for Utah and 0.49 percent per year for the United States).

Table 3-8 summarizes employment data in the area of influence for 1988 and 1989 during the period April through June. Government, especially local government, dominates in both Sanpete County and Carbon County. However, in Emery County mining is the largest employer. Mining provided 13 percent of the jobs in the three counties in 1989, which ranked it third ahead of services and behind government (first) and trades (second).

Nonagricultural jobs constitute over 88 percent of the total civilian labor force in Carbon and Emery counties for both 1988 and 1989. In Sanpete County the figure drops to 60 percent, reflecting a more significant agricultural sector than either Carbon or Emery counties. Unemployment in all three counties is high, but it is highest in Sanpete County.

Table 3-9 reveals that Carbon and Sanpete counties are only in fair fiscal condition and that Emery County is in poor fiscal condition. Net business creations in Emery County in 1986 was a loss of two. Carbon County lost six businesses in the same year and Sanpete County gained seven.

Mine Employment and Production

In 1988 the Skyline Mine operated by Utah Fuel expended \$48,488,000 on mining operations. Tabulation of the distribution of these expenditures is presented in Table 3-10.

As of November 15, 1989 there were 251 people employed at the Skyline Mine. This is expected to increase to 300 by 1991, with continued planned expansion. The distribution of the work force is presented in Table 3-11.

The impact of Skyline's mining operations upon the local labor force is large. Maintaining this contribution to the local economy and developing a modest expansion of mine operations in 1991 are, according to the operator of the mine, closely tied to relocating Main Line No. 41.

Pipeline Construction

A description of methods that would be used to construct the pipeline is provided in Appendix A, Questar Pipeline's Preliminary Construction, Operation, and Maintenance Plan. Table 3-12 provides a list of pipeline acquisition, construction, reclamation, and annual maintenance cost estimates for each route.

Coal

Value - To determine the value of the coal beneath each of the proposed routes, the tonnages of recoverable coal estimated by the BLM were multiplied by \$25.00 per ton, the average for State spot and long-term sales (refer to Table 4-3 in Chapter 4). The resulting figures are base values of the recoverable coal and do not reflect consideration of operating costs.

Royalties amounting to 8 percent of the value of Federal, mined coal are paid to the Federal government. Fifty percent of the 8 percent (which is 4 percent) is then disbursed to the State of Utah and local communities. All figures, both royalties and values, in

Table 4-3 are approximate. Royalties are paid exclusively to the owner when the mined coal is privately owned. Table 4-3 does not include royalties for private coal.

Prior Rights - The existing pipeline has been in place since 1953; whereas, the Skyline Mine permit has more recently been issued. The existing pipeline, a legitimate surface use, is protected from harm by Federal and State regulations and lease stipulations. It is the responsibility of Utah Fuel, the company whose mining activities would affect the existing pipeline, to ensure that it is not damaged by mining activities. Under the current situation, Utah Fuel is financially responsible for protection of the existing pipeline against damage caused by subsidence.

If a bypass pipeline is constructed on public land where no leases currently exist, but a lease is issued in the future, Questar Pipeline would have prior rights. If the mining company chooses to extract coal beneath the pipeline, the mining company would be responsible for ensuring the continued use and operation of the pipeline (as in the case of this project).

However, if a bypass pipeline is constructed on land where leaseholds or private ownerships exist coal owners or lessees would have prior rights. In such a case, Questar Pipeline would have to financially negotiate with the leaseholder or owner for the rights to the coal beneath the proposed pipeline. Otherwise, Questar Pipeline would face the potential of relocating again. Acquisition costs for both surface rights-of-way and coal have been estimated in Table 3-12. Segments 5/6, 8, and 9 in the Valley Camp Triangle; and 20, 21, and 22 along the Winter Quarters Route, and Segment 1 along the Gooseberry Route would cross leased or private coal.

The preference would be to select an unencumbered permanent location for the pipeline to avoid purchasing coal rights, future relocation, or conflict with mining activities.

CULTURAL RESOURCES

Important or potentially important cultural resources along the proposed routes include a prehistoric camp site, an abandoned railroad, three potentially sensitive historic localities, and four areas where there is a possibility of encountering buried Pleistocene vertebrate remains, which could be of both archaeological and paleontological importance. Predictive cultural resource sensitivity assessments categorized the areas within each route as having high, moderate, low, or no sensitivity.

Direct, adverse physical impacts can occur to cultural resources during construction, while indirect impacts may result from increased traffic, which can increase site vandalism. Mitigation measures include avoidance or data recovery. Application of these measures should reduce impacts to an acceptable level.

Background

Federal regulators charged with implementing the Nation's historic preservation program have broadly defined cultural resources as buildings, sites, districts, structures, or objects having historical, architectural, archaeological, cultural or scientific importance. In implementing this definition it has become common practice to delineate

TABLE 3-8
SELECTED LABOR MARKET DATA (APR-JUNE)

	CARBON			EMERY			SANPETE		
	1988	1989	% Chg	1988	1989	%Chg	1988	1989	% Chg
CIVILIAN									
Labor Force	8327	8233	-1.1	3426	3378	-1.4	6250	6490	3.8
Employed	7582	7536	-0.6	3089	3121	1.0	5490	5766	5.0
Unemployed	745	697	-6.4	337	257	-23.7	760	724	-4.7
% of Total	8.9	8.5		9.8	7.6		12.2	11.2	
TOTAL NON- AGRICULTURAL JOBS	7367	7322	-0.6	3368	3421	1.6	3739	3966	6.1
Mining	1482	1195	-19.4	946	922	-2.5	1	4	300.0
Contract									
Const.	158	172	8.9	118	166	40.7	140	215	53.6
Manufacturing	258	307	19.0	10	10	0.0	655	760	16.0
Trans, Comm.									
Utilities	376	394	4.8	807	802	-0.6	149	154	3.4
Trade	1621	1637	1.0	348	352	1.1	803	310	0.9
Fin, Ins,									
Real Estate	193	184	-4.7	47	45	-4.3	91	100	9.9
Service	1314	1427	8.6	285	281	-1.4	395	397	0.5
Government	1965	2006	2.1	807	843	4.5	1505	1526	1.4
Federal	182	189	3.8	46	47	2.2	84	89	6.0
State	477	500	4.8	62	64	3.2	514	525	2.1
Local	1306	1317	0.8	699	732	4.7	907	912	0.6

SOURCE: Job Service, Labor Market Information Report, Utah Department of Employment Security.

TABLE 3-9
ASSESSSED VALUES AND REVENUES

	1960	1970	1980	1981	1982	1983	1984	1985	1986	1987	Growth (Decrease) '80-'87 '86-'87	
CARBON (\$1,000)												
Assessed Valuation	100205	168200	531665	510500	575950	684,045	716245	709295	761044	742211	40%	<2.47%
Gross Taxable Sales		70149	174226	187169	248666	200950	182986	189857	178323	170424	<2.18%	<4.42%
Per Capita Gross												
Tax Sales	0.00	4.45	7.78	8.10	10.08	8.20	7.72	8.11	7.75	7.61	<2.18%	<1.80%
Lodging Room Tax			1429.5	1742.7	1609.9	2022.2	1775.9	1715.5	1266.1	2078.0	45.36%	64.12%
ENERGY (\$1,000)												
Assessed Valuation	52515	50940	946495	1104330	1169100	1402730	1445895	1388335	1484720	1547634	63.51%	4.23%
Gross Taxable Sales		5725	51159	80270	98471	58127	55173	46523	60390	42287	<17.34%	<28.71%
Per Capita Gross												
Tax Sales		1.11	4.41	6.63	7.57	4.44	4.45	3.94	5.12	3.65	<17.23%	<29.97%
Lodging Room Tax			736.7	541.1	769.0	703.3	742.3	747.4	618.6	584.5	<20.65%	<5.51%
SANPETE (\$1,000)												
Assessed Value	62460	75610	252965	239065	249840	267380	296365	318650	335667	311316	23.06%	<7.25%
Gross Taxable Sales		16055	46468	48378	47124	47582	53739	51934	51139	54334	16.92%	6.25%
Per Capita Gross												
Tax Sales		1.46	3.14	3.14	2.93	2.82	3.10	3.07	3.10	3.27	4.14%	5.48%
Lodging Room Tax			222.0	227.0	236.3	2094.9	248.3	239.2	256.5	300.7	35.45%	17.23%

SOURCE: General Economic Conditions: Southeast and Six County Regions, Division of Business and Economic Development, State of Utah.

TABLE 3-10
SKYLINE MINE EXPENDITURES, 1988

Wages & Benefits	\$	10,271,000
Federal, State & Local Taxes		9,444,000
Royalties		7,281,000
Additions Property, Plant & Equipment (excluding sales taxes listed above)		5,064,000
Operating Expenditures (including other assessments, operating supplies, fees and services not included in the above)		<u>16,428,000</u>
TOTAL	\$	48,488,000¹

SOURCE: Memo from John M. Garr, Coastal States Energy Company 11/16/89

¹Excluding interest payments or non-cash expenses such as depreciation.

TABLE 3-11
 DISTRIBUTION OF SKYLINE MINE WORKFORCE

<u>County</u>	<u>Number of Employees</u>	<u>Percent of Total</u>	<u>County</u>				
			<u>Total Workforce</u>	<u>Employed</u>	<u>Percent</u>	<u>Un-employed</u>	<u>Percent</u>
Carbon	36	14.3	8660	8028	92.7	632	7.3
Emery	3	1.2	3620	3403	94.0	217	7.0
Salt Lake	4	1.6	363,430	351,073	96.6	12,357	3.4
Sanpete	135	53.8	6600	6032	91.4	568	8.6
Sevier	7	2.8	6550	6216	94.9	234	5.1
Utah	66	26.3	113,280	109,202	96.4	4078	3.6
—							
TOTAL	251						

SOURCE: Memo from John Garr, Coastal States Energy Company, 11/16/89

TABLE 3-12
ESTIMATED ACQUISITION, CONSTRUCTION, RECLAMATION, AND
MAINTENANCE COSTS BY ROUTE

Route	Acquisition	Construction and Reclamation	Annual Maintenance (entire route)
Alternative A - No Action	\$ 0	\$ 0	\$ 24,300 *
Alternative B - Leave in Place, Full Extraction Mining	\$ 0	\$ 3,334,000 **	\$ 146,650 (15-20 years)
Alternative C - Burnout Canyon Route			
(1)	\$ 0	\$ 2,197,000	\$ 26,820
(2)	\$ 0	\$ 1,898,000	\$ 27,180
(3)	\$ 0	\$ 2,953,000	\$ 28,062
(4)	\$ 0	\$ 2,654,000	\$ 28,220
Alternative D - Gooseberry Route	\$ 4,612,800	\$ 3,937,000	\$ 30,060
Valley Camp Triangle Connectors			
(1)	\$ 0	\$ 240,500	\$ 1,800
(2)	\$ 2,400,000	\$ 253,500	\$ 1,620
(3)	\$ 1,600,000	\$ 214,500	\$ 900
Alternative E - Winter Quarters Routes			
(1) (with Segments 19* and 23*)	\$ 11,464,640	\$ 4,141,600 ***	\$ 36,630
(2) (with Segment 19*)	\$ 6,264,000	\$ 4,092,000	\$ 36,000

* Does not include costs for repairs if subsidence should result from partial mining.

** Does not include cost to replace major sections of pipeline following complete subsidence, which could be as much as \$1,479,000 following cessation of subsidence from each of 3 seams. Also does not include costs to remove redundant pipeline and reclaim disturbed areas at the conclusion of mining (\$228,000).

*** Includes \$60,000 for valve assemblies and piping to modify system to backflow gas to compressor station at Clear Creek.

Note: a: Cost estimates for reclamation are based on an average and do not reflect costs of any special mitigation measures or reclamation of abandoned right-of-way if pipeline is relocated.

b: Acquisition costs include acquisition of private and leased coal and surface right-of-way.

three basic categories of resources: (1) prehistoric resources, (2) historic era sites, and (3) ethnographic sites.

Prehistoric resources are defined as sites and associated artifacts that date from before the time of written records, which do not appear before the arrival of Spanish explorers. These resources represent Native American cultures and societies. The importance of these resources generally stems from their potential to yield valuable information about prehistory and the development of human cultures. Prehistoric sites with important information potential are afforded special status under Federal and State historic preservation guidelines (e.g., the National Historic Preservation Act of 1966, as amended in 1976 et seq. (Public Law 94-422); NEPA (Public Law 91-190); and Protection and Enhancement of the Cultural Environment (Executive Order 11593) and the Utah Antiquities Act of 1969 (Utah Code Ann., Section 63-11-2).

Historic resources are defined as those sites or properties that were occupied or used after the time when written records became available; for much of Utah, this did not occur until the early 1800's. Ordinarily, properties must be at least 50 years old in order to be deemed historic. The importance of such resources, as viewed from the perspective of Federal and State preservation guidelines, lies in their potential to yield important historic information, or from their association with historically important persons or with events that have made a meaningful contribution to the broad patterns of history, or because they represent characteristic styles or the work of a master.

Ethnographic resources are locations of contemporary or heritage importance to Native Americans. Major Federal legislation that requires the consideration of ethnographic considerations in environmental documents includes the same laws that protect prehistoric and historic resources as well as the American Indian Religious Freedom Act (Public Law 95-431).

In 1989, archaeologists from Dames & Moore completed several tasks to determine the effects of each alternative on cultural resources. These included:

- Review of Manti-La Sal National Forest and the Utah State Historic Preservation office cultural resource records for information on previous cultural resource projects within the project area.
- Review of General Land Office records for information on potential historic localities.
- Consultation with Dr. David Madsen, Utah State Archaeologist for information to identify areas with the potential for containing buried Pleistocene mammal remains.
- An intensive, 100 percent pedestrian survey of all segments on National Forest System lands with the exception of the existing route and portions of Segment 24 that had been assessed previously for potential cultural resources in conjunction with the construction of Utah Highway 264 (Bruder, Bassett and Rogge 1990).

In addition, a contact program has been initiated by the Forest Service among local Native American communities soliciting information about any cultural resources having special importance for them.

Existing data indicate that cultural resources in the general study area consist largely of historic properties associated with coal mining activities and related occupation of the region. Prehistoric sites are rare; however, there is reason to believe that evidence of very early human activities associated with the remains of extinct Pleistocene fauna such as mammoths and mastodons may be present.

Known Cultural History

Prehistoric Period - Very little archaeological evidence is available regarding the prehistoric occupation of that portion of the Wasatch Plateau where the project is located. However, excavations in the adjacent eastern Great Basin indicate that earliest humans may have arrived in the general region approximately 15,000 years ago (Gruhn 1961). Artifacts typical of the earliest several thousand years of occupation are often associated with remains of now extinct elephants, camels and bison indicating that they were hunted by the earliest, Paleo-indian inhabitants. Moister and cooler conditions characterized the climate at that time.

Evidence concerning Paleo-indian occupation in Utah is exceedingly sparse (as summarized by Black and Metcalf 1986). However, remains of a Columbian mammoth (Mammuthus columbi) were recovered from the Huntington Reservoir area near the project area and two mastodons (Mammut americanum) have been recovered from sinkholes near Skyline Drive within the study area (Intermountain Reporter 1989; Miller 1987). Radiocarbon dating suggests that the mammoth dates to approximately 11,000 before present (Madsen 1990).

The subsequent era of occupation is known as the Archaic and dates from approximately 8300 to 1500 BP in many parts of the region (Schroedl 1976; Jennings 1978; Black and Metcalf 1986). The nomadic hunting and gathering Archaic cultures apparently reflect an adaptation to a climate much drier and warmer than the previous era.

Sites of the horticulturally based Fremont culture appear throughout much of Utah around AD 500. A three phase sequence, beginning possibly as early as AD 150 and ending at about AD 1200, has been postulated for the San Rafael Fremont variant whose occupation zone is located immediately east of the study area (Black and Metcalf 1986). Early Fremont sites suggest a trend toward seasonal sedentism. Later sites typically are small villages situated along streams and on small knolls above water sources. There is some evidence to indicate that near the end of the sequence, San Rafael Fremont groups aggregated into fewer but larger sites situated adjacent to arable land.

The appearance of distinctive side-notched points and ceramics around AD 1250 reflects the eastward expansion of presumed Shoshone-speaking hunters and gatherers out of the southwestern Great Basin (Holmer and Weder 1980). The Fremont sites disappear at about this time although the reason for this coincidence has not been resolved (Hauck 1979; Nickens 1982).

Ethnohistory Period - The Utes, a Shoshonean population, were the sole inhabitants of east-central Utah at the time of Euro-American contact (Steward 1938). They subsisted by hunting and gathering wild foods in a manner very similar to the Archaic era occupants (Euler 1966; Wheat 1967; Smith 1974; Jennings 1978). The introduction of the horse around AD 1700 profoundly changed their way of life (Stewart 1966). As traffic along the emigrant trails increased and Mormons began to settle Utah in the 1850's and

1860's, the Native Americans came into more and more conflict with the Americans. The Utes were confined to the Uintah Reservations north and east of the study area during the 1870s.

Historic Period - With the exception of the brief Dominguez-Escalante expedition of 1776-1777, the initial intrusion by Euro-Americans into present-day Utah was by fur trappers in the early 1800's. While never great in number, these traders and explorers were effective in causing the Indians to become dependent on manufactured goods, in contributing to the extinction of the bison west of the Continental Divide, and in publicizing the region to eastern interests.

Following an ill-fated attempt on the part of the Mormons to settle the Wasatch Plateau and surrounding areas in 1855, the region was abandoned until 1877. In that year, members of the Sanpete Stake founded agricultural settlements in Castle Valley. Later, cattle and then sheep were grazed within the general region.

Coal was discovered at Connellsville in Huntington Canyon in 1875, and there was an unsuccessful attempt to produce coke there. In 1876, the Pleasant Valley Road was constructed, and the following year high-quality coal was being mined at the Number 1 Mine in Winter Quarters Canyon. This was the first successful commercial coal mine in Utah (Watts 1948). Mining continued there until 1928 despite abortive attempts to organize labor and resulting unrest, an attempt by the railroads to monopolize production, and a tragic mine explosion in 1900, which claimed 199 lives.

Several communities were established in or near the study area to service the mining industry. The company town at Winter Quarters grew to a population of around 800 and had at various times, segregated communities of Welsh or British, Finnish, Greek, and Slavic miners and their families. Many miners opted to settle in the independent town of Scofield, near the railroad, or at Clear Creek, a mill town that later developed its own mines. The aforementioned mines, along with the UP Mine and Mud Creek Mine constituted the Pleasant Valley Coal District for many years.

Although mining continues to be the dominant commercial venture in the region, the ranching, and more recently the recreational industries, have also made use of the study area. The region shows evidence both of summer sheep herding and use by hunting and fishing enthusiasts as well as containing scattered summer homes on private inholdings within the Forest.

Specific Descriptions - Cultural Resources in the Project Area

Within the general study area (which includes all of the US Geological Survey (USGS) Scofield Reservoir and Fairview Lakes quadrangles, and small portions of the C Canyon and Jump Creek quadrangles), 19 previous cultural resource surveys have been undertaken. About 1.5 miles of previous surveys are along the existing pipeline corridor. These studies located 3 archaeological sites on or very near (within 1/8 mile) the proposed routes or the existing pipeline.

In addition, the locations of various historic manifestations (primarily roads) were obtained from Government Land Office (GLO) township maps dating between 1876 and 1931. Table 3-13 lists both the previously recorded archaeological sites and the potential historic site locations from the GLO maps. It should be noted that except where these

historic locations have been field checked, we cannot be certain they still exist. Thus, as noted on Table 3-13, the integrity and potential eligibility for listing on the National Register of Historic Places (National Register) for many of these resources has not been determined.

The 3 previously recorded sites include 1 prehistoric lithic scatter, 1 prehistoric camp site, and 1 historic limited activity site containing a corral, inscribed aspens and trash. Previous recorders have recommended that 2 of the archaeological sites are not eligible for listing on the National Register, but that the prehistoric camp site (42CB334) is eligible.

The 25 potential historic locations include 1 railroad, 1 sawmill, 1 coal prospect, and 22 roads or trails. The presently unused Denver and Rio Grande Western Railroad is extant but its historical integrity and National Register eligibility have not been determined. No trace of the sawmill was found during our field inspections and we assume that either it is no longer extant or it was misplotted on the GLO maps. The condition and National Register eligibility of the coal prospect is unknown.

Most of the roads apparently are narrow bladed tracks that may have been associated with logging, or other temporary access needs, but 5 were more substantial transportation corridors. These are the Skyline Road (now Skyline Drive), noted as early as 1892; the Pleasant Valley Road, which headed northwest from Winter Quarters Camp (1891); the Winter Quarters Camp Road, which connected the company town with Scofield to the east and also apparently was paralleled by a spur railroad track at one time (1876); the Scofield Road, which today is Utah Highway 96 (1876); and the Price Road, which headed towards Price from its intersection with the Scofield Road about 2.75 miles north of Clear Creek (1915).

We suggest that the 5 main transportation corridors might qualify for National Register listing under criterion "a" because of their association with the development of early mining in Utah. However, as noted, at least within the project area or at least where crossed by the alternative routes, 4 have lost their integrity due to grading, widening, and in 1 case paving. There may, however, be well-preserved, National Register eligible segments located outside of the project area. Therefore, if these linear features are eventually considered for National Register listing, those stretches which might be affected by this project would be considered non-contributing elements. The integrity of the fifth major route (the Price Road) is unknown.

We note, however, that the 5 main routes could predict the presence of nearby, unrecorded historic sites. The National Register eligibility of the smaller roads has not been determined, but some have lost their integrity where they are crossed by the alternative routes.

Five groups and 10 isolated occurrences of carved aspen trees were located by the survey as shown on Table 3-13. We recommend that they are not eligible for listing on the National Register and that our recording has essentially exhausted their information potential.

The contacts initiated with local Native American communities have, to date, not resulted in the identification of any traditional use areas or sites having special importance or sacred values.

**TABLE 3-13
ARCHAEOLOGICAL SITES AND HISTORIC LOCALITIES**

SITE / LOCALITY	SEGMENT	ROUTE	CONDITION
<i>Previously Recorded Sites</i>			
1 42EM1306 (lithic scatter)	16, 24	Burnout Canyon	west of Fairview Road (relationship to route undetermined); recommended not eligible
2 42EM1496 (corral, inscribed aspens, historic trash)	18	Existing	east of pipeline (should not be affected); recommended not eligible
3 42CB334 (prehistoric campsite)	20	Winter Quarters	relationship to route undetermined; recommended eligible
<i>Newly Recorded</i>			
1 42SP218 (inscribed aspens)	1	Gooseberry	on route (will be affected); recommended not eligible
2 42SP219 (inscribed aspens)	1	Gooseberry	on route (will be affected); recommended not eligible
3 42SP220 (inscribed aspens)	1	Gooseberry	on route (will be affected); recommended not eligible
4 42SP221 (inscribed aspens)	14	Burnout Canyon	on route (will be affected); recommended not eligible
5 42EM2195 (inscribed aspens)	3b	Burnout Canyon	on route (will be affected); recommended not eligible
<i>Potential Historic Locality</i>			
1 Skyline Road, 1892	1, (3)*	Gooseberry	integrity lost within the project area
2 trail, 1929	1	Gooseberry	west of route (should not be affected); eligibility unevaluated
3 road, 1929	1	Gooseberry	west of route (should not be affected); eligibility unevaluated
4 road, 1892	1	Gooseberry	west of route (should not be affected); eligibility unevaluated
5 road, 1892	1	Gooseberry	integrity lost where crossed by alternate route
6 road, 1891	1	Gooseberry	south of route (should not be affected); eligibility unevaluated
7 road, 1891	1	Gooseberry	unknown; eligibility unevaluated
8 road, 1931	1, 2, 16, 24	Gooseberry, Burnout Canyon	integrity lost where crossed by alternate route
9 road, 1931	1	Gooseberry	dirt road; eligibility unevaluated
10 road, 1931	16, 24	Burnout Canyon	integrity lost where crossed by alternate route
11 road, 1931	1, 2, 3a, 3b, 11, 16, 18	Existing, Burnout Canyon	dirt road; eligibility unevaluated
12 road, 1931	3b	Burnout Canyon	dirt road; eligibility unevaluated
13 sawmill, 1931	4	Burnout Canyon	not extant
14 road, 1931	4, 5, 6, 9	Burnout Canyon	dirt road; eligibility unevaluated
15 road, 1931	6	Burnout Canyon	west of route (should not be affected); eligibility unevaluated
16 Pleasant Valley Road, 1891	12, 13, 20	Existing, Winter Quarters	integrity lost where crossed by alternate route
17 road, 1931	18	Existing	unknown; eligibility unevaluated
18 Winter Quarters Camp Road/Railroad, 1876	20	Winter Quarters	integrity lost where crossed by alternate route
19 Scofield Road, 1876	19, 20, 21, 23	Winter Quarters	integrity lost within project area
20 Denver & Rio Grande Western Railroad	19, 20, 21, 23	Winter Quarters	extant; integrity and eligibility unevaluated
21 coal prospect, 1876	21	Winter Quarters	unknown; eligibility unevaluated
22 Price Road, 1915	20, 21, 22	Winter Quarters	unknown; eligibility unevaluated
23 road, 1915	22	Winter Quarters	unknown; eligibility unevaluated
24 road, 1915	22	Winter Quarters	unknown; eligibility unevaluated
25 road, 1915	23	Existing	unknown; eligibility unevaluated

* Intersects route more than once

Potentially Sensitive Areas

In sum, important or potentially important cultural resources of which we are aware along the proposed routes include a single recommended National Register eligible site (42CB334, the prehistoric campsite), the unused Denver and Rio Grande Railroad, and 3 potentially sensitive historic localities on the Winter Quarters Route: Scofield Road, Winter Quarters Camp Road, and the old road leading toward Price, which is part of Segment 22. (No historic remains were located where the alternate routes would cross or parallel the Skyline and Pleasant Valley roads.) In addition, we have identified 4 areas where there is a possibility of there being buried Pleistocene vertebrate remains. These are low, boggy areas (physiographically similar to the sediment trap in which the Huntington Reservoir mammoth was encountered) along Gooseberry, Upper Huntington, and Mud Creeks.

Using data from the field inventory and records review, we have assigned sensitivity rankings along each of the proposed routes. For those stretches where we or others have undertaken intensive pedestrian surveys and found no eligible sites or where the Forest Service has consulted previously with the State Historic Preservation Officer and determined the potential for cultural resources is too low to warrant survey, we have assigned a sensitivity ranking of "none". Also included here is the existing pipeline corridor that has already been disturbed and therefore would not be expected to contain intact deposits even if any cultural resources had been there originally. Stretches of low sensitivity are those areas on non-National Forest lands that have not been surveyed, but where the potential for encountering cultural resources is considered to be minimal based on the results of intensive survey on National Forest land with similar topography, slope, and other environmental conditions. Areas of moderate sensitivity are those where Pleistocene vertebrates, or historic resources could potentially be encountered, but where their presence has not been verified. A single stretch along Mud Creek is ranked as highly sensitive. This is an area where Pleistocene deposits could be present, and which, in addition, contains the historic Denver and Rio Grande Western Railroad, which may be eligible for listing on the National Register. The sensitivity of each of the proposed routes is summarized below.

Alternatives A and B - Because the existing pipeline route is already disturbed, we judge it to be of no sensitivity from a cultural resources perspective.

Alternative C - Burnout Canyon Routes (1) and (2) - The Burnout Canyon route would contain a 2.1-mile stretch of moderate sensitivity because of the possibility that Upper Huntington Canyon may contain buried, undetected Pleistocene faunal remains.

Alternative C - Burnout Canyon Routes (3) and (4) - Both of these routes would contain 0.3 mile assigned a moderate sensitivity because of potential, undetected Pleistocene remains along Upper Huntington Canyon. Each route would also contain 0.4 mile of low sensitivity where Segment 24 would deviate from the Utah Highway 264 right-of-way, and therefore has not been assessed for potential cultural resources (the Utah Highway 264 right-of-way has been assessed and determined not to require cultural resources inventory (Wikle 1982)).

Alternative D - Gooseberry Route - Two stretches along the Gooseberry Route (totaling 0.7 mile) are assigned moderate sensitivity because of their potential to contain buried, undetected Pleistocene vertebrate remains. These involve the area where Segment 1 would cross Gooseberry Creek, and the stretch along Upper Huntington Canyon (on Segments 2 and 3). The Gooseberry Route also would contain 2.2 miles of low sensitivity on private land, which has not been surveyed. Based on previous findings, we predict that few, if any, important cultural resources would be found in this area.

Valley Camp Triangle Connectors (1) through (3) - All limits of segments of the Valley Camp Triangle have been intensively surveyed and no cultural resources were encountered. Therefore, we judge it to be of no sensitivity from a cultural resource perspective.

Alternative E - Winter Quarters Routes (1) and (2) - The Winter Quarters route would contain areas of high, moderate, and low sensitivity. If Winter Quarters Route (2) is used, 5.1 miles of unsurveyed, low sensitivity area, 1.3 miles of moderate sensitivity possibly containing historic resources as well as possible buried, undetected Pleistocene fauna, and 1.8 miles of high sensitivity would be crossed. The high sensitivity is the result of potential Pleistocene fauna as well as the confirmed presence of a historic railroad north of Clear Creek. The moderate sensitivity areas are just south of Scofield and near the intersection of the old Price Road with the Scofield Road.

If Winter Quarters Route (1) is used instead, all high sensitivity areas will be avoided, and 6.5 miles of unsurveyed low sensitivity would be involved along with 0.9 mile of moderate sensitivity--south of Scofield where both buried, undetected Pleistocene remains and historic resources could be present, and along the historic Price Road.

CHAPTER 4 - ENVIRONMENTAL CONSEQUENCES

This chapter provides a description of the consequences, or potential impacts, to the natural, human, and cultural environments of implementing each alternative. It is the scientific and analytic basis for the comparison of the alternatives (Table 2-2 in Chapter 2). It also describes the consequences of implementing each alternative in terms of the issues.

Impacts are defined as modifications to the environment, as it presently exists, that are brought about by an outside action. Impacts can be beneficial or adverse, short or long term, and either direct or indirect. Short-term impacts are defined as those changes to the environment during construction that would generally revert to preconstruction conditions at or within a few years of the end of construction. Long-term impacts are defined as those that would substantially remain for the life of the project or beyond. Direct impacts are those that are immediate results of construction activities and indirect impacts are those associated with the project as a result of construction activities. An irreversible or irretrievable commitment of resources would occur when the current or potential productivity of those resources are consumed, committed, or lost and can never be regained. Cumulative impacts are those that increase in effects by successive additions.

Generally, the potential impacts were assessed considering the natural, human, and cultural environmental resources present, the duration of the impact, the construction methods that would be used along the alternative proposed routes and appropriate mitigation measures. A summary of the construction techniques is provided in Appendix A - Preliminary Construction, Operation, and Maintenance Plan.

Using the environmental resource data gathered and descriptions of the alternatives, the types of impacts to each resource were identified based on the following criteria:

- Resource Sensitivity, or the probable response of a particular resource to project-related activities
- Resource Quality, or the pre-project condition of the resource potentially affected
- Resource Quantity, or the amount of the resource potentially affected
- Duration of the Impact, or the period of time over which the resource would be affected, measured as short (up to a few years) or long term (life of the project and beyond)

Although these criteria were conceptually the same for each resource study, characteristics of the criteria varied according to the characteristics of each resource. The results yielded qualitative levels of high, moderate, low, or no identifiable impacts as defined below.

High Impact -

A high level of impact would result if the construction, operation, maintenance, or abandonment of the proposed project potentially would cause a significant or substantial adverse change or stress to an environmental resource(s).

- Moderate Impact -** A moderate impact would result if the construction, operation, maintenance, or abandonment of the proposed project potentially would cause some adverse change or stress to an environmental resource(s).
- Low Impact -** A low impact would result if the construction, operation, maintenance, or abandonment of the proposed project potentially would cause a small or insignificant adverse change or stress to an environmental resource(s).
- No Identifiable Impact -** No identifiable impact would be indicated where no measurable change or stress would occur to the specific resource(s) under investigation.

In some cases where impacts were identified as low or unidentifiable, no measures for mitigation were recommended. Where mitigation was warranted and would be effective, recommendations for mitigation were made by the resource specialists to reduce or eliminate specific impacts. The impacts in this document are presented after mitigation measures have been applied; that is, the potential level of impact has been reduced by assuming that appropriate measures (such as the stipulations in Attachment A of Appendix A) would be implemented. A summary of impacts by alternative is provided in Table 4-1 (at the end of Chapter 4) and in Table 2-2 in Chapter 2.

EARTH RESOURCES

Geology

Geological features identified during the resource inventory were analyzed to determine the impacts that would occur. Measures to decrease, or mitigate, the impacts (refer to Attachment A of Appendix A) were applied where appropriate.

The primary concern in the project area is unstable land. Alternative route locations that would affect or be affected by land instability problems, which would preclude construction of the pipeline, were eliminated from further consideration early in the project. Faults in this area are not considered to pose a threat to the pipeline as no post-Quaternary or active faults have been identified. Impacts could occur to the pipeline through fault rupture or ground motion if movement occurs within any of the fault zones in the project area. All of the existing and relocated routes would cross many faults. Placement of the pipeline above fault zones is preferred where coal recovery is of concern. Subsidence-related impacts resulting from the proposed project are addressed in the coal resources section. The following descriptions summarize the criteria used to assess impacts according to the categories high, moderate, low, and no identifiable.

High Impacts

- areas of known land instability potentially creating a hazard to the pipeline or where construction of the pipeline could induce land instability

- areas of very steep slopes (greater than 60 percent) and areas of known or potential land instability that could impact the pipeline or where construction of the pipeline could potentially cause instability
- seep areas on the slopes described in the previous 2 criteria

Moderate Impacts

- areas of steep slopes (30 to 60 percent) and areas of potential land instability
- seep areas on the slopes described in the previous criterion

Low Impacts

- areas of moderate slopes (8 to 30 percent) and potential land instability
- seep areas on the slopes described in the previous criterion

No Identifiable Impacts

- areas of low slopes, no indication of land instability. Seeps may or may not be present.

Most of the existing route and the alternative routes are located in areas of low-to-no-identifiable impacts on gentle slopes and along ridgecrests. Areas of moderate and high impacts are discussed in the paragraphs below. A summary of potential impacts by route is provided in Table 4-2.

Specific Descriptions

Alternative A - No Action - No construction would occur along the existing route under the no-action alternative. Therefore, there would be no effect to surface resources. However, areas of unstable land were mapped along the existing route and interpreted into areas of potential impacts. The only areas of high long-term impacts along the existing route occur along 0.7 mile of Segment 12*. These are areas of known unstable slopes adjacent to Gooseberry Creek and on the east side of the Gooseberry graben. These areas are particularly unstable during unusually wet years. There are 4.3 miles of moderate impact crossed by the existing route. These areas occur on slopes along Segment 12* near Gooseberry Creek, Segment 13* west of Winter Quarters Ridge, Segment 17* near the head of Box Canyon, Segment 18* on slopes west of the ridge line on the east side of Upper Huntington Canyon, Segment 19* west of Mud Creek, and Segment 23* east of Mud Creek. Low impacts (1.8 miles) were identified along Segments 17* and 18* along the ridge west of Upper Huntington Canyon, Segments 7* and 10* on slopes near the head of Burnout Canyon, and Segment 23* east of Mud Creek.

Alternative B - Leave in Place, Full Extraction Mining - If complete mining is allowed and a redundant pipeline is constructed above ground, construction activities could cause some impacts to unstable areas. Construction of the redundant pipeline would result in

no high impacts, but could result in 0.6 mile moderate impact along Segment 17* at the head of Box Canyon and Segment 18* on the ridge east of Upper Huntington Canyon. Low Impacts (0.5 mile) could result along Segments 17* and 18* along the ridge east of Upper Huntington Canyon.

Alternative C - Burnout Canyon Route (1) - There are no high impacts along the segments that would be affected. In response to recommended mitigation, a portion of Segment 3b would be realigned to generally parallel the stream in Burnout Canyon to avoid the unstable areas to the extent possible. Moderate long-term impacts could result from construction for about 0.6 mile on steep slopes along Segment 14 north of The Kitchen and Segment 3b on slopes adjacent to the stream in Burnout Canyon. Low impacts could result along Segment 14 north of The Kitchen. Refer to the description of Alternative A regarding 12*, 13*, 19*, and 23*.

Alternative C - Burnout Canyon Route (2) - Construction of new pipeline would result in no high impacts, but if mitigated could result in 0.9 mile of moderate impact along Segment 15 north of The Kitchen and Segment 3b on slopes adjacent to the stream in Burnout Canyon.

Alternative C - Burnout Canyon Route (3) - This route, as proposed, would cross 1.7 miles of unstable slopes along the west side of Highway 264. However, Forest Service mitigations stipulate that the pipeline be placed under the cut ditch or the west lane of the highway wherever the slopes are unstable. Through the application of this mitigation, the potential impact for this segment would be lessened from high to low. Approximately 0.7 mile of additional low impact could occur from construction along other portions of Segment 24 and along Segment 14. New construction along this proposed route could also result in 0.6 mile of moderate impact on steep slopes along Segment 14 north of The Kitchen and along Segment 3b on slopes adjacent to the stream in Burnout Canyon.

Alternative C - Burnout Canyon Route (4) - The route, as proposed, would cross 1.7 miles of unstable slopes along the west side of Highway 264. However, Forest Service mitigations stipulate that the pipeline be placed under the cut ditch or the west lane of the highway wherever the slopes are unstable. Through the application of this mitigation, the potential impact for this segment would be lessened to low. Approximately 0.6 mile of additional low impact could occur from construction along other portions of Segment 24. New construction along this proposed route could also result in 0.9 mile of moderate impact along Segment 15 north of The Kitchen and along Segment 3b on slopes adjacent to the stream in Burnout Canyon.

Alternative D - Gooseberry Route - New pipeline would cross about 0.6 mile of areas of unstable land and seeps, which could result in high long-term impacts. These areas are along Segment 1 as it descends into and ascends out of the Gooseberry graben. Approximately 2.0 miles of moderate impacts could occur along Segment 1. Moderate impacts could also result along Segment 3b as described for Burnout Canyon Route (1). Low impacts (1.3 miles) could result at the head of Cabin Hollow, on slopes east of the Gooseberry graben, and on the ridge north of Swens Canyon. The Gooseberry Route would provide an opportunity to avoid and reclaim the two areas of unstable land along Segment 12*.

Valley Camp Triangle Connector (1) - Construction of new pipeline could result in 0.6 mile of low impact along Segment 5/6. The Forest Service believes the segment

TABLE 4-2
SUMMARY OF POTENTIAL IMPACTS: GEOLOGICAL HAZARDS
(Miles of entire route/Miles of new pipeline)

Route	Total Miles	High	Moderate	Low	No Identifiable	Comments
Alternative A						
No-Action	13.5/NA	0.7/NA	4.3/NA	1.8/NA	6.7 /NA	land instability along Segment 12*
Alternative B						
Leave in Place, Full Extraction Mining	13.5/4.25	0.7/0.0	4.3/0.6	1.8/0.5	6.7 /3.15	land instability along Segment 12*
Alternative C						
Burnout Canyon (1)	14.9/5.7	0.7/0.0	4.2/0.6	1.2/0.3	8.8 /4.8	land instability along Segments 12* and 3b.
Burnout Canyon (2)	15.1/5.2	0.7/0.0	4.5/0.9	1.1/0.2	8.8 /4.1	land instability along Segments 12* and 3b.
Burnout Canyon (3)	15.1/5.9	0.7/0.0	4.0/0.4	3.7/2.8	6.7 /2.7	land instability along Segments 12* 24, and 3b.
Burnout Canyon (4)	15.3/5.4	0.7/0.0	4.5/0.9	3.2/2.3	6.9 /2.2	land instability along Segments 12* 24, and 3b.
Alternative D						
Gooseberry Route	16.7/12.6	0.6/0.6	3.4/2.0	2.2/1.3	10.5/8.7	land instability and seep areas along Segment 1 and 3b.
Valley Camp Triangle Connectors						
(1)	1.0 /0.6	0.0/0.0	0.1/0.0	0.9/0.6	0.0 /0.0	no land instability identified
(2)	0.9 /0.6	0.4/0.4	0.0/0.0	0.4/0.1	0.1 /0.1	seeps, springs along Segment 8
(3)	0.5 /0.5	0.0/0.0	0.0/0.0	0.5/0.5	0.0 /0.0	no land instability identified
Alternative E						
Winter Quarters (1)	16.1/12.4	0.7/0.0	2.3/0.3	2.4/2.4	10.7/9.7	land instability along Segment 12*
(with Segments 19* and 23*)	20.2/12.4	0.7/0.0	3.3/0.3	3.3/2.4	12.9/9.7	land instability along Segment 12*
Winter Quarters (2)	17.2/12.2	0.7/0.0	3.1/0.7	2.8/2.4	10.6/9.1	land instability along Segment 12*
(with Segment 19*)	20.0/12.2	0.7/0.0	3.7/0.7	3.3/2.4	12.3/9.1	land instability along Segment 12*

Note: Table reflects long-term impacts only.

(modified through mitigation) would avoid all unstable areas, seeps, springs. Segments 7* and 10* are part of the existing route.

Valley Camp Triangle Connector (2) - Construction of new pipeline could result in 0.4 mile of high impact due to seeps and springs on steep slopes along Segment 8. No moderate impacts would result. Only low impacts (0.1 mile) would result along Segment 4, and Segment 10* is part of the existing route.

Valley Camp Triangle Connector (3) - Construction of new pipeline would result in no high or moderate impacts. Low impacts (0.5 mile) could result along Segments 4 and 9 at the head of Boardinghouse Canyon.

Alternative E - Winter Quarters Route (1) - Construction of new pipeline would result in no high impacts, but could result in 0.3 mile of moderate impacts along Segment 20 on the slope east of Mud Creek near Scofield and north of The Elbow. Low impacts (2.4 miles) could result along Segment 20 at the east end of Winter Quarters Ridge and on the ridge east of Mud Creek near Scofield. Refer to the description of Alternative A regarding Segment 12*. No new impacts would occur along associated Segments 19* and 23*.

Alternative E - Winter Quarters Route (2) - Construction of new pipeline would result in no high impacts, but could result in 0.7 mile of moderate impacts along Segment 20 as described under the Winter Quarters Route (1) and Segment 21 north of Broads Canyon. Low impacts (2.4 miles) could result along Segment 20 as described under the Winter Quarters Route (1). No new impacts would occur along associated Segment 19*.

Coal

The issues associated with coal include: reserves affected by the pipeline, value, and royalties; mining methods; scenarios and timing; subsidence; and prior rights. Potential impacts include the effects of the location of the pipeline on the extractability of the recoverable coal reserves and consequent effects related to value and royalties lost or gained, and the effects of mining activities on the pipeline (e.g., subsidence and prior rights).

As discussed in Chapter 3, subsidence cannot be predicted exactly and, in some cases, even nominal amounts could result in stress and damage to the pipeline. Therefore, it is assumed that extraction of the recoverable reserves under the various alternative routes would result in subsidence and cause damage to the pipeline. Even though some of the recoverable reserves could be mined using full-support room-and-pillar methods, it is not possible to calculate the amount due to varying geologic conditions. For the purpose of a fair comparison of alternatives, it is assumed that none of the recoverable reserves can be mined without causing subsidence.

Estimates of the recoverable coal reserves that are beneath each proposed alternative route are discussed in Chapter 3. The reserves were estimated based on the area that must be left unmined or partially mined in order to protect the pipeline from subsidence and damage. These estimates are consistent with the amount of recoverable coal that would need to be left in place and, therefore, impacted by the pipeline (Table 4-3).

It is important to note that the estimates of recoverable coal which would need to protect each pipeline route includes private coal. The associated coal royalties that could be lost to the Federal, State and local governments consider only Federal coal.

If construction of any of the proposed routes is not completed by the Fall of 1990, additional coal would be lost. Delays due to unanticipated construction problems, strikes, unseasonable weather, coal and surface right-of-way acquisition, and litigation are possible. Two longwall panels planned under the existing pipeline would be passed over at the Skyline Mine. This would result in the loss of at least 3 mmt of recoverable coal because future recovery would require barrier pillars and extra gateroads in the 3 minable seams. If the bypassed block of coal is left for any length of time, additional recoverable coal could be jeopardized and potentially lost (up to 9 mmt). This coal and the associated coal royalties are not reflected on Tables 2-2 or 4-3 due to the uncertainties involved regarding recoverability, but will be considered in the decision process.

Specific Descriptions

Alternative A - No Action - The existing route impacts approximately 27.6 mmt of recoverable coal and the area impacted within the Skyline Mine permit area contains approximately 14.9 mmt of recoverable coal. The coal affected by the entire existing pipeline route has a value of \$690 million (\$55.2 million in Federal royalties) and the coal beneath the existing pipeline within the Skyline Mine permit area has a value of \$372.5 million (\$29.8 million in Federal royalties).

Segment 23* impacts recoverable coal reserves within Federal Coal Lease SL-062605. Segment 19* and part of Segment 10* impact recoverable coal reserves in the Valley Camp Belina Mine permit area. An igneous dike zone precludes some development under Segment 10*. Segment 7* crosses a small amount of recoverable coal that could be mined from the Skyline Mine.

Segments 18* and 17* limit planned mining activity at the Skyline Mine. The BLM has determined that the feasible development of 10 longwall panels in 3 minable seams is prohibited by the existing pipeline along Segment 18*. Segment 17* precludes the development of 3 longwall panels in one minable seam. There is some possibility for the partial extraction of coal under the pipeline with full-support mining. However, with 3 minable seams, the potential for pipeline subsidence is enhanced and liability could be a problem.

Segment 13* and the southernmost $\frac{1}{2}$ mile of Segment 12* impact unleased, recoverable coal with a medium to high potential for development and pose the potential for future pipeline relocation or lost coal. The remaining portion of Segment 12* would not impact recoverable coal reserves. The BLM has estimated that 20.9 mmt of implied minable coal underlies this portion of Segment 12*, which is too deep to mine using present technology.

Alternative B - Leave in Place, Full Extraction Mining - If the pipeline is left in place and a redundant pipeline is constructed on the surface to substantially reduce the potential for damage to the pipeline from subsidence, Utah Fuel would completely mine the estimated 14.9 million tons of recoverable coal, with a value of \$372.5 million and royalties of \$29.8 million. The mining of adjacent panels sequentially would be much

TABLE 4-3
ESTIMATES OF RECOVERABLE COAL AND VALUE LOST BY ROUTE

Route	ENTIRE ROUTE			AFFECTED PORTION OF ROUTE		
	COAL (mmt)	VALUE (million \$)	8% FEDERAL ROYALTY (million \$)	COAL (mmt)	VALUE (million \$)	8% FEDERAL ROYALTY (million \$)
Alternative A						
No-Action	27.6	690.0	55.2	14.9	372.5	29.8
Alternative B						
Leave in Place, Full Extraction Mining	12.7	317.5	25.4	0.0	0.0	0.0
Burnout Canyon (1)	14.7	367.5	29.4	2.6	65.0	5.2
Burnout Canyon (2)	17.4	435.0	34.8	2.9	72.5	5.8
Burnout Canyon (3)	14.7	367.5	29.4	2.6	65.0	5.2
Burnout Canyon (4)	17.4	435.0	34.8	2.9	72.5	5.8
Alternative D						
Gooseberry Route	11.8	295.0	19.0	9.6	240.0	14.6
Valley Camp Triangle Connectors						
(1)	0.6	15.0	1.2	0.0	0.0	0.0
(2)	2.1	52.5	4.2	1.8	45.0	3.6
(3)	1.4	35.0	2.8	1.4	35.0	2.8
Alternative E						
Winter Quarters (1)	22.5	562.5	38.0	17.4	435.0	27.8
(with Segments 19* and 23*)	24.7	617.5	42.4	17.4	435.0	27.8
Winter Quarters (2)	17.6	440.0	26.6	11.6	290.0	14.6
(with Segment 19*)	18.9	472.5	29.2	11.6	290.0	14.6

safer than having to skip panels, as well as, more efficient than room-and-pillar mining. Since the extent of subsidence cannot be predicted exactly, the reliability of the redundant pipeline system is questionable. Rerouting would allow for a more efficient mine plan that would maximize the amount of coal recovered at the Skyline Mine. An estimated 12.7 mmt of recoverable coal with an estimated value of \$317.5 million and Federal royalties of \$25.4 million would still be impacted by Segments 23*, 19*, 10*, 7*, 13*, and 12* of the existing route and may pose the potential for future pipeline relocation or lost coal.

Alternative C - Burnout Canyon Route (1) - This proposed route was developed to locate the pipeline in areas that would have little effect on present mining operations. The entire route would impact approximately 14.7 mmt of recoverable coal with an estimated value of \$367.5 million and Federal royalties of \$29.4 million. The area which would be impacted by construction contains approximately 2.6 mmt with an estimated value of \$65 million and Federal royalties of \$5.2 million. Refer to the description of the Alternative A regarding Segments 23*, 19*, 10*, 7*, 13* and 12*, which pose the potential for future lost coal or pipeline relocation. Segments 16 and 2, the southern portion of Segment 14, and Segment 3a would not impact recoverable reserves because the segments parallel Huntington Creek under which mining is severely restricted. That portion of Segment 14 off the Skyline Mine permit area could cause future pipeline relocation. Under Skyline Mine's current mine plan, the western part of Segment 3b would adversely affect 3 longwall panels in one minable seam. It is feasible, however, to redesign mains under this part of the segment to provide for a longwall panel layout that would maximize coal recovery. Mains are already designed in both seams under the eastern part of Segment 3b and no reduction in coal recovery is expected. The northern portion of Segment 14 would affect future recovery in the area with a medium-to-high potential for development.

Alternative C - Burnout Canyon Route (2) - The entire route would impact approximately 17.4 mmt of recoverable coal with an estimated value of \$435 million and Federal royalties of \$34.8 million. The area that would be impacted by construction contains approximately 2.9 mmt of recoverable coal with an estimated value of \$72.5 million and Federal royalties of \$5.8 million. The only difference between Burnout Canyon Routes (1) and (2) is the use of Segments 15 and 17* rather than Segment 14. Segment 15 would impact longwall development planned for the near future in the Skyline No. 3 Mine. A subsidence buffer zone along this segment would directly impact the design of 6 longwall panels. Because it is impossible to develop mains beneath this segment and maintain a good mine design, a substantial reduction in coal recovery would be expected. Segments 7*, 10*, 12*, 13*, 17*, 19*, and 23* are discussed under Alternative A.

Alternative C - Burnout Canyon Route (3) - The impacts to the recoverable coal would be the same as Burnout Canyon Route (1).

Alternative C - Burnout Canyon Route (4) - The impacts to the recoverable coal would be the same as Burnout Canyon Route (2).

Alternative D - Gooseberry Route - The entire route would impact approximately 11.8 mmt of recoverable coal with an estimated value of \$295 million and Federal royalties of \$19.0 million. The area that would be impacted by construction contains approximately 9.6 mmt with an estimated value of \$240 million and Federal royalties of \$14.6 million. The coal under the majority of Segment 1 that would be located in the Gooseberry graben cannot be mined using currently available technology because it is too

deep. There would be little if any impacts to recoverable coal reserves. The eastern 2 miles of Segment 1 overlie recoverable coal and would affect future recovery of coal in an area with medium-to-high potential for development. Recoverable coal reserves are privately owned beneath a .75-mile portion of this segment near Swens' Canyon. Questar Pipeline would have to financially negotiate the rights for the coal or face the potential of relocating the portion of pipeline affected by mining in the future. Segments 2 and 3 are discussed under Alternative C - Burnout Canyon Route (1) and Segments 7*, 10*, 19*, and 23* are discussed under Alternative A.

Valley Camp Triangle Connector (1) - The entire connector would impact approximately 0.6 mmt of recoverable coal with an estimated value of \$15.0 million and Federal royalties of \$1.2 million. To avoid impacting recoverable coal, the original alignment was realigned along the Connellville fault zone where no mining would occur. As a result, no identifiable impacts to the coal resources would occur along Segment 5/6. Segments 7* and 10* are discussed under Alternative A.

Valley Camp Triangle Connector (2) - The entire connector would impact approximately 2.1 mmt with an estimated value of \$52.5 million and Federal royalties of \$4.2 million. New pipeline would impact approximately 1.8 mmt with an estimated value of \$ 45 million and Federal royalties of \$3.6 million. Portions of Segments 4 and 8 overlie recoverable coal reserves in the Belina Mine permit area. The eastern end of Segment 4 would affect recoverable coal, but the western portion is within the Connellville fault zone. The northern portion of Segment 8 would cross the Connellville fault zone, but the southern portion of the segment would impact some recoverable coal. Segment 10* is discussed under Alternative A.

Valley Camp Triangle Connector (3) - New pipeline along Segments 4 and 9 would impact approximately 1.4 mmt with an estimated value of \$35 million and Federal royalties of \$2.8 million. Beneath Segment 9, coal has been mined from the Belina Mine No. 1. Additional mining is anticipated from the underlying Belina No. 2 Mine; therefore, some coal would be impacted. Segment 4 is discussed under Valley Camp Triangle Connector (3).

Alternative E - Winter Quarters Route (1) - The entire route and associated Segments 19* and 23* would impact approximately 24.7 mmt of recoverable coal with an estimated value of \$617.5 million and Federal royalties of \$42.4 million. The area that would be impacted by new pipeline contains approximately 17.4 mmt with an estimated value of \$435 million and Federal royalties of \$27.8 million. The southeasternmost 0.5 mile of Segment 12* and the westernmost 2.5 miles of Segment 20 overlie recoverable coal reserves and would impact future recovery. This area is not within a Federal coal lease, but is considered to have a medium-to-high potential for development because it is accessible from the existing Skyline Mine. The west central portion of Segment 20 impacts recoverable coal reserves, but these reserves have a low potential for development because of the remoteness of the area. Some areas have been mined out along the central part of this segment so there would be no impacts to recoverable coal reserves. The southern portion of Segment 20 would impact Federal Coal Lease U-47947. The remainder of Segment 12* is discussed under Alternative A. Segment 22 crosses Federal Coal Lease SL-062605 and would affect recovery of two minable coal seams beneath the entire segment. Where the proposed route would impact leases, Questar Pipeline would have to negotiate the rights for the coal beneath the proposed pipeline or face the potential of relocating the portion of the pipeline affected by possible future mining.

Alternative E - Winter Quarters Route (2) - The entire route and associated Segment 19* would impact approximately 18.9 mmt of recoverable coal with an estimated value of \$472.5 million and Federal royalties of \$29.2 million. The area that would be impacted by new pipeline contains approximately 11.6 mmt with a value of \$290 million and Federal royalties of \$14.6 million. Refer to Winter Quarters Route (1) for a description of Segment 20 and to Alternative A for a description of Segments 23* and 12*. The northernmost .75 mile of Segment 21 would impact recoverable reserves with a low-to-medium potential for development. The remainder of Segment 21 is below the coal horizon and would not impact any recoverable coal.

Paleontology

The Utah Division of State History provided descriptions of sensitivity levels by which to assess the potential impacts to potentially undetected paleontological resources in the study area. The sensitivity levels provided include critical and significant (high impact), important (moderate impact), and insignificant and unimportant (low impact). Within the study area, most fossils are plentiful, relatively common, and considered insignificant to important. However, significant finds of dinosaur bones and mammoth and mastodon remains have been found in valley-bottom areas and sinkholes on the Wasatch Plateau.

The probability of finding important or significant fossil remains is considered low. However, the construction crew would be made aware of the possibility of finding fossils in the geologic formations and prehistoric mammal remains in the low valley bottoms along Gooseberry Creek and Upper Huntington Creek and sinkholes in the North Horn Formation and the Flagstaff Limestone.

Specific Descriptions - Alternatives where there is a potential for moderate impacts associated with possible locations of buried Pleistocene fauna (potentially indicative of human habitation prehistorically) are described under Cultural Resources and in Table 4-7. All other areas are considered to have low potential impacts.

Soils

The sensitivity of the soils to erosion by water was assessed. Generally, soil erosion hazard was determined by slope steepness, soil types, cover, precipitation, and snow-melt patterns. Proposed construction methods were considered in the assessment of impacts to soils.

Considering the mitigation measures that would be used to control erosion and the ability of the soils to revegetate the surface, the long-term impacts to the soils are considered to be low, except in areas of unstable slopes or seeps. There would be a greater potential for long-term soil erosion on unstable slopes and seep areas.

The majority of impacts resulting from construction activities would be short term and low. Caution during construction and effective reclamation techniques would diminish the impacts. Generally, very little increase in soil erosion would be anticipated to occur as a result of pipeline construction. Much of the existing and proposed routes would be

located along relatively flat valley bottoms and ridgetops. However, some specific areas along the proposed routes are sensitive to erosion and are discussed below.

Short-term moderate impacts could occur along the slopes adjacent to Gooseberry Creek along Segment 12*, on the valley bottoms of Upper Huntington and Burnout Canyons along Segments 16, 2, 3a, and 3b, on the ridge east of Upper Huntington Canyon along Segment 18*, and on the ridge east of Burnout Canyon along Segments 9 and 10*. Moderate, short-term impacts also could occur on the ridge east of Mud Creek along Segments 20 and 22, along the ridge north of Broads Canyon and along the valley bottom along Mud Creek on Segment 21, and on the slopes east and west of Mud Creek along Segments 19* and 23*. Potentially low, short-term impacts could occur in the remainder of the area impacted by pipeline construction.

Impacts to soils in riparian areas could occur in dry meadow areas (meadow soils that are wet only part of the year) and wet meadow areas (meadow soils that are wet year round). Dry meadow areas typically exhibit flat land surface and soils of low susceptibility to compaction. Potential impacts in these areas would be low. Wet meadow areas typically have soils susceptible to compaction and with potential for erosion hazard. Potential impacts in these areas would be moderate. Impacts to soils at stream crossings would be moderate because of the potential for erosion of the stream banks and compaction of the soils. With implementation of mitigation measures, these areas would recover successfully. Therefore, impacts to these areas resulting from construction activities would be short term.

The following descriptions summarize the criteria used to determine levels of impacts.

High Impacts

- a substantial adverse change or stress to the soil
- loss of soil productivity to the extent that vegetation would be difficult to reestablish and grow

Moderate Impacts

- a potential small change or stress to the soil
- loss of soil productivity to the extent that vegetation is able to grow, but not to previous ability

Low Impacts

- soils in areas of low erosional potential
- loss of small amount of soil productivity

No Identifiable Impacts

- soils with slight erosional hazard
- no measurable loss of soil productivity

Specific Descriptions

Table 4-4 summarizes the potential long-term impacts to soils along each alternative. Both long-term and short-term (where applicable) impacts to soils are described below.

Alternative A - No-Action - Approximately 0.7 mile of moderate long-term impact currently exists along Segment 12* on unstable slopes adjacent to Gooseberry Creek and east of the Gooseberry graben. The remainder of the route has 12.8 miles of low long-term impact. No impact to soils from construction disturbance would occur.

Alternative B - Leave in Place, Full Extraction Mining - Along the entire route, approximately 0.7 mile of moderate long-term impact currently exists along Segment 12* as described above. A low level of short-term impact would occur from construction of the 4.25-mile-long redundant pipeline. Installation of strain gauges on the existing pipeline would require excavation about every 100 feet along the pipeline. Later, excavation would be required to repair the existing buried pipeline. With proper revegetation to reduce the potential of erosion resulting from the excavations, impacts would be low.

Alternative C - Burnout Canyon Route (1) - Along the entire route, approximately 0.7 mile of moderate long-term impacts currently exist along Segment 12* as described in Alternative A. Originally, Segment 3b crossed approximately 0.2 mile of unstable land conditions along the lower part of the north slope of Burnout Canyon. To reduce the potential for slope failure, the alignment of Segment 3b would be moved downslope. Although the alignment is moved, low long-term impacts could still occur along the 0.2 mile of this area from construction within the toe of the slope. Low long-term impacts would occur to all 5.7 miles impacted by construction activities. Approximately 3.3 miles of moderate short-term impacts could occur from construction resulting in erosion and compaction of the soils along the riparian areas of Upper Huntington Canyon and Burnout Canyon. If this route is selected, the abandoned portion of the existing right-of-way would be reclaimed and improved.

Alternative C - Burnout Canyon Route (2) - The impacts would be the same as Burnout Canyon Route (1) except 5.2 miles of low long-term impact could occur from pipeline construction. If this route is selected, the abandoned portion of the existing right-of-way would be reclaimed and improved.

Alternative C - Burnout Canyon Route (3) - Segment 24 would cross the bottom of an unstable slope that could result in moderate long-term impacts to soils. However, through stipulations by the Forest Service, the long-term impacts would be reduced to low. Impacts would be the same as Burnout Canyon Route (1), except 5.9 miles of low long-term impact could occur from pipeline construction.

Alternative C - Burnout Canyon Route (4) - Mitigation measures would be employed to reduce impacts from unstable slopes along Segments 3b and 24. The impacts along this

route would be the same as Burnout Canyon Route (2), except 5.4 miles of low long-term impact could occur from pipeline construction.

Alternative D - Gooseberry Route - Moderate, potentially long-term impacts from pipeline construction activities could occur along 0.6 mile of unstable slopes east of Gooseberry graben and along seep areas east of Skyline Drive. The remaining 12.0 miles of the affected portion of the route would receive low long-term impacts. Short-term moderate impacts would occur along 1.4 miles of riparian area in Upper Huntington Canyon and Burnout Canyon. If this route is selected, the unstable areas (0.7 mile) along Segment 12* would be reclaimed providing an opportunity to improve the areas and lower the moderate level of impact. Also, if this route is selected, the abandoned portion of the existing right-of-way would be reclaimed and improved.

Valley Camp Connector (1) - Along the entire connector, approximately 1 mile of low long-term impacts could occur, of which 0.6 mile would be from construction of pipeline.

Valley Camp Connector (2) - Approximately 0.4 mile of moderate long-term impact could occur from pipeline construction in areas of seeps and springs along Segment 8 at the head of Burnout Canyon. The remainder of the connector would have low impacts.

Valley Camp Connector (3) - Low, long-term impacts could occur along the entire 0.5 mile of the connector. Approximately 0.1 mile of moderate short-term impacts could occur to soils with a high hazard of erosion along the east end of Segment 9 at the head of Boardinghouse Canyon.

Alternative E - Winter Quarters Route (1) - Along the entire route, approximately 0.7 mile of moderate long-term impact currently exists along Segment 12* as described in Alternative A. Low long-term impacts would occur along the entire 12.4 miles proposed for pipeline construction. Approximately 5.9 miles of short-term moderate impacts would occur from highly erodible soils on steep slopes and along 0.3 mile of wetland soils near Scofield. The remaining area would have low short-term impacts. If this route is selected, the abandoned portion of the existing alignment would be reclaimed and improved. No new impacts would occur along associated Segments 19* and 23*.

Alternative E - Winter Quarters Route (2) - Same as Winter Quarters Route (1), except 5.7 miles of moderate short-term impacts would occur to highly erodible soils on steep slopes.

Water Resources

The primary issues associated with this project are the effects to floodplains and wetland riparian areas caused by increased flow, effects to the quality of stream and reservoir water caused by sedimentation and phosphate increases, and consequences of slope failure on water quality. Eutrophication of Scofield Reservoir is an issue since phosphates are carried with sediments.

Increases in runoff were estimated using a computer program provided by the Forest Service that calculates the total volume of runoff and the peak flow rate. A storm of 6 hours and a recurrence interval of 10 years (1.6 inches) was used as a basis for the analysis. The Japanese Creek subwatershed was chosen as the worst case situation

TABLE 4-4
SUMMARY OF POTENTIAL IMPACTS: SOILS
(Miles of entire route/Miles of new pipeline)

Route	Total Miles	High	Moderate	Low	No Identifiable	Comments
Alternative A						
No-Action	13.5/NA	0.0/NA	0.7/NA	12.8/NA	0.0/NA	land instability along Segment 12*
Alternative B						
Leave in Place, Full Extraction Mining	13.5/4.25	0.0/0.0	0.7/0.0	12.8/4.25	0.0/0.0	land instability along Segment 12*
Alternative C						
Burnout Canyon (1)	14.9/5.7	0.0/0.0	0.7/0.0	14.2/5.7	0.0/0.0	land instability along Segments 12* and 3b.
Burnout Canyon (2)	15.1/5.2	0.0/0.0	0.7/0.0	14.4/5.2	0.0/0.0	land instability along Segments 12* and 3b.
Burnout Canyon (3)	15.1/5.9	0.0/0.0	0.7/0.0	14.4/5.9	0.0/0.0	land instability along Segments 12* 24, and 3b.
Burnout Canyon (4)	15.3/5.4	0.0/0.0	0.7/0.0	14.6/5.4	0.0/0.0	land instability along Segments 12* 24, and 3b.
Alternative D						
Gooseberry Route	16.7/12.6	0.0/0.0	0.6/0.6	16.1/12.0	0.0/0.0	land instability and seep areas along Segment 1
Valley Camp Triangle Connectors						
(1)	1.0 /0.6	0.0/0.0	0.0/0.0	1.0 /0.6	0.0/0.0	no land instability identified
(2)	0.9 /0.6	0.0/0.0	0.4/0.4	0.5 /0.2	0.0/0.0	seeps, springs along Segment 8
(3)	0.5 /0.5	0.0/0.0	0.0/0.0	0.5 /0.5	0.0/0.0	no land instability identified
Alternative E						
Winter Quarters (1)	16.1/12.4	0.0/0.0	0.7/0.0	15.4/12.4	0.0/0.0	land instability along Segment 12*
(with Segments 19* and 23*)	20.2/12.4	0.0/0.0	0.7/0.0	19.5/12.4	0.0/0.0	land instability along Segment 12*
Winter Quarters (2)	17.2/12.2	0.0/0.0	0.7/0.0	16.5/12.2	0.0/0.0	land instability along Segment 12*
(with Segment 19*)	20.0/12.2	0.0/0.0	0.7/0.0	19.3/12.2	0.0/0.0	land instability along Segment 12*

Note: Table reflects long-term impacts only.

because this subwatershed had the largest ratio of impacted area to subwatershed area. For this analysis, a corridor width of 50 feet was used (early in the project) and assumed as a worst case to expose bare soil for the entire width. Actually, vegetation would be completely removed only where necessary (i.e., area of the trench). Given a runoff curve number of 95, the results showed that runoff would increase by less than 4 percent over existing conditions. Since this is the worst case situation, then increases from runoff from the project would be considered insignificant.

The soil erosion and the annual sediment yield to streams were estimated using procedures developed by the Forest Service (Kelly 1976; Tew 1973). Two subwatersheds were used in this analysis. The first estimated sediment yield for the worst case situation on the Japanese Creek subwatershed (along Segment 1). The second estimated sediment yield in the Electric Lake subwatershed for the proposed Burnout Canyon Route (includes Segments 2, 3a, 3b, 4, 9, and most of 16). Both watersheds used a 50-foot corridor width and an impact area of bare soil mulched to 50 percent ground cover. The results showed that the estimated increases in sediment yield to the Japanese Creek and the Electric Lake subwatersheds were about 0.4 percent and 0.1 percent, respectively. In reality, the sedimentation along Upper Huntington Creek would be much less considering that the model uses the land surface condition of the impacted area as the condition of the land surface between the impacted area and the stream. In these canyons, the land surface between the impacted area and the stream has very dense vegetation that would prevent most sediment from entering the stream. Almost all sedimentation of the stream from the proposed project would probably occur near stream crossings from water flowing along the proposed corridor to the stream.

With these values representing the worst case situation and the most sensitive area, the increases in sediment yield to streams and reservoirs near the proposed routes would be low. However, these estimates are for the watersheds as a whole and do not indicate site-specific increases such as at stream crossings.

The sedimentation at each of the stream crossings was estimated using the same model that was used for the watersheds as a whole. The area that would contribute sediment directly to the stream was considered to be from 150 to 300 feet from the stream crossing. The estimates assume a 50-foot corridor width and an impact area of bare soil mulched to 50 percent cover. The annual sediment yield for all of the stream crossings in Upper Huntington Canyon for the Burnout Canyon Routes and the Gooseberry Routes is estimated to be approximately 0.27 ton and 0.12 ton, respectively. These values are approximately 0.02 percent and 0.01 percent of the annual sediment yield for the Electric Lake watershed, for which Upper Huntington Canyon is a part. The results indicate that short-term impacts from sedimentation at stream crossings would be very small compared to the watershed as a whole. However, since the sediment source would be from a very localized area, and Upper Huntington and Burnout Creeks are high-value spawning areas and important to statewide fishery restocking programs, even a small increase of sediment could have the potential to cause a substantial impact on the fisheries.

The amount of sedimentation at stream crossings would be substantially reduced by the use of effective sediment control devices other than mulching.

No impacts to water quality in Electric Lake and Scofield Reservoir are expected. The increased sediment yield from this project is small when compared to natural sediment yields. The sediment deposition in Scofield Reservoir was approximately 3000 acre-feet

from 1943 to 1979, which is about 83 acre-feet per year (Waddell et al. 1985). Extending the worst case situation on the Japanese Creek subwatershed to the longest proposed route, the increase in the amount of sedimentation is about 0.04 acre-feet. This amounts to about a 0.05 percent increase in the sediment deposition to Scofield Reservoir.

The amount of phosphate loading from this project would be directly related to the amount of sedimentation of the streams. The estimated increase in the amount of phosphorus loading in Scofield Reservoir would be about the same as the sediment yield, approximately 0.05 percent.

Downstream impacts to the water and fisheries would be low during construction since it would occur during nonspawning periods and during periods of low stream flow. Impacts to fisheries in future years would be moderate due to silting in of the spawning gravels.

Areas along Upper Huntington Creek within the 500-year floodplain were identified so that no petroleum products, chemicals, or hazardous materials would be stored there during construction in accordance with Executive Order 11988. Discharge volumes for the 500-year flood event, obtained from the Forest Service, are 159 cubic feet per second (cfs) at The Kitchen, 233 cfs at the mouth of Swens Canyon, and 283 cfs at the mouth of Burnout Canyon. The flow velocity along Upper Huntington Canyon is estimated at 5 feet per second using Manning's equation. By dividing the discharge by the flow velocity, the cross-sectional area that would be inundated by the water is 33 square feet at The Kitchen, about 50 square feet at the mouth of Swens Canyon, and about 60 square feet at the mouth of Burnout Canyon. Considering the valley bottom geometry of Upper Huntington Canyon, the 500-year floodplain lies in the low areas about 50 feet from the stream channel.

The proposed Gooseberry Narrows Project is located just south of the Gooseberry Creek crossing on Segment 1. No conflicts between the proposed Main Line No. 41 Reroute Project and the proposed Gooseberry Narrows Project have been identified.

If appropriate mitigation is not implemented, the consequences of slope failure on the water resources would be great and may include the damming of existing streams, high sedimentation of streams and reservoirs, erosion from the area of land failure, loss of critical fish habitat, and a decrease in water quality affecting municipal drinking water. The likelihood of slope failure occurrence is low for most of the project area. Appropriate mitigation (Appendix A) and caution during construction is essential along the slope west of Gooseberry Creek on Segment 1 and along the north slope of Burnout Canyon on Segment 3b, if the toe of the slope is excavated. Criteria used to assess potential impacts are summarized below.

High Impacts

- high increases in the amounts of sedimentation (approximately greater than 5 percent over existing conditions)

Moderate Impacts

- nonvegetated construction areas occurring within 500 feet of a perennial stream
- sedimentation increases between 1 and 5 percent

Low Impacts

- small increase of sediment (up to 1 percent)

No Identifiable Impact

- nonvegetated construction areas with no perennial stream within 500 feet of the proposed route
- no sedimentation or water quality changes

Specific Descriptions

Table 4-5 shows the number of perennial stream crossings, tons of annual erosion, and tons of annual sediment yield. It is important to note that the descriptions below describe the worst-case results (before mitigation) generated from the model described above.

Alternative A - No-Action - No short-term or long-term impacts from this project were identified.

Alternative B - Leave in Place, Full Extraction Mining - No short-term or long-term impacts from this project were identified.

Alternative C - Burnout Canyon Route (1) - The long-term impacts along the entire route would be low because with proper mitigation the impacted soils would revegetate and sedimentation of the stream would be reduced to existing conditions. Moderate-to-high short-term impacts (2.7 miles within 500 feet of the stream) from pipeline construction would occur from the uppermost creek crossing to Electric Lake along Upper Huntington Creek and moderate short-term impacts (0.6 mile) between the stream crossing on Burnout Creek and Electric Lake. The spring area on the slope south of the creek in Burnout Canyon would be avoided. From construction, the worst-case annual sediment yield is estimated to be 0.27 tons for each of the 9 perennial stream crossings in Upper Huntington Canyon and 0.19 tons for the 1 perennial stream crossing in Burnout Canyon, until the impacted area is revegetated. Low short-term impacts could occur at 2 intermittent stream crossings north and east of The Kitchen (Segments 14 and 16) if water is present or in the event of a rainstorm. The sediment from the stream crossings would eventually be deposited in Electric Lake.

Alternative C - Burnout Canyon Route (2) - The impacts would be the same as Burnout Canyon Route (1) except low short-term impacts could occur at one intermittent stream crossing east of The Kitchen (Segments 15 and 16) if water is present or in the event of a rainstorm.

Alternative C - Burnout Canyon Route (3) - The long-term impacts would be the same as Burnout Canyon Route (1). Moderate-to-high short-term impacts (1.1 miles within 500 feet of the stream) could occur in Upper Huntington Canyon between The Kitchen and Little Swens Canyon and near the south stream crossing on Upper Huntington Creek. The highway would be between the pipeline and Upper Huntington Creek for approximately 2.1 miles along Segment 24 with no impacts occurring along this area. The spring on the slope south of the creek in Burnout Canyon would be avoided. The worst-case annual sediment yield is estimated to be 0.06 ton for the 2 perennial stream crossings in Upper Huntington Canyon and 0.19 ton for the 1 perennial stream crossing in Burnout Canyon. Low short-term impacts at intermittent stream crossings at Little Swens Canyon and Swens Canyon along Segment 24 would be the same as Burnout Canyon Route (1).

Alternative C - Burnout Canyon Route (4) - The impacts would be the same as Burnout Canyon Route (3) except low short-term impacts could occur at 1 intermittent stream crossing east of The Kitchen (Segment 15) if water is present or in the event of a rainstorm.

Alternative D - Gooseberry Route - Along the entire route the long-term impacts would be no identifiable to low. Moderate short-term impacts would occur at one perennial stream crossing on Gooseberry Creek, one perennial stream crossings on Swens Canyon Creek, 3 perennial stream crossings on Upper Huntington Creek, and one perennial stream crossing on Burnout Creek. The spring area on the slope south of Burnout Creek would be avoided. Moderate-to-high short-term impacts from pipeline construction could occur along 1 mile of Upper Huntington Canyon. Moderate short-term impacts could occur along 0.6 mile within Burnout Canyon and 0.2 miles at the Gooseberry Creek stream crossing. From construction, the worst-case annual sediment yield is estimated to be 1.15 tons for the one perennial stream crossing on Gooseberry Creek, 0.12 tons for the 4 perennial stream crossings in Upper Huntington Canyon (includes the crossing at Swens Canyon), and 0.19 tons for the perennial stream crossing in Burnout Canyon until revegetation occurs. The sediment from the stream crossing at Gooseberry Creek would eventually be deposited in the Lower Gooseberry Reservoir, and the sediment from Upper Huntington Canyon and Burnout Canyon would eventually be deposited in Electric Lake.

Valley Camp Triangle Connectors (1) through (3) - The springs that exist along Segments 5/6 and 8 would be avoided during construction. Impacts along all segments of new pipeline would be low.

Alternative E - Winter Quarters Route (1) - Along the entire route, the long-term impacts would be no identifiable to low. Approximately 0.4 mile of moderate short-term impacts could occur near the 2 stream crossings on the creek in Winter Quarters Canyon and Mud Creek. From construction, the worst-case annual sediment yield is estimated to be 0.03 ton at the perennial stream crossing on the creek in Winter Quarters Canyon and 0.03 ton at the perennial stream crossing on Mud Creek. The sediment from these crossings would eventually be deposited in Scofield Reservoir. No new impacts would occur along associated Segments 19* and 23*.

Alternative E - Winter Quarters Route (2) - The long-term impacts would be the same as Winter Quarters Route 1. Moderate short-term impacts could occur along 1.8 miles near Mud Creek between Broads Canyon and Magazine Canyon along Segment 21 and 0.4 mile at the stream crossings on Mud Creek near Scofield and on the creek in Winter Quarters Canyon along Segment 20. There could be moderate short-term impacts at 1 perennial stream crossing on the creek in Winter Quarters Canyon, at 3 stream crossings on Mud

**TABLE 4-5
SUMMARY OF POTENTIAL IMPACTS: WATER**

Route	Riparian Area	Number of Perennial Crossings (1)	Total Annual Erosion (tons)	Total Annual Sediment Yield (tons)
Alternative A				
No-Action	No riparian area impacted	0	0.00	0.00
Alternative B				
Leave in Place, Full Extraction Mining	No riparian area impacted	0	0.00	0.00
Alternative C				
Burnout Canyon (1)	Upper Huntington Canyon	9	0.63	0.27
	Burnout Canyon	1	0.18	0.19
Burnout Canyon (2)	Upper Huntington Canyon	9	0.63	0.27
	Burnout Canyon	1	0.18	0.19
Burnout Canyon (3)	Upper Huntington Canyon	2	0.14	0.06
	Burnout Canyon	1	0.18	0.19
Burnout Canyon (4)	Upper Huntington Canyon	2	0.14	0.06
	Burnout Canyon	1	0.18	0.19
Alternative D				
Gooseberry Route	Upper Huntington Canyon	4	0.28	0.12
	Burnout Canyon	1	0.18	0.19
	Gooseberry Creek	1	1.38	1.15
Valley Camp Triangle Connectors				
(1)	No riparian area impacted	0	0.00	0.00
(2)	No riparian area impacted	0	0.00	0.00
(3)	No riparian area impacted	0	0.00	0.00
Alternative E				
Winter Quarters (1)	Winter Quarters Canyon	1	0.07	0.03
	Mud Creek near Scofield	1	0.07	0.03
Winter Quarters (2)	Winter Quarters Canyon	1	0.07	0.03
	Mud Creek near Scofield	1	0.07	0.03
	Mud Creek between Broads Canyon and Magazine Canyon	3	0.21	0.09

(1) - Only perennial stream crossings impacted by pipeline construction are presented.

Note: Upper Huntington Canyon includes the stream crossing on the creek at the mouth of Swens Canyon. For stream crossings in Upper Huntington Canyon, at the mouth of Winter Quarters Canyon, Mud Creek near Scofield, and Mud Creek between Broads Canyon and Magazine Canyon the length of the area affected on each side of the stream channel was estimated to be approximately 150 feet. For the stream crossing in Burnout Canyon the length of the affected area was estimated to be 150 feet on the north side (gentle slopes) and 300 feet on the south side (steep slopes). The length of the affected area on each side of the stream crossing at Gooseberry Creek was estimated to be approximately 300 feet (steep slopes).

Creek, and 1 stream crossing on the creek in Broads Canyon. From construction, the worst-case annual sediment yield is estimated to be 0.03 ton at the perennial stream crossing on the creek in Winter Quarters Canyon, 0.09 ton at the 3 perennial stream crossings on Mud Creek, and 0.03 ton at the stream crossing on the creek in Broads Canyon. The sediment from these stream crossings would eventually be deposited in Scofield Reservoir. No new impacts would occur along associated Segment 19*.

BIOLOGICAL RESOURCES

Riparian/Wetlands

There is a potential for adverse impacts where proposed routes cross or parallel sensitive riparian and associated wetland areas. The most likely locations for long-term adverse impacts are where Segment 1 would cross Gooseberry Creek and Segments 2 and 16 would parallel or cross Upper Huntington Creek. In general, long-term adverse impacts are avoidable and no net loss of wetlands would occur if appropriate mitigation measures are applied.

Specific Descriptions

Alternative A - No-Action - This alternative would create no effect on vegetation in the project area as no surface resources would be disturbed.

Alternative B - Leave in Place, Full Extraction Mining - If complete coal extraction is allowed and a redundant pipeline is constructed on the surface, some minimal disturbance to vegetation (and habitat) would be anticipated.

Alternative C - Burnout Canyon Routes (1) and (2) - Segments 2, 3a, 3b, and 16 have potential for direct effects on riparian areas. Segment 3b would cross the Burnout Canyon stream channel at 1 location. The pipeline could be installed with minimum impact.

Segments 2 and 16 would parallel Upper Huntington Creek. Riparian vegetation would be impacted nearly the entire length of Upper Huntington Canyon. At 9 locations the pipeline would cross the stream channel or come into direct contact with it. The pipeline would be buried at, or near, ground water level, and if piping occurs, the ground water level could be changed, thereby changing the riparian habitat. Extreme caution during construction would be required to protect this highly sensitive area. No new impacts to riparian vegetation would occur along Segments 19* and 23*.

Alternative C - Burnout Canyon Route (3) and (4) - This route differs from Burnout Canyon Routes (1) and (2) in that Segment 24 replaces Segments 3a, 2, and 16, thereby avoiding most of the potential impacts to riparian areas described for these routes. Segment 24 would cross Upper Huntington Creek northwest of the confluence with Little Swens Canyon and several small tributaries. At these locations, extreme caution during construction would be required as described above.

Alternative D - Gooseberry Route - Segment 1 would cross Gooseberry Creek at a particularly sensitive area with regard to riparian habitats. The alignment as originally identified would cross the stream channel and potentially impact a pond. However, it has

been recommended that the alignment of the route be modified upstream or downstream to avoid this area.

See the preceding discussion on the Burnout Canyon Route regarding Segments 2, 3a, 3b, 19*, and 23*, which are also part of the Gooseberry Route.

Valley Camp Triangle Connectors (1) through (3) - The majority of these routes would be located in dense coniferous forest. There are no riparian habitats.

Alternative E - Winter Quarters Route (1) - Segment 20 would cross Winter Quarters Creek and Mud Creek in Pleasant Valley. The area has been heavily disturbed and, thus, additional disturbance is considered to be a minor impact. Segment 22 would avoid the Mud Creek riparian area, therefore Winter Quarters Route (1) would have less potential impact to riparian habitat than Winter Quarters Route (2).

Alternative E - Winter Quarters Route (2) - Refer to description of Segment 20 above. Segment 21 would parallel Mud Creek north of the town of Clear Creek. These riparian areas are in excellent condition. With proper revegetation, long-term adverse effects on the riparian area could be avoided.

Rangeland

Grazing use would be impacted from several project-related activities. Clearing of the rights-of-way would reduce the amount of forage available until the area is again revegetated. Construction activity would disrupt normal use patterns in some areas, thereby reducing grazing use on a short-term basis. The magnitude of such impacts would depend on time of construction and the specific right-of-way alignment in the various allotments.

Impacts would also occur by grazing-revegetation interactions, whereby successful revegetation may take a longer period and require reseeding if heavily grazed. Conversely, grazing use reduction could occur if restrictions (e.g., fencing) are required to reduce livestock pressure on revegetated areas.

The use of livestock restriction measures should be done on a cooperative basis between the project proponent and the Forest Service livestock operator for each allotment to help reduce these impacts.

Alternative A - No-Action - Alternative A would have little impact on existing rangeland resources that occur on the right-of-way, except for the opportunity to improve range on some areas of the right-of-way through revegetation.

Alternative B - Leave in Place, Full Extraction Mining - Construction of a redundant surface pipeline could interrupt livestock use of some areas during construction operations. Construction could affect 11.8 animal unit months (AUMs). Construction during the July 1 to September 30 use period could affect normal use patterns. Minor impacts to existing forage would occur during construction and operations of the pipeline, but only a small area in the existing right-of-way would be affected.

Alternative C - Burnout Canyon Routes - Construction could affect approximately 13.0 AUMs along Burnout Canyon Routes (1) and (3) and 13.2 AUMs along Burnout Canyon

Routes (2) and (4). Sheep grazing could be affected by construction activities if this occurs during the July 1 to September 30 use period. Rangeland use would also be affected if barriers are needed to keep sheep from revegetated right-of-way until plants are well established.

Alternative D - Gooseberry Route - The Gooseberry Route would cross a relatively large amount of range. Construction could affect 14.6 AUMs. Numerous grazing permittees could be affected by the project during construction and the establishment period of revegetated species. Impacts from construction activities, in addition to direct loss of forage by right-of-way clearance, could change historic use patterns if they occur during the use period. As discussed previously, protection of the revegetated right-of-way from grazing would reduce the amount of grazing acreage available and could reduce livestock access.

Valley Camp Triangle Connectors (1) through (3) - Most of the area of these routes consists of dense coniferous forest and aspen-rangeland, and grazing resources are minimal. The exception occurs in Valley Camp Triangle Connector (1), which contains sagebrush rangeland. Thus, impacts from right-of-way clearing and pipeline construction are considered to be low. Construction could affect 0.9 AUMs along Connector (1), 0.8 AUMs along Connector (2), and 0.4 AUMs along Connector (3).

Alternative E - Winter Quarters Routes - Impacts to grazing would include loss of forage from right-of-way clearance, change in use patterns during construction, and reduction in usable acreage and access by potential restriction of livestock from reclaimed areas. Impacts were rated as low, however, due to short duration and the opportunity to improve the grazing resource through reclamation. Construction could affect 14.1 AUMs along Winter Quarters Route (1) and 15 AUMs along Winter Quarters Route (2). No additional AUMs would be affected along associated Segments 19* or 23*.

Timber

Potential timber volume (gross) losses are summarized in Tables 3-5 and 3-6 using a 60-foot pipeline right-of-way width, the timber volumes for typical spruce-fir and aspen forest sites, and the distance that spruce-fir and aspen forest would be crossed by each alternative of the various routes.

For any reroute, reestablishing existing timber volumes would be long term (over 100 years). With successful reforestation, reestablishment of wood-fiber production would be short term (5 to 10 years). Some of the impacts would be offset by selling merchantable timber and fuelwood. The Federal government would receive the revenue from selling the timber and fuelwood that would be used for various products and, as an economic benefit, 25 percent of all timber receipts would go to the respective counties.

Alternative A - No-Action - No impacts to timber resources are anticipated if the existing route is retained.

Alternative B - Leave in Place, Full Extraction Mining - The construction of a surface redundant pipeline could cause minor impacts in some areas only if timber is cleared for construction access. Such impacts are considered to be minor, but long-term.

Alternative C - Burnout Canyon Routes - Right-of-way clearance would affect approximately 424 thousand board feet (mbf) of timber resources along Burnout Canyon Routes (1) and (3) and 410.6 mbf along Burnout Canyon Routes (2) and (4).

Alternative D - Gooseberry Route - Right-of-way clearance would affect approximately 816.4 mbf of live timber resources.

Valley Camp Triangle Connectors (1) through (3) - Spruce-fir forests occur on almost the entire length of each segment. Right-of-way clearance could affect 127 mbf along Connectors (1) and (2), and 71.1 mbf along Connector (3).

Alternative E - Winter Quarters Routes (1) and (2) - Spruce-fir and aspen timber is especially prominent at the higher elevations of these routes. Right-of-way clearance could affect approximately 607 mbf along Winter Quarters Route (1) and 811.9 mbf along Winter Quarters Route (2). There is no timber within the existing right-of-way of associated Segments 19* and 23*.

Aquatic Resources

For any of the alternative reroutes, minimal impacts to spawning habitat would occur in 1990 as construction would be allowed only after fry have left the gravel. However, future-year classes would be adversely affected since some sediment would be generated that would not wash into the reservoirs for years to come. Artificial flushing flows can be accomplished to remove sediment below reservoirs, but not above reservoirs as is the case with this project. (Estimated "worst-case" sediment yield is summarized on Table 4-5 in the Water Resources section above.)

During the years the pipeline would be in use, operation and maintenance of the pipeline would not be expected to affect aquatic ecosystems except in the unlikely event of a pipeline rupture. Should a pipeline rupture occur beneath or immediately adjacent to a stream, impacts to aquatic organics related to this disturbance would be confined to the area immediately surrounding the rupture. Natural gas is highly insoluble in water and would vent to the atmosphere.

The criteria for determining impacts for this analysis are listed below. It was assumed that all unstable areas proximal to streams would be avoided; all streams potentially affected in the project area have on-site fisheries or are immediately upstream of fisheries; the stream below each stream crossing would be impacted for about 0.5 mile; and cumulative impacts from 2 stream crossings, but on different streams (i.e., Winter Quarters Creek and Mud Creek near the Town of Scofield), raises the impact to the next higher level.

High impact - if the pipeline alignment is within 50 feet of a perennial stream at numerous locations and crosses the stream at more than 4 locations per stream mile.

Moderate-to-high impact - if the pipeline alignment is within 50 feet of a perennial stream at numerous locations and crosses the stream between 2 and 4 locations per stream mile.

Moderate impact - if the pipeline alignment is within 50 feet of a perennial stream at numerous locations and crosses the stream only at one location.

Low-to-moderate impact - if the pipeline alignment occasionally is within 50 feet of a perennial stream, but does not cross the stream or the pipeline alignment crosses the stream perpendicularly at one location.

Low impact - if the pipeline alignment occasionally is within an area 50 to 150 feet of a perennial stream, but does not cross the stream.

No identifiable impact - if the pipeline alignment is farther than 150 feet from a perennial stream.

Specific Descriptions

Alternative A - No-Action - Existing impacts occur in the areas of unstable land along Segment 12*. However, there would be no effect on fish from this project as no surface resources would be disturbed. Low to moderate impacts over 0.5 mile are presently occurring at the existing Gooseberry Creek crossing.

Alternative B - Leave in Place, Full Extraction Mining - There would be no effect on fish in the project area as the redundant pipeline would not cross any streams. Low to moderate impacts over 0.5 mile are presently occurring at the existing Gooseberry Creek crossing.

Alternative C - Burnout Canyon Routes (1) and (2) - These routes would cross the stream channel in Burnout Canyon at 1 location. Along the 0.4 mile of stream between this crossing and Electric Lake, moderate impacts could occur to fisheries due to increased sediment. The route also would parallel Upper Huntington Creek and cross the stream at 9 locations. Potential sedimentation along the 2.2 miles of the route (or 3.0 stream miles) between the uppermost stream crossing and Electric Lake could result in moderate-to-high impact to fisheries. Extreme caution during construction would be required to minimize impacts to Yellowstone cutthroat trout and mottled sculpin habitat, and of sedimentation to spawning gravels.

Alternative C - Burnout Canyon Route (3) and (4) - These routes would cross the stream channel in Burnout Canyon in 1 location. Along the 0.4 mile of stream between this crossing and Electric Lake, moderate impacts could occur to fisheries due to increased sediment. These routes would cross Upper Huntington Creek in 2 locations and could result in moderate to high impacts (1.0 mile total). Extreme caution during construction would be required to minimize impacts to Yellowstone cutthroat trout and mottled sculpin habitat, and of sedimentation to spawning gravels.

Alternative D - Gooseberry Route - Originally, the alignment of Segment 1 crossed a sensitive pond area on Gooseberry Creek that could have been destroyed or damaged by construction. However, to mitigate the potential impacts, the alignment would be moved to avoid the ponds. The crossing of Gooseberry Creek would result in low-to-moderate impacts to fisheries for approximately 0.5 mile downstream from the crossing. Segment 2 and part of Segment 3 would parallel and cross Upper Huntington Creek northwest of the confluence with Little Swens Canyon where resulting impacts would be moderate-to-high between the uppermost crossing and Electric Lake (1.4 miles). Segment 3 also would cross the stream channel in Burnout Canyon at one location where resulting impacts between the crossing and Electric Lake would be moderate (0.4 mile).

Valley Camp Triangle Connectors (1) through (3) - There would be no effects to fisheries along any of the Connectors.

Alternative E - Winter Quarters Route (1) and (2) - Yellowstone cutthroat trout, rainbow trout, and mottled sculpin inhabit Mud Creek and Winter Quarters Creek and spawning habitat would be impacted at and below the stream crossing south of Scofield (Segment 20). The Winter Quarters Creek crossing would result in low-to-moderate impacts to the fisheries in the lower 0.4 mile of the creek. The Mud Creek crossing near the town of Scofield would result in low-to-moderate impacts to the fisheries in the 0.1 mile between the creek crossing and the confluence of Winter Quarters Creek. Cumulative, moderate impacts would result in 0.4 mile of Mud Creek below the confluence with Winter Quarters Creek. There is presently 0.5 mile of low-to-moderate impacts from the existing crossing at Gooseberry Creek. Along Segment 21, the new pipeline would cross Broads Canyon Creek. The crossing would result in low-to-moderate impacts for the 0.2 mile between the crossing and Mud Creek. Also, Segment 21 would parallel and cross Mud Creek at 2 locations north of the town of Clear Creek. Construction activities along and crossings of Mud Creek would result in low-to-moderate impacts to fisheries. No impacts would occur along associated Segments 19* or 23*.

There would be no moderate to high impacts along either route. Winter Quarters Route (1) could result in 0.5 mile of moderate impacts and 1.0 mile of low impacts. Winter Quarters Route (2) could result in 2.8 miles of moderate impacts and 2.1 miles of low to moderate impacts.

Terrestrial Resources

There is a high potential for adverse impacts where the pipeline routes would cross or parallel sensitive riparian areas and streams. Short-term loss of plant productivity could adversely effect important big game winter habitat. Long-term adverse impacts could be avoidable along other portions of the route if appropriate mitigation measures are taken. The most likely areas of adverse impact would be where Segment 1 would cross Gooseberry Creek and Segments 2 and 16 would parallel Upper Huntington Creek, Segment 20 would cross Mud Creek, Segment 21 would parallel Mud Creek, and Segment 3a would cross Upper Huntington Creek.

Specific Descriptions

Alternative A - No-Action - This alternative would create no effect on wildlife in the project area as no surface resources would be disturbed.

Alternative B - Leave in Place, Full Extraction Mining - Some disturbance to wildlife habitat would be anticipated, if the redundant pipeline is constructed.

Alternative C - Burnout Canyon Route (1) - Segments 2, 3a, 3b, and 16 have potential for direct adverse effects on riparian areas, important wildlife habitat. Moderate-to-high short-term impacts to a total of approximately 3.3 miles of riparian habitat could result from construction. Segments 2 and 16 parallel Upper Huntington Creek. Careful construction practices would be employed to minimize degradation of big game winter habitat.

Alternative C - Burnout Canyon Route (2) - Impacts are the same as Burnout Canyon Route (1).

Alternative C - Burnout Canyon Route (3) - This route would have less impact on riparian habitat than Burnout Canyon Routes (1) and (2). Some summer forage for elk and mule deer would be temporarily lost.

Alternative C - Burnout Canyon Route (4) - Impacts are the same as Burnout Canyon Route (3).

Alternative D - Gooseberry Route - Segment 1 crosses Gooseberry Creek at a particularly sensitive area (moderate-to-high impacts) with regard to wildlife habitat. The short-term loss of willow production could adversely impact big game winter range habitat.

Valley Camp Triangle Route Connectors (1) through (3) - There would be no identifiable effect to wildlife resources along the Connectors.

Alternative E - Winter Quarters Route (1) - Winter Quarters and Mud Creek riparian habitat crossed by Segment 20 are of greatly diminished value to wildlife due to overgrazing and their proximity to residential areas. Low-to-moderate impacts could result. Segment 22 would avoid the Mud Creek riparian area. During a recent survey for raptors conducted by the Utah Division of Wildlife Resources three nests were located along this route. The closest nest to the proposed alignment is about 0.8 mile. The terrain and forest vegetation should protect the inhabitants of this nest during construction (Dalton 1989).

Alternative E - Winter Quarters Route (2) - Impacts along Segment 20 are discussed under Winter Quarters Route (1). Segment 21 parallels Mud Creek north of the town of Clear Creek. These riparian areas are in excellent condition. Impacts could be moderate to high.

Special Status Species

No special status species of plants or animals, known to occur in the project area, would be affected. One sensitive species (Hymenoxys helenioides), a Federal candidate plant for listing, may occur in the project area. Prior to construction, the Forest Service botanist will field-check any areas along the selected route where the plant could possibly occur.

AIR QUALITY

Short-term low impacts to air quality are anticipated. During construction, the processes of clearing land and excavating the trench and the movement of equipment have the potential for generating fugitive dust. Emissions of carbon monoxide, nitrogen oxides, and hydrocarbons would be emitted by equipment fueled with gasoline, diesel oil, or other fossil fuel. Fugitive dust generated during construction would be controlled by applications of water on cleared land.

After construction, fugitive dust potentially could be generated by wind on exposed soil of cleared land if the appropriate mitigation measures are not implemented.

RECREATION

The experience of solitude and freedom sought by many recreation users of the National Forest would be disturbed during the construction of the pipeline in any new right-of-way. These disturbances are expected to be short-term, during and immediately following construction. Careful construction followed by aggressive rehabilitation measures are expected to minimize the remaining evidence of construction disturbance. Temporary delays to area traffic would occur, but roads would not close. The following are descriptions of the potential impacts to recreation by each alternative route. Refer to Table 4-6 for specific mileages.

Alternative A - No-Action - Recreation uses would not be affected further.

Alternative B - Leave in Place, Full Extraction Mining - Construction of a section of surface pipeline along Segments 7*, 10*, 17* and 18* in areas with ROS class of SPM recreation would diminish considerably the quality of the outdoor experience expected by visitors. Other segments of this route would not affect recreation.

Alternative C - Burnout Canyon Route (1) - Segments 12*, 13*, 19* and 23* are part of the existing route and would have no further impact on recreation. Segments 3a, 3b, and 14 would reduce the recreation experience for users that encounter disturbance along these segments in remote areas. Segment 14 may become an undesirable intrusion to future recreation users of the proposed campground (Crooked). However, construction of the campground is not anticipated until after the year 2030. Segments 2, 16, 3a and a small portion of Segment 3b would have moderate impacts to the experience sought by recreation users fishing along Upper Huntington Creek.

Alternative C - Burnout Canyon Route (2) - Potential impacts for this route are the same for those common segments described in the preceding route description. The only difference is Segment 14 is replaced by Segments 15 and 17*. Segment 17* is part of the existing route and would have no further impact on recreation. However, Segment 15 crosses an area with a ROS class of SPM recreation and would somewhat diminish the recreation experience of dispersed users encountering the right-of-way.

Alternative C - Burnout Canyon Routes (3) and (4) - The impacts along these routes would be the same as Burnout Canyon Routes (1) and (2) respectively.

Alternative D - Gooseberry Route - Segments 19* and 23* are part of the existing route and would have no further impact to recreation. Segments 3a and 3b would reduce the recreation experience for users that encounter this segment in remote areas. Segment 2, 3a, and a small portion of Segment 3b would have moderate impacts to the experience sought by recreation users fishing along Upper Huntington Creek.

Segment 1 would adversely affect the undeveloped motorized recreation sites in the vicinity of Gooseberry Campground. Segment 1 would have some effects that could

diminish the experience of dispersed recreation users around a private church camp in Little Swens Canyon.

Valley Camp Triangle Connector (1) - Segments 7* and 10* are part of the existing route and would have no impact on recreation. Segment 6 would have minor effects to users of the recreation access road paralleled by this segment. Segment 5 would affect the experience of dispersed recreation users in an area with a ROS class of SPM recreation.

Valley Camp Triangle Connector (2) - Segment 10*, part of the existing route, parallels a recreation access road. Segment 4 would have minor effects to users' experience on a recreation access road paralleled by this segment.

Valley Camp Triangle Connector (3) - Both segments 4 and 9 would have minor effects to users' experience on a recreation access road paralleled by this segment.

Alternative E - Winter Quarters Route (1) - Segment 12* is part of the existing route and would have no further impact on recreation. Segments 22 and most of 20 cross private lands that are not available for public recreation. The western 2.5 miles of Segment 20 crosses National Forest System lands and would cause minor impacts to recreational use. No new impacts would occur along associated Segments 19* and 23*.

Alternative E - Winter Quarters Route (2) - Segments 12* and 23* are part of the existing route and would have no impact on recreation. All of Segment 21 and most of Segment 20 cross private lands that are not available for public recreation. The portion of Segment 20 on National Forest System lands would have minor recreation impacts to an area with a ROS class of SPM recreation. No new impacts would occur along associated Segment 19*.

VISUAL CHARACTERISTICS

The visual resources analysis assessed potential visual impacts of pipeline construction to viewers. Potential impacts to the visual resources management objectives of the Manti-La Sal National Forest Plan are also addressed.

Impacts to sensitive viewers are determined by combining the degree of visual contrast (degree of change) with the visibility and viewing distance from the sensitive viewpoints. Combining these visual elements characterize the visual impacts, or how the contrast of the change is seen from sensitive viewpoints.

A strong contrast in a sensitive foreground view is usually a high impact. Contrasts from middleground and background views are usually less obvious unless the change is to a focal point or local landmark. Impact levels of high, moderate, or low were assigned:

High - Visual impacts are easily noticed by the average Forest user. Modifications to the visual setting dominate the natural appearing view.

Moderate - Visual impacts are not readily noticed (visually co-dominant) in the landscape setting. Although noticeable by the average Forest user, project modifications are subordinate to the natural appearing view.

Low - Visual impacts may be easily overlooked by the average Forest user. Modifications are subordinate in the visual setting, or may not be noticeable.

Potential visual impacts to viewers were assessed based on the Visual Quality Objectives (VQOs) reflected in the National Forest and BLM resource management plans. The area has a VQO of Partial Retention.

Partial Retention allows changes in the landscape that may be evident to the casual observer, but must remain visually subordinate in the natural appearing landscape. Changes should borrow form, line, color, and texture from the surrounding landscape.

New pipeline construction that requires the clearing of trees along proposed route segments would create moderate to strong visual contrasts. These contrasts would result in largely moderate impacts to the VQO of Partial Retention, and low or negligible impacts to the VQO of Modification.

Moderate impacts to Partial Retention are expected to be short-term after applying appropriate mitigation measures and revegetation. Selective thinning of trees along the edge of the right-of-way would create "soft" right-of-way edges and natural appearing openings similar to the existing pattern of the vegetation cover. This could minimize visual impacts to the VQO of Partial Retention.

Specific Descriptions

Table 4-6 summarizes the miles crossed of potential impacts to visual characteristics.

Alternative A - No-Action - This alternative would not further affect visual resources.

Alternative B - Leave in Place, Full Extraction Mining - The construction of a redundant above-ground pipeline for 4.25 miles would cause strong visual contrast (high impact) in the existing pipeline right-of-way on Segments 17* and 18*. Construction along these segments would cause long-term visual impacts.

Alternative C - Burnout Canyon Route (1) - On Segments 2 and 16 and a portion of Segment 3a, moderate visual contrasts (moderate impact) visible from Utah Highway 264 (a proposed National Scenic Byway) would result in minor short-term impacts caused by the removal or disturbance of grassy areas in the bottom of Upper Huntington Creek. Further moderate contrasts would result from clearing stands of aspen and mixed conifer along Segment 3b on the south slope in Burnout Canyon.

Moderate to strong visual contrasts caused by tree removal along most of Segment 14 would result in moderate short-term impacts. A small portion of this segment would be visible from Utah Highway 264; however, views from the highway would be of short duration. The portion of Segment 14 on the ridgeline would be unseen from any other sensitive viewpoints.

Alternative C - Burnout Canyon Route (2) - The visual impacts described in the preceding route description apply to this route, except that Segment 14 is replaced by Segments 15 and 17*. Segment 17* is part of the existing route. Moderate to strong visual contrasts caused by tree removal along a portion of Segment 15 would result in moderate short-term visual impacts visible to views from Utah Highway 264.

**TABLE 4-6
SUMMARY OF POTENTIAL IMPACTS: VISUAL
(Miles)**

ROUTE	TOTAL MILES	HIGH	MODERATE	LOW	NO IDENTIFIABLE	COMMENTS
Alternative A No-Action	13.5	-	-	-	13.5	
Alternative B Leave in place, Full extraction mining	13.5	4.25	-	-	9.25	long-term impact on VQO of Partial Retention and to U-264 views
Alternative C Burnout Canyon (1)	14.6	-	2.8	2.9	9.2	short-term impacts to foreground views of U-264
Burnout Canyon (2)	15.1	-	1.8	3.4	9.9	short-term impacts to foreground views of U-264
Burnout Canyon (3)	15.1	-	3.0	2.8	9.2	mitigation and slope stabilization would result in short-term moderate impacts to U-264 and the north end of Segment 24
Burnout Canyon (4)	15.3	-	2.1	3.2	9.9	short-term moderate impacts to recreation viewers on Segment 14 (also see comment above)
Alternative D Gooseberry Canyon	16.7	0.4	4.0	6.5	5.8	short-term impacts and possible long-term impacts to U-264 and Gooseberry Campground
Valley Camp Triangle Connectors						
(1)	1.0	-	-	0.6	0.4	
(2)	0.9	-	0.1	0.4	0.4	
(3)	0.5	-	0.4	0.1	-	
Alternative E Winter Quarters (1)	16.1	0.5	0.7	2.7	12.2	possible long-term impacts to views from U-96 and residences in Scofield
(with Segments 19* & 23*)	20.2	0.5	0.7	2.7	16.3	
Winter Quarters (2)	17.2	0.5	1.7	4.4	10.6	possible long-term impacts to views from U-96 and residences in Scofield
(with Segment 19*)	20.0	0.5	1.7	4.4	13.4	

Alternative C - Burnout Canyon Route (3) - Visual impacts for this route are described in route (1) for common segments. Segment 24 replaces Segments 2, 3a, and 16 for this route. Moderate visual contrasts from construction and slope stabilization activities along the west side of Utah Highway 264 would be expected to result in short-term moderate impacts, where installing the pipeline would require cutting the slope.

Little Swens Canyon, near its confluence, and Upper Huntington Creek will be crossed by Segment 24. Revegetation efforts are expected to be successful, and visual impacts are expected to be short-term and in the range of low to moderate. Low impacts are expected along the remainder of this segment.

Alternative C - Burnout Canyon Route (4) - Visual impacts for this route are described in route (2) for common segments. Also refer to the preceding paragraph for a description for the visual impacts for Segment 24.

Alternative D - Gooseberry Route - Construction along a portion of route Segment 1 would be expected to have moderate to strong visual contrasts caused by tree removal in an area managed with an emphasis on undeveloped motorized recreation sites. The result would be moderate, short-term impacts to southeast views from Gooseberry Campground, where the segment descends a steep slope adjacent to Gooseberry Creek.

In addition, moderate visual contrasts caused by the temporary exposure of light-colored rock would be expected along Skyline Drive, a scenic backway. These contrasts would result in low impacts for the short-term.

On Segment 2 and a portion of Segment 3, moderate visual contrasts visible from Utah Highway 264 (a proposed National Scenic Byway) would be expected to result from the removal or disturbance of grassy areas in the bottom of Upper Huntington Creek. The resulting low visual impacts would be short-term.

Further moderate contrasts from clearing stands of aspen and mixed conifer along Segment 3b in Burnout Canyon would result in moderate visual impacts.

Valley Camp Triangle Connector (1) - Moderate visual contrasts would result from the removal of a few trees in a small area along Segment 5/6. These contrasts resulting in low visual impacts would only be viewed by the occasional recreation users.

Valley Camp Triangle Connector (2) - Adjacent to a maintained, native-surface forest road, Segment 8 would result in low visual contrasts (low impacts) along the edge of the road where trees would be cleared. Only users of this road would be affected by construction along this segment. Similar contrasts would result where Segment 4 crosses this road.

Valley Camp Triangle Connector (3) - Construction along Segment 9 would result in moderate visual contrasts caused by clearing trees in stands of dense mixed conifers. Moderate visual contrasts would also result where Segment 4 crosses a maintained, native-surface road. These moderate visual contrasts would be expected to be short-term.

Alternative E - Winter Quarters Route (1) - Construction disturbance along a portion of Segment 20, where it would cross south of Scofield would cause moderate to strong visual contrasts visible from residences and Utah Highway 96 resulting in moderate to high

impacts to views. The portion of this segment that would cut through trees along the top of Winter Quarters Ridge would result in moderate visual contrasts; however, the resulting impacts would be low because the area is not visible from sensitive viewpoints. Segment 22 would parallel a primitive two-track road on a ridge unseen by sensitive viewers. No new impacts would occur along associated Segments 19* and 23*.

Alternative E - Winter Quarters Route (2) - Visual impacts for Segment 20 for this route are described in the preceding description. Strong visual contrasts would be expected to result from pipeline construction on a portion of Segment 21 where it would descend the steep-sloped north ridge of Broads Canyon, openly visible to views from Utah Highway 96. Visual impacts could be long-term if revegetation of the slope is hindered by soil instability and slumping. No new impacts would occur along associated Segment 19*.

NOISE

Short-term impacts associated with the noise from construction activities would be anticipated. However, mitigation measures would require that construction occur during periods of least disturbance to wildlife. The level and intensity of noise would be only an annoyance in the natural rural setting.

SOCIOECONOMICS

If construction of the selected proposed route (if any) is not completed by the Fall of 1990, an additional 3 to 9 mmt of recoverable coal could be lost. Unanticipated construction problems, strikes, adverse weather conditions, litigation, and surface right-of-way and coal acquisition could cause delays unless mitigated by using additional personnel and equipment.

Specific Descriptions

Alternative A - No Action - There would be no costs associated with construction or acquisition. Costs for annual maintenance of the existing pipeline is about \$24,300.

As discussed previously, if the pipeline is left in place and fully protected from subsidence, Utah Fuel would be able to mine only up to one-third of the recoverable coal resources by full support mining leaving most of the recoverable coal unmined. There is an estimated 27.6 mmt of recoverable coal beneath this entire route with an estimated value of \$690 million. Up to approximately \$29.8 million in royalties to the Federal and State governments would not be realized if the pipeline is fully protected and the 14.9 mmt of coal under it are not mined. The loss of revenue generated by mining activities (i.e., wages, benefits, supplies, taxes, equipment) excluding royalties would amount to \$291.4 million (based on extrapolated 1988 expenditures).

Alternative B - Leave in Place, Full Extraction Mining - Protecting the pipeline in place over the Skyline Mine permit area involves some element of risk such as the possibility of damage to the pipeline resulting in a stoppage of the natural gas flow and liability to those end users whose gas supply would be curtailed. If the pipeline were to fail during a time of year when access is relatively easy, the cost associated with the required repairs would be low but reestablishing service after interruption is estimated at \$1 million.

Should a pipeline failure occur during the winter months it becomes questionable that service could be restored promptly. During a mild winter the large machinery required may be able to access much of the pipeline, but during harsh winter conditions it is virtually impossible. Service to customers could be interrupted for an extended period, potentially causing injury or death and placing virtually unlimited liability on the companies involved.

The costs below reflect the most likely case for protecting the pipeline in place on the Skyline Mine permit area. Costs for pipeline protection off the Skyline Mine permit area have not been estimated but could be of equal magnitude. There would be an up front cost for engineering, legal, FERC application and permits of \$41,300.

Southern 1.65-mile Portion (overlying 3 minable coal seams) - Installation of the redundant line is projected to cost \$1.3 million. The southern ends of the pipeline most likely would have to be replaced after each seam is mined. Questar Pipeline believes that the entire line would have to be replaced after all of the seams have been mined because the gas transmitting capacity of the pipeline would be decreased by stress. It would cost about \$90,000 to remove the redundant line and reclaim the disturbed area. The total construction cost of a redundant pipeline for the southern portion would be \$2.11 million.

Northern Portion - The northern portion within Skyline Mine's permit area is 2.6 miles long and would be undermined only once. Installation of the surface line and monitoring would cost \$1.993 million. Replacement of the line at the end of the project is estimated at \$759,000. Removal of the surface line and reclamation would be an additional \$138,000. The total construction costs for the northern portion would be \$2.89 million.

The total projected costs for the southern and northern sections (including engineering, legal permits, and FERC application) would be \$5 million. Annual maintenance is projected at \$146,650 for 15 to 20 years. There would be no costs for coal or surface right-of-way acquisition.

There are an estimated 27.6 mmt of recoverable coal beneath the entire route with an estimated value of \$690 million and Federal royalties of \$55.2 million. Approximately 12.7 mmt of recoverable coal worth \$317.5 million and Federal royalties of \$25.4 million would be impacted off the Skyline Mine permit area. Beneath the pipeline within the Skyline Mine permit area, there are an estimated 14.9 mmt of recoverable coal with a value of approximately \$372.5 million and Federal royalties of \$29.8 million.

An estimated 40 contract personnel and 10 company personnel would be required to complete the construction of the redundant pipeline. Actual construction would be let on a bid basis. Assuming that the successful bid is made by a union contractor, in which case 65 percent of the employees are estimated as local hires, the beneficial impacts upon the local labor force could be approximately \$83,200. A nonunion contractor would most likely bring his own employees, but could hire locally. Assuming that the nonunion contractor hires 15 percent of his employees locally, the beneficial impact upon local wages could be approximately \$19,200 for a 20-day contract period.

Those pipeline workers not living in the area would purchase food, other goods, and lodging locally. Estimated expenditures could range from \$26,400 to \$48,400 over the 40-day period.

Finally, during construction of the redundant pipeline, the contractor would be purchasing equipment usage locally. This includes rentals and fuel for heavy equipment. This is projected to range from \$1,920 to \$8,320.

Assuming a multiplier of 2.5, beneficial impact from construction of the redundant pipeline upon the local economies could range from \$173,800 to \$294,000.

Installation of the strain gauges would require 22 company personnel 90 days to complete. No contract employees would be needed. Wages would be approximately \$108,900 and the beneficial impact upon local economies is estimated at \$272,250.

Some additional coal could be lost or temporarily bypassed under Segment 18* to protect the pipeline if the redundant pipeline were not completed in 1990.

Alternative C - Burnout Canyon Routes - Relocation of Main Line No. 41 to Burnout Canyon Routes (1) or (2) would cost an estimated \$2.2 million, \$2.9 million for Burnout Canyon Route (3), and \$2.6 million for Burnout Canyon Route (4). Any of the routes would require 40 to 60 days to complete. Most of the construction activity would be scheduled during the third quarter of the year so as to minimize impact upon the environment. An estimated 50 to 60 construction personnel and 12 to 15 company personnel would be required to complete the work. Actual construction would be let on a bid basis to a private contractor.

Total hourly wages to be spent during construction are estimated to range from \$320,000 to \$576,000 using a rate of \$20.00 per hour for 50 employees working 40 days with up to 60 employees working 60 days. Assuming that the successful bid is made by a union contractor, in which case as estimated 65 percent of the employees would be local hires, the beneficial impacts upon the local labor force could range from \$208,000 to a high of \$374,000. A nonunion contractor would probably bring his own employees, but could hire locally, though probably considerably fewer than a union contractor. Assuming that the nonunion contractor hires 15 percent of his employees locally, the beneficial impact upon local wages would range from almost \$50,000 for a 40-day contract period to \$86,000 for a 60-day contract period.

Questar Pipeline estimates that 12 to 15 company employees would temporarily relocate to the job site during construction. Those pipeline workers not living in the area, both hourly and company employees, would purchase food, other goods, and lodging locally. For the union contractor (hired locally) the estimated range of expenditures is about \$50,000 to almost \$80,000 over the 40 to 60 day life of the project. This also assumes 15 company personnel living in the area during construction. The impact is more considerable for the nonunion contractor who is bringing in most of his labor. The range is \$127,000 up to \$218,000, including company personnel.

Finally, during the construction of the pipeline, the contractor would be purchasing equipment usage locally. This includes rentals and fuel for heavy equipment. This is projected to range from a low of \$32,000 to a high of almost \$67,000 over the duration of the construction.

Local expenditures by the construction contractor could range from a low of \$290,000 to a high of \$514,000 for a union contractor. For a nonunion contractor the range is \$209,000 to \$364,000. Assuming a multiplier of 2.5, this indicates that the beneficial

impact upon the local economies could range from \$522,500 to \$1.235 million over the life of the project.

Annual maintenance costs would be approximately \$26,820. Construction, reclamation, and maintenance costs and other impacts for future pipeline relocation over unleased or unmined coal lands have not been estimated, but could be of similar magnitude. There would be no coal or surface right-of-way acquisition costs.

There are an estimated 14.7 mmt of recoverable coal beneath Burnout Canyon Routes (1) and (3) with an estimated value of \$367.5 million and Federal royalties of \$29.4 million. New pipeline would affect an estimated 2.6 mmt of recoverable coal with a value of \$65 million and Federal royalties of \$5.2 million.

Beneath the entire Burnout Canyon Routes (2) and (4), there are an estimated 17.4 mmt of recoverable coal with an estimated value of \$435 million and Federal royalties of \$34.8 million. New pipeline would affect an estimated 2.9 mmt of recoverable coal with an estimated value of \$72.5 million and Federal royalties of \$5.8 million.

Some additional coal could be lost or temporarily bypassed under Segment 18* if the pipeline is not relocated in 1990.

Valley Camp Triangle Connectors (1) through (3) - The estimated 2.1 mmt of recoverable coal beneath the entire Connector (1) has a value of \$52.5 million and Federal royalties of \$4.2 million. New pipeline would affect 1.5 mmt of recoverable coal with a value of \$37.5 million and Federal royalties of \$3 million. There would be no costs for acquisition of coal or surface rights-of-way.

The estimated 2.1 mmt of recoverable coal beneath entire Connector (2) has a value of \$52.5 million and Federal royalties of \$4.2 million. New pipeline would affect 1.8 mmt of recoverable coal with a value of \$45 million and Federal royalties of \$3.6 million. Coal acquisition costs are estimated at \$2.4 million.

The estimated 1.4 mmt of recoverable coal beneath entire Connector (3) has a value of \$35 million and Federal royalties of \$2.8 million. New pipeline would affect 1.4 mmt of recoverable coal with a value of \$35 million and Federal royalties of \$2.8 million. Coal acquisition costs are estimated at \$1.6 million.

Gooseberry and Winter Quarters Routes - Both routes would have larger beneficial economic impacts due to construction upon the local economy. Capital expenditures would range from \$3.9 million to \$4.14 million for construction. Duration of construction for both alternatives would extend beyond the 40 to 60 days for the other alternatives unless additional crews and equipment are used. In addition, both of the longer alternatives would cross private lands requiring negotiation or condemnation proceedings, factors that would potentially create large time delays.

Employment of 151 new individuals as planned by Skyline Mine to increase production from 3.5 million to 5 million tons per year could be delayed for a minimum of 1 year (1992-1993).

During construction of either of the two alternatives, an estimated \$640,000 to \$864,000 in total hourly wages could be expended. This assumes an 80- to 90-day construction period using one crew as described under Alternative C. A union contractor could

generate between \$416,000 to as high as \$562,000 in wages. A nonunion contractor could expend between \$96,000 and \$130,000 in local wages.

Purchase of food, other goods, and lodging locally could range from \$101,000 to \$110,000 for a union contracting company. These expenditures would increase considerably should the bid for pipeline construction be awarded to a nonunion contractor. A low of \$255,000 to a high of \$327,000 could be expended if a very high percentage of pipeline personnel relocated to the area during construction.

Local expenditures on equipment usage would also increase for these longer route alternatives. The range of expenditures is estimated to be \$64,000 to \$86,000.

It is estimated that a union contractor would contribute between \$581,000 and \$767,000 to the local economy. A nonunion contractor would expend between \$415,000 and \$543,000 locally. Assuming a multiplier of 2.5, these data suggest a beneficial impact upon the local economy ranging from \$1,037,500 to \$1,917,500 over the life of the construction project.

Annual maintenance costs would be \$30,060 for the entire Gooseberry Route, \$36,360 for the entire Winter Quarters Route (1) including Segments 19* and 23* that could not be abandoned, and \$36,000 for the entire Winter Quarters Route (2) including Segment 19* that could not be abandoned.

The costs for construction, reclamation, and maintenance, and other impacts for any future pipeline relocation over unleased or unmined coal lands have not been estimated, but could be similar in magnitude.

Acquisition costs, including costs to acquire rights to private and leased coal and surface rights-of-way, are estimated at \$4,612,800 for the Gooseberry Route, \$11,464,640 for Winter Quarters Route (1), and \$6,264,000 for Winter Quarters Route (2). Beneath the entire Gooseberry Route there are an estimated 11.8 mmt of recoverable coal with an estimated value of \$295 million and Federal royalties of \$19.0 million. Beneath the area of proposed new pipeline there are an estimated 9.6 mmt of recoverable coal with a value of \$240 million and Federal royalties of \$14.6 million.

Beneath the entire Winter Quarters Route (1) including Segments 19* and 23* there are an estimated 24.7 mmt of recoverable coal with an estimated value of \$617.5 million and Federal royalties of \$42.4 million. Beneath the area of proposed new pipeline there are an estimated 17.4 mmt of recoverable coal with a value of \$435 million and Federal royalties of \$27.8 million.

Beneath the entire Winter Quarters Route (2) including associated Segment 19* there are an estimated 18.9 mmt of recoverable coal with a value of \$472.5 million and Federal royalties of \$29.2 million. Beneath the area of proposed new pipeline there are an estimated 11.6 mmt of recoverable coal with a value of \$290 million and Federal royalties of \$14.6 million.

Some additional coal could be lost or temporarily bypassed under Segment 18* if relocation of the pipeline is not completed in 1990.

Mine Employment and Production

Utah Fuel mined 2.263 million tons of coal in 1988 and 2.969 million tons in 1989. Its plans call for increasing this to 3.48 million tons in 1990. The mine is designed to produce at a rate of 5 million tons per year, a goal Utah Fuel plans to reach in the near future. Holding rates of expenditures constant to output, the Skyline Mine, at 5 million tons of production per year, could generate almost \$90 million in expenditures per year in constant dollars. As 70 percent of the mine employees reside in Sanpete, Carbon and Emery counties, the impact of mine operations upon the local economy is important. Roughly \$7 million in wages and benefits now stay in the 3-county area; this could increase to \$13 million in constant dollars with full production. Assuming a multiplier of 2.5, the annual impact upon the local economies of wages only could amount to \$32.5 million once planned levels of mining are attained.

The loss of revenue resulting from a reduction or discontinuation of mining activities (i.e. wages, benefits, supplies, equipment, taxes) with royalties excluded would amount to \$2.914 million based on extrapolating 1988 expenditures (see Table 3-10).

CULTURAL RESOURCES

Direct adverse physical impacts to cultural resources could occur during ground disturbing activities associated with construction, such as vegetation removal, excavation of the pipeline trench, and preparation and use of temporary yards for equipment and materials storage. Indirect adverse impacts could result after construction due to improved access which makes archaeological sites more vulnerable to accidental or deliberate disturbance. Physical disturbance of a site, whether it is direct or indirect, causes a permanent loss of information. Archaeologists study the spatial patterning of artifacts and features within sites; once this pattern has been disrupted, it can never be reconstructed.

Specific Descriptions

The purpose of the impact assessment is to predict relative impacts of the proposed routes. Physical ground disturbance along any given stretch will be very similar given the nature of the project. Therefore, predicted impact levels mirror sensitivity rankings. In rating the severity of impacts, the relative probability of high, moderate and low impacts is assessed.

The results of the impact assessment are tabulated on a segment-by-segment basis in Table 4-7. Because all proposed routes pass through areas of at least moderate sensitivity, it is possible that impacts to cultural resources will not be able to be avoided entirely irrespective of the final route selection. However, the project will be done in compliance with regulations for "Protection of Historic Properties" (36 CFR 800) issued by the Advisory Council on Historic Preservation to implement Section 106 of the National Historic Preservation Act. This will ensure that prudent and feasible measures to avoid or reduce any identified adverse impacts are designed and carried out. The Forest has initiated consultation with the Utah State Historic Preservation Officer for this purpose.

Alternatives A and B - No impacts to important cultural resources are predicted along the existing route. If a redundant pipeline is constructed it is assumed that the effects from construction of the redundant line would be confined to the existing pipeline right-of-way. Although this alignment has not been entirely inventoried, we assume that any cultural resources that might originally have been present along it would have lost their integrity as the result of disturbance caused by initial pipeline installation. It is, of course, possible that subsidence associated with the partial mining option could effect resources beyond the existing right-of-way, but these would be the result of a different action. If temporary storage yards beyond the right-of-way were required as part of this option, they would need to be surveyed to ensure that important cultural resources were identified, evaluated, and properly treated.

Alternative C - Burnout Canyon Routes - Burnout Canyon Routes (1) or (2) could result in 2.1 miles of moderate potential impact related to the possibility of encountering Pleistocene faunal remains. Burnout Canyon Routes (3) or (4) could result in 0.3 mile of moderate potential impact also related to the possibility of encountering Pleistocene faunal remains, as well as 0.4 mile of potential low impact along unsurveyed stretches of Segment 24 where the proposed construction right-of-way deviates from the Highway 264 right-of-way.

Alternative D - Gooseberry Route - This route contains 2.2 miles evaluated as being subject to low potential impact along an unsurveyed stretch of private land on Segment 1 and 0.7 mile of moderate potential impacts because of the possible, undetected, buried Pleistocene faunal remains. No high impacts are anticipated.

Valley Camp Triangle Connectors (1) through (3) - No impacts to cultural resources are predicted along the segments within the Valley Camp Triangle because each has been intensively surveyed and no cultural resources were found.

Alternative E - Winter Quarters Routes - Winter Quarters Route (1) would have 6.5 miles of unsurveyed low potential impact, and 0.9 mile of moderate potential impact. Winter Quarters Route (2) contains 5.1 miles of unsurveyed low potential impact, 1.3 miles of moderate potential impact related both to possible historic resources and Pleistocene fauna, and 1.8 miles of high potential impact posed by the presence of an extant historic railroad in combination with possible Pleistocene faunal presence. Unsurveyed areas located on private lands will need to be surveyed if this route is selected. Appropriate measures for evaluating and treating important cultural resources would then need to be implemented.

COMBINED RESOURCE EFFECTS

Short-Term Uses Versus Long-Term Productivity

Alternative A - No Action - The pipeline has been in place since 1953 and the disturbed corridor was revegetated with understory species of vegetation to decrease the potential for erosion. Trees (deep-rooted overstory) were not replanted in the corridor to avoid conflicts with maintenance of the pipeline. Productivity of the corridor with regard to timber production and habitat and cover for wildlife will not be restored until the existing pipeline is no longer needed and is abandoned. Until the overstory vegetation is restored to blend in with the surrounding vegetation, the corridor will remain a contrast to the visual characteristics of the surrounding views of Forest visitors. The recoverable

TABLE 4-7
SUMMARY OF POTENTIAL IMPACTS: CULTURAL AND PALEONTOLOGICAL RESOURCES
(Miles Crossed)

ROUTE	TOTAL MILES	HIGH	MODERATE	LOW	NO IDENTIFIABLE	COMMENTS
Alternative A No-Action	13.5	-	-	-	13.5	no disturbance, unsurveyed
Alternative B Leave in place, Full extraction mining	13.5	-	-	-	13.5	no disturbance, unsurveyed
Alternative C Burnout Canyon (1)	14.9	-	2.1	-	12.8	segments surveyed, no cultural resources located; moderate potential for buried Pleistocene vertebrate remains
Burnout Canyon (2)	15.1	-	2.1	-	13.0	segments surveyed, no cultural resources located; moderate potential for buried Pleistocene vertebrate remains
Burnout Canyon (3)	15.1	-	0.3	0.4	14.4	possible buried Pleistocene vertebrate remains; unsurveyed
Burnout Canyon (4)	15.3	-	0.3	0.4	14.6	possible buried Pleistocene vertebrate remains; unsurveyed
Alternative D Gooseberry Canyon	16.7	-	0.7	2.2	13.8	possible buried Pleistocene vertebrate remains
Valley Camp Triangle Connectors						
(1)	1.0	-	-	-	1.0	survey complete; no cultural resources
(2)	0.9	-	-	-	0.9	survey complete; no cultural resources
(3)	0.5	-	-	-	0.5	survey complete; no cultural resources
Alternative E Winter Quarters (1)	16.1	-	0.9	6.5	8.7	possible buried Pleistocene vertebrate remains;
(with Segments 19* & 23*)	20.2	-	0.9	6.5	12.8	sites associated with railroad system; other possible historic sites; unsurveyed
Winter Quarters (2)	17.2	1.8	1.3	5.1	9.0	possible buried Pleistocene vertebrate remains;
(with Segment 19*)	20.0	1.8	1.3	5.1	11.8	sites associated with railroad system; other possible historic sites; unsurveyed

coal beneath the existing pipeline can be mined to only a limited extent in order to protect the pipeline from the effects of subsidence.

Alternative B - Leave in Place, Full Extraction Mining - Construction of a redundant pipeline on the surface within the existing right-of-way would allow for both the operation of the existing pipeline and complete mining of the recoverable coal reserves beneath the pipeline. The loss of productivity of the area due to lack of overstory vegetation would be the same as discussed above under Alternative A. Surface disturbance from pipeline construction and repairs would remove some of the understory vegetation already established within the corridor. This would result in a long-term loss of rangeland and to additional short-term impacts as previously discussed in this document.

Alternative C - Burnout Canyon Routes (1) through (4) - The effects would be similar or the same for either of the two variations of this alternative route. Uses of the environment would involve rerouting the pipeline and fully mining the recoverable coal reserves beneath the existing corridor across the Skyline Mine permit area. In areas of unstable slopes the disruption of the surface could accelerate erosion and land movement, especially during abnormally wet years, potentially affecting vegetation. The existing pipeline would be abandoned and the corridor would be reclaimed (i.e., overstory vegetation would be replanted). Both understory and overstory vegetation would be removed from the new corridor for the construction of the new pipeline. The corridor would be revegetated with understory vegetation; however, trees could not be replanted where they would interfere with operation and maintenance of the pipeline. This would result in loss of wildlife habitat and cover and would create a contrast to the visual characteristics of the surrounding areas. Productivity of the abandoned corridor would be replaced by reestablishment of the overstory vegetation along the abandoned right-of-way and the productivity of the new right-of-way would be affected until reclamation is complete. Loss of overstory vegetation would continue until the corridor is abandoned and reclaimed (for the life of the pipeline). Sedimentation from the stream crossing in Upper Huntington Creek and the stream crossing in Burnout Canyon is unavoidable and could result in a temporary loss of productivity of the riparian vegetation and the spawning habitat in both creeks, which flow into Electric Lake.

Alternative D - Gooseberry Route - The effects associated with the construction of the pipeline would be similar to, or the same as, Alternative C with the exception that less riparian area and a smaller portion of the Upper Huntington Creek spawning habitat would be affected.

Valley Camp Triangle Connectors (1) through (3) - The effects associated with construction of the pipeline would be similar or the same for each of the four Connectors and as the alternatives described above with the exception that there are no riparian areas or streams crossed that would result in effects to the fisheries.

Alternative E - Winter Quarters Routes (1) and (2) - The effects associated with construction of the pipeline would be similar to the alternatives described above. Mud Creek is spawning tributary for Scofield Reservoir, which is one of Utah's top fishery reservoirs. The effects on the two variations of this alternative are similar with the exception that Winter Quarters Route (1) would affect less riparian vegetation and make fewer stream crossings consequently affecting fisheries less than Winter Quarters Route (2).

Irreversible and Irretrievable Commitment of Resources

Alternative A - No Action - Since no construction would take place, no surface resources would be affected or irreversibly and irretrievably committed. However, the recoverable coal left unmined to protect the pipeline against subsidence would be irretrievably committed considering current mining technology. Consequently, royalties from the coal would not be realized.

Alternative B - Leave in Place, Full Extraction Mining - The redundant pipeline would be constructed within the existing right-of-way unanchored to the surface and strain gauges for monitoring stress would be installed along the existing pipeline every 100 feet, which would require excavation. The presence of the surface pipeline would affect rangeland until such time that the pipeline is removed. Also the view of the pipeline would be a contrast to the visual characteristics of the surrounding views of Forest visitors. Other disturbance to the surface is expected to be minimal.

Alternative C - Burnout Canyon Routes (1) through (4) - The effects would be the same if not similar for each of the 4 variations of this alternative route. Recoverable coal left unmined to protect the pipeline from subsidence would be irreversibly committed considering current mining technology. Disturbance of unstable slopes could result in erosion and/or mass land movement consequently affecting vegetation. Stands of trees and other vegetation would be cleared from the right-of-way in some areas. Although the right-of-way would be revegetated with understory species, trees could not be planted for the life of the project in areas that would interfere with maintenance of the pipeline. Consequently, wildlife and fish habitat and cover would be affected. Also, contrast with the visual characteristics of the surrounding area would be long-term. Cultural and paleontological resources are nonrenewable resources and if unidentified cultural or paleontological resources are damaged or destroyed as a result of construction, these resources cannot be recovered. However, cultural resources stipulations attached to the COMP (Appendix A) would be appropriate measures to mitigate potential adverse impacts to cultural and paleontological resources.

Alternative D - Gooseberry Route - The irreversible and irretrievable commitment of resources associated with the construction of the pipeline would be the same as described for Alternative C.

Valley Camp Triangle Connectors (1) through (3) - The irreversible and irretrievable commitment of resources associated with construction of the pipeline along each of the 3 Connectors would be the same as described for Alternatives C and D above. It should be noted that no cultural resources were identified during the intensive survey of the Connectors; however, cultural resources may be discovered during construction and if damaged or destroyed these resources cannot be recovered. Appropriate steps to mitigate unforeseen adverse effects to cultural and paleontological resources are specified in Attachment A of Appendix A.

Alternative E - Winter Quarters Routes (1) and (2) - The irreversible and irretrievable commitment of resources associated with the construction of the pipeline would be the same as described for Alternatives C and D above.

Cumulative Effects

It is important to note that no matter which alternative is selected, the pipeline would probably impact or be impacted by recoverable coal reserves in the future.

Alternative A - No Action - Since no construction would take place, there would be no effects to surface resources. However, if no action is taken, then the estimated 14.9 mmt of recoverable coal worth approximately \$372.5 million would not be mined and the 8 percent royalties of \$29.8 million to the Federal and State governments would not be realized.

Alternative B - Leave in Place, Full Extraction Mining - The installation of a redundant pipeline on the surface would allow mining of the 14.9 mmt of recoverable coal and the \$29.8 million of royalties would be realized. Construction of the redundant pipeline on the surface would result in comparatively few effects to the environment; short-term loss of vegetation, long-term loss of rangeland, long-term visual impacts, and potential conflicts with public uses on the Forest. However, the cost for construction of the specialized redundant pipeline, annual maintenance costs combined with the potentially extensive repairs would be very costly and the integrity and reliability of the system could not be guaranteed. In addition, the exposed line would be subject to natural accidents and intentional and unintentional vandalism. These repairs would result in potentially numerous short-term impacts to the environment (e.g., vegetation clearing, erosion potential conflicts with public uses of the Forest).

Alternative C - Burnout Canyon Routes (1) through (4) - The majority of the effects that could result from the construction of the pipeline along any variation of this alternative route would be short term. Overall cumulative effects to vegetation should be minimal and are strongly related to plant community recovery capabilities. There would be a period following construction of increased cumulative impact that is heightened by ongoing regional impacts related to grazing, timber harvest and other land uses. These effects eventually would be reversed through natural processes. Long-term effects would include removal of overstory (wildlife habitat and cover, and visual contrasts) and potential landsliding, both of which could add to the effects of previous impacts in the area (e.g., the existing corridor, Highway 264). Most notably, construction activities along the streams in Upper Huntington Canyon (an important spawning habitat of the Yellowstone cutthroat trout) and Burnout Canyon could cause long-term impacts with cumulative effects. Removal of vegetation proximal to a stream, disturbance to unstable slopes and stream banks adjacent to the streams, and trenching of the streambed (even using a culvert for diverting the water as a mitigation measure) could cause sedimentation that would affect the aquatic ecology of the streams. Spawning would not be affected in 1990 as construction would be allowed only after fry have left the stream. However, spawning habitat could be adversely affected for years into the future since some sediment would be generated that would not wash into Electric Lake for years to come. These impacts would add to the effects of previous impacts in the area (e.g., Highway 264). Impacts along Burnout Canyon Routes (3) and (4) would be less since there would be only a few crossings of Upper Huntington Creek, and the routes would be located on the west side of State Highway 264 not in the riparian area along Upper Huntington Creek.

Alternative D - Gooseberry Route - Cumulative effects along the Gooseberry Route are nearly the same as those along Alternative C except that less riparian vegetation and a smaller portion of the Upper Huntington Creek fishery would be affected.

Valley Camp Triangle Connectors (1) through (3) - Cumulative effects along each of the 3 Connectors would be similar to those described for Alternatives C and D. However, no streams or riparian vegetation would be crossed; therefore, there would be no effects to fisheries.

Alternative E - Winter Quarters Routes (1) and (2) - Cumulative effects along each of the two variations of this alternative route would be similar to those described for Alternative C above with the exception that the Winter Quarters Routes would not affect high-quality fisheries to the extent of Alternatives C (1) and (2) and D. It is anticipated that the potential effects to fisheries from sedimentation of the streams and Scofield Reservoir would be low to moderate.

Mine Employment and Production

Utah Fuel mined 2.263 million tons of coal in 1988 and 2.969 million tons in 1989. Its plans call for increasing this to 3.48 million tons in 1990. The mine is designed to produce at a rate of 5 million tons per year, a goal Utah Fuel plans to reach in the near future. Holding rates of expenditures constant to output, the Skyline Mine, at 5 million tons of production per year, could generate almost \$90 million in expenditures per year in constant dollars. As 70 percent of the mine employees reside in Sanpete, Carbon and Emery counties, the impact of mine operations upon the local economy is important. Roughly \$7 million in wages and benefits now stay in the 3-county area; this could increase to \$13 million in constant dollars with full production. Assuming a multiplier of 2.5, the annual impact upon the local economies of wages only could amount to \$32.5 million once planned levels of mining are attained.

The loss of revenue resulting from a reduction or discontinuation of mining activities (i.e. wages, benefits, supplies, equipment, taxes) with royalties excluded would amount to \$2.914 million based on extrapolating 1988 expenditures (see Table 3-10).

CULTURAL RESOURCES

Direct adverse physical impacts to cultural resources could occur during ground disturbing activities associated with construction, such as vegetation removal, excavation of the pipeline trench, and preparation and use of temporary yards for equipment and materials storage. Indirect adverse impacts could result after construction due to improved access which makes archaeological sites more vulnerable to accidental or deliberate disturbance. Physical disturbance of a site, whether it is direct or indirect, causes a permanent loss of information. Archaeologists study the spatial patterning of artifacts and features within sites; once this pattern has been disrupted, it can never be reconstructed.

Specific Descriptions

The purpose of the impact assessment is to predict relative impacts of the proposed routes. Physical ground disturbance along any given stretch will be very similar given the nature of the project. Therefore, predicted impact levels mirror sensitivity rankings. In rating the severity of impacts, the relative probability of high, moderate and low impacts is assessed.

The results of the impact assessment are tabulated on a segment-by-segment basis in Table 4-7. Because all proposed routes pass through areas of at least moderate sensitivity, it is possible that impacts to cultural resources will not be able to be avoided entirely irrespective of the final route selection. However, the project will be done in compliance with regulations for "Protection of Historic Properties" (36 CFR 800) issued by the Advisory Council on Historic Preservation to implement Section 106 of the National Historic Preservation Act. This will ensure that prudent and feasible measures to avoid or reduce any identified adverse impacts are designed and carried out. The Forest has initiated consultation with the Utah State Historic Preservation Officer for this purpose.

Alternatives A and B - No impacts to important cultural resources are predicted along the existing route. If a redundant pipeline is constructed it is assumed that the effects from construction of the redundant line would be confined to the existing pipeline right-of-way. Although this alignment has not been entirely inventoried, we assume that any cultural resources that might originally have been present along it would have lost their integrity as the result of disturbance caused by initial pipeline installation. It is, of course, possible that subsidence associated with the partial mining option could effect resources beyond the existing right-of-way, but these would be the result of a different action. If temporary storage yards beyond the right-of-way were required as part of this option, they would need to be surveyed to ensure that important cultural resources were identified, evaluated, and properly treated.

Alternative C - Burnout Canyon Routes - Burnout Canyon Routes (1) or (2) could result in 2.1 miles of moderate potential impact related to the possibility of encountering Pleistocene faunal remains. Burnout Canyon Routes (3) or (4) could result in 0.3 mile of moderate potential impact also related to the possibility of encountering Pleistocene faunal remains, as well as 0.4 mile of potential low impact along unsurveyed stretches of Segment 24 where the proposed construction right-of-way deviates from the Highway 264 right-of-way.

Alternative D - Gooseberry Route - This route contains 2.2 miles evaluated as being subject to low potential impact along an unsurveyed stretch of private land on Segment 1 and 0.7 mile of moderate potential impacts because of the possible, undetected, buried Pleistocene faunal remains. No high impacts are anticipated.

Valley Camp Triangle Connectors (1) through (3) - No impacts to cultural resources are predicted along the segments within the Valley Camp Triangle because each has been intensively surveyed and no cultural resources were found.

Alternative E - Winter Quarters Routes - Winter Quarters Route (1) would have 6.5 miles of unsurveyed low potential impact, and 0.9 mile of moderate potential impact. Winter Quarters Route (2) contains 5.1 miles of unsurveyed low potential impact, 1.3 miles of moderate potential impact related both to possible historic resources and Pleistocene fauna, and 1.8 miles of high potential impact posed by the presence of an extant historic railroad in combination with possible Pleistocene faunal presence. Unsurveyed areas located on private lands will need to be surveyed if this route is selected. Appropriate measures for evaluating and treating important cultural resources would then need to be implemented.

COMBINED RESOURCE EFFECTS

Short-Term Uses Versus Long-Term Productivity

Alternative A - No Action - The pipeline has been in place since 1953 and the disturbed corridor was revegetated with understory species of vegetation to decrease the potential for erosion. Trees (deep-rooted overstory) were not replanted in the corridor to avoid conflicts with maintenance of the pipeline. Productivity of the corridor with regard to timber production and habitat and cover for wildlife will not be restored until the existing pipeline is no longer needed and is abandoned. Until the overstory vegetation is restored to blend in with the surrounding vegetation, the corridor will remain a contrast to the visual characteristics of the surrounding views of Forest visitors. The recoverable

TABLE 4-7
SUMMARY OF POTENTIAL IMPACTS: CULTURAL AND PALEONTOLOGICAL RESOURCES
(Miles Crossed)

ROUTE	TOTAL MILES	HIGH	MODERATE	LOW	NO IDENTIFIABLE	COMMENTS
Alternative A No-Action	13.5	-	-	-	13.5	no disturbance, unsurveyed
Alternative B Leave in place, Full extraction mining	13.5	-	-	-	13.5	no disturbance, unsurveyed
Alternative C Burnout Canyon (1)	14.9	-	2.1	-	12.8	segments surveyed, no cultural resources located; moderate potential for buried Pleistocene vertebrate remains
Burnout Canyon (2)	15.1	-	2.1	-	13.0	segments surveyed, no cultural resources located; moderate potential for buried Pleistocene vertebrate remains
Burnout Canyon (3)	15.1	-	0.3	0.4	14.4	possible buried Pleistocene vertebrate remains; unsurveyed
Burnout Canyon (4)	15.3	-	0.3	0.4	14.6	possible buried Pleistocene vertebrate remains; unsurveyed
Alternative D Gooseberry Canyon	16.7	-	0.7	2.2	13.8	possible buried Pleistocene vertebrate remains
Valley Camp Triangle Connectors						
(1)	1.0	-	-	-	1.0	survey complete; no cultural resources
(2)	0.9	-	-	-	0.9	survey complete; no cultural resources
(3)	0.5	-	-	-	0.5	survey complete; no cultural resources
Alternative E Winter Quarters (1)	16.1	-	0.9	6.5	8.7	possible buried Pleistocene vertebrate remains;
(with Segments 19* & 23*)	20.2	-	0.9	6.5	12.8	sites associated with railroad system; other possible historic sites; unsurveyed
Winter Quarters (2)	17.2	1.8	1.3	5.1	9.0	possible buried Pleistocene vertebrate remains;
(with Segment 19*)	20.0	1.8	1.3	5.1	11.8	sites associated with railroad system; other possible historic sites; unsurveyed

coal beneath the existing pipeline can be mined to only a limited extent in order to protect the pipeline from the effects of subsidence.

Alternative B - Leave in Place, Full Extraction Mining - Construction of a redundant pipeline on the surface within the existing right-of-way would allow for both the operation of the existing pipeline and complete mining of the recoverable coal reserves beneath the pipeline. The loss of productivity of the area due to lack of overstory vegetation would be the same as discussed above under Alternative A. Surface disturbance from pipeline construction and repairs would remove some of the understory vegetation already established within the corridor. This would result in a long-term loss of rangeland and to additional short-term impacts as previously discussed in this document.

Alternative C - Burnout Canyon Routes (1) through (4) - The effects would be similar or the same for either of the two variations of this alternative route. Uses of the environment would involve rerouting the pipeline and fully mining the recoverable coal reserves beneath the existing corridor across the Skyline Mine permit area. In areas of unstable slopes the disruption of the surface could accelerate erosion and land movement, especially during abnormally wet years, potentially affecting vegetation. The existing pipeline would be abandoned and the corridor would be reclaimed (i.e., overstory vegetation would be replanted). Both understory and overstory vegetation would be removed from the new corridor for the construction of the new pipeline. The corridor would be revegetated with understory vegetation; however, trees could not be replanted where they would interfere with operation and maintenance of the pipeline. This would result in loss of wildlife habitat and cover and would create a contrast to the visual characteristics of the surrounding areas. Productivity of the abandoned corridor would be replaced by reestablishment of the overstory vegetation along the abandoned right-of-way and the productivity of the new right-of-way would be affected until reclamation is complete. Loss of overstory vegetation would continue until the corridor is abandoned and reclaimed (for the life of the pipeline). Sedimentation from the stream crossing in Upper Huntington Creek and the stream crossing in Burnout Canyon is unavoidable and could result in a temporary loss of productivity of the riparian vegetation and the spawning habitat in both creeks, which flow into Electric Lake.

Alternative D - Gooseberry Route - The effects associated with the construction of the pipeline would be similar to, or the same as, Alternative C with the exception that less riparian area and a smaller portion of the Upper Huntington Creek spawning habitat would be affected.

Valley Camp Triangle Connectors (1) through (3) - The effects associated with construction of the pipeline would be similar or the same for each of the four Connectors and as the alternatives described above with the exception that there are no riparian areas or streams crossed that would result in effects to the fisheries.

Alternative E - Winter Quarters Routes (1) and (2) - The effects associated with construction of the pipeline would be similar to the alternatives described above. Mud Creek is spawning tributary for Scofield Reservoir, which is one of Utah's top fishery reservoirs. The effects on the two variations of this alternative are similar with the exception that Winter Quarters Route (1) would affect less riparian vegetation and make fewer stream crossings consequently affecting fisheries less than Winter Quarters Route (2).

Irreversible and Irretrievable Commitment of Resources

Alternative A - No Action - Since no construction would take place, no surface resources would be affected or irreversibly and irretrievably committed. However, the recoverable coal left unmined to protect the pipeline against subsidence would be irretrievably committed considering current mining technology. Consequently, royalties from the coal would not be realized.

Alternative B - Leave in Place, Full Extraction Mining - The redundant pipeline would be constructed within the existing right-of-way unanchored to the surface and strain gauges for monitoring stress would be installed along the existing pipeline every 100 feet, which would require excavation. The presence of the surface pipeline would affect rangeland until such time that the pipeline is removed. Also the view of the pipeline would be a contrast to the visual characteristics of the surrounding views of Forest visitors. Other disturbance to the surface is expected to be minimal.

Alternative C - Burnout Canyon Routes (1) through (4) - The effects would be the same if not similar for each of the 4 variations of this alternative route. Recoverable coal left unmined to protect the pipeline from subsidence would be irreversibly committed considering current mining technology. Disturbance of unstable slopes could result in erosion and/or mass land movement consequently affecting vegetation. Stands of trees and other vegetation would be cleared from the right-of-way in some areas. Although the right-of-way would be revegetated with understory species, trees could not be planted for the life of the project in areas that would interfere with maintenance of the pipeline. Consequently, wildlife and fish habitat and cover would be affected. Also, contrast with the visual characteristics of the surrounding area would be long-term. Cultural and paleontological resources are nonrenewable resources and if unidentified cultural or paleontological resources are damaged or destroyed as a result of construction, these resources cannot be recovered. However, cultural resources stipulations attached to the COMP (Appendix A) would be appropriate measures to mitigate potential adverse impacts to cultural and paleontological resources.

Alternative D - Gooseberry Route - The irreversible and irretrievable commitment of resources associated with the construction of the pipeline would be the same as described for Alternative C.

Valley Camp Triangle Connectors (1) through (3) - The irreversible and irretrievable commitment of resources associated with construction of the pipeline along each of the 3 Connectors would be the same as described for Alternatives C and D above. It should be noted that no cultural resources were identified during the intensive survey of the Connectors; however, cultural resources may be discovered during construction and if damaged or destroyed these resources cannot be recovered. Appropriate steps to mitigate unforeseen adverse effects to cultural and paleontological resources are specified in Attachment A of Appendix A.

Alternative E - Winter Quarters Routes (1) and (2) - The irreversible and irretrievable commitment of resources associated with the construction of the pipeline would be the same as described for Alternatives C and D above.

Cumulative Effects

It is important to note that no matter which alternative is selected, the pipeline would probably impact or be impacted by recoverable coal reserves in the future.

Alternative A - No Action - Since no construction would take place, there would be no effects to surface resources. However, if no action is taken, then the estimated 14.9 mmt of recoverable coal worth approximately \$372.5 million would not be mined and the 8 percent royalties of \$29.8 million to the Federal and State governments would not be realized.

Alternative B - Leave in Place, Full Extraction Mining - The installation of a redundant pipeline on the surface would allow mining of the 14.9 mmt of recoverable coal and the \$29.8 million of royalties would be realized. Construction of the redundant pipeline on the surface would result in comparatively few effects to the environment; short-term loss of vegetation, long-term loss of rangeland, long-term visual impacts, and potential conflicts with public uses on the Forest. However, the cost for construction of the specialized redundant pipeline, annual maintenance costs combined with the potentially extensive repairs would be very costly and the integrity and reliability of the system could not be guaranteed. In addition, the exposed line would be subject to natural accidents and intentional and unintentional vandalism. These repairs would result in potentially numerous short-term impacts to the environment (e.g., vegetation clearing, erosion potential conflicts with public uses of the Forest).

Alternative C - Burnout Canyon Routes (1) through (4) - The majority of the effects that could result from the construction of the pipeline along any variation of this alternative route would be short term. Overall cumulative effects to vegetation should be minimal and are strongly related to plant community recovery capabilities. There would be a period following construction of increased cumulative impact that is heightened by ongoing regional impacts related to grazing, timber harvest and other land uses. These effects eventually would be reversed through natural processes. Long-term effects would include removal of overstory (wildlife habitat and cover, and visual contrasts) and potential landsliding, both of which could add to the effects of previous impacts in the area (e.g., the existing corridor, Highway 264). Most notably, construction activities along the streams in Upper Huntington Canyon (an important spawning habitat of the Yellowstone cutthroat trout) and Burnout Canyon could cause long-term impacts with cumulative effects. Removal of vegetation proximal to a stream, disturbance to unstable slopes and stream banks adjacent to the streams, and trenching of the streambed (even using a culvert for diverting the water as a mitigation measure) could cause sedimentation that would affect the aquatic ecology of the streams. Spawning would not be affected in 1990 as construction would be allowed only after fry have left the stream. However, spawning habitat could be adversely affected for years into the future since some sediment would be generated that would not wash into Electric Lake for years to come. These impacts would add to the effects of previous impacts in the area (e.g., Highway 264). Impacts along Burnout Canyon Routes (3) and (4) would be less since there would be only a few crossings of Upper Huntington Creek, and the routes would be located on the west side of State Highway 264 not in the riparian area along Upper Huntington Creek.

Alternative D - Gooseberry Route - Cumulative effects along the Gooseberry Route are nearly the same as those along Alternative C except that less riparian vegetation and a smaller portion of the Upper Huntington Creek fishery would be affected.

Valley Camp Triangle Connectors (1) through (3) - Cumulative effects along each of the 3 Connectors would be similar to those described for Alternatives C and D. However, no streams or riparian vegetation would be crossed; therefore, there would be no effects to fisheries.

Alternative E - Winter Quarters Routes (1) and (2) - Cumulative effects along each of the two variations of this alternative route would be similar to those described for Alternative C above with the exception that the Winter Quarters Routes would not affect high-quality fisheries to the extent of Alternatives C (1) and (2) and D. It is anticipated that the potential effects to fisheries from sedimentation of the streams and Scofield Reservoir would be low to moderate.

Main Line No. 41
Reroute Project

ROUTE SEGMENTS	TOTAL MILEAGE	GEOLOGY (MILES)				SOILS (MILES)				WATER (CROSSINGS)				BIOLOGY (MILES)				LAND USE (MILES)				VISUAL (MILES)				CULTURAL (MILES)				RECOVERABLE COAL RESERVES (MILLIONS OF TONS)	ESTIMATED COSTS (MILLIONS OF DOLLARS)	COMMENTS
		H	M	L	N	H	M	L	N	H	M	L	N	M-H	L-M	L	N	H	M	L	N	H	M	L	N	H	M	L	N			
ALTERNATIVE A	13.5 / 0.0	0.7 / 0.0	4.3 / 0.0	1.8 / 0.0	6.7 / 0.0	0.7 / 0.0	12.8 / 0.0						2 / 0							13.5								13.5	27.6 / 14.9	0.0	G - Land instability along Segment 12*.	
ALTERNATIVE B	13.5 / 4.25	0.7 / 0.0	4.3 / 0.6	1.8 / 0.5	6.7 / 3.15	0.7 / 0.0	12.8 / 4.25						2 / 0	0.3	0.5	12.7			0.1	4.2	9.2	4.25						13.5	12.7 / 0.0	3.3	B - Long-term rangeland loss. G - Land stability along Segment 12*. V - Affects recreation experience, long-term impacts in VQO of partial retention and to U-264 views.	
ALTERNATIVE C																																
(1)	14.9 / 5.7	0.7 / 0.0	4.2 / 0.6	1.2 / 0.3	8.8 / 4.8	0.7 / 0.0	14.2 / 5.7					10 / 10	2 / 0	3.3	0.9	10.7			0.1	4.0	10.8	2.8	2.9	9.2	2.1		12.8	14.7 / 2.6	2.2	L - Short-term traffic delays U-264, effects on dispersed recreation uses. V - Short-term impacts to foreground views of U-264. C - Possible buried Pleistocene vertebrate localities. G - Land instability Segments 12* B - 10 stream crossings; impacts to riparian and spawning areas.		
(2)	15.1 / 5.2	0.7 / 0.0	4.5 / 0.9	1.1 / 0.2	8.8 / 4.1	0.7 / 0.0	14.4 / 5.2					10 / 10	2 / 0	3.3	0.9	10.9			0.1	4.5	10.5	1.8	3.4	9.9	2.1		13.0	17.4 / 2.9	1.9	L - Short-term traffic delays U-264, effects on dispersed recreation uses. V - Short-term impacts to foreground views of U-264. C - Possible buried Pleistocene vertebrate localities. G - Land instability Segments 12* B - 10 stream crossings; impacts to riparian and spawning areas.		
(3)	15.1 / 5.9	0.7 / 0.0	4.0 / 0.9	3.7 / 2.8	6.7 / 2.7	0.7 / 0.0	14.4 / 5.9					3 / 3	2 / 0	1.0	0.1	14.0			0.1	4.0	11.0	3.0	2.8	9.3	0.3	0.4	14.4	14.7 / 2.6	2.95	L - Short-term traffic delays U-264, effects on dispersed recreation uses. V - Short-term impacts to foreground views of U-264. C - Possible buried Pleistocene vertebrate localities. G - Land instability Segments 12* B - 3 stream crossings; impacts to riparian and spawning areas.		
(4)	15.3 / 5.4	0.7 / 0.0	4.5 / 0.9	3.2 / 2.3	6.9 / 2.2	0.7 / 0.0	14.6 / 5.4					3 / 3	2 / 0	1.0	0.9	13.4			0.1	4.5	10.7	2.1	3.2	10.0	0.3	0.4	14.6	17.4 / 2.9	2.65	L - Short-term traffic delays U-264 and Skyline Drive, effects on users of undeveloped motorized recreation sites. V - Short-term and some possible long-term impacts to U-264 and Gooseberry Campground. C - Possible buried vertebrate localities, unsurveyed. B - 6 stream crossings; impacts to riparian and spawning areas.		
ALTERNATIVE D	16.7 / 12.6	0.6 / 0.6	3.4 / 2.0	2.2 / 1.3	10.5 / 8.7	0.6 / 0.6	16.1 / 12.0					6 / 6	1 / 0	1.9	0.9	13.9			6.5	10.2	0.4	4.0	6.5	5.8	0.7	2.2	13.8	11.8 / 9.6	8.5	L - Short-term traffic delays U-264 and Skyline Drive, effects on users of undeveloped motorized recreation sites. V - Short-term and some possible long-term impacts to U-264 and Gooseberry Campground. C - Possible buried vertebrate localities, unsurveyed. B - 6 stream crossings; impacts to riparian and spawning areas.		
VALLEY CAMP TRIANGLE																																
(1)	1.0 / 0.6	0.0 / 0.0	0.1 / 0.0	0.9 / 0.6	0.0 / 0.0	0.0 / 0.0	1.0 / 0.6					0 / 0				1.0			0.3	0.7		0.6	0.4			1.0	0.6 / 0.0	0.24	C - Survey complete, no cultural resources located.			
(2)	0.9 / 0.6	0.4 / 0.4	0.0 / 0.0	0.4 / 0.1	0.1 / 0.1	0.4 / 0.4	0.5 / 0.2					0 / 0				0.9			0.3	0.6		0.5	0.4			0.9	2.1 / 1.8	2.65	C - Survey complete, no cultural resources located.			
(3)	0.5 / 0.5	0.0 / 0.0	0.0 / 0.0	0.5 / 0.0	0.0 / 0.0	0.0 / 0.0	0.5 / 0.5					0 / 0				0.5			0.5			0.4	0.1			0.5	1.4 / 1.4	1.8	C - Survey complete, no cultural resources located.			
ALTERNATIVE E																																
(1)	20.2 / 12.4	0.7 / 0.0	3.3 / 0.3	3.3 / 2.4	12.9 / 9.7	0.7 / 0.0	19.5 / 12.4					2 / 2	2 / 0	0.4	1.5	18.3			1.5	14.6	0.5	0.7	2.7	16.3	0.9	6.5	24.7 / 17.4	15.6	Segments 19* and 23* cannot be abandoned, results in loss of coal and associated royalties. L - Increases access in timber unit; short-term traffic obstruction U-96. V - Possible long-term impacts to views from U-96 and residences in Scofield. G - Land instability along Segment 12*.			
(2)	20.0 / 12.2	0.7 / 0.0	3.7 / 0.7	3.3 / 2.4	12.3 / 9.1	0.7 / 0.0	19.3 / 12.2					5 / 5	2 / 0	1.8	3.8	14.4			1.5	15.7	0.5	1.7	4.4	13.4	1.8	1.3	5.1	18.9 / 11.6	10.35	Segments 19* and 23* cannot be abandoned, results in loss of coal and associated royalties. L - Increases access in timber unit; short-term traffic obstruction U-96. V - Possible long-term impacts to views from U-96 and residences in Scofield. G - Land instability along Segment 12*.		

Total for Route 13.5 / 4.25 Affected Portion

H - High Impact M - Moderate Impact L - Low Impact N - No-Identifiable Impact

- Includes acquisition, construction, and typical reclamation costs. Special site-specific mitigation or reclamation or abandoned right-of-way not included.
- Includes consideration of timber, rangeland, and recreation.
- Includes consideration of riparian areas, aquatic resources other vegetation and wildlife.

TABLE 4-1
Summary of Impacts
by Alternative

CHAPTER 5 - LIST OF PREPARERS

EIS PREPARATION

Dames & Moore Study Team

The following individuals participated in the formulation and analysis of the alternatives and the subsequent preparation of the EIS under the direction of the Forest Service.

Cindy L. Smith—Project Manager, Director of Environmental Services and Public Involvement Specialist

- BS degree in Liberal Arts and Sciences
- Completed graduate studies in anthropology and environmental planning
- Thirteen years of interdisciplinary experience in environmental projects management, environmental resources inventory and impact assessment, agency coordination, public involvement, and cultural resources management.

Steve Meyer—Project Coordinator, Geographer/Planner and Technical Illustration Specialist

- BS and MA in Geography
- 1978 to present with Dames & Moore, participated in land use studies for U.S. Census Bureau, formerly senior cartographer for St. Lawrence-Eastern Ontario Commission, New York.

E. Linwood Smith—Senior Investigator/Biological Resource Studies, Director of Biological Studies

- PhD in Zoology
- Eighteen years of experience as a professional biological consultant, served on the faculties of University of Arizona and Arizona State University, owned and operated biological consulting firm.

Loren R. Hettinger—Reclamation Planning/Soils Analysis, Senior Biologist

- MS in Biology from New Mexico State University
- PhD in Botany from University of Alberta (Canada)
- Wide range of reclamation planning experience related to oil and gas pipelines; coal, precious metal, and uranium surface mining; transportation; and hazardous waste clean-up projects.

Stephen L. Clark—Vegetation/Threatened and Endangered, and Sensitive Plants

- BS from Weber State College
- MS from Utah State University
- PhD from Brigham Young University
- Professor of Botany, Director of Herbarium, Director of the Institute of American Indian Botany at Weber State College, since 1965 conducted numerous range and watershed management studies, and studies of rare and endangered plants in the Intermountain Region.

Robert Quinlan—Fisheries Biology, Aquatic Biologist

- BS in Biology from University of Wyoming
- MS in Zoology and Physiology Water from University of Wyoming
- Past Assistant Fisheries Biologist for Wyoming Fish and Game Department, and Assistant Program Manager/Chevron USA and Amoco.

Charles Condrat—Earth Resources, Earth Resources Specialist

- BS in Forestry from Utah State University
- MS in Water Science Utah State University
- Experienced in geological, soils, water resources and paleontological investigations in Utah, Idaho, Colorado, and Arizona involving transmission lines, pipelines and timber sales.

John E. Wallace—Geotechnical Engineer, Associate and Senior Project Engineer

- BS in Civil Engineering
- MS in Civil Engineering
- Registered professional engineer in nine states
- Over 15 years of experience in geotechnical consulting, design and project management for industrial and commercial development projects, facility siting, and waste management facility design.

Doug Lootens—Geotechnical Engineer, Partner and Senior Geologist

- BS in Geology
- MS in Geology
- Twenty years of experience in environmental planning and resources development
- 1973 to present, managed resource development mining projects world wide, designed and managed mineral resource evaluation projects, providing project management for large, interdisciplinary projects.

Clayton Spear—Soil Scientist, Subconsultant to Dames & Moore

- BS in Soil Science
- Soil scientist for Soil Conservation Service for 31 years
- Familiar with soil series in project area and will coordinate the field investigations required to obtain Order 2 inventories.

Greg Gault—Land Use and Visual Aesthetics, Landscape Architect

- BS in Landscape Architecture
- Skills include NEPA compliance, visual resource assessments, recreation planning, research/analysis of land use, resource mapping, presentation and report preparation, graphics, and aerial imagery interpretation.
- Completed land use and visual studies for Caribou National Forest Timber Environmental Assessment, and Conda-Pocatello Pipeline Project in southeastern Idaho.

Barbara Lewis—Socioeconomics, Socioeconomic Specialist

- MS in Water Resources Management with concentration in Resource Economics
- Principal investigator for socioeconomic inventories and impact assessment for several federal projects requiring compliance with NEPA.

Budd Hebert—Socioeconomics, Socioeconomic Specialist

- BS in Geography
- MS in Geography Planning
- PhD in Economic Geography
- Provide numerous economic analyses on several marketing projects, identifying the major sectors of the economy and the location of production and consumption.
- Project economist for Corp for Engineers.
- Assistant and Associate Professor in Urban Studies and Geography for eight years.

J. Simon Bruder—Cultural Resources, Principal Investigator in cultural resources

- PhD from Arizona State University
- Eighteen years of experience in graduate study, teaching, and archeological research in the American Southwest and Mesoamerica.
- Principal investigator or project director for 12 archeological projects for Dames & Moore.

Everett Bassett—Cultural Resources, Archaeologist for Dames & Moore

- Undergraduate degrees in Biology and History
- Twelve years of archaeological research experience in Egypt, the Sudan, and both the east coast and southwestern regions of the United States.
- Extensive research and publishing in biological anthropology, worked as historical and prehistorical archaeologist.

CONTRIBUTORS AND DOCUMENT REVIEWERS

Forest Service

<u>Specialist</u>	<u>Specialty</u>	<u>Project Role</u>
Walt Nowak	Geology/Geotechnical	Interdisciplinary (ID) Team Leader
Carter Reed	Geology/Geotechnical	Supervisor's Office Coordinator/Consultant
Brent Barney	Engineering	ID Team Member
Becky Hammond	Geology/Geotechnical	ID Team Member
Dennis Kelly	Watershed/Hydrology	ID Team Member
Rod Player	Wildlife (terrestrial)	ID Team Member
Bruce Roberts	Wildlife (aquatic)	ID Team Member
Robert Thompson	Vegetation, special- status plants, reclamation	ID Team Member
Dan Larsen	Soils/Reclamation	ID Team Member
James Jensen	Visual Quality	ID Team Member
Glen Jackson	Recreation/Timber	ID Team Member
Leland Matheson	Range	ID Team Member
Stan McDonald	Cultural Resources	ID Team Member

<u>Specialist</u>	<u>Specialty</u>	<u>Project Role</u>
<u>Bureau of Land Management</u>		
Brent Northrup		Coal estimation
Terry McParland		Coal estimation
Jeff Cundick		Coal estimation
<u>Utah Division of Wildlife Resources</u>		
Larry Dalton		Raptor survey

CHAPTER 6 - CONSULTATION WITH OTHERS - PUBLIC INVOLVEMENT PROCESS

PROJECT SCOPING AND UPDATES

Integral to the environmental process is the solicitation of comments from various Federal, State and local agencies, and interested organizations and individuals to assure that the most accurate and current environmental information and public issues are incorporated into planning and decision-making.

After reviewing Questar Pipeline's application, the Forest Service identified a number of potential issues, and included these in the August, 1989 scoping document. The Forest Service distributed an information letter dated August 10, 1989 to agencies and organizations on the project mailing list developed by the Forest Service. A Notice of Intent was published in the Federal Register on Friday, August 11, 1989, which solicited comments nationwide during public scoping. Also, articles were published in the Price, Utah, Sun Advocate newspaper. The Forest Service conducted a public meeting on August 30, 1989, in Price, Utah, to describe the project and invite comments. Parties attending the public scoping meeting are listed on Table 6-1.

The comments received during project scoping further assisted to identify the scope of issues to be addressed during the environmental studies in preparation of the EIS. Six people provided oral comments at the scoping meeting, and 9 letters were received during the scoping period. The issues identified through public involvement and comments received during the scoping period are summarized in Table 6-2. A copy of the scoping materials and copies of letters are provided in Appendix D.

In November 1989, a newsletter was distributed to agencies, organizations, and landowners to provide updated information on the status of the project. In January 1990, a second newsletter was distributed to announce the status of the environmental analysis and the availability of the draft EIS. A list of agencies, organizations, and persons to whom copies of the DEIS were sent is provided on Table 6-3.

PUBLIC COMMENTS AND AGENCY RESPONSES

Once the draft environmental impact statement (DEIS) was completed, copies of the DEIS were distributed to relevant Federal, State, county, and local agencies; and to interested organizations and individuals for review and comment (refer to Table 6-3). This section describes the process followed for the public review of the DEIS, the comments on the DEIS provided by the public, and responses to those comments.

Public comments on the adequacy of the document were solicited from agencies, organizations, and individuals and were received in the form of letters. Eighty-nine letters were received. Every effort was made to organize the comments and responses in such a way that reviewers can readily identify the principal issues of public concern.

Public Review Process and Procedures

The DEIS was filed with the Environmental Protection Agency (EPA) and released to the public on May 10, 1990. The EPA published a notice of the filing in the Federal Register on May 18, 1990, which initiated the 45-day public review period. Approximately 170

copies of the DEIS were sent to Federal, State, and local government agencies, organizations, and individuals for review and comment.

During the public review period, an open house to display project information, solicit comments, and answer questions was hosted by the Forest Service in Price, Utah, on June 13 and 14. An announcement of the dates and location of the public open house was submitted to local newspapers, the Sun Advocate and Emery County Progress, and to the local radio, KOAL, station. Seventeen individuals attended the open house. Table 6-4 lists the attendees. No substantive comments were received.

In response, a total of 89 letters were received by the Manti-La Sal National Forest during the review period. With prior arrangements, all written comments may be inspected at the following location:

Office of the Supervisor
Manti-La Sal National Forest
599 West Price River Drive
Price, Utah 84501
(801) 637-2817

The Forest Service reviewed and carefully considered all comments and responded to those substantive comments that questioned findings of analyses, presented new data, or raised questions or issues relevant to the potential environmental impacts of the proposed project and alternatives, as required by NEPA and implementing regulations.

All 89 of the letters received are listed in Table 6-5 in the following order: Federal, State, county, and local agencies; organizations; businesses; and individuals. The majority of the letters received expressed similar comments that do not require responses. The comments are summarized below (refer to "Summary of Public Comments"). Letters that cannot be easily summarized or vary from the majority of letters are reproduced with responses in Table 6-6. Also, in accordance with Forest Service regulations, letters from agencies and elected officials are reproduced and attached to this document in Appendix A.

Summary of Public Comments

The majority of the letters expressed 3 predominate comments, which are summarized below and require no response.

- support Burnout Canyon Route
- concern about the socioeconomic impacts to the region if the mining operation as planned is not allowed to proceed
- environmental analysis is adequate

The majority of commentators support the use of the Burnout Canyon Route. Some of the commentators specified Burnout Canyon Route (3), the preferred alternative of the Forest Service. Other commentators did not specify a preference for any particular 1 of the 4 Burnout Canyon Route alternatives. A few individuals indicated that although there would be some inconvenience during construction (e.g., traffic delays), the temporary inconvenience would be justified by the long-term advantages of using the preferred route.

The main reason for the support of the Burnout Canyon Route is based on socioeconomics within the region. The commentors emphasized the importance of mining to the region. Comments indicated that by relocating the pipeline and allowing recovery of the coal reserves below the existing pipeline, the region (Carbon, Emery, and Sanpete counties as well as the State of Utah) would benefit from the mined resource through royalties, taxes, and jobs. If the 15 million tons of coal is not recovered, the associated royalties, taxes, and income would not be realized and would result in a negative impact to the region. Some commentors also stated that the Burnout Canyon Route is the shortest and would be less costly to build than the Winter Quarters or Gooseberry routes and could be constructed this year.

One individual favored either of the 2 Winter Quarters Route alternatives as these would avoid his property. Federal grazing permit along the Burnout Canyon Route (3) would result in removing vegetation that would require approximately 2 to 3 years to revegetate.

The Utah Division of Wildlife Resources (DWR) stated a preference for leaving the pipeline in place and protecting it from subsidence. However, DWR indicated that the use of Burnout Canyon Route (3) would be acceptable with the implementation of appropriate mitigation measures (refer to Table 6-6, Letter 9).

Numerous commentors stated that the environmental analysis is adequately addressed in the DEIS. (However, some commentors noted the severity of some mitigation measures.)

In addition, there were a few miscellaneous comments. A few individuals stated their appreciation for leaving the existing pipeline in place to avoid additional disturbance to the environment. One commentor asked whether or not big game habitat migrations or winter range would be affected. The answer to this question is provided on DEIS page 4-2, "Some summer forage for elk and mule deer would be temporarily lost." No other impacts to big game are anticipated.

TABLE 6-1
PUBLIC SCOPING MEETING ATTENDEES

<u>Name</u>	<u>Representing</u>
Judy Zumwalt	Self
Representative Ray Nielsen	Legislature
John M. Garr	Coastal States Energy Company
L. Craig Hilton	Utah Fuel Company
Cindy L. Smith	Dames & Moore
Dave Flaim	Questar Pipeline Company
Glen Zumwalt	Coastal States Energy Company
Carter Reed	Forest Service
Randy Heuscher	Bureau of Land Management
Rex Headd	Questar Pipeline Company
Tim Blackham	Questar Pipeline Company
Dale Stapley	Utah Department of Transportation
Mike Legerski	Questar Pipeline Company
Gordon Smith	Questar Pipeline Company
Mark Bailey	Self
Susan Linner	Utah Division of Oil, Gas and Mining
Kim Blair	Questar Pipeline Company
Emma Kuykendall	Carbon County Commissioner
Russ Madsen	Utah Fuel Company
Georgene Reed	Self
Becky Hammond	Forest Service
Sharon Metzler	Forest Service
Walter E. Nowak	Forest Service
Bruce Roberts	Forest Service
Aaron Howe	Forest Service
Ira Hatch	Forest Service
Charlene McDougald	Forest Service
Gordon Reid	Forest Service
Leland Matheson	Forest Service

TABLE 6-2
SUMMARY OF SCOPING COMMENTS

Commentor	Comments	Response
Oral Comments Received at Public Meeting		
Mark Bailey Interested Public	Concern about road closure along Burnout Canyon Proposed Route.	May be delay of 15 to 30 minutes. No closure is anticipated. Refer to Appendix A.
	Would the abandoned ROW be revegetated (including trees?)	The Forest Service responded yes.
	When would rehabilitation take place?	Rehabilitation is an ongoing process, should be rehabilitated [following construction] that fall. Refer to Appendix A.
Dale Stapley, Utah Department of Transportation	What would be impacts along Highway 96 (Winter Quarters Proposed Route)	May be minor delays during boring operation. No closure anticipated. Refer to Appendix A.
Emma Kuykendall Carbon County Commissioner	Would old pipeline be abandoned or moved?	Forest Service preference would be to retire it in place.
	Concerned about local economy - pipeline should be moved as soon as possible so coal production is not slowed. Concerned about leaving [old] pipeline in place to prevent disturbance.	Comments have been noted. Refer to Chapters 3 and 4, sections on Coal and Socio-economics.
Glen Zumwalt Utah Fuel Company	What is schedule for project decision and construction?	Environmental process should be completed by May or June. Construction [completion] targeted for October 1990 with 40-day construction period required for Burnout Canyon Route, others require longer period (80 to 90 days). Refer to Chapter 2.

Table 6-2 (continued)
Summary of Scoping Comments

Commentor	Comments	Response
Ray Nielson Utah State Representative	Concerned about local economy and National Energy Policy. Mineral lease money contributes to State and local economy. Irresponsible to leave 15 million tons of low-sulfur, high-energy coal unmined. Can't afford to curtail production. Decision should be made to move the pipeline—in an environmentally acceptable way.	Comments have been noted. Refer to Chapters 3 and 4, sections on Coal and Socio-economics.
John Garr Formerly with Coastal States Energy	The issue of the pipeline should move ahead expeditiously in reasonably economically viable direction. Coastal States needs to meet schedule as economically as possible.	Comments have been noted.
Written Comments		
Don Ostler, P.E., Director Bureau of Water Pollution Control, Utah Department of Health	Concerned about deterioration of water quality of Scofield Reservoir caused primarily by nutrient enrichment from agricultural practices and consequent excessive biological productivity. Concerned about stream-bank stabilization.	Comments have been considered and appropriate measures will be implemented to minimize adverse impacts to water quality and streambanks. Refer to Chapters 3 and 4 under "Water" and "Biological Resources."
Jody L. Williams Utah Power & Light	Appears from map that preferred pipeline route would cross near upper reaches of Electric Lake: (1) pipeline should not be placed below high	Comments have been noted and addressed in this document. Refer to map in Appendix C for locations of proposed routes. Refer to Chapters 3 and 4.

Table 6-2 (continued)
Summary of Scoping Comments

Commentor	Comments	Response
Jody L. Williams (continued)	<p>water line; (2) permittee should practice good sediment control during construction to avoid sedimentation to Huntington Creek or Electric Lake; (3) permittee should be prohibited from allowing leaks or discharges from pipeline into Huntington Creek or Electric Lake; (4) emergency response plan should be required in event of rupture; and (5) impacts to recreation should be minimized during construction and revegetation activities.</p>	<p>regarding sedimentation. Regarding gas leaks or discharges, natural gas is highly insoluble in water. Assuming methane characteristics at 59°F, the solubility in water is approximately 3.0×10^{-5} mole fraction or 2.6×10^{-5} lb. gas per lb. water. Refer to Appendix A regarding emergency response plan. Refer to Chapter 4, "Land Use," regarding impacts to recreation.</p>
Larry B. Dalton, Utah Division of Wildlife Resources (DWR)	<p>Concerned about adverse impacts to nesting raptors, big game summer range, and waterways that support self-sustaining populations of yellowstone cut-throat trout. "Without question, rehabilitation of all disturbed areas is anticipated."</p> <p>Inventory of raptor nest sites needed.</p> <p>No disturbance to big game parturition activities between May 15 and July 15.</p> <p>Sediment pollution must be minimized to protect fisheries. Suggests mitigation measures.</p>	<p>Comments have been addressed in this document. Refer to Chapters 3 and 4 Biological Resources regarding wildlife. Refer to Appendix A, Attachment A, regarding mitigation measures and stipulations for rehabilitation.</p> <p>Survey completed by DWR November 7, 1989.</p> <p>Construction is scheduled for Fall 1990.</p> <p>Mitigation suggestions incorporated into environmental analysis.</p>

Table 6-2 (continued)
 Summary of Scoping Comments

Commentor	Comments	Response
Larry B. Dalton (continued)	Also suggests several off-site mitigation measures.	Suggestions have been noted.
	Order of preference for alternative: (1) use existing alignment to ensure delivery of gas, (2) Burnout Canyon Route (using Segment 11), (3) Winter Quarters Route, (4) Gooseberry Route.	Comments have been noted.
	Either the Burnout Canyon or Winter Quarters Routes present likelihood for substantial negative impacts to terrestrial and aquatic wildlife resources. Both routes traverse high-priority valued summer range for big game and parallel valuable sport fishery resources.	
Vernal J. Mortensen Coastal States Energy Company	Provides descriptions and comments on the alternatives including proposed reroute locations. Supports use of the Burnout Canyon proposed route.	Comments have been noted and incorporated into the text of this document. Refer to Chapter 2.
Lauren O'Donnell, Federal Energy Regulatory Commission	Stated FERC would not have input to EIS under current regulations. Will act on Questar's year-end filing.	Comments have been noted. Refer to Table 1-1.

Table 6-2 (continued)
 Summary of Scoping Comments

Commentor	Comments	Response
Skyline Property Owners Association	<p>Represents about 200 property owners in Gooseberry Canyon subdivision. Object to proposal [Burnout Canyon Route]:</p> <p>(1) residents must have access to property and</p> <p>(2) disruption of the environment and tributaries to Electric Lake where fish spawn. Urge consideration of another proposal.</p>	<p>Comments have been considered and addressed in this document. Although there could be delays of 15 to 30 minutes, no closure of roads to traffic is anticipated. Refer to Chapters 3 and 4, Biological Resources, regarding fish. Refer to Chapter 2 for discussion of alternative proposed routes considered.</p>
C.K. Blair Questar Pipeline Company	<p>Emphasizes that location of pipeline is a critical concern because system failure causing service interruptions could jeopardize public health and safety and costs to reestablish service are substantial. Should be located to avoid geologic hazards and areas subject to future mining-related subsidence. Prefers Burnout Canyon Route - Gooseberry and Winter Quarters Routes present economic and schedule constraints. Describes other location alternatives that were considered but eliminated from further study.</p> <p>Questar Pipeline is not willing to reroute into an area it cannot legally preclude future mining-related subsidence.</p>	<p>Comments have been noted and addressed in this document. Refer to Chapter 2 regarding alternative proposed routes and alternative routes considered but eliminated from further evaluation.</p>