2.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION

The formulation of alternatives was guided by the key focus issues; purpose and need; land use objectives of the Fishlake National Forest LRMP, the BLM San Rafael RMP, and the Forest Planning Unit Management Framework Plan; and the need to comply with Federal, State, and local laws, regulations, and policies. The potential alternatives were evaluated by the Interdisciplinary Team (IDT) to determine whether they addressed the focus issues, met the purpose and need of the project, and were technically and economically feasible.

During the alternatives development process, the IDT reviewed a reasonable range of potential alternatives to the Proposed Action. The alternatives developed encompass the complete spectrum of possible decisions that range from No Action to selection of one of three alignment Alternatives. A variety of factors were examined during the development of the alternatives for the EIS. Consideration was given to avoidance and/or minimization of effects to water (surface and groundwater), wetlands, riparian zones, vegetation, wildlife, special status species, range/livestock, cultural resources, public safety, and aesthetics. However, the sloping to steep natural terrain between the Acord Lakes Road and SR-10 limits the options available for locating roads and other surface facilities.

The following Alternatives are consistent with the Fishlake National Forest LRMP, the BLM San Rafael RMP, and the Forest Planning Unit Management Framework Plan. Four Alternatives were considered for analysis in this EIS, as shown in **Figure 1-2**, and listed as follows:

ALTERNATIVE A - NO ACTION

A public road for the purposes of transporting coal or alternate access to the SUFCO Mine would not be built in Convulsion Canyon/Quitchupah Creek area. The existing road would remain in place and in use. The existing transport route of Acord Lakes Road to I-70 to SR-10 to power plants and railroad loadouts would continue to be utilized. Also the current land uses in the Quitchupah Creek area would continue.

ALTERNATIVE B - QUITCHUPAH CREEK ROAD ALIGNMENT

This alignment generally follows the existing two-track road in Convulsion Canyon/Quitchupah Creek area to the maintained county road in Emery County to junction with SR-10 at the Quitchupah Creek Bridge. This alignment is approximately 8.9 miles long. The legal description is as follows:

Junction Acord Lakes Road:	SW1/4 of Section 11, T.22 South, R.4 East, SLBM
thru:	Section 12, T.22 South, R.4 East, SLBM
	Sections 18, 17, 16, 15, 14, 13, 24, T.22 South, R.5 East, SLBM
	Section 19, T.22 South, R.6 East, SLBM
Junction SR-10:	NW1/4 of Section 30, T.22 South, R.6 East, SLBM

The existing road would be supplanted by the new road for about 5 miles of its length. In areas where the new road alignment is more direct than the existing road, the unused road segments (approximately 4.3 miles of two-track road) would be fully reclaimed and no longer driveable.

ALTERNATIVE C - ALTERNATE JUNCTION WITH SR-10 AND ALTERNATE DESIGN

This alignment follows Alternative B to a point on the western edge of Section 13 T. 22S R. 5E, then turns northeast to gain elevation the last two miles and junction with SR-10 at a favorable grade, 1.5 miles north of the Quitchupah Creek Bridge. The alternate junction allows loaded coal trucks to utilize their momentum to gain elevation and avoid the steep grade on Quitchupah Hill on SR-10. The alternate design includes additional wildlife fencing and underpasses to allow livestock and wildlife to move safely back and forth through the road corridor. The legal description is as follows:

Junction Quitchupah Creek Road:	SW1/4 of Section 13, T.22 South, R.5 East, SLBM
thru:	Section 18, T.22 South, R.6 East, SLBM
Junction SR-10:	SW1/4 of Section 17, T.22 South, R.6 East, SLBM

Under this alignment, about 4.4 miles of the existing road would be supplanted by the new road. Two-track road segments that would be reclaimed total 2.5 miles.

ALTERNATIVE D - WATER HOLLOW ROAD ALIGNMENT

This alignment follows the existing two track road in Convulsion Canyon, then turns southeast at a point near the center of Section 18, T. 22S R. 5E, crosses Convulsion Canyon, then crosses Water Hollow and the Water Hollow and Saleratus Benches. This alignment avoids proximity to Quitchupah Creek and the North Fork Rock Art complex, but it does involve large cuts and fills to cross Water Hollow and a few other large drainages. This road alternative would be 11.25 miles long. The legal description is as follows:

Junction Quitchupah Creek Road:	SE1/4 of Section 18, T.22 South, R.5 East, SLBM
thru:	Sections 18, 17, 20, 21, 28 and 33, T.22 South, R.5 East, SLBM
	Sections 1, 2, 3, 4, T.23 South, R.5 East, SLBM
	Section 35, T.22 South, R.5 East, SLBM
Junction SR-10:	NW1/4 of Section 1, T.23 South, R.5 East, SLBM

Except for the western end where the new road would obliterate the existing road (approximately 2.1 miles), the existing road would remain in place and in use.

Applicant Committed Measures/Best Management Practices

Throughout the document, several terms are used to discuss ways of preventing or alleviating impacts to resources. These terms are defined below and in the glossary.

Applicant or Agency-Committed Measures are steps planned or taken toward the accomplishment of a purpose that the applicant (i.e. SSD and SUFCO Mine) or agency is committed to completing, executing, fulfilling, etc.

Best Management Practices (BMPs) means schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce impacts to resources. These practices are defined by research and field testing to be the most effective and practicable methods to achieve desired resource protection.

2.1 Alternative A - No Action

Under this Alternative, the existing uses and environment in Quitchupah Creek and Water Hollow would continue unchanged in the foreseeable future. The historic use of the area for livestock trailing and grazing, the general solitude of the environment, recreational uses, and generally undisturbed condition of the cultural resources would continue. Likewise, current activities in the Project Area would continue; these include livestock trailing and grazing, erosion, and road/power line maintenance. Years of livestock trailing and grazing have impacted riparian and wetland soils by causing detrimental puddling and compaction disturbances. Trailing and grazing have also impacted general vegetation, and water quality (high total dissolved solids). Road erosion has also affected access into the canyon. Erosion due to road and power line construction and maintenance has also affected water quality. Emphasis on livestock grazing via intensive range management as recorded in the Fishlake National Forest LRMP is likely to continue as the primary management for Forest lands in Convulsion Canyon.

Under the No Action Alternative, the current transportation routes would continue to be utilized (**Figure 1-3**). UDOT has initiated studies to determine what is needed on SR-10 to handle the large increase in coal truck traffic from the junction with I-70 to the Hunter and Huntington power generating plants. State Route 57 from Orangeville to SR-10, which formerly was the sole route for coal transport to Hunter Power Plant, was designed and constructed to accommodate coal truck traffic from the adjacent mines to the power generating plants. SR-10, constructed 40 years ago, was not originally designed and constructed to accommodate large volumes of coal truck traffic. To accommodate this increasing coal truck traffic, the southern 20 mile section of SR-10 from I-70 to Muddy Creek would need to be rebuilt and bridges replaced. According to the Utah Department of Transportation (UDOT) online construction reports, the repaving and rehabilitation of the southern 10-mile section of SR-10 from milepost 0 (Fremont Junction, at I-70) to milepost 10 (Quitchupah Hill) (Project # STP-0010(20)0) has been completed. The replacement of Muddy Creek bridge north of Emery was 95 percent complete in October 2005 (Project # BRF-0010(27)16; UDOT 2005).

In addition, passing lanes would need to be constructed at Quitchupah Hill and Rock Creek to improve traffic flow.

According to a study (Parsons Brinkerhoff, 2001), the consequences of increased coal truck traffic (an increase from 20% trucks to 60% trucks in the AADT) on SR-10 highway conditions include severe pavement rutting, pavement cracking, increased pot-holing and patching, accelerated bridge deterioration, ride deterioration, and increased traffic congestion. The build alternatives (B,C,& D) would provide relief from this increased coal truck traffic on the lower portion of SR-10.

The No Action Alternative provides no relief for truck traffic on SR-10; the current coal transport route would continue as the future route. SR-10 is a high maintenance road due to the presence of Mancos shale-derived soils underlying the road base. UDOT/ Emery County expenditures for accelerated maintenance on this road under the No Action Alternative would continue. The emissions from the consumption of 1.4 million gallons of diesel fuel annually would continue.

2.2 Alternative B - Quitchupah Creek Road Alignment

Sevier County SSD has proposed to upgrade the existing road in Quitchupah Creek canyon, which connects the Acord Lakes Road in Sevier County with SR-10 in Emery County. The lands in this corridor are a combination of private, USFS, BLM, and SITLA. Under this Alternative, the round-trip coal hauling transport distance would be decreased by approximately 55.4 miles, which would also shorten the trip for mine services located in Carbon and Emery Counties and would reduce traffic on the southern portion of SR-10. The proposed Quitchupah Creek Road would be located along an existing two-track road through Quitchupah Canyon from SR-10 in Emery County to an existing mine road in Convulsion Canyon, Sevier County. The road would intersect SR-10 in the north half of Section 30, Township 22 South, Range 6 East (**Appendix A**). From SR-10, it would continue to the northwest into Sevier County, and then westward, generally following an existing trail along Quitchupah Creek, into Convulsion Canyon, to where it would connect with the Acord Lakes Road in the southwest quarter of Section 11, Township 22 South, Range 4 East.

The proposed road would be a 28-foot wide paved surface, with an operational right-of-way of 66 feet. Two pullouts for parking off the road shoulder would be provided; one at the Link Canyon channel crossing, and one at the East Springs Creek crossing. The construction corridor would vary from 50 feet to 60 feet on the flatter ground (eastern end) to an average 100 feet for the remainder of the road. The

road would be designed for a speed of 40 miles per hour, and constructed according to the standards of AASHTO, the current UDOT Standard Specifications for Road and Bridge Construction, and any additional requirements of the County. No facilities would be built in association with this alignment. The existing road would be supplanted by the new road for about 5 miles of its length. In areas where the new road alignment is more direct than the existing road, the unused road segments (approximately 4.3 miles of two-track road) would be fully reclaimed and no longer driveable. The details of the engineering design are presented in **Appendix B**.

Lands

The lands crossed by this proposed road include private, USFS, BLM, and SITLA (see **Figures 2-1** and **2-2**). There are several private landowners along the route, listed as follows:

Wynona P. Olsen, Trustee
Patricia Lois and George E. Olsen
Julian Bowman
James V. Olsen, Trustee
Thomas C. Bunn et al.
Castle Valley Ranches, LLC

Table 2.2-1 describes land status, length of proposed road within each jurisdiction, and estimated disturbance.

Table 2.2-1 Quitchupah Creek Road Alignment Land Status and Proposed Disturbance

Land Mgmt.	QCR Road Distance (miles)	County Jurisdiction	Road Construction Disturbance (acres)	Existing Road Disturbance (acres)	Staging Areas (acres)	Pull-Outs (acres)	Total New Surface Disturbance (acres)
USFS	2.3	Sevier	24.0	3.3	5.0	0.3	26.0
BLM	1.8	Sevier	18.4	1.8	5.0	0.3	21.9
SITLA	1.1	Sevier	12.3	0.9	5.0	0	16.4
Private	3.7	Sevier & Emery	33.7	5.7	0	0	28.0
Totals	8.9		88.4	11.7	15.0	0.6	92.3

Road Corridor

The construction corridor for the Quitchupah Creek Road would range from 50 feet to a maximum 220 feet, depending upon terrain, soil stability, and proximity to Quitchupah Creek. Approximately 11.7 acres of the construction right-of-way would be on previously disturbed ground. The total maximum new disturbance under this alternative within the road construction corridor would be 89.0 acres. Approximately 45 acres of land would be dedicated to roadway when the construction has been completed.

The Quitchupah Creek Road alignment would require expansion of the SR-10 bridge crossing over Quitchupah Creek to accommodate additional lanes for acceleration and turning.

Staging Areas
It is anticipated that there would be two to three staging areas associated with this project. These would be located upon USFS and BLM, and/or SITLA administered lands; each would be approximately five acres. Staging areas would be utilized for equipment storage, maintenance, and parking. The staging areas would be bladed, with erosion control provisions installed as necessary. They would be reclaimed at the end of the construction period. Potential staging areas are:

1) existing road north of station 18+00 to 22+00
2) area south of station 220+00 to 224+50
3) area north of station 386+00 to 389+00 (see **Appendix B**, Strips Maps 1,8,13)

Borrow Material Areas
The materials required for construction of the road include 75,000 cubic yards (yd^3) of granular borrow, 40,000 yd^3 of untreated base course, and 20,000 yd^3 of gravel to make asphalt. These materials would be purchased from a local gravel pit or extracted from an existing aggregate borrow source located east of SR-10.

Pullouts
Pullouts are proposed for each of the build alternatives for access to adjoining lands. Each would be 30 feet wide by 100 feet long unless the design is to use the existing road. Pullouts for Alternative B are proposed at the following stations:

Station 12+00 to 13+00	north side of proposed road
Station 60+00 to 63+50	north side, use existing road as pullout
Station 121+00 to 122+00	south side of road
Station 175+50 to 180+00	south side, use existing road as pullout
Station 287+00 to 288+00	south side of road
Station 450+00 to 451+00	north side of road

SR-10 Junction
The proposed road would junction with SR-10 at the existing intersection with the CONSOL Mine Road, an Emery County road 4.5 miles south of the Town of Emery. Because the proposed road and the CONSOL Mine Road would both carry coal truck traffic, both right and left turn lanes would be required for each road. Also, due to the uphill grade for northbound traffic, an extended acceleration and climbing lane of 2,300 feet would be required for the coal truck traffic (**Figure 2-3**). Thus, there would be 4 lanes south of the intersection and 5 lanes north of the intersection. The existing bridge over Quitchupah Creek would need to be widened 8 feet to the west and 32 feet to the east, almost doubling its current width.

An access permit would be required from UDOT for the junction with SR-10. The disturbance for construction of the intersections and additional lanes would occur within the existing UDOT right-of-way or acquired right-of-way.

Construction Procedures
It is anticipated that the road would be built in 10 months using a construction spread that would employ an estimated peak work force of approximately 30 to 50 persons.

The design and construction of the road would be in general conformance with applicable industry standards as determined through engineering design.

The construction sequence includes preparing the right-of-way and roadbed, construction of the road, and restoring the staging areas.

Preparation of the Right-of-Way and Roadbed
Preparation of the construction corridor would involve topographic survey of the right-of way to establish final roadbed grade and staking the centerline of travel. Blading and removing vegetation over the entire length of the right-of-way and at staging areas would occur within the staked limits of the right-of-way. A maximum of 92.3 acres of land would be affected. Spoil and cut vegetation would be temporarily stockpiled along the right-of-way edges. Soil material would be separated by means of windrowing or sidecasting. A minimum of six inches of the upper soil material (topsoil) would be stored along the edge of the bladed right-of-way.

Upon completion of roadbed clearing, crews would begin construction of the roadway subgrade. Road base would be placed along the established roadway and graded to plan. Graders, scrapers, and dozers would be utilized to obtain the necessary grade and alignment. Once the prescribed grade and centerline of travel are constructed to plan, pavement would be placed.

The contractor would not disturb areas outside the staked right-of-way without prior written permission from the appropriate land managing agency or individual owner.

During rehabilitation, this topsoil material would be spread evenly over the disturbed areas.

Soil Stabilization
Upon approval to build the proposed road or alternative, appropriate geotechnical investigations would be performed to determine soil characteristics throughout the roadway. California Bearing Ratio (CBR) values would be determined and used to complete the pavement designs according to methods approved and specified by AASHTO.

Calculated design for the road indicates that no more than a 12-inch thick layer of granular borrow will be necessary below the untreated base course. Calculation of CBR from 16 soil samples collected on the alignments supports the 12-inch granular borrow layer (see **Appendix B** for details). However, some of the soils contain a high percentage of expandable clays that can deform and break up road base and asphalt. UDOT has had extensive experience with these expandable soils under some of the major roads within the area, and recommends up to three feet of granular fill and base on top of them. The use of three feet or more of granular borrow would be an option for sites with particular soil problems. These clayey soils are also strongly saline, so they should not be used as fill or for fill slopes.

If it were determined that unusual subsurface formations or soft soils existed, additional features would be added to the design of the roadway cross-section. These additional features could include: geotextile and/or geogrid between the native soil and the extra depth of placed granular borrow; geotextile and/or geogrid within the placed granular borrow; and/or other soil improvement methods such as compaction grouting, deep dynamic compaction, and lime and cement stabilization methods.

If it is determined that the soils in question are inadequate for subgrade material, the soft soils would be removed and replaced with granular borrow materials that meet the required strength, in conjunction with the use of the methods mentioned above.

In any case, for soil stabilization as well as all other aspects of final road design, USFS and BLM would have final approval on the specific techniques and materials used.

Construction of the Road
After crews have prepared the road subgrade, the contractor would begin hauling, placing, and compacting the granular borrow to an estimated depth of 8 to 12 inches. This is the first phase of the surfacing process. The second phase would involve placement and compaction of an eight-inch lift of untreated base course. **Figures 2-4** and **2-5** show typical cross sections for road construction. **Figure 2-4** is a typical section for the road on suitable soils and **Figure 2-5** is a typical section for road construction on expansive soils.

The completed road would have a 28-foot paved surface width. The road would consist of 6 to 8 inches of untreated base course overlaid by 5-inches of asphalt concrete.

Approximately 400,000 yd^3 of roadway excavation, 41,000 tons of non-rutting asphalt concrete and asphalt mix, 80,000 tons of untreated base course, and 75,000 yd^3 of granular borrow are proposed for the road construction.

Public Access & Safety
During construction of the road, signs would be placed on SR-10 at the Quitchupah Creek Road junction as well as on the Acord Lakes Road, notifying the public of construction activities. The existing two-track road would be available for partial access into the Quitchupah drainage. Provisions would be made for hunter access during big game hunting season, depending upon the status of road construction at that time.

Blasting
The proximity of the Quitchupah Creek Road alignment to rock canyon walls in some areas suggests the need for blasting to remove rock. The areas that may require blasting include:

Station 25+00 to 50+00
Station 80+00 to 81+00
Station 108+00 to 111+00
Station 118+00 to 122+00
Station 156+00 to 174+00
Station 233+00 to 237+00
Station 262+75 to 263+25
Station 275+00 to 283+00

Appendix B contains maps showing the approximate locations of these blast sites.

The contractor must exercise great care in blasting and would be responsible for and assume all liability connected with the blasting and use of explosives. The contractor would be liable for all damage on adjacent property, all injuries, lawsuits, complaints, and any other actual or alleged damages. Blasting would be conducted in accordance with the Labor Commission, Occupational Safety and Health, Hazardous Material, R614-4-18 - Use of Explosives and Blasting Agents. Provision R614-4-18 (A)(3) states: "When blasting is done in congested areas or in close proximity to a structure, or any other installation that may be damaged, the blast shall be covered before firing with a mat constructed so that it is capable of preventing fragments from being thrown." The contractor would observe all safety rules for the handling of explosives, and in no case would blasting caps be stored near the explosives. No blasting would be done outside regular working hours except with special approval. All explosives would be stored in compliance with laws and regulations and all storage places would be properly marked. The

contractor would comply with Utah Occupational Safety and Health (UOSH) construction standards, chapter "U" rules and regulations. The contractor would provide a qualified explosives expert to act as advisor and consultant during drilling and blasting operations. Blasted material would be used for riprap if it meets riprap specifications, otherwise it would be used as fill material.

Erosion and Sediment Control

Erosion due to construction activities would be controlled as necessary by: using energy dissipation at culverts; placing straw wattles, rolled coir logs, or similar structures on steep slopes with fine grained soils; placing or leaving large rock; reseeding fill and cut slopes; and other measures as defined in **Appendix B – BMPs.** In regard to sediment control, silt fences, water bars, or other sediment control structures, as defined in **Appendix B - BMPs**, would be utilized to prevent sediment loading during streambank manipulation and road construction. Some of these controls (both erosion-related and sediment-related) would be left in place until full stabilization of the roadway and slopes have been reached. A Storm Water Pollution Prevention Plan (SWPPP) would be developed prior to construction, as one of the terms of the required storm water discharge permit that would be required by Utah Division of Water Quality (DWQ). It would detail how and when each control device would be utilized. The SWPPP would be developed to ensure that the construction project complies with all permit requirements including the 401 Water Quality Certification Application conditions. **Appendix B** contains the BMPs that would be utilized during and after construction.

Dust Control

Water for dust control and compaction during construction of the lower portions of the road would be solicited from a local irrigation company, depending upon the time of year of construction. In the event no water is available during irrigation season, water would be requested from Emery or other sources and trucked to the site. At the upper end of the road, water would be obtained from the mine pump station by Sta. 65+00.

Stream Crossings and Culverts

The road alignment for Alternative B would require a total of 43 culverted crossings. **Figure 2-6** shows the locations of these crossings. This includes 18 primary crossings and 25 secondary crossings. Primary crossings are designated at perennial, intermittent, or ephemeral watercourses that have large drainage areas and/or defined channels. Secondary crossings are designated at smaller ephemeral watercourses that drain smaller watersheds and/or have little or no channel definition. All of the primary and secondary culvert crossings would be designed to pass the 100-year flow, as calculated by Utah Department of Transportation methodology (UDOT, 2002). **Table 2.2-2** shows the 18 primary culvert locations, design flows and culvert diameters.

Depending upon the season of construction, up to six of these crossings would be expected to be wet. BMPs that would be implemented during culvert design, placement, and maintenance are described in **Appendix B**.

The existing bridge on SR-10 would require widening 8 feet to the west and 32 feet to the east, almost doubling its size. This construction would be under the direction of UDOT and to UDOT and AASHTO standards.

In addition to the crossing culverts, numerous borrow ditch relief culverts would be used to direct and control road and upgradient runoff. They would be spaced at 500-foot intervals or less, depending upon road slope and proximity to stream channels. BMPs that apply to borrow ditch relief and other road drainage issues are contained in **Appendix B**.

Table 2.2-2 Primary Culvert Crossing Information - Alternative B

Station	Design Flow (cubic feet per second)	Culvert Diameter (inches) RCMP unless noted
11+00	123	60
18+00	173	72
66+00	234	84
94+00	252	84
186+50	117	96
190+50	39	42
201+00	123	60
203+50	26	36
213+50	108	60
228+50	1702	3 (108)*
232+50	1702	3 (108)*
250+00	1144	2 (108)*
251+50	2800	300 by 120 (alum. box)*
256+50	2800	300 by 120 (alum. box)*
268+00	282	84
300+00	156	60
323+50	117	60
451+00	586	120

* These crossings would provide fish passage.
Note: At crossings where fish passage is required, specialized culverts may be used, and diameter/type may vary from what is given above. However, in all cases, capacity will be capable of passing the 100-year flow at a minimum.

Stream Re-Alignment

Stream realignment would be required in upper Convulsion Canyon, lower East Spring Canyon, and in Quitchupah Creek at the Rock Art site. The stream realignment process requires a State of Utah Stream Alteration Permit. For this project, because an individual COE permit would also be needed for the wetland fill, the COE has asked to handle all stream realignment and crossing permits under the single COE 404 permit, rather than using the joint state/federal GP40 Permit that is handled under the Stream Alteration rules. The permit would set conditions for hydraulic design of each realigned section to maintain the integrity of the creek both upstream and downstream. Further, **Appendix B** provides BMPs that would be used in the design and construction of these realigned sections.

In upper Convulsion Canyon, the channel would be moved north away from the road fill toe between stations 13+00 and 15+00, for a realignment distance of 200 feet. Just downstream from that location, the channel would be moved south between the new road fill and the steep canyon slope, between Stations 19+00 and 45+00. Based upon this road stationing, channel realignment would be required for approximately 2,600 feet.

In lower East Spring Canyon, the proposed road, between stations 65+00 and 75+00, would interfere with about 1,100 feet of the existing East Spring Canyon channel. A culvert about 170 feet long would replace the existing crossing, and from the mouth of the culvert downstream for approximately 900 feet, the channel would be realigned to the south of this existing location. Depending upon the appropriate morphologic sinuosity of the final designed replacement channel, total length of the realignment, not including culvert, would be about 900 feet.

In Quitchupah Creek at the Rock Art complex, an existing dry meander bend would need to be shortened in order to accommodate the road fill west of North Fork. This would occur between Station 249+00 and 250+00, or 100 feet of roadway. In total, a maximum of 350 feet of channel would require realignment (based upon road stationing, not including any meandering of lost or replaced channel).

In Convulsion Canyon, the realigned segments would be straightened to a grade of approximately 9 percent. They would have a narrower, more uniform channel bottom than the existing channel, and would likely be riprapped and contain grade control to maintain stability. Transitional treatments would be done to insure that, at the downstream end of the realigned reach, velocities and flow area are returned to their original conditions, as described in **Appendix B**.

At approximately 249+00, a short channel realignment in Quitchupah Creek would be required. About 130 feet of meander would be filled, and a maximum of about 350 feet of stream would be placed back in its meander (it was recently cut-off during a flow event). An MSE (mechanically stabilized earth) wall, and other protective measures would be specified in the final design. The diversion of 130 feet of the stream from the cutoff back into the meander would restore 350 feet of the stream channel and decrease the grade from 7.6 percent to 2.3 percent (Strip Map 9).

For the East Spring Canyon realignment, a more naturally functioning channel would be designed, as described in the applicant-committed environmental protection measures later in this Chapter.

Construction Equipment
The following equipment would be utilized during various phases of construction:

- Road grader
- Rubber tired loader
- Conventional scrapers
- Hydraulic excavators (track or wheel)
- Rear dump trucks
- Belly dump trailers
- Asphalt paving machines
- Water truck for dust control
- Steel drum static compactors
- Sheeps foot compactors
- Hand held vibratory plate compactors
- Gravel crushing facility
- Track dozers
- Construction office trailer

Hazardous Materials
The contractor for Sevier County SSD would manage all hazardous materials (including hazardous chemicals, substances, and wastes) in full accordance with all applicable Federal, State, and local regulations. Regulated hazardous materials would be managed in an appropriate manner that protects workers and the public, and prevents accidental releases to the environment. In the event that any such materials were to be released to the environment in excess of the reportable quantities defined under the relevant Federal or State regulations, the required notifications would be made, and required reports would be completed and submitted to the appropriate agencies. In such an event, the USFS and BLM would be provided with copies of any such reports, along with the designated recipient agencies.

Reclamation
Reclamation would consist of recontouring the disturbed areas to blend into surrounding terrain, or as requested by the agencies or landowners. Crews would reseed the staging and borrow areas using seed mixtures as directed by the appropriate land managing agency. Appropriate measures would be taken as necessary to prevent erosion, including the use of water bars (See **Appendix B - BMPs**). Reclamation would be conducted to agency standards and would include monitoring and maintenance to agency satisfaction.

Reclamation would be conducted upon completion of the road (or as specified by the land managing agency), after seedbed preparation, while the growth medium is still comparatively soft and loose. All disturbed areas along the road right-of-way would be reseeded with certified noxious-weed free seed mixtures specified in **Table 2.2-3**. The areas would be drill seeded. In areas where the seed is hand broadcast, the seeding rates listed in **Table 2.2-3** would be doubled. The use of fertilizer is not anticipated at this time. However, a tackifier would be used with the seeding and mulching in order to decrease the potential for erosion and give the seed base a stable environment to grow. The erodible soils on the west end of the alternate route may require the use of erosion matting to protect the soil surface and ensure seed germination on the reclaimed soils in this area.

The existing road and two-track trail not included in the road construction area would be reclaimed to stabilize old road surfaces and reduce erosion and sedimentation. A few small sections may not be reclaimed due to rockiness or very steep slopes around headcuts or to maintain access to other roads. The stabilization of the adjoining proposed road corridor due to reclamation and drainage control would reduce the discharge of sediments onto the reclaimed existing road. The few small unreclaimed sections would be expected to slowly revegetate due to stabilization of adjoining reclaimed road.

No special efforts would be expended on the existing fords on Quitchupah Creek, as they are currently stable and would revegetate slowly when relieved of traffic.

Table 2.2-3 Site-Specific Seed Mixtures for Quitchupah Creek Road

Agency	Common Name	Application Rate (lbs./acre PLS)
USFS/ BLM	Western wheatgrass	2
	Indian ricegrass	2
	Galleta grass	2
	Desert Globemallow	2
	Magnar Great Basin wildrye	2
	Needle and Thread grass	2
	Appar Lewis flax	3
	Delar small burnet	3
	Shadscale	2
	Total	20

[1] PLS = Pure live seed

The reclamation procedures for the old road segments outside the right-of-way would include:

- ripping the old road surface to relieve compaction,
- removing culverts and regrading road to natural grades and drainage,
- installing water bars per agency specifications,
- seeding to establish vegetation,
- mulching/armoring with coarse rock to maximize moisture retention and protect reclaimed surfaces,
- placement of barriers to prevent traffic on reclaimed road surface,
- installing electric fence to exclude livestock from seedings in areas where livestock will roam freely, and
- monitoring and maintenance for at least three years or until bond release.

For reseeding of low elevation saline soils, a more drought and saline tolerant seed mix would be utilized (**Table 2.2-4**).

Table 2.2-4 Seed Mixture for Low Elevation Saline Soils Quitchupah Creek Road*

Agency	Common Name	Application Rate (PLS Pounds per Acre)[1]
BLM	Alkali sacaton	1
	Blue grama - Alma	3
	Galleta grass	3
	Gooseberry globemallow	3
	Castle Valley saltbush	3
	Kochia, prostrate	2
	Total	15

*BLM Mixture [1] PLS = Pure live seed

Quitchupah Creek Road Use

Coal trucks servicing the SUFCO Mine would utilize the proposed road 5 days per week, 24 hours per day, 250 days per year. The rate of use would be dependent upon the amount of coal shipped to eastern markets. In addition, there would be traffic related to employee commutes, mine services, and general or recreational travel.

The coal transport trucks currently in use on the Acord Lakes Road consist of a dual trailer with a loaded weight of 43 tons. These trucks would also be utilized on the Quitchupah Creek Road.

Operation and Maintenance

The proposed road would be maintained primarily by Sevier County SSD, who would be responsible for scheduling of maintenance and repairs. Sevier County SSD would also be responsible for monitoring storm event or runoff damage. The current road maintenance agreement between Sevier and Emery Counties for the easternmost 1.5 miles of Quitchupah Creek Road would be revised. Maintenance on the Emery County portion of the road could be performed by either county, by agreement.

Applicant-Committed Environmental Protection Measures for Alternative B Quitchupah Creek

Wetlands and Waters of the U.S.

The U.S. Army Corps of Engineers (COE) under authority of Section 404 of the Clean Water Act as amended and Executive Order 11990 requires that all impacts to jurisdictional wetlands be mitigated. The b(1) guidelines provide a regular process for determining if the permit to be issued for filling wetlands and the accompanying mitigation plan is in the best interest of the Nation's wetlands. The b(1) guidelines offer three tiered steps: 1) to avoid impacts to wetlands, 2) if avoidance is not possible then minimize impacts, and 3) if avoidance and minimization of impacts is not possible then mitigate impacts.

There are five jurisdictional wetlands in the immediate vicinity of the proposed road; one 0.07-acres wetland at Station 44+00 and one 0.26-acre wetland at Station 67+00 in East Spring Canyon (**Appendix B**, Strip Maps 2,8) would be impacted. The COE has indicated that it would require a mitigation ratio of 3:1 on the acreage in the same watershed, and the conceptual mitigation plan more than meets that. The potential mitigation sites within the Quitchupah Creek watershed are somewhat limited mainly due to the dynamics of the channels, which either makes it difficult to divert sufficient water to establish a wetland, or thwarts efforts to permanently establish a wetland basin or area because of their instability.

In addition to the wetland near East Spring Creek, the creek also has a hydric fringe in the flat bottom of the channel. The proposed route would cover the stream for approximately 1,140 feet at three locations. To compensate for the combined loss of approximately 0.33 acres of wetlands filled at Stations 44+00 and 67+00, three measures would be designed and installed.

1. The existing wetland at Station 48+00 is located at the head of the perennial stream in Convulsion Canyon but downstream of the realigned ephemeral channel in the upper canyon. The source of water for the wetland is subsurface flows surfacing in the channel at Station 41+00 and a spring at the foot of a large rock adjacent to the existing two-track road. Headcutting has begun where the wetland discharges into the stream channel. The installation of a structure to elevate the discharge point four to five feet above the incised stream would enlarge the wetlands capacity by approximately 1,000 yds^3, and a hardened discharge point would stop the headcutting action. The enlarged capacity of the wetlands would allow for retention of the sediments generated upstream by realignment of the ephemeral channel. The enlarged wetlands would cover approximately 0.33 acres (See Strip Map 2 in **Appendix B**).

2. A potential wetland site exists at Station 62+50 where the stream coming out of Convulsion Canyon has created a willow community on a bench with a 2 percent gradient. An in-line wetland system would be created at this location by allowing streamflow to fill behind several shallow dikes constructed across the channel/floodplain area. Upstream of each dike, excavated areas would be dug to increase saturated areas. The resulting ponds and saturated areas would create a diversified wetland complex, ranging from flowing water, ponded open water, and saturated soils. The dikes would be designed with spill points to discharge excess water. The combined wetland acreage to be created would be 1.2 acres. With a combined capacity of 2,000 yds^3 , the diked areas would also serve to retain sediments. They would use approximately 6 percent of the average annual flow of Convulsion Canyon. See Strip Map 2 in **Appendix B**.

Items 1 (0.33 acres) and 2 (1.2 acres) above would result in a total of 1.53 acres of wetlands that would be enhanced or increased as a result of mitigation. Subtracting the 0.31 acres of poor quality wetlands already present at station 48+00 gives a total of new wetland creation of 1.22 acres. Given the loss of 0.33 acres of wetlands due to filling at Stations 44+00 and 67+00, the proposed mitigation would exceed the Corps' minimum 3:1 replacement ratio. Final detailed wetland mitigation designs must be approved by the COE. The above conceptual plans have been discussed with the current COE representative assigned to this project, who has agreed in concept with the mitigation strategy. However, specific approval would not come until the formal application process is undertaken.

3. The East Spring Canyon stream would be brought under the proposed road through a 170-foot long culvert at Station 65+50. From the mouth of the culvert downstream for approximately 900 feet, the channel would be newly constructed and would parallel the road fill to rejoin the existing stream channel upstream of the juncture with Convulsion Canyon. Channel designs would be based upon BMPs given in **Appendix B**. The resultant constructed channel would emulate the existing channel in dimensions, cross-section, and gradient so the flows, hydric fringe, wetlands, and riparian zone would replace that covered with road fill. The placement of check dams, deflectors, and riprap would help stabilize the new channel as it adjusts to the flows. Salvage of riparian vegetation (such as cut willow, sedge clumps, etc.) from the abandoned channel would be used where practical to boost vegetative success along the new channel. The channel would not be as deep as the incised channel; it would be designed to contain bankfull flows, with overbank areas accommodating larger flood events. See Strip Map 2 in **Appendix B**.

Raptor Protection
The haul route would be patrolled daily, during daylight hours, to pick up and dispose of all animal carcasses (wild and domestic, large and small) in order to keep the road surface clear. This would reduce scavenging on the road surface by raptors and vultures. The concern is that scavengers feeding on larger carcasses that aren't readily removed from the road would be subject to coal truck-wildlife collisions. Scavengers present on the road while feeding could cause unnecessary mortality among the protected raptors. The Sevier County Special Services District would be responsible for removing carcasses to a specified disposal area in accordance with the regulations of the State Board of Health. This would continue for the duration of the life of the mine. The SSD or the SSD's contractor would secure and maintain any necessary license or permits required by State or local authorities to perform this service.

Water
As a result of coal loading, coal trucks have coal dust and debris on the exterior of the truck that is blown off as the truck travels; this dust and debris becomes part of sediments along the roadbed. Since coal trucks traveling in Convulsion Canyon would be in close proximity to the stream, fugitive coal dust from the trucks would readily enter the stream system as airborne or waterborne sediments. To prevent this, the coal trucks loading at the SUFCO Mine would be cleaned after loading and prior to entering the public road system to remove fugitive coal particles from the exterior of the truck and trailer.

Livestock
Cattle Trail
In order to accommodate cattle movement along the road corridor, a fenced cattle trail would be constructed within the road right-of-way on Forest lands, on the north side of the alignment, between the underpass at Broad Hollow and Station 60+00, approximately 1½ miles in length. The fenced trail would continue in intermittent sections below this Station (See **Appendix B** – Strip Maps) in areas where terrain restricts movement of cattle outside the right of way. The trail would be 15 to 20 feet wide, and in some places narrowed to 10 feet wide. The trail width would be cleared of vegetation during right-of-way preparation; it would be seeded once road construction is completed. Access to the trail would be gated on either end; cattle would be trailed along the road to the fenced cattle trail entrance in the spring, and cattle would gather at Broad Hollow to be let back on the trail in September. At Station 60+00, the continuous fenced trail would end, but cattle would continue to trail down outside the fenced road right-of-way and into the intermittent fenced sections of cattle trail down to the holding facility at the Forest boundary. Holding facilities would be constructed and maintained by the SSD in Broad Hollow and at the east boundary of the Forest to hold cattle that drift prior to the opening of the cattle trail gate (See Strip Maps 1 & 2 in **Appendix B**). Water would be provided at the holding facilities by the SUFCO Mine.

Riparian Protection
Riparian fencing along Quitchupah Creek would be installed and maintained by the applicant on public lands (BLM, FS, SITLA) adjacent to the road. This includes about 2.4 miles on Fishlake National Forest lands, about 1.2 miles on State lands, and about 1.1 miles on BLM lands contiguous to the State parcel, for a total of about 4.7 miles of Quitchupah Creek that would be fenced. The riparian fencing is expected to be 3-wire 42" standard wildlife fence (See **Appendix B**). Wildlife friendly crossings would be provided on each side of the stream at locations correlated to migration corridors and/or wildlife trails. These crossings would be lodgepole, approximately 33 feet wide, and the same height as the fencing. Fence design, installation, and maintenance would be according to agency specification. Riparian fencing would exclude cattle from the stream except at designated watering areas.

Rock Art
Because the rock art panels are very visible from the existing two-track, they have become well known to locals and rock art associations. The panels include a mixture of Archaic and Fremont styles, very unique for this part of Utah. The main panels are located on State lands administered by SITLA, but other panels are located on adjacent public lands.

Currently the rock art panels are accessible via the Emery County maintained road and the two-track that extends past the site. Because the previously proposed alignment for Alternatives B&C was in close proximity, within 60 feet of the rock art complex at North Fork, a realignment was designed.

The realignment of the proposed road cuts off two-track access to the site and provides the opportunity to limit or regulate public access to the rock art. If the proposed road is constructed, the two-track could be reclaimed and removed from service (See **Appendix B**, Strip Maps 9&10). A gate would be placed along this portion of the fence in order to facilitate cattle grazing on the state land.

The road realignment is designed to begin at station 246+00 and swing south to cross the North Fork approximately 220 feet downstream of the proposed crossing, then proceed east 200 feet to cross Quitchupah Creek and stay south along the slope. The realignment would then proceed northeast to cross the creek on a box culvert and then align to join the proposed route at station 263+00. This realignment is about 1,800 feet long compared to the original proposed alignment of 1,600 feet between stations.

An existing dry meander bend in Quitchupah Creek just west of North Fork would need to be shortened in order to accommodate the road fill. This would occur between Station 249+00 and 250+00, or 100 feet of roadway. At this location, the shortening of the dry meander would be required (from 500 feet currently to 350 feet). The diverting of the stream from an existing cut-off of the meander would actually restore 350 feet of dry channel negating any loss of gradient.

The realigned road would be 300 feet away from the rock art panels and across Quitchupah Creek. This would serve to restrict access to the panels by not providing a convenient stopping place in the close vicinity. The existing two-track could be reclaimed/barricaded (i.e. with strategically placed boulders or other natural material) in this area so it could not be used to directly access the site.

The realignment would also avoid the untested cultural sites near the rock art panels and would cross fluvial affected terrain. There are no eligible sites within the realignment corridor.

Agency-Committed Environmental Protection Measures for Alternative B

The riparian zones of Quitchupah Creek and Convulsion Canyon have been degraded by livestock grazing within the stream bottoms over the years. To alleviate this condition and restore the riparian zones, livestock grazing would be eliminated on approximately 4.7 miles of stream through a combination of grazing permit changes, fencing along the proposed road, and cross-fencing where necessary. The actual fencing would be completed under an applicant-committed measure as described above; the permit actions related to this measure would be handled by the appropriate agencies. Fenced watering points would be provided where underpasses allow livestock to pass under the proposed road and access the stream. The construction of the proposed road is the primary catalyst for the changing management of grazing within the riparian zone.

Specifically, on Forest lands in Convulsion Canyon, the livestock would trail on the fenced livestock trail to and from summer pasture in the Quitchupah Allotment, and would no longer have access to the riparian zone or the mitigation wetlands and stream realignment. The spring trailing would begin in the private

lands at the east boundary of the Forest lands. The fall trailing would begin at the holding facility adjacent to Acord Lakes Road.

Per 43 CFR 4130-2(f), other terms would be incorporated into the grazing permit to cease grazing in the riparian zones along the stream. Five AUMs of forage would be lost along the stream corridor by this action. A combination of road fences, fenced livestock trail, and cross-fencing would restrict livestock access to the stream corridor.

On state lands, a condition of the rights-of-way would restrict livestock grazing in the riparian zone to specific fenced watering points.

The restoration of the riparian zones would improve wildlife and aquatic habitats, reduce sediment discharge to the stream, improve aesthetics, and stabilize the stream channel.

2.3 Alternative C - Alternate Junction with SR-10 and Alternate Design

This alternate route would diverge from the proposed route in the southwest quarter of Section 13, Township 22 South, Range 5 East and proceed east across Section 18, Township 22 South, Range 6 East to the junction with SR-10 in the southwest corner of Section 17, Township 22 South, Range 6 East (**Appendix A**). This route would be 0.2 miles longer than Alternative B but it would bypass the grade on SR-10 that now slows loaded coal trucks and potentially slows all northbound traffic on SR-10. The grade for this Alternative is 0.6 percent for loaded coal trucks. The loaded trucks would junction with SR-10 at a point 270 feet higher than the Alternative B junction where the grade for northbound traffic is 0.07 percent. The Alternative C route would have less elevation change between the Mine and SR-10 and allow loaded coal trucks to utilize their momentum gained while descending Quitchupah Creek Road to ascend the 0.6 percent grade. The route would cross lower Link Canyon channel, as does the Proposed Road route. The total acreage impacted for Alternative C would be 96.3 acres.

The Alternate Design would incorporate additional features to the proposed Quitchupah Creek Road to facilitate livestock movements within allotments, and also facilitate wildlife movements to and from the winter range. The wildlife/livestock facilities would include fencing of the road to keep the livestock off the roadway during the grazing season. Approximately 16.3 miles of fence would be installed under this Alternative design. It is also proposed that five underpasses approximately 20 feet wide, 70 feet long, and 8 feet high would be incorporated into this build Alternative to facilitate wildlife/livestock access to both sides of the fenced road for grazing purposes. The underpasses would also provide access to Quitchupah Creek, the only watering source in the allotments. One additional underpass would be constructed under the existing Acord Lakes Road, adjacent to the intersection with the proposed Quitchupah Creek Road, to allow wildlife/livestock to cross under during the spring and fall trailing.

Under this alignment, about 4.4 miles of the existing road would be supplanted by the new road. Two-track road segments that would be reclaimed total 2.5 miles.

Lands
The lands crossed by this Alternative include private, public, and SITLA. Public lands include those managed by the USFS, Fishlake National Forest, and the BLM, Richfield Field Office (**Figures 2-1** and **2-2**). There are two private landowners along the route, listed as follows:

Castle Valley Ranches, LLC
Kenneth Lee and Earlene R. Christiansen

Table 2.3-1 describes land status, length of Alternative C within each jurisdiction, and estimated disturbance.

Table 2.3-1 Alternative C Alternate Junction with SR-10 and Alternate Design Land Status and Proposed Disturbance

Land Mgmt	Road Distance (miles)	County Jurisdiction	Construction Disturbance (acres)	Existing Road Disturbance (acres)	Staging Areas (acres)	Pull-Outs (acres)	Total New Surface Disturbance (acres)
USFS	2.3	Sevier	24.0	3.3	5	0.3	26.0
BLM	2.8	Sevier	23.6	1.4	5	0.3	27.5
SITLA	1.1	Sevier	12.3	0.9	5	0	16.4
Private	2.9	Sevier & Emery	31.4	5.0	0	0	26.4
Totals	9.1		91.3	10.6	15	0.6	96.3

The road construction corridor and staging area details for this alternative would be similar to the information presented in Alternative B, except this alignment would not require alteration of the SR-10 bridge crossing over Quitchupah Creek since no additional traffic lanes for accelerating and turning vehicles would be necessary at that site.

Pullouts

Pullouts are proposed for each of the build alternatives. Each would be 30 feet wide by 100 feet long unless the design is to use the existing road. Pullouts for Alternative C are proposed at the following stations:

Station 12+00 to 13+00	north side of proposed road
Station 60+00 to 63+50	north side, use existing road as pullout
Station 121+00 to 122+00	south side of road
Station 175+50 to 180+00	south side, use existing road as pullout
Station 287+00 to 288+00	south side of road
Station 430+00 to 431+00	north side of road

SR-10 Junction

The proposed road would junction with SR-10 approximately 3.0 miles south of the Town of Emery, creating a new intersection. Because the proposed road would carry coal truck traffic, both right and left turn lanes would be required for the proposed road. Since there is little grade for northbound traffic, an acceleration lane of 1,380 feet would be required for the coal truck traffic (**Figure 2-7**). Thus, there would be three lanes south of the intersection and four lanes north of the intersection. This construction would be under the direction of UDOT, and to UDOT and AASHTO standards. The disturbance for construction of the intersection and additional lanes would occur within the UDOT right-of-way or acquired right-of-way. An access permit would be required from UDOT for the junction with SR-10.

Construction Procedures

The design, preparation of right-of-way and roadbed, and general construction procedures of this alternative route would be similar to the information presented in Alternative B. BMPs are provided in **Appendix B**.

Stream Crossings and Culverts

The road alignment for Alternative C would require a total of 44 culvert crossings. **Figure 2-8** shows the typical channel realignment and **Figure 2-9** shows the locations of these crossings. This includes 22 primary crossings and 22 secondary crossings. The western-most 34 of these crossings would be the same crossings as would be required under Alternative B. Both primary and secondary culvert crossings would be designed to pass the 100-year flow, as calculated by Utah Department of Transportation methodology (UDOT, 2002). **Table 2.3-2** shows the 22 primary culvert locations, design flows, and culvert diameters.

Depending upon the season of construction, up to six of these crossings would be expected to be wet. BMPs that would be implemented during culvert design, placement, and maintenance are described in **Appendix B**.

In addition to the crossing culverts, numerous borrow ditch relief culverts would be used to direct and control road and upgradient runoff. They would be spaced at 500-foot intervals or less, depending upon road slope and proximity to stream channels. BMPs that apply to borrow ditch relief and other road drainage issues are contained in **Appendix B**.

Table 2.3-2 Primary Culvert Crossing Information - Alternative C

Station	Design Flow (cubic feet per second)	Culvert Diameter (inches) RCMP unless noted
11+00	123	60
18+00	173	72
66+00	234	84
94+00	252	84
186+50	117	96
190+50	39	42
201+00	123	60
203+50	26	36
213+50	108	60
228+50	1702	3 (108)*
232+50	1702	3 (108)*
250+00	1144	2 (108)*
251+50	2800	300 by 120 (box)*
256+50	2800	300 by 120 (box)*
268+00	282	84
300+00	156	60
323+50	117	60
392+00	500	108
410+00	140	84
422+50	220	96
434+50	550	120
463+00	100	60

*These crossings would provide fish passage.
Note: At crossings where fish passage is required, specialized culverts may be used, and diameter/type may vary from what is given above. However, in all cases, capacity will be capable of passing the 100-year flow at a minimum.

Stream Re-Alignment
Stream realignment would be required at all of the same locations as for Alternative B: in upper Convulsion Canyon, lower East Spring Canyon, and in Quitchupah Creek at the Rock Art sites. The stream realignment process requires a State of Utah Stream Alteration Permit. For this project, because an individual COE permit would also be needed for the wetland fill, the COE has asked to handle all stream realignment and crossing permits under the single COE 404 permit, rather than using the joint state/federal GP40 Permit under the Stream Alteration rules. The permit would set conditions for hydraulic design of each realigned section to maintain the integrity of the creek both upstream and downstream. Further, **Appendix B** provides BMPs that would be used in the design and construction of these realigned sections.

Reclamation
Reclamation along the Alternate Junction with SR-10 alignment would be similar to the reclamation procedures identified in Alternative B (See **Appendix B** - BMPs). The erodible soils on the west end of the alternate route would require the use of erosion matting to protect the soil surface and ensure seed germination on the reclaimed soils in this area.

Road Use
Use of the Alternate Junction with SR-10 road alignment would be equivalent to that identified in Alternative B.

Operation and Maintenance
Operation and maintenance actions and requirements along the Alternate Junction with SR-10 would be equivalent to those identified in Alternative B, except that additional maintenance, by the SSD, of wildlife/livestock infrastructure such as fencing and underpasses would also be required. Monitoring of maintenance would be conducted by the BLM.

Applicant-Committed Environmental Protection Measures for Alternative C

These measures would be the same as those for Alternative B with the addition of the following:

1. An underpass for wildlife would be constructed at Station 377+00. Deer use a north-south corridor to move to the agricultural fields and creek for food and water, and return via the same corridor to seek cover in the terrain north of the gap.

Agency-Committed Environmental Protection Measures for Alternative C

These measures would be the same as those for Alternative B.

2.4 Alternative D - Water Hollow Road Alignment

Water Hollow is a large northeast-southwest trending drainage that cuts through Old Woman Plateau on the Fishlake National Forest. The Alternative D - Water Hollow Road would utilize the Quitchupah Creek Road Alignment for 2.0 miles of the westernmost portion of its alignment. At this point, it crosses Quitchupah Creek and follows to the south of this drainage to Water Hollow. This Alternative continues in an easterly direction along an existing jeep trail to Water Hollow Benches where it then turns south to Saleratus Benches. From Saleratus Benches, the Water Hollow Road Alternative then turns north and east to connect with SR-10.

The Water Hollow Road Alternative alignment is about 7,550 feet above mean sea level (AMSL); this alignment is 11.25 miles long and drops 1,430 feet in elevation for an average grade of 2.5 percent. The descent into Water Hollow has an average grade of 4 percent, and the ascent out of Water Hollow onto Water Hollow Bench is 7 percent for 900 feet. The crossing of Water Hollow would require large cuts up to 65 feet deep on both approaches and a large fill 90 feet high and 350 feet wide. This alignment also crosses several other large perennial and ephemeral tributary drainages, for a total of 20 primary crossings. The acreage of impact for the Water Hollow Road is 146.3 acres (**Figure 1-2**). Except for the western end where the Water Hollow road would obliterate the existing two-track road (approximately 2.1 miles), the existing road would remain in place, but signs would be posted ("*NOT MAINTAINED FOR NORMAL TRAFFIC"*) to discourage use. At the Forest boundary, motorized access to the paved road would be restricted.

Lands

The lands crossed by this build alternative include mostly public lands and one parcel of private land (**Appendix A**). Public lands include those managed by the BLM, Richfield Field Office headquartered in Richfield in Sevier County. The National Forest System lands are managed by the Fishlake National Forest headquartered in Richfield, Utah. The private landowner is Castle Valley Ranches, LLC (see **Figures 2-2 and 2-10**).

Table 2.4-1 describes the length of the Water Hollow Road alternative within each jurisdiction and the estimated disturbance.

Table 2.4-1 Alternative D - Water Hollow Road Land Status and Proposed Disturbance

Land Mgmt	Road Distance (miles)	County Jurisdiction	Construction Disturbance (acres)	Existing Road Disturbance (acres)	Staging Areas (acres)	Pull-Outs (acres)	Total New Surface Disturbance (acres)
USFS	2.52	Sevier	30.5	2.6	5.0	0.3	33.2
BLM	7.94	Sevier	95.3	0	10.0	0.6	105.9
SITLA	0.26	Sevier	2.4	0	0	0	2.4
Private	0.53	Sevier	4.8	0	0	0	4.8
Totals	11.25		133.0	2.6	15.0	0.9	146.3

Details for design and construction are available for this alternative alignment (**Appendix B**).

Pullouts

Pullouts are proposed for each of the build alternatives. Each would be 30 feet wide by 100 feet long unless the design is to use the existing road. Pullouts for Alternative D are proposed at the following stations:

Station 12+00 to 13+00	north side of proposed road
Station 60+00 to 63+50	north side, use existing road as pullout
Station 121+00 to 122+00	south side of road
Station 174+50 to 175+50	south side of road
Station 182+00	north side of road, access point from old road
Station 219+00 to 220+00	south side of road
Station 239+00 to 240+00	east side of road
Station 299+00 to 300+00	east side of road
Station 325+00 to 326+00	east side of road
Station 497+00 to 498+00	north side of road

SR-10 Junction
The proposed road would junction with SR-10 approximately 6.5 miles south of Emery Town and 2.0 miles south of Quitchupah Creek bridge, creating a new intersection. Because the proposed road would carry coal truck traffic, both right and left turn lanes would be required for the proposed road. Since there is little grade for northbound traffic, an acceleration lane of 1,380 feet would be required for the coal truck traffic (**Figure 2-11**). Thus, there would be three lanes south of the intersection and four lanes north of the intersection. This construction would be under the direction of UDOT and according to UDOT and AASHTO standards. An access permit would be required from UDOT.

The disturbance for construction of the intersection and additional lanes would occur within the UDOT right-of-way or acquired right-of-way.

Wildlife Bridge Crossings
Big game animals cross this road area to access winter and summer ranges, thus wildlife crossings must be constructed at strategic locations along the route to facilitate migration patterns.

Utah Division of Wildlife Resource guidelines suggest the following: "Structures designed to allow wildlife passage below the road should meet an "openness ratio" of one or greater. This is to say that the width of the bridge multiplied by the height of the bridge, divided by the length of the bridge, should be at least "1". Since these bridges must accommodate mature bull elk, the height of the bridge must be at least 16 feet to allow for antler clearance (Jones, 2005, Letter from Derris Jones, Regional Supervisor, S.E. Region, UDWR, August 31, 2005).

Stream Crossings and Culverts
The road alignment for Alternative D would require a total of 44 culvert crossings and five bridge crossings (as per UDWR recommendations, Mead 2005, email from Leroy Mead, UDWR, 3-30-2005). **Figure 2-12** shows the locations of these crossings. This includes 20 primary crossings and 29 secondary crossings. The western-most 4 of these crossings would be the same crossings as would be required under Alternative B. Both primary and secondary culvert crossings, and bridges, would be designed to pass the 100-year flow, as calculated by UDOT methodology (UDOT, 2002). **Table 2.4-2** shows the primary culvert crossing locations, design flows, and culvert diameters; as well as the recommended wildlife crossing bridge locations. Two additional wildlife bridge crossings are suggested by UDWR and shown in the table. Final number, placement, and design of wildlife bridge crossing structures would be determined during project implementation in consultation with the UDWR and BLM biologists.

Depending upon the season of construction, three of these crossings would be expected to be wet. BMPs that would be implemented during culvert design, placement, and maintenance are described in **Appendix B**.

In addition to the crossing culverts, numerous borrow ditch relief culverts would be used to direct and control road and upgradient runoff. They would be spaced at 500-foot intervals or less, depending upon road slope and proximity to stream channels. BMPs that apply to borrow ditch relief and other road drainage issues are contained in **Appendix B**.

Table 2.4-2 Primary Culvert Crossing Information - Alternative D

Station	Design Flow (cubic feet per second)	Minimum Culvert Diameter (inches)/ Bridge Crossing RCMP unless noted
11+00	123	60
18+00	173	72
66+00	234	84
94+00	252	84
121+50	419	Wildlife Bridge**
131+50	125	72
177+00	1060	Wildlife Bridge**
229+50	52	Wildlife Bridge**
255+00	56	Wildlife Bridge**
306+50	120	Wildlife Bridge**
338+00	75	54
339+50	75	54
341+50	58	48
366+50	66	48
384+50	42	48
412+50	324	72
419+00	9	96
432+00	173	48
463+00	356	96
471+00	53	96
359+40		Wildlife Bridge ** (Additional UDWR suggested)
507+80 or 491+90 or 493+10		Wildlife Bridge ** (Additional UDWR suggested)

*Crossing would provide for fish passage.
** These crossings are addressed in mitigation measures for wildlife.
Note: At crossings where fish passage is required, specialized culverts may be used, and diameter/type may vary from what is given above. However, in all cases, capacity will be capable of passing the 100-year flow at a minimum.
Additional Note: Structures designed to allow wildlife passage below the road should meet an "openness ratio" of one or greater. This is to say that the width of the bridge multiplied by the height of the bridge, divided by the length of the bridge, should be at least "1".

Stream Realignment

Stream realignment would be required at two of the locations proposed under Alternative B or C: in upper Convulsion Canyon (two realigned segments) and in lower East Spring Canyon. There would be no realignment needed in Quitchupah Creek at the Rock Art site. The stream re-alignment process requires a State of Utah Stream Alteration Permit. For this project, because an individual COE permit would also be needed for the wetland fill, the COE has asked to handle all stream realignment and crossing permits under the single COE 404 permit, rather than using the joint state/federal GP40 Permit under the Stream Alteration rules. The permit would set conditions for hydraulic design of each realigned section to maintain the integrity of the creek both upstream and downstream. Further, **Appendix B** provides BMPs that would be used in the design and construction of these realigned sections.

Construction Procedures
Wherever possible, design and construction practices similar to those described for the Quitchupah Creek Road alignment (Alternative B) would be followed. However, the Water Hollow alternative alignment crosses significantly rougher terrain for much of its route and more extensive cuts and fills would be necessary, as well as perhaps more substantial blasting requirements. This may require a longer period of construction. Road operations, maintenance, and usage would be similar to those described for the Quitchupah Creek Road alignment. BMPs are provided in **Appendix B**.

Applicant-Committed Environmental Protection Measures for Alternative D

Wetlands
The plans for replacement of wetlands and riparian communities in the upper section of Alternative D are presented under Alternative B.

Water
The coal truck cleaning measure for this Alternative is the same as was presented in Alternative B.

In addition, the applicant would be responsible for constructing and maintaining water bars along the remaining segments of the existing Quitchupah Creek Road to improve storm drainage, and reduce erosion and sedimentation. These water bars would be constructed to agency specifications in regard to size, location, and outflow considerations. A maintenance schedule would also be stipulated by the agencies.

Raptor Protection
The removal of animal carcasses from the road is same as detailed in Alternative B.

Wildlife Bridge Crossings
Big game animals would need to cross this road alignment in order to access winter and summer ranges, Five wildlife crossing structures are planned for strategic locations along the route to facilitate migration patterns. These structures would be designed to allow wildlife passage below the road, and in order to accommodate mature bull elk, the height of the bridges must be at least 16 feet to allow for antler clearance.

Livestock
The riparian fencing and the managed trailing for livestock on the Forest allotment are the same as presented in Alternative B.

G.L. Olsen Allotment
Since a relatively high number of cattle are concentrated in this small allotment, the proposed road would need to be fenced to restrict cattle access to the road. Also the road in the allotment is mostly cut below the natural grade, creating a wide ditch with steep sideslopes making it difficult for cattle to enter and exit the ditch. To control the cattle and better manage the allotment, the proposed road would be fenced.

The fencing would extend on both sides of the cuts and/or fills from Station 187+00 on the west to Station 275+00 on the east, a distance of 8,800 feet (1.6 miles). Cattleguards on the proposed road and natural barriers at each end of the fence would restrict cattle movement past the fenced portions of the road. On the west, the cliffs and cattleguard would prevent cattle from entering Water Hollow. This would relieve grazing pressure on the narrow riparian zone in Water Hollow and on The Cove tributary. On the east, the cattleguard and natural barriers of the drainages with cliffs would prevent cattle drift into the Saleratus Allotment. Gates located every mile would allow cattle to be moved across the proposed road as needed

and would allow cattle that did accidentally enter upon the roadway to be removed. See Figures PP-07-10 in **Appendix B**.

Since the cattle would be blocked from watering in Water Hollow, and the two ponds on the east are usually dry, a water system would need to be developed to provide water for the cattle during the short grazing season. The system would consist of 5,000 gallon (or larger) water storage tanks located at Stations 223+00 and 261+00 with a pipe system extending to water troughs located 500 to 1,300 feet away from the proposed road on both sides of the road. The system would be gravity-fed with water levels in the troughs controlled by float valves. The SSD would haul water to the storage tanks located along the road during the 4-6 week grazing season. Two watering systems are required because of deep drainages with cliffs blocking movement of cattle between the seedings. See Figures PP-08 & 11 in **Appendix B**.

The allotment, divided by the road, fenced, with watering troughs on both sides of the road, would then be managed as a two pasture allotment. The turn-in pasture would be rotated each year to better manage the forage. The cattle would be moved internally between pastures as stipulated in the allotment management plan and would cross the road at a designated time when coal transport was not scheduled or coal transport was halted to allow for the crossing. Cattle would enter and exit the allotment via a trail directly from Quitchupah Creek to the north.

Saleratus Allotment
Because the cattle concentrate on the lower elevations of this allotment, fencing would be needed to restrict cattle access to the proposed road. The fence would start at Station 435+00 on the west where steep terrain combined with a cattleguard on the road would block westward cattle movement. The fence would extend east across the lower slopes and valleys to Station 594+50 where it would join with the right-of-way fencing along SR-10. A cattleguard would also be installed here to prevent cattle on the road from entering the SR-10 roadway. Gates every mile would allow for any needed cattle movement north and south or removal of trespass cattle on the road. There would be about 19,000 feet (3.6 miles) of fencing.

The cattle would be moved across this road if needed, either by moving when coal transport is not scheduled or scheduling a halt to transport so the cattle would be moved at a designated time.

There would be no fencing on approximately 16,000 feet (about 3 miles) in the rough terrain adjacent to the upper benches.

Livestock Trail
The construction of 1.5 miles of trail for livestock is the same as presented in Alternative B.

Agency-Committed Environmental Protection Measures for Alternative D

These measures would be the same as those for Alternative B in Convulsion Canyon.

2.5 Best Management Practices

General best management practices (BMPs) related to road design, construction, reclamation, and operation are described in detail in **Appendix B**. These practices, based upon sound, tested techniques from established government sources (e.g., US Forest Service, BLM, and State of Utah), would be closely adhered to throughout the Project.

Prior to start of the project, an Alternative-specific BMP Report, which relates specifically to potential resource impacts of that alternative, would be prepared to mitigate for any impacts which might occur during the construction of the road. This BMP report would relate to storm water protection and water quality monitoring. A schedule would be set up for the monitoring of all BMPs, and the construction supervisor, using a checklist, would observe and write down project conditions and compliance with the BMP report. That person would also make recommendations as to the repair or addition of BMPs. The reports would be placed in a central location and made available to any construction inspectors. At the end of the project, the reports would be placed into the As-built Report.

A site plan would be developed which identifies the physical features of the site, the location of the proposed development, and the location of temporary and/or permanent BMPs. The purpose of this would be to minimize earth movement and vegetation removal, avoid steep slopes, and retain natural drainage systems. It also includes maintenance of this plan by updating it regularly as conditions change, and describes grading season and construction practices, access roads, dust control and topsoil management, and designs of temporary and permanent soil stabilization through engineered and bio-engineered techniques.

2.6 Other Scenarios Considered But Eliminated From Detailed Study

Other alternatives or scenarios considered during agency review of the Proposed Action and during public scoping focused on different routes for the road or different methods to ship the coal to market.

Alternate Road Access
Different routes proposed basically considered constructing a road across the Old Woman Plateau or through Link Canyon. The Old Woman Plateau is an area south of the SUFCO Mine portal mostly on National Forest system lands that are managed as a Research Natural Area (RNA), portions of which have restrictions prohibiting vehicle travel, so the construction of a transport road would require modifications of the existing Forest management direction. The route through Link Canyon is located just west of the Town of Emery. Link Canyon has a good county-maintained road to the old mine workings where a portal could be located for loading trucks. The portal was identified in the Pines Tract EIS as a potential site for accessing coal in the Pines Tract. However, under the SUFCO mine plan and mining schedule this site is not economically feasible for construction and operation of a loadout. Issues such as constructing a way through naturally burned or oxidized coal at the portal site and restructuring the mine conveyor system to discharge at this portal site were expensive items. The mine engineers for the BLM in a meeting on June 23, 2000, after reviewing the mine plans and conceptual plans for a Link Canyon Portal, advised the responsible USFS and BLM officials that a portal plan was not economically viable (**Appendix C**).

Conveyor Systems
Different methods to transport coal centered on constructing conveyor systems to convey coal to a loadout facility where trucks would transport the coal to destinations in Carbon County. One conveyor system suggested would begin at the SUFCO Mine portal, traverse down East Spring Canyon to Quitchupah Creek where a loadout facility would be constructed. The terrain in East Springs Creek Canyon is too rugged and steep for a conveyor system so this alternative is not feasible from an engineering standpoint. A conveyor system in Link Canyon was also suggested, because a county road currently exists in the canyon. A conveyor system in Link Canyon would require a loadout facility in the vicinity of Emery Town to load the trucks destined for Carbon County. But because the portal facility was not economically feasible, a conveyor system in Link Canyon becomes a moot point.
A slurry system was also considered but the water demands are beyond the area's capability to provide, so this system was also not considered feasible.

Muddy Creek, a deep canyon on the north side of the Pines Tract, which is now being mined through the SUFCO Mine, was also considered as a possible portal site and coal transport route. However, the two primary problems with this alternative are: 1) a route in the canyon would be rough and steep and located adjacent to a stream that provides culinary water, a problem for maintaining water quality, and 2) the mine plan as explained in the preceding discussion on a portal in Link Canyon is not economically feasible.

2.7 Summary Comparison of Alternatives Relative to Issues

Table 2.7-1 presents a summary comparison of resources potentially affected by each Alternative. The information presented in this table is a summary comparison of the data presented in detail in Chapter 3 of this EIS. The effects identified in this table also assume that applicant-committed measures and mitigation have been implemented. The comparison of effects also includes effects that are common to all build Alternatives to demonstrate the relative effect of each Alternative.

2.8 Past, Present, Reasonably Foreseeable Future Actions

Council of Environmental Quality (CEQ) regulations (40 CFR 1508.7) define cumulative impact as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonable foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time."

Past, present, and foreseeable future actions in the Quitchupah Creek Road Project Area have been developed, and summaries are included in **Appendix D**. The action, year of occurrence, and estimates of residual, current, or anticipated effects, if any, are presented in tables provided in **Appendix D**. Actions are grouped by resource. The sum of the effects of these actions, in addition to the anticipated direct and indirect effects of the Proposed Action, forms the basis for the cumulative effects analysis.

The cumulative area for most resources is the Quitchupah Creek Road Project Area, which is defined as the Quitchupah Creek watershed west of SR-10 and excluding the North Fork and Link Canyon drainage areas. The Quitchupah Creek watershed area as defined includes Convulsion Canyon, East Spring Canyon (where SUFCO Mine is located), the lower portion of Water Hollow Creek, the drainages on Water Hollow and Saleratus benches, the junction of Quitchupah Creek and North Fork, and the lower portion of Link Canyon. These imposed boundaries generally follow the cliffs and escarpments on either side of Quitchupah Creek and tributaries.

The cumulative area for transportation and socioeconomics includes the tri-county area of Carbon, Emery, and Sevier Counties, the affected area for this project. Cumulative effects are discussed in each resource section in Chapter 3.

Table 2.7-1 Comparison of Alternatives

Key Issue	Alternative			
	A - No Action	**B - Proposed Road**	**C - Junction & Design**	**D - Water Hollow Road**
Water Quality				
1- Quitchupah Creek	1 - Erosion continues on exposed existing road surface and from uplands with poor vegetation cover	1 - Accelerated erosion from increased road disturbance; partially offset by BMPs and environmental commitments	1 - Accelerated erosion from increased road disturbance; partially offset by BMPs and environmental commitments	1 - Accelerated erosion from increased road disturbance, large cut/fill requirements, and retention of old road; partially offset by BMPs and greater distance to stream for new alignment
2 - Salinity, Colorado River & 303d listing of lower creek	2 - Salinity in creek continues at existing levels, primarily due to grazing, irrigation, and natural processes	2 - Major sources of salinity continue; potential road contributions minimal in relation to other sources	2 - Major sources of salinity continue; potential road contributions minimal in relation to other sources	2 - Major sources of salinity continue; potential road contributions minimal in relation to other sources
3 - major culverts or crossings	3 - No change in number or type of crossings; no change in consequences due to risk of crossing failure	3 – 18 total primary crossings; assigned rating of consequences due to risk of crossing failure is 1	3 – 22 net primary crossings; calculated rating of consequences due to risk of culvert crossing failure is 1.2	3 – 20 new primary crossings; calculated rating of consequences due to risk of culvert crossing failure is 1.4
4 - sedimentation potential, road <500 feet to creek	4 - 35,400 feet	4 - 33,800 feet	4 - 32,300 feet	4 - 38,900 feet
Soils				
1 – highly erodible soils	1 - 60 percent or 29,200' of the existing two-track road is in erodible soils	1 - 60 percent or 29,200' of the road would be in erodible soils	1 - 65 percent or 32,400' of the road would be in erodible soils	1 - 56 percent or 32,800' of the road would be in erodible soils
2 - shrink-swell soils	2 - 32 percent or 15,700'	2 - 32 percent or 15,700'	2 - 40 percent or 19,400'	2 - 58 percent or 33,900'
3 - Farmland soils	3 - 0.0 acres impacted	3 - 1.4 acres impacted (less than 1% of 145 acres)	3 - 1.4 acres impacted (less than 1% of 145 acres)	3 – 0.0 acres impacted
Vegetation				
1 - riparian	1 - No filling of riparian zone	1 - Approximately 1.0 acre of riparian zone at two locations would be filled	1 - Approximately 1.0 acre of riparian zone at two locations would be filled	1 - Approximately 1.0 acre of riparian zone at two locations would be filled
2 - noxious weeds	2 - The existing scattered colonization would continue	2 - Disturbances in the 8.9 mile road corridor could be subject to noxious weed invasion	2 - Disturbances in the 9.1 mile road corridor could be subject to noxious weed invasion	2 - Disturbances in the 11.25 mile road corridor could be subject to noxious weed invasion
3 - riparian protection through restricted or no grazing	3 - no protection	3- 4.7 miles of protection	3- 4.7 miles of protection	3- 4.7 miles of protection
4 - specific analysis	4 - Impacts to vegetation would occur due to grazing; road maintenance on east end,	4 - The 8.9 mile road corridor would cause disturbance in 5 different plant communities	4 - The 9.1 mile road corridor would cause disturbance in 5 different plant communities	4 - The 11.25 mile road corridor would cause disturbance in 5 different plant communities
5 – Wetlands	5 –Grazing-related impacts to existing wetlands would continue	5 – 0.33 acres of wetland filled, but a greater than 3:1 mitigation ratio proposed	5 – 0.33 acres of wetland filled, but a greater than 3:1 mitigation ratio proposed	5 – 0.33 acres of wetland filled, but a greater than 3:1 mitigation ratio proposed

Table 2.7-1 continued

Key Issue	Alternative			
	A - No Action	**B - Proposed Road**	**C - Junction & Design**	**D - Water Hollow Road**
Wildlife				
1 - road hazard	1 - Road not a hazard to wildlife	1 - Wildlife collisions would be greatly reduced due to fencing along the 8.9 mile road corridor	1 - Wildlife collisions would be greatly reduced due to fencing and underpasses along the 9.1 mile corridor	1 - Wildlife collisions would be greatly reduced due to fencing and underpasses along the 11.25 mile corridor
2 - displacement	2 - Low level of human activity	2 - Human activity along 8.9 mile road corridor would cause displacement of wildlife	2 - Human activity along 9.1 mile road corridor would cause displacement of wildlife	2 - Human activity along 11.25 mile road corridor would cause displacement of wildlife
3 - winter range seeding	3 - no additional seedings	3 - no additional seedings	3 - no additional seedings	3 - up to 700 acres of seedings
4 – fragmentation	4 - minor along existing road/track	4 - 9 miles of divide between uplands and riparian	4 - 7 miles of divide between uplands and riparian	4 - 2 miles of divide between uplands and riparian
5 – noise	5 – manmade noise distant or infrequent	5 – Increase in noise would create wildlife road avoidance zones	5 – Increase in noise would create wildlife road avoidance zones	5 – Increase in noise would create wildlife road avoidance zones
Fisheries				
1 - spills in stream	1 – no increased risk of spill to stream	1 – spill potential small, but if occurred, likely to reach stream	1 - spill potential small, but if occurred, likely to reach stream	1 - spill potential small, and unlikely to reach stream over much of the road length
2 - sediments, TDS, turbidity, etc	2- 35,400' of road within 500' of Quitchupah Creek as potential sediment source with no BMPs imposed	2 – 33,800' of road within 500' of Quitchupah Creek as potential sediment source, risk partially reduced by BMPs	2 – 32,300' of road within 500' of Quitchupah Creek as potential sediment source, risk partially reduced by BMPs	2 – 38,900' of road within 500' of Quitchupah Creek as potential sediment source, risk partially reduced by BMPs (includes existing two-track road that would remain in place)
TES Species				
1 - TES plants	1 - Little potential to impact TES plants	1 - A high potential to impact TES plant habitats	1 - A high potential to impact TES plant habitats	1 - A low potential to impact TES plant habitats
2 - TES fish, impacts due to sedimentation	2 - Continued sedimentation may affect fish populations	2 - Little change in sedimentation throughout Project Area	2 - Little change in sedimentation throughout Project Area	2 - No change in sedimentation throughout Project Area
3 - Section 7	3 - No Effect	3 - No adverse effect (MANLAA)	3 - No adverse effect (MANLAA)	3 - No adverse effect (MANLAA)
4 - MIS species	4 - No additional impacts	4 - >0.1% of sagebrush habitat disturbed	4 - >0.1% of sagebrush habitat disturbed	4 - >0.1% of sagebrush habitat disturbed

Table 2.7-1 continued

Key Issue	Alternative			
	A - No Action	**B - Proposed Road**	**C - Junction & Design**	**D - Water Hollow Road**
Range Resources				
1 - loss of forage due to road construction	1 - 0 AUMs	1 - 4 AUMs	1 - 4 AUMs	1 - 5 AUMs
2 - changes in livestock operations	2 - No changes	2 – Livestock would utilize segments of fenced corridor for trailing	2 - Livestock would utilize segments of fenced corridor for trailing	2 - Livestock would utilize segments of fenced corridor for trailing
3 - road hazard	3 - Not a hazard	3 – Minimal hazard as livestock would be fenced from road	3 - Minimal hazard as livestock would be fenced from road	3 - Minimal hazard as livestock would be fenced from road
4 - feed production on private land	4 - No Effect on impact to pastures	4- The elimination of 1.4 acres of pasture land would reduce feed production slightly (less than 1%)	4 - The elimination of 1.4 acres of pasture land would reduce feed production slightly (less than 1%)	4 - No impact to pastures
5 – changes in in-stream watering	5 – No changes in watering	5 – Riparian fencing would restrict livestock to specific locations for watering in-stream along 4.7 miles of Quitchupah Creek	5 – Riparian fencing would restrict livestock to specific locations for watering in-stream along 4.7 miles of Quitchupah Creek	5 – Riparian fencing would restrict livestock to specific locations for watering in-stream along 4.7 miles of Quitchupah Creek
6 – loss of forage due to riparian fencing	6 – 0 AUMs	6 – 5 AUMs	6 – 5 AUMs	6 – 5 AUMs
7 – Changes to allotments	7 – No changes to allotments	7 – E. Olsen allotment split by fencing of the road; cattle must be moved to each side	7 – E. Olsen allotment split by fencing of the road; underpass provides easy access	7- G.L. Olsen Allotment split by fencing of road; cattle must be moved to each side; water source cut off, therefore water provided by toll user
Land Use and Recreation				
1 - traditional uses	1 - Traditional uses unaffected	1 - The introduction of easy access and industrialization would reduce or eliminate many traditional uses	1 - The introduction of easy access and industrialization would reduce or eliminate many traditional uses	1 - The introduction of easy access and industrialization would reduce or eliminate many traditional uses
2 – ATV/OHV access	2 - Existing road would remain open for use as ATV/OHV route	2 - Existing road would no longer be available as ATV/OHV route	2 - Existing road would no longer be available as ATV/OHV route	2 – Much of the existing road would remain accessible as ATV/OHV route; 2.1 miles of route on FS land not available
3 - roadless (USFS)	3 - No roadless issues in area	3 - No roadless issues in area	3 - No roadless issues in area	3 - No roadless issues in area
4 - other facilities	4 - Facilities built around existing road	4 - Road construction would affect mine wastewater system, fences, and power line	4 - Road construction would affect mine wastewater system, fences, and power line	4 - Road construction would affect mine wastewater system, fences, and power line
5 - private lands	5 - Road easements covered by prescriptive rights-of-way	5 - The road would cross 3.7 miles of private land requiring the acquisition of rights-of-way from six landowners	5 - The road would cross 2.9 miles of private land requiring the acquisition of rights-of-way from two landowners	5 - The road would cross 0.53 miles of private land requiring the acquisition of rights-of-way from one landowner

AUM = Animal Unit Month

Table 2.7-1 continued

Key Issue	Alternative			
	A - No Action	**B - Proposed Road**	**C - Junction & Design**	**D - Water Hollow Road**
Visual Resources				
1 - change in aesthetics	1 - Peaceful and remote	1 - The road would change nature and peacefulness of this remote area	1 - The road would change nature and peacefulness of this remote area	1 - The road would change nature and peacefulness of this remote area
2 - road visibility	2 - Hardly visible	2 - The road would be readily visible in the landscape, compared to existing road	2 - The road would be readily visible in the landscape, compared to existing road	2 - The road would be readily visible in the landscape, especially at Water Hollow, compared to existing road
3 - Visual Class	3 - Compatible with Modification and Class IV	3 - Compatible with Modification and Class IV	3 - Compatible with Modification and Class IV	3 - Compatible with Modification and Class IV
ACEC and Wild & Scenic River				
1- Proposed ACEC	1 – No Effect	1 – Impacts to cultural values for which ACEC was nominated	1 – Impacts to cultural values for which ACEC was nominated	1 – No Effect
2- Proposed Wild & Scenic River	2 – No Effect	2 – Impacts to cultural values for which 1.3 mile segment of Wild & Scenic River was nominated	2 – Impacts to cultural values for which 1.3 mile segment of Wild & Scenic River was nominated	2 – No Effect
Cultural Resources				
1 - rock art	1 Continued potential for indirect impacts to known rock art sites	1 – Potential indirect impacts to known rock art sites	1 – Potential indirect impacts to known rock art sites	1 - Continued potential for indirect impacts to known rock art sites
2 - impacts to historic and prehistoric sites	2 - No impacts to sites	2 - Direct impacts to 6 eligible sites, potential indirect impacts to rock art	2 - Direct impacts to 10 eligible sites, potential indirect impacts to rock art	2 - 0 eligible sites impacted
3 - paleontological sites	3 - No impacts to significant paleontological sites	3 - No impacts to significant paleontological sites	3 - No impacts to significant paleontological sites	3 - No impacts to significant paleontological sites
Native American Concerns				
1 - sacred values	1 - No impacts to sacred values	1 - Direct impacts to sacred values in Convulsion Canyon/ Quitchupah Creek	1 - Direct impacts to sacred values in Convulsion Canyon/ Quitchupah Creek	1 - Direct impacts to sacred values in Convulsion Canyon
2 - areas of traditional importance	2 - No impacts to known cultural resource sites	2 - Direct and indirect impacts to known cultural resource sites	2 - Direct and indirect impacts to known cultural resource sites	2 - Direct and indirect impacts to known cultural resource sites

Table 2.7-1 continued

Key Issue	Alternative			
	A - No Action	**B - Proposed Road**	**C - Junction & Design**	**D - Water Hollow Road**
Transportation				
1 - reduce distance	1 - There would be no reduction in the round-trip haul	1 - Would reduce round-trip haul by 55.4 miles	1 - Would reduce round-trip haul by 58 miles	1- Would reduce round-trip haul by 46.7 miles
2 - junction	2 - No change in existing junction	2 - The junction would require widening of bridge, the addition of turn lanes, and a long acceleration lane to ascend grades on SR-10	2 - The junction would require the addition of two turn lanes on level grade	2 - The junction would require the addition of two turn lanes on level grade
3 - SR-10 surface	3 - Coal truck traffic will increase maintenance on SR-10 from milepost 0 to Muddy Creek	3 - Coal truck traffic will increase maintenance on SR-10 from milepost 9 to Muddy Creek	3 - Coal truck traffic will increase maintenance on SR-10 from milepost 10 to Muddy Creek	3 - Coal truck traffic will increase maintenance on SR-10 from milepost 6 to Muddy Creek
Socioeconomics				
1 – Economic benefits, mine production, mine employment	1 - Continued mine production, employment, and revenues due to contract sales to east and addition of Muddy tract	1 - A potential increase in mine production, employment, and revenues due to increased sales to eastern markets and addition of Muddy tract. There are also economic benefits that accrue, in time, for the electrical energy consuming public and industry. Lower cost will allow mine to recover an additional 44 million tons, adding 6 to 10 years to mine life.	1 - A potential increase in mine production, employment, and revenues due to increased sales to eastern markets and addition of Muddy tract. There are also economic benefits that accrue, in time, for the electrical energy consuming public and industry. Lower cost will allow mine to recover an additional 44 million tons, adding 6 to 10 years to mine life.	1 - A potential increase in mine production, employment, and revenues due to increased sales to eastern markets and addition of Muddy tract. There are also economic benefits that accrue, in time, for the electrical energy consuming public and industry. Lower cost will allow mine to recover an additional 20 million tons, adding 3 to 5 years to mine life.
2 -Emery County	2 - Continued economic stimulus and truck traffic due to contract sales	2 - There would be economic benefits for Emery, Carbon, and Sevier Counties	2 - There would be economic benefits for Emery, Carbon, and Sevier Counties	2 - There would be economic benefits for Emery, Carbon, and Sevier Counties
3 - Fuel savings to SUFCO Mine	3 - No fuel savings to SUFCO Mine due to continued use of longer route	3 - The shorter haul route would have fuel savings up to 1.6 million gallons per year.	3 - The shorter haul route would have fuel savings up to 1.7 million gallons per year.	3 - The shorter haul route would have fuel savings up to 1.4 million gallons per year.
4 - Cost savings to SUFCO Mine	4 - No cost savings to SUFCO Mine due to continued use of longer route	4 - $4-10 M annual cost savings due to shorter route	4 - $4-11 M annual cost savings due to shorter route	4 - $4-9 M annual cost savings due to shorter route
5 - Lifestyle impacts	5 - Traditional uses continue in canyon	5 - Impacts to current canyon users would occur	5 - Impacts to current canyon users would occur	5 - Impacts to current canyon users would occur
6 - UDOT Maintenance costs on SR-10	6 - Cost of $1.84 million	6 - Cost of $1.06 million, a savings of $773,000 as compared to No Action	6 - Cost of $0.92 million, savings of $918,000 as compared to No Action	6 - Cost of $1.27 million, savings of $564,000 as compared to No Action
7 – Safety	7 - No second route to SUFCO Mine to lessen congestion and provide additional emergency access	7 - The new road would reduce the traffic density on the other route, which should make the overall shipping process safer because neither route would carry the full traffic load and the resulting high traffic density.	7 - The new road would reduce the traffic density on the other route, which should make the overall shipping process safer because neither route would carry the full traffic load and the resulting high traffic density.	7 The new road would reduce the traffic density on the other route, which should make the overall shipping process safer because neither route would carry the full traffic load and the resulting high traffic density.