FLATIRON - ERIE 115KV TRANSMISSION LINE

Larimer, Boulder & Weld Counties, Colorado

Environmental Support Document
Supplement to Draft
Environmental Impact Statement

U.S. Department of Energy
Western Area Power Administration
Loveland Area Office - Loveland, Colorado

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Section A. Data Collection, Data Sources

A.1 EARTH RESOURCS

Data on potential landslide areas were obtained from a technical report by Braddock & Eicher (1961) and a geologic map (Colton, 1978). The sensitive soil slope conditions mapping unit is based upon the physical and chemical properties of the project area soils as contained in the U.S. Soil Conservation Soil Survey for Boulder (1975), Larimer (1980) and Weld - Southern Part (1980) Counties.

Floodplain mapping data are from a variety of sources including Flood Rate Insurance Maps for Boulder, Weld, and Larimer Counties; City of Longmont Floodplain Studies; and Boulder County Zoning Maps.

Data on subsidence is from Colorado Geophysical Survey maps (Turney et al., 1983).

A.2 WATER RESOURCES

U.S. Geological Survey (U.S.G.S.) maps at a scale of 1:24,000 and color aerial photographs taken August 23, 1988 were used to identify major streams, ponds, and reservoirs. U.S.G.S. 7.5 minute quadrangle maps used include Carter Lake (1962); Hygiene (1979, photorevised); Niwot (1967); Berthoud (1950); Longmont (1968); and Erie (1979, photorevised). Planimetering was used where necessary to create two categories of ponds, i.e., those less than 40 acres and ponds greater than 40 acres in size.

A.3 BIOLOGICAL RESOURCES

A.3.1 COLORADO DIVISION OF WILDLIFE (CDOW)

The Wildlife Resource Information System (WRIS) and central and northeast region wildlife maps were used to identify the location of wildlife populations and sites important to consider when planning the location of the transmission line. These maps had been updated in 1977/78 for Boulder County, in 1979/80 for Weld County, and in 1988 for Larimer County. Regional maps were updated in 1989. WRIS maps for the northern half of the study area were updated in 1990.

A.3.2 COLORADO NATURAL AREAS PROGRAM (CNAP), DIVISION OF PARKS AND OUTDOOR RECREATION

This agency completed a file search on November 5, 1986 and January 20, 1988 for rare, threatened, or endangered plants, animals and plant associations of the study area and prepared a map. They also identified designated natural areas.

A.3.3 BOULDER COUNTY COMPREHENSIVE PLAN

This document contained much of the wildlife and vegetation information provided by CDOW and CNAP. The plan also included a map of designated critical wildlife habitats, seasonal big game ranges, critical plant associations, and rare plant sites.

A.3.4 AERIAL PHOTOGRAPHY

Color aerial photography (8/23/88) at a scale of 1:24,000 and field reconnaissance were used to identify and map the major wetlands of the study area.

A.4 EXISTING LAND USE

It should be noted that land uses in part of the study area are changing rapidly. Agricultural land and undeveloped land is being converted to residential and various urban land uses.

Various aerial photography series were used to determine the distribution of developed uses and agriculture. These included:

- Color aerial photography, Western Area Power Administration, 1988, 1" = 2000' scale. Northern 3/4 of the study area.
- Black and white aerial photography, Western Area Power Administration, 1987, 1" = 1000' scale. Route of existing Flatiron-Gunbarrel Transmission Line.
- Black and white aerial photography, Weld County, 1983, 1" = 600' scale. Southeast portion of the study area.
- Black and white aerial photography, Boulder County and Public Service Company of Colorado, 1984, 1" = 400' scale. Southern portion of the study area.
- Black and white aerial photography, Larimer County, 1987. Northern portion of study area.

Selective site observations by EDAW, Inc. also provided a spot check on general existing land uses.

The City of Longmont, the City of Boulder and various street guide publications provided information to confirm the location of schools and other institutional uses.

Open space was also identified from several City of Boulder and Boulder County publications, particularly the City's Open Space Trails Map (1987), which in fact covers most of the County; and Boulder County's Road Map (1990).

Information on airports/airstrips was provided by the City of Longmont and Muller, Sirhall and Associates, planners for the Longmont and Tri-County Airports. Published sources included the Denver Regional Council of Governments' Approach Plan (map) of the Tri-County Airport; and the Federal Aviation Administration's Regulation 14 CFR Chapter 1, Part 77 - Objects Affecting Navigable Airspace, 1986.

Information on the location of the Telecommunications Research Facility Protection Zone was obtained from the Boulder County Zoning Maps, and the legal requirements of the protection zone from the National Oceanic and Atmospheric Administration, 1990.

The specific documents used are listed in Appendix A in the EIS.

A.5 PLANNED LAND USE

Comprehensive plans (i.e., long-term plans) were the documents interpreted to determine planned land uses in the study area. Zoning maps were consulted as a check, in case of any specific problem areas. The appropriate department at each city or county was contacted, and each provided its most recent comprehensive plan documents. They also provided guidance on which plan should take precedence in areas of overlap. Departments were contacted from:

- City of Longmont
- Town of Erie
- Weld County
- City of Loveland
- Larimer County
- Boulder County
- City of Boulder

The specific documents used are listed in Appendix A in the EIS.

A.6 EXISTING UTILITIES

Information on the locations and types of existing major transmission lines in the study area was obtained from various electrical system maps produced by the several utility companies that own the lines. The locations of some of these were refined in the field by EDAW, Inc.

A.7 CULTURAL RESOURCES

Cultural resource information was obtained from the Office of Archaeology and Historic Preservation, Colorado Historical Society.

A.8 VISUAL RESOURCES

Information on visual resources was obtained from several sources. Boulder County provided information on their designated landmarks. Boulder County and the City of Longmont provided information on their scenic corridors approaching Longmont. EDAW, Inc. determined the extent of scenic landscape from examination of the topographic base map, color aerial photography and field observation.

Section B. Definition of Constraint Values for all Environmental Components in Study Area

The components of the study area environment that might be substantially affected by (or might affect) transmission line construction and/or operation were described and located on a series of data maps (Figures 4.2 through 4.8 in the EIS). Each environmental component on each map was assigned a value representing its general constraint to or opportunity for transmission line siting. Constraint values were determined by resource specialists from a consideration of: the sensitivity and rarity of each environmental component, the probability of its being adversely affected by transmission line construction/operation, or the probability and severity of any hazard that the component might present to a transmission line. Additional considerations in assigning constraint values were the typical sizes of the occurrences of each component (would they often be spannable by a new transmission line), and the general feasibility of mitigating any impacts to each component.

The constraint and opportunity values of all the mapped environmental conditions were combined on a single constraint/opportunity siting map (Figure 4.9 in the EIS). This map is used (together with a consideration of electrical system needs) to help generate alternative proposed project routes that make the maximum of siting opportunities and minimize crossings of the higher value constraints. The routes are represented by 1,500-foot wide corridors with a preliminary centerline. The system of alternative routes is also shown, for reference, on the individual data maps in Chapter 4 in the EIS. The separate individual alternative routes that (in total) make up this system of routes are shown on Figures 3.9, 3.12 and 3.15.

Chapter 4 in the EIS describes the results of the process that resulted in a system of alternative routes. The process that quantifies the impacts of these routes, so they can be compared, is a separate step (though it utilizes essentially the same data inventory). The methodology by which impacts are assessed is explained in detail in Section C of this Environmental Support Document. The results of the impact assessment are reported in Chapter 5 of the EIS.

Section C. Definition of Potential Impact Levels for All Combinations of Project and Environment

C.1. INTRODUCTION

The methodology used to assess impacts proceeds in two basic steps. First, it defines the potential theoretical short term (construction period) and long term (operation and presence of the project) impact levels (not actual quantities) for all possible combinations of project construction action type and environmental component. Although many environmental components are never crossed or approached by any portion of any of the project alternatives, this overview (or "checklist") methodology facilitates the process of defining the impact levels by providing a frame of reference for each judgment. It also allows for efficient consideration of new alternatives, if necessary. Second, the methodology quantifies the actual impacts for the proposed system of alternative routes; i.e., the actual quantities of effect of various levels (significant and moderate adverse, or beneficial) on the environmental components crossed (or approached) by the three alternatives. The "frame of reference" impact levels are presented in detail in this section. The actual impacts of the routes are presented in the EIS.

The steps used to define all possible, potential impact levels are outlined below:

- Define all project construction action types (see Figure 3.8 in the EIS) and indicate them on a map of each of the project alternatives (Figures 3.9, 3.12 and 3.15 in the EIS).

- For each resource category in the study area (e.g., biological resources, existing land use), formulate a list of the types and causes of potential impact that any portion of the project might induce.

- For each resource category, describe the mitigation measures that will be appropriately applied as part of the project action (all impacts are post-mitigation).

- For each resource category, list the criteria to be used to determine the significance level of impacts. (For example, it was concluded that impacts to existing urban land uses would be considered "significant" if construction and/or operation of the line would disrupt an existing activity to the extent that the activity could not practically continue.) Criteria are standards used for judging the significance of specific levels of impacts, however caused. They have no relationship to a project action.

- For each environmental component, as potentially affected by each project construction action (keeping in mind types and causes of impacts, mitigation measures and significance criteria), define a resulting impact level -- significant, moderate, low to none or beneficial. Do this for short-term and long-term impacts. Short-term impacts are those affecting a resource during the period of construction of the project. They derive from the activities required to construct the line or from the disturbance caused by these activities, and diminish after construction is completed. After two years, impacts classified as short term are not readily detectable when compared to the pre-existing baseline condition. Long-term impacts are those affecting a resource during the entire life of the project. They derive from the

presence of the line and its maintenance accessways, the action of passing electricity through its conductors, or from the periodic or emergency maintenance operations it requires.

- Tabulate results.

C.2 EARTH RESOURCES

C.2.1 TYPES AND CAUSES OF POTENTIAL IMPACTS

Impacts to earth resources are primarily associated with land disturbance during the construction phase of the project. Potential impacts include:

(1) Construction activities, especially blading for an accessway, could change water infiltration patterns which could initiate later movement of a potentially active portion of a landslide deposit, resulting in the possibility of damage to the project or to adjacent structures/property/resource values, and in creation of an unvegetated soil area.

(2) Impacts to soils would be associated with construction activities and the removal of topsoil and soil-protective vegetative cover. Construction activities could compact soils and thereby reduce infiltration. These disturbances could increase erosion and cause loss of productivity.

(3) Minor, local increases in flood stage could potentially be caused by flood debris lodged against a transmission line structure.

(4) Subsidence could potentially damage transmission line structures or throw them out of alignment, requiring increased repair and maintenance work with consequent disturbance impacts.

C.2.2 MITIGATION MEASURES

The mitigation measures listed below constitute a checklist of the full range of measures that would be applied in appropriate locations to reduce the impacts to earth resources.

- Potential Landslide Areas

  (1) Geotechnical surveys would be performed before construction, and should identify most areas that might become active. Rerouting the line, and particularly its accessways, would reduce the risk of construction initiated movement in such areas. Other measures, such as dewatering, regrading and deep pile foundations to transmission line structures, would be implemented if necessary.

- Sensitive Soil/Slope Conditions

  (2) Initial disturbance would be held to the minimum area feasible.

(3) In areas that contained topsoil and where severe disturbance was anticipated, the topsoil would be removed, stockpiled and respread after construction, except in areas needed for maintenance access.

(4) All disturbed areas would be regraded.

(5) All disturbed areas not needed for maintenance access would be reseeded.

(6) If necessary, disturbed areas would be mulched and fertilized to achieve establishment of a herbaceous ground cover capable of stabilizing soils and preventing erosion.

(7) Erosion control measures would be implemented on disturbed areas, including areas that must be used for maintenance operations (accessways and areas around structures).

(8) The minimum feasible area would be used for accessways (12 foot wide running surface), and the minimum feasible clear area would be maintained around structures (about 10 feet).

(9) Structures would be located and designed to conform with the terrain. Leveling and benching of the structure sites would be the minimum necessary to allow structure assembly and erection.

(10) Any required new accessways would be located to utilize the least steep terrain, and therefore to disturb the smallest area feasible.

- Floodplains

(11) Floodplains would be spanned, wherever feasible, to avoid locating transmission structures within flood areas.

(12) Where floodplains were too wide to be spanned, to the extent feasible, structures would be located so that the minimum number of structures would occur within the flood area; these would be located in areas of least depth and current. Structures potentially subject to flood flows would be designed and constructed to withstand flood flows, and in accordance with local floodplain regulations.

- Subsidence Areas

(13) Small subsidence areas that appeared hazardous would be spanned, wherever feasible, to avoid locating transmission line structures in the hazardous areas.

(14) Where subsidence areas are too large to be spanned, structures would be located so that the minimum feasible number of structures occur within the subsidence area.

C.2.3 SIGNIFICANCE CRITERIA

- Potential Landslide Areas

  Impacts would be considered significant if construction or maintenance of the project would substantially increase the hazard of movement of any potential slide area, resulting in potential damage to property or other resources.

- Sensitive Soil/Slope Conditions

  Soils/vegetation resources would be considered significantly impacted if revegetation practices would not produce plant cover capable of stabilizing soils and controlling erosion on disturbed areas larger than 1/2 acre within two years.

- Floodplains

  Impacts of the project on flooding would be considered significant if placement of structures within the floodplain resulted in measurable increases in flood hazards to adjoining properties, measurably decreased the storage volume of a floodplain, or substantially changed patterns of flood drainage.

- Subsidence Areas

  Impacts would be considered significant if subsidence compromised the structural integrity of any part of the transmission line or resulted in hazards to people or property, including shock hazards from inadequate conductor clearance.

C.2.4 RESULTING IMPACT LEVELS

Figure C.1 (1,2) shows the potential impact levels to earth resources that are estimated to result from a consideration of the above types and causes of impacts, mitigation measures and significance criteria. Almost all impacts are in the low to none category. There is the potential for moderate adverse impacts from some of the more intense project construction actions, including long-term impacts from induced movement of landslide areas, short-term impacts because of erosion after construction, and long-term hazards of subsidence affecting a transmission line.

C.3. WATER RESOURCES

C.3.1 TYPES AND CAUSES OF POTENTIAL IMPACTS

(1) Increased sedimentation caused by construction of accessways, or construction disturbance at structure sites or at other construction areas.

(2) Increased sedimentation caused by the crossing of streams by construction/maintenance equipment.

(3) Risk of leakage of cooling/insulating oil from underground transmission lines.

Figure 6.1 (1 of 2)

Potential Impact Levels

Environmental Component	Relationship to Action	Constraint Value (See Table 4.1)	Types & Causes of Potential Impacts (See Previous Section)	Mitigation Measures (See Previous Section)	Construction Action Type (See Figure 3.8)	Resulting Impact Levels: Short Term			Resulting Impact Levels: Long Term			
EARTH RESOURCES						Significant Adverse	Moderate Adverse	Low to No Adverse	Significant Adverse	Moderate Adverse	Low to No Adverse	Beneficial
POTENTIAL LANDSLIDE AREA	CROSSED	M	1	1	1			●		●		
					2			●			●	
					3			●			●	
					4			●			●	
					5			●			●	
					6			●			●	
					7			●		●		
					8			●		●		
SENSITIVE SOIL / SLOPE CONDITIONS	CROSSED	M	2	2-10	1			●			●	
					2			●			●	
					3			●			●	
					4			●			●	
					5			●			●	
					6			●			●	
					7		●				●	
					8			●			●	
FLOODPLAIN	CROSSED	L	3	11-12	1			●			●	
					2			●			●	
					3			●			●	
					4			●			●	
					5			●			●	
					6			●			●	
					7			●			●	
					8			●			●	

Figure C.1 (2 of 2)

Potential Impact Levels

Environmental Component	Relationship to Action	Constraint Value (See Table 4.1)	Types & Causes of Potential Impacts (See Previous Section)	Mitigation Measures (See Previous Section)	Construction Action Type (See Figure 3.8)	Resulting Impact Levels: Short Term			Resulting Impact Levels: Long Term			
						Significant Adverse	Moderate Adverse	Low to No Adverse	Significant Adverse	Moderate Adverse	Low to No Adverse	Beneficial
EARTH RESOURCES												
SUBSIDENCE AREA	CROSSED	M	4	13-14	1			•			•	
					2			•			•	
					3			•			•	
					4			•			•	
					5			•			•	
					6			•				•
					7			•		•		
					8			•			•	
					1							
					2							
					3							
					4							
					5							
					6							
					7							
					8							
					1							
					2							
					3							
					4							
					5							
					6							
					7							
					8							

C.3.2 MITIGATION MEASURES

The mitigation measures listed below constitute a checklist of the full range of measures that would be applied in appropriate locations to reduce the impacts to water resources.

(1) Wherever feasible, structure sites and other disturbed areas would be located as far as practical from streams (including ephemeral streams), ponds, lakes and reservoirs.

(2) In general, other than with underground construction, there would be no crossings of perennial streams by construction equipment. Existing bridges or culverts would be used.

(3) Blasting will not be allowed in or near streams.

(4) Construction activities will be performed by methods that will prevent entrance or accidental spillage of solid matter, contaminants, debris and other objectionable pollutants and wastes into ephemeral or perennial streams, ponds, lakes, reservoirs or underground water bodies. Such pollutants and wastes include, but are not restricted to: sediment, refuse, garbage, cement, concrete, sanitary waste, industrial waste, oil and other petroleum products, aggregate processing tailings, mineral salts and thermal pollution.

(4a) Construction activities, including grading of accessways, will not alter natural drainage patterns. Culverts will be installed where necessary to maintain existing drainage patterns.

(5) Waste waters from concrete batchings or other construction operations shall not enter streams, watercourses, or other surface waters without the use of such turbidity control methods as settling ponds, gravel-filter entrapment dikes, approved flocculating processes that are not harmful to fish, recirculation systems for washing of aggregates, or other approved methods. Any such waste waters discharged into surface waters will be monitored by Western to ensure that it is essentially free of settleable material. Settleable material is defined here as that material which will settle from the water by gravity during a one-hour quiescent period in a detention pond.

(6) Dewatering work for structure foundations or earthwork operations adjacent to or encroaching on streams or watercourses, or other surface waters, will be conducted in a manner to prevent muddy water and eroded materials from entering the streams or watercourses by construction of intercepting ditches, bypass channels, barriers, settling ponds, or by other approved means.

(7) Excavated material or other construction materials will not be stockpiled or deposited near or on streambanks, lake shorelines, or other watercourse perimeters where they can be washed away by high water or storm runoff, or can in any way encroach upon the actual watercourse itself.

Figure C.2 (1 of 1)

Potential Impact Levels

Environmental Component	Relationship to Action	Constraint Value (See Table 4.1)	Types & Causes of Potential Impacts (See Previous Section)	Mitigation Measures (See Previous Section)	Construction Action Type (See Figure 3.8)	Resulting Impact Levels: Short Term			Resulting Impact Levels: Long Term			
						Significant Adverse	Moderate Adverse	Low to No Adverse	Significant Adverse	Moderate Adverse	Low to No Adverse	Beneficial
WATER RESOURCES												
POND OR RESERVOIR OVER 40 ACRES	CROSSED NOT SPANNABLE	VH	1,3	1, 4-7	1		•				•	
					2		•				•	
					3		•				•	
					4		•				•	
					5		•				•	
					6			•			•	
					7	•				•		
					8		•				•	
POND OR RESERVOIR LESS THAN 40 ACRES	CROSSED. ASSUMED SPANNED BY OVERHEAD LINES. ASSUMED CONSTRUCTION EQUIPMENT DOES NOT ENTER WATER	H	1-3	1, 4-7	1			•			•	
					2			•			•	
					3			•			•	
					4			•			•	
					5			•			•	
					6			•			•	
					7		•			•		
					8			•			•	
MAJOR RIVER OR CREEK	CROSSED, SPANNED BY OVERHEAD LINES. ASSUMED CONSTRUCTION EQUIPMENT DOES NOT ENTER WATER	M	1-3	1-7	1			•			•	
					2			•			•	
					3			•			•	
					4			•			•	
					5			•			•	
					6			•			•	
					7		•			•		
					8			•			•	

C.3.3 SIGNIFICANCE CRITERIA

Impacts to water resources would be considered significant if water quality was modified by increased sedimentation to the extent that it is in violation of Federal or Colorado State Standards.

C.3.4 RESULTING IMPACT LEVELS

Figure C.2 (1) shows the potential impact levels to water resources that are estimated to result from a consideration of the above types and causes of potential impacts, mitigation measures and significance criteria. There is the potential for moderate adverse short-term impacts to all types of water resources from underground construction across a water body. If an oil leakage from the underground transmission line were to occur near a water body, there would be the potential for moderate long-term adverse impacts. If transmission line structures were to be built in a large (unspannable) pond or reservoir, there would be the potential for significant adverse short-term impacts. Given the mitigation measures proposed, all other impacts would be low to none.

C.4. BIOLOGICAL RESOURCES

C.4.1 TYPES AND CAUSES OF POTENTIAL IMPACTS

(1) Disturbance of wetlands, critical plant associations, rare plant habitat, wildlife habitat and natural areas could be caused by the construction of accessways and transmission line structures, and by the movement of construction vehicles and equipment.

(2) Disturbance of wildlife by construction and maintenance activities could result in temporary movement to less suitable habitats, stress, or permanent displacement. In the case of nesting raptors, disturbance could result in nest failure and loss of production for one year. New construction accessways could provide access into critical wildlife habitats after construction.

Critical use periods for important wildlife species/habitats are as follows:

Mule deer/elk critical winter range	December 15-March 31
Bald eagle wintering areas	November 15-March 15
Golden eagle nests	February 1 - July 15
Heron rookeries	April 1 - July 1

(3) Increased mortality of birds could occur from collisions with elements of the transmission line, especially the overhead ground wires. The design of the transmission line would eliminate any risk of electrocution to raptors.

C.4.2 MITIGATION MEASURES

The mitigation measures listed below constitute a checklist of the full range of measures that would be applied in appropriate locations to reduce impacts to biological resources.

(1) Structures and access ways would be carefully located to span or avoid or minimize disturbance of sensitive vegetative conditions, including wetlands, wherever feasible.

(2) In general, other than with underground construction, there would be no crossing of streams (Colorado rare fish habitat) by construction equipment. Existing bridges or culverts would be used.

(3) Visibility markers would be placed on overhead ground wires in critical areas to reduce bird collisions.

(4) Prior to construction, observations would be made to determine if there are any active prairie dog colonies that could be disturbed by project construction. If any colonies are active and impacts to the colony are anticipated, the U.S. Fish and Wildlife Service will be consulted to determine if it is necessary to survey for black-footed ferrets. U.S. Fish and Wildlife Service would determine the proper course of action in the very unlikely event that ferrets were found.

(5) Immediately prior to construction and in consultation with agencies regulating wildlife, a survey of the identified golden eagle nesting areas would be conducted to determine if nests are active. Construction around active nests would be avoided, if necessary, within the appropriate boundaries during the critical period of use (February 1 - July 15).

(6) Construction would be avoided, if necessary, within 0.25 mile of heronries during the critical period of use (April 1 - July 1).

(7) If necessary, and if requested by land owners and land management agencies, fence sections and lockable gates would be provided to restrict access on new or improved access roads.

C.4.3 SIGNIFICANCE CRITERIA

- Impacts to wetlands would be considered significant if the requirements of the U.S. Army Corps of Engineers relative to wetlands (including the requirements of Section 404 of the Clean Water Act), were not met..

- Impacts to rare plants and critical plant associations would be considered significant if more than one percent of the known habitat within the mapped study area would be permanently lost.

- Impacts to wildlife would be considered significant if prairie dog colonies would be disturbed, where this would result in potential impacts to the endangered black-footed ferret.

- For direct avian mortality (i.e., line strikes), impacts would be considered significant if a major increase in the frequency of mortality would be reasonably likely to occur.

- Impacts to wildlife would be considered significant if the presence of the line would result in the permanent removal of more than one percent of any critical or important habitat type that occurs within the mapped study area.

Figure C.3 (1 of 7)

Potential Impact Levels

Environmental Component	Relationship to Action	Constraint Value (See Table 4.1)	Types & Causes of Potential Impacts (See Previous Section)	Mitigation Measures (See Previous Section)	Construction Action Type (See Figure 3.8)	Resulting Impact Levels: Short Term			Resulting Impact Levels: Long Term			
BIOLOGICAL RESOURCES						Significant Adverse	Moderate Adverse	Low to No Adverse	Significant Adverse	Moderate Adverse	Low to No Adverse	Beneficial
WETLANDS (POTENTIAL)	CROSSED (NOT SPANNED)	H	1	1	1		●				●	
					2		●				●	
					3		●				●	
					4		●				●	
					5		●				●	
					6			●			●	
					7		●			●		
					8		●				●	
WETLANDS (POTENTIAL)	CROSSED (SPANNED)	H	1	1	1			●			●	
					2			●			●	
					3			●			●	
					4			●			●	
					5			●			●	
					6			●			●	
					7		●			●		
					8			●			●	
CRITICAL PLANT ASSOCIATIONS	CROSSED (SPANNED)	M	1	1	1			●			●	
					2			●			●	
					3			●			●	
					4			●			●	
					5			●			●	
					6			●			●	
					7		●			●		
					8			●			●	

Figure C.3 (2 of 7)

Potential Impact Levels

Environmental Component	Relationship to Action	Constraint Value (See Table 4.1)	Types & Causes of Potential Impacts (See Previous Section)	Mitigation Measures (See Previous Section)	Construction Action Type (See Figure 3.8)	Resulting Impact Levels: Short Term			Resulting Impact Levels: Long Term			
						Significant Adverse	Moderate Adverse	Low to No Adverse	Significant Adverse	Moderate Adverse	Low to No Adverse	Beneficial
BIOLOGICAL RESOURCES												
RARE PLANTS	CROSSED (SURVEYED)	H	1	1	1			●			●	
					2			●			●	
					3			●			●	
					4			●			●	
					5			●			●	
					6			●			●	
					7		●			●		
					8			●			●	
CRITICAL WILDLIFE HABITAT (BOULDER COUNTY DESIGNATION)	CROSSED (NOT SURVEYED)	H	1, 2	6	1		●				●	
					2			●			●	
					3			●			●	
					4			●			●	
					5			●			●	
					6			●			●	
					7		●				●	
					8			●			●	
WATERFOWL PRODUCTION AND STOPOVER AREA	CROSSED OR PASSED WITHIN 400'	M	1-3	1, 3	1			●			●	
					2			●			●	
					3			●			●	
					4			●			●	
					5			●			●	
					6			●				●
					7			●		●[1]	●[2]	
					8			●			●	

1 - CROSSED
2 - PASSED WITHIN 400'

Figure C.3 (3 of 7)

Potential Impact Levels

Environmental Component	Relationship to Action	Constraint Value (See Table 4.1)	Types & Causes of Potential Impacts (See Previous Section)	Mitigation Measures (See Previous Section)	Construction Action Type (See Figure 3.8)	Resulting Impact Levels: Short Term			Resulting Impact Levels: Long Term			
BIOLOGICAL RESOURCES						Significant Adverse	Moderate Adverse	Low to No Adverse	Significant Adverse	Moderate Adverse	Low to No Adverse	Beneficial
PRAIRIE DOG TOWN (POTENTIAL BLACK FOOTED FERRET HABITAT)	CROSSED (NOT SPANNED)	L	1,2	4	1			●			●	
					2			●			●	
					3			●			●	
					4			●			●	
					5			●			●	
					6			●			●	
					7		●				●	
					8			●			●	
GOLDEN EAGLE NEST AREA (WITH BUFFER ZONE)	CROSSED (NOT SPANNED)	M	1-3	5	1			●			●	
					2			●			●	
					3			●			●	
					4			●			●	
					5			●			●	
					6			●			●	
					7			●			●	
					8			●			●	
BALD EAGLE WINTER CONCENTRATION AREA	CROSSED (NOT SPANNED)	H	1-3	3	1		●				●	
					2		●				●	
					3		●				●	
					4		●				●	
					5		●				●	
					6		●				●	
					7		●				●	
					8		●				●	

Figure C.3 (4 of 7)

Potential Impact Levels

Environmental Component	Relationship to Action	Constraint Value (See Table 4.1)	Types & Causes of Potential Impacts (See Previous Section)	Mitigation Measures (See Previous Section)	Construction Action Type (See Figure 3.8)	Resulting Impact Levels: Short Term			Resulting Impact Levels: Long Term			
BIOLOGICAL RESOURCES						Significant Adverse	Moderate Adverse	Low to No Adverse	Significant Adverse	Moderate Adverse	Low to No Adverse	Beneficial
BALD EAGLE RIPARIAN FLIGHT CORRIDOR	CROSSED (NOT SPANNED)	L	1-3	-	1			●			●	
					2			●			●	
					3			●			●	
					4			●			●	
					5			●			●	
					6			●			●	
					7			●			●	
					8			●			●	
BALD EAGLE FEEDING AREA	CROSSED (NOT SPANNED)	H	1-3	-	1		●				●	
					2		●				●	
					3		●				●	
					4		●				●	
					5		●				●	
					6		●				●	
					7		●				●	
					8		●				●	
BALD EAGLE ROOST SITE (INCLUDES 1/4 MILE BUFFER ZONE)	CROSSED (NOT SPANNED)	H	1-3	3	1		●				●	
					2			●			●	
					3			●			●	
					4			●			●	
					5			●			●	
					6			●			●	
					7		●				●	
					8		●				●	

Figure C.3 (B of 7)

Potential Impact Levels

Environmental Component	Relationship to Action	Constraint Value (See Table 4.1)	Types & Causes of Potential Impacts (See Previous Section)	Mitigation Measures (See Previous Section)	Construction Action Type (See Figure 3.8)	Resulting Impact Levels: Short Term			Resulting Impact Levels: Long Term			
						Significant Adverse	Moderate Adverse	Low to No Adverse	Significant Adverse	Moderate Adverse	Low to No Adverse	Beneficial
BIOLOGICAL RESOURCES												
HERONRY (INCLUDES 1/4 MILE BUFFER ZONE)	CROSSED (NOT SPANNED)	H	1-3	3,6	1			●		●		
					2			●			●	
					3			●			●	
					4			●			●	
					5			●			●	
					6			●				●
					7			●			●	
					8			●		●		
MULE DEER WINTER RANGE	CROSSED (NOT SPANNED)	L	1,2	–	1			●			●	
					2			●			●	
					3			●			●	
					4			●			●	
					5			●			●	
					6			●			●	
					7			●			●	
					8			●			●	
ELK WINTER RANGE	CROSSED (NOT SPANNED)	L	1,2	–	1			●			●	
					2			●			●	
					3			●			●	
					4			●			●	
					5			●			●	
					6			●			●	
					7			●			●	
					8			●			●	

Figure C.3 (6 of 7)

Potential Impact Levels

Environmental Component	Relationship to Action	Constraint Value (See Table 4.1)	Types & Causes of Potential Impacts (See Previous Section)	Mitigation Measures (See Previous Section)	Construction Action Type (See Figure 3.8)	Resulting Impact Levels: Short Term			Resulting Impact Levels: Long Term			
BIOLOGICAL RESOURCES						Significant Adverse	Moderate Adverse	Low to No Adverse	Significant Adverse	Moderate Adverse	Low to No Adverse	Beneficial
NATURAL AREA (STATE OR BOULDER COUNTY DESIGNATED)	CROSSED (NOT SPANNED)	M	1-3	7	1		●			●		
					2			●			●	
					3			●			●	
					4			●			●	
					5			●			●	
					6			●				●
					7		●			●		
					8		●			●		
SMALL MAMMAL HABITAT (GRASSHOPPER MOUSE AND MEADOW JUMPING MOUSE)	CROSSED (SPANNED)	M	1,2	-	1			●			●	
					2			●			●	
					3			●			●	
					4			●			●	
					5			●			●	
					6			●			●	
					7			●			●	
					8			●			●	
COLORADO RARE FISH HABITAT (ACTUAL OR POTENTIAL)	CROSSED (SPANNED)	M	1	2	1			●			●	
					2			●			●	
					3			●			●	
					4			●			●	
					5			●			●	
					6			●			●	
					7		●			●		
					8			●			●	

Figure C.3 (7-87)

Potential Impact Levels

Environmental Component	Relationship to Action	Constraint Value (See Table 4.1)	Types & Causes of Potential Impacts (See Previous Section)	Mitigation Measures (See Previous Section)	Construction Action Type (See Figure 3.8)	Resulting Impact Levels: Short Term			Resulting Impact Levels: Long Term			
						Significant Adverse	Moderate Adverse	Low to No Adverse	Significant Adverse	Moderate Adverse	Low to No Adverse	Beneficial
BIOLOGICAL RESOURCES												
RARE INSECT HABITAT (MINER BEE)	CROSSED (SPANNED)	M	1	—	1			●			●	
					2			●			●	
					3			●			●	
					4			●			●	
					5			●			●	
					6			●			●	
					7		●				●	
					8			●			●	
					1							
					2							
					3							
					4							
					5							
					6							
					7							
					8							
					1							
					2							
					3							
					4							
					5							
					6							
					7							
					8							

- Impacts to wildlife would be considered significant if the following critical ranges would be adversely affected by project construction or maintenance operations during their season of use to the extent that the wildlife populations would be stressed.

  - Mule deer and elk winter range
  - Bald eagle roost and wintering areas
  - Golden eagle nest areas
  - Heron rookeries, including a 0.25 mile buffer zone

C.4.4 RESULTING IMPACT LEVELS

Figure C.3 (1-7) shows the potential impact levels to biological resources that are estimated to result from a consideration of the above types and causes of potential impacts, mitigation measures and significance criteria. There is the potential for moderate adverse impacts to several biological resources, including short-term impacts to wetlands, bald eagle winter concentration areas and bald eagle feeding areas, from most overhead construction actions. There is also the potential for moderate adverse short-term impacts to County and State designated critical wildlife habitat and natural areas, and bald eagle roost sites from the more intense construction action types; i.e., Types 1 and 8. Underground construction has the potential to cause moderate adverse short-term impacts to most wildlife components that are not seasonally avoided. The project's underground alternative has the potential to cause moderate adverse long-term impacts to special or restricted plant communities. Construction of a new overhead transmission line has the potential to cause moderate long-term impacts from increased bird collisions with line elements.

All other impacts would be low to none, except that removal of a transmission line could have long-term benefits to waterfowl production/stopover areas, heronries and designated natural areas.

C.5 EXISTING LAND USE

C.5.1 TYPES AND CAUSES OF POTENTIAL IMPACTS

It is assumed that all elements of the project would be so sited that major existing buildings would never have to be removed. The visual effects of the project action on sensitive land uses are excluded here. They are addressed in Section C.8.

(1) ROW restrictions might require relocation or the removal of existing subsidiary buildings.

(2) ROW restrictions would limit future improvements/expansion of existing residential, retail, office, institutional, recreational, commercial and industrial properties; and would preclude most future development (particularly the location of buildings) within the transmission line ROW.

(3) Presence of structures in center pivot irrigation areas would prevent operation (or efficient operation) of the irrigation equipment.

(4) Presence of structures in cultivated areas would impede movement of agricultural equipment.

(5) Presence of structures in cultivated areas would remove a small amount of land from production. On average, assuming H-frame structures, about .11 acres would be taken out of production per mile of construction across cultivated land. This makes the worst case assumption that all structures would be "square" to the direction of cropping. (Ag. Experiment Station, University of Minnesota).

(6) Presence of the line in flight clearance zones around airports would present a safety hazard. However, presence of the line in other areas would not constitute a measurable hazard to air traffic.

(7) Construction and maintenance activities in cultivated areas would cause crop damage in some seasons.

(8) Noise, dust, traffic, excavated areas and disturbed areas would affect residential, commercial, institutional and recreational uses during the construction period.

(9) Noise and other effects from energized conductors would affect residential and recreational land uses.

(10) Presence of the line within areas subject to Telecommunication Research Facility Protection Act could disrupt telecommunications.

(11) Construction of a transmission line across an operating railroad could cause traffic delays during some construction operations.

(12) Presence of the line in a mineral extraction area would preclude extraction of a portion of the resource.

(13) There could be fire in the case of an oil spill from underground transmission lines.

Prior to the growth, in recent years, of public concerns about the potential health effects of electromagnetic fields, there were a number of studies concluding that the presence of a transmission line had little or no effect on adjacent land and property values. Now, public perception that electromagnetic fields may have adverse health effects is widespread. There are some studies indicating that this perception, as well as changing aesthetic values, translates into a perception by the public of a negative effect on the resale value of properties, as well as changing aesthetic values, adjacent to transmission lines. However, there is no known solid evidence that there is an actual effect.

C.5.2 MITIGATION MEASURES

The mitigation measures listed below constitute a checklist of the full range of measures that would be applied in appropriate locations to reduce impacts to existing land uses:

(1) Use would be made of existing roads for construction/maintenance access wherever feasible.

(2) Landowners or land management agencies would receive prior notice of impending construction (activities and scheduling). Users of public property would be notified via posted information.

(3) ROW easement would be purchased at fair market value of the rights taken.

(4) Owners of any structures that had to be removed from the ROW would be compensated according to the Uniform Relocation Assistance and Land Acquisition Policies Act of 1970.

(5) Specific siting of project structures, wire pulling/tensioning sites, marshalling areas, and construction/maintenance access roads would be done in cooperation with affected landowners and land management agencies to minimize interference with existing uses. To the extent feasible, given project engineering limitations and/or other environmental (including topographic) constraints, transmission structures and other project elements would be sited as close as possible to existing roads, fences and property boundaries.

(6) Construction activities that require crossing of operating railroads would be done in a manner that would avoid interference with railroad operations.

(7) Survey monuments and other property markers would be protected.

(8) Blasting, if any, would be carefully controlled, and landowners would be notified in advance of blasting.

(9) Construction materials would be cleaned up, erosion would be controlled and disturbed areas would be reclaimed.

(10) Damage to any property improvements would be corrected to preconstruction condition, or the landowner would be financially compensated for those damages.

(11) Agricultural soil that might have lost productivity through compaction caused by movement of construction vehicles and equipment would be restored to the previous level of productivity.

(12) The line would be designed to minimize noise and other electrical effects from the energized conductors.

(13) Fences and structures would be grounded to prevent electric shocks strong enough to be annoying.

(14) Lockable gates and fencing would be provided to enable management agencies and landowners to restrict access on new and improved access roads.

(15) Overhead ground wires would be marked for visibility at airstrips.

(16) The line would be designed to minimize interference with radio, television and other communication systems.

(17) The project would not be constructed in the agricultural growing season (except for winter wheat).

C.5.3 SIGNIFICANCE CRITERIA

- Impacts to land use would be considered significant if construction and/or operation of the line would disrupt an existing or proposed activity to the extent that the activity could not practically continue or would be substantially disrupted or limited.

- Impacts to residential, retail, office, institutional, commercial or industrial land use would be considered significant if any major building would have to be removed to comply with electrical safety codes restricting uses of the ROW.

- Impacts to mineral extraction would be considered significant if more than one percent of the mineral resources at any operating extraction area could not be extracted.

- Impacts to transportation would be considered significant if the presence of the line would prevent safe aircraft movement into or out of an established airport or airstrip.

- Impacts to recreational land uses would be considered significant if any major building at a developed recreation site would have to be removed to comply with electrical safety codes restricting use of the ROW.

- Impacts to agriculture would be considered significant if the presence of the line would result in the permanent removal from cultivation of more than one percent of any affected field, (based on Colorado Agriculture Department Guidelines).

- Impacts on agriculture would be considered significant if the presence of structures in any cultivated field would substantially disrupt or limit its continued cultivation.

- Impacts to communication would be considered significant if operation of an established communication facility was prevented, substantially disrupted or limited.

C.5.4 RESULTING IMPACT LEVELS

Figure C.4 (1-5) shows the potential impact levels to existing land uses that are estimated to result from a consideration of the above types and causes of potential impact, mitigation measures and significance criteria.

Almost all developed land uses have the same potential level of impact. Adverse impacts would occur in the short term from construction disturbance. This would occur with all construction action types, including Action 6 (removal). The level of disturbance would vary with the sensitivity of the land use, but would never be as high as significant or as low as low; i.e., it would always be moderate. However, a wider range of long-term impact levels could potentially be caused to these developed land uses, depending on the construction action. Action Type 1, construction of an overhead transmission line on new ROW, would have moderate long-term impacts. Action Types 6 and 7, respectively removal of a line and construction of an underground line, would have beneficial effects because of the reduction or elimination of ROW restrictions. The remaining action types, that add, replace or modify structures in the existing ROW, would have long-term effects at the low to none level, since the change from existing conditions they would cause would be minor.

Figure C.4 (1 of 5)

Potential Impact Levels

Environmental Component	Relationship to Action	Constraint Value (See Table 4.1)	Types & Causes of Potential Impacts (See Previous Section)	Mitigation Measures (See Previous Section)	Construction Action Type (See Figure 3.8)	Resulting Impact Levels: Short Term			Resulting Impact Levels: Long Term			
						Significant Adverse	Moderate Adverse	Low to No Adverse	Significant Adverse	Moderate Adverse	Low to No Adverse	Beneficial
EXISTING LAND USE												
RESIDENTIAL AREA OR SITE	CROSSED, RESIDENCE NOT IN R.O.W.	H	1, 2, 8, 9	1-5, 8-10, 12-14, 16	1		●			●		
					2		●				●	
					3		●				●	
					4		●				●	
					5		●				●	
					6		●					●
					7		●					●
					8		●				●	
RETAIL/ OFFICE DEVELOPMENT	CROSSED, MAJOR BUILDINGS NOT IN R.O.W.	M	1, 2, 8	1-5, 8-10, 12-14, 16	1		●			●		
					2		●				●	
					3		●				●	
					4		●				●	
					5		●				●	
					6		●					●
					7		●					●
					8		●				●	
INSTITUTIONAL DEVELOPMENT: SCHOOL	CROSSED, MAJOR BUILDINGS NOT IN R.O.W.	H	1, 2, 8	1-5, 8-10, 12-14, 16	1		●			●		
					2		●				●	
					3		●				●	
					4		●				●	
					5		●				●	
					6		●					●
					7		●					●
					8		●				●	

Figure C.4 (2 of 5)

Potential Impact Levels

Environmental Component	Relationship to Action	Constraint Value (See Table 4.1)	Types & Causes of Potential Impacts (See Previous Section)	Mitigation Measures (See Previous Section)	Construction Action Type (See Figure 3.8)	Resulting Impact Levels: Short Term			Resulting Impact Levels: Long Term			
EXISTING LAND USE						Significant Adverse	Moderate Adverse	Low to No Adverse	Significant Adverse	Moderate Adverse	Low to No Adverse	Beneficial
INSTITUTIONAL DEVELOPMENT: OTHER THAN SCHOOL	CROSSED, MAJOR BUILDINGS NOT IN R.O.W.	M	1,2, 8	1-5, 8-10, 12-14, 16	1		●			●		
					2		●				●	
					3		●				●	
					4		●				●	
					5		●				●	
					6		●					●
					7		●					●
					8		●				●	
INDUSTRIAL/ HEAVY COMMERCIAL/ UTILITIES	CROSSED, MAJOR BUILDINGS NOT IN R.O.W.	L	1,2	1-5, 8-10, 12-14, 16	1		●			●		
					2		●				●	
					3		●				●	
					4		●				●	
					5		●				●	
					6		●					●
					7		●					●
					8		●				●	
EXTRACTION	CROSSED	M	12	1-5, 8-10, 12-14, 16	1		●			●		
					2		●				●	
					3		●				●	
					4		●				●	
					5		●				●	
					6		●					●
					7		●					●
					8		●				●	

Figure C.4 (3 of 5)

Potential Impact Levels

Environmental Component	Relationship to Action	Constraint Value (See Table 4.1)	Types & Causes of Potential Impacts (See Previous Section)	Mitigation Measures (See Previous Section)	Construction Action Type (See Figure 3.8)	Resulting Impact Levels: Short Term			Resulting Impact Levels: Long Term			
EXISTING LAND USE						Significant Adverse	Moderate Adverse	Low to No Adverse	Significant Adverse	Moderate Adverse	Low to No Adverse	Beneficial
PUBLIC RECREATION/ OPEN SPACE	CROSSED	H	1,2, 8,9	1-5, 8-10, 12-14, 16	1		•			•		
					2		•				•	
					3		•				•	
					4		•				•	
					5		•				•	
					6		•					•
					7		•					•
					8		•				•	
PRIVATE RECREATION/ OPEN SPACE	CROSSED	H	1,2, 8,9	1-5, 8-10, 12-14, 16	1		•			•		
					2		•				•	
					3		•				•	
					4		•				•	
					5		•				•	
					6		•					•
					7		•					•
					8		•				•	
AGRICULTURAL STRUCTURE/ FARMYARD/ FEEDLOT/ GREENHOUSE	CROSSED	M	1,2	1-5, 8-10, 12-14, 16	1		•			•		
					2		•				•	
					3		•				•	
					4		•				•	
					5		•				•	
					6		•					•
					7		•					•
					8		•				•	

Figure C.4 (4 of 5)

Potential Impact Levels

Environmental Component	Relationship to Action	Constraint Value (See Table 4.1)	Types & Causes of Potential Impacts (See Previous Section)	Mitigation Measures (See Previous Section)	Construction Action Type (See Figure 3.8)	Resulting Impact Levels: Short Term			Resulting Impact Levels: Long Term			
EXISTING LAND USE						Significant Adverse	Moderate Adverse	Low to No Adverse	Significant Adverse	Moderate Adverse	Low to No Adverse	Beneficial
CENTER, PIVOT OR OTHER MOVING RIG IRRIGATION	CROSSED, (BY DEFINITION COULD NOT OCCUR ON THE EXISTING R.O.W./ TYPES 2-8)	VH	3,4, 5,7	1-3, 5, 8-11, 13, 14	1			●	●			
					2							
					3							
					4							
					5							
					6							
					7							
					8							
CULTIVATION	CROSSED	M	4,5, 7	1-3, 5, 8-11, 13, 14, 17	1			●		●		
					2			●			●	
					3			●			●	
					4			●			●	
					5			●			●	
					6			●				●
					7			●				●
					8			●			●	
INDUSTRIAL/ COMMERCIAL TYPE DEVELOPMENT ASSOCIATED WITH AIRPORT/ LANDING STRIP (EXCLUDING FLIGHT CLEARANCE ZONE)	CROSSED	M	1,2	1-5, 8-10, 12-14, 16	1		●			●		
					2		●				●	
					3		●				●	
					4		●				●	
					5		●				●	
					6		●					●
					7		●					●
					8		●				●	

Figure 6.4 (3 of 5)

Potential Impact Levels

Environmental Component	Relationship to Action	Constraint Value (See Table 4.1)	Types & Causes of Potential Impacts (See Previous Section)	Mitigation Measures (See Previous Section)	Construction Action Type (See Figure 3.8)	Resulting Impact Levels: Short Term			Resulting Impact Levels: Long Term			
						Significant Adverse	Moderate Adverse	Low to No Adverse	Significant Adverse	Moderate Adverse	Low to No Adverse	Beneficial
EXISTING LAND USE												
EXISTING AND FUTURE FLIGHT CLEARANCE ZONES AT AIRPORT FOR 85' HIGH STRUCTURES	CROSSED (BY DEFINITION COULD NOT OCCUR ON THE EXISTING R.O.W.) (TYPES 2-8)	VH	6	15	1	●			●			
					2							
					3							
					4							
					5							
					6							
					7							
					8							
AREA SUBJECT TO TELECOMMUNICATIONS RESEARCH FACILITY PROTECTION ACT	CROSSED (BY DEFINITION COULD NOT OCCUR ON THE EXISTING R.O.W.) (TYPES 2-8)	VH	10	16	1	●			●			
					2							
					3							
					4							
					5							
					6							
					7							
					8							
RADIO TOWER SITE	CROSSED	H	1	1-5, 8-10, 12-14, 16	1		●			●		
					2		●				●	
					3		●				●	
					4		●				●	
					5		●				●	
					6		●					●
					7		●					●
					8		●				●	

Impacts on agriculture would have a different pattern. The important potential impacts on center pivot irrigation is long-term. These impacts would be significant. Short-term impacts of construction would all be low to none. Long-term effects would be moderate where new structures would be placed in fields, beneficial where a line was removed or replaced underground, and low to none in the case of new structures, replacements and modifications on the existing ROW. Two special categories of land use are flight clearance zones and telecommunication research facility exclusion zones. By definition, the existing ROW could not coincide with these areas; therefore, only Construction Action 1 could affect them. Long and short-term impacts would both be significant in these cases.

C.6 PLANNED LAND USE

The types and causes of potential impacts on planned land uses would be essentially the same as those on existing land uses (see Section B.1.E). However, there is often uncertainty as to the reality of specific planned uses (the fact that different uses than those planned may occur in a given location); and opportunity exists, if a new transmission line would be built in the interim, to accommodate the future use to the proposed project. The mitigation measures proposed would be those that had already occurred during detailed siting and construction of the project. Some might apply to planned land uses to some extent. Impacts on future land uses would be considered significant if a proposed use could not proceed as planned, or would be substantially disrupted or limited.

As a result of the above considerations, it can be concluded that impacts on a specific planned land use would be substantially lower than those for an equivalent project construction action affecting the corresponding existing use. The impact levels that would result from the project construction actions on planned land uses would never be higher than low.

C.7 CULTURAL RESOURCES

C.7.1 TYPES AND CAUSES OF POTENTIAL IMPACTS

(1) Physical disturbance during construction of accessways or transmission line structures, or disturbance caused by the movement of construction vehicles may damage or destroy historical or archaeological resources.

(2) There may be vandalism or unauthorized removal of cultural artifacts; or disturbance of cultural materials of value by construction workers during the construction period.

(3) There may be vandalism or unauthorized removal of cultural artifacts, or disturbance of cultural materials by the public after construction, facilitated by increased accessibility.

(4) The character of the setting of a major historic resource could be comprised by the presence of a new transmission line.

C.7.2 MITIGATION MEASURES

The mitigation measures listed below constitute a checklist of the full range of measures that would be applied in appropriate locations to reduce impacts to cultural resources.

(1) Before construction, Western would perform a Class III (100 percent of surface) cultural survey on all previously undisturbed areas to be disturbed, including new structure site and new accessways. A product of the survey would be a Cultural Resources Report recording findings and suggesting mitigation measures. These findings would be reviewed with the State Historic Preservation Office and other appropriate agencies, and specific mitigation measures necessary for each site or resource would be determined. Mitigation might include careful relocation of accessways, structure sites, and other disturbed areas to avoid cultural sites that should not be disturbed. Mitigation might also include data recovery.

(2) Prior to construction, all supervisory construction personnel would be instructed on the protection of cultural resources with reference to relevant laws and penalties, and the need to cease work in the location if cultural resource items are discovered.

(3) Construction activities would be monitored or sites flagged to prevent inadvertent destruction of any cultural resource for which the agreed mitigation was avoidance.

(4) Construction crews would be monitored to prevent vandalism or unauthorized removal or disturbance of cultural artifacts or materials.

(5) Gates would be provided to any new maintenance accessways to facilitate control of access by landowners and land management agencies, and to minimize increased use by the public.

(6) Should any cultural resources that were not discovered during the Class III survey be encountered during construction, ground disturbance activities at that location would be suspended until the provision of the National Historic Preservation Act and enabling legislation had been carried out.

C.7.3 SIGNIFICANCE CRITERIA

Impacts to cultural resources would be considered significant if the integrity of a site on or eligible for the National Register of Historic Places was affected.

C.7.4 RESULTING IMPACT LEVELS

Figure C.5 (1) shows the potential impact levels to cultural resources that are estimated to result from a consideration of the above types and causes of potential impact, mitigation measures and significance criteria.

Post-mitigation impact levels would all be low to none.

Figure C.5 (1 of 1)

Potential Impact Levels

Environmental Component	Relationship to Action	Constraint Value (See Table 4.1)	Types & Causes of Potential Impacts (See Previous Section)	Mitigation Measures (See Previous Section)	Construction Action Type (See Figure 3.8)	Resulting Impact Levels: Short Term			Resulting Impact Levels: Long Term			
						Significant Adverse	Moderate Adverse	Low to No Adverse	Significant Adverse	Moderate Adverse	Low to No Adverse	Beneficial
CULTURAL RESOURCES												
HISTORIC SITE/AREA ON OR OFFICIALLY ELIGIBLE FOR THE NRHP	CROSSED	H	1-3	1-6	1			•			•	
					2			•			•	
					3			•			•	
					4			•			•	
					5			•			•	
					6			•			•	
					7			•			•	
					8			•			•	
CULTURAL SITE/AREA FIELD ASSESSED AS ELIGIBLE FOR THE NRHP, OFFICIAL STATUS PENDING	CROSSED	M	1-3	1-6	1			•			•	
					2			•			•	
					3			•			•	
					4			•			•	
					5			•			•	
					6			•			•	
					7			•			•	
					8			•			•	
CULTURAL SITE/AREA WITH NO OR INCOMPLETE ASSESSMENT AND/OR OFFICIAL EVALUATION OR FIELD ASSESSED AND/OR OFFICIALLY EVALUATED AS NOT ELIGIBLE FOR THE NRHP	CROSSED	L	1-3	1-6	1			•			•	
					2			•			•	
					3			•			•	
					4			•			•	
					5			•			•	
					6			•			•	
					7			•			•	
					8			•			•	

Figure C.6 (1 of 3)

Potential Impact Levels

Environmental Component	Relationship to Action	Constraint Value (See Table 4.1)	Types & Causes of Potential Impacts (See Previous Section)	Mitigation Measures (See Previous Section)	Construction Action Type (See Figure 3.8)	Resulting Impact Levels: Short Term			Resulting Impact Levels: Long Term			
VISUAL RESOURCES						Significant Adverse	Moderate Adverse	Low to No Adverse	Significant Adverse	Moderate Adverse	Low to No Adverse	Beneficial
EXISTING RESIDENTIAL LAND USES	CROSSED OR PASSING ALONG EDGE	H	1	1,2	1		●			●		
					2			●			●	
					3			●			●	
					4			●			●	
					5			●			●	
					6			●				●
					7			●				●
					8		●			●		
PLANNED RESIDENTIAL LAND USES	CROSSED	M	1	1,2	1			●		●[1]	●[2]	
					2			●			●	
					3			●			●	
					4			●			●	
					5			●			●	
					6			●			●	
					7			●			●	
					8			●		●[1]	●[2]	
EXISTING RECREATIONAL/ OPEN SPACE LAND USES (PUBLIC OR PRIVATE)	CROSSED OR PASSING ALONG EDGE	H	1	1,2	1		●			●		
					2			●			●	
					3			●			●	
					4			●			●	
					5			●			●	
					6			●				●
					7			●				●
					8		●			●		

1 - CROSSED
2 - PASSING ALONG EDGE

Figure C.6 (2 of 3)

Potential Impact Levels

Environmental Component	Relationship to Action	Constraint Value (See Table 4.1)	Types & Causes of Potential Impacts (See Previous Section)	Mitigation Measures (See Previous Section)	Construction Action Type (See Figure 3.8)	Resulting Impact Levels: Short Term			Resulting Impact Levels: Long Term			
VISUAL RESOURCES						Significant Adverse	Moderate Adverse	Low to No Adverse	Significant Adverse	Moderate Adverse	Low to No Adverse	Beneficial
PLANNED RECREATIONAL/ OPEN SPACE LAND USE (PUBLIC OR PRIVATE)	CROSSED	M	1	1,2	1			●		●[1]	●[2]	
					2			●			●	
					3			●			●	
					4			●			●	
					5			●			●	
					6			●			●	
					7			●			●	
					8			●		●[1]	●[2]	
SCENIC AREA (BOULDER COUNTY DESIGNATION)	CROSSED	H	2	1,2	1		●			●		
					2			●			●	
					3			●			●	
					4			●			●	
					5			●			●	
					6			●				●
					7			●				●
					8		●			●		
NATURAL LANDMARK (BOULDER COUNTY DESIGNATION)	CROSSED	H	2	1,2	1		●			●		
					2			●			●	
					3			●			●	
					4			●			●	
					5			●			●	
					6			●				●
					7			●				●
					8		●			●		

1 - CROSSED
2 - PASSING ALONG EDGE

Figure C.6 (3 of 3)

Potential Impact Levels

Environmental Component	Relationship to Action	Constraint Value (See Table 4.1)	Types & Causes of Potential Impacts (See Previous Section)	Mitigation Measures (See Previous Section)	Construction Action Type (See Figure 3.8)	Resulting Impact Levels: Short Term			Resulting Impact Levels: Long Term			
VISUAL RESOURCES						Significant Adverse	Moderate Adverse	Low to No Adverse	Significant Adverse	Moderate Adverse	Low to No Adverse	Beneficial
SCENIC CONDITION LANDSCAPE	CROSSED	M	2	1,2	1		●			●		
					2			●			●	
					3			●			●	
					4			●			●	
					5			●			●	
					6			●				●
					7			●				●
					8		●			●		
VISUALLY SENSITIVE HIGHWAY CORRIDOR (BOULDER COUNTY AND/ OR CITY OF LONGMONT DESIGNATION)	CROSSED	M	2	1,2	1		●			●		
					2			●			●	
					3			●			●	
					4			●			●	
					5			●			●	
					6			●				●
					7			●				●
					8		●			●		
					1							
					2							
					3							
					4							
					5							
					6							
					7							
					8							

C.8 VISUAL RESOURCES

C.8.1 TYPES AND CAUSES OF POTENTIAL IMPACT

Visual impacts are primarily long-term; i.e., they would arise from the presence of the project.

(1) Visual impacts could potentially occur where the project would be seen and perceived by visually sensitive viewers as intrusive. Two types of land use (both existing and proposed) are the locations of such viewers. These are residential and recreational land uses.

(2) Visual impacts could also potentially occur if the project was located in areas that have been designated as scenic, or where visual quality was designated as important.

C.8.2 MITIGATION MEASURES

No special mitigation measures are feasible for the visual effects of this transmission line, since the proposed action is the uprating of an existing line.

(1) To minimize adverse visual effects, the line uprate construction would be designed to match the existing project elements.

(2) The new line segments in Alternative D would use nonspecular insulators and conductors. **(Western confirm)**

C.8.3 SIGNIFICANCE CRITERIA

Impacts to visual resources would be considered significant if the visual changes caused by the project would be dominant, as seen from visually sensitive viewpoints.

C.8.4 RESULTING IMPACT LEVELS

Figure C.6 (1-3) shows the potential impact levels to visual resources that are estimated to result from a consideration of the above types and causes of potential impacts, mitigation measures and significance criteria.

The potential impacts from the construction action types that consist of additions, replacements and modifications of the structures along the existing ROW are uniformly low to none (on all environmental components) because of the minor visual nature of the changes that would occur. The installation of a new transmission line on a new ROW, or of the bulky overhead to underground transition structure, could potentially have moderate adverse impacts on all visually sensitive environmental components. Removal of the existing transmission line outright, or its replacement with an underground line, would have a beneficial effect on these components.

* U.S. GOVERNMENT PRINITING OFFICE 1993-776-409