ENVIRONMENTAL ASSESSMENT

POWER LINE TO TRACT C-b

of the

WHITE RIVER ELECTRIC ASSOCIATION, INC.

February 19, 1980

Inspection Copy
Pls do not Remove

ENVIRONMENTAL ASSESSMENT

POWER LINE TO TRACT C-b

of the

WHITE RIVER ELECTRIC ASSOCIATION, INC.

February 19, 1980

TABLE OF CONTENTS

TABLE OF CONTENTS (Cont.)

TABLE OF CONTENTS (Cont.)

TABLE OF CONTENTS (Cont.)

Page

<u>LIST OF APPENDICES</u>

LIST OF TABLES

LIST OF FIGURES

(AS APPENDIX A)

FOREWORD

The projected construction of an electrical transmission line to Occidental Petroleum Company's development of Oil Shale Tract C-b is a necessary adjunct to that project. A very large amount of environmental work and analysis has been pursued as part of that project and the data on this subject is voluminous and has been distributed widely. Nevertheless, a separate analysis--as an embodied in this Environmental Analysis Record--is prerequisite to application for the right-of-way across public lands. The right-of-way over public lands will be acquired under Special Land Use Permits which will be issued under the authority of the U. S. Bureau of Land Management. This work, consequently will follow the Bureau's guidelines and criteria for an environmental analysis, and, the analysis has been derived principally through the use of the data base generated by the staff of the White River Resource Area and now contained in the files of the Meeker, Colorado Office.

The principal references used for this EA are:

Reference A. White River Management Framework Plan, Volume I, Steps I, II, and III - Lands, Minerals, Forest Products.

Reference B. White River Management Framework Plan, Volume II, Steps I, II, and III - Range Management, Wild Horses, and Water Shed.

Reference C. White River Management Framework Plan, Volume III, Steps I, II, and III - Wildlife, Recreation, Fire, Access.

Reference D. Piceance Basin Planning Unit Resource Analysis, Volume I, General Information Step I, Physical Profiles Step II, Present Status Step II, Lands Step III, Minerals Step III, Forest Products Step III, Range Management Step III, Wild Horses Step III, Physical Profile Step II, Minerals Step II, Soils Step II, Vegetation Step II, Animals Step II.

Reference E. Piceance Basin Planning Unit Resource Analysis, Volume II, Watershed Step III, Wildlife Step III, Fisheries Step III, Recreation Step III.

Reference F. Piceance Basin Planning Unit Resource Analysis, Volume III, Lands Step IV, Minerals Step IV, Forest Management Step IV, Wild Horses Step IV, Watershed Opportunities Step IV, Wildlife Step IV, Recreation Step IV.

Reference G. Piceance Basin Wildlife Management Plan (Sikes Act), Colorado Division of Wildlife and BLM, February 9, 1977.

Additional information on the environment surrounding Tract C-b may be found in the extensive analyses made for Tract C-b. The archive for this information is located in the library of the Office of the Oil Shale Supervisor, 131 N. 6th Street, Suite 300, Grand Junction, Colorado 81501. The references from that source which are used in this report are:

Reference H. Oil Shale Tract C-b Detailed Development Plan and Related Materials, Volume II; C-b Shale Oil Project, Ashland Oil, Inc., Shell Oil Co., Operator, February 1976.

Reference I. Oil Shale Tract C-b Environmental Baseline Program Final Report (Nov. 1976 through October 1976), Executive Summary; C-b Shale Oil Venture, Ashland Oil Inc., Occidental Oil Shale, Inc., Operator.

Reference J. Detailed Development Plan and Related Materials, Volume 2 of 2, February 1976, Section XIII, Scenic and Archaeological Values.

Reference K. Supplemental Material to Detailed Development Plan Modifications, July 21, 1977.

Reference L. Oil Shale Tract C-b Environmental Baseline Program Final Report (Nov. 1976 through Oct. 1976), Ecology, Volume 4; Ashland Oil Inc., Occidental Oil Shale, Inc., Operator.

Reference M. Oil Shale Tract C-b Environmental Baseline Program Final Report (Nov. 1974 through Oct. 1976), Ecology-Appendices A & B, Volume 4; Ashland Oil Inc., Occidental Oil Shale, Inc., Operator.

Large segments of the EA are direct quotations or are paraphrased from the above works and are not set in quotes to provide continuity of the text. References from outside of these works are given. Inputs from the White River Electric Association are identified by an asterisk (*).

Specific reference is made to power requirements for the development and production of Tract C-b within: The <u>Final Environmental Statement for the Prototype Oil Shale Leasing Program in Colorado</u>; <u>Regional Impacts of Oil Shale Development</u> in 6 Volumes, U. S. Department of Interior, 1973, on the following pages:

	<u>Volume I</u>		<u>Volume III</u>
Pages	I-91	Pages	IV-24
	III-12		IV-40 through 42
	111-21		IV-110
	III-174		IV-123
	III-201		

All figures are included as Appendix A.

SECTION I - PURPOSE OF AND NEED FOR ACTION

The purpose of this project is to construct and operate a two-circuit, 138 kV transmission line to serve the primary power needs of Oil Shale Tract C-b. The two-circuit line will connect the existing substation, which lies about 3 miles southwest of Meeker, to the northern boundary of Tract C-b over an approximate 19.5 mile right-of-way. The circuits will tie to a switchyard to be located just within the northern boundary of Tract C-b. Within Tract C-b, an additional three miles of 138 kV line will serve two substations.

The power transmitted over this line will provide service at a voltage of 138 kV and at a rate of approximately 35,300 kw by 1981 and 100,000 kw by 1986, the year for which full scale production is projected.

Regulations promulgated by the Mine Safety and Health Administration (MSHA) require that operations at Tract C-b must have two independent systems to insure that power is available even under emergency conditions. The electrical power to be provided by the WREA over this projected transmission line will constitute the primary power source for the operations. A secondary, or back-up source will be provided by on-site electrical generating units which will be fueled by natural gas.

Although the direct purpose of the transmission line is to provide power to Tract C-b, it is also contributory to the action purpose of Tract C-b--the development of commercial shale oil production.

A. Background Data*

The White River Electric Association, Inc., (WREA), operates an electric distribution system serving parts of Rio Blanco, Moffat and Garfield Counties in northwestern Colorado. WREA is a Colorado Corporation, founded under the provisions of the Rural Electrification Act, and provides the electrical needs of its users under the authority of a certificate of public convenience and necessity under Decision No. 62229 issued February 3, 1964. The authorized service area is shown on Figure la, and Decision No. 62229 is on file at the offices of the White River Electric Association, Inc., P. O. Box 958, Meeker, Colorado 81641.

Occidental Oil Shale, Inc., as operator of the C-b Shale Oil Venture, desires to receive electrical service to fill their need for power. Tract C-b lies within the authorized service area of the WREA.

SECTION I. PURPOSE OF AND NEED FOR ACTION

The purpose of this project is to construct and operate a two-circuit, 138-kV transmission line to serve the primary power needs of Oil Shale Tract C-b. The two-circuit line will connect the existing substation, which lies about 3 miles southeast of Meeker, to the northern boundary of Tract C-b over an approximate 20.5 mile right-of-way. The circuits will tie to a switchyard to be located just within the northern boundary of Tract C-b. Within Tract C-b, an additional three miles of 138-kV line will serve two substations.

The power transmitted over this line will provide service at a voltage of 138 kV and at a rate of approximately 35,000 kW by 1981 and 150,000 kW by 1985, the year for which full scale production is projected.

Regulations promulgated by the Mine Safety and Health Administration (MSHA) require that operations at Tract C-b must have two independent systems to insure that power is available when under emergency conditions. The electrical power to be provided by the REA over this projected transmission line will constitute the primary power source for the operations. A secondary, or back-up source will be provided by on-site electrical generating units which will be fueled by natural gas.

Although the direct purpose of the transmission line is to provide power to Tract C-b, it is also contributory to the entire purpose of Tract C-b--the development of commercial shale oil production.

A. Background Data*

The White River Electric Association, Inc., (WREA), operates an electric distribution system serving parts of Rio Blanco, Moffat and Garfield Counties in northwestern Colorado. WREA is a Colorado Corporation founded under the provisions of the Rural Electrification Act and provides the electrical needs of its users under the authority of a certificate of public convenience and necessity under Decision No. 62229 issued February 1, 1964. The authorized service area is shown on Figure 1a, and Decision No. 62229 is on file at the offices of the White River Electric Association, Inc., P. O. Box 958, Meeker, Colorado 81641.

Occidental Oil Shale, Inc., as operator of the C-b Shale Oil Venture, desires to receive electrical service to fill their need for power. Tract C-b lies within the authorized service area of the WREA.

Oil Shale Tract C-b is one of two tracts of land in Colorado leased by the Federal government under its prototype oil shale development program instituted in 1973. The pioneering effort of the development of this tract has been carried forward under full public scrutiny according to the recommendations of the Oil Shale Environmental Advisory Panel and according to all federal and state statutes and regulations. Primary direction for project development has been approved by the Area Oil Shale Supervisor's Office--a multidisciplinary group of specialists--operating under the jurisdiction of the U. S. Geological Survey.

SECTION II - ALTERNATIVES INCLUDING THE PREFERRED ACTION

Alternative A considers a route beginning at the Meeker Substation and extending southwesterly over Kendall Peak to Tract C-b. This has been determined to be the preferred alternative and is the proposed route for the transmission line. The principal, site specific, details of project construction are discussed beginning on Page 10.

Alternative B considers a route from the Meeker Substation running westerly along with White River, turning to the south across the Piceance Creek Gas Field to Tract C-b.

Alternative C considers a route southerly from the Meeker Substation, running along the Meeker-Rifle Corridor to Thirteen Mile Creek and thence westerly parallel to Piceance Creek to Tract C-b.

Alternative D considers the effect of no action.

See Figure 1b for map showing Alternative Routes.

Action Components Common to Alternative Routings

The following action components are common to all alternative routings:

The right-of-way needed for the projected transmission line outside of Tract C-b lies primarily on public lands which are managed under the jurisdiction of the U. S. Bureau of Land Management. The projected right-of-way--as well as Tract C-b itself--lie within the Piceance Creek Planning Unit of the White River Resource Area of the Craig District of the Colorado State Office of the BLM. See Figure 1c.

The entire proposed ROW from the Meeker Substation to the Process Area within Tract C-b is the subject of this EA.

In a letter dated June 2, 1978, to the BLM Branch of Adjudication in Denver, the WREA made application for a Grant of Right-of-way for this project. In response, the BLM Branch of Records and Data Management assigned the Serial No. C-26839 to the application. This EA is a companion document.

In the application, it was requested that the right-of-way grant be issued for a 50-year renewable term. It was noted that the development of the oil shale reserves of Tract C-b and surrounding area, and the possible future generation of electric power from a by-product gas from the retorting process, makes it necessary to maintain a transmission line corridor into the area. The uncertainties associated with these future events require the 50-year term with a right to renewal.

Some uncertainty exists at this present time concerning disposal or abandonment of the transmission line after Tract C-b is mined out and closed. It is expected that other mineral development on

SECTION II - ALTERNATIVES INCLUDING THE PROPOSED ACTION

Alternative A considers a route beginning at the Meeker Substation and extending southwesterly over Kendall Peak to Tract C-b. This has been determined to be the preferred alternative and is the proposed route for the transmission line. The principal, site specific, details of project construction are discussed beginning on Page 10.

Alternative B considers a route from the Meeker Substation running westerly along with Highway 64, turning to the south across the Piceance Creek Gas Field to Tract C-b.

Alternative C considers a route southerly from the Meeker Substation, running along the Meeker-Rifle corridor to between Miller Creek and thence westerly parallel to Piceance Creek to Tract C-b.

Alternative D considers the effect of no action.

See Figure 1b for map showing Alternative Routes.

Action Components Common to Alternative Routings

The following action components are common to all alternative routings.

The right-of-way needed for the projected transmission line outside of Tract C-b lies primarily on public lands which are managed under the jurisdiction of the U. S. Bureau of Land Management. The projected right-of-way as well as Tract C-b itself, lie within the Piceance Creek Planning Unit of the White River Resource Area of the Craig District of the Colorado State Office of the BLM. See Figure 1c.

The entire proposed ROW from the Meeker Substation to the Process Area within Tract C-b is the subject of this EA.

In a letter dated June , 1976, to the BLM Branch of Acquisition and Survey, the WRECA made application for a Grant of Right-of-Way for this project. In response, the BLM Branch of Records and Data Management assigned the Serial No. C-26538 to the application. This EA is a companion document.

In the application, it was requested that the right-of-way grant be issued for a 50-year renewable term. It was noted that the development of the oil shale reserves of Tract C-b and surrounding areas and the possible future generation of electric power from a by-product gas from the retorting process makes it necessary to maintain a transmission line corridor into the area. The potentials associated with these future events require the 50-year term with a right of renewal.

Some uncertainty exists at this present time concerning disposal or abandonment of the transmission line after Tract C-b is mined out and closed. It is expected that other mineral development on

Federal Leases adjacent to Tract C-b may also require electrical power which also could be supplied with this same line; consequently, the transmission line could have a useful life considerably longer than that of Tract C-b alone. Thus, it is not now possible to forecast the useful life of the line, and procedures for abandonment will be commensurate with the conditions, regulations, and management practice which will prevail at that future time.

Electrical service is now being provided to the WREA at the Meeker Substation over a 138 kV transmission line from power stations at Hayden and Craig, Colorado. The new transmission line will tap the 138 kV busbar at the Meeker Substation and will deliver power to a switchyard located within Tract C-b.

The switchyard at Tract C-b will serve two substations where the incoming 138 kV line voltage will be transformed to 13.8 kV for distribution throughout the tract. The first substation will be constructed in the area of the mine shafts. The second substation will be located in the process area. The ROW for the power corridor will lead from the switchyard to the mine shaft area and the first substation, and then to the process area. A plan of the corridors in shown on Figure 2a and a diagram of the major circuits is shown on Figure 2b. The switchyard and the first transformer station will be built first and the line to the process area and the second transformer station will be built next.

Two parallel transmission lines will be constructed within the projected ROW. Each line will be a 3-conductor or 3-phase, single circuit transmission line. The project schedule calls for the start of construction of the first circuit in June, 1980 and completion and energization by May, 1981. Construction of the second and parallel circuit will be started in 1984 and will be completed by 1985. The project schedule for construction of the first circuit, as prepared by the Colorado-Ute Electric Association, is shown on Figure 2c.

The transmission line and appurtenances will be constructed according to standards set forth in <u>Electric Transmission Specification and Drawings</u>, REA Form 805, Rev 2-73, as required by the Rural Electrification Administration of the U. S. Department of Agriculture, and in the Sixth Edition of the <u>National Electric Safety Code</u>.

The transmission lines will be supported on standard REA design wooden pole structures for the greater portion of the line; however, steel structures will be used to cross the agricultural lands in the valley of the White River and to support the span which crosses the valley of Piceance Creek.

The principal pole structure will be the "H-frame" tangent structure as designed for a maximum 161 kV transmission line as shown in Figure 3a. Structures at turns greater than 5 to 10^{o} will require use of the "H-frame" small angle structure as shown in

Natural Gases adjacent to Tract C-b may also require electrical power which also could be supplied with this same line; consequently, the transmission line could have a useful life considerably longer than that of Tract C-b alone. Thus, it is not now possible to forecast the useful life of the line, and procedures for abandonment will be commensurate with the conditions, regulations, and management practice which will prevail at that future time.

Electrical service is now being provided to the area at the Meeker Substation over a 138 KV transmission line from power stations at Hayden and Craig, Colorado. The new transmission line will tap the 138 KV power at the Meeker Substation and will deliver power to a switchyard located on the tract C-b.

The switchyard at Tract C-b will serve two substations where the incoming 138 KV line voltage will be transformed to 13.8 KV for distribution throughout the tract. The first substation will be constructed in the area of the mine shaft. The second substation will be located in the process area. The 138 KV power circuit line will run from the switchyard to the mine shaft area and the first substation, and then to the process area. A plan of the corridors is shown on Figure 5a and a diagram of the power circuit is shown on Figure 7b. The switchyard and the first transformer station will be built first and the line to the process area and the second transformer station will be built next.

Two parallel transmission lines will be constructed within the projected ROW. Each line will be a 3-conductor, 3-phase, single circuit transmission line. The project schedule calls for the start of construction of the first circuit in June 1976 and completion and energization by May 1977. Construction of the second and parallel circuit will be started in 1978 and will be completed in 1980. The project schedule for construction of the first circuit, as prepared by the Colorado-Ute Electric Association, is shown on Figure 8.

The transmission line and appurtenances will be constructed according to standards set forth in Electric Transmission Specification and Drawings, REA Form 805, Rev 2-75 as issued by the Rural Electrification Administration of the U. S. Department of Agriculture, and in the Sixth Edition of the National Electric Safety Code.

The transmission lines will be supported on standard REA design wooden pole structures for the greater portion of the line; however, steel structures will be used to cross the agricultural lands in the valley of the White River and to support the span which crosses the valley of Piceance Creek.

The principal pole structure will be the "H-Frame" tangent structure as designed for a maximum 161 KV transmission line as shown in Figure 9a. Directional structures greater than 5 to 10° will require use of the "H-Frame" small angle structure as shown in

Figure 3b, and greater turns will require the use of 3-pole intermediate angle structure as shown in Figure 3c. The lines will be designed to minimize the use of guyed structures. Photographs of these structures are shown in Appendix C on Figures C-3 and C-4

The two circuits will be located on two lines which will occupy the ROW with a symmetrical spacing of 40'-120'-40' from edge to edge of the 200-foot ROW, as shown in Figure 3d.

The poles will be made from Douglas fir or from western red cedar. The call for bids for these poles has not yet been made; however, the most suitable timber for such poles is most readily available from commercial forest stands in Idaho. The poles will be treated to prevent rot and decay either by creosote or penta-treatment. The nominal finished color of the poles will be a natural wood brown. The pole structures will be located at about 700-to 800-foot intervals along the ROW.

Clearing of the right-of-way will be performed according to the nominal criteria shown on the Clearing Right-of-way Guide on TM-12, 12-1, 13, on Page 84 of Form 805. Based upon this source, a typical clearing guide for the projected two circuits is shown on Figure 3d. The usual clearing guide will be modified for this project so as to minimize disturbance to existing vegetation. The removal or trimming of brush and trees will be minimal and is a function of obtaining enough clearance for the lines to obtain an adequate level of safety.

The National Electric Safety Code (NESC) requires a minimum horizontal clearance from the outside phase conductor to the edge of the right-of-way. The following is a tabulation of clearance required for a nominal 138 kV phase-to-phase transmission line with 700-800 foot spans and a maximum elevation of 7,600 feet.

Basic horizontal clearance:	5.00 feet
Voltage Adder (84-50)x .4 inches=	1.13 feet
Elevation Adder $\frac{7600-3300}{1000}$ x 0.03 x 1.13=	0.15 feet
Conductor sideswing:	17.70 feet
Total clearance to outside phase	23.98 feet
Phase spacing 2x15.5 feet	31.00 feet
Clearance to outside phase	23.98 feet
Total required right-of-way width for one transmission line	78.96 feet
Total required right-of-way width for two transmission lines	157.92 feet
Additional separation between lines for security reason	42.08 feet
Total Right-of-Way Width	200.00 feet

The right-of-way requested is wider than the minimums required by the NESC: however, because of safety reasons involving the mining operation, continuity of electric service to C-b Tract is a necessity. The additional separation is based on consideration of a structural collapse of one line due to excessive wind or ice-loading and in falling maintaining clearance to the intact line, including consideration of conductor breakage and possible whipping. Also, additional separation would aid in preventing loss of both lines in the event of an airplane crash.

Span distances of 700-to 800-feet over this terrain, will require that normal structures use 75-to 90-foot poles spaced about 15.5 feet apart with a crossarm approximately 32 feet long attached 8 feet below the top of the pole. Depending upon the height of the particular pole, each will be buried to a depth of from 9 to 11 feet below the surface and will be backfilled with compacted soil. An x-brace will be installed between the poles.

Although the specifications for the conductors have not yet been set it is expected that each phase will consist of a single 795 MCM non-specular ACSR conductor attached by means of suspension insulator strings to the crossarm. Phase spacing will be about 15.5 feet. Such a conductor will be a multiple-strand aluminum braided cable having a core strand of braided steel cable for strength.

It is estimated that the construction crew will employ about 40 workers. It is estimated that each of the two circuits will require about 11 months for completion and an additional month for clean up. No special provision will be made for housing of the construction workers and their families and they will depend upon the housing which is available in the area. Separate construction crews will be mobilized for the construction of each circuit.

Upon completion of construction, each circuit will be energized and placed into operation. The addition of the new circuits to the WREA service will not require any direct expansion of the operating staff; however, it is expected that the addition of the service to Tract C-b will contribute to a growing need for new personnel. In this manner, this project will increment the growth of WREA and thus will tend to contribute to the need for additional staff.

Operational needs will consist primarily of annual inspection and maintenance of the transmission lines. Normal maintenance of such lines consists of the replacement of insulators which have been vandalized by rifle fire and the trimming of encroaching vegetal growth.

It is expected that the transmission lines will have a minimum operating life of 30 years as is needed for amortization of the financing of the line. More likely, the lines will have a serviceable life of 57 years, the projected mine life of Tract C-b, or more.

Upon completion of the service life, the right-of-way will be prepared for decommissioning. Decommissioning will include dismantling and removal from the right-of-way of all salvagable conductor and hardware. Power poles will be removed over nearby existing access roads or by helicopter. All other poles will be felled and cut into lengths which can be handled by two men. In conference with the BLM, these sawn lengths will be stacked in nearby clearings and will be burned under controlled conditions during a wet season so as to avoid possible wildfires.

Wherever it might be required, the surface will be restored and revegetated.

In any case, the abandonment of the right-of-way will be completed according to the terms of the right-of-way grant and commensurate with standard practice which may exist at that future time.

As will be discussed later in this report under the section on alternatives, the proposed alignment route was chosen so as to minimize visibility as well as the length of the right-of-way.

Possible mitigating measures for generic adverse effects are incorporated within route selection criteria, in the consideration of alternative rights-of-way, and in the stipulations imposed by the BLM upon lease permits and agreements.

The route selection process was based upon the following criteria:

- To route the projected transmission line so as to obtain the optimum accomodation among factors of: a.) cost, b.) environmental acceptibility, c.) compliance with applicable statutes and regulations to expedite the issuance of permits, and, d.) route acceptance by local public opinion.

- To locate the line so as to minimize the disturbance to agricultural lands. In the White River Valley, where section lines will be followed, fences were already in existance and intrusion was minimized. In the valley of Piceance Creek, the line will be routed so that pole structures would not have to be located within agricultural meadows.

- To place the line in locations which will minimize visibility and in this manner to reduce disturbance to aesthetic values of scenic quality.

- To reduce costs and to minimize the length of line by choosing the shortest feasible route.

- To locate pole structures on higher ground avoiding valleys and obviating flood hazards.

- To take advantage of existing roads and topography so as to provide access with a minimum of surface disturbance.

The Bureau of Land Management has indicated that the following stipulations will be imposed upon the special use permit for the ROW which will cross public lands.

- Disturbance of the surface will be minimal and commensurate with good construction practice.

- All existing improvements, including, but not limited to, fences, gates, cattleguards, roads, culverts, pipelines, bridges, monuments, water developments and control structures, wherever altered by construction of the projected line, will be left in good serviceable condition equivalent to, or better than, the condition prior to construction disturbance. Fence integrity will be maintained by operating and construction personnel through gate closure, emplacement of temporary cattleguards, or by the presence of personnel during construction. Improvements which are damaged, destroyed or significantly worn by construction or use will be restored to serviceable condition to the degree practicable, or otherwise replaced.

- Protection of grazing allotments will require that the BLM will notify the affected grazing permittees prior to the commencement of construction. Allotment integrity must be maintained. All breached fences will require the construction of a gate and construction workers will be required to close the gates. The construction company will be liable for livestock damages or loss resulting from the loss of allotment integrity during construction.

- In segments to be constructed by helicopter, no new access roads will be built to provide entry to the site of each pole structure. Pole holes will be dug either by a tractor mounted auger which will make one pass in and one pass out of each site or for sites inaccessible by tractor mounted auger, portable equipment will be used. Poles will be transported into each site and wires will be strung from structure to structure by the use of a helicopter.

The Environmental Assessment of White River Electric Association (WREA), Inc. power line to tract C-b, as prepared by GEAE Corporation of Salt Lake City, Utah, has been reviewed by the Bureau of Land Management. With the corrections listed below, this EA is considered to be an adequate assessment of the effects of the proposed action on the environment.

ERRATA

1. Pg. 12, first sentence: lithis should be lithic.
2. Pg. 13, 5th paragraph;
   first sentence: - extentpossible should be extent possible.
   third sentence: - BLM due--"should read, "BLM after due"
3. Pg. 21, 2nd paragraph, first sentence: - (VRM Class II) should be (VRM Class II & III)
4. Pg. 42, 4th paragraph, first sentence: - "---, the White River was sampled near its confluence with the White River." should read "---Piceance Creek was sampled near its confluence with the White River."
5. Pg. 56, 2nd paragraph, last sentence: - should read "Two of the sites were heavily disturbed by chaining and one partially disturbed by a road traversing it."
6. Pg. 66, 9th paragraph: delete "---for a monthly average of 500 cattle."
7. Pg. 67, item 2.), first sentence: "---acreswould--" should be "acres would--"

   item 4.), first sentence: should read - "this allotment consists of 765 acres, of which 467.2 acres are within the proposed site area."

   second sentence: (6/14 - 7/11) should be (6/14 - 7/10)

   third sentence: "--- 30 AUMs--" should be "-- 50 AUMs--"

   item .5), first sentence: should read - "this allotment consists of 23,042 acres, of which 518.4 acres are within the proposed site area."

   second sentence: "---the other had only--" should be "--the other used only--"

   last sentence: "--- 43 areas--". should be "--- 43 AUMs---".

item .6), first sentence: should read - "this allotment consists of 54,820 acres, of which 17,792 acres are within the proposed site area."

8. Pg. 68, item 7.), first sentence: should read - "this allotment consists of 11,145 acres, of which 9,830 acres are within the proposed site area."

   last sentence: "---hte--" should be "---the--"

   item 8.) first paragraph , first sentence: should read "This allotment consists of 23,018 acres, of which 17,792 acres are within the proposed site area.

   1st paragraph, last sentence: "---lcensed--" should be "---licensed--"

   item 9.), first sentence: should read "this allotment consists of 156,091 acres, of which 15,469 acres are within the proposed site area."

   last sentence: should read "---2,065 AUMs---"

9. Pg. 75, 3rd paragraph, 4th sentence: "--- incidence on raptor--" should read"--- incidence of raptor---".

10. Pg. 81, first paragraph, 2nd sentence: should read "--- in Hayden and Craig."

Item (6), first sentence: should read - "This alignment consists of 56,810 acres, of which 17,582 acres are within the proposed site area."

8. Pg. 48, item 7.1, first sentence: should read - "This alignment consists of 11,385 acres, of which 8,552 acres are within the proposed site area."

Last sentence: "---Queen" should be "---Ono-"

Item 8.1 first paragraph. First sentence should read "This alignment consists of 23,058 acres, of which 17,393 acres are within the proposed site area

1st paragraph, last sentence: "---increased---" should be "---decreased---

Item 9.1, first sentence: should read "This alignment consists of 119,091 acres, of which 15,978 acres are within the proposed site area."

Last sentence: should read "---7,000 cells---"

9. Pg. 75, 3rd paragraph, 4th sentence: "--- incidence on report---" should read "--- incidence of report---".

10. Pg. 81, first paragraph, 2nd sentence: should read "--- in October and Dec."

- Use of the land will comply with federal and state laws, regulations, and standards relating to air, water and land pollution.

- The ground surrounding each pole structure will be restored to its natural contour, and all excavated soil will be replaced into the pole hole. If required, local seeding with grass seed mixtures stipulated by the BLM will restore bare spots around any structure where construction activity has resulted in damage to the local grasses.

- Steel pole structures to be erected on private lands only will be painted "sagebrush" green color to blend with the background.

- Wire conductors will be of non-reflective finish.

- Construction of the powerline could be directly in a straight line from P.I. 478+80.44 to P.I. 502+65.89 which would eliminate surveyed P.I. 497+58.97 and avoid disturbance of archaeological site 5RB766.

- Wherever new road construction or grading of existing trails or roads is required which will cause new surface disturbance, a Class III (100% Pedestrian) archaeological survey survey will be required and approved prior to such work in order to identify potential sites and to prevent any surface disturbance of these sites. Issuance of special use permits will be required prior to construction or grading of trails and access roads. Special use permits also will be required on any existing roads where a turn radius must be increased to allow passage of long wheel base vehicles such as pole trucks.

- Upon selection of the powerline route and termination point within Oil Shale Lease Tract C-b boundary, White River Electric Association should submit a 7½' USGS topographic map to the BLM WRRA archaeologist showing the selected route and all related facilities for approval prior to construction of any faciliies within the boundary of Tract C-b.

- Should antiquities, objects of noticeable historic, prehistoric or scientific interest be discovered by excavations, the BLM will be notified immediately, and the objects will be left in the condition and position at the time of discovery.

- The locations of each pole structure crossing the suspected area of the <u>Astragulus detritalis</u> and the <u>Astragulus lutosus</u> will be examined by the BLM botanist. If any are found whose loss would jeopardize the existance of the species, appropriate changes will be made to the location of the structure by conference between representatives of the applicant and the BLM.

- No unnecessary cutting of Douglas fir will be permitted.

- Clearing of vegetation of any kind will be kept to a minimum consistant with consideration of transmission line safety. All firewood over 4" diameter will be cut

- Use of the land will comply with Federal and State laws, regulations, and standards relating to air, water and land pollution.

- The ground surrounding each pole structure will be restored to its natural contour, and all excavated soil will be replaced into the pole hole. If required, local seeding with grass seed mixtures stipulated by the BLM will restore bare spots around any structure where construction activity has resulted in damage to the local grasses.

- Steel pole structures to be erected on private lands only will be painted "sagebrush" green color to blend with the background.

- Wire conductors will be of non-reflective finish.

- Construction of the powerline could be directly in a straight line from P.I. 419+55.44 to P.I. 502+43.09 which would eliminate subsequent P.I. 497+58.97 and avoid disturbance of archaeological site 5RB760.

- Whenever new road construction or grading of existing trails or roads is required which will cause new surface disturbance, a Class III (100% pedestrian) archaeological survey will be required and approved prior to such work in order to identify potential sites and to prevent any surface disturbance of these sites. Issuance of special use permits will be required prior to construction or grading of trails and access roads. Special use permits also will be required on any existing roads where a turn radius must be increased to allow passage of long wheel base vehicles such as pole trucks.

- Upon selection of the powerline route and termination point within Oil Shale Lease Tract C-b boundary, White River Electric Association should submit a 7½' USGS topographic map to the BLM BDRA archaeologist showing the selected route and all related facilities for approval prior to construction of any facilities within the boundary of Tract C-b.

- Should antiquities, objects of noticeable historic, pre-historic or scientific interest be discovered by excavations, the BLM will be notified immediately, and the objects will be left in the condition and position at the time of discovery.

- The locations of each pole structure traversing the suspected area of the *Astragalus detritalis* and the *Astragalus lutosus* will be examined by the BLM botanist. If any are found whose loss would jeopardize the existence of the species, appropriate changes will be made to the location of the structure by conference between representatives of the applicant and the BLM.

- No unnecessary cutting of Douglas fir will be permitted.

- Clearing of vegetation of any kind will be kept to a minimum consistent with consideration of transmission line safety. All firewood over 4" diameter will be cut to 4-foot lengths for salvage and use.

- Aircraft warning markers will be attached to conductors which are suspended over Piceance Creek.

- Protection of wildlife from construction activity will require that:

  - No construction or helicopter activity will be permitted within deer concentration area #319 from the period December 1 through March 31. Area #319 is that concentration area encompassing the powerline route between Gardenhire Gulch and Collins Gulch (T. 2 S., R.96 W., from NW¼ Section 21 through NE¼ Section 31).

  - No construction activity or helicopter flights will be permitted in the concentration area of the Bald Eagle along the White River during the period November 15 through April 15. This bald eagle concentration area comprises a zone 0.5 mile on either side of the White River throughout its entire length.

  - On the ground construction and human activity could be suspended within 0.25 mile of active red-tailed hawk and golden eagle nests to avoid critical disturbance of raptors during the nesting season, March 1 to June 30. Site specific examination and determination of occupancy at each nest site by a qualified wildlife biologist may increase, decrease, or nullify the application of the 0.25 mile buffer zone. The subject mitigating measure could be applied more particularly to the red-tailed hawk nest on Piceance Creek (T. 2 S., R. 96 W., Sec. 31), and the golden eagle nest located south of Kendall Peak (T. 1 S., R. 95 W., Sec. 22). During the period March 1 through June 30, all helicopter flights could be suspended within 0.5 mile of these raptor nests if they are known to be active. Suspension of construction, human activity and helicopter flights to avoid disturbance of active raptor nests which do exist on Tract C-b may be accomplished after survey and location of the powerline and related facilities within Tract C-b.

- All pole structures are to be designed to meet the raptor protection design criteria as set forth in:

  INFO MEMO CO-79-141
  REA Bulletin 61-10, March 9, 1979
  "<u>Powerline contacts by eagles and other large birds</u>."

-o-o-o-o-o-o-the 4-acre [illegible] for salvage and use.

o Aircraft warning markers will be attached to conductors which are suspended over Pinedale Creek.

o Protection of wildlife from construction activity will require [illegible]:

- No construction or helicopter activity will be permitted in [illegible] grouse concentration area [illegible] from the period December 1 through March [illegible] area [illegible] that [illegible] the power line route [illegible] and [illegible] (T. [illegible], R. [illegible] [illegible] 21 through [illegible] Section [illegible]).

- No construction activity or helicopter flights will be permitted in the concentration area of the bald eagle along the White River during the period November [illegible] through April [illegible]. This bald eagle concentration area comprises a [illegible] mile on either side of the White River throughout [illegible] entire length.

- On the [illegible] construction and [illegible] activity would be [illegible] within [illegible] mile of active red-tailed hawk and golden eagle nests with [illegible] critical [illegible] during the [illegible] season, March [illegible] June [illegible]. [illegible] specific [illegible] and determination of [illegible] of each nest site [illegible] qualified wildlife biologist may increase, decrease or nullify the application of the [illegible] mile buffer zone. The subject mitigation measure would be applied more particularly to the red-tailed hawk nest on Pinedale Creek (T. [illegible], R. [illegible] W., Sec. [illegible]), and the golden eagle nest located north of [illegible] ([illegible] W., Sec. [illegible]). During the [illegible] March 1 through June 10, all helicopter flights would be [illegible] within 0.5 mile of these [illegible] if they are known to be active. [illegible] of construction, [illegible] activity and helicopter flights [illegible] presence of active raptor nests which [illegible] may be accomplished [illegible] survey [illegible] location of the [illegible] line and [illegible] facilities within [illegible].

o All pole structures are to be designed to meet the [illegible] for [illegible] set forth in:

[illegible]
[illegible]
[illegible]
[illegible]

[illegible]

The remainder of this section discusses the individual alternatives considered in this analysis. The three routing alternatives A, B and C are shown on Figure 1b.

A. Alternative A - The Kendall Peak Route

A direct line route between the Meeker Substation and Tract C-b --which is locally modified to avoid certain environmental factors--is the route considered as Alternative A. This routing is shown on Figure 5 and a longitudinal profile is shown on Figure 6.

The following discussion of Alternative A is given in three principal parts. The first part is a discussion of routing considerations. The second part is a discussion of construction methods. The third is a discussion of environmental effects.

1. Routing Considerations

The routing of Alternative A begins at the existing Meeker Substation which is located in Section 31, T. 1 N., R. 94 W., near the S¼ Corner, as shown on Figure 5. A photograph of the Meeker Substation is shown on Figure C-3 of Appendix C.

The routing of Alternative A begins at the substation and extends westwards along the General Land Office (GLO) and BLM Cadastral surveyed 6th Principal Meridian (6th P. M.) Baseline for a distance of a little over 2 miles. This first leg of the route crosses agricultural lands which lie along low hills just south of the flood plain of the White River. In order to minimize disturbance of the productivity and the aesthetics of these lands, the first route alteration located the centerline of the ROW so as to follow an existing fenceline which is coincident with the 6th P. M. Baseline.

The applicant has been authorized by the Utility Corridor Committee of the Rio Blanco County Planning Commission to use steel pole structures along this beginning segment of the ROW. These structures are currently under design. Each pole will be multisided--6 to 8 sides or facets--and will have cross-arm supports in a "delta" configuration which will provide conductor spacing of 15½', or more, and thus will provide protection for large raptors. The steel structures will be painted a "sagebrush" green color so as to blend with background vegetation. One row of structures will be used to support the first circuit, and a second, parallel, row of structures will be constructed to support the second circuit. The separation of two circuits on two rows of structures is dictated by safety reasons which demand continuity of electrical transmission to provide life support requirements for underground miners at Tract C-b. The location of these structures along the fenceline will minimize disturbance to the cultivation and productivity of the surrounding farmlands. The area along the Baseline fenceline is shown on Figure C-6 of Appendix C. Except for the crossing of the valley of Piceance Creek, all other pole structures for the remainder of the route are to be constructed of wood poles according to the details of REA specifications as shown on Figures 3a, 3b and 3c.

West of the agricultural lands, the route turns to the southwest to ascend a canyon immediately west of Puckett Gulch. Originally this line was intended to closely follow the route of a natural gas pipeline which ascends the same ridge about ¼-mile to the west. The centerline of the ROW was moved to its present position to avoid induced electromagnetic effects to the pipeline.

The remainder of this section discusses the individual alternatives considered in this analysis. The three location alternatives A, B and C are shown on Figure 10.

B. Alternative A — The Applicant's Route

A direct line route between the Hacker Substation and Tower 694 —which is locally modified to avoid sensitive environmental features— the route considered as Alternative A. Their routing is shown on Figure 5 and a longitudinal profile is shown in Figure 6.

The following discussion of Alternative A is given in three principal parts. The first part is a discussion of routing considerations. The second part is a discussion of construction methods. The third is a discussion of environmental effects.

1. Routing Considerations

The routing of Alternative A begins at the existing Hacker Substation which is located in Section [illegible], T. [illegible] N., R. 74 W., near the Sy Corner, as shown on Figure 5. A photograph of the Hacker Substation is shown on Figure C-1 of Appendix C.

The routing of Alternative A begins at the substation and extends westwards along the section land office (BLM) cadastral surveyed 6th Principal Meridian (6th P.M.) baseline for a distance of [illegible] over 4 miles. This first leg of the route crosses agricultural lands which lie along the [illegible] south of the [illegible] River. In order to minimize disturbance of the productivity and the aesthetics of these lands, the first route alternative located the centerline of the ROW so as to follow an existing pole line which is coincident with the 6th P. M. Baseline.

The applicant has been authorized by the [illegible] County Commissioners of the Rio Blanco County Planning Commission to use these single structures along this beginning segment of the ROW. These structures are currently under design. Both pole guys on multiple [illegible] or steel [illegible]—are still have [illegible] supports in a single "pole" [illegible] which will provide a [illegible] of [illegible] and thus will provide protection for large animals. The single structures will be painted a "[illegible]" green color so as to blend with background vegetation. The line of structures will be used to support the first circuit, and a second parallel row of structures will be constructed to support the second circuit. The designation of two circuits on two rows of structures was dictated by safety reasons which demand continuity of electrical transmission to provide [illegible] support requirements for underground lines, [illegible] The location of these structures along the [illegible] will minimize disturbance to the [illegible] productivity of the surrounding farmlands. The [illegible] along the [illegible] is shown on Figure C-3 of Appendix C. Except for the crossing of the valley of [illegible] Creek, all other pole structures for the remainder of the route are to be [illegible] according to the [illegible] or REA specifications as shown in Figures [illegible] and [illegible].

West of the agricultural lands, the route turns to the southwest to ascend a [illegible] immediately west of [illegible]. Originally this line was intended to [illegible] the route of a natural gas pipeline which [illegible] the [illegible] a [illegible] to the west. The centerline of the ROW was moved to its present position to avoid induced electromagnetic effects in the pipeline.

Along this ridge another line change was made so as to circumvent an archaeological site containing lithic scatter.

At the top of the ridge, the route of Alternative A crosses the top of Kendall Peak, the highest point in this area. The original routing of Alternative A was changed to avoid a communications microwave tower of the Western Slope Gas Company which is located at the summit of Kendall Peak. The alteration of the routing was made so as to prevent interference of the transmission line with radio communications.

From the top of Kendall Peak, the route continues to the southwest, over an area of steep topography in the vicinity of Segar Gulch, and the Dry Fork of Piceance Creek beyond. The descent of the route from the top of Segar Mountain to the Dry Fork was carefully selected so as to pass through an area of patchy stands of Douglas fir which lie along the northern slope of this drainage. This routing will minimize the cutting and trimming needed to provide safety clearance for the conductors.

The routing continues to the southwest and was selected so as to avoid wells and other facilities of the Piceance Creek Gas Field. In this area the route turns more to the west so as reduce possible visibility from County Highway 5 in the valley of Piceance Creek. The route crosses County Highway 3 in Collins Gulch to the ridge beyond, where it turns southerly along a ridgeline. With this approach and descent to Piceance Creek, the transmission line approaches County Highway 5 at almost a right angle and thus minimizes the visibility of the transmission line from the highway and enables the crossing of agricultural lands with a minimum of disturbance.

At the crossing of Piceance Creek, a long span will cross the valley. The conductors will be supported on the north side by a steel structure to be built upon a steep ridge where guy wires cannot be used for support. At this location, consequently, a special 3-pole structure is to be built the northern end of this long span. The south end of the long span will be supported by a standard REA wooden structure to be located on the ridge south of Piceance Creek. This structure will support the long span by the use of supporting guy wires.

South of Piceance Creek, the line will follow fencelines and will parallel the main entrance road into Tract C-b. The length of the ROW from the Meeker Substation to the northern boundary of Tract C-b is approximately 19.5 miles. The transmission line will transmit power at 138 Kv to a switchyard located inside Tract C-b, immediately south of the northern boundary. Two circuits will carry the power from the switchyard to a substation near the mine shafts and to another substation to be located at the process area. The corridor within Tract C-b increases the length of the ROW for Alternative Route A to 22.5 miles.

The total area of the ROW required by this transmission line is estimated for this EA at about 526 acres. Of this, about 433 acres, or 82%, lie within public lands. Of this 433 acres, Along this ridge another line change was made so as to circumvent an archaeological site containing lithic scatter.

At the top of the ridge, the route of Alternative A crosses the top of Kendall Peak, the highest point in this area. The original routing of Alternative A was changed to avoid a communications microwave tower of the Western Slope Gas Company which is located at the summit of Kendall Peak. The alteration of the routing was made so as to prevent interference of the transmission line with radio communications.

From the top of Kendall Peak, the route continues to the southeast, over an area of steep topography in the vicinity of [illegible] Gulch, and the dry fork of Piceance Creek beyond. The descent of the route from the top of [illegible] Mountain to the dry fork was carefully selected so as to pass through an area of mature stands of Douglas fir which lie along the northern slope of this drainage. This routing will minimize the cutting and trimming needed to provide safety clearance for the conductors.

The routing continues to the southwest and was selected so as to avoid wells and other facilities of the Piceance Creek Gas Field. In this area the route turns more to the west so as reduce possible visibility from County Highway 5 in the valley of Piceance Creek. The route crosses County Highway 5 in Collins Gulch to the ridge beyond, where it turns southerly along a ridgeline. With this approach and descent to Piceance Creek, the transmission line approaches County Highway 5 at almost a right angle and thus minimizes the visibility of the transmission line from the highway and enables the crossing of agricultural lands with a minimum of disturbance.

At the crossing of Piceance Creek, a long span will cross the valley. The conductors will be supported on the north side by a steel structure to be built upon a steep ridge where guy wires cannot be used for support. At this location, consequently, a special 3-pole structure is to be built the northern end of this long span. The south end of the long span will be supported by a standard H23 wooden structure to be located on the ridge south of Piceance Creek. This structure will support the long span by the use of supporting guy wires.

South of Piceance Creek, the line will follow ridgelines and will parallel the main drainage into Tract C-b. The length of the ROW from the Meeker Substation to the northern boundary of Tract C-b is approximately [illegible] miles. The transmission line will transmit power at 138 kV to a switchyard located inside Tract C-b immediately south of the northern boundary. Two circuits will carry the power from the switchyard to a substation near the mine shaft and to another substation to be located at the process area. The corridor within Tract C-b increases the length of the Western Alternative Route A to [illegible] miles.

The total area of the ROW required by the transmission line is estimated for this [illegible] at about [illegible] acres. Of this, about [illegible] acres, or [illegible]%, lie within public lands. Of this 413 acres, about 50 acres lie within Tract C-b. About 93.45 acres, or 18%, of the ROW lie within private lands. This includes ROW which lies within the tract, but not within the existing site of the Meeker Substation. Thus, the proposed ROW for Alternative A contains about 0.5% of the 101,696 acres of the Site Area shown on Figure 5. The analysis of this report covers this area, including that portion of the ROW which falls within Tract C-b.

2. Construction Methods

Alternative A Considers that the lines will be constructed in part by conventional methods on the ground and in part by helicopter. Conventional construction will be used beginning at the Meeker Substation and ending near Station 308, north of Hay Gulch. From that point, helicopter construction will be used to cross Hay Gulch, Segar Gulch, and the Dry Fork of Piceance Creek and will be ended near Station 530. From that point, the remainder of the line into Tract C-b will be constructed by conventional methods on the ground.

Staging areas for materials layout and pole assembly will require from 3 to 4 acres of land. At present it is expected that only two staging areas will be needed. The first staging area will be located on private lands at or near the Meeker Substation. The second staging area will be located in the construction area on Tract C-b. No staging is now projected from any other area.

The methods of construction of this project are principally influenced by accessibility of the ROW. Access requirements have been estimated for the construction of the first circuit as is shown on Table 1 and Figure 6. The principal categories for access area: over existing roads and trails; passage overland; and over new roads and trains which will need to be built for the project. The construction of new access trails will require applications for and issuance of special use permits by the BLM.

Existing roads will be used to the fullest extent possible. Some grading of existing roads may be necessary wherever they are now impassable. Such grading will be performed in consultation with, and with the permission of the BLM after a Class III (100% pedestrian) cultural resource inventory has been performed and recommendations approved by the BLM due consideration is given possible archaeological sites and possible areas of Threatened and Endangered plant species. It is not now possible to define the amount of such road which will require grading or repair.

Wherever possible, passage by equipment will be made overland in a manner which will minimize disturbance to the surface and to vegetation. Such passage will be obtained through naturally passable terrain and vegetation. No earth-moving will be done. Some selective cutting of vegetation may be about 12 acres lie within Tract C-b. About 51.41 acres, or 38%, of the ROW lie within private lands. This includes ROW which lies within the tract, but not within the existing site of the Weber Substation. Thus, the proposed ROW for Alternative A contains about 0.5% of the 11,696 acres of the Site Area shown in Figure 5. The analysis of this report covers this area, including that portion of the ROW which falls within Tract C-b.

2. Construction Methods

Alternative A Considers that the lines will be constructed in part by conventional methods on the ground and in part by helicopter. Conventional construction will be used beginning at the Weber Substation and on up near Station 330, north of Ute Gulch. From that point, helicopter construction will be used to cross Ute Gulch, Sedar Gulch, and the first half of [illegible] Creek and will be ended near Station 3 [illegible]. From that point, the remainder of the line into Tract C-b will be constructed by conventional methods on the ground.

Staging areas for materials layout and pole assembly will require small areas of land. At present it is expected that only two staging areas will be needed. The first staging area will be located on private lands about near the Weber Substation. The second staging area will be located in the construction area on Tract C-b. No staging is now projected from any other site.

The methods of construction on this project are necessarily influenced by accessibility of the ROW. Access requirements have been estimated for the construction of the first segment of the ROW as shown in Table 1 and Figure 6. The principal categories for access are: overland travel on roads and trails, [illegible], and low roads and routes which will need to be built for the project. The construction of new access trails will require grading in the ROW and issuance of special use permits [illegible] of the ROW.

Existing roads will be used to the fullest extent possible. Some grading of existing roads may be necessary wherever they are not adequate. Such grading will be performed in consultation with and with the permission of the BLM after a Class III (100% pedestrian) cultural resources inventory has been performed and recommendations approved by the BLM. Due consideration is given [illegible] and potential areas of [illegible]. It is not now possible to define the amount of such road which will require grading or [illegible].

Wherever possible, passage by equipment will be made overland in a manner which will minimize disturbance to the vegetation and the ground surface. Such passage will be obtained through [illegible] to natural terrain and vegetation. No earthmoving will be done. Some selective cutting of vegetation may be

TABLE 1 - ESTIMATE OF SURFACE ACCESS REQUIREMENT FOR CONSTRUCTION

ITEM NO. (a)	DESCRIPTION OF ITEM	OVERLAND (b)		NEW TRAIL (c)	
		LENGTH IN FEET	AREA IN ACRES	LENGTH IN FEET	AREA IN ACRES
1	Overland access along "Base Line" fenceline.	2100	0.72		
2	Cross drainage.			100	0.04
3	Overland access along "Base Line" fenceline.	300	0.10		
4	Cross drainage.			300	0.13
5	Overland access along "Base Line" fenceline.	650	0.22		
6	Cross drainage.			100	0.04
7	Overland access along "Base Line" fenceline.	1250	0.42		
8	Cross drainage.	200	0.06	200	0.09
9	Overland access along "Base Line" fenceline.	600	0.20		
10	Cross drainage.			200	0.09
11	Overland access along "Base Line" fenceline.	2100	0.72		
12	Overland from existing road.	200	0.06		
13	Cross drainage and possible install culvert.			200	0.09
14	Overland access to PI No. 5 at Station 131+07.70.	2800	0.96		
15	Overland access.	450	0.15		
16	From about Station 131 use existing trail to about 3600' to the southwest.	NA	NA	NA	NA
17	New sidetrail cut to access structure.			400	0.18
18	New sidetrail cut to access structure.			350	0.16
19	New sidetrail cut to access structure.			350	0.16

(a) Numbered items correspond to those on Figure 6.
(b) Vehicular travel overland with minor selective cutting of vegetation.
(c) New trails which will require surface blading.
NA Not Applicable.

SHEET 1 OF 5

TABLE 1 - ESTIMATE OF SURFACE ACCESS REQUIREMENT FOR CONSTRUCTION

ITEM NO. (a)	DESCRIPTION OF ITEM	OVERLAND (b)		NEW TRAIL (c)	
		LENGTH IN FEET	AREA IN ACRES	LENGTH IN FEET	AREA IN ACRES
20	New trail bladed along top of ridge.			4200	1.92
21	Access along existing roads and overland access from approximately Station 213 to the fenceline near Station 290.	7700	2.65		
22	New gate installed in fenceline	NA	NA	NA	NA
23	Overland access utilizing primitive existing trail along ridge for limited access by tractor mounted augur & tensioning equipment.	5000	1.72		
24	Approximate end of conventional construction. Approximate beginning of helicopter construction at about Station 286 and ending at about Station 530 along a ROW length of about 24,400 feet.	NA	NA	NA	NA
25	Access from existing trails east of and along the divide between Hay and Segar Gulches for limited access by tractor-mounted augurs and for tensioning equipment. Overland access along new route to pole structure along ridgeline to north.	1800	0.61		
26	Access along existing trail on ridgeline of Segar Mountain.	NA	NA	NA	NA
27	Limited overland access by tractor-mounted auger and by tensioning equipment.	11,600	3.99		
28	Access along existing roads along bottoms of Hay and Segar Gulches and along the Dry Fork of Piceance Creek.	NA	NA	NA	NA

(a) Numbered items correspond to those on Figure 6.
(b) Vehicular travel overland with minor selective cutting of vegetation.
(c) New trails which will require surface blading.
NA Not Applicable.

TABLE 1 - ESTIMATE OF SURFACE ACCESS REQUIREMENT FOR CONSTRUCTION

ITEM NO. (a)	DESCRIPTION OF ITEM	OVERLAND (b) LENGTH IN FEET	OVERLAND (b) AREA IN ACRES	NEW TRAIL (c) LENGTH IN FEET	NEW TRAIL (c) AREA IN ACRES
29	Overland access along ridges south of the Dry Fork of Piceance Creek to point where conventional construction is again started with a structure located in the vicinity of Station 531.	3200	1.10		
30	New sidetrail to access structure. Access from existing trail described below in item 29 which travels ridgeline.			600	0.27
31	New forked sidetrail to access two structures from existing trail.			1000	0.45
32	New sidetrail to access structure.			400	0.18
33	New sidetrail to access structure.			200	0.09
34	New sidetrail to access structure.			100	0.04
35	New sidetrail to access structure.			150	0.04
36	New sidetrail to access structure.			50	0.02
37	New sidetrail to access structure.			150	0.06
38	New sidetrail to access structure.			300	0.13
39	Access to area over existing roads within the Piceance Creek Gas Field.	NA	NA	NA	NA
40	Overland access in the vicinity of the Piceance Creek Gas Field from about PI. No. 10 at Station 652+33.73 to another existing trail in the vicinity of Station 763+02.43.	11,100	3.04		
41	New trail requiring considerable road cuts on steep side slope. Estimated width up to 50 feet.			4000	3.66 (d)

(a) Numbered items correspond to those on Figure 6.
(b) Vehicular travel overland with minor selective cutting of vegetation.
(c) New trails which will require surface blading.
(d) Substantial road cut will be required.
NA Not Applicable.

SHEET 3 OF 5

TABLE 1 - ESTIMATE OF SURFACE ACCESS REQUIREMENT FOR CONSTRUCTION

ITEM NO. (a)	DESCRIPTION OF ITEM	OVERLAND (b)		NEW TRAIL (c)	
		LENGTH IN FEET	AREA IN ACRES	LENGTH IN FEET	AREA IN ACRES
42	Overland access to three structures on ridge located near PI NO. 13 or Station 816+89.84.	3000	1.03		
43	Overland access from trails and a pipeline ROW clearing which leads from the Piceance Creek Gas Field to item 42, above.	NA	NA	NA	NA
44	General access to area over Collins Gulch Road.	NA	NA	NA	NA
45	New sidetrail to access structure on ridge to west of Collins Gulch Road. Will require side slope cuts to estimated width of 50 feet.			1200	1.37
46	Access over existing trail network serving Piceance Creek Gas Field.	NA	NA	NA	NA
47	Overland access to three structures.	3400	1.17		
48	Overland access to structure from existing trail.	400	0.13		
49	New trail to structure.			800	0.36
50	Overland access across open swale to access three structures.	2000	0.68		
51	New sidetrail from existing trail to access structure.			200	0.09
52	New sidetrail to access structure.			100	0.04
53	New sidetrail to access structure.			200	0.09
54	New sidetrail to access structure.			200	0.09
55	New sidetrail to access structure.			100	0.04
56	New sidetrail to access structure.			50	0.02

(a) Numbered items correspond to those on Figure 6.
(b) Vehicular travel overland with minor selective cutting of vegetation.
(c) New trails which will require surface blading.
NA Not Applicable.

TABLE 1 - ESTIMATE OF SURFACE ACCESS REQUIREMENT FOR CONSTRUCTION

ITEM NO. (a)	DESCRIPTION OF ITEM	OVERLAND (b)		NEW TRAIL (c)	
		LENGTH IN FEET	AREA IN ACRES	LENGTH IN FEET	AREA IN ACRES
57	New sidetrail to access the structure at the northern end of the span over the valley of Piceance Creek.			100	0.04
58	Access from the surface support facilities located on Tract C-b along an existing trail which leads northerly to the ridge shoulder overlooking the southern side of the valley of Piceance Creek. This rude trail will require some selected blading to allow access by equipment; however, this route is mainly overland, and provides access to the steel structure which will support the southern end of the span over the valley of Piceance Creek. Provides access to items 59 through 63 below.	3600	1.23		
59	New sidetrail to access structure.			150	0.06
60	New sidetrail to access structure.			200	0.09
61	New sidetrail to access structure.			200	0.09
62	New sidetrail to access last off-tract structure.			200	0.09
63	New sidetrail to access structure.			200	0.09
	TOTALS FOR OVERLAND ACCESS	63,450	20.96		
	TOTALS FOR NEW TRAILS			17,250	10.40

(a) Numberd items correspond to those on Figure 6.
(b) Vehicular travel overland with minor selective cutting of vegetation.
(c) New Trails which will require surface blading.

SHEET 5 OF 5

required in some passages; however, this will be limited to selected individual plants or trees, and performed so as not to disturb the habitat or visual resource. In the portion of the ROW where helicopter construction will be used between Hay Gulch and the Dry Fork of Piceance Creek, overland access will be limited to single passages in and out by tractor mounted augers for the drilling of pole holes and for conductor tensioning equipment, and by small portable equipment. Such access will have a width of 15' or less. As estimated from Table 1, disturbance to the surface by overland passage for construction of the first circuit will affect 63,450' of passage and a surface area of 20.96 acres. Construction of the second circuit will utilize approximately the same overland access and will produce an equivalent disturbance.

Where conventional construction on the ground is obstructed by impassable terrain, new access trails will be constructed over selected and limited routings. These will be selected in conference and with the approval of the BLM. Such work will require removal of vegetation as well as earthwork to include cutting and filling by dozer and blading by patrol. It is expected that the width of such surface disturbance will have widths less than 20'. Based upon the present concept of access, an estimate of the new trails which will be required for the first circuit are shown on Table 1. The total, or aggregate length of such trails is 17,250' and has a total surface area of 10.40 acres. Although the second circuit is yet to be designed, it is estimated that construction will require new access trails of an equivalent acreage.

Access to structures uphill from Station 173 will be gained from the roads on top of Kendall Peak, over a steep existing trail which runs parallel to the ROW and by blading about 4200' of trail (Item No. 20) along the ridgeline. From this trail southwards over Kendall Peak to the fenceline near Station 290, access to the structures will be overland.

A gate (Item No. 22) will be constructed in this fence to provide overland access to about Station 308, where conventional construction will end and helicopter construction will begin. One overland trip passage, by tractor mounted auger and tensioning equipment, will be made along a rude trail on the ridgeline which reaches to about Station 336.

Helicopter construction will begin about Station 308 and will extend across Hay Gulch, Segar Gulch, and the Dry Fork of Piceance Creek to about Station 531, where conventional ground construction will be resumed. In this construction mode, pole holes will be dug by tractor mounted augers or other portable equipment which will travel overland in one passage in and out. The pole structures will be assembled at or near the Meeker Substation. A large helicopter will be used to airlift the assembled structures to each site. Dependent upon the

height of the particular structure, which could range from 70 to 100 feet, each pole will be emplaced in holes to as deep as 10 feet. The holes will be backfilled and compacted to the required design criteria.

Conductor wires will be strung from pole to pole by a sock-line carried by a light helicopter. The sock-line attaches to the conductor which is then winched from the ground. This operation is illustrated by the photographs shown on Figures 4a, 4b, and 4c given herein in Appendix A.

On the divides between Hay and Segar Gulches, and between Segar Gulch and the Dry Fork of Piceance Creek, ground access by tractor mounted augers and tensioning equipment will be gained over existing roads and trails which lie along the high ridge to the east and overland as shown on Table 1 for Items 25 through 27.

Access to valley bottoms will be gained over existing roads which follow Hay and Segar Gulches and the Dry Fork of Piceance Creek.

Conventional construction will be resumed at a structure to be located south of the Dry Fork at about Station 530. From this point southwards into Tract C-b, access will be on the ground.

The ROW south of the Dry Fork, between Stations 530 and P.I. No. 10 at Station 652+33.73 is accessible over existing roads which serve the Piceance Gas Field and more particularly from an existing road which parallels this leg of the ROW. The northern end of this leg will provide access over a new trail (Item No. 10) and overland (Item No. 29) to three structures. Two other structures will also be served by a new sidetrail (Item No. 31). Other structures lie along this leg a short distance from the existing access road, but will require construction of 7 new short sidetrails as shown for Item Nos. 32 through 38.

The leg of the ROW which runs from P.I. No. 10 to P.I. No. 11 at Station 763+02.43 can be reached entirely overland (Item No. 40). This area crosses the Piceance Creek Gas Field and easily is accessible over numerous roads and open mesa tops.

Where the ROW descends from the top of the mesa beginning at P.I. No. 11, and ending beyond P.I. No. 12 at Station 794+56.14, a new side hill trail (Item No. 41) will be cut which could extend as much as 4,000 feet. This trail will involve a cut on the uphill side and fill on the downhill side. This cut will be the largest item of earthwork needed for this project.

Three structures to be located near Station 808, near P.I. No. 13 (Station 816+89.94) and near Station 820, will be height of the particular structure, which range in radius from 15 to 100 feet. [illegible] will be [illegible] to [illegible] 10 feet. The berms will be [illegible] than the [illegible] design criteria.

Conductor wires will be strung from pole to pole in a catenary curve carried by a light [illegible]. [illegible] will be [illegible] on the [illegible] between [illegible] from the ground. This operation is illustrated by the [illegible] shown on Figures 4-4b and [illegible] in the Appendix.

On the [illegible] between [illegible] and [illegible] the [illegible] [illegible] will [illegible] the [illegible] the high [illegible] shown on [illegible] in Appendix [illegible].

[illegible] will [illegible] which [illegible] degree [illegible] and the [illegible] of [illegible].

[illegible] construction will be [illegible] to be [illegible] at about [illegible] from [illegible] on the ground.

The [illegible] of the Dry Fork, between [illegible] and [illegible] will [illegible] which [illegible] and more particularly [illegible] of [illegible] which [illegible] and [illegible] with [illegible] structures will [illegible] to [illegible] will [illegible] shown on [illegible].

The [illegible] will [illegible] [illegible] to [illegible] and [illegible] will be [illegible] and [illegible].

While the [illegible] from the [illegible] beginning at [illegible] between [illegible] will be [illegible] as a [illegible] will [illegible] on the [illegible]. This [illegible] will be [illegible] for the [illegible].

[illegible] will [illegible] and [illegible] will [illegible].

accessed overland (Item No. 42) from an existing pipeline ROW. These are located immediately east of the Collins Gulch Road.

The line will be constructed across Collins Gulch and will be accessible from Rio Blanco County Road No. 3 (Item No. 44). A new trail (Item No. 45) will be built to access a structure just to the west of this road near Station 835. Beyond this structure, access will be from the top of the mesa above.

Three structures to be located near Stations 849, 854 and 860 will require overland access (Item No. 47) beginning at existing roads and trails which lie along the mesa top and which service the Piceance Creek Gas Field.

Similarly, overland access from these same service roads will reach a structure to be located near Station 872 (Item No. 48) and also will lead to a new trail (Item No. 49) to provide access to another structure to the east, near Station 866.

Structures to be located along the ROW between PI No. 14 at Station 877+53.23 and PI No. 15 at Station 989+83 will be accessible from an existing trail (Item No. 46) which runs parallel to the ROW in this area, by travel overland, and by short new access trails. Three structures to be located near Stations 886,893, and 901, will be accessible overland (Item No.50) through an open swale. Beyond these, 7 short side trails (Item Nos. 51 through 57) will be bladed to reach structures located along this ridge.

The last structure at the southern end of this ridge will support the northern end of the long span across the valley of Piceance Creek, and will be designed and constructed as a special 3-pole steel self-supporting structure of about 80 to 85' in height. The location of this structure upon very steep terrain prevents the use of guy wires for lateral support of the long span.

The span across the valley of Piceance Creek will be approximately 1900 feet long. Orange warning markers will be attached to this span to provide a warning to pilots of low-flying aircraft.

Access for construction of the last leg of the line south of Piceance Creek leading into Tract C-b, will be gained from an existing trail (Item 58) which runs parallel and adjacent to the ROW. This trail is in poor condition and will require some grading. The northern end of the trail will provide access the standard REA wooden pole structure which si to support the southern end of the long span which will cross the valley of Piceance Creek. The stress of the long span will be supported by the use of guy wires.

About 5 other structures along this leg will be accessed from this same existing trail (Item No. 58) over new side-which was overland (Item No. 46) [illegible] an existing pipeline road. These are located immediately east of the Collins Gulch road.

The line will be constructed across [illegible] which [illegible] will be accessible [illegible] (see [illegible] 1, Item No. [illegible]). A [illegible] trail (Item No. 40) will be built to access a structure to the east of [illegible] near Station 883. Beyond this structure, access will be from the [illegible] of the same access.

Three structures to be located near Stations 8[illegible], 896 and 901 will require [illegible] across [illegible] (Item No. [illegible]) [illegible] the existing [illegible] trail which [illegible] top and which serves the [illegible].

Similarly, overland access from these same service roads will reach a structure to be located near station 822 (Item No. 48) and [illegible] (Item No. 49) to provide access to another structure to the north, near Station 925.

Structures to be located along the ROW between [illegible] at Station 9[illegible] and [illegible] at Station 9[illegible] will be accessed from an existing trail (Item No. 5[illegible]) which runs parallel to the ROW on this side, by overland overland, and by short new access trails. Three structures to be located near stations 936, 937 and 9[illegible] will be accessible overland (Item No. 5[illegible]) through [illegible]. Beyond these, [illegible] new trails (Item Nos. 51 through 5[illegible]) will be bladed to reach structures located along this ridge.

The last structure at the southern end of this ridge will support the northern end of the long span across the valley of [illegible] Creek, and will be designed and constructed as a special 3-pole steel self-supporting structure of about 90 to 100' in height. The location of this structure upon very steep terrain prevents the use of guy wires for lateral support of the long span.

The span across the valley of [illegible] Creek will be approximately 2000 feet long. Orange aerial markers will be attached to this span to provide a warning to pilots of low flying aircraft.

Access for construction of the [illegible] of the line south of [illegible] Creek canyon into [illegible] will be gained from an existing trail (Item No. 5[illegible]) which runs parallel and adjacent to the ROW. This trail is in poor condition and will require some grading. The northern end of the trail will provide access to the [illegible] wooden pole structure which is to support the southern end of the long span which will cross the valley of [illegible] Creek. The stress of the long span will be supported by the use of guy wires.

About 7 other structures along this leg will be accessed from [illegible] existing trail (Item No. 58) over new aligntrails (Item Nos. 59 through 63). The southernmost of these will provide access to the last structure before entering the switchyard within the northern boundary of Tract C-b.

The remaining ROW which lies within Tract C-b is shown on Figure 2a. Construction of the transmission line within the tract is integral with the design and construction of other items of the surface support facility and production areas. Since the entire area is industrial in character and has already undergone extensive earthwork and surface disturbance, no increment to such disturbance from this incremental construction is considered within this EA.

Construction of the second circuit has been projected to be started in 1984 and to be completed and energized by 1985. The second circuit is yet to be located by field survey; however, it will be constructed in the same manner as the first circuit. For the greater part, access will be obtained over the same roads and trails used in the construction of the first circuit. Some of these will require short extensions to reach the sites of paired pole structures for the second circuit. Surface disturbance from the construction of the second circuit should be less than that from the first but approximately in the same order of magnitude of from 10 to 13 acres.

3. Environmental Effects

Effects which might be considered to be adverse to the environment as a result of the implementation of Alternative A are:

- The increase in hazard to low-flying aircraft as a result of the suspension of conductors across large valleys.
- If upon examination of each pole hole location it is found that proposed threatened or endangered plant species are in danger, it would constitute a significantly adverse environmental effect. Such effect will be mitigated by moving the pole hole location. Any residual jeopardy to these species which may remain after mitigation will constitute a significant environmental effect which cannot be avoided.
- Should any subsurface archaeological data or artifacts be lost as a result of construction or decommissioning even after mitigating measures have been applied, this loss will constitute an adverse environmental effect which cannot be avoided.
- Placement of orange warning markers on conductors across the valley of Piceance Creek will provide a contrast rating of 12 in a VRM Class II area and constitutes a discordant impact.

Braille lines Nos. 23 through 631. The abandonment of these will probably occurs in the last stage before entering the switchyard within the northern boundary of Tract C-b.

The remaining ROW which lies within Tract C-b is shown on Figure I-8. Construction of the transmission line within the tract is integral with the design and construction of other items of the surface support facility and production areas. Since the entire area is scheduled for disturbance and has already undergone environmental assessment and surface disturbance, no increment in environmental impacts from this incremental construction is anticipated within this ROW.

Construction of the second circuit: has been programmed to be started in 1977 and to be completed and energized by 1980. The alignment of the second circuit is yet to be selected by field survey; however, it will be constructed in the same manner as the first circuit. For the most part, towers will be located near the same towers and in the right-of-way of the construction of the first circuit. Some of these will require minor adjustments in each case, the piers or steel tower structures for the second circuit. Surface disturbance from the construction of the second circuit should be less than that from the first, and approximately in the same order of magnitude of impacts as shown.

2. Environmental Effects

Effects which might be considered to be adverse to the environment as a result of the implementation of Alternative A are:

- The increase in hazard to low-flying aircraft as a result of the presence of conductors across large valleys.

- Although consideration of each route location has been given to the natural or man-made sight barriers along the line, it would constitute a significant adverse environmental effect. This effect will be minimized to the most practicable extent. Any detailed proposal to place towers in which the towers are either on ridges, will constitute a significant adverse environmental effect as the design has indicated.

- Where all significant archaeological data or artifacts are lost as a result of construction of the transmission line and accessory roads, these have been recorded in earlier environmental studies which cannot be replaced.

- The removal of native woody vegetation in construction access and tower site clearance areas will result in a loss of the habitat for wildlife and constitute a loss of the resource.

- Depending upon the rationale of development of a proposed panoramic view and overlook of Tract C-b which has been recommended by the BLM, the nearby presence of a transmission line may, or may not be, an adverse effect to recreation.

- The operation of a helicopter for construction will tend to increase the probability of injury or death--particularly to the pilot and will constitute an adverse environmental effect which cannot be avoided.

- New incoming workers for construction of the proposed transmission line will tend to increase the group of socioeconomic problems related to the explosive growth of population which is expected to be caused by energy developments in this area and is considered as a significantly adverse environmental effect which cannot be avoided.

- Commitment of land use for a transmission line ROW will have the effect that future land uses will have to consider the presence of the transmission line so as not to adversely affect the facility and its operation. This effect will tend to be adverse to that project.

- The contribution to the increment of gaseous emissions from the power plants in Hayden and Craig, Colorado.

- The generation of an increment of ozone to the atmosphere.

- The increment of emissions of combustion products from the operation of internal combustion engines in vehicles and aircraft during construction, operation, and decommissioning of the transmission line.

- During the period of construction there will be temporary disturbance to wildlife and some possible loss of productivity.

- In the construction of 17,250' of new access trails, about 10.40 acres of surface will be altered and an equivalent area of vegetation will be lost. Also in 63,450' of overland passage of construction equipment, some portion of 20.96 acres of surface will be disturbed with some associated loss of vegetation. This will result in:

  - A loss of vegetation as habitat for small mammals and birds. Some loss of small mammals will occur through loss of micro-habitat.

  - A loss of some habitat for large animals; and a possible diminishment of productivity.

- A loss of topsoil, an increase in susceptibility to erosion, a tendency to increase dissolved solids and siltation in downstream waters.
- A loss in grazing productivity, which, based upon 1978 actual use for an average of 16.2 acres per AUM, would approximate 1.9 AUMs. A portion of this loss would be recovered within one year whereas the remainder would be an annual loss until recovery was obtained.

o The activity of construction would have adverse effects upon:

- Deer in critical winter areas between December 1 through March 31. If activity were not abated during this period, there would be some loss in productivity in three areas:
  1.) West and southwest of the Meeker Substation in the Josephine Basin.
  2.) In the hills north of Piceance Creek.
  3.) In the hills south of Piceance Creek and north of Tract C-b.
- A nest of the golden eagle which is located in the N½ of Sec. 22, T. 1 S., R. 95 W., is reported to lie within approximately 500' easterly of Station 313. If this nest is occupied during the period March 1 through June 30, construction within ¼ mile may have an adverse effect upon nesting productivity.
- A nest of the red-tailed hawk which is reported to be near the center of Section 31, T. 2 S., R. 96 W., about 300' westerly of Station 988. If this nest is occupied during the period March 1 through June 30 construction within ¼ mile may have an adverse effect upon nesting productivity.
- Big game hunting during the period October 15 through November 15.
- Productivity of nearby grazing cattle through spooking.

o Construction of the second circuit will result in environmental effects similar to those derived from construction of the first.

A loss of topsoil, an increase in susceptibility to erosion, a tendency to increase dissolved solids and siltation in downstream waters.

A loss in grazing productivity. Using Bureau upon 1978 normal [illegible] for an average of [illegible] acres per AUM would approximate [illegible] AUMs. A portion of this loss would be recovered within one year whereas the remainder would be an annual loss until recovery was obtained.

The activity of construction would have adverse effects upon:

Deer in critical winter range between December 1 through March 31. If activity were not stopped during this period, there would be some loss in productivity in three areas:

1. South and southwest of the Meeker Substation in the Josephine Basin.

2. In the hills north of Piceance Creek.

3. In the hills south of Piceance Creek and north of Stake Springs Draw.

A nest of the golden eagle which is located in the [illegible] of Sec. [illegible], T. 1 S., R. 95 W., is expected to lie within approximately 500' easterly of Station [illegible]. If this nest is occupied during the period March 1 through June 30, construction within 1 mile may have an adverse effect upon nesting productivity.

A nest of the red-tailed hawk which is reported to be near the center of Section [illegible], T. 2 S., R. 95 W. About 300' westerly of Station [illegible]. If this nest is occupied during the period March 1 through June 30 construction within 1 mile may have an adverse effect upon nesting productivity.

Elk near [illegible] during the period October 15 through November 15.

Productivity of nearby riparian cattle through [illegible]

Installation of the second circuit would result in recurrence of effects as listed above for each operation after construction of the first.

B. Alternative B - White River Route

A second possible route runs westerly from the Meeker Substation south of the White River. A transmission line constructed along this route is considered herein as Alternative B and is shown on Figure 1b.

This route would begin at the Meeker Substation and would follow the alignment described under Alternative A as crossing westwards across agricultural lands on a route coincident with the fence along the Cadastral Baseline. About 2 miles west of the Meeker Substation, the route of Alternative B would separate from that of Alternative A. The route of Alternative B would instead follow the southern bank of the White River--not along the flood plain-- but in the foothills and high ground which lies south of the floodplain.

The route leaves the river at the lower ends of Kendall and Hay Gulches and turns south in the vicinity of the Dry Fork of Piceance Creek and Little Corral Gulch. From this point the route joins a corridor for pipelines and utility lines which runs from White River City to the Piceance Gas Field. This route crosses the Piceance Gas Field close to Mobil Camp and either would turn south directly to Tract C-b or would join the same route followed by Alternative A along the ridge west of Collins Gulch.

The route crosses southwards over Piceance Creek and enters the northern boundary of Tract C-b to serve the switchyard to be located at the same point as for Alternative A.

This route would be approximately 25 miles long, or about 10% longer than that for Alternative A.

The routing of Alternative B crosses land, vegetation and habitat which are very similar to those of Alternative A. Effects to the various aspects of the environment would be similar; however, since the magnitude of such effects is roughly proportional to the area or length of the corridor, most environmental effects caused by the route of Alternative B may be expected to be 10 percent larger than for that of Alternative A.

Distinct effects which might be attributed to the characteristics of the route of Alternative B are identified as follows:

The route of Alternative B, where it passes south of the White River, has a high visibility from the valley where many residences are located and from Colorado Highway 64 which is a main well traveled route between Rifle and Meeker. A transmission line in this area would result in a contrast rating of 15 or more and would be inconsistent with management objectives for the VRM Class II rating which has been assigned to this area.

d. Alternative B - White River Route

A second possible route runs westerly from the Meeker Substation south of the White River. A transmission line constructed along this route is considered herein as Alternative B and is shown on Figure 1b.

This route would begin at the Meeker Substation and would follow the alignment described under Alternative A but crossing westward on more private land than a route coincident with the [illegible] pipeline. About 1 miles east of the Meeker substation, the route of Alternative B would separate from that of Alternative A. The route of Alternative B would instead follow the southern bank of the White River—not along the flood plain— but in the foothills and high ground which lies south of the floodplain.

The route leaves the river at the lower ends of [illegible] and [illegible] Gulches and turns south in the vicinity of the Dry Fork of Piceance Creek and Little [illegible] Gulch. After this point the route joins a corridor for pipelines and utility lines which runs from White River City to the Piceance Gas Field. This route crosses the Piceance Gas Field close to [illegible] and continues south, generally to [illegible] Creek which is the same route followed by Alternative A along the [illegible] east of [illegible] Gulch.

The route crosses southwards over Piceance Creek and enters the northern boundary of Tract C-b to serve the substation to be located at the same point as for Alternative A.

This route would be approximately 25 miles long, or about 10% longer than that for Alternative A.

The routing of Alternative B is essentially over land, vegetation and habitats which are very similar to those of Alternative A. Effects on the various aspects of the environment would be similar. However, since the magnitude of such effects is roughly proportional to the area of disturbance, most environmental effects caused by the route of Alternative B may be expected to be 10 percent greater than for that of Alternative A.

Significant effects which would be attributed to the characteristics of the route of Alternative B are identified as follows:

The route of Alternative B, where it passes south of the White River, has a high visibility from the valley where many residences are located and from Colorado Highway 64 which is a main east-west traveled route between Rifle and Meeker. A transmission line in this area would result in a [illegible] rating of 15 or more and would be inconsistent with management objectives for the VRM class II rating which has been assigned to this area.

The route of Alternative B is different from the other two routes in that it parallels and lies close to the cliffs and steep terrain which provides winter habitat to the wintering bald eagle, a protected species. Although, the design on the transmission poles and conductor spacing are such as to mitigate effects upon large raptors, and no significant adverse effects are expected ro result from any of the routes, any residual tendency for harm to these species would be comparatively higher for this Alternative Route B than for the others.

The most significant factor concerning the comparison of routes and their suitability for the construction of a transmission line, is the fact that preliminary discussion with BLM officials and the Utility Corridor Committee of the Rio Blanco County Planning Commission has indicated that the location of the proposed transmission line along the route of Alternative B would excessively degrade the visual resource of the of the White Rive (VRM Class II III) and that the route probably could not be approved under the objectives and criteria for land use planning established by the Rio Blanco Planning Commission. Consequently, Alternative B does not appear to offer a viable route.

The route of Alternative B is slightly closer to the strutting ground of the Sage Grouse in the vicinity of Mobil Camp so that predation by eagles using the transmission poles for perches would tend to be higher for Alternative B than for Alternative A.

The route of Alternative B would lie close to the landing strip located near Mobil Camp and might cause increased hazard to aircraft using that facility. The other two alternative routes do not pose such hazard because they are distant from the landing strip.

The route of Alternative B would cross the area known to have nests of the red-tailed hawk and would tend to disturb these raptors to about the same extent as would the route of Alternative A.

A Class III(100% pedestrian) cultural resource inventory has not been performed along the route of Alternative B. Therefore, the effects of this proposal on cultural resources is unknown.

C. Alternative C - Meeker-Rifle Corridor Route

The third and last routing alternative considered in this analysis, is the possible route southwards from the Meeker Substation which generally follows or parallels the route of the existing Meeker-Rifle Utility Corridor.

This route would extend southward parallel to Colorado Highway 13 and 789 to a point in the vicinity of Dry Thirteen Mile Creek or some other point near Rio Blanco Store, where the route would run westerly parallel to the upper reach of Piceance Creek and would finally enter Tract C-b from the east.

This route is from 25 to 26 miles long and about 20% longer than the route of Alternative A and about 10% longer than the route of Alternative B.

A Class III (100% pedestrian) cultural resource inventory has not been performed along the route of Alternative C. Therefore, the effects of the proposed route C on cultural values are unknown.

The general environmental effects that apply to all the routes and which have been discussed under Alternative A, above, also apply to the route of this Alternative C. Effects to the environment will be similar, but the magnitude of these effects will be proportionately greater for the longer routes. Thus in general, a comparison of effects for Route C would indicate that they would tend to be 20% greater than for Alternative A, and 10% greater than for Alternative B. The actual environmental costs for such over-expenditure would be felt as pollution of air and waters where the metal of the conductors would be mined, at the smelters, and at the fabricating plants. The route would also require the greater use of timber for more pole structures, the greater expenditure for services and fuels, and would result in a greater duration of construction which would tend to extend the adverse effects which accrue to the group of socioeconomic problems related to rapid regional growth.

The Meeker-Rifle utility corridor already is occupied by 5 existing transmission lines whose presence is highly visible from Colorado Highway 13 and 789. This corridor has a high visual sensitivity and has been the subject of adverse criticism from the local populace due to the concentration of pole and other support structures.

The Utility Corridor Committee of the Rio Blanco County Planning Commission in preliminary discussions about the project has indicated that the addition of another transmission line to the Meeker-Rifle corridor would be highly objectionable and that Alternative C probably could not be approved under the objectives and criteria for land use planning established by the Rio Blanco County Planning Commission. As a consequence, the route of Alternative C does not appear to be viable.

D. Alternative D - No Action

Since the U. S. Mine Safety and Health Administration has required that the Tract C-b mining operation have two reliable sources of electrical power to insure operational safety, and since the use of electrical power generated at large commercial generating stations is the most economical source of such electricity, the alternative of no action would be tantamount to a mandate to cease all development activity at Tract C-b.

There are only two other economically viable alternatives for the generation of electrical power at the Tract--natural gas and coal. With transmitted power having been taken as the prime source of electrical energy, the stand-by source of power was chosen to be natural gas-fired generating units on the site. The only other viable alternative for stand-by electrical power was to utilize diesel engine powered generating units. The increasing cost, the diminishing availability, long truck transport which would increase highway traffic, and other environmental considerations all mitigated against the use of diesel fuel as the stand-by source. Since natural gas is facing a long-term decline in availability and increase in price, this fuel was not designated as the prime source for electrical generation. It has been speculated that the low BTU retort gas might be utilized as a source of energy for generating needs; however, practical design considerations for such possible use does not appear either to be technically feasible, economically competitive, or sufficiently reliable to be considered as the primary electrical source in preference to the immediate availability of transmitted electrical power. It is thus seen that the transmission of electrical energy into the site is the only viable option.

Although shale oil itself has been demonstrated to be a useful boiler fuel, shale oil has an intrinsically higher priority and value for refining of mobile liquid fuels and other hydrocarbon products. It is more desirable to use coal for power generation and to reserve shale oil for mobile liquid fuels.

SECTION III - AFFECTED ENVIRONMENT

The construction and operation of the projected transmission line to Tract C-b will have affects upon four different levels of environment: 1.) The Site Area; 2.) Rio Blanco County and its related area of trade; and, 3.) The nation, as defined by our need for energy; and, 4.) Our current geopolitical situation at the international level.

This discussion is limited to the environment of the Site Area only (as shown on Figure 5). Other considerations of the environment are discussed in Reference 1.

1. Climate and Air Quality

(a) Climate

The climate of the Site Area is that of the arid steppe which is typical of that found throughout the western slope of Colorado. This climate is characterized by a high proportion of days of sunshine to cloudiness, and a low average annual precipitation. The summer days are warm, nights are cool, and the relative humidity is low. In winter, temperatures are low, but are moderated by dry air and strong solar radiation.

Meteorological measurements have been made at stations near Rifle, at the Little Hills Experimental Station, and at Tract C-b. Table 2, gives a summary of data. The years of record for Rifle and Little Hills Stations span the years 1959 through 1973. The data for Tract C-b is for the period of November, 1974, through October, 1975.

TABLE 2

SUMMARY OF CLIMATOLOGICAL DATA

	Little Hills	Tract C-b	Rifle
Elevation (feet)	6,140	6,880	5,400
Temperature (^oF) Mean	43^o	$39-44^o$	46^o
Average Max. Temperature	65^o	$68-68^o$(a.)	70^o
Average Min. Temperature	20^o	$-2-16^o$	21^o
Temperature Extremes	-48 to 97^o	-51 to 100^o	-38 to 99^o
Precipitation (inches)	13"	2.98-3.95"	11"

(a.) approximate estimate

Relative humidity at Tract C-b for the year of record varied from 8% to 100%. During the winter, hourly averages varied from 72% on the plateau to 75% in Piceance Creek. In the summer, these were 29% and 39%, respectively.

Strong solar radiation results in frequent high midsummer afternoon temperatures. Daytime readings above 100°F are not uncommon as opposed to nighttime readings in the mid 40's. July tends to be the hottest month. Low midwinter temperatures are common due to the cold air drainage downwards into the valleys. December and January are the coldest months with readings below -35°F being common.

On the average, elevations below 5,500 feet have approximately 124 frost-free days compared to 30 to 50 days at elevations above 6,000 feet.

1.) Precipitation

Although 12 to 24 inches of precipitation have been measured annually for other parts of the Piceance Basin, the 1974-1975 year of record measured an average annual precipitation of about 3-4 inches. This is consistent with the generally dry climate which, when combined with irregular topography and related orographic effects, results in a variable precipitation pattern. Generally, average annual precipitation along the northern edge of the Site Area is about 12 inches, compared to 24 inches in the higher elevations along the southern rim of the Piceance Basin. Most of the precipitation occurs as rain during early spring, late summer and fall. Summer rain generally occurs as thunderstorms moving across the area towards the north-northeast. Usually these storms are of short duration, and frequently are of high intensity locally. Fewer than 10 days a year have precipitation greater than 0.5 inches. Drought years, or years of rainfall below normal, occur 3 or 4 out of 10 year periods (Ref. D).

2.) Snowpack

Precipitation as snow falls any time from October to April. Snow at lower elevations may have depths of from 2 to 3 feet; however, due to strong solar radiation, snow seldom persists at exposed locations below 7,000 feet. Snow at higher elevations reaches depths of 6 feet or more and the snow may persist until April. In certain locations at higher elevations, travel may become impossible due to drifting snow.

3.) Winds, atmospheric stability and inversions

Geostrophic winds at higher altitudes control the surface winds, resulting in reduced velocity and a mild surface flow. Above 8,500 feet elevation, wind flow is predominantly from the southwest throughout most of the year. Wind roses at the 100-foot level are shown in Figure 7.

Relative humidity at Beach C-4 for the year of record varied from 48 to 100%. During the winter, hourly averages varied from 75% on the plateau to 95% in Piceance Creek. In the summer, these were 50% and 65%, respectively.

Strong solar radiation results in frequent high midsummer afternoon temperatures. Daytime readings above 100°F are not uncommon as opposed to nighttime readings in the mid 40's. July tends to be the hottest month. Low midwinter temperatures are common due to the cold air drainage downward into the valleys. December and January are the coldest months with readings below -25°F fairly common.

On the average, elevations below 6,500 feet have approximately 100 frost free days compared to 50 to 90 days at elevations above 8,000 feet.

[illegible] Precipitation

Although 12 to 24 inches of precipitation have been measured annually in other parts of the Piceance Basin, the 1974-1976 period of record recorded an average annual precipitation of about 12.5 inches. This is consistent with the generally dry climate which, when combined with irregular topography and related orographic effects, results in a variable precipitation pattern. Generally, average annual precipitation along the northern edge of the site area is about 11 inches and increases to 24 inches in the higher elevations along the southern rim of the Piceance Basin. Most of the precipitation occurs as rain during early spring, late summer and fall. Summer rain generally occurs as thunderstorms moving across the area towards the north-northeast. Usually these storms are of short duration, and frequently are of high intensity locally. Fewer than 10 days a year have precipitation greater than 0.5 inches. Drought years, or years of rainfall below normal, occur 3 or 4 out of 10 year periods (Ref. 1).

[illegible] Snowpack

Accumulation of snow fails any time from October to April. Snow at lower elevations may have depths of from 1 to 2 feet; however, due to strong solar radiation, snow seldom persists on exposed locations below 7,000 feet. Snow at higher elevations reaches depths of 4 feet or more and the snow may persist until April. In certain locations at higher elevations, travel may become impossible due to drifting snow.

[illegible] Winds, atmospheric stabilities and inversions

Geostrophic winds at higher altitudes control the surface winds, resulting in reduced velocity and a mild surface flow. Above 8,500 feet elevation, wind flow is predominantly from the southwest throughout most of the year. Wind roses at the 100-foot level are shown in Figure 7.

Although surface winds on the plateaus and uplands of the Site Area also are predominantly from the southeast, diurnal terrestrial heating and cooling daytime airflow is both up-valley and vertical, whereas night time flow is downward into the valleys. Depression winds flow down the drainages in the Piceance Creek Valley. Thus prevailing wind flows are variable locally--particularly in the Piceance Creek Valley, where the prevailing wind has a dominant direction from the east-southeast. The depression winds result in a noticeable lowering of temperatures in the valleys.

Measurements, from aircraft and by acoustical sounders near Tract C-b indicate that during the 1974-1975 period of measurement inversions occurred over Piceance Creek Valley for 57% of the days, and over Tract C-b for 77% of the days. The average inversion height varies from about 560 feet to over 1200 feet. The data indicate that inversions persist for one day or longer in only 4% of the cases.

Atmospheric stability was analyzed from meteorological tower measurements at Tract C-b using vertical temperature difference. The analysis shows that, during fall and winter, the air masses are characterized by Pasquill-Gifford Stability Classes "E" and "F" as being more stable than the air masses during spring and summer--when Classes "A" and "B" prevail. Generally, in the fall and winter, the air mass is more stable during daylight hours than at night. During spring and summer the air mass becomes less stable during the daylight hours, probably due to warming of the air so that greater stability occurs at night.

The mountains and rough terrain of the area significantly modify the flow of upper level air because of frictional effect. In the valleys with broad floors, such as Piceance Creek, inversions usually form at night. Air movement beneath these inversions is minimal and wind direction is determined by the local downslope circulation. These inversions are usually dissipated by surface heating during the day, but may persist for portions of the day.

The frequency of measureable winds averages 12% for the year. Winds seldom reach an intensity where they can be considered to have an influence on the resources in the area.

(b) Air quality

Air quality throughout the region is high because of low population and associated low-levels of combustion of fossil fuels.

Site Area air quality is of concern due to the development of oil shale projects. The developers of these projects are performing extensive acquisition of data to project future effects upon site quality.

Although surface winds on the plateaus and uplands of the Site Area also are predominantly from the southeast, diurnal terrestrial heating and cooling daytime air flow is both up-valley and vertical, whereas night-time flow is downward into the valleys. Depression winds flow down the drainages in the Piceance Creek Valley. These prevailing wind flows are variable locally--particularly in the Piceance Creek Valley, where the prevailing wind has a dominant direction from the east-southeast. The depression winds result in a noticeable lowering of temperatures in the valleys.

Measurements, from aircraft and by acoustical sounders near Tract C-a indicate that during the 1974-1975 period of measurement, inversions occurred over Piceance Creek Valley for 57% of the days, and over Tract C-b for 77% of the days. The average inversion height varies from about 560 feet to over 1200 feet. The data indicate that inversions persist for one day or longer in only 4% of the cases.

Atmospheric stability was analyzed from meteorological tower measurements at Tract C-b using vertical temperature differences. The analysis shows that, during fall and winter, the air masses occur as defined by Pasquill-Gifford Stability Classes "E" and "F" as being more stable than the air masses during spring and summer when Classes "A" and "B" prevail. Generally, in the fall and winter, the air mass is more stable during daylight hours than at night. During spring and summer, the air mass becomes less stable during the daylight hours, probably due to warming of the air so that greater stability occurs at night.

The mountains and rough terrain of the area significantly modify the flow of upper level air masses by frictional effects. In the valleys with broad floors, such as Piceance Creek, inversions usually form at night. Air movement beneath these inversions is minimal and wind direction is determined by the local drainage air circulation. These inversions are usually dissipated by surface heating during the day, but may persist for portions of the day.

The frequency of mesoscale winds averages 12% for the year. Winds seldom reach an intensity where they can be considered to have an influence on the resources in the area.

<u>(b) Air Quality</u>

Air quality throughout the region is high because of low population and associated low-levels of combustion of fossil fuels.

Site Area air quality is of concern due to the development of oil shale projects. The developers of these projects are performing extensive acquisition of data to project future effects upon air quality.

The measurement of air quality as part of the baseline monitoring program on Tract C-b shows that the average background concentrations of the constituents monitored are fairly low. Measurements for the period November 1974, through October,1975, are abstracted from Tract C-b data (Ref. H), and are shown in Table 3.

Preliminary analysis by Tract C-b consultants indicate the following comments (Ref. H).

No correlations of any constituents measured have been made with possible sources.

The concentrations of NO and NO_2 are above global background and could be attributable to internal combustion engines used near the monitoring stations along County Road 5, and on Tract C-b.

The concentration of SO_2 is within the range of global background. The detailed development plan speculates that the high H_2S might be derived from nearby gas fields. However, this is not compatible or consistent with the methane analyses which are within global background levels. Ozone concentrations are consistent with global concentrations.

Concentration of CO is considerably higher than global. The Tract C-b analysis suggests that this is due to motorized traffic along County Road 5.

The concentrations of nonmethane hydrocarbons are considered as possibly coming from naturally occurring organic compounds due to growth of vegetation during seasonal periods. This interpretation is subject to further study.

Particulate concentrations are largely related to wind, the activities of man in raising fugitive dust, and to naturally occurring organic aerosols.

Measurements of selenium, mercury and arsenic, as well as a broad suite of other trace metals, together with radioactivity, indicate that all of these elements are at extremely low concentrations in the ambient atmosphere near Tract C-b.

All of these measurements indicate that air quality in the Site Area is good, but has been affected, at least to a minimal degree, by regional activities of man.

2. Geology, Topography, Minerals and Alluvial Valleys

(a) Geology

The Site Area lies within the northeastern sector of the Piceance Basin, which is the major structural feature of the area.

TABLE 3

AVERAGE ANNUAL CONCENTRATIONS OF GASES AND PARTICULATES AT TRACT C-b

CONSTITUENT	Station 020 in Piceance Valley	Station 023 on Plateau at Tract C-b	Global Average Background
NO ug/m^3	4.5	3.1	0.2-2.15
NO ug/m^3	3.5	1.7	1.9-2.6
O_3	69.3	64.9	40-80
Non-methane HC ug/m^3	76.2	124.2	---
$CH_4 ug/m^3$	852.3	845.5	814-977
CO ug/m^3	1237.2	867.8	100-200
$SO_2 ug/m^3$	0.7	1.2	1-4
H_2S ug/m^3	0.1	1.8	0.3
Particulates ug/m^3	13.2	12.2	---

(See Figure 8, which shows surface geology of the Site Area.) The northeastern end of the ROW begins in a valley formed by the erosion of the Tertiary Wasatch Formation at the upturned northeastern corner of the Piceance Basin. At this location the steeply dipping sediments of the Cretaceous Williams Fork Formation and older sediments are exposed in the Grand Hogback, which lies east of Colorado Highway 13, and which has a north-south strike trend. The GRand Hogback dips steeply towards the west and forms the eastern flank of the Piceance Basin.

A well developed sequence of sediments underlies the Site Area. The shallower sedimentary section of interest includes 4,000 to 5,000 feet of the Cretaceous Mancos Shale; up to 5,600 feet of the Cretaceous Mesa Verde Group; 5 to 50 feet of the Tertiary Ohio Creek Conglomerate; an unnamed sequence of brown sandstone and dark shale, varying in thickness from 0 to 500 feet; about 1,675 feet of the Tertiary Fort Union combined upper and lower members; about 3,400 feet of the Tertiary Wasatch Formation; up to 3,000 feet of the oil-shale bearing Green River Formation; and up to 1,250 feet of the Tertiary Uinta Formation.

Quaternary alluvium occurs along all of the major and minor drainages.

Beginning at the northeastern end, where the Meeker substation is built on the Wasatch Formation, the ROW rises upwards through the Anvil Points and Parachute Creek Members of the Green River Formation and through the Uinta Formation, which caps Kendall Peak. From Kendall Peak all the way to Tract C-b, the surface is immediately underlain by the Uinta Formation, by colluvium locally, and by alluvium in the bottoms of drainages.

The southern half of the ROW crosses the anticlinal structure of the Piceance Creek Dome. This structure has an axial crest which trends N 65°W and plunges both to the northwest and southeast. Most dips around the structure are low. The southwestern flank of this structure is defined by a syncline, whose axis lies just south of Piceance Creek. About 2 miles south of the axial crest two faults form a small graben.

A series of northwest-southeast trending faults occurs in the vicinity of Kendall Peak and Segar Mountain. These faults display both normal and reverse movement which may be indicative of a local graben related to structural adjustment near the northeast corner of the Piceance Basin.

(b) Topography

The Site Area of the route of Alternative A lies across the northeastern corner of the Piceance Basin. Beginning at the northeastern end of the Site Area, the right-of-way (ROW) lies

(See Figure 4 which shows surface geology of the Site Area.) The northeastern end of the ROW begins in a valley formed by the erosion of the Tertiary Wasatch Formation at the upturned northeastern corner of the Piceance Basin. At this location, the steeply dipping sediments of the Cretaceous Iles and Book Formation and older sediment are exposed in the Grand Hog-back, which lies east of Colorado Highway 13, and which has a north-south strike trend. The Grand Hogback dips steeply to-ward the west and forms the eastern flank of the Piceance Basin.

A well developed sequence of sediments underlies the Site Area. The shallowest sedimentary section of interest includes 6,000 to 7,000 feet of the Cretaceous Mancos Shale; up to 5,500 feet of the Cretaceous Mesa Verde Group; 5 to 50 feet of the Ter-tiary Ohio Creek Conglomerate; (an unnamed sequence of brown sandstone and dark shale, varying in thickness from 0 to 500 feet); about 1,525 feet of the Tertiary Fort Union combined upper and lower members; about 3,400 feet of the Tertiary Wasatch Formation; up to 3,000 feet of the oil-shale bearing Green River Formation; and up to 1,350 feet of the Tertiary Uinta Formation.

Quaternary alluvium occurs along all of the major and minor tributaries.

Beginning at the northeastern end, where the Meeker substation is built on the Wasatch Formation, the ROW rises upwards through the Anvil Points and Parachute Creek Members of the Green River Formation and through the Uinta Formation, which caps Kendall Peak. From Kendall Peak all the way to Tract C-a, the surface is immediately underlain by the Uinta Formation, by colluvium, locally, and by alluvium in the bottoms of drainages.

The southern half of the ROW crosses the anticlinal structure of the Piceance Creek Dome. This structure has an axial crest which trends N 65°W and plunges both to the northwest and south-east. Most dips around the structure are low. The southwestern flank of this structure is defined by a synclinal axis, which lies just south of Piceance Creek. About 2 miles south of the axial crest two faults form a small graben.

A series of northwest-southeast trending faults occurs in the vicinity of Kendall Peak and Cedar Mountain. These faults dis-play both normal and reverse movement which may be indicative of a local graben related to structural adjustment near the northeast corner of the Piceance Basin.

(b) Topography

The Site Area of the route of Alternative A lies across the northeastern corner of the Piceance Basin. Beginning at the northeastern end of the Site Area, the right-of-way (ROW) lies on low, rolling foothills adjacent to the flood plain of the White River. The substation which is the point-of-beginning of the line, lies at an elevation of about 6,250 feet (MSL), or approximately 170 feet above the White River. The ROW extends 2¼ miles westwards across the same foothills and turns to the southwest for a 1600-foot ascent to the top of Kendall Peak. The elevation at the top of the peak is 7,980.

The top of Kendall Peak is a mesa surface which slopes to the southwest. From Kendall Peak the ROW trends to the southwest and crosses at about a right angle across a series of deep canyons which trend northwesterly. In sequence from the northeast to southwest, these canyons are Hay Gulch, Segar Gulch, and the Dry Fork of Piceance Creek. From the crest of the ridge lines to the bottom of the gulches there is about 440 to 480 feet of difference in elevation. Southwest of the Dry Fork of Piceance Creek the ROW rises again to the mesa surface near the Triangulation Station Myers which lies at an elevation of 7,841. From Myers, the ROW turns more to the west across the mesa towards the Piceance Dome Gas Field. From that point the topography consists of a gently rounded mesa surface which is dissected by a series of southerly-trending dry washes which flow first into Jessup Gulch and then across Collins Gulch. On the south-southwesterly ridge which separates Collins Gulch from Gardenhire Gulch, the ROW descends from the mesa surface down to a crossing of the valley of Piceance Creek. At the point of crossing, the valley is relatively flat across a width of about 1,500 feet and an elevation of about 6,300 feet. From the bottom of the valley the ROW ascends the southern slope of Piceance Valley on a gentle ridge which rises to Tract C-b immediately west of Cottonwood Gulch. The line terminates at the surface support and processing facilities of the mine which lies on a rounded mesa surface which slopes northerly. The terminal facilities lie at elevations around 6,800 feet--about 550 feet higher than the point-of-beginning.

The topography and fluvial cycle are in late youth. Slopes at the toes of valley bottoms are concave and relatively gentle. Side slopes are generally steep on exposed rock outcrops. Near the upper mesa surface the edges or crowns are gently rounded and convex.

(c) Mineral resources

The sediments which underlie the ROW and adjacent to the Site Area are of considerable economic potential, due to contained deposits of fossil fuels and other minerals. These include oil shale, oil, natural gas, nahcolite and dawsonite--saline minerals which contain sodium and aluminum--and asphaltum Coal measures probably underlie the Site Area, but at depths not considered extractable under current economics. These mineral resources are shown on Figure 9.

on low, rolling foothills adjacent to the flood plain of the White River. The substation which is the point-of-beginning of the lines lies at an elevation of about 5,[illegible] feet (MSL) or approximately 170 feet above the White River. The ROW extends 2½ miles southwards across the same foothills and turns to the southwest for a 1600-foot ascent to the top of Kendall Peak. The elevation at the top of the peak is 7,[illegible].

The top of Kendall Peak is a mesa surface which slopes to the southwest. From Kendall Peak the ROW trends to the southwest and crosses, at about a right angle across a series of deep canyons which trend northeasterly. In sequence from the northeast to southwest, these canyons are Hay Gulch, [illegible] Gulch, and the Dry Fork of Piceance Creek. From the crest of the [illegible] line to the bottom of the gulches there is about 400 to [illegible] feet of difference in elevation. Southwest of the Dry Fork of Piceance Creek the ROW rises again to the mesa surface near the Triangulation Station Myers which lies at an elevation of 7,[illegible]. From Myers, the ROW turns more to the west across the mesa towards the Piceance Creek Gas Field. From that point, the topography consists of a gently rounded mesa surface which is dissected by a series of southerly-[illegible] [illegible] which flow first into [illegible] Gulch and then [illegible] into the Gulch. On the south-southwesterly ridge [illegible] Calamity Gulch from [illegible] Gulch, the ROW descends from the mesa surface down to a crossing of the valley of Piceance Creek. At the point of crossing, the valley is relatively flat across a width of about 1,[illegible] feet and an elevation of about 6,300 feet. From the bottom of the valley the ROW ascends the southern slope of Piceance Valley up a small ridge which rises to Tract C-b immediately west of Stewart Gulch. The line terminates at the surface support and processing [illegible] site of the mine which lies on a rounded mesa surface which slopes northerly. The terminal facilities site is at around 6,[illegible] feet--about 650 feet higher than the point-of-beginning.

The topography and fluvial cycle are in late youth. Slopes at the edge of valley bottoms are concave and relatively gentle. Side slopes are generally steep or exposed rock outcrops. Near the upper mesa surface the edges of streams are gently rounded and convex.

(c) Mineral resources

The sediments which underlie the ROW and adjacent to the site area are of considerable economic potential, due to contained deposits of fossil fuels and other minerals. These include oil shale, coal, natural gas, nahcolite, and dawsonite--saline minerals which contain sodium and aluminum--and sodium. Coal measures probably underlie the site area, but at depths not considered extractable under current economics. These mineral resources are shown on Figure 9.

1.) Oil shale

Oil shale is known to underlie the ROW and a large portion of the Site Area, particularly under Oil Shale Tract C-b at the southern end of the ROW. Isopachous contours for oil shale greater than 25 gallons per ton are shown on Figure 9. The development of Tract C-b is the reason for the construction of the projected transmission lines.

The principal deposits of oil shale lie within the Parachute Creek Member of the Eocene Green River Formation. This member is a continuous section, which ranges in thickness from 500 feet at the northeastern edge of the Site Area to 1,200 feet near the southern edge of the Piceance Basin. In the center of the Piceance Basin it achieves a maximum developed thickness of 1,900 feet. The Parachute Creek Member crops out around the periphery of the basin and is covered by over 1,000 feet of overburden in the center of the basin. In the lower and middle oil shale zones of the north central part of the basin thick sequences of oil shale, up to 1,000 feet thick, will yield an average of 25 gallons of shale oil per ton. From this depositional center, the lower zones become thinner, and have lower yields as the margins of the basin are approached.

The upper oil shale zone contains the Mahogany Zone which contains the richest and most important beds in the Green River sequence. This zone has a thickness which ranges from 300 to 680 feet thick. At Tract C-b, the Mahogany Zone lies beneath overburden which ranges from 800 to 1,250 feet thick, and averages 1,000 feet in thickness. Estimated reserves from Tract C-b are 3 billion barrels of oil in mineable beds containing 30 gallons or more per ton (Ref. 1). According to the office of the Area Oil Shale Supervisor, 1.2 billion barrels are estimated as being recoverable by modified in situ (in place) technology.

It has been estimated that inferred and indicated reserves for the Piceance Basin Unit have a combined total of over 2.5 million million tons of oil shale, containing 15 to 45 gallons per ton of shale oil. This would contain about 900 billion barrels of shale oil at 100% recovery (ref. D).

The development of the oil shale deposits of Tract C-b is being pursued vigorously by the C-b Shale Oil Venture, a project of Occidental Oil Shale, Inc. The Ralph M. Parsons Company is the prime contractor.

Oil Shale Tract C-b was one of two tracts in Colorado leased by the Federal Government under the Federal Prototype Program instituted in 1973. The tract is being developed with the intent of achieving commercial production by the mid-1980's. Initial construction is now underway and includes the preparation of

1. Oil Shale

Oil shale is known to underlie the ROW and a large portion of the Site Area, particularly under Oil Shale Tract C-b at the southern end of the ROW. Isopachous contours for oil shale greater than 25 gallons per ton are shown on Figure 9. The development of Tract C-b is the reason for the construction of the projected transmission lines.

The principal deposits of oil shale lie within the Parachute Creek Member of the Eocene Green River Formation. This member is a continuous section which ranges in thickness from 500 feet at the northeastern edge of the Site Area to 1,200 feet near the southern edge of the Piceance Basin. In the center of the Piceance Basin it achieves a maximum thickness of 1,900 feet. The Parachute Creek Member crops out around the perimeter of the basin and is covered by over 1,000 feet of overburden in the center of the basin. In the lower and middle oil shale zones of the north central part of the basin thick sequences of oil shale, up to 1,000 feet thick, will yield an average of 20 gallons of shale oil per ton. From this depositional center, the lower zones become thinner and have lower yields as the margins of the basin are approached.

The upper oil shale zone contains the Mahogany zone which contains the richest and most important beds in the Green River sequence. This zone has a thickness which ranges from 100 to 300 feet thick. At Tract C-b, the Mahogany zone lies beneath overburden which ranges from 800 to 1,200 feet thick, and averages 1,000 feet in thickness. Estimated reserves from Tract C-b are 5 billion barrels of oil in Mahogany beds containing 30 gallons or more per ton (Ref. 11). According to the office of the Area Oil Shale Supervisor, 1.2 billion barrels are estimated as being recoverable by modified in situ (in place) technology.

It has been estimated that inferred and indicated reserves for the Piceance Basin will have a combined total of over 1.2 million million tons of oil shale, containing 15 to 45 gallons per ton of shale oil. This would contain about 900 billion barrels of shale oil at 100% recovery (Ref. 11).

The development of the oil shale deposits of Tract C-b is being pursued vigorously by the C-b Shale Oil Venture, a project of Occidental Oil Shale, Inc. The Ralph M. Parsons Company is the prime contractor.

Oil Shale Tract C-b was one of two tracts in Colorado leased by the Federal Government under the Federal Prototype Program instituted in 1973. The tract is being developed with the intent of achieving commercial production by the mid-1980's. Initial construction is now underway and includes the preparation of mine surface support facilities, the construction of poured concrete headframes, and the sinking of access, ventilation, and production shafts. The shafts will allow access for the development of mine and retort test areas. This testing is projected to begin in 1984 to confirm procedures for the commercial operations. It is projected that full-scale production of 57,000 barrels per day over a production life of 55 years will ultimately yield nearly 1.2 billion barrels of shale oil and up to 1.65 billion barrels if surface retorting is included. This facility will employ about 1,600 permanent employees.

2.) Saline minerals - nahcolite and dawsonite

The saline minerals dawsonite, nahcolite and halite are interbedded and dispersed within the oil shale sequence in the center of the Piceance Basin. Although the evaporite minerals underlie the southwestern portion of the Site Area of this report, the mineral nahcolite lies in depositional centers to the west and northwest and is not believed to occur beneath the Site Area of this report. It is anticipated that in the future, some of these areas may become important in the production of alumina and sodium carbonate as byproducts from the production of oil shale.

It is estimated that resources of nahcolite occur in the center of deposition (outside the Stie Area) and contain about 500 million tons per square mile, and that the Piceance Planning Unit may contain as much as 29 billion tons. After processing, nahcolite is converted into a carbonate of sodium--similar to baking soda--and can be used to absorb sulphur dioxide in gaseous emission, and thus may prove useful in environmental pollution control.

Dawsonite is a potential source of aluminum. It is estimated that the total amount of dawsonite in place in the Piceance Planning Unit is 19 billion tons, or about 3 times the world reserves of alumina contained in bauxite ores. Isopachous lines on Figure 9 indicate that from 400 to 800 feet of dawsonite bearing sediments underlie the Site Area. It is possible that an integrated oil shale process may produce metallurgical grade alumina. As an alternative, aluminum trihydrate can be produced from dawsonite and combined with sodium sulfate to form combined products of sodium aluminate and sodium sulfate. These compounds can be used to remove phosphorous and colloidal particles from waste waters (Ref. C).

The Mineral Development Area for saline minerals includes the Superior Oil Company Development and the existing sodium leases in the area. These sites are the subject of active exploration, mine surface support facilities, the construction of power concrete headframes, and the sinking of access, ventilation, and production shafts. The shafts will allow access for the development of mine and retort test areas. This testing is projected to begin in 1984 to confirm procedures for the commercial operations. It is projected that full scale production of 57,000 barrels per day over a production life of 65 years will ultimately yield nearly 1.3 billion barrels of shale oil and up to 1.65 billion barrels if surface retorting is included. This facility will employ about 1,600 permanent employees.

Saline Minerals - Nahcolite and Dawsonite

The saline minerals dawsonite, nahcolite and halite are interbedded and dispersed within the oil shale sequence in the center of the Piceance Basin. Although the evaporite minerals underlie the southeastern portion of the Site Area of this report, the mineral nahcolite lies in depositional centers to the west and northwest and is not believed to occur beneath the Site Area of this report. It is anticipated that in the future, some of these areas may become important in the production of alumina and sodium carbonate as byproducts from the production of oil shale.

It is estimated that resources of nahcolite occur in the center of deposition (outside the Site Area) and contain about 300 million tons per square mile, and that the Piceance Planning Unit may contain as much as 29 billion tons. After processing, nahcolite is converted into a carbonate of sodium--similar to baking soda--and can be used to absorb sulphur dioxide in gaseous emission, and thus may prove useful in environmental pollution control.

Dawsonite is a potential source of aluminum. It is estimated that the total amount of dawsonite in place in the Piceance Planning Unit is 19 billion tons, or about 3 times the world reserves of alumina contained in bauxite ores. Isopachous lines on Figure 7 indicate that from 400 to 800 feet of dawsonite bearing sediments underlie the Site Area. It is possible that an integrated oil shale process may produce metallurgical grade alumina. As an alternative, aluminum trihydrate can be produced from dawsonite and combined with sodium sulfate to form combined products of sodium aluminate and sodium sulfate. These compounds can be used to remove phosphorous and colloidal particles from waste waters (Ref. 7).

The Mineral Development Area for saline minerals includes the Superior Oil Company Development and the existing sodium leases in the area. These sites are the subject of active exploration.

and formal proposals have been prepared for development. The Piceance Planning Unit has four proposed sodium leases under preference right lease application. If these leases are issued and exploration indicates that commercial development is justified, these leases will be upgraded to development areas. The relative priorities for these applications have been established by the location of the thickest, highest grade saline deposits near the center of deposition. The two highest priority leases are located just to the north of the Piceance Dome Gas Field, and south of the Little Hill Game Experiment Station. These lie just to the northwest of the Site Area. The other two leases lie near Ryan Gulch, five and ten miles west of the southwestern end of the Site Area.

3.) Natural gas and oil

Reserves of natural gas and minor associated oil occur within the Known Geologic Structure (KGS) of the Piceance Creek Gas Field. This field is shown on Figure 10.

The production of oil and gas is an important industry within the Piceance Planning Unit. Historically, the production of of natural gas has been the most important extractive industry in the Piceance Basin. Most of the production has been from stratigraphic traps, and large amounts of resources await drilling and development.

The first major Tertiary gas production in the Piceance Basin was established in 1930 with a discovery well located in Section 9, T. 2 S., R. 96 W., in the vicinity of the old "Magnolia Camp" (now Mobil Camp) and about 1½ miles north of the projected ROW where it crosses Collins Gulch. Piceance Creek South Field was discovered in 1954, and the Sulphur Creek Field in 1959. Oil and gas exploration continues active throughout the Site Area and region.

Production in the Piceance Creek Gas Field is from a sequence of alternating sandstone, shale and sandy shale beds in the lower part of the Douglas Creek Member of the Green River Formation, and from massive lenses of medium to coarse grained sandstone in the Wasatch Formation. These sand lenses occur within several thousand feet of formation. The producing zone in the Douglas Creek Member varies from 12 to 25 feet in thickness. Pools at various horizons in the Wasatch Formation are designated as the "A", "F", and "G" by the operator, the Mobil Oil Corporation. All of the oil produced in the field has come from the Wasatch "G" pool (Ref. D).

In 1973, 1975, and 1976, nuclear and massive hydraulic fracturing (MHF) projects in the Piceance Basin were intended to recover appreciable fractions of the large volumes of gas locked within low permeability discontinuous sandstone units within the Mesa Verde and the Fort Union Formations. A 1973 report, National Gas Survey of the U.S. Power Commission, estimated that the total proven and inferred tight gas sand resources in the Piceance Basin are 207.1 trillion cubic feet of gas. In an attempt to increase permeability to produce this "tight" gas, three nuclear devices--each with a yield of 30 kilotons of dynamite--were detonated as part of the Rio Blanco Project in Section 14, T. 3 S., R. 98 W., about 6 miles west of Tract C-b on May 17, 1973. The shot produced three chimneys which did not connect; however, a gas yield was obtained from the upper chimney. Production from the lower chimney revealed the presence of radioactive strontium and cesium produced with the gas. In 1974, a Colorado law was passed which requires that any future nuclear blasting will require consideration and approval by a public referendum vote. A massive hydraulic fracturing (MHF) experiment was conducted in 1975 in a test well located in Section 11, T.3 S., R. 98 W. (ref. D). Another MHF test was performed by the Mobil Oil Company within the Site Area and was financed by the Energy Research and Development Administration (now the Department of Energy).

4.) Coal

Although coal measures probably underlie the Site Area within the Williams Fork Formation of the Mesa Verde Group, and may also occur within the underlying Iles Formation, they are projected to lie at depths greater than 3,000 feet under most of the Site Area, and are not considered as being extractable under present exonomic conditions. The closest potential commercial coal lies to the northwest and southwest of the Site Area, near Rangley.

5.) Asphaltum

Rock asphalt (oil impregnated sandstone, or more simply, tarsand) occurs in deposits located a few miles southeast of the Site Area along the west side of Colorado Highway 13-789. These deposits crop out along the east side of the Petrolite Hills and trend north-south. The deposits occur in sandstone beds near the base of the Green River Formation which dips westerly towards the Piceance Basin. The deposite are reported as layers along bedding and as veins and seeps within the sandstone. There is no known production. The deposits are unexplored and no quantitive estimate of the resource has been made. Nevertheless, these deposits which extend from the Petrolite Hills northwards into the Gray Hills, are probably the largest in Colorado (Ref. D).

in 1973, 1974, and 1976, nuclear and massive hydraulic fracturing (MHF) projects in the Piceance Basin were intended to recover appreciable fractions of the large volumes of gas locked within low permeability lenticular sandstone units within the Mesa Verde and the Fort Union Formations. A 1973 report, National Gas Survey of the U.S. Power Commission estimates that the total proven and inferred tight gas sand resources in the Piceance Basin are 207.1 trillion cubic feet of gas. In an attempt to increase permeability to produce this "tight" gas, three nuclear devices--each with a yield of 30 kilotons of dynamite--were detonated as part of the Rio Blanco Project in Section 14, T. 3 S., R. 98 W., about 6 miles west of Tract C-b on May 17, 1973. The shot produced three chimneys which did not connect; however, a gas yield was obtained from the upper chimney. Production from the lower chimney revealed the presence of radioactive strontium and cesium produced with the gas. In 1974, a Colorado law was passed which requires that any future nuclear blasting will require consideration and approval by a public referendum vote. A massive hydraulic fracturing (MHF) experiment was conducted in 1975 in a test well located in Section 11, T. 3 S., R. 98 W. (Ref. 0). Another MHF test was performed by the Mobil Oil Company within the Site area and was financed by the Energy Research and Development Administration (now the Department of Energy).

4.1 Coal

Although coal measures probably underlie the Site Area within the Williams Fork Formation of the Mesa Verde Group, and may also occur within the underlying Iles Formation, they are projected to lie at depths greater than 4,000 feet under most of the Site Area, and are not considered as being minable under present economic conditions. The closest potential commercial coal lies to the northwest and southeast of the Site Area, near Rangely.

4.2 Asphaltics

Rock asphalt (oil impregnated sandstone), or more simply, tar sand occurs in deposits located a few miles southeast of the Site Area along the west side of Colorado Highway 13-789. These deposits crop out along the west side of the Metroite Hills and trend north-south. The deposits occur in sandstone beds near the base of the Green River Formation which dips easterly towards the Piceance Basin. The bitumen has migrated as layers along bedding and in veins and seams within the sandstone. There is no known production. The deposits are unexplored and no quantitative estimate of the resource has been made. Nevertheless, these deposits which extend from the Metroite Hills northward into the Gray Hills, are probably the largest in Colorado (Ref. 0).

6.) Salable minerals

Sand, and reportedly gravel, is available from the alluvium which occurs in the stream beds and valley bottoms of the area. With the exception of sand and gravel which has been excavated for road construction, no large scale use has been made of this commodity in the Site Area. Some sand and gravel pits have been excavated along the higher bench south of the White River in the vicinity of the Meeker Substation. Value of production from these pits is unknown.

It is not anticipated that continuing development of oil shale in this area will result in any significant demand from sources within the Site Area. At present, free use permits are granted to County and State Highway Departments for road construction. It is noteworthy that aggregates used in the concrete structures at the Tract C-b surface support facilities has been imported from near Craig (Personal communication from Occidental Petroleum to R. Chojnacki, Oct. 1978).

Although "moss-rock" has been noted near Meeker and in other parts of the Piceance Planning Unit, none has been reported from within the Site Area.

7.) Locatable minerals

Metallic minerals are known to exist within the Piceance Basin in trace amounts; however, lands in the Piceance Basin are presently withdrawn from minerals entry under the 1872 mining law (Personal communication BLM, October 19, 1978).

(d) Alluvial valleys

The proposed ROW traverses alluvial filled valleys which include Segar Gulch, the Dry Fork of Piceance Creek and main Piceance Creek. As no structures will be built within these alluvial filled valleys, no interaction between them and the project is expected.

3. Soils

Soils wherever they are well developed within the Site Area consist basically of dark colored, cool climate associations. Wherever moderate steep slopes are subjected to erosion, soils consist largely of colluvium derived from the underlying bedrock which on the Site Area consists of light colored, tan to bnown, sands, silts and some shale-derived clays.

Although the soils of the Site Area were originally mapped using the generic classification used by the BLM, the Soil Conservation Service has recently remapped these soils according to

specifically defined and named associations. These are listed below and shown on Figure 10 (Ref. 3).

Soil Type 2 - Havre-Glendive-Redrob Association: These are deep, nearly level to moderately steep, well to somewhat poorly drained soils on stream and river terraces, benches, narrow valley floors and major drainages.

Soil Type 6 - Rentsac-Moyerson-Blazon Association: These are shallow, gently sloping to steep, well drained soils on side and toe slopes of mountains, canyons, ridges, and low hills or ridgetops.

Soil Type 7 - Zoltay-Work-Piceance Association: These are deep and moderately deep, nearly level to hilly, well drained soils on uplands, terraces and bench slopes.

Soil Type 8 - Megel-Kobar-Castner Association: These are deep and shallow, sloping to steep, well drained soils on mountain and broad ridge tops, side slopes and toe slopes.

Soil Type 9 - Owen Creek-Jerry-Maurice Association: These are moderately deep and deep, sloping to steep, well drained soils on mountain crests, side slopes, steep narrow ridges and toe slopes.

Soil Type 10 - Parachute-Irigul-Starman Association: Moderately deep and shallow, sloping to steep, well drained soils on mountain crests, side slopes, and high ridges.

4. Water

Water in the Site Area is derived largely from springtime snowpack melt water which results both in surface water runoff and in ground water recharge. The ground water, in turn, contributes to surface flows of Piceance Creek, and its tributaries.

Piceance Creek is the principal stream flowing through the Site Area. According to 7 years of flow measurements at Station 102, USGS 09306200, below Ryan Gulch near Rio Blanco, the average discharge is 15.6 cfs, or 11,300 acre-feet per year. During the period of record from October, 1964, through the present, the historic maximum discharge was an estimated 400 cfs on March 9, 1966, and the minimum daily flow was 0.80cfs for several days in 1966. Surface runoff is greatest during the spring season through May and June, when the major streams and discharges reach flood levels. This flooding is caused by

rapid melting of the winter pack snows as temperatures rise. Usually by late July, streams have subsided to near a base flow which prevails until the cycle is repeated again the following spring (Ref. D). Most of the smaller gulches tributary to Piceance Creek on the northern bank are dry washes because they lack significant catchment areas. Surface water flows support highly productive meadows and pastures which lie in the bottom of Piceance Creek Valley. All surplus water flows into the White River at the confluence near White River City. The White River, in turn, flows into the Green River, and contributes to the flow of the main Colorado River System.

Ground water in the area is important as it is the principal source of rural domestic water supplies.

Rural habitations in the unit are widely dispersed and water quantities are generally adequate. Most areas have moderately hard water, but the quality is good otherwise. Wells which tap unconsolidated alluvial deposits along streams are the major sources. Yields normally range from 25-500 gallons per minute. Wells are also drilled into consolidated rocks, principally sandstone, to tap confined water sources. Water from deep wells is used primarily for rural domestic consumption, and livestock and wildlife watering needs. There are no known irrigation wells in the unit (Ref. D).

The Green River Formation is the best potential source of ground water in the northern part of the Piceance Creek Basin. There are many flowing wells and the maximum depth to water is about 200 feet. The leached zone contains water in fractures and solution openings and is considered the principal bedrock aquifer in the northern part of the Piceance Creek Basin because it has the greatest areal extent, permeability, and storage capacity. It contains 2.5 million acre-feet or more of water in storage. The transmissivity of the zone ranges from less than 3,000 gpd per ft. (gallons per day per foot) in the margins of the basin, to 20,000 gpd per ft. in the center of the basin. Tests indicate that the potential yield of a well tapping the leached zone is estimated to be about 10^{-4}, but when not confined, the storage coefficient would be about 10^{-1}. Thus, pumping very large quantities of water would cause water levels to decline several hundred feet to the top of the leached zone in a short time (1 yr.), but after water levels reached the leached zone the decline would be much slower. (Ref. D)

The dissolved-solids concentration of water in the Green River Formation ranges from 250 to 63,000 mg/l. Water near the edges of the basin contains less than 2,000 mg/l dissolved solids and the dominant ions are calcium, magnesium, and bicarbonate.

About halfway between the edges of the basin and the center, dissolved-solids are about the same as at the edges, but the dominant ions are sodium and bicarbonate. Near the center of the basin, the water has dissolved considerable amounts of saline minerals and the dissolved solids average 25,000 mg/l and the principal constituents are sodium and bicarbonate. Chloride concentration ranges between 500 and 2,500 mg/l. (Ref. D)

Alluvium is a source of groundwater along Piceance Creek. The alluvial aquifer is capable of storing and transmitting more water per unit volume than any other aquifer in the basin. However, the aereal extent of the deposits is small compared to that of bedrock aquifers. The alluvium is confined to belts less than 1 mile wide along the creeks.

Along the major drainages, the alluvium ranges from 0 to 140 feet thick and the saturated thickness may be as much as 100 feet in a few places (Coffin and others, 1968). Water in the alluvium occurs under both unconfined and artesian conditions (Ref. D).

An aquifer test in the alluvium of Piceance Creek showed that after pumping a few hours, the hydrologic boundaries of the alluvium will affect draw-downs and well yields (Coffin and others, 1968). The storage coefficient probably averages about 0.20. In places where the alluvium contains clay beds the transmissivity may be as low as 20,000 gpd per ft. Thus, well yields vary widely from place to place according to variations in lithology of the alluvium at the well, and proximity of the well to the hydrologic boundaries. Initial yields from properly located, developed, and constructed wells are estimated to be as much as 2,000 gpm (Ref. D).

The alluvial aquifer is recharged by precipitation, by flowing surface water, by streams, and by infiltration from the Green River Formation. The aquifer discharges to streams, springs, wells, and to the atmosphere by evaporatranspiration (Ref. D).

The dissolved-solids concentration of water in the alluvium ranges from 250 to 25,000 mg/l. Water in alluvium in the upper reaches of the major drainages contains less than 700 mg/l dissolved-solids. In general, the principal ions in the alluvial water are calcium, magnesium, and bicarbonate. Ions in the water in the alluvium of Piceance Creek are predominately calcium, magnesium, sodium, and bicarbonate; the dissolved-solids concentration increases downstream.

Additional livestock and wildlife needs are usually supplied by the development and use of surface water sources, although some live water springs are developed, and a few ponds have ground water augmentation from springs and seeps (Ref. D).

About halfway between the edges of the basin and the center dissolved-solids are about the same as at the edges, but the dominant ions are sodium and bicarbonate. Near the center of the basin, the water has dissolved considerable amounts of saline minerals and the dissolved solids average 25,000 mg/l and the principal constituents are sodium and bicarbonate. Chloride concentration ranges between 500 and 2,500 mg/l. (Ref. D)

Alluvium is a source of groundwater along Piceance Creek. The alluvial aquifer is capable of storing and transmitting more water per unit volume than any other aquifer in the basin. However, the areal extent of the deposits is small compared to that of bedrock aquifers. The alluvium is confined to belts less than 1 mile wide along the creeks.

Along the major drainages, the alluvium ranges from 0 to 140 feet thick and the saturated thickness may be as much as 100 feet in a few places (Coffin and others, 1968). Water in the alluvium occurs under both unconfined and artesian conditions (Ref. D).

An aquifer test in the alluvium of Piceance Creek showed that after pumping a few hours, the hydrologic boundaries of the alluvium will affect draw-downs and well yields (Coffin and others 1968). The storage coefficient probably averages about 0.20. In places where the alluvium contains clay zones the transmissivity may be as low as 10,000 gpd per ft. Thus, well yields vary widely from place to place according to variations in lithology of the alluvium at the well, and proximity of the well to the hydrologic boundaries. Initial yields from properly located, developed, and constructed wells are estimated to be as much as 1,500 gpm (Ref. D).

The alluvial aquifer is recharged by precipitation, by flowing surface water, by streams, and by infiltration from the Green River Formation. The aquifer discharges to streams, springs, wells, and to the atmosphere by evapotranspiration (Ref. D).

The dissolved-solids concentration of water in the alluvium ranges from 250 to 25,000 mg/l. Water in alluvium in the upper reaches of the major drainages contains less than 500 mg/l dissolved-solids. In general, the principal ions in the alluvial water are calcium, magnesium, and bicarbonate. Ions in the water in the alluvium of Piceance Creek are predominantly calcium, magnesium, sodium, and bicarbonate; the dissolved-solids concentration increases downstream.

Additional livestock and wildlife water are usually supplied by the development and use of surface water sources, although some live water springs are developed, and a few ponds have ground water augmentation from springs and seeps (Ref. D).

In 1973, a potable water sampling of springs in the immediate vicinity of the Piceance Creek Gas Field gave the following results (Ref. E).

Safe bacteriological characteristics:

Post Gulch Spring, SE¼, NE¼ of Section 1, T. 2 S., R. 96 W.

Unsafe bacteriological characteristics:

Dark Canyon Spring, SW¼, NW¼ of Section 11, T. 2 S., R. 96 W.

Jessup Gulch Spring, SW¼, SE¼ of Section 14, T. 2 S., R. 96 W.

Two Buck Spring, SW¼, NE¼ of Section 32, T. 2 S., R. 95 W.

Other springs are shown on the Topographic Map in Figure 5.

5. Vegetation

Vegetation within the Site Area is predominantly terrestrial. Some surface water provides habitat for aquatic vegetation along Piceance Creek and the White River. All other streams are intermittent and are dry over much of the year. As a consequence emphasis of the discussion below is upon terrestrial plants.

(a) Terrestrial vegetation

The vegetation of the Site Area and region is typical of the arid and semi arid steppe and mountain climate. The major vegetative units which occur in the Site Area are discussed below and shown on Figure 11.

Type 1-Grassland - The grasslands of the area include perennial grass types intermixed with forbs and shrubs, occasional browse species and, when in a deteriorated condition, annual grasses.

This type grows on exposed ridges having shallow soils, in deep mesa soils, on gently sloping foothill terraces, and on alluvial fans in valley bottoms and drainages. This type includes grasslands created by vegetative manipulation or wildfires.

Dominants include western wheatgrass, needle and thread, June grass, bluegrass, carex and Indian ricegrass. Associated species include Three-awn, timothy, beardless bluebunch wheatgrass, cheatgrass, brome snakeweed, rabbitbrush and big sagebrush.

Noxious and poisonous plant problems in the grassland community are negligible unless the type is in deteriorated condition. Plants such as arrowgrass, locoweed, halogeton and cheatgrass readily invade the grassland type when in poor range condition.

Type 4-Sagebrush - Dominants are big sagebrush, black sagebrush, Utah serviceberry, rabbitbrush and bitter brush. Associated species are western wheatgrass, needle and thread, June grass, cheatgrass, broom snakeweed, lupine, and buckwheat.

Type 5-Mountain shrub - Dominants are Utah serviceberry, serviceberry, Gambel oak, and mountain mahogany. Associated species are snowberry, big sagebrush, common chokecherry, bitterbrush, western wheatgrass, mountain brome, June grass, bluegrass, western yarrow, aster, carex, and fleabane.

Type 6-Conifer - Within the Site Area conifers are found along the protected slopes in the vicinity of the Dry Fork of Piceance Creek, Timber Gulch, Segar Gulch, and along Kendall Gulch. These consist of thin stands of limited extent. Dominants of this type are the Douglas Fir, Engleman spruce, and subalpine fir.

Type 7-Waste - Lack of significant vegetation.

Type 9-Pinyon-juniper - Dominants are Utah juniper and pinyon. Associated species are big sagebrush, Utah serviceberry, rabbitbrush, mountain mahogany, bitterbrush, western wheatgrass, Indian ricegrass, beardless bluebunch, and broom snakeweed.

Type 10-Broadleaf - Although no areas of broadleaf are noted in current mapping of the Site Area, previous work has noted the presence of some broadleaf types along the upper southern slopes of the upper reaches of Timber Gulch. The understory vegetative production varies inversely with the overstory density. Open stands often support an appreciable quantity of shrubs and grass-forb understory vegetation.

Dominants are quaking aspen; whereas associated species include snowberry, mountain ninebark, mountain brome, pinegrass, bluegrass, columbine, geranium, buckwheat, and lupine.

Type 19-Cropland - Croplands in the Site Area lie along the valley bottoms and lower gentle slopes of the White River, Sheep Creek, and Piceance Creek. The croplands in the valley bottoms are irrigated pastures, whereas those which occur on upper slopes are irrigated only in the spring, when snowmelt water flows in the intermittent drainages.

Type 20-River Bottom - Native riparian vegetation occurs along the White River and Piceance Creek, both of which have perennial water flow. These stands are open to dense, and include shrubs, young trees, occasional large trees, and open marshy or sub-irrigated bottomlands.

Dominants include willow, dogwood, carex, cottonwood, and cattail. Associate species include beardless bluebunch, wheatgrass, bottlebrush-squirreltail, cheatgrass, needle and thread, and June grass.

Terrestrial Vegetation Summary

The areas of surface covered by these various vegetation types and their relative percentages within the Site Area are shown in Table 4 following.

TABLE 4

VEGETATION TYPES

Category	Acreage		Percentage
Type 9 - Pinyon-juniper	39,052		38.4
Type 5 - Mountain shrub	19,933		19.6
Type 4 - Sagebrush	16,169		15.9
Type 7 - Rock outcrop	14,136		13.9
Type 19- Cropland	4,576		4.5
Type 1 - Grassland (chained)	4,068		4.0
Type 20- River Bottom (Meadow)	2,339		2.3
Type 1 - Grassland	1,423		1.4
TOTALS:	101,696	acres	100.0%

It is shown that within the Site Area the three dominant types of vegetation are pinyon-juniper, mountain shrub and sagebrush. Together these types cover almost three-quarters of the Site Area. Almost 14% of the Site Area is comprised of rock outcrop and barren ground. Almost 90% of the Site Area is covered by these types.

The remainder of the Site Area is covered by cropland, chained and reclaimed grassland, meadow and native grassland.

It is to be noted that sagebrush and mountain shrub form a mixed community. The mapping classification is based upon the dominance of one species over the other.

It is also to be noted that the areas of vegetative manipulation were largely chained pinyon-juniper, and reclaimed as grassland.

(b) Aquatic vegetation

Aquatic vegetation of the waters of Piceance Creek and the White River was studied during the baseline investigation for Oil Shale Tract C-b. Sampling of surface waters including Piceance Creek, and the White River revealed species of green algae, blue-green algae, euglenids, and vascular plants. A species list may be found in Reference M in Table B-5-4, and is not reproduced here.

(c) Condition and trends

Range conditions and trends have been noted within the Site Area only for the Segar Gulch Grazing Allotment as shown on Figure 12. As was discussed in the Unit Resource Analysis (Ref. D), the condition and trend within this allotment varied from pasture to pasture. In the northwest portion of the allotment the range condition was rated as fair and the trend as static. In the south central area, the condition was rated as fair to good and the trend as static. In the south central area of the allotment, the condition along valley bottoms was rated as poor and the trend as declining.

(d) Threatened & endangered plant species

According to Carol Pease, Botanist at the White River Area Office (Personal Communication to R. Chojnacki), the projected ROW crosses an area suspected of containing the proposed endangered plant species Astragalus detritalis, M. E. Jones, and having the common name of Debris milkvetch and the proposed threatened plant species Astragalus lutosus, M. E. Jones, and having the common name Dragon milkweed.

A description of Astragalus detritalis as published in an illustrated guide to the proposed threatened and endangered species in Colorado, by the U. S. Fish and Wildlife Service is reproduced on Figure 13a. An illustration of this plant and its noted locations in Colorado are shown on Figure 12b.

A description and location near the Site Area of the Dragon milkweed (milk-vetch) as given in the Memoirs of the New York Botanical Garden, Volume 13, 1964, is reproduced in Figure 12b.

6. Animals

The greatest portion of the surface of the Site Area is composed of a terrestrial environment and therefore, life is dominated by terrestrial animal forms. Aquatic environment is limited to the White River at the northern end of the Site Area and to Piceance Creek in the southern portion of the Site Area.

(a) Aquatic animals

The acquatic environment is limited to the waters of the White River at the northern end of the Site Area and to Piceance Creek in the southern portion of the Site Area. These are the only perennial streams within the Site Area. Although other surface waters occur as intermittent streams and stockponds, these waters are subject to drying out in periods of drought. Although some smaller life forms may survive in remnant waters during such drought, this is not the dominant aquatic environment.

Very little data is available for the aquatic environment of the White River; however, a large amount of data is available from the studies of the ecology of the area surrounding Oil Shale Tract C-b. The reader is specifically referred to the Environmental Baseline Program, the volumes on Ecology, and specifically to the sections on Aquatic Ecology (Ref. L). The following discussion is abstracted from that work and is limited to the dominant species of fish:

> "Three species of trout and various none-game fish occur in the vicinity of Tract C-b (Ed. principally in Piceance Creek). Brook trout (Salvelinus fontinalis), rainbow trout (Salmo gairdineri), and brown trout (Salmo trutta) were captured during the study. However, rainbow and brown trout are relatively rare in the Tract vicinity. Other fish include the mountain sucker (Castosmus platyrhyncus), speckled dace (Rhinchythys osculus), mottled sculpin (Cottus bairdi), and flannelmouth sucker (Costosmus latipinnus)........"

In that same study for Tract C-b, the White River was sampled near its confluence with the White River. Although the confluence of these streams is several miles away from where the White River crosses the northeasterly end of the Site Area, their discussion does offer an indication of the aquatic forms to be found there. It was said that,

> "The White River at its confluence with Piceance Creek has a river environment compared to the small stream environment of Piceance Creek. However, cold water fish species are more abundant upstream near the headwater regions of the White River than in the

vicinity of Piceance Creek. Mottled sculpin are abundant in the White River. In addition, mountain whitefish, flannelmouth suckers and speckled dace have been collected. Sampling in the White River is difficult and data obtained on fish species in the White River is sketchy compared to other areas under study."

Because of the lack of interaction between the proposed project and the aquatic environment, no further emphasis is placed upon aquatic animals within this analysis.

(b) Terrestrial animals

The terrestrial animal life of the Site Area is dominated by man. The demography of the Site Area is discussed in this Section under Social Aspects.

The terrestrial environment of the Site Area is utilized for the production of domestic animals--principally cattle. This usage is discussed in terms of grazing allotments in this section under Land Use.

The other terrestrial animals, or wildlife, are discussed within this section. The Site Area contains a variety of wildlife ranging from large mammals, such as mule deer, to small mammals, such as the vole, and raptors such as the red-tailed hawk. Animal species are shown on Figure 13, Habitat Map.

The Site Area lies in a region noted for a mule deer herd that winters in the Piceance Basin, and which has been claimed to be the "largest migratory mule deer herd in the world". Numbers in past years have been estimated at 50,000 and higher (Ref. A).

1.) Mule Deer

Mule deer are the most prominent wildlife inhabitants of the Site Area. As shown on Figure 13, the Site Area provides both winter and summer habitat for this species. In the winter, the lower valley slopes and bottoms provide protection from the harsh weather. Four areas of Critical Winter Range (CWR) provide protection for deer within this Site Area. The first lies at the northeastern end of the site, occupies the low foothills above the flood plain of the White River, and extends southwards up Sheep Creek. The population in this area is reported at a density of 100/sq mile. The second lies on the westerly slopes of Dark Canyon, and has a population density reported at 80 per square mile. The third lies along the northern slopes of the Piceance Creek Drainage; where a series of canyons provides protection from winterly winds coming from the northwest and southwest; where the sagebrush habitat provides cover and browse, and where full exposure is gained from the low, warming sun--directly from the south. The reported winter population density is 80/sq mile.

vicinity of Piceance Creek. Mottled sculpin are abundant in the White River. In addition, mountain whitefish, flannelmouth suckers and speckled dace have been collected. Sampling in the White River is difficult and data obtained on fish species in the White River is sketchy compared to other areas under study."

Because of the lack of interaction between the proposed project and the aquatic environment, no further emphasis is placed upon aquatic animals within this analysis.

(c) Terrestrial animals

The terrestrial animal life of the Site Area is dominated by man. The demography of the Site Area is discussed in this Section under Social Aspects.

The terrestrial environment of the Site Area is utilized for the production of domestic animals--principally cattle. This usage is discussed in terms of grazing allotments in this section under Land Use.

The other terrestrial animals, or wildlife, are discussed within this section. The Site Area contains a variety of wildlife ranging from large mammals, such as mule deer, to small mammals such as the mole, and raptors such as the red-tailed hawk. Animal species are shown on Figure 13, Habitat Map.

The Site Area lies in a region noted for a mule deer herd that winters in the Piceance Basin, and which has been claimed to be the "largest migratory mule deer herd in the world". Numbers in past years have been estimated at 50,000 and higher (Ref. 8).

(1) Mule Deer.

Mule deer are the most prominent wildlife inhabitants of the Site Area. As shown in Figure 13, the Site Area provides both winter and summer habitat for this species. In the winter, the lower valley slopes and bottoms provide protection from the harsh weather. Four areas of critical winter range (CWR) provide protection for deer within this Site Area. The first lies at the northeastern end of the Site. It occupies the low foothills above the flood plain of the White River and extends southwards up Sheep Creek. The population in this area is reported at a density of 100/sq mile. The second lies on the westerly slopes of Dark Canyon, and has a population density reported at 80 per square mile. The third lies along the northern slopes of the Piceance Creek drainage, where a series of canyons provides protection from westerly winds coming from the northwest and southwest, where the sagebrush habitat provides cover and browse, and where full exposure is gained from the low, warming sun--directly from the south. The reported winter population density is 90/sq mile.

This third concentration area is probably the most important within this Site Area--particularly in years of severe winter and deep snow. The fourth, and last winter concentration area lies within the sagebrush and chained areas which occupy the ridge or mesa tops in the vicinity of Tract C-b. The population density is estimated at 80/sq mile.

The Site Area also provides summer range in the higher elevations of the Site Area. This summer range generally lies above 7,600 feet elevation, and extends from Kendall Peak on the north--running southerly along the mesa top--towards Joe Bush Mountain--then southwesterly to the ridge which divides Dry Thirteen Mile Creek from the headwater area of the Dry Fork of Piceance Creek. The population density for deer during the summer in the Kendall Peak Area is reported to be about 21 / sq mile. Deer wintering along Piceance Creek and southwards, will tend to migrate towards the southern rim of the Piceance Basin, as shown on Figure 13.

The mule deer which use the Site Area are members of the Piceance Basin deer herd. Population estimates of this herd have been variable. Historical data is not clear, and the herd was decimated by a high winter kill in the 1972 and 1973 severe winter season. (It was estimated that the 1971-1972 wintering population was between 35,000 and 40,000 deer, prior to the large loss of animals from the severe winter weather.) Under the best estimates now available, the present herd is believed to have recovered, and to now, again, have a population of about 35,000 animals.

Baseline studies for Tract C-b (Ref I) indicated the importance of the southerly facing slopes which lie north of Piceance Creek. The work revealed the importance of the area, due to the accessibility of bunchgrass as a result of the early snowmelt on these southern exposures. This same work indicated that winter kill of deer is high, and that about 76% of the mortality is among fawns who become exhausted from traversing deep snow and drifts.

2.) Elk

An area of elk habitat occupies a realtively remote sector of the Site Area centered upon the high country around Segar Mountain--extending northwards to Kendall Peak. Although the area is largely used as summering grounds for elk, the Segar Mountain area also provides high winter use (Ref. E). Elk density in the Kendall Peak Area is estimated at 4/sq mile.

3.) Mountain lion

All of the Site Area, as well as the Piceance Basin, is mountain lion habitat. Seasonal use areas of mountain lion in the Site Area probably follow seasonal use area of deer, because deer are one of the main prey species of mountain lions (Ref. E).

This third concentration area is probably the most important within this Site Area--particularly in years of severe winter and deep snow. The fourth, and last winter concentration area lies within the sagebrush and chained areas which occupy the ridge or mesa tops in the vicinity of Tract C-b. The population density is estimated at 90/sq mile.

The Site Area also provides summer range in the higher elevations of the Site Area. This summer range generally lies above 7,000 feet elevation, and extends from Kendall Peak to the north--running southerly along the mesa top--towards Jones Mountain--then southwesterly to the ridge which divides the Thirteen Mile Creek from the headwater area of the Dry Fork of Piceance Creek. The population density for deer during the summer in the Kendall Peak Area is reported to be about [illegible] sq mile. Deer wintering along Piceance Creek and southwards, will tend to migrate towards the southern rim of the Piceance Basin, as shown on Figure 13.

The mule deer which use the Site Area are members of the Piceance Basin deer herd. Population estimates of this herd have been variable. Historical data is not clear, and the herd was decimated by a high winter kill in the 1972 and 1973 severe winter season. (It was estimated that the 1971-1972 wintering population was between 15,000 and 40,000 deer, prior to the large loss of animals from the severe winter weather.) Under the best estimates now available, the present herd is believed to have recovered, and to now, again, have a population of about 33,000 animals.

Baseline studies for Tract C-b (Ref 8) indicated the importance of the southerly facing slopes which lie north of Piceance Creek. The work revealed the importance of the area due to the accessibility of bunchgrass as a result of the early snowmelt on these southern exposures. This same work indicated that winter kill of deer is high, and that about 75% of the mortality is among fawns who become exhausted from traversing deep snow and drifts.

[illegible] Elk

An area of elk habitat occupies a relatively remote sector of the Site Area centered upon the high country around Segar Mountain--extending northwards to Kendall Peak. Although the area is largely used as summering grounds for elk, the Segar Mountain area also provides high winter use (Ref. 8). Elk density in the Kendall Peak Area is estimated at 1/sq mile.

[illegible] Mountain Lion

All of the Site Area, as well as the Piceance Basin, is mountain lion habitat. Seasonal use areas of mountain lion in the Site Area probably follow seasonal use area of deer, because deer are one of the main prey species of mountain lions (Ref. 8).

There is no existing data on the present or past population of mountain lions in the Piceance Basin. The Colorado Division of Wildlife estimates 5 to 15 lions in the Piceance Basin (Ref. E).

Until March 1968, a bounty of $50.00 was paid by the state for each lion killed. Since 1965, the lion has been protected by being classified as a big game animal which may be killed by licensed hunters during the established hunting season. An estimated 1 or 2 lions are taken each year in the Piceance Basin (Ref. F).

4.) Black bear

Habitat well suited for balck bear lies in the more remote high country of the Site Area centering on Segar and Kendall Peaks. No specific data for this species has been reported for the Site Area.

5.) Coyote

Coyotes are believed to be relatively abundant within the Site Area near Tract C-b (Ref. I). The performance of baseline studies for Tract C-b indicated the presence of high numbers of coyotes. The analysis observes that the high population may be due to the high rate of winter mortality of deer in an area where predation control is minimal.

6.) Bobcat

Field work for the Tract C-b studies has indicated that the bobcat has a moderate to high population in the area (Ref. I), particularly in rimrock areas. The bobcat, together with the coyote are significant predators of cottontail.

Populations of bobcat are probably down from the early 1900's due to trapping, hunting and poisoning. During the past several years, fur prices for this species have been high and, consequently, trapping and hunting have increased. The prey species for bobcats are small mammals, birds, and occasionally young or weak deer and domestic livestock. The bobcat prefers habitat located in rocky canyons, along stream bottoms, and in the pinyon-juniper woodland.

7.) Rabbit

Rabbits, both cottontail and the white-tailed jackrabbit are abundant, both within the Site Area, and in the Piceance Basin.

There is no existing data on the present or past population of mountain lions in the Piceance Basin. The Colorado Division of Wildlife estimates 5 to 15 lions in the Piceance Basin (Ref. 10).

Until March 1965, a bounty of $50.00 was paid by the state for each lion killed. Since 1965, the lion has been protected by being classified as a big game animal which may be killed by licensed hunters during the established hunting season. An estimated 1 or 2 lions are taken each year in the Piceance Basin (Ref. 6).

4.1 Black Bear

Habitat well suited for black bear lies in the more remote high country of the Site Area bordering on Beaver and Kendall Peaks. No specific data for this species has been reported for the Site Area.

5.1 Coyote

Coyotes are believed to be relatively abundant within the Site Area near Tract C-b (Ref. 11). The preliminary baseline studies for Tract C-b indicated the presence of high numbers of coyotes. The analysis observed that the high population may be due to the high rate of winter mortality of deer in an area where predation control is minimal.

6.1 Bobcat

Field work for the Tract C-b studies has indicated that the bobcat has a moderate to high population in the area (Ref. 11), particularly in riparian areas. The bobcat, together with the coyote are significant predators of section 8.12.

Populations of bobcat are probably down from the early 1900's due to hunting, trapping and poisoning. During the past several years, fur prices for this species have been high and, consequently, trapping and hunting have increased. The prey species for bobcats are small mammals, birds, and occasionally young of game deer and domestic livestock. The bobcat prefers habitat where there is rocky outcrops, along stream bottoms, and in the pinyon-juniper woodlands.

7.1 Rabbit

Rabbits - both cottontail and the white-tailed jackrabbit are abundant, both within the Site Area, and in the Piceance Basin.

The cottontail rabbit, as do all species of rabbit, have a highly cyclic population trend. Cottontails may reach a high of 150 to 200 rabbits per square mile in the Piceance Planning Unit, and drop to a low of 15 to 20 per square mile. The Piceance Basin population is believed to have reached a low during the extremely harsh winters of 1973 and 1974, and, until the equally hard winter of 1978-79, the population had been increasing. The effects of this winter are yet to be noted.

The species is non-migratory, and is more abundant in sagebrush and shrub communities where cover and food are plentiful. In summer months they feed on tender herbaceous vegetation, forbs, and green grasses. During winter, they turn to twigs and the bark of young trees. Water requirements for cottontails are not crucial because they are able to acquire most of their water needs through the plants they eat, and from dew on the vegetation. Cover is of prime importance to cottontails, and consequently, they are seldom found far from brush thickets or other suitable cover. Cottontails make extensive use of agricultural lands and crops grown on them (Ref. E).

8.) Other medium-sized mammals

During the gathering of baseline data for Tract C-b (Ref. I), sampling for medium-sized animals also identified the yellow-bellied marmot, muskrat, beaver, porcupine, striped skunk, long-tailed weasel, raccoon and badger as inhabiting areas on or near the tract.

Marmots were sighted on two occasions in the agricultural lands of Piceance Creek, and are believed to have moved into the area during the period of study, in 1976. Muskrats were observed near ponds and irrigation ditches, but are not abundant. No sign of beaver was noted. Porcupine are common in the higher elevations. Striped skunks were infrequently observed. The long-tailed weasel appears to favor the chained rangeland areas. Badger also inhabit the area, but are not common. Raccoon tracks are found commonly along Piceance Creek, and a local rancher claims that raccoons are more numerous than in past years (Ref. I).

9.) Small mammals

Also during the same gathering of baseline data for Tract C-b (Ref. I), the following species of small mammals were noted as inhabiting areas on, or near, Tract C-b.

The cottontail rabbit, as do all species of rabbits, have a highly cyclic population trend. Cottontails may reach a high of 650 to 800 rabbits per square mile in the Piceance Planning Unit, and drop to a low of 15 to 30 per square mile. The Piceance Basin population is believed to have reached a low during the extremely harsh winters of 1972 and 1973, and until the equally hard winter of 1978-79, the population has been increasing. The effects of this winter are yet to be measured.

The species is non-migratory, and is most abundant in sagebrush and shrub communities where cover and food are plentiful. In summer months they feed on herbaceous vegetation, forbs, and green grasses. During winter, they turn to twigs and the bark of young trees. Water requirements for cottontails are not critical because they are able to meet most of their water needs through the plants they eat, and from dew on the vegetation. Cover is of prime importance to cottontails, and consequently, they are seldom found far from brush thickets or other suitable cover. Cottontails make extensive use of agricultural lands and brush growth on sites (Ref. 8).

9.4 Other medium-sized mammals

During the gathering of baseline data for Tract C-b (Ref. 1), sampling for medium-sized animals also identified the yellow-bellied marmot, muskrat, beaver, porcupine, striped skunk, long-tailed weasel, raccoon, and badger as inhabiting areas on or near the tract.

Muskrats were sighted on two occasions in the agricultural lands of Piceance Creek, and are believed to have moved into the area during the period of study, in 1975. Muskrats were observed near ponds and irrigation ditches, but are not abundant. No signs of beaver were noted. Porcupine are common in the higher elevations. Striped skunks were infrequently observed. The long-tailed weasel appears to favor the riparian vegetation along the creek. Badger also inhabit the area, but are not common. Raccoon tracks are found commonly along Piceance Creek, and a local rancher claims that raccoons are more numerous than in past years (Ref. 1).

9.5 Small mammals

Also during the same gathering of baseline data for Tract C-b (Ref. 1), the following species of small mammals were noted as inhabiting areas on or near the tract:

TABLE 5

SMALL MAMMALS

Soricidae	
Sorex cinereus	Masked shrew
Sorex vagrans	Vagrant shrew
Leporidae	
Sylvilagus audubonii	Cottontail
Sciuridae	
Eutamias minimus	Least chipmunk
Eutamias umbrinum	Uinta chipmunk
Spermophilus lateralis	Golden-mantled ground squirrel
Spermophilus richardsonii	Richardson's ground squirrel
Geomyidae	
Thomomys talpoides	Pocket gopher
Heteromyidae	
Peroganthus apache	Apache pocket mouse
Cricetidae	
Lagurus curtatus	Sagebrush vole
Microtus longicaudus	Long-tailed vole
Microtus montanus	Montane vole
Microtus pennsylvanicus	Meadow vole
Neotoma cinerea	Bushy-tailed woodrat
Peromyscus maniculatus	Deer mouse
Peromyscus truei	Pinyon mouse
Zapodidae	
Zapus princeps	Western jumping mouse
Mustelidae	
Mustela frenata	Long-tailed weasel

The analysis of this data indicated that the chained pinyon-juniper-grassland has created habitat suitable for small mammals. This has resulted apparently from an increased diversity and abundance of herbaceous vegetation and cover. This altered habitat tends to provide more herbaceous vegetation for such species as voles, pocket gophers and shrews --which normally are not present in unchained pinyon-juniper. It was also noted that fewer small mammal species were observed in agricultural meadows, pinyon-juniper rim-rock, bottomland sagebrush, and mixed mountain shrub habitats, due largely to lower diversity of vegetation and reduced edge.

Detailed discussions of small mammals observed on, and near, Tract C-b are available in Reference I.

10.) Birds

The gathering of baseline data on birds for Tract C-b is considered as being typical of the Site Area. During that work observations were made of 136 species of birds on, or near, the Tract. The more common species included:

TABLE 6

BIRDS

Mallard	Red-breasted nuthatch
Green-winged teal	American robin
Blue-winged teal	Townsend's solitaire
Cinnamon teal	Hermit thrush
Marsh hawk	Mountain bluebird
Rough-legged hawk	Blue-gray gnatcatcher
Red-tailed hawk	Bohemian waxwing
Golden eagle	Red-winged blackbird
American kestrel	Evening grosbeak
Spotted sandpiper	House finch
Mourning dove	Red crossbill
Screech owl	Green-tailed towhee
Great-horned owl	Rufous-sided towhee
Broad-tailed hummingbird	Vesper sparrow
Horned lark	Gray-headed junco
Scrub jay	Tree sparrow
Pinyon jay	Chipping sparrow
Common raven	Brewer's sparrow
Black-capped chickadee	Song Sparrow
Mountain chickadee	

(Source: Reference I)

The peregrine falcon, a threatened and endangered species, is expected to hunt over, and migrate through the vicinity of the Tract and Site Area.

Other species were sighted in the region but are considered of negligible importance near Tract C-b. These included the great blue heron, white faced ibis, redhead, Swainson's hawk, peregrine falcon, merlin, blue grouse, Virginia rail, sora, semipalmated plover, long-billed curlew, Hammond's flycatcher, bushtit, pygmy nuthatch, brown creeper, Cedar waxwing, gray vireo, Tennessee warbler, house sparrow, northern oriole, Cassin's finch, pine grosbeak, grasshopper sparrow, lark sparrow, and golden-crowned sparrow.

Songbirds

Detailed songbird studies have been performed on and near Tract C-b. These studies indicate the species which may be oonsidered to also be present within the Site Area of this study. In the cited work, a songbird census was prepared by sampling of transects in four principal vegetative habitats: pinton-juniper, chained pinyon-juniper, bottomland sagebrush, and riparian meadow.

The census was made on seasonal sampling, which broadly centered upon wintering, or permanent resident, species, and spring-summer nesting, or migratory species. During the winter season the site area provides habitat to the more hardy species as well as those migrating from harsher climes. Consequently, diversity is low, and the preferred habitats are within the pinyon-juniper and riparian meadows, hwerever protection and food may be available. Populations seem to vary proportionately to the degree of winter harshness, and related vegetative productivity. Birds such as the Bohemian waxwing, the finches, the grosbeaks, and the crossbills eat juniper berries and thus occupy the pinyon-juniper habitat. Song sparrows and house finches winter in the riparian meadow habitat.

The dominant breeding species of late spring and early summer are shown, ranked by importance index-for the top twenty species-in Table 7.

TABLE 7

BREED SPECIES-IMPORTANCE AND HABITAT-TRACT C-b BIRDS

Species	Importance Value	Habitat
Chipping sparrow	135.0	pinyon-juniper
Brewers sparrow	126.0	bottomland sagebrush
Green tailed towhee	123.0	mixed mountain shrub
Song sparrow	118.0	riparian meadow
Pinyon jay	115.0	pinyon-juniper
Red-winged blackbird	110.0	riparian meadow
Gray-headed junco	110.0	pinyon-juniper
Broad-tailed hummingbird	107.0	chained pinyon-juniper
Cliff swallow	107.0	riparian meadow
Blue-gray gnatcatcher	107.0	bottomland sagebrush
House finch	107.0	pinyon-juniper
House wren	106.0	chained pinyon-juniper
Mountain bluebird	105.0	pinyon-juniper
Hermit thrush	105.0	chained pinyon-juniper
Rough-winged swallow	104.0	riparian meadow
Cliff swallow	103.0	riparian meadow
American robin	103.0	riparian meadow
Solitary vireo	102.0	pinyon-juniper
Common flicker	101.0	pinyon-juniper
Scrub jay	101.0	pinyon-juniper

The principal wintering species and their relative abundance are shown in Table 8, on the following page.

TABLE 8

PRINCIPAL WINTERING SPECIES IN THE FOUR PRIMARY HABITATS ON THE TRACT C-b STUDY AREA

HABITAT: USAGE BY SPECIES	PERCENTAGE OF RELATIVE ABUNDANCE		
Pinyon-juniper habitat	Transect 4[1]	Transect 4[1]	Transect 5B[3]
Red-breasted nuthatch	42.0	4.7	
Mountain chickadee	26.3	8.1	1.4
Pinyon jay	15.0	----	2.5
House finch	----	47.7	----
Red crossbill	----	19.4	0.3
Bohemian waxwing	----	----	94.2
Chained pinyon-juniper habitat	[1]	[2]	
Horned lark	----	38.6	
Red crossbill	----	32.1	
Rufous-sided towhee	----	19.3	
Bottomland sagebrush habitat	[1]	[2]	
Tree sparrow	48.6	----	
American robin	42.9	----	
House finch	----	62.5	
Evening grosbeak	----	18.8	
Scrub jay	----	18.8	
Riparian meadow habitat	[1]	[2]	
Horned lark	45.8	----	
Tree sparrow	20.9	----	
American robin	18.2	----	
Song sparrow	15.1	90.9	

[1] January 1975

[2] February 1976

[3] February 1976

(Source: Reference I)

Detailed information on songbirds may be found in Reference I.

Upland gamebirds

Upland gamebirds which have been reported to inhabit the Site Area include sage grouse, blue grouse, mourning dove and introduced turkey.

Sage grouse have been noted as inhabiting the Site Area. Four strutting grounds, or leks, have been identified. As shown in Figure 13, three leks lie within the Piceance Creek Gas Field, and the fourth lies immediately west of Tract c-b. This area is one of three areas in the Piceance Basin where sage grouse have been consistently observed. The preferred habitat of the sage grouse is the sagebrush-grass type. The highest densities of this bird occur where the types are closely associated with irrigated lands, dry-land farms and river bottoms (Ref. F). A special three-year study of the sage grouse was to be conducted by the Colorado Division of Wildlife in order to locate breeding, nesting, brooding,and wintering areas, and to determine measures for the protection of this species (Ref. G).

Blue grouse have been reported to occupy portions of the same area, within the Piceance Creek Gas Field, as the sage grouse.

Mourning dove have been reported as occupying all habitats on, and near, Tract C-b. This species is reported as being most abundant in pinyon-juniper adjacent to chained habitat and in the transition of sagebrush and young pinyon-juniper. The mourning dove has been measured to have a population density of from 0.01 to 0.1 per acre (originally reported in metric units). As reported in Reference I, Davis and Anderson have noted that such habitat provides trees suitable for roosting, daytime resting, nesting, --and are interspersed with open areas containing ample supplies of forbs and weeds which are common food items of the mourning dove. Prior to fall migration in September, large flocks congregate along nearby streams and in bottomland sagebrush, and in open pinyon-juniper reasonably close to water. During October 1974, this flocking resulted in population densities of 0.24 birds per acre in the riparian habitat along Piceance Creek. Mourning doves reappear and congregate along Piceance Creek in early April, and disperse in pairs to specific breeding sites during late April (Ref. I).

The Colorado Division of Wildlife released 14 turkeys in the Dry Fork area in March 1975, near the Little Hills Experimental station, and subsequent sightings indicate that these birds have survived. The same agency plans to release 12 to 15 more birds in the same general area. A map published by the DOW indicates that the expected habitat will include portions of the Site Area northeast of Piceance Creek.

Waterfowl and shorebirds

The Site Area has a very limited amount of water available on the surface of the White River, Piceance Creek and in various small stock ponds and tanks. Intensive studies of the waterfowl (Ref. I) along the waters of Piceance Creek, near Tract C-b, are considered representative of the Site Area. According to these studies, neither the Site Area nor the Piceance Basin lie within any major segment of the Pacific Waterfow Flyway. Nevertheless, some migratory waterfowl species do move through the area in September and October. Sandpipers appear to leave the Basin before the end of September.

During the study, 24 species of waterfowl and shorebirds were noted within the study area near the Tract. Of these, 11 species nest within the area.

The three most populous species along Piceance Creek are mallard, green-winged teal, and the American wigeon. Since the American wigeon migrates into the Piceance Basin during October and leaves by March, the mallard and the green-winged teal are the only abundant permanent residents near the Tract. The blue-winged teal, a common resident in early fall, is present in low numbers during winter.

The most common nesting species during June are mallard, green-winged teal, spotted sandpiper, Wilson's Phalarope, and cinnamon teal. Less common nesting species are the blue-winged teal, American coot, and common snipe.

The magnitude of waterfowl usage of site waters is indicated by a census taken in the P-L Ranch pond in 1974 and 1975. The high usage was during October 1974, when the pond provided habitat for 45.7 birds use days. The low was in July of 1975, with a utilization of only 7.5 bird-use days.

Other sources have reported that summering population consists of mallards, blue-winged teal, cinnamon teal, gadwall, pintails, and mergansers. It has been estimated that there were 1,000 ducks using Piceance Creek, but species, season of use, and duck-use days were not set forth. Other waterfowl species which inhabit or use the Piceance Planning Unit and may be expected to utilize the Site Area may be found in the Species List in Table 1, Animals (1605.36) in Reference D.

Raptors

The Site Area provides habitat for 20 reported species of raptor. These include eleven species of diurnal hawk, vulture, and eagle, eight owl species, as well as common raven. At least 4 of the species have identified nesting sites near Tract C-b (Ref. I).

Waterfowl and Shorebirds

The site area has a very limited amount of water available on the surface of the White River, Piceance Creek and in various small stock ponds and tanks. Intensive studies of the waterfowl (Ref. 1) along the waters of Piceance Creek, near Site C-b, are considered representative of the site area. According to these studies, neither the site area nor the Piceance Basin lie within any major segment of the Pacific Waterfowl Flyway. Nevertheless, some migratory waterfowl species do move through the area in September and October. Residents appear to leave the basin before the end of September.

During the study, 14 species of waterfowl and shorebirds were noted within the study area near the Tract. Of these, 11 species nest within the area.

The three most populous species along Piceance Creek are mallard, green-winged teal, and the American wigeon. Since the American wigeon migrates into the Piceance Basin during October and leaves by March, the mallard and the green-winged teal are the only abundant permanent residents near the Tract. The blue-winged teal, a common resident in early fall, is present in low numbers during winter.

The most common nesting species during June are mallard, green-winged teal, spotted sandpiper, Wilson's Phalarope and [illegible]. Less common nesting species are the blue-winged teal, American coot, and common snipe.

The population of waterfowl use of this habitat is indicated by a census taken in the C-a North pond in 1974 and 1975. The high usage was during October 1974, when the pond provided habitat for 43.7 birds-use days. The low was in July of 1975, with a utilization of only 7.5 bird-use days.

Other sources have reported that suspected or expected occurrence of mallards, blue-winged teal, cinnamon teal, gadwalls, pintails and mergansers. It has been estimated that there were 2,000 ducks using Piceance Creek, but specific season of use and duck-use days were not set forth. Other waterfowl species which inhabit or use the Piceance Planning Unit and may be expected to utilize the Site Area may be found in the species list in Table 11, Appendix III, in Reference 1.

Raptors

The Site Area provides habitat for twenty reported species of raptors. These include eleven species of diurnal hawks, vultures, and eagles, eight owl species, as well as common raven. At least 4 of the species have identified nesting sites near Site C-b (Ref. 1).

Fourteen species of raptors were noted within the Tract C-b study area. These include the rough-legged hawk, golden eagle, and the bald eagle, are the most abundant diurnal wintering species. Most wintering species frequent riparian meadows. bottomland sagebrush, and the chained pinyon-juniper areas where abundant small mammal populations are available for food (Ref. I).

The red-tailed hawk, marsh hawk, and American kestral are abundant in the area during summer and fall, but not during late winter. The prairie falcon has been seen in small numbers.

Eight species of owls have been sighted in the area. These include the great horned owl, screech owl, long-eared owl, and barn owl, and--an infrequent winter visitor to temperate climates--the snowy owl. The short-eared owl, saw-wet owl and pygmy owl were also reported in small numbers.

Nesting raptors have been noted within the Site Area. The locations of nesting areas of the red-tailed hawk and the golden eagle, as well as a winter concentration area for the bald eagle are shown on Figure 13.

The red-tailed hawk and the golden eagle nest in the highlands above Piceance Creek in the vicinity of the chained pinyon-juniper grassland, and near riparian habitat and meadows where small mammals are abundant.

A series of nests of the red-tailed hawk is reported along the northern side of the valley of Piceance Creek, within Tract C-b and along the northern slope of Hay Canyon near the proposed ROW. One of these lies near the center of Section 31, T. 2 S., R. 96 W., about 300' westerly of Station 988.

Nests of the golden eagle also are found within the Site Area in the vicinity of Tract C-b and along the northern slope of Hay Canyon. One of these golden eagle nests is reported to lie in the N½ of Section 22, T. 2 S., R. 96 W., about 500' easterly of Station 313.

The bald eagle is a winter visitor of a concentration area centered along the White River in the northern part of the Site Area. The steep cliffs and high trees along the White River provide habitat for the bald eagle; however, no nests for the bald eagle are known within the Piceance Basin proper.

Sightings of the peregrine falcon, an endangered species, have been reported over Oil Shale Tract C-a, but none have been reported over the Site Area. The most suitable nesting habitat for the peregrine falcon lies along the cliffs of the Parachute Canyon area, about 18 miles south of Tract C-b.

11.) Amphibians, reptiles and invertebrates

Species of amphibians, reptiles and invertebrates which may be expected to inhabit the Site Area may be found in the Species List of Table 1 in Reference D.

Studies of these animals were performed during the baseline data acquisition for Tract C-b, and are discussed in full in Reference I.

In Tract C-b studies on reptiles, the sagebrush lizard, Sceloporus graciosus, was found to be abundant and widespread. Slash piles and grass cover apparently provided additional habitat for the northern plateau lizard, Sceloporus undulatus elongatus, the tree lizard, Urosaurus ornatus, and the short-horned lizard, Phrynosoma douglassi. The western terrestrial garter snake, Thamphosis elegans was the only other reptile found on the Tract. The western rattlesnake, Crotalus viridis, and the gopher snake, Pituophis melanoeocus, were expected, but not found within Tract C-b.

The only amphibian observed during the Tract C-b studies was the leopard frog, Rana pipiens, which was found in large numbers in Steward Lake, Lower Stewart Lake, and in Piceance Creek.

Studies also were performed within the Tract area on invertebrates. Ground dwelling arthropods which were abundant, were Darkling beetles, Tenebrionidae; ants, Formicidae; mites, Acari; hunting spiders, Gnaphosidae; wolf spiders, Lycosidae; ground beetles, Carabidae; and Jerusalem crickets, Gryllacrididae. Shrub dwelling arthropods were examined by four major vegetative types. According to their report (Ref. I), "The four most abundant arthropod groups collected from each browse species in order of decreasing abundance were: serviceberry--aphids, plant bugs, leafhoppers, tent caterpillar larvae; mountain mahogany--psyllids, plant bugs, wolf spiders, tent caterpillar larvae; big sagebrush--plant bugs, leafhoppers, tent caterpillar larvae, and thrips----." Of all these species, the omnivorous ant and the mite were found to be the most abundant species.

(c) Threatened and endangered animals

The bald eagle is known to winter in areas adjacent to the White River; however, no nests have been reported within the Site Area within the Piceance Basin.

No other threatened or endangered animal species are known to live within the Site Area.

7. Cultural Features

(a) Prehistoric cultural features

In accordance with the requirements of the Antiquities Act of 1906, the Historic Preservation Act of 1966, and Federal Executive Order 11593, the ROW was examined for archaeological and historical sites. The findings of the work are contained in reports on file with the White River Resource Area Office of the BLM in Meeker (References 2 and 4). The former reference indicates that an area of lithic scatter was found on the north slope of Kendall Peak.

A 60% pedestrian inventory was performed by the Laboratory of Public Archaeology on Tract C-b in August 1974. Three archaeological sites were located on Tract C-b during this survey. All 3 sites were lithic scatters and none appear to meet the criteria for eligibility to the National Register of Places. Two of the sites were heavily disturbed by chaining and one partially disturbed by chaining and one partially disturbed by a road traversing it.

In the vicinity of Collins Gulch and Piceance Creek, several isolated finds were made near the ROW.

(b) Historic cultural features

There are no historic sites along the route described as Alternative A.

8. Aesthetics/Visual Resource

Aesthetic values of the Site Area are in large measure related to visual quality and to parallel values of recreational usage which consists principally of hunting.

Aesthetic and visual values are similar in aspect to the average terrain found in the northwestern sector of Colorado, and more specifically to that which is found in and is characteristic of the Piceance Basin.

Discussion of aesthetic values for the area follows closely that of the visual resource. The visual resource and recreation are discussed in the following sections.

(a) Landscape character

The character of the landscape of the Site Area varies according to five major aspects, based largely upon topography. These five major aspects are:

- The view of the northern end of the projected ROW as seen from the floor of the valley of the White River and Sheep Creek.

- The view of northwestern central interior as seen from the floor of the valley of the Dry Fork of Piceance Creek.

- The view of the southern end of the Site Area from the floor of the valley of Piceance Creek.

- The view as seen from the upland mesa surface north and south of Piceance Creek in the vicinity of Tract C-b and the county roads which traverse the Piceance Creek Gas Field.

- The interior view of the high plateau which forms the eastern rim of the Piceance Basin in the vicinity of Joe Bush Mountain and Kendall Peak.

1.) <u>As seen from the White River Valley and Sheep Creek</u>

The landscape character of the northern end of the Site Area is dictated by four major visual elements.

The first visual element is composed of the strongly linear White River together with its verdant flood plain and adjacent meadowlands. The view is seen principally by the residents of ranches along the valley floor and by travelers along Colorado Highway No. 64 which follows the northern edge of the flood plain through Powell Park. The valley floor to the edges of the flood plain is about a mile wide and is the setting for many ranches together with meadowlands, with stands of trees and other riparian vegetation which follow the edges of the White River and along well established irrigation ditches. Homes and residences are scattered throughout this bucolic setting. Grazing cattle and horses can be seen from place to place.

The second visual element is composed of the high ridgeline which lies 3½ miles south and 2,000 feet above the White River. The ridge is the extreme northeasterly corner of the Piceance Basin rim. The rapid ascent of the slope from the valley floor upwards to the skyline forms a massive visual rampart to the south for even the most casual viewer located anywhere in the valley. The high rim is seen as sedimentary formations having strong horizontal linearity. The sideslopes which drop from the high rim are covered with typical vegetation of the semiarid climate and offer grasslands mixed with scrub brush and low stands of pinyon-juniper. In the middleground, the combination of bare sediments and sparse vegetation present a mosaic of browns and greens, which in spring and periods of moisture may have a clarity of tone and bright contrast. During dry periods, however, the colors of brush and soil are muted and pastel and convey a visual sense of aridity.

- The view of southwestern central interior as seen from the floor of the valley of the Dry Fork of Piceance Creek.

- The view of the southern end of the Site Area from the floor of the valley of Piceance Creek.

- The view as seen from the upland mesa surface north and south of Piceance Creek in the vicinity of Tract C-b and the county roads which traverse the Piceance Creek Gas Field.

- The interior view of the high plateau which forms the western rim of the Piceance Basin in the vicinity of Cow Ridge Mountain and Kendall Peak.

iv. As seen from the White River Valley and [illegible]

The landscape character of the northern end of the Site Area is dictated by four major visual elements.

The first visual element is composed of the strongly linear White River together with its verdant flood plain and adjacent woodlands. The river is seen principally by the residents of ranches along the valley floor and by travelers along Colorado Highway No. 64 which follows the northern edge of the flood plain through Powell Park. The valley floor to the edges of the flood plain is about a mile wide and is the setting for many ranches together with meadowlands, with stands of trees and other riparian vegetation which follow the edge of the White River and along well established irrigation ditches. Homes and residences are scattered throughout that bucolic setting. Grazing cattle and horses can be seen from place to place.

The second visual element is composed of the high plateau which lies to the south and 1,000 feet above the White River. The slope is the extreme northeasterly extent of the Piceance Basin rim. The rapid ascent of the slope from the valley floor upwards to the skyline forms a massive visual backdrop to the south for even the most casual viewer located anywhere in the valley. The high rim is seen as sedimentary formations having strong horizontal linearity. The landforms which drop from the high rim are covered with typical vegetation of the semi-arid climate and other grass-lands mixed with scrub brush and low stands of pinyon-juniper. In the middleground, the combination of hard sediments and sparse vegetation present a mosaic of browns and greens which in spring and periods of moisture may have a clarity of tone and bright contrast. During dry periods, however, the colors of brush and soil are muted and pastel and convey a visual sense of aridity.

The third visual element to form the scenic quality at the northern end of the Site Area is the presence of the strong north-south trending Grand Hogback which forms the eastern slopes of Sheep Creek. Colorado Highways 13 and 789 follow a natural north-south corridor along this route. Travelers going toward Meeker in the north have a view downwards into the White River Valley. Travelers going toward Rifle to the south have a view of the valley of Sheep Creek which is formed by the Grand Hogback to the east and the slopes which rise to the rim of the Piceance Basin to the west.

The fourth visual element is composed of the floor of the Sheep Creek Valley where it has its juncture with the White River Valley and consists of semiarid grasslands which are utilized for agricultural meadowland and grazing. The view offered is one of light yellow and yellow-green grasslands with few if any tall trees.

A major electrical transmission line corridor runs southerly along the floor of the Sheep Creek Valley. Both steel and wooden transmission line towers and poles are seen by the casual observer. This corridor and its lines form a strong linear visual feature which crosses the valley at almost right angles.

At the juncture of these major visual elements, the Meeker Substation and switchyard of the Colorado-Ute Electrical Association--which is the point of beginning for the projected ROW--lies along the edge of the southern bank of the White River flood plain. The substation itself does not have a high visibility from either the valley floor or from any of the surrounding highways, even though some of the transmission lines are easily seen.

In composite, the northern end of the Site Area within the White River Valley, offers a tranquil pastoral setting. Most viewers of average persuasion would consider the scene as being one having moderately high visual quality.

2.) <u>As seen from the floor of Dry Fork of Piceance Creek</u>

The bottom of the valley of the Dry Fork of Piceance Creek is accessible from the northwest along County Roads 22 and 127. The streams are deeply incised at this location into the high plateau lands and mesas. Thus the traveler's view is limited to the immediate foreground by the sharp and steeply sloping canyon walls which lie from a ¼-mile to ½-mile distant on either side of most roads and trails. Views to the middleground can only be seen along occasional side canyons which lead principally towards the south. As is indicated by the name, the Dry Fork is an intermittent

The third visual element to form the scenic quality at the northern end of the Site Area is the presence of the strong north-south trending Grand Hogback which forms the eastern slopes of Sheep Creek. Colorado Highways 13 and 789 follow a natural north-south corridor along this route. Travelers going toward Meeker in the north have a view downward into the White River Valley. Travelers going toward Rifle to the south have a view of the valley of Sheep Creek which is bounded by the Grand Hogback to the east and the slopes which rise to the rim of the Piceance Basin on the west.

The fourth visual element is observed at the floor of the Sheep Creek Valley where it has its junction with the White River Valley and consists of seasonal grasslands which are utilized for agricultural seedland and grazing. The view offered is one of light yellow and yellow-green grasslands with few if any tall trees.

A major electrical transmission line corridor runs southerly along the floor of the Sheep Creek Valley. Both steel and wooden transmission line towers and poles are seen by the casual observer. This corridor and its lines form a strong linear visual feature which crosses the valley at almost right angles.

At the juncture of these major visual elements, the Meeker substation and switchyard, of the Colorado-Ute Electrical Association, which is the point of beginning for the proposed line along the edge of the southern part of the White River flood plain. The substation itself does not have a high visibility from either the valley floor or from any of the surrounding highways, even though some of the transmission lines are easily seen.

In summary, the northern end of the Site Area, within the White River Valley, offers a tranquil pastoral setting, which viewers of diverse persuasion would consider the scene at least one having moderately high scenic quality.

(2) As seen from the Floor of the Dry Fork of Piceance Creek

The bottom of the valley of the Dry Fork of Piceance Creek is accessible from the northeast along County Roads 13 and 127. The roads are deeply incised at this location into the high plateau lands and mesas. Thus the traveler's view is limited to the immediate foreground of the steep and steeply sloping canyon walls which lie from a quarter to a mile distant on either side of most roads and trails. Views to the middleground can only be seen along the side canyons which lead principally toward the south. As is indicated by the name, the Dry Fork is an intermittent stream which has a dry bed for a greater portion of each year. The area is dry, and the low desert vegetation also conveys the sense of aridity. Colors and tones are muted earthtones. Although the area is used for the grazing of cattle, and some meadow and grasslands are present in the valley bottoms, the scene and its quality are one of ordinary desert. This is promoted by the sandy bottoms which raise plumes of fugitive dust with the passage of each vehicle.

Although the area offers a strong sense of isolation, and although the valleys provide access for recreational hunting for large and small game, the overall scenic quality is judged as having little merit for a viewer of average bent.

3.) <u>As seen from the valley of Piceance Creek</u>

The traveler to the southern end of the Site Area will approach this sector either from the east at Rio Blanco Store, or from the west at White River City over County Road 5.

As County Road 5 lies in the valley bottom, the view is oriented in the direction of the valley where distances of one to two miles may be seen. The bottom of the valley is narrow--only about ¼-mile in most places--so that views to the north are limited to a few hundred feet to the crests of nearby ridges and to the south across the valley bottom for distances of from 1,000 to 2,000 feet to the low ridgeline lying south of the valley.

On either side lie steep lower slopes which reveal many rock outcrops more or less covered with intermittent patches of vegetation. The vegetation is mostly of the pinyon-juniper type which reaches upwards and beyond the line of sight. Occasional glimpses are seen to both north and south as side valleys join the main course of Piceance Creek. The valley bottom itself is lush with green grass, pastures, marshlands, and occasional small ponds covering an acre or less. Piceance Creek itself wanders through the meadows and reveals a small incised stream bed no more than 5 to 10 feet wide on the average.

Ranches are seen along the valley floor about every 1½ to 2 miles. For the greater part, the ranches are rustic and reveal moderately good to poor upkeep. With the exception of one new residence with modern, natural wood finish architecture, most of the houses are traditional rural design and are surrounded by rudely constructed barns, outbuildings and corrals of unpainted and weathered character.

Meadow lands show evidence of cultivation, hold tractors and other farm equipment and contain fenced stacks of hay, stream which has a dry bed for a greater portion of each year. The area is dry, and the low desert vegetation also conveys the sense of aridity. Colors and tones are muted earthtones. Although the area is used for the grazing of cattle, and some meadow and grasslands are present in the valley bottoms, the scene and its quality are one of ordinary desert. This is promoted by the sandy bottoms which raise plumes of fugitive dust with the passage of each vehicle.

Although the area offers a strong sense of isolation, and although the valleys provide access for recreational hunting for large and small game, the overall scenic quality is judged as having little merit for a viewer of average sensitivity.

3. As seen from the Valley of Pleasance Creek

The traveler to the southern end of the site area will approach this sector either from the east at Rio Blanco Store, or from the west at White River City over County Road 4.

As County Road 4 lies in the valley bottom, the views are oriented in the direction of the valley where distances of one to two miles may be seen. The bottom of the valley is narrow--only about ¼-mile in most places--so that views to the north are limited to a few hundred feet to the crests of nearby ridges and to the south across the valley bottom for distances of from 1,000 to 2,000 feet to the low ridgeline lying south of the valley.

On either side lie steep lower slopes which reveal many rock outcrops more or less covered with intermittent patches of vegetation. The vegetation is mostly of the pinyon-juniper type which reaches upwards and beyond the line of sight. Occasional glimpses are seen to both north and south as side valleys join the main course of Pleasance Creek. The valley bottom itself is lush with green grass, pastures, marshlands and occasional small ponds covering an acre or less. Pleasance Creek itself winders through the meadows and reveals a small incised stream bed no more than 5 to 10 feet wide on the average.

Ranches are seen along the valley floor about every 1½ to 2 miles. For the greater part, the ranches are rustic and reveal moderately good to poor upkeep. With the exception of one new residence with modern, natural wood frame architecture, most of the houses are traditional rural design, and are surrounded by ruddy constructed barns, outbuildings and corrals of unpainted and weathered character.

Meadow lands show evidence of cultivation, with tractors and other farm equipment and cobbed fenced stacks of hay and in some instances, geometric stacks of baled hay. The scene is made more pastoral by the presence of many small herds of grazing cattle.

4.) As seen from the ridges and mesas above Piceance Creek

The fourth aspect of view, or viewshed, lies in the south-western end of the Site Area and may be seen from the upper ridges and mesas which flank Piceance Creek to the north and south. Tract C-b surface facilities lie on this upland plateau surface south of Piceance Creek, whereas the surface facilities related to the Piceance Creek Gas Field are located on this upland surface north of the creek. Access to the upper ridges is gained either from the road to Tract C-b, or on County Road 3 which leads up Collins Gulch to Mobil Camp.

The aspect from several places on this plateau surface provides panoramic views of large portions of the Piceance Basin. From the vicinity of Mobil Camp, views in all directions reach the far background. To the north, the hills beyond the Little Hills Experimental Station can be seen. To the northeast, the profile of the Danforth Hills may be seen through the distant haze. To the west are seen the slopes which rise towards the western rim of the Piceance Basin beyond Tract C-a and in the vicinity of Rangely. To the southwest, the skyline is formed by the upper slopes of the Cathedral Bluffs. To the south, the view of the skyline is formed by the gentle rise of the Piceance Basin towards the rim of the Roan Plateau in the vicinity of Parachute Creek. The view from Tract C-b is similar; however, the northerly view is dominated by the intermediate slopes north of Piceance Creek. The industrial character of the area is seen by the surface facilities at Tract C-b and at the Piceance Creek Gas Field.

5.) As seen from the high plateau surface near Joe Bush and Kendall Peaks

A large sector of the north-central portion of the Site Area is obscured from view from most ot the major routes of access. This is due to the fact that most access and viewing is from valley bottoms which do not permit sight of large portions of the upper plateau surfaces. This is especially true for the high plateau slopes which lie north of the Dry Fork of Piceance Creek and south of Kendall Peak. The area between Joe Bush Peak and Kendall Peak can only be seen from dirt roads and trails which approach the high plateau from the northeast. The general character of this seldom seen area is of mesa curfaces dissected by deep narrow valleys which have relatively steep sideslopes. Only one or two and in some instances, geometric stacks of baled hay. The scene is made more pastoral by the presence of many small herds of grazing cattle.

4) As seen from the ridges and mesas above Piceance Creek

The fourth aspect of view, or viewshed, lies in the southwestern end of the Site Area and may be seen from the upper ridges and mesas which flank Piceance Creek to the north and south. Tract C-b surface facilities lie on this upland plateau surface south of Piceance Creek, whereas the surface facilities related to the Piceance Creek Gas Field are located on this upland surface north of the creek. Access to the upper ridges is gained either from the road to Tract C-b, or on County Road 3 which leads up Collins Gulch to Noble Camp.

The aspect from several places on this plateau surface provides panoramic views of large portions of the Piceance Basin. From the vicinity of Noble Camp, views in all directions reach the far background. To the north, the hills beyond the Little Hills Experimental Station can be seen. To the northeast, the cuestas of the Danforth Hills may be seen through the distant haze. To the west are seen the slopes which rise towards the western rim of the Piceance Basin beyond Tract C-a and in the vicinity of Rangely. To the southwest, the skyline is formed by the upper slopes of the Cathedral Bluffs. To the south, the view of the skyline is formed by the gentle rise of the Piceance Basin towards the rim of the Roan Plateau in the vicinity of Parachute Creek. The view from Tract C-b is somewhat however, the northerly view is dominated by the intervening slopes north of Piceance Creek. The industrial character of the area is seen by the surface facilities at Tract C-b and at the Piceance Creek Gas Field.

5) As seen from the high plateau surfaces near the Hush and Kendall Peaks

A large sector of the north-central portion of the Site Area is obscured from view from most of the major routes of access. This is due to the fact that most access and viewing is from valley bottoms which do not permit sight of large portions of the upper plateau surfaces. This is especially true for the high plateau slopes which lie north of the Dry Fork of Piceance Creek and south of Kendall Peak. The area between Hush Peak and Kendall Peak can only be seen from dirt roads and trails which approach the high plateau from the northeast. The overall character of this region seen area is of mesa surfaces dissected by deep narrow valleys which have relatively steep sidewalls. Only one or two roads connect the upper ridges with the valleys and these are in poor condition. The general view is of rolling ridges covered by scrub brush vegetation. The upper surfaces are practically devoid of moisture and thus the vegetation is that typical of arid conditions and this is conveyed to the viewer. Colors are earth tones and muted greens and browns of vegetation.

(b) Visual Resource Management Analysis (VRM)

A Visual Resource Management Analysis (VRM) has been prepared for the Site Area by the White River Resource Area BLM Office. A composite map showing the results of this analysis is shown in Figure 16 and photographs of the Site Area are shown on Figures C-1 through C-19. It is to be noted that of the 22.5 miles of ROW which traverse the Site Area, about 11.5% cross lands which have been rated at VRM Class II within the valleys of Piceance Creek and of the White River. About 4.4% of the ROW cross VRM Class III lands in the vicinity of the Piceance Creek Gas Field, and about 64.4% cross lands which have been rated at VRM Class IV.

9. Recreation Resources

The Site Area offers opportunities for recreation. These include hunting, fishing--to a limited extent--and viewing of wildlife, geological areas of interest, cultural sites and scenery.

(a) Hunting

The Site Area lies within the Colorado Division of Wildlife's Game Management Unit 22. This unit reportedly contains the nation's largest migrant herd of mule deer and deer hunting is the most important recreational use of the area. Other game species such as elk and mountain lion are also hunted in this area.

(b) Fishing

Fishing is pursued in the waters of the White River, and to a far more limited extent in Piceance Creek and its tributaries; however, the fishery is not particularly noteworthy or significant.

(c) Scenic values and viewing

Three areas offer potential for scenic viewing of moderately high capability. The first lies along the White River Valley where the pastoral and verdant setting offers pleasant open space values to the resident and traveler. The second area lies north of Piceance Creek on the ridge near Mobil Camp, as shown on Figure 15. At this location roads connect the upper ridges with the valleys and these are in poor condition. The general view is of rolling ridges covered by scrub brush vegetation. The upper surfaces are practically devoid of moisture and thus the vegetation is that typical of arid conditions and this is conveyed to the viewer. Colors are earth tones and muted greens and browns of vegetation.

(2) Visual Resource Management Analysis (VRM)

A Visual Resource Management analysis (VRM) has been prepared for the Site area by the White River Resource Area BLM Office. A composite map showing the results of this analysis is shown in Figure 16 and photographs of the Site area are shown on Figures F-1 through F-19. It is to be noted that of the 20.5 miles of ROW which traverse the Site area, about 2.58 cross lands which have been rated at VRM Class II along the valleys of Piceance Creek and of the White River. About 4.5% of the ROW cross VRM Class III lands in the vicinity of the Piceance Creek Gas Field, and about 64.4% cross lands which have been rated at VRM Class IV.

c. Recreation Resources

The Site area offers opportunities for recreation. These include hunting, fishing--to a limited extent--and viewing of wildlife, geological areas of interest, historical sites and scenery.

(a) Hunting

The Site area lies within the Colorado Division of Wildlife's Game Management Unit 22. This unit reportedly contains the nation's largest migrant herd of mule deer and deer hunting is the most important recreational use of the area. Other game animals such as elk and mountain lion are also hunted in this area.

(b) Fishing

Fishing is pursued in the waters of the White River and to a far more limited extent in Piceance Creek and its tributaries; however, the fishery is not particularly noteworthy or significant.

(c) Sightseeing and Viewing

These areas offer potential for scenic viewing of moderate to high quality. The first lies along the White River Valley where the pastoral and verdant setting offers pleasant open scene vistas to the pheasant and traveler. The second area lies north of Piceance Creek on the ridge near Mobil Camp, as shown on Figure 15. This area location a high ridge near County Road 76 has a panoramic view of the Piceance Basin to the south, including an ideal vantage point for an overview of Oil Shale Tract C-b. Although the WRRA initially recommended that this overlook be developed, this recommendation has since been withdrawn. The third potential area for viewing lies within Tract C-b, where a Visitor's Center is being constructed to provide viewing of the oil shale development and to provide information to interested visitors.

The remaining area has been rated as having a limited value for dispersed activities ranging from moderate through moderately low and low capabilities.

(d) Wildlife and viewing

Several areas within the Site Area, as shown on the Wildlife Habitat Map of Figure 13, provide opportunities for the viewing of wildlife. The most notable opportunities for viewing are for deer, sage grouse, and for raptors such as the bald eagle along the White River Valley, the golden eagle and the red-tailed hawk in the vicinity of Tract C-b.

(e) Geology and viewing

The geology of the Piceance Basin is of interest due to the concentration of energy minerals. Within the Site Area, viewing of formations and structures is available along the Grand Hogback near Highway 13 and 789; in and around Dudley Gulch near Piceance Creek--where the Uinta Formation is exposed in a small graben--the vicinity of the Piceance Creek Gas Field; and along the valley of Piceance Creek.

(f) Recreational riding

The roads and trails of the Site Area offer opportunity for the riding in off-road vehicles, on horseback, or on snowmobiles during the winter months. Open space and scenic values offer a readily available potential for recreation.

(g) Existing recreational facilities

With the exception of the Visitor Center planned for Tract C-b, there are no formal recreational facilities in the Site Area.

(h) Recreational capability classification

The Site Area was analyzed according to the BLM Recreational Capability Classification. The results of this study are shown on Figure 14.

The southern two-thirds of the Site Area were classified as having a low to moderately low capability for dispersed

recreational activities. These included potential for viewing, and off-road vehicle travel. Two areas near Mobil Camp were ranked as Class 3, with a moderately high capability for the panoramic views available from two topographically high hills. These are being considered as candidates for development for viewing if the oil shale activity indicates enough interest.

In the northern third of the area, the upper slopes around Kendall Peak have been ranked as Class 4 with a moderate capability for landform viewing and snowmobiling. The agricultural area in the vicinity of the Meeker Substation has been classified as Class 3 for having a moderately high capability for snowmobiling. The strip along the southern bank of the White River has a classification of Class 4 for dispersed activities for agricultural interest, canoe tripping and angling.

In general, the classifications are low for most of the Site Area.

10. Social Aspects

The social aspects of the Site Area derive from those of the population which lives within and near the Site Area.

This population is based upon the tradition of the settlers who occupied the area in the 1800's and whose culture was based upon an agricultural and ranching economy. Centers of cultural or economic activity centered upon the towns of Rangely and Meeker, which served the widely dispersed and isolated families living on ranches. With the advent of modern communications, these ranches are no longer isolated and enjoy all modern amenities.

Living contemperaneously with the agricultural-ranching community is a population whose livelihood is dependent upon the production of mineral resources. The production of oil and gas has given rise to large populations which immigrated into the area in the early 1900's in the vicinity of Rangely, and within the Site Area in the years following 1929 when the discovery of oil and gas were made at the Piceance Creek Dome. The current large scale developments in oil shale and other mineral fuels within the region will probably have considerable impact upon the social and cultural patterns of the county.

(a) Demography

The population within the immediate Site Area is small and is concentrated within three areas.

The first center of population lies along the White River, where about 61 people reside in 18 rural residences. Of these, 17 people in 5 families reside south of the river, and 44 people in 13 families reside north of the river.

The second area of population lies at the gas production facilities at the Piceance Creek Gas Field. At the camp of the Mobil Oil Corporation (shown on older maps as the "Magnolia Camp"), in Section 9, T. 2 S., R. 96 W., two families-with 3 adults and 4 children-have permanent residences, and occupy two house trailers. Three additional trailers provide field season residence (March-November) for drilling and research personnel. Thus, the Mobil Camp has a permanent population of 7 people, and a transient population of an additional 8 to 9 people or more.

Also at the Piceance Creek Gas Field, the Northwest Pipeline Corporation operates a compressor station with a small resident staff. The staff and their families reside at a camp in two permanent dwellings, and two house trailers. The residents include 8 adults and 3 children.

The third center of population is comprised by the ranch families resident in the valley of Piceance Creek near Tract C-b. Within the Site Area, four permanent residences, and two house trailers provide year long dwelling for six family units. Each family has two adults and an average of 2.2 children per family. Thus, a total of twelve adults and thirteen children, for a total of twenty-five people, reside along County Road 5 within the southern end of the Site Area.

A transient population of workers will be employed for the production of shale oil at Tract C-b. It is estimated that, when full-scale operations are obtained, about 1600 full-time workers will be employed (Ref. K). It is estimated that under a 3-shift operation, approximately a third, or 533 workers, will be on site at any given time. Twice this number, or 1066, may be expected to be on site during shift changeovers.

The construction of facilities and the operations at Tract C-b, attract a considerable number of visitors. The operators plan a Visitor's Facility at the northern edge of the Tract, which is sure to attract large numbers of visitors in the near future. It is not possible to project how many visitors may be expected.

In summary, the Site Area contains 30 residences with family units, and a population of 104 people.

11. Economics

The economics of the Site Area are related to those of the region, to Rio Blanco County, and the trading centers of Rangely and Meeker. The economics of this region is discussed in Section B of Appendix A in Reference 1.

12. Land Uses

Historically, the principal uses for the land within the Site Area have been for ranching, livestock grazing, hunting, and the production of oil and gas.

With the inception of exploration and development of oil shale, saline minerals, and the increased emphasis on oil and gas--particularly from tight formations, it may be expected that the character of land use is changing. In the past, and at present, ranching and hunting have been compatible with the production of oil and gas; however, with the development of large underground mines--or in-situ extraction--some conflicts in the use may be expected.

The Site Area for this EA, which is shown in Figure 5, contains about 101,696 acres or 158.9 square miles. Figure 16 shows the surface ownership, and Table 9 following gives the acreages and percentages of the ownership categories.

TABLE 9

SURFACE OWNERSHIP OF THE SITE AREA-TRACT C-b POWER LINE

Ownership	Acres	Percentage of Site Area
Private Land	27,458	27.0
Public Land	72,408	71.2
Public Water Reserve	1,525	1.5
Colorado Division of Wildlife	305	0.3
TOTAL ACREAGE-SITE AREA	101,696	100.0%

(a) Land use for wilderness

No public lands within the Site Area have been recommended for wilderness consideration.

(b) Land use for minerals

The land surface is underlain by resources of oil shale, evaporite minerals, oil and gas, coal, ground water, and other minerals.

The Piceance Creek Oil and Gas Field which occupies the south-central sector of the Site Area has been in continuous production since its discovery in 1929 and is a principal land use.

Oil shale underlies a large portion of the Site Area, Tract C-b--which the proposed transmission line will serve--is currently under development for the production of shale oil. The oil shale resource is a major one and land use for such production is expected to increase.

Although other minerals, including evaporites containing aluminum, potassium, and soda, also underlie the Site Area, their development will be subordinate to and loosely related to the development of oil shale.

It is considered that the development of mineral resources which underlie the Site Area is a major use of the surface and will grow with increased development of oil shale.

Further discussion of the mineral resource of the Site Area is given in the section so titled.

(c) Land use for livestock grazing

The site contains portions of 9 grazing allotments which cover about 86,105.6 acres. About 82.9% of the Site Area is used for grazing. These allotments are shown on Figure 18 and discussed in the following paragraphs.

The average actual consumptive productivity in 1978 was 16.2 acres per AUM whereas the qualifications permit an average 7.4 acres per AUM.

The qualification potential for grazing within the Site Area is 6,014 AUM's for a monthly average of 500 cattle.

The projected ROW crosses about 439.4 acres of these allotments and has a rated capacity of 24.5 AUMs in actual use and 55.2 AUMs at qualification capacity.

The utilization of lands within the Site Area for grazing is considered as being a major land use. Recent actual use of the affected grazing allotments is summarized as follows.

(b) Land Use for Minerals

The land surface is underlain by resources of oil shale, evaporite minerals, oil and gas, coal, ground water, and other minerals.

The Piceance Creek Oil and Gas Field which occupies the south-central sector of the Site Area has been in continuous production since its discovery in [illegible] and is a principal land use.

Oil shale underlies a large portion of the Site Area. Tract C-b—which the proposed transmission lines will service—is currently under development for the production of shale oil. The oil shale resource is a major one and land use for such production is expected to increase.

Although other minerals, including evaporites containing aluminum, potassium, and soda, also underlie the Site Area, their development will be subordinate to and loosely related to the development of oil shale.

It is considered that the development of mineral resources which underlie the Site Area is a major use of the surface and will grow with increased development of oil shale.

Further discussion of the mineral resources of the Site Area is given in the section on Geology.

(c) Land Use for Livestock Grazing

The site occupies portions of 9 grazing allotments which cover about [illegible] acres. About [illegible]% of the Site Area is used for grazing. These allotments are shown on Figure 18 and discussed in the following paragraphs.

The average actual consumptive productivity in 1978 was 16.2 acres per AUM whereas the qualifications pastures permit an average 7.4 acres per AUM.

The qualification potential for grazing within the Site Area is 6,013 AUM's for a monthly average of 500 cattle.

The proposed ROW crosses about [illegible] acres of these allotments and has a rated capacity of 34.5 AUMs in actual use and [illegible] AUMs at qualification capacity.

The utilization of lands within the Site Area for grazing is considered as being a major land use. Present actual use of the affected grazing allotments is summarized as follows.

1.) Puckett Gulch (6001)

This allotment consisting of 4256 acres would be crossed by the proposed action. There is one operator who is licensed to graze 140 head of cattle for 5 months during the summer (5/1 - 9/30). These cattle utilize 21 AUMS of forage. The operator in 1978 utilized his entire qualifications.

2.) Pine Knott Gulch (6002)

This allotment consisting of 2464 acreswould be crossed by the proposed action. There is 1 operator who is licensed to graze 54 head of cattle for 3 months during the summer and fall (9/1 - 11/30). These cattle consume 97 AUMS of forage. During 1978, the operator utilized all of his grazing privileges.

3.) Wood Road Gulch (6003)

This allotment consisting of 1359 acres would be crossed by the proposed action. There is one operator who is licensed to graze 40 head of cattle for 1 month during spring and summer (6/12 - 7/10). These cattle consume 19 AUMs of forage. During 1978 the operator utilized all his privileges.

4.) Power Line (6004)

This allotment consisting of 467.2 acres would be crossed by the proposed action. There is 1 operator in the allotment who grazed 110 head of cattle for 1 month during the spring and summer (6/14 - 7/11). These cattle consume 30 AUMs of forage. The operator during 1978 utilized all his privileges.

5.) North Dry Fork (6005)

This allotment consisting of 518.4 acres would be crossed by the proposed action. There are two operators who are licensed for 1010 AUMs annually on the allotment. However, in 1978 one operator took total non-use and the other had only 292 AUMs of forage. Both operators graze the range during the spring (4/16 - 6/30) and during the fall (11/1 - 12/15). The site area would accomodate 43 areas of grazing at the present license level.

6.) Little Hills (6006)

This allotment consisting of 17,792 acres would be crossed by the proposed action. There are 5 operators that are licensed for 8085 AUMs of grazing use on the allotment. These permitees have been activating less than their qualifications in recent years. At the licensed level of use, the acreage of the proposed action is qualified for 2712 AUMs of grazing. This allotment is used year long.

1.1 Beckett Gulch (6003)

This allotment consisting of 4236 acres would be crossed by the proposed action. There is one operator who is licensed to graze 140 head of cattle for 5 months during the summer (5/16 - 9/30). These cattle utilize 21 AUMS of forage. The operator in 1978 utilized his entire qualifications.

2.1 Pine Knott Gulch (6004)

This allotment consisting of 2464 acres would be crossed by the proposed action. There is 1 operator who is licensed to graze 61 head of cattle for 2 months during the summer and fall (9/1 - 10/30). These cattle consume 61 AUMS of forage. During 1978, the operator utilized all of his grazing privileges.

3.1 Wood Road Gulch (6005)

This allotment consisting of 1529 acres would be crossed by the proposed action. There is one operator who is licensed to graze 47 head of cattle for 1 month during spring and summer (6/12 - 7/10). These cattle consume 19 AUMS of forage. During 1978 the operator utilized all his privileges.

4.1 [illegible] (6006)

This allotment consisting of 467.2 acres would be crossed by the proposed action. There is 1 operator in the allotment who grazed 120 head of cattle for 1 month during the spring and summer (6/16 - 7/15). These cattle consume 30 AUMS of forage. The operator during 1978 utilized all his privileges.

5.1 Smith Dry Fork (6007)

This allotment consisting of 5189.4 acres would be crossed by the proposed action. There are two operators who are licensed for 1218 AUMS annually on the allotment. However, in 1978 one operator used 1018 AUMS and the other had only 282 AUMS of forage. Both operators graze the range during the spring (4/16 - 6/15) and during the fall (11/1 - 12/15). The site area would accommodate 41 acres of grazing at the present licensed level.

6.1 [illegible] Gulch (6008)

This allotment consisting of 10,731 acres would be crossed by the proposed action. There are 5 operators that are licensed for 1208 AUMS of grazing use on the allotment. These operators have been activating less than their qualifications in recent years, the licensed level of use. The acreage of the proposed action is classified for .113 AUMS of grazing. This allotment is used year round.

7.) Main Dry Fork (6007)

This allotment consisting of 9830 acres would be crossed by the proposed action. Two operators are licensed for 1536 AUMs of cattle use from 7/1 to 10/31. At the licensed level of use the acreage of hte proposed action can support 1355 AUMs of use.

8.) Segar Gulch (6008)

This allotment consisting of 17,792 acres would be crossed by the proposed action. One operator is licensed for 3499 AUMs of cattle use from 6/1 - 11/20 but has been activating less than licensed use in recent years. At the lcensed level the Site Area would produce 3054 AUMs of forage.

There is an Allotment Management Plan (AMP) written for this allotment. It describes a grazing system consisting of 4 pastures used in the Rest Rotation System. Each pasture is treated identically in that they all receive use during all portions of the grazing system on a 4-year rotational basis.

9.) Piceance Mountain (6023)

This allotment consisting of 15,469 acres would be crossed by the proposed action. Four opertors are licensed to run cattle on this allotment from 5/1 - 11/15. Total licensed use is 20,836 AUMs but the permittees have been taking partial use in recent years. At the licensed level of use the Site Area produces AUMs of forage annually.

(d) Land use for transportation

The ROW crosses a rugged, but easily accessible area of the northeastern corner of the Piceance Basin.

This area is accessible from the north along paved highway Colorado 64 which connects Meeker with Rangely along an east-west route which follows the valley of the White River.

The area is bounded on the east by--but is not readily accessible from--Colorado Highway 13 (also U. S. 789) which connects Meeker with Rio Blanco Store and the community of Rifle.

The area is bounded on the south and west by Rio Blanco County Road 5 which follows the valley bottom of Piceance Creek from Rio Blanco Store to its confluence with the White River at White River City.

Each of these three routes is a well defined communications corridor serving ranches, oil and gas fields, and oil shale developments. North-south Colorado Highway 13, from Meeker to Rifle is well utilized by several electrical transmission lines. The area is also serviced by many underground oil and gas pipelines.

The projected ROW begins in the Meeker-Rio Blanco-Rifle utility and access road corridor which is a major corridor used for Colorado Highway 13/789 and five electrical power transmission lines. The ROW crosses an electrical power line and a telephone line which crosses the Piceance Creek Oil and Gas Field in a northwesterly-southeasterly direction and is referred to as the White River City-Rio Blanco Corridor. The ROW also crosses the Piceance Creek Corridor which contains roads, a power line and a telephone line. Where the projected ROW approaches and enters Tract C-b, it follows a short corridor referred to as the Tract C-b Corridor.

The Site Area contains three communications site facilities. The first is located upon private land atop of Kendall Peak and provides microwave control of gas transmission facilities operated by the Western Slope Gas Company. The second is a microwave television translator located upon public lands and operated by Rio Blanco County. The third is a microwave station located upon public lands at the compressor station of the Mountain Fuel Supply Company in the southeasterly area of the Piceance Creek Oil and Gas Field.

The Site Area is accessible by fixed-wing aircraft on a landing strip near Mobil Camp. This strip is used by corporate aircraft servicing the Piceance Creek Gas Field and by others in the area. The closest commercial airport

is at Meeker. The closest commutor airline service is at Hayden, Colorado. The closest full commercial airline service is at Grand Junction.

Utility lines for electricity and telephone are located along the principal roads and provide service to the families resident at the ranches and oil and gas production facilities as well as to Tract C-b.

The northeastern end of the projected ROW is located at the WREA substation in Section 31, T. 1 N., R. 94 W., about 3 miles southwest of Meeker. It may be reached by traveling from Meeker on Colorado Highway 13 to a point 0.4 miles south of the bridge over the White River where it is joined by Rio Blanco County Road 33. County Road 33 is a graded gravel road which follows the southern edge of the White River flood plain. On County Road 33, about 0.9 miles west of Highway 13, another gravel road leads 0.7 miles southerly to the substation. The projected ROW near the substation and near the White River is accessible over several dirt roads and trails used for agricultural purposes.

The ascent of the ROW to Kendall Peak is accessible over a well traveled dirt road which leads southerly up Puckett Gulch. This road provides access to the upper and eastermost rim of the high ridge and mesa, which marks the eastern and northern limits of the Piceance Basin. From this high rim, several other dirt roads and trails provide access to the ROW along the upper ridges and slopes in the vicinity of Kendall Peak, Hay Gulch, Segar Gulch, Segar Mountain, and also provides access to the bottom of the canyon of the Dry Fork of Piceance Creek by way of Timber Gulch.

The bottoms of Hay Gulch, Segar Gulch, and the Dry Fork of Piceance Creek are more readily accessilbe from the northwest from County Roads 127 and 22. County Road 127 joins Colorado Highway 64 about 10 miles west of Meeker and has a route southerly across a small bridge across the White River and up Hay Gulch. A dirt road travels easterly up Hay Gulch to provide access to the ROW; however, County Road 127 leaves the bottom of Hay Canyon and crosses a topographic divide and drops to the bottom of the Dry Fork of Piceance Creek where it joins County Road 22. County Road 22 ascends the Dry Fork from the west, from County Highway 3, and passes the Little Hills Experimental Station. From the junction with County Road 127, County Road 22 continues easterly to provide access to the ROW in the bottoms of the Dry Fork and Segar Gulch.

Access to the projected ROW where it ascends the ridges leading to the high ground of the rolling mesa surface near the Piceance Dome Field is most accessible from County Road 3 which ascends Collins Gulch from County Road 5 located along Piceance Creek.

The southern sector of the ROW, on the northern and southern slopes of Piceance Creek is accessible from County Road 5 and from the access road leading across private lands to Tract C-b.

In general the ROW is relatively accessible wherever it crosses valley bottoms and ridge tops; however, the crossings of the steep slopes are rough and relatively inaccessible without new road construction. Due to the inaccessibility of these steep slopes between Hay Gulch and the Dry Fork of Piceance Creek, the transmission lines will be constructed by using helicopters for the movement of linemen, augering equipment and placement of pole structures and the stringing of line.

(e) <u>Land use for residence</u>

Use of the land surface is made for residential dwellings in three separate sectors of the Site Area. The largest number of residential buildings are located in the northeastern sector of the Site Area, along the valley bottom of the White River. A second concentration of residences is in the southern sector of the Site Area, along the bottom of Piceance Creek where several ranch homes are built. The third concentration of residences is located in the Piceance Creek Oil and Gas Field where several families reside to service production and compressor facilities.

The details of these resident populations are given in the section on <u>Demography</u>.

Although the use of lands within the Site Area for residential purposes is common, this use is minor and is subordinate to grazing, mineral production and recreation.

SECTION IV - ENVIRONMENTAL CONSEQUENCES

The environmental consequences, or effect, of the proposed project are discussed under three alternative routings, A, B, and C, and the alternative of no action.

A. Alternative A - The Kendall Peak Route

1. Discussion of Impacts

(a) Climate and air quality

The operation will indirectly tend to enable the increment of gaseous emissions of SO_2, NO_x, CO, and particulates in Hayden into the atmosphere; however, the plant operates according to applicable existing legislation and regulations concerning air quality.

The operation of the transmission line will result in the generation of some small amount of ozone; however, the line is of such low voltage that no evidence exists that adverse effects may be expected.

In construction and in decommissioning, internal combustion engines in both ground and air vehicles will release increments of SO_2, NO_x, CO, and particulates to the atmosphere. These engines will be operating according to all existing legislation and regulations and standards.

(b) Geology, topography, minerals and alluvial valleys

No adverse effects are perceived as a consequence of geology.

Structures on hilltops and long conductor spans across canyons may cause some increased hazard to low-flying aircraft. Regulations of the Federal Aviation Administration define the airspace below an altitude of 500' as being unregulated and as requiring pilots of low-flying aircraft to follow visual flight rules. Nevertheless, orange warning markers will be attached to the long conductor spans which will cross the valley of Piceance Creek, and the spans which cross other large canyons will be allowed to sag as low as possible commensurate with safe transmission line design criteria.

(c) Soils

As shown in Table 1, the construction of new access roads will cross about 17,250 lineal feet of land. Assuming that such construction will require an average width of 20 feet, an area of 10.40 acres of surface soils will be disturbed. This represents 2.2% of the 482 acres within the ROW to the north end of the Tract C-b, and 0.001 of the lands within the Site Area. When the second circuit is constructed, a similar amount of disturbance may be expected.

(d) Water

The disturbance of the soil will tend to add an increment of sedimentation and dissolved solids to downstream waters.

(e) Vegetation

The mode of construction for Alternative A, as shown on Figure 5, calls for 15.46 miles, or 76 percent of the entire ROW, by conventional ground access and construction, and for 4.62 miles or 24 percent, by helicopter emplacement of structures and stringing of conductors.

As a result of this method of construction, it is estimated in Table A that construction equipment will travel overland for a distance of 63,450 linear. Assuming that as much as an average width of 15 feet will be disturbed, it is estimated that a total area of 20.96 acres of vegetation will be disturbed. If this were converted to a total loss at the average grazing productivity for the Site Area (based upon 1978 actual use) of 16.2 acres per AUM, a loss of 1.3 AUMs would be sustained.

In the areas where conventional ground access will be used for construction, it is estimated in Table 1 that 17,250 linear feet of new access trails will require grading or cuts and fills which will remove vegetation. Assuming that such work will require an average width of 30 feet, about 10.40 acres of vegetation will be removed. Again using 16.2 acres per AUM, as above, a loss of productivity would be sustained of about 0.6 AUM.

The proposed endangered plant species Astragalus detritalis, M. E. Jones, and the proposed threatened plant species Astragalus lutosus, M. E. Jones, have been reported from within the area of interest. To avoid damage to these species from the construction of pole structures, each location will be examined by a BLM botanist. If it is determined that the survival of the species is endangered, the pole hole location will be moved. Also where existing access roads might require grading or repair, or new access roads might be built within suspect areas of Threatened or Endangered plant species, field investigations in advance of construction will be required so that such species will not be significantly harmed. Effects upon vegetation similar to those described above may be expected from construction of the second circuit.

(f) Animals

Due to the disturbance of 20.96 acres of vegetation from overland travel of construction equipment, as shown on Table 1, there will be some loss of productivity of small mammals and birds.

(d) Water

The disturbance of the soil will tend to add an increment of sedimentation and dissolved solids to downstream waters.

(e) Vegetation

The mode of construction for Alternative A, as shown on Figure 3, calls for 15.45 miles, or 76 percent of the entire ROW, by conventional ground access and construction, and for 4.65 miles or 24 percent, by helicopter emplacement of structures and stringing of conductors.

As a result of this method of construction, it is estimated in Table A that construction equipment will travel overland for a distance of 59,130 linear feet. Assuming that a width as an average width of 15 feet will be disturbed, it is estimated that a total area of 20.36 acres of vegetation will be disturbed. If this were converted to a total loss of the average grazing productivity for the Safe Area (based upon 1978 actual use) of 15.7 acres per AUM, a loss of 1.3 AUMs would be sustained.

In the areas where conventional ground access will be used for construction, it is estimated in Table A that 17,250 linear feet of new access trails will require grading of cuts and fills which will remove vegetation. Assuming that such work will require an average width of 10 feet, about 3.96 acres of vegetation will be removed. Again using 15.7 acres per AUM, as above, a loss of productivity would be sustained of about 0.3 AUM.

The proposed endangered plant species Astragalus terminalis, M. E. Jones, and the proposed threatened plant species Astragalus gibbsii, M. E. Jones, have been reported from within the area of interest. To avoid damage to these species from the construction of pole structures, each location will be examined by a BLM botanist. If it is determined that the survival of the species is endangered, the pole hole location will be moved. Also where existing access roads might require grading or repair, or new access roads might be built within suspect areas of threatened or endangered plant species, field investigations in advance of construction will be required so that such species will not be significantly harmed. Effects upon vegetation similar to those described above may be expected from construction of the second circuit.

(f) Animal

Due to the disturbance of 20.36 acres of vegetation from overland travel of construction equipment, as shown on Table 1, there will be some loss of productivity of small mammals and birds.

Due to the loss of 10.40 acres of vegetation from the construction of new roads, also as shown in Table 1, there will be a loss of micro-habitat for small mammals and an associated possible loss of individuals.

The activity of construction will tend to cause avoidance to large game animals. Such avoidance would become adverse if the activity were to occur within critical winter range for deer during the period December 1 through March 31 and would tend to result in a loss of productivity.

The activity of construction would tend to cause some spooking of cattle grazing in the area and thus would tend to cause some diminishment in productivity.

A nest of the golden eagle is located in the N½ of Section 22, T. 1 S., R. 95 W., and lies about 500' easterly of Station 313 on the ROW. If this nest is occupied during the period March 1 through June 30, the disturbance of construction activity within ¼-mile might adversely affect nesting productivity.

A nest of the red-tailed hawk is located near the center of Section 31, T. 2 S., R. 96 W., about 300' westerly of Station 988 on the ROW. If this nest is occupied during the period March 1 through June 30, the disturbance of construction at that time within ¼-mile might adversely affect nesting productivity.

Although the bald eagle is known to nest along the White River, the route of the transmission line lies 1 mile or more from this feature and thus lies south of the limit stipulated by the BLM as that in which construction activity would affect this species.

In order to reduce possible effects of conductors upon large raptors or birds, all structures will be designed to meet the raptor protection design criteria as set forth in

INFO MEMO CO-79-141
REA BULLETIN 61-10, March 9, 1979
<u>Powerline contacts by eagles and other large birds.</u>

Although booming and strutting grounds of the sage grouse lie about a mile north of the proposed ROW in the vicinity of the Piceance Creek Gas Field, this distance from construction activity will be adequate to avoid disturbance and the resulting effect is not considered as being significantly adverse.

Although the operation of ultra-high voltage transmission lines in the 756 K_V range has raised questions concerning possible adverse biological effect, such consideration is

not applicable to the operation of the 138 K_V circuits proposed for this project. Consequently, no significant adverse effects are expected to occur along the projected ROW.

Occasional collisions by birds with the transmission line conductor wires are not expected to harm avian populations and is not considered as being a significant effect. Removal of the conductors at the time of decommissioning will eliminate this possible effect.

The presence of the transmission line and pole structures will provide perches for raptors near the booming and strutting grounds of sage grouse located within the Piceance Creek Gas Field. It may be expected that these structures will provide additional perches for raptors and that predation of sage grouse will be increased. This is adverse to the sage grouse and beneficial to the raptors. An increased incidence on raptor predation on sage grouse is not expected to lessen the grouse population's viability. The presence of the pole structures will provide scratching posts for cattle. Effects upon animals similar to those described above may be expected as a result of construction of the second circuit.

During operation, annual and other aerial inspections, and maintenance work will temporarily disturb wildlife; however, the disturbance will be of short duration.

The activity of decommissioning will temporarily disturb wildlife; however, this will be of short duration.

Decommissioning will terminate annual and other inspections which would disturb wildlife.

<u>(g) Cultural features</u>

As was discussed under <u>(a) Prehistoric Cultural Features</u> in Section 3, above, an archaeological examination was made of the proposed ROW (Reference 2). The results of this examination, which are on file with the offices of the White River Resource Area (WRRA) in Meeker, indicated that one prehistoric site of lithic scatter was found on the northern slope of Kendall Peak. As a consequence, one leg of the proposed ROW was rerouted so as to avoid this area in order to minimize disturbance of the site. Also, several isolated finds were made in the vicinity of Collins Gulch and Piceance Creek; however, these did not result in any recommendations for change in routing. White River Electric Association will consult with BLM WRRA archaeologist prior to construction of any route or related facilities and roads on Tract C-b to insure cultural resources on the Tract C-b are avoided.

not applicable to the operation of the 138 kV circuit proposed for this project. Consequently, no significant adverse effects are expected to occur along the proposed ROW.

Occasional collisions by birds with the transmission line conductor wires are not expected to harm avian populations and is not considered as being a significant effect. Removal of the conductors at the time of decommissioning will eliminate this possible effect.

The presence of the transmission line and pole structures will provide perches for raptors near the booming and strutting grounds of sage grouse located within the Piceance Creek Gas Field. It may be expected that these structures will provide additional perches for raptors and that predation of sage grouse will be increased. This is adverse to the sage grouse and beneficial to the raptors. An increased incidence on raptor predation on sage grouse is not expected to lessen the grouse populations viability. The presence of the pole structures will provide scratching posts for cattle. Effects upon animals similar to those described above may be expected as a result of construction of the second circuit.

During operation, annual and other aerial inspections, and maintenance work will temporarily disturb wildlife; however, the disturbance will be of short duration.

The activity of decommissioning will temporarily disturb wildlife; however, this will be of short duration.

Decommissioning will terminate annual and other inspections which would disturb wildlife.

(d) Cultural Resources

As was discussed under (a) Prehistoric Cultural Resources in Section 3 above, an archaeological examination was made of the proposed ROW (Reference 2). The results of this examination, which is on file with the offices of the White River Resource Area (WRRA) at Meeker, indicated that one prehistoric site of lithic scatter was found on the northern slope of Kendall Peak. As a consequence, one leg of the proposed ROW was relocated so as to avoid this area in order to minimize disturbance of the site. Also, several isolated finds were made in the vicinity of Collins Gulch and Piceance Creek; however, these did not result in any recommendations for change in routing. White River Electric Association will consult with the WRRA archaeologist prior to construction of any route or related facilities and roads on Tract C-b to insure cultural resources on the Tract C-b are protected.

Additional archaeological reconnaissance will be required before any existing roads are graded or repaired and before any new access trails are constructed.

Should any archaeological sites or artifacts be lost despite the stipulated mitigating measures, such loss will be an unavoidable environmental effect.

No historical sites within the area of interest have been nominated to the Register of Historical Places, nor is any such nomination known to be in process. The few possible sites of historical interest within the project area consist of a few pioneer cabins, corrals, and related structures which lie at considerable distances away from the alternative routes. No adverse effects are perceived from the proposed project upon historical sites.

(h) Aesthetics/visual resources

Aesthetic degradation which might be caused to the visual resource near the alternative transmission line routes is of considerable importance in the selection of the preferred route.

Alternative A - the route over Kendall Peak, is the only route of the three alternatives which is effectively screened from view along major highways over the greatest length of the ROW. Only the crossings of County Highway 5 at Piceance Creek immediately north of Tract C-b, and of County Highway 3 in Collins Gulch will have sight of the transmission line where it crosses typical undeveloped terrain.

The visual contrast rating of the proposed project has been rated according to the BLM Visual Resource Management (VRM) system. According to this system, the maximum degree of contrast created by the proposed action would be located at the crossing of Piceance Creek Valley (which has an existing VRM rating of Class II) where orange markers will be attached to the conductors as warning to the pilots of low-flying aircraft. The contrast ratings at the Piceance Creek Valley crossing are "0" for land features, 11 for vegetation features, and 15 for structural features which includes the orange warning markers. The maximum degree of contrast recommended for a VRM Class II area is 12; thus, the contrast of the markers in this Class II area will constitute a discordant impact according to the VRM System.

The next highest degree of contrast created by the proposed action would be located along the route between the Meeker Substation and Kendall Peak which has been rated as VRM Class II. In this area some new sidetrails will be cut to reach the locations of structures and some topping of pinyon-juniper may be required to provide safety clearance for conductors, both of which may cause a linear visual

contrast on this northern facing slope. The contrast rating created by these actions will be 11 for vegetation and 10 for structural features; however, the contrast of new trails to be cut may exceed the 12 rating points as recommended as being the maximum for the VRM Class II.

Except for these two areas where VRM Class II ratings exist, the proposed action would be acceptible under the VRM guidelines.

Mitigation of the perception of the line and its facilities over the ROW of Alternative A has been obtained by: routing the line through areas with low visual sensitivity; by the use of natural dark colored wood pole structures over most of the route; by the use of steel structures which will support both circuits on a single line of poles across the Josephine Basin and across the long span across the valley of Piceance Creek; by the painting of these steel structures a "sagebrush" green so as to blend with the vegetation; and, by the use of non-specular coated conductors to reduce "shine".

The route of Alternative A over Kendall Peak is the only one of the three alternative routes considered which has received approval by the Utility Corridor Committee of the Rio Blanco County Planning Commission.

(i) Recreation resources

The principal recreational use of the area is for hunting--especially for the hunting of deer. It is not expected that recreation resources will be significantly affected, including hunting.

(j) Social aspects

The following effects upon social considerations have been noted in this analysis.

The operation of a helicopter for the stipulated construction method will tend to increase the probability of injury or death --particularly to the pilot.

New incoming workers for construction of the proposed transmission line will tend to increase the group of socioeconomic problems related to the explosive growth of population which is expected to be caused by energy developments in this area. This is considered as an unavoidable environmental impact.

The presence of conductors suspended high above valley floors may increment hazards to low-flying aircraft. To mitigate such hazard, warning markers will be attached to these conductors to increase their visibility, wherever required by the configuration of the valley crossing. Such markers probably will be stipulated for the crossings of Piceance Creek.

The contribution of the operation of the transmission line to the operation of Tract C-b will have an indirect influence in improving this country's self-sufficiency in energy resources which will strengthen our diplomatic relations and will enhance our national defense.

(k) Economics

The following effects are those which not only involve purely economic considerations, but also those wherein economics is inextricably related to social consequences.

Construction of the transmission line will utilize materials, supplies and energy which have been produced or fabricated elsewhere in the nation. The purchase of these items will contribute to the incomes and life support for the employees of the producers.

Construction monies will be spent locally and will flow into the economy of Rio Blanco County.

Expenditures for construction will contribute taxes at the local, county, state and national levels.

The transmission of power will provide an increment to work, income and resulting life support for employees of the White River Electric Association and of the Colorado-Ute Electric Association.

Portions of that income will be infused into the local economies at Meeker, Craig, and Hayden.

Portions of the income of the work force at the White River Electric Association and the Colorado-Ute Electric Association will provide taxes at all governmental levels.

Although the operation of the transmission line will have a tendency to increase the work load of WREA personnel, addition of the line will not result in the hiring of new

personnel. Consequently, no new workers are expected to require increased municipal services, and, no adverse effect is perceived.

As the operation of the transmission line will enable operation and production at Tract C-b, it will make an indirect contribution to the beneficial economic aspects of employment, payroll, and expansion of the tax base in Rio Blanco County.

The operation of the transmission line will enable operation and production of Tract C-b, and thus will make an indirect contribution to employment which will lead to new workers entering the area. This in turn will lead to a full scope of socioeconomic problems which are associated with a sudden increase in local population.

The contribution of the operation of the transmission line to the operation of Tract C-b will have an indirect influence on this nation's self-sufficiency in energy resources and will have a favorable effect upon our balance of trade.

(1) Land uses

The following possible effects upon other land uses have been noted in this analysis as follows:

Commitment of land use for a transmission line ROW will have the effect that future land uses will have to consider the presence of the transmission line so as not to adversely affect the facility and its operation.

Routing criteria specify that the transmission line ROW will avoid all gas field wells and significant service structures. This will have the effect of eliminating possible adverse interaction between the normal operations of the gas field and of the transmission line.

Routing criteria call for the crossing of large diameter pipelines at an angle of 15^{o} or more so as to avoid possible adverse effects to the pipeline which might be caused by an induced electromagnetic field.

The location of the projected transmission line ROW over areas which might be susceptible to ground surface subsidence due to mineral extraction is not considered as being significantly adverse to the integrity or operation of the line because dislocated pole structures may be restored to their original positions.

The commitment of an easement for the projected transmission line will not inhibit the extraction of any mineral from beneath the ROW. Thus, no loss of any mineral resources will be incurred as a result of the presence or operation of the transmission line.

(m) Effects within Tract C-b

The addition of transmission and related facilities within Tract C-b has been the subject of well publicized and intensive evaluation under the direction of the Oil Shale Task Force. The results of these evaluations are contained in References H through M which are detailed in the Foreword of this EA.

The enviornmental effects from the addition of the transmission facilities will be incremental to those which already are resulting from the construction of the mining complex on Tract C-b. Such incremental effects are an extension of those effects detailed in this EA for the main portion of the ROW which leads to the tract. Any incremental effects which may result from the construction of the transmission line and facilities will be an extension of the construction effects already underway. Nevertheless, effects from the construction of the transmission line are mitigated by the following factors:

1.) The surface and subsurface within Tract C-b has been dedicated to a priority land usage for the extraction of shale oil. The incremental effects of tranmission line construction and operation are a necessary adjunct and rational extension of what is already a commitment to industrial development.

2.) The transmission ROW and lines and related facilities will cross lands which have already been altered by vegetal treatment as is shown on Figure 11. Any additional disturbance to vegetation by construction activity will be relatively minor when compared to that which has already performed.

3.) Construction acces will use existing trails which lie adjacent to the proposed ROW.

4.) The surface of Tract C-b has already received blanket clearance for cultural and paleontological resources(Reference 4) under the main application and approval for the larger Tract C-b project.

5.) Cultural resources will be protected furthur by sitpulations of the BLM, as listed on Page 9 and elswhere in this EA, that the WREA will submit a detailed plan of the transmission line and related facilities on a USGS 7½' topographic quadrangle map to the WRRA archaeologist for further consideration and evaluation in order to prevent disturbance of archaeological sites which might have been missed by the previous work of Reference 9.

2. Adverse Environmental Effects Which Cannot Be Avoided Should Alternative A Be Implemented

In this section are listed those effects which are considered to be significantly adverse to the environment as a result of the implementation of Alternative A - The Route Over Kendall Peak.

- The increase in hazard to low-flying aircraft as a result of the suspension of conductors across large valleys.

- If upon examination of each pole hole location and each new access trail it is found that proposed threatened or endangered plant species are in danger, it would constitute a significantly adverse environmental effect. Such effect will be mitigated by moving the pole hole location or trail. Any jeopardy to these species which may remain after mitigation will constitute a significant environmental effect which cannot be avoided.

- Should any archaeological data or artifacts be lost as a result of decommissioning even after mitigating measures have been applied, this loss will constitute an adverse environmental effect which cannot be avoided.

- The operation of a helicopter for the stipulated construction method will tend to increase the probability of injury or death--particularly to the pilot and will constitute an adverse environmental effect which cannot be avoided.

- New incoming workers for construction of the proposed transmission line will tend to increase the group of socioeconomic problems related to the explosive growth of population which is expected to be caused by energy developments in this area and is considered as a significantly adverse environmental effect which cannot be avoided.

- Commitment of land use for a transmission line ROW will have the effect that future land uses will have to consider the presence of the transmission line so as not to adversely affect the facility and its operation. This effect will tend to be adverse to such future projects.

The following effects are considered to be adverse, but not necessarily significant.

- The contribution to the increment of gaseous emissions from the power plant in Hayden.

- The generation of an increment of ozone to the atmosphere.

- The increment of emissions of combustion products from the operation of internal combustion engines in vehicles and aircraft during construction and operation of the transmission line.

- During the period of construction there will be temporary disturbance to wildlife and some possible loss of productivity.

- In the construction of 17,250' of new access trails, about 10.40 acres of surface will be altered and an equivalent area of vegetation will be lost. Also in 63,450' of overland passage of construction equipment, some portion of 20.96 acres of surface will be disturbed with some associated loss of vegetation. This will result in:

    - A loss of vegetation as habitat for small mammals and birds. Some loss of small mammals will occur through loss of micro-habitat.

    - A loss of some habitat for large animals; and a possible diminishment of productivity.

    - A loss of topsoil, an increase in susceptibility to erosion, a tendency to increase dissolved solids and siltation in downstream waters.

    - A loss in grazing productivity, which, based upon 1978 actual use for an average of 16.2 acres per AUM, would approximate 1.9 AUMs. A portion of this loss would be recovered within one year whereas the remainder would be an annual loss until recovery was obtained.

- The activity of construction would have adverse effects upon:

    - Deer in critical winter areas between December 1 through March 31. If activity were not abated during this period, there would be some loss in productivity in three areas:

        1.) From the Meeker Substation to about Station 158;
        2.) From about Station 816 to Station 990;
        3.) From about Station 10+04 to the northern boundary of Tract C-b.

The following effects are considered to be adverse, but not necessarily significant.

- The contribution to the increment of gaseous emissions from the power plant at Hayden.

- The generation of an increment of noise in the atmosphere.

- The increment of gas emissions of combustion products from the operation of internal combustion engines in vehicles and engines during construction and operation of the transmission line.

- During the period of construction there will be temporary disturbance to wildlife and some possible loss of productivity.

- In the construction of 17,250 feet of new access trails, about 21.60 acres of surface will be affected and an equivalent area of vegetation will be lost. Also in 47,520 of overland passage of construction equipment, some portion of 50.90 acres of surface will be disturbed with some accompanying loss of vegetation. This would result in:

  - A loss of vegetation as habitat for small mammals and birds. Some loss of small mammals will occur through loss of burrow-habitat.

  - A loss of some habitat for large animals and a possible short-term loss of productivity.

  - A loss of topsoil. The increase in erosion ability by exposure, a tendency to increase dissolved solids and siltation in downstream waters.

  - A loss in grazing productivity which, based upon 1978 actual use for an average of 1.5 AUM's per acre, would approximate 108 AUM's. A portion of this loss would be recovered within two years whereas the remainder would be tolerated until recovery were completed.

- The presence of construction would have adverse effects upon:

- Deer in critical winter areas between December 1 to April 30. If activity of work was started during this period there would be some loss of productivity in these areas.

  1. From the Hayden Substation to Hayden Station 138.
  2. From above station and Steamboat 230.
  3. From above Stations 180 to the southern boundary of Routt County.

- A nest of the golden eagle which is located in the N½ of Section 22, T. 1 S., R. 95 W., is reported to lie within approximately 500' easterly of Station 313. If this nest is occupied during the period March 1 through June 30, construction within ¼ mile may have an adverse effect upon nesting productivity.

- A nest of the red-tailed hawk which is reported to be located near the center of Section 31, T. 2 S., R. 96 W., about 300' westerly of Station 988. If this nest is occupied during the period March 1 through June 30, construction within ¼ mile may have an adverse effect upon nesting productivity.

- Big game hunting during the period October 15 through November 15.

- Productivity of nearby grazing cattle through spooking.

o Effects similar to those above will be repeated in construction of the second circuit.

3. <u>The Relationship Between Short-Term Uses of Man's Environment and the Maintenance and Enhancement of Long-Term Productivity</u>

Electrical current will be transmitted first on one circuit and finally by two from the Meeker Substation to the substation at Tract C-b. It is projected that oil shale reserves at Tract C-b will provide for a mine life of 57 years, beginning with full scale production in 1985. The construction activity is expected to take place during some period less than a year for the first circuit and also less than a year for the second circuit. Upon completion of the useful life of the transmission lines, the wire conductors will be removed and salvaged and the pole structures will be dismantled, felled and either removed where permitted by road access, or will be sawed into handleable lengths and burned during a wet season to prevent the possibility of a wild fire.

The period of construction and operation of the transmission line will be relatively short-term in comparison to the limitless time of use after the transmission line is decommissioned.

Construction of new access roads for the first circuit will result in the loss of 10.40 acres of vegetation and habitat and a loss of similar magnitude is expected for construction of the second circuit.

- A nest of the golden eagle which is located in the NE¼ of Section 22, T. 1 S., R. 95 W., is reported to lie within approximately 500' easterly of Station 31?. If this nest is occupied during the period March 1 through June 30, construction within ½ mile may have an adverse effect upon nesting productivity.

- A nest of the red-tailed hawk which is reported to be located near the center of Section 31, T. 7 S., R. 96 W., about 300' westerly of Station 986. If this nest is occupied during the period March 1 through June 30, construction within ½ mile may have an adverse effect upon nesting productivity.

- Big game hunting during the period October 15 through November 15.

- Productivity of nearby grazing cattle through spooking.

o Effects similar to those above will be repeated in construction of the second circuit.

4. The Relationship Between Short-Term Uses of Man's Environment and the Maintenance and Enhancement of Long-Term Productivity

Electrical current will be transmitted first on one circuit and finally on two from the Meeker Substation to the substation at Tract C-b. It is projected that oil shale reserves at Tract C-b will provide for a mine life of 30 years, beginning with full scale production in 1985. The construction activity is expected to take place during some period less than a year for the first circuit and also less than a year for the second circuit. Upon completion of the useful life of the transmission lines, the wire conductors will be removed and salvaged and the pole structures will be dismantled, felled and either removed where permitted by road access, or will be sawed into manageable lengths and burned during a wet season to prevent the possibility of a wild fire.

The period of construction and operation of the transmission line will be relatively short term in comparison to the limitless time of use after the transmission line is decommissioned.

Construction of new access roads for the first circuit will result in the loss of 10.50 acres of vegetation and habitat and a loss of similar magnitude is expected for construction of the second circuit.

Although the transmission line and ROW will require that later actions consider the integrity and safety of the operation of the line, the design and location of the ROW are such as to allow passage for other uses and does not in actuality present a barrier of any kind.

The presence of the transmission line will have no significant deterrence or effect upon the production of minerals in the subsurface due to possible subsidence.

Thus, it is expected that the construction, operation, and eventual decommissioning of the transmission line and ultimate release of the special permit for right-of-way usage, will not have any appreciable deleterious effect upon long-term productivity.

4. Irreversible and Irretrievable Commitments of Resources Should the Alternative Be Implemented

The transmission of electricity will have an indirect effect upon the enabling of the consumption of coal resources which will be burned to produce electricity. Since this energy will be used to produce other energy in the form of shale oil with a significant multiplier effect, this commitment of resource is productive and desirable.

5. Possible Conflicts Between the Alternatives and the Objectives of Federal, Regional, State and Local Land Use Plans, Policies and Controls for the Area

The principal and intended purpose for the operation of the proposed transmission line is to enable the development of Tract C-b in order to prove the feasibility of commercial production of shale oil.

In the pursuit of this goal, the construction and the operation of the proposed transmission line is conformable with the policy of the Executive Branch of the United States Government, as announced recently by the President, to pursue rapid development of all energy sources in order to achieve energy independence for our nation.

Only a few possible conflicts with governmental policies have been identified.

A possible conflict exists if the route of Alternative A is found to endanger two varieties of proposed threatened or endangered species of plant. The proposed mitigating measures of field examination for these species by a BLM botanist and moving pole hole locations and new access roads if necessary will obviate such danger. Thus the proposed project will be in compliance with the Threatened and Endangered Species Act.

Although the transmission line and ROW will require that later actions consider the integrity and safety of the operation of the line, the design and location of the ROW are such as to allow passage for other uses and none will in actuality present a barrier of any kind.

The presence of the transmission line will have no significant deterrence or effect upon the production of minerals in the subsurface due to possible disruption.

Thus, it is expected that the construction, operation, and eventual decommissioning of the transmission line and ultimate release of the special permit for right-of-way usage, will not have any appreciable deleterious effect upon long-term productivity.

4. Irreversible and Irretrievable Commitments of Resources Should the Alternative be Implemented

The transmission of electricity will have an indirect effect upon the enabling of the consumption of coal resources which will be burned to produce electricity. Since this energy will be used to produce other energy in the form of shale oil with a significant multiplier effect, this commitment of resources is productive and desirable.

5. Possible Conflicts Between the Alternatives and the Objectives of Federal, Regional, State and Local Land Use Plans, Policies and Controls for the Area

The principal and intended purpose for the operation of the proposed transmission line is to enable the development of tract C-a in order to prove the feasibility of commercial production of shale oil.

In the pursuit of this goal, the construction and the operation of the proposed transmission line is conformable with the policy of the Executive Branch of the United States Government as announced recently by the President, to pursue rapid development of all energy sources in order to achieve energy independence for our nation.

Only a few possible conflicts with governmental policies have been identified.

A possible conflict exists if the route of Alternative A is found to endanger two varieties of proposed threatened or endangered species of plants. The proposed mitigating measures of field examination for these species by a BLM botanist and moving pole, tower locations and new access roads if necessary will obviate such danger. Thus the proposed project will be in compliance with the Threatened and Endangered Species Act.

A possible conflict with various acts protecting the bald eagle and other raptors might exist if these were threatened by the operation of the proposed transmission line. As mitigating design measures will obviate such danger, such conflict is not projected.

A possible conflict with the policies of NEPA might occur through wildlife and habitat disturbance, but such effects are herein indicated to be temporary and readily mitigated through temperal restrictions.

A possible conflict might exist with the goals and objectives of the Utility Corridor Committee of the Rio Blanco County Planning Commission. It is the policy of Rio Blanco County, as evaluated by this group, not to approve the construction of any utility along any corridor, or in any manner which result in the degredation of agricultural lands or their productivity. Meetings held among the Utility Corridor Committee, the White River Electric Association, and the U. S. Bureau of Land Management have indicated that the route of Alternative A over Kendall Peak would be acceptible. Thus, although some minor areas of possible conflict might be encountered within the use of Alternative A for the route of the proposed transmission line, the overall prospect appears to be one of favorability and compatibility with the concept of multiple use of the public lands, and with the goals of the Rio Blanco County Planning Commission.

B. Alternative B - The White River Route

The White River Route is intermediate in length among the three alternative routes. As conceived, this route would lead westerly along the southern bank of the White River and would turn southerly to cross the area of the Piceance Gas Field considerably west of the route of Alternative A. This route would be approximately 22 miles long to the north boundary of Tract C-b and an additional 3 miles within the tract for a total length of about 25 miles or roughly 10% longer than the route of Alternative A.

The routing of Alternative B crosses land, vegetation and habitat which are very similar to those of Alternative A. Effects to the various aspects of the environment would be similar; however, since such effects are roughly proportional to the area or length of the corridor, most environmental effects caused by the use of the route of Alternative B would be approximately 10% larger than for those of Alternative A.

A possible conflict with various acts protecting the bald eagle and other raptors might exist if these were threatened by the construction of the proposed transmission line. As mitigating design measures will obviate such danger, such conflict is not projected.

A possible conflict with the policies of BLM might occur through wildlife and habitat disturbance, but such effects are herein indicated to be temporary and readily mitigated through required mitigations.

A possible conflict might exist with the goals and objectives of the Utility Corridor Committee of the Rio Blanco County Planning Commission. It is the policy of Rio Blanco County, as evaluated by this group, not to approve the construction of any utility along any corridor, or in any manner which results in the degradation of agricultural lands or their productivity. Meetings held among the Utility Corridor Committee, the White River Electric Association, and the U. S. Bureau of Land Management have indicated that the route of Alternative A near Yellow Creek would be acceptable. Thus, although some minor areas of possible conflict might be encountered within the use of Alternative A for the route of the proposed transmission line, the overall concept appears to be one of favorability and compatibility with the concept of multiple use of the various lands, and with the goals of the Rio Blanco County Planning Commission.

B. Alternative B - The White River Route

The White River Route is intermediate in length among the three alternative routes. As conceived, this route would lead westerly along the southern bank of the White River and would then turn southerly to cross the area of the Piceance Creek Field considerably west of the route of Alternative A. This route would be approximately 17 miles long to the north boundary of Tract C-b and an additional 2 miles along the tract for a total length of about 19 miles or roughly 10% longer than the route of Alternative A.

The routing of Alternative B crosses land, vegetation and habitat which are very similar to those of Alternative A. Effects of the various aspects of the environment would be similar, however, since such effects are roughly proportional to the size or length of the corridor, most environmental effects caused by the use of the route of Alternative B would be approximately 10% greater than for those of Alternative A.

1. Discussion of Impacts

(a) Climate and air quality

The use of the route of Alternative B would increase effects upon air quality only to the extent that emissions of internal combustion engines would be increased by 10% over route A and that similarly the level of production of ozone also would be increased by an amount of about 10%.

(b) Geology, topography, minerals and alluvial valleys

No adverse effects are expected to be greater for Alternative B under this category than for the other two alternatives.

(c) Soils

No increased effects upon soils will result from Alternative B over the other, except only to the extent that there will be roughly 10% more structures, 10% more pole holes augured, and proportionately longer new access trails.

(d) Water

Effects of siltation and dissolved solids upon water quality could be expected to be 10% greater than for Alternative A.

(e) Vegetation

Access to a greater number of structures along Alternative B would tend to cause approximately 10% more disturbance to vegetation that in Alternative A.

Also there would be a 10% higher probability, based upon the longer ROW, that proposed Threatened and Endangered Plant Species would be encountered.

(f) Animals

The temporary disturbance of wildlife together with some possible loss of productivity would be expected to be 10% more than that for Alternative A.

The route of Alternative B would be from 4 to 5 miles longer near the cliffs along the southern bank of the White River than would Alternative A. As a consequence, there would be a greater tendency to disturb the adjoining wintering area of the bald eagle.

The ROW of Alternative B would be about the same distance from the strutting grounds of the sage grouse as would Alternative A, and any disturbance would be about the same.

The ROW of Alternative B would traverse the nesting area of the red-tailed hawk over about the same distance as would Alternative A.

Annual and emergency inspections, and repairs would be expected to have an incidence of temporary disturbance to wildlife which would be 10% greater for Alternative B than for A. The disturbance in construction and decommissioning also would be 10% more for Alternative B over A.

(g) Cultural features

The effects of Alternative B upon cultural resources are unknown. No survey has been performed along this route.

(h) Aesthetic/visual resources

The routing of Alternative B would lie along the southern side of the White River and would have an exposure within this visually sensitive zone for about 5 to 6 miles greater than would Alternative A. It is the possible disturbance of the visual and aesthetic quality of this specific area along the Shite River that mitigates against the choice of this route. The remainder of Alternative Route B is very similar in visual quality to that of Route A.

(i) Recreation resources

From the standpoint of recreation, the route of Alternative B is similar to that of Alternative A except that it is 10% longer and any tendency for adverse affects would be greater in the former than in the latter. In terms of the effect upon the proposed panorama and overlook north of Piceance Creek, both transmission corridors would pass close to the area of proposed development and would both be seen with about equal impact.

(j) Social aspects

The time for construction of a line over the route of Alternative B would take about 10% longer to build, and the time duration of possible social effects would be extended by that amount.

The increased length of the corridor of Alternative B over A would not increase shale oil production and would not enhance our national defense.

The line of Alternative B would not cross over more wide valleys than would A and therefore, would not increase the hazard to low-flying aircraft significantly.

(k) Economics

It has been roughly estimated that the construction of a transmission line over the route of Alternative B by conventional ground access would be about the same as for the use of helicopter construction over the preferred route of Alternative A.

All other effects related to employment, payroll, tax sontributions and socioeconomic effects would be proportionate to the respective cost and time duration of construction.

(l) Land use

As the longer route of Alternative B would have a 10 percent greater area and length than Alternative A, there would be a 10 percent greater chance for conflict in land use. The proximity of a greater length of Alternative B along the White River and its agricultural lands, results in an even higher probability of conflict.

2. Adverse Environmental Effects Which Cannot Be Avoided Should Alternative B Be Implemented

With the exception of the possibility of adverse aesthetic effects, almost all of the general significantly adverse effects which are listed under the discussion for Alternative A also apply to the route for Alternative B; however, all such effects will have a tendency to have a magnitude of 10 percent higher than for A.

The possibility for the degradation of the quality of the visual resource along the route of Alternative B is considerably higher than for A because it lies adjacent to the White River Valley. The visual quality of the scenery along the White River is high, and would be adversely affected more by Alternative Route B than by Alternative A.

3. The Relationship Between Short-Term Uses of Man's Environment and the Maintenance and Enhancement of Long-Term Productivity

The general discussion given under Alternative A is also applicable to the discussion of this subject for Alternative B. The tendency, however, is that adverse effects which might affect productivity will have magnitudes of about 10% higher for Route B over Route A.

4. Irreversible and Irretrievable Commitments of Resources Should the Alternative B Be Implemented

The use of the routing of Alternative B would result in the expenditure of resources at a level of about 10% higher than

for Route A. This increment in expenditures would not result in increased productivity of shale oil at Tract C-b over than if Alternative Route A were used.

5. Possible Conflicts Between the Alternatives and the Objectives of Federal, Regional, State and Local Land Use Plans, Policies and Controls for the Area

The discussion of this section under Alternative A generally applies to this Alternative B, except as relates to the objectives of government of Rio Blanco County. In a meeting among the Utility Corridor Committee of the Rio Blanco County Planning Commission, officials of the White River Electric Association and the U. S. Bureau of Land Management, it was noted that the committee considers that the construction of a transmission line along the route of Alternative B would result in excessive degradation of visual values and would not be approved by the County Planning Commission.

C. Alternative C - The Meeker-Rifle Corridor

Alternative C, the route which parallels Colorado Highway 13/789 between Meeker and Rifle, is the third and last alternative routing considered in this analysis. The route along the Meeker-Rifle utility corridor is a long established corridor which contains 5 existing transmission lines. The transmission lines have a high visibility for the full length of the corridor.

The Alternative C Route would run south from the Meeker Substation and would turn west in the vicinity of Dry Thirteen Mile Creek. It would have a length of from 26 to 27 miles or more depending upon the final alignment and would be up to 20% longer than Alternative A. This is the longest and least direct route of the three alternatives.

The routing of Alternative C would carry the transmission line closer to major traveled highways than the others and would have a greater visibility and sensitivity than would the others.

Since the route is 20% longer than Alternative A and 10% longer than Alternative B, the increased length of Alternative C would tend to have an increased magnitude of the general adverse effects common to the three routes. Thus, in general, the longest route will have a susceptibility to have the greatest amount of adverse environmental effect.

for Route A. This increment in expenditures would not result in increased productivity of shale oil at Tract C-b over that if alternative Route A were used.

2. Possible Conflicts Between the Alternatives and the Objectives of Federal, Regional, State and Local Land Use Plans, Policies and Controls for the Area

The discussion of this section under Alternative A generally applies to this Alternative B, except as relates to the objectives of government of Rio Blanco County. In a meeting among the Utility Corridor Committee of the Rio Blanco County Planning Commission, officials of the White River Electric Association and the U. S. Bureau of Land Management, it was noted that the committee considers that the construction of a transmission line along the route of Alternative B would result in excessive degradation of visual values and would not be supported by the County Planning Commission.

C. Alternative C - The Meeker-Rifle Corridor

Alternative C, the route which parallels Colorado Highway 13/789 between Meeker and Rifle, is the third and last alternative routing considered in this analysis. The route along the Meeker-Rifle utility corridor is a long established corridor which contains 2 existing transmission lines. The transmission lines have a high visibility for the full length of the corridor.

The Alternative C Route would run south from the Meeker Substation and would turn west in the vicinity of Dry Fork - Government Creek. It would have a length of from 66 to 77 miles or more depending upon the final alignment and would be up to 30% longer than Alternative A. This is the longest and least direct route of the three alternatives.

The routing of Alternative C would carry the transmission line closer to major traveled highways than the others and would have a greater visibility and sensitivity than would the others.

Since the route is 30% longer than Alternative A and 10% longer than Alternative B, the increased length of Alternative C would tend to have an increased magnitude of the general adverse effects common to the three routes. Thus, in general, the longest route will have a greater tendency to have the greatest amount of adverse environmental effect.

1. Discussion of Impacts

(a) Climate and air quality

The use of the route of Alternative C would tend to increase the emissions of internal combustion engines used in construction vehicles and aircraft by 20% and would increase the duration time by about the same amount.

(b) Geology, topography, minerals and alluvial valleys

No adverse effects are expected to be greater for Alternative C under this category than for the other two alternatives.

(c) Soils

The choice of Alternative C over the others would result in effects upon soils which would be expected to be about 20% higher due to the proportionate increase in the number of structures, the number of pole holes, and the number of new access trails required for the increased length of construction.

(d) Water

Water quality degradation would tend to be 20% greater for Alternative C than for Alternative A.

(e) Vegetation

Access to a greater number of structures along Alternative C would tend to cause approximately 20 percent greater temporary disturbance to vegetation than for the other alternatives. There would be a 20% proportionately higher expectation that the longer ROW might encounter the proposed Threatened and Endangered Plant Species discussed herein.

(f) Animals

Because of its greater length, the route of Alternative C would be expected to have a temporary disturbance to wildlife from construction activity 20% greater than for Alternative A.

Although Alternative C would not be located near the wintering area of the bald eagle along the White River, it might, according to the final alignment, be that the route could cross nesting areas of the golden eagle and the red-tailed hawks. Although the route would cross habitat of the sage grouse, the route would not be located near any strutting grounds.

Annual and emergency inspections maintenance and repairs would be expected to have an incidence of temporary disturbance to wildlife which would be 20% greater than for Alternative A and 10% for Alternative B.

(g) Cultural features

The effects of Alternative C upon cultural resources are unknown. No survey has been performed along this route.

(h) Aesthetic/visual resources

The routing of Alternative C would follow or parallel the existing Meeker-Rifle Utility Corridor. This is a visually sensitive zone becuase it is near a well traveled major highway and because it already contains 5 transmission lines.

The concentration of these lines in one corridor has elicited a considerable amount of adverse criticism from the local populace.

From the standpoint of this criticism, the placement of another transmission line along or near the others would be sure to cause strong opposition.

(i) Recreation resources

The routing of Alternative C, except for any visual degradation which might have subordinate effects on aesthetics, would not have any significant effect upon recreational values.

In terms of aesthetics, the route of Alternative C will pass south of Piceance Creek and will not approach the locale of the panoramic viewpoints which have been proposed for development. As the other alternative routes pass close to the proposed panoramic viewpoints, any adverse effects on aesthetics which might accrue to Alternative Routes A or B, would not accrue to Alternative Route C.

(j) Social aspects

The time for construction of a line over the route of Alternative C would take about 20% longer than for Alternative A and about 10% longer for Alternative B. The time duration of possible social effects would be extended by those approximate percentages.

The increased length of the route of Alternative C over B or over A would not increase oil shale production and would not enhance our national defense.

The line of Alternative C would cross over approximately the same number of wide va-leys and it is believed that the hazard of suspended conductors to low-flying aircraft would be the same for all three alternatives.

(k) Economics

Predicated upon the use of the same construction mode over the three alternative routes the use of Alternative C would cost 20% more than for Alternative A and 10% more than for Alternative B. Thus, whatever social effects which might accrue to payrolls and the number of people employed, or the duration of employment, will tend to be increased or decreased in magnitudes approximately proportionate to the expenditures. Such effects would include both those which are beneficial and those which are adverse.

(l) Land use

The longer route of Alternative C, over those of Alternatives A or B, would result in ROW corridors which would be respectively 10 and 20 percent greater, and areas which would also be proportionately greater. Thus, the possibility for the conflict of competing land uses would be of greater potential for Alternative Route C than for the others.

2. Adverse Environmental Effects Which Cannot Be Avoided Should Alternative C Be Implemented

With the exception of the possibility of adverse aesthetic effects, almost all of the general adverse effects which are listed for the discussion of Alternative A also apply to the route of Alternative C; however, all such effects will have a tendency to be of a magnitude proportionately greater as the length of the route is increased. Thus, it may be expected that such effects will be roughly 20% greater over those for Alternative A and 10% greater for those over Alternative B.

The addition of the proposed transmission line to a route along or parallel to the existing lines in the Meeker-Rifle Utility Corridor would be controversial.

3. The Relationship Between Short-Term Uses of Man's Environment and the Maintenance and Enhancement of Long-Term Productivity

The general discussion given under Alternative A is also applicable to the discussion of this subject for Alternative C. The tendency; however, is that adverse effects which might affect productivity will have magnitudes 20% higher than Alternative A and 10% greater than Alternative B.

The line of alternative C would cross over approximately the same number of wide washes, and it is believed that the impact of suspended construction on low-flying aircraft would be the same for all three alternatives.

(k) Economics

Predicated upon the use of the same construction cost for the three alternative routes the cost of alternative C would cost 20% more than for Alternative A and 9% more than for Alternative B. Thus, whatever social effects which might accrue to a region, and the number of people employed, or the duration of employment, will tend to be increased or decreased in an alternative approximately proportionate to the expenditures. Such effects would include both those which are beneficial and those which are adverse.

(l) Land Use

The longer route of Alternative C, over those of Alternatives A or B, would result in its corridor, which would be respectively 12 and 7% greater in area, and areas which would also be permanently removed. Thus, the probability and the extent of competing land uses would be of greater potential for Alternative C than for the others.

2. Adverse Environmental Effects Which Cannot be Avoided Should Alternative C be Implemented

With the exception of the possibility of adverse aesthetic effects, almost all of the general adverse effects which are listed for the discussion of Alternative A also apply to the route of Alternative C. However, all such effects would have a tendency to be of a magnitude proportionately greater as the length of the route is increased. Thus, it may be expected that such effects will be roughly 20% greater over those for Alternative A and 12% greater than over Alternative B.

The addition of the proposed transmission line in a route along or parallel to the existing lines in the Mead-Liberty Utility Corridor would be controversial.

3. The Relationship Between Short-term Uses of Man's Environment and the Maintenance and Enhancement of Long-Term Productivity

The general discussion given under Alternative A is also applicable to the discussion of this subject for Alternative C. The tendency, however, is that adverse effects which might affect productivity will have a tendency for greater than Alternative A and 10% greater than Alternative B.

4. Irreversible and Irretrievable Commitments of Resources Should Alternative C Be Implemented

The use of the routing of Alternative C would result in the expenditure of resources at a level of about 20% higher than for Alternative A and 10% more than for Alternative B. This increment in expenditures would not result in increased productivity of shale oil at Tract C-b over that if Alternatives A or B were used.

5. Possible Conflicts Between Alternative C and the Objectives of Federal, Regional, State and Local Land Use Plans, Policies and Controls for the Area

The discussion of this section under Alternative A generally applies to this Alternative C, except as relates to the objectives of government of Rio Blanco County. In a meeting among the Utility Corridor Committee of the Rio Blanco County Planning Commission, officials of the White River Electric Association and the U. S. Bureau of Land Management, it was noted that the committee considers that the construction of a transmission line along the route of Alternative C would result in excessive degradation of visual values and would not be approved by the County Planning Commission.

D. Energy Requirements and Conservation Potential of the Various Alternatives

Comparison of the three possible alternative transmission line routes shows that Alternative A is the shortest route, that Alternative C is the longest, and that Alternative B is intermediate.

In the construction of the proposed lines Alternative A would be the shortest route and therefore would require the least number of pole structures, wires, the smallest amount of conductor, the least provision of construction services, and the shortest time duration of construction. In addition, the application of mitigating measures to minimize environmental effects would be reduced to a minimum and socioeconomic problems would be the minimum possible among the three routes. The increase in the expenditure of materials, supplies, energy, and human effort for the construction of the line over the route of Alternative B would approximately be 10% greater than for Alternative A. Similarly, these expenditures for the construction of the proposed transmission line over the route of Alternative C would be about 20% greater than for Alternative A.

B. Irreversible and Irretrievable Commitments of Resources Should Alternative C be Implemented

The use of the routing of Alternative C would result in the expenditure of resources at a level of about 20% higher than for Alternative A and 10% more than for Alternative B. This increment in expenditures would not result in increased productivity of shale oil at Tract C-b over that if Alternatives A or B were used.

C. Possible Conflicts Between Alternative C and the Objectives of Federal, Regional, State and Local Land Use Plans, Policies and Controls for the Area

The discussion of this section under Alternative A generally applies to this alternative C, except as relates to the objectives of government of Rio Blanco County. In a meeting among the Utility Corridor Committee of the Rio Blanco County Planning Commission, officials of the White River Electric Association and the U.S. Bureau of Land Management, it was noted that the committee considered that the construction of a transmission line along the route of Alternative C would result in excessive degradation of visual values and would not be approved by the County Planning Commission.

D. Energy Requirements and Conservation Potential of the Various Alternatives

Comparison of the three possible alternative transmission line routes shows that Alternative A is the shortest route, that Alternative C is the longest, and that Alternative B is intermediate.

In the construction of the proposed lines Alternative A would be the shortest route and therefore would require the least number of pole structures, wires, the smallest amount of conductor, the least provision of construction supplies, and the shortest time duration of construction. In addition, the application of mitigating measures to minimize environmental effects would be reduced to a minimum and socioeconomic problems would be the minimum possible among the three routes. The increase in the expenditure of materials, supplies, energy, and human effort for the construction of the line over the route of Alternative B would approximately be 5% greater than for Alternative A. Similarly, these expenditures for the construction of the proposed transmission line over the route of Alternative C would be about 10% greater than for Alternative A.

The dollar value of these increased expenditures is not significant, but rather, it is the actual use of physical raw materials, the actual consumption of energy or power in all of its economically usable forms, and the actual human labor expended in the production of transmission line components that is of significance. Thus the shorter the route, the lower will be the true environmental costs, and the lower will be the unit cost of the end product--shale oil.

In the operation of the transmission line, the shortest route of Alternative A will be the most electrically efficient and will result in the least amount of line losses of energy due to inductive resistance. Alternative A also will enjoy the least amount of work for inspection, maintenance, and repair.

Considering the above expenditures of materials, energy and labor, the choice of Alternative C for the transmission line route would result in expenditures 20% greater than for Alternative A. The choice of Alternative B would result in expenditures 10% greater than for Alternative A.

It is thus apparent that the choice of Alternative A will result in the most energy efficient route, and consequently, is the preferred route to achieve conservation of resources.

REFERENCES

1. Gaea Corporation. Environmental Assessment Record, Gas Service Pipeline To Oil Shale Tract C-b; Appendix A - Description of the Environment Affected Beyond the Site Area; Western Slope Gas Company; October 23, 1978.

2. Luoma, Gary; prepared under the supervision of Calvin H. Jennings; Archaeological Reconnaissance of the Meeker to C-b Tract 138 K_V Power Line, Rio Blanco County, Colorado. Reports of the Laboratory of Public Archaeology, No. 26, Laboratory of Public Archaeology, Colorado State University, Fort Collins, Colorado, January 1979.

3. Raptor Research Foundation Incorporated. Undated. Suggestive practices for raptor protection on power lines. Report prepared for Edison Electric Institute, available through Raptor Research Foundation.

4. Jennings, Calvin H., Cultural and Paleontological Resources: Federal Oil Shale Lease Tract C-b. Woodward Clyde Consultants, March 1975.

APPENDIX A

FIGURES TO ACCOMPANY MAIN TEXT

LIST OF FIGURES
(AS APPENDIX A)

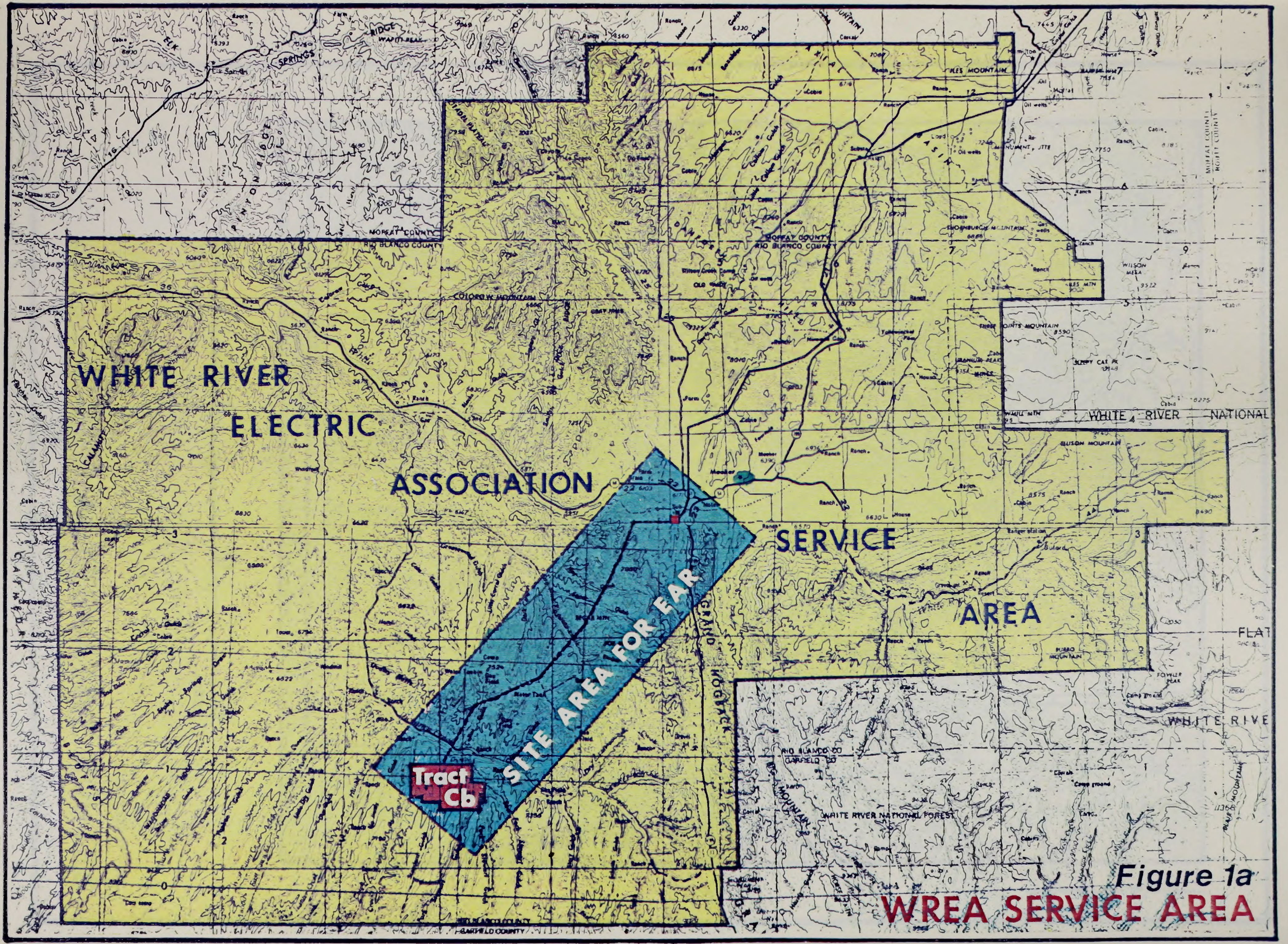


Figure 1a
WREA SERVICE AREA

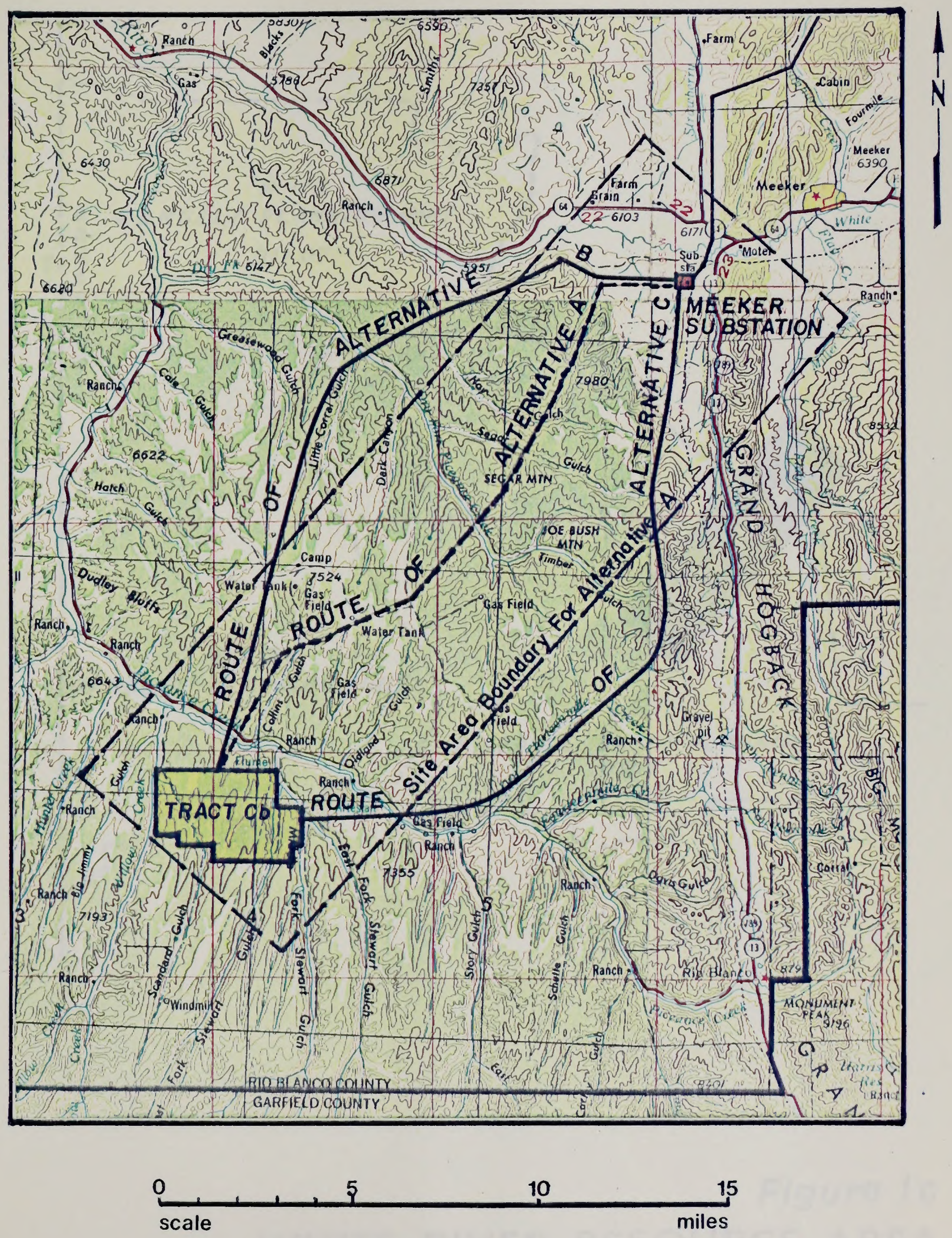


FIGURE 1b

ALTERNATIVE ROUTES

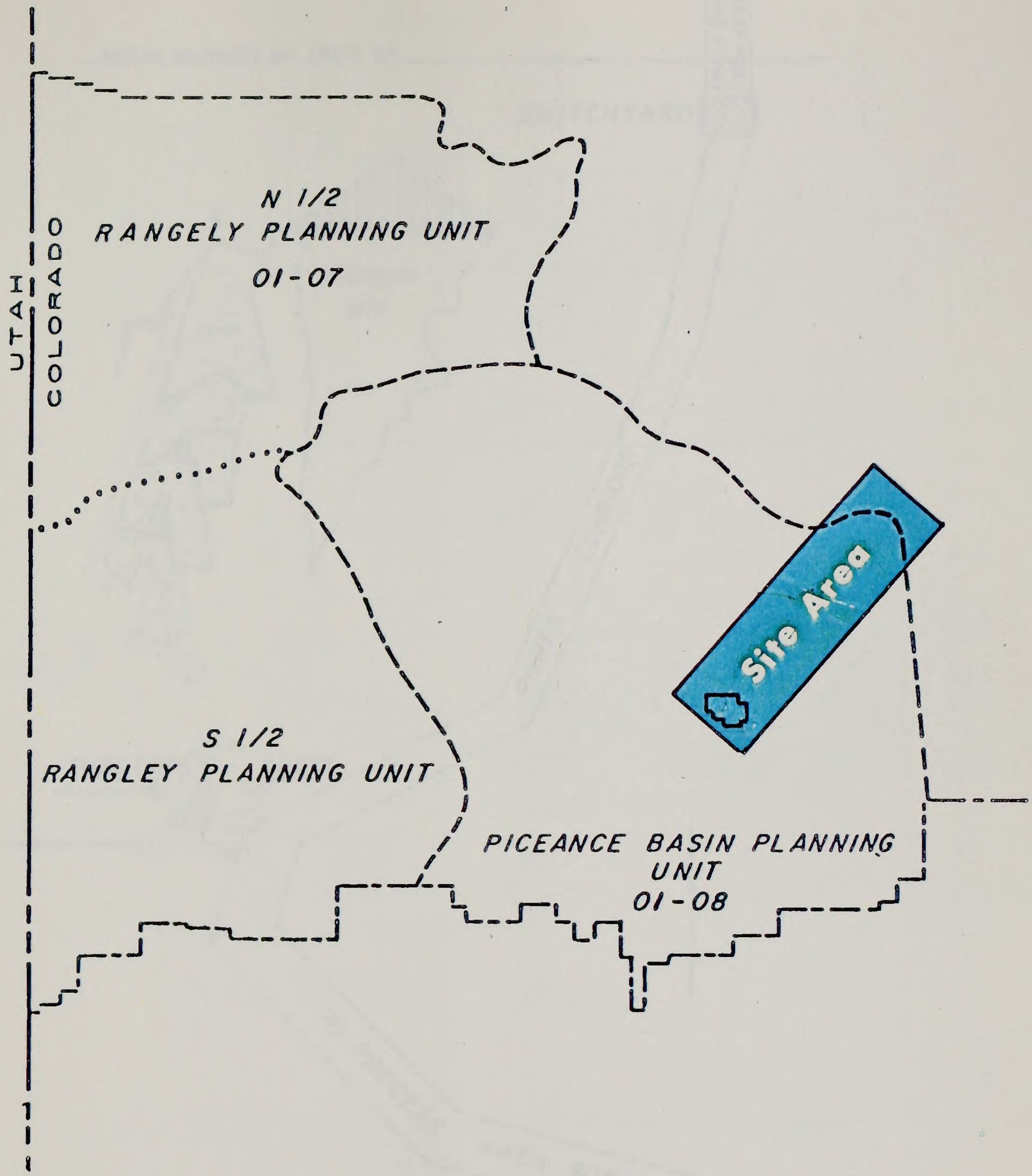


Figure Ic

WHITE RIVER RESOURCE AREA

PICEANCE BASIN PLANNING UNIT

TRANSMISSION LINE FOR OIL SHALE TRACT Cb

White River Electric Association

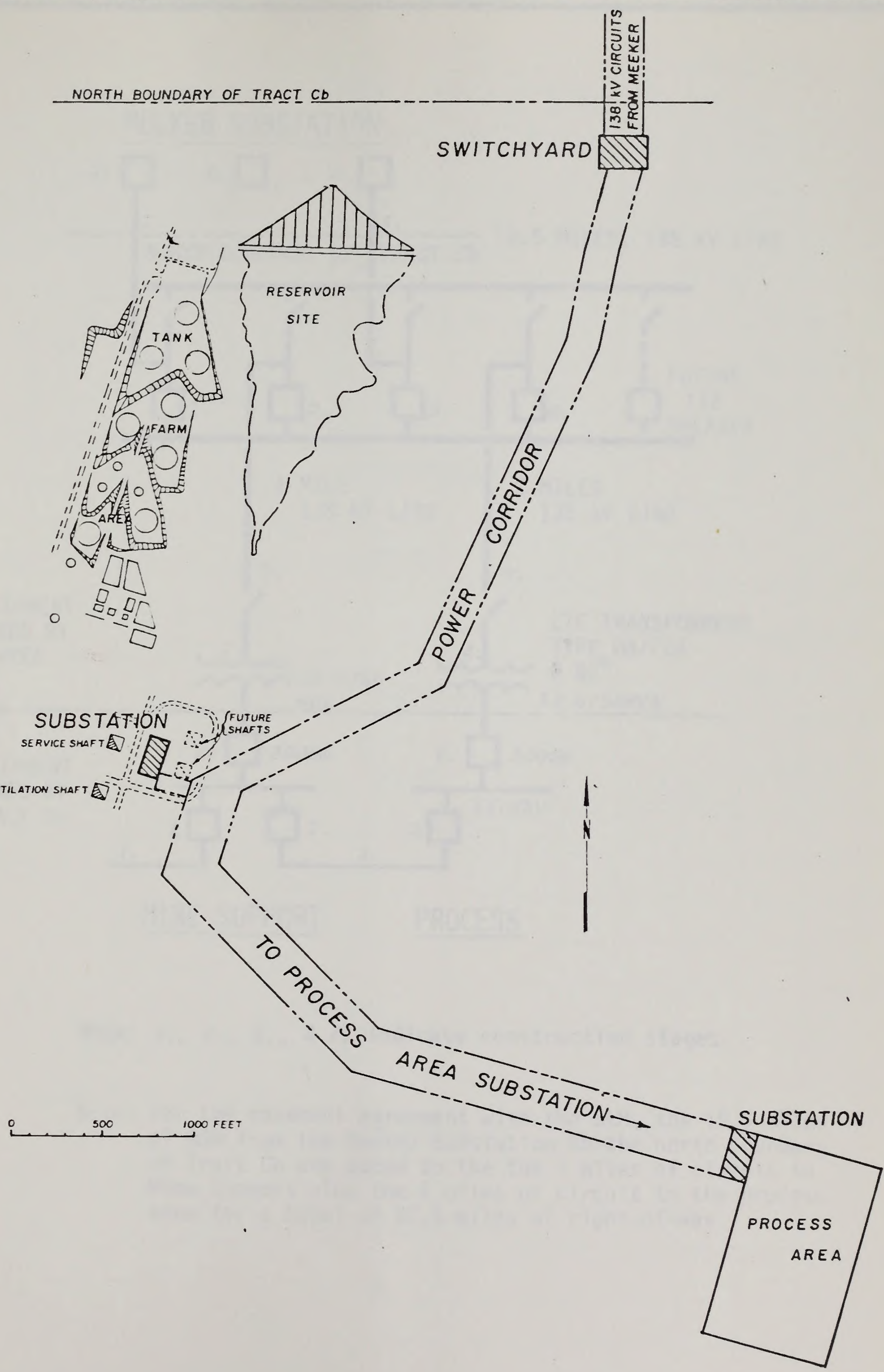
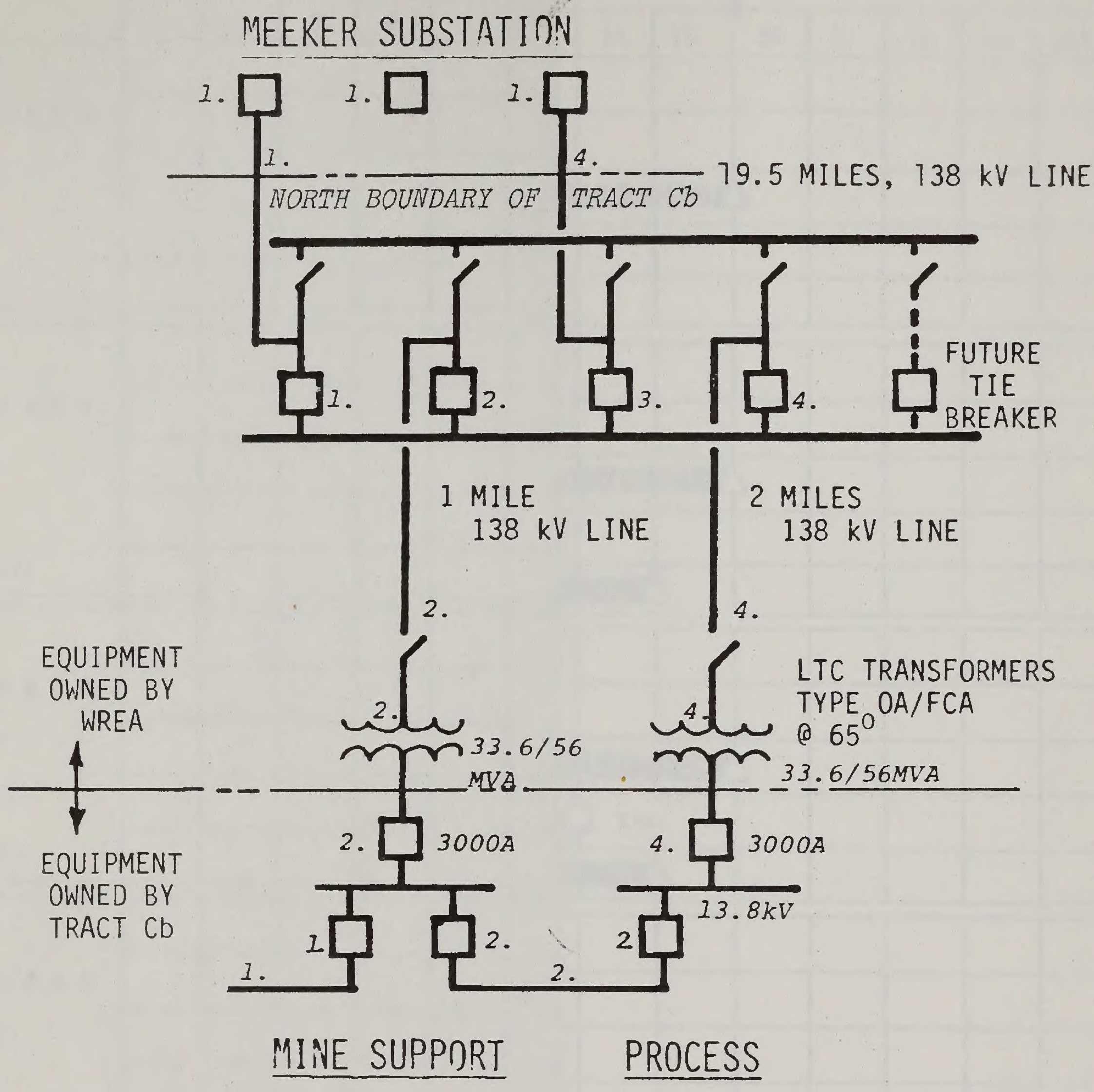


FIGURE 2a
TRANSMISSION FACILITIES ON TRACT Cb



Note: *1., 2., 3., & 4.* indicate construction stages.

Note: For the easement agreement with the BLM, the 19.5 miles of ROW from the Meeker Substation to the north boundary of Tract Cb are added to the the 1 miles of circuit to Mine Support plus the 2 miles of circuit to the process area for a total of 22.5 miles of right-of-way.

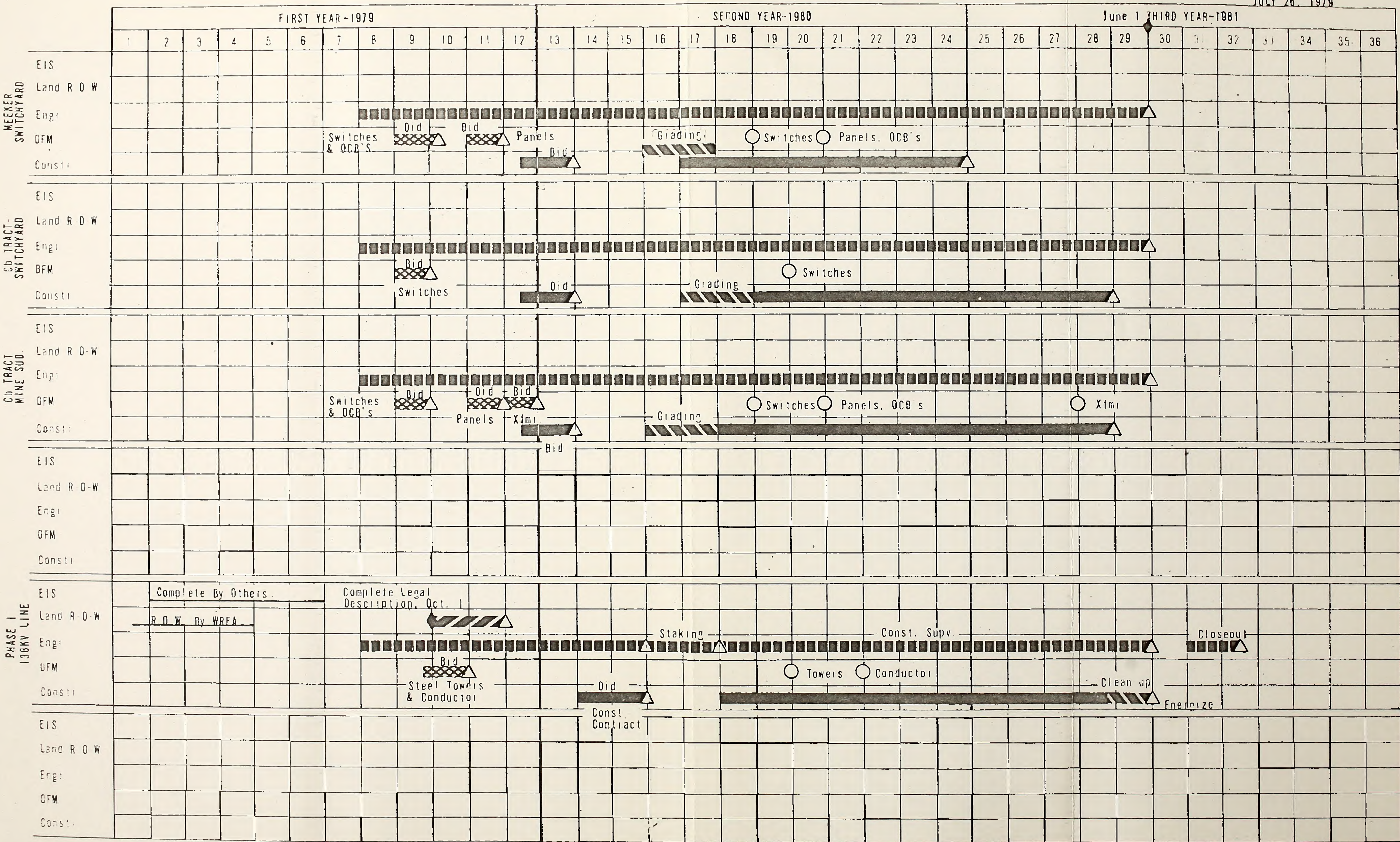
FIGURE 2b.

DIAGRAM OF MAJOR CIRCUITS

WHITE RIVER ELECTRIC ASS'N.
OCCIDENTAL OIL SHALE, INC. Cb TRACT
SUBSTATION & TRANSMISSION LINE SCHEDULE

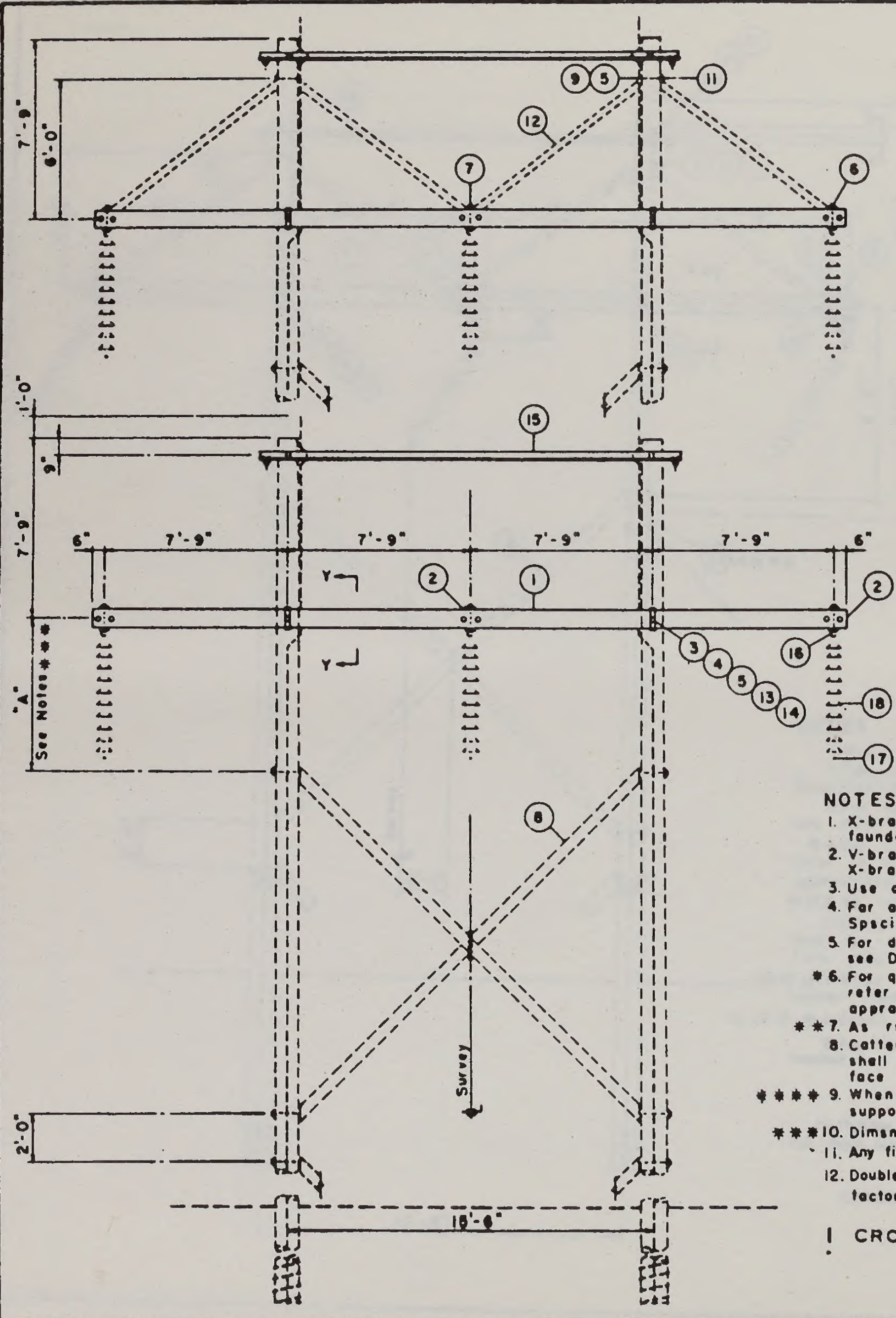
△ Completion of this phase of project
⬡ Contract awarded and REA approval
○ Major equipment delivered

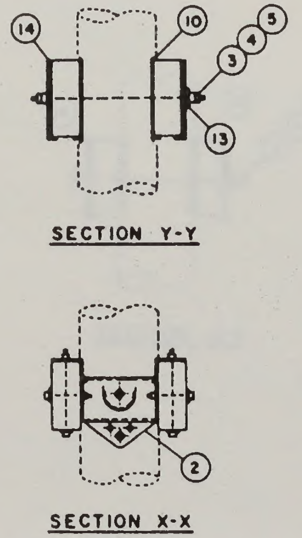
JULY 26, 1979



Source: Colorado-Ute Electric Association

FIGURE 2c





NOTES

1. X-braced structures shall have suitable pole foundation to resist uplift.
2. V-braced structures may require guying or X-braces to withstand transverse loads.
3. Use of braces must be economically justified.
4. For other requirements of assemblies refer to Specification T-7.
5. For details of spacers and V-brace fittings see Drg. TM-111.

* 6. For quantities required for other assemblies refer to table, total quantity equals sum of appropriate columns.

** 7. As required, see Drg. TM-1.

8. Cotter keys in insulator strings and clamps shall be oriented in same direction and shall face pole.

**** 9. When specified use alternate type OHGW support and pole tie.

*** 10. Dimension "A" shall be as shown on Drg. TM-104.

† 11. Any field drilled pole holes shall be pressure treated.

12. Double crossarms shall be shipped complete with factory assembled hardware.

| CROSSARM TYPE 71

DESCRIPTION OF ASSEMBLIES	
TH-10	No braces
TH-10X	One X-brace
TH-10VO	2-Vee braces outside poles
TH-10VOX	Same as TH-10VO with one X-brace
TH-10VI	2-Vee braces inside poles
TH-10VIX	Same as TH-10VI with one X-brace
TH-10V4	4-Vee braces
TH-10V4X	Same as TH-10V4 with one X-brace
X	One cross brace
XX	Two cross braces

LIST OF MATERIALS - TH-10

DRG. REF.	REQ'D.	DESCRIPTION	ITEM
1	2	Crossarm, 3 5/8" x 9 3/8" x 32'-0" long †	
2	3	Spacer Fitting Assembly, separation as req'd.	
3	2	Threaded rod 7/8" x req'd. length	
4	4	Nut for 7/8" bolt	
5	4 *	Locknut for 7/8" bolt, MF type	
6	*	Bent Bolt, 7/8" x 5 1/2" with th'd. washer & nut	
7	*	Bent Stud, 7/8" x 8" with th'd. washer & nut	gy
8	*	X-brace Assembly, TM-110	
9	*	Machine Bolt, 7/8" x req'd. length	
10	4	Gain Plate 3" x 9 1/2" x 1/4"	
11	*	Curved Washer 4" x 4" x 1/4" x 15/16" hole	
12	*	V-braces, 3 3/8" x 5 3/8" x req'd length	
13	2	Spring Washer, 15/16" hole	
14	4	Ribbed Tie Plate, 3" x 9 1/2" x 1/4"	
15	1	OHGW Support Assembly TM-109 ****	
16	3	Suspension Hook	eh
17	3	Suspension Clamp and Connecting Piece	el
18	**	Suspension Insulator, 5 3/4" x 10, 15000# M&E	k

MATERIALS REQ'D. FOR OTHER ASSEMBLIES

DRG. REF.	TH-10VO		TH-10VI		TH-10V4		X		XX	
	REQ'D	ITEM	REQ'D	ITEM	REQ'D	ITEM	REQ'D	ITEM	REQ'D	ITEM
TH-10	1		1		1					
5	4		4		6					
6	2				2					
7			1		1					
8		vo		vi		vv	1	vs	2	vx
9	2		2		2					
11	2		2							
12	2		2		4					

TRANSMISSION LINE TANGENT STRUCTURE
H-FRAME SUSPENSION - TWO POLE
(161 KV. MAXIMUM)

Scale:

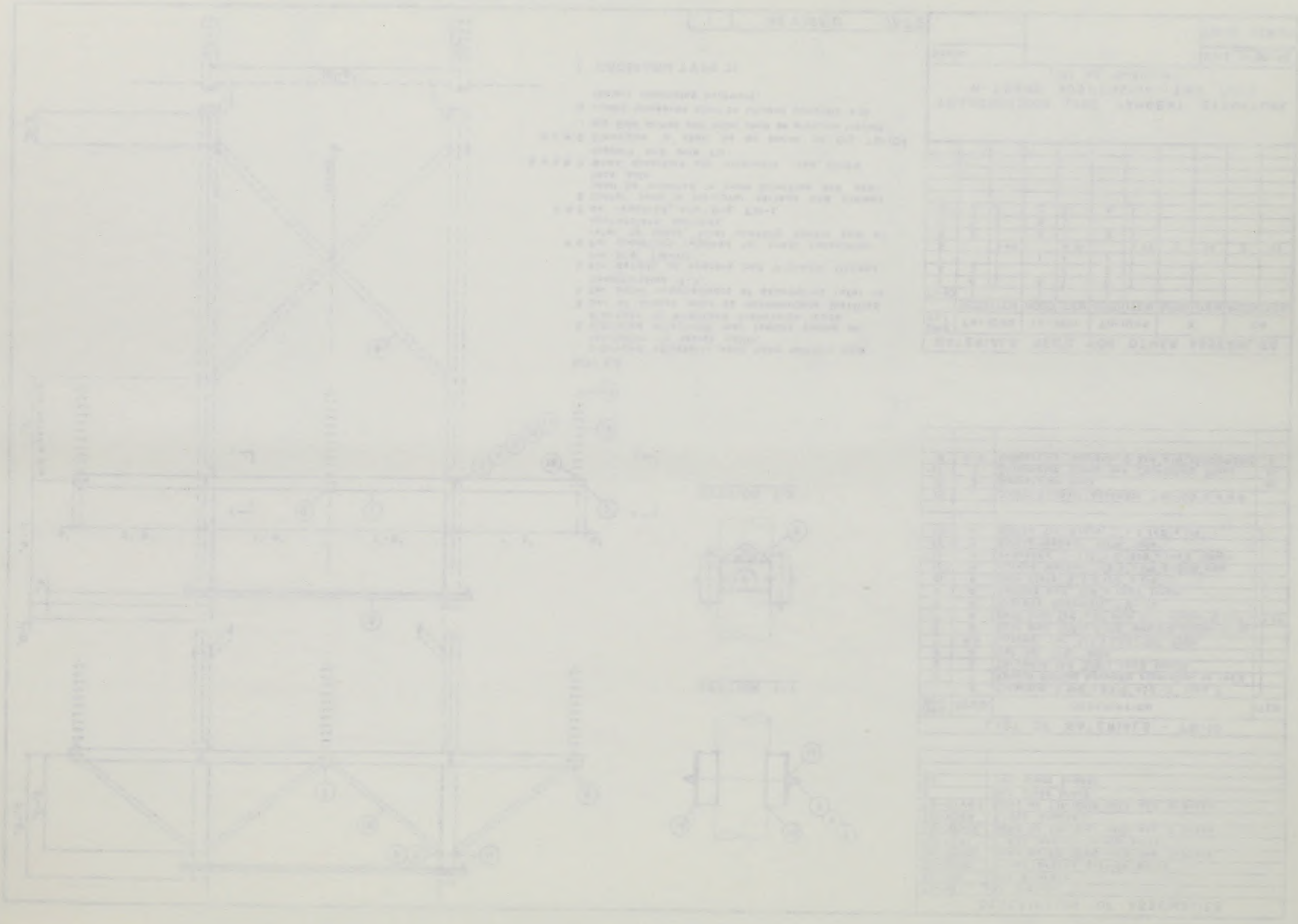
Date: 11-30-62

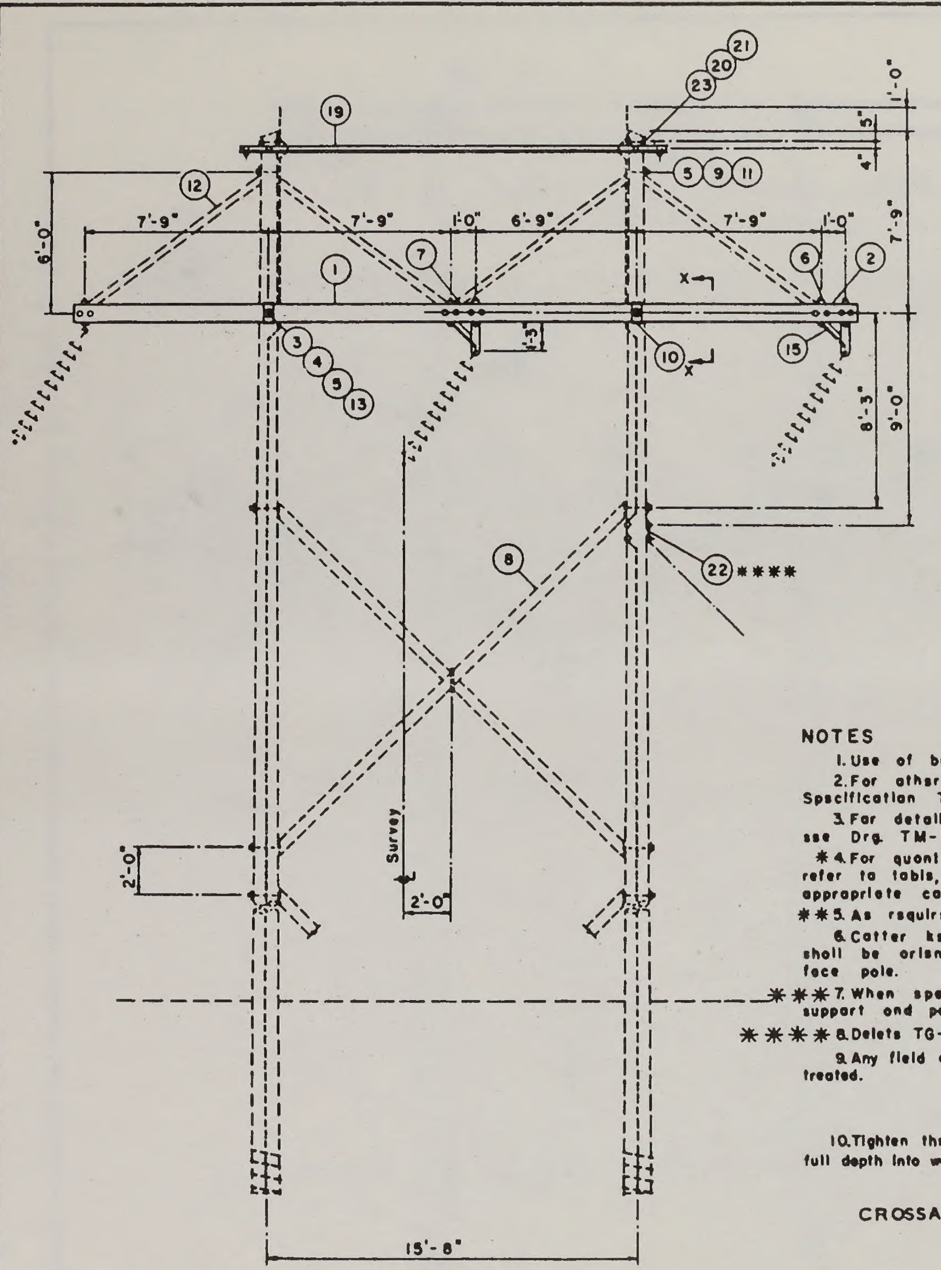
TH-10 SERIES

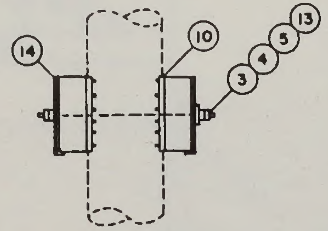
1	REVISED	7-72

FIGURE 3a - NORMAL TANGENT STRUCTURE

FIGURE 3c - NORMAL TANGENT STRUCTURE







SECTION X-X

DESCRIPTION OF ASSEMBLIES	
TH-11B	No braces
TH-11BX	One X-brace
TH-11BVO	2 Vee braces, outside poles
TH-11BVOX	Same as TH-11BVO with one X-brace
TH-11BVI	2 Vee braces, inside poles
TH-11BVIX	Same as TH-11BVI with one X-brace
TH-11BV4	4-Vee braces
TH-11BV4X	Same as TH-11BV4 with one X-brace
X	One cross brace
XX	Two cross braces

LIST OF MATERIALS - TH-11B

DRG. REF.	REQ'D.	DESCRIPTION	ITEM
1	2	Crossarm 3 5/8"x 9 3/8" x 33'-0" long	
2	5	Spacer Fitting Assembly, Separation as reqd.	
3	2	Threaded rod 7/8" x reqd. length	
4	4	Nut for 7/8" bolt	
5	4 *	Locknut for 7/8" bolt, MF Type.	
6	*	Bent Bolt, 7/8" x 5 1/2" with thd. washer & nut	
7	*	Bent Stud, 7/8" x 8" with thd. washer & nut	
8	*	X-brace Assembly, TM-110	gw
9	*	Bolt, Machine, 7/8" x reqd. length	
10	4	Grid Gain, 4 1/2" x 9" x 15/16" hole	
11	*	Washer, Sq. Curved, 4"x 4" x 1/4" x 15/16" hole	
12	*	Vee braces, 3 3/8" x 5 3/8" x reqd length	
13	2	Spring Washer, 15/16" hole.	
14	4	Ribbed Tie Plate, 3"x 9 1/2" x 1/4"	
15	2	Angle Bracket Assembly	
16	3	Suspension Hook	sh
17	3	Suspension Clamp and Connecting Piece	sl
18	* *	Suspension Insulator, 5 3/4"x 10", 15000# M & E	k
19	1	OHGW Support Assemby TM-109 * * *	
20	2	Bolt, Machine, 5/8" x reqd. length	c
21	2	Locknut for 5/8" bolt, MF Type	sk
22	1	Guy Attachment, TG-20	
23	4	Washer, sq. curved 4"x 4" x 1/4" x 11/16" hole	

MATERIALS REQUIRED FOR OTHER ASSEMBLIES

DRG. REF.	TH-11BVO		TH-11BVI		TH-11BV4		X		XX	
	Reqd	Item	Reqd	Item	Reqd	Item	Reqd	Item	Reqd	Item
TH-11B	1		1		1					
5	4		4		6					
6	2				2					
7			1		1					
8	·	VO	·	VI		VV	1	VX	2	VX
9	2		2		2					
11	2		2							
12	2		2		4					

NOTES

1. Use of braces must be economically justified.
2. For other requirements of assemblies refer to Specification T-7.
3. For details of spacers and V-brace fittings see Drg. TM-111.

* 4. For quantities required for other assemblies refer to table, total quantity equals sum of appropriate columns.

** 5. As required, see Drg. TM-1.

6. Cotter keys in insulator strings and clamps shall be oriented in same direction and shall face pole.

*** 7. When specified use alternate type OHGW support and pole tie.

**** 8. Delete TG-20 when guying is not required.

9. Any field drilled pole holes shall be pressure treated.

10. Tighten through bolts until grid gain teeth are indented full depth into wood surfaces.

CROSSARM TYPE 72

TRANSMISSION LINE SMALL ANGLE STRUCTURE
H-FRAME SUSPENSION - TWO POLE
(161 KV. MAXIMUM)

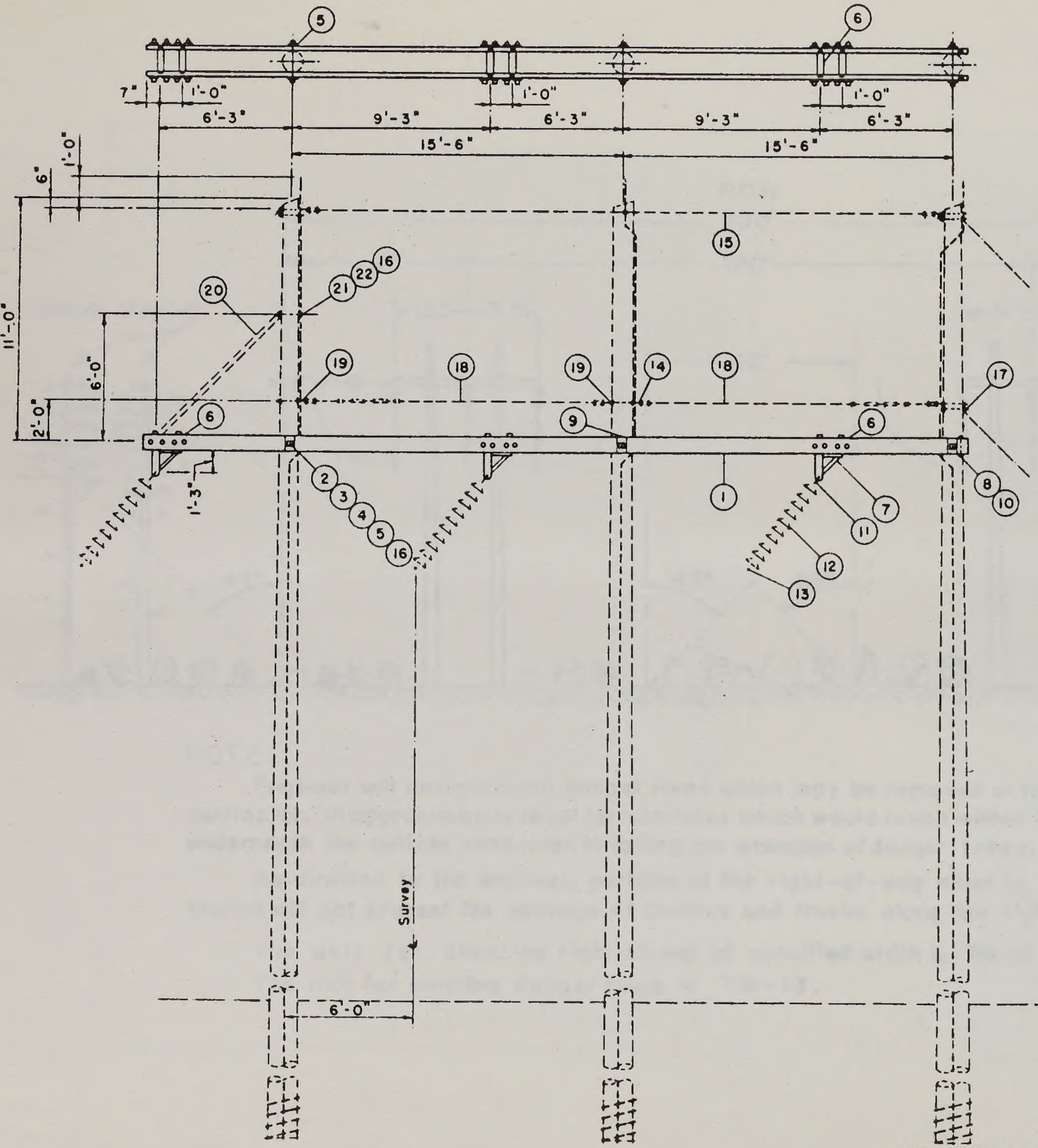
Scale:

Date: 12-5-62

TH-11B SERIES

1	REVISED	7-72

FIGURE 3b - SMALL ANGLE STRUCTURE



NOTES

✳1. As required, see Drg. TM-1.

2. Make one turn of pole ground wire around guy attachment bolts next to pole.

3. Tighten through bolts until grid gain teeth are indented full depth into wood surfaces.

4. Refer to drawing TM-111 for spacer fitting & angle bracket details.

5. Any field drilled pole holes shall be pressure treated.

✳✳ CROSSARM TYPE 74

LIST OF MATERIALS

DRG REF	REQD TH-12	REQD TH-12A	DESCRITION	ITEM
1	2	2	Crossarm, 3 5/8" x 9 3/8" x 38'-6" ✳✳	g
2	3	3	Threaded Rod, 7/8" x req'd. length	
3	6	6	Nuts for 7/8" bolt	
4	6	6	Ribbed Tie Plate 3"x9 1/2"x 1/4"	
5	3	3	Spring Washer, 15/16" hole	
6	6	6	Spacer Fitting Assembly, Separation as reqd	
7	3	3	Angle Bracket Assembly	
8	2	2	Washer Head Bolt, 1/2" x 12", w/Washer Nut	
9	6	6	Grid Gain, 4 1/2" x 9" x 15/16" hole	
10	2	2	Locknut for 1/2" bolt, MF Type	ek
11	3	3	Suspension Hook	eh
12	✳	✳	Insulator, Suspension, 5 3/4"x 10", 15000#M&E	k
13	3	3	Suspension Clamp & Connecting Piece	ei
14	1	1	Eyenut for 3/4" bolt	
15	1	1	Pole Tie Assembly, TG-104	
16	6	7	Locknut for 7/8" bolt, MF Type	ek
17	1	1	Guy Attachment, TG-21	
18	2	2	Overhead Guy Assembly TG-14	
19	2	2	Guy Attachment, TG-19	
20		1	V-Brace	
21		1	Machine Bolt 7/8" x reqd length	c
22		1	Washer, Sq. Curved 4"x4"x 1/4" x 15/16" hole	

TRANSMISSION LINE
INTERMEDIATE ANGLE STRUCTURE
H-FRAME SUSPENSION - THREE POLE
(161 KV. MAXIMUM)

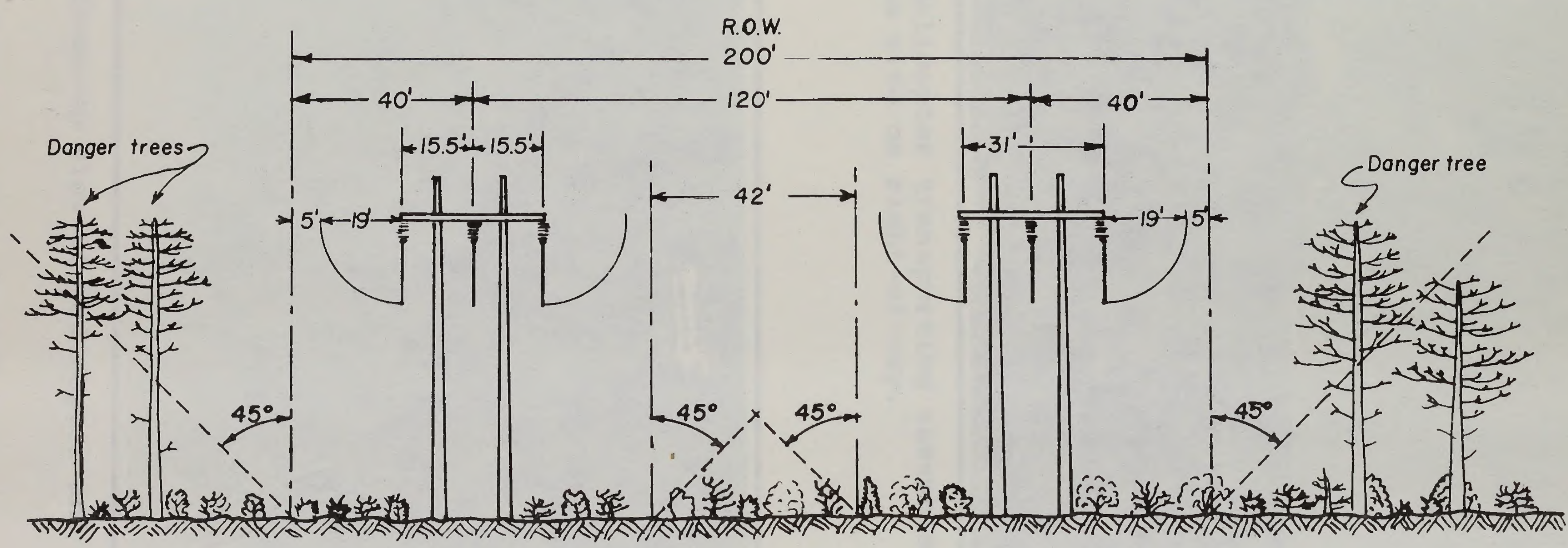
Scale:

Date: 12-5-62

TH-12

1 REVISED 7-72

FIGURE 3c - INTERMEDIATE ANGLE STRUCTURE



NOTE:

Engineer will designate all danger trees which may be removed or topped at option of contractor. In approximately level terrain trees which would reach within five feet of a point underneath the outside conductor in falling are examples of danger trees.

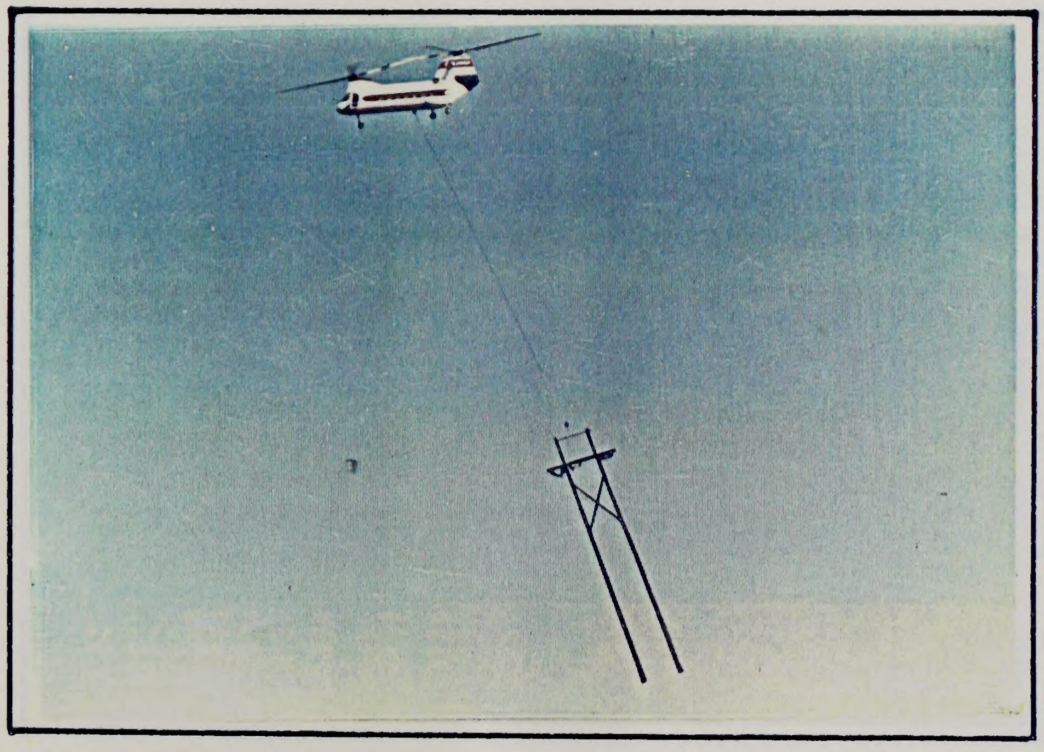
As directed by the engineer, portions of the right-of-way must be cut so that stumps will not prevent the passage of tractors and trucks along the right-of-way.

The unit for clearing right-of-way of specified width is TM-12 or TM-12 (1)
The unit for clearing danger trees is TM-13.

Adapted from TM-12, 12-1, 13, in R.E.A. Form 805, Rev. 2-73

FIGURE 3d - CLEARING GUIDE

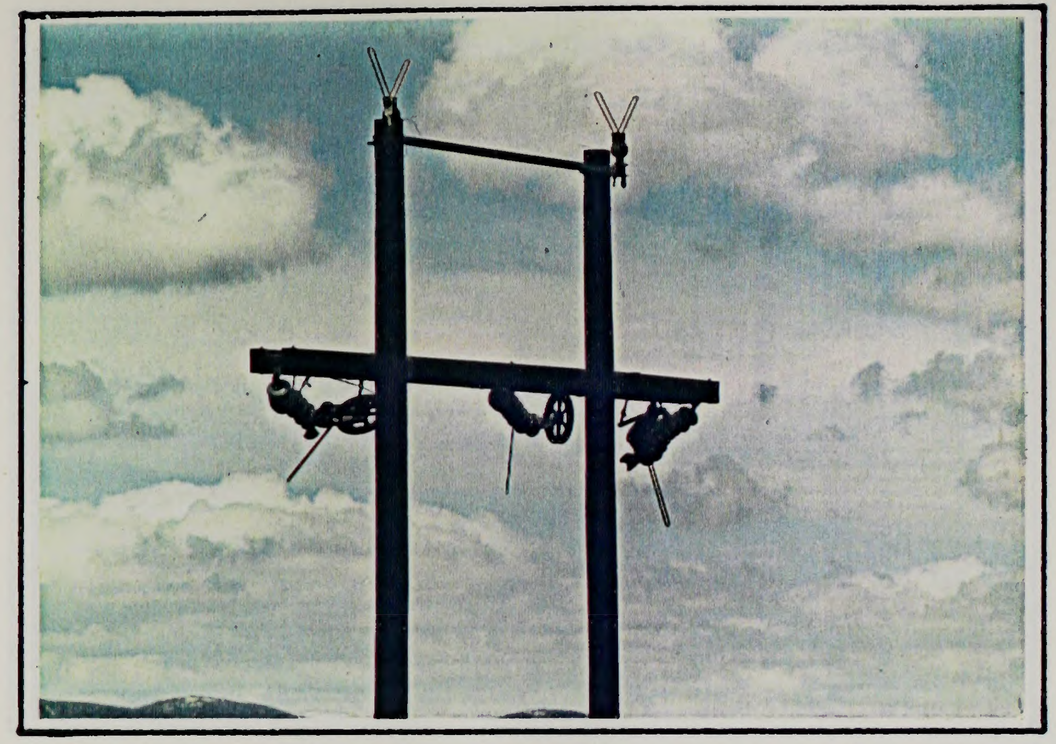
Helicopter transporting assembled 2-pole structure to site on right-of-way.



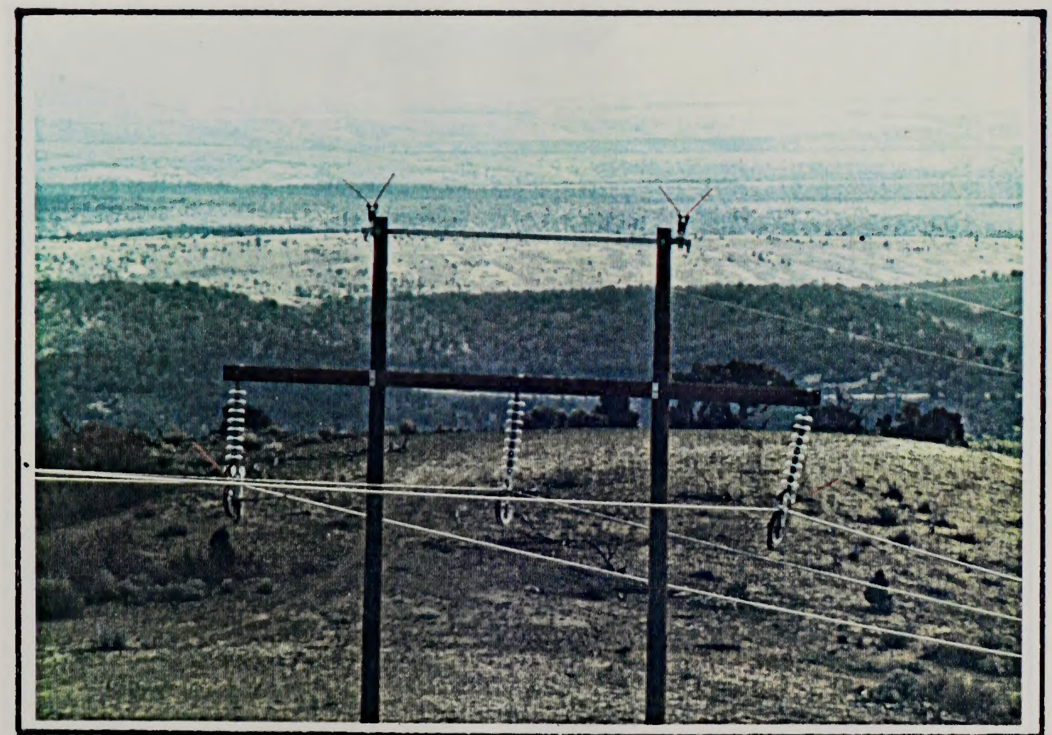
Close-up view of helicopter and pole assembly.

BLM Photos by J. Moritz

FIGURE 4a
Photographs of helicopter transport of pole structure to a site area.



Pole structure prepared for acceptance of conductor from helicopter.

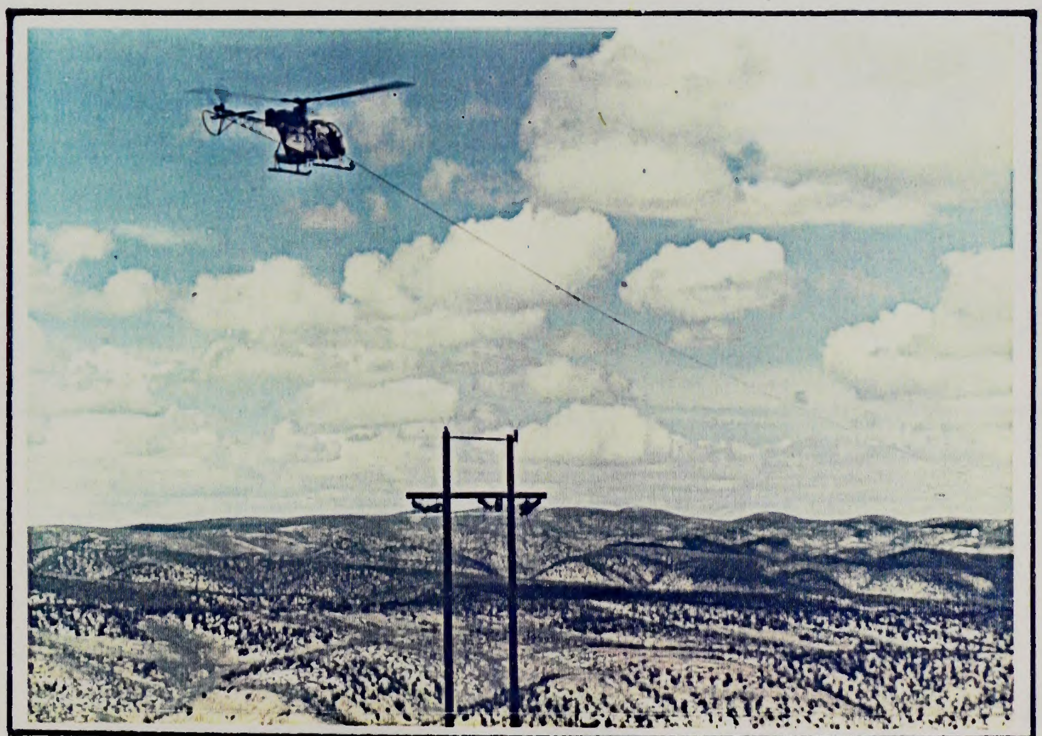


Pole structure showing 3 conductors emplace on pulleys, prior to tensioning.

BLM Photos by J. Moritz

FIGURE 4b
Photographs of pole structure ready to receive conductor wire.

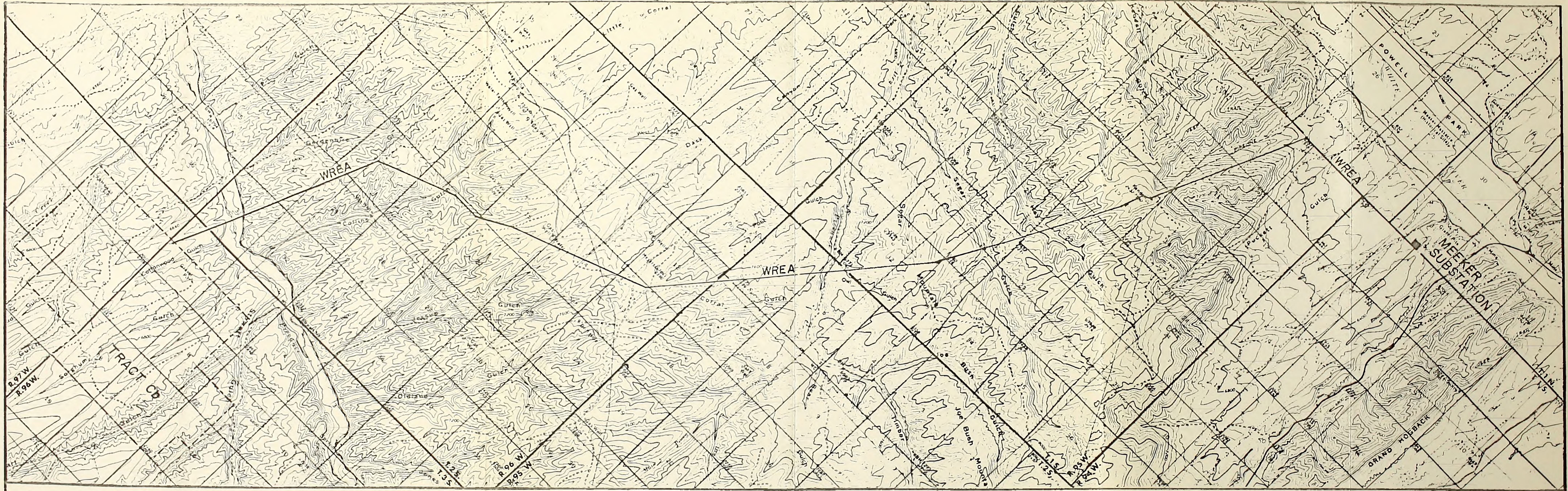
Helicopter has just left ground with conductor wire to start the stringing operation. Note conductor spool with braking winch on ground.



Helicopter is approaching structure for placement of conductor onto pole structure.

BLM Photos by J. Moritz

FIGURE 4c
Photographs of helicopter stringing the conductor wire.



SCALE 1" = 1 MILE

0 1 2 3 4 Miles

Contour Interval 80 Feet

WREA — Proposed Transmission Line 138 KVa

------ Oil Shale Tract C-b

FIGURE 5

RIGHT-OF-WAY & SITE AREA

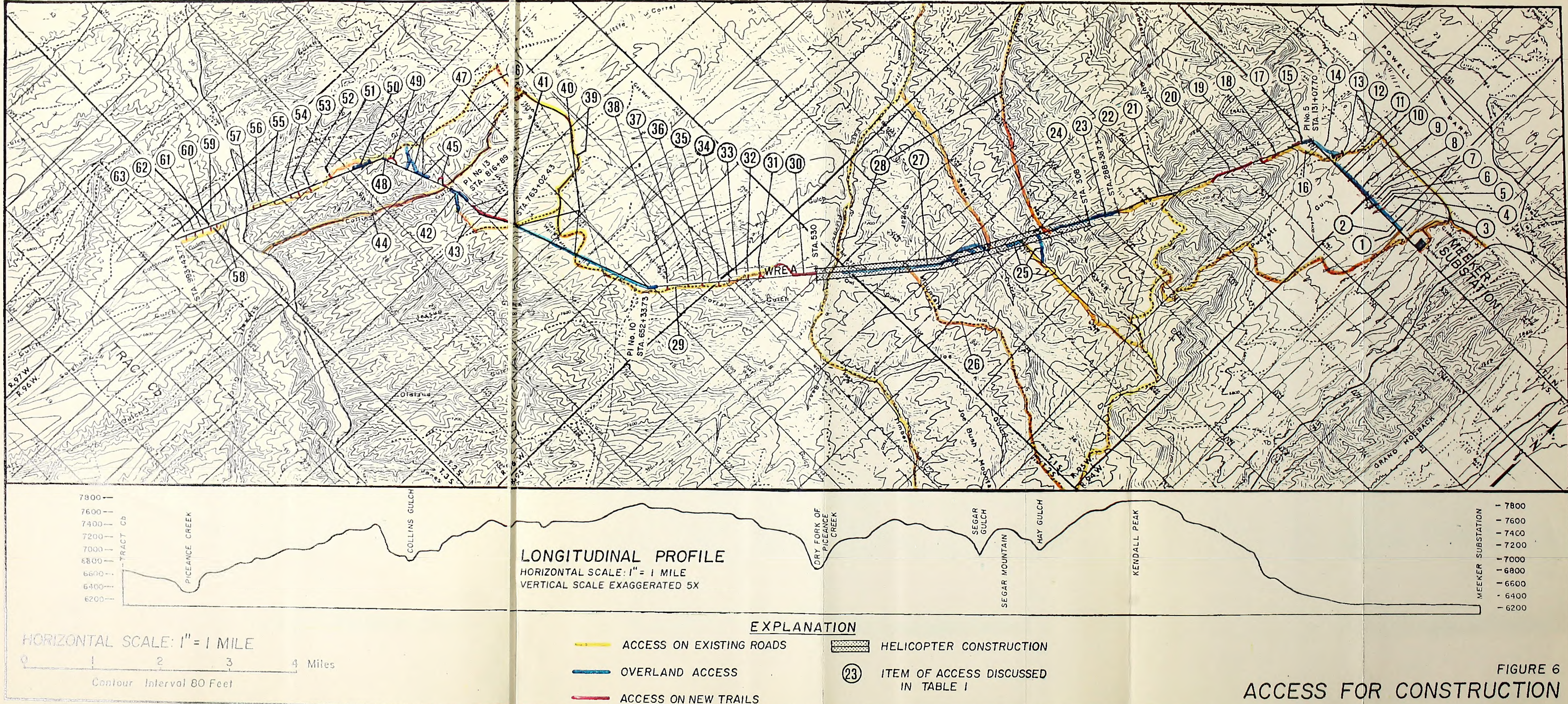


FIGURE 6
ACCESS FOR CONSTRUCTION

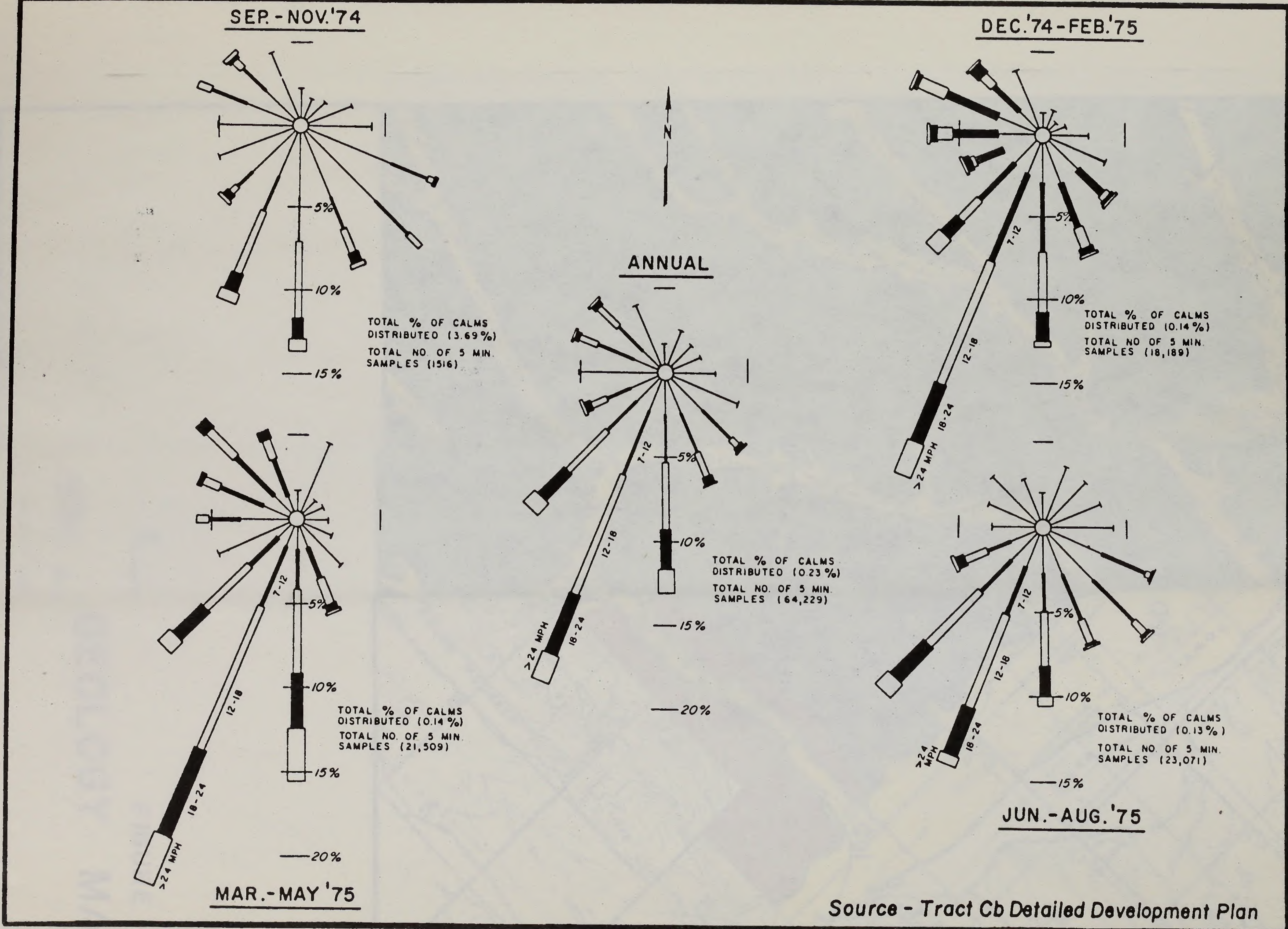
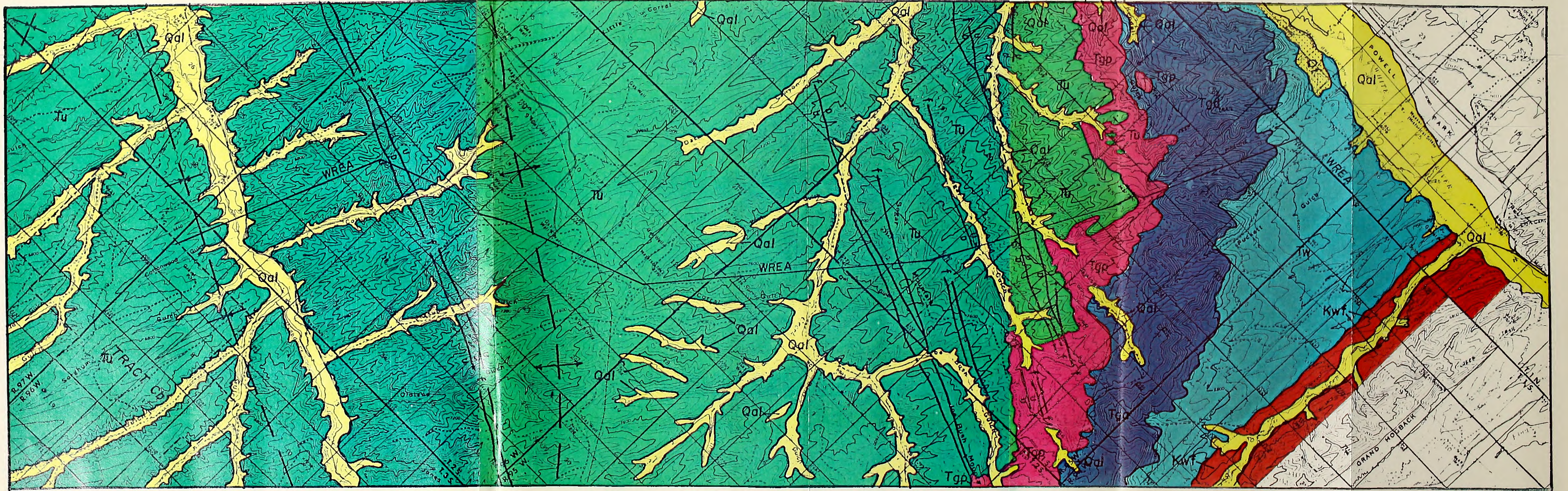


FIGURE 7 - QUARTERLY & ANNUAL WIND ROSES-100-FOOT LEVEL-TRACT Cb



Qal	Quaternary alluvium
Ql	Quaternary terrace deposits
Tu	Tertiary Uinta Fm.
Tgp	Tertiary Green River Fm. Parachute Creek Member
Tga	Tertiary Green River Fm. Anvil Points Member
Tw	Tertiary Wasatch Fm.
Kwf	Cretaceous Williams Fork Fm.
	Fault - dashed where covered
	Anticline
	Syncline

SCALE 1" = 1 MILE

0 1 2 3 4 Miles

Contour Interval 80 Feet

WREA Proposed Transmission Line 13.8 Kva

Oil Shale Tract C-b

FIGURE 8

GEOLOGY MAP

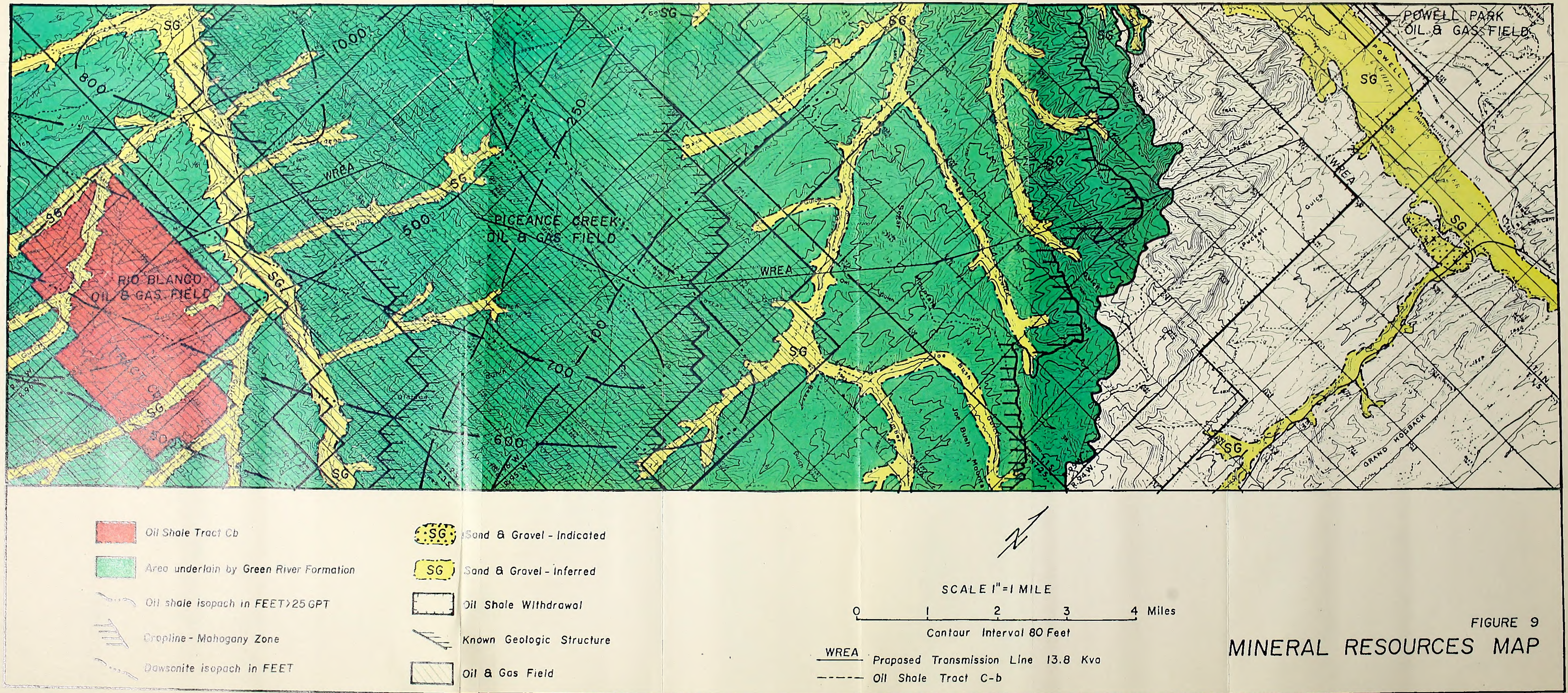
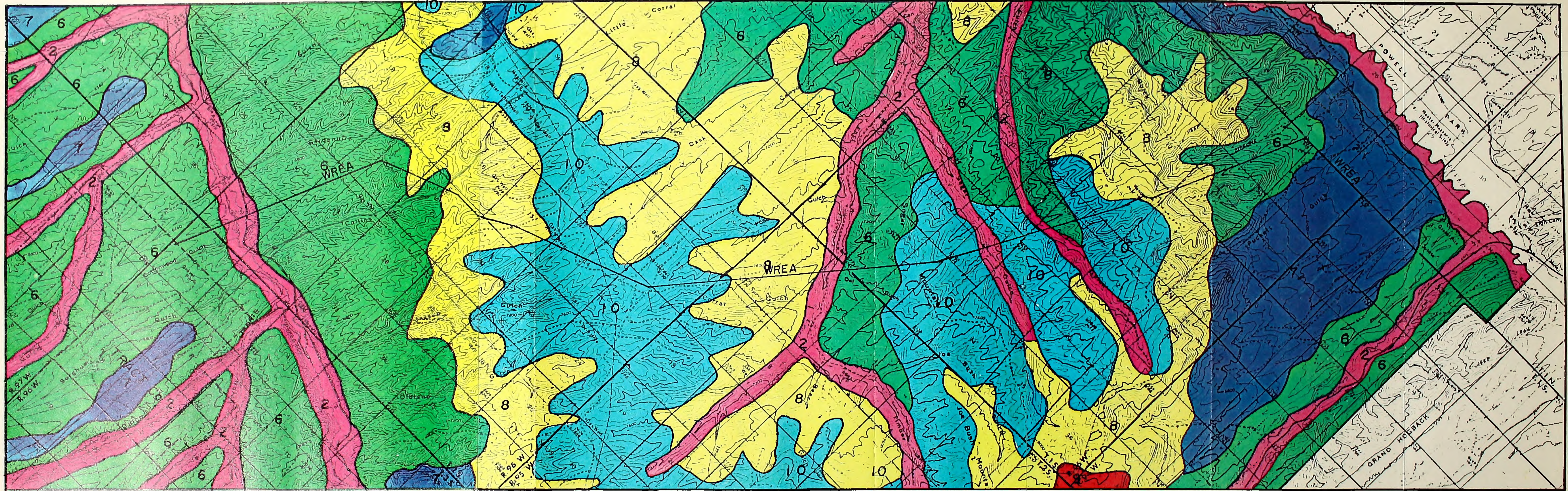


FIGURE 9
MINERAL RESOURCES MAP



2 Havre-Glendive-Redrob Soils Ass.

6 Rentsac-Moyerson-Blazon Soils Ass.

7 Zaltay-Work-Piceance Soils Ass.

8 Mergel-Kobar-Castner Soils Ass.

9 Owen Creek-Jerry-Maurice Soils Ass.

10 Parachute-Irigul-Starman Soils Ass.

SCALE 1" = 1 MILE

0 1 2 3 4 Miles

Cantour Interval 80 Feet

WREA Prapased Transmission Line 13.8 Kva

------ Oil Shale Tract C-b

FIGURE 10
SOILS MAP

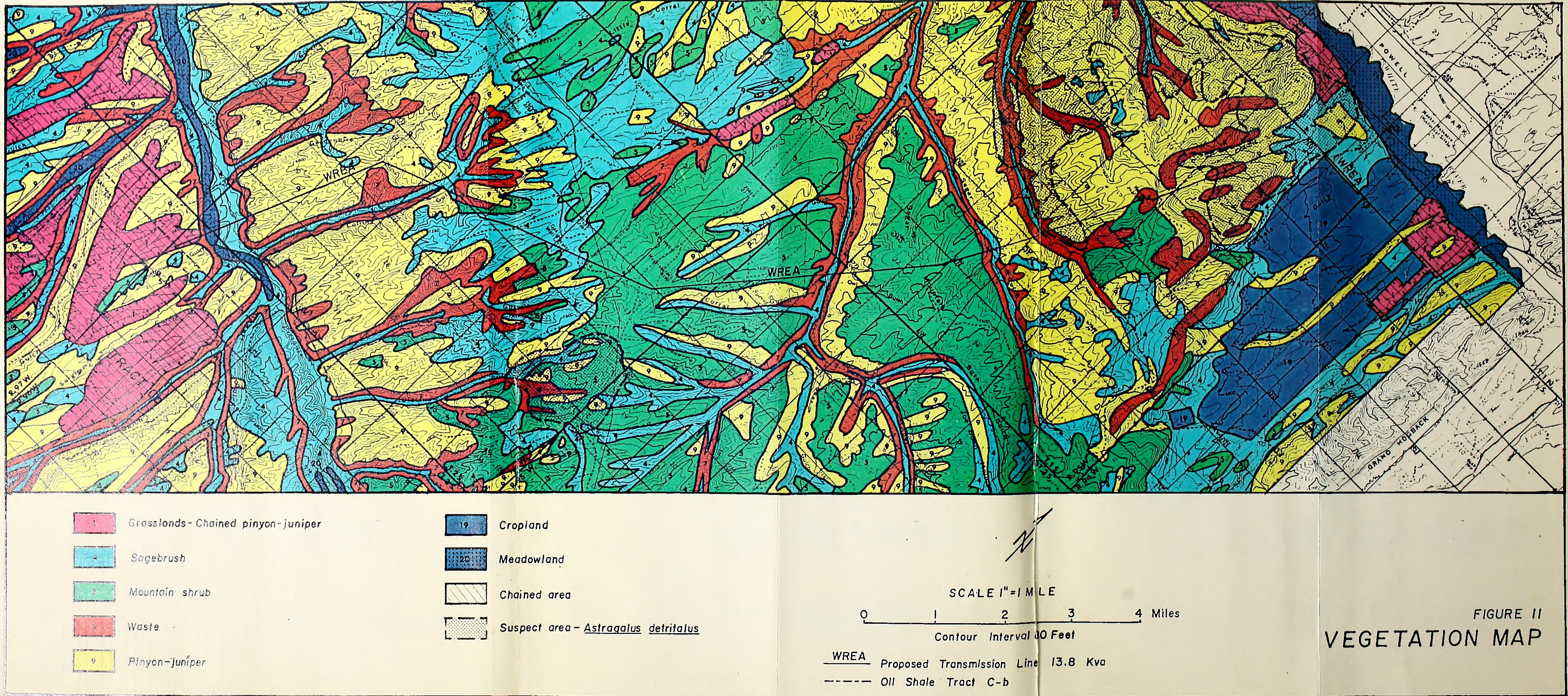
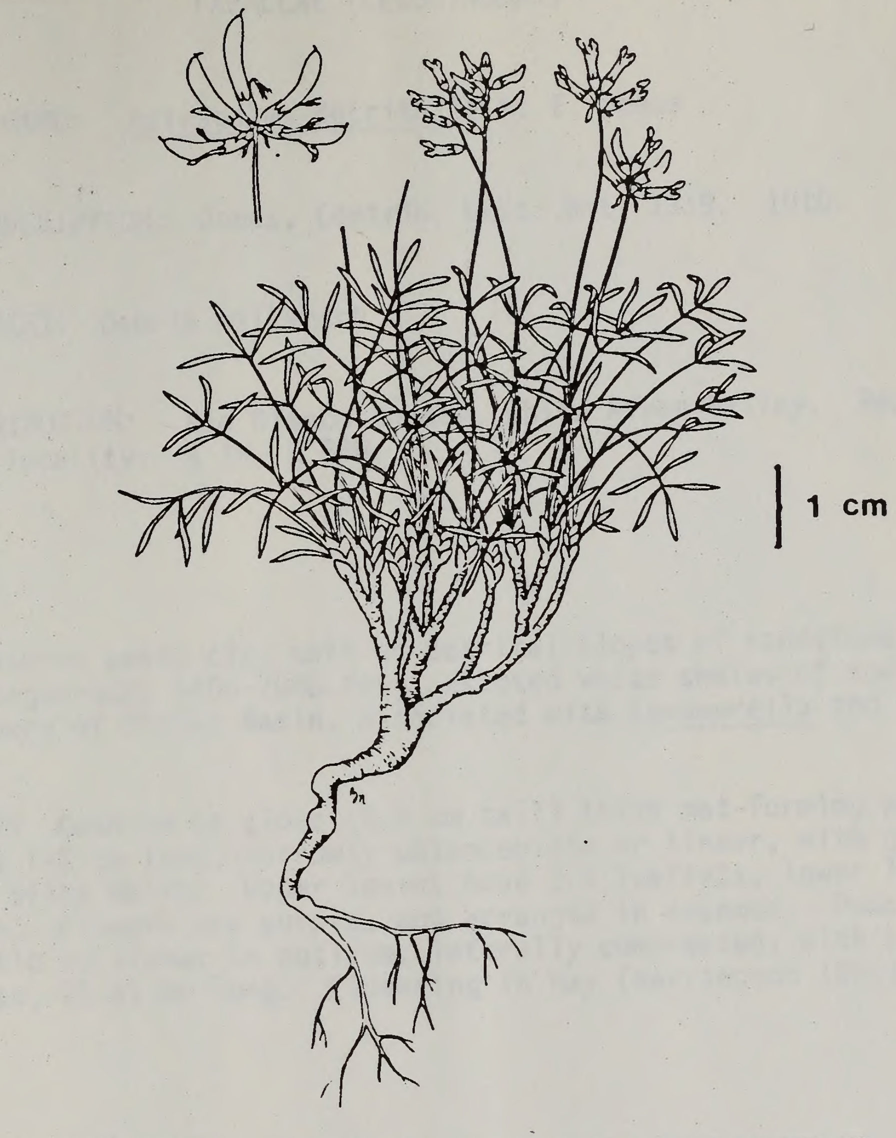


FIGURE 11
VEGETATION MAP



Source - U.S. Fish & Wildlife Service

FIGURE 12a - Astragalus detritalis & reported occurrences in Rio Blanco Co.

FABACEAE (LEGUMINOSAE)

SCIENTIFIC NAME: Astragalus detritalis M. E. Jones

ORIGINAL DESCRIPTION: Jones, Contrib. West. Bot. 13:9. 1910.

COMMON NAME(S): Debris milkvetch

KNOWN DISTRIBUTION: Rio Blanco County, White River Valley. Representative locality: T 1N, R 94W.

HABITAT: Barren sandy clay soil on detrital slopes of sandstone outcrops; with sagebrush; 5400-7000 feet; exposed white shales of southern periphery of Uintah Basin, associated with Lesquerella and Penstemon.

DESCRIPTION: Cushion or close (2-6 cm tall) thick mat-forming perennial. Leaves 1-2 cm long, narrowly oblanceolate or linear, with gray or white silky hairs. Upper leaves have 3-5 leaflets, lower leaves are simple. Flowers are purple, and arranged in racemes. Pods flat, elliptic to linear in outline, laterally compressed, with prominent sutures, 15-31 mm long. Flowering in May (Harrington 1964).

TAXONOMIC PROBLEMS: None known

EXISTING OR POTENTIAL THREATS: Unknown

LAND OWNERSHIP/MANAGEMENT: BLM and private

REMARKS: "Local, but forming colonies at scattered stations within the Uintah Basin in Duchesne, Uintah Counties, Utah, and Rio Blanco County, Colorado" (Barneby 1964).

Source - U.S. Fish & Wildlife Service

FIGURE 12b - Description of Astragalus detritalis

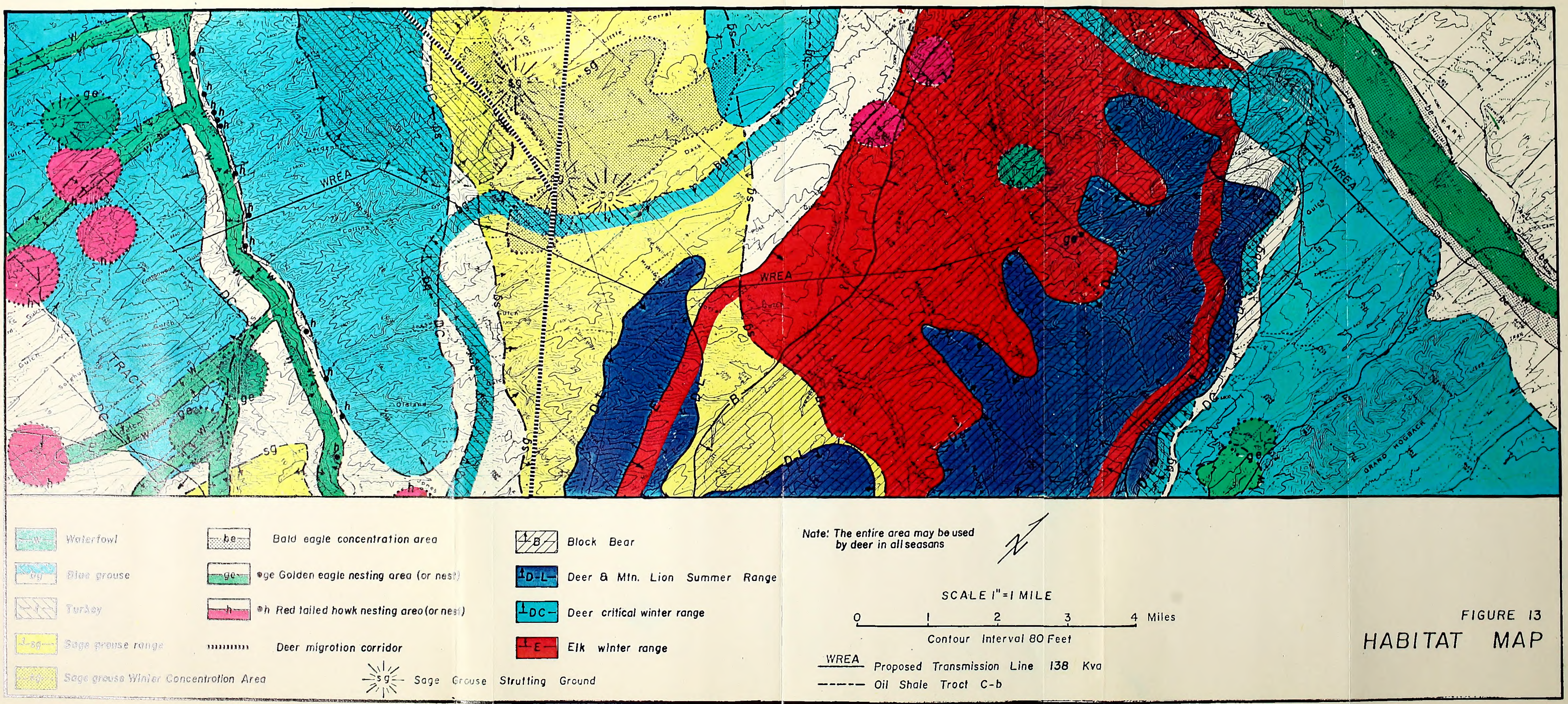
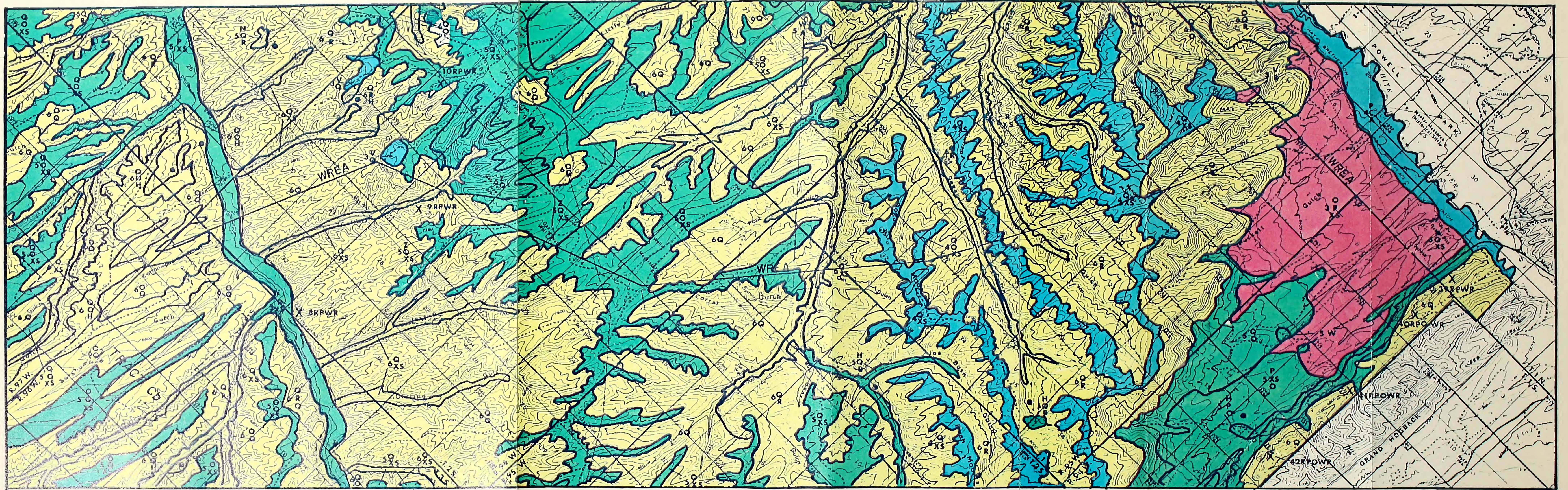


FIGURE 13
HABITAT MAP



CAPABILITY CLASSES

Intensive activities

- Class 3 – Moderately high capability

Dispersed activities

- Class 4 – Moderate capability
- Class 5 – Moderately low capability
- Class 6 – Low capability

Historic or cultural interest

Geologic interest

SUBCLASSES-RECREATIONAL FEATURES

A - Angling
H - Cultural
N - Lodging
O - Viewing upland wildlife
P - Agricultural interest
Q - Topographic-landscape variety
R - Rock formations
V - Panoramic view
W - Viewing waterfowl
XS - Snowmobiling
Z - Man-made features–Non-urban

N

SCALE 1" = 1 MILE

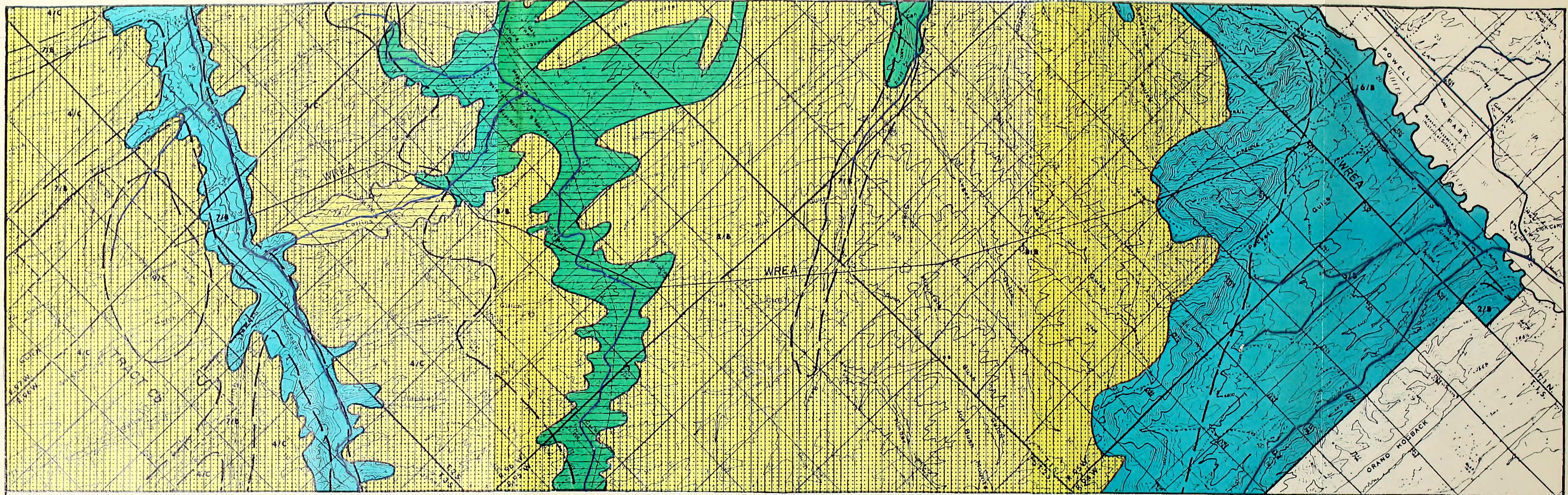
0 1 2 3 4 Miles

Contour Interval 80 Feet

WREA Proposed Transmission Line 13.8 Kva

Oil Shale Tract C-b

FIGURE 14
RECREATION



VRM MANAGEMENT OBJECTIVE CLASS

CLASS II

CLASS III

CLASS IV

VISUAL ZONE

SELDOM SEEN

FOREGROUND-MIDDLEGROUND (All non-stippled areas)

VISUAL SENSITIVITY

HIGH (All non-hachured areas)

MEDIUM

LOW

SCENIC QUALITY

8/B RATING POINTS/SCENIC QUALITY CLASS

COUNTY, STATE OR FEDERAL ROADS OR HIGHWAYS

N

SCALE 1" = 1 MILE

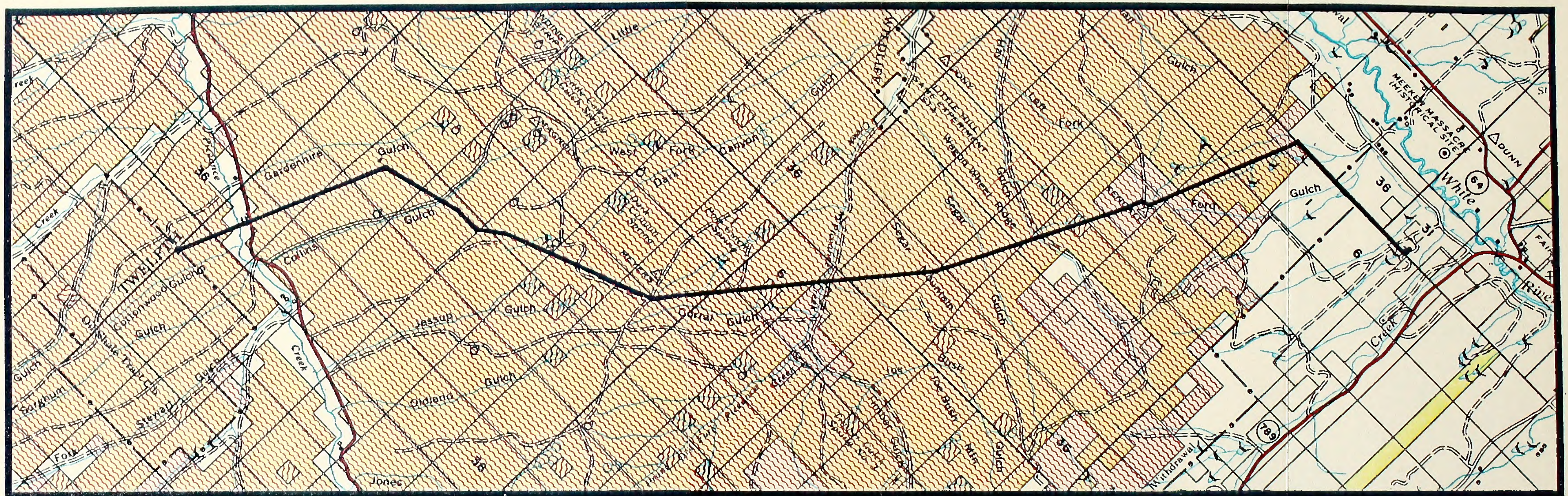
0 1 2 3 4 Miles

Contour Interval 80 Feet

WREA Proposed Transmission Line 13.8 Kva

Oil Shale Tract C-b

FIGURE 15
VISUAL RESOURCES MANAGEMENT



0 1 2 3 4 5 6 Miles

SCALE: 1" = 2 MILES

Private Land

Public Land

Federal Agency Protective Withdrawal - Public Land

Federal Agency Protective Withdrawal - Private Land

Public Water Reserve

State Wildlife Area

FIGURE 16

SURFACE OWNERSHIP MAP

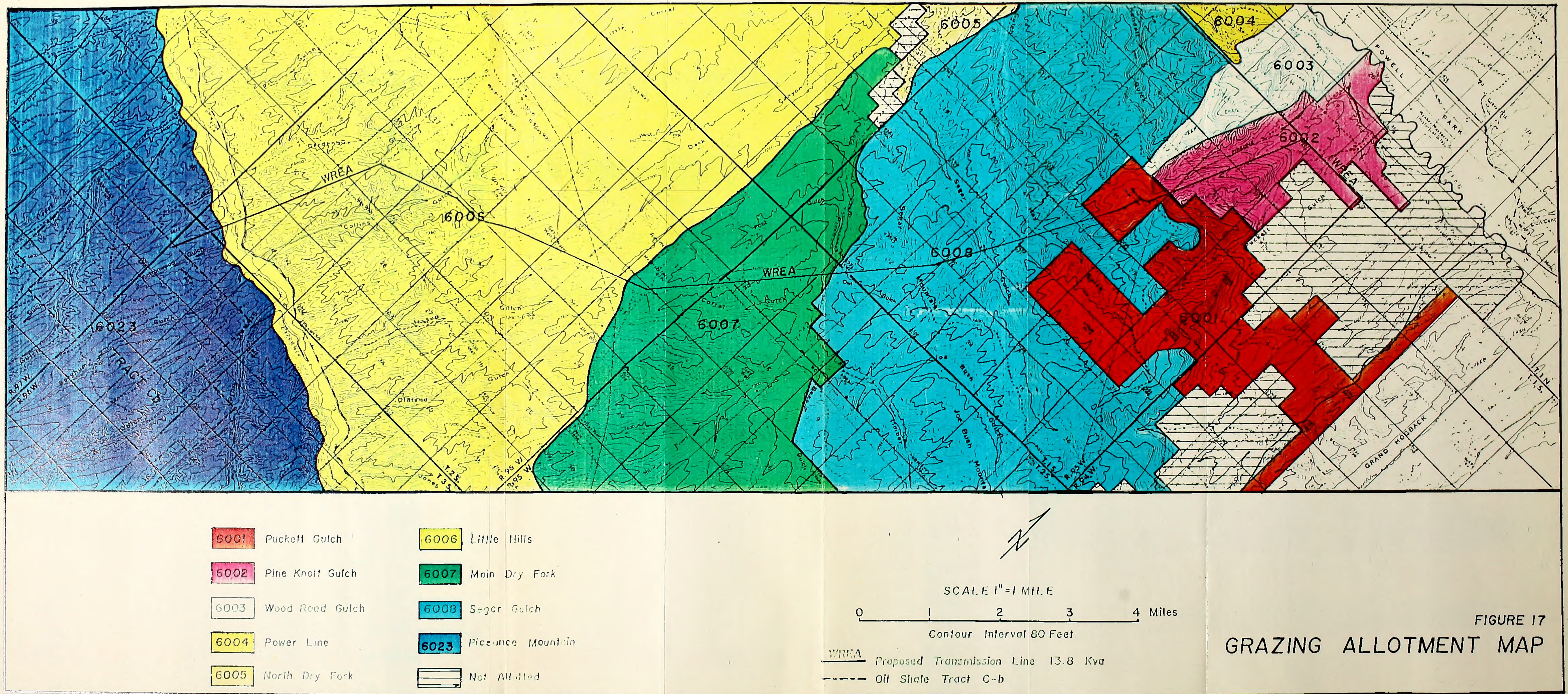


FIGURE 17
GRAZING ALLOTMENT MAP

APPENDIX B

ANALYSIS OF RAPTORS

By: Clayton M. White, Ph.D.,
Professor of Zoology,
Brigham Young University,
Provo, Utah

The proposed route for the transmission line will not have significant negative impact on raptors or other birds. Should there be any impact, it is expected to be only negligible. All power lines have occasional bird collisions but normally such circumstances are not significant to the population. Bald eagles (Haliaeetus leucocephalus) and golden eagles (Aquila chrysaetos) currently roosting along the White River move out to feed in the juniper hillsides as shown by food remains in roosting trees. That portion of the power line route near the White River may be used for hunting perches by these two eagles. If this is the case, the power line will have a positive influence on these species. Electricution is known to occur with large birds such as eagles but is not expected to occur in the case of the proposed transmission line. Electricution usually takes place on distribution and not transmission lines. The configuration of the proposed poles should eliminate the possibility of electricution (Raptor Research Foundation--undated report). Another possible positive influence of the transmission line may be their use as structures for the placement of nests. Ferruginous hawks (Buteo regalis) and ravens (Corvus corax), in particular, quickly begin using such structures for nest placements as shown by studies in the Dakota's (Gilmer and Wiehe 1977) and elsewhere. These nests do not interferewith transmission capabilities nor do they have any influence on the normal functioning of the lines. The red-tailed hawk (Buteo jamaicensis) that occur in the region, especially in the vicinity of Tract Cb may adapt to use the poles for nest placement.

Direct measurable negative impact raptors are not expected to occur by virtue of the pole configuration and the area in which they occur. However, possible secondary negative impacts may occur on other avian

species. Eagles are known to prey on Sage grouse (Centrocercus urophasianus). Eagles, primarily golden eagles, are present in the area of the grouses "booming" and "struting" lek areas during the grouse courtship period and they may use the poles to their advantage as hunting and resting perches in order to prey on grouse. The poles are, however, at least one mile from the lek areas and so their utilization for such hunting perches are expected to be minimal. The poles are close enough that these may be effectively used for resting perches, however, and thus near enough to allow exploitation of those grouse as a food source.

The red-tailed hawk is a most adaptable species and the passing of the line through its presumed nesting area near the Track Cb facility are not expected to produce a negative impact as shown by other studies.

Other than the random and uncommon collision of a raptor passing through the area or sage grouse moving to and from their "struting" lek areas, the locations of the transmission line should have only negligible effect. Any negative effect may be temporary in nature and not of permanent significance in terms of the population or the species in question.

Raptor Research Foundation Incorporated. Undated. Suggestive practices for raptor protection on power lines. Report prepared for Edison Electric Institute, available through Raptor Research Foundation.

Gilmer, D. S. and J. N. Wiehe. 1977. Nesting by ferruginous hawks and other raptors on high voltage power line towers. The Prairie Naturalist 9:1-10.

APPENDIX C

PORTFOLIO OF PHOTOGRAPHS TO ACCOMPANY THE

VISUAL RESOURCE MANAGEMENT ANALYSIS

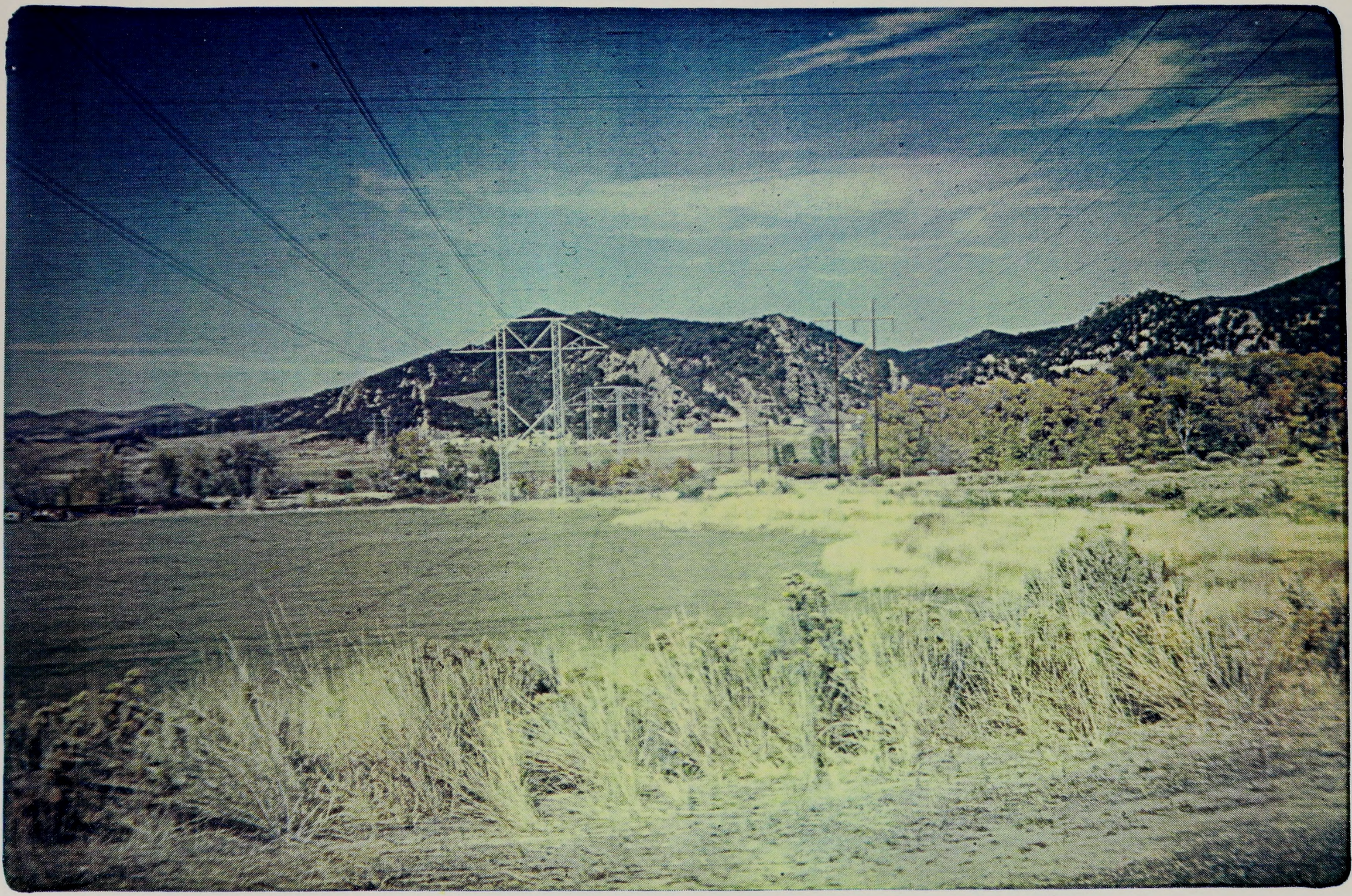


Figure C-1 - View to north from road along southern edge of the White River Valley showing the Meeker-Rifle transmission corridor where it crosses the valley of the White River.

Figure C-2 - View to the south from the road leading to the Meeker Substation and showing the Meeker-Rifle transmission corridor. The Meeker Substation is on the left skyline and the rim of the Piceance Basin Plateau forms the right skyline.

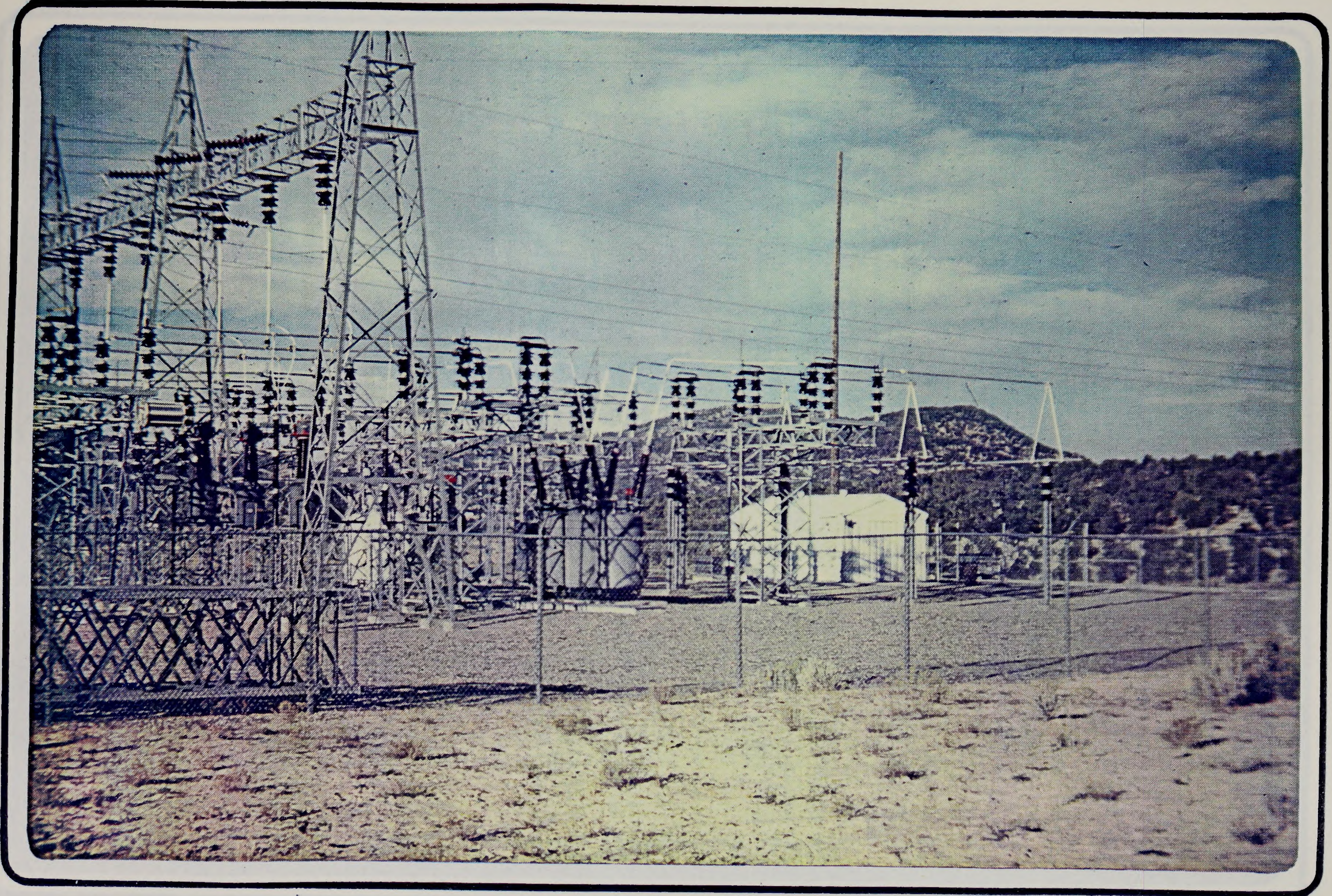


Figure C-3 - The Meeker Substation is the point of beginning for the proposed transmission line to Tract C-b.

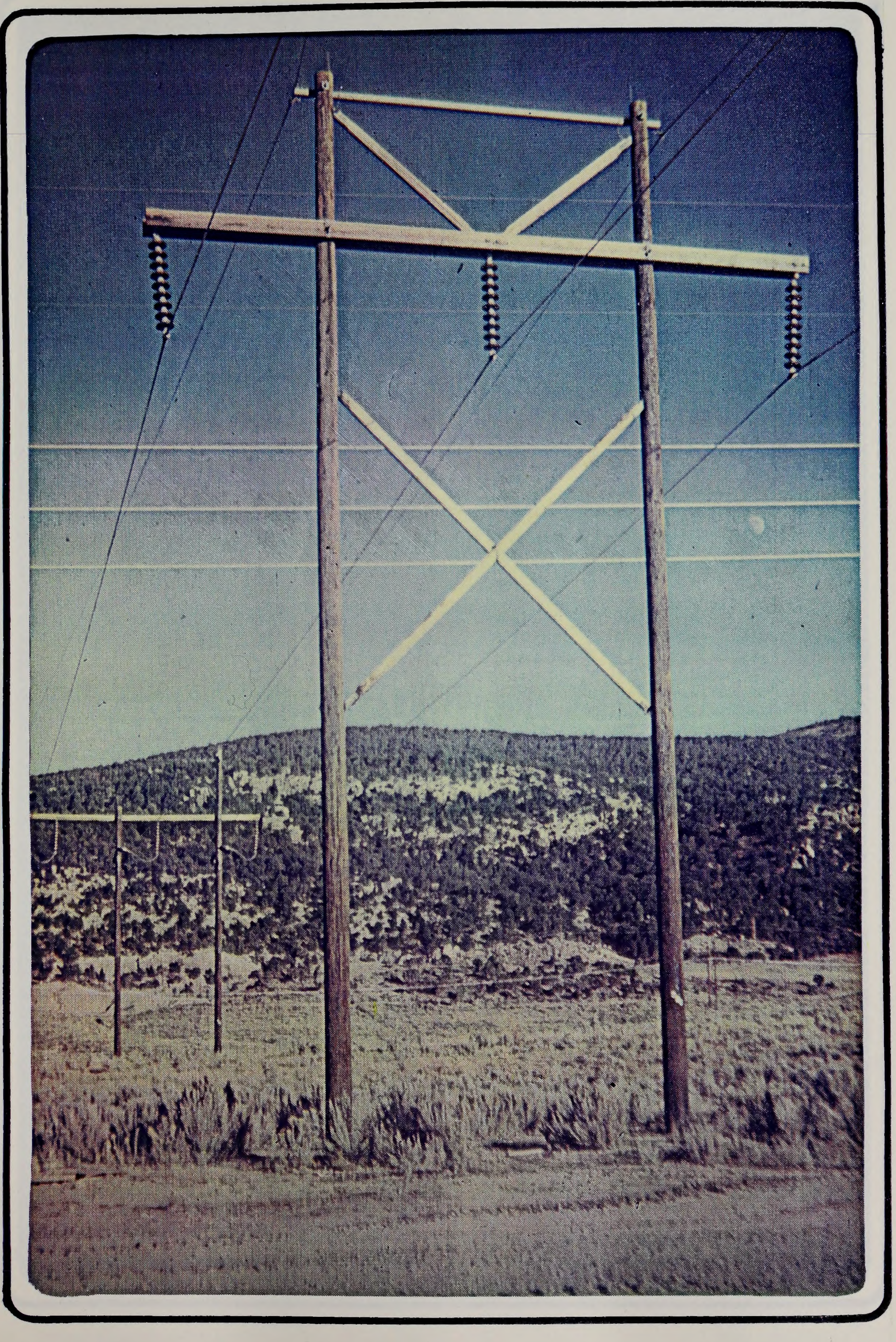


Figure C-4 - Typical 2-pole tangent structure constructed to REA specifications.

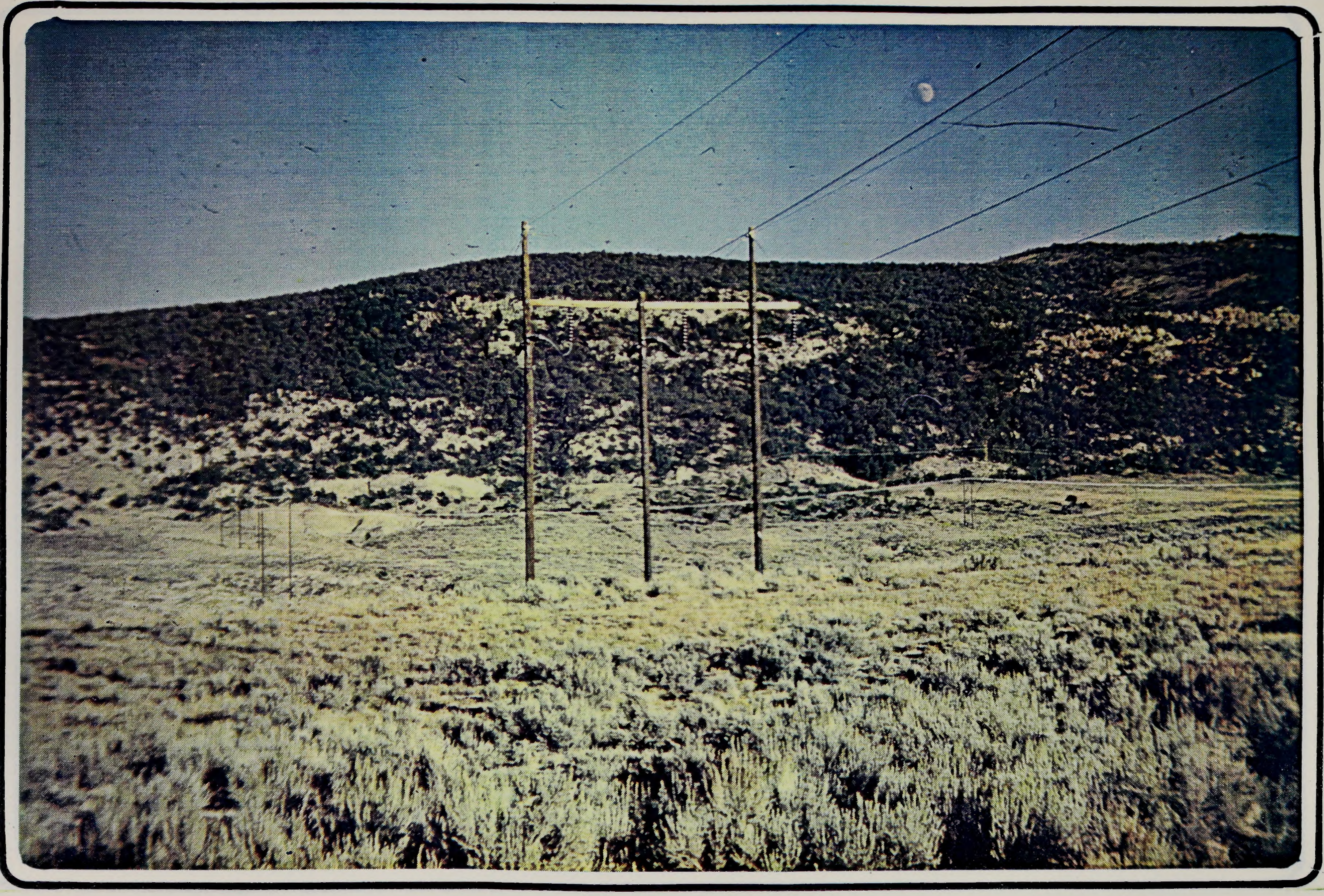


Figure C-5 - Typical 3-pole structure constructed to REA specifications for low- to medium-angle corners. Note how the wood color and texture of the poles blends with the background vegetation.

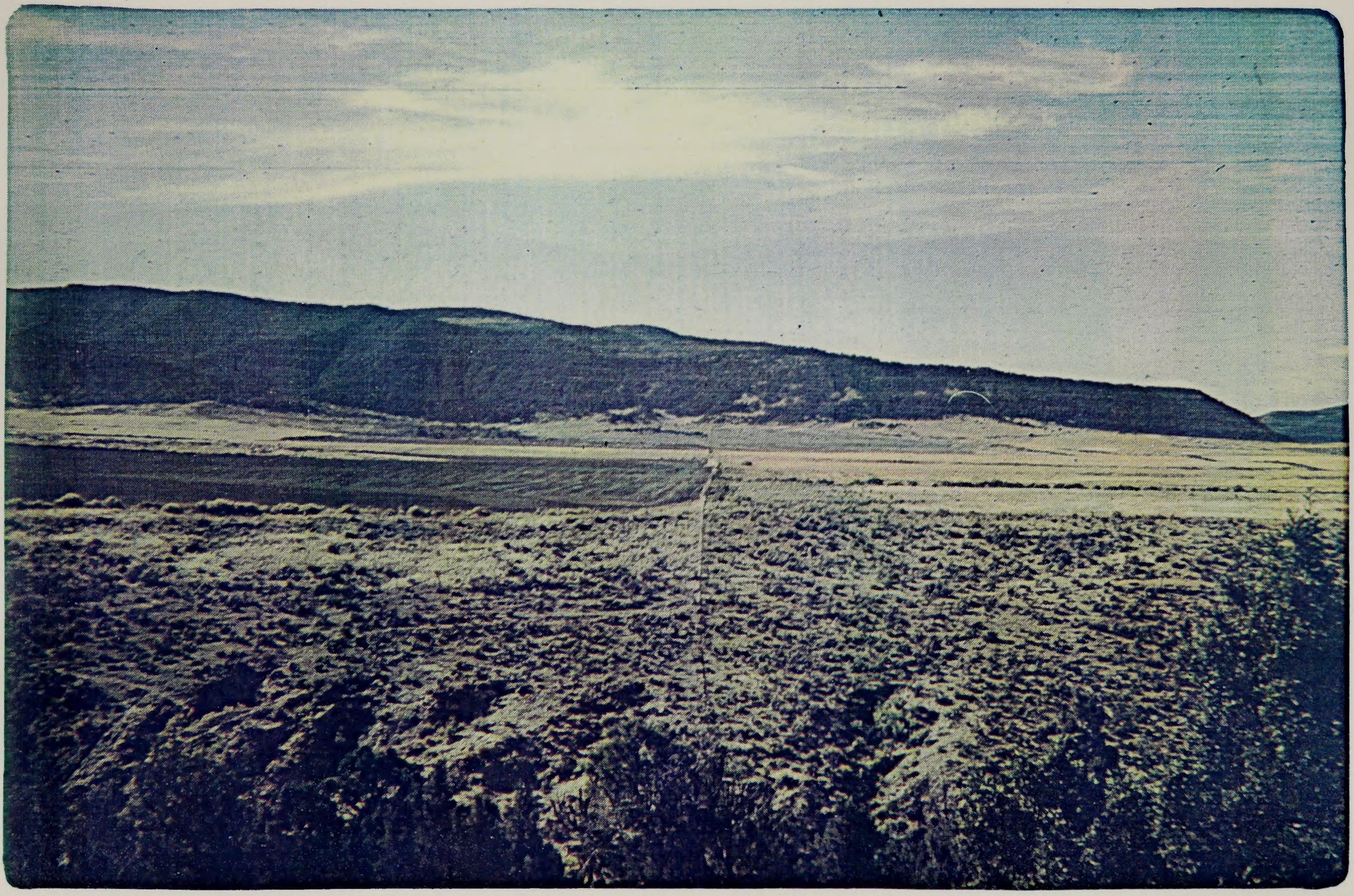


Figure C-6 - View from the Meeker Substation looking west along the Baseline fenceline. The projected ROW and transmission line will follow this fenceline and then turn southerly to the top of Kendall Peak. Single steel structures holding both circuits will minimize disturbance to farmland.

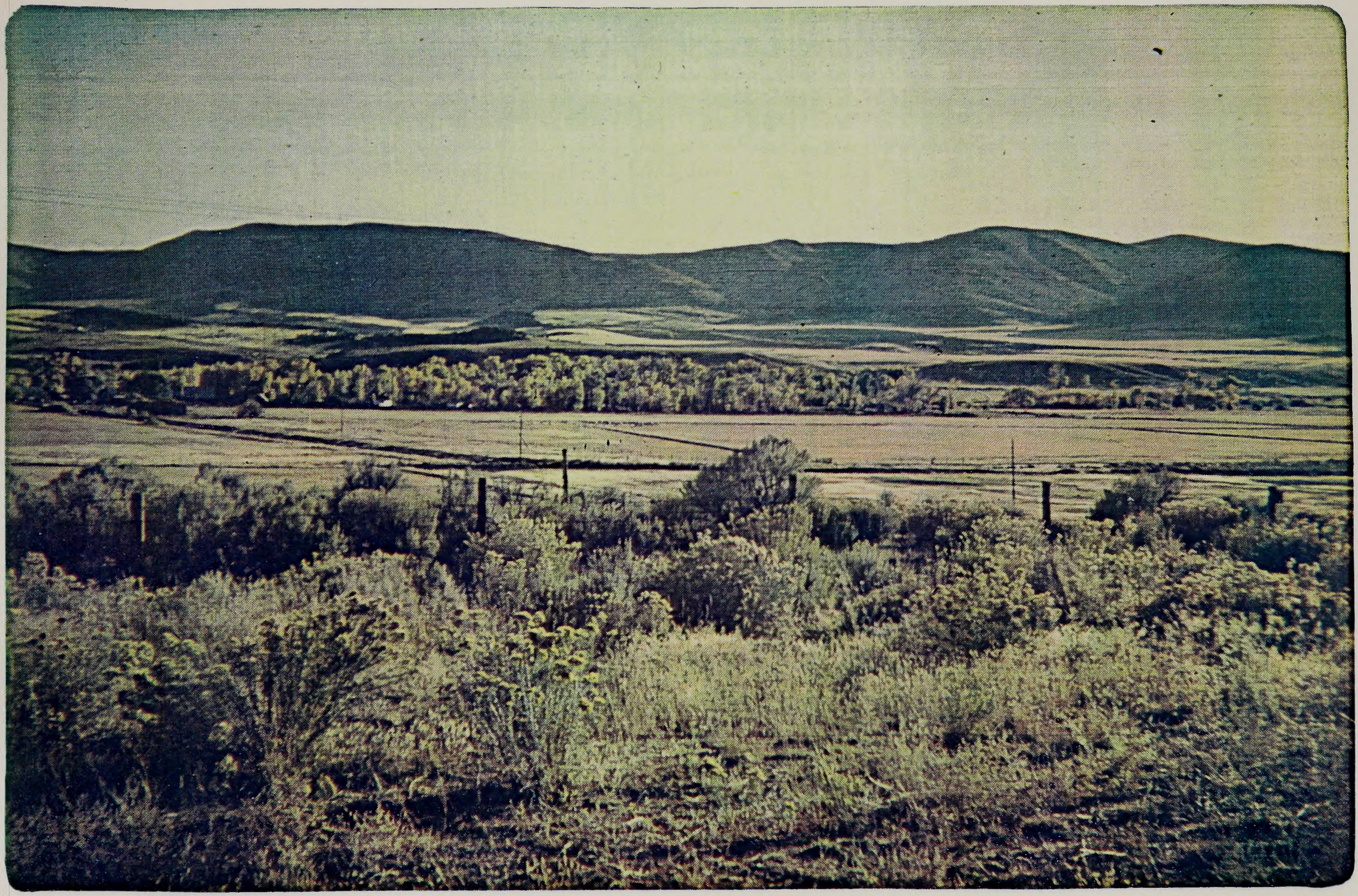


Figure C-7 - View from Highway 64 along the northern edge of the White River Valley looking south towards the rim of the Piceance Basin Plateau. The ROW will ascend to Kendall Peak at the right skyline.

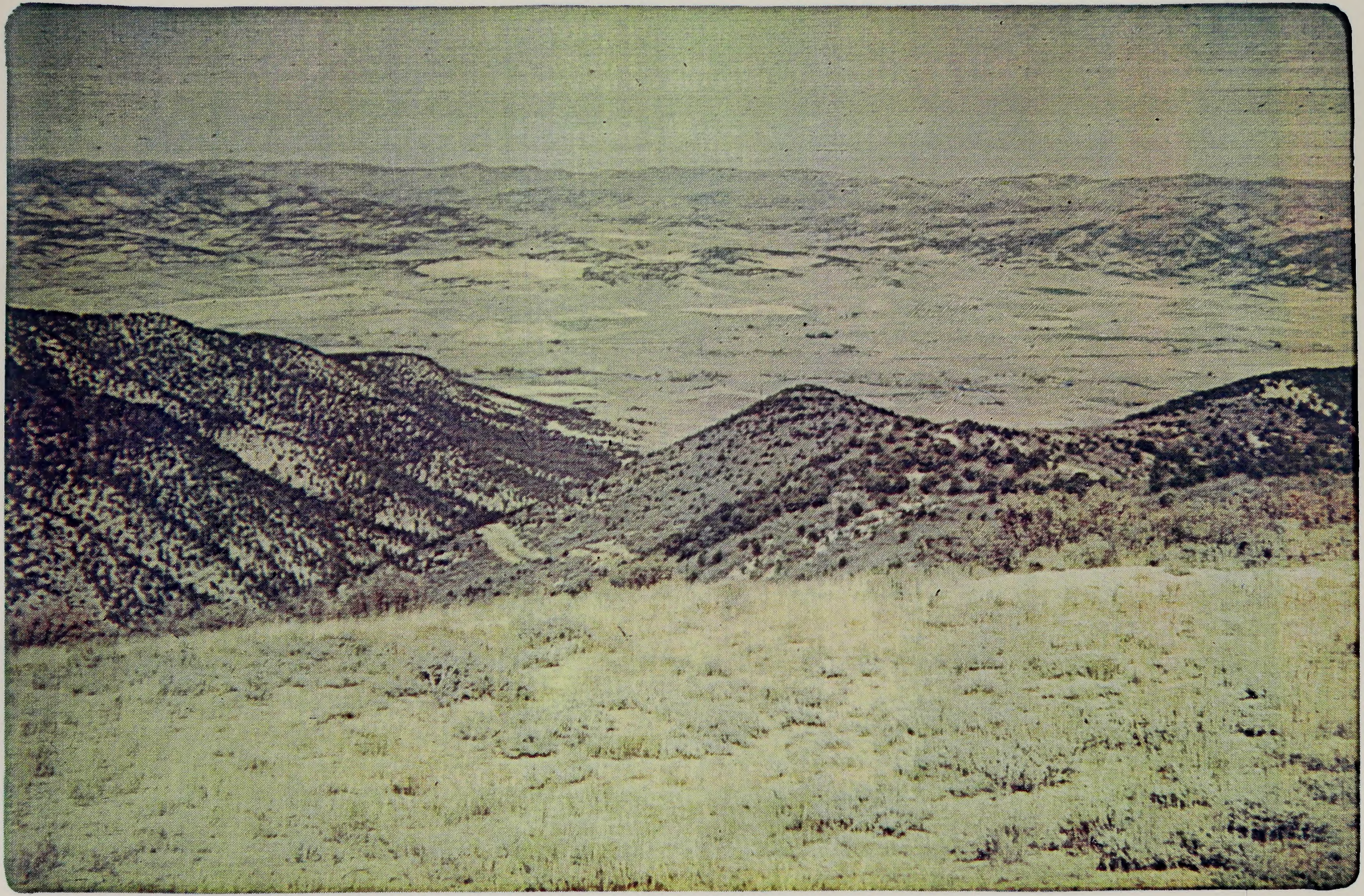


Figure C-8 - View to the north from the top of Kendall Peak looking into the valley of the White River. The projected ROW will be located along the right edge of this picture.

Figure C-9 - The microwave station of the Western Slope Gas Company on Kendall Peak.

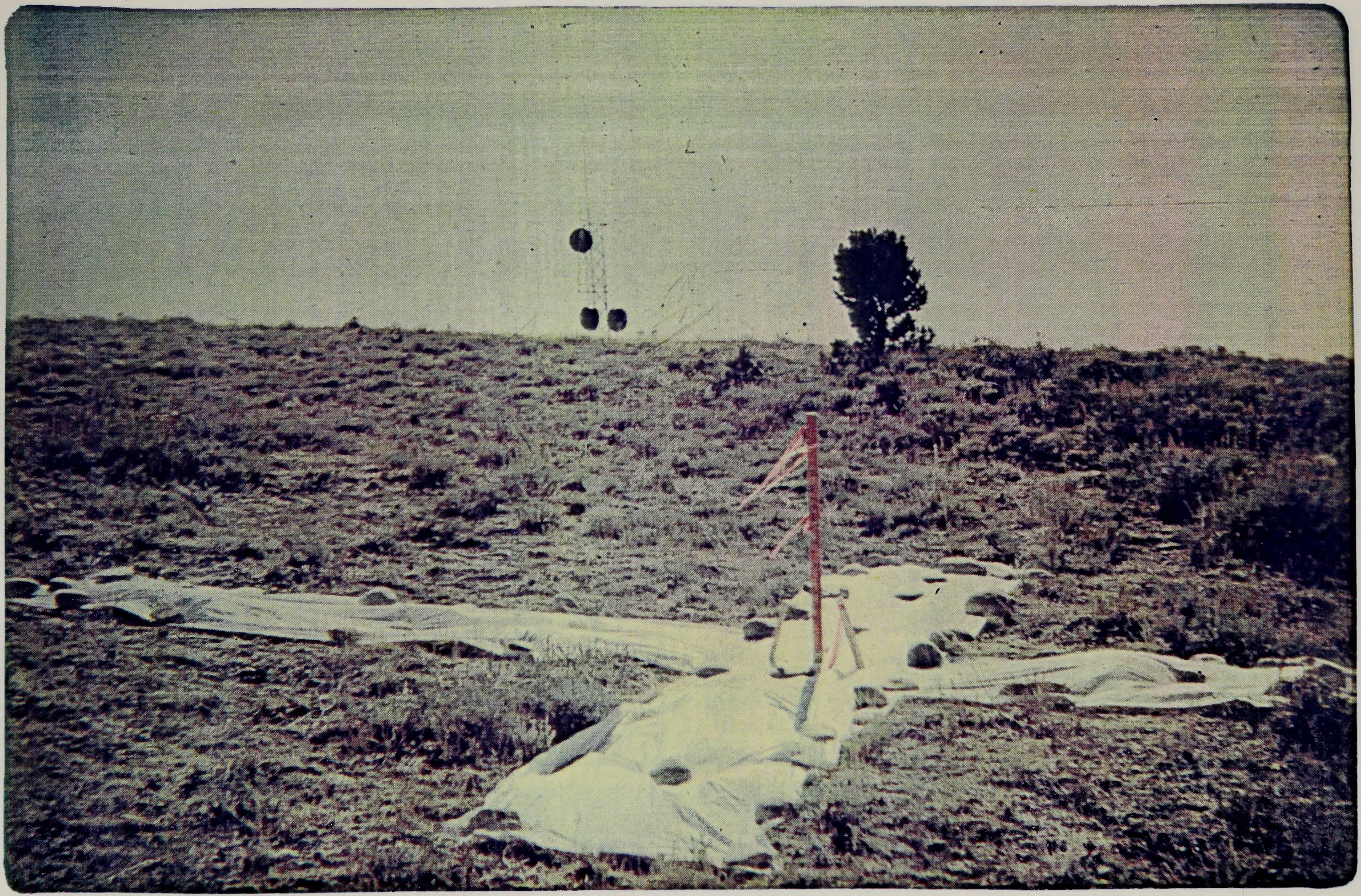


Figure C-10 - Survey stake and aereal survey flag show the distance between the centerline of the ROW and the microwave tower. The original ROW was moved so as to prevent communications interference.

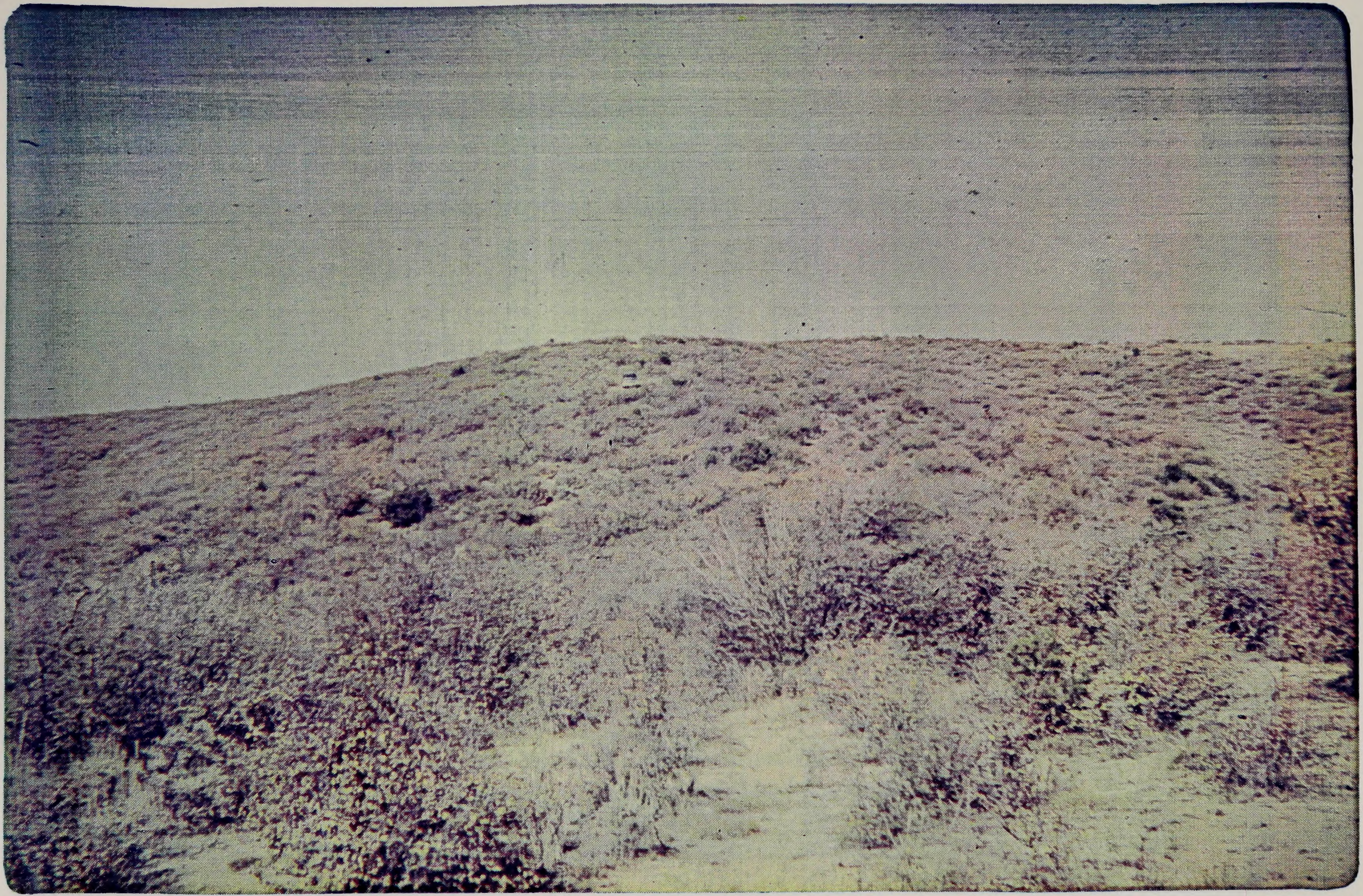


Figure C-11 - View of the rounded southwestern ridge of Kendall Peak from the south along the route of the projected ROW.

Figure C-12 - View to the southwest along the projected ROW from the southwestern Ridge of Kendall Peak. Segar Gulch is hidden behind brush. Segar Mountain lies in the middleground with the Dry Fork of Piceance Creek beyond.

Figure C-13 - View to the northwest looking downstream along the Dry Fork of Piceance Creek. The projected ROW enters the view from the right and will descend the steep slope through occassional small stands of Douglas fir. The ROW cross to the left and will ascend moderately steep slopes to reach the plateau in the vicinity of of the Piceance Creek Gas Field.

Figure C-14 - View to the southwest looking along the centerline of the projected ROW where it will ascend from the Dry Fork of Piceance Creek.

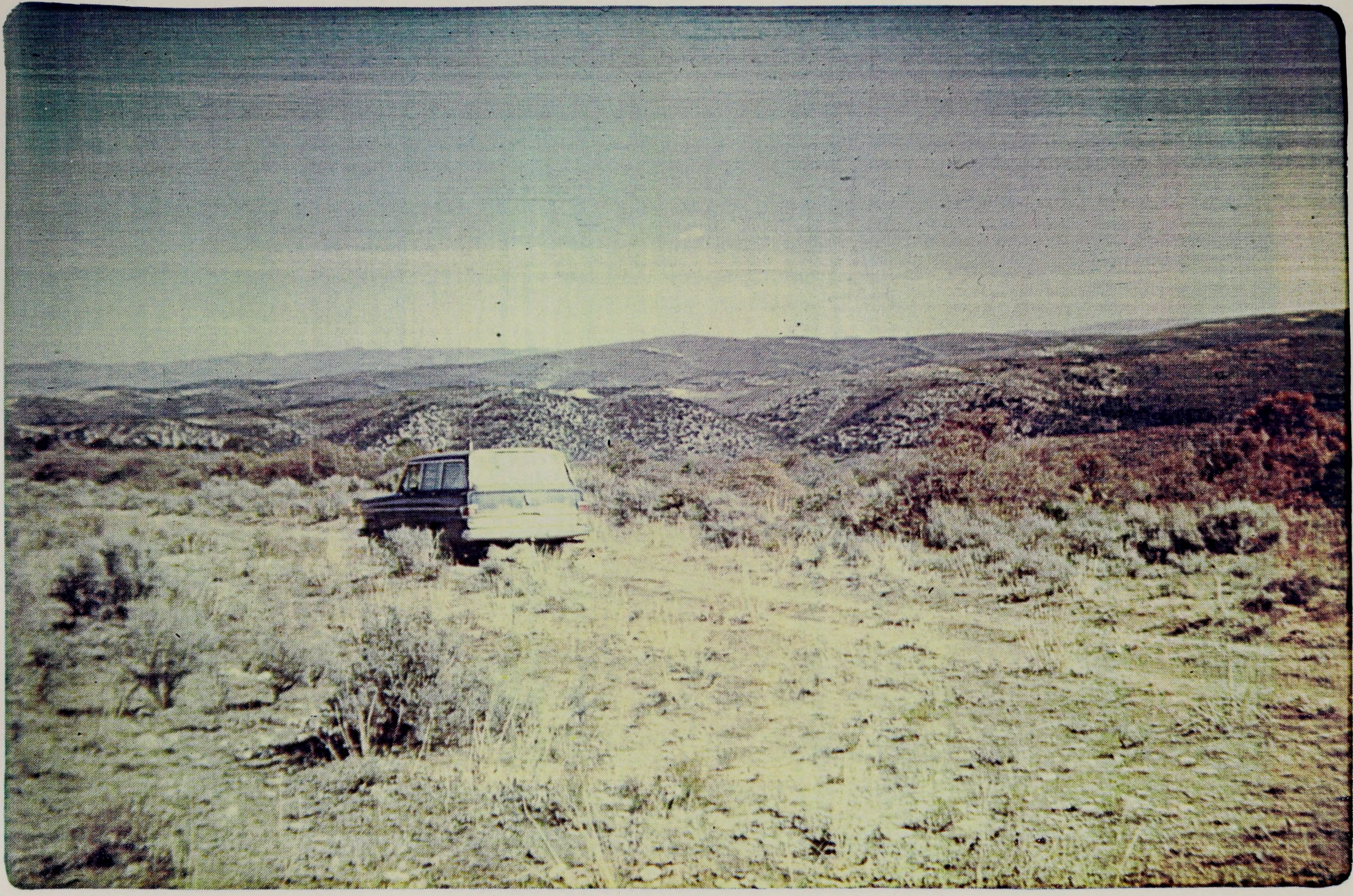


Figure C-15 - View looking northeast along the centerline of the projected ROW over the ridge near the Myers Triangulation Station at the northern edge of the Piceance Creek Gas Field. The top of Segar Mountain is seen level with the roof of the vehicle. Segar Gulch and Kendall Peak lie beyond.

Figure C-16 - View to the southwest along the ridge near Myers Triangulation Station and looking along the centerline of the projected ROW towards its crossing of Collins Gulch.

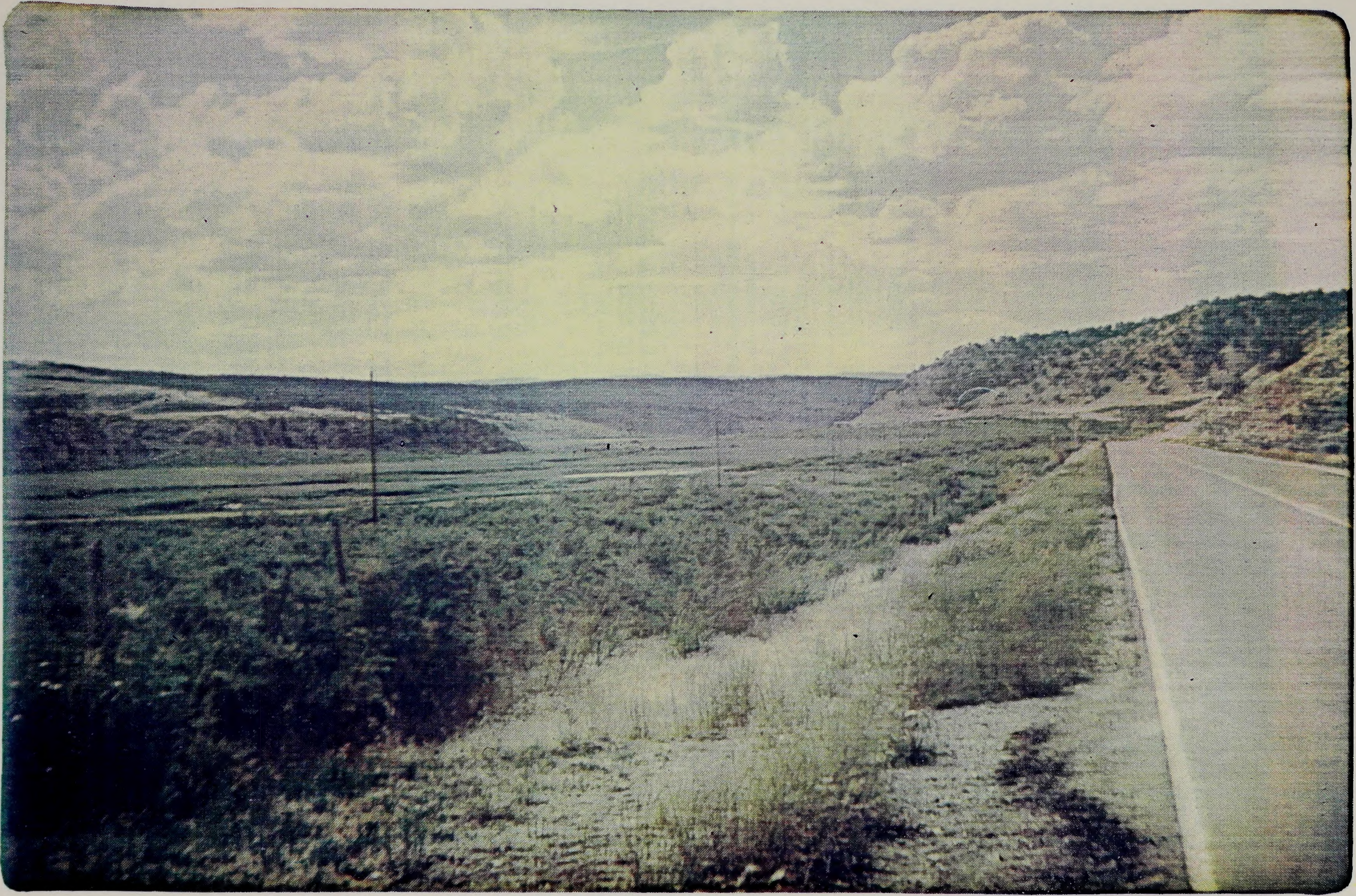


Figure C-17 - View to west, looking downstream along Piceance Creek. The view shows typical valley profile near the projected crossing of the ROW. Tract C-b lies on top of the plateau to the left and out of the view.

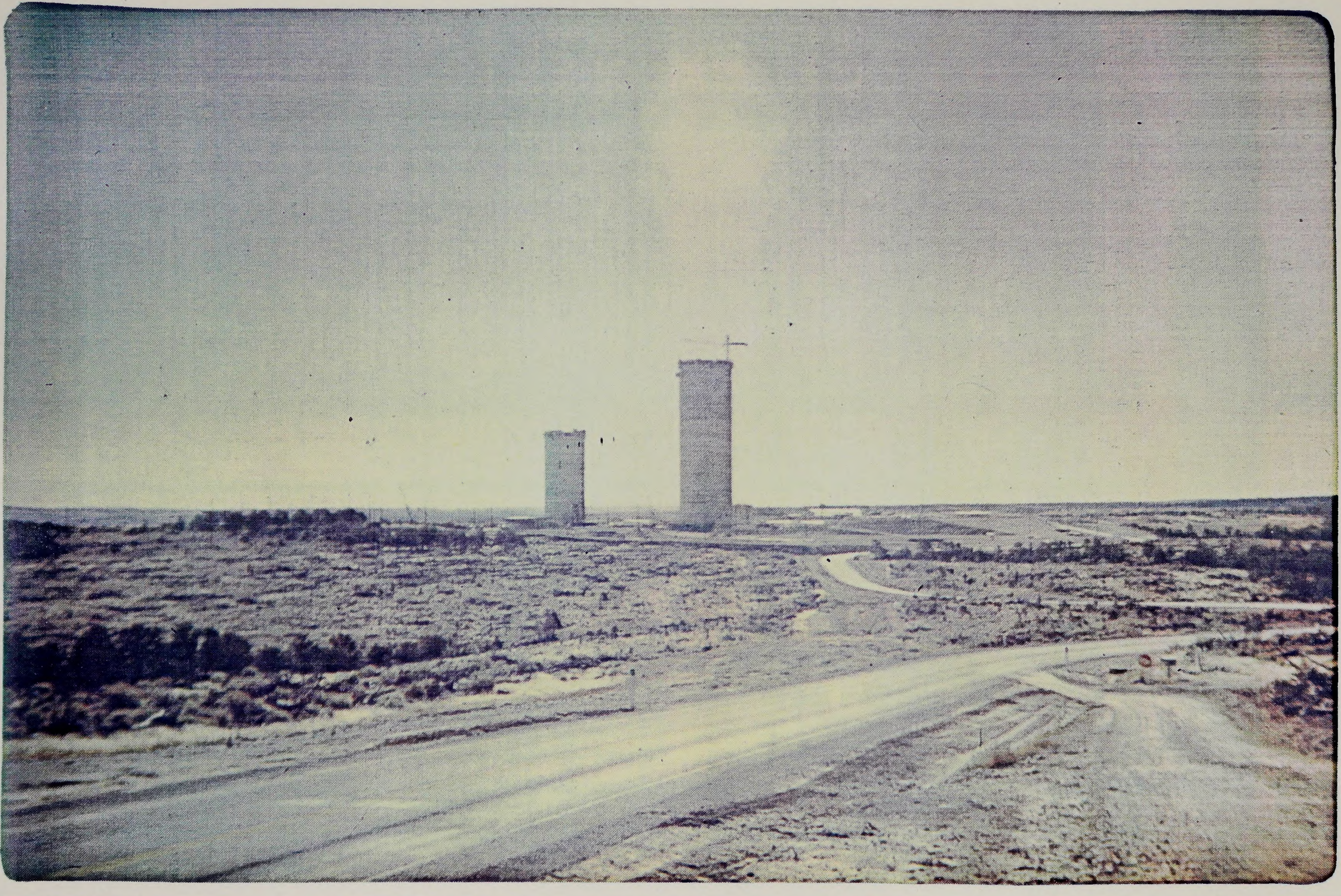


Figure C-18 - View looking south towards the surface support facilities on Tract C-b and the two massive concrete headframes for the mineshafts. The projected transmission line will serve a switchyard which will be located at about the left edge of the picture.

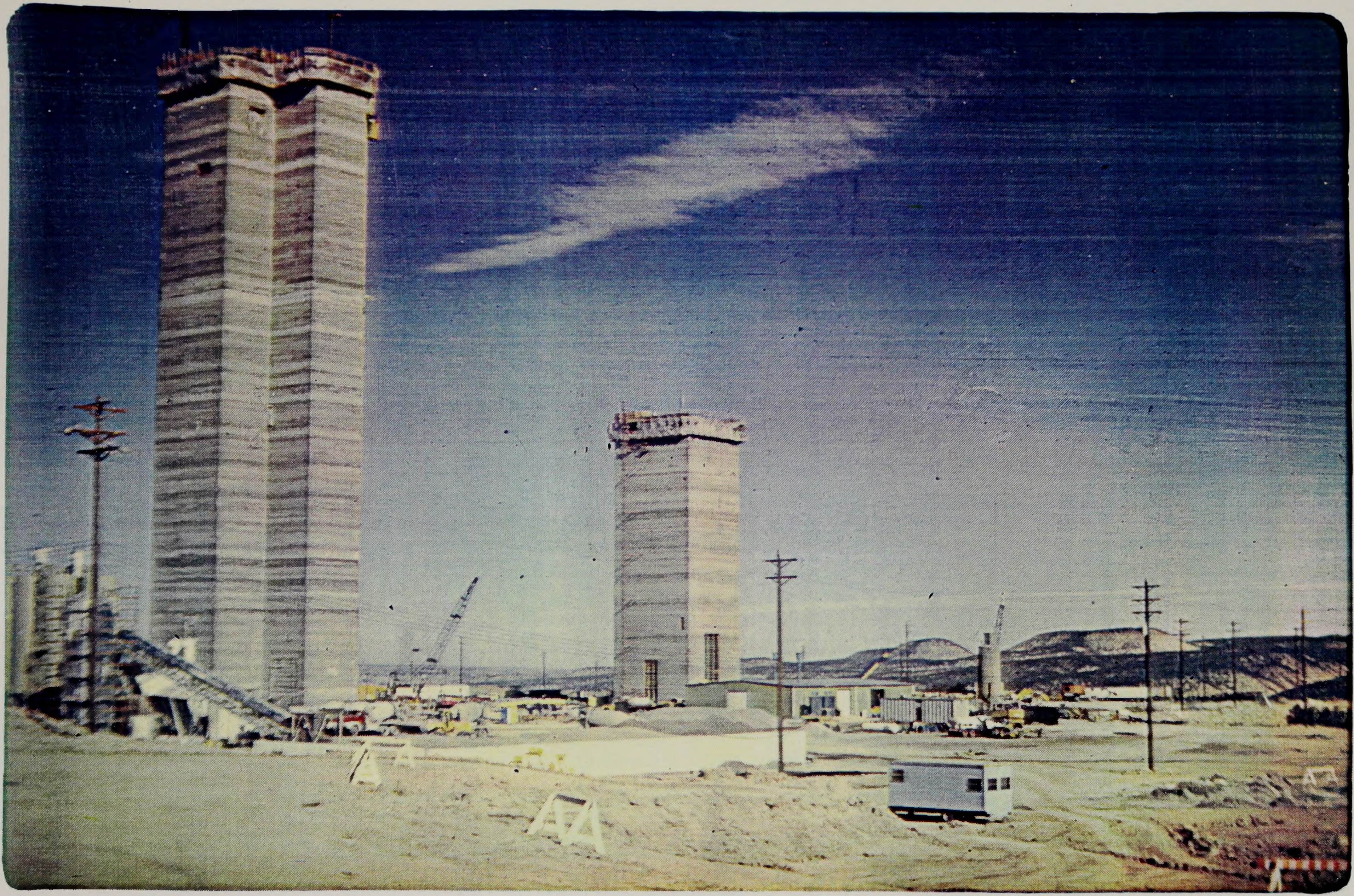


Figure C-19 - The mine service area of the surface support facilities on Tract C-b.