MONTANA DEPARTMENT OF NATURAL RESOURCES AND CONSERVATION

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DAVID G. DRUM

449-3712
32 SOUTH EWING
NATURAL RESOURCES BUILDING
HELENA, MONTANA 59601

October 7, 1976

Enclosed is a report entitled,"Final Environmental Impact Statement on Anaconda-Hamilton 161 kV Transmission Line"for your information.

The Department would like to point out a possible source of confusion on page 9 of this publication, on which Justification No. II appears to stand alone with no discussion. Please note that the discussion following Justification No. III applies also to No. II; a compliation error, however, did not make this fact obvious.

The Board of Natural Resources and Conservation will publicize a time and location for hearings on this project at a later date.

Sincerely,

Wayne Wetzel

WAYNE WETZEL
ENVIRONMENTAL COORDINATOR

WW/ad

Enclosure

FINAL ENVIRONMENTAL IMPACT STATEMENT ON • • • • •

ANACONDA—HAMILTON 161 KV TRANSMISSION LINE

ENERGY PLANNING DIVISION, MONTANA
DEPARTMENT OF NATURAL RESOURCES
AND CONSERVATION • • • • • • • •
HELENA, MONTANA 59601

SEPTEMBER, 1976

MONTANA DEPARTMENT OF NATURAL RESOURCES AND CONSERVATION

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GARY WICKS, DIRECTOR

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449-3712
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NATURAL RESOURCES BUILDING
HELENA, MONTANA 59601

October 15, 1976

Please note the following corrections to the report entitled, "Final Environmental Impact Statement on the Anaconda-Hamilton 161 kV Transmission Line".

Sincerely,

Wayne A. Wetzel

Wayne Wetzel
Environmental Coordinator

Corrections to Final Environmental Impact Statement
on the Anaconda-Hamilton 161 kV Transmission Line

1. Page 10 - The third and fourth sentences of Section A should read:
"However, the performance of either alternative under a single contingency condition (one line out) is determined by voltage levels in the Missoula area. As the Missoula area load continues to grow, voltage levels in the Missoula area especially under single contingency conditions will become low enough to require a major reinforcement.

2. Page 10 - Section B should be changed to read as follows:
... Two possible locations are fairly obvious. The BPA...

3. Page 11 - To Alternate 2 add the following:
Year 5 Establish a 230 kV tap near Rattlesnake

4. Page 33 - The fifth sentence of the second paragraph should read:
This road is open on the average only 138 days per year (see Table 8).

5. Page 40 - The last sentence of the third complete paragraph should read:
For example, the present value of $10,000 worth of power in the year 2001 is worth $1,460 today assuming an 8 percent discount rate.

6. Page 41 - In Table 10 heading change "5/2" to "5.5".

7. Page 43 - In the first and second sentences on the page change 26,000 KW to 26,600 KW. In the third sentence change (26,600 MW) to (26,600 KW).

8. Page 43 - The last sentence of the paragraph continued from page 40 should be deleted. That is, delete "The growth of peak... shown in Table 9."

9. Page 43 - The second sentence of the first complete paragraph should read:
... the total expected outage time per customer per year would be...

10. Page 46 - The third sentence of the second paragraph should be changed to read:
...the following results:
(186,120 KWH) (the adjusted economic cost in $/KWH) = $2,244,000...

11. Page 46 - Change the last sentence of the fourth complete paragraph to read:
The benefits lost would be the 20-year loss in economic productivity: $61,420, assuming three hours of outage per year of the existing line; and $122,829, assuming six hours of outage.

12. Page 55 - In the second paragraph of Section (J) Wood Products, the sixth sentence should read:

...extremely cold weather, heat transfer ducts could freeze...

13. Page 56 - Change the first sentence of the second complete paragraph to read:

Three phase electric back-up generation of approximately 180 KW capacity would be required to keep the boiler system operative during power outage.

14. Page 66a- The first sentence of the Section e. conclusion should read:

...may exceed the general economic level benefits.

15. Page 129 - The third sentence of the third complete paragraph should read:

From 1972 to 1975, Victor and Corvallis with BPA had decreases...

16. Page 135 - The third sentence of the second complete paragraph should read:

...through the steep, narrow Skalkaho or Railroad Creek Creek Canyons in particular.

17. Page 136 - Replace "With respect to page 52, paragraph 3, the applicant comments:

Reference is made to ...voltage problems."

with the following:

With respect to page 52, paragraph 2, the applicant comments: The statement that "PSC Rule 805 does not affect considerations of electrical need for the proposed Anaconda-Hamilton transmission line" is incorrect. A good utility must provide reliable service and plan for events which are excluded by Rule 805. If the State is going to accept a lesser degree of reliability under the Siting Act, then it must also accept the responsibilities that may result from a lesser reliability.

18. Page 136 - In the last sentence on the page change (Opity 1976) to (Opitz 1976)

19. Page 137 - After the third paragraph (Regarding section 3.5.3 of the Draft EIS...) insert the following:

The Department is cognizant of the fact that the applicant did send to the Department load flow studies including the Philipsburg area and that the ten year plan includes projections of load growth in the Philipsburg area, but this fact does not constitute an application to serve a need in the Philipsburg area.

RECEIVED
OCT 8 1976
ENVIRONMENTAL QUALITY

FINAL ENVIRONMENTAL IMPACT STATEMENT ON

THE PROPOSED MONTANA POWER COMPANY ANACONDA-HAMILTON 161 kV TRANSMISSION LINE

ENERGY PLANNING DIVISION
ALBERT C. TSAO, ADMINISTRATOR
DEPARTMENT OF NATURAL RESOURCES AND CONSERVATION
GARY J. WICKS, DIRECTOR

SEPTEMBER 1976

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PART ONE

RECOMMENDATION

The Department of Natural Resources and Conservation recommends to the Board of Natural Resources and Conservation that no electrical transmission line be constructed between Anaconda and Hamilton across the Sapphire Mountains because the Department is not convinced that the proposed facility represents the minimum adverse environmental impact, considereing the state of available technology and the nature and economics of the available alternatives.

Justification Summary

The Department makes its recommendation on the basis that one or more alternatives exist which would:

I. Result in less environmental impact than any corridor across the Sapphire Mountains

II. Provide a long-term solution to the Missoula and Bitterroot valley area's transmission system requirements

III. Cost less in the long-term than any long-term solution involving the proposed Anaconda-Hamilton 161 kV line

IV. Satisfy the Board's policy of utilizing existing corridors if the need for the establishment of any new corridors is not clearly justified

V. Satisfy the transmission system reliability criterion proferred by the applicant as justification for the proposed Anaconda-Hamilton line and the broader definition of need which in the Department's view is consistent with the intent of the Utility Siting Act.

I. JUSTIFICATION NO. I

The Department makes its recommendation on the basis that one or more alternatives exist which would result in less environmental impact than any corridor across the Sapphire Mountains.

A. Summary

Several different alternative corridors have been identified by the MPC and the EPD between Anaconda and Hamilton. These differ in specific impact potential, as discussed in the draft EIS. However, all are qualitatively similar in potential for certain types of adverse environmental impacts because all cross the Sapphire Mountain Range, all attain altitudes greater than 7,000 feet, and all include significant areas of montane coniferous forests. These adverse environmental impacts, taken together, would represent considerable degradation of natural resources regardless of which route is chosen across the Sapphire Mountains. The discussion following justifications No. II and III shows that alternatives exist through the Bitterroot Valley between Bonner and Hamilton which are feasible not only from engineering and economic standpoints, but would provide more long-term transmission system benefits than would a line between Anaconda and Hamilton. The purpose of this section is to summarize evidence obtained by the Department, originally presented in the draft EIS, that alternatives exist between Bonner and Hamilton which would result in significantly less adverse environmental impact than any of the Anaconda-Hamilton corridors. This evidence is presented below; each of the six major environmental concerns addressed in the draft EIS will be treated separately.

B. Impact to Aquatic Ecosystems

All corridors crossing the Sapphires include areas which have been identified as having large-to-severe risk for adverse impact to aquatic ecosystems (see Aquatic Ecosystems Composite Map in the draft EIS). The EPD eastern alternative from Bonner to Hamilton (NOTE: this alternative has been revised in Section IV, Part Two of this document, dealing with public comment) includes less area in these categories than any of the Anaconda-Hamilton corridors. Specifically, the overall impact risk to aquatic ecosystems is greater for corridors crossing the Sapphire Mountains than for Bitterroot Valley alternatives for the following reasons:

(1) Mountain streams in the Sapphires generally support an important sport fishery or provide important spawning and rearing haitat for important resident or downstream sport fisheries. In the Bitterroot Valley, many streams are intermittent or support a limited sport fishery due to dewatering or other habitat deterioration.

(2) The risk for sedimentation, which would adversely affect the sport fishery in affected streams, is generally greater in the Sapphire Mountains than the Bitterroot Valley. This is due to the erosive

character of mountain soils, the steep slopes encountered throughout the Sapphire Mountains, and the relatively high precipitation encountered at higher elevations in the mountains.

All Anaconda-Hamilton alternatives have slopes greater than 10 per cent over most of their length, and include large areas having slopes greater than 30 per cent. These steep slopes not only increase the probability of erosion, but tend to increase the amount of road building necessary for access (unless helicopter construction is used). In the Bitterroot Valley, slopes are much shallower, and extensive road construction may not be required. Sediment risk within the EPD eastern alternative from Bonner to Hamilton is much less than within any of the Anaconda-Hamilton corridors, since most of this corridor (with the exception of parts of the Bonner-Miller Creek substation segment) includes land having slopes of less than 30 per cent, and more importantly, existing access roads may be used essentially along the entire length of the corridor.

All Anaconda-Hamilton alternatives cross the Sapphire Divide at elevations greater than 7,000 feet; the highest elevation found within the Bonner-Hamilton eastern alternative is about 6,000 feet, and most of the corridor lies below 5,000 feet. Elevation per se has little to do with sediment risk, but elevation is closely correlated with average annual precipitation, snow depth, and length of snow cover, all of which influence the risk for erosion. Above 7,000 feet elevation in the Sapphire Mountains, average annual precipitation generally exceeds 40 inches per year, and snow cover exists during most of the year. Access to a line through these areas in winter would be extremely difficult, and vehicular travel on access roads or cross-country while the soil is wet may result in severe gullying or erosion. These problems would be much less severe within the EPD eastern alternative from Bonner-Hamilton.

C. Impact on Land Productivity

All Anaconda-Hamilton alternatives contain considerable commercial forest land, including areas having a relatively high productivity (greater than 80 cubic feet per acre per year), which would be essentially removed from commercial production within a cleared right-of-way. The necessity of forest clearing within the right-of-way and for access roads intensifies adverse impact to other concerns as well, particularly to the visual, terrestrial fauna, and aquatic ecosystems concerns.

The eastern alternative from Bonner to Hamilton contains much less forested land than any corridor across the Sapphires. Much of this forested land has been logged, and nearly all has a productivity of less than 80 cubic feet per acre per year. Forested land within this corridor consists largely of Ponderosa pine savannah, narrow strips of timber extending into the valley, and logged areas, rather than closed-canopy montane forest characteristic of the Sapphires. The need for timber clearing can be greatly reduced by choosing a centerline within this corridor which utilizes existing forest openings and clearings. Significant impacts to agricultural productivity are not expected for Anaconda-Hamilton corridors or the Bonner-Hamilton eastern alternative.

D. Visual Impacts

All Anaconda-Hamilton alternatives are located predominantly within areas of large-to-severe impact risk. This is due primarily to the following:

(1) All cross the Sapphire Mountains, a scenic and largely undeveloped mountain range where expectation to view a transmission line is very low

(2) All include extensive closed-canopy coniferous forests, where a cleared right-of-way would result in a highly visible configuration

In contrast, the eastern alternative from Bonner to Hamilton is located predominantly within areas having slight-to-moderate impact risk. In addition, most of this corridor contains an existing 161 kV line, and the addition of a second line would not alter the visual character of the area. As mentioned earlier, few areas of closed canopy forest are located within this alternative.

E. Impact on Land Use Patterns

All Anaconda-Hamilton alternatives include National Forest Inventoried Roadless Areas, non-selected roadless areas, or areas proposed for wilderness study under Senate Bill 393. A transmission line is incompatible with these land uses, and would conflict with the management policy of the USFS and with Senate Bill 393. Robert H. Torheim, USFS Regional Forester, states in a letter to the Department (published in its entirety in Part Two of this document):

> Legal and policy constraints preclude consideration of powerline construction in roadless areas prior to completing land use plans or project environmental impact statements .... We cannot make a decision regarding the proposed transmission line until land use plans for these roadless areas are complete.

Centerline location which avoids designated roadless areas is not possible within any of the applicant's Anaconda-Hamilton corridors.

The EPD eastern alternative between Bonner and Hamilton includes no such specially-managed areas. This alternative includes a portion of the Pattee Canyon Recreation Area, but this could easily be avoided within the two-mile-wide corridor. From Miller Creek to Hamilton Heights, this alternative corridor contains land which is presently used as a transmission right-of-way.

Significant impacts to agricultural land use or settlement areas are not expected for either Anaconda-Hamilton corridors or the Bonner-Hamilton eastern alternative.

F. Impact on Terrestrial Fauna

All Anaconda-Hamilton corridors include areas of high-to-severe wildlife impact potential. These areas include roadless, forested land high in the Sapphire Mountains, where the potential for habitat alteration and disturbance to wildlife due to timber clearing and road construction is relatively great. Increased human use of these areas due to access roads and/or a cleared right-of-way may result in displacement of animals and increased hunting pressure, possibly reducing hunting opportunities over areas much larger than the right-of-way. Also of high-to-severe impact potential are the winter ranges of elk and mule deer, generally located at the lower edge of timber in the Sapphire foothills.

Wildlife impact potential is much less throughout the Bitterroot Valley than in the Sapphire Mountains. This great difference in impact potential is due primarily to the fact that human activity and past habitat alteration has essentially eliminated security areas for larger non-domestic mammals from the valley, while many such areas remain in the Sapphires. The eastern Bonner-Hamilton alternative includes some areas of large-to-severe impact potential, primarily winter ranges, but potential impacts can be mitigated or prevented by closely paralleling the existing 161 kV line using existing access and logging roads, and limiting construction to the summer and fall months.

G. Socio/Economic Impacts

Potential impacts of the proposed transmission lines on the economy and social structure are relatively small in magnitude, often intangible, and largely independent of corridor locations. However, all Bonner-Hamilton and Anaconda-Hamilton alternatives are expected to arouse strong public opposition, which may be considered an adverse social impact.

During the summer of 1976, the USFS conducted a study of the social impact which would result from a transmission line from Anaconda to Hamilton or Bonner to Hamilton. Analysis of data collected was not completed in time for inclusion into this document, but preliminary results indicate that if conflicts with the Pattee Canyon Picnic and Recreation Areas and residences in the Pattee Canyon area can be resolved by centerline placement, the social impacts of an Anaconda-Hamilton route and a Bonner-Hamilton route would be similar. It is believed that the revision of the Bonner-Miller Creek segment (see Part Two of this document) adequately resolves the conflicts noted herein.

H. Conclusion

Potential adverse environmental impacts common to all Anaconda-Hamilton alternatives are compared with those of the revised Bonner-Hamilton alternative in Table 1. The purpose of this comparison is to show that an alternative exists between Bonner and Hamilton which would result in significantly less adverse environmental impact than any of the alternatives crossing the Sapphires. In summary, it has been shown that the proposed facility does not represent the minimum adverse environmental impact, considering the nature and economics of the various alternatives.

TABLE 1

COMPARISON OF ANACONDA-HAMILTON ALTERNATIVE CORRIDORS
WITH THE REVISED BONNER-HAMILTON EASTERN ALTERNATIVE

Concern	All Anaconda-Hamilton Alternatives[1]	Bonner-Hamilton Eastern Alternative[2]
A. Impact to Aquatic Ecosystems	Include considerable area of high to severe impact risk[1]	Includes less area of high to severe impact risk[1] than any Anaconda-Hamilton alternative
	Cross the Sapphire Divide at elevations of 7000' or greater	Located entirely between 3000' and 6004' elevation; does not cross Sapphire Divide
	Include areas having average annual precipitation of 40" or greater	Located entirely within areas having less than 30" average annual precipitation
	Include considerable area having slopes greater than 30%	Includes less area of slopes greater than 30% than any Anaconda-Hamilton alternative
	Would require extensive access road construction, provided helicopter methods are not used	Would require little or no access road construction, even if helicopters not used
	Include headwater areas of streams having productive fisheries habitat	Includes valley portions of streams where fisheries habitat has been degraded by dewatering, etc.
	Potential impacts extremely difficult or costly to mitigate	Potential impacts easily mitigated or prevented
B. Impact to Land Productivity	High potential for significant impact to forest productivity	Little potential for significant impact to forest productivity
	Include considerable commercial forest land	Includes little commercial forest land
	Include extensive closed-canopy forests which would require much clearing	Includes primarily rangeland, savannah, or logged areas which would require very little clearing
	Include considerable commercial forest land of productivity greater than 80 cu. ft./acre/yr.[1]	Includes much less forest land of productivity greater than 80 cu. ft./acre/yr.[1] than any Anaconda-Hamilton alternative.
	Potential impacts to forest productivity difficult, costly, or impossible to mitigate	Potential impacts to forest productivity easily mitigated or prevented

TABLE 1
(continued)

Concern	All Anaconda-Hamilton Alternatives[1]	Bonner-Hamilton Eastern Alternative[2]
	Little potential for significant impact to agricultural productivity	Little potential for significant impact to agricultural productivity
C. Visual Impact	Predominantly located in areas of large to severe impact risk[1]	Predominantly located in areas of slight to moderate impact risk[1]
	Include areas of very low expectation to view a transmission line	Includes an existing 161 kV transmission line over most of length
	Include designated roadless areas where a cleared right-of-way would be highly visible	Includes no designated roadless areas
	Potential impacts difficult or impossible to avoid or mitigate	Potential impacts relatively easily mitigated by judicious centerline placement
D. Impact to Land-Use Patterns	Include National Forest inventoried roadless areas, non-selected roadless areas, or areas proposed for wilderness study under S.B. 393	Inlcudes no designated roadless areas
	Include little area where utility corridors are a major land use	Includes an existing utility corridor over most of length
	Little potential for interference with agricultural land use or settlement areas	Little potential for interference with agricultural land use or settlement areas
	Potential impacts difficult or impossible to avoid or mitigate	Potential impacts easily avoided or mitigated by judicious centerline placement
E. Impacts to Terrestrial Fauna	Include considerable areas of high to severe wildlife impact potential[1], which cannot be avoided by centerline placement	Includes few areas of high to severe wildlife impact potential[1], all of which can be avoided by centerline placement
	Would result in much habitat alteration, as extensive right-of-way clearing and road construction would be required	Would result in little habitat alteration, as existing access roads and transmission line corridors could be used

TABLE 1

(continued)

Concern	All Anaconda-Hamilton Alternatives 1/	Bonner-Hamilton Eastern Alternative 2/
	Includes winter ranges of economically important game species	Includes winter ranges of econmically important game species
	Include roadless land important as summer-fall security areas for economically important game species	Includes essentially no summer-fall security areas
	Potential impacts difficult or costly to mitigate	Potential impacts easily mitigated or avoided
F. Socio/Economic Impacts	Would arouse much public opposition	Would arouse much public opposition

1/ As described in the Draft EIS

2/ As revised on page 133 of this document

II. JUSTIFICATION NO. II

The Department makes its recommendation on the basis that one or more alternatives exist which would provide a long-term solution to the Missoula and Bitterroot valley areas' transmission system requirements.

III. JUSTIFICATION NO. III

The Department makes its recommendation on the basis that one or more alternatives exist which would cost less in the long-term than any long-term solution involving the proposed Anaconda-Hamilton 161 kV line.

A. Summary

Reliability of the electric power transmission serving the Bitterroot Valley can be improved by building either a 161 kV line from Anaconda to Hamilton or a second 161 kV line from the Missoula area to Hamilton. Each of these two basic alternatives would provide two 161 kV feeds into the Bitterroot Valley. However, the performance of either alternative under a single contingency condition (one line out) is determined by voltage levels under certain conditions in the Missoula area. As the Missoula area load continues to grow, voltage levels under certain conditions in the Missoula area (especially under single contingency conditions) will become low enough to require a major reinforcement. The logical long-term solution is a 230 kV tap off the BPA line in the Missoula area which will provide substantial extra capacity and greatly improved reliability to Missoula.

As stated above, the performance of either 161 kV line into Hamilton under single contingency conditions depends upon voltage conditions in the Missoula area, which, in turn, are partially determined by an eventual 230 kV tap in the Missoula area. Because of this interdependence between the reinforcement of the Missoula area and the improvement of reliability in the Bitterroot Valley, neither the MPC nor the DNRC should examine the reliability problem in the Bitterroot Valley by itself without also considering the solution of the problem in the Missoula area. Whether action is taken to reinforce the Missoula area now or in the near future, the method of reinforcement is directly relevant to the choice of the alternative adopted for the Bitterroot Valley.

The MPC has not yet determined the location or design of a 230 kV tap. Determination of the best location for a 230 kV tap and its optimum design require extensive engineering studies. The Department, working within its staffing and financial constraints, has developed one alternative involving a 230 kV tap at Missoula No. 4 substation with the BPA 230 kV line looped through. This alternative involves the construction of a 40-mile 161 kV line form Missoula No. 4 substation to Hamilton Heights substation. Engineering studies of this alternative carried out by the Department show that satisfactory voltage levels are maintained for all single line contingency cases modeled.

B. Engineering Alternatives

Although the location or design of a 230 kV tap in the Missoula area has not been studied in detail, two possible locations are fairly obvious: the BPA Hot Springs-Anaconda 230 kV line passes within one-half mile of Rattle-

snake substation, and an interconnection between the 161 kV system and the BPA 230 kV line may easily be made at Rattlesnake. A reinforcement of Rattlesnake substation would, of course, increase the capacity available at Rattlesnake, and detailed engineering studies would be required to determine the extent of transmission facilities required to cope with the extra capacity.

The other location for a 230 kV tap is at Missoula No. 4 substation. Such a location would require the construction of one or two 11-mile 230 kV lines connecting Missoula No. 4 substation to the BPA 230 kV line. A two-line connection would improve the reliability of the tap. The advantages of locating the tap at Missoula No. 4 substation are detailed under E.

Considering the two locations of a 230 kV tap at Missoula in conjunction with the two basic possibilities of building a 161 kV line into Hamilton from either Anaconda or Missoula gives rise to a total of four engineering alternatives which can be compared in order to determine whether it is prudent to build a 161 kV line from Anaconda to Hamilton.

Since a 161 kV line between Anaconda and Hamilton may facilitate a future reinforcement of the Philipsburg area, the economic analysis of the alternatives will include the cost effect of such a reinforcement. Nevertheless, in the absence of an application to serve need in the Philipsburg area, the Department cannot consider future reinforcement of the Philipsburg area as justification for the applicant's proposed facility. (See the Department's response in Section IV of Part Two to the MPC's comment letter.)

The timing of each step in the following alternatives is taken from an economic analysis prepared by the MPC at the request of the DNRC and submitted to the Department on September 13, 1976.

Alternative 1 (see Figure 1):

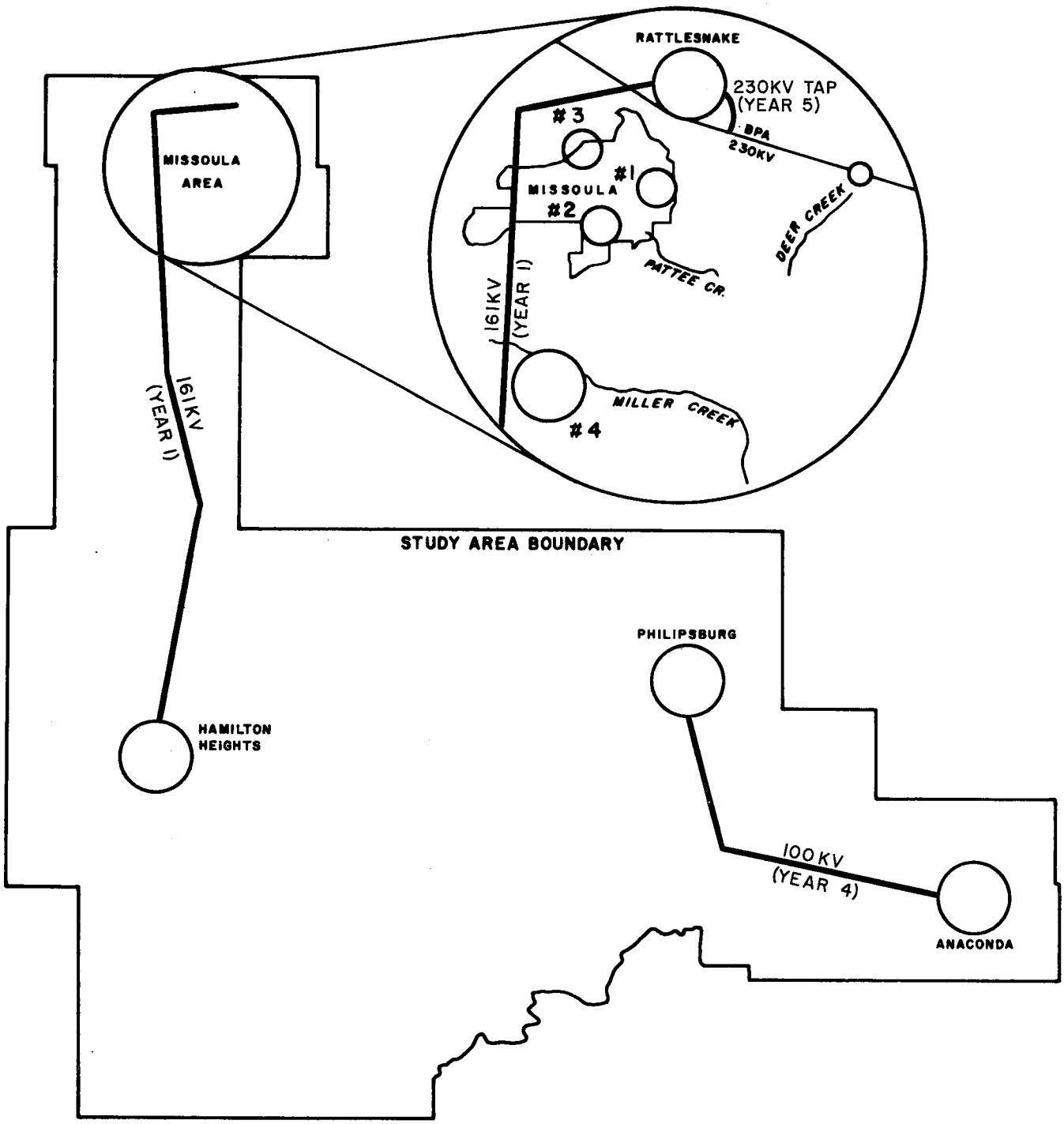
Year 1	Build a 53-mile 161 kV line from Rattlesnake to Hamilton Heights
Year 4	Build a 27-mile 100 kV line from Anaconda City to Philipsburg and establish a 100/50 kV substation
Year 5	Establish a 230 kV tap near Rattlesnake

Alternative 2 (see Figure 2):

Year 1	Build a 65-mile 161 kV line from Anaconda to Hamilton Heights
Year 4	Establish a 161/50 kV substation near Philipsburg on the Anaconda-Hamilton 161 kV line and connect the substation to the Philipsburg 50 kV transmission system

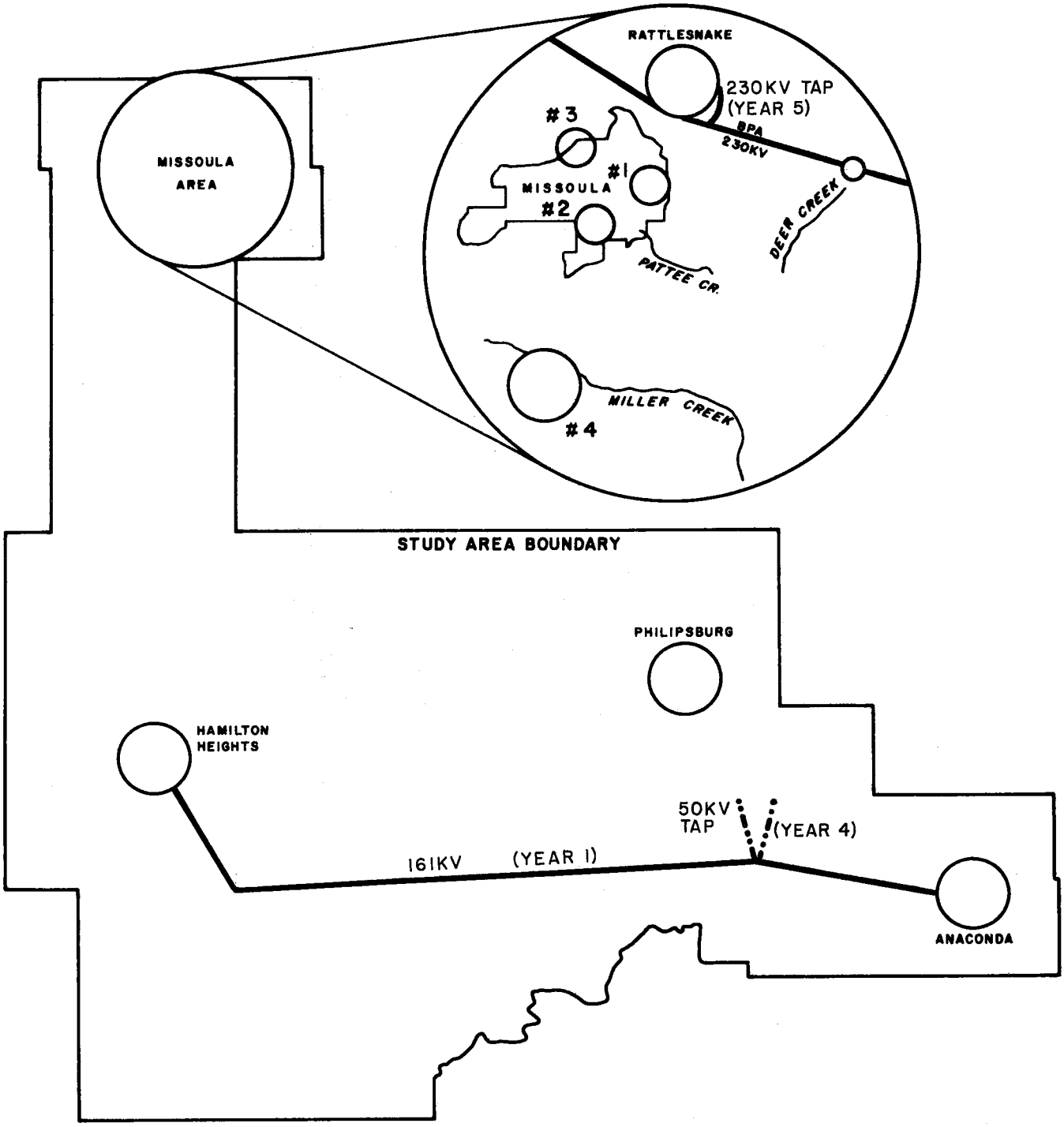
Alternative 3 (see Figure 3):

Year 1	Loop the BPA 230 kV line through Missoula No. 4 and establish a 230 kV tap, build a 40-mile 161 kV line from Missoula No. 4 to Hamilton Heights



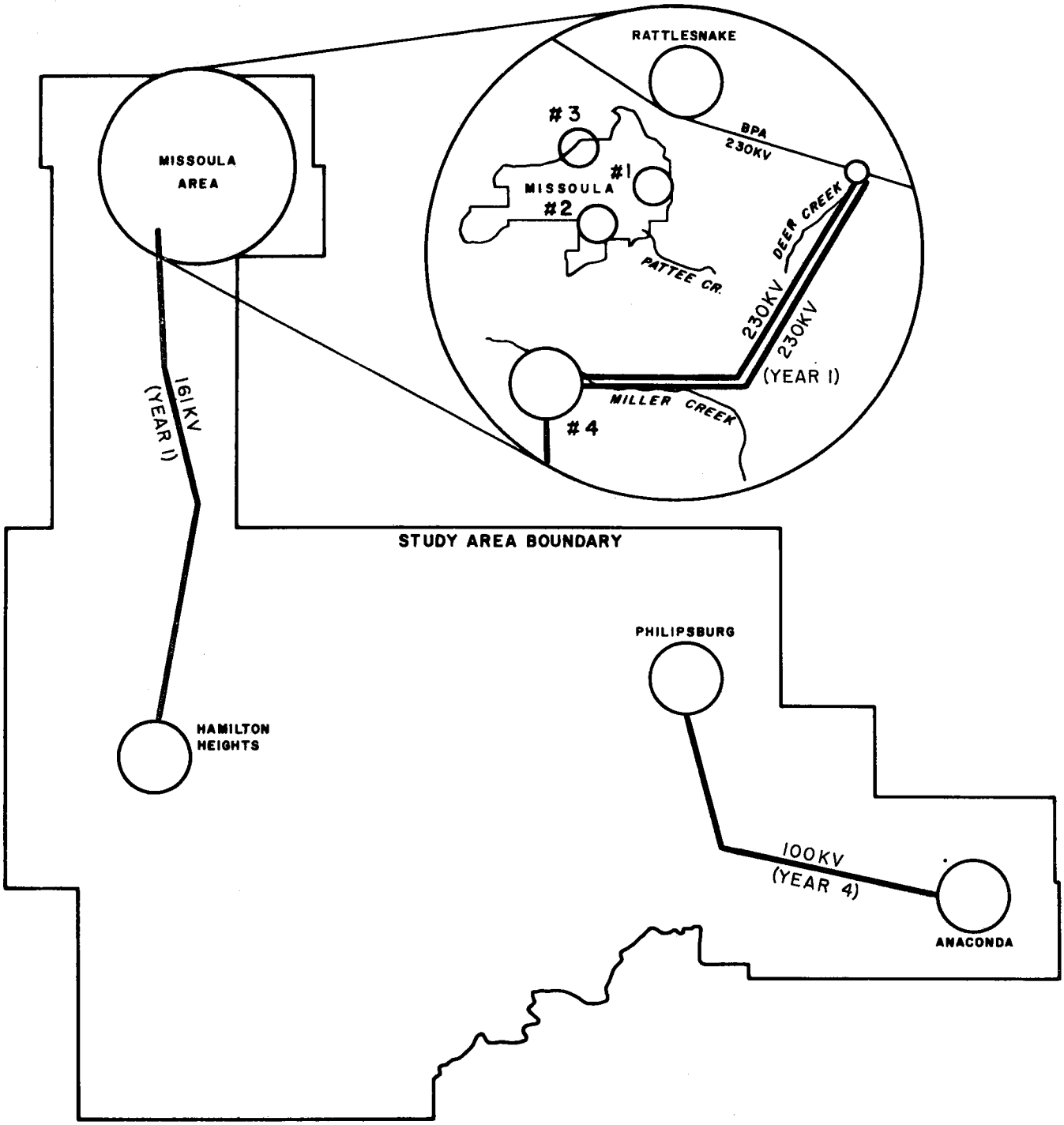
ALTERNATIVE 1

FIGURE 1



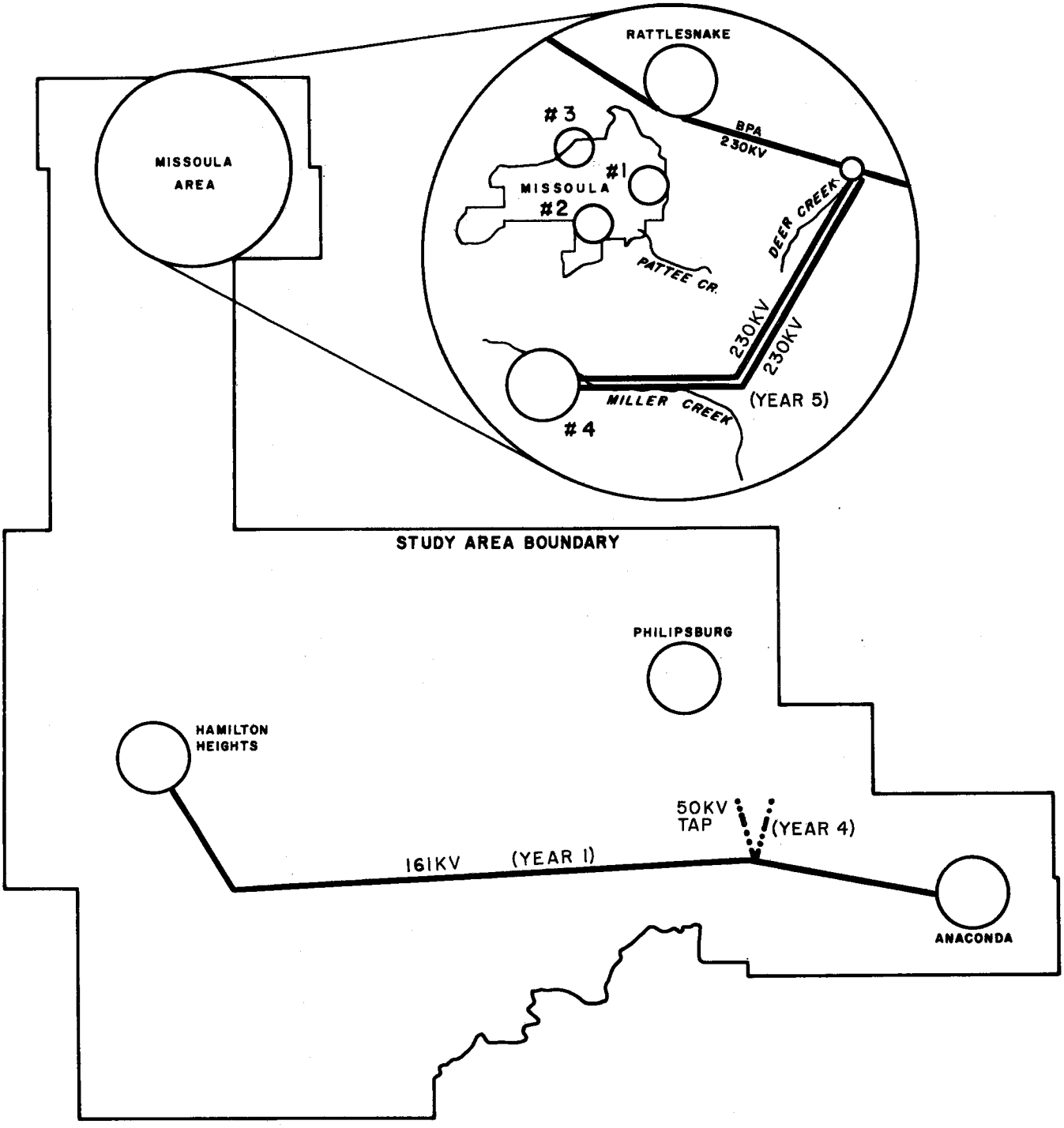
ALTERNATIVE 2

FIGURE 2



ALTERNATIVE 3

FIGURE 3



ALTERNATIVE 4

FIGURE 4

Year 4 Build a 27-mile 100 kV line from Anaconda City to Philipsburg and establish a 100/50 kV substation

Alternative 4 (see Figure 4):

Year 1 Build a 65-mile 161 kV line from Anaconda to Hamilton Heights

Year 4 Establish a 161/50 kV substation near Philipsburg on the Anaconda-Hamilton 161 kV line and connect the substation to the Philipsburg 50 kV transmission system

Year 5 Loop the BPA 230 kV line through Missoula No. 4 and establish a 230 kV tap

C. Economic Analysis of Alternatives

The Department has completed an economic ananlysis of the alternatives using costing information provided by the MPC. The method of analysis is identical to that adopted by the MPC in the analysis submitted to the Department on September 13, 1976. The MPC has been requested to provide the basis for an annual carrying charge of 22 per cent, but at the time of this writing, no information had been received from the MPC. Details of the analysis are tabulated in Tables 2, 3, 4, and 5.

The economic analysis establishes that for either of the two locations considered for a 230 kV tap in the Missoula area, it is less expensive in the long-term to build a 161 kV line from the Missoula area to Hamilton. Eventual reinforcement of the Philipsburg area has been considered in the economic analysis of alternatives.

D. Engineering Studies

Engineering studies completed by the Department and its consultants subsequent to the publication of the draft EIS have been concerned with an analysis of the applicant's preferred alternative and the development of an alternative that would not only solve the problems in the Missoula area and the Bitterroot Valley, but would also have less environmental impact.

1. Analysis of Applicant's Preferred Alternative

A load flow base case modeling the Anaconda-Hamilton 161 kV line was developed from the MPC base case (1979HW3LD), which includes Colstrip Units 3 and 4 and the associated 500 kV system. Adequate voltage levels are maintained throughout the Bitterroot Valley and the Missoula area. The 161/100 kV 30 MVA transformer at Missoula No. 4 substation overloaded by about 10 per cent. A larger transformer would therefore be required regardless of the disposition of this application.

The system design criterion adopted by the MPC calls for a minimum acceptable voltage of 90 per cent of nominal under a single contingency, i.e.,

TABLE 2

ECONOMIC ANALYSIS - ALTERNATIVE 1

Year	Action	Capital Cost	Cumulative Cost	Carrying Charge [1] 22%	Present Worth [2] Factor 8%	Present Worth of Annual Charge
1	161 kV from Rattlesnake to Hamilton including terminals	2,709,500	2,709,500	596,090	0.9259	551,920
2			2,709,500	596,090	0.8573	511,028
3			2,709,500	596,090	0.7938	473,176
4	100 kV from Anaconda to Philipsburg 100/50 kV substation at Philipsburg	1,204,800	3,914,300	839,146	0.7350	616,712
5	230 kV tap at Rattlesnake	2,848,000	6,762,300	1,487,706	0.6806	1,012,533
6			6,762,300	1,487,706	0.6302	937,552
7			6,762,300	1,487,706	0.5835	868,076
8			6,762,300	1,487,706	0.5403	803,808
9			6,762,300	1,487,706	0.5002	744,151
10			6,762,300	1,487,706	0.4632	689,105
11			6,762,300	1,487,706	0.4289	638,077
12			6,762,300	1,487,706	0.3971	590,768
13			6762,300	1,487,706	0.3677	547,029

TABLE 2
(continued)

Year	Action	Capital Cost	Cumulative Cost	Carrying Charge 22%	Present Worth Factor 8%	Present Worth of Annual Charge
14			6,762,300	1,487,706	0.3405	506,564
15			6,762,300	1,487,706	0.3152	468,925
						9,948,422

[1]The annual carrying charge covers the return on investment, depreciation, taxes, and yearly operating and maintenance expense.

[2]The Present Worth Factor is the factor by which monies spent in the future should be multiplied to obtain their present value.

NOTE: Effective total capital cost = $5,662,900 (in year 1 dollars)

TABLE 3

ECONOMIC ANALYSIS - ALTERNATIVE 2

Year	Action	Capital Cost	Cumulative Cost	Carrying Charge[1] 22%	Present Worth[2] Factor 8%	Present Worth of Annual Charge
1	161 kV from Anaconda to Hamilton including terminals	3,244,000	3,244,000	713,680	0.9259	660,796
2			3,244,000	713,680	0.8573	611,838
3			3,244,000	713,680	0.7938	566,519
4	161/50 kV substation on line and connection to Philipsburg	1,034,200	4,278,200	941,204	0.7350	691,785
5	230 kV tap at Rattlesnake	2,848,000	7,126,200	1,567,764	0.6806	1,067,020
6			7,126,200	1,567,764	0.6302	988,005
7			7,126,200	1,567,764	0.5835	914,790
8			7,126,200	1,567,764	0.5403	847,063
9			7,126,200	1,567,764	0.5002	784,196
10			7,126,200	1,567,764	0.4632	726,188
11			7,126,200	1,567,764	0.4289	672,414
12			7,126,200	1,567,764	0.3971	622,559

TABLE 3
(continued)

Year	Action	Capital Cost	Cumulative Cost	Carrying Charge 22%	Present Worth Factor 8%	Present Worth of Annual Charge
13			7,126,200	1,567,764	0.3971	622,559
14			7,126,200	1,567,764	0.3405	533,824
15			7,126,200	1,567,764	0.3152	494,159
						10,747,623

[1]The annual carrying charge covers the return on investment, depreciation, taxes, and yearly operating and maintenance expense.

[2]The Present Worth Factor is the factor by which monies spent in the future should be multiplied to obtain their present value.

NOTE: Effective total capital cost = $6,067,300 (in year 1 dollars)

TABLE 4

ECONOMIC ANALYSIS - ALTERNATIVE 3

Year	Action	Capital Cost	Cumulative Cost	Carrying Charge [1] 22%	Present Worth [2] Factor 8%	Present Worth of Annual Charge
1	230 kV tap at Missoula No. 4 161 kV from Missoula No. 4 to Hamilton	5,575,000	5,575,000	1,226,500	0.9259	1,135,616
2			5,575,000	1,226,500	0.8573	1,051,478
3			5,575,000	1,226,500	0.7938	973,596
4	100 kV from Anaconda to Philipsburg 100/50 kV substation at Philipsburg	1,204,800	6,779,800	1,491,556	0.7350	1,096,294
5			6,779,800	1,491,556	0.6806	1,015,153
6			6,779,800	1,491,556	0.6302	939,979
7			6,779,800	1,491,556	0.5835	870,323
8			6,779,800	1,491,556	0.5403	805,888
9			6,779,800	1,491,556	0.5002	746,076
10			6,779,800	1,491,556	0.4632	690,889
11			6,779,800	1,491,556	0.4289	639,728
12			6,779,800	1,491,556	0.3971	592,297

TABLE 4
(continued)

Year	Action	Capital Cost	Cumulative Cost	Carrying Charge 22%	Present Worth Factor 8%	Present Worth of Annual Charge
13			6,779,800	1,491,556	0.3677	548,665
14			6,779,800	1,491,556	0.3405	507.875
15			6,779,800	1,491,556	0.3152	470,138
						12,081,375

[1]The annual carrying charge covers the return on investment, depreciation, taxes, and yearly operating and maintenance expense.

[2]The Present Worth Factor is the factor by which monies spent in the future should be multiplied to obtain their present value.

NOTE: Effective total capital cost = $6,494,700 (in year 1 dollars)

TABLE 5

ECONOMIC ANALYSIS - ALTERNATIVE 4

Year	Action	Capital Cost	Cumulative Cost	Carrying Charge[1] 22%	Present Worth[2] Factor 8%	Present Worth of Annual Charge
1	161 kV from Anaconda to Hamilton including terminals	3,244,000	3,244,000	713,680	0.9259	660,796
2			3,244,000	713,680	0.8573	611,838
3			3,244,000	713,680	0.7938	566,519
4	161/50 kV substation on line and connections to Philipsburg	1,034,200	4,278,200	941,204	0.7350	691,785
5	230 kV tap at Missoula No. 4	4,883,200	9,161,400	2,013,308	0.6806	1,370253
6			9,161,400	2,013,308	0.6302	1,268,787
7			9,161,400	2,013,308	0.5835	1,174,765
8			9,161,400	2,013,308	0.5403	1,087,790
9			9,161,400	2,013,308	0.5002	1,007.057
10			9,161,400	2,013,308	0.4632	932,564
11			9,161,400	2,013,308	0.4289	863,508
12			9,161,400	2,013,308	0.3971	799,485

TABLE 5
(continued)

Year	Action	Capital Cost	Cumulative Cost	Carrying Charge 22%	Present Worth Factor 8%	Present Worth of Annual Charge
13			9,161,400	2,013,308	0.3677	740,293
14			9,161,400	2,013,308	0.3405	685,531
15			9,161,400	2,013,308	0.3152	634,595
						13,155,566

[1]The annual carrying charge covers the return on investment, depreciation, taxes, and yearly operating and maintenance expense.

[2]The Present Worth Factor is the factor by which monies spent in the future should be multiplied to obtain their present value.

NOTE: Effective total capital cost = $7,521,000 (in year 1 dollars)

one transmission line out of service. Load flow cases modeling various single line outage conditions were run and the voltage levels at important buses in the Missoula area and the Bitterroot Valley are tabulated in Table 6, together with transformer loads and total power imported into the area from Anaconda. Conditions under system normal case and the worst single line outage case are shown in Figures 5 and 6 respectively.

Clearly, in four out of the five single contingency cases, the voltage level at Darby in 1979 is already below the applicant's acceptable level of 90 per cent of nominal. Although it is possible to adjust the taps at Hamilton Heights substation to boost the voltage at Hamilton by about 5 per cent, the voltage level at Darby will still fall below the acceptable level of 90 per cent of nominal by 1980 under single line outage conditions. A 161 kV line form Anaconda to Hamilton would, therefore, meet the MPC system design criterion only in the short-term.

An examination of the load flows shows that the poor voltage in the Darby area for a single contingency line outage is a direct result of power demand in the Missoula area. Under both normal and single line outage conditions, adequate voltages are maintained at Missoula substations. However, because of the existing load and the projected load growth at Missoula, the existing transmission system with the Anaconda-Hamilton line added cannot ensure adequate voltage at Darby in the event of any one of the four single contingency cases shown in Table 6. The MPC has already considered an eventual 230 kV tap in the Missoula area to provide additional support to Missoula (MPC application, page 7, paragraph 2). This additional support would, in turn, raise voltages in the Bitterroot Valley.

The problems in the Bitterroot Valley and the Missoula area cannot, therefore, be solved only by the construction of a 161 kV line between Anaconda and Hamilton (as proposed by the applicant). Establishment of a 230 kV tap to the Missoula area will be necessary in the near future, probably by 1980, unless short-term measures can be taken to effectively maintain satisfactory voltage levels at Darby under single line outage conditions.

2. BPA Tap Alternative

An alternative based on a 230 kV tap off the BPA line in the Bonner area with a 230 kV loop through Missoula No. 4 (Miller Creek) substation was developed because it offers the following advantages:

(i) It provides a source of power independent of Rattlesnake substation for both Missoula and the Bitterroot Valley

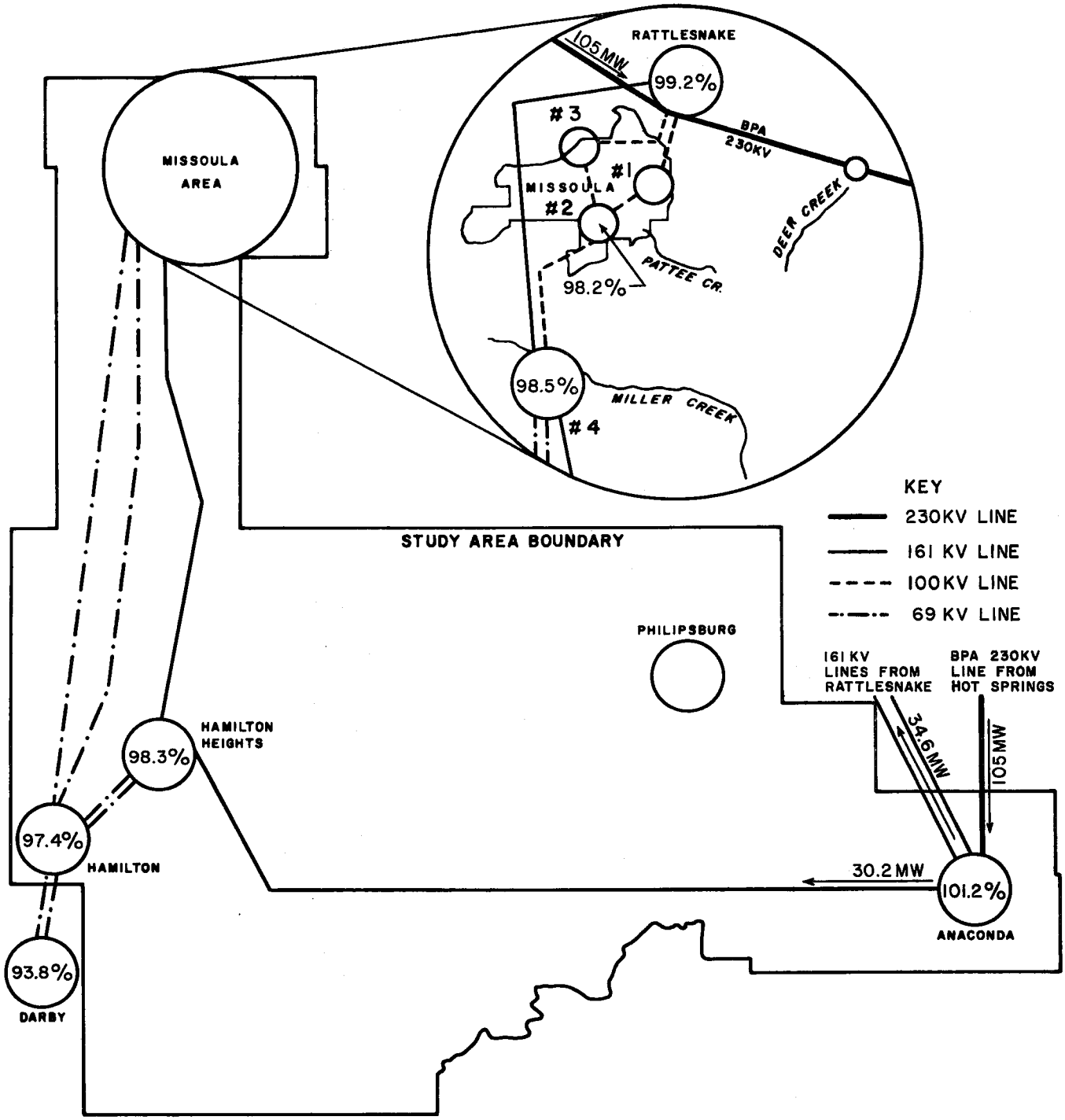
(ii) The 100 kV system in urban Missoula is substantially strengthened by the introduction of power infeed into its extremity at Missoula No. 4 substation, i.e., both the capacity and reliability are greatly increased

(iii) It avoids the construction of another 161 kV line between Rattlesnake and Missoula No. 4 substation which would have to pass through urban Missoula

TABLE 6

BPA TAP AT MISSOULA 161 KV LINE BUILT
FROM MISSOULA NO. 4 TO HAMILTON HEIGHTS

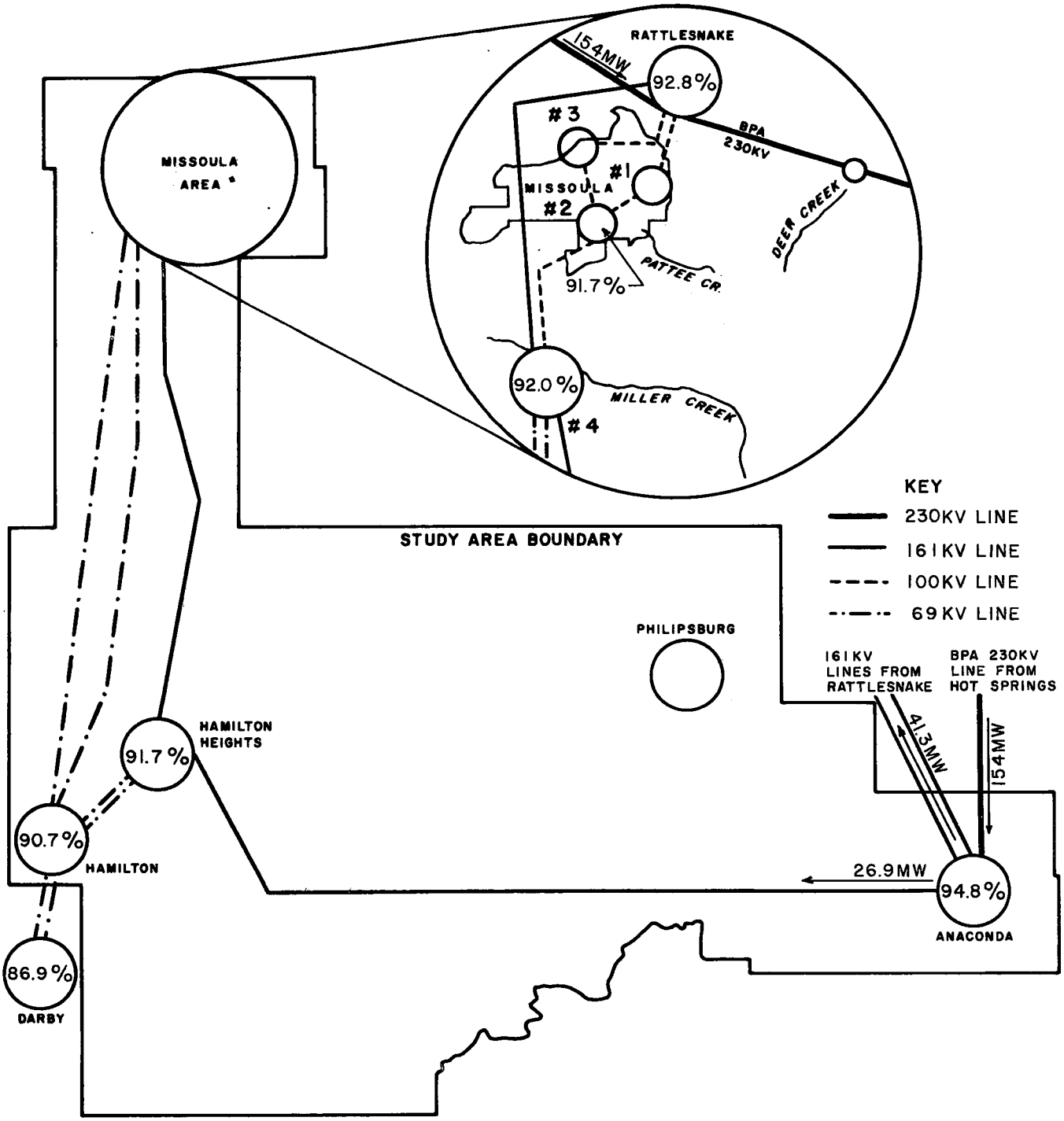
Load Flow Case No.	Condition	Bus Voltage Level as Percentage of Nominal									Transformer Loads (% of capacity)			Power From Millcr 161 kV
		Millcr 161 kV	Rtlsnk 161 kV	Rtlsnk 100 kV	Missfr 100 kV	Waldrf 100 kV	Missfr 100 kV	Missfr 69 kV	Hamhts 69 kV	Darby 69 kV	Rtlsnk 161/100 kV	Missfr 161/100 kV	Missfr 100/69 kV	
1	System Normal (Base Case)	101.2%	97.5%	99.2%	98.2%	96.9%	98.5%	100.1%	97.6%	93.8%	88%	113%	56%	64 MW
2	Ovando-Millcr 230 kV Line Out	94.8%	91.4%	92.8%	91.7%	90.6%	92.0%	93.4%	90.7%	86.9%	87%	108%	46%	54 MW
3	Hotspg-Millcr 230 kV Line Out	97.1%	93.5%	95.0%	93.9%	92.8%	94.2%	95.7%	93.0%	89.3%	87%	110%	46%	55 MW
4	Millcr-Hamhts 161 kV Line Out	101.1%	94.9%	96.4%	95.3%	94.1%	95.4%	96.9%	92.1%	88.3%	91%	103%	61%	58 MW
5	Kerr-Rtlsnk-Missfr 161 kV Line Out	99%	92.2%	93.6%	92.5%	91.3%	92.8%	94.5%	92.3%	88.6%	91%	71%	44%	80 MW
6	Rtlsnk-Millcr 261 kV Line Out	101.1%	95.2%	96.9%	95.9%	94.7%	96.3%	97.8%	95.7%	92.1%	86%	111%	47%	60 MW



1979 HEAVY WINTER LOADS

Percent of Nominal Voltage at Various Substations Assuming Applicant's Alternative with Normal Operation of System (Base Case)

FIGURE 5



1979 HEAVY WINTER LOADS

Percent of Nominal Voltage at Various Substations Assuming Applicant's Alternative and Worst Single Line Out Contingency

FIGURE 6

A 230 kV tap off the BPA line at Missoula No. 4 substation combined with a second 40-mile 161 kV line between Missoula No. 4 and Hamilton Heights substation was added to the MPC base case 79HW3LD to model the BPA tap alternative. Several single line outage conditions were modeled on the computer. The voltage levels at important buses in the Missoula area and the Bitterroot Valley are tabulated in Table 6, together with transformer loads and the net power imported into the area from the 230 kV system. As shown in Table 7, voltage levels at every bus are well above the minimum acceptable level for every single line outage case modeled. Conditions under system normal case and the worst single line outage case are shown in Figures 7 and 8.

A comparison of base cases for the two alternatives modeled shows that the system losses for the Anaconda-Hamilton 161 kV line alternative are higher by 7.5 MW (5.0 per cent) and 37.7 MVAr (3.4 per cent) because a major proportion of the power imported into the area is transmitted from Hot Springs to Anaconda over the 230 kV system and then sent back into the Missoula area over the 161 kV system. Also, the line loading on each of the two 100 kV lines out of Rattlesnake feeding Missoula No. 1 and Missoula No. 3 substations is reduced by almost one-third for the BPA tap alternative.

The above analysis shows that a BPA tap alternative would perform better than the applicant's preferred Anaconda-Hamilton 161 kV line under both system normal and system abnormal conditions. This alternative involves the construction of two 230 kV lines, each approximately ten miles long, between the 230 kV BPA line and Missoula No. 4 substation. One possible corridor for these lines was shown in the draft EIS. Another possible corridor is shown in Figure 14 in Section IV of Part Two.

Because a BPA tap alternative involves work on a facility owned by the BPA, the Department submitted copies of all engineering studies to the BPA for its comments. A complete copy of the BPA's comments is contained in Section III, Part Two of this document. In comparing the BPA tap and Anaconda-Hamilton alternatives, the BPA wrote:

> The BPA 230 kV tie, development of Missoula bus #4 and a second Rattlesnake-Hamilton 161 kV line appears to be a stronger plan for the whole area, including Missoula and the Bitterroot Valley.

E. Comparison of Alternatives - Engineering Analysis

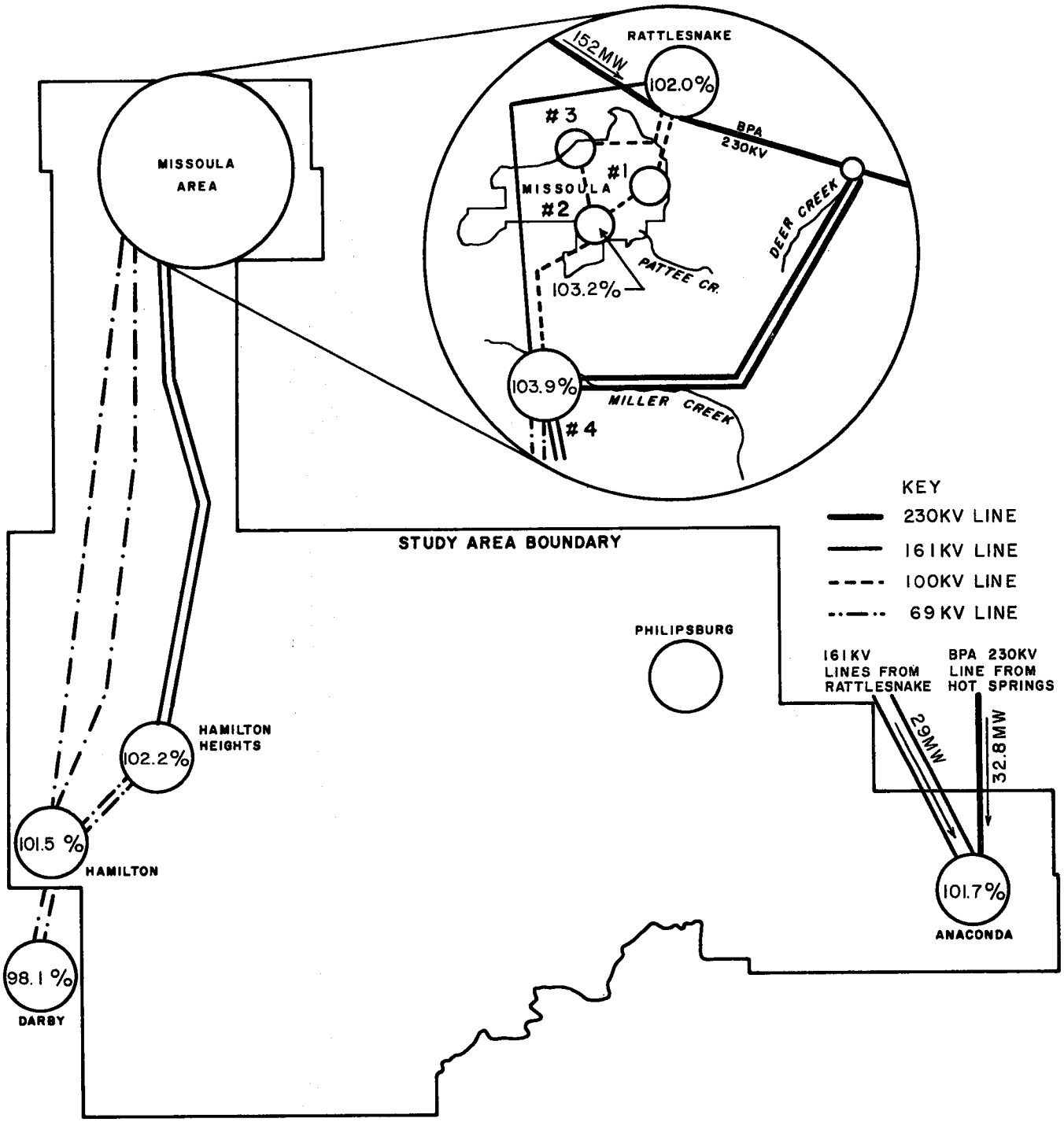
Apart from the location, design, and timing of a 230 kV tap in the Missoula area, the two basic alternatives for the improvement of electric power reliability in the Bitterroot Valley are: (1) a 161 kV line from Anaconda to Hamilton Heights, or (2) a 161 kV line from the Missoula area to Hamilton Heights.

Both the MPC and the Department have considered the two possible line routes. In comparing a 161 kV line from Rattlesnake to Hamilton Heights with a 161 kV line from Anaconda to Hamilton Heights, the MPC states as follows in its application.

TABLE 7

BPA TAP AT MISSOULA 161 KV LINE BUILT
FROM MISSOULA NO. 4 TO HAMILTON HEIGHTS

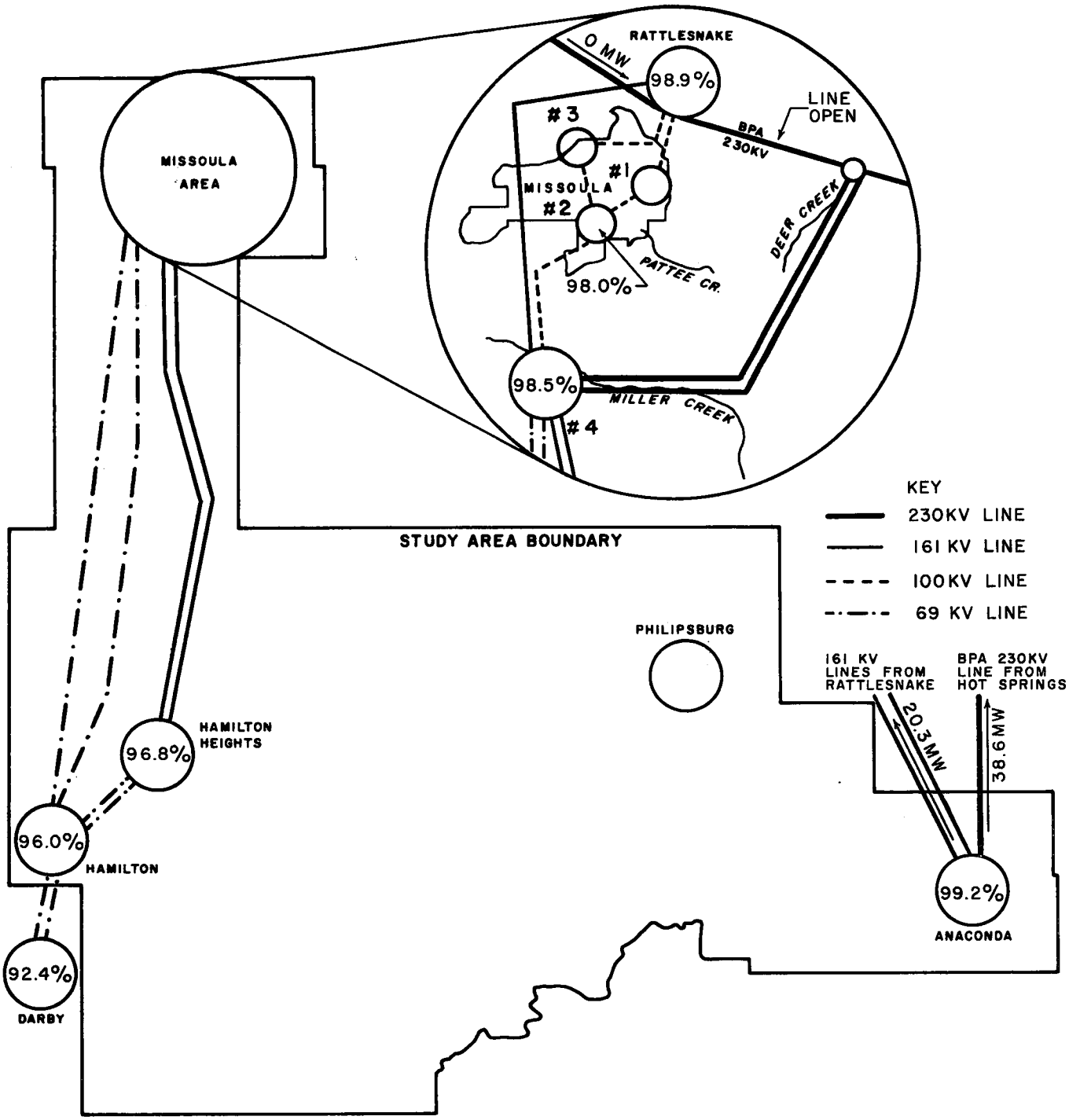
Load Flow Case No.	Condition	Bus Voltage Level as Percentage of Nominal									Transformer Loads (% of Capacity)			Net Power From 230 kV
		Miller 161 kV	Rtsnk 161 kV	Rtsnk 100 kV	Misstwo 100 kV	Waldrf 100 kV	Missfr 100 kV	Missfr 69 kV	Hamltn 69 kV	Darby 69 kV	Rtlsnk 161/100 kV	Missfr 161/100 kV	Missfr 100/69 kV	
7	System normal (base case)	101.7%	102 %	104 %	103.2%	101.6%	103.9%	105.9%	101.5%	98.1%	67%	73%	68%	89 MW
8	Kerr-Rtlsnk 161 kV line out	101.5%	100 %	102.1%	101.4%	99.7%	102.3%	104.3%	99.8%	96.4%	61%	69%	68%	104 MW
9	Hotspg-Missfr 230 kV line out	99.2%	97.3%	98.9%	98.0%	96.7%	98.5%	100.3%	96.0%	92.4%	76%	71%	65%	59 MW
10	Missfr-Miller 230 kV line out	101.6%	101.8%	103.8%	103 %	101.4%	103.7%	102.4%	101.3%	97.9%	66%	72%	68%	92 MW
11	Busfault at Rtlsnk 100 kV	101.9%	104.3%	-	97.3%	92.6%	100.5%	102.7%	100.9%	97.5%	-	150%	46%	86 MW
12	Hotspg-Ovando 230 kV line out	101.5%	101.6%	103.6%	102.8%	101.3%	103.5%	105.6%	101.1%	97.7%	66%	71%	68%	87 MW
13	Ovando-Miller 230 kV line out	99.0%	100.1%	102 %	101.3%	99.7%	102 %	104 %	99.6%	96.1%	64%	70%	67%	85 MW
14	Missfr-Hamhts 161 kV line out	101.7%	101.7%	103.7%	102.9%	101.3%	103.6%	105.6%	100.6%	97.2%	65%	71%	73%	89 MW



1979 HEAVY WINTER LOADS

Percentage Nominal Voltage at Various Substations Assuming a Tap of the BPA 230 kV Line at Miller Creek (Missoula #4) Substation and Worst Single Line Out Contingency

FIGURE 7



1979 HEAVY WINTER LOADS

Percentage Nominal Voltage at Various Substations Assuming a Tap of the BPA 230 kV Line at Miller Creek (Missoula #4) Substation Worst Single Line Out Contingency

FIGURE 8

> A second line from Missoula to Hamilton . . . may have slightly greater reliability because it would be constructed at a lower elevation and be more accessible .... From an economic standpoint, Plan "B" (second line from Missoula to Hamilton) would have certain advantages. The installation and maintenance costs of building a line from Missoula to Hamilton as proposed in Plan "B" would be less than building a line from Anaconda to Hamilton .... Building a second 161 kV line from Missoula to Hamilton as proposed in Plan "B" would have the advantage of the potential possibility of locating a second line parallel or partially parallel to an existing right-of-way.

The MPC proceeds to dismiss the above advantages as "not significant" and outweighed by social and land use impacts of building a line through the populated areas of Missoula and the Bitterroot Valley as opposed to an Anaconda-Hamilton 161 kV line through a wilderness area.

Purely from an engineering point of view, a 161 kV line route from Anaconda to Hamilton has significant disadvantages. Such a line would pass through the heavily forested Sapphire Mountains, requiring substantial preconstruction tree cutting and extensive maintenance of the clear-cut throughout the operating life of the line. Because of the overall high elevation of the line, it would be prone to lightning strikes--a major cause of transmission line outages. Further, the Sapphire Mountains between Anaconda and Hamilton are crossed by only one road. This road is open on the average only 138 days (see Table 8). Access to an Anaconda-Hamilton line during winter would be limited to snow machines and helicopters. Access to those portions of the line built on steep slopes during winter storms may be impossible. The inaccessibility of a line for the major part of the year imposes severe constraints on a transmission line being built primarily for reliability.

Table 8

Skalkaho Road Opening and Closing Dates

Year	Opening Date	Closing Date	
1949	June 15	November 29	
1950	June 8	October 26	
1951	June 13	October 25	
1952	May 30	November 18	
1953	June 22	November 21	
1954	June 26	October 26	
1955	June 20	October 31	
1956	June 15	October 26	
1957	June 7	November 17	
1958	June 16	November 7	
1959	June 26	October 9	
1960	June 20	November 4	
1961	June 10	October 27	
1962	June 19	November 20	
1963	June 14	November 6	
1964	June 26	November 13	
1965	June 15	November 15	
1966	June 6	November 9	
1967	June 26	October 25	
1968	May 16	October 15	
1969	May 12	October 15	
1970	June 26	October 27	
1971	July 1	November 1	
1972	July 5*	October 27	
1973	June 26	October 31	
1974	July 16*	November 21	
1975	July 25*	October 29	
1976	June 30		
Average	June 18	November 3	Open 138 days

SOURCE: Personal communication to the Department from Marvin Brackman of the Highway Department, 1976.

*Opened late due to flood and water damage.

IV. Justification No. IV

The Department makes its recommendation on the basis that one or more alternatives exist which would satisfy the Board's policy of utilizing existing corridors if the need for the establishment of any new corridors is not clearly justified.

On September 13, 1973, the Board of Natural Resources and Conservation announced its policy that existing corridors must be utilized if the need for a new corridor is not clearly justified. No corridor now exists between Anaconda and Hamilton across the Sapphire Mountains. Department studies indicate that a Bonner to Hamilton alternative, which does include an existing 161 kV corridor throughout most of its length, would:

(1) provide a long-term solution to the Missoula and Bitterroot Valley transmission system

(2) cost less in the long-term than the proposed Anaconda-Hamilton line

(3) result in less environmental impact than the proposed Anaconda-Hamilton lines.

Therefore, the Department does not believe that the clear justification which the Board policy requires to open a new corridor is evident.

V. Justification No. V

The Department makes its recommendation on the basis that one or more alternatives exist which satisfy the transmission system reliability criterion preferred by the applicant as justification for the proposed Anaconda-Hamilton line and the broader definition of need which in the Department's view is consistent with the intent of the Utility Siting Act.

A. Applicant's Explanation of Need

In explaining the need for the Anaconda-Hamilton 161 kV transmission line in the application, the applicant wrote that:

> The proposed facility is needed to provide adequate and reliable service to the Bitterroot area and also the city of Missoula, Montana. This need is based upon regionally recognized utility practice and design procedures to provide a minimum transmission voltage level of 90% of the nominal voltage at the distribution substation during peak summer load while one transmission line that normally serves that substation is out of service.

Department engineering analysis indicates that after 1977 an outage of the Missoula No. 4-Hamilton Heights 161 kV line during peak system loads would result in inadequate (i.e., less than 90 per cent of nominal) voltages at Darby substation in the Bitterroot Valley. An additional line would be required to meet the ". . .regionally recognized utility practice and design procedures. . ." of maintaining 90 per cent of nominal voltage under single contingency condtions.

As discussed under Justification No. II, the alternative of tapping the BPA tap near Missoula and building a second Missoula-Hamilton 161 kV line would meet, on a long-term basis, the criterion of maintaining a 90 per cent of nominal voltage level with one transmission line out of service.

B. Department's Explanation of Need

The Department is not convinced that acceptance of the utility criterion of maintaining a single contingency 90 per cent nominal voltage level as sufficient basis for need of a transmission line would comply with the intent of the Utility Siting Act. As previously stated:

> . . . the Department takes the position that a broader consideration of need is necessary; that it must evaluate whether the citizens of Motnana need the proposed facility only after it has considered the need for electricity or energy <u>along with</u> the overall costs and benefits, the environmental impacts, <u>and</u> the availablity of reasonable alternatives that have less impact on the environment. (Clyde Park-Dillon Final EIS)

In the case of an application for a transmission line to increase reliability, the Department believes that determination of need should not be based solely upon a voltage criterion, but also upon an analysis of the benefits of the increased reliability versus the environmental, economic, and social costs of providing such reliability.

In an application such as this one in which the primary electrical or engineering justification for construction of a new transmission line involves increasing service reliability, the necessity of considering the costs and benefits of the additonal reliability is especially significant. The significance stems from the fact that perfect or 100 per cent reliable electrical service is impossible. Regardless of how many redundant power sources are available, or how many transmission and distribution lines connect the source and load, some probability of interruption of electric supply exists. The costs of building additional generation, transmission, and distribution facilities to increase reliability must, therefore, be weighed against the benefits to be gained. At some point, the decision must be made that the probability of outage is sufficiently low, or that the economic, environmental, and social costs exceed the value of additional reliability.

Historically, the decision of when service reliability is functionally adequate has been made by the utility companies. In response to Department inquiry, the applicant has stated that in the past no economic analysis of the costs and benefits of increasing reliability by construction of transmission lines has been made. Indeed, a search of the economic literature indicates that the absence of such analysis is probably not unique to this applicant. However, the intent of the Utility Siting Act and other environmental legislation such as the Montana Environmental Policy Act (MEPA) and the National Environmental Policy Act (NEPA) clearly require a balancing, cost-benefit type of analysis of actions which could significantly affect environmental quality.

The following sections contain the Department's initial attempt at performing an economic analysis of reliability. The approach taken is to estimate an upper bound of the economic value of the additional reliability which would result from construction of the proposed Anaconda-Hamilton 161 kV line. The upper bound value results because all assumptions made are expected to overestimate the amount of electrical energy available only if the Anaconda-Hamilton line is constructed. This type of analysis can provide a basis from which to judge the advisability of the commitment of environmental, economic, and social resources to increase reliability.

The economic costs and benefits associated with the additional reliability which would result from the proposed Anaconda-Hamilton line are examined from two different perspectives or levels of impact: the general economic level, and the level of the individual electricity consumer. Other alternatives to the additional Anaconda-Hamilton line reliability capable of mitigating the impacts upon individual electrical customers will also be discussed.

B.1. General Level Economic Costs and Benefits of Anaconda-Hamilton Line Additional Reliability

Because the economic costs of construction of the Anaconda-Hamilton line would be borne ultimately at the general economic level by all electric consumers in the MPC service area, a comparison will be made of the cost of the line, the general economic benefits of the additional long-term Bitterroot Valley transmission reliability, and present eletricity costs. As discussed under Justification No. II, construction of the Anaconda-Hamilton line would also postpone, on a short-term basis, the need to construct an additional 230 kV interconnection at Missoula. For this reason, the general benefits were assumed in this analysis to be the economic value of the additional Bitterroot Valley reliability and a $1,000,000 reduction in the Anaconda-Hamilton costs of construction due to postponement of the Missoula 230 kV interconnection.

The analysis of the electrical reliability economic cost and resulting benefits involves several steps:

(1) Combination of variations in daily and monthly peak loads and future projections of peak load in the Bitterroot Valley to calculate the variations in the Bitterroot Valley load between 1976-1995

(2) Estimation of the "expected value" of the load that would be carried by the proposed Anaconda-Hamilton 161 kV line (the load the two 69 kV lines could not adequately handle) for the 1976-1995 period

(3) Estimation of the yearly outage rate of the existing 161 kV line

(4) Calculation of the economic value of the electric energy that would not be available if the Anaconda-Hamilton line is not built and the existing 161 kV line fails

(5) Calculation of the present value of the economic productivity that would be lost due to outage of the Missoula No. 4-Hamilton Heights 161 kV line if the Anaconda-Hamilton line were not built

(6) Comparison of the value of the service provided by the Anaconda-Hamilton 161 kV line, with the adjusted cost of building the line

(7) Calculation of the cost of providing reliability by dividing the adjusted cost of the line by present value of load on the Anaconda-Hamilton 161 kV line

The analysis results will provide several figures for comparison purposes, the economic value of electricity in the Bitterroot Valley, the lost economic value due to outage of the existing 161 kV line, the economic cost of providing the reliability and a comparison with current electricity rates paid.

Step 1 of the analysis involves several sub-steps, the first being the determination of the monthly and daily variation in the Bitterroot Valley load throughout the year. The variation of monthly loads was based upon

substation meter readings for the Bitterroot Valley in 1975. The monthly peak load occurred in February, and the monthly low occurred in May. These loads are used to simply indicate times of year when highs and lows occur, and are not the basis for future projections, as will be explained shortly.

TABLE 9

1975 LOADS

Month	Load	Percentage of February Peak
January	28,654	91
February	31,348	100
March	26,388	84
April	23,507	74
May	22,746	73
June	24,084	77
July	24,312	78
August	25,942	83
September	24,832	79
October	24,180	77
November	27,184	87
December	29,682	95

SOURCE: Montana Power Company correspondence, 1975 substation readings.

For simplification purposes, November through March were lumped together as winter load at 100 per cent peak,[1/] and April through October as summer load at 75 per cent of peak load. This will overestimate the duration of the peak load and the severity of load outages due to the 161 kV line being down.

Daily load fluctuations were derived from voltage charts of representative valley summer and winter days. These charts show peak electrical use occurring approximately eight hours daily (day time), slacking to an estimated 60 per cent of the winter peak in the winter, and to 50 per cent of the summer peak in the summer. Again, to simplify the analysis, the actual daily load variation was assumed to consist of a "daily high" of 12 hours of constant peak load and a "daily low" of 12 hours of 70 per cent of the peak load. Also, the summer daily peak was also assumed to be 70 per cent of the peak load. Expressing all loads in terms of percentage of the peak load, and combining the daily and monthly load variations results in the following description of the annual Bitterroot Valley load variations:

1/ Unless otherwise qualified, the term "peak" means the highest Bitterroot Valley system load throughout the entire year.

Winter--5 months:

winter high--12 hours per day at 100 per cent peak load
winter low--12 hours per day at 70 per cent peak load

Spring to fall--7 months:

summer high--12 hours per day at 75 per cent peak load
summer low--12 hours per day at (70 per cent (75 per cent) = 53 per cent peak load

The next substep in the analysis is the projection of the Valley peak load in time. Growth in the peak load was extrapolated from 1976 to 1995 at 5.5 per cent per year. This figure is the overall load growth factor calculated from MPC revised 1976-1985 load projections (MPC, 11-year load forecasts). The 1976 base value of the Valley peak load was taken as 26,600 KW after diversity. This is the figure used by the applicant in modeling peak 1976 Bitterroot Valley transmission system in Exhibit F of its application. This value should not be confused with the summation of substation peak loads shown in Table 9 as the table loads have not accounted for peak diversity, i.e., the fact that all substation loads do not peak simultaneously.

Table 10 lists and Figure 9 graphs the growth of the peak load corresponding to each of the four yearly load classes.

A twenty-year time frame was used as the basis of this analysis, from 1976 to 1995. This period was used, since estimates of electrical loads beyond 1995 become unreliable. Data are presented in Part Two questioning the validity of sustained growth in the Bitterroot, due to confused and diminished loads in the first half of the 1970's. Assuming leveling of load growths after 1995, discounting the value of these loads to 1976 "present value" quickly reduces their value and negates their impact. For example, $10,000 worth of power in the year 2001 is worth $1,460 today at percentage of present value.

Because the existing Missoula-Hamilton 161 kV line was constructed in 1973, no long-term outage record for this line has yet been established. As of this writing, a long-term outage record of the Bitterroot Valley 69 kV lines has not been provided by the applicant. In the absence of long-term outage data, future outages on the Missoula-Hamilton 161 kV line are assumed to be equally likely at any time throughout the year. Given this assumption, the probabilities of an outage during the winter and summer high and low load conditions are calcualted as follows:

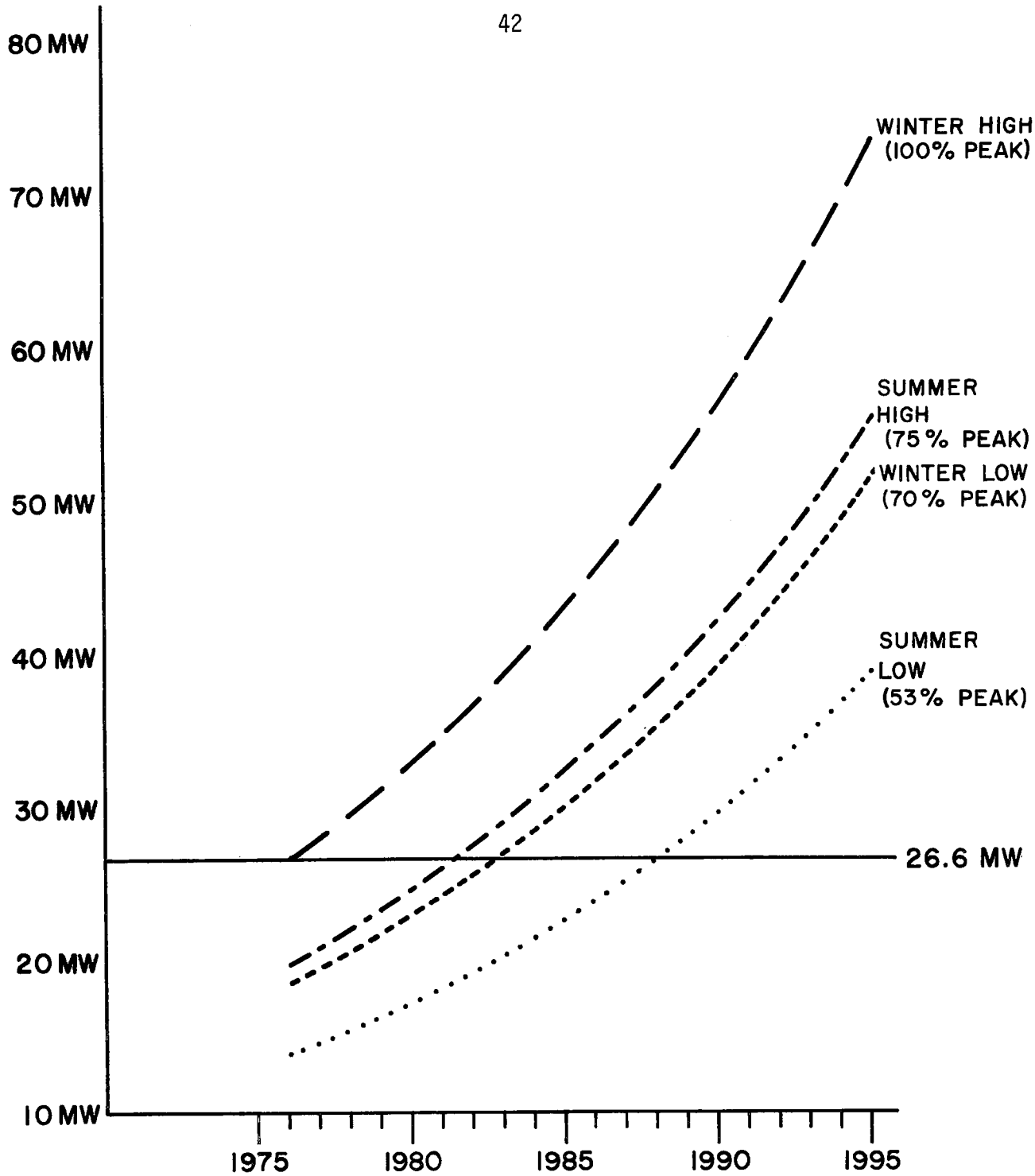
winter high and low = (percentage of daily duration) X (percentage of yearly duration)
= 12/24 X 5/12
= 21 per cent of the time

summer high and low = 12/24 X 7/12
= 29 per cent of the time

TABLE 10

GROWTH OF PEAK LOAD FROM 1976-1995
AT 5.5 PER CENT YEARLY, AT FOUR TIMES OF YEAR

	5/2 Per Cent Growth Per Year	Winter High 100 Per Cent	Winter Low 75 Per Cent	Summer High 70 Per Cent	Summer Low 53 Per Cent
1976	26,600	26,000	19,950	18,620	14,098
1977	28,063	28,063	21,047	19,644	14,873
1978	29,606	29,606	22,205	20,724	15,691
1979	31,235	31,235	23,426	21,865	16,554
1980	32,953	32,953	24,714	23,068	17,464
1981	34,765	34,765	26,074	24,336	18,425
1982	36,677	36,377	27,508	25,675	19,430
1983	38,694	38,694	29,021	27,087	20,508
1984	40,823	40,823	30,617	28,577	21,635
1985	43,068	43,068	32,301	30,148	22,825
1986	45,437	45,437	34,077	31,807	24,081
1987	47,936	47,936	35,952	33,556	25,405
1988	59,572	50,572	37,929	35,401	26,802
1989	53,354	53,354	40,015	37,349	28,277
1990	56,288	56,288	42,216	39,403	29,832
1991	59,384	59,384	44,538	41,570	31,473
1992	62,650	62,650	46,987	43,856	33,204
1993	66,096	66,096	49,571	46,268	35,030
1994	69,731	69,731	52,298	48,813	36,956
1995	73,566	63,566	55,175	51,498	38,989



GROWTH OF PEAK LOAD ABOVE CAPACITY OF TWO 69 KV LINES
FROM 1976-1995 AT 5.5 PER CENT YEARLY GROWTH

FIGURE 9

According to Exhibit F of the Anaconda-Hamilton application, a load of 26,000 kw can be supplied to the valley via the 69 kV "A" and "B" lines while maintaining all substation voltages at greater than 90 per cent of nominal. This 1976 summer peak load will be used as the maximum capacity of the two 69 kV lines so that an outage of the existing 161 kV line when the valley load exceeded 26,000 kw would result in lost load. Multiplication of the amounts of load over the two 69 kV lines' capacity (26,600 MW) for the four yearly periods (winter high, winter low, summer high, and summer low), times the probability of an outage for the four yearly periods yields the expected value of the MW load which will be carried by the Anaconda-Hamilton 161 kV line (Table 11). The growth of peak load in the valley from 1976 to 1995 assuming 5.5 per cent annual growth is shown in Table 9.

The expected outage time per year for the Missoula-Hamilton 161 kV line was estimated to be three hours per year. In conversations with the Department, the applicant estimated that on a statewide basis, the total expected outage time per year would be less than eight hours. Considering the location and modern design of the existing Missoula-Hamilton 161 kV line, its outage rate was estimated by the Department to be three hours per year over the twenty-year period. To provide an indication of the significance of this estimated outage rate on the analysis results, calculations were also made assuming an average of six hours of outage per year (see Figure 10).

An approximate economic value generated in Ravalli County is the combination of labor and proprietors' income and dividends, interest and rent, which was $46,427,000 in 1974[2/]. Dividing this number by the electrical use in the valley will yield a high estimate of the economic value generated by each KWH. This is a high estimate, assuming that all of this economic activity takes place in the valley. For example, most dividends, rent and interest are earned elsewhere. Lolo, the northern portion of the valley, is not included, but this population to an overwhelming extent engages in economic activity in Missoula, not the Bitterroot Valley.

According to the Montana Power Company, the 1974 load in the Bitterroot Valley was 139,546,726 KWH. Dividing $46,427,000 by 139,546,726 KWH yields $.33, the economic production of each KWH used in the Bitterroot Valley in 1974.

It is now possible to calculate the present value of the economic losses caused by line outage in the Bitterroot Valley. The product of the yearly expected load, times the average annual outage time (three and six hours), times the economic value of electricity ($.33) and a "present value" discount factor equals the "present value" of economic productivity lost due to 161 kV line failure. A discount factor of 8 per cent per year was used, being the rate at which the Montana Power Company is able to finance capital expenditures, to reduce all future economic value to a common base year, 1976. The present value of economic productivity lost is $61,420 for

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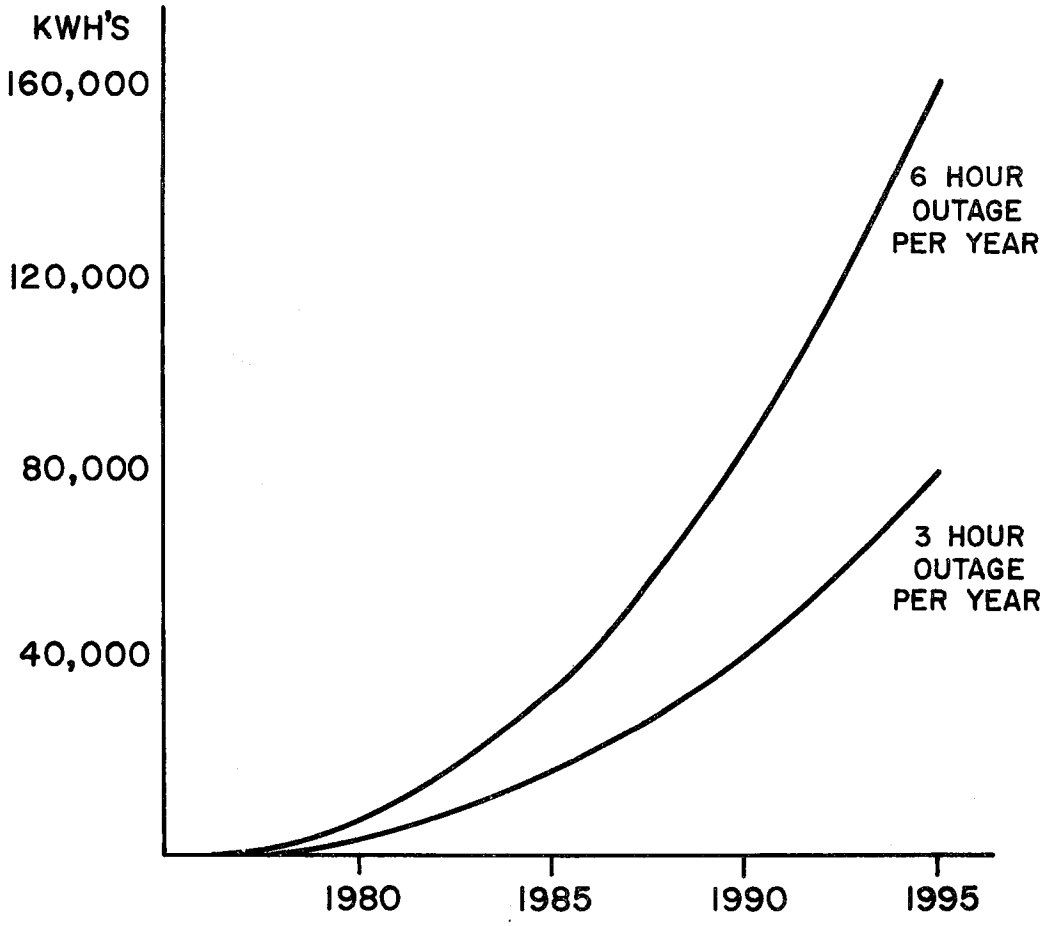
2/Regional Economic Information System, U.S. Bureau of Econmic Analysis, Montana Department of Community Affairs, Helena, Montana.

Table 11

EXPECTED MW LOAD CARRIED EACH YEAR
BY ANACONDA-HAMILTON 161 kV LINE

1977	(1.5) (.21)	.32
1978	(3.0) (.21)	.63
1979	(4.6) (.21)	.97
1980	(6.3) (.21)	1.32
1981	(8.2) (.21)	1.72
1982	(10.1) (.21) + (.9) (.29)	2.38
1983	(12.1) (.21) + (2.4) (.29) + (.4) (.21)	3.32
1984	(14.2) (.21) + (4.0) (.29) + (2) (.21)	4.56
1985	(16.5) (.21) + (.57) (.29) + (3.5) (.21)	5.86
1986	(18.8) (.21) + (7.5) (.29) + (5.2) (.21)	7.22
1987	(21.3) (.21) + (9.4) (.29) + (7.0) (.21)	8.67
1988	(24) (.21) + (11.3) (.29) + (8.8) (.21) + (.2) (.29)	10.23
1989	(26.8) (.21) + (13.4) (.29) + (10.7) (.21) + (1.7) (.29)	12.26
1990	(29.7) (.21) +(15.6) (.29) + (17.8) (.21) + (3.2) (.29)	14.38
1991	(32.8) (.21) + (18) (.29) + (15) (.21) + (4.9) (.29)	16.68
1992	(36.1) (.21) + (20.3) (.29) + (17.3)(.21) + (6.6) (.29)	19.01
1993	(39.5) (.21) + (23) (.29) + (19.7) (.21) + (8.4) (.29)	21.55
1994	(43.1) (.21) + (25.7) (.29) + (22.2) (.21) + (10.4) (.29)	24.18
1995	(47) (.21) + (28.6) (.29) + (24.9) (.21) + (12.4) (.29)	26.99



Expected "Relied Upon" Load Carried Each Year By the Anaconda-Hamilton 161 kV Line From 1976 Through 1995, at 3 and 6 Hours Use Per Year

Figure 10

three hours of outage and $122,829 for six hours of outage. These are both high estimates, as all productivity lost due to power outage is assumed to be permanently lost, i.e., no allowance is made for the possibility of overtime work to make up for productivity losses during outages.

A comparison can now be made between the dollar value of the present value of lost productivity due to outages of the existing 161 kV line without the Anaconda-Hamilton line and Anaconda-Hamilton line costs. In correspondence with the Department, the applicant estimated that the Anaconda-Hamilton line would require a new investment of $3,244,000. Reducing this figure by $1,000,000 to account for the savings to the applicant resulting from the postponement of the Missoula 230 kV connection gives an adjusted cost of $2,244,000. This adjusted cost is 36 times the productivity lost during 1976 to 1995 at 3 hours of existing 161 kV line outage per year and 18 times the lost productivity for 6 hours of outage per year.

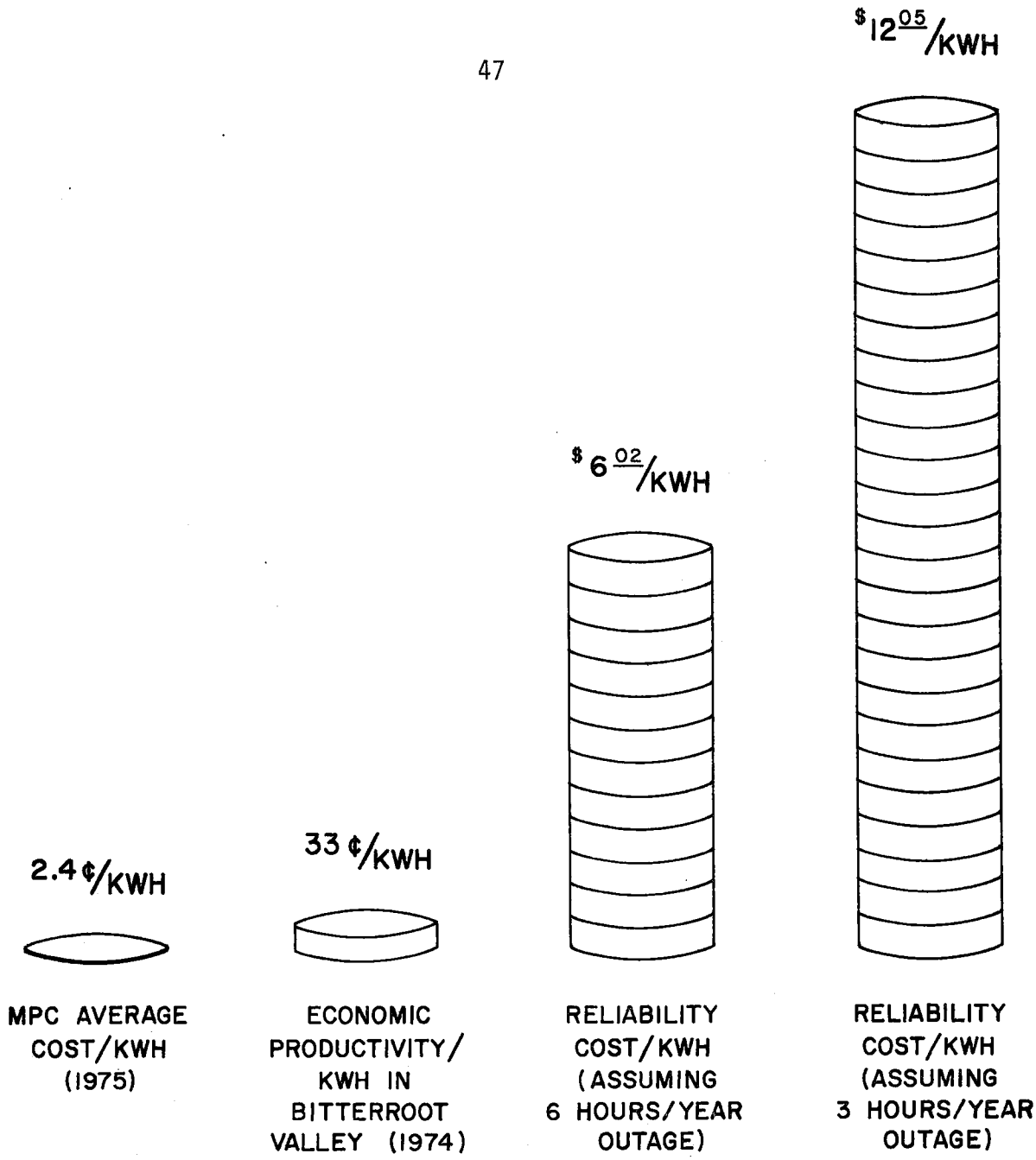
Additionally, one needs to look at the economic cost of the line in Kilowatt-hours (KWH), which is the cost of the line divided by the KWH's of use. Again, the expected load is used, multiplied times the outage rate per year. Using the 8 per cent discount to calculate "present value," the following results: (186,120 KWH) (the adjusted economic cost) = $2,244,000 yielding $12.05/KWH for three hours of outage and $6.03 for six hours of outage. This is the cost per KWH of providing, via the Anaconda-Hamilton line, the residents in the Bitterroot with the electrical energy beyond the capacity of the existing 69 kV lines during the twenty-year period 1976-1995. In other words, $12.05/KWH is the best estimate of the reliability cost to have the Anaconda-Hamilton 161 kV line.

The Montana Power Company's 1975 annual report indicated that on the average, electricity cost their customers 2.4 cents per KWH.

Figures 11 and 12 summarize the general economic costs and benefits of the additional reliability of the Anaconda-Hamilton line. As shown in Figure 10, the cost of the additional energy provided to the customers in the Bitterroot Valley by the Anaconda-Hamilton line ranges from $6.02/KWH to $12.05/KWH, compared to an economic value or benefit, of electricity in the valley of $.33/KWH, and average 1975 cost of electricity to MPC customers of $.02/KWH. Figure 12 compares the adjusted cost of constructing the Anaconda-Hamilton line--$2,244,000--with the benefits which would be lost if the line is not built. The benefits lost would be the 20-year loss in economic productivity, assuming that three hours of outage of the existing line per year is $61,420 and that six hours of outage per year is $122,829.

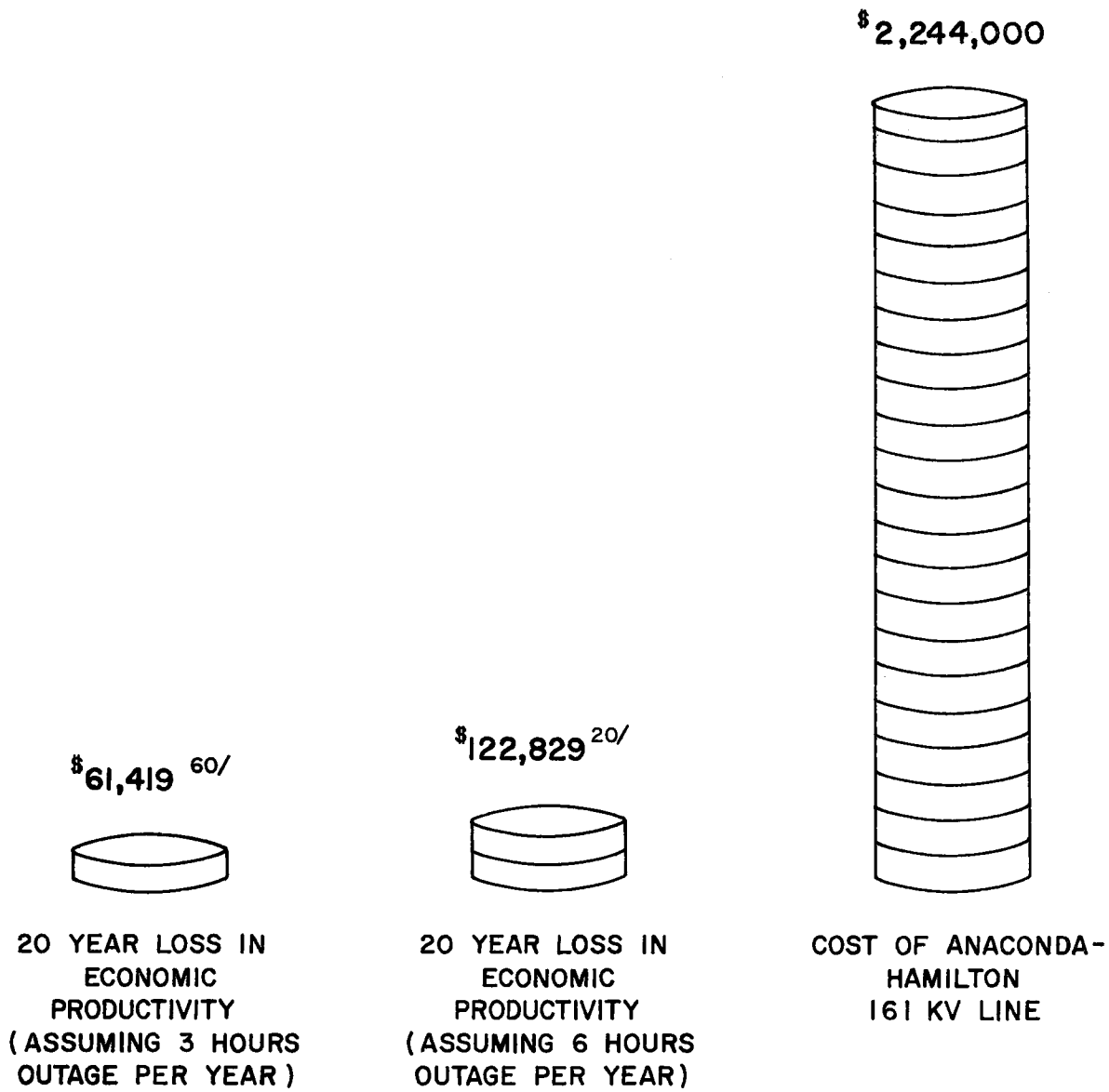
Conclusion

Results of the preceeding analysis indicate that the economic investment necessary to satisfy the applicant's single contingency 90 per cent voltage criterion in the Bitterroot Valley is substantially higher than the value of the economic productivity which would result from the additional reliability.



Comparison of MPC Average Electrical Cost Per KWH, Economic Productivity Per KWH in Bitterroot Valley, and Reliability Cost Per KWH of Anaconda-Hamilton 161 kV Line

Figure 11



Comparison of the Present Value of Lost Economic Productivity (1976-1995) From Miller-Hamilton 161 kV Line Outage (No Anaconda-Hamilton 161 kV), and the Cost of the Anaconda-Hamilton 161 kV Line

Figure 12

B.2. Impacts of Power Outages on Individual Bitterroot Valley Electrical Consumers

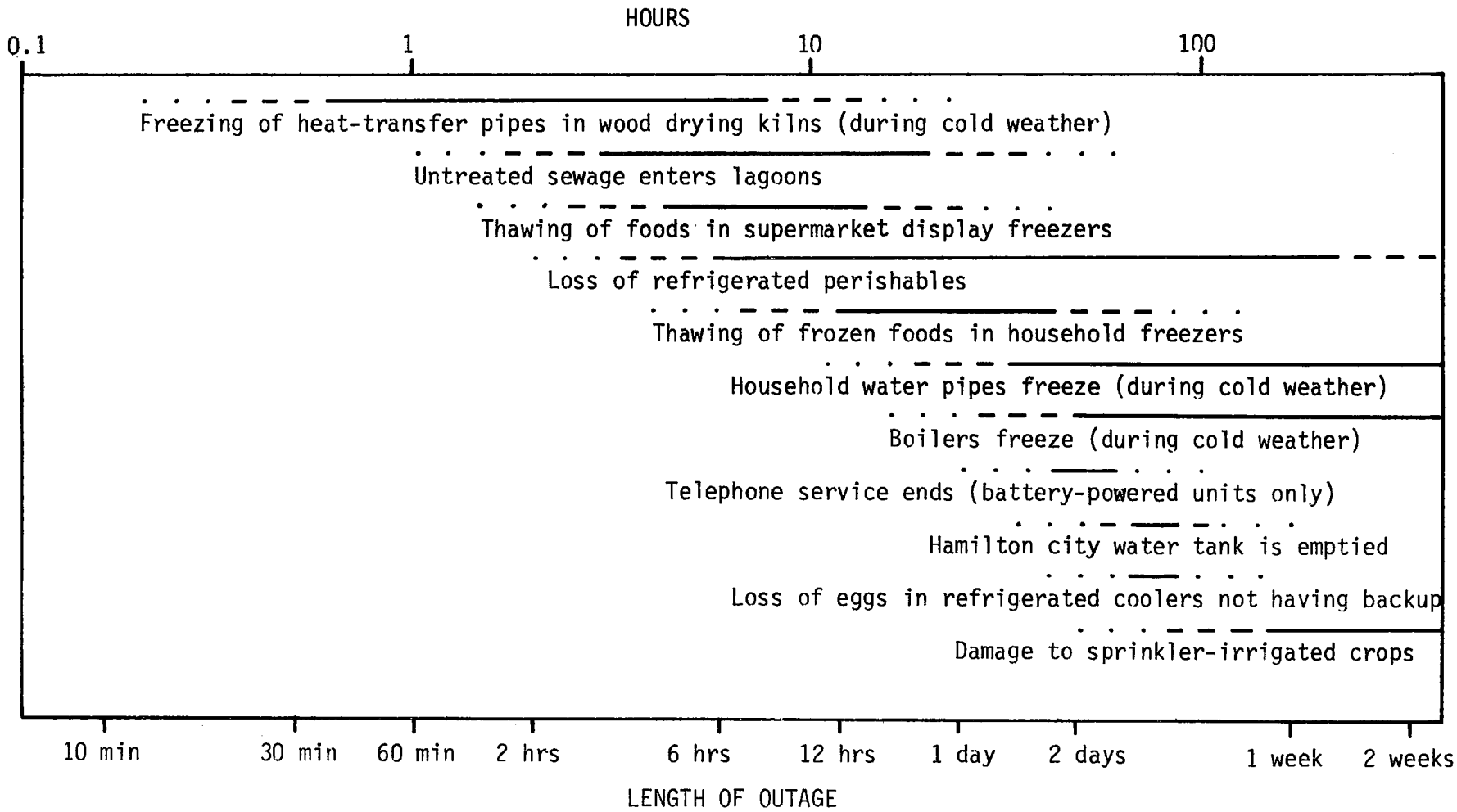
a. Summary

The Bitterroot valley south of Lolo supports a variety of small businesses and manufacturers, primarily associated with the forest products industry and agriculture. There are no major heavy industries (such as smelters or refineries) in the valley, and potential economic losses caused by extended power outage would be minor compared to the major industrial centers of the State. Where potential losses due to power outages are relatively great and reliability is critical (as in the case of hospitals and large poultry farms), some sort of back-up system is usually available.

The magnitude of damage caused by extended power outages, of course, depends on a number of variables, most improtant of which are length of outage and the time of year when the outage occurs. Figure 13 is a graphical summary of the types of impacts which begin to occur during outages of various lengths. It can be seen here that outages of one hour or less seriously affect very few customers, and these would be affected only during extremely cold weather. Property damage due to power outages of 1-24 hours in duration is primarily limited to loss of perishables stored in freezers or coolers. More serious damage, such as freezing of pipes, boilers, and storage tanks, occurs only after longer outages and only during periods of extreme cold.

Perhaps the greatest potential for property damage due to extended power outage is found at the S & W Sawmill wood treatment plant, where the entire boiler-heat transfer system could be damaged following an outage of several days during extremely cold weather. Smaller boilers at a number of other businesses could also be damaged during such an outage. Potential losses are also relatively great at supermarkets, creameries, meat lockers, and meat packing plants, where extended outages could result in loss of large quantities of stored food. In these cases, installation of standby generation facilities could mitigate or prevent such losses.

In an effort to determine the magnitude of potential impacts of power outages on individual electrical customers in the Bitterroot Valley south of the Miller Creek substation (referred to hereafter as "the valley"), EPD personnel conducted a survey of representative customers. The sampling does not represent a complete inventory of businesses and public services in the valley and no attempt was made to contact every electrical customer. An effort was made, however, to contact a cross-section of businesses and agencies in the valley, and to contact at least one representative of each type of business establishment which may have a high potential for losses due to extended power outages (e.g., meat lockers). These customers were contacted in person or by phone, and were asked: (1) what sources of energy they were dependent upon, (2) if electric power outages had caused losses in the past, (3) what types of impacts would result from extended outages, and (4) if standby or back-up energy sources are available in the event of a power outage. The results of this survey are summarized below.



Some Impacts of Power Outages of Different Lengths. Approximate times at which damage begins are based on data obtained by the Department.

FIGURE 13

b. General Impacts

Any power outage, regardless of the duration, is an inconvenience to persons accustomed to a continuous supply of electricity. This type of nuisance is compounded as the length and frequency of outages increases, and constitutes a very real impact. Outages of several hours or more begin to economically affect manufacturers or businesses because products cannot be produced or customers cannot be served. Extended outages can also result in property damage to both homes and businesses.

Perhaps the most obvious type of impact which would generally affect both residential and commercial electric consumers is loss of heat. Power outages would mean loss of heating not only for individuals with all-electric heat, but also most individuals with heating systems fueled by natural gas, propane, and oil, as electricity is required to operate fans and thermostat controls on most gas and oil heating systems. In well-insulated buildings, outages of several days or more during cold winters can create a variety of problems. Among these are discomfort, loss of pets and/or house plants, freezing of water pipes and water heaters, and loss of perishable stored products such as foods and chemicals. Some homes and businesses in the valley are heated by wood stoves or have fireplaces available in case of loss of electrically-controlled heat.

Extended power outages during warm seasons can result in loss of frozen or refrigerated perishables. Frozen foods may be safe in household freezers during outages of 12 hours or more if the freezers are not opened; most refrigerated foods would last somewhat longer. Some thawed foods can be salvaged, but the contents of large freezers are generally more than can be consumed by an average family in the space of several days.

c. Specific Impacts

In this section, impacts more specific to various types of consumers will be discussed.

(i) Impacts to Public Services

(a) Law Enforcement

The Ravalli County Sheriff's Office and the police departments of Hamilton and Stevensville were contacted. In Hamilton, radio communication facilities, an emergency siren, and the town's four traffic lights are dependent upon electricity. Also, the basement of the new county courthouse lies below the water table, and is presently kept dry by a system of two electric pumps, at least one of which operates continually. Two Civil Defense gasoline-operated generators, together having a capacity of 15 kw, are installed in the old courthouse building. These generators have sufficient capacity to provide power during outages to the Hamilton Police and Fire Departments. However, no back-up system has been installed in the new courthouse, where the Ravalli County Sheriff's Office has recently been moved. Consideration is being given to the installation of a back-up generator at the new courthouse.

The Stevensville Police Department operates through the Sheriff's Office in Hamilton; raios are located in cars and would not be affected by power outages.

(b) Water Supply

The private company which is responsible for Hamilton's water supply was contacted. The city water storage tank is filled during the night by electric pumps, and contains enough water to provide the needs of Hamilton for 1-2 days. No back-up generation is available for pumps, and a power outage of two days or longer would cause problems with the city water supply. Customers are asked to turn off sprinklers in the event of a major fire to allow fire trucks to fill up with city water.

Domestic water is supplied to most rural residences by wells with electric pumps. Those residences with systems without pressure storage tanks would be without water immediately upon the onset of a power outage. Those with pressure storage tanks would have water available until tank pressure was lost.

(c) Fire Control

The volunteer fire departments of Hamilton and Stevensville were contacted. The Hamilton Fire Department shares back-up generation with the Police Department. The siren at City Hall would sound even in the event of a power outage. In Stevensville, no back-up is available, and the fire warning siren would not sound if the power were out, but firemen could be notified of a fire by telephone. Fire trucks normally fill with city water but have the capability of filling up from the Bitterroot River, ditches, or reservoirs if the city water supply were exhausted.

In rural areas, fires would have to be fought from trucks if electric power were out, since water is normally pumped from wells by electricity.

(d) Sewage Disposal

The Ravalli County sanitarian and the City Sanitary Engineer at Hamilton were contacted. Sewage treatment facilities such as aeration systems, digesters and clarifiers are operated by electricity, while lagoons are not. No back-up is presently available. After a power outage of several hours, sewage would bypass electrically-operated treatment facilities and accumulate in lagoons; this would cause some mechanically untreated sewage eventually to enter the Bitterroot River from the lagoons.

(e) Communications

KLYQ, the only major radio station in the valley south of Lolo, operates two transmitters (one AM, one FM) at Hamilton. No back-up is available, and transmitting is not possible during power outages. A few minor outages have occurred in the past, but none have caused financial or other losses to the station.

Mountain Bell's telephone service is dependent upon electrical power, but a back-up system of batteries is available at most offices to allow telephone services during outages of 1-2 days or less. In the last few years, no outages have been long enough to interfere with telephone service in the valley. Mountain Bell will soon be installing a back-up direct generator at Hamilton which would provide for telephone service during outages of indefinite length.

(f) Health Care Facilities

The major hospital in the area is the Marcus Daly Memorial Hospital located in Hamilton, a relatively new hospital which was opened April 15, 1975. Heating is provided by hot water, using natural gas and oil as fuel, but the heating system cannot operate without electricity. Most of the critical drugs and vaccines needed by patients in the valley are stored at the hospital, some in electrically-operated refrigerators or freezers. A diesel generator of 175 kw capacity is available as a standby power ource; it switches on automatically in case of power outage and can provide all present electrical needs of the hospital. This generator can be run indefinitely; 600 gallons of fuel are stored at the hospital. Power outages have occurred several times since the hospital was opened; the generator has provided the hospital's electricity during these periods.

One nursing home, located at Stevensville, was contacted. This facility is heated by gas-fired boilers which require electrcity for operation. In case of power outage, battery packs are available to operate fire alarms, exit lights, and hall lights for up to six hours. Other than this, no back-up is available. However, even extended outages here do not pose a direct threat to human life; no critical medical care facilities are located here, and emergency bedding is available in case of outages during periods of extreme cold. Outages have not caused severe problems in the past.

(ii) Impacts to Commercial Customers

(a) Groceries

Four grocery stores were contacted, including the largest supermarket in the area, located in Hamilton. Extended power outages can cause considerable economic losses to these stores, as entire inventories of perishables and frozen foods may be lost. Losses to foods in the top layers of display freezers would probably begin within two hours, and to foods in deeper layers within two to three hours. Most refrigerated perishables would begin to spoil after 4-12 hours, and vegetable produce after 12-24 hours during hot weather. Outage duration sufficient to cause damage depends upon weather and upon the time of day when outage occurs. Only one of the four groceries, the one located in Florence, reported recent losses due to power outage. None had back-up generation available.

(b) Service Stations

The two service stations contacted reported loss of business to be the greatest impact of power outage, as electric gasoline pumps could not be used. One of the stations reported outages to be infrequent; the other complained that periods of low voltages or "brown-outs" causing damage to motors have occurred during winter months in the past years. No back-up was available at these stations.

(c) Meat Packing Plants

Four meat packing and/or storage firms were contacted. All depend upon electricity to operate coolers and freezers, and could lose their entire inventory of meats should an extended power outage occur. Estimates of the length of time without power after which losses would begin to occur ranged from 12 to 48 hours for frozen meats and from 6 to 48 hours for unfrozen meats in coolers. Back-up generation was not available. No losses due to power outage have been reported.

(d) Feed and Grain Suppliers

Two feed stores were contacted, one in Stevensville and one in Hamilton. The former relies upon electricity to power a pellet mill which could not function during an outage, but reported no perishables on hand. The latter is also totally electric, and would be shut down during an outage. It was reported that tanks of melted fat would solidify and some pipes would plug during an overnight outage (six to eight hours), causing some inconvenience but no major losses. An outage of several days during extreme cold weather could result in damage to the boiler through freezing. A large inventory of veterinary drugs is stored in freezers at this plant; some do not require freezing, but others would be destroyed if thawed. No back-up is available, but no major losses due to outages have been reported.

(e) Creamery

A creamery in Hamilton was contacted. Cheese and ice cream are the major products of this plant, and are stored in large coolers and freezers. The storage facilities are operated by compressors powered by a natural gas boiler, which cannot run without electricity. Ice cream would begin to soften after 6 to 24 hours of power outage and would be lost by an outage of two days. Cheese in coolers would reportedly be safe for up to a week without refrigeration, except in very hot weather. One recent outage was reported which nearly caused 1,000 pounds of cheese to be lost, but no actual losses due to power outage have occurred. The value of ice cream on hand is approximately $4,000 and that of cheese is greater than $5,000. No back-up is available.

(f) Concrete Plants

The two concrete plants contacted are totally dependent upon electricity

for normal businees operations. One plant reported that a power outage of a day or longer during extreme cold may result in loss of a $12,000 boiler system due to freezing if the boiler cannot be drained. No back-up is available, but no losses due to power outages have been reported.

(g) Veterinary Service

One veterinary clinic was contacted. It was reported to have two refrigerators, a vaccine cooler, a freezer for specimens, plus a deep freeze for serums, all of which are dependent upon electricity. Damage to stored perishables would probably begin after a 24-hour outage. No back-up is available, but no losses due to outages have been reported.

(h) Pharmacy

A pharmacy store in Hamilton was contacted. A variety of drugs are stored under refrigeration; some would spoil following an outage of several hours, but some would keep for many hours and others would not be damaged at all. Most critical drugs and vaccines are stored at the hospital. No back-up is available at this pharmacy, and no losses due to outages were reported.

(i) Greenhouses

One greenhouse near Hamilton was contacted. This greenhouse is heated with a natural gas furnace not dependent upon conventionally transmitted electricity for operation. It was reported that this system of heating is prevalent among greenhouses, as electric heat is too expensive. Power outages, of course, would not cause major losses to greenhouses having this heating arrangement.

(j) Wood Products

A major sawmill and finishing plant at Darby, and a log home manufacturing plant near Woodside were contacted. All are dependent upon electricity for normal operation, and would suffer considerable loss of business and production during extended power outages.

Of all the electric customers contacted in this study, the wood finishing plant at Darby has the potential for the greatest loss of property in the event of extended outages. At this plant, wood is dried in large kilns, which are heated by steam through a high-surface-area system of stainless-steel heat-transfer ducts. The steam originates in a large boiler, which is fired by a wood chip burner. Chips are supplied to the burner by a system of electric induced draft fans which transport the chips from a hopper to the burner through large metal pipes. In the event of power outage, chips could not be transferred to the boiler, and the system of heat-transfer pipes would rapidly lose heat. If this occurred during a period of extremely cold weather, heat transfer could freeze up before they could be drained, resulting in significant damage to the system. An evaporation tank and a water and oil storage

tank may also freeze if not drained; total potential losses due to freezing were estimated at $500,000. It is not known how long this equipment would take to freeze, but during below-zero weather the heat transfer pipes would probably freeze within a matter of hours.

A standby oil burner is on hand to keep the boiler running in the event that the supply of wood chips is exhausted. However, this boiler cannot be operated without electricity, as 1.5 amps are required for the oil igniter, and a number of electric motors are required for operation of the system. The motors and their capacities are as follows:

Oil burner pump motor	1.5 hp	
Oil blower motor	7.5 hp	
Induced draft fan motor	40.0 hp	
Over fire fan motor	20.0 hp	
Forced draft motor	7.5 hp	TOTAL 76.5 hp

Three phase electric back-up generation of approximately the load for 80 hp of electric motors would be required to keep the boiler system operative during power outage. In addition, the boiler must be supplied with water; usually this is provided from a well having an electric pump of approximately 25 hp capacity. In the event of power outage, an emergency supply of city water from Darby, sufficient to provide the boiler with water for several hours, is available and could be used.

No damage caused by power outages was reported at the sawmill contacted.

The log home plant reports a 3,500-watt gasoline generator on hand which could allow some workmen to continue work during a power outage. The office has a wood stove to provide heat during outages. No problems due to past outages were reported.

Fire fighting would be a problem at these wood products plants during power outage, since water is pumped from wells by electricity. City volunteer fire departments would have to be called in case of fire during an outage.

(k) Railroads

Burlington Northern, which operates a railroad through the valley, reports that an extended power outage would not adversely affect operations of the railroad. The train is only operated once a week, and can operate without electricity. Railroad crossing signals have battery packs which would allow them to operate during outages of several hours.

(l) Airports

The Hamilton airport, although the largest airport in the valley, serves no major airlines. Extended power outages would not seriously affect operations of the airport, as this airport does not have instrument approach and provides only advisory communications to aircraft. Nighttime approaches during outages would be difficult, as approach lights and beacons could not

operate, but not impossible. No back-up is available.

(m) Trapper Creek Youth Camp

This U.S. Forest Service-operated youth camp is located along the West Fork of the Bitterroot River several miles upstream from Bonner. The facility is all-electric, and loss of power would cause loss of heat and other inconveniences. Approximately $10,000 worth of frozen food is on hand, and would be damaged after an outage of one day or longer. The fire-fighting system, which is run on electric pumps, could not operate during an outage. A back-up generator is reportedly available, but is presently on loan to the Office of Civil Defense in Hamilton.

(n) Restaurants

Two restaurants in the valley were contacted; one is operated in conjunction with a truck stop, and the other in conjunction with a laundromat. Both reported loss of business, loss of frozen foods, and discomfort to be the greatest impact of extended power outage. Two recent outages of short duration were reported, but none caused severe problems. No back-up is available.

(iii) Farms and Ranches

(a) Dairy Farms

Milking of cattle at large dairy farms is typically accomplished by electric milking machines, and milk is stored in refrigerated tanks which are also dependent upon electricity. Milk is usually picked up daily and shipped in refrigerated tanks to Missoula, Butte, and Spokane. In case of outages, dairies not having back-up systems could not milk cows. One dairy we contacted has a 20 kw diesel tractor-operated standby generator, capable of supplying all the electric needs of the dairy, available in case of power outage.

(b) Poultry Farms

The largest egg producer in the valley, having approximately 200,000 laying hens, was contacted. Electricity is needed in summer to cool and circulate air through the coops; a brief (one hour or less) outage during a hot day could result in loss of the entire laying stock. In winter, no auxiliary heating is necessary, as the chickens themselves provide adequate body heat. Refrigerated coolers for egg storage also run on electricity but losses of eggs would not occur unless an outage of 2-3 days or longer occurred. Six back-up generators (2 deisel, 2 natural gas, 2 propane) are available to provide power during outages, so there is little actual danger of severe losses resulting from extended power outage; no losses were reported.

(c) Other Farms and Ranches

Several rural farms, ranches, and the Ravalli County Extension Agent were contacted in an effort to determine impact of power outage on agriculture. Electric power outages are a great inconvenience to rural farms and ranches, but would cause little real damage to crops or livestock. While some irrigation in the valley is dependent upon electric pumps, much is gravity-operated from ditches and canals. Most irrigated crops can tolerate several days without water; certain crops (such as corn and malting barley) would begin to suffer damage after three days without water during the heat of the summer. Outages were not reported to have caused major problems in the past.

b. Reliability Alternatives

If no 161 kV line is constructed into the Bitterroot Valley, alternatives are available which would reduce the impact on valley electrcial customers of an outage of the existing Missoula No. 4-Hamilton Heights 161 kV line. The impacts of extended outage of the existing Missoula No. 4 to Hamilton Heights line could be reduced by load shedding and rotating remaining power among substations. Both long-and short-term outages of the existing 161 kV line could be mitigated by individual back-up generators.

Before discussing the alternatives to the Anaconda-Hamilton reliability, it is important to understand the significance of the proposed line on service reliability to ultimate electric consumers. Construction of the proposed 161 kV line would necessarily increase the reliability of the transmission system, but would not eliminate short or extended power outages to electric consumers in the Bitterroot valley. Power delivery to valley consumers depends not only upon at least one 161 kV line to bring sufficient power into the valley, but also upon the 69 kV lines, distribution substations, and distribution lines to distribute power to individual customers. The Anaconda-Hamilton line would eliminate the effects of an outage of the existing Missoula No. 4-Hamilton Heights 161 kV line only if the 69 kV lines and distribution system remained operational. Stated another way, if catastrophic damage occurred to the Missoula No. 4-Hamilton Heights 161 kV line requiring several hours or longer to repair, and if either of the 69 kV "A" or "B" lines or the Hamilton Heights-Hamilton double circuit 69 kV line or the distribution system were not similarly damaged, then the Anaconda-Hamilton 161 kV line would prevent an extended outage to Bitterroot valley consumers. The double circuit 69 kV line proposed by the applicant between the Hamilton-Heights and Hamilton substations is particularly significant. The simultaneous loss of the Missoula No. 4-Hamilton Heights 161 kV line and this double circuit 69 kV line would mean that no power could be delivered to any Bitterroot valley customers via the Anaconda-Hamilton line.

In summary, the Anaconda-Hamilton line would increase transmission system reliability, i.e., the ability to transport power to the Bitterroot valley. However, it would eliminate power outages during a fault of the Missoula No. 4-Hamilton Heights 161 kV line only to the extent that the valley 69 kV lines and distribution systems are operational. Any severe weather problem causing an outage of the existing Missoula-Hamilton 161 kV line (e.g., strong wind, ice storm, heavy wet snow, etc.) would also probably

cause outages of the valley 69 kV lines and distribution systems.

(i) Load Shedding and Load Rotation Alternative to the Anaconda-Hamilton Reliability

As is the case with the Anaconda-Hamilton line, the load shedding and rotation alternative could mitgate the impact of an extended outage of the Missoula No. 4-Hamilton Heights 161 kV line to the extent that the existing valley 69 kV lines and distribution system would remain operational.

The impact would be reduced by rotating power among valley substations and/or large power customers so that an extended outage to all or parts of the Bitterroot valley could be avoided.

Load shedding in this context refers to the dropping of sufficient load after an outage of the Missoula-Hamilton Heights 161 kV line to avoid widespread inadequate voltage or "brown-outs" in the Bitterroot Valley. Beginning in summer 1977, peak loads in the valley are projected by the applicant to begin exceeding the capacity of the 69 kV "A" and "B" lines, and loss of the existing 161 kV line during these periods would result in inadequate voltage levels. Within an hour of such an outage of the Missoula No. 4-Hamilton Heights line, sufficient load could be manually removed from the valley system to restore adequate voltage to at least portions of the valley. If the fault on the 161 kV line could not be rapidly repaired, the applicant could devise a plan for rotating the energy capable of being adequately provided by the 69 kV "A" and "B" lines among valley substations or large power customers. The rotation would be necessary during those periods in which the total valley load would exceed the capacity of the 69 kV lines. By this alternative, Bitterroot valley customers would not receive the continuous electrical energy which would be available because of the added transmission reliability of the Anaconda-Hamilton line, but they could be spared both "brown-outs" and the extended power outages due to loss of the exisiting 161 kV line which could cause serious property damage and other inconveniences.

(ii) Individual Back-Up Generation Alternative

An additional alternative available directly to individual valley electrical consumers which is capable of eliminating or substantially reducing the impact of power outages is installation of back-up systems. These back-up systems could range from batteries to operate controls on some natural gas heating systems to 100 kw gas or oil-fired generators to provide electricity for commercial processes.

Back-up systems are now in use in the Bitterroot valley. Valley public service agencies involved in the immediate protection of human-life (e.g., the Hamilton hospital, Hamilton police, etc.) have back-up systems. Some businesses which would suffer severe economic damage bacause of power outages also now have back-up systems (e.g., floral greenhouse, an egg producer, a dairy farm). Some rural residences also have back-up heating systems independent of electricity. However, some businesses susceptible to severe economic damage due to both short-and long-term power outages do

not have back-up systems (e.g., S & W Sawmill, meat packing establishments, dairy farms, groceries, etc.). A transmission line built to increase system reliability will generate revenue to a utility beyond that resulting from the remainder of the transmission system only when a transmission line fault occurs. For this reason the cost of transmission lines constructed primarily for reliability cannot be offset by additional revenue and must be borne by all electric consumers of the utility company. A decision to build the Anaconda-Hamilton line to partially reduce the risk of economic loss due to power outages would therefore amount to a subsidy of those Bitterroot valley electric consumers by all electric consumers in the applicant's service area. If, on the other hand, those susceptible businesses chose to purchase back-up systems, the reliability cost would be borne by those individuals purchasing the business' goods or services.

Back-up systems also have the added advantage of providing protection against power outages caused by utility generation, transmission, or distribution outages. Even if the Anaconda-Hamilton 161 kV line is constructed, power outages to Bitterroot valley electrical consumers will continue to occur. Table 13 contains information filed by the applicant concerning all power outages to ultimate Bitterroot valley consumers except:

(1) those which affect five or fewer customers or are less than 30 minutes duration

(2) those which do not interrupt service to consumers

(3) momentary outages on the transmission system

(4) planned outages in which the customers have been notified beforehand (MPC 4-5-76)

Table 14 indicates that through the period 1-1-75 to 8-20-76, a total of 51 power outages due to distribution system (i.e., both distribution substation and lines) faults occurred, resulting in over 7,000 customer hours of lost power. Individual distribution-related outages lasted up to 14 hours.

Equipment costs for back-up generators, manual starting and automatic starting controls for various set sizes are shown in the table below.

TABLE 12

Generator Size	Generator Cost	Starting Equipment	
		Manual	Automatic
5 kw 1-phase	$1624.00	$165.00	$ 473.00
30 kw 3-phase	4900.00	175.00	1548.00
55 kw 3-phase	6650.00	394.00	2313.00
85 kw 3-phase	8525.00	594.00	3668.00

SOURCE; A.I. Distributors, Great Falls, Montana, 1976.

TABLE 13

1975 BITTERROOT VALLEY ELECTRIC POWER OUTAGES[1/]
DISTRIBUTION SYSTEM AND SUBSTATION RELATED

Date	Time	Location	Duration	No. of Customers Effected	No. of Customer Hours	Cause of Outage
2-13-75	5:00 am	Corvallis	1h 0m	35	35	Enclosed cutout broke.
2-13-75	2:30 pm	West Hamilton	0h 40m	50	33.3	Cattle rubbing on guy wire.
3-13-75	4:00 pm	South of Lolo	2h 30m	18	45	Broken static wire.
4-26-75	3:00 am	Stevensville	6h 0m	15	90	Snow and ice on line.
4-26-75	4:30 am	Stevensville	3h 0m	20	60	Snow and ice on line.
4-26-75	6:00 am	Stevensville	8h 0m	10	80	Snow and ice on line.
4-26-75	10:00 am	Hamilton	0h 40m	14	9.3	Snow and ice.
4-26-75	11:30 am	South of Darby	2h 30m	16	40	Heavy snow and ice.
4-26-75	12:30 pm	Victor	3h 0m	50	150	Storm. Broken primary.
4-26-75	12:30 pm	Corvallis	0h 30m	500	250	Storm. Broken static wire.
4-26-75	2:30 pm	Hamilton	0h 40m	14	9.3	Blown fuse.
4-26-75	3:30 pm	Hamilton	1h 30m	60	90	Blown fuse.
4-26-75	3:30 pm	Hamilton	0h 40m	14	9.3	Blown fuse.
5-26-75	2:30 pm	Hamilton	0h 50m	17	14.2	Truck hit pole.

TABLE 13
(continued)

Date	Time	Location	Duration	No. of Customers Effected	No. of Customer Hours	Cause of Outage
5-28-75	3:30 am	Victor-Florence	1h 40m	575	958.3	Flashover on insulator caused relay problems.
5-28-75	3:30 am	Lolo	0h 45m	537	402.8	Flashover on insulator caused relay problems.
6-19-75	1:00 am	Hamilton	0h 53m	62	54.8	Tree in line.
6-19-75	3:10 pm	Corvallis	0h 45m	43	32.2	Insulator shorted out.
6-19-75	6:00 pm	Corvallis	1h 0m	43	43	Wires wrapped together.
6-22-75	6:00 pm	East of Florence	1h 30m	35	52.5	Winds. Wire down.
7-4-75	10:50 pm	stevensville	2h 0m	15	30	Lightning. Blown fuse.
7-4-75	10:56 pm	Stevensville	2h 0m	23	46	Lightning. Blown fuse.
7-29-75	2:45 am	Corvallis	3h 0m	130	390	Tree in line.
7-29-75	8:45 am	Darby	1h 30m	75	112.5	Tree in line.
7-29-75	1:00 pm	Hamilton	1h 30m	27	40.5	High winds.
8-2-75	3:15 pm	Corvallis North	0h 30m	55	27.5	Wind blew trees into line
8-14-75	9:57 am	Darby	0h 58m	743	718.2	Bird flew into capacitor bank at sub.
8-19-75	6:45 pm	North-Hamilton	1h 0m	50	50	Lightning and wind. Blown fuse.

TABLE 13
(continued)

Date	Time	Location	Duration	No. of Customers Effected	No. of Customer Hours	Cause of Outage
8-19-75	6:45 pm	Hamilton	0h 40m	40	26.7	Lightning and wind. Blown fuse.
8-19-75	6:45 pm	Hamilton-Corvallis	0h 50m	30	25	Lightning and wind. Blown fuse.
8-27-75	6:00 pm	Stevensville-Florence	3h 0m	80	240	Tree in line
8-27-75	6:00 pm	Stevensville-Florence	6h 0m	25	150	Tree in line. Pole down.
8-27-75	6:00 pm	North of Stevensville	14h 0m	6	84	Tree in line. No communications.
9-3-75	3:00 am	North of Florence	2h 0m	23	46	Blown fuse.
10-21-75	3:30 am	West side of Hamilton	8h 0m	47	376	Trees in line due to heavy snow.
10-21-75	7:00 am	Lolo, Florence, and Victor	5h 0m	80	400	Heavy snow. Trees in line.
10-21-75	8:00 am	Hamilton	10h 0m	36	360	Heavy snow. Trees in line.
10-21-75	8:00 am	Stevensville	5h 0m	25	125	Heavy wet snow. Trees in line
10-21-75	8:00 am	Stevensville	10h 0m	35	350	Heavy wet snow. Trees in line
11-24-75	9:45 pm	Hamilton	2h 40m	74	197.6	Auto hit pole.
	TOTAL				6,254.0	customer hours

TABLE 13
(continued)

Transmission

Date	Time	Location	Duration	No. of Customers Effected	No. of Customer Hours	Cause of Outage
7-6-75	7:30 pm	Bitterroot Valley	0h 30m	300	150	Lightning
7-10-75	3:50 pm	Bitterroot Valley	4h 30m	6,300	28,350	Lightning storm2/
7-29-75	8:30 pm	Lolo	1h 30m	500	500	Pole fire
10-21-75	7:00 am	Lolo, Florence, and Victor	2h 0m	500	1,000	Heavy snow. Trees in line
10-21-75	1:00 pm	Stevensville	1h 0m	500	500	Heavy wet snow.
	TOTAL				30,500	customer hours

SOURCE:

1/On the PSC outage forms the outages are not catagorized as transmission and distribution. The break down shown in this table was made by comparing data in the PSC forms with data in Table 3-16 of the Draft EIS.

2/Some ambiquity exists concerning this outage. Data in Table 3-16 of the Draft EIS reported the following data for 7-10-75: Line Out: Rattlesnake Sub to Missoula No. 4 Sub 161kV line; Cause: Unknown; Service Lost Location: Entire Bitterroot Valley; Time: 3 min.

TABLE 14
(continued)

Date	Time	Location	Duration	No. of Customers Effected	No. of Customer Hours	Cause of Outage
7-12-76	4:30 am	Hamilton North	2h 0m	40	80	Lightning. Blown fuses
8-1-76	9:30 pm	Hamilton	2h 0m	70	140	Lightning storm
8-2-76	7:30 pm	Darby	2h 0m	12	24	Storm. Tree in line
8-6-76	8:30 pm	Hamilton West	1h 0m	35	35	Tree in line.
8-7-76	6:00 am	Hamilton West	0h 40m	15	10	Auto hit guy wire.
	TOTAL				1,188.4	customer hours
			Transmission			
8-2-76	7:30 pm	Darby	1h 0m	500	500	Storm. Tree in line
8-6-76	8:40 pm	Victor-Florence	1h 0m	521	521	Tree in line
					1,021	customer hours

The above does not include installation costs and operating costs comprising fuel and maintenance costs. Fuel and maintenance costs are directly related to usage and are unlikely to be significant. Capital costs of plant and manual control range between approximately $360.00 per kw for a 5 kw generator and $107.00 per kw for a 85 kw generator.

e. Conclusion

Results of the Department's initial attempt at weighing the economic costs and benefits of a transmission line suggest that the costs of the Anaconda-Hamilton line may exceed the general economic level. The investment necessary to satisfy the applicant's 90 per cent voltage criterion in the Bitterroot valley is substantially higher than the value of the economic productivity which would result from the additional reliability. Construction of the Anaconda-Hamilton line would reduce the potential for inconvenience and property damage to individual customers due to short-and long-term power outages in the valley. Alternatives to the Anaconda-Hamilton line are available to reduce the impact of power outages on individual electricity customers. Load shedding and rotation could, under certain condtions, be utilized to prevent electricity customers from going without electrcity for long durations. Installations of back-up heating and power systems would provide greater protection against power outage than the proposed line, but the costs of this alternative would be borne by individuals in the Bitterroot valley.

PART TWO

PUBLIC COMMENTS ON THE DRAFT EIS

PART TWO

PUBLIC COMMENTS ON THE DRAFT EIS

I. Public Meetings

The Department conducted three public meetings for the purpose of obtaining statements from individuals and groups regarding the application and the draft EIS. The first meeting was in Missoula on August 23, 1976, and was attended by approximately 50 persons. The second meeting was in Hamilton on August 24, 1976, and was attended by approximately 50 persons. The third meeting took place in Anaconda on August 25, 1976, and 23 persons attended.

Of the many persons who provided verbal comments, only two residents supported the application as proposed--one from Missoula and one from Anaconda.

Negative comments given at the public meetings, which reflected many of the same attitudes presented in letters to the Department, related to the question of need for the proposed Anaconda-Hamilton 161 kV transmission line. Nearly all respondents prefaced their remarks with an expression of doubt that a real need for the line exists, or that the rationale of reliability is sufficient in this application to justify construction of a new line.

One participant, an economics professor, presented a lengthy discussion on the validity of the applicant's load projections. He stated that it is not valid to base future projections on patterns established during the previous ten years, asserting that consumption patterns will change due to impending price increases. Furthermore, this respondent maintained that even if the MPC's projections were accepted, the few hours of added reliability afforded by the proposed line would not be worth the economic and environmental costs incurred.

Another major concern expressed relates to the proposed line's location. Strong opposition has been organized by residents of the Pattee Canyon area against routing of the line through the Canyon. The major concern stated was that the line would cross a public recreational area, which, according to a representative from Pattee Canyon, was ignored by the draft EIS. Residents have organized an Ecological Board of Review for the purpose of coordinating lawsuits against violations of zoning provisions enacted by the residents themselves. Four volumes of public opinion questionnaires regarding this issue were submitted to the Department. (NOTE: Since the public meetings, the Department has revised its alternative Bonner-Hamilton route. It is shown in Figure 14 in section IV.)

Concern was expressed also that if a transmission corridor were routed through the Bitterroot Valley, pressure may begin immediately for routing another line through the Magruder corridor across the Bitterroot Range. Some respondents who expressed this concern also recommended that existing corridors be used instead of creating new corridors and rights-of-way.

II. Summary of Written Response

Through August 28, 1976, the Department received approximately 30 letters in response to the draft EIS. Several of the persons giving verbal statements at the public meetings also submitted letters, which were included in the letter compilation.

All of the letters received by the Department expressed opposition to the application. The reasons given are tabulated below. The most common reasons given were: aesthetic degradation, reliability is insufficient need, and the study area's wilderness characteristics. More than 50 per cent of the letters received were from residents of the Pattee Canyon area.

Reasons given to deny permission for construction of the line:	Number of Times Cited:
1. Aesthetic considerations	14
2. Reliability is not sufficient need	11
3. The study area's wilderness characteristics (roadless areas included in Senate Bill 393)	10
4. Recreational considerations	8
5. Inadequate proof of need	6
6. Land value would decrease	6
7. Possible degradation or destruction of area through increased access to hikers, hunters, and others	2
8. Increased expense to electricity consumers	2

Some respondents offered recommendations. They are listed below.

Recommendations:	
1. That the line run from Bonner to Hamilton	1
2. Upgrade existing lines	3
3. Utilize existing corridors	6

III. Selected Letters

Of the written comments received, several have special importance or are representative of recurring points of view. These comments are reproduced here, followed by the Department's response in section IV.

BEFORE THE MONTANA DEPARTMENT OF

NATURAL RESOURCES AND CONSERVATION

IN THE MATTER OF THE APPLICATION BY THE MONTANA POWER COMPANY FOR A CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY AND PUBLIC NEED IN REGARD TO THE ANACONDA-HAMILTON 161 KV LINE	)	COMMENTS ON THE DRAFT EIS

I.

The Applicant submits the following comments on the Department of Natural Resources draft environmental impact statement on the Anaconda-Hamilton 161 kV transmission line, issued July, 1976. References are made in these comments to page and paragraph numbers in the draft environmental impact statement. Some comments are also made on some general issues raised throughout the Department's draft environmental impact statement.

Page 8, paragraph 3: Missoula urban area contains about 60,000 people, rather than 30,000 as shown.

Page 9, paragraph 4: It should be pointed out that the Skalkaho road is closed to traffic about eight months of the year.

Page 10, chapter 2: It is submitted that the Department's methodology which includes valuating and weighing particular factors in determining the location of a transmission line is very subjective. Because this methodology is subjective, it should be qualified that such methodology is a limited planning tool and is by no means perfect.

Page 11, last paragraph: In referring to the upgrading or expansion of existing systems, the problems and costs associated with such upgrading should also be noted.

Page 12, paragraph 1: In the discussion of peak load management, it should be noted that peak load management may defer deficiencies, but may not eliminate the need for additional transmission lines forever.

Page 14, paragraph 1: Why were the two concerns of reliability and cost which were used by the Department in the Clyde Park-Dillon study, not included in the list of concerns in this study? What is meant by "costs were evaluated on alternatives generated by other means"? What is the other means which was used by the Department?

Page 15, paragraph 2: What is the Department's basis for selecting the equivalence function? Are the ratings used in this study the same as the ratings used in the ClydePark-Dillon project? If not, why? The terms "severe impact, significant and slight impact" should be defined. Again, it is submitted that the methodology used by the Department is subjective and there is no adequate description or justification for this subjective rating system.

Page 16, paragraph 6: What evidence does the Department have that indicates some of the corridors were "shown to be obviously superior to others no matter which"? The Applicant requests a copy of these composite maps which support that statement.

Page 16, paragraph 7: What are the "many factors" that the Department believes the Board decision will be based upon?

Page 18: It is submitted that the Department has categorized a cell by the dominant characteristics in that cell, and such dominant cell theory does not give a representative picture of the details within a cell.

Page 19, paragraph 1: It should be emphasized that the Applicants have stressed the increased load growth in the Missoula and Philipsburg areas as well as the Bitterroot Valley as a basis of the need for this project.

Page 20: Table 3-1 should also include the McClay and CKS Lumber Company substations. And the map showing existing transmission lines incorrectly shows two 50 kV lines between Philispburg and Drummond because one of the lines is a partail 25 kV line. The question marks shown on Table 3-2 were answered by a letter from John Evans to the Department dated April 20, 1976.

Page 37, paragraph 3: Details on the anticipated load growth in the Missoula area were supplied by the Applicant in its annual long range plan, and the results are also shown on page 41, Table 3-13 of the Department's draft EIS.

Page 43: In discussing sprinkler irrigation, some projection and discussion of potential conversions from flood to sprinkler irrigation should be made, and what potential increase in electricity may result therefrom.

Page 44, last paragraph: The formula should read

$Y = e^{3BX}$.

Page 45: The headings on the last three columns are incorrect.

Page 47, last paragraph: The last sentence should be qualified with the proviso that the lines are adequate through 1985, if the Applicant does not carry power to Lolo and Stevensville, and if a tap is made to provide a good source in the Missoula area. However, the Applicant does carry power to Lolo and Stevensville and a tap has not yet been made in the Missoula area. See page 9 of the Applicant's application.

Page 52, second paragraph: The statement that "PSC Rule 805 does not affect considerations of electrical need for the proposed Anaconda-Hamilton transmission line" is incorrect. A good utility must provide good electrical service, and the utility must provide reliable service and plan for events which are excluded by Rule 805. If the State is going to accept a lesser degree of reliability under the Siting Act, then it must also accept the responsibilities that may result from a lesser reliability.

Page 52, paragraph three: Reference is made to Department engineering studies which do not indicate voltage problems in the Missoula area. What studies are these and by whom were they made? The Applicant requests a copy of such studies. It should be noted that the Applicants by letter of March 15, 1976, from John Evans disagrees with this statement by the Department regarding no indication of voltage problems.

Page 53, paragraph two: The Applicants did send to the Department load flow studies covering the Philipsburg area by letter of March 15, 1976, and the ten year plan also indicates there are growing loads in the Philipsburg area, and that

some transmission facility is needed in that area. The Department is requested to take notice of this information.

Page 53, last paragraph: The Department refers to analysis by the Department which do not substantiate an electrical need in Missoula through 1979. The Applicants wish to know by whom these studies were done and request a copy of such analysis.

Page 54, paragraph three: In discussing alternatives of wind and solar power, it should be pointed out that transmission lines would still be needed to carry electricity, when solar and wind power are not producing energy.

Page 56, paragraph five: The costs for underground transmission shown in this paragraph and also on Table 4-1 cover costs for materials only. It should be noted that there are additional costs with underground transmission for labor, maintenance, right of way clearing, etc. Also the costs shown on Table 4-1 are for 115 kV transmission lines and the public should not be misled that these figures would be applicable to the Anaconda-Hamilton facility.

Page 58, paragraph 1: In the discussion on load dropping, it should be pointed out that this alternative is not feasible at this time, and the implementations of a load shedding program on The Montana Power Company system are very difficult.

Page 59, paragraph 1: In the discussion of the "ripple control system" a discussion of the costs of implementing such a system should also be referenced.

Page 59, last paragraph: The Applicants disagree that the Philispburg area was not represented by the Applicants as having a need. Reference is made to the need in the Philipsburg area on page 7 of the original application, and supplemental information referred to above was also supplied to the Department.

Page 61, paragraph 1. In discussing alternatives to the Applicants, there should be some discussion of the costs of such alternatives.

Page 62, Table 4-2. In Case Nos. 6, 7, & 8 on Table 4-2, the Applicants wish to know by whom they were done, when, and the Applicants request a copy of these case studies.

Page 63, paragraph 1. If the Department is going to consider tapping the BPA 230 kV line, consideration should be given to tapping said line in the vicinity of the Rattlesnake rather than in the Bonner area. The Applicants also wish to know whether the Department has considered whether the BPA line has adequate lightning protection from Hot Springs to Mill Creek.

Page 63, paragraph 2: Reference is made to a 161/50 kV substation which the Applicants submit is not necessarily correct because no studies have yet been conducted regarding such a substation.

Page 65: A discussion of the thermal capacity of the transmission line should read "203" rather than "230".

Page 67, paragraph 1: The construction cost should read "$42,500 per mile" rather than $42,000.

Page 68 & 69: The Applicants question that construction by helicopter can save money and request that the Department document such statement in its environmental impact statement, and the Applicants also request a copy of such documentation.

Page 69, paragraph 2: Reference is made to studies which are presently underway to establish acceptable limits of interference. The Applicants wish to know by whom these studies are being done, and also request a copy of such studies.

Page 69, last paragraph: In discussing impacts such as corona effects, it is submitted that the Department should compare effects of such corona based on the Applicants' corridor, compared to the effects based upon the Department's corridors. Also, it should be noted that in the discussion of corona, var size is as important as voltage.

Chapter 6: It is submitted that the Department discusses impacts and general mitigation measures in this chapter which are not related to this project.

Page 74, paragraph 2: In discussion of sediment and sedimentation levels, it is submitted that these will be minor or minimized. Organic debris will not be in excess of natural levels.

Page 76, paragraph 3: Reference to effects on entire water shed are irrelevant in this project because this project will not effect an entire water shed.

Page 80, paragraph 2: Discussion of increased water temperatures is irrelevant to this project because it is submitted there will not be any change in stream temperatures as a result of this project. "Increased water temperatures" and "thermal pollution" are not synonymous terms.

Page 81-83. It is submitted that the mapping system is an imperfect tool because it is based on highly subjective ratings and the maps do not necessarily represent all the detail within the selected cell.

Page 89, paragraph 1: Roads that are not closed are not necessarily long term losses because in many cases the farmer perfers that the road be left open for his own use and increased productivity.

Page 91, paragraph 1: It should be noted that what clearing is done is prescribed by the Forest Service and is not necessarily a certain width, and also, in some instances, trees are topped rather than cleared.

Page 92, paragraph 1: It should be noted that trees do not lean toward the line because of phototiopism. Trees will grow toward sunlight, but they do not lean.

Page 92. The Department's views on access roads are sometimes inconsistent in that in some instances they suggest that the public should use right of way to collect fire wood and other such activities, and on the other hand they suggest that access roads should be closed so that they imply that the public should not use the right of way or associated area.

Page 97, paragraph 5: It is submitted that the net results of transmission line development in clearing through forested land will in many cases increase the area of forage availability.

Page 98, paragraph 1: It is submitted that the Department's treatment of visual impact is very subjective. It is also submitted that the Department's proposed corridors have more visual impact than those of the Applicants. Some consideration must be given by the Department to the number of viewers who will view a facility.

Page 103: It should be noted in discussion of U. S. Senate Bill 393, that this Bill was proposed after the Applicants had considered potential corridors for this facility with the Forest Service.

Page 110, Paragraphs 2 and 5: It is submitted that transmission lines will not necessarily discontinue the use or irrigation processes, and it is submitted that people will not stop using recreational facilities because of the visual impact of the transmission line.

Page 111, paragraph 2: In discussions of loss of irrigation land, it should be pointed out that there will be little, if any, loss of irrigation land from this proposal as proposed by the Applicants' corridor, although there may be more as proposed by the Department's corridor. And it should be pointed out that transmission lines, in fact, provide power so that many lands can in fact be sprinkler irrigated.

Page 112, paragraph 2: It is submitted that access roads do not necessarily irreversibly change the roadless character of an area because roads can be closed and reclaimed.

Page 112, paragraph 6: When the Department discusses impact in the Georgetown Lake area, it should be pointed out that the Department's corridor in this area will cause more impact because it is closer to the Georgetown Lake area, and crosses the highway twice, and parallels the scenic highway for a ways and also runs through the Skalkaho Game Preserve.

Page 116: It should be pointed that one of the proposed corridors of the Department crosses the Ravalli National Wildlife Refuge. Also, reference to illegal shooting by construction workers is unsupported, and it should be pointed out that the construction guidelines prohibit construction crews to carry firearms.

Page 125, paragraph 1: The Applicants concur with the Department's statement that impacts of transmission line construction can be greatly mitigated in many instances.

Page 133: Reference to an 8% increase in 1973 to 1985 should more correctly read 8% per year from 1973 through 1985.

Page 136, paragraph 2: It should be pointed out that if there is radio and tv interference, it will be corrected.

Page 135, paragraph 3: A discussion of the benefits of electric reliability should be expanded. A general discussion of reliability is submitted by the Applicants at the end of these comments, and the Department is requested to take notice of these comments in their EIS.

Page 136, paragraph 2: This alleged reduction of land values is completely unfounded. If there is any substantiation for this comment, the Applicants wish a copy of such substantiation. Professional appraisers do not find that land values are reduced in the market because of transmission lines.

Page 137, paragraph 5: References to construction of utility facilities for self-fulfilling prophecy are unfounded and not relevant to this project, because this project is proposed for reliable service to serve people.

Page 140, paragraph 5: Reference that forested lands are included in nearly every mile of this corridor is incorrect. The first ten miles in the Anaconda end of the Applicants' corridor is not timber. It does not have brush and will not require wide clearing. The first five miles at the Hamilton end of the Applicants' preferred corridor has practically no timber and most of the next four miles to the Skalkaho road has been logged. There are some logged areas in Sand Basin and many open areas in the Potato Lakes area. There has been a great deal of logging from west of the East Fork Reservoir to Storm Lake Creek. The line would not cross the East Fork Reservoir, but would go north of it.

Page 142, paragraph 2: There is not a large amount of Forest Service land in segment H-K. Half of it is not timber and the other half has been mostly logged.

Page 142, paragraph 4: It is submitted that because this line will be seen by relatively few people, it does not have a large visual impact. The East Fork Reservoir is for irrigation and is not popular for recreation.

Page 142, paragraph 5: There is not a narrow strip of land at the head of Railroad Creek that is being studied as a possible designation as a roadless area. Also, the Bitterroot National Forest designated this area as a possible power line corridor as it is the lowest pass across the Sapphire Mountains in this area.

Page 143, paragraph 1: Segment H-I is not roadless. It has been logged extensively and has numerous logging roads. The lower part of Segment of G-F has been logged and has many logging roads. The same is true of Segment E-D.

Page 143, paragraph three: The Applicants' preferred corridor is not proposed along Daly Creek so there could not be any impact to equatic ecosystems along Daly Creek. Further, the Applicants do not agree that the visual impact of the preferred corridor is large to severe.

Page 146, paragraph three: In the early meetings with the Forest Service, even before the Utility Siting Law was passed, they ruled out any power line along Willow Creek. Now the EPD is proposing such a corridor. This route would cross Palisade Mountain, which is more than a thousand feet higher in elevation that the pass at Railroad Creek. This is an area that the Forest Service considers very fragile and they don't want it disturbed. The EPD fails to mantion the Skalkaho Game Preserve in this area which this route would cross for many miles. The Forest Service also ruled out any power lines on the north side of Mt. Emerine because of planned recreation in this area. Segment P-C of the EPD route traverses this area. This segment also crosses cultivated fields and hay meadows north of Potato Lakes. These are avoided by the preferred route. This route goes very close to the very popular Georgetown Lake, whereas, the preferred route is more than two miles from it. From Silver Lake east to Anaconda, this route follows Highway U. S. 10A. This area is very congested at the Anaconda end and it is just not practical to build a 161 kV power line through here. The preferred route avoids all this congestion.

The EPD has a proposed corridor along Daly Creek. This is a very deep narrow canyon with very steep sides. It just is not practical to build a 161 kV power line through this canyon.

The Applicants believe that their proposed Anaconda-Hamilton facility is preferable to building another line from Missoula to Hamilton through the Bitterroot Valley. It is submitted that the Department's alternative would have more impact on people than the Applicants' proposed facility. It should also be noted that in some instances the public and the Department have suggested that more Forest Service land be used for transmission facilities rather than private land, and in this regard there is more Forest Service land on the Applicants' corridor than on the Department's. It should also be pointed out that if another line is built in the Bitterroot Valley, another new substation would have to be constructed east of Bonner. It should also be pointed out that a second 161 kV line could not be built on the same right of way with the existing 161 kV line.

Page 156: The Department's discussion of long term effects related to future growth patterns suggest that the Department of Natural Resources is supporting a no new growth policy for Montana. If this is not the case, then this discussion should be clarified.

II.

GENERAL COMMENTS ON CERTAIN TOPICS RAISED THROUGHOUT THE DRAFT EIS

1. Replacing 69 kV "A" or "B" line in the Bitterroot Valley with a 161 kV transmission facility.

The alternative of replacing either the "A" or "B" line was considered and rejected on the basis of cost and safety. Either line could be replaced with 161 kV facilities but would require:

(a) The removal of the existing 69 kV line if the present right or way were to be utilized.

(b) All underbuild would probably have to be placed on a separate distribution structure because of inductive coupling and safety.

(c) A review of all communication systems in the area especially hand-wired systems such as telephone to determine the detrimental effects of inductive coupling.

(d) Radio and tv interference could present problems because of the close proximity of many residences and potential low levels of signal to noise ratios.

(e) Cost of the alternatives of replacing "A" or "B" line and providing reliable electric facilities to Missoula #4 Substation.

2. Reliability.

Electric systems should contain reliable sources of power. Generally, the system should be designed to be able to maintain adequate voltage levels in the event of single contingency outage cases, and in particular areas, consideration must be given to double contingency outages.

To obtain a power system which is adequate to meet the reliability requirements of each customer and yet which is low in cost requires that the power system engineer plan the power system on an over-all inclusive basis. While the electrical system is installed in parts such as substations, transformers, transmission lines, oil circuit breakers, etc., the system nevertheless functions as a complete integral unit. The best way to get an overall picture of the probable performance of a power system is to make a one-line diagram. This on one small piece of paper, shows the system in its entirety. The one-line diagram gives a reasonable idea of service reliability and how the components of the system will fit together electrically to serve most effectively and economically. There are many factors which must be considered in the over-all planning of a power system. Some of the more important aspects to be considered are discussed in the following.

One cannot put too much emphasis on safety. Men and equipment are constantly being utilized in and around electrical facilities. Design of adequate ground clearances, ability to maintain electrical facilities while energized, and selection of adequate electrical equipment, both electrically and physically are but a few of the ways that good, safe design contribute to system reliability.

Economics is an important part of system reliability. Cost comparisons must be made and it is important that all parts of the system be included. The cost of the completely installed system, not just the price of components, must be considered. The most reliable transformation system with its inherent high costs does not insure the most reliable power system as a trans-

former is but one component of the power system.

Plans must include future expansion. Failure to provide for the future results in extravagence, inflexibility and complicated systems. Some important items in this respect are reserve in substation capacity, switchgear with a margin in interrupting rating to allow for increased power supply, and last but most important, selection of a proper voltage level which is high enough to permit expansion without bottlenecks. Service interruptions will occur if improper planning is made and equipment cannot be released from service for proper maintenance. Transformer changeouts must be accomplished without service interruption or expansion of the existing facility must be possible without service interruption. These efforts are placed in adequate design and engineering before the facility is constructed.

The system must be made simple, In complicated systems service reliability is usually reduced because of mistakes made in an emergency. Engineering again must design the system simply so that operation of the system can be made as smoothly as possible.

Engineering design must consider service reliability in every function of the design. Many specific areas of design are considered important to each project. In transmission design, the location of structures, strength of structures, shield wire angle, clearing of hazardous trees are just a few. The

substation design includes coordination of protective equipment; selection of adequate lightning protection devices, selection of adequate BIL and selection of electrical design are but a few of the items which must be considered.

Reliability of service in any area must be considered from an engineering and an economic aspect. One line diagrams must be prepared and cost comparisons must be made on all parts of the proposed system. In some areas, it is not technically feasible to construct duplicate transmission facilities so additional service reliability must come from selection of better equipment and structures, operating procedures, increased safety factors for design, better selection of the location of facilities and special emphasis on maintenance of electrical facilities while energized.

Substation design for major substations normally provides for sufficient capacity in station equipment so that equipment failure will not ordinarily result in long outage times to customers in the event of loss of a transformer, circuit breaker, bushing or similar trouble.

A commonly used design criterion is to provide facilities and capacity to withstand one foreseeable contingency, such as the loss of one line, one transformer or other occurrence. Usually system design does not provide for second or greater contingencies because of the excessive cost and the low probability of two failures occurring simultaneously.

Those people responsible for the design and operation of a power system must devote a great deal of thought to system reliability and investment of substantial sums of money are necessary to insure a good reliable system. Many factors must be considered - such as number of customers involved, magnitude of load, location of emergency equipment, etc., are but just a few which must be considered in evaluating reliability.

Major industrial customers and towns usually have two or more sources of power supply. In case anything happens to one source, the remaining one can supply the customer. Thus, dual sources are one important design criterion.

In case of short circuits on transmission lines, feeders, transformers, etc., the objective of protective relaying is to define the faulted area and to take corrective action by tripping power circuit breakers to isolate the faulted line or apparatus. This protects the remaining power system from the faulted apparatus and tends to assure the customer of continued power supply. Thus, adequate protective relaying and power circuit breakers are important criteria in power system design.

3. Philispburg Area

Listed in the April 1, 1975 and April 1, 1976 Long Range Plans filed with the Department of Natural Resources is a potential project entitled "Anaconda-Philipsburg-Drummond" 60 miles and 100 kV. It also states this project is necessary if the Anaconda-Hamilton 161 kV is not approved. No discussion was made of need in Philipsburg area, but DNR was made aware that additional transmission facilities would be needed to serve

the Philipsburg area by the Long Range Plans. And it is submitted that the Applicant's proposed Anaconda-Hamilton line will better serve all areas, including the Bitterroot Valley, Missoula and Philipsburg than any alternative or combination of alternatives proposed by the Department.

RESPECTFULLY SUBMITTED THIS 27th day of August, 1976.

THE MONTANA POWER COMPANY

By _____

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
Federal Building
Missoula, Montana 59807

8430

AUG 31 1976

Albert C. Tsao, Administrator
Energy Planning Division
Montana Department of Natural Resources
and Conservation
32 South Ewing
Helena, Montana 59601

Dear Mr. Tsao:

Thank you for this opportunity to respond to the draft environmental impact statement for the proposed Anaconda-Hamilton 161KV transmission line.

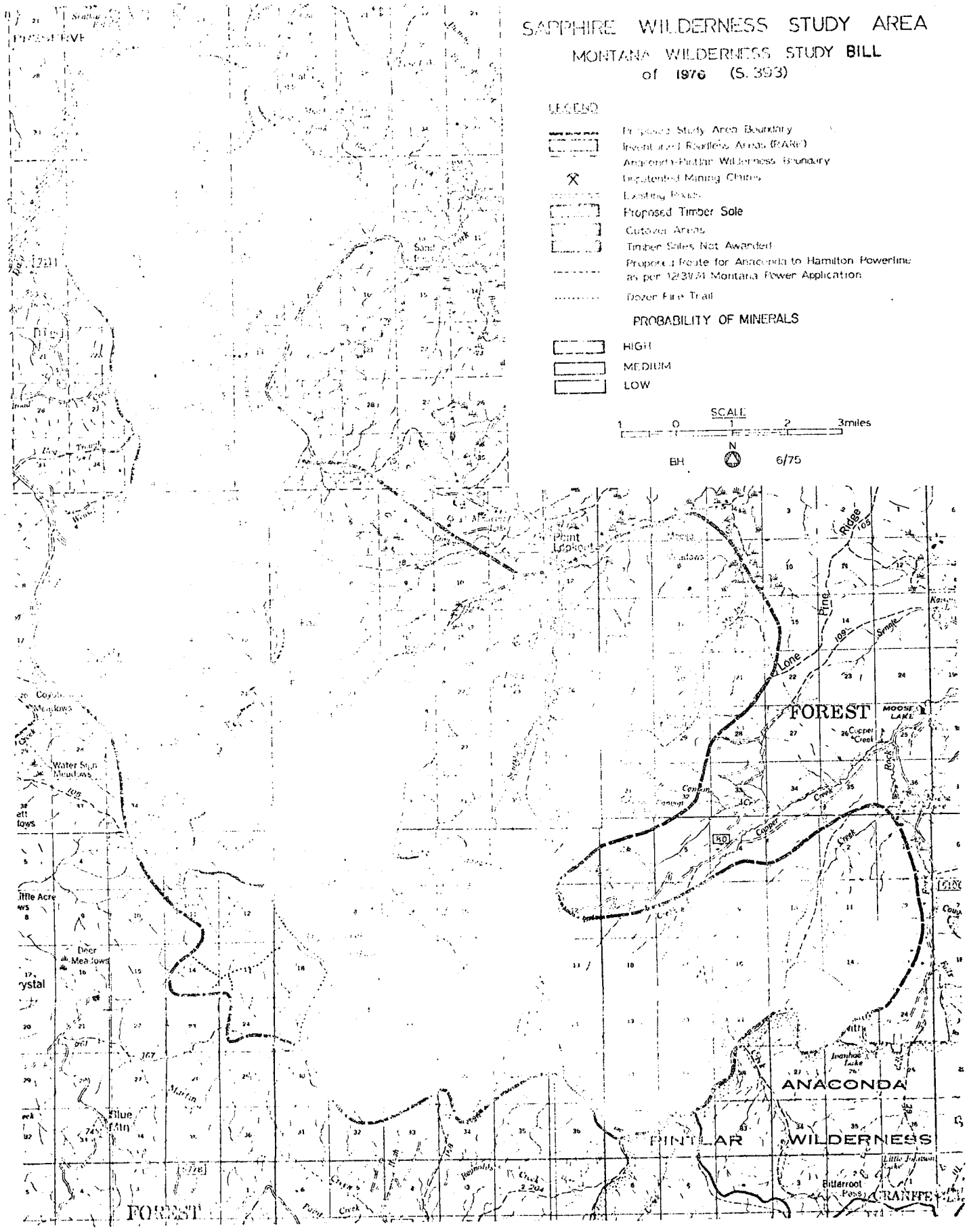
You and your staff deserve compliments on the wealth of data presented. Also, the detailed presentation of potential impacts and mitigating measures deserves recognition.

I wish to comment on some points raised during our review process. Editorial suggestions have been included as a letter attachment. Major comments form the body of this letter.

Our main comments are included in the following paragraphs:

1. The question of electrical "Need" has not been resolved. Although the introduction to Chapter 3 generally defines need in terms of reliability, this concept becomes confused by the mass of load data presented. We realize you have not yet completed your "Need" studies. Hopefully, the final environmental impact statement will resolve "Need" and provide a more complete basis for evaluating the transmission line proposals.

2. An equally basic concern is with National Forest inventoried roadless areas crossed by several alternative line proposals. Legal and policy constraints preclude consideration of powerline construction in roadless areas prior to completing land use plans or project environmental impact statements. We anticipate completion of a land use plan for the roadless area south of the Skalkaho Highway early in 1977. A completed plan for the area north of the Highway should follow within 6 to 9 months. We cannot make a decision regarding the proposed transmission line until land use plans for these roadless areas are completed.


R18W
R17W
R16W
SAPPHIRE WILDERNESS STUDY AREA
MONTANA WILDERNESS STUDY BILL
of 1976 (S. 393)
LEGEND
Proposed Study Area Boundary
Inventoried Roadless Areas (RARE)
Anaconda-Pintlar Wilderness Boundary
Unpatented Mining Claims
Existing Roads
Proposed Timber Sale
Cutover Areas
Timber Sales Not Awarded
Proposed Route for Anaconda to Hamilton Powerline as per 12/31/74 Montana Power Application
Dozer Fire Trail
PROBABILITY OF MINERALS
HIGH
MEDIUM
LOW
SCALE
1 0 1 2 3miles
N
BH
6/75
T 6 N
T 5 N
T 4 N
T 3 N
T 2 N
FOREST
ANACONDA
PINTLAR
WILDERNESS
Lone
Pine
Ridge
Copper
Creek
Rock
Smith
Martin
Bitterroot
Pass
Ironhoe
Lake
Little Johnson
Lake
Water Sign
Meadows
Deer
Meadows
Blue
Mtn
Coyote
Meadows
Little Acre
Meadows
Point
Lookout
Moose
Meadows
Sand
Fork
Trail
Creek
Point
Creek
Green
Creek
Bonanza
Creek
Cemetery
Canyon
Moose
Lake
Copper
Creek
Rock
Creek
Smith
Creek
Pine
Creek
Lone
Ridge
105
109
167
267
204
228
40
61N

3. A transmission line crossing National Forest lands in Pattee Canyon would be incompatible with our management objective for the area, which is to provide for such forms of recreation as picnicking, hiking, snowshoeing, and conservation education.

   In 1973, through administrative authority, the National Forest lands in Pattee Canyon, in and around the Pattee Canyon picnic ground, were designated as an Area of Concentrated Public Use. This area was so classified because it is an important day use recreation area serving Missoula and surrounding communities. As stated in the attachment to this letter, the recreation map in the draft environmental statement does not recognize the existence of either the picnic ground or Area of Concentrated Public Use designation in Pattee Canyon. Further, the visual analysis map erroneously rates the potential visual impact in Pattee Canyon as "slight" to "small" when, in view of the recreation use on public land and residential development on adjacent private land, it should be rated "very high."

   It does appear, however, that there are alternate routes from points U to V which may have less severe impacts.

4. We prefer a corridor which does not cross south of the dam (Points O to E) in the East Fork Reservoir area on the Deerlodge National Forest. This is a water oriented recreation area which also provides access to the Anaconda Pintlar Wilderness. Our preliminary land planning in this area indicates probable conflicts between a transmission line and recreational values.

5. My final comment concerns the social impacts of the alternatives. Most of the information presented is socio-economic in nature; possible impacts on people's lifestyles from the proposed line are not given adequate consideration. We have conducted a series of social impact interviews to determine the effects on lifestyle and are now compiling the information. This information will be available for your evaluation and use by early September 1976.

I hope you will find our comments helpful in developing your recommendations.

Sincerely,

Robert H. Torheim

ROBERT H. TORHEIM
Regional Forester

Attachments - 2

Additional Comments and Suggestions Pertaining to the Anaconda-Hamilton 161KV Transmission Line Draft Environmental Impact Statement

Page 3.--The last paragraph speaks to the Bitterroot Mountains as being dissected by streams which have carved out nearly parallel east-west gorges. These east-west gorges were carved out by glacial action.

Page 8.--The population of Missoula is listed as 30,000 people. Here and in other places the populations quoted are apparently only the number of people living inside the "city limits." These figures tend to understate the actual number of people involved.

Page 9.--Paragraph three refers to large areas of recently subdivided agricultural land in the Bitterroot Valley. However, the greatest acreage of subdivision was during the "apple boom" in the early 1900's.

Page 14.--The top half of the page speaks to least-cost and greatest-reliability concerns. The bottom of that section says costs were evaluated on alternatives generated by other means. The final environmental impact statement could be improved by displaying these costs on the inter-alternative comparison table, 7-2.

Page 60.--Section 4.3.1.1 says that if the Anaconda-Hamilton Transmission Line is built, the power available to meet Missoula's growth would not be sufficient and therefore require a backup perhaps 2 to 3 years after construction of the Anaconda-Hamilton Line. If Missoula is going to need additional power to accommodate growth, then a tap of the BPA 230KV line or some other alternative source is going to be needed. Therefore, the $1.9-million cost to tap the BPA 230KV line does not appear to be an appropriate cost consideration for evaluation of the alternatives, since it probably will be needed in any case.

Page 83.--The "Severe" erodibility hazard found here is misleading. "Severe" rating is based on road construction suitability. Construction without roads, using helicopters, is not considered in this rating since it is not assumed to be a common practice in Montana. This should be explained.

Page 84.--Slope may be given too much weight in the Summed Value formula since slope is already considered as a factor in the Erodibility Hazard rating.

Page 88, 6.3.4.2. Rangeland.--A transmission line may open natural barriers on range allotment or pasture boundaries, thereby eliminating livestock control. This should be identified as a short-term impact if mitigating measures are required.

Page 89, III Mitigating Measures.--Compacted surfaces should be broken up by plowing or chiseling (ripping) deep compacted layers.

On National Forest lands, range improvements should be protected and/or restored to Forest Service standards. Natural barriers should be replaced with fences.

Seeding, mulching, and fertilization should be required to restore ground cover for soil protection. Treating fertilization as a range restoration measure tends to underrate its value for vegetation establishment.

Page 91.--Paragraph five appears that it should read: " . . . loss may be greater than on range land . . . ."

II.A Clearing.--May want to try to keep the right-of-way in non-conifer vegetation.

Page 92, paragraph 3.--Slash disposal may be a problem if the area has to be entered at frequent intervals.

Last paragraph.--Quite often, logged areas are more productive than unlogged areas.

Page 94.--The text should define animal unit month (AUM) correctly. An AUM is considered to be one mature (1,000 lb.) cow grazing for 1 month. The conversion factor is one sheep = 0.2 AUM and one horse = 1.2 AUM.

The predominate range sites within the study area appears to be a coarse sand or gravelly, silt loam rather than a silty range site.

The Very High Potential Impact rating for Visual Concerns found here should include the Pattee Canyon Areas of Concentrated Public Use and all the open grassland slopes viewed from Missoula and outlying subdivisions, specifically Dean Stone Mountain and Miller Creek areas. These should also be identified on the Visual Analysis Map.

Page 103.--It would seem that waterfowl wildlife refuges should be placed ahead of game management areas as having more restrictions on land use. There are some minor problems with the definitions for items 1 and 2; however, we do not feel they present any problems in understanding.

Page 106.--The Recreation Map following page 106 should also show the boundaries the Regional Forester designated for Pattee Canyon Areas of Concentrated Public Use and the Pattee Canyon Picnic Site. Also, the boundary of Senate Bill 393 Proposed Sapphire Wilderness Study Area is inaccurately shown on the map. Attached is a map showing the revised April 1976 boundary.

Road System Map.--Impacts of new roads providing access to tower sites and staging areas could be more significant than the transmission line itself. There are many existing roads on National Forest lands that are not shown on the map (following page 106). We suggest you show the entire road system in order to display the relationship between the corridor alternatives, existing road access, and needed new road access.

We would be glad to work with you to make a more realistic assessment of road impacts.

Page 107.--Snowmobiling is not permitted in ski areas.

Page 109, V. Historical and Archaeological Sites.--The National Environmental Policy Act of 1969 (NEPA) offers no actual protection to historical and archaeological sites. Management considerations and procedures prescribed by Executive Order 11593 and the Historic Preservation Act of 1966 are to be indicated in the environmental impact statements required by NEPA. Until cultural resources are inventoried, the statement that they are small parcels of land and can usually be avoided within a 2-mile corridor is not justified. They are not necessarily small parcels of land; and sizable archaeological and historical districts can be listed on the National Register.

The "Recreation" map (facing page 106) also does not distinguish clearly between the State and National Registers. For example, all National Register sites that are indicated are also (incorrectly) identified as State Monuments. Not all National Register sites are identified (e.g., Granite is listed only as a ghost town; there are two National Register properties listed in Anaconda, only one is indicated). Some sites are located imprecisely, e.g., Fort Owen and St. Mary's Mission are shown to be south of Stevensville. The Lolo Trail is indicated as a "National Historic Trail" (an apparent non-existent classification). It is a Registered National Historic Landmark and as such is also automatically listed on the National Register. The listed property extends from Traveler's Rest to Weippe, Idaho. (The Lewis and Clark Trail corresponds in part to the Lolo Trail. Segments of the Lewis and Clark Trail are under study by the Bureau of Outdoor Recreation for National Trail Status.)

Wildlife maps following page 125.--Whitetail Deer Map - The distribution does not appear to be broad enough. Mountain Goat Map - The distribution appears to be too large.

Page 129, Table 6-9.--The per capita income shown does not correspond to our copies of Montana County Profiles, Department of Community Affairs.

Page 142.--The discussion of the Sand Basin area in the second paragraph gives the impression that this area should be avoided. This is not entirely correct. As mentioned before, the "Severe" Erosion Hazard Classification is based on road construction. Tower sitings and staging areas are not considered limiting because they occupy very small areas of land and the limitations can be overcome by special location procedures. If helicopter construction replaces road access and is economically feasible, the premise that the area should be avoided does not apply.

Page 148.--The description of the EDP Western Alternative in Section 7.3.2.1 implies there is an existing 69KV transmission line over the entire length. Since there is no existing 69KV transmission line connecting Miller Creek substation Number 4 to Bonner via Pattee and Deer Creeks, this should be clarified.

The above short and somewhat terse comments address miror deficiencies we uncovered in the draft environmental impact statement. Please discuss any of them that seem unclear with Ron Roginski of the Deerlodge National Forest.

09 13 02

United States Department of the Interior

BONNEVILLE POWER ADMINISTRATION
SPOKANE AREA OFFICE
Room 561, U.S. Court House, West 920 Riverside Avenue
Spokane, Washington 99201

IN REPLY REFER TO:

OKE

September 10, 1976

RECEIVED
SEP 13 1976
MONT. DEPT. OF NATURAL RESOURCES & CONSERVATION

Mr. Albert C. Tsao, Administrator
Energy Planning Division
Montana Department of Natural Resources
and Conservation
32 South Ewing Street
Helena, Montana 59601

Dear Mr. Tsao:

Attached are Bonneville Power Administration's comments on the Draft Environmental Impact Statement concerning the Anaconda-Hamilton 161-kV transmission line as proposed by The Montana Power Company.

Sincerely yours,

Theodore C. Rednour

Theodore C. Rednour
Acting Area Engineer

Enclosure

BPA Comments
Draft Environmental Statement
Anaconda-Hamilton 161-kV Transmission Line

This Draft Environmental Impact Statement is considerably improved over those previously presented by the Department. The computer generated maps of the environmental impacts are quite impressive. However, BPA does feel the evaluation of electrical needs and system alternatives need improvement. The Draft EIS is incomplete in these areas.

As BPA is mentioned so prominently as well as the proposed tapping of our facilities, we feel Bonneville should have been more involved. We were not provided copies for review until we read a newspaper article that they had been published. We then requested copies on August 17, 1976. We did not have detailed knowledge of the 230-kV tap plans until our meeting with Mr. Sood on August 25, 1976. This did not allow time for BPA to run computer power flow studies to evaluate these plans before the date comments were due.

BPA has the responsibility to supply the power needs of Missoula and Ravalli Electric Cooperatives. Therefore, we are very interested in service to the Bitterroot Valley. We do not serve the Phillipsburg area, but in recent studies of the BPA (Missoula Electric Cooperative) service out of Drummond we found the 100 kV to be very weak at Drummond. This is also the source of service to the Phillipsburg area; therefore, we do not doubt that service to Phillipsburg must be strengthened.

In several of the above areas BPA would have provided necessary studies, reviewed loads, and worked closely with the Department had we been asked. In any future occasions where BPA facilities or customers are involved, we would appreciate early contact.

Our comments on specific items are:

Chapter 3. Electrical Need

The BPA forecasts for Missoula and Ravalli Electric Cooperatives appear to be larger than The Montana Power Company forecasts in the DNR EIS. Based on tables 3-7, VIII, IX, X, XI, and XII in the EIS the summer 1976 load for the two cooperatives is 14.2 MW and the January 1979 peak load is 26.2 MW.

In addition to the BPA load, MPC has load at seven stations in the valley, including several which have BPA load. Using table 3-15 on page 45 of the EIS, we estimate the summer 1976 MPC load at 16.6 MW and the January 1979 peak load at 27.4 MW. If the above evaluation of the Bitterroot Valley load is correct, the load flows do not represent the worst loading or voltage condition which could occur in 1979.

Based on the load flow studies given us by Mr. Sood on August 25, 1976, and our load evaluation and considering only transformer and line thermal limits without regard to line sag limits or switchgear or bus limits, we see the Bitterroot Valley service problem as follows:

1. The two 100/69-kV autos at Missoula may overload this coming winter even without an outage if the Hamilton Heights line operating at 69-kV is supplied from the Missoula #2 bus.

2. The high resistance 69-kV lines from Missoula to Darby will be loaded heavy enough that during an outage of one line either static capacitors are needed on distribution feeders to give very good power factor or switched capacitors should be considered at Hamilton or Darby.

3. Load flows prepared by the DNR appear to represent a summer 1979 condition rather than a winter condition in the Bitterroot Valley.

4. Assuming loads are shown correctly for the Missoula urban area in the load flows, any single contingency outage does not appear to cause any problem except low voltage. A really severe double contingency outage would be the loss of both 161-kV lines from Kerr to Rattlesnake.

5. For reliable service in the Bitterroot Valley next year, another line is needed into Hamilton to strengthen the two existing 69-kV lines as well as increased transformer capacity on the 100/69-kV banks at Missoula #2. It appears to us that the Missoula #2 bank capacity should be increased even if the new line is operated at 161 kV with a 161/69-kV bank at Hamilton.

Severe voltage problems are probably at Bitterroot Valley stations before conductor thermal limits are reached on the two 69-kV lines (assuming loss of the single Missoula-Hamilton Heights 161-kV line). Although it may be possible to correct the voltage problems with switched shunt capacitors, the voltage fluctuations coupled with high transmission loss support the need for additional line support into the valley in 1977.

6. Either an Anaconda-Hamilton 161-kV line or a second Rattlesnake-Hamilton 161-kV line appears to provide the needed support into the valley subsequent to the support in the above item (5). The additional support is needed in 1978 to meet January 1979 peak load conditions. The BPA 230-kV tie, development of Missoula bus #4 and a second Rattlesnake-Hamilton 161-kV line appears to be a stronger plan for the whole area including Missoula and the Bitterroot Valley. This 230-kV tie may be a higher cost plan.

7. The Anaconda-Hamilton 161-kV line provides very little support to Missoula except by displacement of the load which is normally supplied out of Missoula.

8. The Anaconda-Hamilton 161-kV line has the advantage of bringing a strong line near the Phillipsburg load area making it possible to reinforce the present low voltage (50-kV) line supplying power to this area. It also supports service and adds reliability in the Bitterroot Valley.

9. Colstrip does have some effect on the loading of the 230-kV lines from Hot Springs to Anaconda. The construction of two 500-kV lines from Colstrip to Hot Springs will increase the strength of the power source at Hot Springs. It also will decrease the flow from Hot Springs to Anaconda because more power is supplied into Anaconda from Billings over 230-kV lines. An even more important consideration is the construction of Jim Bridger thermal plant which reduces the flow of power south from Anaconda and thereby unloads the Hot Springs-Anaconda 230-kV line. Because of these factors it appears that the Hot Springs-Anaconda 230-kV line can be tapped at Missoula without causing it to overload. In the future as load grows in the area, it may be necessary to strengthen the line between Hot Springs and Missoula. As long as generators are operating at Jim Bridger and large amounts of power are not scheduled from the northwest to Idaho and Utah, we do not believe a delay in Colstrip 3 and 4 will cause excessive loadings on the BPA Hot Springs-Anaconda 230-kV line or cause overloads if there is a tap to MPC at Missoula.

Our comments on the text of the Draft Environmental Impact Statement are:

In Section 3.5.1 summer loads are used for load flow tests. The BPA loads presented in the text are approximately 60 percent higher in the winter. The summer studies do not, therefore, show the most severe conditions.

In Section 3.5.2 the Missoula area is tested during summer peak loads. Missoula load has to be higher during the winter, thus winter peaks should be studied.

In Section 3.6 we agree more studies are required. Factual information from these future studies would allow reviewers of this Draft EIS to provide better comments. In fact, without the studies completed, the Draft EIS is incomplete.

Chapter 4. System Alternatives

In Section 4.3 the omission of any studies or discussion on service to the Phillipsburg area does not seem to be a realistic approach to solving the power needs for this part of Montana. Dismissing future problem areas and considering only short-range plans will lead to additions which may not solve the long-range needs. This is another shortcoming of the Draft EIS. Studies should look further into the future. What is the next step? How will it fit the present plans? What are the long-range economics?

The various alternatives to serve this portion of Montana are not completely studied (or not presented) and economic studies are not shown.

In Section 4.3.1 Missoula Area - the statement that "No electrical need for additional transmission capacity has yet been established" seems to be a conclusion not established by the data presented.

In Section 4.3.1.1 - Proposed Anaconda-Hamilton 161-kV Alternative - This section makes assumptions on service to Missoula that may or may not be true. Studies should be prepared to define the problems and show dates of insufficiency in the power system.

In Section 4.3.1.2 - BPA Tap Alternative - BPA should have been given detailed information on this alternative so that we could constructively commented during preparation of the Draft EIS. The cost of this plan also should be evaluated.

Table 4.2 presents several winter load flow cases that were not mentioned in Chapter 3. These seem to show only summer loads.

In Case 3 does the system normal condition contain the proposed transmission additions?

The numbers in the title of Case 8 do not have reference to a drawing and are meaningless.

In Section 4.3.2.3 - Summary - We agree that further studies are needed. The Draft EIS is incomplete without them.

09 10 24

STATE OF MONTANA

DEPARTMENT OF

FISH AND GAME

Helena, MT 59601
September 8, 1976

RECEIVED
SEP 10 1976
MONT. DEPT. OF NATURAL RESOURCES & CONSERVATION

Dr. Albert Tsao, Administrator
Energy Planning Division
Department of Natural Resources
Helena, MT 59601

Dear Albert:

Enclosed for your information is a memo I recently received from the regional staff regarding the 161 KV transmission line extending from Anaconda to Hamilton.

This correspondence, along with that submitted directly to you by John Firebaugh on August 20, will constitute our department's official reply.

As always, we thank you for the opportunity to review and comment.

Sincerely,

James A. Posewitz, Administrator
Environment & Information Division

JAP/sd

cc: Environmental Quality Council
Robert Rothweiler

STATE OF MONTANA
DEPARTMENT OF FISH AND GAME
HELENA, MONTANA

Office Memorandum

TO : Wes Woodgerd Attn: Jim Posewitz DATE: September 3, 1976

FROM : Jim Ford By: Robert Rothweiler

SUBJECT: Comments on Draft Environmental Impact Statement on...Anaconda-Hamilton 161 KV Transmission Line.

The Montana Department of Fish and Game opposes the construction of a proposed transmission line from Anaconda to Hamilton across the upper Rock Creek drainage and through the roadless area of the Sapphire Mountains. The Department questions this development because of probable effects of power line construction on wildlife populations located in and utilizing the area within the requested routes. The Department is particularly concerned about the effects on game animals and fish and ultimately, the opportunities for hunting and fishing by outdoor recreation enthusiasts.

For many years the Department of Fish and Game has based its wildlife management programs on the maintenance of wildlife habitat:

For game fish -- maintenance of water quality and quantity of lakes and streams, and in the case of streams, preservation of natural stream characteristics.

For game animals -- maintenance of range conditions that support maximum game populations on their various seasonal ranges with special emphasis on winter range.

Department investigations and inventories reveal changes in wildlife populations resulting from changes in habitat. In some circumstances, changes

in habitat conditions have enhanced wildlife numbers, however, in many more instances, wildlife populations have deteriorated.

The environmental impact statement adequately presents the potential impacts and the mitigating measures to reduce these impacts. Assuming the proposed power transmission line from Anaconda to Hamilton is approved, the major impact on aquatic and terrestrial wildlife will result during construction. Following completion of the transmission line, animal use will change in relation to the change in habitat.

The impact statement indicates "edge" and possibly small forage areas may be increased as a result of right-of-way clearing. Timber removal along the selected corridor would result in a long, narrow clearcut. However, the removal of forest canopy does not necessarily result in additional game range.

Until recent years, game managers and land managers have assumed that such changes were generally beneficial. Closed canopy timber stands produced less wildlife than seral stages of forest growth resulting from disturbances such as fire or logging. Timber harvest was accepted as a method to create forage areas for big game and the associated roads were utilized as a means of increasing hunter access. Forest managers have commonly justified timber removal by clearcutting as beneficial to big game animals. The change from closed-canopy forests to "open parks" and brush areas create edge and winter range. The attendent roads create access for hunters. Following timber harvest, the roads became recreational roads. Dispersed recreation including driving-for-pleasure, sightseeing, etc. became a major use of National Forest. The forest manager then cites the various recreational benefits of roads as further justification for timber removal.

Recent information indicates timber removal may or may not benefit game species and additional access does not improve hunting. The value of right-of-way clearing as game range depends on elevation, slope, exposure, soils, its

proximity to existing and proposed roads not associated with the transmission line, its proximity to timber harvest areas, its proximity to domestic livestock grazing allotments, and various other factors.

The transmission line corridor will reduce the roadless characteristics of the Sapphire Mountain divide. This roadless area provides a retreat for elk populations moving from the pressures of developmental activities at lower elevations. Many proponents of forest development declare that maintaining roadless environments waste natural resources. However, these roadless areas are an integral part of the elk range in the Rock Creek drainage and on the east side of the Bitterroot Valley. These forested areas provide only marginal commercial timber resources while they provide habitat for prime elk populations.

Forest planning for the west side of the Sapphire Mountains divide in the Bitterroot National Forest has reserved a transmission line corridor in the Railroad Creek drainage, a tributary to Skalkaho Creek. Will this decision by the Bitterroot National Forest influence eventual construction of the transmission line? If a decision to build the line is forthcoming, how does it influence the transmission line corridor?

I will comment specifically on two paragraphs in the Environmental Impact Statement"

Page 72, 6.2.2.

"The salmonid populations of the study area are in no danger of disappearing as a result of transmission line-related impacts. The threat lies in the potential for reduction of an already declining amount of productive habitat. For example, poor land management techniques, heavy dewatering for irrigation, and man-made alterations are reducing the amount of productive fisheries habitat available now. Construction of a transmission line through productive sport fish areas can contribute further to the deterioration of important habitat."

Page 114, I

"The immediate impact of small-scale timber clearing on affected species is not expected to be great, and may not result in immediate and obvious reductions in animal numbers, but should not be disregarded. Piece-meal erosion of habitat is too often ignored, although it places irreversible constraints on the future abundance and distribution of animals, and may become significant as further habitat alteration due to other causes (such as clearcut logging, urban and industrial expansion) continues."

The proposed transmission line may not have a considerable effect on wildlife populations in the Upper Rock Creek drainage. Yet, it has "the potential for reduction of an already declining amount of productive habitat," and it is part of the "piece-meal erosion" of wildlife habitat. At present, the Deer Lodge National Forest is involved in the planning process for this area. Forest planners have not made public the plans for the area, but they do indicate forest development activities will increase. The total developments proposed for the Upper Rock Creek area will have extreme impact on wildlife populations.

08 23 04

STATE OF MONTANA

RECEIVED
AUG 23 1976
MONT. DEPT. OF NATURAL RESOURCES & CONSERVATION

DEPARTMENT OF FISH AND GAME
823 W. Ravalli
Hamilton, Montana 59840
August 20, 1976

Mr. Albert C. Tsao, Administrator
Energy Planning Division
Montana Department of Natural Resources and Conservation
32 South Ewing Street
Helena, Montana 59601

Dear Mr. Tsao:

I appreciate the opportunity to review and comment on the Draft Environmental Impact Statement for the proposed Montana Power Company (MPC) 161 KV transmission line extending from Anaconda to Hamilton.

A transmission line which requires road access for installation and service through portions of roadless areas will have an impact on wildlife populations, particularly big game. In addition to creating disturbances and harassment to wildlife, increased road access (mainly logging roads) in the Bitterroot during the past 10 years has allowed easy hunter access into what were remote sanctuaries for big game. This has resulted in an accelerated harvest rate, particularly during those hunting seasons with heavy snows, and has necessitated shorter hunting seasons to prevent overharvesting local herds. Primarily due to increased road access, the either-sex elk season in the Bitterroot during the last 10 years has been reduced by over 50 percent to maintain a stable harvest. We can and have adjusted (shortened) hunting season lengths but it is at the expense of hunter recreation days. Few roadless drainages remain outside of wilderness areas and road construction in these remote locations such as that planned for the proposed MPC transmission line can only be detrimental to big game and will be one more step toward even shorter hunting seasons and less recreational hunting opportunity.

The MPC states that the primary purpose of the Anaconda-Hamilton transmission line is reliability. I question the logic of choosing a route over the Bitterroot-Rock Creek divide for reliability when heavy snowfalls are frequent, snow depths render the area inaccessable except for snowmachine travel for seven-eight months out of the year, and the chance of other severe weather (high winds, lightning, ice storms, etc.) is much greater than a lower elevation valley route. Lightning, high winds, and ice storms accounted for most of the line outage causes listed in Table 3-16 of the Draft EIS.

The need for additional power at this time is questionable, particularly when the recently completed Missoula-Hamilton Heights 161 KV line has only been energized at 69 KV. On page 28 of the Draft EIS it states "...the applicant projects an increase in electrical load of 8% per year through 1985. This increase is based in part on a history an average 8% annual growth from 1948 to 1973, and in part upon an average 11% annual growth from 1963 to 1973." (emphasis added) However, census figures indicate that total growth between 1960 and 1970 in Ravalli County

was 11%, not 11% annually. And figures listed in Table 3-8 for population growth in Ravalli County from 1971-1975 show from 2-6% annual growth. There is no doubt that the population of Ravalli County is increasing, but not at the rate of 8-11% annually stated by MPC.

On page 47 MPC states "...the present transmission system, in the absence of line outages, should be adequate to accomodate anticipated load growth without excessive voltage drops at Bitterroot Valley substations through 1975." Why the sudden concern over outages when we have done so well in the past with increasing population and electrical demand? If increased reliability due to other possible line outages is the primary function of this proposed transmission line, then the preferred route over the Bitterroot-Rock Creek divide seems like a very poor choice. However, it would probably be a more direct route for sending power to the coast from the coal generating plants in eastern Montana, particularly if the Magruder Corridor is utilized as a transmission line route.

Again, I question the need for this proposed transmission line and I am not convinced that it is necessary. However, if the decision is made to build the line, I would recommend replacing either of the existing 69 KV "A" or "B" lines which generally parallel U.S. Highway 93 with a new 161 KV line, or utilizing the existing utility corridor along the Missoula-Hamilton Heights line. No additional road access would be required, year-round access would be much easier, and the chances of outages from lightning, ice, wind, heavy snow, etc. would certainly be lessened.

Sincerely,

John E. Firebaugh
pm

John E. Firebaugh
Area Game Biologist

JEF/pm
cc: Jim Ford

Lynn 09 08 0 3

Department of Health and Environmental Sciences

STATE OF MONTANA HELENA, MONTANA 59601

~~John S. Anderson M.D.~~
~~Director~~
A.C. Knight, M.D.
Acting Director

RECEIVED
SEP 8 1976
MONT. DEPT. OF NATURAL RESOURCES & CONSERVATION

Mr. Albert Tsao, Administrator
Energy Planning Division
Department of Natural Resources
and Conservation
Helena, MT 59601

Sept. 7, 1976

Dear Albert:

Members of the Water Quality Bureau reviewed the water quality aspects of the draft environmental impact statement (EIS) on the proposed Anaconda-Hamilton 161 kV transmission line and submitted the following comments:

> "From the water pollution control standpoint and considering the information in your draft EIS, we agree with your preference of routes for the transmission lines. However, this does not mean that the other routes could not be certified if proper construction techniques were utilized. Additional information on actual techniques to be utilized on specific sections of lines after center line routing has been selected will be needed before the Department can consider certification."

I will forward comments from the Air Quality Bureau after the bureau reviews the impact statement.

As previously mentioned, due to heavy workloads and the technical and lasting nature of utility siting projects it is imperative that our bureaus be given more than 45 days (30 days review and 15 days extension) to review proposed projects. We presume the bureaus will be involved much earlier once the agreement of understanding between the Department of Natural Resources and Conservation and Department of Health and Environmental Sciences becomes a reality.

In addition to the agreement, it would help to send two copies of any material you want reviewed. One would go to the Air Quality Bureau, the other to Water Quality. This would enable the bureaus to review the material simultaneously.

Sincerely,

Tom Ellerhoff

TOM ELLERHOFF
Technical Writer

cc: B. Wake
S. Brown
M. Roach
D. Willems

09 10 18

Department of Health and Environmental Sciences

STATE OF MONTANA HELENA, MONTANA 59601

~~John S. Anderson M.D.~~
~~Director~~

A.C. Knight, M.D.
Acting Director

RECEIVED
SEP 10 1976
MONT. DEPT. OF NATURAL RESOURCES & CONSERVATION

Mr. Albert Tsao, Administrator
Energy Planning Division
Department of Natural Resources
and Conservation
Helena, MT 59601

Sept. 9, 1976

Dear Albert:

The Air Quality Bureau has reviewed the draft environmental impact statement (EIS) for the proposed Anaconda-Hamilton 161 kV line and recommends that standard slash burning procedures be observed during construction of the line. Enclosed is a copy of the bureau's open burning guidelines.

Thank you for the opportunity to comment on the draft EIS.

Sincerely,

Thomas W. Ellerhoff

TOM ELLERHOFF
Technical Writer

cc: B. Wake
M. Roach
D. Willems
S. Brown

OPEN BURNING GUIDELINES

The conditions stipulated for the clearing of land for highways, dams, pole lines, etc. are:

1. All possible material shall be marketed.

2. Non-marketable material 4 inches in diameter and larger shall be chipped and sold for pulp or cut in 4 foot lengths and piled at a location accessible to the public to be used as fireplace wood or for small recreational fires. (Piles must be located so as not to interfere with construction or operation of the project.)

3. Material less than 4 inches in diameter may be burned as slash under the following conditions:

   A. Material must be in clean dry piles suitable for burning.

   B. Material must be dried for 30 days under good drying conditions or 60 days if more than 1.00 inch of precipitation has fallen.

   C. Burning takes place between 8:00 a.m. and 5:00 p.m. on days of good smoke dispersion.

   D. Burning in forest areas must be coordinated with and meet with the approval of the forester in charge of the area.

DCA MONTANA DEPARTMENT OF COMMUNITY AFFAIRS
Capitol Station, Helena, Montana 59601
Thomas L. Judge
Governor

RECEIVED
AUG 10 1976
MONT. DEPT. OF NATURAL RESOURCES & CONSERVATION

August 9, 1976

Albert Tsao, Administrator
Energy Planning Division
Department of Natural Resources & Conservation
32 South Ewing
Helena, Montana 59601

Dear Albert:

Thank you for the opportunity to review your EIS on the Anaconda-Hamilton project.

We believe that a transmission line can have an effect on community development and land use plans that guide community development, yet the EIS for the Anaconda-Hamilton project is conspicuously mute on this subject. We want to point out that while the Siting Act does not require review of the project in light of local land use plans, to meet the requirements for environmental impact statements under MEPA the statement should take into account such plans.

We recommend that you send a copy of the EIS to the Missoula, Ravalli, Granite, and Deer Lodge County planning offices, if you have not done so.

I look forward to working with you on EIS reviews and administrative procedures.

Sincerely,

Dick

Richard P. Drews
Assistant to the Director

/njk

09 10 16

THOMAS L. JUDGE
GOVERNOR

STATE OF MONTANA
DEPARTMENT OF HIGHWAYS

HELENA, MONTANA 59601

H. J. ANDERSON
DIRECTOR OF HIGHWAYS

September 8, 1976

IN REPLY REFER TO:

DEIS - Anaconda
Hamilton 161KV
Transmission Line

RECEIVED
SEP 9 1976
MONT. DEPT. OF NATURAL RESOURCES & CONSERVATION

Mr. Albert Tsao
Administrator Energy Planning
Department of Natural Resources & Conservation
32 S. Ewing
Helena, Mt. 69501

Dear Mr. Tsao:

The Department of Highways has reviewed the DEIS on Anaconda Hamilton 161 KV Transmission Line, July 1976. We find the documentation adequate from our jurisdictional standpoint.

We assume that the minimum clearances as set forth in the National Electrical Code will be followed for those sections of transmission line which cross over public highways and roads. Additionally, when the actual corridors and centerlines are selected, please advise and coordinate the same with the Chief of the Field Maintenance Bureau in Butte (Robert Hunter) and Missoula (Jay Duba). Early cooperation may preclude costly relocations associated with future highway projects.

Very truly yours,

H. J. ANDERSON
DIRECTOR OF HIGHWAYS

33-SCK/REH/mmn

BY Stephen C. Kologi
Stephen C. Kologi, P.E., Chief -
Preconstruction Bureau

cc: D.S. Johnson
G. L. Anders
R.E. Hall
R. Hunter
Jay Duba

MONTANA 76

GEORGE VUCANOVICH CHAIRMAN
HELENA

WM. M. KESSNER VICE CHAIRMAN
BLACK EAGLE

G. R. COONEY
BUTTE

P. L. BACHELLER
BILLINGS

BAXTER LARSON
WOLF POINT

08 03 01

PUBLIC SERVICE COMMISSION 1227 11th Avenue • Helena, Montana 59601
Telephone: (406) 449-3007 or 449-3008

August 2, 1976

Gordon Bollinger, Chairman
P. J. Gilfeather
Thomas Monahan
James R. Shea
George Turman

RECEIVED
AUG 03 1976
MONT. DEPT. OF NATURAL RESOURCES & CONSERVATION

Mr. Albert Tsao, Administrator
Energy Planning Division
Natural Resources & Conservation
32 South Ewing
Helena, Montana 59601

Dear Albert:

We are in receipt of the Draft Environmental Impact Statement on Anaconda-Hamilton 161 KV Transmission Line along with your letter of July 30.

On pages 46 and 47 of this draft statement, reference is made to "PSC Rule 805." In future reports, this should be corrected to read "PSC Rule E 8-5."

From an engineering standpoint, we have no adverse comments on the draft statement.

Sincerely,

PUBLIC SERVICE COMMISSION

Jim Watson

Jim Watson
Utilities Engineer
Utility Division

td

09 08 02

Deer Lodge County Planning Board

P.O. Box 902 Anaconda, Montana 59711 Phone 563-5531

RECEIVED
SEP 7 1976
MONT. DEPT. OF NATURAL RESOURCES & CONSERVATION

September 3, 1976

Montana Department of Natural Resources and Conservation
Energy Planning Division
32 South Ewing
Helena, Montana 59601

Attention: Albert C. Tsao

The Deer Lodge County-City of Anaconda Planning Board hereby submits its comment regarding the Proposed Montana Power Company Anaconda-Hamilton 161 KV Transmission Line.

Members of the Board, representing the City of Anaconda and the County of Deer Lodge, have studied the draft Environmental Impact Statement on the proposed line, attended the public meeting held in Anaconda and other meetings where the proposal was discussed.

We particularly refer to Chapter Seven of the Impact Statement which supports the basis from which this Board unanimously voted to recommend that the line run from Bonner to Hamilton.

We strongly oppose this line running from Anaconda to Hamilton, especially in view of the high potential adverse impacts reported in Chapter Seven as compared with the low potential adverse impact of the Bonner to Hamilton route following the existing MPC line.

Sincerely,

Frank Boucher

Frank Boucher, Chairman

Roberta L. Chandler

Roberta L. Chandler, Director

FB/RLC/lw

cc: Linda Sitzman, Deer Lodge Forest Service

08 26 06

The Montana Wilderness Association

RECEIVED

AUG 26 1976

MONT. DEPT. of NATURAL RESOURCES & CONSERVATION

4000 4th Avenue, North
Great Falls, Montana
59401

Albert C. Tsao, Administrator
Energy Planning Division
Montana Department of Natural Resources and Conservation
32 South Ewing Street
Helena, Montana
59601

August 19, 1976

Dear Mr. Tsao;

As president of the Montana Wilderness Association, I appreciate the opportunity to present our opinion regarding the proposed Anaconda-Hamilton 161kv Transmission Line. Additional pertinent comments on this matter will be provided by Doris Milner, chairman of MWA's Bitterroot Committee.

A major basis for requesting this line is that of 'need', although the matter of whose need is never clearly indicated. Chapter three of the DEIS, where 'need' is to be established, fully fails to demonstrate that additional electrical power is presently necessary within the Bitterroot Valley. Future need is inadequately based on outdated data and unfounded assumptions and cannot be considered valid. Furthermore, the demonstration of 'need' to transmit that additional power over the Sapphire Mountains as opposed to alternative routes is totally ignored. On this basis alone, the Department of Natural Resources and Conservation has sufficient grounds on which to deny this request for additional transmission facilities.

The DEIS attempts to shortcut normal legislative processes by prematurely proposing development within the boundaries of a Wilderness Study Area as designated in S. 393 prior to final legislative action. Such tactics of pressure by big industry against the displayed will of the people of Montana cannot be tolerated. Any decision to allow development within the study area established by S.393 directly violates the solemn trust between the government and the people and reduces the spectre of democracy. Again, the only reasonable decision is one of denial for the transmission line request.

Sincerely,

Thomas E. Horobik

Thomas E. Horobik
president

University of Montana

Missoula, Montana 59801

(406) 243-0211

24 August 1976

Albert C. Tsao
Administrator
Energy Planning Division
Montana Dept. of Natural Resources & Cons.
32 South Ewing Street
Helena, Montana 59601

Dear Mr. Tsao:

Impact Statement

This is a statement concerning the Anaconda-Hamilton 161 KV transmission line.

Specific Area of Comment

Comments refer specifically to the EPD Alternative Corridor termed Bonner and Hamilton (Code UV) via Pattee Canyon.

General Comment

Because impact statements cover large tracts of land they often miss small, but important details. This comment provides land use information in detail concerning the Deer Creek Pattee Canyon Area.

Pattee Canyon Recreation Area

The proposed Bonner-Hamilton transmission line route (Code UV) bisects the Pattee Canyon Recreation Area. This tract of approximately 1500 acres has been set aside for intensive, controlled public recreation by the U.S. Forest Service since 1973. The area serves approximately 70,000 people in the Missoula area. This area is mentioned in the Draft (page 149) as very high visual impact and high impact to terrestrial fauna. A complete list of plants and animals, land use and vegetational analysis is included in the materials appended to this letter.

Pattee Canyon Area Zoning

Most of the land within the Pattee Canyon area has been zoned to minimize subdivision impact. Two important zoning restrictions are: (1) only 1 home per 5 acres; (2) Specific permission must be obtained from the City-County Commissioners before any change in the natural physiography occurs. These zoning restrictions were imposed by the residents on themselves to preserve the natural vegetation and lessen the impact of development on wildlife. Further, these restrictions provide that the lands surrounding the Pattee Canyon Recreation Area are managed to enhance the environment of that Recreation Area.

Socio/Economic Impacts

The impact statement draft (P-149) advises that there is"potential for intense opposition to a new transmission line; nuisance impacts."

Residents: The residents of Pattee Canyon have elected an Ecological Review Board to coordinate law suits against violations of those provisions enacted by the residents to protect the area. To date, this board and the residents have entered into and won four lawsuits in district court and two in the Montana Supreme Court. The board has also intervened in poor land use cases and coordinated the resistance with the aid of the U.S. Forest Service, County Commissioners and Sen. Lee Metcalf. In short, the resistance to the Pattee Canyon Corridor for the Bonner-Hamilton alternative 161 KV line will indeed be intense, professional and broad-based.

Missoula Area: Resistance to the Pattee Canyon Routing will not be limited to the residents of that specific area. Because the Pattee Canyon Recreation Area serves the general public, further resistance will be enlisted from the 70,000 estimated potential users of that Recreation Area. Enclosed are approximately 500 questionaire responses gathered to support the original Recreation Area Proposal. You can be assured that the 60 residents and their board will act to coordinate the general public in a negative high-profile response against the use of these public and private lands for a power line corridor. Further, because Sen. Metcalf was instrumental in the creation of the Recreation Area we may well count on his continued support.

Sincerely,

Dr. R. Sheridan

R. Sheridan, Assoc. Professor of Botany
Member Pattee Canyon Ecological Board

Enclosures (Please return)
a.) Proposal Pattee Canyon Rec. Area b.) 4 volumes of questionaires
c.) Map showing Recreation Area recent land additions, proposed additions.

Department of Chemistry

University of Montana
Missoula, Montana 59801
(406) 243-0211

August 23, 1976

RECEIVED
AUG 25 1976
MONT. DEPT. OF NATURAL RESOURCES & CONSERVATION

Albert C. Tsao, Administrator
Energy Planning Division
Montana Department of Natural
Resources and Conservation
32 South Ewing Street
Helena, Montana 59601

Dear Mr. Tsao:

I have read the draft Environmental Impact Statement on the proposed Anaconda-Hamilton 161KV Transmission Line. On the basis of that reading, I must recommend that the Department's final EIS recommend to the Board of Natural Resources and Conservation that the Certificate of Environmental Compatability and Public Need be denied to the Montana Power Co.

The cause for the denial should, in my opinion, be on the basis of the inadequate proof of need of the project. It is amazing that in over 30 pages of data and explanation on "Electrical Need" there is no mention (let alone analysis) of the effect of price on electrical growth rates. A methodology such as that used by the company, "Each substation is carefully analyzed for growth rate based upon historical data. The load growth rate of a particular substation is found by fitting an exponential curve using the method of least squares to a given set of data and then determining from this curve the compound percentage growth rate," may have had some utility in the past when energy was cheap and getting cheaper. It is entirely inadequate at a time of rapidly increasing prices for all forms of energy, including electricity. Data available from other states show clearly that low prices for electricity result in high demand and vice versa. A real analysis of need must include a) the projected price of electricity/Kw hr, particularly after the building of Colstrip I-IV and b) the effect of the increased price upon demand.

The details of the load projections are also perplexing. Much is made of the need for irrigation, but peak loads are

never projected to be highest during irrigation season. And since no details of projected growth in Missoula are listed at all, comment about that area is impossible.

In all probability an equally strong case for denial can be made on the basis of Environmental Compatability. The fact is that all of the suggested routes must cross land that is extensively used for recreation (e.g. Pattee Canyon) or is potential wilderness. Either set of choices is, by definition, environmentally incompatible with a transmission line.

Sincerely yours,

Ronald E. Erickson

Ronald E. Erickson
Director
Environmental Studies

REE:md

08 30 19

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AUG 30 1976

MONT. DEPT. of NATURAL RESOURCES & CONSERVATION

August 27, 1976

Albert C. Tsao
Administrator
Dept. of Natural Resources
& Conservation
Helena, Montana

Dear Mr. Tsao,

After reading portions of what seems to be a very thorough impact statement on the proposed Anaconda--Hamilton 161KV transmission line, I am writing to you asking that you do not grant Montana Power's application nor act upon the EPD Alternatives. Although the Report's historical estimated future load data seem to indicate that there may very well be an 8% increased electrical demand yearly in the Bitterroot, Montana Power's application for the new line is not based on this data.

> "The applicant has indicated that the present transmission system, in the absence of line outages, should be adequate to accomodate anticipated load growth without excessive voltage drop at Bitterroot Valley substations through 1995."
> (P. 47,"Impact Statement")

The problem of reliability or "outages" in the Hamilton and Missoula areas seems to be the rationale for the MP application, yet the Statement presents their caseas a weak one:

1) The 1.5 years of operation of the Missoula-Hamilton Heights 161 KV line "is insufficient to assess the reliability," (although there have been no outages so far.) p. 52.

2) "Since 1971 one outage has occurred at the Rattlesnake substation"with no loss of service and lasting only one minute. p. 52.

3) After suggesting that Philipsburg would need the additional transmission capacity, "the applicant did not discuss the Philipsburg area in explaining the need for the proposed line."

My conclusions from your Impact Statement are that there has not been a clearly expressed need for the MP expansion at this time.

More generally, as a Pattee Canyon resident and a person who enjoys fishing and hiking in such areas as Rock Creek and Skalkaho Pass, and as a mother who hopes Montana will retain many of its natural assets for the next generations, I would hope that Montana Power would concentrate on upgrading its present lines and utilizing the established corridors--rather than extending out through the countryside.

Although fewer people see power lines in the woods than in the city, the "visual impact" is far greater because of their incongruity in a natural setting, while in an urban setting one assumes lines are overhead. It is also true, that to run a corridor up a slope of mountains makes the corridor much more visible and from a greater distance, than running it along a valley such as the 230KV lines near Bonner.

Initially, perhaps, upgrading lines may be more expensive than building new ones, but it should pay off in the long run by limiting the corridors and thus simplifying upkeep and repair. Anyway, it is common sense. As a man rebuilds a fence which will no longer serve his purposes, rather than putting up a clutter of fences--so it seems proper that Montana Power upgrade what it has, rather than leave the old power lines scattered in corridors across the country as relics of a previous era.

Sincerely yours,

Susan Geary

Susan Geary

08 31 07

GEOPLAN
Geology and Land Planning Consultants
2425 Mary Avenue
Missoula, MT 59801
(406) 543-5850

August 27, 1976

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MONT. DEPT. of NATURAL
RESOURCES & CONSERVATION

Gary J. Wicks & Albert C. Tsao
Energy Planning Division
Department of Natural Resources
and Conservation
Helena, MT 59601

Dear Sirs:

I have reviewed the Draft Environmental Impact Statement on the Anaconda-Hamilton 161KV Transmission Line. The draft statement deals, in depth, with six environmental concerns... each of these concerns is directly or indirectly affected by the geologic environment. I bring this to your attention because of the obvious lack of geologic support data and with the hope that geologic conditions will be more carefully considered in future utility corridor evaluations.

In 1975, the Bitterroot National Forest contracted for and received a report entitled "Skalkaho-Gird and Sleeping Child Geological Study". This report was designed to portray potential for geologic problems resulting from surface disruption by timber management, mineral exploration, grazing and utility line construction.

The series of overlays which accompanied the report presented several data groups including slope, soil thickness, bedrock stability, potential for geologic hazards and erosion potential. Each of these overlays was generated at a reliability level considerably greater than that of the "Erodibility Hazard" map prepared for your draft statement. Obviously, detailed geologic information is not available for your entire study area. However, where detailed, reliable information exists, it should be incorporated.

I am most concerned with the reliability of the Land Systems Inventory Sub-section map in utility corridor evaluations. Two problems are apparent here:

1) Utility line construction in mountainous terrain involves timber removal and road construction. These activities combined with structurally incompetent bedrock will often produce rockfall, large debris slides, landslides, etc. These mass movements can impact terrestrial and aquatic ecosystems, land productivity and visual quality. The "Land Systems Inventory" does not adequately evaluate the constraints or opportunities offered by bedrock structural conditions.

2) The very broadly defined associations used in preparing the Land System Inventory Sub-section level map allow for potential, major misrepresentations of the physical environment. A case in point is the "Slight" erodibility hazard rating assigned to the Skalkaho Creek-Daly Creek corridor. The Erosion Overlay prepared for the "Skalkaho-Gird and Sleeping Child Geological Study" indicates moderate to high erosion potential for several areas flanking these creeks.

I hope your group will take some action on these comments. Please feel free to contact us if you have any questions.

Most sincerely,

GEOPLAN

Bruce E. Cox

Bruce E. Cox
Geologist and Land
Planning Consultant

BEC:skw

cc: Billy Hicks, U.S.F.S., Region 1 Geologist
Gary Morrison, U.S.F.S., Bitterroot Forest Geologist

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AUG 30 1976

MONT. DEPT. OF NATURAL
RESOURCES & CONSERVATION

Route 5
Pattee Canyon
26 August 1976

Albert C. Tsao, Administrator
Energy Planning Division
Montana Dept. of Natural Resources
32. South Ewing Street
Helena, Montana 59601

Dear Sir:

During this era of supposed energy conservation, the Montana Power Company is suggesting to the people of Hamilton that they need the Proposed 161 KV transmission line from Anaconca to Hamilton. I strongly resent this assertion by Montana Power.

Even more strongly do I resent the alternate plan by the EPD in which the backup transmission line would bisect Pattee Canyon. My husband and I recently moved into the canyon precisely because it is the only area near Missoula that still has a pristine, undeveloped aura about it. A transmission line across the canyon would ruin this intangible but very definite asset of the area.

I believe the alternative that wasn't mentioned, i.e., no power line, should be strongly considered. Montana Power won on Colstrip 3 and 4. This time let the people win. Don't permit any power line.

Please send me a copy of the final Environmental Impact Statement.

Sincerely,

Mrs Susan Carmody

Mrs. Susan Carmody

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AUG 30 1976
MONT. DEPT. OF NATURAL
RESOURCES & CONSERVATION

Route 5, Pattee Canyon
Missoula, Montana 59801
August 27, 1976

Albert C. Tsao, Administrator,
Energy Planning Division
Montana Dept. of Natural Resources and Conservation
32 South Ewing Street
Helena, Montana 59601

Dear Dr. Tsao:

I recommend that the Dept. of Natural Resources and Conservation deny a permit to construct a new 161 kV electric transmission line between Hamilton and Anaconda. I have read the draft EIS and have attended one hearing, and remain unconvinced that a real need exists for greater reliability in electrical service.

The following questions occur: What is a reasonable reliability? Does a new line really mean that electrical service will be improved from something like the figures given for 1971-1972, where the service in the valley had ranged from 99.94 to 99.99 per cent perfect? (testimony of Montana Power)

On page 136, the draft EIS states that a line constructed "solely to achieve reliability will probably result in a rate increase". Will people really be paying something like $12.75 per kilowatt hour of electricity for periods when they would otherwise be without electricity? Most of us can live without such expensive reliability. People, in fact, are probably much more eager to make real choices than the power companies would suppose: the mountains shown in Mr. Brant's slide presentation, the refuges, game reserves, and recreational areas left untrammeled by lines and access roads, in exchange for nine hours total a year (or some such number) of electrical outage. With these thoughts in mind, then, would you please elaborate on the use of alternative methods, load dropping, and a ripple control system (pages 58 and 59). Surely these are worth more than two pages of consideration. Bill Cook of Florence talked about power being actually waster by pressure reduction valves that take unwanted water pressure out of his irrigation pipes. Surely we could figure out some way to add that power back into Montana Power's grid system.

As you perhaps know, most of western Europe (which is also "technologically advanced") uses one-half the energy that we use in the United States--a recent visit to Great Britain confirmed that people live with space heaters, cool rooms, cook sometimes only once a day, heat only 2-3 gallons of water at one time (a handy device for any family's hot water tank) and yet manage somehow to lead creative and productive lives.

Sincerely,

Nancy Erickson

Nancy N. Erickson

RECEIVED

AUG 30 1976

MONT. DEPT. OF NATURAL
RESOURCES & CONSERVATION

08 30 12

Route 5, Pattee Canyon
Missoula, Montana 59801
August 26, 1976

Mr. Albert C. Tsao
Administrator, Energy Planning Division
Montana Department of Natural Resources & Conservation
32 South Ewing Street
Helen, Montana 59601

Dear Mr. Tsao:

I have studied the draft impact statement for the proposed Montana Power Company transmission line from Anaconda to Hamilton.

In view of the absence of any demonstrated need for this line, the major adverse environmental impacts that the statement identifies clearly make approval of the line undesirable and unjustified, in my view. The disruption of existing roadless, undeveloped areas and the scenic degradation the line would produce are an unacceptably high price to pay for a trivial increase in system reliability.

The suggested alternate routing from Bonner to Miller Creek is particularly unsatisfactory. This line would slash through the only forested, mountain canyon accessible close to the Missoula population. This is a major, highly valuable urban recreation area and a power line, even with "H" type poles rather than towers, would seriously degrade it. This would be totally unacceptable to many people in Missoula. The impact statement correctly shows high scenic values and high potential adverse impacts in the area.

The line would also severely reduce property values in a very high quality residential area, and I expect protracted legal proceedings would result if an attempt were made to use this route. I recommend this suggestion, which did not originate with the power company, be withdrawn.

Please send me a copy of the final impact statement when it is prepared.

Sincerely,

Dr Robert C Lucas

Dr. Robert C. Lucas
Route 5, Pattee Canyon
Missoula, Montana 59801

08 31 06

RECEIVED

AUG 30 1976

MONT. DEPT. OF NATURAL
RESOURCES & CONSERVATION

William S. Welles

Box 531
Philipsburg, Mt.
59858

August 26, 1976

Albert C. Tsao
Administrator, EPD
32 So. Ewing St.
Helena, Montana
59601

Dear Mr. Tsao:

I appreciate having been sent the EIS concerning the proposed 161kv Anaconda to Hamiliton transmission line, and I would like to submit the following comments:

1. I am a landowner living on the West Fork of Rock Creek. Any of the proposed routes for this transmission line would affect our ranch. I seriously question the need for the line at all. It seems to be an attempt by Montana Power and BPA to increase their base and range to provide power east of the Divide. The arguement about increasing 'reliability' is propaganda.
2. The proposed routes of Montana Power would negate the existing roadless areas in the Sapphire Mtns. There is already too much encroachment in these areas and the constuction of such a line would create irreversable damage.
3. EPD's alternative corridor travelling down the East Fork and up the West Fork of Rock Creek would not concern roadless areas but it would ruin the values of our ranch and several others as well. By this I mean not just the economic values of our land, but the entire spectrum of the quality of our lives. And the lives of our livestock and the lives of the flora and fauna (which is still abundant and beautiful, but would be seriously damaged). I could rage on for pages but I am sure you understand my feelings about the possibility of a transmission line crossing my meadow.
4. It would seem to me that because Montana Power has buried the existing power line in the valley, it would be a precedent to be followed if, in fact, it is decided that this transmission line is necessary at all. I was forced to pay a considerable sum to be hooked into the buried line which runs less than 100 feet behind my house, and therefore I feel it would be only fair to force the powers-to-be to pay a considerable sum to bury their 161kv line.

Your staff should be commended for their hard work on the EIS but as with the transmission line itself, the question asked by M.R. Moskow, "Is it worth it?" is applicable. Is it worth it and for whom?

All of the above has been said before by others who know more than I; so, please add my name to those opposed to this transmission line. It's not worth it to me and it could ruin my plans for rebuilding this old ranch. Please keep me on your mailing list and if you are ewer in this area please stop in and enjoy my view.

Sincerely,

Willis S Welles

IV. Department Responses to Public Comment

The letters published in the previous section serve as representative samples of the public response received on this application. The Department does not respond here to every question posed in every letter. Questions not individually addressed in this section were not ignored; rather, they were considered as a whole in the preparation of the final EIS.

This section is organized into two parts. Part A responds to all comments and questions except those regarding engineering characteristics and electrical need. Part B responds exclusively to the applicant's questions and comments pertaining to engineering characteristics and electical need.

A. General Responses

1. Methodology

The U.S. Forest Service made comments to the effect that the Department's identification of areas having severe erosion hazard is misleading because helicopter construction or other mitigations can reduce the actual amount of erosion in those areas.

It should be pointed out that conventional construction methods were assumed when rating impact risk for all six concerns identified in the draft EIS.

The applicant questioned computer categorization of cells by dominant characteristics of each cell, on the basis that these data do not give a representative picture of the details within a cell.

The same may be argued of any mapping system. A symbol for a city on a road map does not give a representative picture of the details within the city, and the symbol of a tree does not give a representative picture of the details of the leaves, insects, birds, etc. within the tree. The methodology described for categorizing cells is merely a mapping technique, and uses a computer as a tool to facilitate an otherwise time-consuming process. As such, it is subject to the same limitations common to all mapping efforts.

2. Reliability

As discussed in section II, a major concern expressed in many public comments received was that the costs and benefits of increased reliability, which must be considered in determination of need, were not adequately discussed in the draft EIS. A more complete treatment of the costs and benefits of additional reliability has been presented in Part One of this Final EIS, in the discussion following Justification No. V.

Other comments were received questioning the validity of the applicant's load growth analysis. The following represents the Department's analysis of the applicant's load growth data.

Load Growth and Energy Consumption in the Bitterroot Valley

Montana Power Company's original application for the Anaconda-Hamilton 161 kV line projected an increase in electical load in the Bitterroot Valley of 8 per cent per year through 1985. This 8 per cent figure is based upon 8 per cent load growth from 1948 to 1973, and 11 per cent load growth between 1963 and 1973. The MPC's projections of load growth, and the reliability for an increasing load growth, are critical to its argument that the Anaconda-Hamilton 161 kV line be built immediately.

Investigation of the load growth from 1970 to 1975 indicates a growth rate of slightly less than 5.5 per cent per year. The 1975 substation peak loads of 32,994 kw was only 1,465 kw greater than 1972's load of 31,530 kw. The load figures for the four-year period from 1972-1975 differ from the 1960's as growth appears to have slowed considerably, or even reversed itself (see Table 15). Later correspondence (August 1976) from the MPC contained load estimates for the Bitterroot substations, which showed decreased estimates for major substations in the Valley having high historical growth rates; Lolo (11.6 per cent to 4.8 per cent), Darby (12.4 per cent to 3 per cent), plus decreased load estimates for Corvallis with BPA and Stevensville with BPA.

Approximately 70 per cent of the load in 1972 and 1975 was in eight substations in the Valley, and their load decreased by 110 kw. As the table shows, growth has been irregular at best. From 1972 to 1975, Victor and Corvallis with BPA and decreases in load while Florence, Stevensville, Stevensville with BPA, Grantsdale with BPA, Hamilton rural, and Darby showed varying growth.

Lolo, Hamilton City, and Corvallis comprised the remaining 30 per cent of the load, increasing from 8,570 kw in 1972 to 10,144 kw in 1975. This represents a growth rate slightly more than 5.5 per cent per year. Changes appear to be taking place in the electical consumption of the Valley, but on a pattern different from the past.

3. System Alternatives

Several letters were received requesting a more thorough comparison of transmission alternatives, and a consideration of the alternatives of load shedding and no action. A comparison of transmission system alternatives has been presented in Part One of this Final EIS under Justification No. I, and a discussion of impacts of power outages on electrical customers (which may be considered an analysis of the impacts of no action) and load shedding is presented in Part One under Justification No. V.

4. Environmental Concerns and Impact

The applicant suggests that permanent access roads over agricultural land do not represent long-term losses, as the farmer may use the road to increase his own productivity.

It should be emphasized that agricultural land which is crossed by a per-

TABLE 15

MONTANA POWER COMPANY'S BITTERROOT VALLEY ELECTRICAL DATA, 1972-1975, FOR SUBSTATION PEAK LOAD

	1972	1975
Florence	560 KW	750 KW
Stevensville	2400 KW	2466 KW
Stevnesville W/BPA	2600 KW	2632 KW
Victor	650 KW	630 KW
Corvallis W/BPA	5400 KW	3920 KW
Grantsdale W/BPA	1450 KW	1540 KW
Hamilton Rural	2400 KW	3312 KW
Darby	7500 KW	7600 KW
SUB TOTAL	22,960 KW	22,850 KW
Lolo Hamilton City	4200 KW	5136 KW
Hamilton City	3100 KW	3424 KW
Corvallis	1270 KW	1584 KW
TOTAL	31,530 KW	32,994 KW

NOTE: It appears that plans to proceed with construction of a 161 kV line to the Bitterroot Valley are based upon conflicting data. Data on loads are confusing: for example those areas projected with the fastest growth, Stevensville (5.4%), Stevensville W/BPA (8.8%), Corvallis W/BPA (8.3%) and Grantsdale W/BPA (7.2%), showed small growths while those with small projected growths showed steady growth, i.e., Hamilton City, Corvallis, and Lolo. Due to the confusing load picture, it is difficult to project a convincing future picture of load growth in the valley.

manent road is taken out of production, regardless of the use to which the road is put.

A statement was made by the applicant to the effect that access roads do not necessarily irreversibly change the roadless character of an area. While it is indeed true that access roads can be closed and reclaimed, it must be emphasized that reclamation of Montana roads to restore roadless qualities has been an extremely rare event in the past, and there is no reason to believe it will occur in this area, particularly if a transmission line accompanies the road. Intrusion of access roads into previously unroaded areas reduces the probability that the areas will be designated and/or managed as roadless areas or wilderness; access roads accompanied by transmission lines essentially reduce this probability to zero. Thus, the effects which access roads of the types that would accompany the Anaconda-Hamilton 161 kV transmission line would have on the roadless character of an area must realistically be assumed irreversible, at least during the period of several generations.

Several comments were made by the applicant to the effect that a powerline which is seen by relatively few people does not have a large visual impact.

As the Department has explained earlier, the visual impact of a transmission line is not wholly dependent upon the number of people who view the line, but is also a function of the viewer's expectation to view a line in a certain setting. It is entirely possible for a line to have a large or severe visual impact even if viewed by a relatively small number of people (see section 6.3.3.5. of the Clyde Park-Dillon draft EIS, and section 6.4. of the Anaconda-Hamilton draft EIS).

The U.S. Forest Service, in an attachment to its letter of public comment published in section III, supplied minor corrections to the boundaries of the USFS inventoried roadless area between the Skalkaho Highway and the Anaconda-Pintlar Wilderness Area, and to the boundaries of the Sapphire Wilderness Study Area (under Senate Bill 393) as published in the Recreation map in the draft EIS. These corrections have been noted, but do not substantially change the Department's analysis of potential environmental impacts for this area.

Both the applicant and the USFS felt that the Department underestimated the population of Missoula as approximately 30,000 people. This figure is based upon the 1970 census, which reported the population of Missoula as 29,497. The Department, however, is aware that the Missoula area contains a higher population than that reflected within the city itself.

Many letters were received from persons who live in Pattee Canyon or who are planning to build homes there. These people frequently commented that they had moved to the canyon because of its "pristine," or "undeveloped" nature, and they strongly object to a power line through the area because it would alter its "unspoiled beauty." Partly because of such residential development, Pattee Canyon today contains little land which is truly pristine or unspoiled. Examination of aerial photographs of the area reveals that it contains abundant roads, logged areas, utility corridors, and other evidences of human activity, and can in no way be considered "pristine" or "undeveloped."

5. Selection and Evaluation of Alternative Corridors

a. Revision of Bonner-Miller Creek Substation Alternative Corridor

In response to public comment concerning the Pattee Canyon area, the Department has revised the Bonner-Miller Creek substation alternative corridor (U-V), as shown in Figure 14.

The shortest straight-line distance between the Miller Creek substation and the BPA 230 kV line near Bonner is approximately 9.0 miles. Assuming that point U (the Miller Creek substation) is fixed, and that the BPA 230 kV line can be tapped at any point along its length, it is possible to make the following comparisons of the length of the line which would be built within each corridor:

(i) The distance from the Miller Creek substation to the BPA 230 kV line along the center of the two-mile-wide corridor is approximately 10.0 miles for the original segment U-V (as shown in the draft EIS) and 11.5 miles for the revised segment (as shown in Figure 14).

(ii) The shortest distance connecting the Miller Creek substation with the BPA 230 kV line within the two-mile-wide corridor is approximately 9.5 miles for the original segment U-V and 10.25 miles for revised segment U-V.

Since the original and revised corridors cross similar terrain and largely overlap, potential adverse environmental impacts of a transmission line within each corridor are similar. However, in several respects, impact potential within the revised corridor U-V differs from that described in the draft EIS for the original corridor U-V. These differences are pointed out below for each of the six major concerns.

1. Impacts to Aquatic Ecosystems. There is no significant difference. The revised corridor includes an area of steep (greater than 30 per cent) slopes on the south faces of Mount Dean Stone and Mitten Mountain, but much of this area has been logged, and transmission line construction would not significantly increase sedimentation or adversely affect the fisheries of Miller Creek, Deer Creek, or the Bitterroot River.

2. Impacts on Land Productivity. There is no significant difference; both corridors include timberland (most having a productivity of less than 80 cubic feet/acre/year) and a small amount of irrigated land.

3. Visual Impacts. Both corridors have moderate-to-high potential for visual impact. A transmission line within the revised corridor could be effectively hidden from view from the Missoula area and the Pattee Canyon Recreation area by centerline placement south of the Mount Dean Stone - Mitten Mountain ridgeline and near the West Fork Deer Creek road. Such a line could also be hidden from view to motorists on the Miller Creek road through centerline

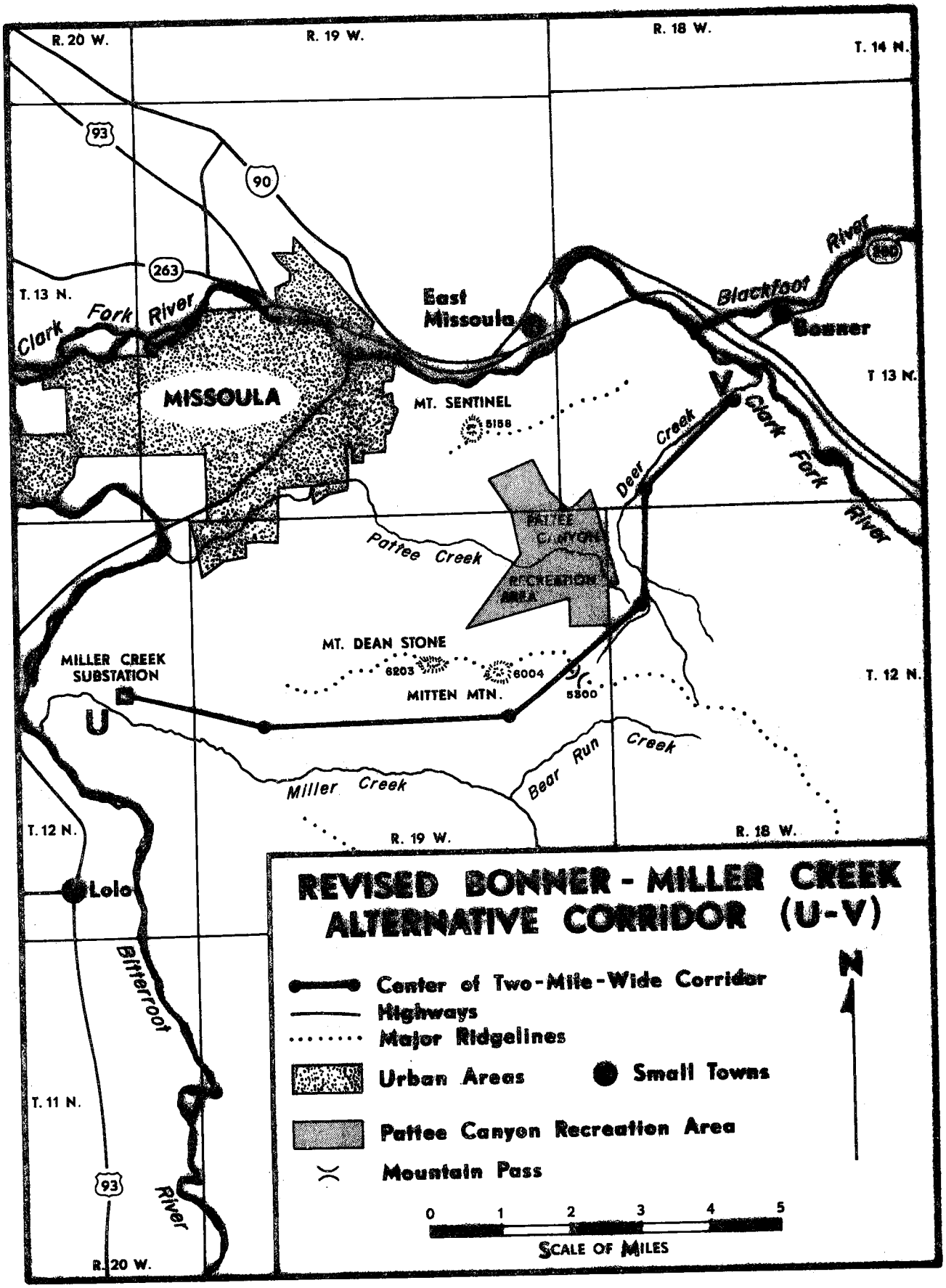
R. 20 W.
R. 19 W.
R. 18 W.
T. 14 N.
T. 13 N.
T. 12 N.
T. 11 N.
93
90
263
Clark Fork River
MISSOULA
East Missoula
Blackfoot River
Bonner
MT. SENTINEL
5158
Deer Creek
Clark Fork River
Pattee Creek
PATTEE CANYON RECREATION AREA
MT. DEAN STONE
6203
6004
5500
MITTEN MTN.
MILLER CREEK SUBSTATION
U
V
Miller Creek
Bear Run Creek
Lolo
Bitterroot River
REVISED BONNER - MILLER CREEK ALTERNATIVE CORRIDOR (U-V)
Center of Two-Mile-Wide Corridor
Highways
Major Ridgelines
Urban Areas
Small Towns
Pattee Canyon Recreation Area
Mountain Pass
N
0 1 2 3 4 5
SCALE OF MILES

Figure 14

location several hundred yards north of the road and through use of timber and topography in screening the line. The line may be visible, however, from Highway 93 between Florence and Lolo.

4. Impacts on land use patterns. A transmission line could be sited within the revised corridor to avoid the Pattee Canyon Recreation and Picnic Areas as well as the built-up areas along Pattee Canyon and the foothills from the mouth of Pattee Canyon to the Miller Creek Substation.

5. Impacts on terrestrial fauna. There is no significant difference. Much of the area within the revised corridor has been logged and roaded, and the additional impacts of transmission line construction and operation upon wildlife would be minor.

6. Socio/economic impacts. A transmission line within the revised corridor is likely to arouse less public opposition and incur less social impact than one within the original corridor. This is due to the fact that the revised corridor does not include lower Pattee Creek (a heavily subdivided area), and that it provides for bypassing of the Pattee Creek Recreation and Picnic Areas. Economic impacts of both corridors would be quite similar.

b. Response to Specific Comments Concerning Evaluation of Alternative Corridors

The applicant stated that, "East Fork Reservoir is for irrigation and is not popular for recreation," and that the applicant's preferred line would not cross this reservoir, but would go north of it.

The USFS, in the letter published in section III, has described the East Fork Reservoir as ". . . a water oriented recreation area which also provides access to the Anaconda Pintlar Wilderness;..."

The applicant disagrees with the Department's statement that forested lands are included in nearly every mile of the applicant's preferred corridor, and presents a description of a possible centerline which avoids timber for several miles near either endpoint.

The Department's inventory has shown that forested land is included in every mile of the applicant's preferred two-mile-wide corridor except for the first two miles southeast of point K and for six miles west of the Anaconda substation (point A). The applicant further states that half of segment H-K is not timber; the Department's data show that of the 18 square miles within the two-mile-wide corridor segment H-K, approximately 12 are forested.

A comment was made by the applicant to the effect that ". . . there is not a narrow strip of land at the head of Railroad Creek that is being studied for a possible designation as a roadless area."

The area in question, at the head of Railroad Creek and in the vicinity of

Railroad Pass, is not only included in the Sapphire Wilderness Study Area (Senate Bill 393), but is also within a National Forest Inventoried Roadless Area (see Recreation map in the draft EIS).

The applicant questions reference by the Department to potential impacts to aquatic ecosystems at Daly Creek, on the basis that its "preferred corridor is not proposed along Daly Creek so there could not be any impact to aquatic ecosystems along Daly Creek." However, the applicant's preferred two-mile-wide corridor includes approximately one mile of Daly Creek, an area of large to severe potential for adverse impact to aquatic ecosystems.

The applicant further expresses concern over potential impacts resulting from construction through areas having narrow canyons or steep slopes. Referring specifically to the canyon of Daly Creek, the applicant states that "It just is not practical to build a 161 kV power line . . ." through this area because of the narrowness of the canyon and the steepness of slopes (applicant's comments, page 13). The Department shares the applicant's concern about the practicality of transmission line construction through such areas--areas which are characteristic of the Sapphire Mountains in general, and the applicant's preferred route through the steep, narrow Skalkaho or Railroad Creek in particular. This is one of the reasons, as discussed earlier, that the Department has recommended that no transmission line be built across the Sapphire Mountains.

6. Comments on Geological Considerations

The Department obtained a copy of a geological study referred to by GEOPLAN in its public comment letter early in its study of this application. The report was examined to determine how it could be used in corridor selection. The staff geologist and soil specialist concluded that the report would be of little value in connection with this application. This conclusion in no way reflects on the GEOPLAN study's quality or reliability, but is a consequence of the quality of the existing data in the Department's study area. As in other transmission line projects done by the Department, high quality mapping on larger scale maps have not been incorporated into the mapping systems. To use detailed, high quality information (geologic or any other kind) in part of the study area where only poor quality information exists for the remainder, causes parts of the area to be biased for or against placement of the corridor.

7. Policy

The applicant, referring to page 156 of the draft EIS, states that the "discussion of long term effects related to future growth patterns suggest that the Department is supporting a no new growth policy for Montana."

The Department has reexamined the discussion, and sees nothing in it that could be interpreted as "support" for a "no new growth policy." A "no growth policy" hasnot been adopted by the Department and the Department has never advocated such a policy. In fact, by virtue of the Department's suggesting an alternative corridor for a new transmission line serving the Bitterroot area, it can be seen that the Department is not advocating any termination of overall load growth. The applicant's statement, in this case, is on its face nonsensical. The Department has many statuatory responsibilities to promote growth,

through programs such as the Renewable Resources Development Program, the Alternative Energy Program, the development of water resources, and the management and sale of timber resources. Statistics for these programs indicate what the Department's policy is with regard to economic development and growth. In addition, the Department's recommendations for approval for over 90 per cent of the applications received under the utility siting mandate could hardly be interpreted as a "no growth policy."

B. Response to the MPC on Engineering and Electrical Need

The applicant comments, concerning page 19, paragraph 1, of the draft EIS that:

> It should be emphasized that the applicants have stressed the increased load growth in the Missoula and Philipsburg areas as well as the Bitterroot Valley as a basis of the need for this project.

In the Anaconda-Hamilton application, the applicant mentioned future load growth-related problems of the Philipsburg area only in connection with the alternative plans available to serve the needs of the Bitterroot Valley and Missoula. In discussions with the Department on August 31, 1976, the date on which the applicant's comments were received by the Department, representatives of the MPC stated that load growth at Philipsburg is not a need for the Anaconda-Hamilton line. The representatives further stated that the recent closure of a sawmill at Philipsburg had complicated future projections of Philipsburg's load growth.

With respect to page 52, paragraph 3, the applicant comments:

> Reference is made to Department engineering studies which do not indicate voltage problems in the Missoula area. What studies are these and by whom were they made? The applicant requests a copy of such studies. It should be noted that the applicants by letter of March 15, 1976, from John Evans disagrees with this statement by the Department regarding no indication of voltage problems.

The complete draft paragraph from which the applicant quoted is:

> Voltage drops larger than those specified by PSC regulations are predicted to occur in the Bitterroot Valley only during an outage of one or more transmission lines. Because section 8-6 of Rule 805 exempts voltage variations outside the specified limits during transmission line outages not under the control of the utility, the PSC Rule 805 does not affect considerations of electrical need for the proposed Anaconda-Hamilton Transmission line (draft EIS, page 52).

The fact that the applicant wants to provide reliable service and plan for events which are excluded by Section 8-6 does not affect the truth of the above quote. The PSC has no reliability standard designating the acceptable minimum numbers of hours of power outages to transmission line failures (Opity 1976).

In reference to Department engineering studies, which, as of the writing of the draft EIS, did not indicate voltage problems in the Missoula area, the applicant asked, "What studies are these and by whom were they made?" The applicant also notes that a letter sent to the Department disagrees with this statement.

The Department engineering studies referred to were carried out by HARZA Enginneering Company. HARZA modeled an outage of the 161 kV line between Rattlesnake and Missoula No. 4 substation. Adequate voltage levels were observed throughout Missoula. It should be noted that according to the applicant, cases 1 and 3A accompanying the applicant's March 15, 1976, letter did not converge, i.e. no model solution was obtained. However, in later studies carried out by the Department's consultants, a case similar to 3A not only converged, but also produced adequate voltage levels.

Regarding section 3.53 of the draft EIS (page 53, paragraph 2), the applicant requests that the Department take note of load flow studies transmitted by letter to the Department and that the ten-year plan indicated growing loads in the Philipsburg area.

Regarding the last paragraph on page 59 of the draft EIS, the applicant wrote:

> The applicants disagree that the Philipsburg area was not represented by the applicants as having a need. Reference is made to the need in the Philipsburg area on page 7 of the original application, and supplemental information referred to above was also supplied to the Department.

On page 7 of its application, under the section heading "Discussion of Alternative Plans and Technologies," the applicant did write that the Anaconda-Hamilton 161 kV line could be a potential source of power to the Philipsburg area. This statement does not constitute an application to serve need at Philipsburg. As previously stated, on August 31, 1976, in discussions with the Department, representatives of the applicant stated that load growth at Philipsburg does not constitute a need for the Anaconda-Hamilton line.

The applicant also asked who is making studies to establish acceptable limits of interference mentioned in section 5.4. of the draft EIS.

The reference to studies presently underway does not refer to Department studies, but is rather a general comment on nationwide efforts to establish acceptable limits of interference.