APPLICATION FOR A 230 kV TRANSMISSION LINE
MONTANORE PROJECT
LINCOLN COUNTY, MONTANA

Submitted to:

MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY
1520 E. 6th Avenue
Capitol Station
Helena, Montana 59620

and

U.S. FOREST SERVICE
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CHAPTER 1 INTRODUCTION

1.1 DESCRIPTION OF PROJECT

This application is submitted by Mines Management, Inc. (MMI) for the Montanore Project to construct a new 230 kV transmission line from Pleasant Valley, approximately 26 miles southeast of Libby, to the proposed Montanore Project mine site on the east side of the Cabinet Mountains. The Montanore Project is a silver and copper mine being developed by MMI. The Montanore Project is located about 18 miles south of Libby in the Cabinet Mountains of Northwest Montana (Figure 1-1).

The application is also intended to provide information on the existing environment and alternative route alignments to allow the Montana Department of Environmental Quality (DEQ) and the U.S. Forest Service (USFS) to complete a joint environmental analysis of the proposed transmission line and mining project.

A Montana Major Facility Siting Act Permit Application for the transmission line was originally submitted to the State of Montana for the Montanore Project in June 1989 by Noranda Minerals Corp. Noranda was the original developer and proponent for the Montanore Project. After receiving the necessary state and federal authorizations, Noranda failed to construct the Montanore Project.

In May 1989, following Noranda's submittal of an application for a Hard Rock Operating Permit to the Department of State Lands (DSL) and USFS, the preparation of a joint Environmental Impact Statement (EIS) began. The Final EIS was completed in October 1992 and the Record of Decision (ROD) was issued in 1993. Baseline environmental work and a description of the mining project were included in the operating permit application and are extensively cross-referenced in this application.

The ore body is located beneath the Cabinet Mountain Wilderness Area. All access and surface facilities would be located outside of the wilderness boundary in Lincoln and Sanders Counties.

The Montanore Project would initially start at 12,500 tons per day (tpd) with ultimate production reaching 20,000 tpd. The power requirements are sized for full production (20,000 tpd). Ore would be crushed underground and conveyed to a mill at the surface near the Ramsey Creek portals. Ore would be ground at the mill, and the silver and copper concentrated by conventional froth flotation. Tailing material from the mill process would be conveyed through a pipeline to the tailing disposal impoundment approximately 4 miles from the mill in the Little Cherry Creek drainage. Access to the mill and tailing facilities would be by the existing U.S. Forest Service Bear Creek Road. One adit is proposed near Rock Lake. It would serve as a ventilation adit that would be situated on patented mining claims HR 133 and HR 134. The lower Libby adit was the original adit developed by Noranda as part of their exploration program. Noranda drove approximately 12,000 feet before cessation of operations.

Currently there is no electrical power distribution system serving the proposed mine site.

This application presents the North Miller Creek alternative as the preferred transmission line alternative, as was selected within the 1992 EIS and 1993 ROD. Figure 1-2 shows the alignment of the preferred North Miller Creek alternative. Mitigation measures were developed specifically for the preferred route alignment and were identified within the 1993 Certificate of Environmental Compatibility and Public Need. These same mitigation measures are also incorporated into this current application and are included as Appendix G.

A new Hard Rock Operating Permit application has also been updated and was submitted in December 2004 to DEQ and USFS. These agencies are currently reviewing the application are preparing to initiate an EIS for the project.

Figure 1-1. Location Map

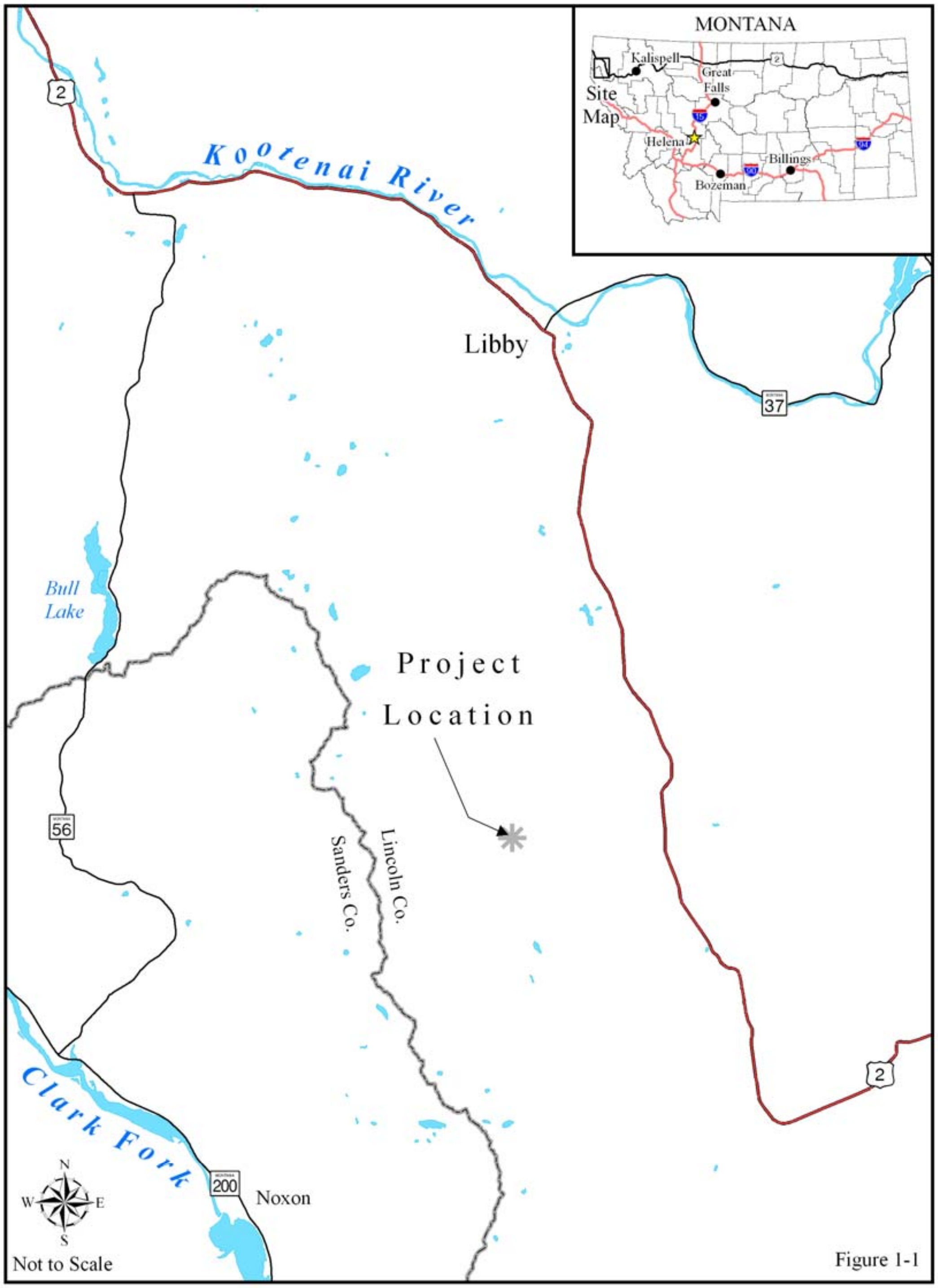
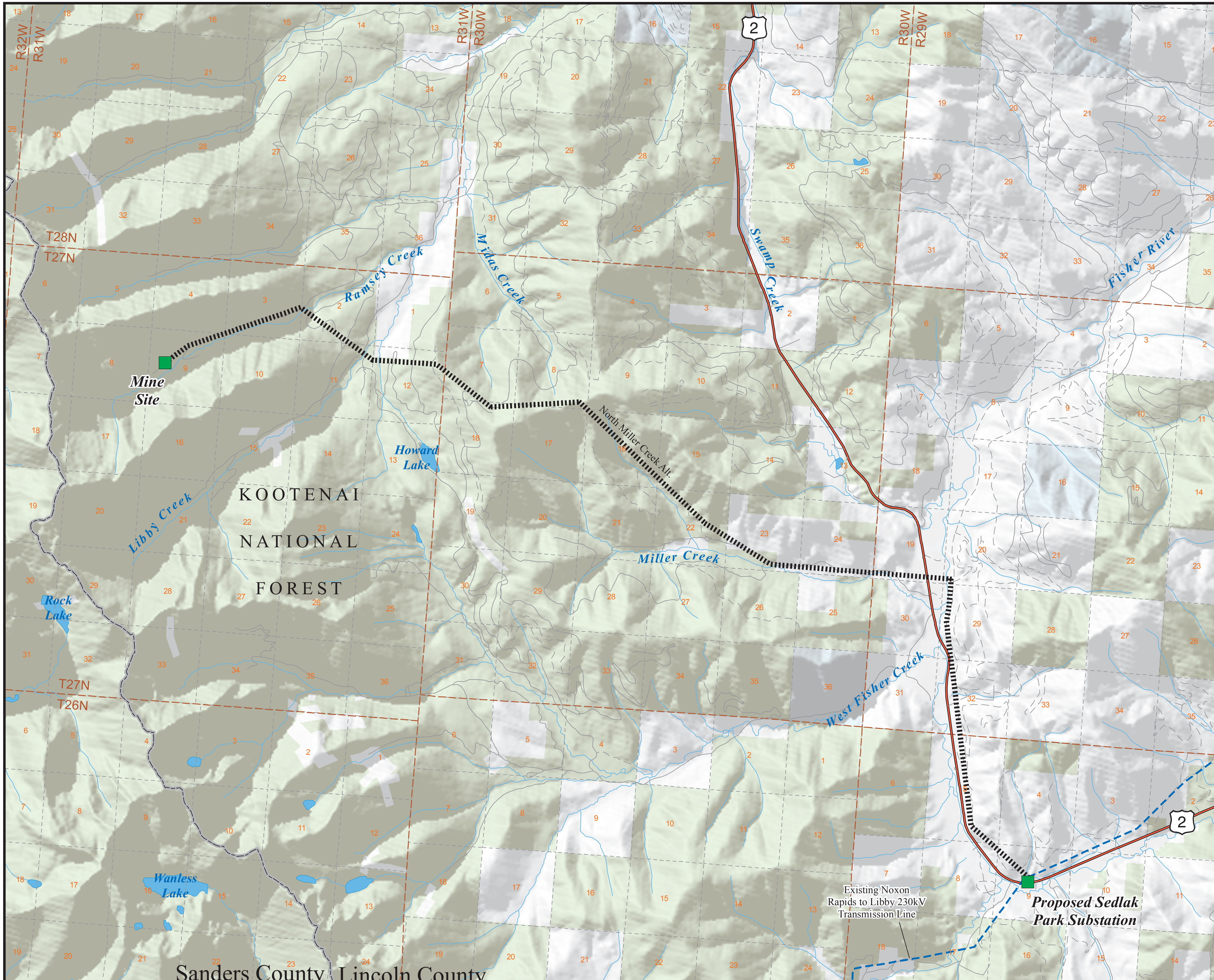


FIGURE 1-2

Preferred Route (From 1992 EIS and 1993 ROD)



Legend

- Substation
- Preferred Route (North Miller Creek)
- 230kV Transmission Line
- Major Highway
- Minor Road
- Two Track
- County Boundary
- Township Line
- Section Line
- River or Stream
- Lake, Pond, or Reservoir
- USDA Forest Service
- State of Montana

0 0.5 1 2 3
Miles

1:80,000

POWER ENGINEERS

Print Date : June 06, 2005

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1.1.1 Purpose and Structure of the Application

The proposed 230 kV transmission line would be designed and built solely to service the mine.

This application is submitted to DEQ for a permit to site a major facility to satisfy the requirements of the Montana Major Facility Sitting Act (Title 75, Chapter 20, MCA).

This application follows the suggested format in the Administrative Rules (Title 17, Chapter 20, ARM) and consists of two volumes. Maps required by the rules are contained in Volume 2: Maps. Mylar overlay copies of each of the maps were previously supplied to DEQ with the original 1989 application.

This application evaluates the alternatives that were included in the original 1989 application (Miller Creek, Swamp Creek, Swamp Creek Alternative A, Midas Creek, and West Fisher Creek). The environmental data and comparison of the alternative routes included in this application has been retained from the 1989 application.

An EIS was produced in 1992 that further evaluated the alternative routes. A summary of the EIS evaluation and comparison has also been included in this application.

2.1.2 Power Requirements

Power requirements for the mine and mill are extensive and would place heavy demands on any supply system utilized. Peak demand (total of all electrical loads operating on the system) average over a 15 minute period would be approximately 40 megawatts.

Main electrical uses would include crushing, grinding and pumping in the mill in addition to underground ventilation and crushing, conveying, and operation of electric mine equipment. Heavy demands would be placed on the electrical supply system during certain times, such as startup after power outages, and when equipment would have to be started under fully loaded conditions.

Electrical system stability would be critical because of complex equipment operating requirements, including computerized control systems and large horsepower motors.

No other uses of the proposed transmission line are anticipated between the tap source in Pleasant Valley and the substation at the mine site in Ramsey Creek.

2.1.3 Mine Permitting and Environmental Analysis

An Application for a Hard Rock Operating Permit for the proposed mine and associated facilities was submitted to DEQ and the USFS in December 2004. The DEQ and USFS are in the process of reviewing the Operating Permit for completeness. One condition for beginning mine construction and operation is that the Operating Permit Application has been declared complete by DEQ and accepted by the USFS. Agency approval of the mine will also require the completion of a joint Environmental Impact Statement (EIS) that covers all aspects of the project including the transmission line. The USFS and DEQ have developed a Memorandum of Understanding to coordinate joint permit application review and National Environmental Policy Act (NEPA) and Montana Environmental Policy Act (MEPA) environmental analysis. Under MEPA (ARM 17.4.607), state agencies (i.e., DEQ) are required to cooperate in the environmental review.

A third-party contractor will coordinate with DEQ and the USFS in preparing the EIS.

1.2 DESCRIPTION OF DESIGN ALTERNATIVES CONSIDERED

1.2.1 Power Sources

Five sources of power were considered. A source of power from the west side of the Cabinet Mountains was considered. This source would originate at the Noxon Dam and follow Rock Creek via a 230 kV transmission line for approximately 8 miles to a secondary substation located at a portal on the west side of the Cabinet Mountains. From the secondary substation the power would continue via medium voltage mine feeder cables through approximately 33,000 feet of adit to the receiving substation at Ramsey Creek, located on the east side of the Cabinet Mountains. This alternative was eliminated because of the high cost of 190,000 feet of medium voltage mine feeder cables and extremely poor voltage regulation resulting from the medium voltage mine feeder system.

In addition to these problems this alternative would require upgrading of the road in the Rock Creek basin. Other surface disturbances would include an additional substation at the Rock Creek Portal area for termination of the 230 kV line. Access during power outages would also be a significant problem if this option were used. Since there would not normally be personnel at the Rock Creek location, it would cause substantial operational delay in getting a problem resolved with the substation, if there were problems in that area. Wintertime maintenance would also be another problem for the Rock Creek road.

Consideration was given to constructing a switchstation to tap the Noxon-Libby 230 kV line at a point approximately 7 miles southwest of Pleasant Valley. The Montana state plane coordinates for this substation are 539,500 Easting and 409,250 Northing. These coordinates are located in Section 33, Range 30 West, Township 26 North. Switchstations of this size are normally inspected at least once a month, with continuous access to the substation required for equipment repairs or lien switching. This requires reliable access to the substation. Utilization of this remote site with no maintained access roads would require costly road maintenance and would reduce services to the mine.

The third power source considered is the Libby substation located just north of the town of Libby. It consists of a Bonneville Power Administration (BPA) powerline fed from the Libby Dam. This source has severe system capacity problems and various costly upgrades would have to be completed to allow use of this facility to feed power to the mine. Through communication with Flathead Electric Cooperative, it was determined that transmission line capacity from Libby Dam to the Libby substation is too small to adequately supply the mine. An upgrade of approximately 12 miles of 115 kV line from Libby Dam to Libby would have to be constructed to enable the Libby substation to supply power to the mine. Additionally the 115 kV/230 kV transformer would have to be upgraded at the Libby Dam substation.

Approximately 26 miles of new 115 kV line would have to be built from the Libby substation to the mine. The transmission line losses for a 115 kV line are four times as great as those for a 230 kV line. In addition to the line losses there are substantial transformer losses in the step down from 230 kV to 115 kV.

Another source considered for power service to the mine site was an onsite generation facility. This alternative was not studied in detail due to the extensive capital costs for a plant of this size as well as potential problems with on-site emissions. Power demands would require an approximately 50 megawatt plant to be installed on-site. Generation plant capital cost will range from 35 to 50 million dollars to build the generating plant. In addition, there would be a substantial cost to install the gas line to the site to provide gas for these units. Although there has been no detailed evaluation done to arrive at an exact estimate, a cost of $5.0 million is anticipated for construction costs of a pipeline to extend service from the Pacific Gas pipeline approximately 40 miles away. Generation plant operating costs would also be high.

Another consideration was the loss of a non-renewable resource (natural gas) versus the renewable hydro-electric power that would be consumed by purchasing power off of the local electrical transmission grid.

The preferred power source is located at Pleasant Valley. The switchstation would tap the Noxon-Libby 230 kV transmission line. The coordinates are 571,000 Easting and 428,400 Northing, located in Section 9, Range 29 West, Township 26 North. This site is located adjacent to Highway 2, which would allow continuous year-round access to the switchstation.

1.2.2 Line Voltage

The preferred line voltage is 230 kV. Any voltage other than 230 kV would require a step-down transformer at the Pleasant Valley substation. A substation with a step-down transformer would require a greater construction area than a substation without a step-down transformer. Transformers are not 100 percent efficient in transforming the voltage and would therefore unnecessarily dissipate energy.

A second reason for using 230 kV is that as voltage decreases, current increases. For example, if the line current is 125 amps at 230 kV, then the line current would be 250 amps at 115 kV. Power losses on a transmission line are expressed as I^2R where I is line current (amps) and R is the transmission line resistance. It can be seen that by dropping the line voltage by half, the line current doubles. Doubling of line current quadruples the line power loss (because $2^2 = 4$). Therefore the line power losses that occur at 69 kV are more than eleven times as great as losses at 230 kV.

1.2.3 Structure Design

The preferred structures, selected in the 1992 EIS, to support the conductors are 95 foot steel monopoles. H-frame structures were considered and comparative information, when appropriate, has been included in this application. The primary reason for choosing the monopole over H-frame structures is that right-of-way and clearing widths would be less with monopoles. Also, steel monopoles would require less maintenance during operations and can be purchased in an assortment of colors, which may ease the visual impact of the transmission line. Although the cost of steel monopoles over H-frame wood structure would be approximately $5,000 per mile more, the applicant feels the overall environmental impacts would be less for steel monopoles.

1.3 DESCRIPTION OF ALTERNATIVES CONSIDERED

Evaluation of alternative transmission line corridors includes a systematic comparison of potential intertie points, economics, environmental concerns and availability of power. The study area for screening alternatives is shown in Volume 2, Exhibit 1. Three potential supply sources and seven potential corridors were identified in the reconnaissance-level evaluation during the MFSA review. Figure 1-3 shows these original corridor alignments.

1.3.1 Study Area

The study area boundaries were defined on location of existing supply sources and preliminary economic analysis. Sources initially identified as capable of supplying the mine include the Noxon Rapids Dam, Libby Dam, the 230 kV line between the two dams and a 115-kv substation located near the town of Libby. Two potential tap sites were located along the 230 kV Noxon Rapids to Libby Dam line, one tap site at the Noxon Rapids Dam and one near Libby. These sites and the associate corridors were identified based on suitable topography, existing road systems and a reconnaissance evaluation of exclusion areas (wilderness), sensitive areas (roadless areas) and areas of concern (areas of rugged topography and specially managed buffer areas).

The Cabinet Mountain Wilderness, shown on Exhibit 1, is an exclusion area (ARM 17.20.1428) eliminated from consideration of above ground siting of the powerline. The North Silver Butte Creek, Great Northern Mountain, Upper Rock Creek and Upper McKay Creek areas have substantial acreage managed as roadless (see Kootenai National Forest Plan and Exhibits 1 and 3). The Silver Butte Creek and Great Northern Mountain areas are sensitive area identified at the reconnaissance level (ARM 17.20.1429). Substantial areas of steep slopes (inventory level areas of concern), occur within the study area. USFS slope mapping at a scale of 1:24,000 exists for the study area and is shown for the baseline area of Exhibit 4. Specially managed buffer areas adjacent to the wilderness are another area of concern. These buffers include areas managed as roadless, recommended for addition to wilderness, and areas managed for protection of grizzly bears. These areas have been designated and mapped by the USFS in the Kootenai National Forest Plan and are shown for the baseline study area on Exhibit 3. Seven potential transmission line corridors (Figure 1-3) identified based on routing suitability, supply sources and avoidance of exclusion areas, sensitive areas and avoidance of exclusion area, sensitive areas and areas of concern are:

1) Miller Creek
2) West Fisher Creek
3) North Fork Miller / Midas Creek
4) Libby Creek
5) Trail Creek
6) Rock Creek
7) Swamp Creek

This section of the application provides a general discussion of each of the alternatives and provides the data and rationale used by the applicant for eliminating three of the alternatives from further detailed consideration. Table 1-1 is a matrix summarizing cost, reliability, environmental and land management considerations analyzed in the reconnaissance level screening of corridor alternatives.

Kootenai National Forest Management Areas (MAs) depicted in Figure 1-3 were selected for analyses because it was expected that they would be relatively good indicators of impact potential of the proposed powerline. Management Area 2 was selected because it is being managed for roadless resource values; whereas Management Area 5 is being managed to promote visual resources. Management Area 13 is managed to retain the old growth forest component and Management Area 14 is reflective of potential habitat for grizzly bear recovery. Management Area 15 is managed because of its high potential to produce timber. These MAs could be affected by construction of the powerline and ancillary facilities. Although other MAs also could be affected, the apparent association of potential impacts with Management Areas 2, 5, 13, 14, and 15 is relatively direct and easily assessed.

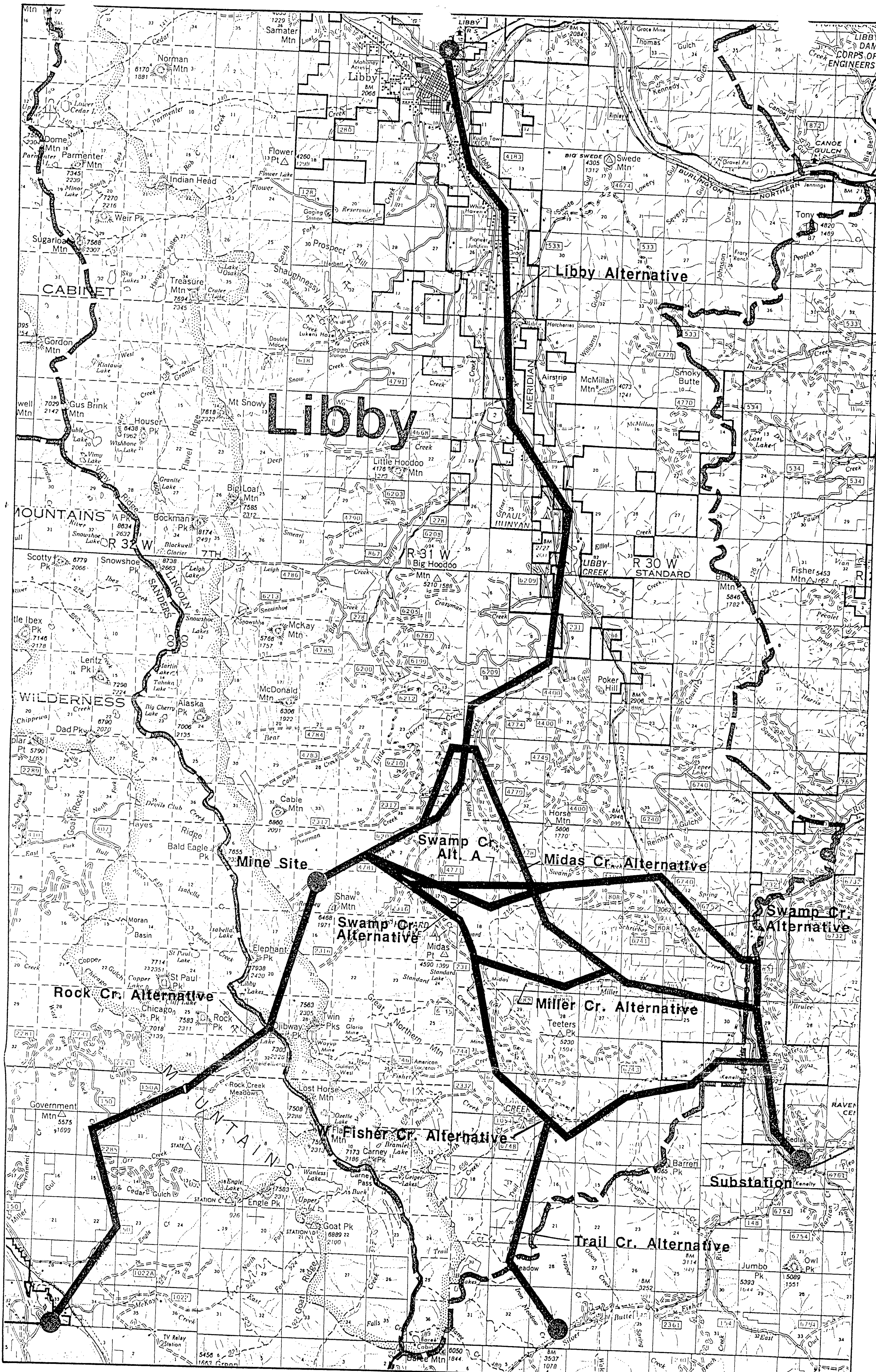


Figure 1-3. Seven Alternate Routes

1.3.2 Miller Creek

The Miller Creek corridor follows the Fisher River valley north from the Pleasant Valley tap site for four miles; then turning west, follows Miller Creek to its headwaters; crosses the divide into the Libby Creek drainage near Howard Lake; continues northwestward until reaching Ramsey Creek where it turns west and terminates at the plant site. The Miller Creek alternative has the advantage of paralleling existing roads over essentially the entire 15.6 mile route. Other advantages include relatively low construction and operating costs, relatively low environmental impacts and relatively low impacts to private lands, roadless areas and sensitive USFS land management units. The primary disadvantage of the Miller Creek alternative is that the route passes near Howard Lake, where visual resource concerns are high. The Miller Creek corridor has been retained for further detailed study.

1.3.3 Libby Creek

The Libby Creek corridor runs south along Libby Creek from the site of an existing substation on the east side of the town of Libby; near the confluence of Libby and Poorman Creeks the route would angle southwest to the mouth of the Ramsey Creek Canyon and continue west to the plant site. The Libby Creek route is approximately 23 miles in length. The primary advantage of the Libby Creek route is that it would follow existing transportation and transmission line routes over much of its length. The major disadvantages of the Libby Creek route are construction costs nearly twice that of several other routes, substantially higher operating costs than several other routes, and all potential rout alignments would pass through and adjacent to a much higher population density and substantially more private land than other routes. There are 675 dwellings within one mile of its corridor. An additional disadvantage is that the source of power in Libby is not adequate to supply the mine. The 12 mile supply line from Libby to Libby Dam would require expensive upgrades to provide the adequate power supply to the Libby substation. Because of the substantially greater length and cost, greater impacts to private land and residential areas, and an insufficient existing supply source, the Libby Creek corridor was dropped from further consideration and is not analyzed in detail in this permit application.

1.3.4 West Fisher Creek

The West Fisher Creek corridor follows the Fisher River north from the Pleasant Valley intertie site to the confluence with West Fisher Creek; the corridor then proceeds west along West Fisher Creek to near its confluence with Standard Cree; the corridor then proceeds north-northwesterly over the divide into the Libby Creek drainage to Ramsey Cree; and then west to the plant site. The West Fisher alternative is approximately 19 miles in length and generally follows existing road networks unless an optional route to the southwest of Howard Lake is chosen. Advantages of the West Fisher alternative are the relatively low impact to private lands and roadless areas. Disadvantages include high impacts to sensitive land management areas, big game habitat and grizzly bear habitat. Of the three corridors retained for further detailed study, the West Fisher Creek option has the highest potential for impact on the environment.

NORANDA POWERLINE CORRIDOR ALTERNATIVES

	MILLER CR.	W. FISHER CR.	MIDAS CR.	LIBBY CR.	TRAIL CR.	ROCK CREEK
LENGTH (miles)	16.35	19.4	18.2	23.3	16.3	13.5
COST OF CONSTRUCTION (Dollars)	2,450,000	2,910,000	2,730,000	4,346,000	2,445,000	30,000,000
COST OF OPERATING (15 yrs.)($)	214,586	254,305	238,575	1,079,955	213,689	500,000
TECHNICAL CONSIDERATIONS			Lots of steep and rugged terrain	Requires upgrade of approx. 12 miles of line from Libby Dam to Libby	Requires extensive roadbuilding and clearing	Requires 6 miles of underground line w/ Voltage stepdown Transformer Loss Major Power Loss System Performance Inadequate Reliability Diminished
PRIVATE LAND						
Miles Crossed	7.3	8.6	7.7	12.2	5.4	2.4
# of Dwellings within 1 mile	14	13	13	675	6	15
ACCESS						
# of miles with no roads within 1/2 mile of CL and > 15% slope	0	0 if route to SW of Howard Lake is chosen: 1.2	0	0	4.3	0
FOREST MANAGEMENT PLAN miles of :						
MA2	1.4	1.4	1.1	1.1	5.7	2.4
MA5	0	0	0	0	0	0
MA13	0.7	1.5	1.2	3.9	1.5	1.6
MA14	1.8	4.2	1.1	1.3	4.0	2.3
MA15	1.0	0.2	2.1	0	0.2	0
TOTAL	4.9	7.3	5.5	6.3	11.4	6.3
STREAM CROSSINGS	8	12	9	14	9	7
ERODIBLE SOILS Miles w/in USFS map Erodible Soil Type	5.3	5.9	7.4	7.0	1.8	3.2
ENVIRONMENTAL CONSIDERATIONS miles within:						
Big Game Winter Range	5.05	5.65	7.05	0	1.8	1.8
Eagle Flight Corridor	4.0	5.0	4.0	17.0	0	0
Fall Bear Concentration	0.5	0.5	0	0	0.5	0
GRIZZLY ECOSYSTEM						
Situation 1	4.9	8.4	3.0	3.0	11.4	12.8
Situation 2	2.0	2.6	3.2	0	2.5	1.4
Elk Security Areas	0	0	0.75	0	1.75	0

Table 1-1. Screening Level Evaluation of Corridor Alternatives

1.3.5 North Fork Miller Creek / Midas Creek (Midas)

The North Fork Miler Creek/Midas Creek corridor follows the Fisher River Valley north from the Pleasant Valley for four miles. It then turns west along Miller Creek to the mouth of the North Fork of Miller Creek where it turns northwest along the North Fork of Miller Creek. It crosses the divide into the Midas Creek drainage, follows Midas Creek northward skirting around some private property along Libby Creek, turns southwest to the Ramsey Creek drainage and follows Ramsey Creek to the plant site. Advantages of the North Fork Miller Creek/Midas Creek alternative include relatively low environmental impacts, low impacts to private land, roadless areas, and sensitive USFS land management units, and the route does not impact the visually and recreationally sensitive Howard Lake area. It also follows the existing road network fairly well. Disadvantages of the North Fork Miller Creek/Midas Creek alternative include the relatively long length of the corridor, and technical considerations of constructing the line on the rugged and steep terrain in the Libby Divide Trail area. The Midas alternative is more visible from the wilderness than some of the other corridors. The North Fork Miller/Midas Creek alternative corridor has been retained for further detailed study.

1.3.6 Trail Creek

The Trail Creek corridor begins near the junction of Iron Meadow Creek and the Silver Butte Fisher River; it follows north along Iron Meadow Creek to its headwaters; crosses the divide into the Trail Creek drainage, follows Trail Creek north to its confluence with West Fisher Creek; the corridor then proceeds northwesterly along West Fisher Creek to near its confluence with Standard Creek; then continues northwesterly over the divide into the Libby Creek drainage to Ramsey Creek; then west along Ramsey Creek to the plant site. The main advantage of the Trail Creek alternative is its relatively shorter length (approximately 16 miles). Disadvantages of this corridor include high impacts to roadless areas and USFS sensitive land management units (e.g. Grizzly bear habitat or recreation). This corridor would also require relatively extensive clearing and road building. Because of these high potential environmental impacts, the Trail Creek corridor has not been retained for further detailed study.

1.3.7 Rock Creek

The installation of a powerline up the Rock Creek drainage could begin at either the Noxon Switchyard near the Noxon Rapids Dam, where it would tap into the 115 kV system there, or by tapping into the Noxon/Libby 230 kV line which is included in the other alternatives. From that point it would continue up the Rock Creek drainage for approximately 8½ miles to the point where it would terminate at a substation built to transfer the power to a level that can be transferred by underground cable. Power would be taken from the substation, via several underground cables installed in a horizontal adit extending under the Cabinet Mountains for approximately 35,000 ft., to the Ramsey Plant site area in the Ramsey Drainage. The overall distance for power transmission from the Noxon site to the Ramsey site would be approximately 15.1 miles. The power cables would terminate at a substation built at the Ramsey site to receive this power and distribute it to the mill and mine complex.

A. Environmental impacts.

1) Road construction

The road system in the Rock Creek drainage would have to be upgraded for two basic reasons. First, large equipment is required for powerline construction. A moderate level of road upgrade would be necessary to accommodate the equipment and also to allow the transport of the large transformers (50 ton) required for the substation. Bridge upgrades would be necessary as well.

In addition, the Rock Creek drainage road would have to be maintained on a year-round basis. This necessitates improvements to the road and increased maintenance costs.

Advantages: Reduced road construction required for powerline construction versus other options, however since other options would not require any significant road or bridge upgrades for the substation construction and operation this advantage is minimized.

Disadvantages: Additional road improvements that have to be made in order to accommodate year-round accessibility as well as the transport of up to approximately 50-ton transformers during construction and/or maintenance.

2) Substation construction

The substation required at Rock Creek for this option creates redundant costs and surface impacts. This substation facility would be in addition to the one already necessary for the Ramsey Creek site. Some of the principal components of this duplication are secondary switchgear lineup, grounding installation, switchgear building and possible additional transformation installations depending on what distribution voltage would be used from Rock Creek to Ramsey Creek.

Advantage: None since a substation facility would have to be incorporated at Ramsey in addition to the one at Rock Creek.

Disadvantage: Additional costs would be incurred and additional ground would be required for the extra substation, versus just one site if overland power were taken directly up Ramsey Creek.

3) Length of overall line. (Approximately 15.1 miles)

Advantages: Approximate 8.5 overland line and associated disturbances compared to 16-mile overland line for other options.

Disadvantages: Approximate 6.5 linear miles of underground conductors required in lieu of overland line.

B. Serviceability

Serviceability would be reduced with the additional substation located at the Rock Creek side because no crews would be stationed there for normal operations. This would require service personnel to travel from the Ramsey side around to the Rock Creek substation site to perform any tasks related to restoring service due to a substation problem. If access could be obtained through the mine, this would be an approximate 30 to 45-minute commute if no obstacles were encountered. If access could not be obtained through the mine, service would require travel through Libby in which case the access could easily exceed 2 hrs. Neither of these situations are a tenable condition.

Advantages: None

C. System adequacy and performance

1) Reliability

Reliability, as it relates to potential of an outage, would be on par with other options considered up to the point of service at the Rock Creek adit; however, from there on the overall site power system relies on the underground installation of power feeders through the mine complex. This places the mill and well as all of the mining operations at the risk associated with underground tunnel installations. In other words, if there should be a failure of the adit opening destroying the feeder cables, the loss of power would completely shut down the operation. Return of power would be dependent on the extent of the failure.

2) Performance of the electrical system

Performance of this type of system would not be acceptable for the type of loads anticipated at the Ramsey Mill site. System stability would be substantially degraded due to the large voltage drops incurred in the additional transformation required at the extra substation at Rock Creek and the voltage drops incurred in the underground power conductors between Rock Creek and Ramsey Creek.

In order to transmit power required to the Ramsey Site, the power must be stepped down to a voltage level which is consistent with underground mine cable technology. It is not possible to transmit the same voltage level underground as exists on the overland 145-230 kV powerlines. Cable technologies for this voltage are extremely sophisticated and simply do not exist in the current extruded type of cable construction which would normally be used underground. Normal underground distribution voltages do not exceed 13,800 volts. In comparison, 115 kV is almost 9 times that distribution level and 230 kV would be almost 18 times as great. From a technical point of view, installation of these high voltages underground is simply not an option. If other special oil insulated conductor methods were tried it would require a very large capital investment.

Since high voltage transmission underground is not practical, the only option is to reduce the voltage of the service taken underground. This means installing transformers at the Rock Creek side and reducing the voltage to a standard level feasible to take underground.

Since the conductor losses are proportional to the square of the current in the conductors in question, and the current is inversely proportional to the system voltage for a given load, stability problems will be significant during normal running conditions. The starting of the large mill motors on a system with long lengths of cable and additional transformers will be unsatisfactory.

Advantages: None

D. Cost

The overall distribution distance to the Ramsey site would be approximately 2.7 miles less than the Miller Creek option. However, several additional factors would greatly increase the cost of bringing power to the site via this route.

1) Cable costs underground are substantially higher on a per kW/foot basis than those on overland powerlines. As many as seven feeders would be required in order to provide adequate capacity for the power required, as compared with only one on the high voltage system used on surface.
2) An additional transformer would be required at the Rock Creek portal site.
3) An adit to the Rock Creek site is not proposed as part of the current mine plan and would, therefore, be required solely for the power line.

Advantages: None

Disadvantages: Higher overall capital costs.

Higher overall operating costs.

In summary, this option has few redeeming features when considered overall and has not been considered further.

1.3.8 Swamp Creek

The main Swamp Creek corridor is 17.3 miles in length. Swamp Creek Alternative A is 17.1 miles in length. Both corridors are identical until they reach the Midas Creek area. The first 8.5 miles of the corridors are one-half mile to the east of Highway 2 and roughly parallel the highway's northwesterly course from Pleasant Valley to a point approximately 1 to 1.5 miles northwest of Schreiber Lake. There the corridor crosses Highway 2 and continues west to the Swamp Creek drainage where the main corridor follows a ridgeline to the south and Alternative A continues through a headwater drainage of Midas Creek. Both alternatives continue west where they cross Howard Creek, then Libby Creek and then continue into the Ramsey Creek drainage and on to the plant site. Advantages of the Swamp Creek alternatives are generally smaller impacts to environmentally sensitive areas compared to the other alternatives. Disadvantages are an additional mile of corridor compared to Miller Creek and generally rougher terrain which will make construction more expensive and reduce system reliability.

1.4 APPLICATION SUMMARY

This application for a 230 kV transmission line generally follows the format suggested by DEQ in ARM 17.20.803 and also provides data on alternatives to allow the USFS and DEQ to complete the necessary environmental review of the line. Much of the information on alternatives not considered in detail is contained in this section of the application; information on baseline environmental conditions is contained in the Application for a Hard Rock Operating Permit and Proposed Plan of Operations submitted to DEQ and the USFS. The transmission line would be constructed only for the use of the mine and would not affect rates or services to other public utility users. The transmission line would be scheduled for removal at the end of the mining operation and it is anticipated that DEQ and the USFS will include costs for removal in their bonding requirements.

1.4.1 MFSA Application Transmission Line Routes Evaluated in Detail

As described above in Section 1.3, seven alternate corridors were studied for identifying alternative routes to be studied in detail within this application. For reasons stated above, five routes (Miller Creek, Midas Creek, Swamp Creek, Swamp Creek Alternative A, and West Fisher) have been examined in detail to evaluate engineering and environmental considerations. A principal centerline within each corridor has been selected to allow comparisons between the alternatives.

The Miller Creek route, as identified on Figure 1-4, was selected as the applicant's preferred alternative within the original MFSA application, dated June 1989 (the Miller Creek alternative is also shown on Exhibit 2 within Volume 2 of the application). However, the four alternative routes evaluated within this application, including Miller Creek, were altered during the application review process and once a detailed site survey was conducted. The adjustments were made during the environmental review studies and the development of the EIS.

Therefore the alternative routes studied in detail in the EIS, including the EIS preferred alternative selected by the Forest Service and DEQ, vary slightly in alignment. A summary of the EIS alternative routes is included below in Section 1.4.2.

1.4.2 EIS Transmission Line Routes Evaluated in Detail

The original MFSA application routes (1989) were adjusted as they were evaluated in detail within the 1992 EIS. The four alternative routes evaluated within the EIS include: Miller Creek (Alternative 1 in the EIS; the preferred alignment in the 1989 MFSA application), Miller Creek with Modifications (Alternative 4 in the EIS), North Miller Creek (Alternative 5 in the EIS; also the EIS preferred alternative), and Swamp Creek (Alternative 6 in the EIS).

Potential impacts and route comparison information for the alternatives evaluated in the EIS has been included in Section 5.2.12. A summary of the selection of the EIS preferred alternative has been included in Section 5.2.13.

A summary of the EIS alignments and differences from the MFSA application alignments is provided below. The alignments of the EIS alternatives are shown on Figure 1-5.

Miller Creek – This EIS alignment is the preferred route from the 1989 MFSA application, as described in detail in this application. This alternative was evaluated within the EIS using the same alignment as proposed by the proponent.

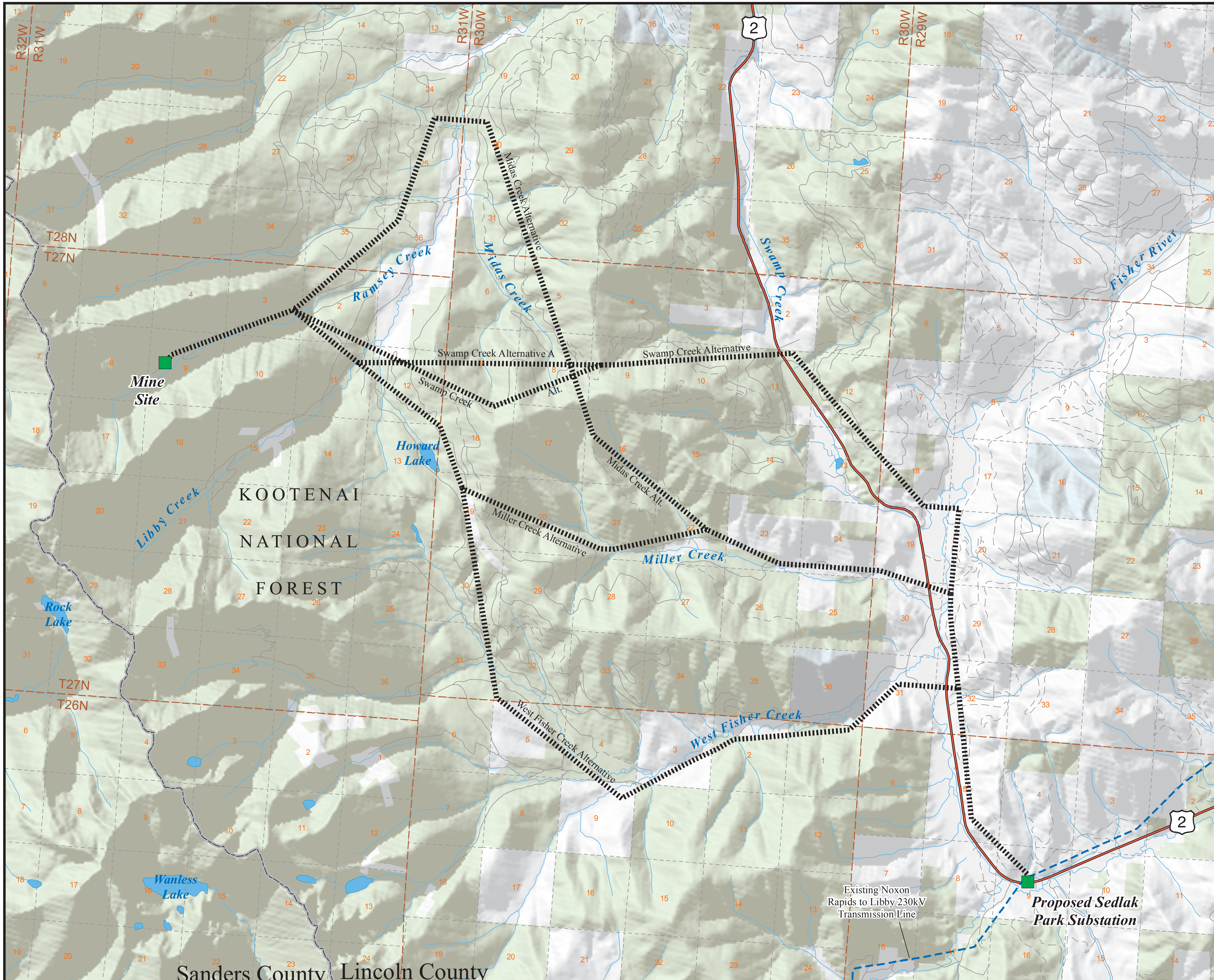
Miller Creek with Modifications – This EIS alignment included modifications to the proposed Miller Creek alignment. Differences made to the alignment can be seen in Figure 1-5. Most notably, the route was realigned south of the Fisher River crossing in order to avoid an old landslide. A realignment of the transmission line and access road to the east would reduce potential impacts to low levels. In addition, some construction operations were added to this alternative, such as using helicopters to string ground wire and the conductor, painting the structures a darker non-reflective color, and using brown ceramic insulators.

North Miller Creek (Agencies Preferred Alternative) – This EIS alternative would realign the transmission line route from the upper Miller Creek drainage to the mouth of Ramsey Creek (see Figure 1-5). This alternative would utilize a portion of the Midas Creek alternative as shown on Figure 1-4. Construction operations described above for the Miller Creek with Modifications alternative would also be included with the North Miller Creek alternative.

Swamp Creek – This EIS alternative is similar to the Swamp Creek alternative described within this application. However, adjustments were made and the final alignment studied in detail within the EIS differed in several areas, including the crossing of the Fisher River and the crossing of Highway 2 (see Figure 1-5).

FIGURE 1-4

Alternative Routes (Evaluated in Detail in MFSA Application)



Legend

- Substation
- Alternative Route
- 230kV Transmission Line
- Major Highway
- Minor Road
- Two Track
- County Boundary
- Township Line
- Section Line
- River or Stream
- Lake, Pond, or Reservoir
- USDA Forest Service
- State of Montana

0 0.5 1 2 3
Miles

1:80,000

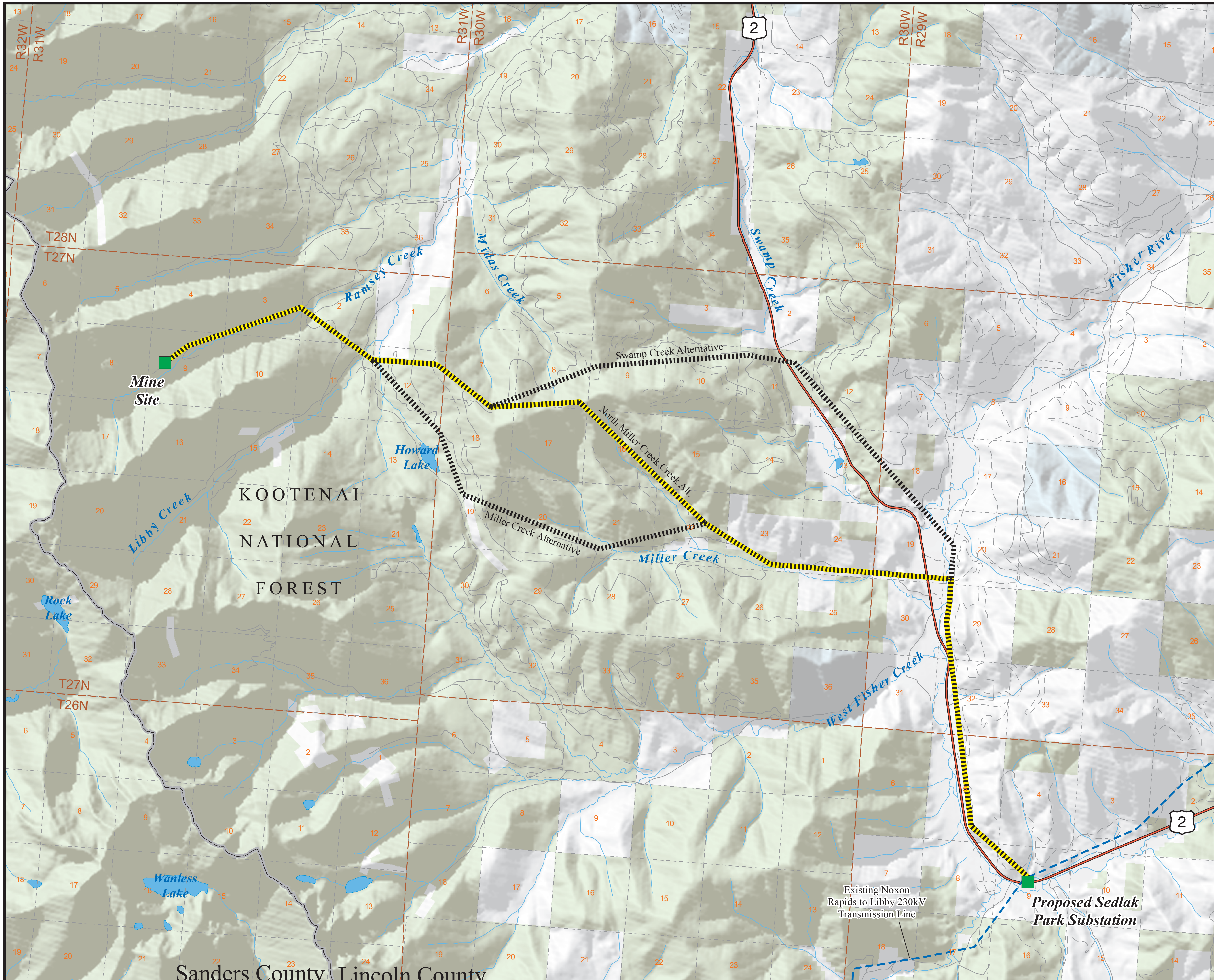
POWER ENGINEERS

Print Date : June 06, 2005

W:\Env_Projects\Montanore\Apps\MFSA_11by17_Map.mxd MFSA_Rev4_060605_TDH

FIGURE 1-5

Alternative Routes (From 1992 EIS)



Legend

- Substation
- Alternative Route
- Preferred Route
- 230kV Transmission Line
- Major Highway
- Minor Road
- Two Track
- County Boundary
- Township Line
- Section Line
- River or Stream
- Lake, Pond, or Reservoir
- USDA Forest Service
- State of Montana

0 0.5 1 2 3

Miles

1:80,000

POWER ENGINEERS

Print Date : June 06, 2005

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CHAPTER 2 DESCRIPTION OF PROPOSED FACILITY

This application presents the North Miller Creek alternative as the preferred transmission line alternative, as was selected within the 1992 EIS and 1993 ROD. Figure 1-2 shows the alignment of the preferred North Miller Creek alternative.

2.1 DESIGN CHARACTERISTICS (ARM 17.20.1509)

This section of the permit application contains descriptions of the project engineering to allow DEQ to assess operational and environmental impacts of the proposed transmission line.

2.1.1 Design Specifications and Calculations

Appendix A contains the following calculations:

a. 230 kV monopole steel structure calculations.

b. 230 kV monopole steel electrical calculations.

2.1.2 Design Features – Environmental Mitigation

Steel monopole structures were selected primarily to reduce visual impacts and to mitigate public access/wildlife impacts as described in Section 1.2.3 and 5.2.7 while still maintaining the highest degree of structural integrity. In addition, use of steel poles would not require the cutting of the large timber wood poles like those used in an H-frame design.

2.1.3 Major Facility Components

a. The transmission line support structures are planned to be steel monopoles (see Figure 2-1). These poles would be zinc plated and could be chemically etched or painted to provide a low reflectively and long life.

b. The monopoles would be 83.5 feet high and will be embedded to a depth of 11.5 feet in accordance with Rural Electrification Administration Bulletin 62-1.

c. The span length would average 750 feet, resulting in approximately 7 structures per mile.

d. The ground wire and static line construction would be in accordance with Rural Electrification Administration Bulletin 62-1 and the National Electric Safety Code (see Figure 2-1).

e. No aviation flight paths have been identified for the preferred corridor, therefore no markers or other warning devices have been planned.

f. Three conductors with a horizontal spacing of approximately 20 feet and a vertical spacing of 6 feet 6 inches are proposed. One static wire would be located approximately 17 feet above the top conductor (see Figure 2-1).

g. The tap point of the line will consist of a switchyard located at coordinates 571,000 Easting and 428,400 Northing referred to as Pleasant Valley. These coordinates are located in Section 9, Range 29 West, Township 26 North. This location is adjacent to the State Highway 2, which will allow 24-hour per day access. The switch station will be no larger that 300’ x 340’ (see Figure 2-2).

This substation will be designed, built and operated by the Bonneville Power Authority. All construction will be in accordance with current BPA and REA Standards, including REA Bulletin 65-1 and the National Electrical Safety Codes.

2.1.4 Voltage and Current

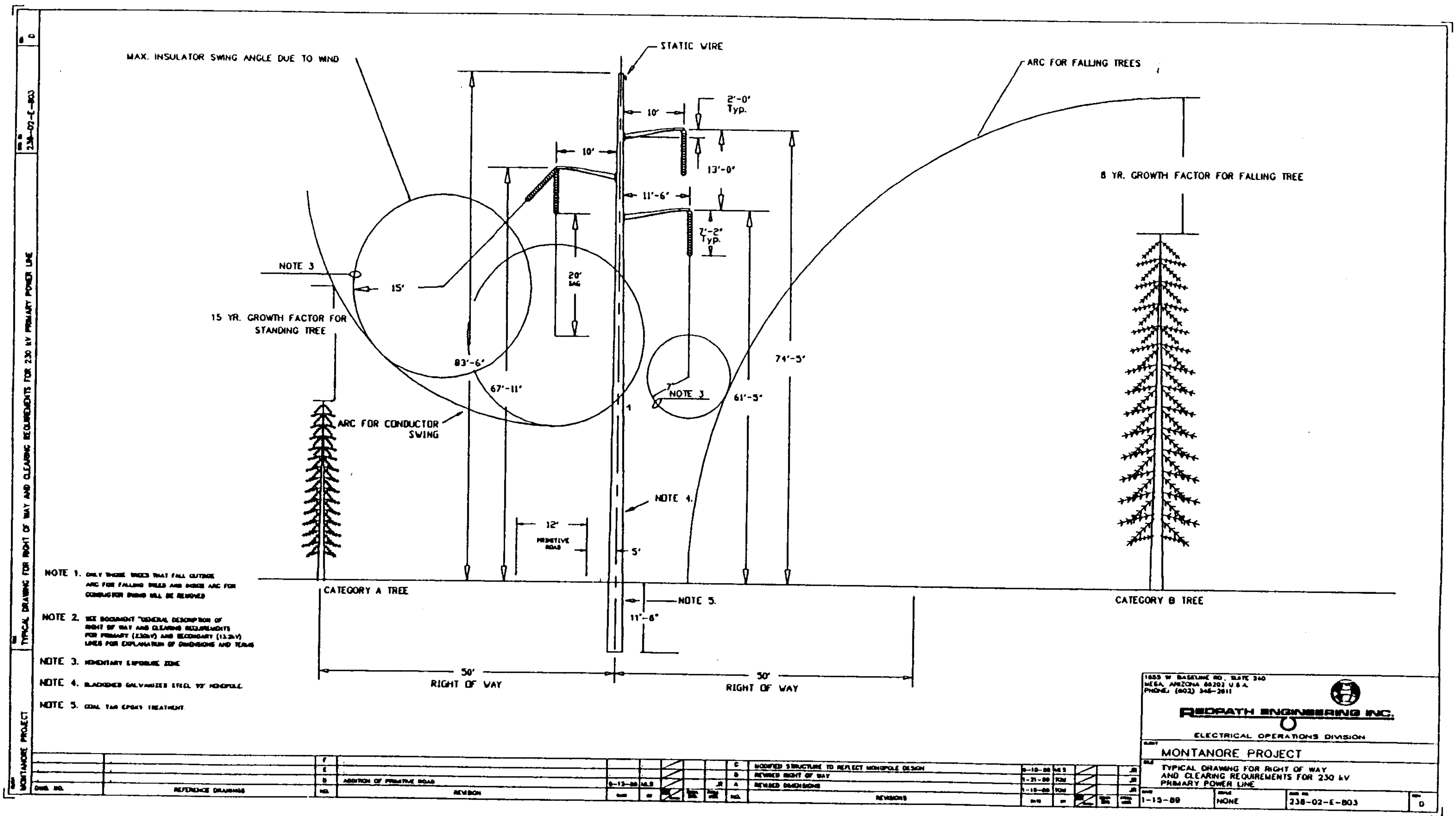
Peak voltage and current loading for the transmission line during adverse conditions would be 230 kV and 125 amps, respectively.

2.1.5 Noise and Electrical Interference

Figures 2-3 through 2-6 present the predicted audible noise levels from the 230 kV transmission line. Due to the characteristics of Corona discharge in fair weather conditions, the audible noise for transmission lines is negligible and is generally considered insignificant (Reference Transmission Line Reference Book – 345 kV and Above / Second Edition; Page 271). The recognized allowance in difference for fair weather noise is 25 db (A) down from a wet conductor condition (Reference IEEE Transactions on Power Apparatus and Systems, Vol. PAS-100, No. 1, Jan. 1981 – Investigation of Corona and Field Effects of AC/DC Hybrid Transmission Lines). Historical weather data from the Libby area as well as a tabulation of yearly data is included in Appendix F. All of these items are based on a one-year period as well as an averaged value over the years depicted. Figures 2-7 and 2-8 show the predicted electric field strengths in (kV/m), Figures 2-9 and 2-10 show the induced vehicular currents in milliamperes (mA) and Figures 2-11 and 2-12 show the magnetic field strength, Figures 2-13 and 2-14 show the radio frequency noise at 1mHZ and Figures 2-15 and 2-16 show the radio frequency noise at the channel 2 frequency. Figure 2-17 shows common ambient noise levels for comparison.

2.1.6 Standards

The transmission line would meet the standards of the National Electric Safety Code.



STATIC WIRE
MAX. INSULATOR SWING ANGLE DUE TO WIND
ARC FOR FALLING TREES
8 YR. GROWTH FACTOR FOR FALLING TREE
15 YR. GROWTH FACTOR FOR STANDING TREE
ARC FOR CONDUCTOR SWING
NOTE 3
NOTE 4.
NOTE 5.
10'
2'-0' Typ.
13'-0'
11'-6'
7'-2' Typ.
15'
20' SAG
83'-6'
67'-11'
74'-5'
61'-5'
12'
PRIMITIVE ROAD
5'
11'-6"
CATEGORY A TREE
CATEGORY B TREE
50' RIGHT OF WAY
50' RIGHT OF WAY
NOTE 1.
NOTE 2.
NOTE 3.
NOTE 4.
NOTE 5.
REDPATH ENGINEERING INC.
ELECTRICAL OPERATIONS DIVISION
MONTANORE PROJECT
TYPICAL DRAWING FOR RIGHT OF WAY AND CLEARING REQUIREMENTS FOR 230 kV PRIMARY POWER LINE
1-15-89
NONE
238-02-E-803
D

Figure 2-1

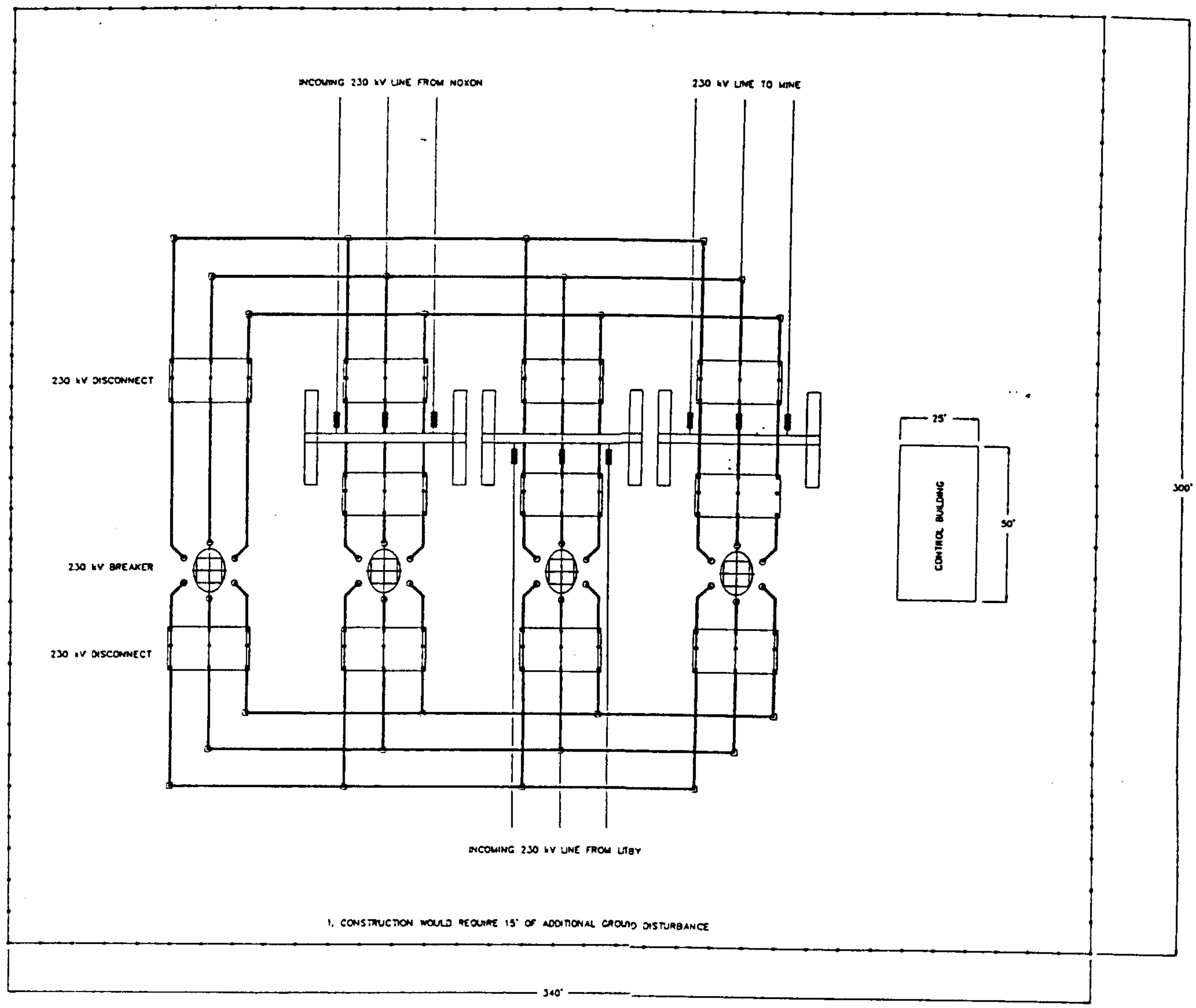
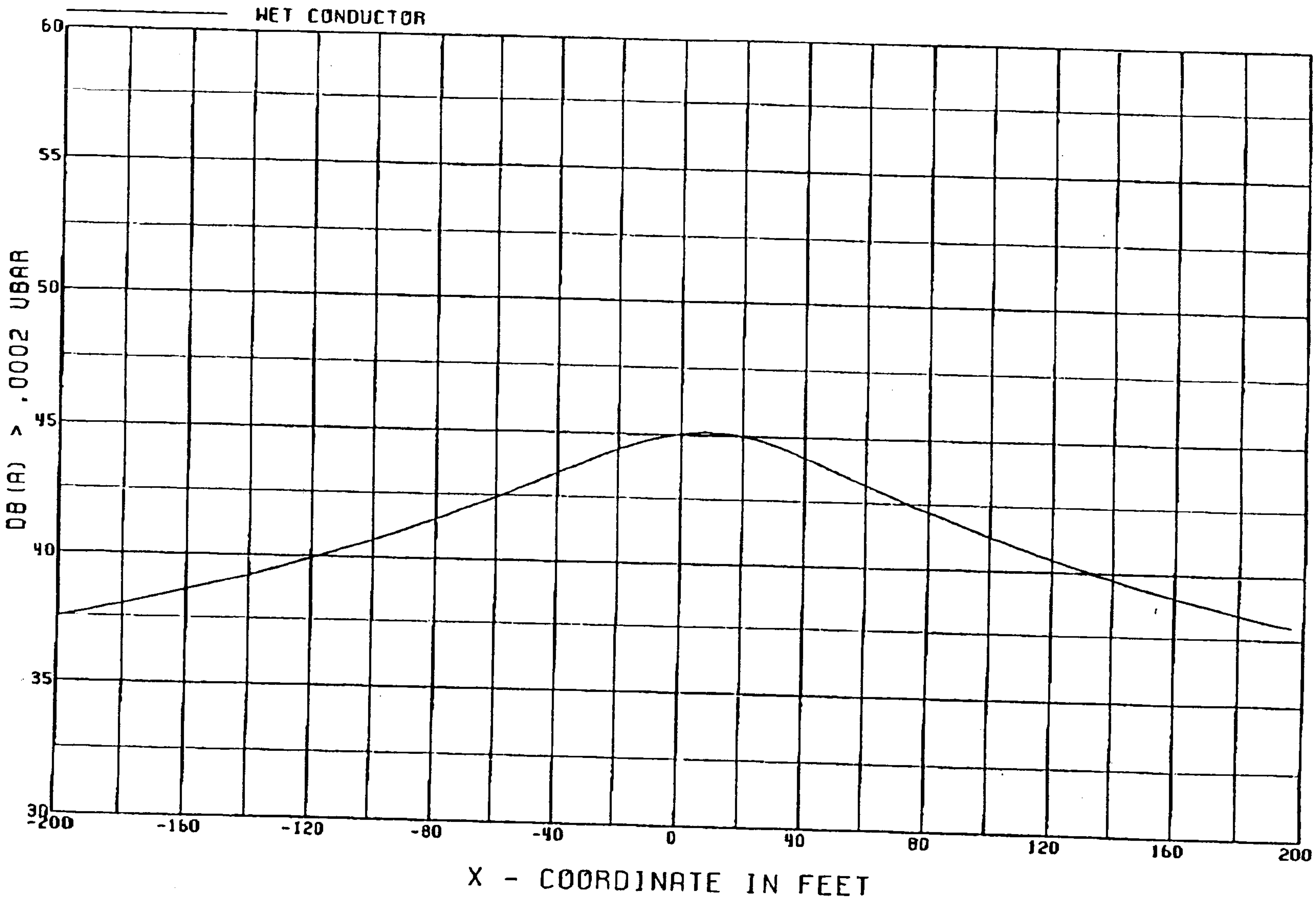


Figure 2-2

B.P.A. Pleasant Valley 230 KV Switchyard/Substation General Arrangement

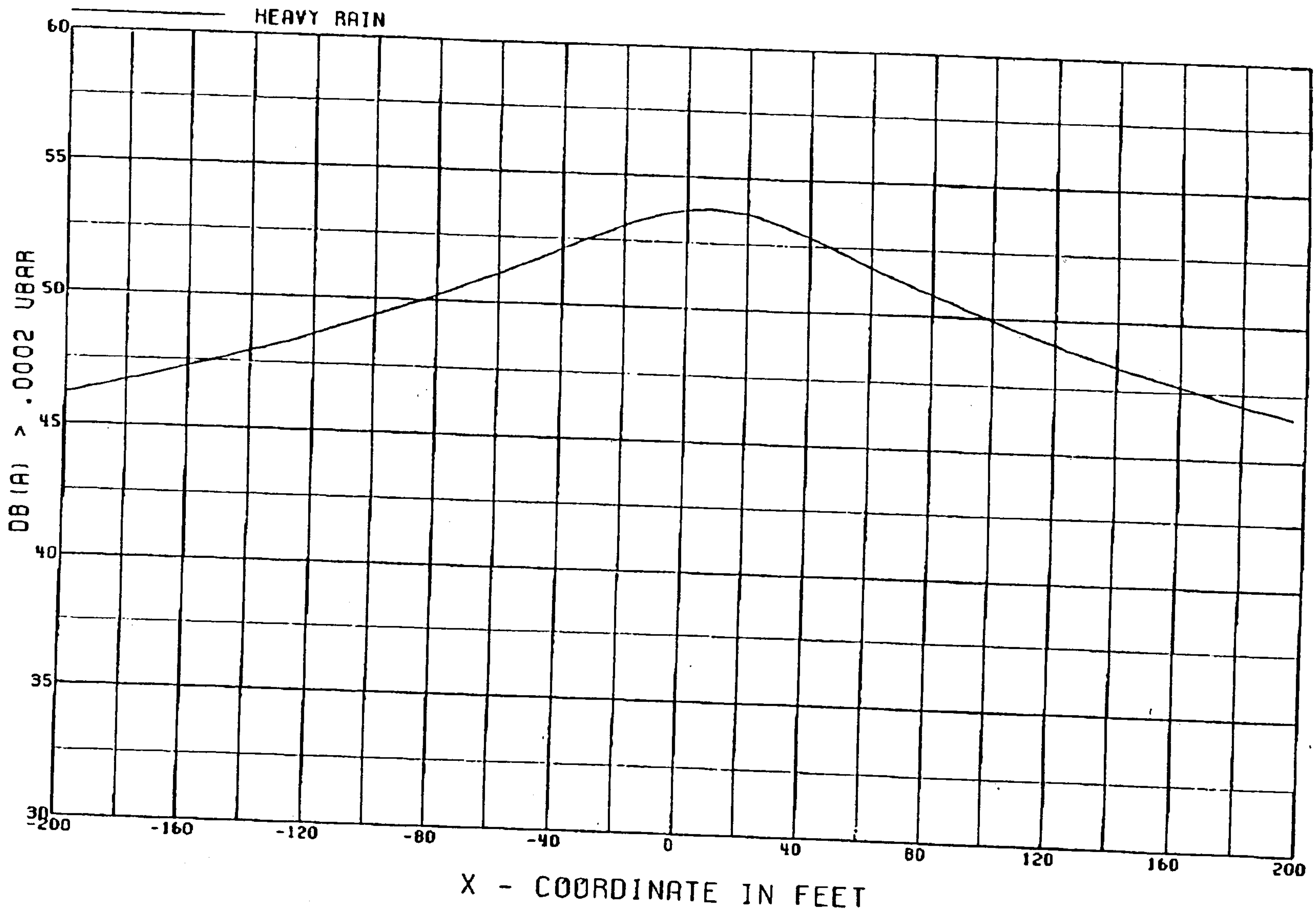


POWER
TECHNOLOGIES
INC.

AUDIBLE NØISE PRØGRAM

230 KV SINGLE CIRCUIT UPSWEPT ARMS

Figure 2-3



POWER TECHNOLOGIES INC.

AUDIBLE NØISE PRØGRAM

230 KV SINGLE CIRCUIT UPSWEPT ARMS

Figure 2-4

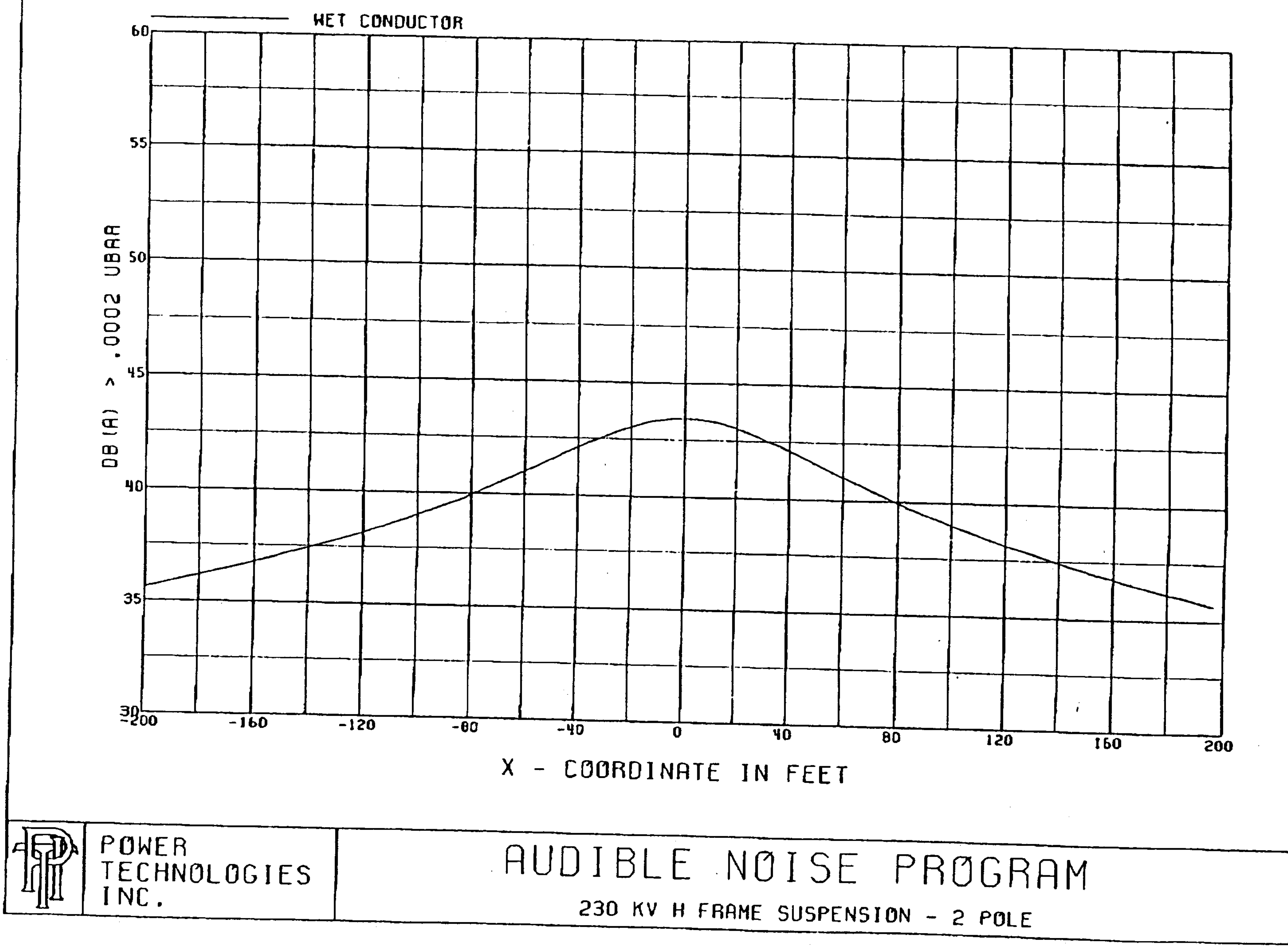
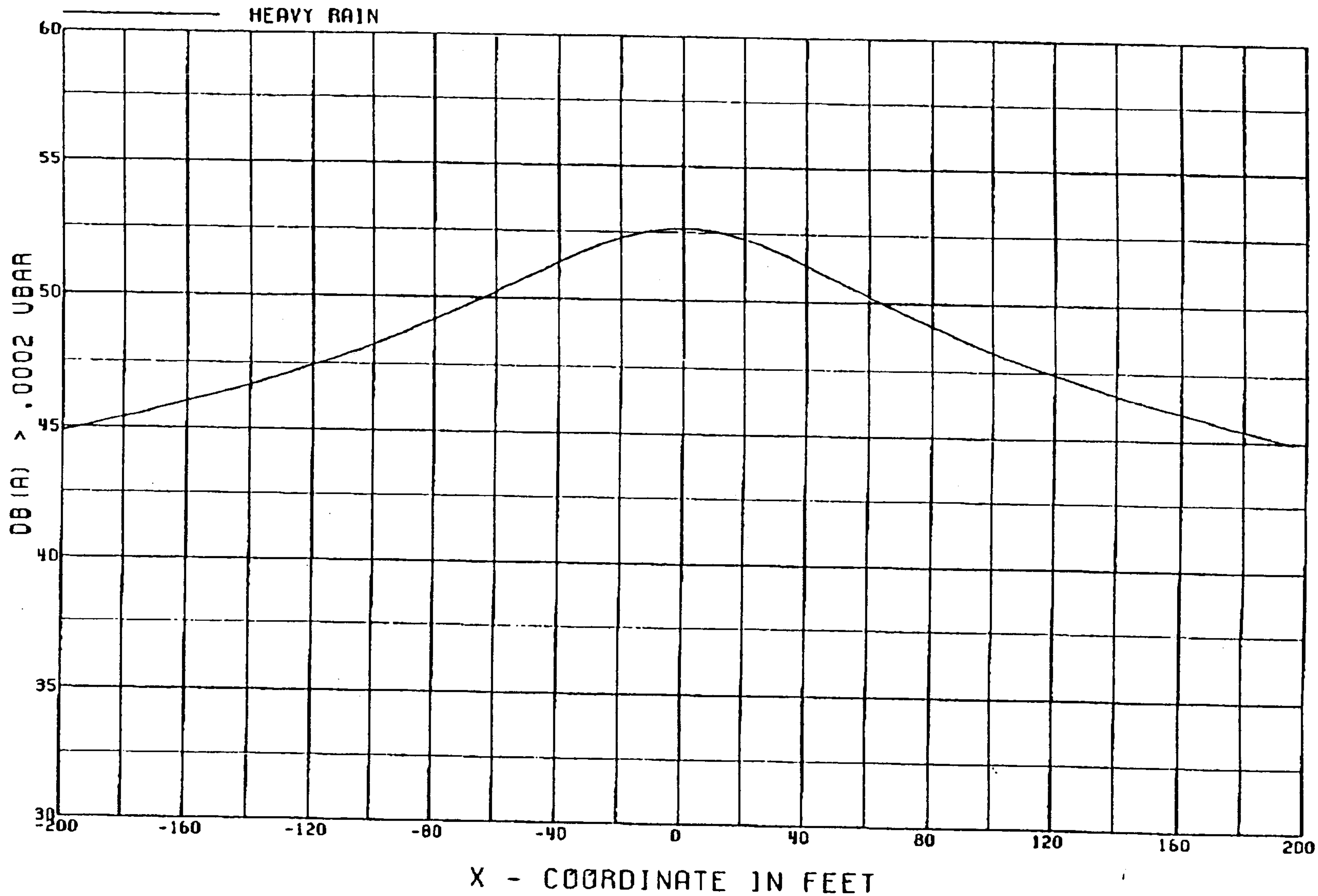

WET CONDUCTOR
60
55
50
45
40
35
30
DB(A) > .0002 UBAR
-200
-160
-120
-80
-40
0
40
80
120
160
200
X - COORDINATE IN FEET
POWER
TECHNOLOGIES
INC.
AUDIBLE NØISE PRØGRAM
230 KV H FRAME SUSPENSIØN - 2 POLE

Figure 2-5

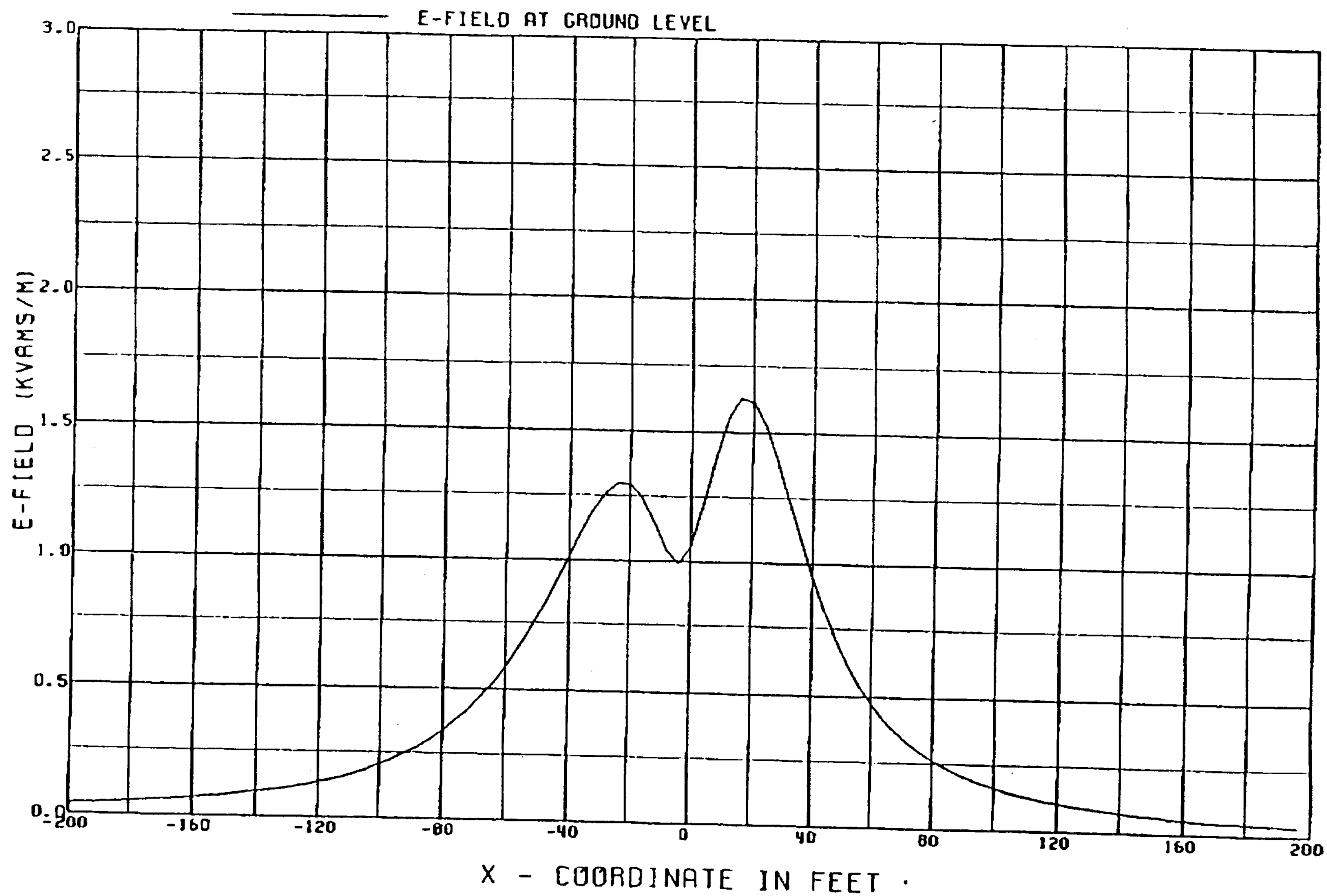


POWER
TECHNOLOGIES
INC.

AUDIBLE NØISE PRØGRAM

230 KV H FRAME SUSPENSIØN - 2 PØLE

Figure 2-6

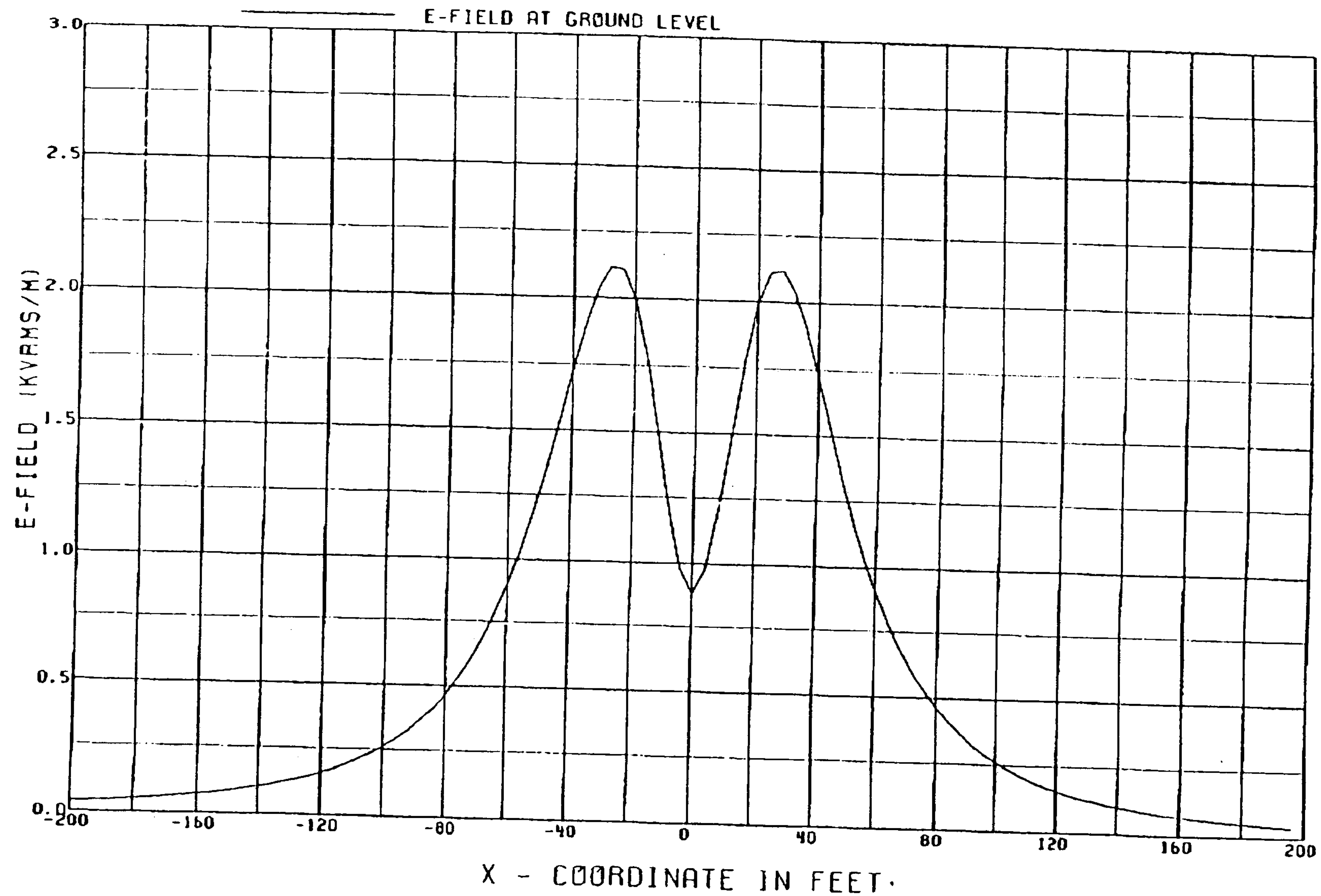


POWER TECHNOLOGIES INC.

ELECTRIC FIELD PROGRAM

230 KV SINGLE CIRCUIT UPSWEPT ARMS

Figure 2-7

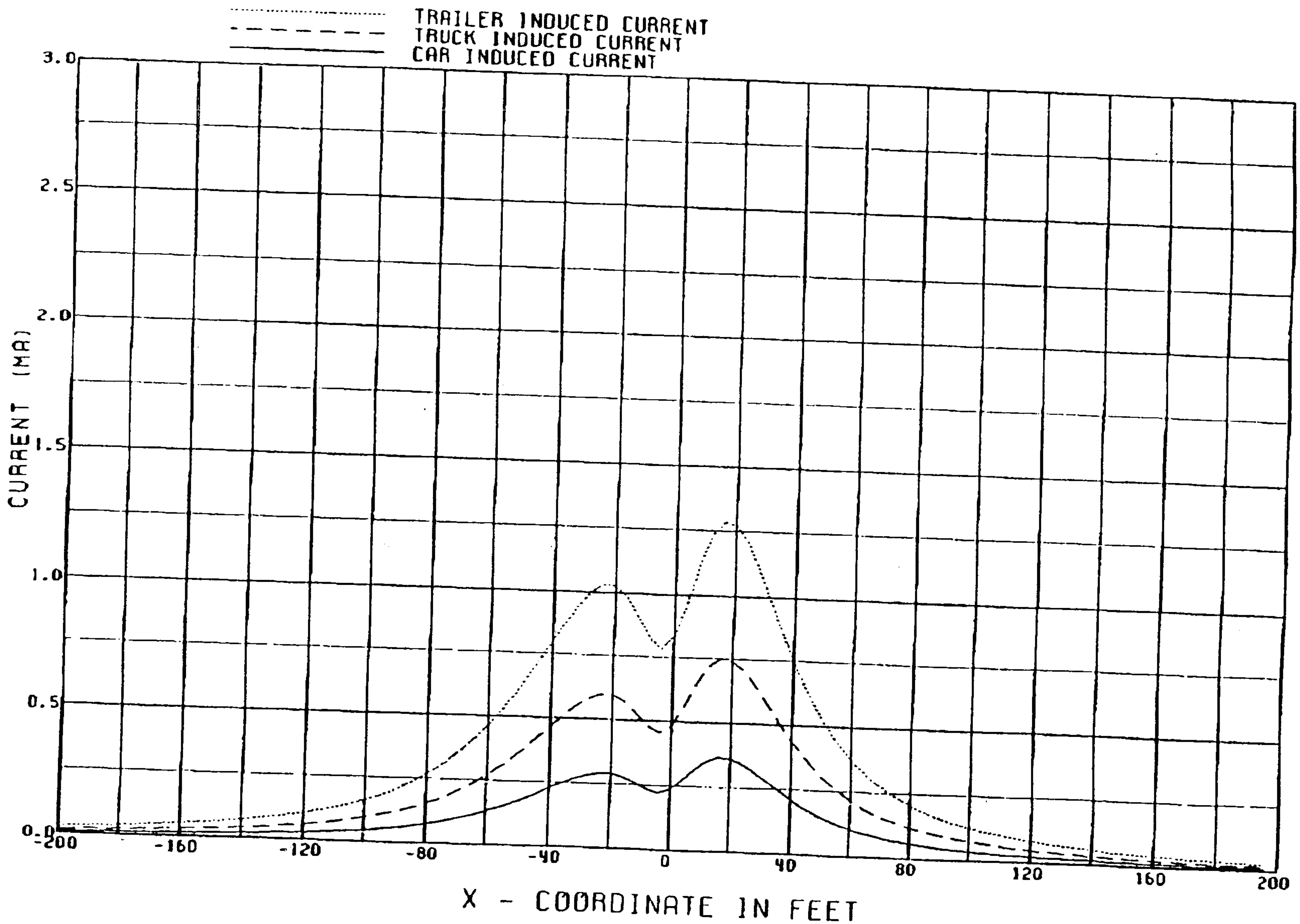


POWER
TECHNOLOGIES
INC.

ELECTRIC FIELD PROGRAM

230 KV H FRAME SUSPENSION - 2 POLE

Figure 2-8



POWER
TECHNOLOGIES
INC.

ELECTRIC FIELD PRØGRAM

230 KV SINGLE CIRCUIT UPSWEPT ARMS

Figure 2-9

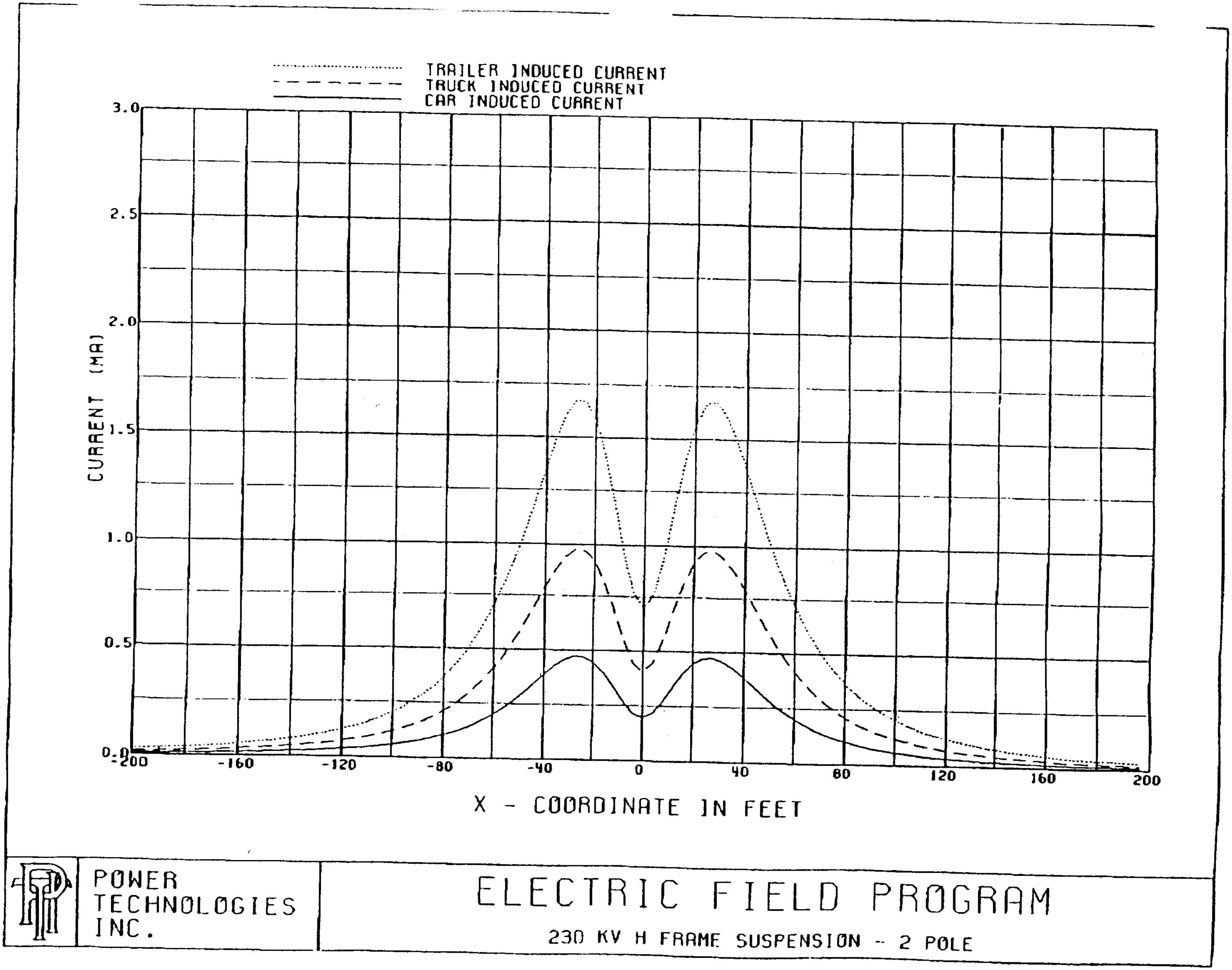

TRAILER INDUCED CURRENT
TRUCK INDUCED CURRENT
CAR INDUCED CURRENT
CURRENT (MA)
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-200
-160
-120
-80
-40
0
40
80
120
160
200
X - COORDINATE IN FEET
POWER
TECHNOLOGIES
INC.
ELECTRIC FIELD PROGRAM
230 KV H FRAME SUSPENSION - 2 POLE

Figure 2-10

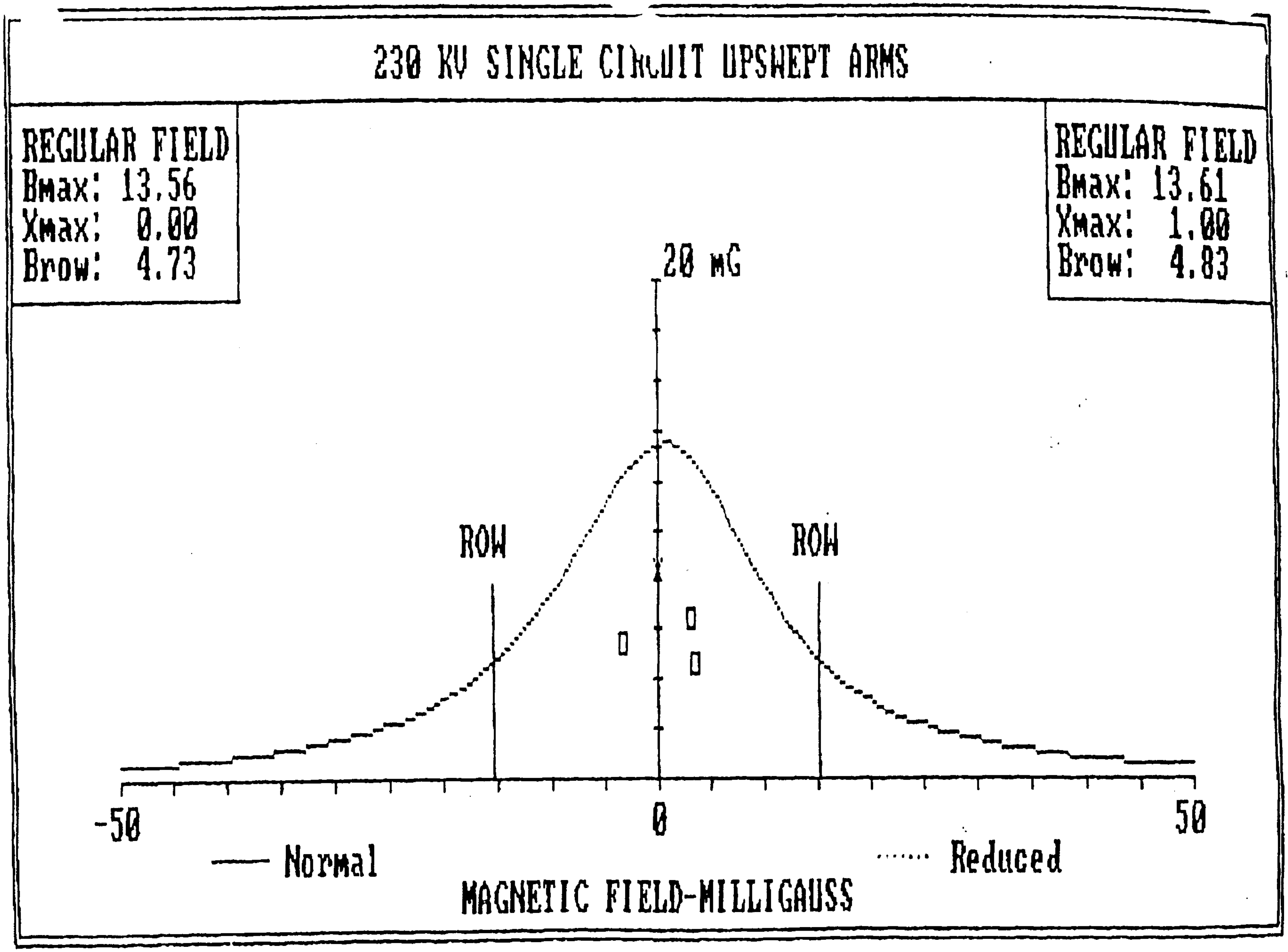

230 KV SINGLE CIRCUIT UPSWEPT ARMS
REGULAR FIELD
Bmax: 13.56
Xmax: 0.00
Brow: 4.73
REGULAR FIELD
Bmax: 13.61
Xmax: 1.00
Brow: 4.83
20 mG
ROW
ROW
-50
0
50
Normal
Reduced
MAGNETIC FIELD-MILLIGAUSS

Figure 2-11

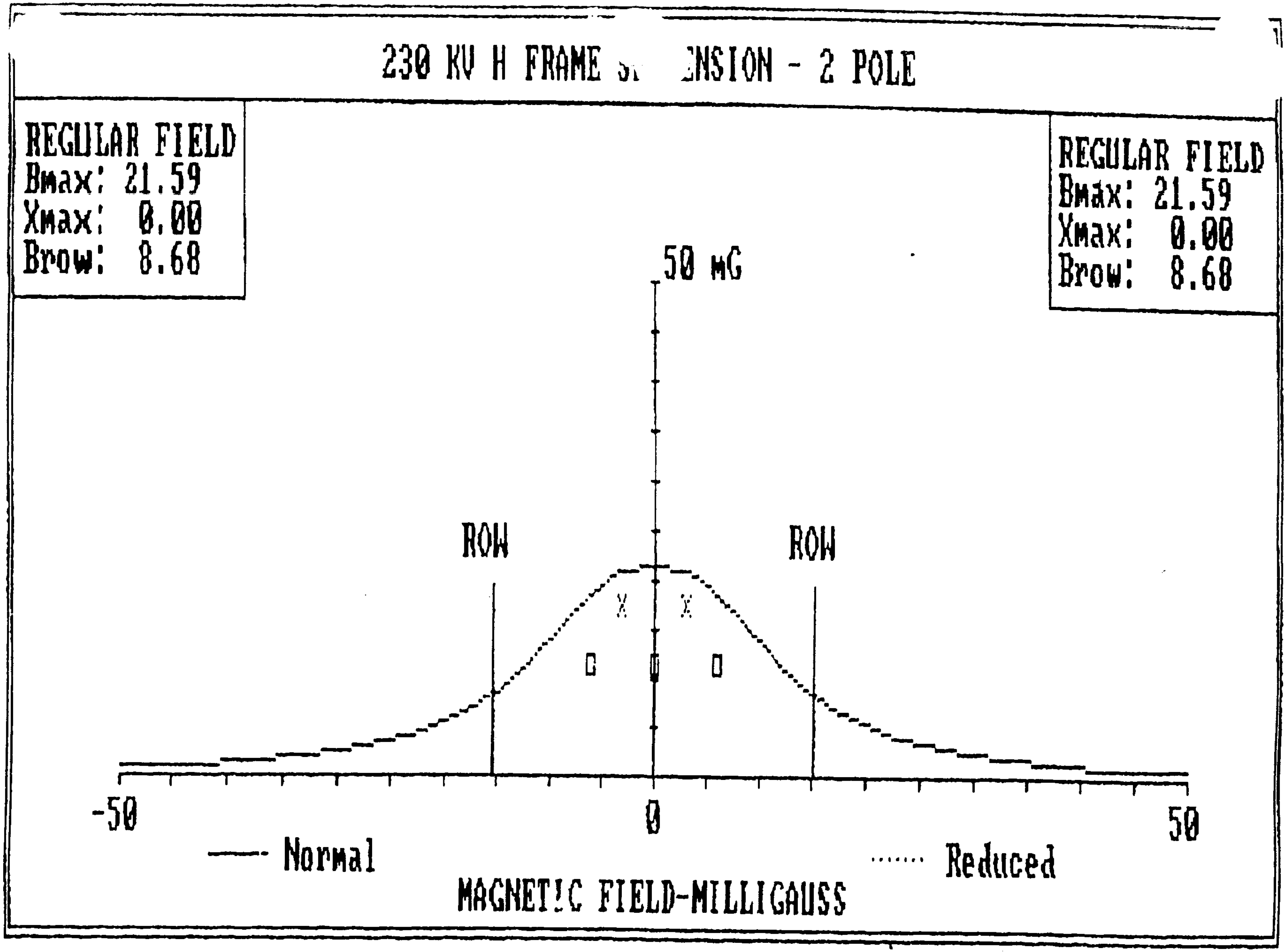

230 KV H FRAME S…NSION - 2 POLE
REGULAR FIELD
Bmax: 21.59
Xmax: 0.00
Brow: 8.68
REGULAR FIELD
Bmax: 21.59
Xmax: 0.00
Brow: 8.68
50 mG
ROW
ROW
-50
0
50
Normal
Reduced
MAGNETIC FIELD-MILLIGAUSS

Figure 2-12

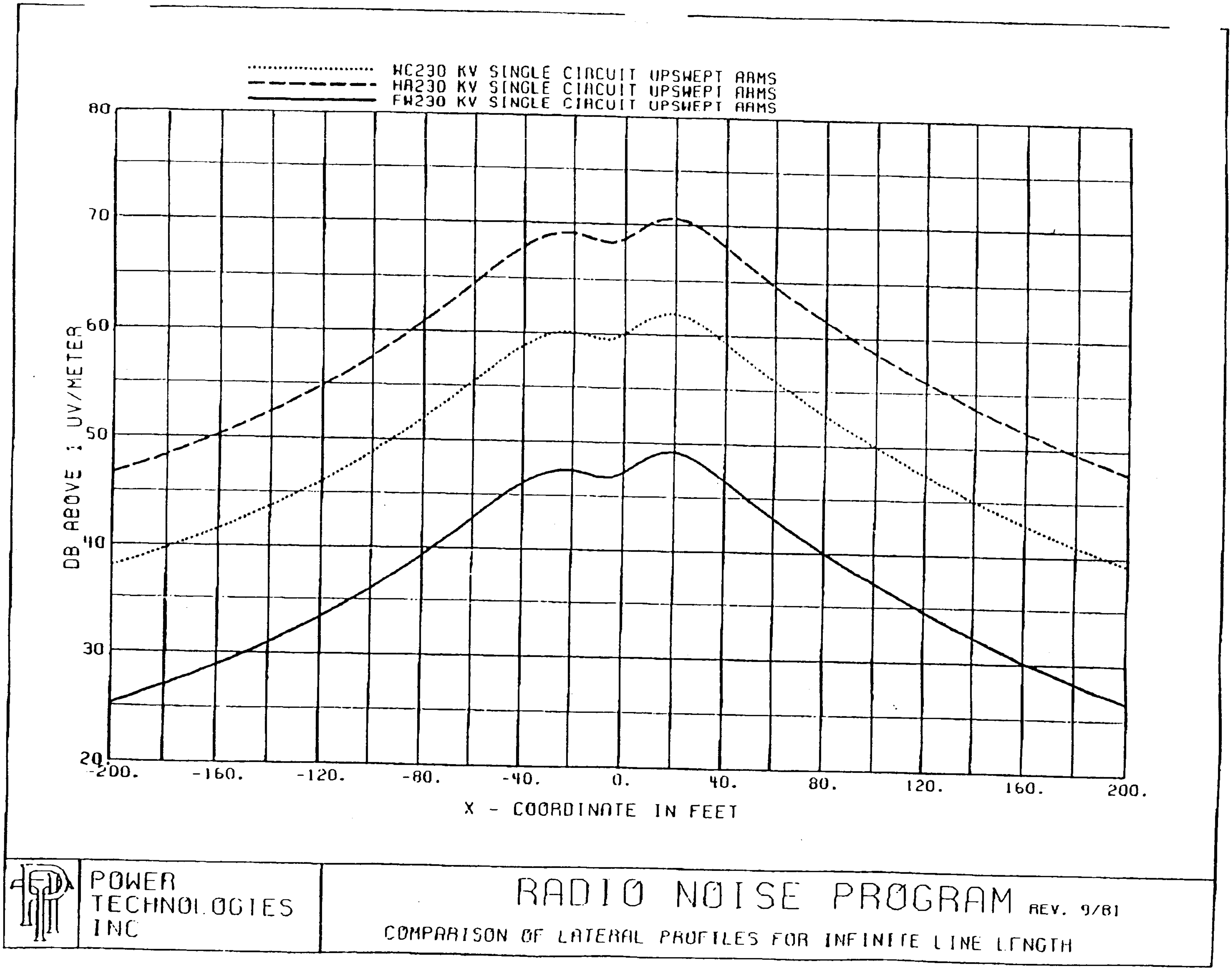
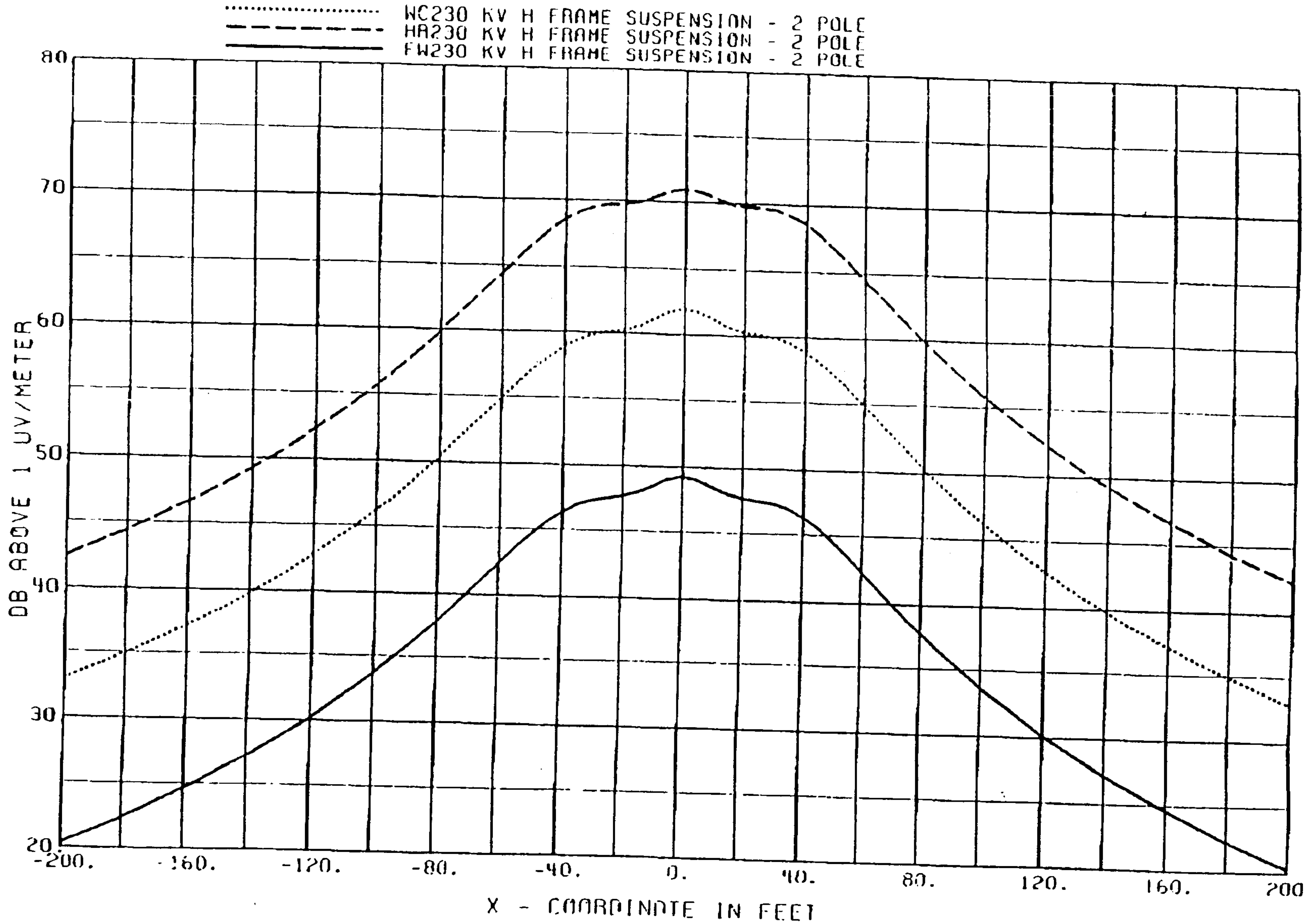

WC230 KV SINGLE CIRCUIT UPSWEPT ARMS
HA230 KV SINGLE CIRCUIT UPSWEPT ARMS
FW230 KV SINGLE CIRCUIT UPSWEPT ARMS
DB ABOVE 1 UV/METER
80
70
60
50
40
30
20
-200.
-160.
-120.
-80.
-40.
0.
40.
80.
120.
160.
200.
X - COORDINATE IN FEET
POWER
TECHNOLOGIES
INC
RADIO NOISE PROGRAM REV. 9/81
COMPARISON OF LATERAL PROFILES FOR INFINITE LINE LENGTH

Figure 2-13



POWER TECHNOLOGIES INC

RADIO NØISE PRØGRAM REV. 9/81

COMPARISON OF LATERAL PROFILES FOR INFINITE LINE LENGTH

Figure 2-14

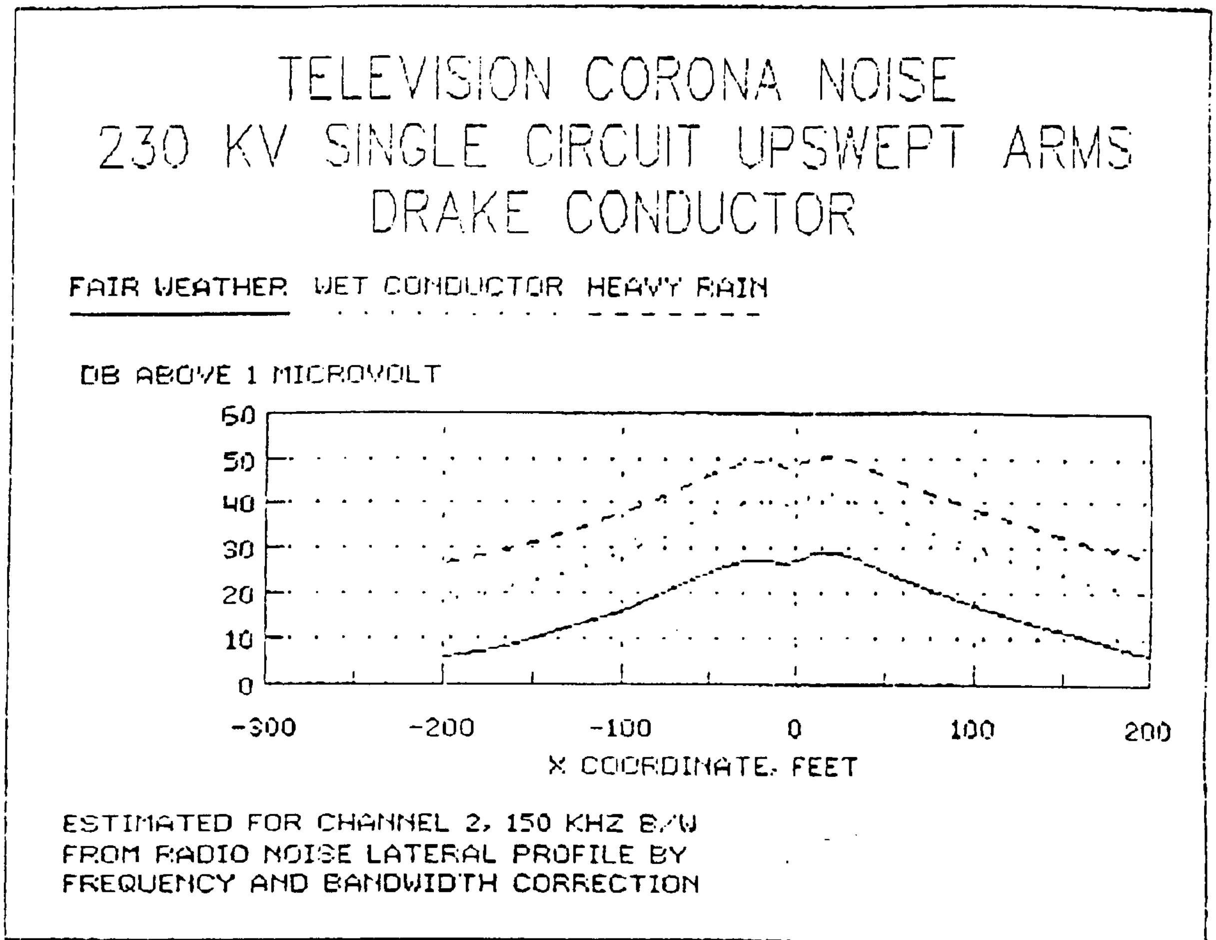

TELEVISION CORONA NOISE
230 KV SINGLE CIRCUIT UPSWEPT ARMS
DRAKE CONDUCTOR
FAIR WEATHER
WET CONDUCTOR
HEAVY RAIN
DB ABOVE 1 MICROVOLT
60
50
40
30
20
10
0
-300
-200
-100
0
100
200
X COORDINATE, FEET
ESTIMATED FOR CHANNEL 2, 150 KHZ B/W
FROM RADIO NOISE LATERAL PROFILE BY
FREQUENCY AND BANDWIDTH CORRECTION

Figure 2-15

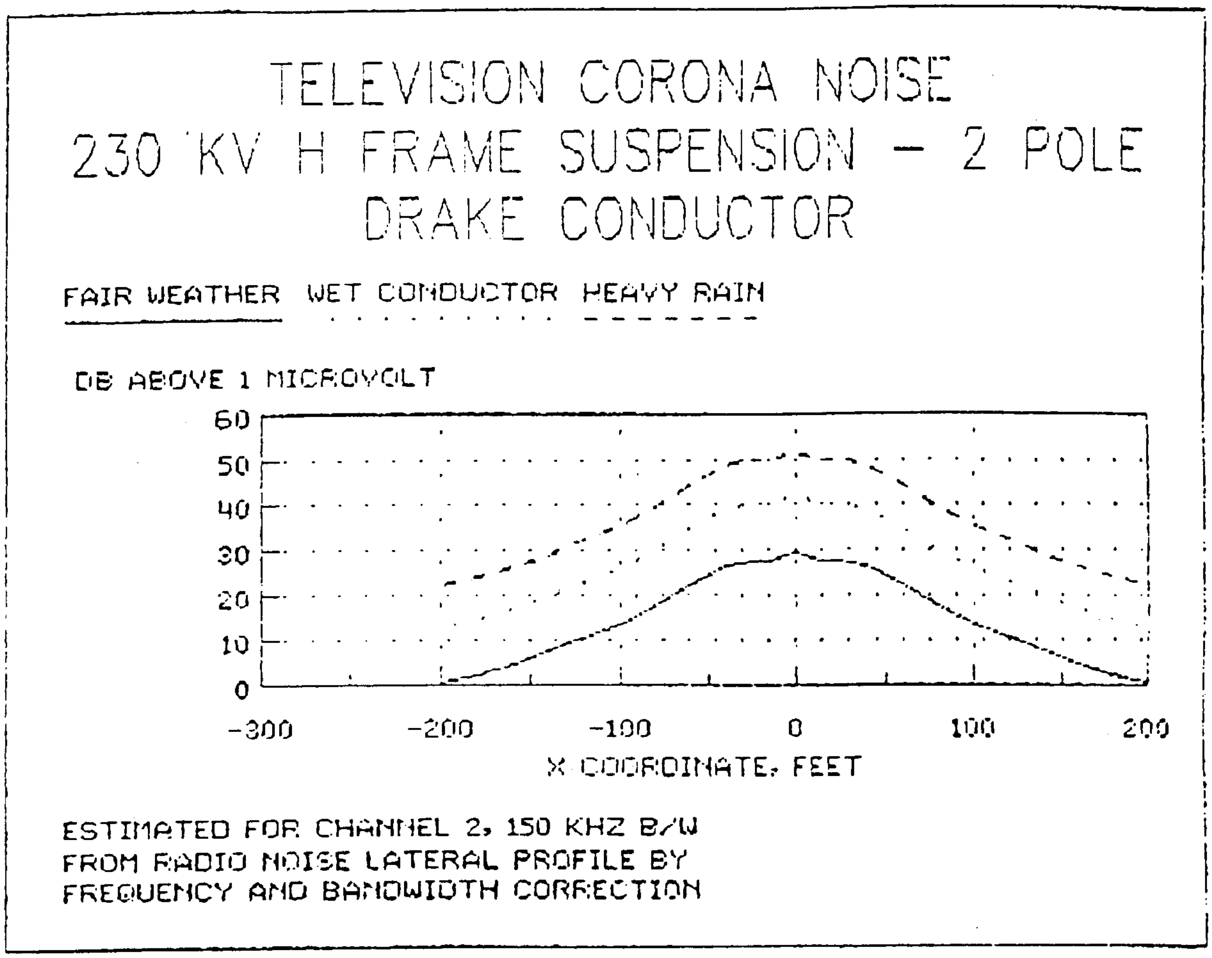
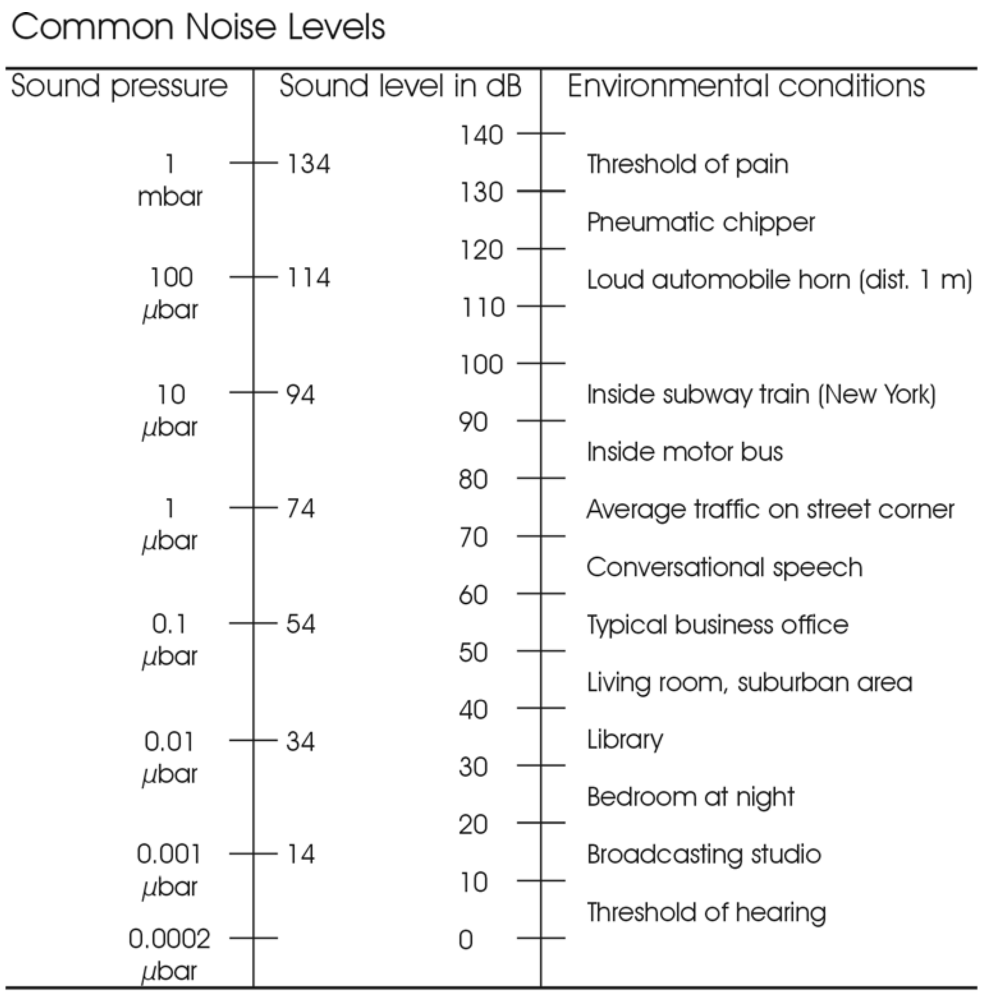

TELEVISION CORONA NOISE
230 KV H FRAME SUSPENSION - 2 POLE
DRAKE CONDUCTOR
FAIR WEATHER
WET CONDUCTOR
HEAVY RAIN
DB ABOVE 1 MICROVOLT
60
50
40
30
20
10
0
-300
-200
-100
0
100
200
X COORDINATE, FEET
ESTIMATED FOR CHANNEL 2, 150 KHZ B/W
FROM RADIO NOISE LATERAL PROFILE BY
FREQUENCY AND BANDWIDTH CORRECTION

Figure 2-16

Figure 2-17. Common Noise Levels



Source: Electric Power Research Institute. 1975 Transmission Line Reference Book, 345-kV and Above, Table 6.2.1

2.2 CONSTRUCTION DESCRIPTION (ARM 17.20.1510)

2.2.1 Construction Schedule

Figure 2-18 shows the preliminary construction schedule from the application submittal to final clean up of the construction site.

The steps involved in the major construction activities are:

- Survey of center line.
- Setup staging areas for storing poles and construction equipment.
- Right-of-way clearing and access road construction.
- Transport steel poles from staging site to final pole locations.
- Dig holes for poles.
- Set and frame poles.
- String conductors.
- Energize and test line.
- Clean up construction site.
- Reclamation of construction disturbances. Close temporary construction roads as required.

Figure 2-19 shows the typical construction activities involved in constructing a transmission line.

2.2.1.1 Construction Storage Requirements

Storage

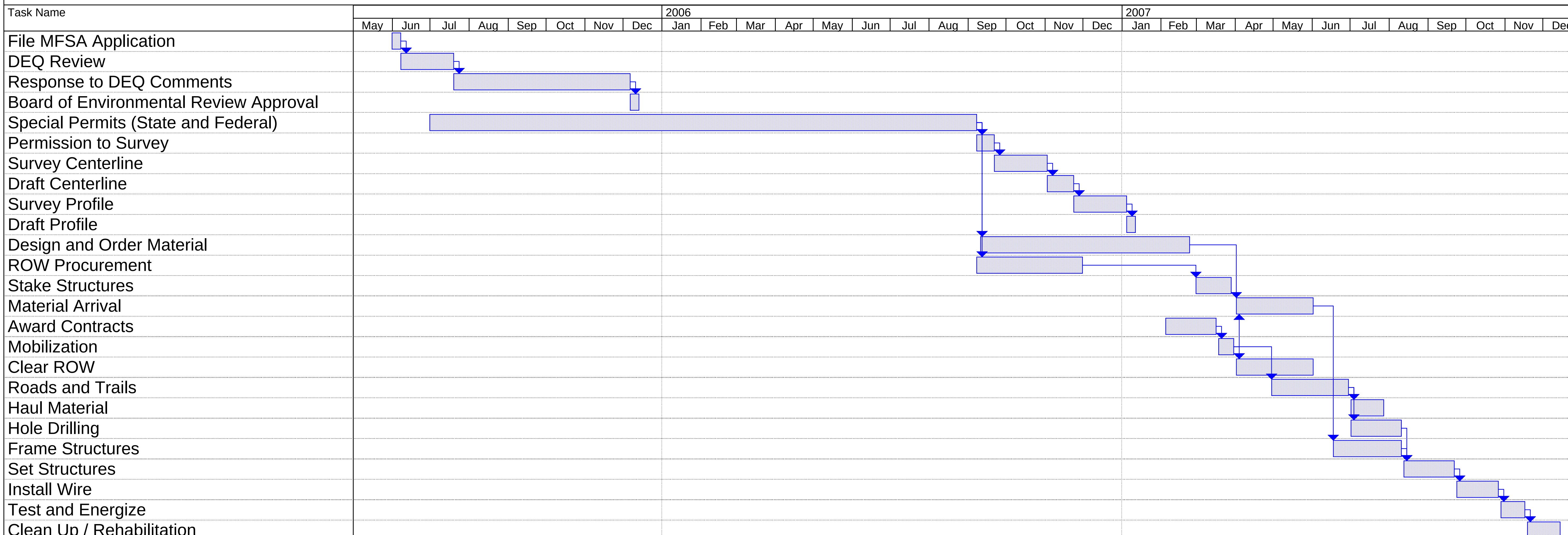
The principal storage need for any of the alternatives will be for the poles when they arrive at the rail head in Libby. The poles will be unloaded from train cars and temporarily stored close to the railway. Pole storage will require a yard approximately 25,000 square feet in area.

Wire conductors will also require storage. Approximately 2,300 square feet of yard area will be required for wire storage. This is a maximum figure since some of the wire will go directly to the field. The wire storage yard will be located adjacent to the centerline of the right-of-way and located as close to a major highway as possible. Overall size will be approximately 15,000 square feet in area. For the Fisher or Miller Creek options, it is anticipated no framing in the yard as all framing will be done at the pole sites. For the Midas or Swamp Creek options, a larger marshalling yard (158,000 square feet or 3.6 acres) will be required because framing will be done in the yard. Other yard requirements will be for equipment parking, servicing and general crew organization. This will include such items as a field construction office and miscellaneous construction trailers.

Pulling Site Requirements

Figure 2-20 shows typical conductor pulling activities. Disturbance area requirements for these sites will be 2,160 square feet from the end closest to the pole, to the end of the pulling equipment trailer setup. These sites will be 40 feet wide and up to 150 feet long. Because of the length of the puller setup and its proximity to the pole, the sites will extend beyond the boundary of the right-of-way up to a maximum of 100 feet (this would occur where the pull angle was at 90 degrees to the right-of-way). Most sites would be less.

Transmission Line Schedule
Montanore Project



Mines Management, Inc. **Figure 2-18**

Figure 2-19. Typical construction activities

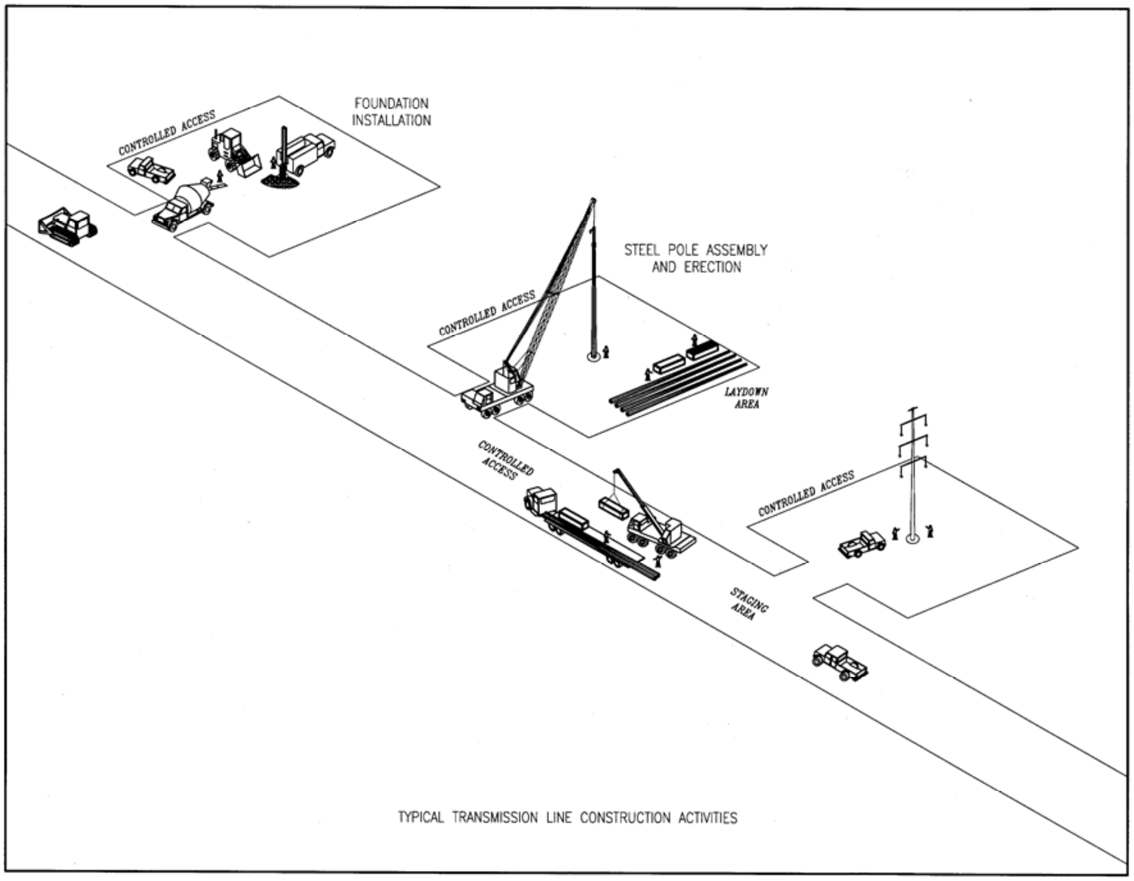
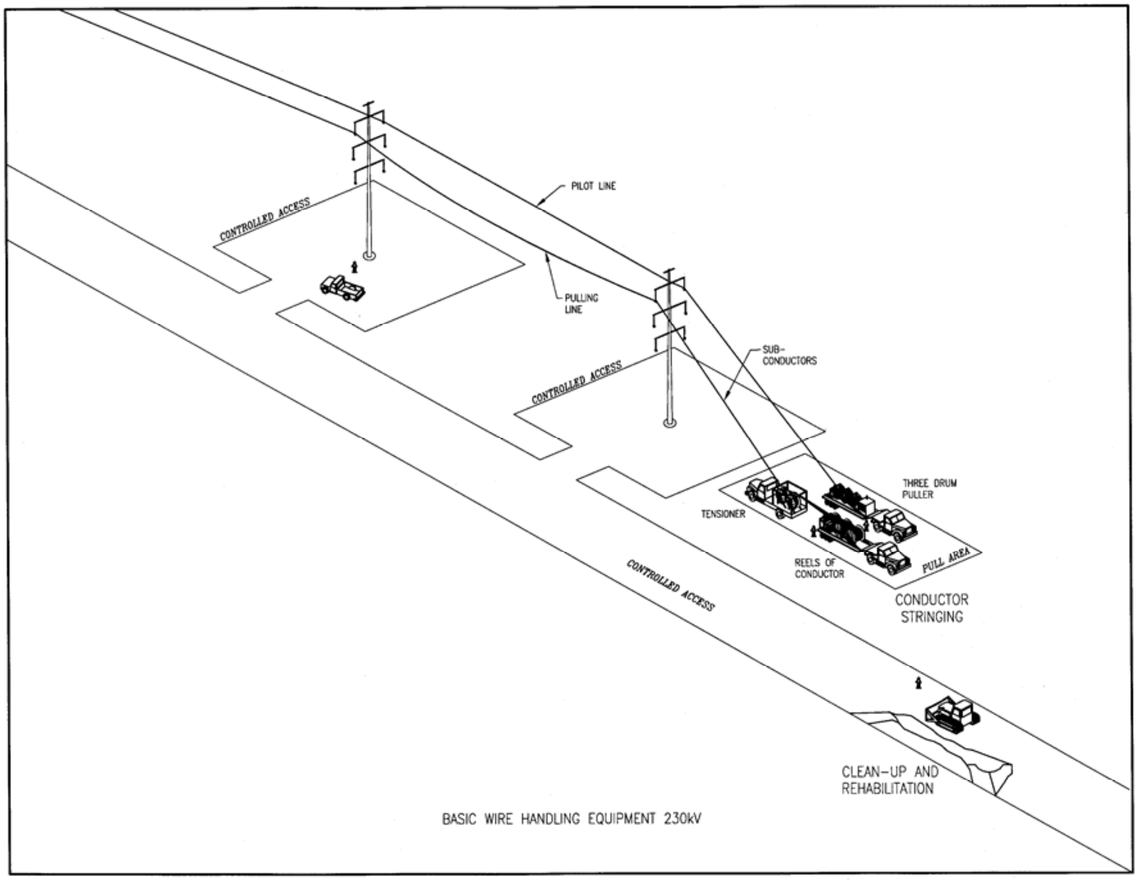


Figure 2-20. Typical line pulling activities



2.2.1.2 Construction Sequence and Activities

The construction of the proposed transmission line would follow the sequence of: 1) centerline surveyed and staked; 2) access roads built; 3) work areas cleared as needed; 4) foundations installed, towers erected and installed; 5) ground wire, conductors, and ground rods installed, and 6) the site would be cleaned-up and reclaimed. The types of equipment required to construct the proposed Project are shown in Table 2-1.

Surveying

Construction survey work for the proposed Project consists of establishing a centerline location, specific pole locations, ROW boundaries, work area boundaries and access roads to work areas. The preliminary locations of the centerline, structures, work areas and areas where access roads are not possible have been identified.

The specified ROW boundaries, work areas, access roads and other proposed Project features would be marked with painted laths or flags. These would be maintained until final cleanup and/or reclamation is completed, after which they would be removed.

Access Road Construction

The utility corridor has many existing trails and roads in the vicinity of the proposed Project. However, the existing road network would require upgrading in order to allow access of construction equipment into the transmission line corridor. This may involve clearing vegetation and re-grading. A set of final design plans detailing the location of work areas and new and existing access roads would be approved prior to the start of construction.

Equipment to construct the access roads would include hand tools, bulldozers, graders and crew-haul vehicles. Specific actions would be implemented to reduce construction impacts. Standard design techniques such as installing water bars and dips to control erosion would be included. In addition, measures would be taken to minimize impacts in specific locations and during certain periods of the year. Such conditions could arise during heavy rains or high winds. To prevent impacts during such periods, construction activities would be restricted or curtailed.

Foundation Installation

Excavations for foundations would be made with power auger equipment. Where the soil permits, a vehicle-mounted power auger would be used. The foundation excavation and installation requires equipment access to the foundation sites. If rocky areas are encountered, foundations may require blasting. The foundation excavation and installation, except where a helicopter will be used, requires access to the site by a power auger or drill, a crane, material trucks, and ready-mix trucks. Concrete for use in constructing foundations would be obtained from commercial sources or from a remote batch plant on private land, depending on contractor needs.

Foundation holes left open or unguarded would be covered and/or fenced where practical to protect the public and wildlife. Soil removed from foundation holes would be stockpiled on the work area and used to backfill holes. All remaining soil not needed for backfilling would be spread on the work area. Concrete trucks would wash their chute debris into a depression in the permanent disturbance area at the pole site and soil from the foundation excavation would be used to cover the chute debris.

If blasting were required, it would be conducted in strict compliance with safety orders or rules in force where the operation is required. All employees engaged in any operation related to the handling and the use of explosives would obtain all certification required by the state or county in which such operation is located. Accurate accounting of all explosives would be maintained, and any shortages would be reported immediately to the Construction Manager and to the public law enforcement authorities. No explosives would be stored on the proposed Project site. Explosives would be stored in accordance with state and federal laws. Safeguards such as blasting mats would be employed when needed to protect the adjacent property. In extremely sandy areas, soil stabilization by water or a gelling agent may be used prior to excavation.

After excavations are completed, cast-in-place concrete footings would be installed. Cast-in-place footings would be installed by placing reinforcing steel in the excavated foundation hole and encasing it in concrete.

Pole Assembly and Erection

Steel pole sections and associated hardware would be shipped to each pole work area by truck. Steel poles would be assembled on the work area (Figure 2-19). Areas need to be large enough to accommodate laying down the entire length of the steel pole while cross arms and insulators are mounted to it. Cross arms are then installed and rigged with insulator strings and stringing sheaves at each ground wire and conductor position, while the pole is on the ground. The assembled pole would then be hoisted into place by a large crane or helicopter (Figure 2-19).

Temporary construction yards may be necessary and would be located on existing disturbed areas or other areas on private lands along the line route. The yards would serve as field offices, reporting locations for workers, parking space for vehicles and equipment or sites for temporarily marshalling of construction materials.

Conductor Installation

Once poles are in place, a pilot line would be pulled (strung) from pole to pole and threaded through the stringing sheaves on each pole. A larger diameter, stronger line would then be attached to the pilot line and strung. This is called the pulling line. This process is repeated until the ground wire and conductor is pulled through all sheaves (Figure 2-20).

Conductor splicing would be required at the end of a conductor spool or if a conductor is damaged during stringing. The work would occur on work areas for the poles or pulling/tensioning sites.

Conductor would be strung using powered pulling equipment at one end and powered braking or tensioning equipment at the other end. For public protection during wire installation, guard structures would be erected over roadways, power-lines, structures, and other obstacles. Guard structures consist of H-frame poles placed on either side of an obstacle. These structures prevent ground wire, conductor, or equipment from falling on an obstacle. Equipment for erecting guard structures includes augers, line trucks, pole trailers, and cranes. Guard structures may not be required for small roads. On such occasions, other safety measures such as barriers, flagmen, or other traffic control would be used.

Ground Rod Installation

As a part of standard construction practices, prior to wire installation, tower footing resistance along the route would be measured. If the resistance to remote earth for each transmission tower greater than 25 ohms, counterpoise (ground wires) would be installed to lower the resistance to 25 ohms or less. Counterpoise consists of a bare copper clad or galvanized steel cable buried a minimum of 12 inches deep, extending from one or more tower legs for up to 200 feet.

Helicopter Use

Helicopters may be necessary to assist in the construction of the line where ground access is not possible or where the contractor decides it would cost effective. Helicopters would be used to bring in equipment to pole sites, place transmission structures, and string the conductor. This method of construction would replace the need for small portions of access roads in these locations, and would eliminate vehicle access to the structures to perform maintenance activities. Maintenance in these pole locations would be limited to helicopter access and maintenance or pedestrian access.

Ground disturbance associated with the use of helicopter construction would include work areas for each pole site measuring approximately 15 feet x 15 feet, depending on the topography of the site. All necessary equipment would be lowered from a helicopter to allow foundation installation and pole setting. Vegetation would be removed and the work area would be graded by hand to flatten as needed for the safe operation of equipment and access by work crews.

For all helicopter installation and/or wire stringing, MMI would work with the USFS to ensure that the appropriate notifications would be made to coordinate the air space with other possible helicopters in the area being used for seeding, fire support or other use.

2.2.2 Construction Equipment

Typical construction equipment for the Miller and Fisher Creek options includes, but is not limited to the list shown in Table 2-1 below.

Table 2-1. Typical Construction Equipment used for the Miller and Fisher Creek Options.

Quantity	Description	Use
5	¾ ton 4x4 pickups	General use
1	Road tractor	Transport Requirements
1	45-foot pole trailer	Transport poles
1	40-foot float	Transport equipment and materials
2	Wire trailers	Wire reels
1	Fuel/Maintenance Truck	As named
1	Production diggers	Dig holes for poles
1	Air Track/Compressor	Drill rock in holes for explosives
1	5-ton dump truck	Haul backfill material
1	Case 580 backhoe	Miscellaneous and backfill
1	Sag Cat	Pulling up sag
1	D6 Cat (Sock line pull)	Pulling in sock lines
1	Setting Crane – 45-ton RT	Setting poles in holes
1	Boom Truck – 6-ton	Handling wire reels, etc.
1	Flatbed truck – 2-ton	Hauling misc. materials
1	Puller – single drum	Pulling in ACSR conductor
1	Tensioner	Tensioning conductor
1	Four drum rope machine	Sock line
2	85-foot bucket trucks	Clipping work, etc.
1	Office trailer	Construction yard office
1	Electric Generator (Yard)	Construction yard power
1	Pole Cat	Setting guard poles over highway, river and other powerlines

Construction equipment requirements for the Midas and Swamp Creek options would be the same, with the additional equipment needs shown in Table 2-2.

Table 2-2. Additional equipment needs for the Midas and Swamp Creek Options.

Quantity	Description	Use
1	Sky Crane helicopter	Setting poles
1	Bell Turbo Jet helicopter	Sock pull

2.2.3 Right-of-Way

The right-of-way width would be 100 feet. There are no foreseen restrictions for land uses in the right-of-way except that trees would be trimmed periodically. The right-of-way and clearing areas would have a nominal width of 100 feet from the start to the finish of the line. This right-of-way should contain most of the activity for the actual line. In order to perform clearing in accordance with clearing criteria listed herein, Class A and B trees which are outside the bounds of the right-of-way would need to be removed due to the dangers they impose to the line.

2.2.3.1 Expansion Capabilities and Requirements

The nature of the loads and mine power requirements will not require future expansions of the powerline.

2.2.3.2 Clearing Requirements for Sock Pulling Operations

Where a bulldozer is used to pull in the sock line, clearing for the stringing of the conductors will have to be done along the full length of the powerline. Where a helicopter is used, such as in the Swamp Creek route, these lengths would not have to be cleared strictly for the purpose of stringing the line. For example, if the conductors span an area such as a ravine or small valley and this section is pulled in via helicopter, the area under the conductors that do not interfere with clearance restrictions would not have to be cleared.

Access Construction

Access trail construction will involve the clearing of trees and brush and, if necessary, blading with a dozer. Bladed roads will be kept to a minimum width of approximately 12 feet.

Clearing to Facilities the Stringing of Conductors

The pulling bulldozer must be able to traverse the centerline of the conductor installation in a straight path. This requires the clearing of timber, brush and grubbing in the areas directly beneath the conductors.

2.2.3.3 General Right-of-Way Clearing Requirements

General clearing for the right-of-way would be governed by the constraints set forth in this section and as indicated in Figure 2-1 (Redpath Engineering Drawing No. 238-02-E-803). This method of clearing constraints will eliminate clearing unnecessary timber and will provide an overall right-of-way clearing that will vary in width as dictated by the timber local to a given area and by the somewhat scalloped profile of the line.

2.2.4 Access Roads

The access roads leading to the 230 kV transmission line pole sites will be temporary primitive roads and will be closed and reclaimed immediately after completion of construction of the 230 kV line. Closing is done primarily to limit public access to the powerline corridor in an attempt to lessen the hunting pressure on the grizzly bear. It will also lessen the likelihood of rifle shots at the powerline insulators.

Any required access overland to the powerline will require opening of a particular road again on a temporary basis. This will generally involve a small dozer to remove the berms constructed on the temporary access roads.

The roads will be 12 feet in width and will be cleared of all trees and shrubs. All market value trees will be removed for sale and tree trash and cleared shrubs will be placed on a downhill side of the road for erosion control. Where a blade must be used to facilitate road construction, the topsoil will be moved to the uphill side of the road. Upon completion of construction of the 230 kV line the topsoil will be moved back to the road bed using a blade. Since the construction time of the line is so short, no drainage will be provided for the temporary roads. The final phase of reclamation will be to disk the temporary roads and to reseed with a native grass and forb seed mix.

The estimated amount of temporary road construction for the four alternatives is as follows:

Miller Creek Option	=	3.1 miles
Midas Creek Option	=	4.3 miles
Fisher Creek Option	=	4.7 miles
Swamp Creek Option	=	4.3 miles
Swamp Creek Option A	=	3.9 miles

The Miller Creek option (preferred alternative) follows existing state and USFS roads except for short reaches in the upper Miller Creek, Howard Lake, Libby Creek, and Ramsey Creek areas. Since the powerline corridor follows existing roads, new road construction would be minimal. The amount of access road construction is estimated to be 3.1 miles. Detailed access road location will be determined as part of the preliminary survey of the preferred route. Once the preliminary survey has been accomplished and approximate pole locations established, the total amount and alignment of new road construction can be more accurately determined.

2.2.5 Land Use in Right-of-Way

The calculated right-of-way width is 100 feet. There are no foreseen restrictions for land uses in the right-of-way.

2.2.6 Construction Camps

Construction crews would consist of both local and outside employment. Those requiring housing would utilize local RV camping or local motels.

2.2.7 Reclamation

The reclamation efforts at the end of the construction of the powerline would consist of efforts to close all roads which have been made accessible for the specific function of construction of the powerline. This would be done with berms pushed into the roadways which would exclude any traffic to the areas that were opened up for construction purposes. The intent here would be to exclude any traffic possible, however if necessary for some catastrophe on the line that would require major repair equipment, one of these roads could be opened up at some time in the future for a limited access period, to allow repairs. These openings would be reclosed upon completion of repairs. In addition to this, the roads would be reseeded with flora indigenous to the area, at the completion of the construction phase of the project.

The reclamation methods to be used at the end of the transmission life would be as follows:

- Remove conductors from poles
- Remove power poles and reclaim pole locations
- Recontour access roads, pole sites and right-of-way and revegetated with the plant species discussed in Appendix D.

Reclamation activities could require reclaiming of some access roads and equipment similar to that used in construction. Reclamation procedures are described in more detail in Appendix D.

2.2.8 Fire Control

Periodic inspection of the transmission line would be conducted by helicopter to assess structural integrity. High-speed protective relaying would be used to clear the line in cases of phase-to-phase or phase-to-ground arcing. These procedures would minimize the risk of transmission line-caused fires. The mine will have a trained fire crew and will cooperate with the USFS and local fire departments in controlling forest fires.

2.3 OPERATION AND MAINTENANCE DESCRIPTION (ARM 17.20.1512)

2.3.1 Maintenance Procedures

Maintenance procedures for the transmission line would be:

- Periodic inspection of the transmission line would be conducted by helicopter to assess structural integrity.
- The conductors, insulators, monopoles and other structures would be visually surveyed every seven years by climbing the poles.
- Line crews from the applicable local utility would perform repairs and return the line supplying electricity to service under emergency conditions.
- Complaints of radio and television interference would be investigated by a communications crew from the applicable local utility using a spectrum analyzer and a directional antenna. Appropriate remedial actions would be taken to eliminate or reduce radio or television interference.

2.3.2 Design Characteristics to Avoid Power Outages

Pole structure design is consistent with National Electric Safety Code and the Rural Electrification Administration standards. These standards take into account both heavy ice and wind loading. Transmission line route location, pole location and structure design are intended to minimize impacts of natural destructive events. Monopole structures will be located to avoid floods, aircraft, unstable slopes and avalanche chutes. Natural events such as avalanches, floods and aircraft collisions with the line are accounted for by high-speed protective relaying at the source of the line. Protective relays monitor transmission line parameters and automatically disconnect the transmission line from the source of power within one tenth of a second after the problem occurs.

2.3.3 Right-of-Way Land Use

There would be no restrictions of land use in the transmission line right-of-way.

2.3.4 Vegetation Control

There are no plans for the use of herbicides to control shrubs or tree growth in the right-of-way. However, selective herbicides may be used to control noxious weeds. Once right-of-way clearing has been accomplished, a four-year program of tree trimming and or tree cutting will be implemented. The right-of-way will be monitored periodically for excessive tree growth by visual ground inspection or helicopter flights.

CHAPTER 3 FACILITY COSTS

3.1 ESTIMATED COST OF FACILITIES (ARM 17.20.811)

3.1.1 Design, Construction and Materials Costs

Transmission line costs based on preliminary facility design are estimated to allow DEQ to establish an Application Fee. For the purposes of this application it is assumed that unit costs are equally applicable to all alternatives except where specifically noted. The level of detail required in these cost estimates is, in places, less than normally required of public utilities. All construction, maintenance and operation costs for this line would be the responsibility of the Montanore Project. Estimated per mile construction costs are shown in Table 3-1.

These costs are based on a 230 kV line optimization study by Valmont Industries and a Bonneville Power Administration memorandum on transmission line estimated data dated July 6, 1987 (Shaw, 1987) for the original 1989 MFSA application. These data are representative of the costs for this project for the purposes of comparison of the transmission line alternatives.

Table 3-1. 230 kV Transmission Line Costs per Mile.

Parameters	
Voltage	230 kV
Structures	Steel monopole
Conductor	795 Drake
Right-of-way width	100 feet
Number of poles	7 per mile
Material Costs	
Shafts	$ 25,258.20
Crossarms	$ 4,738.80
Insulators	$ 5,082.00
Shieldwire Hardware	$ 257.40
Grounding	$ 396.00
Shieldwire	$ 1,170.00
Conductor	$ 18,141.00
Construction Costs	
Shaft	$ 5,940.00
Crossarms	$ 1,815.00
Insulators	$ 1,386.00
Shieldwire Hardware	$ 264.00
Grounding	$ 297.00
Shieldwire	$ 1,045.00
Conductor	$ 10,890.00
Clearing	$ 2,736.00
15% Indirect cost of above items	$ 11,912.00
Labor for right-of-way acquisition	$ 7,600.60
Road construction	$ 30,971.00

<u>Engineering Costs Per Mile</u>

Survey	$ 15,520.00
Design	$ 4,580.00
Total per mile construction cost	$150,000.00

Estimated Total Cost of 15.6 miles = $150,000 x 15.6 = $2,340,000

3.1.2 Environmental Cost

The Bonneville Power Administration Study (BPA, 1987) lists the range of cost for environmental impact statements as being between $120,000.000 and $500,000.00.

The projected cost for the environmental baseline work, permit preparation and environmental impact statement for the Montanore Project Powerline is as follows:

Man-hour cost = $50.00/hour x 4,800 hours = $240,000

Drawing cost = $2,000 (20 drawings)

<u>Total Environmental Study Cost = $242,000</u>

3.1.3 Cost of Right-of-Way Land Acquisition

The Bonneville Power Administration has estimated that the cost of a right-of-way 100 feet wide for non-urban private lands east of the Cascades is about $9,500 per mile (BPA, 1987).

3.1.4 Total Cost of Facility

Design, construction and material costs	=	$2,340,000
Environmental costs	=	$ 242,000
Right-of-way costs	=	$ 163,020
Total facility cost	=	$2,745,020

Note: The estimated costs for this project are based on Valmont Industries and Bonneville Power Administration's past history of transmission line construction and are considered to reflect a reasonable estimate of the project costs.

3.2 LINEAR FACILITIES, ESTIMATED ANNUAL COST (ARM 17.20.815)

Two annual costs would be incurred with transmission line construction; these are line power loss costs and maintenance costs.

3.2.1 Transmission Line Power Losses

Transmission line power losses for the preferred Miller Creek route (15.6 miles) are based on the following:

a. Resistance of 15.6 miles of 795 Drake = 2.0 ohms/phase

b. Average load of mine = 32 mVA

c. Amps = 80 amps

d. Power loss = amps^2 x resistance
= 80^2 x 2.0 ohms per phase
= 12,800 watts per phase
= 38.40 kW for 3 phases

e. Cost = kW x $.03/kW x 24 hr/day x 357 days =

Estimated Total Transmission Power Line Loss Costs = $9,870/year

Note: The mine will operate 350 days per year. The mill will operate 365 days per year. Since the mine and mill have approximately equal loads an average of 357 days can be used. A power agreement has not been negotiated.

3.2.2 Maintenance of Line

A transmission line of similar design had a reported maintenance cost of $88.80 per mile ($1,385.00 for 15.6 miles) per year (Stewart, 1988).

3.2.3 Total Annual Operating Cost

Total yearly cost for operation of the transmission line is estimated to be $11,255 assuming conductor losses of $9,870/year, and maintenance cost of $1,385/year.

3.3 DOCUMENTATION OF CONTRACTS (ARM 17.20.816)

Preliminary discussion with BPA and Flathead Electric Cooperative has been initiated and a letter of intent has been submitted to Flathead to supply power for the project. BPA and Flathead are evaluating power sources and have indicated that sufficient transmission capacity is available on the Noxon-Libby 230 kV transmission line. Appendix B contains the original 1989 agreements for the project. MMI expects to have similar agreements negotiated again for the project.

3.4 PRICING POLICY (ARM 17.20.817)

All costs for construction of this facility will be borne by MMI.

A letter was submitted to Flathead Electric Cooperative as indicated above. Flathead, if selected as the power provider, will supply MMI with electric power rates. The original letter, dated March 10, 1989, from Flathead indicates the power rates and revenue at that time. This letter is included as Appendix C within this application. MMI expects to receive a similar letter again for the project.

3.5 EVALUATION OF ECONOMIC COSTS AND BENEFITS (ARM 17.20.818)

The primary benefit of the proposed line will be to the Montanore Project. Without construction of the transmission line the mine would not be economically feasible. The secondary benefits of the mine are the supply of jobs and tax base to Lincoln County. Additionally, the mine would produce substantial quantities of silver and copper.

CHAPTER 4 EXPLANATION OF NEED

4.1 EXPLANATION OF NEED (ARM 17.20.920)

At the present time there is no transmission line in the Montanore Project mine area. If the mine is to operate, a source of power must be established. The proposed 230 kV transmission line would meet this requirement.

4.1.1 Transient Stability Consideration (ARM 17.20.921)

The proposed transmission line to the Montanore Project mine is a radial feed and does not require transient stability considerations by itself. Bonneville Power Administration is in the process of providing a transient stability study for their evaluation of the proposed Pleasant Valley substation, proposed for use as a source of power for the transmission line to the Montanore Project mine (see Appendix B; BPA Agreement No. DE-AI79-89BP79400).

4.1.2 Power Transfer Capacity, Voltage Drop (ARM 17.20.922)

The proposed transmission line is needed to serve a new load that has no connection to an existing transmission system and has been applied for under rule category 17.20.922. The proposed transmission line conductor would be 795 Drake ACSR. The worse case terminal capacity of this conductor would be 650 amps. The maximum anticipated load required at the mine is 125 amps. This leaves a margin of over 500 percent for the thermal capacities of the transmission line under worse case loading.

A computer program to predict voltage drop was used to determine the voltage drop on the line during worse case conditions of 40 mVA. The modeled voltage drop was less than 1 percent. This voltage drop is much less than the plus or minus 10 percent that can be accommodated by an online tap changer.

4.1.3 Reliability of Service (ARM 17.20.923)

Since reliability of service is not the basis for need for service, this section under 17.20.923 of the MFSA does not apply. However reliability was considered within this application for the purpose of comparing alternative routes, as described below.

Several items go into the evaluation of a power line's reliability in terms of power outages. These subjects are as follows:

A. <u>Source reliability.</u> This is a comparison of the generating sources such as hydroelectric, coal, nuclear etc. Since all of the options dealt with here will have the same source of power available – hydroelectric, this subject is not a factor.

B. <u>System reliability.</u> This is an assessment of the capability of the transmission system to accept a fault condition and to continue operating. This relates primarily to the way the system circuit is configured and is affected by electrical characteristics as well. Again, since all of the alternatives submitted are tapped from the same point on the existing 230 kV powerline, this item is not a factor in evaluating the relative reliability of the options under consideration.

C. <u>Powerline reliability.</u> (This covers the portion of the powerline that would be built from the tap point in Pleasant Valley to the Ramsey Site). Two areas of assessment are involved in determining powerline reliability. These are physical construction characteristics and exposure.

Since all the options in this permit application would use identical construction materials, this item is not a factor.

The evaluation of powerline reliability, therefore, becomes a comparison of the quantity and types of exposure the various options would be subject to. With comparable conditions, as the overall powerline length is increased, the reliability is decreased proportionally. This is because all areas of physical exposure are increased. Exposure to weather, primarily lightning and ice loading, is the greatest threat to powerline reliability. There are no specific data sources to quantify outage occurrences relative to terrain location, but it is well established that higher terrain locations increase the likelihood of lightning strikes. Another potential source of powerline damage comes from humans. People shoot at insulators – primarily during the hunting season. Since all the option sites receive similar hunting activities, this is not a significant factor in choosing among the options. The four options are rated as follows:

1) The Swamp Creek alternatives would have the least reliability of the for because of their greater overall length (compared to Miller Creek), north slope location (ice loading) and increased lightning strike exposure due to their higher average elevation relative to the average elevation of the other alternatives.

2) Midas Creek would have the next worse reliability because of its overall length and its higher average elevation.

3) Fisher Creek would have the second best reliability of the four alternatives, but is longer than the Miller Creek option. It traverses terrain similar to the Miller option and does not have the extreme terrain that is found in the Midas or Swamp Creek alternatives.

4) Miller Creek would have the best reliability of the four alternatives under construction because of its minimum length and the fact that it is located at the lowest overall average elevation of the four alternatives. In addition to this overall lower elevation, approximately 40% of this route is situated in the low lying valley floor of Miller Creek as opposed to traversing the higher elevations found in the Midas and Swamp Creek options.

If there should be a failure of the powerline, then access would be substantially affected by the type of terrain encountered. Two different scenarios have been estimated below. Each of these scenarios assumes winter time conditions with the need to replace one pole.

Estimates for production loss includes standby maintenance costs, generation costs, supervision costs, and minimal labor costs. It is assumed that these shutdowns would be of such a duration that the normal mine operating crews would not be brought in. Consequently these costs do not allow for full labor costs. In addition actual repair costs are also evaluated.

1) Options with areas of no vehicular access. (Midas and Swamp Creek)

Downtime in this scenario is seven days because only helicopter or foot access is possible.

Based on lost revenue, standby operating costs, and repair costs the estimate is as follows:

7 days down time –	
Production Loss	$912,000.00
Helicopter costs	$ 55,000.00
Labor costs	$ 19,980.00
Materials costs	$ 3,000.00
Mob. – Demob costs	$ 2,000.00
Total cost for 7 days	$991,800.00

2) Option with vehicular access possible. (Miller and Fisher Creek)

Downtime in this scenario is four days because vehicular access is possible.

Based on lose revenue, standby operating costs, and repair costs, the estimate is as follows:

4 days down time –	
Production Loss	$512,664.00
Labor costs	$ 13,500.00
Materials costs	$ 3,000.00
Mob. – Demob costs	$ 1,500.00
Total cost for 4 days	$530,664.00

4.1.4 Economy Considerations (ARM 17.20.924)

The only purpose of the transmission line would be to supply power to the Montanore Project mine. Since there is no other transmission line presently serving the mine site, this section does not apply to this application.

4.2 RELIABILITY CRITERIA (ARM 17.20.907)

The applicant would not own or operate a system as described in this section, therefore this section does not apply to this application.

4.3 AGREEMENTS (ARM 17.20.929)

This section is intended for an electric utility. Since the applicant is not an electric utility, this section does not apply to this application.

CHAPTER 5 ANALYSIS OF ALTERNATIVES

5.1 EVALUATION OF ALTERNATIVES (ARM 17.20.1304-1305)

5.1.1 Evaluation Summary

This application presents the North Miller Creek alternative as the preferred transmission line alternative, as was selected within the 1992 EIS and 1993 ROD. Figure 1-2 shows the alignment of the preferred North Miller Creek alternative.

The baseline studies presented in this application are from the original 1989 application. These data will be updated during the development of the EIS and this application will be updated as the data and studies are completed.

An evaluation of alternative tap points and power sources is discussed in Section 1.2 of this application. The only potential energy source other than construction of the proposed transmission line would be on-site generation. Permanent on-site generation would not be acceptable because of the high costs. If a powerline is not built (no action alternative) the mine would not be constructed, substantial investment losses would accrue to Montanore Project partners, and the resource would remain undeveloped.

There is no existing 230 kV powerline to the mine site. In addition, the proposed line is to be built to service one customer with a constant no growth load. Therefore, the load flow studies required by 17.20.1304 do not apply.

Criteria for selection of the three alternative corridors include cost, reliability, engineering feasibility and environmental concerns as discussed in Section 1 of this application. Of the three other alternatives deleted from further consideration, the Libby Creek alternative was dropped because of cost and population/private land concerns, Rock Creek was not considered further because of reliability and cost problems, and the Trail Creek option was dropped because of environmental and land management issues.

A cost comparison of the three alternatives considered in this application is summarized in Table 5-1. Performance reliability, system constraints and construction timing for the three alternatives are substantially the same. Estimated construction and operation costs are shown on Table 3-1. Transmission line losses are calculated in Section 3.2.1

A reconnaissance level evaluation of environmental advantages and disadvantages is discussed in Section 1.3. Detailed analyses of environmental issues related to the three alternative corridors are contained in Section 5.2.

	Miller Creek	W. Fisher Creek	Midas Creek	Swamp Creek	Swamp Creek A	Libby Creek	Trail Creek	Rock Creek
TOTAL LENGTH (MILES)	16.2	17.9	19.7	17.3	17.2	23.3	16.3	7.5
CONSTRUCTION COST PER MILE	150,000	150,000	150,000	150,000	150,000	135,000	150,000	150,000
UPGRADE EXIST. LINE	0	0	0	0	0	1,200,000	0	0
ADIT & CABLE COSTS	0	0	0	0	0	0	0	34,413,000
TOTAL CONSTRUCTION COSTS	2,430,000	2,685,000	2,955,000	2,595,000	2,580,000	4,345,500	2,445,000	25,538,000
ENVIRONMENTAL COSTS (EIS)	242,000	242,000	242,000	242,000	242,000	242,000	242,000	242,000
RIGHT-OF-WAY COSTS	169,290	187,055	205,865	180,785	179,740	243,485	170,355	78,375
OPERATING COSTS (PER MILE PER YEAR) (1)	878	878	878	878	878	3,090	878	878
CABLE POWER LOSSES	0	0	0	0	0	0	0	88,605
TOTAL OPERATING COSTS OVER 15 YEARS	213,254	235,743	259,449	227,841	226,524	1,079,955	214,671	187,380
TOTAL COST	3,054,644	3,349,798	3,662,314	3,245,626	3,228,264	5,910,940	3,072,006	36,045,755

(1) includes maintenance and power losses

Table 5-1. Alternate Cost Comparison

5.1.2 Criteria for Evaluation of Alternatives (ARM 17.20.1305)

The criteria for evaluation of alternatives include:

Line construction cost.

Environmental cost.

Land cost for right-of-way.

Maintenance cost.

Transmission line energy loss.

Based on these cost criteria, (Section 17.20.1304) the alternatives are ranked for preference as follows:

1st	Miller Creek
2nd	Swamp Creek
3rd	Swamp Creek Alternative A
4th	Midas Creek
5th	West Fisher Creek

5.2 ALTERNATIVE SITING STUDY

The baseline studies presented in this application are from the original 1989 application. These data will be updated during the development of the EIS and this application will be updated as the data and studies are completed.

5.2.1 Exclusion Areas (ARM 17.20.1428)

The only exclusion area in the study is the Cabinet Mountains Wilderness Area shown on Exhibits 1 and 3. There are no National Primitive Areas within the study area.

5.2.2 Sensitive Areas (ARM 17.20.1429)

5.2.2.1 Reconnaissance

a) There are no national or state wildlife refuges, game ranges or game management areas within the study area.

b) There are no national or state parks or monuments in they study area.

c) There are no national or state designated recreation areas in the study area.

d) There are no national wild and scenic rivers or rivers under study for such designation within the study area.

e) The North Silver Butte Creek, Great Northern Mountain, Upper Rock Creek and Upper McKay Creek areas have substantial acreage managed as roadless (see Kootenai National Forest Plan and Exhibit 1). Although none of these areas contain a contiguous block of 5,000 acres of federally owned roadless area, they are managed as roadless by the Kootenai National Forest.

5.2.2.2 Inventory

The inventory area includes the three corridors detailed and shown in Exhibit 2. The inventory presented in this application is primarily from the original 1989 application. Some of these data have been updated for this application. Other data will be updated during the development of the EIS and this application will be updated as the data and studies are completed.

For the inventory area sensitive areas are as follows:

a) There are no communication facilities (including television, radio, microwave or emergency network towers or facilities) in the inventory area.

b) There are no military installations within the inventory area.

c) A Plum Creek conservation easements is located along the Fisher River within the inventory area. Powerlines are permitted within the conservation easement with prior authorization.

d) There are no airports within the inventory area. The nearest airport is the Libby air field approximately six miles southeast of Libby (Exhibit 1).

e) There are no designated federal or state waterfowl production areas within the inventory area.

f) The U.S. Forest Service (USFS) identifies, maps, and manages stands of old growth or mature timber with the objective of providing habitat for old growth dependent wildlife species (U.S. Department of Agriculture, Forest Service, 1987). Most of the old growth forests that would be crossed by the alternative powerline routes are along perennial streams (Exhibit 7). Old growth forests have been designated as corridor avoidance areas by USFS.

g) Pursuant to the Endangered Species Act, no critical habitat has been designated in the proposed project area for any state or federally listed threatened or endangered species (personal communication, Laurie Nordstrom, June 8, 2005).

Federally listed Endangered, Threatened, and Candidate species that are present within Lincoln County include:

Scientific Name	Common Name	Status
Acipenser transmontanus	White Sturgeon (Kootenai River Pop.)	LE
Haliaeetus leucocephalus	Bald Eagle	LT
Ursus arctos horribilis	Grizzly Bear	LT
Silene spaldingii	Spalding's Campion	LT
Canis lupus	Gray Wolf	LE
Lynx canadensis	Canada Lynx	LT
Salvelinus confluentus	Bull Trout	LT
Howellia aquatilis	Water Howellia	LT
Botrychium lineare	Slender Moonwort	C

h) No national historic landmarks or national register historic districts or sites are located in the inventory area based on consultation with Montana State Historic Preservation Office (SHPO) and review of the National Register of Historic Places.

i) No historic districts or sites in the inventory area have been nominated to, or determined eligible for, the National Register of Historic Places by the State Historic Preservation Office (SHPO). This information is based upon consultation with SHPO and the Kootenai National Forest, and review of the National Register of Historic Places. Letters requesting information have been submitted to the Flathead and Kootenai Tribes.

j) There are no national trails in the inventory area.

k) There are no municipal watersheds within the inventory area.

l) There are no contiguous 5,000 acre roadless blocks in the area.

5.2.2.3 Baseline Study

This data is currently being reviewed and will be updated as part of the EIS process by either MMI or the EIS contractor. Sensitive areas for the baseline study area are shown on Exhibits 2 through 13 at a scale of 1:24,000.

a) There are no schools or potential school development areas within the baseline study area.

b) There are no agricultural experiment stations within the baseline study area.

c) U.S. 2 is not considered a scenic highway and there are no designated scenic overlooks on U.S. 2 within the baseline study area.

d) Threatened and Endangered species data is currently being reviewed and will be updated as part of the EIS process by either MMI or the EIS contractor.

One threatened (grizzly bear) and two endangered (bald eagle and peregrine falcon) species seasonally occupy habitat in the project area. According to Thompson (1989), seasonal ranges of grizzly bear include portions of the alternative corridors on Libby Creek, Ramsey Creek, Miller Creek, and West Fisher Creek. The grizzly population in and adjacent to the Cabinet Mountains probably does not exceed 15 bears, a population density of 1 bear per 113 square miles (Kasworm and Manley, 1988).

The U.S. Forest Service (1987) compiled a Grizzly Ecosystem Map which delineates areas key to the survival of grizzlies where seasonal or year-long grizzly habitat under natural, free-ranging conditions is common (Management Situation 1). Areas without highly suitable habitat components, but where grizzlies are present occasionally (Management Situation 2), also have been delineated by USFS. In this application, “occupied grizzly bear habitat” is composed of units delineated by the U.S. Forest Service as Situation 1 and 2.

Grizzly bear habitat concerns also have been incorporated by the U.S. Forest Service into their Management Plan for the Kootenai National Forest. Management Unit Number 14 has been defined by the U.S. Forest Service as:

> Productive forest lands identified as being essential for the recovery of the grizzly bear. Manage to provide forage, cover, and security by using compatible timber and road management practices.

Management Unit 14 is a subunit of “occupied grizzly bear habitat” (i.e., Situations 1 and 2), designated for timber and road management to benefit grizzly bear.

Bald eagles are spring and fall migrants near the alternative corridors along Libby Creek and Fisher River. During the fall and spring, when the streams are not frozen, bald eagles feed on fish, waterfowl (along the major rivers and streams), and road-killed deer (Exhibit 5) (Thompson, 1989). Relatively large numbers of bald eagle winter along the Kootenai River which remains open all winter. Active bald eagle nests also are known along the Kootenai River; however, there are no known bald eagle nests within the project area.

Peregrine falcon probably occur in the project area as rare migrants. There are no known historic nests in or adjacent to the Cabinet Mountains.

5.2.3 Areas of Concern (ARM 17.20.1430)

The baseline studies presented in this application are from the original 1989 application. These data will be updated during the development of the EIS and this application will be updated as the data and studies are completed.

Areas of concern as defined by Section 17.20.1430 have been used in assessing potential transmission corridors at reconnaissance, inventory and baseline study levels.

5.2.3.1 Reconnaissance

Reconnaissance level areas of concern are mapped on ½-inch scale in Exhibit 1, and on 1:24,000 scale in Exhibit 8.7

a) Areas of rugged topography, generally slopes greater than about 30% are shown in Exhibit 1.

b) Specially managed buffer areas surrounding the wilderness include areas managed as roadless for recreation and wildlife values. These specially managed areas are shown for the study area based on USFS management units 2 and 8 (Kootenai National Forest Plan, 1987) on Exhibit 1.

c) Specially managed buffer areas are maintained around seasonally important grizzly bear habitat and big game winter range by preventing motor vehicle access. Roads that traverse important seasonal grizzly bear and big game habitats are blocked by gates and signs are posted describing access restrictions. Exhibit 8 shows roads that are closed either seasonally or year-round.

5.2.3.2 Inventory

This data is currently being reviewed and will be updated as part of the EIS process by either MMI or the EIS contractor.

Inventory level areas of concern are mapped at 1:24,000 scale as described below:

a) There are no communities or residential clusters within one mile of the three alternative corridors. There are no cities or towns within one mile of the three alternative corridors.

b) All irrigated and dry cropland has been identified by aerial photos and DEQ records. Table 5-2 contains a list of irrigation rights with the place of use within one mile of any of the powerline alternatives.

c) There are no prime or unique farm lands within the inventory areas.

d) The only permitted surface mining areas within one mile of the three transmission routes are mines included under the Small Miner's Exclusion Act (Montana Department of State Lands).

e) Erodible soils and areas of high reclamation constraints within the corridors of all alternative routes are shown on Exhibit 9. The areas of concern with respect to erodible soils include map units 102, 108 and 112. These soils have formed from silty, glacial, lacustrine sediments and occur as flat to slightly undulating terraces at low elevations (Kuennen & Gerhardt, 1984).

Table 5-2. Irrigation Water Rights In and Near Inventory Area.

DNRC #	Source	POU	Acres Irrigated	Owner
W-000328	Silver Butte	N2 E2 NW 8 T26N R29W	8	Flint, C.
	Fisher River	- NW NE 8 T26N R 29W	30	
		- NE SE 8 T26N R29 W	23	
W-002293	Schrieber Creek	- SW NE 19 T27N R29W	15	Waylett, N & H
W-034334	Miller Creek	- - S2 22 T27N R30W	2	Church, M Uithof, A
P-039897	Pleasant Valley Fisher River	E2 NE NW 10 T26N R29W	11	Bolinger, D & A
C-042527	Groundwater	- N2 NW 10 726N R29W	3	Manicke, F & A
C-061959	Groundwater	NE NE NW 10 T26N R29W	7	Manicke, F & A
W-114592	UT Fisher River	NE NW NE 8 T26N R29W	1	Buckner, W & H
W-140317	Fisher River	W2 SW SW 32 T27N R29W	6	Kenelty, R
W-140318	Hunter Creek	W2 SW 32 T27N R29W	14	Kenelty, R

Irrigation plots are shown on Exhibit 8.

Areas of concern with respect to reclamation constraints include map units 360, 403 and 405. These areas are characterized by shallow soils, steep slopes, a high proportion of rock outcrop and, in the case of unit 405, a harsh subalpine climate (Kuenned & Gerhardt, 1984). A more detailed discussion of soils and land type units is contained in Section 5.2.11.7 (17.20.1440 (7)).

f) The Forest Service has published a visual management plan using the Visual Management System. The Visual Management System (VMS) is a process to inventory and analyze visual resources in order to systematically determine the relative levels of visual quality and sensitivity. This system determines the appropriate level of protection to give to visual change in the landscape. The VMS is a comprehensive inventory and analysis tool which allows visual resources to be considered in evaluation of proposed actions.

For purposes of this study, areas of special concern would include visual quality objectives levels where the threshold for visual change is exceeded in a landscape that does not adequately absorb the visual intrusion or modification. Examples in the study corridor include areas of Retention or Partial Retention, Visual Quality Objectives (VQOs) that are located in areas of Low Retention VQO, and Low Visual Absorption Capacity (VAC) located along the shoulder slopes of the Cabinet Mountains. Partial Retention and other Retention areas of Low VAC that include moderate (>15%) to steep (>30%) slopes of clear cut timber harvesting are scattered throughout the study corridors. Another area of concern includes areas of high visual sensitivity such as major recreation sites and areas of travel routes. These include the trails into the Cabinet Mountain Wilderness and the Wilderness itself, Howard Lake, USFS Road 231 and U.S. Highway 2.

g) Winter distribution of elk, mule deer, white-tailed deer, moose, and mountain goat are shown on Exhibit 5. Winter ranges for elk, moose, and deer occur on south and southwest facing slopes along Miller creek, West Fisher Creek, and Fisher River. These species typically move from the higher elevations in the Cabinet Mountains, east to the relatively open slopes at lower elevations. The Miller Creek and West

Fisher Creek areas support big game species throughout the winter and are important transitional habitats in spring and fall. Animals moving between summer and winter ranges migrate through these east-west flowing drainages.

h) Elk security areas have been identified by the Montana Department of Fish, Wildlife and Parks (DFWP) (personal communication, Gerald Brown, May 1, 1989) as areas where habitat, terrain, and other factors allow elk to remain in a defined area despite the increased stress of hunting season. To maintain elk security and to maintain optimum hunter opportunity, DFWP established a Road Management Policy. The Policy states that with 80 percent hiding cover the road density should not exceed 2.4 miles of road per square mile of habitat. Where hiding cover is 50 percent, road density should not exceed 0.1 mile of road per square mile of habitat. Elk security areas within the alternative corridors occur in the Teeters Peak area and in the headwaters of the North Fork Miller Creek (Exhibit 5).

i) Mountain goat summer habitat includes the cliffs and cirques at the head of the Ramsey Creek drainage. This habitat lies mostly within the Cabinet Mountains Wilderness Area boundary and is not traversed by any of the alternative powerline corridors. Mountain goats winter on the steep, south and east facing rocky slopes and cliffs above the alternative corridor segment along Ramsey Creek (Exhibit 5).

j) There are no sage grouse or sharp tailed grouse breeding areas in the inventory area.

k) There are no prime waterfowl breeding areas within the project area; however, some ducks (mallards) nest on the wetland/beaver pond complex (Exhibit 7) on Libby Creek, about two miles north of Howard Lake and on Howard Lake. Howard Lake is also a resting area for migrating ducks and geese, particularly in the fall. According to Bratkovich (personal communication, April 20, 1989), as many as 300 geese and 300 ducks have been observed in mid-November on Howard Lake.

Although there is limited data on seasonal waterfowl use of Howard Lake, there is little reason to expect that the proposed powerline route would pose a hazard to waterfowl in flight. Waterfowl collisions with conductors, poles, or overhead ground wires typically occur where powerlines cross heavily used flight corridors near major rivers or extensive wetlands. The proposed powerline route does not cross a heavily used flight corridor. The route is situated on slopes where the right-of-way has been cleared either by logging or for powerline construction and, over much of the route near Howard Lake, the conductors and poles would be either lower than the tree canopy or extend only a few feet above the taller trees.

There is no apparent flight corridor into or out of Howard Lake. The lake is situated well off the valley floor and perched midway up a mountain slope. Drainage out of the lake is a high gradient, narrow stream that is completely shielded from overhead view by a dense canopy of conifers. Waterfowl would not be attracted to use this narrow stream as a flight path.

l) The wetland/beaver pond complex, approximately 2 miles northwest of Howard Lake along Libby Creek (Exhibit 7), has a large population of woolgrass (Scirpus cyperinus). This species has been designated as a species of special concern by the Montana Natural Heritage Program (1989) because it may be imperiled in Montana because of its rarity in the state.

m) There are no geologic units that have a reasonable probability of containing significant paleontological resources found within the inventory area.

n) The entire area has been identified as containing locations of contemporary use that have religious or heritage significance and value to the Kootenai Tribe (personal communication, Naida Lefthand, May 1989). The Kootenai and the Flathead Tribes have both received maps showing the general area and have been requested to submit written comments regarding their concerns for the area.

o) Howard Lake (34.5 acres), the wetland/beaver pond complex (40 acres) on Libby Creek, and a wetland complex on the South Fork of Miller Creek, are the only waterbodies/wetlands with a surface area greater than 20 acres (see Exhibits 2 and 7).

p) Surface supplies of potable water within the inventory area are shown on Exhibit 8.

q) The proposed new substation and the terminus of the powerline are not located on or near active faults with evidence of recent movement (Witkind, 1975).

5.2.3.3 <u>Baseline Study</u>

These data will be updated during the development of the EIS and this application will be updated as the data and studies are completed. Baseline study areas of concern were mapped at a scale of 1:24,000 as described below. The baseline studies presented in this application are from the original 1989 application.

a) All individual residences and farm out-buildings visible in 1988 air photos within the baseline study are shown on Exhibit 8.

b) Snow avalanche chutes within the study area were identified from aerial photography and are shown on Exhibit 9.

c) Mature riparian forests occur along portions of Fisher River, West Fisher Creek, Libby Creek, and Ramsey Creek (Exhibit 7). The riparian forests along West Fisher Creek, Miller Creek, and Fisher River are composed primarily of spruce with varying densities of deciduous shrubs (Western Resource Development Corporation 1989a). The riparian forest along Ramsey Creek is old growth western red cedar, western hemlock, and Engelmann spruce, with scattered, large black cottonwoods. Some of the larger cottonwoods are hollow, serving as important habitat for cavity nesting birds.

   Densities and heights of cottonwoods vary from dense stands of saplings and pole-sized trees along recently flooded portions of Libby Creek (often several hundred stems per acre) to scattered over-mature individual trees along Ramsey Creek, upper Libby Creek, and Little Cherry Creek (less than 2 trees per acre). Often these scattered cottonwoods, up to 3 to 4 feet in diameter and 60 to 80 feet tall, are broken off, hollow snags.

   The riparian vegetation along the Fisher River and West Fisher Creek is an admixture of conifers (spruce, hemlock, and western red cedar) and mature cottonwoods. Stands of cottonwoods are not uniformly distributed among conifer species. Typically, clumps of mature cottonwoods in excess of 20 inches in diameter and about 60 feet in height grow interspersed with conifers. Their distribution is related to past floods that have scoured streamside gravel bars and low portions of the floodplain.

d) There are no white pelicans, heron, cormorant, gull or tern nesting colonies within the study area.

e) Wildlife species of special concern known to occur in the vicinity of the proposed powerline corridors are: grizzly bear, bald eagle, osprey, northern goshawk, golden eagle, northern pygmy owl, barred owl, pileated woodpecker, olive-sided flycatcher, western bluebird, tailed frog and bull trout (Thompson, 1989). The Cooper's hawk, harlequin duck, shorthead sculpin and spoonhead sculpin might occur in the proposed powerline corridor, but their presence has not been documented.

1. Osprey

Osprey are closely associated with rivers and lakes where nesting habitat and fish, their primary food, are available. Two osprey nests, currently inactive, have been identified by Bratkovich (personal communication, April 20, 1989) along West Fisher Creek near the alternative powerline corridor (Exhibit 5). Osprey that have nested along West Fisher Creek have been observed at Howard Lake preying on fish (personal communication, Bratkovich, April 20, 1989).

2. Northern Goshawk

The northern goshawk is a common breeding species in coniferous forest habitat of northwestern Montana. No nests have been reported in the vicinity of the alternative powerline corridors; however, intensive on-the-ground surveys have not been conducted to identify goshawk nest locations.

3. Golden Eagle

Golden eagles nest in the Cabinet Mountains, but no nest locations are known for the alternative powerline corridors. Two low-level helicopter surveys conducted in April 1989 of the alternative powerline corridors did not reveal the presence of any golden eagle nests. Golden eagles may occasionally be found in the alternative powerline corridors hunting for carrion or mammalian prey species.

Habitat utilized by golden eagles probably includes most forest types, both logged and unlogged, as well as roadsides where carrion may be present. Nest locations probably are restricted to relatively undisturbed, remote cliffs.

4. Pygmy Owl

Pygmy owls nest in tree cavities in mature or old growth conifer forests. Suitable nesting habitat appears to be present in the alternative corridor study area. Thompson (1989) observed a pygmy owl near Little Cherry Creek, but did not determine whether the species was nesting in the area.

5. Barred Owl

Barred owls nest in the Kootenai National Forest in mature and old growth conifer forests. A barred owl was observed by Thompson (1989) in an old growth western hemlock stand within the alternative powerline corridor along Ramsey Creek. Nesting of this species has not been confirmed along the alternative corridors.

6. Pileated Woodpecker

Pileated woodpeckers commonly occur in the powerline corridors in coniferous forest habitats. This species nests in cavities of snags usually associated with old growth forests. Although nesting in the vicinity of the alternative corridors has not been confirmed, Thompson (1989) reported that there was circumstantial evidence of breeding in the area.

7. Olive-sided Flycatcher

This species is relatively common in the conifer forests traversed by mid to upper elevation portions of the alternative powerline corridors. It probably nests in the study area, although breeding has not been confirmed (Thompson, 1989).

8. <u>Western Bluebird</u>

Western bluebirds are relatively rare in the study area; however, they were observed in clear-cuts and spruce-fir habitats (Thompson, 1989). Typically, this species nests in cavities of snags near forest openings and clearings.

9. <u>Tailed Frog</u>

Tailed frogs have been found in aquatic habitats in Libby, Ramsey, Midas, Poorman, and Little Cherry Creeks (Thompson, 1989). They also may occur in West Fisher and Miller creeks. Habitat in these streams appears to be suitable for tailed frog; however, the streams have not been sampled.

10. <u>Bull Trout</u>

Bull trout are found throughout the Kootenai River drainage, including Libby Creek and Ramsey Creek in the powerline corridor. Based on data collected by Western Resource Development Corporation (1989a), there are about 0.2 bull trout per 100 square feet of stream in upper Libby Creek and from 0.1 to 0.2 bull trout per 100 square feet of stream in Ramsey Creek. It is suspected, but not confirmed, that bull trout migrate from the Kootenai River in the fall to spawn in Libby Creek and tributaries of Libby Creek.

f) Limited access areas of steep slopes (greater than approximately 15% based on USGS slope mapping) that are located more than ½ mile from an existing road are limited to the area located to the southwest of Howard Lake and are shown on Exhibit 8.

5.2.4 Delineation of Study Area (ARM 17.20.1434)

The study area including all reasonable power sources is shown in Exhibit 1. Exhibit 1 is at the scale of ½ inch = 1 mile as agreed to by DEQ (Elliott, 1989). The study area boundaries were defined based on location of existing supply sources and preliminary economic analysis. Sources initially identified as capable of supplying the mine included the Noxon Rapids Dam, Libby Dam, the 230 kV line between the two dams and a 115 kV substation located near the town of Libby. Two potential tap sites were located along the 230 kV Noxon Rapids to Libby Dam line, one tap site at the Noxon Rapids Dam and one near Libby. These sites and the associated corridors were identified based on suitable topography, existing road systems and a reconnaissance evaluation of exclusion areas (wilderness), sensitive areas (roadless areas) and areas of concern (areas of rugged topography and specially managed buffer areas). Libby, which is not served by 230 kV, was included initially to address the USFS interest in the potential for a combined road access and transmission line corridor. Construction and transmission economics (as outlined in 17.20.1426(c)) quickly reduced the focus of the reconnaissance and inventory level evaluation to the stretch of line between Noxon Rapids Dam and Pleasant Valley.

5.2.5 Reconnaissance of Study Area (ARM 17.20.1435)

Reconnaissance of the study area included evaluation of exclusion areas, sensitive areas, and areas of concern as outlined in Sections 5.2, 5.2.2 and 5.2.3.

5.2.6 Selection of Study Corridors (ARM 17.20.1436)

Study corridors shown on Exhibit 2 were selected based on review of exclusion areas, sensitive areas and areas of concern; cost; engineering considerations and discussions with the USFS and DEQ. The introduction (Section 1.3) discusses the reasons for eliminating several potential study corridors. Selection of the four corridors retained for detailed investigation was discussed in meetings with the DEQ and the USFS on April 5, April 12 and May 1, 1989.

The selection of four reasonable corridor alternatives involved the construction of a screening matrix (Figure 1-3) which included cost, reliability, land management and environmental considerations. Corridor width was established at a constant one mile to facilitate comparison of alternative corridors. The Miller, Midas, Swamp and West Fisher corridors were selected for additional study because they contain topographically suitable terrain, are roaded throughout much of their length and did not appear to have any overwhelming environmental or cost disadvantages.

5.2.7 Study Corridor Inventory (ARM 17.20.1437)

The baseline studies presented in this application are from the original 1989 application. These data will be updated during the development of the EIS and this application will be updated as the data and studies are completed. Study corridor base maps at a scale of 1:24,000 were used for the study area inventory. Maps were CAD generated using USGS database files based on seven ½ minute quadrangles. A mylar of the base map and the required overlays were supplied to DEQ with submittal of this information within the 1989 application.

5.2.8 Environmental Information Inventory (ARM 17.20.1438)

5.2.8.1 <u>Land Use (17.20.1438 (1))</u>

This data is currently being reviewed and will be updated as part of the EIS process by either MMI or the EIS contractor.

Within the inventory area of the three corridor alternatives there are no:

- a) developed areas adjoining cities or towns,
- b) designated residential growth areas,
- c) railroads or railroad right-of-ways, or
- d) industrial or commercial areas.

U.S. Highway 2 and USFS roads are shown on Exhibit 1. There are no other federal or state highways or any designated county roads within the inventory area. The county does maintain portions of forest service roads where there are residences. The county maintains the service roads where there are residences. The county maintains the first 3 miles of the West Fisher Road, the first 3 ½ miles of the Silver Butte Road and the first ½ mile of the Libby Creek Road. The only transmission line greater than 50 kV within the three corridor inventory area is the BPA 230 kV line from Noxon Rapids to Libby Dam shown on Exhibit 1.

Under natural conditions, all of the land traversed by the alternative corridor routes would be forested, except following fires. Currently, logging has removed the overstory forest in some areas (see Exhibit 7), allowing for grasses and other forage suitable for livestock to increase in productivity. These clear-cut or logged areas are productive grazing areas until the forest regenerates and competition for sunlight reduces understory growth.

There is one active grazing allotment within the study area (personal communication, Jon Jeresek). The leasee is John Beebe who has a USFS permit for 27 cows and a private land permit for 3 cows. The allotted grazing season is May 16 to October 15, however the cattle are generally removed from the area by mid-September to avoid the hunting season.

According to the Kootenai National Forest Plan (U.S. Department of Agriculture, Forest Service, 1987), grazing will only be allowed after forest regeneration has been established. If there is insufficient forage for both livestock and big game, enough forage for big game will be assured.

Vegetation types are shown on Exhibit 7.

5.2.8.2 Land Ownership (17.20.1438 (2))

Public lands for the inventory area are shown on Figure 1-2. There are no tribal or Indian reservation lands in the inventory area.

5.2.8.3 Slope Characteristics (17.20.1438 (3))

An overlay depicting slope categories as mapped by the USFS and approved by the DEQ is included in Exhibit 4.

5.2.8.4 Social and Economic Characteristics (17.20.1438 (4) and (5))

The social and economic characteristics of the study area were updated and included in the 2004 Hard Rock permit application. The baseline studies presented within this section were updated using data and information contained within the 2004 Hard Rock permit application. These data will continue to be updated during the development of the EIS and this application will be updated as the data and studies are completed.

The nearest population center to the Montanore Project and the powerline alternatives is Libby.

The three alternative powerlines are all in one census enumeration district, ED 725. Ed725 is bounded by U.S. 2 to the northeast and east and the Sanders county line to the south and west. The northwest boundary is defined by a line running from Ojibway Peak to the head of Ramsey Creek, down Ramsey Creek, to Libby Creek and down Libby Creek to where it intercepts U.S. 2. In 1980, ED 725 had 166 people. There were 50 families and 21 one-person households.

Examination of USGS quads for the study area for the three alternative powerlines indicate that there are no residential clusters of five or more dwelling units per 20 acres within one mile of any of the powerline alternatives.

A comprehensive baseline socioeconomic study (Economic Consultants Northwest, 1989) was submitted to the DSL with MMI's original Montanore Project Application for a Hard Rock Operating Permit in 1989. A Hard Rock Impact Plan is currently being prepared and will be submitted to the Hard Rock Impact Planning Board within the next several months.

Lincoln County residents generally do not favor preservation that prohibits development of natural resources. Most residents support commercial and industrial development of the region as long as state and federal environmental laws are followed.

The federal government (USFS) manages about 75 percent of the land in Lincoln County. The Kootenai National Forest Plan Record of Decision (1987) outlines the federal government's land use plan.

Appendix 15 in the Kootenai National Forest Plan (1987) establishes criteria for identifying corridor exclusion areas, avoidance areas and windows within the Forest.

a) **Exclusion Areas** – Land areas determined to be unavailable for corridor allocation or facility siting.

- Include only those areas with a legal Congressional mandate that excludes linear facilities, example – National Wilderness lands.

b) **Avoidance Areas** – Land areas that pose particular land use or environmental impacts which would be difficult or impossible to mitigate.

1. Areas where establishment and use of corridors conflict with land use/ land management objectives:
   - Specially managed areas; such as areas designated for developed and primitive recreation, research natural areas, environmental education areas.
   - Environmentally sensitive areas (certain wildlife habitat areas, faults, wetlands, slump areas, etc.).
   - Archaeological and historical sites.
   - Areas with specific visual objectives which conflict with facility placement.
   - Active coal mining units.
2. Areas with special or unique values that have been accorded specific and sometimes protected management status through "legislative" action. These values conflict with facility placement:
   - National Recreation Areas
   - Wild, scenic and recreational rivers
   - Nationally classified trails
   - State recreation areas
3. Areas which have been identified by local government bodies (within their areas of jurisdiction) as not suitable for the placement of linear facilities:
   - Urban residential areas
   - City parks

c) **Windows** – usually short, narrow passageways through constrained areas which are the most feasible potential locations for linear facilities, considering engineering and/or environmental factors:

- Areas recognized as critical corridor segments because of physiographic or technical suitability.
- Restricted passages identified as a result of allocation for exclusion or avoidance areas.
- Existing critical corridor segments through sensitive areas, such as urban, residential areas or areas of intensive land use.

Demographic Conditions: The population growth in Lincoln County has more than doubled since 1940. The largest increase in population occurred between 1960 and 1970 due to the construction of the Libby Dam. There was a slight decline in population between 1970 and 1990. There has been a recovery since, with the population increasing by almost 8 percent, from 17,481 in 1990 to 18,837 in 2000. The Census Bureau's most recent population estimate of 18,835 indicates almost no growth between 2000 and 2003.

The natural increase (births over deaths) for Lincoln County from 2000 through 2003 declined slightly by 0.5 percent, however net migration (internal and international) increased by 0.8 percent over the same period. The population of Lincoln County is projected to increase by 0.7 percent per year over the next 27 years, reaching 22,700 by the year 2030.

The median age for Lincoln County was 42 years compared to 37.5 years in the state for both males and females. In 2000, the median family income in Lincoln County was at $31,784 about 21.5 percent lower than the state figure of $40,487. In Lincoln County, nearly 80.2 percent of the population 25 years and over had completed 12 years or more of school as compared to 87.2 percent at the state level.

The birth rate per 1,000 in Lincoln County was 10.4 percent, compared to 12.5 percent in the state. Lincoln County had a death rate of 10.6 per 1,000 population in 2002. This is 1 percentage point higher than the rate of deaths in the state. Cancer, heart disease, and cerebrovascular diseases were the 3 leading causes of death recorded at both the state and county levels.

Social Life: The history of northwestern Montana has greatly influenced the social character, human interactions, and life-styles of current residents in the Libby area. Settlement of the region began with gold mining and a resource extractive economy has prevailed since that time with cyclical periods of high employment followed by periods of recession. In addition to the economic factors, ethnic heritage, occupations requiring strenuous physical labor, and the geographic isolation have directed the social evolution of residents of the Kootenai Valley.

Libby area residents have adapted to the cyclic nature of the economy by living off the land (i.e., hunting, fishing, gardening, firewood gathering, and berry picking). Local residents tend to acquire vehicles, homes, and other possessions which are functional rather than ostentatious. Residents of Lincoln County, because of their livelihoods, are closely linked to the natural environment, have a conservation ethic, but do not favor preservation that would prohibit development of natural resources.

Employment Conditions: Over the last thirty-three years, the labor force in Lincoln County, defined as persons working or seeking work, has declined from 7,275 in 1970 to 7,018 by 2003. This is a decline of 0.1 percent per year. The number of employed decreased by 0.4 percent per year from 6,628 to 5,901 over the same period. The unemployment rate in Lincoln County has varied from 8.9 percent in 1970 to a high of 19.4 percent in 1982, reaching 15.9 percent in 2003. Since 1990, the unemployment rate in Lincoln County has averaged about 13.5 percent of the labor force.

Another way to measure employment is to count the number of full and part-time jobs, rather than the number of people working. Over the last thirty-two years, employment in Lincoln County has increased at an annual rate of 0.7 percent, rising from 7,130 in 1970 to 8,935 in 2002.

The government enterprises sector with 16.5 percent of total employment was the largest employer in Lincoln County in 2002. The retail trade sector was the next largest with 11.7 percent jobs. The manufacturing sector accounted for 9.5 percent.

The manufacturing sector, which includes timber and harvesting and wood products manufacturing, represents 16 percent of all businesses in the county. *Rosauer's Grocery Store, St. John's Lutheran Hospital, Plum Creek Timber, Semi-Tool are major private sector employers in Lincoln County.*

The mining sector represents 0.3 percent of all businesses in the county. Genesis Inc. is currently hiring staff to support the mining operations. This number should be available in early 2005. In

1979, the Troy Mine (now Genesis, Inc.) and W.R. Grace, Inc were the two dominant mine operators in the area. At that time, this accounted for approximately 7 percent of all employment in the county. Currently mine employment, even with Genesis, Inc. at full production is significantly below the 7 percent figure in 1979.

Total employment in Lincoln County is projected to increase to 12,503 by the year 2030. This increase represents an annual growth rate of 1.21 percent, which is higher than the historical 1970-2002 growth rate of 0.7 percent.

Income Conditions: Real per capita income in Lincoln County has been increasing at a rate of 1.4 percent per year, rising from $12,178 to $18,790 in 2002. This compares to an annual growth rate of 1.9 percent real per capita income statewide. Although increasing each year, per capita income is much lower than the statewide average real per capita income of $23,855.

Total earnings in real 2002 dollars declined at a rate of 0.2 percent per year between 1970 and 2002. Total earnings in the state, however has been increasing at a rate of 2.30 percent per year.

Total earnings to Lincoln County in 2000 real dollars are projected to increase from $208.7 million in 2002 to $488.16 million by 2030, representing an annual rate of increase of 3.1 percent.

Community Services: *There are 5.5 elementary schools, 2 middle schools, and 3 high schools in Lincoln County. Schools in Lincoln County are:*

City	*Elementary Schools*	*Middle Schools*	*High Schools*
Libby	*1.5*	*1*	*1*
Troy	*1*	*0*	*1 (inc. Middle School)*
Eureka	*1*	*1*	*1*
Fortine	*1*	*0*	*0*
Trego	*1*	*0*	*0*

Law enforcement services in the Lincoln County study area are provided by the Lincoln County Sheriff's Office, Montana Highway Patrol, Eureka Police Department, Troy Police Department, and Libby Police Department. The Sheriff's Office, has a total of 14 deputies. There are 2 jail facilities in the study area – a 24-cell adult jail in Libby and a 2-cell juvenile holding facility in Troy.

Fire protection is provided by 9 fire departments in Lincoln County. The fire departments, include the Bull Lake, Eureka, Fisher River, Libby, McCormick, Ranchers, Trego/Fortine/Stryker, Troy, and Yaak fire departments. The Libby and Troy Fire Departments (both rural and city) are volunteer departments. The rural/city Libby Fire Department has 28 volunteers and the Troy rural/city Fire Department has 25 volunteers.

The Lincoln County health care facilities include the St. John's Lutheran Hospital, Prompt Care – a rural health clinic in Eureka and Libby, Lincoln Community Health Center in Libby. The other health care facilities in the area include, the Center for Asbestos Related Diseases (CARD), Libby Care Center for the elderly, Libby Clinic, Neuman Foot & Ankle Clinic and Lincoln County Radiology. The Troy area medical facilities include the Medicine Tree Primary Care and the Troy Medical Center. Lincoln County is served by approximately 20 licensed physicians, 6 dentists.

More than 50 percent of the households in Lincoln County use a well for water supply. In Libby, approximately 2,000 households are served by the municipal water system which obtains water from Flower Creek. The town of Troy receives its municipal water supply from 2 wells and O'Brien Creek.

Approximately 76 percent of the households in Lincoln County, including the town of Troy utilize septic tanks for wastewater disposal. The city of Libby has operated a public wastewater treatment facility since 1964, and in 1985, converted from a primary to a secondary treatment facility (i.e., an activated sludge oxidation ditch system).

The Human Services Office is located in Libby. Funding for the social welfare program comes from state, federal, and county sources; however, the state administers the program. Services include aid to families with dependent children, food stamps, medical services, general assistance, and fuel assistance.

Fiscal Conditions: Total taxable valuation in Lincoln County declined from $28.46 million in fiscal year (FY) 1996 to $25.25 million in 2002. This is a decline of 11.3 percent with no accompanying decrease in population.

Between 1996 and 2002, revenues from property taxes increased by 15 percent from $10,585,506 to $12,171,099.The major revenue source to Lincoln County government was intergovernmental transfers during 2002.

Total expenditures for Lincoln County during FY 2002 were budgeted at $14.3 million. In FY 2002, 21.2 percent of the budget was spent on general government, 21.61 percent on public safety, and 12 percent on public works.

Municipalities: Taxable valuation for Libby declined from $3,298,085 in FY 1996 to $2,529,771 by FY 2002, representing a 23.3 percent decline in the tax base. In 1990 data, total revenues for Libby had decreased 5 percent since 1980. It is expected that a similar trend is likely with current data.

Taxable valuation in Troy decreased by 24.1 percent between FY 1996 and FY 2002 from $953,157 to $723,332. Since the closure of the Troy Mine, it is expected that Troy has had a similar condition and will be verified with the Hard Rock Mining Impact Plan.

School Districts: The taxable valuation for all the school districts in Lincoln County increased slightly from $25.25 million in FY 2002 to $25.36 million in FY 2003.

Taxable valuation for the Libby School District decreased slightly from $11.61 million to $11.2 million between FY 2002 and 2003. Total revenues increased slightly from $13 million in FY 2002 to $13.7 million in FY 2003. Expenditures at the Libby School District increased from $11.2 million to $11.8 million over the same time period.

Taxable valuation for the Troy School District increased from $8.7 million to $9.1 million between FY 2002 and 2003. Total revenues remained the same at $5.85 million between FY 2002 and 2003. Expenditures at the Troy School District decreased slightly from $4.34 million to $4.32 between FY 2002 and 2003.

Taxable valuation for the Eureka School District increased from $15 million to $15.4 million between FY 2002 and 2003. Total revenues for the Eureka School District increased by 114.6 percent between FY 2002 and 2003, increasing from $7.5 million to $16 million. Expenditures increased from $5.6 million to $6.6 million over the same time period.

Housing: In 2000, the U.S. Bureau of the Census reported that Lincoln County had 9,319 year-round housing units. Of the 7,764 occupied housing units, 76.6 percent were occupied by owners. The percent of owner-occupied housing units was much higher than the state percent of 69.1 percent in 2000.

There were 67 realtors operating in Libby, Troy, and, Eureka, listed with the Montana Association of Realtors. On December 14, 2004, the Montana Association of Realtors had 99 residential listings for sale and 87 parcels of land for sale (62 with less than 6 acres, 16 with 6 to 25 acres, and 9 with more than 25 acres).

Public Concerns (ARM 17.20.1438 (6))

Public Outreach for Original 1989 MFSA Application - In an effort to inform the public and to receive issues and concerns regarding the project, information and maps showing the three powerline corridors were sent to the residents and landowners within one mile of the three corridor options in 1989. Personal or telephone contact was made on May 10 and 11, 1989 with people residing in the area to determine their concerns regarding the proposed powerline. In addition, representatives of the USFS and Champion International (now Plum Creek) were interviewed to determine whether the proposed project would adversely affect their land management activities.

The major concern of the residents near the alternative routes and USFS was visibility. Many of those interviewed stated that no one wants to see a powerline. However, most people said that they knew it was a necessity for the mine to operate and, therefore, they could accept its presence. Several people were against siting the powerline in sight of their property. The USFS indicated that visibility was a major issue and the powerline must be sited to minimize visual impacts.

Landowners voiced concerns on how well debris would be cleaned up under the powerline. On a previous 230 kV powerline project, the BPA left large slash piles which proved to be a fire hazard, and residents did not want that to happen again. Many residents stated that when BPA built the 230 kV powerline, many promises were made which were not kept. These same residents and Champion were concerned that the access roads be reclaimed to prevent soil erosion and control noxious weeds.

There were several concerns and questions on the siting of the powerline and substation:

Two residents stated that they preferred the Miller Creek – Midas Creek option as it would not interfere with the elk hunting on West Fisher Creek.

One resident asked why a powerline from Iron Meadow Pass was not being considered as it would be the shortest route. Two residents thought the powerline leg from the Pleasant Valley tap to where it would cross Highway 2 should be behind the ridge rather than follow the existing Champion haul road as it would be shorter and cheaper to construct and not visible from their ranch. Several residents asked if the substation could be located elsewhere as the area where the substation is presently proposed, known as Manicke Park, is used for picnics, baseball games and other community activities.

Several residents asked if the powerline would affect their existing electrical service and if it was possible for individuals to tap into the powerline.

Several residents asked if there were harmful effects from powerlines, if it affected crops or animals, caused cancer or would cause radio reception interference.

The Champion spokesman stated that in general Champion is not in favor of encumbering their land with right-of-ways that take timber out of production. Timber removed from Champion land would be cut to Champion standards and hauled to their mill. The slash would have to be handed to abate fire hazard. Construction roads would have to be built to minimize erosion and when possible closed and reclaimed immediately to help control noxious weeds. Champion would need to know how the powerline would restrict their logging activities in order to be adequately compensated.

The USFS stated that visibility was a concern and the powerline must be constructed to minimize its visual impact. The USFS also indicated that the powerline and access roads should not adversely affect cultural resources, grizzly habitat, recreation areas, flood plains or wetlands. As much as possible the powerline should be built in existing corridors to minimize impact to undisturbed arrears. Concern was also expressed that the corridor would take timber out of production.

The U.S. Fish and Wildlife Service, by directive of the Endangered Species Act, is concerned about the potential impacts of the project on threatened or endangered species (i.e., grizzly bear, bald eagle, grey wolf, and peregrine falcon). The Montana Department of Fish, Wildlife and Parks is concerned about the possibility of impacts to streams and aquatic life as a result of increased sedimentation. They also are concerned that increased access could result from the project and reduce security habitat for big game and, consequently, render animals more susceptible to both legal and illegal shooting.

Current Public Outreach – A letter was sent to land owners within ½ mile of the five alternative routes studied in detail within this application on April 28, 2005. A map showing the study area accompanied the letter. The letter also informed the land owners and invited them to a public open house held on May 5, 2005.

The purpose of the public open house was to inform interested public of transmission line component of the project and to obtain specific concerns or issues with the alternative route alignments. Alternative routes evaluated in detail within this application, as well as those studied in detail within the EIS were presented during the public meeting. The public meeting was advertised within The Western News on April 29 and May 4, 2005.

Comments obtained from the May 5 public meeting are summarized below:

- Miller Creek Alternative goes across Howard Lake viewshed
- North Miller Creek and Miller Creek Alternatives cross unroaded pockets of elk habitat
- Swamp Creek Alternative utilizes existing roads
- Avoid private lands to the extent practical
- Miller Creek would be easier construction
- Recreational gold panning occurs in Libby Creek near alternatives
- Realign Miller Creek Alternative to better utilize existing roads
- Road on west side of Howard Lake is abandoned
- Trail Creek Alternative should be re-evaluated for detailed study
- 90 degree angle on Miller Creek Alternative does not make sense
- What are the impact differences between North Miller Creek and Miller Creek
- A Plum Creek Conservation Easement is located along Fisher River
- North Miller Creek crosses grizzly core habitat
- Swamp Creek was identified as the environmentally preferred alternative
- Transmission line would add open space for deer, elk, and bears to feed
- Wildlife would use the right-of-way as a travel corridor to winter range
- The mine would provide jobs for Libby area

5.2.8.5 Identification and Description of Visually Sensitive Areas (ARM 17.20.1438 (7))

This data is currently being reviewed to ensure consistency with the previous analyses. The data will be updated, as required, as part of the EIS process by either MMI or the EIS contractor.

Inventories of visual quality or variety classes for the study area corridors were compiles from existing baseline data available from the Kootenai and Kaniksu National Forests, United States Forest Service (USFS). The approach used for describing the visual resource baseline information was developed by the USFS and is known as the Visual Management System (VMS). Consistent with the DEQ regulations, the inventory includes the characteristics of variety, harmony, naturalness, and uniqueness of the landscape features, including landforms, rock forms, water forms and vegetation. Other characteristics include color, influence of adjacent scenery, and cultural modifications. Table 5-4 (Visual Resources Inventory Summary) and Exhibit II display the categories of Class A (distinctive) and Class B (common) landscapes for each alternative segment along the study corridors. No Class C (minimal landscapes) are located in the study area. Class A landscapes are found along the Cabinet Mountain Range. The remainder of the study area lands is Class B.

Significant cultural modifications to the existing landscape include timber harvesting and access roads. These modifications are evident through much of the Class B landscape and dominate portions of the Miller, Howard, and Libby Creek drainages. An inventory of visual compatibility or Visual Absorption Capability (VAC) was conducted with the assistance of the USFS. VAC is the inherent capability of the characteristic landscape to absorb visual change or landscape modification. VAC levels range from high (areas most capable of absorbing visual change) to low (areas least capable of absorbing modification to the landscape).

The VAC inventory determined that the study corridors are located in six different characteristic landscape absorption units. These units are further described in Section 5.2.11.9 and in Section 8.2.3 of the Hard Rock Operating Permit Application and are displayed on Map 4, of that report and Exhibit 10 of this application. Table 5-3 identifies the alternative corridor segments' VAC ratings. High VAC is found in the Cabinet Mountains, and Miller, Fisher, Schreiber and Swamp Creek drainages. Moderate VAC is located in intermountain valleys and slopes. Low VAC is found along the shoulder slopes of the Cabinet Mountains.

Table 5-3. Visual Resource Inventory Summary

Alternative Segment	Variety Class (Visual Quality) [a]	Sensitivity Level [b]	Distance Zone [c]	Visual Quality Objective [d]	Visual Absorption Capability [e]
A1	B	1	FG/MG	R	7
A2	B	1	FG/MG	R	7
A4	B	1	FG/MG	R	7
B1	B	3	FG	R/M	7/5/4
B2	B	3	FG	M	4
C1	B	3	FG/MG	R	5
C2	B	3/2/1	MG/BG	M	5/6/4
C3	B	3/2	FG/MG	R/PR	4/6/3/2/1
C4	B	3	FG/MG	R	5
C5	B	3/2	MG	R	6
D1	B	3	MG	M	5
D2	B	3/2	MG	M/R	5/6
E1	B	2	FG/MG	M/PR	7/5/6/3
E2	B	2	MG	PR	3/6
F1	B/A	2	MG	PR	6
F2	B/A	2	MG	PR/R	6/2
G1	B	2	FG/MG	PR/M	6
G2	B	2	FG/MG	M/PR	6
H	B	2	FG/MG	R	6
I1	B	2/1	FG	R	6
I2	B	2	FG/MG	R	6
J	B	2/1	FG	R	6
K	B	2	MG	R/PR	6
L1	B	2/1	FG/MG	R	6/3
L2	B	2	FG/MG	R	6/3

Alternative Segment	Variety Class (Visual Quality) [a]	Sensitivity Level [b]	Distance Zone [c]	Visual Quality Objective [d]	Visual Absorption Capability [e]
M1	B	2	MG	R/PR	3/2
M2	B	2	MG	PR	2
N1	B	2	MG	R	2
N2	B	2	FG/MG	R	2/1
O	B	2	FG/MG	R	1
P1	B	3	FG/MG	R	5
P2	B	3	MG	M	5
Q1	B	2	FG/MG	PR	6
Q2	B	2	FG/MG	PR	6
Q3	B	2	FG	PR	6
R1	B	2/1	FG/MG	R	6
R2	B	2/1	FG/MG	R	6/3
R3	B	2	FG/MG	R	3
S	B/A	2	FG/MG	R	3
T1	B	1/3	FG/MG	PR/M	7/4/5/6
T2	B	3	FG	PR/R	4/6
T3	B	3	FG	PR/R	6
U	B	2/1	MG/BG	R/PR	6/4
V	B	2/1	MG/BG	R/PR	4/6
W	B	2	FG/MG	R	3/2
X	B	2	FG	R	3/2
Y1	B	2/1	FG	R	7/5
Y2	B	2/1	FG	R	7/4/6/5

(a) Variety Class is a USFS term used to assign a visual quality level based on visual variety or diversity of a landscape character.
(b) 1 = High; 2 = Moderate; 3 = Low
(c) FG = Foreground; MG = Middleground; BG = Background
(d) R = Retention; PR = Partial Retention; M = Modification
(e) 2 = Low; 6 = Moderate; 3, 4 & 7 = Moderate – High; 1 & 5 = High

Characteristics examined for VAC ratings included physical factors of topographic slope, landscape diversity, soil color contrast, vegetative pattern, screening density, color, and regeneration potential. Perceptual factors evaluated included magnitude of visibility (number of times seen, number of viewers, duration of view, focal point sensitivity, slope and aspect relative to viewer, distance and lighting conditions), existing visual quality (natural form, line, texture and color), and culturally modified (man-made) form, line, texture and color. The weighting of VAC factors is provided on Table 5-7.

5.2.8.6 Cultural and Historical Resources (ARM 17.20.1438 (8))

The baseline studies presented in this application are from the original 1989 application. These data will be updated during the development of the EIS and this application will be updated as the data and studies are completed.

a) The baseline cultural resource inventory report for the Hard Rock Operating Permit Application (Greiser, 1989) contains paleontological, prehistorical and historical overviews for the area including the proposed transmission line corridors. In addition, the baseline report contains the results of SHPO's and Forest Service cultural resource property site file searches. The powerline inventory and baseline areas contains some lands beyond that covered in the mine baseline inventory, therefore additional searches were requested from SHPO (Appendix E) and the Kootenai National Forest. The properties previously recorded in and near the study area appear to be representative of potentially significant types. The mine baseline inventory covered approximately 40% of the proposed transmission line corridors and inventories conducted by the Forest Service have covered another 5%.

b) The existing data base, in the form of inventories undertaken by HRA (Greiser, 1989), the Forest Service and other cultural resource personnel (see bibliography), is more than adequate for defining and anticipating the occurrence of potentially significant paleontological, prehistoric and historical properties or sites.

c) Prehistoric cultural resource property types which are likely to be encountered in the area include short-term campsites and cambium-peeled or scarred trees. These are most likely to occur in the West Fisher drainage and because of the rarity of campsites in the general area they would be significant if they contained intact cultural deposits. Historic property types likely to occur in the area include mines, which may include buildings or foundations, as well as adits or exploration pits; townsites which would consist of foundations plus trash dumps; roads or trails which provided access to the towns and mines; various mine related features such as flumes or ditches which carried water to hydraulic operations or isolated exploration pits; temporary camps, roads and railroads associated with late 19^{th} and early 20^{th} century logging; and properties such as fire lookouts, guard stations and ranger stations associated with historic Forest Service activities in the area. Most historic property types recorded to date in the general area have lacked integrity and were not considered to be of significant value to historic research. However, if historic properties contain intact buildings, foundations or dumps with materials greater than 50 years old, they may be considered significant.

d) A map (Exhibit 13) has been prepared showing the location and extent of previous cultural resource surveys and any properties located, with an indication of level of intensity, year of survey, sponsor, report reference, type of resource, and property boundaries, if available.

5.2.9 Selection of Alternative Routes (ARM 17.20.1439)

Alternative route segments have been identified for each of the study corridors as shown on Exhibits 2 and 6. Because the corridors are short, narrow and topographically constrained, the route alternatives are generally short segments. Alternative route segments have been identified in areas where wildlife, soils, property ownership or visual resource values have indicated potential conflicts. Alternate routes were selected as part of the interdisciplinary assessment process described in Section 5.2.12. Route segments have been identified on Exhibit 6 to allow discussion of individual segments in this application.

5.2.10 Baseline Study (ARM 17.20.1440)

5.2.10.1 <u>Baseline Study Area</u>

The baseline study was designed to cover the three study corridors and the various alternative routes within the corridors described in Section 5.2.9. Baseline data, utilized to select a preferred route, includes information presented in Sections 5.2.2 through 5.2.8 and 5.2.11.

5.2.10.2 <u>Route Mapping</u>

Route locations are shown on Exhibit 6 to within one-tenth mile of anticipated final location on 1:24,000 scale maps.

5.2.10.3 <u>Overlays</u>

Overlays of the baseline interdisciplinary information were supplied to DEQ with the submittal of the 1989 application, as well as paper copies of the various baseline study disciplines included in this application.

5.2.10.4 <u>Aerial Photos</u>

Current available aerial photos includes 2003 NAIP photography, however, this data does not cover the entire study area. Available aerial photos to cover the remainder of the study area includes DOQQ black & white photography dated 1995.

5.2.10.5 <u>Compliance with all Standards, permit requirements, and implementation plans</u>

To the best knowledge of the applicant, this application in conjunction with the Hard Rock Operating Permit Application contains adequate information to allow the DEQ to evaluate all necessary permits and plans for the proposed transmission line.

5.2.10.6 <u>Sensitive Areas and Areas of Concern</u>

This data is currently being reviewed to ensure consistency with the previous analyses. The data will be updated, as required, as part of the EIS process by either MMI or the EIS contractor.

Sensitive areas and areas of concern crossed by each alternative route were evaluated in the comparison of alternative routes and are shown on Figure 5-1 (see Section 5.2.12).

5.2.10.7 <u>Mitigation Measures</u>

The Certificate of Environmental Compatibility and Public Need, issued in 1993, stated that Appendix F and Appendix H of the 1992 Final EIS were made part of the issued certificate. These mitigation measures are incorporated into the Project for the preferred route of North Miller Creek. Appendix F and H, of the Final EIS are included as Appendix G within this application.

5.2.11 Baseline Data Requirements and Impact Assessment (ARM 17.20.1444)

5.2.11.1 Land Use

This data is currently being reviewed to ensure consistency with the previous analyses. The data will be updated, as required, as part of the EIS process by either MMI or the EIS contractor.

a) There are no platted subdivisions within one mile of any of the alternative routes.

b) There are no major public buildings within one mile of any of the alternative routes.

c) There are no pipelines eight inches or greater in diameter on any of the alternative routes.

5.2.11.2 Construction Manpower

Total manpower required for the construction of the 230 kV transmission line is estimated to be a 23-man crew as follows.

MANPOWER:

1 Foreman

DIGGER CREW

1 Linesman

1 Operator

2 Helpers

BOOM TRUCK AND POLE TRUCK

2 Operators

2 Helpers

CLEARING CREW

1 Truck driver

1 Boom operator

2 Helpers

1 Bulldozer operator

SETTING POLES, FRAMING AND STRINGING WIRE

1 Boom operator

2 Linemen (in bucket trucks)

2 Linemen (on poles)

4 Helpers

All three routes would require approximately the same size construction crew and equipment. The size of the crew would depend somewhat on the construction schedule; this crew estimate is based on the proposed construction time schedule (Figure 2-18).

5.2.11.3 Land Use Impacts

This data is currently being reviewed to ensure consistency with the previous analyses. The data will be updated, as required, as part of the EIS process by either MMI or the EIS contractor.

The major land uses along the alternative powerline corridors are logging, mining, recreation, ranching and summer homes. Agricultural use is mainly along the Fisher River and would not be impacted by the powerline. There is no industrial use along any of the corridors. Logging is the principal commercial use, taking place in both private land and USFS land. There are no residential developments or residential clusters along any of the routes, but there are individual summer and year-round residences.

Table 5-4 lists the different USFS Management units along each route. The amount of the private land crossed by each route is also shown. The private land crossed on all routes is quite similar with the West Fisher Creek Alternative crossing the most private land, 8.5 miles; Miller Creek Alternative and Midas Creek Alternative both cross 6.96 miles of private land, all of which is Plum Creek owned. The Swamp Creek Alternative crosses 6.30 miles of private land and Swamp Creek Alternative A crosses 6.21 miles of private land, all of which is Plum Creek owned. The West Fisher Creek Alternative crosses three different privately owned land units and a small segment of state lands (.15 miles) in addition to the USFS land.

The powerline could preclude timber harvest in some areas beyond the proposed 100-foot right-of-way if special logging equipment was needed such as jammer poles. The powerline would not affect mining use. The powerline could affect recreation use by its visibility if it intruded on an individual's outdoor experience. The powerline would be visible from several residences and could impact perceived quality of life.

There are no significant differences in potential impacts between any of the alternatives routes to existing land uses. The visibility of the powerline would be the major impact to recreational and residential use.

5.2.11.4 Social Impacts

This data is currently being reviewed to ensure consistency with the previous analyses. The data will be updated, as required, as part of the EIS process by either MMI or the EIS contractor.

The construction crew for the powerline is a temporary and relatively small percent of the new employment for the construction of the mine. Most of the skilled labor required for the construction of the powerline would be brought in by the contractors building the powerline. The powerline would take approximately six months to construct and workers would not significantly affect any public or private services. Temporary influx of construction workers and the long-term taxable value of the powerline would bring increased revenues to Libby and Lincoln County. Social and economic impacts of the entire mine project will be addressed in detail by the Hard Rock Impact Plan. There are no significant differences in social impacts among the three corridors and associated routes.

5.2.11.5 Public Concerns

The concerns and attitudes of landowners within one mile of any of the alternatives routes are described in Section 5.2.8.5 of this application. Section 5.2.8.5 describes both the public outreach program completed in 1989 and the current 2005 public involvement meetings and outreach.

Primary local public concerns are visibility of the powerline from the crossing of private lands.

5.2.11.6 Access Roads

The access roads leading to the 230 kV transmission line pole sites will be temporary primitive roads and will be reclaimed immediately after construction of the 230 kV line. The roads will be 12 feet in width and will be cleared of all trees and shrubs. All market value trees will be removed for sale and tree trash and cleared shrubs will be placed on the downhill side of the road for erosion control. Where a blade must be used to facilitate road construction, the topsoil will be moved to the uphill side of the road. BMPs and mitigation measures, listed in Appendix G, will be adhered to during road construction and reclamation of disturbed areas. The final phase of reclamation will be to disc the access roads and to reseed with a native grass and forb seed mix. The road prism will remain to allow for maintenance access, and emergency access if needed. MMI will coordinate with the USFS to limit access to roads by installation of berms or gates as necessary.

Access road construction requirements for each of the three corridor alternatives have been determined by a preliminary engineering evaluation which assumed pole location for the primary route for each alternative. The estimated amount of temporary road construction for each of the three alternatives is as follows:

1. Miller Creek Option = 3.1 miles
2. Midas Creek Option = 4.3 miles
3. Fisher Creek Option = 4.7 miles
4. Swamp Creek Option = 4.3 miles

The percentage of access roads requiring blading is as follows:

Swamp Creek Option	56%
Fisher Creek Option	39%
Midas Creek Option	59%
Miller Creek Option	68%

This data was generated by manually setting pole locations on the base line map using Autocad. Once the pole locations were made, a line was drawn from the pole location to the nearest existing road. The distance from the pole to the nearest road was obtained and these access road segments added for each of the alternatives.

Land Use	Miller Creek	West Fisher Creek	Midas Creek	Swamp Creek	Swamp Creek A
Management Unit 2 (miles)	1.71	1.71	2.06	1.71	1.71
Management Unit 11 (miles)	1.76	0	2.54	2.29	2.29
Management Unit 12 (miles)	2.15	1.35	0	1.67	1.67
Management Unit 13 (miles)	0.47	0.89	0.53	0.19	0.59
Management Unit 14 (miles)	1.02	3.09	2.86	1.63	0.99
Management Unit 15 (miles)	0.25	0.33	3.3	0.66	1.84
Management Unit 16 (miles)	1.42	1.42	0.19	0.95	0.44
Management Unit 17 (miles)	0	0	0.13	0.25	0.25
Management Unit 18 (miles)	0	0	1.06	1.16	0.2
Management Unit 19 (miles)	0	0	0	0.23	0.59
USFS Recreation Area (miles)	0.47	0.47	0	0.32	0.25
Private Land (miles)	6.96	8.5	6.96	6.21	0.34
State Land (miles)	0	0.15	0	0	6.21
Total Route Mileage	16.21	17.91	19.72	17.27	17.17

Table 5-4. Land Use Along Each of the Powerline Alternatives

5.2.11.7 Soils – Wind and Water Erosion Risk, Mass Movement Potential and Reclamation Constraints

This data is currently being reviewed to ensure consistency with the previous analyses. The data will be updated, as required, as part of the EIS process by either MMI or the EIS contractor.

The baseline studies presented in this application are from the original 1989 application. These data will be updated during the development of the EIS and this application will be updated as the data and studies are completed and if updated or more current data exists.

Earth resource information for the study area is the Land System Inventory of the Kootenai National Forest by Kuennen and Gerhardt (1984). The land type units developed under this system within the study area are mapped on Exhibit 9 and a general description of each land type is presented in Table 5-5. Further detail about each land type can be obtained from Kuennen and Gerhardt (1984). The land types which have serious erosion or mass movement potential and severe reclamation constraints are also shown on Exhibit 9. Table 5-6 lists the characteristics of the land types which pertain to erodibility, road suitability, sediment delivery and revegetation potential. These characteristics are discussed further in the follow description of each alternative corridor.

Miller Creek Alternative: The proposed route begins at Pleasant Valley and follows the east side of Fisher River along the boundary of land types 101 (floodplain) and 301 (glacial till) and 101 and 112 (terrace). The steep Sideslopes within land type 112 are poorly suited to construction because of the high erodibility of the silty, lacustrine soil. In addition, the land type is characterized by small rotational failures and cutbank slumping. Past history of road cut and fill failure indicates a high cost for road maintenance. Road surfaces may be dusty when dry and rutted when wet. Steep cut slopes and compacted areas may be difficult to revegetate but otherwise there are few constraints to reclamation. Many of the potential hazards associated with this land type can be mitigated by avoiding construction on steep slopes and using existing access roads.

The bottomland alluvial soils of land type 101 along the Fisher River are subject to flooding and a seasonally high water table which may limit construction. The main concerns with this land type are the protection of stream banks and channels, limiting sediment production and protection of wetlands.

The last mile of the route along the Fisher River falls along the boundary between land type 101 and 252. Land type 252 is characterized by steep slopes (greater than 60 percent), erodible soils formed in volcanic ash-influenced loess and rocky outcrop. The steepness of the slopes makes road construction and revegetation difficult and contributes to high sediment delivery efficiency. The use of an existing access road can mitigate most of the potential impacts.

At Miller Creek, the route turns west and runs for four miles on gentle slopes on the north side of the creek. The first mile is on land type 108 which is a mixed unit of alluvial and lacustrine deposits overlain by volcanic ash-influenced loess. The soils are moderately suited to construction although they are highly erodible and tend to slump on steep slopes. The bearing strength of the laustrine sediments is low. Use of the existing road will mitigate hazards. The next mile is on an upper terrace of Miller Creek (land type 103) which has few constraints to development. The next two miles border between land type 302 and the lacustrine sediments of land type 112 (previously discussed). Land type 302 has no serious constraints to development. The slope in this section is gentle which reduces the potential impact and there is an existing access road.

From the confluence of the North and South Forks of Miller Creek, and over the divide toward Howard Lake, the route lies on mountain side-slopes of land types 352 and 355. The alternative routes around Howard Lake are also within these land types. These soils have volcanic ash-influenced surface layers overlying dense glacial tills. Land type 355 also contains approximately 25 percent rock outcrop. These two land types do not have significant constraints to construction other than slope steepness which may result in raveling of cut slopes and related difficulty of revegetation.

The northern alternative route around Howard Lake continues within land types 352 and 355. As this route turns north toward Ramsey Creek and continues into that drainage, it alternates between land types 352 and 407. In passing the hill immediately south of Ramsey Creek, land type 408 on the slope-side should be avoided due to extreme steepness and the potential for debris slides. Land type 407 occurs in the bottom of U-shaped glacial valleys. The soils have formed in volcanic ash-influenced loess overlying glacial till. The till is a gravelly sandy loam which tends to ravel on steep cut slopes by otherwise there are no serious constraints to construction.The southern alternative route around Howard Lake continues in land types 352 and 355 until it joins the northern alternative at Ramsey Creek as described above.

Midas Creek Alternative: This alternative route is the same as the Miller Creek route up to a point approximately three miles west of the mouth of Miller Creek. Here the route turns northwest up to a tributary and is within land type 112 which has erosion and mass movement hazards previously described. Beyond the tributary drainage, the route crosses land types 352, 355 (previously described), 353 and 360. Land type 353 is very similar to 352 and 355 but has a higher proportion of rock outcrop. It has no serious constraints to construction. Land type 360 occurs on rounded ridge tops where rock outcrop and extremely stony material limit revegetation. Over 50 percent of the surface is rock outcrop.

Land type 323 is within the Midas Creek drainage. This land type consists of calcareous glacial fills in mountain foothills and is moderately erodible but has no serious constraints to development. The route crosses Libby Creek over land types 102 and 322. Land type 102 contains terraces formed by silty lacustrine sediments. The soils are highly erodible, cut slopes slump easily, and the bearing strength of the material is low. Road surfaces tend to be dusty when dry and rutted when wet. Mitigation can be achieved by avoiding soil disturbance on or adjacent to stream banks. The route turns south toward Ramsey Creek within land type 322.

Table 5-5 Map Unit Descriptions
(Adapted from Kuennen and Gerhardt 1984).

Map Unit Symbol	Map Unit Name	Physiography	Slope % Elev Ft	Parent Material	Soil Components Classification	Family	Rock Outcrop %
101	Fluvents, Flood Plains	Alluvial Lands	0-10 1800-4200	Alluvial Deposits	Fluvents	NA	0
102	Andic Dystrochrepts, Lacustrine Substratum	Lacustrine Terraces	0-15 2000-3000	Glacial Lake Deposits	Andic Dystrochrepts	Fine-Silty, Mixed, Frigid	0
103	Andic Dystrochrepts, Alluvial Terraces	Alluvial Terraces	0-15 200-3500	Glacial Lake Deposits	Andic Dystrochrepts	Loamy-Skeletal, Mixed, Frigid	0
104	Andic Dystrochrepts Andaquic Haplumbrepts Somewhat Poorly Drained Complex, Glacial Till Substratum	Knolls And Sinkholes	5-35 220-4200	Glacial Drift Precambrian Belt Group	Andic Dystrochrepts Andaquic Haplumbrepts	Loamy-Skeletal, Mixed, Frigid Fine-Silty, Mixed Frigid	5
105	Fluventic Umbric Dystrochrepts, Wet Meadows	Alluvial Lands	0-10 2000-4500	Alluvial Deposits	Fluventic Umbric Dystrochrepts	Loamy-Skeletal, Mixed, Frigid	0
106	Andic Dystrochrepts, Glacial Outwash Substratum	Outwash Terraces	0-15 2000-4000	Outwash Deposits	Andic Dystrochrepts	Sandy-Skeletal, Mixed, Frigid	0
108	Andic Dystrochrepts And Typic Dystrochrepts, Lacustrine And Alluvial Substratum	Lacustrine And Alluvial Terraces	0-15 2200-3700	Glacial Lake And Alluvial Deposits	Andic Dystrochrepts Typic Dystrochrepts	Fine-Silty, Mixed, Frigid Fine-Silty, Mixed, Frigid	0

Table 5-5 Map Unit Descriptions
(Adapted from Kuennen and Gerhardt 1984).

Map Unit Symbol	Map Unit Name	Physiography	Slope % Elev Ft	Parent Material	Soil Components Classification	Family	Rock Outcrop %
112	Eutric Glossoboralis, Clayey, Lacustrine Substratum	Clayey Lacustrine Terraces	0-25 2200-3600	Glacial Lake Deposits	Eutric Glossoboralis	Fine, Illitic	0
252	Andic Dystrochrepts, Steep	Structural Fluvial Breaklands	>60 3100-4600	Precambrian Belt Group	Andic Dystrochrepts	Loamy-Skeletal, Mixed, Frigid	5-15
301	Typic Eutrochrepts, Glacial Till Substratum	Glaciated Mountain Slopes	15-35 2400-3800	Precambrian Belt Group	Typic Eutrochrepts	Loamy-Skeletal, Mixed, Frigid	<5
302	Typic Eutrochrepts, Glacial Till Substratum	Glaciated Mountain Slopes	20-60 3000-4200	Precambrian Belt Group	Typic Eutrochrepts	Loamy-Skeletal, Mixed, Frigid	5-15
303	Lithic Dystrochrepts – Rock Outcrop Complex, South Aspects	Glacially Scoured Ridge Tops And Ridge Noses	15-35 3500-4700	Precambrian Belt Group	Lithic Dystrochrepts	Loamy-Skeletal, Mixed, Frigid	>50
322	Typic Glossoboralis, Volcanic Ash Surface	Glaciated Mountain Slopes	15-35 2500-4500	Tertiary And Precambrian Rock	Typic Glossoboralis	Fine, Illitic	<5
323	Typic Eutroboralis, Calcareous Glacial Till Substratum	Glaciated Mountain Foothills	15-35 2500-4500	Precambrian Belt Group	Typic Eutrochrepts	Fine-Silty, Mixed	<5
351	Andic Dystrochrepts, Glacial Substratum, Stream Dissected Slopes	Glaciated Drainage Heads And Mountain Sideslopes	30-60 3000-5000	Precambrian Belt Group	Andic Dystrochrepts	Loamy-Skeletal, Mixed, Frigid	10
352	Andic Dystrochrepts, Glacial Till Substratum	Glaciated Low Relief Mountain Sideslopes	20-60 2200-5200	Precambrian Belt Group	Andic Dystrochrepts	Loamy-Skeletal, Mixed, Frigid	<5

Table 5-5 Map Unit Descriptions
(Adapted from Kuennen and Gerhardt 1984).

Map Unit Symbol	Map Unit Name	Physiography	Slope % Elev Ft	Parent Material	Soil Components Classification	Family	Rock Outcrop %
353	Andic Cryochrepts – Lithic Cryochrepts – Rock Outcrop Complex, Rolling Ridges	Glacial Scoured Ridge Tops	15-35 3500-5500	Precambrian Belt Group	Andic Cryochrepts Lithic Cryochrepts	Loamy-Skeletal, Mixed Loamy-Skeletal, Mixed	25-50
355	Andic Dystrochrepts – Rock Outcrop Complex, Very Cobbly Substratum	Glacially Scoured Valley Sideslopes	20-50 3000-5200	Precambrian Belt Group	Andic Dystrochrepts	Loamy-Skeletal, Mixed, Frigid	0-25
381	Andic Dystrochrepts, Thin Glacial Till Substratum, Stream Dissected Slopes	Glaciated Drainageheads And Sideslopes	30-60 3000-5000	Precambrian Belt Group	Andic Dystrochrepts	Loamy-Skeletal, Mixed, Frigid	5-15
401	Andic Dystrochrepts Lithic Cryochrepts – Rock Outcrop Complex, Glacial Trough Walls Headwalls	Glacially Scoured Trough Walls	>60 4200-7000	Precambrian Belt Group	Andic Cryochrepts Lithic Cryochrepts	Loamy-Skeletal, Mixed Loamy-Skeletal, Mixed	>40
403	Rock Outcrop – Andic Cryochrepts – Lithic Cryochrepts complex, cirque	Alpine Ridges and Glacial Headwalls	>60 5500-8000	Precambrian Belt Group	Andic Cryochrepts Lithic Cryochrepts	Loamy-Skeletal, Mixed Loamy-Skeletal, Mixed	50-80

Table 5-5 Map Unit Descriptions
(Adapted from Kuennen and Gerhardt 1984).

Map Unit Symbol	Map Unit Name	Physiography	Slope % Elev Ft	Parent Material	Soil Components Classification	Family	Rock Outcrop %
404	Andic Cryochrepts, glacial till substratum	Alpine Basins and Sideslopes	>60 4500-6500	Precambrian Belt Group	Andic Cryochrepts Lithic Cryochrepts	Loamy-Skeletal, Mixed Loamy-Skeletal, Mixed	50-80
405	Andic Cryochrepts – Lithic Cryochrepts complex, subalpine ridges and basins	Frosted Churned Alpine Slopes and Ridgetops	15-50 5500-8000	Precambrian Belt Group	Andic Cryochrepts Lithic Cryochrepts	Loamy-Skeletal, Mixed Loamy-Skeletal, Mixed	15-25
406	Andic Cryochrepts, warm	Frosted Churned Alpine Slopes	15-50 5400-7000	Precambrian Belt Group	Andic Cryochrepts	Loamy-Skeletal, Mixed	5-15
407	Andic Cryochrepts, glacial till substratum	Alpine Glacial Moraines	5-20 3500-5500	Precambrian Belt Group	Andic Cryochrepts Lithic Cryochrepts	Loamy-Skeletal, Mixed Loamy-Skeletal, Mixed	0-10
408	Andic Cryochrepts, glacial till substratum, steep	Steep Valley Sideslopes and Truncated Spurs	>60 2500-5500	Precambrian Belt Group	Andic Cryochrepts	Loamy-Skeletal, Mixed	5-20

Map Unit	Soil Erodibility		Roads		Sediment Delivery	Regeneration		Revegetation
Symbol	Surface	Subsurface	Suitability	Limitation	Efficiency	Potential	Limitation	Potential
101	high	moderate	fair	excess water	low	high	frost, gravelly	fair
102	high	high	poor	slumping	low	high	---	good
103	high	moderate	good	---	low	high	shallow soil	fair
104	high	moderate	fair	high water table	moderate	high	---	good
105	high	moderate	poor	excess water	low	NA	NA	very poor
106	high	moderate	good	---	low	high	shallow soil	fair
108	high	high	fair	slumping	low	high	---	good
112	high	high	poor	slumping	low	high	boggy areas	good
252	moderate	moderate	poor	steep slopes	high	moderate	wet soils	fair
301	moderate	moderate	good	---	moderate	moderate	soil moisture	fair
302	moderate	moderate	fair	slumping	moderate	moderate	soil moisture	fair
303	moderate	moderate	fair	non-rippable	NA	poor	NA	poor
322	high	high	good	---	moderate	high	---	good
323	moderate	moderate	fair	steep slopes	moderate	moderate	---	good
351	high	moderate	poor	slope stability	high	high	---	fair
352	high	moderate	good	steep slopes	moderate	high	---	good
353	moderate	moderate	fair	bedrock	low	moderate	short growing season, shallow and rocky soils	poor
355	high	moderate	fair	rock outcrop	moderate	high	---	good
381	high	moderate	fair	slumping	high	high	---	good
401	high	low	poor	steep slopes	high	slight	shallow, rocky soil	very poor
403	high	low	poor	slope stability	high	very poor	shallow, rocky soil; short growing season; frost heave	very poor
404	high	moderate	good	---	moderate	high	short growing season; frost heave; high rock content	fair-low
405	high	low	fair	bedrock	moderate	very poor	short growing season: frost heave; high rock content	fair
406	high	moderate	good	---	moderate	moderate	short growing season; frost heave; high rock content	fair
407	high	moderate	good	---	moderate	slight	---	poor
408	high	moderate	poor	steep slopes, non-rippable	high	moderate	short growing season	poor

Table 5-6. Map Unit Interpretations
(adapted from Kuennen and Gerhardt 1984)

This land type is characterized by gentle slopes of dense glacial till overlain by ash-influenced surface horizons. The till has a gravelly, silty clay loam texture. It is moderately suited to construction although it is erodible and tends to slump on cut slopes. Adverse impacts can be mitigated by avoiding construction near drainages. The remainder of the route into Ramsey Creek passes through land types 352 and 407 which have been previously described. Land types 401 and 408 on the north slope of Ramsey Creek will be avoided due to extreme steepness of the slope which contributes to debris slides, erosion and high sediment delivery and difficult revegetation.

West Fisher Creek Alternative: This route follows the Fisher River as described for the Miller Creek alternative until it turns southwest into West Fisher Creek. The land types crossed in the West Fisher Creek drainage are 108, 103, 112 and 352, all of which are discussed above. Land types 103 and 352 have no serious constraints to construction while land types 108 and 112 are highly erodible and land type 112 is prone to slumping and slope failures. Avoidance of steep slopes and use of existing access roads within these land types will mitigate potential impacts. At the junction of West Fisher Creek and Lake Creek, the route crosses a short stretch of land types 103 and 108 (previously described) and continues north within land type 352. The route alternatives between land type 352 and short sections of land type 351 and 381. Both of these land types are characterized by steep slopes with volcanic ash-influenced loess overlying glacial till. They have a history of slope failures and debris slides within channels, so crossings should be carefully evaluated. The steepness of the slopes tends to increase erosion on cut slopes with related difficulty of revegetation. Slope steepness also contributes to high sediment delivery efficiency, so sediment mitigation measures should be used w here road construction crosses drainages. The remainder of the route alternative section into Ramsey Creek is described under the Miller Creek Alternative section.

Swamp Creek Alternative: The Swamp Creek route also follows the Fisher River north as described for the Miller Creek alternative and then extends past Miller Creek approximately one mile further along Fisher River through land type 102. Land type 102 contains terraces formed by silty lacustrine sediments. The soils are highly erodible, cut slopes slump easily and the material exhibits a low bearing strength. The route then turns northwest for approximately three miles through land types 101, 108, 355 and 352. Approximately half of this segment passes through land type 108 which is a highly erodible unit containing lacustrine and alluvial terraces. The route then turns west for about three miles through land types 352, 355 and 360. Land types 352 and 355 have no serious constraints to construction; however land type 360 occurs on round ridge tops where rock outcrops and extremely rocky materials limit revegetation. At this point, in land type 360, the alternative splits into two options that continue generally westward to the Ramsey Creek drainage. The main Swamp Creek option (Option A) dips to the southwest, and then back to the northwest through land types 352, 355, 103, 322 and 407. This option dips to the southwest to avoid the tremendous relief encountered in Swamp Creek Option A that travels west through the top of the Midas Creek drainage then back up over the divide into the Libby Creek and Ramsey Creek drainages. Option A also travels through land types 352, 355, 103, 322 and 407. All of these land types are fairly well suited for construction although land type 322 is erodible and tends to slump on cut slopes. This land type is characterized by gentle slopes of dense glacial till overlain by ash-influenced surface horizons. The till has a gravelly, silty clay loam texture. The two options of the Swamp Creek Alternative then rejoin at Ramsey Creek and will proceed southwest to t he mine site through land type 407. Land types 401 and 408 on the north slope of Ramsey Creek will be avoided as discussed for the Midas Creek alternative.

5.2.11.8

Engineering

a) Structure construction and right-of-way consideration for all three alternatives are such that the single circuit transmission line could be upgraded to a double circuit line if future considerations required this unanticipated upgrade. The three alternatives considered would not have any differences which affect the ability of this line to accommodate an additional circuit. The right-of-way width would have to be modified if an additional line were installed.

b) All three alternates require the same type of structure, which is a steel monopole.

c) Since the transmission line pole construction is steel monopole and requires less maintenance than wood pole construction, maintenance roads will not be necessary after the transmission line construction phase. Inspection and repair of the line will be accomplished by helicopter.

d) There are no other utilities, communication facilities, or any other type of facility in the area which would be expected to experience interference from a transmission line in any of the corridor alternative.

e) Perennial stream floodplains in the study area are shown on Exhibit 4. As FEMA (Federal Emergency Management Agency) mapping is not available for these drainages, the floodplains were determined by examination of aerial photography and from Kootenai National Forest land type mapping (Kuennen and Gerhardt, 1984). The floodplain on the Fisher River is delineated by the Forest Service's land type unit 101 which is described as "recent floodplain". Examination of the air photos shows that the area within this land type along the Fisher River also includes the first terrace above the river. This is the only occurrence of land type 101 in the study area. Floodplains on the other drainages in the study area were determined from air photos and U.S.G.S. topographical maps. Areas mapped as floodplain are gravel and cobble filled segments which do not support significant vegetation. With the exception of West Fisher Creek and portions of Miller Creek and Libby Creek, most of the stream reaches are narrowly incised and do not have a floodplain wide enough to define on a 1:24,000 scale map.

The 100-year flood discharge for nine stream reaches in the study area is shown below, and was calculated using the method of Omang et al., (1986) for the west region of the state. The locations of these reaches are shown on Exhibit 4.

STREAM	100 YEAR PEAK DISCHARGE (cfs)
Fisher River at Miller Creek	4,665
West Fisher Creek at mouth	1,820
West Fisher Creek at Lake Creek	1,083
Standard Creek at mouth	367
Miller Creek at mouth	305
Midas Creek at mouth	215
Howard Creek at mouth	285
Libby Creek at Howard Creek	618

STREAM	100 YEAR PEAK DISCHARGE (cfs)
Ramsey Creek at mouth	487

Construction of poles on active floodplains would be avoided as the meandering and occasionally braided nature of the streams would erode pole foundations over time. Construction or disturbance related to access roads would also be minimized on active floodplains to minimize the amount of sediment which would enter the stream during annual runoff. Stream reaches with steep cutbanks would be avoided to prevent slumping, excessive erosion and sedimentation.

Following is a list of the number of perennial stream crossings required by each alternative route and the approximate number of miles adjacent to a perennial stream for each route.

Route	Number of Perennial Stream Crossings	Miles Adjacent to Perennial Stream
West Fisher Creek	8	4.4
Miller Creek	7	3.4
Midas Creek	5	2.9
Swamp Creek	5	3.6
Swamp Creek Alternative A	5	3.6

The Miller Creek alternative involves fewer stream crossings and fewer miles adjacent to a perennial stream than the other two alternatives. The magnitude of potential flood discharge is substantially less in Miller and Midas Creeks than in West Fisher Creek.

f) There are no designated flight corridors in the study areas and no significant aeronautical hazards would occur from construction of a transmission line in any of the alternative corridors.

5.2.11.9 Visual Resources Characteristics

The baseline studies presented in this application are from the original 1989 application. These data will be updated, as required, during the development of the EIS and this application will be updated as the data and studies are completed.

The visual resources investigation addressed an area of visual influence containing the proposed alternative transmission line corridors and activities associated with the construction and operation of a 230 kV transmission line. Regional inventories were prepared as described in Section 5.2.8.6. Exhibits 10, 11 and 12 provide specific visual information covering the same topic inventories for each of the alternative study corridors. Table 5-3 is a summary of the visual resource inventory for alternative segments.

With the assistance of the Forest Service, Key Observation Points (KOPs) were identified for the corridor study (Exhibit 12). KOPs are representative viewing locations in the study area. Table 5-7 (Key Observation Points) summarizes the visual information for 17 KOPs. Each KOP has been assigned a sensitivity level by the Forest Service based upon number of viewers, type of viewers, and viewer expectation. KOP viewer position of superior (above), normal (same level) or inferior (below) relative to the alternative corridor location are identified. All KOPs within the Cabinet Mountain Wilderness are superior positions. Howard Lake and a portion of U .S. Highway 2 and USFS 231 are inferior positions. Other portions of U.S. 2 and USFS 231 are normal. Duration of view is defined as long- or short-term based upon the type of viewing activity characteristic of the KOP. Short view duration generally occurs along travel routes without vista points. Long view duration occurs with recreational activities, hiking trails, and travel routes having vistas, scenic overlooks, or focal points.

For each KOP, the viewing area or viewshed was inventoried for the landscape's physical effectiveness to screen modifications topographically or by use of vegetation – variety, pattern, height and/or density. The study area was separated into seven visual absorption capability (VAC) units. These are described below and displayed on Exhibit 10.

1) Cabinet Canyons – High VAC

Topography characteristics have high diversity. There is a high diversity of vegetation types or classes. Soils provide for a moderate productivity and relatively short-term vegetation recovery period. Viewer position is inferior; focal points are strongly oriented toward the Cabinet Mountains Wilderness. The foreground is screened to the uphill side.

2) Cabinet Shoulders – Low VAC

Topography is primarily steep slopes and low diversity. Vegetation is generally homogeneous variety, low diversity and solid timber canopy. Soils provide a moderate productivity. Viewer position is inferior. Intermittent views break up view duration. Focal points of Cabinet Mountain Wilderness are strong. There are strong perpendicular views of slopes.

3) Intermountain Valley Floor – Moderate to High VAC

Topography consists of gentle slopes and valley plains. There is a diversity of vegetation classes, colors and heights caused by timber harvesting activities. Soils are very productive and offer rapid revegetation potential. Viewer position is normal. Generally, vegetation screening is in the foreground. Views are parallel to the slope. Strong adjacent scenery dominates visual interest.

4) Open Mountain Faces – Moderate to High VAC

Topography is steep and contains well dissected slopes. Vegetation diversity is evident in class and color. Soil productivity is lower with slow vegetation recovery. Soil color surface to subsurface is darker to lighter. Viewer position is inferior and views are perpendicular to the slope. This VAC unit contains secondary focal points.

5) Riparian Valley – High VAC

Topography is characteristic of gentle slopes; this unit has low diversity, is poorly dissected and has linear orientation. High diversity of vegetation is displayed in class, color and variety of pattern. Steep mountainside slopes provide a strong canyon enclosure. Soils are productive with rapid vegetation recovery. Viewer position is normal. Foreground vegetation screening is common. Man-made modification dominates many areas of the foreground view.

6) Vegetated Mountain Faces – Moderate VAC

Topography is generally characterized by steep slopes with scattered pockets of dissected slopes. Vegetation contains a low diversity of classes and heights. Soils are productive with good vegetation recovery. Viewer position is inferior with views perpendicular to slope. Northern portions of VAC unit contain dominant man-made modifications.

TABLE 5-7 KEY OBSERVATION POINTS INVENTORY SUMMARY

KOP	VISUAL SENSITIVITY LEVEL	VIEW POSITION	VIEW DISTANCE	DURATION OF VIEW	VIEWSHED VQO	VIEWSHED VAC
Snowshoe Peak	H	Superior	BG	Long	R	M/H
Bald Eagle Peak	H	Superior	MG/BG	Long	R	M/H
Libby Lakes	H	Superior	MG/BG	Long	R	M/H
Howard Lake	H	Inferior	FG	Long	R	M
Divide Trail	H	Superior	MG/BG	Long	R	M
Great Northern Mountain	M	Superior	MB/BG	Long	R	M
USFS 231 (NW4S31T28N430W)	M	Normal	FG/MG	Short	R/PR	M/H
USFS 231 (NW4SIT27NR31W)	M	Normal	FG/MG	Short	R	M/H
USFS 231 (North Vista Point)	M	Superior	FG/MG	Short/Long	M/PR	M/L
USFS 231 (South Vista Point)	M	Superior	FG/MG	Short/Long	M/PR	M/L
Libby Divide Trail	M	Normal/ Superior	FG/MG	Short/Long	R/M	M/H
U.S. Highway 2 (Fisher River Crossing)	H	Normal/ Inferior	FG	Short	R/PR	M/H
Libby Divide Trail (near Horse Mountain)	M	Superior	MG	Long	R	L/M/H
Miller Ridge Trail	M	Superior	NG	Long	R/M	M/H
Teeters Peak Trail	M	Superior	NG	Long	M	M/H
Barren Peak Trail at Barren Peak	M	Superior	NG	Long	R/PR/M	M/H
West Fisher Creek at Barren Peak Trailhead	M	Normal	FG/NG	Short/Long	M/PR	M/H

H = High
M = Moderate for Visual Sensitivity Level and Viewshed VAC, and Modification for Viewshed VQO
L = Low
FG = Foreground
MG = Middleground
BG = Background
R = Retention
PR = Partial Retention

Note: The VAC perceptual factors of view position, view distance, duration of view were identified as the major VAC factors. Other perceptual VAC factors identified as moderate included number of times seen, number of viewers, focal point sensitivity, slope relative to viewer and aspect relative to viewer. Low perceptual factors included lighting and seasons.

7) Valley Plain – Moderate to High VAC

Topography is gentle to flat with strong linear orientation. Vegetation contains a diversity of classes, color and, patterns which are largely man-made. Soils are very productive with rapid vegetation recovery. Observer position is normal. Some foreground screening breaks up view duration. Views are parallel to the slop. Foreground focal points include occasional rural settings and scattered dwellings.

The inventories of VQO, VAC and KOPs were synthesized to identify potential areas of impact to the visual resource. Section 5.2.11.10 describes the assessment process and identifies areas of significant impacts for the alternative corridors.

5.2.11.10 Visual Resource Assessment

This data is currently being reviewed to ensure consistency with the previous analyses. The data will be updated, as required, as part of the EIS process by either MMI or the EIS contractor. Potential visual resource impacts are evaluated upon impact significance criteria and methodology established by USFS and consistent with ARM 17.20.1444(10) of the Montana DEQ regulations. Two issues are important in determining impact significance: (1) the type and extent of actual physical contrast, and (2) the level of visibility of a corridor segment with consideration given to the landscape's VQO and capability to absorb or hide the structures. Impact to visual resources is considered significant if the construction and operation of the proposed action would adversely affect: (1) the quality of any scenic resource; (2) any scenic resource having rare or unique values; (3) the view from, or the visual setting of, any designated or planned park, wilderness, natural areas, or other visually sensitive land use; (4) the view from, or the visual setting of, any major travel route; and/or (5) the view from, or the visual setting of, any established, designated, or planned recreation, education, preservation, or scientific facility, use area, activity, and view point or vista. Quality of the visual environment is based on VQO classes. Impacts are determined by comparing the net level of estimated contrast with the visual management guidelines defined for the given VQO class.

The assessment of visual impacts was conducted from selected KOPs at representative locations for potentially viewing the transmission line. Table 5-7 identifies the KOPs recommended for study by the USFS.Levels of impact were based upon VQO and VAC classification of lands crossed by each alternative. None of the alternatives cross Preservation (P) lands; thus, no severe impacts were recorded. Potentially moderate to high impacts would occur in Retention (R) lands of moderate to low VAC factors; low to moderate impacts would occur on Partial Retention (PR) lands of moderate to low VAC factors; low impacts would occur on Modification (M) lands of moderate to high VAC and minimal impacts to lands seldom seen. Impacts were field checked during the Fall 1989.

Table 5-8 displays a summary of visual resource impacts identified for each segment of the alternative corridors.Among the routing alternatives studied the Swamp Creek alternative (Segments A_1, A_2, A_3, T_1, T_2, X, R_3, N_1, N_2 and O) would cause the least number of miles visual impacts. Swamp Creek would have 1.1 miles of high, 2.4 miles of moderate, and 9.35 miles of low visual impacts. Miller Creek (Segments A_1, A_2, A_3, B_1, P_1, P_2, D_2, R_1, R_2, R_3, N_1, N_2 and O) would have the same miles of high impacts, slightly higher moderate impacts and lower low impacts than Swamp Creek. Miller Creek Alternative would cause 1.1 miles of high, 3.45 miles of moderate and 7.4 miles of low impacts. West Fisher Creek Alternative (Segments A, Y, E_1, Q_1, G_2, R_1, R_2, R_3, N_1, N_2, and O) would cause 1.65 miles of high, 4.75 miles of moderate and 4.5 miles of low impacts. The Midas Creek Alternative (Segments A_1, A_2, A_3, C_4, C_1, C_5, C_2, S, N_2 and O) would cause 1.1 miles of high, 2.4 miles of moderate and 9.35 miles of low visual impacts.

		Associated Alternative				Impact Level				
Alternative Segment	Length (Miles)	Miller	Midas	West Fisher	Swamp	Severe	High	Moderate	Low	Minimal
A_1	2.95	X	X	X	X	0	0.7	0.6	0	1.65
A_2	0.9	X	X	X	X	0	0.4	0.5	0	0
A_3	0.4	X	X		X	0	0	0.15	0.25	0
B_1	1.45	X				0	0	0	1.5	9.5
B_2	0.5	X				0	0	0	0.5	0
C_1	3.1		X			0	0	0.4	1.5	1.2
C_2	5.8		X				0	0.3	3.8	1.7
C_3	3.4		X			0	0.6	0.2	2.3	0.3
C_4	0.7		X			0	0	0	0.7	0
C_5	0.25		X			0	0	0.25	0	0
D_1	2.3	X				0	0	0	1.6	0.7
D_2	2.3	X				0	0	0.4	0.35	1.55
E_1	4.15			X		0	0	0	1.55	2.6
E_2	0.35			X		0	0	0	0.1	0.25
F_1	1.55			X		0	0.7	0.45	0.4	0
F_2	1.85			X		0	0	0	1.15	0.7
G_1	0.8			X		0	0	0.3	0	0.5
G_2	1.75			X		0	0.25	0.5	0.7	0.3
H	1.4	X				0	0.4	0.5	0.1	0.4
I_1	0.1	X				0	0.05	0.05	0	0
I_2	1.1	X				0	0	0.1	0.1	0.9
J	1.0	X				0	0.9	0.1	0	0
K	0.5	X		X		0	0	0	0.5	0
L_1	1.65	X				0	0.05	1.2	0	0.4
L_2	0.35	X				0	0	0.15	0	0.2

Table 5-8. Visual Resource Impact Summary

Alternative Segment	Length (Miles)	Associated Alternative: Miller	Midas	West Fisher	Swamp	Impact Level: Severe	High	Moderate	Low	Minimal
M_1	1.3	X		X		0	0	0.5	0.5	0.3
M_2	0.3	X		X		0	0	0.2	0.1	0
N_1	0.1	X		X	X	0	0	0	0.1	0
N_2	1.3	X		X	X	0	0	0	0.3	1.0
O	0.5	X	X	X	X	0	0	0	0	0.5
P_1	1.1	X				0	0	0	1.1	0
P_2	1.45	X				0	0	0	0.51	1.35
Q_1	1.0			X		0	0	0	0	1.0
Q_2	0.9			X		0	0	0	0.3	0.6
Q_3	0.1			X		0	0	0	0	0.1
R_1	0.9	X				0	0	0.9	0	0
R_2	1.5	X				0	0	1.1	0	0.4
R_3	1.05	X			X	0	0	0.9	0.15	0
S	1.8		X			0	0	0.2	1.3	0.3
T_1	6.55				X	0	0	0.1	1.75	4.8
T_2	0.5				X	0	0	0.3	0	0.2
T_3	0.4				X	0	0	0.4	0	0
U_3	2.2				X	0	0	0.5	0.3	1.4
V	3.55				X	0	0.55	2.0	0	1.0
W	1.65				X	0	0	1.2	0.25	0.2
X	0.8				X	0	0	0.4	0.1	0.2
Y_1	2.85		X			0	0	1.85	0.6	0.4
Y_2	2.8			X		0	0	0.85	1.45	0.5

5.2.11.11 Biological Resources Impacts

The baseline studies presented in this application are from the original 1989 application. These data will be updated, as required, during the development of the EIS and this application will be updated as the data and studies are completed.

Intensive studies of fish, wildlife, and vegetation for portions of the alternative powerline corridor routes were conducted by Thompson (1989) and Western Resource Development Corporation (1989b). Segments of the corridor not addressed in these reports were surveyed in April 1989. Two low-level helicopter flights in conjunction with on-the-ground reconnaissance were conducted to identify raptor nests, big game winter concentrations, and migration corridors. These flights were conducted on April 7 and April 20, 1989. Each flight was about 4 hours in duration and followed alternative powerline corridors at elevations of 50 to 300 feet above the terrain and trees (see the Hard Rock Mining Application for more details on helicopter surveillance flights). Pedestrian and vehicle surveys were conducted as described in the mine permit application submitted to the Montana Department of State Lands. In addition, vehicle surveys of accessible portions of the route were conducted on April 19, May 10, July 17, and July 18, 1989.

Discussion with USFS and DFWP biologists took place to identify wildlife concerns that may be associated with segments of the alternative corridors.

Wildlife

The most common big game animals occupying the alternative corridors are white-tailed deer, mule deer, and moose. White tailed-deer frequent lower elevations within 1 mile of streambottoms; however, during summer and early fall, they extend their ranges to mid and upper elevations. Old growth closed canopy forests of Douglas-fir and ponderosa pine are important winter ranges in northwestern Montana because the overstory intercepts snowfall thereby keeping the understory shrubs accessible for browsing. In addition, old growth Douglas-fir forests often have relatively large amounts of tree-growing lichens which are important winter food for deer.

Moose are similar to white-tailed deer in distribution. They are common along all the streams near the alternative corridors with their summer and fall distribution extending to the upper elevations in the tree line. Moose seasonally eat both shrubs and forbs, but willow, where available, is a preferred winter food.

Mule deer occur along streambottoms and extend their summer distribution into the alpine. During the winter, mule deer utilize lower elevation ranges with adequate amounts of woody browse plants.

Mountain goats summer on alpine and subalpine cliffs and ridges, and most migrate to slightly lower elevations in the winter. Typically, goat winter ranges are very limited in area and sparse in vegetation with limited carrying capacities. An important feature of mountain goat behavior is their strong desire for salt. Mountain goats will use salt licks during all months of the year to relieve a sodium imbalance related to their seasonal shifts in food habits (Herbert and Cowan, 1971). The desire of goats for salt can lead them into insecure habitat away from escape terrain where they are vulnerable to predation (Interagency Rocky Mountain Front Wildlife Monitoring/Evaluation Program, 1987).

Elk are not as numerous in the study area as deer or moose; however, they are the favored game animal of many hunters. Elk utilize a wide variety of habitats and ingest a greater diversity of plant species than any other North American members of the deer family (Thomas and Bryant, 1987). Over its range, North American elk consume 142 species of forbs, ferns, and lichens; 77

species of grasses and grass-like plants; and 11 species of shrubs and trees (Nelson and Leege, 1982).

Over most of their range, elk are critically dependent upon lower elevation grasslands, shrublands, and open forests as winter range. Winter ranges are linked with higher elevation summer and fall habitats by traditional migration routes. Calving areas are selected in specific types of habitat that provide the required security, temperature conditions, and forage for maximum survival of both calves and cows. Security from both predators and hunting is an important habitat feature that is recognized and managed by wildlife biologists and natural resource management agencies.

In the powerline study area, elk utilize all habitats and elevations during the summer and fall. Fall security habitats (i.e., areas where elk move in response to hunting pressure or remain despite hunting pressure) occur in areas near the upper elevations between the North Fork of Miller Creek and Teeters Mountain (Exhibit 5) (Gerald Brown, personal communication, May 1, 1989).

Most of the black bear in Montana are found in the northwestern part of the state. Although black bears can become habituated to human developments, they thrive best where logging, road construction, agriculture, and other environmental disturbances have not significantly altered their habitat and increased interaction with humans.

Rosgaard (1983) stated that the greatest potential for direct impacts of resource development on black bears occurs in the spring, a critical time when bears must regain weight lost during denning. During the spring, bears spend extended periods feeding on open slopes, and meadows where they are most visible, and therefore, more vulnerable to hunters. Black bears eat a wide variety of both plant and animal foods, but select succulent green forage in the spring after leaving their dens.

The breeding season for black bears also begins in the spring.

The grizzly bear is restricted to mountainous terrain in northwestern Montana and in south central Montana adjacent to Yellowstone Park. The highest population density of the grizzly in Montana occurs in Glacier National Park and in the mountain ranges that extend southward from the Park.

According to Dood et al. (1986), grizzly bear densities varied from 1 bear per 6 square miles in the North Fork of the Flathead River to 1 bear per 19 square miles in the Mission Mountains. On the Rocky Mountain East Front, the average grizzly bear density between 1980 and 1986 was 1 bear per 20 square miles. In the Cabinet-Yaak ecosystem in northwestern Montana, the density of grizzlies is approximately 1 bear per 100 square miles.

Aderhold (1988) reports that the Cabinet Mountain-Yaak River grizzly bear ecosystem comprises approximately 1 million acres and supports 25 to 50 grizzly bears. The Glacier Park-Northern Continental Divide ecosystem encompasses about 6 million acres and has an estimated 549 to 813 bears. The Yellowstone grizzly population inhabits portions of the Gallatin and Beaverhead national forests and has an estimated 200 to 300 animals. The Northern Continental Divide grizzly population is stable and may be increasing; the Cabinet Mountain population is believed to be decreasing; and the Yellowstone population appears to be slightly increasing. In total, the grizzly population in Montana is estimated to be between 600 and 900 animals.

Important grizzly bear habitat includes seasonal use areas (i.e., spring forage areas and fall-winter denning areas) as well as travel corridors between seasonal or alternative feeding areas (Interagency Rocky Mountain Front Evaluation Program, 1987). Travel corridors may be essential to the maintenance of gene flow between various population segments in the Northern Continental Divide ecosystem.

Big game winter ranges are delineated on Exhibit 5. In addition to big game animals, 92 species of breeding birds and more than 20 species of small mammals are reported to occur in the study area (Thompson, 1989). The most common birds, in decreasing order of density, are: robin, dark-eyed junco, song sparrow, chipping sparrow, black-capped chickadee, golden-crowned kinglet, MacGillivray's warbler, Townsend's warbler, Swainson's thrush, orange-crowned warbler, fox sparrow, yellow warbler, and hermit thrush. The greatest number of breeding birds (63) occurs in riparian habitats, followed by spruce-fir habitats (58), shrubfields (57), mixed-conifer stands (50), clear-cuts (48), and western hemlock stands (37).

Eleven raptors (i.e., birds-of-prey) have been observed in the study area – osprey, bald eagle, red-tailed hawk, American kestrel, great-horned owl, barred owl, sharp-shinned hawk, northern goshawk, golden eagle, northern pygmy owl, and great gray owl. Red-tailed hawks and American kestrels were the most frequently observed species.

Waterfowl and shorebirds observed in the study area include mallard, common goldeneye, common mergansers, blue-winged teal, and spotted sandpipers. Wetlands along Libby Creek and Howard Lake are the primary waterfowl habitats in the study area.

Small mammals that occur in the study area are deer mouse, red-tailed chipmunk, red squirrel, snowshoe hare, northern flying squirrel, bushy-tailed woodrat, Gapper's red-backed vole, pika, Columbian ground squirrel, northern pocket gopher, golden-mantled ground squirrel, long-tailed weasel, western jumping mouse, beaver, montane vole, yellow-pine chipmunk, yellow-bellied marmot, muskrat, porcupine, and striped skunk. Carnivores and furbearers in the study area include coyote, marten, mink, wolverine, mountain lion, bobcat, and red fox. Reptiles and amphibians in the study area in clued valley garter snake, wandering garter snake, rubber boa, red-legged frog, tailed frog, boreal toad, and long-toed salamander.

Vegetation

Quantitative information on plant communities was gathered utilizing methods described in the mine application submitted to the Montana Department of State Lands. Qualitative observations were made during reconnaissance surveys of the study area during the spring, summer, and fall. Vegetation was mapped utilizing aerials photographs combined with field reconnaissance. Vegetation units were delineated based on the relative density of dominant overstory and/or understory wood species.

Riparian conifer/cottonwood communities were identified and mapped along drainages were conifers (spruce, hemlock, and western red cedar) and black cottonwood were codominants in the forest overstory. All riparian zones in the study area include conifers as both climax and seral components. Cottonwood density and age are determined by flood frequency and intensity in the drainage. Where relatively large floods have periodically occurred (i.e., along Libby Creek), young cottonwoods are frequent and dominate the lower floodplain and gravel bars along some reaches. In the headwaters of Libby Creek and along smaller streams, flooding does not scour the gravel bars and promote cottonwood growth; therefore, climax conifer species predominate.

Wetlands were identified and mapped following a methodology published by the U.S. Corps of Army Engineers. Wetlands were identified and mapped based on the presence of facultative or obligate wetland plant species as well as on soil and hydrological features. Old growth was mapped by reference to the Kootenai National Forest Plan as well as through field reconnaissance. Old growth stands included those delineated by the U.S. Forest Service in addition to mature stands of hemlock and western red cedar observed along streams in the study area. Old growth cedar and hemlock stands typically had many trees in excess of 24 inches in diameter and had understories with relatively sparse shrub and forb growth. Canopy cover in these stands was usually 100 percent or higher, which created an understory dominated by climax plant species adapted to low light intensities.

Species composition, successional status, and spatial distribution of plant communities of the study area reflect the integrated influences of geography, landform, fire, and past disturbance. The strong influence of geography on the flora is demonstrated by the large number of dominant plants where distribution is directly associated with the Pacific Maritime climatic influence. Oceanic air masses move inland to northwestern Montana providing abundant rain and snowfall and generally humid, cloudy conditions except in midsummer (Arno, 1979). Relatively mild winter temperatures, even at high elevations, allow coastal forest species to survive and become dominant members of the flora (Daubenmire, 1989).

Pacific coastal species which are common components of the vegetation of the study area are: western hemlock, western red cedar, grand fir, mountain hemlock, western white pine, yew, wild ginger, and queen's cup beadlily. A second major floristic element comprising the flora of the study area is characterized by species whose distribution is associated with the Rocky Mountains. These species include: western larch, subalpine fir, Englemann spruce, mountain ash, goldthread, shinleaf, Rocky Mountain maple, beargrass, and menziesia.

Major landforms features that strongly influence environmental conditions and, consequently, plant distribution are elevation, aspect, and slope configuration (Deitschman, 1973). These landform characteristics, in turn, determine soil development, moisture infiltration and retention, evapotranspiration, growing season, wind exposure, and cold air drainage.

Fire has been a major determinant of successional status of plant communities in northwestern Montana. Lightning and human-caused fires have been instrumental in perpetuating the abundance of several species that dominate many sites of the study area (i.e., western larch, lodgepole pine, Douglas-fir, western white pin, bracken fern, ceanothus, and fireweed). Arno and Peterson (1983) reported that fires usually recur about every 6 years in dry ponderosa pine and Douglas-fir communities and about every 40 or more years in subalpine habitats. On wet sites dominated by western red cedar, western hemlock, and Englemann spruce, only 1 or 2 significant fires per century can be expected (Arno and Davis, 1980).

Logging, current the major human influence on the vegetation, began in the early 1900s and reached its "boom years" during and after World War II. Typically, timber is clear-cut and the slash is piled and burned. Seed trees are left standing to promote forest reproduction.

During the 1988 growing season, approximately 306 species of vascular plants were collected and identified from the Montanore Project mine study area including 13 trees, 10 tall shrubs, 35 low shrubs, 9 sub-shrubs, 60 grasses and grass-like plants, 148 forbs, and 31 cryptogams (Western Resource Development Corporation, 1989a). Of the 306 vascular plants identified, 281 (92 percent) are native to northwestern Montana.

Special status plant species (i.e., threatened, endangered, rare, or relatively unknown) that could occur in the study area have been identified by the U.S. Department of Agriculture Forest Service (1988), Lesica et al. (1984), and the Montana Natural Heritage Program (MNHP). The U.S. Fish and Wildlife Service has not listed any federally classified threatened or endangered plant species for Montana, pursuant to the Endangered Species Act.

Sensitive plants were searched for through systematic scrutiny of habitats where various species would be expected to occur. During the course of quantitative data collection and seasonal reconnaissance surveys, all unknown plants were collected and identified. Through extended periods in the field (portions of two growing seasons), observing individual plants, plant association, and habitats, all plants became distinct and recognizable to an experienced botanist.

If some sensitive plants were not reported, it is because they were not observed during intensive observation periods over two growing seasons.

Two sensitive plant species, northern beechfern (*Thelypteris phegopteris*) and wool-grass (*Scirpus cyperinus*), are located within the study area. The northern beechfern has been identified by the Regional Forester as a sensitive species due to a combination of rarity and limited distributions within the Northern Region, and potential habitat loss. The northern beechfern is classified by the MNHP as secure globally, but imperiled in Montana because of rarity within the state. Habitat requirements of dense old growth cedar, high water table, soils with a thick organic surface, and stable braiding streams are limited on the KNF.

Wool-grass also is a USFS-designated sensitive species. Wool-grass grows in the Bear Creek drainage along Libby Creek, and in a wet raidside ditch between Poorman Creek and Little Cherry Creek. A large population with thousands of individuals grows in a large wetland on Libby Creek, near the confluence with Howard Creek. This population would be near the proposed transmission line corridor. Several individual plants have been found in moist areas in the Little Cherry Creek and Bear Creek drainages.

The Montana Natural Heritage Program has identified 2 species thought to be rare, threatened, or endangered that could occur in the study area —Yerba Buena and Pacific blackberry. The Montana Natural Heritage Program lists these species as occurring near the Noxon Rapids Dam.

Although WESTECH (1987) reported the occurrence of both species along Rock Creek in Sanders County, neither of these plants were found in the powerline corridor study area.

Weeds are plant species which are the initial colonizers of plant communities following human-caused or natural disturbance of canopy structure and/or soil. Weedy species or “ruderals” (Grime 1979) typically have reproductive, morphological, and physiological attributes which impart to them the ability to effectively occupy vacant growing space and compete with climax and late successional species. Most weeds have several of the following characteristics:

1) Continuous seed production for as long as growing conditions permits.
2) Effective ways of dispersing seed.
3) Ability of seeds to remain dormant in the soil for long periods of time.
4) Ability to grow under adverse environmental conditions.
5) Adaptations to a wide variety of soil and climactic conditions.
6) Ability to effectively compete for soil moisture, nutrients, and sunlight.
7) Genetic adaptability.

Weedy species are not necessarily environmental or economical liabilities. Native species which dominate in the primary stages of ecological succession rapidly stabilize soil and provide large amounts of biomass which provides important food and cover for wildlife. Some exotic plant species, however, have become “noxious” weeds, invading disturbed areas and replacing native species.

According to the County Noxious Weed Management Act (MCA 7-22-21-1 et seq.), a noxious weed is any exotic plant species that is established or which may be introduced in Montana which may render the land unfit for agriculture, forestry, livestock, wildlife, or other beneficial uses. The District Weed Board of both Lincoln and Sanders counties have identified noxious weeds for their areas (Table 5-9). Three noxious weeds were identified for the study area – Canada thistle, St. Johnswort, and spotted knapweed. St. Johnswort and spotted knapweed are primarily restricted to roadsides and have not yet become dominant components of the flora on disturbed sites such as clear-cuts.

Canada thistle is a dominant roadside weed and rapidly invades clear-cuts the first year or two after logging and slash burning. Along Fisher River and from the confluence of Libby Creek and the Kootenai River, spotted knapweed has extensively invaded the valley along and adjacent to the highway.

Both spotted knapweed and St. Johnswort occur along all roads in the study area except those where alder and other shrubs and forbs have encroached on the roadway and have formed dense stands. Typically, the highest densities of these noxious weeds occur on the most heavily used roads that have been periodically graded and have had the road shoulders mowed or treated to removed woody plant encroachment. The Bear Creek Road is a good example of a heavily used road, with relatively high densities of spotted knapweed and St. Johnswort, irregularly distributed along the road margin. Both of these weeds appear to most vigorously colonize the driest microsites along the road margins where clover, grasses, or other forms have not become well established or are periodically removed by road maintenance.

Along the Little Cherry Creek Road, Ramsey Creek Road, and Upper Libby Creek Road, these weeds sporadically occur, but are not nearly as dense as in the Fisher River Valley or along the Bear Creek Road. Along the less heavily used and managed roads, it appears that these weeds are currently expanding their dominance of disturbed sites, where overstory shrub canopies (primarily alder) have been cut from the road margins and road grades have been altered by cuts and fills.

According to French and Lacey (1983), spotted knapweed is the number one weed problem in western Montana because it reduces livestock forage and soil erosion when it invades rangeland. Lacey et al. (1986) report that the current annual loss to the Montana range livestock industry due to knapweed is $4.5 million. Spotted knapweed infestations on the Bitterroot National Forest are predicted to cause the elk herd to decline by 200 animals annually due to loss of forage. St. Johnswort is unpalatable to livestock and animals do not eat the plant unless forced to by lack of suitable forage. Ingestion of the plant causes photosensitization in livestock and should be regarded as poisonous (Lacey and Lacey, 1986).

Common invader species (i.e., colonizers during early succession(in the study area which are not noxious weeds include: lodgepole pine, western larch, black cottonwood, western white pine, alder, ceanothus, red raspberry, huckleberry, redtop, Kentucky bluegrass, timothy, yarrow, goldenrod, white sweet clover, yellow sweet clover, fireweed, clover and bracken fern.

Table 5-9. Noxious Weeds of Lincoln County and/or Sanders County.

Common Name	**Scientific Name**
Canada Thistle	*Cirsium arvense*
Field Bindweed	*Convolulus arvensis*
Whitetop	*Cardaria draba*
Leafy Spurge	*Euphorbia esula*
Russian Knapweed	*Centaurea repens*
Spotted Knapweed	*Centaurea maculosa*

Diffuse Knapweed	*Centaurea diffusa*
Dalmation Toadflax	*Linaria dalmatica*
St. Johnswort	*Hypericum perforatum*
Dyers Woad	*Isatis tinctoria*
Yellow Starthistle	*Centaurea solstitialis*
Common Crupina	*Crupina vulgaris*
Tansy Ragwort	*Senecio jacobaea*
Burdock	*Arctium minor*
Eurasian Millfoil	*Myriophyllum spicatum*
Hounds Tongue	*Cynoglossum officinale*
Musk Thistle	*Carduus natans*
Yellow Toadflax	*Linaria vulgaris*

Sources: Lincoln County Weed Board; Montana Department of Agriculture

Exhibit 7 illustrates the vegetation types present in the 2-mile wide study area for the alternative powerline routes. Native vegetation in these transmission line corridors include coniferous forests, clear-cuts, shrublands, riparian, and wetland types. Also present are agricultural pasturelands, residential areas, talus slopes, and water. Native vegetation types are in various stages of ecological succession as a past history of logging, fire, agriculture, or other disturbance has arrested or reinitiated the progress toward climax. Native communities are similar to those of the intensive study area as described by Western Resource Development Corporation (1989a).

Coniferous forest communities on the drier south-facing slopes along Fisher River and Libby Creek are dominated by Douglas-fir. On the valley floor and on slopes along Miller, Libby, and Ramsey creeks, lodgepole pine, larch, grand fir, and Douglas-fir form the forest overstory with western hemlock and western red cedar usually occurring as the subdominant tier of the canopy. The relative amounts of the composite conifer species vary greatly from site to site. Some communities, for example, along Miller Creek, are mostly western larch and lodgepole pine, whereas the dominance of other species reflects a continuum. The high diversity in species composition, distribution, canopy structure and seral status of existing conifer communities are factors which complicate the delineation of existing communities on the basis of dominants. The quantitative descriptive data on the coniferous forest of the intensive study area (Western Resource Development Corporation, 1989a) is applicable to much of the transmission line study area.

Along upper Libby Creek and Ramsey Creek, where the proposed corridor crosses or closely parallels the stream, old growth stands of western red cedar and western hemlock form buffer zones between logged areas and the streams. Similar climax communities are described by Cooper et al. (1987) and Pfister et al. (1977).

Clear-cuts vary in species composition and canopy structure, depending on the time elapsed since harvesting, slash disposal methods, and sources of seed that remain. The most recent clear-cuts typically have relatively large amounts of bare soil and partially burned litter. With removal of the overstory, the native grasses and sedges, present before logging (e.g., pinegrass, tall tristeum, and elk sedge) usually grow vigorously and expand their canopy cover. Introduced grasses such as timothy, brome, and redtop usually also increase. Plants that commonly are invaders include Canada thistle, fireweed, clovers, wild strawberry, Scouler willow, Canada buffaloberry, and snowbrush ceanothus. Tree seedlings and saplings which usually predominate are western larch, lodgepole pine, Douglas-fir, and grand fir. Understory species, typical of climax or near-climax stands, are greatly reduced in number and distribution and often occur only on microsites where the original ground cover has not been severely altered. As with coniferous forests, the quantitative data of the intensive study area (Western Resource Development Corporation, 1989a) are applicable to much of the transmission line study area.

Shrublands are present only in the avalanche chutes of Libby and Ramsey creeks. They are described from quantitative data by Western Resource Development Corporation (1989a).

Riparian communities grow along Fisher River, West Fisher Creek, Miller Creek, and Libby Creek. These cottonwood-dominated riparian communities are in early successional stages. Periodic scouring by flooding and sediment deposition are essential to the maintenance of riparian vegetation. Pioneer species, such as cottonwood and willow, require recently deposited, fully exposed alluvium for seed germination and growth (Johnson et al., 1976; Fenner et al., 1985; Foote, 1965; Wikum and Wali, 1974; Weaver, 1960). Major floods in the early 1970s have resulted in regeneration of many of the cottonwood communities in the riparian zones of the study area.

Riparian communities are extremely diverse ranging from pure black cottonwood stands with a shrubby understory to cottonwood stands with varying densities of Englemann spruce, aspen, grand fir, lodgepole pine, ponderosa pine, Douglas-fir, western red cedar, western hemlock, water birch, and willows. The shrub understory is dominated by numerous species such as Sitka alder and snowberry which form dense stands with varying densities of red-osier dogwood, serviceberry, thimbleberry, Douglas spirea, Nootka rose, Oregon grape, Canada buffaloberry, kinnikinnik, and black hawthorn.

5.2.11.12 Cultural Resource Overview

The baseline studies presented in this application are from the original 1989 application. These data will be updated, as required, during the development of the EIS and this application will be updated as the data and studies are completed.

Based on the in-depth archival and documentary research effort conducted for the proposed powerline and associated facilities corridors, no National Register of Historic Places listed or eligible properties will be affected. The study area included at least one-half mile either side of all proposed corridors. The only potential concern might be the effect on Native American religious or heritage sites. While such locations have not yet been identified, input from the Kootenai Cultural Program states their preferred alternative is the West Fisher Creek – Howard Lake route.

Various in-house surveys have been conducted throughout the area by the Forest Service since 1977. While extensive timber sale areas are reviewed for cultural resource, the inventories on the ground tend to concentrate on high probability locations. A SHPO sponsored survey of properties which illustrated historic themes and patterns of development in Lincoln County for future planning purposes was reported in a draft manuscript in 1981 (Roeder and Heath, 1981). The architects and historians involved in the survey recorded selected buildings within properties which they felt were potentially eligible for the National Register, however, evaluations were never completed.

In 1988, pedestrian cultural resource inventories were conducted along 100 foot (30 meter) corridors in the Ramsey Creek, Libby Creek, Howard Lake, Miller Creek and Pleasant Valley-Fisher River areas (Greiser, 1989). In addition, a windshield survey was conducted from Howard Lake to U.S. Highway 2 via West Fisher Creek. It is anticipated that the majority of any route selected for the transmission line would be subjected to an intense pedestrian survey for cultural resources.

Because of the presence of densely forested areas, accurate site density information is not possible. However, based on field checking and documentary review it appears that both prehistoric and historic sites can be expected to occur in greater numbers in the West Fisher drainage. The largest number of cultural resource properties from both time periods have been recorded along the West Fisher, which might be partially caused by more inventories in that area. While more inventories have also been conducted along the West River, there is also more historic mining activity documented there. Howard Lake to the Old Town townsite on Libby Creek is considered another area of potentially greater density of historic sites. The area projected to have the lowest site density for either time period is that through which the North Fork of Miller Creek-Midas Creek corridor passes. The Pleasant Valley-Fisher River areas appear to have low site density on the slopes above the valley, while historic settlement in the valley was based on agricultural potential, so site density appears to be low. The Swamp Creek alternative generally follows steep slopes where cultural resource property probability is expected to be low. The only deviation from this is where the line would cross the Schreiber Creek Valley and known properties occur.

The available information reviewed for powerline corridors and mine area resulted in no National Register listed or eligible properties or sites in the study area. Site forms for the properties recorded in the area have been or are being reviewed by SHPO. However, properties recorded by the Forest Service are not review for eligibility since avoidance is recommended and carried out. In addition, the buildings recorded during the Roeder and Heath (1981) survey have not been evaluated, although they were recommended as eligible.

While the majority of the properties would likely not be eligible due to loss of integrity based on similar properties in and adjacent to the area which have been reviewed, SHPO review of the properties would be needed for a determination of eligibility. If further testing at the prehistoric properties and further research and testing at the Hildebrandt cabin locate intact deposits of cultural material or more information on the occupants then the properties would likely be determined eligible. Three historic properties along Highway 2, the Schreiber homestead, the Wad Ranch and the Manicke School, contain buildings which have been recommended as eligible (Roeder and Heath, 1981), but have not been fully recorded or evaluated by SHPO.

5.2.11.13 <u>Cultural Resource Impacts</u>

The baseline studies presented in this application are from the original 1989 application. These data will be updated, as required, during the development of the EIS and this application will be updated as the data and studies are completed.

There are no known significant paleontological localities, historic landmarks or properties from any time period listed on or eligible for the National Register of Historic Places. To date specific areas of Native American religious or heritage concern have not been identified. There are there prehistoric and three historic properties known within the area which would require additional investigation to determine National Register eligibility. If the prehistoric properties are determined eligible it would likely be on the basis of their potential to yield information the qualities of which would not be affected by the facility. If historic properties with buildings are determined eligible, impact to setting by the proposed facility would have to be evaluated.

Since no listed or eligible properties or locations of concern have been identified in the area, no special construction methods or topographic screening to eliminate or reduce impacts are necessary at this time. Three historic properties within view of the proposed Pleasant Valley substation, the southern end of the line and possibly the Swamp Creek alternative may have National Register eligible buildings. For properties with eligible buildings, indirect effects such as impact to viewshed would need to be evaluated. Such steps as use of natural features for screening or low visibility elements in the facility are potential mitigative measures if the properties are determined eligible.

5.2.11.14 Recreation Areas

This data is currently being reviewed to ensure consistency with the previous analyses. The data will be updated, as required, as part of the EIS process by either MMI or the EIS contractor.

Recreation areas within the impact zones of the three corridors include the Lake Creek Campground along West Fisher Creek, the Howard Lake Campground, the gold panning recreation area on Libby Creek and the Cabinet Mountain Wilderness Area. Libby Creek, West Fisher Creek and the Fisher River are commonly used fishing streams and are accessed at many points from USFS roads. The Pleasant Valley (Manicke Park) area on Plum Creek property near the proposed tap site is used by local groups as an informal picnic area.

Area recreation use is described in the Hard Rock Operating Permit Application. Use estimates for the Howard Lake Campground; Lake Creek Campground, and the recreation gold panning areas are shown on Table 5-10.

Table 5-10. Recreation Use at Developed Sites.

	Overnight Use		**Day Use**	
Site	**Visitors/Year**	**Visitor Use Days/Year**	**Visitors/Year**	**Visitor Use Days/Year**
Howard Lake Campground	550	1650	2000	700
Lake Creek Campground	100	300	Negligible	Negligible
Gold Panning Area	25	150	300	100

Note: Use information for 1988 from USFS; one visitor use day equals one visitor for 12 hours.

5.2.11.15 Recreation Area Impacts

This data is currently being reviewed to ensure consistency with the previous analyses. The data will be updated, as required, as part of the EIS process by either MMI or the EIS contractor.

No changes in access to the four developed recreation areas identified in 4.2.11.14 would be anticipated for any of the corridor or route alternatives. Portions of the transmission line and pole structures would be visible from the Howard Lake campground for the preferred Miller Creek and West Fisher Creek alternatives. The preferred route options in the vicinity of Howard Lake (R_1, R_2) have been selected to minimize visual impacts from the lake/campground area. The transmission line would also be visible from the Lake Creek Campground for all routes of the West Fisher alternative. The transmission line and pole structures would be visible for the preferred route for the Miller and West Fisher alternatives from the recreation gold panning area. The USFS has recently developed a designated recreation site for gold panning. Visual sensitivity by these viewers has been factored into the visual aesthetics assessment. Assessment of visual impacts to the Howard Lake area has been closely coordinated with USFS personnel. Section 5.2.10.7 of this application discusses the design and siting considerations that have been undertaken to mitigate visual impacts to this area.

Howard Lake:

Significant long-term indirect impacts were identified for the west side of Howard Lake and the Howard Lake campground area. Segment J (Exhibit 12) has approximately 0.6 miles located in a Retention VQO which is highly visible on a timber harvested open face, one-half mile from the recreation site. Although the segment of concern is located on an old harvested area, the dominance and scale of the transmission structures would draw strong visual attention and cause a significant adverse effect.

Cabinet Mountains Wilderness:

Generally, long-term indirect impacts would occur from several vista points and overlooks within the wilderness. However, existing views from the wilderness in the vicinity of the study corridors contain areas of landscape modifications caused by timber harvesting and access roads. Portions of segments C, D, and L located in a Retention VQO would be more visually evident (Low VAC) from the wilderness because of the crossing of steep terrain, homogeneous vegetation pattern and slopes facing perpendicular to the viewing direction. These segments would likely contain portions of significant straight line contrast to land form and vegetation features.

Recreation areas are shown on Exhibit 2 within Volume 2: Maps.

5.2.11.16 Perennial Streams

This data is currently being reviewed to ensure consistency with the previous analyses. The data will be updated, as required, as part of the EIS process by either MMI or the EIS contractor.

Exhibit 4 within Volume 2: Maps shows the location and names of all perennial streams crossed by each alternative route and impact zone. The water quality classification for all of these streams is B-1. The number of perennial stream crossings required for each alternative route is listed in the description of floodplains (Section 5.2.11.8 (e)).

5.2.11.17 Water Resources

This data is currently being reviewed to ensure consistency with the previous analyses. The data will be updated, as required, as part of the EIS process by either MMI or the EIS contractor.

The primary potential impact to water resources from construction of the powerline is sediment delivery to streams. The potential impact can be evaluated by examination of Exhibit 9 which shows erodible soils along each alternate route. The soils section of this report describes the soils and their erodibility in greater detail. The land types (described by Kuennen and Gerhardt, 1984) which have the potential for contributing sediment to streams and which are crossed by at least one of the alternative routes are listed below.

LAND TYPE	POTENTIAL CAUSE
101	Located in and adjacent to streams and prone to flood
102	Highly erodible, tends to slump, located near stream
108	Highly erodible, tends to slump, located near stream
112	Highly erodible, slumping and slope failures, near streams
252	Steep slopes with high sediment delivery efficiency
322	Highly erodible, tends to slump

351	Steep slopes, debris slides, high sediment delivery
381	Steep slopes, debris slides, high sedimentary delivery

The actual impacts of construction should be minimal because access roads already exist along most of the proposed routes through these land types.

The project is not expected to have any adverse effects on groundwater or on the few potable water supplies along Miller Creek and the Fisher River which are derived from springs. The project does not cross any municipal watersheds.

5.2.11.18 Noise and Electrical Effects

The noise and electrical field data for the proposed 230 kV transmission line are presented on lateral profile plots (Figures 2-3 through 2-12) with results computed out to 200 feet from each side of the point "0.00" in the plots).

Figures 2-3 through 2-6 present the predicted audible noise levels from the 230 kV transmission line under "wet conductor" and "heavy rain" conditions for both the preferred steel monopole and alternate TH-230 H-frame structures. Although heavy rain noise levels are higher than wet conductor noise levels, the ambient noise levels associated with heavy rain (wind, rain, and/or thunder) tend to mask transmission line noise. Typical noise levels found in natural environments are shown in Table 2-17. The predicted audible noise levels generated by the 230 kV transmission line are quite low when compared to typical environmental noise.

The predicted ground level electric field intensities in kilovolts rms per meter (KV/m) are shown in Figures 2-7 and 2-8 and inducted vehicular currents in milliamperes (mA) are shown in Figures 2-9 and 2-10. The maximum electric field of the preferred configuration is about 1.65 kV/m at 20 feet from centerline (within the transmission line right-of-way). Humans have a "median level of electric field perception" equal to 2.7 kV/m in the presence of spark discharges (EPRI, 1975). The largest electric field produced by the 230 kV transmission line is well below these values.

> The National Electric Safety Code (NESC) states that: "…For voltages exceeding 98 kV alternating current to ground… either the clearance shall be increased or the electric field, or the effect thereof, shall be reduced by other means, as required, to limit the current due to electrostatic effects to 5.0 milliamperes, rms, if the largest anticipated truck, vehicle, or equipment under the line were short-circuited to ground…" (Institute of Electrical and Electronics Engineers, Inc., 1983).

An examination of Figure 2-9 (preferred structure type) shows the largest induced vehicular current (in the largest anticipated vehicle) is only 1.3 mA.

Figures 2-11 and 2-16 show the anticipated magnetic field strength in milligauss. Figures 2-13 and 2-14 show the anticipated radio interference at 1 MHz. Figures 2-15 and 2-16 show the anticipated radio frequency noise level at the channel 2 television frequency.

Experience has shown that most radio frequency interference is generated by other than high voltage gradients on a transmission line. Most radio frequency interference is caused by broken conductors or loose hardware. Radio frequency interference can easily be located with test equipment and eliminated by tightening loose hardware or replacing broken conductors.

5.2.12 Comparison of Alternative Routes (ARM 17.20.1446)

MFSA Application Routes - Alternative routes were comparatively ranked quantitatively by tabulating the linear distances of sensitive areas or areas of concern traversed by each route option. These values are summarized in a matrix (Table 5-11) which depicts the factors used to evaluate the relative merits of the various routing alternatives.The most important impacts that could occur with construction and operation of the powerline would be to visual quality associated with recreation and travel in the project area, and to grizzly bear habitat. Impacts to visual resources would be partially mitigated but some visual intrusion would remain where the powerline and poles cannot be screened from view by terrain or trees. Impacts on grizzly bear habitat would have no negative effects on bears if associated human activities could be effectively regulated to minimize interaction between humans and bears. The possibility that grizzlies would be accidentally shot during the spring black bear season would be reduced through measures such as road closure and rapid re-establishment of shrubs and trees on disturbed sites (see Section 5.2.11.11).

An interdisciplinary team of resource specialists jointly evaluated the siting of the powerline routes within the corridors subsequent to the reconnaissance survey to select a preferred route. Each specialist reviewed the alignment and ascertained which alternative routes would pose the least impact risk to the various resource area considered (e.g. land use, visuals, wildlife, soils and socioeconomic concerns). Areas where impact risks would be high were identified and avoidance of impacts within the corridor by changing the alignment of the route was discussed.

Areas of concern and sensitive areas that could be avoided by relocating the route alignment included: visually sensitive areas near the Miller/Midas Creek alternative, Howard Lake, West Fisher Creek and near Ramsey Cree; erosive soils along Miller Creek; mountain goat winter range in the south facing slope above Ramsey Creek; and engineering problems on the steep slopes at the mouth of the narrow canyon into Ramsey Creek. The possibility that any of the proposed route alignments would create conflicts among resource areas was carefully evaluated. Also, cost and engineering feasibility was evaluated for each proposed route change.

None of the route changes created conflicts for one or more resource areas while reducing them for another. The change in alignment on the south slope above Ramsey Creek, for example, reduced potential impacts on wildlife and visual resources and improved the engineering properties of the route. The change in route alignment on Miller Creek to avoid erosion soils benefited aquatic resources by reducing the risk of sediment delivery to Miller Creek and also avoided crossing a parcel of private land.

Several sensitive areas could not be avoided by changing the route alternatives within the corridors. From the Pleasant Valley substation site to the West Fisher and Miller Creeks, the route could not be reasonably moved to avoid private land or aligned to totally eliminate visual impacts from U.S. Highway 2 or from residences in the Fisher River Valley. Moving the route out of the view of those in the Fisher River Valley would require moving the line over 1.5 miles to the east, and increasing the elevation of the route by more than 1,500 feet. The length of the line and, therefore, the cost of the line would increase, new roads would have to be constructed and big game winter/spring range would be affected. The siting of the line in the lower slopes along the Fisher River to avoid views of structures in the horizon was judged to be an effective means of reducing the visual intrusion of the powerline on landscapes of the area.

It was not possible to avoid habitat occupied by grizzly bears or areas managed as buffers through road closures because of its extensive occurrence within the alternative corridors. Although these areas could not be avoided by route alignments within the corridors, potential impacts would be reduced with appropriate mitigation (see Section 5.2.10.7).

	MILLER CR.	W. FISHER CR.	MIDAS CR.	SWAMP CR.	SWAMP CR. A
TOTAL LENGTH (miles)	16.2	17.9	19.7	17.3	17.2
COST OF CONSTRUCTION	2,430,000	2,685,000	2,955,000	2,595,000	2,580,000
COST OF OPERATING (15 years)	213,356	235,743	259,449	227,841	226,524
CUMULATIVE DISTANCE TO NEAREST ROADS (miles)	3.1	4.7	4.3	4.3	3.9
HIGH VISUAL IMPACT ZONES (miles)	1.1	1.0	1.1	1.6	1.1
PRIVATE PROPERTY (miles)	7.0	8.5	7.0	6.2	6.2
CULTURAL RESOURCES IMPACTS	LOW	LOW	LOW	LOW	LOW
POOR ACCESS (mi. w/ no roads within 1/2 mile & > 15% slope:	0	0	0	0	0
PERENNIAL STREAM CROSSINGS	7	8	5	5	5
ERODIBLE SOILS (miles)	5.0	6.0	7.9	4.9	4.9
AVALANCHE CHUTES (miles)	0.1	0.1	0.2	0.1	0.1
MASS MOVEMENT (miles)	4.0	4.6	3.5	2.0	2.0
SLOPE GREATER THAN 55% (mi.)	1.4	1.0	1.5	1.9	1.9
ENVIRONMENTAL CONSIDERATIONS					
Big Game Winter Range(miles)	4.4	6.1	6.3	0.4	0.4
Eagle Habitat (miles)	4.4	2.7	4.4	5.4	5.4
Grizzly Habitat (miles) (1)	4.7	5.5	6.1	4.9	4.2
Elk Security Areas (miles)	0	0	1.2	0.3	0.3
VEGETATION HABITATS					
Clearcut (miles)	2.7	2.8	5.3	4.7	4.4
Old Growth (miles) (2)	0.5	0.9	0.5	0.2	0.3
Riparian Habitat (miles)	0.3	3.3	0.3	0.7	0.7
EXCLUSION & AVOIDANCE AREAS					
Avoidance (MA:2,11,12,13,14,19)	7.1	7.0	8.0	7.7	7.5
Exclusion (MA:7,8,9)	0	0	0	0	0

(1) Situation 1 and Situation 2 Grizzly Habitat
(2) Managed As Old Growth By USFS (MA13)

Table 5-11. Comparison of Powerline Corridor Alternatives

EIS Routes – Table 5-12 summarizes the potential impacts of the alternative routes that were evaluated for the project within the 1992 EIS.

Table 5-12. Comparison of EIS Alternative Routes.

	ALTERNATIVE				
FACTOR	1: Miller Creek	4: Miller Creek with Modifications	5: North Miller Creek	6: Swamp Creek	COMMENTS
Miles of high and moderate visual effects	7.0	5.0	4.8	5.1	Alternatives 4, 5 and 6 would have -.7 miles of line with high visual effects along U.S. 2. Alternative 1 would have 1.7 miles of high visual impacts due to additional disturbance during line stringing.
Miles of low visual effects	6.8	9.0	7.8	6.2	
Miles of very low visual effects	2.5	2.7	3.7	6.0	
Miles of public land crossed	9.3	9.4	9.1	11.0	
Miles of Plum Creek land crossed	7.2	7.2	7.2	5.6	
Miles of other private land crossed	0.1	0.1	-	0.4	
Changes required to KNF Plan					KNF would adopt new management area (MA 23) covering acres affected along the selected alternative.
-total acres for reassignment to transmission line use	369	369	224	254	
Total acres of tree clearing	193	203	183	200	Each route would affect at least one old growth stand less than 50 acres in size. The number of these small stands would increase as follows: Alternative 1 (4); Alternative 4 (3); Alternative 5 (1); and Alternative 6 (2).
Acres of old growth habitat removed	50	61	46	74	
Acres of old growth habitat affected (clearing and fragmentation)	130	202	140	155	
Old growth habitat < 50 acres	6-7	6-7	2-3	3-4	
Miles of road on erodible land types	4.1	1.6	1.4	1.0	DNRC and KNF would approve final design.
Miles of road on other land types	11.0	6.1	5.3	5.0	
Number of perennial streams requiring new crossings	5	1	0	0	All perennial streams could be crossed using existing bridges, except Miller Creek, where the bridge was washed out. Under Alternative 1, 5 streams would be crossed by a crawler tractor used to string the line.
Number of structures on designated floodplains	2-3	2	1	1	Crossings of designated floodplain on Fisher River would require review by the DNRC and Lincoln County Disaster and Emergency Services Coordinator.
Number of intermittent streams crossed by centerline	20	19	16	10	Intermittent streams are shown on 7.5 minute quad maps.
Number of intermittent streams crossed by roads	15-16	5-6	5-6	5	More streams crossed by Alternative 1 due to the use of crawler tractor for line stringing.
Jurisdictional wetlands affected (acres)	0	0	0	<1	The Swamp Creek alternative would affect less than 1 acre of wetland. Other wetlands would be avoided.

Effects on grizzly bear					
Habitat units temporarily affected during construction	177	177	463	198	Mainly short-term impacts during construction; proposed mitigation includes timing restriction on line construction during spring. All access roads in grizzly bear habitat closed following construction.
Miles of transmission line in grizzly bear habitat	8.9	8.9	6.5	3.6	
Miles of new access road in grizzly bear habitat	4.7	4.7	4.1	1.2	
Total miles of elk security area crossed by -					
line	1.8	1.6	1.3	0.3	All new roads built for transmission line construction would be closed to public travel
roads	3.0	1.4	0.8	0.1	
Total miles of big game winter range crossed by -					
line	3.8	4.4	3.6	0.4	Construction timing would be used to avoid impacts to animals using winter range.
roads	2.8	2.6	2.0	0.3	

5.2.13 Selection of Preferred Route (ARM 17.20.1447)

In the original 1989 MFSA Application, the Miller Creek alternative was selected as the preferred route based on cost, engineering reliability and environmental concerns.

The Miller Creek alternative was the shortest (15.6 miles) and lowest cost ($2.9 million) of the alternatives evaluated in detail in the original application and it minimized potential impacts to aquatic resources, wildlife, visual quality, recreation, private land, historic/cultural resources and residences (see Table 5-11). Access road construction was also least for the Miller Creek route. Because there were no conflicts in siting criteria among the various resource areas evaluated, no quantitative weighting system was applied in selecting the preferred route (see Section 17.20.1440 (c)). However, cost, reliability, visual concerns and potential impacts to the threatened grizzly bear were considered as having the greatest influence on siting options.

The Miller Creek alternative was included in the evaluation of transmission line alternatives in the 1992 EIS. In addition to the selected route from the MFSA application, three other alternatives were also evaluated and compared for the selection of the transmission line alternative for the project within the 1992 EIS (see Table 5-12). In evaluating the alternatives in the 1992 Final EIS, the agencies did not select the Miller Creek alternative, but rather recommended Alternative 5 (North Miller Creek) as providing the best balance for a route and centerline. This update application also selects and recommends the North Miller Creek alternative route as the preferred alternative for the transmission line.

Appendix A: Structural and Electric Design Calculations

VALMONT INDUSTRIES, INC.
INDUSTRIAL & CONSTRUCTION
PRODUCTS DIVISION
VALLEY, NEBRASKA 68064
(402) 359-2201

****************** Valmont Steel Pole Program ******************

TITLE: MONTANORE 230 KV TRANSMISSION LINE STEE

MODE: Selection   OUTPUT: Printer   LOAD CASES: 2

POLE HEIGHT ABOVE GROUND: 83.50 (FEET)   EMBEDDED LENGTH: 11.500 (Feet)

****

This Valmont Steel Pole Analysis computer program and the accompanying Users Guide are provided by Valmont Industries, Inc. (VALMONT) to its customers, solely as a guide in the selection of VALMONT steel pole products and in the analysis of such products. The program, when used according to program specifications and within program limitations as set forth in the Users Guide, will provide the data described in the 'Output' section found on pages 6 and 7 of th Users Guide. VALMONT is not responsible for customer user errors or program changes made while using the program or for losses or inconveniences or for any consequential damages caused by using the program. VALMONT makes no express warranties or implied warranties, including merchantability and fitness for a particular purpose, in regard to the program other than those found in the Users Guide 'Output' section mentioned above.

    Release 1.1 : 01-05-8

******************* LOAD APPLICATION POINTS ************************

ARM ID	HEIGHT ABOVE GROUND (FT)	ARM RISE (FT)	ARM LENGTH (FT)	TOP VIEW ORIENTATION (DEG)
1	83.0000	0.00000	0.50000	0.0000
2	74.5000	2.00000	10.00000	0.0000
3	68.0000	2.00000	10.00000	180.0000
4	61.5000	2.00000	11.00000	0.0000
5	0.0000	0.00000	0.00000	0.0000
6	0.0000	0.00000	0.00000	0.0000
7	0.0000	0.00000	0.00000	0.0000
8	0.0000	0.00000	0.00000	0.0000
9	0.0000	0.00000	0.00000	0.0000
10	0.0000	0.00000	0.00000	0.0000
11	0.0000	0.00000	0.00000	0.0000
12	0.0000	0.00000	0.00000	0.0000

Case Number 1
Case ID :1
MINIMUM Safety Factor Required : 1.000000
Structure Weight OVERLOAD Factor : 1.000000
WIND PRESSURE on Pole (PSF) : 4.00000
WIND ORIENTATION (Degrees) : 0.0000

ARM ID	X-FORCE (LB)	Y-FORCE (LB)	Z-FORCE (LB)
1	850	0	905
2	1317	0	2468
3	1317	0	2468
4	1317	0	2468
5	0	0	0
6	0	0	0
7	0	0	0
8	0	0	0
9	0	0	0
10	0	0	0
11	0	0	0
12	0	0	0

****

Load Case Number 2
Case ID :2
MINIMUM Safety Factor Required : 1.000000
Structure Weight OVERLOAD Factor : 1.000000
WIND PRESSURE on Pole (PSF) : 22.00000
WIND ORIENTATION (Degrees) : 0.0000

ARM ID	X-FORCE (LB)	Y-FORCE (LB)	Z-FORCE (LB)
1	544	0	222
2	1675	0	903
3	1675	0	903
4	1675	0	903
5	0	0	0
6	0	0	0
7	0	0	0
8	0	0	0
9	0	0	0
10	0	0	0
11	0	0	0
	0	0	0

VALMONT INDUSTRIES, INC.

MONTANORE 230 KV TRANSMISSION LINE STEE

	Height Above Base (Ft)	Mean Dia. Points (In)	Wall Thick (In)	Yield Stress (Ksi)	Dia/ Thick (F-F)	Flat/ Thick (F-F)	Allow Stress (Ksi)	Mom of Inertia About Y-Y (In^4)	Axes X-X (In^4)	Cross Sectior Area (In^2)
BASE	0.00	28.772	0.1875	65.00	149.22	37.84	57.16	1661.07	1661.07	16.78
	5.00	27.597	0.1875	65.00	143.17	36.22	58.75	1465.76	1465.76	16.09
	10.00	26.422	0.1875	65.00	137.12	34.60	60.34	1286.39	1286.39	15.41
	15.00	25.247	0.1875	65.00	131.06	32.97	61.93	1122.29	1122.29	14.72
	20.00	24.072	0.1875	65.00	125.01	31.35	63.52	972.77	972.77	14.04
	25.00	22.897	0.1875	65.00	118.96	29.73	65.00	837.16	837.16	13.35
	30.00	21.722	0.1875	65.00	112.90	28.11	65.00	714.77	714.77	12.67
JL(1)	34.70	20.617	0.1875	65.00	107.21	26.58	65.00	611.12	611.12	12.02
	35.00	20.547	0.1875	65.00	106.85	26.49	65.00	604.94	604.94	11.98
JH(1)	38.00	20.230	0.1875	65.00	105.22	26.05	65.00	577.39	577.39	11.80
	40.00	19.760	0.1875	65.00	102.80	25.40	65.00	538.07	538.07	11.52
	45.00	18.585	0.1875	65.00	96.74	23.78	65.00	447.68	447.68	10.84
	50.00	17.410	0.1875	65.00	90.69	22.16	65.00	368.02	368.02	10.15
	55.00	16.235	0.1875	65.00	84.64	20.53	65.00	298.42	298.42	9.47
	60.00	15.060	0.1875	65.00	78.58	18.91	65.00	238.20	238.20	8.78
ARM 4	61.50	14.708	0.1875	65.00	76.77	18.43	65.00	221.87	221.87	8.58
	65.00	13.885	0.1875	65.00	72.53	17.29	65.00	186.68	186.68	8.10
ARM 3	68.00	13.180	0.1875	65.00	68.90	16.32	65.00	159.67	159.67	7.69
	70.00	12.710	0.1875	65.00	66.48	15.67	65.00	143.19	143.19	7.41
ARM 2	74.50	11.653	0.1875	65.00	61.03	14.21	65.00	110.34	110.34	6.79
	75.00	11.535	0.1875	65.00	60.42	14.05	65.00	107.03	107.03	6.73
	80.00	10.360	0.1875	65.00	54.37	12.42	65.00	77.54	77.54	6.04
) 1	83.00	9.655	0.1875	65.00	50.74	11.45	65.00	62.76	62.76	5.63

VALMONT INDUSTRIES, INC.

:ANORE 230 KV TRANSMISSION LINE STEE   CATALOG POLE SELECTED : 95.0178

***** LEVEL DATA AND LOAD CASE MOMENTS *****

Load Case Number 1   SHEAR FORCE AT BASE

Case ID :1   TOTAL VERTICAL FORCE

Height	Mean Diameter Points	D/T Across Flats	B/T	Stress Reduct Factor	{Moment Load	About Wind	X-Axis Defl	(Kip-In)} Total	{Moment Load
0.00	28.772	149.22	37.84	0.88	0	0	0	0	4497
5.00	27.597	143.17	36.22	0.90	0	0	0	0	4209
10.00	26.422	137.12	34.60	0.93	0	0	0	0	3921
15.00	25.247	131.06	32.97	0.95	0	0	0	0	3632
20.00	24.072	125.01	31.35	0.98	0	0	0	0	3344
25.00	22.897	118.96	29.73	1.00	0	0	0	0	3056
30.00	21.722	112.90	28.11	1.00	0	0	0	0	2768
34.70	20.617	107.21	26.58	1.00	0	0	0	0	2497
35.00	20.547	106.85	26.49	1.00	0	0	0	0	2480
38.00	20.230	105.22	26.05	1.00	0	0	0	0	2307
40.00	19.760	102.80	25.40	1.00	0	0	0	0	2192
45.00	18.585	96.74	23.78	1.00	0	0	0	0	1904
50.00	17.410	90.69	22.16	1.00	0	0	0	0	1616
55.00	16.235	84.64	20.53	1.00	0	0	0	0	1328
60.00	15.060	78.58	18.91	1.00	0	0	0	0	1040
61.50	14.708	76.77	18.43	1.00	0	0	0	0	954
65.00	13.885	72.53	17.29	1.00	0	0	0	0	450
68.00	13.180	68.90	16.32	1.00	0	0	0	0	324
0.00	12.710	66.48	15.67	1.00	0	0	0	0	537
.4.50	11.653	61.03	14.21	1.00	0	0	0	0	420
75.00	11.535	60.42	14.05	1.00	0	0	0	0	87
80.00	10.360	54.37	12.42	1.00	0	0	0	0	36
83.00	9.655	50.74	11.45	1.00	0	0	0	0	5

VALMONT INDUSTRIES, INC.

ANORE 230 KV TRANSMISSION LINE STEE CATALOG POLE SELECTED : 95.0178

***** LOADING CASE DEFLECTIONS AND STRESSES *****

Load Case Number 1

Case ID :1

Height	Moment Of Inertia	Coordinates Of Stress Points X	Coordinates Of Stress Points Y	Deflections Load	Deflections Total	Total With No Defl	STRESSES (Incl. Deflections Result) Bendg	Axial	Torsn	She
0.00	1661	14.0	0.0	0.00	0.00	40.46	44.46	0.68	0.00	0.
5.00	1466	13.4	0.0	0.18	0.20	41.02	45.34	0.70	0.00	0.
10.00	1286	12.9	0.0	0.75	0.83	41.55	46.19	0.71	0.00	0.
15.00	1122	12.3	0.0	1.71	1.89	42.04	46.98	0.73	0.00	0.
20.00	973	11.7	0.0	3.10	3.44	42.46	47.69	0.74	0.00	0.
25.00	837	11.2	0.0	4.94	5.49	42.78	48.27	0.76	0.00	0.
30.00	715	10.6	0.0	7.25	8.07	42.96	48.66	0.79	0.00	0.
34.70	611	10.1	0.0	9.88	11.02	42.95	48.77	0.81	0.00	0.
35.00	605	10.0	0.0	10.06	11.22	42.94	48.77	0.82	0.00	0.
38.00	577	9.9	0.0	12.00	13.40	41.18	46.80	0.82	0.00	0.
40.00	538	9.6	0.0	13.39	14.97	40.98	46.60	0.83	0.00	0.
45.00	448	9.1	0.0	17.25	19.32	40.21	45.70	0.87	0.00	0.
50.00	368	8.5	0.0	21.66	24.29	38.88	44.04	0.91	0.00	0.
55.00	298	7.9	0.0	26.62	29.90	36.78	41.32	0.95	0.00	1.
60.00	238	7.4	0.0	32.15	36.15	33.57	37.07	1.01	0.00	1.
61.50	222	7.2	0.0	33.91	38.15	32.32	35.41	1.03	0.00	1.
65.00	187	6.8	0.0	38.20	42.99	17.44	19.83	0.77	0.00	0.
[illegible].00	160	6.5	0.0	42.01	47.31	14.14	15.69	0.81	0.00	0.
[illegible].00	143	6.2	0.0	44.61	50.26	24.04	25.38	0.50	0.00	0.
74.50	110	5.7	0.0	50.73	57.17	22.39	22.67	0.52	0.00	0.
75.00	107	5.7	0.0	51.43	57.96	4.85	5.41	0.16	0.00	0.
80.00	78	5.1	0.0	58.52	65.93	2.55	2.70	0.16	0.00	0.
83.00	63	4.8	0.0	62.79	70.75	0.57	0.41	0.16	0.00	0

VALMONT INDUSTRIES, INC.

'ANORE 230 KV TRANSMISSION LINE STEE CATALOG POLE SELECTED : 95.0178

***** LEVEL DATA AND LOAD CASE MOMENTS *****

Load Case Number 2 SHEAR FORCE AT BASE

Case ID :2 TOTAL VERTICAL FORCE

Height	Mean Diameter Points	D/T Across Flats	B/T	Stress Reduct Factor	{Moment About X-Axis (Kip-In)} Load	Wind	Defl	Total	{Moment Load
0.00	28.772	149.22	37.84	0.88	0	0	0	0	4883
5.00	27.597	143.17	36.22	0.90	0	0	0	0	4549
10.00	26.422	137.12	34.60	0.93	0	0	0	0	4215
15.00	25.247	131.06	32.97	0.95	0	0	0	0	3881
20.00	24.072	125.01	31.35	0.98	0	0	0	0	3547
25.00	22.897	118.96	29.73	1.00	0	0	0	0	3213
30.00	21.722	112.90	28.11	1.00	0	0	0	0	2879
34.70	20.617	107.21	26.58	1.00	0	0	0	0	2564
35.00	20.547	106.85	26.49	1.00	0	0	0	0	2544
38.00	20.230	105.22	26.05	1.00	0	0	0	0	2344
40.00	19.760	102.80	25.40	1.00	0	0	0	0	2210
45.00	18.585	96.74	23.78	1.00	0	0	0	0	1876
50.00	17.410	90.69	22.16	1.00	0	0	0	0	1542
55.00	16.235	84.64	20.53	1.00	0	0	0	0	1208
60.00	15.060	78.58	18.91	1.00	0	0	0	0	874
61.50	14.708	76.77	18.43	1.00	0	0	0	0	773
65.00	13.885	72.53	17.29	1.00	0	0	0	0	450
68.00	13.180	68.90	16.32	1.00	0	0	0	0	310
70.00	12.710	66.48	15.67	1.00	0	0	0	0	325
74.50	11.653	61.03	14.21	1.00	0	0	0	0	205
75.00	11.535	60.42	14.05	1.00	0	0	0	0	54
80.00	10.360	54.37	12.42	1.00	0	0	0	0	21
83.00	9.655	50.74	11.45	1.00	0	0	0	0	1

VALMONT INDUSTRIES, INC.

ANORE 230 KV TRANSMISSION LINE STEE CATALOG POLE SELECTED : 95.0178

***** LOADING CASE DEFLECTIONS AND STRESSES *****

Load Case Number 2
Case ID :2

Height	Moment Of Inertia	Coordinates Of Stress Points X	Y	Deflections Load	Total	Total With No Defl	STRESSES {Incl. Deflections Result Bendg	Axial	Torsn	Sh
0.00	1661	14.0	0.0	0.00	0.00	51.95	53.73	0.36	0.00	1.
5.00	1466	13.4	0.0	0.23	0.24	51.84	53.76	0.36	0.00	1.
10.00	1286	12.9	0.0	0.95	0.98	51.65	53.71	0.36	0.00	1.
15.00	1122	12.3	0.0	2.16	2.24	51.36	53.55	0.36	0.00	1.
20.00	973	11.7	0.0	3.89	4.05	50.93	53.24	0.36	0.00	1.
25.00	837	11.2	0.0	6.16	6.41	50.33	52.72	0.36	0.00	1.
30.00	715	10.6	0.0	8.99	9.36	49.48	51.93	0.36	0.00	1.
34.70	611	10.1	0.0	12.17	12.69	48.38	50.86	0.37	0.00	1.
35.00	605	10.0	0.0	12.39	12.92	48.30	50.78	0.37	0.00	1.
38.00	577	9.9	0.0	14.72	15.35	45.58	47.95	0.36	0.00	1.
40.00	538	9.6	0.0	16.38	17.10	44.85	47.20	0.36	0.00	1.
45.00	448	9.1	0.0	20.95	21.89	42.59	44.85	0.37	0.00	1.
50.00	368	8.5	0.0	26.10	27.28	39.52	41.61	0.38	0.00	1.
55.00	298	7.9	0.0	31.82	33.28	35.34	37.14	0.39	0.00	1.
60.00	238	7.4	0.0	38.07	39.86	29.59	30.95	0.40	0.00	1.
61.50	222	7.2	0.0	40.05	41.93	27.47	28.66	0.40	0.00	1.
65.00	187	6.8	0.0	44.81	46.94	18.25	19.14	0.30	0.00	1.
[illegible].00	160	6.5	0.0	49.03	51.37	14.03	14.59	0.31	0.00	1.
[illegible].00	143	6.2	0.0	51.90	54.39	15.29	15.76	0.19	0.00	0.
74.50	110	5.7	0.0	58.53	61.35	11.33	11.39	0.19	0.00	0.
75.00	107	5.7	0.0	59.27	62.13	3.33	3.50	0.06	0.00	0.
80.00	78	5.1	0.0	66.80	70.03	1.51	1.55	0.05	0.00	0.
83.00	63	4.8	0.0	71.33	74.80	0.14	0.10	0.04	0.00	0.

MONTANORE 230 KV TRANSMISSION LINE STEE CATALOG POLE SELECTED : 95.0178

*** POLE CHARACTERISTICS ***

POLE HEIGHT ABOVE GROUND	POLE SHAFT WEIGHT	POLE TAPER	GROUNDLINE DIAMETER	TOP DIAMETER
83.50	3995	0.1400	17.33	9.40

Sectioning Levels	/First/ 36.53
Connection Type	Lap Splice
Overlap Length	3.30

*** SECTION CHARACTERISTICS ***

	/First/	/Second/
Section Base Diam.	18.94	0.00
Section Top Diam.	19.35	9.40
Diam. at Section	17.33	19.73
Section Thickness	0.1875	0.1793
Section Length	48.03	0.00
Section Weight	2518	1477
Section Yield Str.	65.00	55.00

*** STRUCTURAL CHARACTERISTICS ***

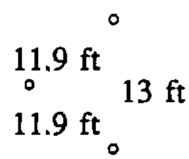
LOCATION CODE	BASE	Minimum S.F. SECT 1	Minimum S.F. SECT 2	TOP
Height From Base (Ft)	0.00	0.00	38.00	83.00
Major Diameter -X- (In)	17.33	27.98	19.73	9.51
Minor Diameter -Y- (In)	17.33	27.98	19.73	9.51
Crit Section Modulus (In^3)				
Across The Points	114.69	114.69	56.54	12.75
Across The Flats	118.73	118.73	58.53	13.19
Moments About -Y- Axis (K-In)				
Loading Only	4883	4883	2344	0
Wind On Pole	1242	1242	303	0
Deflected Vert Load	255	255	160	0
Moments About -X- Axis (K-In)				
Loading Only	0	0	0	0
Wind On Pole	0	0	0	0
Deflected Vert Load	0	0	0	0
Resultant Moment (Kip-In)	6380	6380	2807	0
Total Deflection (In)	0.00	0.00	15.35	71.57
Governing Load Case	2	2	2	1
Allowable Stress (Ksi)	57.16	57.16	65.00	65.00
Total Stress (Ksi)	54.12	54.12	48.34	0.00
Safety Factor	1.06	1.06	1.34	999.00
Shear Force (Lb)	8534	8534	6827	0
Total Vertical Force (Lb)	6104	6104	4273	0

LOCATION CODE -*- TOP IS POLE TOP, BASE IS GROUNDLINE,
Minimum S.F. IS SECTION LEVEL WITH LEAST SAFETY FACTOR.
TOTAL STRESS INCLUDES Bending, Compression, Torsion and Shear.
NOTE --> ALL DIAMETERS SHOWN ARE OUTSIDE AND MEASURED ACROSS FLATS.

230 KV TRANSMISSION LINE ELECTRICAL CALCULATIONS

Conductor Type 795 Drake
GMR = .0373 = DS
AC resistance at 50°C = .128 ohms/mile

Conductor Spacing



Inductive Reactance

Deq. = Cube root (11.9 X 11.9 X 13)
= 12.26 ft

XL = $2 \times 10^{-7} \times 1609 \times 2 \times \pi \times F \times \ln.(Deq./DS)$

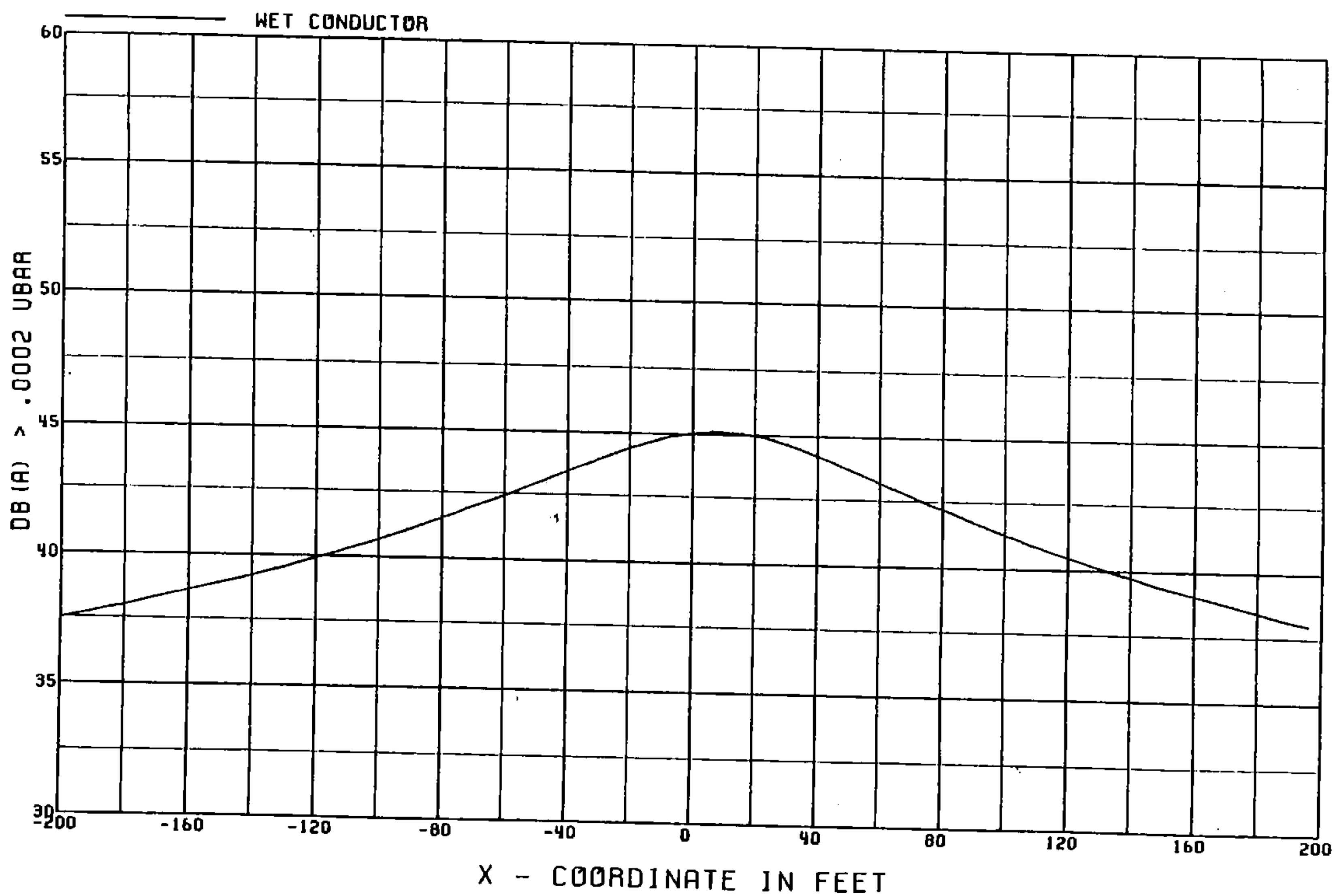
= $2 \times 10^{-7} \times 1609 \times 2 \times \pi \times 60 \times \ln.(12.26/.0373)$

= .703 ohms/mile

Z = .128 + J.703 ohms/mile

Phase angle = 79.68°

For 16.35 miles Z = 2.09 + J11.49 ohms

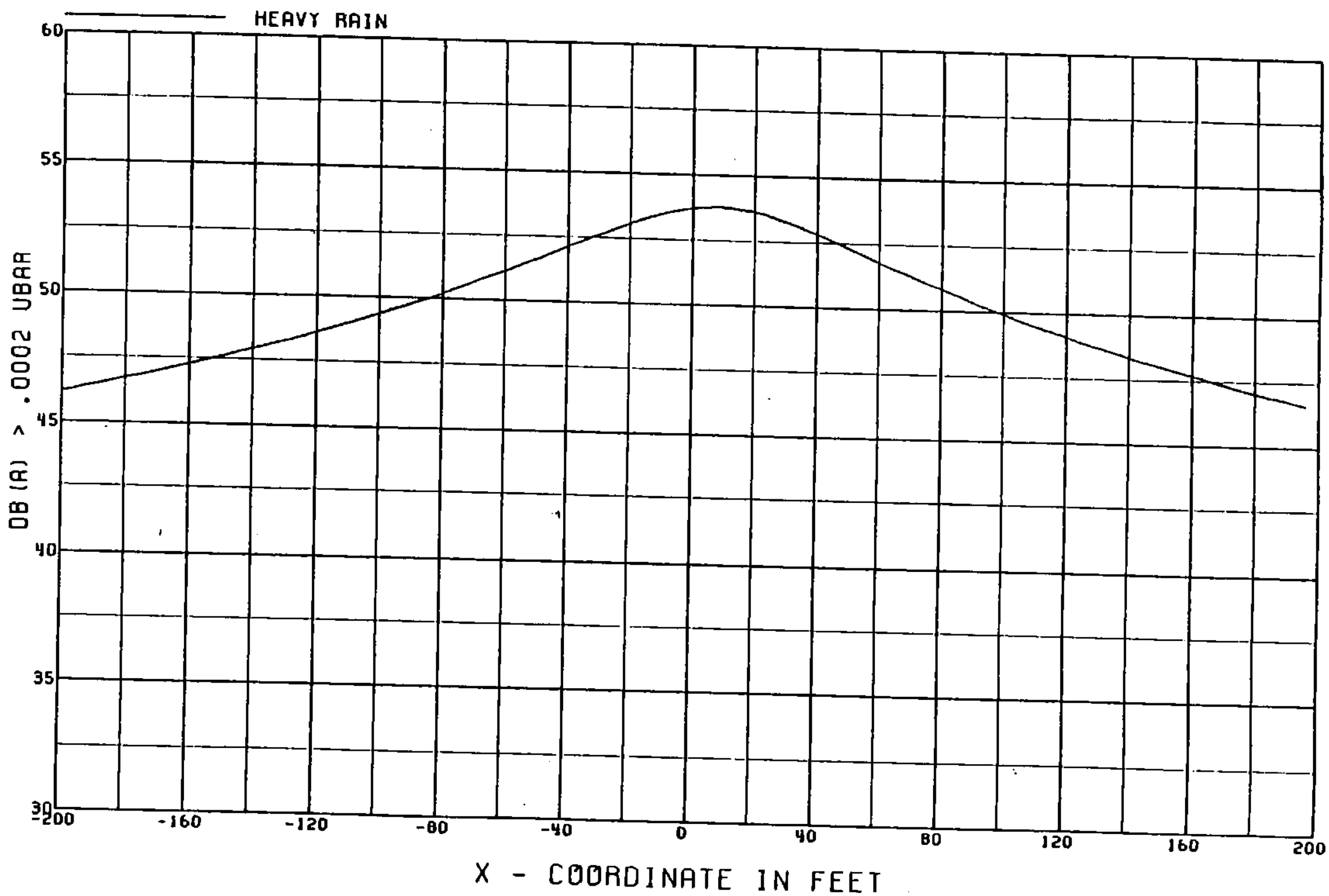


POWER TECHNOLOGIES INC.

AUDIBLE NØISE PRØGRAM

230 KV SINGLE CIRCUIT UPSWEPT ARMS

Figure 2

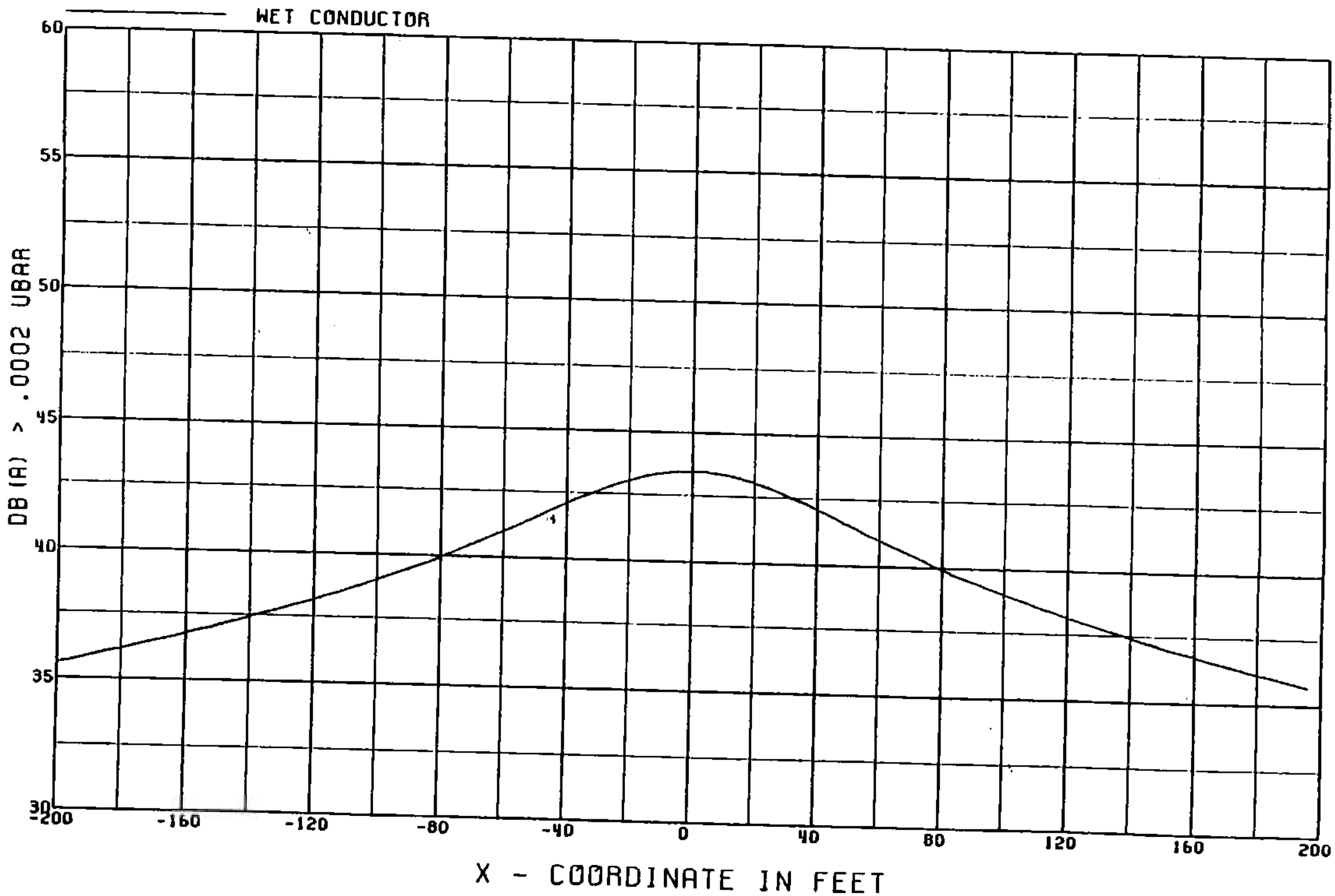


POWER
TECHNOLOGIES
INC.

AUDIBLE NØISE PRØGRAM

230 KV SINGLE CIRCUIT UPSWEPT ARMS

Figure 3

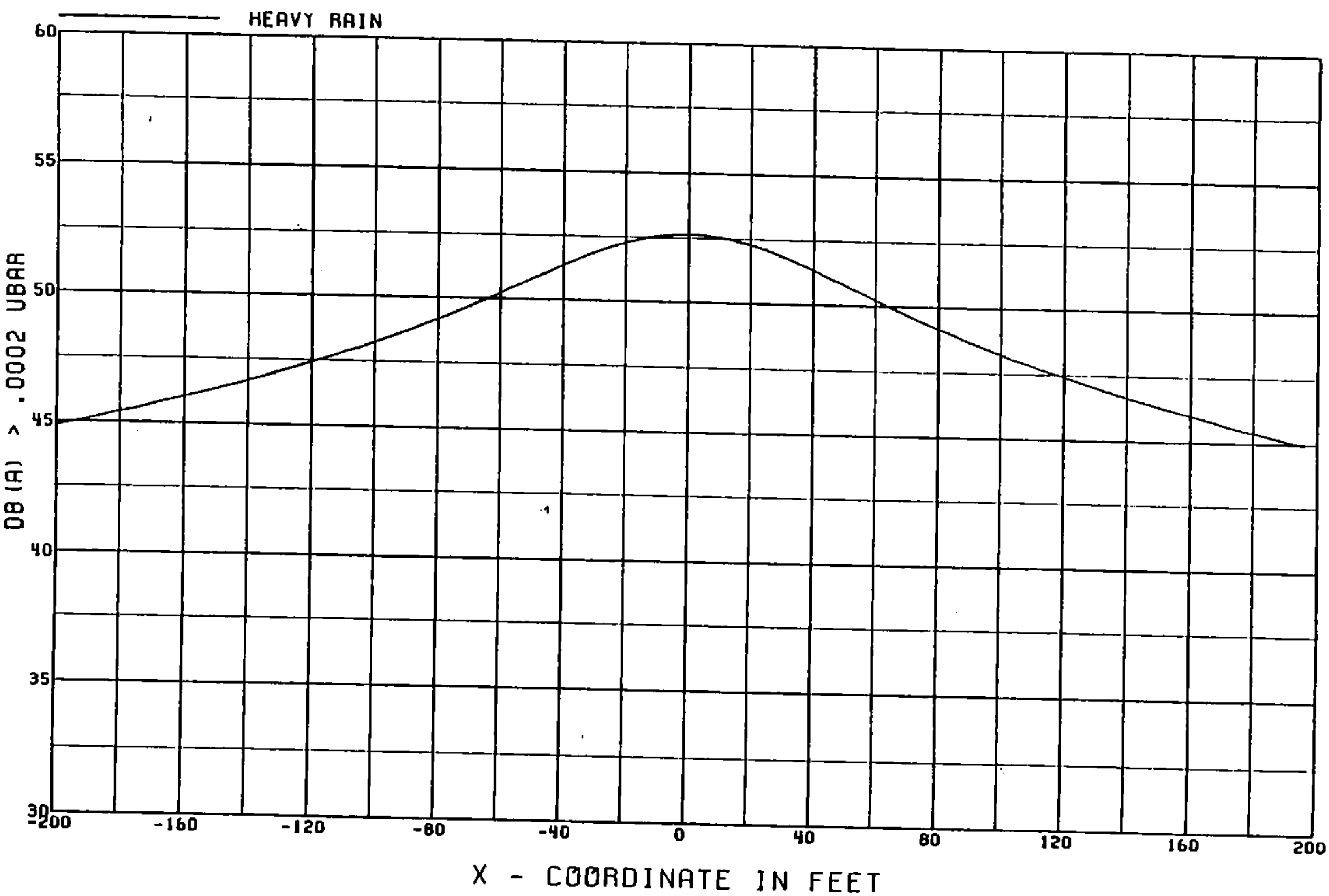


POWER
TECHNOLOGIES
INC.

AUDIBLE NØISE PRØGRAM

230 KV H FRAME SUSPENSION - 2 PØLE

Figure 4

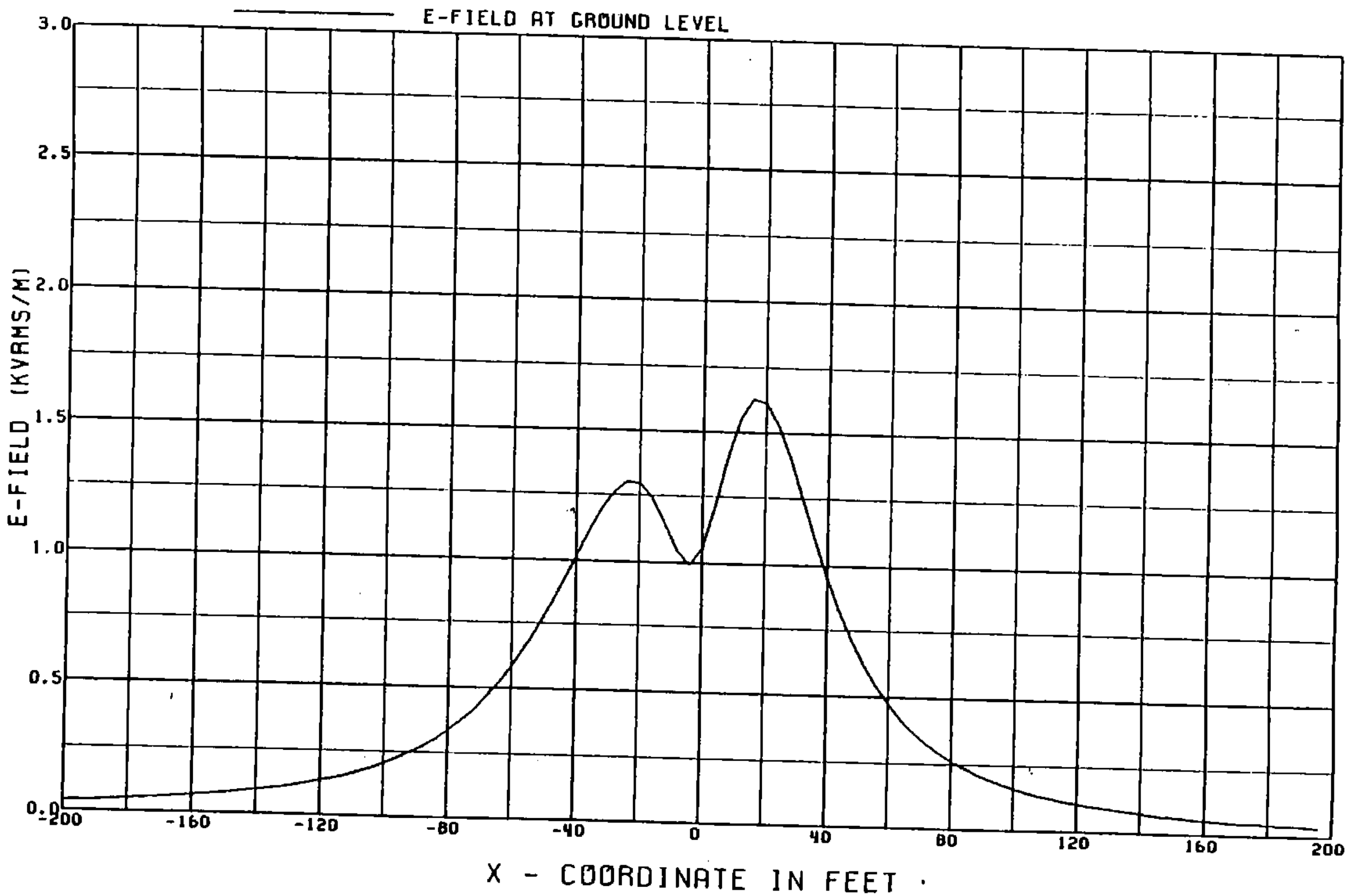


POWER TECHNOLOGIES INC.

AUDIBLE NOISE PROGRAM

230 KV H FRAME SUSPENSION - 2 POLE

Figure 5



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INC.

ELECTRIC FIELD PROGRAM

230 KV SINGLE CIRCUIT UPSWEPT ARMS

Figure 6

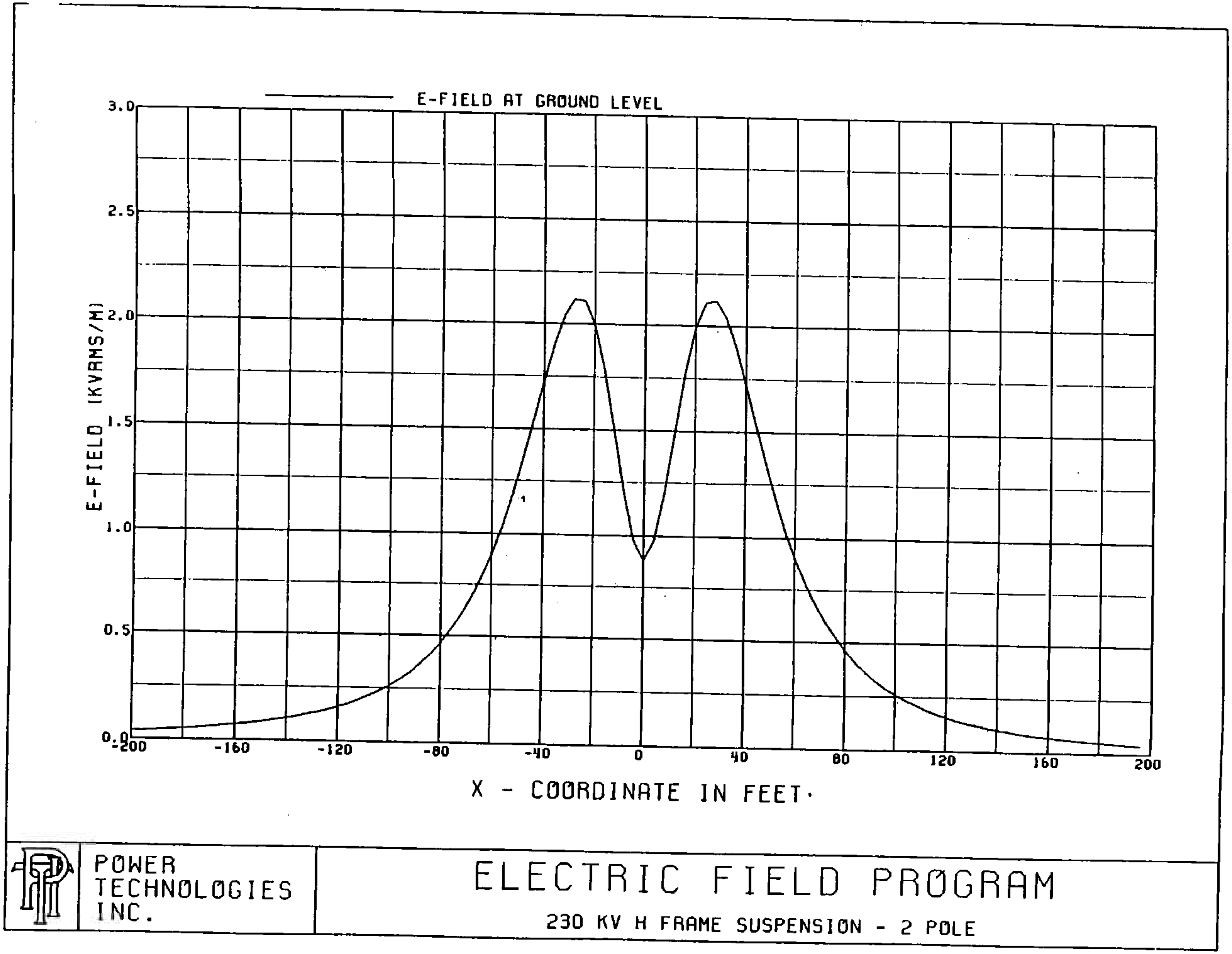
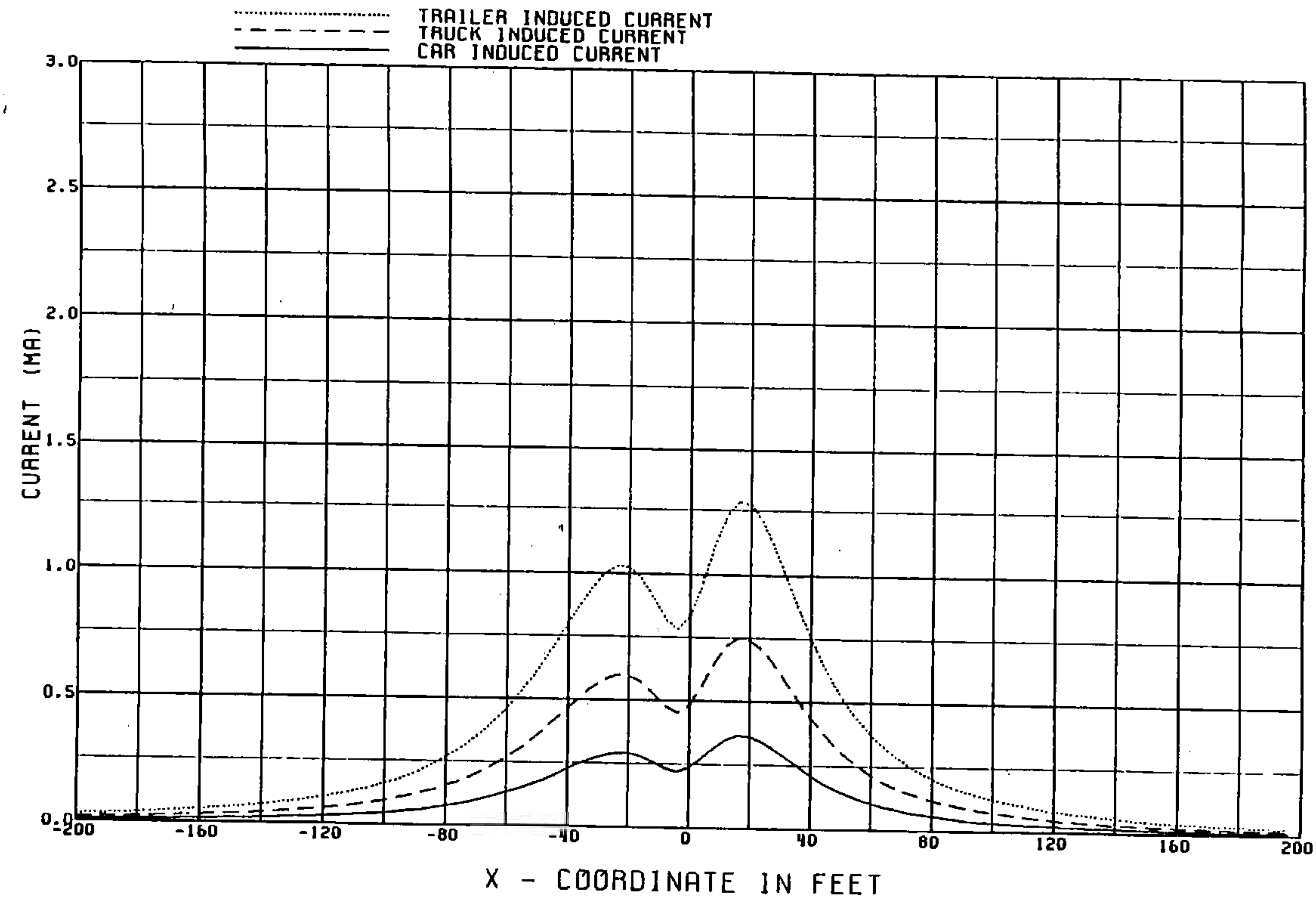

E-FIELD AT GROUND LEVEL
E-FIELD (KVRMS/M)
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-200
-160
-120
-80
-40
0
40
80
120
160
200
X - COORDINATE IN FEET
POWER TECHNOLOGIES INC.
ELECTRIC FIELD PROGRAM
230 KV H FRAME SUSPENSION - 2 POLE

Figure 7

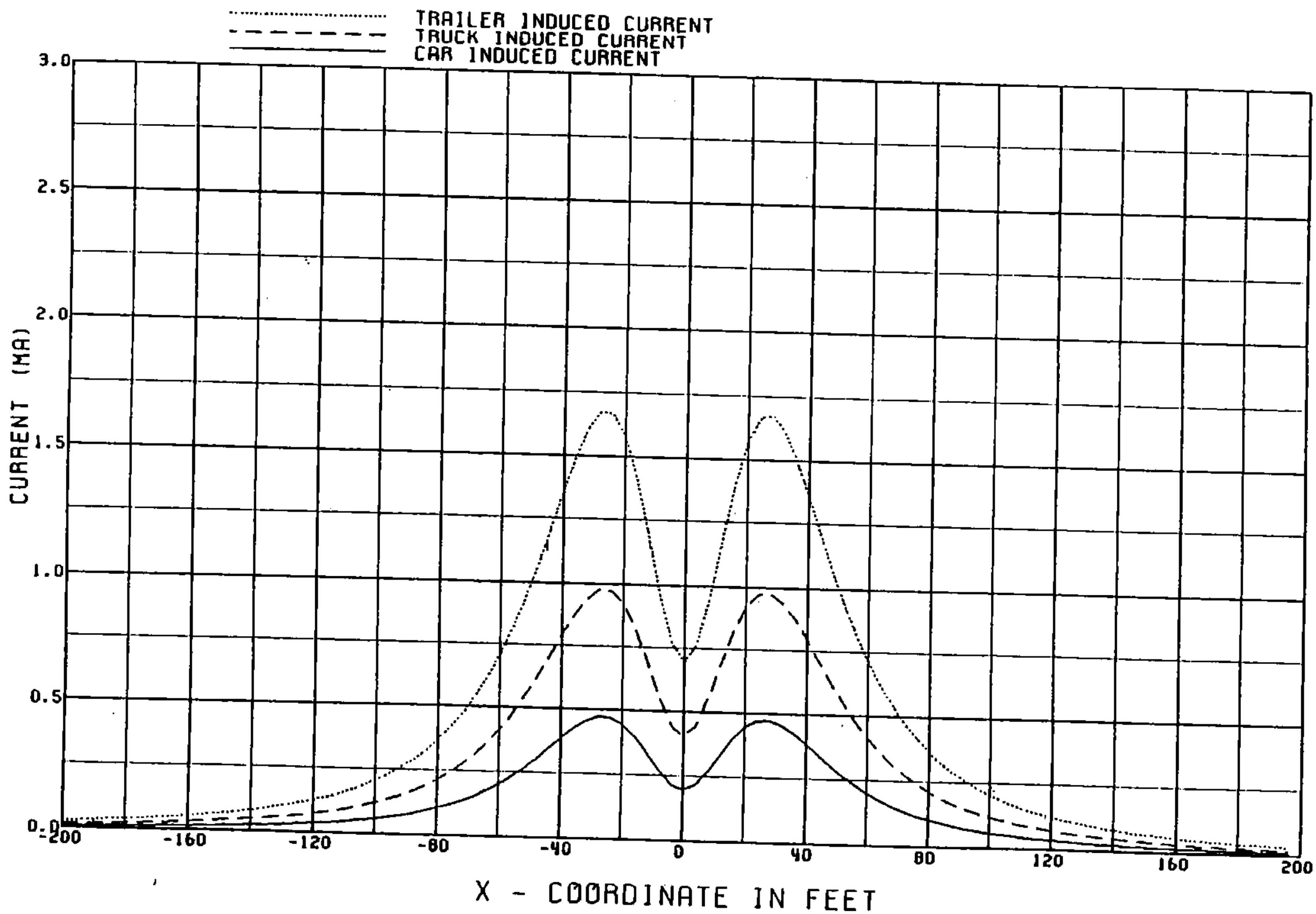


POWER TECHNOLOGIES INC.

ELECTRIC FIELD PROGRAM

230 KV SINGLE CIRCUIT UPSWEPT ARMS

Figure 8



POWER TECHNOLOGIES INC.

ELECTRIC FIELD PROGRAM

230 KV H FRAME SUSPENSION - 2 POLE

Figure 9

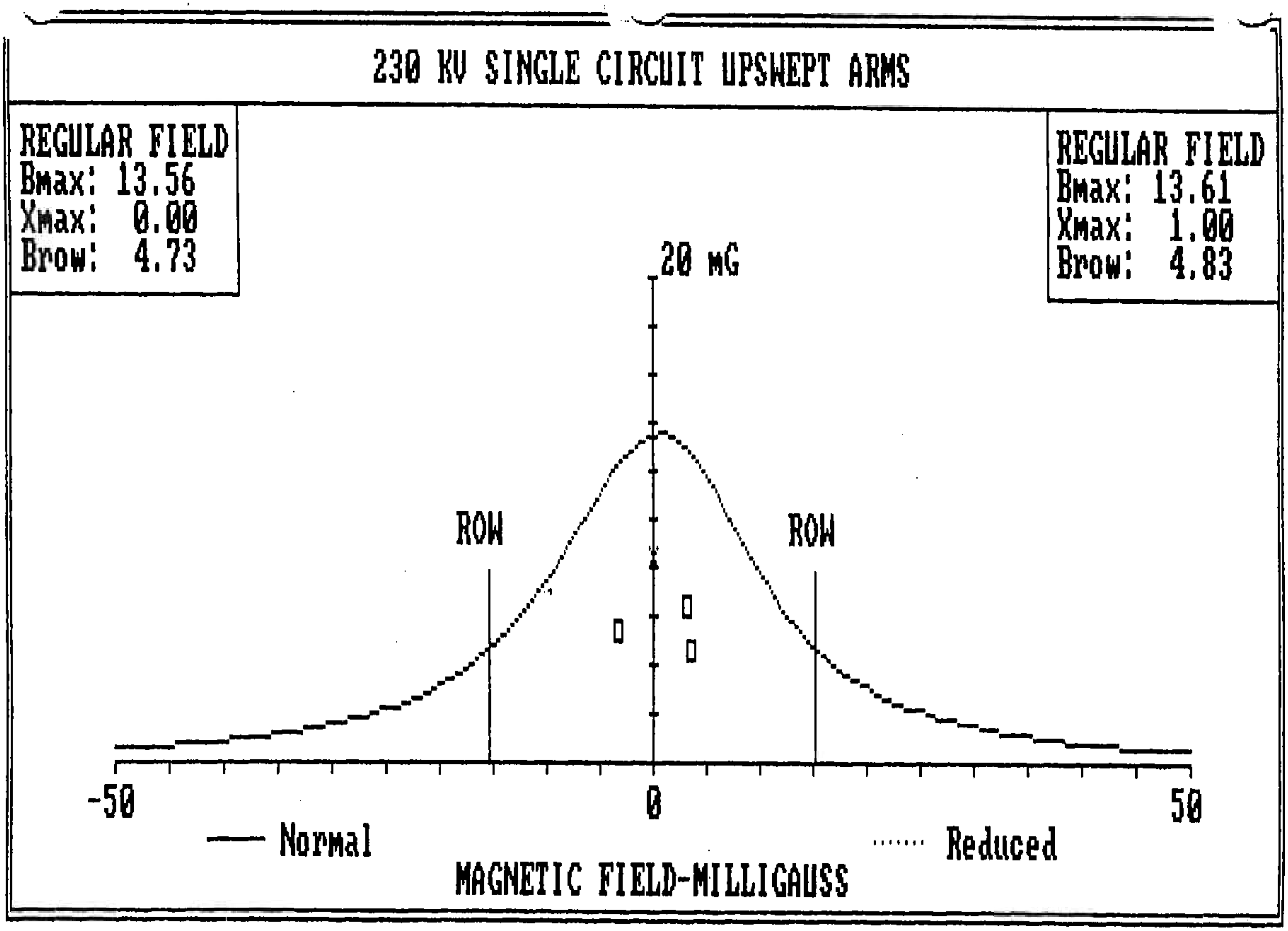

230 KV SINGLE CIRCUIT UPSWEPT ARMS
REGULAR FIELD
Bmax: 13.56
Xmax: 0.00
Brow: 4.73
REGULAR FIELD
Bmax: 13.61
Xmax: 1.00
Brow: 4.83
20 mG
ROW
ROW
-50
0
50
Normal
Reduced
MAGNETIC FIELD-MILLIGAUSS

Figure 10

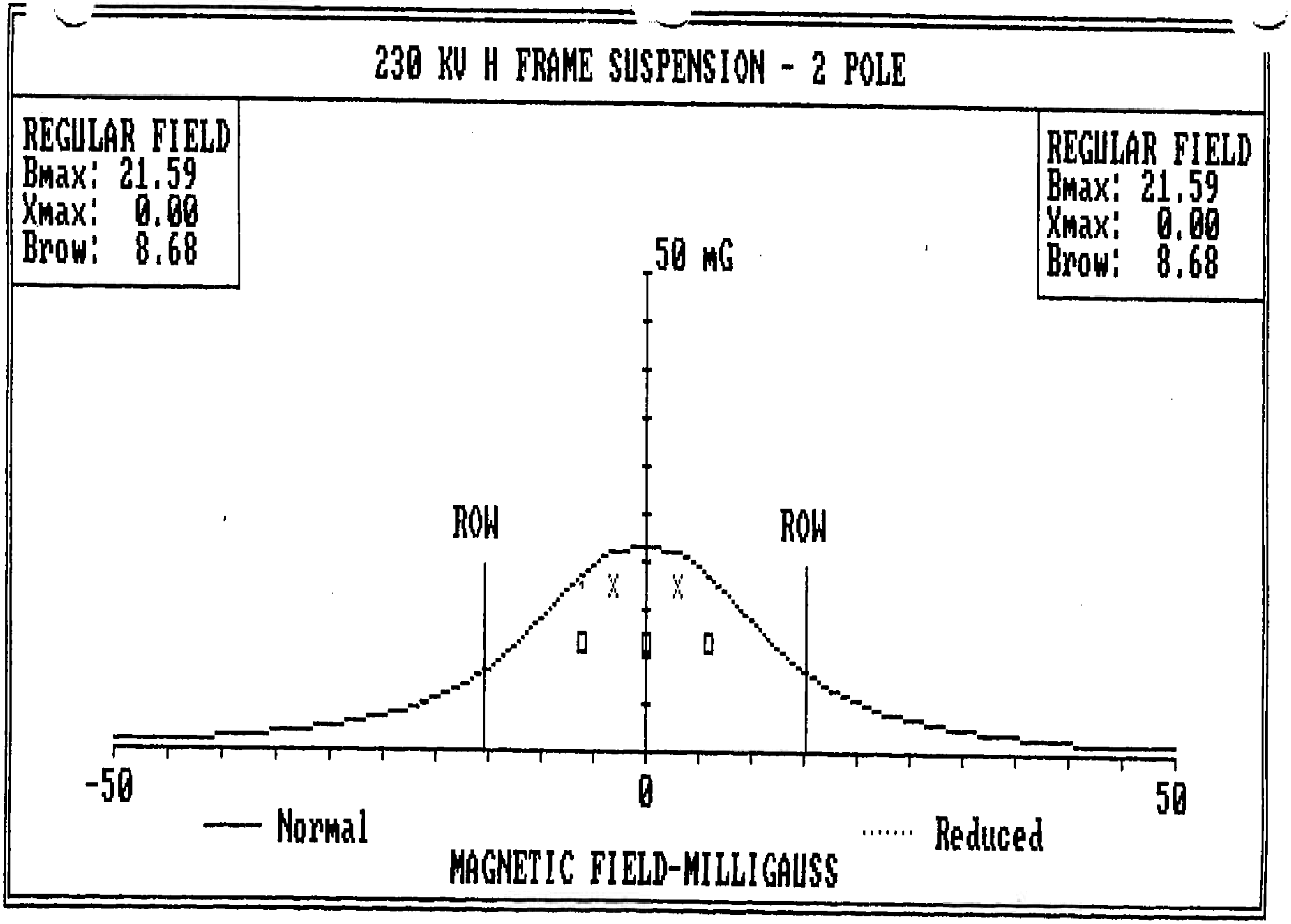
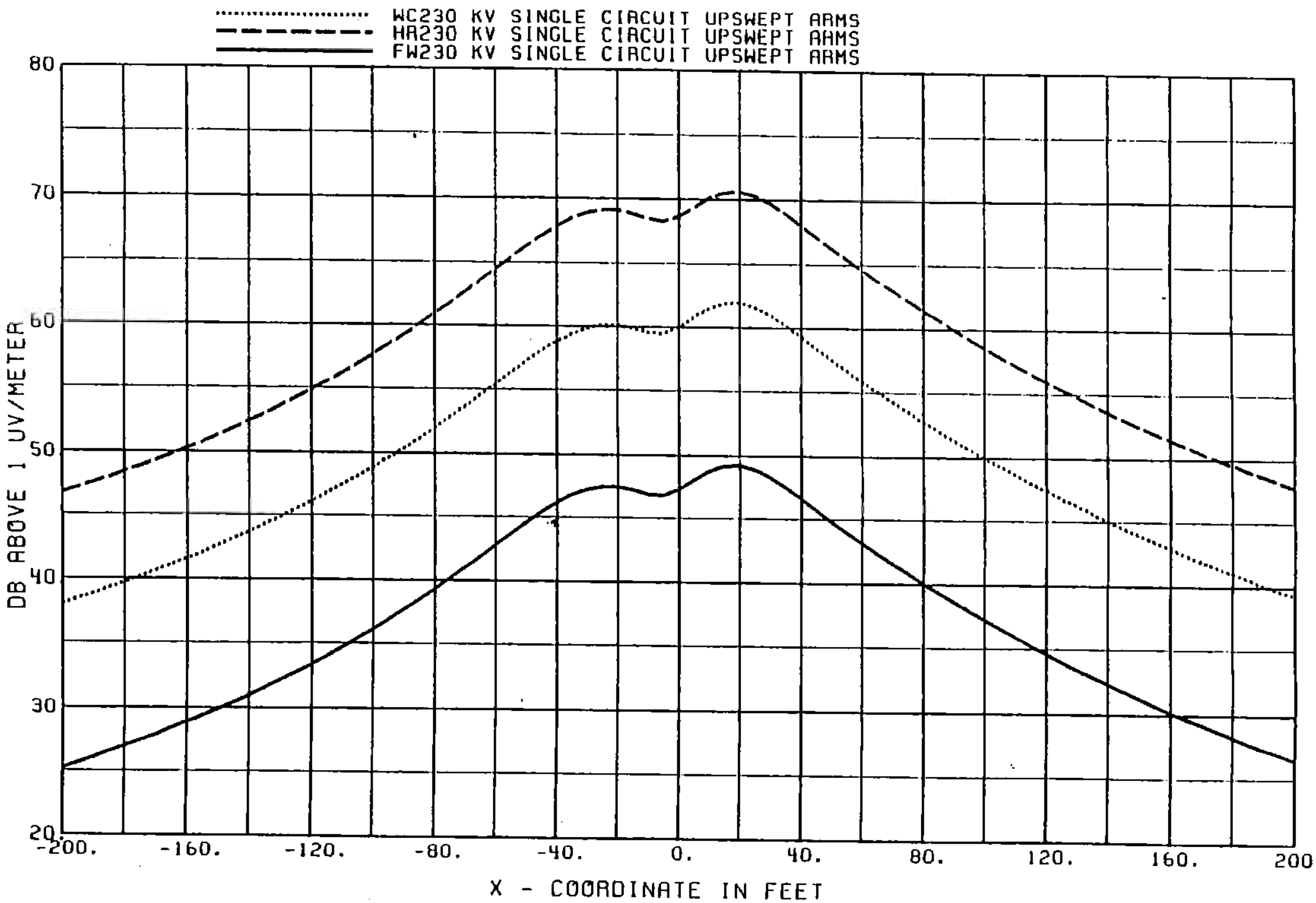

230 KV H FRAME SUSPENSION - 2 POLE
REGULAR FIELD
Bmax: 21.59
Xmax: 0.00
Brow: 8.68
REGULAR FIELD
Bmax: 21.59
Xmax: 0.00
Brow: 8.68
50 mG
ROW
ROW
-50
0
50
Normal
Reduced
MAGNETIC FIELD-MILLIGAUSS

Figure 11

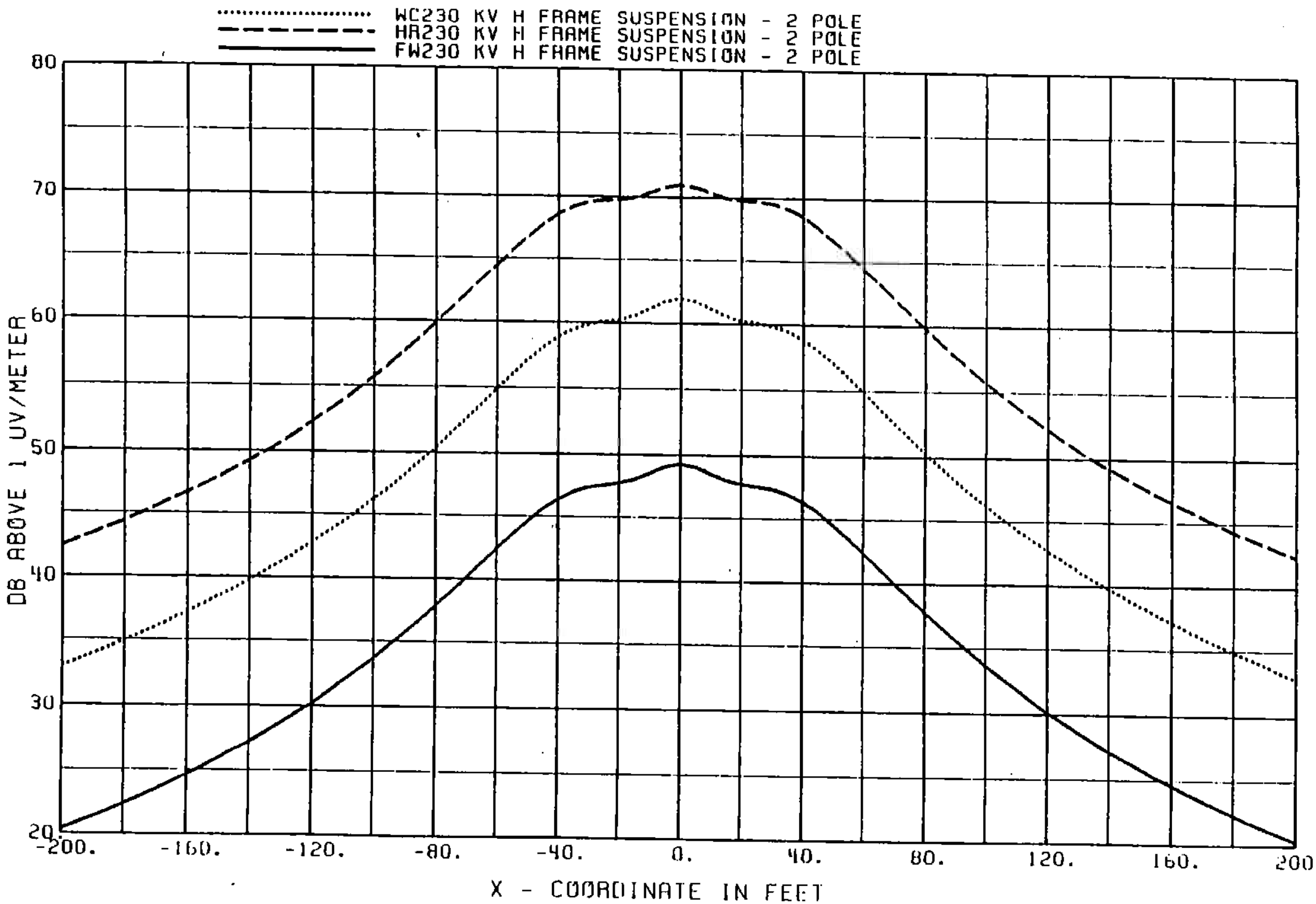


POWER TECHNOLOGIES INC

RADIO NOISE PROGRAM REV. 9/81

COMPARISON OF LATERAL PROFILES FOR INFINITE LINE LENGTH

Figure 12



POWER TECHNOLOGIES INC

RADIO NOISE PROGRAM REV. 9/81

COMPARISON OF LATERAL PROFILES FOR INFINITE LINE LENGTH

Figure 13

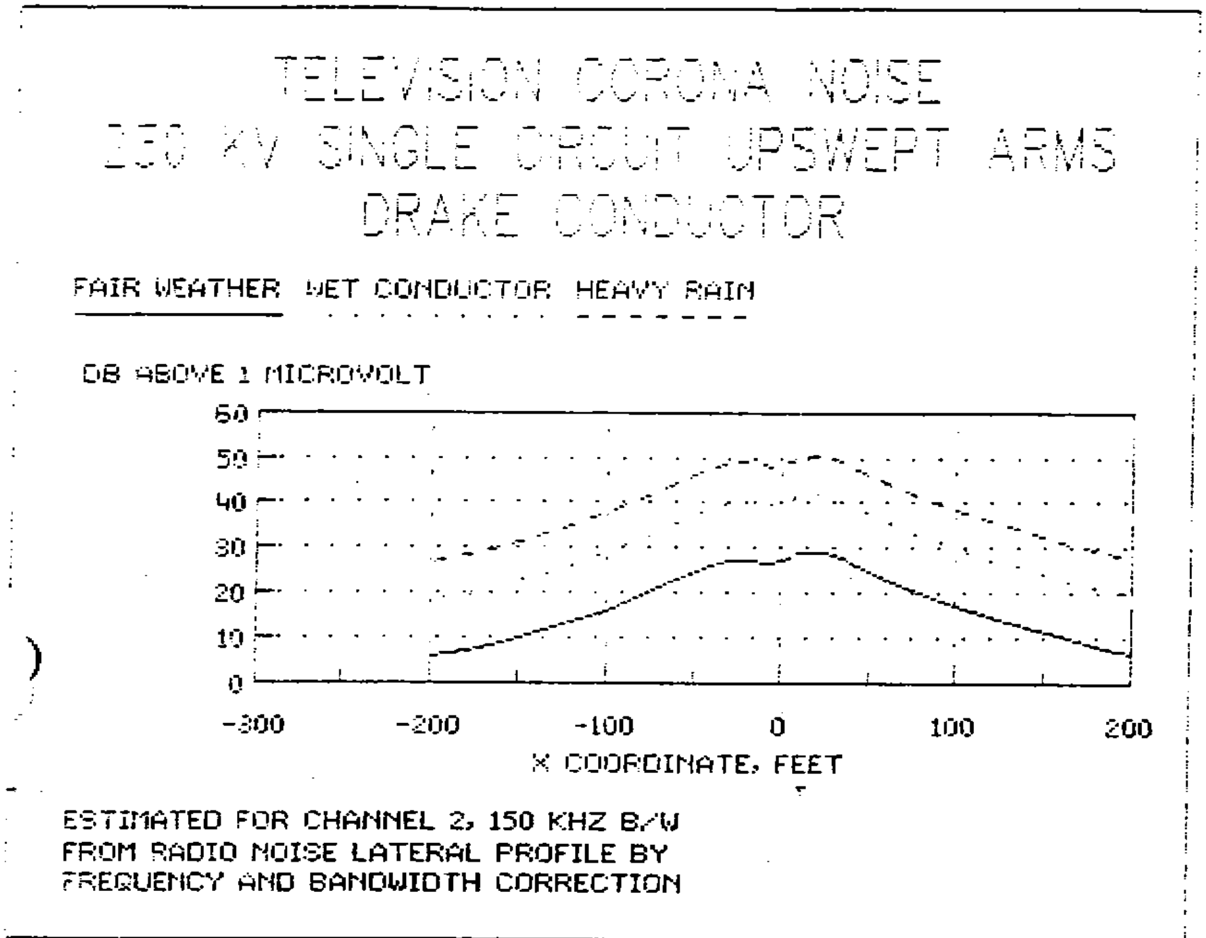

TELEVISION CORONA NOISE
230 KV SINGLE CIRCUIT UPSWEPT ARMS
DRAKE CONDUCTOR
FAIR WEATHER
WET CONDUCTOR
HEAVY RAIN
DB ABOVE 1 MICROVOLT
60
50
40
30
20
10
0
-300
-200
-100
0
100
200
X COORDINATE, FEET
ESTIMATED FOR CHANNEL 2, 150 KHZ B/W
FROM RADIO NOISE LATERAL PROFILE BY
FREQUENCY AND BANDWIDTH CORRECTION

Figure 14

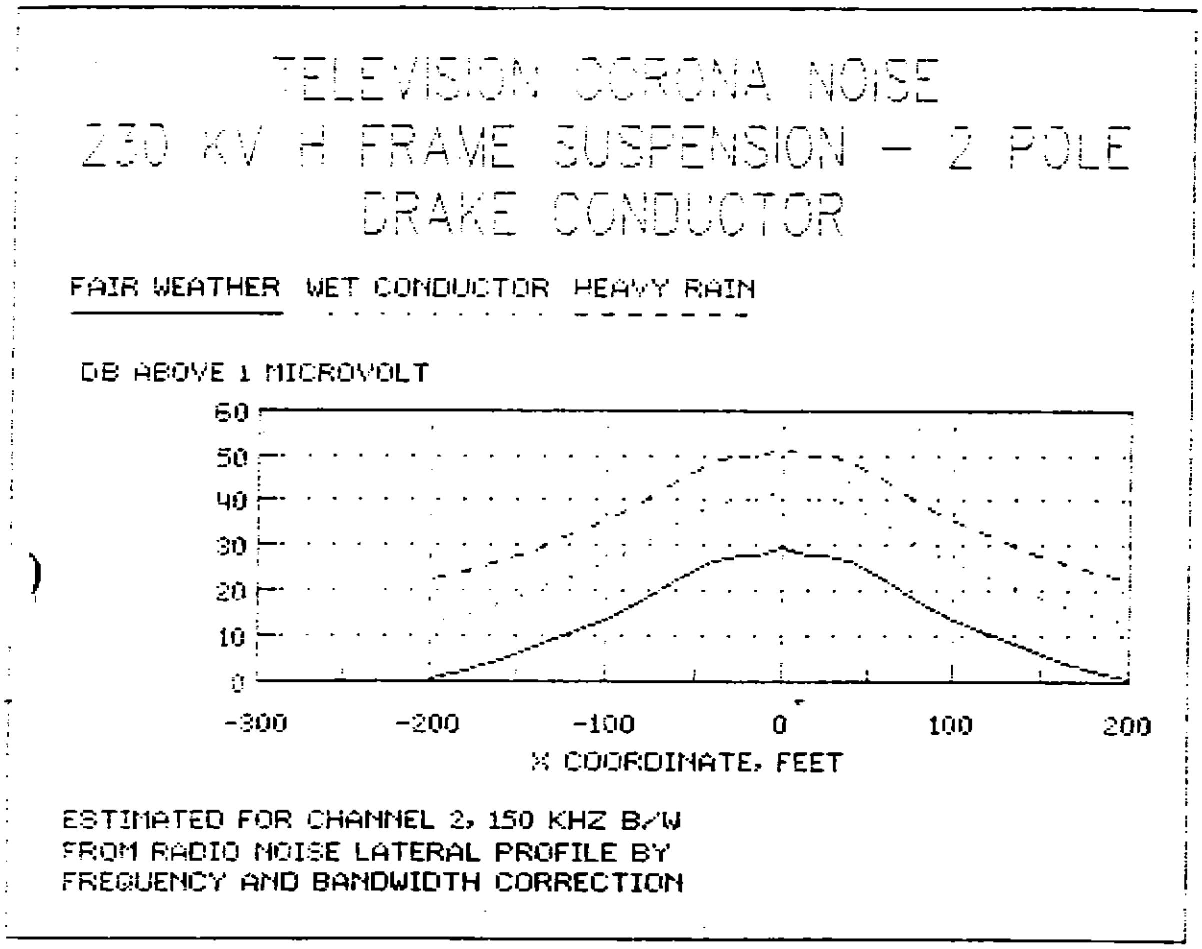

TELEVISION CORONA NOISE
230 KV H FRAME SUSPENSION – 2 POLE
DRAKE CONDUCTOR
FAIR WEATHER WET CONDUCTOR HEAVY RAIN
DB ABOVE 1 MICROVOLT
60
50
40
30
20
10
0
-300
-200
-100
0
100
200
X COORDINATE, FEET
ESTIMATED FOR CHANNEL 2, 150 KHZ B/W
FROM RADIO NOISE LATERAL PROFILE BY
FREQUENCY AND BANDWIDTH CORRECTION

Figure 15

Table 4.2-1. Common Noise Levels.

Sound pressure	Sound level in dB		Environmental conditions
		140	
1 mbar	134		Threshold of pain
		130	
			Pneumatic chipper
		120	
100 μbar	114		Loud automobile horn (dist. 1 m)
		110	
		100	
10 μbar	94		Inside subway train (New York)
		90	
			Inside motor bus
		80	
1 μbar	74		Average traffic on street corner
		70	
			Conversational speech
		60	
0.1 μbar	54		Typical business office
		50	
			Living room, suburban area
		40	
0.01 μbar	34		Library
		30	
			Bedroom at night
		20	
0.001 μbar	14		Broadcasting studio
		10	
0.0002 μbar			Threshold of hearing
		0	

Figure 16

Source: Electric Power Research Institute. 1975 Transmission Line Reference Book, 345-kV and Above, Table 6.2.1

TRANSMISSION LINE PROJECT SCHEDULE

PROJECT TITLE MONTANA PROJECT
BY: Jim Rogers
DATE: 5-10-89

```
ACTIVITY                          MONTHS
                                  0  2  4  6  8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52
FILE STATE APPLICATION            X
DNRC REVIEW                       XXXXXXXXXXXXXXXXXX
NORANDA APPLICATION FOLLOWUP         XXX
BNRC REVIEW AND APPROVAL                            X
PERMISSION TO SERVEY                                 X
SERVEY CENTER LINE                                    XXXX
DRAFT CENTERLINE                                          XX
SURVEY PROFILE                                            XX
DRAFT PROFILE                                               X
DESIGN & ORDER MATERIAL                                      XXXXXX
R/W PROCUREMENT                                                    XXXXXX
SPECIAL PERMITS STATE & FED                                     XXXXXX
STAKE STRUCTURES                                                         XXX
MATERIAL ARRIVAL                                                   XXXXXX
AWARD CONTRACTS                                                       XXX
MOBILIZATION                                                               X
CLEAR R/W                                                                  XX
ROADS AND TRAILS                                                            XXX
HAUL MATERIAL                                                              XXXX
HOLE DRILLING                                                                XXX
FRAME STRUCTURES                                                              XXX
SET STRUCTURES                                                                 XXX
INSTAL WIRE                                                                     XXX
TEST AND ENERGIZE                                                                 XX
CLEAN UP                                                                            X
```

Figure 17

Appendix B: Agreements

Department of Energy
Bonneville Power Administration
Upper Columbia Area
Room 561, U.S. Court House
West 920 Riverside Avenue
Spokane, Washington 99201-1083

May 30, 1989

In reply refer to: UE

Mr. Joe Scheuering, Project Manager
Noranda Minerals Corporation
Montana Mining Venture
P.O. Box A.L.
Libby, MT 59923

Dear Joe:

Enclosed is Noranda Minerals Corporation's (Noranda) fully signed original of Reimbursable Agreement No. DE-AI79-89BP79400, dated May 25, 1989, between Bonneville Power Administration (Bonneville) and Noranda for preliminary engineering and environmental work (Phase 1). This contract covers development of a 230-kV point-of-delivery to Noranda's future power supplier for a connection to Bonneville's Noxon-Libby 230-kV Line near Pleasant Valley, Montana. Your Check No. 1157 for the amount of $25,000.00 has been received and deposited in Noranda's Trust Account.

Confirming our conversation of May 23, 1989, I have scheduled at meeting at your Libby, Montana, office on Monday, June 5, between key Bonneville engineering and environmental staff involved in carrying out the reimbursable work covered by our agreement.

At this meeting we will want to obtain additional information about Noranda's project and proposed electrical system to enable Bonneville to begin its system planning studies and to cooperate with Noranda, the US Forest Service, and the Montana State Department of Natural Resources and Conservation (DNRC), in preparation of the environmental documents covering the proposed Bonneville 230-kV substation and tap to Bonneville's existing power line. As part of this meeting we will also want to develop a schedule of our respective work activities, then visit the possible substation sites, and gather information to evaluate them for discussion and write-up in the environmental documents and for use in design of the substation. Arrangements are made for the Bonneville people to arrive by Bonneville aircraft at the Libby, Montana, airport at 10:00 a.m. Mountain Daylight Time, and leave at 4:00 p.m. Mountain Daylight Time.

Don Hawkins, BPA's Montana District Engineer, is scheduled to meet us at the Libby Airport. I understand that Noranda can provide additional ground transportation. Bonneville people scheduled to attend the meeting and participate in the substation site investigation work, in addition to Tim Patrick, Don Hawkins, and me, will be:

Len Morales, System Planning, Project Manager
Lou Driessen, Facilities Siting Engineer (Civil Engineer)
Robert Kuepper, Substation Design, Project Manager
Phil Havens, Environmental Specialist

If you have any questions or other matters that we need to discuss before the meeting, please call me at (509) 353-2567.

Sincerely,

Paul E. Eichin, P.E.
Area Engineer

Enclosure

cc:
Ed Netherton
J.S. Redpath Corp.
Mesa, Arizona

Don Hawkins, P.E.
BPA Montana District Engineer
Missoula, MT

NORANDA COPY

U.S. DEPARTMENT OF ENERGY—BONNEVILLE POWER ADMINISTRATION

AGREEMENT

1. AGREEMENT NO.	1A. AGREEMENT TYPE:	MODIFICATION NO.	2. EFFECTIVE DATE	3. PROCUREMENT REQUEST NO.
DE-AI79-89BP79400	( ) Interagency ( ) Intraagency ( ) Intergovernmental (X) Customer		See Block 15	79-89BP79400

4. ISSUED TO: Noranda Minerals Corporation
Montana Mining Venture
101 Woodlands Road
P.O. Box A.L.
Libby, Montana 59923

5. ISSUED BY:
U.S. Department of Energy
Bonneville Power Administration
P.O. Box 3621
Portland, Oregon 97208

6. PRINCIPAL CONTACTS
Technical: Joe Scheuering, Project Manager
Phone: (406)293-8795
Administrative: (See above)
Phone:

7. PRINCIPAL CONTACTS
Technical: Timothy O. Patrick
Phone: (509) 353-2592
Administrative: Paul E. Eichin
Phone: (509) 353-2567

8. THIS AGREEMENT WAS NEGOTIATED PURSUANT TO:
☐ 31 U.S.C. 686(a) (Federal)
☒ 16 U.S.C. 832a(f) (Customer)
☐ 16 U.S.C. 832g (Other)
☐ ____________

9. ACCOUNTING INFORMATION (BPA USE ONLY):

10. TITLE AND BRIEF DESCRIPTION OF WORK TO BE PERFORMED UNDER THIS AGREEMENT: BPA will perform at Noranda's expense, preliminary engineering and environmental work required for development of a 230-kV point-of-delivery to Noranda's future power supplier from a connection to BPA's Noxon-Libby 230-kV line near Pleasant Valley, MT. The detailed scope of BPA work (Phase 1) is described in Exhibit A, attached. Phase 2 work, not covered by this Agreement, would include the detailed design, material orders, and construction of BPA facilities required to serve Noranda's power supplier, and would be financed under a separate Reimbursable Agreement or other business arrangement to be determined at a later date. If the actual costs for Phase 1 work exceeds $50,000, a revision to this Agreement will be necessary. An initial deposit of $25,000 to BPA is required with signing of this Agreement. Additional deposits to the Trust Fund will be requested by BPA when needed to cover BPA's actual costs.

The following documents are attached to and become a part of this Agreement:

1. Letter of Request, dated April 18, 1989, to BPA's Wayne Lee from Joe Scheuering, Project Manager, Noranda Minerals Corporation, Montana.
2. Letter dated May 11, 1989, to Joe Scheuering, Noranda, from Wayne Lee, BPA, Upper Columbia Area Manager.
3. Exhibit A: Scope of work for preliminary engineering and environmental work (Phase 1).

If this is an Intergovernmental or Customer Agreement, the provisions on the reverse of this form are a part of the Agreement.

11. AMOUNT TO BE PAID BY BPA: $____________

Submit SF-1081 or other invoice to:

Division of Fiscal Accounting and Disbursement—DT
Bonneville Power Administration
P.O. Box 3621
Portland, Oregon 97208

12. AMOUNT TO BE PAID BPA: $ Actual Costs
First Payment: $25,000.00
Accounting Information: ____________

SF 1081 to be submitted to:
Name ____________
Address ____________

13. EFFECTIVE PERIOD OF AGREEMENT:
This Agreement will be effective from the date in Block 2 until October 1, 1990

14. SIGNATURE OF PARTICIPANT:
BY: [signature]

15. U.S. DEPT. OF ENERGY, BONNEVILLE POWER ADMINISTRATION
BY: [signature: Wayne R. Lee]

NAME AND TITLE OF SIGNER (Type or Print)	DATE SIGNED	NAME AND TITLE OF SIGNER (Type or Print)	DATE SIGNED
Joe Scheuering, Project Manager Noranda Minerals Corporation	5/23/89	Wayne R. Lee, Area Manager Upper Columbia Area	5/25/89

BPA 1398 AUG. 1983

Department of Energy
Bonneville Power Administration
Upper Columbia Area
Room 561, U.S. Court House
West 920 Riverside Avenue
Spokane, Washington 99201-1083

May 11, 1989

In reply refer to: UE

Mr. Joe Scheuering, Project Manager
Noranda Minerals Corporation
Montana Mining Venture
P.O. Box A.L.
Libby, MT 59923

Dear Joe:

Thank you for your April 18, 1989, letter notifying Bonneville Power Administration (BPA) of Noranda's intention to develop a copper-silver mining project in Lincoln County, Montana. In response to your request that BPA provide Noranda with a scope of work for BPA's preliminary engineering and environmental work necessary to serve Noranda's future power supplier from a connection to BPA's Noxon-Libby 230-kV line at Pleasant Valley, we have enclosed the following information:

1. Reimbursable Agreement No. DE-AI79-89BP79400 which will authorize BPA to perform the required preliminary engineering and environmental work needed to meet Noranda's 1993/94 timetable to serve its loads from a connection to the BPA Noxon-Libby 230-kV line at Pleasant Valley.

2. Exhibit A to the Reimbursable Agreement which provides a detailed scope of work with our best cost estimate at this time for performing the preliminary engineering and environmental work for the 230-kV point-of-delivery to Noranda's power supplier from BPA's Noxon-Libby 230-kV line. We should be able to provide Noranda a more accurate estimate of BPA costs after completion of the initial planning studies. Attached to Exhibit A is a list of requirements for the BPA Project Diagram and a typical project schedule for BPA's planning and budgeting work as applied to the Noranda project.

As a result of Paul Eichin's discussions with Jim Rogers of J.S. Redpath, I understand that there will be a meeting at the project site this month regarding the EIS work and siting of the proposed Pleasant Valley Substation site at the 230-kV line tap point. It is important that BPA participate in this meeting. I would appreciate you letting Paul know as soon as possible the meeting time and place and the items to be discussed. We also need to obtain, at this meeting or soon thereafter, more specific and up-to-date information from Noranda about the level of service reliability required at the BPA point of delivery, and any other engineering and operational parameters that BPA will need to consider during the power system planning studies. This information will have a direct bearing on the type of station equipment and switching arrangement required to serve Noranda's needs. We will also need more specific information regarding Noranda's proposed electrical system and operations at the mine and mill and its connected loads, in order to accurately model the system during our system studies.

We are aware of the importance that Noranda has placed on the timely completion of the 230-kV power supply facilities by 1993/94, as mentioned in Noranda's application to the Montana State DNRC for a power line permit. I would like to emphasize that BPA's ability to respond to Noranda's need and complete the preliminary engineering, environmental, and future work on a schedule to meet Noranda's 1993/94 timetable will largely depend on the timely exchange of information and decision making between our respective organizations including that of your contractors.

If the enclosed Reimbursable Agreement is acceptable to Noranda, please sign both originals in the place provided, and return them to me for signature. A check made out to Bonneville Power Administration for the $25,000 Trust Fund deposit should accompany these documents. A fully executed original will be returned to you with acknowledgment of your payment. During the course of BPA's work, Paul Eichin, Area Engineer, will be sending you either a monthly or bimonthly statement of accrued charges to the Trust Fund Account and keep you advised of the status of BPA's work.

Thank you for your attention to these matters. We also are looking forward to a productive working relationship with Noranda and its consultants on this project.

Sincerely,

Wayne R. Lee

Wayne R. Lee
Area Manager

Enclosures

cc:
George Eskridge - UM
BPA, Missoula, MT

EXHIBIT A to
Reimbursable Agreement No.
DE-AI79-89BP79400

PRELIMINARY ENGINEERING
and
ENVIRONMENTAL WORK
for
SERVICE TO NORANDA MINERALS CORPORATION
PLEASANT VALLEY, MONTANA

Preliminary Engineering - Estimated Cost $35,000 (See Note 1)

A. Power Flow and Voltage Studies

These studies are required to analyze the effects of the added load and new electrical facilities on the existing transmission system for various normal and motor-starting load conditions and for outage situations. These study results will help in determining the station type, layout, and design requirements of facilities for connection to the BPA system.

B. Stability Studies

These studies are required to analyze the system stability effects of adding large motor and other loads on the existing system. If faults on the 230-kV system do not cause stability problems, then minimum studies will be made. If problems are indicated, there would be consideration for a load dropping or remedial action scheme to maintain service to Noranda's critical loads. These studies will help in determining the station layout and design requirements.

C. System Protection and Control Studies

These studies involve fault calculations with the Noranda load connected to the BPA system and determining requirements for relaying, control, communication, and protection of the new and existing power facilities at the 230-kV BPA point-of-delivery to Noranda's power supplier.

D. EMTP Studies

EMTP (Electro-Magnetic Transients Program). These are studies required to help develop the relay and protection scheme, and determine what modifications or additions will be needed to the existing single-pole relaying now in service on the Noxon-Libby 230-kV Line.

Another reason for EMTP studies is to uncover potential transient conditions that could cause substation equipment damage, in particular, to arresters and transformers. BPA's EMTP studies will focus on the substation facilities required to provide Noranda's power supplier a 230-kV point-of-delivery from the BPA line.

E. Preliminary Station Layout Studies

These studies involve substation site selection and plot plan studies for the 230-kV station at Pleasant Valley. Studies will identify the most optimum design for estimating purposes. These studies will assume a BPA-designed, -owned, -constructed, -maintained, and -operated 230-kV switchyard at the point-of-interconnection to BPA's line. Possible design options include a ring bus, main/auxiliary bus arrangement, or a less extensive development, if possible, to meet Noranda's service requirements while maintaining the service integrity of the BPA system.

F. Project Management Activities

This involves the proper coordination and development of the plan-of-service and includes:

1. Requesting estimates, tracking, and reporting costs for the preliminary engineering work;
2. Drawing of the Project Diagram (see Note 2);
3. Resolving all technical issues, and obtaining approval of the Project Diagram;
4. Coordinating the budget and work orders, and assuring the BPA electrical facilities are scheduled to meet the proposed energization date (see Note 3);
5. Coordination with the BPA environmental staff on the required environmental documentation for BPA's system additions;
6. Time required for coordination of contractual arrangements and documentation thereof, in preparation for Phase 2 work (detailed design and construction);
7. Conducting or attending meetings involving the plan-of-service;
8. Determination of metering, communications, and system control and protection requirements.

G. Engineering Cost Estimates for BPA Reimbursable Work

Time spent by BPA's design sections for preparing all budget/work order level cost estimates for BPA's facilities required at the tap point and at other points on the BPA system, and revenue metering at the Noranda Mine Site.

Environmental Work - Estimated Cost $15,000

Preparation of any additional BPA environmental documents for facilities to be constructed and owned by BPA at the tap point, not covered by U.S.Forest Service and state documents. BPA monitoring and assistance to Noranda, U.S.F.S., and the State of Montana in the drafting, review, and approval of the Federal EIS needed to meet NEPA requirements and the power facilities permit needed to meet state requirements.

NOTE (1) BPA estimated, and actual, total costs for reimbursable work includes a 30% flat rate administrative overhead charge applied to direct costs. Charges based on actual costs, not estimated costs.

NOTE (2) The BPA Project Diagram is the planning document BPA uses to document the plan-of-service, and must be approved by key organizations within BPA before detailed design and construction can begin on a project. See Attachment A for a list of Project Diagram requirements.

NOTE (3) The BPA project budgeting/scheduling process for reimbursable projects normally requires a 3 to 4 year period from start of detailed planning and environmental work through to project energization (see Attachment B). For example, if planning for service to Noranda loads begins in May 1989, the detailed design and material acquisition would normally be scheduled to begin by October 1990, and construction would normally be scheduled to begin in March 1993 to meet a late 1993 or early 1994 energization date.

PROJECT DIAGRAM REQUIREMENTS

The following information should be provided on the Project Diagram as indicated.

I. General

A. New facilities included in the project and existing facilities as appropriate--in single line diagram format.

B. Area Office in upper right hand corner.

C. Loads (if applicable) up to 10 years from energization.

D. Fault MVA's for pertinent buses (both three phase and one line-to-ground).

E. Title block--reference Area Office (if applicable).

F. Notes--(should generally be shown on right hand side of tracing).

G. Energization Date.

H. Mark "Preliminary" with date when appropriate.

I. 20-year development (if necessary).

J. Reference other pertinent diagrams (control, etc.).

K. Justification for project (should be shown as Note 1). Should be very brief and general, e.g. "to prevent line overloads during outages."

L. Project Engineer's name and telephone number (not just initials).

M. Any special considerations.

II. Substations

A. Name and ownership.

B. Change of ownership (where applicable) and owners names.

C. Substation boundaries (if applicable).

D. Transformers.

1. Voltages, MVA rating, whether three-phase or single-phase, and type of cooling.
2. Transformer connection (use words to avoid confusion, e.g. "delta-wye"). Customer's phasing requirements should be included as a Note 2 on the diagram.
3. Transformer LTC.

E. Fuses--size if known.

F. Switches.

1. Correct type (hook, group, load break, quick break, resistor, etc.).
2. Voltage and minimum current rating.
3. Grounding blade requirements.
4. If a "Load Break" type--minimum recovery voltage.

G. Breakers/Circuit Switchers.

1. Type (PCB, recloser, etc.).
2. Voltage, minimum continuous current and interrupting capability.

H. Station Service.

1. Station service transformer and fuses (if applicable).
2. If alternative station service is required, indicate source.

I. Surge Protection--for lines, transformers, and terminals (either arrestors, rod gaps, or shield wire).

J. Metering.

1. CT's--indicate desired ratios.
2. Meters (indicating and revenue).
3. PT's (with fuses or expulsion links).

K. Relaying/Protection.

The type of protection to be provided for the entire project should be indicated. These details will be worked out in advance with the appropriate system protection engineers. Standard relaying symbols should be used on the diagram.

L. Control/Communications.

1. Supervisory Controls--any supervisory control with the appropriate symbols.
2. Communication requirements (if required) will be developed by the Division of Substation and Control Engineering and shown on a separate PD.

M. Harmonic Filters--if required.

N. Shunt Capacitors.

1. MVARS, rated KV and group makeup.
2. Voltage swings caused by capacitor switching with all lines in and with strongest source line out.

O. Series Capacitors--impedance, rated Amps and group makeup.

P. Retirement of Facilities.

III. Transmission Lines

A. Line name and voltage.

B. Mileages.

C. Conductor size (if known).

D. Loading Information--as a separate note:

1. Levelized peak loading over study period.
2. Single Contingency outage loading at least 10 years in the future.
3. Load factor.
4. Time of Peak (winter, summer, etc.).

E. Switches.

1. Correct type (group, hook, load break, quick break, etc.).
2. Voltage and minimum current rating.
3. Ground blade requirements.
4. If a "Load Break" type--minimum recovery voltage.

F. Shield wires (if applicable).

G. Retirement of facilities.

IV. Generators

A. Nameplate voltage.

B. Nameplate impedances/inertia constants.

C. Nameplate MVA power factor, and output MVA.

D. Generator neutral grounding (solid, reactor, distribution transformer, etc.).

E. Generator protection.

F. Method of synchronization (should be done by plant participant).

G. Plant factor including estimated peak and total annual energy production.

H. Type of generator (synchronous, induction, etc. and any associated power factor corrective devices.

Division of System Engineering
12-4-85 (WP-EOF-3448L)

ATTACHMENT
P. 5 of 5

NO.	REVISIONS	COORD ENGR	OM&C	AREA	APPROVED

PROJECT DIAGRAM

FISCAL YEAR PROG.	BUDGET ITEM
ENERGIZATION DATE(S)	
COORD. ENGR.	CHECKED EOFA
CONTROL PD	CHECKED EEP
OM&C CONCURRENCE	
AREA CONCURRENCE	
APPROVED	

UNITED STATES DEPARTMENT OF ENERGY
BONNEVILLE POWER ADMINISTRATION
HEADQUARTERS, PORTLAND, OREGON

DIVISION OF SYSTEM PLANNING

SERIAL	SOURCE	SIZE	SHEET	REVISION

LEGEND

- THIS PROJECT – BPA
- THIS PROJECT – OTHER
- EXISTING OR OTHER PROJECT – BPA
- EXISTING OR OTHER PROJECT – OTHER

ATTACHMENT E

BUDGETING/SCHEDULING PROCESS

MAJOR FACTORS IN SELECTION OF 'F.Y.' IN BUDGETING (MAIN GRID AND AREA SERVICE)

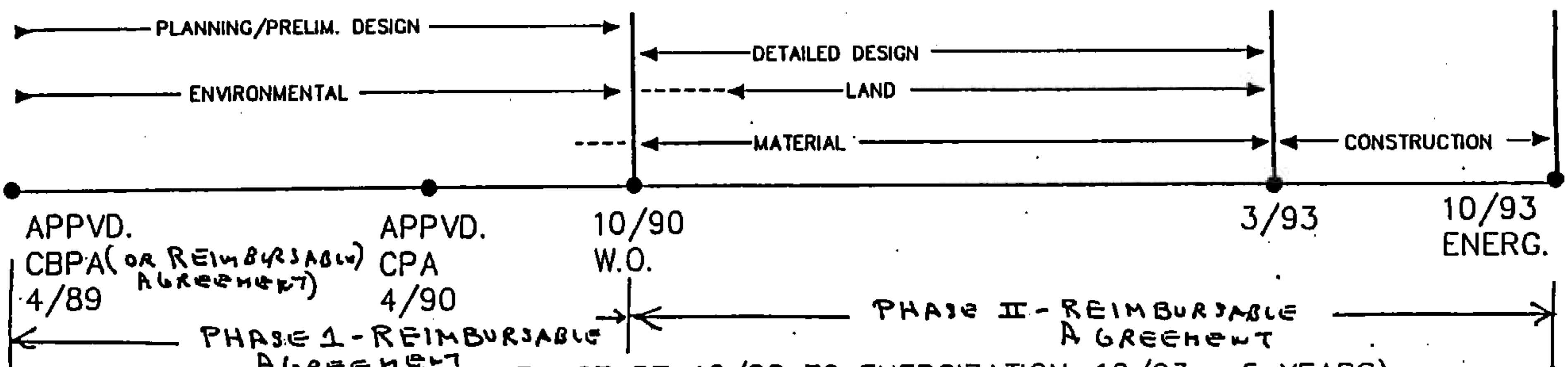
ENVIRONMENTAL PROCESS: (CAT. EXCL, SHORT EA/BRIEF MEMO, EA, EIS)

MAJOR MATERIAL: TRANSFORMERS, BREAKERS, STEEL, CONDUCTORS (MR/PR/SPEC/SOLICITATIONS/BID ANALYSIS/AWARD/DELIVERY)

LAND: NEW RIGHT-OF-WAY (APPRAISAL, ACQUISITION, COMDEMNATION)

CONSTRUCTION SCHEDULE: HOW MANY SEASONS (WEATHER, OUTAGE REQUIREMENTS)

FY 91 NEW START PROJECT (TYPICAL)



(FROM NEW START-10/88 TO ENERGIZATION-10/93: 5 YEARS)

101 Woodlands Road
P.O. Box A.L.
Libby, Montana 59923

noranda

April 18, 1989

Wayne R. Lee - Area Manager
Upper Columbia Area
Bonneville Power Administration
Room 561, US Court House
W. 920 Riverside Ave.
Spokane, WA 99201

Dear Mr. Lee:

Pursuant to previous discussions with yourself and your staff, Noranda Minerals Corp wishes to notify Bonneville Power Administration of our intention to develop a copper-silver mining project in Lincoln County, Montana.

In our preliminary planning, we have identified the possibility of obtaining electric power for the project from the Bonneville Power Noxon-Libby line; and we have indicated this alternative in our Application for a Hard Rock Operating Permit to the Montana Department of State Lands. We believe the project would be best served with a 230 kv transmission line from a tap at Pleasant Valley to a substation at our proposed plant site in Ramsey Creek. We have not as yet contracted a utility for the service.

Your staff has indicated a requirement for preliminary engineering including system load study and modeling, tap configuration and design, and cost estimates. There will also be some requirement for your staff participation in developing the application and EIS for the powerline license.

We would appreciate your providing Noranda a scope and cost estimate for the engineering requirements and also the alternatives available for funding the work.

Thank you for your attention to these matters. We are looking forward to a productive work effort with your organization.

Yours very truly,

NORANDA MINERALS CORP
MONTANORE

Joe Scheuering
Project Manager

cc: Geo. Eskridge - BPA Missoula

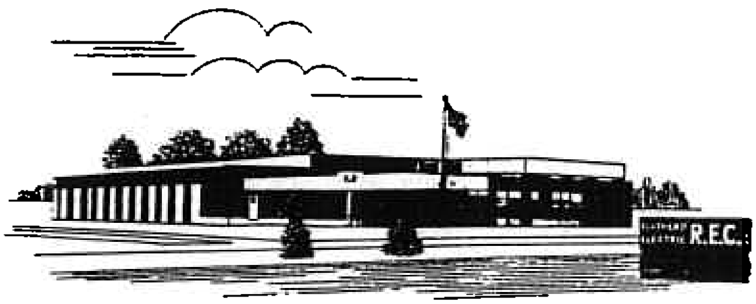
JS/dw

Appendix C: Project Power Cost Calculations

Flathead Electric Cooperative Inc.

2510 HIGHWAY 2 EAST, KALISPELL, MONTANA 59901
PHONE (406) 752-4483

10 March 1989



Mr. Jim Rogers
J. S. Redpath Corp.
1855 W. Baseline Rd., Suite 240
Mesa, Arizona 85202

Dear Mr. Rogers:

Pursuant to our telephone conversation on March 9, 1989, I wish to restate that Flathead Electric Cooperative is a truly non-profit, member-consumer oriented distribution utility.

A fair rate for energy sold to Noranda for the Ramsey Creek Mine would have to be based upon close relationship to the Bonneville Wholesale Power Rate which we feel is the most stable long-term wholesale supplier in the region, due to the large amount of scrutiny under which all rate changes are reviewed and BPA is a heavily hydroelectric based power marketing agency.

If Noranda were to pay for all construction costs of the 230kv tap and stepdown substation, transmission line to the mine site and receiving substation, the total estimate of which we submitted on 11-25-88 as being approximately $4.8 million, the average rate for energy delivered is proposed to be approximately 4 mills above the BPA wholesale rate. At this point we have not been able to get a firm wholesale rate from BPA, since a 50 mw load initiated in a single year causes the implementation of the new large single load policy of BPA; however, as long as the surplus lasts in the Northwest, it is possible to utilize the Long Term Surplus Rate Schedule, SL-87, which is a negotiated wholesale rate schedule in the range between the Priority Firm Rate Schedule and the New Resource Rate Schedule. Based upon an average 40 mw load and a 90% load factor, the Priority Firm Wholesale Rate would be approximately 22 mills and the New Resource Rate would be approximately 29 mills for firm non-interruptible power purchase.

This would result in a rate proposal range to Noranda from Flathead Electric Cooperative of approximately 26 mills to 33 mills with a highly probable rate of 29 to 31 mills per KWH. This is an approximate

APPENDIX C

average rate for all annual kwh delivered; a rate schedule would reflect the BPA rate schedule and would have kw demand rate and seasonal energy rate components. The 4 mill wholesale to retail delivery differential is the Flathead Electric Cooperative's coverage of operating, maintenance and administrative costs, including such items as right-of-way maintenance, line maintenance, line loss, taxes, depreciation, reserves and administrative monitoring.

A preliminary estimate of construction time to complete the 230kv, 50mva stepdown-tap substation, 17 miles of 115kv transmission line and a 50 mva delivery substation is 2 years or less, dependent upon delivery times of the 2 transformers, approval to begin construction times from BPA, Noranda and U. S. Forest Service. We also are certain that the cost of the 230kv tap stepdown station we have proposed is approximately $1 million less than the BPA cost would be for a similar station.

There are several additional items which we feel would be very beneficial to discuss at a meeting in the near future.

Sincerely,

Warren G. McConkey

WARREN G. MCCONKEY
Manager

WGMc:sa

Appendix D. Environmental Specifications for the Montana 230kV Transmission Line

DEFINITIONS

ACCESS EASEMENT:	Any land area over which the OWNER has received an easement from a landowner allowing travel to and from the project. Access easements may or may not include access roads.
ACCESS ROAD:	Any travel course which is constructed by substantial recontouring of land and which is intended to permit passage by most four-wheeled vehicles.
BEGINNING OF CONSTRUCTION:	Any project-related earthmoving or removal of vegetation (except for clearing of survey lines).
BOARD:	Montana BOARD of Natural Resources and Conservation
CONTRACTOR:	Constructors of the Facility (agent of owner)
DEWP:	Montana Department of Fish, Wildlife, and Parks
DHES:	Montana Department of Health and Environmental Sciences
DNRC:	Montana Department of Natural Resources and Conservation
DOH:	Montana Department of Highways
DSL:	Montana Department of State Lands
EXEMPT FACILITY:	A facility meeting the requirements of 75-20-202, MCA and accompanying rules
LANDOWNER:	The owner of private property or the managing agency for public lands
OWNER:	The owner(s) of the facility, or the owner's agent
SENSITIVE AREA:	Area which exhibits environmental characteristics that may make them susceptible to impact from construction of a transmission facility. The extent of these areas are defined for each project but may include any of the areas listed in 36.7.2533 or 36.7.2534 ARM as "sensitive areas" or "areas of concern."
SHPO:	State Historic Preservation Office

PREFACE

For any transmission facility approved by the Board of Natural Resources and Conservation, a set of environmental specifications must be developed jointly by the applicant and DNRC and included in the Certificate of Environmental Compatibility and Public Need.

For a specific project, draft language for those environmental specifications which apply to the entire project is developed prior to publication of the draft EIS. This language is then subjected to public review in the DEIS, revised for the final EIS, and approved by the Board at the time of route approval. Site-specific measures, which cannot be specified until after detailed centerline study, must be included in the Certificate at the time the Board approves a final centerline for the facility.

The purpose of this document is to provide a checklist and suggested language for non-site-specific environmental specifications (items 0.0 through 4.5.2), and a checklist of types of site-specific data which typically need to be worked out during centerline study (Addendums A through P). This approach can greatly facilitate the preparation of a project-specific set of environmental specifications for Board approval. This document has been written to include suggested language for most environmental specifications typically employed to mitigate impacts of transmission lines of all voltages above 100 kV. These specifications are those which DNRC and BNRC have found necessary to ensure environmental protection during construction and operation of transmission facilities. The language included has been carefully worded to be suitable for most projects, but it is anticipated that certain minor modifications will be needed to accommodate a specific project of a certain voltage located in a certain portion of the state. Certain of the measures listed may not apply and may therefore be deleted; additional measures may be added as a result of public and agency involvement. It is intended that this document will be used as the starting point for discussions between an applicant and DNRC in preparing a final set of environmental specifications to be included in the DEIS on a specific project.

A number of site-specific attachments (Addendums A through P) are listed herein; it is intended that language for these attachments will be worked out jointly by DNRC and the applicant during centerline study. The site-specific attachments required for a given project may be quite different from the list suggested in this document and may differ considerably from project to project.

It should be emphasized that this document is merely a suggested starting point for discussion. It has no legal standing and imposes no requirements upon an applicant; legal standing comes about when a revised version of this document is approved by the Board for a specific project certified under MFSA.

INTRODUCTION

The purpose of these specifications is to ensure mitigation of potential environmental impacts during the construction, operation, and maintenance of a transmission facility. These specifications are intended to be incorporated into the texts of contract plans and specifications.

For non-exempt facilities, the Montana Major Facility Siting Act supercedes all state environmental permit requirements except for those dealing with air and water quality, public health and safety, water appropriations and diversions, and easements across state lands (75-20-103 and 401, MCA). A major purpose of these specifications is to ensure that the intent of the laws which are superceded is met, even though the procedures of applying for and obtaining permits from various state agencies are not. As specified later in this document, the State Inspector will have the responsibility for arranging reviews and inspections by other state agencies which would otherwise have been done through a permit application process.

Addendums A through P refer to the site-specific concerns and areas that apply for a specific project. These addendums, as needed, will be prepared by the OWNER working in consultation with the DNRC prior to Board approval of a centerline for a particular project.

0.0 GENERAL SPECIFICATIONS

0.1 SCOPE

These specifications apply to all lands affected by the project. Where the landowner requests practices other than those listed in these specifications, the OWNER may authorize such a change provided that the STATE INSPECTOR is notified in writing of the change and that the change would not be in violation of: (1) the intent of any state law which is superceded by the Montana Major Facility Siting Act; (2) the Certificate; (3) any conditions imposed by the BOARD; or (4) the BOARD's finding of minimum adverse impact; or (5) the regulations in 36.7.5501 and 5502, ARM.

0.2 ENVIRONMENTAL PROTECTION

The OWNER shall conduct all operations in a manner to protect the quality of the environment and to reduce impacts to the greatest extent practical.

0.3 CONTRACT DOCUMENTS

These specifications shall be part of or incorporated into the contract documents; therefore, the OWNER and the OWNER'S agents shall be held responsible for adherence to these specifications in performing the work.

0.4 BRIEFING OF EMPLOYEES

The OWNER shall ensure that the CONTRACTOR and all field supervisors are provided with a copy of these specifications and informed of which sections are applicable to specific procedures. It is the responsibility of the OWNER, its CONTRACTOR, and CONSTRUCTION SUPERVISORS to ensure that the intent of these measures are met. Supervisors shall inform all employees on the applicable environmental constraints spelled out herein prior to and during construction. Site-specific measures spelled out in the addendums attached hereto shall be incorporated into the design and construction specifications or other appropriate contract document.

0.5 COMPLIANCE WITH REGULATIONS

All project-related activities of the OWNER shall comply with all applicable local, state, and federal laws, regulations, and requirements.

0.6 LIMITS OF LIABILITY

The OWNER is not responsible for correction of environmental damage or destruction of property caused by negligent acts of DNRC employees during construction monitoring activities.

0.7 DESIGNATION OF SENSITIVE AREAS

The DNRC, in its evaluation of the project, has designated certain areas along the right-of-way or access roads as SENSITIVE AREAS. The OWNER shall take all reasonable actions to avoid adverse impacts in these SENSITIVE AREAS.

0.8 PERFORMANCE BONDS

To ensure compliance with these specifications, the OWNER shall submit to the State of Montana or its authorized agent a BOND or bonds pertaining specifically to the restoration of the right-of-way and adjacent land damaged during construction. Post-construction monitoring by DNRC will determine compliance with these specifications and other mitigating measures included herein. At the time cleanup and restoration are complete, and revegetation is progressing satisfactorily, the OWNER shall be released from his obligation for restoration. At the time the OWNER is released, a portion of this BOND or a separate BOND shall be established by the OWNER and submitted to the State of Montana or its authorized agent. This BOND shall be held for five years or until monitoring by DNRC indicates that reclamation and road closures have been adequate. The amount and bonding mechanisms for this section shall be agreed to by the BOARD and OWNER under provisions established by 36.7.4006(2) ARM. The amounts of BOND or BONDS shall be as specified in Addendum B and attached. Proof of bond shall be submitted to DNRC.

0.9 DESIGNATION OF STRUCTURES

Each structure for the project shall be designated by a unique number on plan and profile maps. References to specific poles or towers in Addendums A through P shall use these numbers. If this information is not available because the survey is not complete, locations along the centerline shall be indicated by station numbers or mileposts. Station numbers or mileposts of all angle points shall be designated on plan and profile maps.

0.10 ACCESS

When easements for construction access are obtained for construction personnel, provision will be made by the OWNER to ensure that DNRC personnel will be allowed access to the right-of-way and to any off-right-of-way access roads used for construction during the term of the BOND(S) required by 36.7.4006(2), ARM. Liability for damage caused by providing such access for the STATE INSPECTOR shall be limited by Section 0.6 LIMITS OF LIABILITY.

0.11 DESIGNATION OF STATE INSPECTOR

DNRC shall designate a STATE INSPECTOR or INSPECTORS to monitor the OWNER'S compliance with these specifications and any other project-specific mitigation measures adopted by the BOARD as provided in

36.7.5502(1), ARM. The STATE INSPECTOR shall be the OWNER's liaison with the State of Montana on construction, post-construction, and reclamation activities. All communications regarding the project shall be directed to the STATE INSPECTOR. The name of the STATE INSPECTOR can be obtained by contacting the Administrator of the Energy Division, DNRC.

1.0 PRECONSTRUCTION PLANNING AND COORDINATION

1.1 PLANNING

1.1.1 Planning of all stages of construction and maintenance activities is essential to ensure that construction-related impacts will be kept to a minimum. The CONTRACTOR and OWNER shall, to the extent possible, plan the timing of construction, construction and maintenance access and requirements, location of special use sites, and other details before the commencement of construction.

1.1.2 Preferably thirty days, but at least fifteen days before the start of construction the OWNER shall submit plan and profile map(s) depicting the location of the centerline and of all construction access roads, maintenance access roads, structures, clearing backlines, and, if known, special use sites. The scale of the map shall be 1:24,000 or larger.

1.1.3 If special use sites are not known at the time of submittal of the plan and profile, the following information shall be submitted no later than five days prior to the start of construction. The location of special use sites including staging sites, pulling sites, batch plant sites, splicing sites, borrow pits, campsites, and storage or other buildings shall be plotted on one of the following and submitted to the Department: ortho photomosaics of a scale 1:24,000 or larger, available USGS 7.5' plan and profile maps of a scale 1:24,000 or larger.

1.1.4 Changes or updates to the information submitted in 1.1.2. and 1.1.3. shall be submitted to the DNRC as they become available. In no case shall a change be submitted less than five days prior to its anticipated date of construction. Changes in these locations prior to construction (where designated SENSITIVE AREAS are affected), must be submitted to the DNRC 7 days before construction and approved by the STATE INSPECTOR prior to construction.

1.1.5 Long-term maintenance routes to all points on the line should be planned before construction begins. Where known, new construction access roads intended to be maintained for permanent use shall be differentiated from temporary access roads on the maps required under 1.1.2 above.

1.2 PRECONSTRUCTION CONFERENCE

1.2.1 At least one week before commencement of any construction activities, the OWNER shall schedule a preconstruction conference. The STATE INSPECTOR shall be notified of the date and location for this meeting. One of the purposes of this conference shall be to brief the CONTRACTOR and land management agencies regarding the content of these specifications and other BOARD-approved mitigating measures, and to make all parties aware of the roles of the STATE INSPECTOR and of the federal inspectors (if any).

1.2.2 The OWNER's representative, the CONTRACTOR's representative, the STATE INSPECTOR, and representatives of affected state and federal agencies who have land management or permit and easement responsibilities shall be invited to attend the preconstruction conference.

1.3 PUBLIC CONTACT

1.3.1 Written notification by the OWNER'S field representative or the CONTRACTOR shall be given to local public officials in each affected community prior to the beginning of construction to provide information on the temporary increase in population, when the increase is expected, and where the workers will be stationed.

1.3.2 The OWNER shall negotiate with the landowner in determining the best location for access easements, and the need for gates.

1.3.3 The OWNER shall contact local government officials, or the managing agency, as appropriate, regarding implementation of required traffic safety measures.

1.4 HISTORICAL AND ARCHAEOLOGICAL SURVEY

1.4.1 The OWNER must develop and carry out a plan approved by the State Historic Preservation Office (SHPO) that includes steps which have been and will be taken to identify, evaluate, and avoid or mitigate damage to cultural resources affected by the project. The plan (Addendum I) shall include: (1) actions taken to identify cultural resources during initial intensive survey work; (2) an evaluation of the significance of the identified sites and likely impacts caused by the project; (3) recommended treatments or measures to avoid or mitigate damage to known cultural sites; (4) steps to be taken in the event other sites are identified after approval of the plan; and (5) provisions for monitoring construction to protect cultural resources. Except for monitoring, all steps of the plan must be carried out prior to the start of construction. The requirement for this plan should not be construed to exempt or alter compliance by the OWNER or managing agency with 36 CFR 800. This plan must be filed with SHPO.

2.0 CONSTRUCTION

2.1 GENERAL

2.1.1 The preservation of the natural landscape contours and environmental features shall be an important consideration in the location of all construction facilities, including roads, storage areas, and buildings. Construction of these facilities shall be planned and conducted so as to minimize destruction, scarring, or defacing of the natural vegetation and landscape. Any necessary earthmoving shall be planned and designed to be as compatible as possible with the natural land forms.

2.1.2 Temporary construction sites and staging areas shall be kept to the minimum size necessary to perform the work. Such areas shall be located where most environmentally compatible, considering slope, fragile soils or vegetation, and risk of erosion. After construction, these areas shall be restored as specified in Section 3.0 of these specifications unless a specific exemption is authorized in writing by the STATE INSPECTOR.

2.1.3 All work areas shall be maintained in a neat, clean, and sanitary condition at all times. Trash or construction debris (in addition to solid wastes described in section 2.14) shall be regularly removed during the construction and reclamation periods.

2.1.4 Vegetation such as trees, plants, shrubs, and grass on or adjacent to the right-of-way which do not interfere with the performance of construction work, or operation of the line itself shall be preserved.

2.1.5 The OWNER shall take all necessary actions to avoid adverse impacts to SENSITIVE AREAS listed in Addendum A. The STATE INSPECTOR shall be notified two working days in advance of initial clearing or construction activity in these areas. The OWNER shall mark or flag the clearing backlines and limits of disturbance in certain SENSITIVE AREAS as designated in Addendum A. All construction activities must be conducted within this marked area.

2.1.6 The OWNER shall either acquire appropriate land rights or provide compensation for damage for the land area that will be disturbed by construction. The width of the area disturbed by construction shall not exceed a reasonable distance from the centerline as necessary to perform the work. For this project construction activities should be contained within the area specified in Addendum C.

2.1.7 Flow in a streamcourse may not be permanently diverted. If temporary diversion is necessary, flow will be restored before a major runoff season or the next spawning season, as determined by the STATE INSPECTOR in consultation with the managing agency (see 2.11.6).

2.2 CONSTRUCTION MONITORING

2.2.1 The STATE INSPECTOR is responsible for implementing the monitoring plan required by 36.7.5501(1), ARM. The plan specifies the type of monitoring data and activities required and terms and schedules of monitoring data collection, and assigns responsibilities for data collections, inspection reporting, and other monitoring activities. It is attached as Addendum 0.21.

2.2.2 The STATE INSPECTOR, the OWNER, and the OWNER'S agents will rely upon a cooperative working relationship to reconcile potential problems relating to construction in sensitive areas and compliance with these specifications. When construction activities will cause excessive environmental impacts due to seasonal field conditions or encounters with sensitive features, the STATE INSPECTOR will talk with the OWNER about possible mitigating measures or minor construction rescheduling to avoid these impacts. The STATE INSPECTOR will be prepared to provide the OWNER with written documentation of the reasons for the modifications within 24 hours of their imposition.

2.2.3 The STATE INSPECTOR may require mitigation measures or procedures at some sites beyond those listed in Addendum A in order to minimize environmental damage due to unique circumstances that arise during construction, such as unanticipated discovery of a cultural site. The STATE INSPECTOR will follow procedures described in the monitoring plan when such situations arise.

2.2.4 In the event that the STATE INSPECTOR shows reasonable cause that compliance with the BOARD conditions or these specifications is not being achieved, the DNRC would take corrective action as described in 36.7.5502(9) and (10), ARM.

2.3 TIMING OF CONSTRUCTION

2.3.1 Construction and motorized travel may be restricted or prohibited at certain times of the year in certain areas. Exemptions to these timing restrictions maybe granted by DNRC in writing if the OWNER can clearly demonstrate that no environmental impacts will occur as a result. These areas, listed in Addendum D, include areas deemed as sensitive areas and areas of concern in 36.7.2533 or 36.7.2534 ARM.

2.3.2 In order to prevent rutting and excessive damage to vegetation, construction will not take place during periods of high soil moisture when construction vehicles will cause severe rutting requiring extensive reclamation.

2.4 PUBLIC SAFETY

2.4.1 All construction activities shall be done in compliance with existing health and safety laws.

2.4.2 Requirements for aeronautical hazard marking shall be determined by the OWNER in consultation with the Montana Aeronautical Division, the FAA, and DNRC. These requirements are listed in Addendum E. Where required, aeronautical hazard markings shall be installed at the time the wires are strung, according to the specifications listed in Addendum E.

2.4.3 Noise levels shall not exceed established BOARD standards as a result of operation of the facility and associated facilities. For electric transmission facilities, the average annual noise levels, as expressed by an A-weighted day-night scale (Ldn) will not exceed (a) 50 decibels at the edge of the right-of-way in residential and subdivided areas unless the affected landowner waives this condition, and (b) 55 decibels at the edge of property boundaries of substations in residential and subdivided areas.

2.4.4 The facility shall be designed, constructed, and operated to adhere to the National Electric Safety Codes regarding transmission lines.

2.4.5 The electric field at the edge of the right-of-way will not exceed 1 kilovolt per meter measured 1 meter above the ground in residential or subdivided areas unless the affected landowner waives this condition, and that the electric field at road crossings under the facility will not exceed 7 kilovolts per meter measured 1 meter above the ground.

2.5 PROTECTION OF PROPERTY

2.5.1 Construction operations shall not take place over or upon the right-of-way of any railroad, public road, public trail, or other public property until negotiations and/or necessary approvals have been completed with the managing agency. Designated recreational trails as listed in Addendum A will be protected and kept open for public use. Where it is necessary to cross a trail with access roads, the trail corridor will be restored. Adequate signing and/or blazes will be established so the user can find the route. All roads and trails designated by government agencies as needed for fire protection or other purposes shall be kept free of logs, brush, and debris resulting from operations under this agreement. Any such road or trail damaged by this project shall be promptly restored as nearly as possible to its original condition.

2.5.2 Reasonable precautions shall be taken to protect, in place, all public land monuments and private property corners or boundary markers. If any such land markers or monuments are destroyed, the marker shall be re-established and referenced in accordance with the procedures outlined in the "Manual of Instruction for the Survey of the Public Land of the United States" or, in the case of private property, the specifications of the county engineer. Re-establishment will be at the expense of the OWNER.

2.5.3 Construction shall be conducted so as to prevent any damage to existing real property including transmission lines, distribution lines, telephone lines, railroads, ditches, and public roads crossed. If such property is damaged by operations under this agreement, the OWNER shall repair such damage immediately to a reasonably satisfactory condition in consultation with the property owner.

2.5.4 In areas with livestock, the OWNER shall make a reasonable effort to comply with the reasonable requests of landowners regarding measures to control livestock. Care shall be taken to ensure that all gates are reclosed after entry or exit and the landowner shall be compensated for any losses to personal property due to construction or maintenance activities. Gates shall be inspected and repaired when necessary during construction and missing padlocks shall be replaced. The OWNER shall ensure that gates are not left open at night or during periods of no construction activity. Any fencing or gates cut, removed, damaged, or destroyed by the OWNER shall immediately be replaced with new materials. Fences installed shall be of the same height and general type as the fence replaced or nearby fence on the same property, and shall be stretched tight with a fence stretcher before stapling or securing to the fence posts. Temporary gates shall be of sufficiently high quality to withstand repeated opening and closing during construction, to the satisfaction of the landowner.

2.5.5 The CONTRACTOR must notify the OWNER, the STATE INSPECTOR, and, if possible, the affected landowner within two working days damage to land, crops, property, or irrigation facilities, contamination or degradation of water, or livestock injury caused by the OWNER's construction activities, and the OWNER shall reasonably restore any damaged resource or property or provide reasonable compensation to the affected party.

2.5.6 Pole holes and anchor holes must be covered or fenced in any fields, pastures, or ranges used for livestock grazing or where a landowner's requests can be reasonably accommodated.

2.5.7 When requested by the landowner, all fences crossed by permanent access roads shall be provided with a gate. All fences to be crossed by access roads shall be braced before the fence is cut. Fences not to be gated should be restrung temporarily during construction and permanently within 30 days following construction, subject to the reasonable desires of the landowner.

2.5.8 Where new access roads cross fence lines, the OWNER shall make reasonable effort to accommodate the landowner's wishes on gate location and width.

2.5.9 Any breaching of natural barriers to livestock movement by construction activities will require fencing sufficient to control livestock.

2.6 TRAFFIC CONTROL

2.6.1 At least 30 days before any construction within or over any state or federal highway right-of-way, the OWNER will notify the appropriate DOH field office to review the proposed occupancy and to resolve any problems. The OWNER must supply DNRC with documentation that this consultation has occurred. This documentation should include any measures recommended by DOH and to what extent the OWNER has agreed to comply with these measures. In the event that recommendations or regulations were not followed, a statement as to why the OWNER chose not to follow them should be included.

2.6.2 In areas where the construction creates a hazard, traffic will be controlled according to the applicable DOH regulations. Safety signs advising motorists of construction equipment shall be placed on major state highways, as recommended by DOH. The installation of proper road signing will be the responsibility of the OWNER.

2.6.3 The managing agency shall be notified, as soon as practicable, when it is necessary to close public roads to public travel for short periods to provide safety during construction.

2.6.4 Construction vehicles and equipment will be operated at speeds safe for existing road and traffic conditions.

2.6.5 Traffic delays will be restricted on primary access routes, as determined by the DOH or the managing agency.

2.6.6 Access for fire and emergency vehicles will be provided for at all times.

2.6.7 Public travel through and use of active construction areas shall be limited at the discretion of the managing agency.

2.7 ACCESS ROADS AND VEHICLE MOVEMENT

2.7.1 Construction of new roads shall be held to the minimum reasonably required to construct and maintain the facility. State, county, and other existing roads shall be used for construction access wherever possible. Access roads intended to be permanent should be initially designed as such. The location of access roads and towers shall be established in consultation with affected landowners and landowner concerns shall be accommodated where reasonably possible and not in contradiction to these specifications or other BOARD conditions.

2.7.2 All new roads, both temporary and permanent, shall be constructed with the minimum possible clearing and soil disturbance to minimize erosion, as specified in Section 2.11 of these specifications.

2.7.3 Where practical, all roads shall be initially designed to accommodate one-way travel of the largest piece of equipment that will eventually be required to use them; road width shall be no wider than necessary.

2.7.4 Roads shall be located in the right-of-way insofar as possible. Travel outside the right-of-way to enable traffic to avoid cables and conductors during conductor-stringing shall be kept to the minimum possible. Road crossings of the right-of-way should be near support structures.

2.7.5 Where practical, temporary roads shall be constructed on the most level land available. Where temporary roads cross flat land they shall not be graded or bladed unless necessary, but will be flagged or otherwise marked to show their location and to prevent travel off the roadway.

2.7.6 In order to minimize soil disturbance and erosion potential, no cutting and filling for access road construction shall be allowed in areas of up to 5 percent sideslope. In areas of over 5 percent sideslope, road building that may be required shall conform to a 4 percent outslope. The roads shall be constructed to prevent channeling of runoff, and shoulders or berms that would channel runoff shall be avoided.

2.7.7 The OWNER will maintain all permanent access roads, including drainage facilities, which are constructed for use during the period of construction. In the event that a road would be left in place, the OWNER and landowner may enter agreements regarding maintenance for erosion control following construction.

2.7.8 Any use damage to existing private roads, including rutting, resulting from construction operation shall be repaired and restored to condition as good or better than original as soon as possible. Repair and restoration should be accomplished during and following construction as necessary to reduce erosion.

2.7.9 All permanent access road surfaces, including those under construction, will be prepared with the necessary erosion control practices as determined by the STATE INSPECTOR or the managing agency prior to the onset of winter.

2.7.10 Any necessary snow removal shall be done in a manner to preserve and protect road signs, and culverts, to ensure safe and efficient transportation, and to prevent excessive erosion damage to roads, streams, and adjacent land.

2.7.11 At the conclusion of line construction, final maintenance will be performed on all existing private roads used for construction access by the CONTRACTOR. These roads will be returned to a condition as good or better than when construction began.

2.7.12 At least 30 days prior to construction of a new access road approach intersecting a state of federal highway, or of any structure encroaching upon a highway right-of-way, the OWNER shall submit to DOH a plan and profile map showing the location of the proposed construction. At least five days prior to construction, the OWNER shall provide the STATE INSPECTOR written documentation of this consultation and actions to be taken by the OWNER as provided in 2.6.1.

2.8 EQUIPMENT OPERATION

2.8.1 During construction, unauthorized cross-country travel and the development of roads other than those approved shall be prohibited. The OWNER shall be liable for any damage, destruction, or disruption of private property and land caused by his construction personnel and equipment as a result of unauthorized cross-country travel and/or road development.

2.8.2 To prevent excessive soil damage in areas where a graded roadway has not been constructed, the limits and locations of access for construction equipment and vehicles shall be clearly marked or specified at each new site before any equipment is moved to the site. Construction foremen and personnel should be well versed in recognizing these markers and shall understand the restriction on equipment movement that is involved.

2.8.3 Dust control measures shall be implemented on access roads where required by the managing agency or where dust would pose a nuisance to residents. Construction activities and travel shall be conducted to minimize dust. Water, straw, wood chips, dust palliative, gravel, combinations of these, or similar control measures may be used. Oil or similar petroleum-derivatives shall not be used.

2.8.4 Work crew foremen shall be qualified and experienced in the type of work being accomplished by the crew they are supervising. Earthmoving equipment shall be operated only by qualified, experienced personnel. Correction of environmental damage resulting from operation of equipment by inexperienced personnel will be the responsibility of the OWNER. Repair of damage to a condition reasonably satisfactory to the landowner, managing agency, or, if necessary, DNRC, would be required.

2.8.5 Sock lines will be strung using methods which minimize disturbance of soils and vegetation.

2.8.6 Following construction in areas designated by the local weed control board as noxious weed areas the CONTRACTOR shall thoroughly clean all vehicles and equipment to remove weed parts and seeds immediately prior to leaving the area.

2.9 RIGHT-OF-WAY CLEARING AND SITE PREPARATION

2.9.1 The STATE INSPECTOR shall be notified at least ten days prior to any timber clearing. The STATE INSPECTOR shall be responsible for notifying the DSL Forestry Division.

2.9.2 During clearing of survey lines or the right-of-way, shrubs shall be preserved to the greatest extent possible. Shrub removal shall be limited to crushing where possible or cutting where necessary. Plants may be cut off at ground level, leaving roots undisturbed so that they may resprout.

2.9.3 Right-of-way clearing shall be kept to the minimum necessary to meet the requirements of the National Electric Safety Code. Trees to be saved within the clearing backlines and danger trees located outside the clearing backlines shall be marked. Clearing backlines in SENSITIVE AREAS will be indicated on plan and profile maps. All snags and old growth trees that do not endanger the line or maintenance equipment shall be preserved. In designated SENSITIVE AREAS, the STATE INSPECTOR shall approve clearing boundaries prior to clearing.

2.9.4 In no case should the entire nominal width of the right-of-way be cleared of trees up to the edge, unless approved by the STATE INSPECTOR and the landowner. Clearing should instead produce a "feathered edge" right-of-way configuration, where only specified hazard trees and those that interfere with construction or conductor clearance are removed. In areas where there is potential for long tunnel views of transmission lines or access roads as described in Addendum A, special care shall be taken to screen the lines from view. Where appropriate, special care shall be taken to leave a separating screen of vegetation where the right-of-way parallels or crosses highways and rivers.

2.9.5 During construction, care will be taken to avoid damage to small trees and shrubs on the right-of-way that do not interfere with the clearing requirements under 2.9.3. and would not grow to create a problem over a ten-year period.

2.9.6 Soil disturbance and earthmoving will be kept to a minimum.

2.9.7 The OWNER shall be held liable for any unauthorized cutting, injury or destruction to timber whether such timber is on or off the right-of-way.

2.9.8 Unless otherwise requested by the landowner or managing agency, felling shall be directional in order to minimize damage to remaining trees. Maximum stump height shall be no more than 12 inches on the uphill side or 1/3 the tree diameter, whichever is greater. Trees will not be pushed or pulled over. Stumps will not be removed unless they conflict with a structure, anchor, or roadway.

2.9.9 Special logging, clearing, or excavation techniques may be required in certain highly sensitive or fragile areas.

2.9.10 Crane landings shall not be constructed on level ground unless extreme conditions (such as soft or marshy ground) make such construction necessary. In areas where more than one crane landing per tower site would be built, the STATE INSPECTOR will be notified at least 5 days prior to the beginning of construction at those sites.

2.9.11 No motorized travel on, scarification of, or displacement of talus slopes shall be allowed except where approved by the STATE INSPECTOR and landowner or managing agency.

2.9.12 To avoid unnecessary ground disturbance, counterpoise should be placed or buried in disturbed areas whenever possible.

2.9.13 Slash resulting from project clearing that may be washed out by high water the following spring shall be removed and piled outside the floodplain before runoff. Instream slash resulting from project clearing must be removed within 24 hours.

2.9.14 Streamside trees will be felled away from streams rather than into or across streams.

2.10 GROUNDING

Grounding of fences, buildings, and other structures on and adjacent to the right-of-way shall be done according to the specifications of the National Electric Safety Code.

2.11 EROSION AND SEDIMENT CONTROL

2.11.1 Clearing and grubbing for roads and rights-of-way and excavation for stream crossings shall be carefully controlled to minimize silt or other water pollution downstream from the rights-of-way. Sediment retention basins will be installed as required by the STATE INSPECTOR or managing agency.

2.11.2 Roads shall cross drainage bottoms at sharp or nearly right angles and level with the streambed whenever possible. Temporary bridges, fords, culverts, or other structures to avoid stream bank damage will be installed.

2.11.3 Under no circumstances shall streambed materials be removed for use as backfill, embankments, road surfacing, or for other construction purposes.

2.11.4 No excavations shall be allowed on any river or perennial stream channels or floodways at locations likely to cause detrimental erosion or offer a new channel to the river or stream at times of flooding.

2.11.5 Installation of culverts, bridges, or other structures in perennial streams will be done with normal construction procedures following on-site inspections with DNRC and DFWP. All culverts shall be installed with the culvert inlet and outlet at natural stream grade or ground level. Water velocities or positioning of culverts shall not impair fish passage.

2.11.6 Construction of access roads, bridges, fill slopes, culverts, or impoundments, or channel changes within the high-water mark of any perennial stream, lake, or pond, requires consultation with DFWP and local conservation district and application of applicable water quality standards. Within 15 days prior to start of construction, the OWNER shall submit written documentation that consultation has occurred. Included in this documentation should be the recommendation of the agencies consulted and the actions that OWNER expects to take to completely implement them.

2.11.7 No blasting shall be allowed in streams. Blasting may be allowed near streams if precautions are taken to protect the stream from debris and from entry of nitrates or other contaminants in the stream.

2.11.8 The OWNER shall maintain private roads while using them. All ruts made by machinery shall be filled or graded to prevent channeling. In addition, the OWNER must take measures to prevent the occurrent of erosion caused by wind or water during and after use of these roads. Some erosion-preventive measures include but are not limited to, installing or using cross logs, drain ditches, water bars, and wind erosion inhibitors such as water, straw, gravel, or combinations of these.

2.11.9 The OWNER shall prevent material from being deposited in any watercourse or stream channel. Where necessary, measures such as hauling of fill material, construction of temporary barriers, or other approved methods shall be used to keep excavated materials and other extraneous materials out of watercourses. Any such materials entering watercourses shall be removed immediately.

2.11.10 The OWNER shall be responsible for the stability of all embankments created during construction. Embankments and backfills shall contain no stream sediments, frozen material, large roots, sod, or other materials which may reduce their stability.

2.11.11 Culverts, arch bridges, or other stream crossing structures shall be installed at all permanent crossings of flowing or dry watercourses where fill is likely to wash out during the life of the road. Culvert or bridge installation is prohibited in areas of important fish spawning beds identified by MDFWP and during specified fish spawning seasons on less sensitive streams or rivers. All culverts shall be big enough to handle approximately 15-year floods. Culvert size shall be determined by standard procedures which take into account the variations in vegetation and climatic zones in Montana, the amount of fill, and the drainage area above the crossing. All culverts shall be installed at the time of road construction.

2.11.12 No fill material other than that necessary for road construction shall be piled within the high water zone of streams where floods can transport it directly into the stream. Excess floatable debris shall be removed from areas immediately above crossings to prevent obstruction of culverts or bridges during periods of high water.

2.11.13 No skidding of logs or driving of vehicles across a perennial watercourse shall be allowed, except via authorized construction roads.

2.11.14 No perennial watercourses shall be permanently blocked or diverted.

2.11.15 Skidding with tractors shall not be permitted within 100 feet of streams containing flowing water except in places designed in advance, and in no event shall skid roads be located on these streamcourses. Skid trails shall be located high enough out of draws, swales, and valley bottoms to permit diversion of runoff water to natural undisturbed forest ground cover.

2.11.16 Construction methods shall prevent accidental spillage of solid matter, contaminants, debris, petroleum products, and other objectionable pollutants and wastes into watercourses, lakes, and underground water sources. Catchment basins capable of containing the maximum accidental spill shall be installed at areas where fuel, chemicals or oil are stored. Any accidental spills of such materials shall be cleaned up immediately.

2.11.17 To reduce the amount of sediment entering streams, a strip of undisturbed vegetation will be provided between areas of disturbance (road construction or tower construction) and streamcourses, and around first order or larger streams that have a well-defined streamcourse or aquatic or riparian vegetation, unless otherwise required by the landowner. Buffer strip width is measured from the high water line of a channel and will be as determined by the STATE INSPECTOR and managing agency. For braided streams with more than one discernible channel (ephemeral or permanent) the high water line of the outermost channel is used. In the event that vegetation cannot be left undisturbed, structural sediment containment, approved by the STATE INSPECTOR, must be substituted before soil disturbing activity commences.

2.11.18 When no longer needed, all temporary structures or fill installed to aid stream crossing shall be removed and the course of the stream re-established to prevent future erosion.

2.11.19 All temporary dams built on the right-of-way shall be removed after line construction unless otherwise approved by the STATE INSPECTOR. Dams allowed to remain shall be upgraded to permanent structures and shall be provided with spillways or culverts and with a continuous sod cover on their tops and downstream slopes. Spillways may be protected against erosion with riprap or equivalent means.

2.11.20 Damage resulting from erosion or other causes shall be repaired after completion of grading and before revegetation is begun.

2.11.21 Point discharge of water will be dispersed in a manner to avoid erosion or sedimentation of streams.

2.11.22 Riprap or other erosion control activities will be planned based on possible downstream consequences of activity, and during the low flow season if possible.

2.11.23 Water used in embankment material processing, aggregate processing, concrete curing, foundation and concrete life cleanup, and other waste water processes shall not be discharged into surface waters without a valid discharge permit from DHES.

2.12 ARCHAEOLOGICAL, HISTORICAL AND PALEONTOLOGICAL RESOURCES

2.12.1 All construction activities shall be conducted so as to prevent damage to significant archaeological, historical, or paleontological resources.

2.12.2 Any relics, artifacts, fossils or other items of historical, paleontological, or archaeological value shall be preserved in a manner agreeable to both the landowner and the State Historic Preservation Officer. If any such items are discovered during construction, SHPO shall be notified immediately. Work which could disturb the materials or surrounding area must cease until the site can be properly evaluated by a qualified archaeologist (either employed by the OWNER or representing SHPO) and recommendations made by that person based on the Historic Preservation Plan. For significant sites, recommendations of the State Historic Preservation Officer must be followed by the OWNER.

2.12.3 The OWNER shall conform to treatments recommended for cultural resources by either the Montana State Historic Preservation Office (SHPO) or the Advisory Council on Historic Preservation (ACHP).

2.13 PREVENTION AND CONTROL OF FIRES

2.13.1 Burning, fire prevention, and fire control shall comply with the burning plan and fire plan. These plans shall meet the requirements of the managing agency and/or the fire control agencies having jurisdiction. The STATE INSPECTOR shall be invited to attend all meetings with these agencies to discuss or prepare these plans. The STATE INSPECTOR, in turn, shall notify DSL of all such meetings.

2.13.2 The OWNER shall direct the CONTRACTOR to comply with regulations of any county, town, state or governing municipality having jurisdiction regarding fire laws and regulations.

2.13.3 Blasting caps and powder shall be stored only in approved areas and containers and always separate from each other.

2.13.4 The OWNER shall direct the CONTRACTOR to properly store and handle combustible material which could create objectionable smoke, odors, or fumes. The OWNER shall direct the CONTRACTOR not to burn refuse such as trash, rags, tires, plastics, or other debris, except as permitted by the county, town, state, or governing municipality having jurisdiction.

2.14 WASTE DISPOSAL

2.14.1 The OWNER shall direct the CONTRACTOR to use licensed solid waste disposal sites. Inert materials (Group III wastes) may be disposed of at Class III landfill sites; mixed refuse (Group II wastes) must be disposed of at Class II landfill sites.

2.14.2 Emptied pesticide containers or other chemical containers must be triple rinsed to render them acceptable for disposal in Class II landfills or for scrap recycling pursuant to ARM 16.44.202(12) for treatment or disposal. Pesticide residue and pesticide containers shall be disposed of in accordance with ARM 16.20.633(9).

2.14.3 All waste materials constituting a hazardous waste defined in ARM 16.44.303, and wastes containing any concentration of polychlorinated biphenyls must be transported to an approved designated hazardous waste management facility (as defined in ARM 16.44.202(12) for treatment or disposal.

2.14.4 All used oil shall be hauled away and recycled or disposed of in a licensed Class II landfill authorized to accept liquid wastes or in accordance with 2.14.2 and 2.14.3. above. There shall be no intentional release of crankcase oil or other toxic substances into streams or soil. In the event of an accidental spill into a waterway, the substances will be cleaned up and the Water Quality Bureau, DHES, will be contacted immediately.

2.14.5 Sewage shall not be discharged into streams or streambeds. The OWNER shall direct the CONTRACTOR to provide refuse containers and sanitary chemical toilets, convenient to all principal points of operation. These facilities shall comply with applicable federal, state, and local health laws and regulations.

2.14.6 In order to reduce fire hazard, small trees and brush cut during construction should be chipped, burned, and/or scattered. Slash 3 inches in diameter or greater may be scattered in quantities of up to 15 tons/acre unless otherwise requested by the landowner. Tops, limbs and brush less than 3 inches in diameter and 3 feet in length may be left in quantities less than 3 tons per acre except on cropland and residential land or where otherwise specified by the landowner. In certain cases the STATE INSPECTOR will authorize chipping and scattering of tops, limbs and brush in excess of 3 tons per acre as an erosion control measure. Merchantable timber should be decked and removed at the direction of the landowner or managing agency.

2.14.7 Refuse burning shall require the prior approval of the landowner and a Montana Open Burning Permit must be obtained from MDHES.

2.15 SPECIAL MEASURES

2.15.1 Poles with a low reflectivity constant should be used to reduce potential for visual contrast.

2.15.2 Crossings of rivers should be at right angles. Strategic placement of structure should be done both as a means to screen views of the transmission line and to minimize the need for vegetation clearing.

3.0 POST-CONSTRUCTION CLEANUP AND RECLAMATION

3.1 CLEANUP

3.1.1 All litter resulting from construction is to be removed, to the satisfaction of the landowner, from the right-of-way and along access roads leading to the right-of-way. Such litter shall be legally disposed of as soon as possible, but in no case latter than within 60 days of completion of wire clipping. If requested by the landowner, the OWNER shall provide for removal of any additional construction-related debris discovered after this initial cleanup.

3.1.2 Insofar as practical, all signs of temporary construction facilities such as haul roads, work areas, buildings, foundations or temporary structures, stockpiles or excess or waste materials, or any other vestiges of construction shall be removed and the areas restored to as natural a condition as is practical, in consultation with the landowner.

3.2 RESTORATION, RECLAMATION, AND REVEGETATION

3.2.1 Restoration, reclamation, and revegetation of the right-of-way, access roads, crane pads, splicing or stringing sites, borrow sites, gravel, fill, stone, or aggregate excavation, or any other disturbance shall be in accordance with the Reclamation and Revegetation Plan. The OWNER may choose to develop this plan in consultation with appropriate land management agencies as part of easement negotiations. In this case, the OWNER shall provide written documentation of consultation with those agencies and a copy of the agreed-to plan.

3.2.2 After construction is complete, and in cooperation with the landowner, temporary roads shall be closed.

3.2.3 In agricultural areas where soil has been compacted by movement of construction equipment, the OWNER shall direct the CONTRACTOR to rip the soil deep enough to restore productivity, or if complete restoration is not possible, the OWNER shall compensate the landowner for lost productivity.

3.2.4 Earth next to access roads that cross streams shall be replaced at slopes less than the normal angle of repose for the soil type involved.

3.2.5 All drainage channels shall be restored to a gradient and width which will prevent accelerated gully erosion.

3.2.6 Drive-through dips, open-top box culverts, waterbars, or cross drains shall be added to roads at the proper spacing and angle as necessary to prevent erosion.

3.2.7 Interrupted drainage systems shall be restored.

3.2.8 Seeding prescriptions to be used in revegetation, requirements for hydroseeding, fertilizing, and mulching, as jointly determined by representatives of the OWNER, DNRC, DSL, and other involved state and federal agencies, are specified in Addendum L.

3.2.9 Piling and windrowing of material for burning shall use methods that will prevent significant amounts of soil from being included in the material to be burned and minimize destruction of ground cover. Non-mechanized methods are recommended if necessary to minimize soil erosion and vegetation disturbance. Piles shall be located so as to minimize danger to timber and damage to ground cover when burned.

3.2.10 During restoration in areas where topsoil has been stockpiled, the site will be graded to near natural contours and the topsoil will be replaced on the surface.

3.2.11 Excavated material not suitable or required for backfill shall be evenly filled back onto the cleared area prior to spreading any stockpiled soil. Large rocks and boulders uncovered during excavation and not buried in the backfill will be disposed of as approved by the STATE INSPECTOR and/or the landowner.

3.2.12 Application rates and timing of seeds and fertilizer, and purity and germination rates of seed mixtures, shall be as determined in consultation with the DNRC and U.S. Forest Service. Reseeding shall be done at the first appropriate opportunity after construction ends.

3.2.13 Where appropriate, hydroseeding, drilling, or other appropriate methods shall be used to aid revegetation. Mulching with straw, wood chips, or other means shall be used where necessary.

3.2.14 All temporary roads shall be obliterated and reclaimed (with the concurrence of the landowner). All temporary roadways shall be graded and scarified to permit the growth of vegetation and to discourage traffic. Permanent unsurfaced roadbeds not open to public use will be revegetated as soon after use as possible unless specified otherwise by the landowner.

4.0 OPERATION AND MAINTENANCE

4.1 RIGHT-OF-WAY MANAGEMENT AND ROAD MAINTENANCE

4.1.1 Maintenance of the right-of-way and permanent access roads shall provide for the protection of SENSITIVE AREAS identified prior to and during construction.

4.1.2 Vegetation that has been saved through the construction process and which does not pose a hazard or potential hazard to the powerline, particularly that of value to fish and wildlife, shall be allowed to grow on the right-of-way.

4.1.3 In areas other than cropland, vegetation cover shall be maintained in the areas immediately adjacent to transmission towers in cooperation with the landowner.

4.1.4 Grass cover, water bars, cross drains, and the proper slope shall be maintained on permanent access roads and service roads in order to prevent soil erosion.

4.2 MAINTENANCE INSPECTIONS

The OWNER shall have responsibility to correct soil erosion or revegetation problems on the right-of-way or access roads as they become known. Appropriate corrective action will be taken where necessary. The OWNER may, through agreement with the landowner or managing agency, provide a mechanism to identify and correct such problems.

4.2.2 Operation and maintenance inspections using ground vehicles shall be timed so that routine maintenance will be done when access roads are firm, dry or frozen, wherever possible.

4.3 CORRECTION OF LANDOWNER PROBLEMS

4.3.1 When the facility causes interference with radio, TV, or other stationery communication systems after the facility is energized, the OWNER will correct the interference with mechanical corrections to facility hardware, or antennas, or will install remote antennas or repeater stations, or will use other reasonable means to correct the problem.

4.3.2 The OWNER will respond to complaints of interference by investigating complaints to determine the origin of the interference. If the interference is not caused by the facility, the OWNER shall so inform the person bringing the complaint. The OWNER shall provide the STATE INSPECTOR with documentation of the evidence regarding the source of the interference if the person brings the complaint to the STATE INSPECTOR or the BOARD.

4.4 HERBICIDES AND WEED CONTROL

4.4.1 Weed control, including any application of herbicides in the right-of-way, will be in accordance with recommendations of the Montana Department of Agriculture, and in accordance with a right-of-way maintenance plan.

4.4.2 Herbicides will not be used in certain areas identified by DNRC, MDFWF, and DHES, or as requested by the landowner.

4.4.3 Proper herbicide application methods will be used to keep drift and nontarget damage to a minimum.

4.4.4 Herbicides must be applied according to label specifications and in accordance with 4.4.1. above. Only herbicides registered in compliance with applicable federal and state laws may be applied.

4.4.5 Herbicides shall not be sprayed during heavy rains or threat of heavy rains. Vegetation buffer zones shall be left along all identifiable stream channels. Herbicides shall not be used in any public water supply watershed identified by the DHES.

4.4.6 In areas disturbed by transmission facilities, the OWNER will cooperate with landowners in control of noxious weeds as designed by the weed control board having jurisdiction in the county crossed the line.

4.4.7 All applications of herbicides must be performed by a licensed applicator.

4.4.8 During the second and third growing seasons following the completion of restoration and reseeding, the OWNER and STATE INSPECTOR shall inspect the right-of-way and access roads for newly-established stands of noxious weeds. The county weed control supervisor shall be invited to attend this inspection. In the event that stands of weeds are encountered, appropriate control measures shall be taken by the OWNER.

4.5 MONITORING

4.5.1 DNRC may continue to monitor operation and maintenance activities for the life of the project in order to ensure compliance with the specifications in this section.

4.5.2 The OWNER will be responsible to DNRC for the term of the RECLAMATION BOND. After this time the OWNER will report to individual landowners and managing agencies except as specified in conditions to the certificate.

Appendix E. Cultural Survey Inventory

State Historic Preservation Office
Montana Historical Society
Mailing Address: 225 North Roberts • Helena, MT 59620-9990
Office Address: 102 Broadway • Helena, MT • (406) 444-7715

RECEIVED
MAY 2 1989

May 1, 1989

T. Weber Greiser, Senior Archaeologist
Historical Research Associates
P.O. Box 7086
Missoula, Montana 59807-7086

Re: Noranda Inc. Transmission Line Siting, Lincoln County

Dear Weber:

Please find enclosed a computer print-out containing a summary of cultural sites recorded within the townships of your file search request. The print-out is organized in numerical order by township and range for your convenience.

A search of our bibliography information by township reveals a number of inventory reports on the subject area. These are exclusively Kootenai National Forest reports as follows:

Timmons, R.	1983	Red Barren Timber Sale.
Timmons, R.	1987	Miller Ck. & Schreiber Lake Dozer Piling
Calvi, J.	1988	LB3000 Libby Creek
Manning, C.	1979	Barren Peak Cost Share Roads
Manning, C.	1979	West Fisher Cost Share Road Project
Collins, M.	1983	Trail Timber Sale
Timmons, R.	1984	Stagnation Regeneration
Timmons, R.	1983	Teeters Bug Pest Control
Collins, M.	1981	1981 D-5 Cost Share Projects
Collins, M.	1981	1981 D-6 Cost Share Projects
Collins, M.	1982	Silver Butte Timber Sale
Moore, L.	1985	Swamp Schreiber Timber Sale
Whiteman, A.	1987	West Fisher Seed Tree

You may wish to contact the Kootenai N.F. regarding information about these reports or others not accessible through our current files.

Thank you for consulting with us. We understand that this is an expansion on an earlier inventory to encompass a larger area of potential effect.

Sincerely,

Mark F. Baumler

Mark F. Baumler, Ph.D.
Deputy SHPO/Archaeologist

File: DSL/Hardrock/1989
Kootenai NF/1989

Appendix F: Weather Data

Historical Weather Data from Libby Montana:

TEMPERATURE – Cold waves, which cover parts of Montana on the average of 6 to 12 times a winter, are confined mostly to the sections northeast of a Glacier Park – Miles City line. A few of these cold waves cover the entire area east of the Divide, and will cover the State all the way from the Dakotas to Idaho. These cold waves do not now hold the dangers they did years ago before transportation, roads, communications, and even heating plants developed to their present levels. However, with temperatures well below zero accompanied by strong winds with blowing snow, these cold waves can be very inconvenient and even dangerous to the careless or inexperienced. In small areas ideally situated for radiation cooling, low temperatures can fall to -50° F or lower. The coldest ever observed was -70° F at Rogers Pass, 40 miles northwest of Helena, on January 20, 1954. This is the coldest of record for the entire United States, exclusive of Alaska. In contrast, the low at Helena that morning was only -36°F.

During the summer months hot weather occurs fairly often in the eastern parts of the State. The highest ever observed was 117° at Glendive on July 20, 1893, and Medicine Lake on July 5, 1937. Temperatures of over 100° sometimes occur in the lower elevation areas west of the Divide during the summer, but hot spells are less frequent and of shorter duration than in the plains sections. Hot spells nowhere become oppressive, however, because summer nights almost invariably are cool and pleasant. In the areas with elevations above 4,000 feet, extremely hot weather is almost unknown. Summer days, however, are usually warm enough for light summer clothing.

Winters, while usually cold, have few extended cold spells. Between cold waves there are periods, sometimes longer than 10 days, of mild but often windy weather. These warm, windy winter periods occur almost entirely along the eastern slopes of the Divide and are popularly known as “chinook” weather. The so-called “chinook” belt extends from the Browning-Shelby area southeastward to the Yellowstone Valley above Billings. Through this belt, “chinook” winds frequently reach speeds of 25 to 50 mph or more and can persist, with little interruptions, for several days. In January, the coldest month, temperature averages range from 11° F for the Northeastern Division to 22° F for the South Central (upper Yellowstone Valley) Division. In some areas east of the Continental Divide, January or February can average zero or below, but such occurrences range from infrequent to about once in 10 to 15 years in the coldest spots. Most Montana lakes freeze over every winter, but Flathead Lake between Polson and Kalispell, freezes over completely only during the coldest winters, about 1 year in 10. All rivers carry floating ice during the late winter or early spring. Few streams freeze solid; water generally continues to flow beneath the ice. During the coldest winters “anchor” ice, which builds from the bottom of shallow streams, on rare occasions causes some flooding.

In July, the warmest month, temperature averages range from 74° for the Southeastern Division to 64° F for the Southwestern Division. This mid-summer warmth is fairly steady, very seldom severe, and is tempered by normal nighttime mnima in the 50’s and 60’s. Miles City, one of the State’s warmest places in July, has a July average minimum temperature of 60° and an average maximum of 90° F. Generally, adequate moisture permits rapid plant and crop development during most growing seasons.

PRECIPITATION – Precipitation varies widely and depends largely upon topographic influences. Areas adjacent to mountain ranges in general are the wettest, although there are a few exceptions where the “rain shadow” effect appears. Generally, nearly half the annual long-term average total falls from May through July. This is perhaps the main reason why Montana in consistently one of the largest producers of dryland grain crops. The Western Division of the State is the wettest and the North Central the driest. There are a few valleys in the Western Division that are relatively dry, as reflected by Deer Lodge and Lonepine averages of 11.00 and 11.46 inches respectively. Probably the driest part of the State is along the Clark Fork of the Yellowstone River in Carbon County. In this area, 8 miles south-southwest of Belfry, the average precipitation for a 16-year period is 6.59 inches. The highest average in the State is 34.70 inches at Heron.

Annual snowfall varies from quite heavy, 300 inches, in some parts of the mountains in the western half of the State, to around 20 inches at some stations in the two northern Divisions east of the Continental Divide.

Most of the larger cities have annual snowfall within the 30 to 50 inch range. Most snow falls during the November-March period, but heavy snowstorms can occur as early as mid-September or as late as May 1 in the higher southwestern half of the State. In eastern sections early or late season snows are not very common. Mountain snowpacks in the wetter areas often exceed 100 inches in depth as the annual snow season approaches its end around April 1 to 15.

The greatest volume of flow of Montana's rivers occurs during the spring and early summer months with the melting of the winter snowpack. Heavy rains falling during the spring thaw constitute a serious flood threat. Ice jams, which occur during the spring breakup, usually in March, cause backwater flooding. Flash floods, although restricted in scope, are probably the most numerous and result from locally heavy rainstorms in the spring and summer. Damaging floods have occurred in 1952, 1953, and 1964.

OTHER CLIMATIC FEATURES – Severe storms of several types can occur, but the most troublesome are hailstorms which cause crop and property damage averaging about $5 million annually. This is not unusually large for an area of 146,000 square miles, however, and their occurrence is limited mainly to July and August, infrequently in June and September.

Tornadoes develop infrequently (about 2 per year) and occur almost entirely east of the Divide, largely in the eastern third of the State. Severe windstorms of a general nature are rare but can occur locally, mainly east of the Divide, from a few to several times a year. Drought in its most severe form is practically unknown, but dry years do occur in some sections. All parts of the State rarely suffer from dryness at the same time. The only exceptions on record occurred during the 1930 decade. Drought infrequently lasts 2 or 3 years in one or two of the State's climatic subdivisions.

LIBBY 32 SSE, MONTANA

Period of Record General Climate Summary - Temperature

Station:(245020) LIBBY 32 SSE

From Year=1949 To Year=2004

	Monthly Averages			Daily Extremes				Monthly Extremes				Max. Temp.		Min. Temp.	
	Max.	Min.	Mean	High	Date	Low	Date	Highest Mean	Year	Lowest Mean	Year	>= 90 F	<= 32 F	<= 32 F	<= 0 F
	F	F	F	F	dd/yyyy or yyyymmdd	F	dd/yyyy or yyyymmdd	F	-	F	-	# Days	# Days	# Days	# Days
January	29.7	13.5	21.6	51	24/1953	-44	30/1950	32.9	53	4.7	***	0.0	15.9	30.2	5.9
February	36.3	16.5	26.4	59	24/1995	-39	02/1996	32.8	63	12.4	***	0.0	6.5	27.7	3.2
March	43.1	20.8	31.9	74	30/2004	-23	02/1960	38.0	92	23.6	***	0.0	2.5	29.8	1.4

April	53.0	27.1	40.0	84	25/1977	2	02/2002	44.4	80	35.5	***	0.0	0.0	24.9	0.0
May	63.0	33.4	48.2	89	30/1986	8	01/1954	55.8	58	43.2	55	0.0	0.0	14.4	0.0
June	70.3	39.3	54.8	93	22/1955	21	01/1951	60.7	61	51.3	91	0.3	0.0	5.2	0.0
July	78.9	41.9	60.4	98	12/1953	26	03/1999	66.6	75	52.9	93	2.7	0.0	1.9	0.0
August	78.6	40.7	59.7	102	04/1961	22	28/2000	66.6	67	54.5	95	2.8	0.0	3.6	0.0
September	68.3	34.2	51.3	100	03/1950	8	23/2000	61.1	67	45.1	65	0.3	0.0	13.1	0.0
October	53.8	27.9	40.8	81	07/1980	-15	30/2002	45.7	65	35.5	102	0.0	0.4	22.1	0.1
November	37.5	21.7	29.6	65	12/1999	-26	16/1959	36.5	49	15.3	85	0.0	6.5	27.4	1.2
December	30.0	15.7	22.8	52	09/1957	-43	29/1990	29.5	80	7.9	83	0.0	16.8	30.5	3.8
Annual	53.5	27.7	40.6	102	19610804	-44	19500130	42.9	67	36.3	85	6.1	48.5	230.9	15.6
Winter	32.0	15.2	23.6	59	19950224	-44	19500130	29.5	53	14.2	93	0.0	39.2	88.4	12.9
Spring	53.0	27.1	40.0	89	19860530	-23	19600302	43.4	92	34.1	55	0.0	2.5	69.1	1.4
Summer	75.9	40.6	58.3	102	19610804	21	19510601	63.9	61	53.4	93	5.8	0.0	10.7	0.0
Fall	53.2	27.9	40.6	100	19500903	-26	19591116	45.0	63	32.4	85	0.3	6.9	62.6	1.4

LIBBY 32 SSE, MONTANA

Period of Record General Climate Summary - Precipitation

Station:(245020) LIBBY 32 SSE														
From Year=1949 To Year=2004														
	Precipitation											Total Snowfall		
	Mean	High	Year	Low	Year	1 Day Max.		>= 0.01 in.	>= 0.10 in.	>= 0.50 in.	>= 1.00 in.	Mean	High	Year
	in.	in.	-	in.	-	in.	dd/yyyy or yyyymmdd	# Days	# Days	# Days	# Days	in.	in.	-
January	3.11	9.36	53	0.28	85	2.00	09/1953	16	9	1	0	26.9	103.0	54
February	2.23	5.68	72	0.25	73	1.21	12/1954	12	7	1	0	16.2	44.5	75
March	1.98	4.00	97	0.42	65	1.26	30/1963	13	7	0	0	14.6	54.5	102
April	1.66	3.42	54	0.13	77	1.41	06/1972	11	6	1	0	5.2	18.0	70
May	1.99	5.89	98	0.20	54	2.14	27/1998	12	6	1	0	1.1	7.0	61
June	2.14	4.74	80	0.19	77	2.27	08/1964	11	6	1	0	0.1	3.4	95
July	1.07	3.97	93	0.03	53	1.60	17/1954	6	3	1	0	0.0	0.0	49
August	1.21	3.19	76	0.00	55	1.60	27/1966	7	3	1	0	0.1	6.6	92
September	1.40	4.51	68	0.00	90	1.31	18/1957	8	4	1	0	0.2	3.0	57
October	2.05	5.79	67	0.02	87	1.59	27/1994	11	6	1	0	2.6	18.9	84
November	2.88	6.14	55	0.33	79	1.77	19/1996	14	9	1	0	14.5	57.1	96
December	3.03	7.38	96	0.64	86	1.86	22/1964	15	9	1	0	23.8	70.9	96

Annual	24.75	34.12	72	13.10	52	2.27	19640608	135	75	11	1	105.3	177.0	54
Winter	8.37	16.98	72	2.14	77	2.00	19530109	43	25	4	1	66.9	140.0	69
Spring	5.62	9.37	97	1.99	52	2.14	19980527	35	19	2	0	20.9	60.0	102
Summer	4.43	7.99	93	1.07	100	2.27	19640608	24	12	2	0	0.2	6.6	92
Fall	6.33	11.98	55	1.25	87	1.77	19961119	34	20	3	0	17.3	61.7	96

MONTANA

AVERAGE WIND SPEED - MPH
STATION: KALISPELL AP, MT (KFCA)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
3.9	4.4	5.5	6.6	6.6	5.9	5.4	5.3	4.8	4.2	4.1	3.8	5.0

PREVAILING WIND DIRECTION
KALISPELL AP, MT (KFCA)

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
S	S	SSE	SSE	SSE	SSE	SSE	S	S	S	S	S	S

Appendix G: Mitigation Measures

DEFINITIONS

ACCESS EASEMENT:	Any land area over which the OWNER has received an easement from a LANDOWNER allowing travel to and from the project. Access easements may or may not include access roads.
ACCESS ROAD:	Any travel course which is constructed by substantial recontouring of land and which is intended to permit passage by most four-wheeled vehicles.
BEGINNING OF CONSTRUCTION:	Any project-related earthmoving or removal of vegetation (except for clearing of survey lines).
BOARD:	Montana BOARD of Natural Resources and Conservation.
CONTRACTOR:	Constructors of the Facility (agent of owner).
DFWP:	Montana Department of Fish, Wildlife, and Parks.
DHES:	Montana Department of Health and Environmental Sciences.
DNRC:	Montana Department of Natural Resources and Conservation.
DOT:	Montana Department of Transportation.
DSL:	Montana Department of State Lands.
EXEMPT FACILITY:	A facility meeting the requirements of 75-20-202, MCA and accompanying rules.
LANDOWNER:	The owner of private property or the MANAGING AGENCY for public lands.
MANAGING AGENCY:	State or federal agency with primary responsibility for managing a specific land area.
OWNER:	The owner(s) of the facility, or the owner's agent.
SENSITIVE AREA:	Area which exhibits environmental characteristics that may make them susceptible to impact from construction of a transmission facility. The extent of these areas are defined for each project but may include any of the areas listed in 36.7.2533 or 36.7.2534, ARM as "sensitive areas" or "areas of concern."
SHPO:	State Historic Preservation Office.
STATE CONSTRUCTION INSPECTOR:	Person or persons designated by DNRC to monitor reclamation and operation of the facility for compliance with the conditions of BOARD approval.

INTRODUCTION

This document contains measures identified by DNRC for minimizing the impacts of the proposed Noranda 230-kV transmission line project. Additional site-specific measures will be identified as necessary, based on a review of final design. Any measures deemed necessary as a result of this review will be attached as Attachment A: Sensitive Area Requirements.

The purpose of these specifications is to ensure mitigation of environmental impacts during the construction, operation, and maintenance of a transmission facility. These specifications are intended to be incorporated into the texts of contract plans and specifications.

For non-exempt facilities, the Montana Major Facility Siting Act supersedes all state environmental permit requirements except for those dealing with air and water quality, public health and safety, water appropriations and diversions, and easements across state lands (75-20-103 and 401, MCA). A major purpose of these specifications is to ensure that the intent of the laws which are superseded is met, even though the procedures of applying for and obtaining permits from various state agencies are not. As specified later in this document, the State Inspector will have the responsibility for arranging reviews and inspections by other state agencies which would otherwise have been done through a permit application process.

0.0 GENERAL SPECIFICATIONS

0.1 Scope

These specifications apply to all lands affected by the project. Where the LANDOWNER requests practices other than those listed in these specifications, the OWNER may authorize such a change provided that the STATE INSPECTOR is notified in writing of the change and that the change would not be in violation of: (1) the intent of any state law which is superseded by the Montana Major Facility Siting Act; (2) the Certificate; (3) any conditions imposed by the BOARD; or (4) the BOARD's finding of minimum adverse impact; or (5) the regulations in 36.7.5501 and 5502, ARM.

0.2 Environmental Protection

The OWNER shall conduct all operations in a manner to protect the quality of the environment and to reduce impacts to the greatest extent practical. It is the intent of these measures to incorporate and apply "best management practices" during construction, post construction, operation, and decommissioning of the facility.

0.3 Contract Documents

These specifications shall be part of or incorporated into the contract documents; therefore, the OWNER and the OWNER's agents shall be held responsible for adherence to these specifications in performing the work.

0.4 Briefing Employees

The OWNER shall ensure that the CONTRACTOR and all field supervisors are provided with a copy of these specifications and informed of which sections are applicable to specific procedures. It is the responsibility of the OWNER, its CONTRACTOR, and CONSTRUCTION SUPERVISORS to ensure that the intent of these measures are met. Supervisors shall inform all employees on the applicable environmental constraints spelled out herein prior to and during construction. Site-specific measures spelled out in the addendums attached hereto shall be incorporated into the design and construction specifications or other appropriate contract document.

0.5 Compliance with Regulations

All project-related activities of the OWNER shall comply with all applicable local, state, and federal laws, regulations, and requirements.

0.6 Limits of Liability

The OWNER is not responsible for correction of environmental damage or destruction of property caused by negligent acts of DNRC employees during construction monitoring activities.

0.7 Designation of Sensitive Areas

DNRC, in its evaluation of the project, has designated certain areas along the right-of-way or access roads as SENSITIVE AREAS. The OWNER shall take all reasonable actions to avoid adverse impact in these SENSITIVE AREAS. (see Attachment A).

0.8 Performance Bonds

To ensure compliance with these specifications, the OWNER shall submit to the State of Montana or its authorized agent a BOND or bonds pertaining specifically to the restoration of the right-of-way and adjacent land damaged during construction. Post-construction monitoring by DNRC will determine compliance with these specifications and other mitigating measures included herein. At the time cleanup and restoration are complete, and revegetation is progressing satisfactorily, the OWNER shall be released from his obligation for restoration. At the time the OWNER is released, a portion of this BOND or a separate BOND shall be established by the OWNER and submitted to the State of Montana or its authorized agent. This BOND shall be held for five years or until monitoring by DNRC indicates that reclamation and road closures have been adequate. The amount and bonding mechanisms for this section shall be agreed to by the BOARD and OWNER under provisions established by 36.7.4006(2), ARM. The amounts of BOND or BONDS shall be specified in Addendum B and attached. Proof of bond shall be submitted to DNRC.

0.9 Designation of Structures

Each structure for the project shall be designated by a unique number on plan and profile maps. If this information is not available because the survey is not complete, locations along the centerline shall be indicated by station numbers or mileposts. Station numbers or mileposts of all angle points shall be designated on plan and profile maps. References to specific poles or towers in communication between the OWNER and DNRC shall use these numbers.

0.10 Access

When easements for construction access are obtained for construction personnel, provision will be made by the OWNER to ensure that the STATE INSPECTOR assigned by DNRC will be allowed access to the right-of-way, including the use of any off-right-of-way access roads used during the term of the BOND(s) required by 36.7.4006(2), ARM. Liability for damage caused by providing such access for the STATE INSPECTOR shall be limited by Section 0.6, Limits of Liability.

0.11 Designation of State Inspector

DNRC shall designate a STATE INSPECTOR or INSPECTORS to monitor the OWNER's compliance with these specifications and any other project-specific mitigation measures adopted by the BOARD as provided in 36.7.5502(1), ARM. The STATE INSPECTOR shall be the OWNER's liaison with the State of Montana on construction, post-construction, and reclamation activities. All communications regarding the project shall be directed to the STATE INSPECTOR. The name of the STATE INSPECTOR can be obtained by contacting the Administrator of the Energy Division, DNRC.

1.0 PRECONSTRUCTION PLANNING AND COORDINATION

1.1 Planning

1.1.1 Planning of all stages of construction and maintenance activities is essential to ensure that construction-related impacts will be kept to a minimum. The CONTRACTOR and OWNER shall, to the extent possible, plan the timing of construction, construction and maintenance access and requirements, location of special use sites, and other details before the commencement of construction.

1.1.2 Preferably 45 days, but at least 30 days before the start of construction, the OWNER shall submit plan and profile map(s) depicting the location of the centerline and of all construction access roads, maintenance access roads, structures, clearing backlines, and, if known, special use sites. The scale of the map shall be 1:24,000 or larger. Specifications and typical sections for construction and maintenance access roads shall be submitted with the plan and profile map(s). When these materials are submitted, access road locations shall have been flagged on-the-ground for review by the STATE INSPECTOR.

1.1.3 If special use sites are not known at the time of submittal of the plan and profile, the following information shall be submitted no later than five days prior to the start of construction. The location of special use sites, including staging sites, pulling sites, batch plant sites, splicing sites, borrow pits, campsites, and storage or other buildings, shall be plotted on one of the following and submitted to the Department: ortho photomosaics of a scale 1:24,000 or larger, available USGS 7.5' plan and profile maps of a scale 1:24,000 or larger.

1.1.4 Changes or updates to the information submitted in 1.1.2 and 1.1.3 shall be submitted to DNRC as they become available. In no case shall a substantive change be submitted less than fifteen days prior to its anticipated date of construction. Changes in these locations prior to construction (where designated SENSITIVE AREAS are affected), must be submitted to DNRC 15 days before construction and approved by the STATE INSPECTOR prior to construction.

1.1.5 Long-term maintenance routes to all points on the line should be planned before construction begins. Where known, new construction access roads intended to be maintained for permanent use shall be differentiated from temporary access roads on the maps required under 1.1.2 above.

1.2 Preconstruction Conference

1.2.1 At least one week before commencement of any construction activities, the OWNER shall schedule a preconstruction conference. The STATE INSPECTOR shall be notified of the date and location for this meeting. One of the purposes of this conference shall be to brief the CONTRACTOR and land management agencies regarding the content of these specifications and other BOARD-approved mitigating measures, and to make all parties aware of the roles of the STATE INSPECTOR and of the federal inspectors (if any).

1.2.2 The OWNER's representative, the CONTRACTOR's representative, the STATE INSPECTOR, and representatives of affected state and federal agencies who have land management or permit and easement responsibilities shall be invited to attend the preconstruction conference.

1.3 Public Contact

1.3.1 Written notification by the OWNER's field representative or the CONTRACTOR shall be given to local public officials in each affected community prior to the beginning of construction to provide information on the temporary increase in population, when the increase is expected, and where the workers will be stationed.

1.3.2 The OWNER shall negotiate with the LANDOWNER in determining the best locations for access easements and the need for gates.

1.3.3 The OWNER shall contact local government officials, or the MANAGING AGENCY as appropriate, regarding implementation of required traffic safety measures.

1.4 Historical and Archaeological Surveys

1.4.1 The OWNER must develop and carry out a plan approved by DNRC that includes steps which have been and will be taken to identify, evaluate, and avoid or mitigate damage to cultural resources affected by the project. The plan shall include: (1) actions taken to identify cultural resources during initial intensive survey work; (2) an evaluation of the significance of the identified sites and likely impacts caused by the project; (3) recommended treatments or measures to avoid or mitigate damage to known cultural sites; (4) steps to be taken in the event other sites are identified after approval of the plan; and (5) provisions for monitoring construction to protect cultural resources. Except for monitoring, all steps of the plan must be carried out prior to the start of construction. The requirement for this plan should not be construed to exempt or alter compliance by the OWNER or MANAGING AGENCY with 36 CFR 800. However, compliance with 36 CFR 800 can be used to satisfy the requirements included in this section.

2.0 CONSTRUCTION

2.1 General

2.1.1 The preservation of the natural landscape contours and environmental features shall be an important consideration in the location of all construction facilities, including roads, storage areas, and buildings. Construction of these facilities shall be planned and conducted so as to minimize destruction, scarring, or defacing of the natural vegetation and landscape. Any necessary earthmoving shall be planned and designed to be as compatible as possible with the natural land forms.

2.1.2 Temporary construction sites and staging areas shall be kept to the minimum size necessary to perform the work. Such areas shall be located where most environmentally compatible, considering slope, fragile soils or vegetation, and risk of erosion. After construction, these areas shall be restored as specified in Section 3.0 of these specifications unless a specific exemption is authorized in writing by the STATE INSPECTOR.

2.1.3 All work areas shall be maintained in a neat, clean, and sanitary condition at all times. Trash or construction debris (in addition to solid waste described in Section 2.14) shall be regularly removed during the construction and reclamation periods.

2.1.4 Vegetation such as trees, plants, shrubs, and grasses on or adjacent to the right-of-way which do not interfere with the performance of construction work or operation of the line itself shall be preserved.

2.1.5 The OWNER shall take all necessary action to avoid adverse impacts to SENSITIVE AREAS listed in Addendum A. The STATE INSPECTOR shall be notified two working days in advance of initial clearing or construction activity in these areas. The OWNER shall mark or flag the clearing backlines and limits of disturbance in certain SENSITIVE AREAS as designated in Addendum A or required by the STATE INSPECTOR. All construction activities must be conducted within marked areas.

2.1.6 The OWNER shall either acquire appropriate land rights or provide compensation for damage for the land area that will be disturbed by construction. The width of the area disturbed by construction shall not exceed a reasonable distance from the centerline as necessary to perform the work. For this project, construction activities should be contained within the area specified on the plan and profile maps approved by the STATE INSPECTOR as provided for in General Specification number 0.9.

2.1.7 Except for Sedlak Creek, flow in a streamcourse may not be permanently diverted. If temporary diversion is necessary, flow will be restored before a major runoff season or the next spawning season, as determined by the STATE INSPECTOR in consultation with the MANAGING AGENCY (see 2.11.6).

2.2 Construction Monitoring

2.2.1 The STATE INSPECTOR is responsible for implementing the monitoring plan required by 36.7.5501 and 5502, ARM. The plan consists of those actions necessary to determine compliance with the terms and conditions of the BOARD's approval and to be consistent with applicable BOARD standards contained in Administrative Rules or BOARD Order.

2.2.2 The STATE INSPECTOR may require mitigation measures or procedures at some sites beyond those listed in Addendum A in order to minimize environmental damage due to unique circumstances that arise during construction. Unique circumstances would include unanticipated discovery of a cultural site or active sensitive raptor nest, and situations when construction activities will cause excessive environmental impacts due to seasonal field conditions. The STATE INSPECTOR will require appropriate mitigating measures or minor construction rescheduling to avoid these impacts. The STATE INSPECTOR will provide the OWNER with written documentation of the reasons for the modifications within 24 hours of their imposition.

2.2.3 In the event that the STATE INSPECTOR shows reasonable cause that compliance with the BOARD conditions or these specifications is not being achieved, DNRC would take appropriate corrective action as provided in 36.7.5502(12), ARM.

23 Timing of Construction

2.3.1 Construction and motorized travel may be restricted or prohibited at certain times of the year in certain areas. Exemptions to these timing restrictions may be granted by DNRC in writing if the OWNER can clearly demonstrate that no environmental impacts will occur as a result. These areas, listed in Addendum A, include areas deemed as sensitive areas and areas of concern in 36.7.2533 or 36.7.2534, ARM.

2.3.2 In order to prevent rutting and excessive damage to vegetation, construction will not take place during periods of high soil moisture when construction vehicles will cause severe rutting requiring extensive reclamation.

24 Public Safety

2.4.1 All construction activities shall be done in compliance with existing health and safety laws.

2.4.2 Requirements for aeronautical hazard marking shall be determined by the OWNER in consultation with the Montana Aeronautical Division, the FAA, and DNRC. Where required, aeronautical hazard markings shall be installed at the earliest practical time following stringing of the wires.

2.4.3 Noise levels shall not exceed established BOARD standards as a result of operation of the facility and associated facilities. For electric transmission facilities, the average annual noise levels, as expressed by an A-weighted day-night scale (Ldn), will not exceed (a) 50 decibels at the edge of the right-of-way in residential and subdivided areas unless the affected LANDOWNER waives this condition, and (b) 55 decibels at the edge of property boundaries of substations in residential and subdivided areas.

2.4.4 The facility shall be designed, constructed, and operated to adhere to the National Electric Safety Codes regarding transmission lines.

2.4.5 The electric field at the edge of the right-of-way will not exceed 1 kilovolt per meter measured 1 meter above the ground in residential or subdivided areas unless the affected LANDOWNER waives this condition, and that the electric field at road crossings under the facility will not exceed 7 kilovolts per meter measured 1 meter above the ground.

25 Protection of Property

2.5.1 Construction operations shall not take place over or upon the right-of-way of any railroad, public road, public trail, or other public property until negotiations and/or necessary approvals have been completed with the MANAGING AGENCY. Where it is necessary to cross a trail with access roads, the trail corridor will be restored. Adequate signing and/or blazes will be established so the user can find the route. All roads and trails designated by government agencies as needed for fire protection or other purposes shall be kept free of logs, brush, and debris resulting from operations under this agreement. Any such road or trail damaged by this project shall be promptly restored as nearly as possible to its original condition.

2.5.2 Reasonable precautions shall be taken to protect, in place, all public land monuments and private property corners or boundary markers. If any such land markers or monuments are destroyed, the marker shall be re-established and referenced in accordance with the procedures outlined in the "Manual of Instruction for the Survey of the Public Land of the United States" or, in the case of private property, the specifications of the county engineer. Re-establishment will be at the expense of the OWNER.

2.5.3 Construction shall be conducted so as to prevent any damage to existing real property including transmission lines, distribution lines, telephone lines, railroads, ditches, and public roads crossed. If such property is damaged by operations under this agreement, the OWNER shall repair such damage immediately to a reasonable satisfactory condition in consultation with the property owner.

2.5.4 In areas with livestock, the OWNER shall make a reasonable effort to comply with the reasonable requests of LANDOWNERS regarding measures to control livestock. Care shall be taken to ensure that all gates are reclosed after entry or exit and the LANDOWNER shall be compensated for any losses to personal property due to construction or maintenance activities. Gates shall be inspected and repaired when necessary during construction and missing padlocks shall be replaced. The OWNER shall ensure that gates are not left open at night or during periods of no construction activity. Any fencing or gates cut, removed, damaged, or destroyed by the OWNER shall immediately be replaced with new materials. Fences installed shall be of the same height and general type as the fence replaced or nearby fence on the same property, and shall be stretched tight with a fence stretcher before stapling or securing to the fence posts. Temporary gates shall be of sufficiently high quality to withstand repeated opening and closing during construction to the satisfaction of the STATE INSPECTOR.

2.5.5 The CONTRACTOR must notify the OWNER, the STATE INSPECTOR, and, if possible, the affected LANDOWNER within two working days of damage to land, crops, property, or irrigation facilities, contamination or degradation of water, or livestock injury caused by the OWNER's construction activities. The OWNER shall reasonably restore any damaged resource or property or provide reasonable compensation to the affected party.

2.5.6 Pole holes and anchor holes must be covered or fenced in any fields, pastures, or ranges used for livestock grazing or where a LANDOWNER's requests can be reasonably accommodated.

2.5.7 All fences crossed by permanent access roads shall be provided with a gate or other suitable closure to the satisfaction of the STATE INSPECTOR. All fences to be crossed by access roads shall be braced before the fence is cut. Fences not to be gated should be restrung temporarily during construction and permanently within 30 days following construction, subject to the reasonable desires of the LANDOWNER.

2.5.8 Where new access roads cross fence lines, the OWNER shall make reasonable effort to accommodate the LANDOWNER's wishes on gate location and width.

2.5.9 Any breaching of natural barriers to livestock movement by construction activities will require fencing sufficient to control livestock.

26 Traffic Control

2.6.1 At least 30 days before any construction within or over any state or federal highway right-of-way, the OWNER will notify the appropriate DOT field office to review the proposed occupancy and to resolve any problems. The OWNER must supply DNRC with documentation that this consultation has occurred This documentation should include any measures recommended by DOT and to what extent the OWNER has agreed to comply with these measures. In the event that recommendations or regulations were not followed, a statement as to why the OWNER chose not to follow them should be included.

2.6.2 In areas where the construction created a hazard, traffic will be controlled according to the applicable DOT regulations. Safety signs advising motorists of construction equipment shall be placed on major state highways, as recommended by DOT. The installation of proper road signing will be the responsibility of the OWNER.

2.6.3 The MANAGING AGENCY shall be notified, as soon as practicable, when it is necessary to close public roads to public travel for short periods to provide safety during construction.

2.6.4 Construction vehicles and equipment will be operated at speeds safe for existing road and traffic conditions.

2.6.5 Traffic delays will be restricted on primary access routes, as determined by DOT or the MANAGING AGENCY.

2.6.6 Access for fire and emergency vehicles will be provided for at all times.

2.6.7 Public travel through and use of active construction areas shall be limited at the discretion of the MANAGING AGENCY.

2.7 Access Roads and Vehicle Movement

2.7.1 Construction of new roads shall be held to the minimum reasonably required to construct and maintain the facility. State, county, and other existing roads shall be used for construction access wherever possible. Access roads intended to be permanent should be initially designed as such. The location of access roads and towers shall be established in consultation with affected LANDOWNERS and LANDOWNER concerns shall be accommodated where reasonably possible and not in contradiction to these specifications or other BOARD conditions.

2.7.2 All new roads, both temporary and permanent, shall be constructed with the minimum possible clearing and soil disturbance to minimize erosion, as specified in Section 2.11 of these specifications.

2.7.3 Where practical, all roads shall be initially designed to accommodate one-way travel of the largest piece of equipment that will eventually be required to use them; road width shall be no wider than necessary.

2.7.4 Roads shall be located in the right-of-way insofar as possible. Travel outside the right-of-way to enable traffic to avoid cables and conductors during conductor stringing shall be kept to the minimum possible. Road crossings of the right-of-way should be near support structures.

2.7.5 Where practical, temporary roads shall be constructed on the most level land available. Where temporary roads cross flat land, they shall not be graded or bladed unless necessary, but will be flagged or otherwise marked to show their location and to prevent travel off the roadway.

2.7.6 In order to minimize soil disturbance and erosion potential, no cutting and filling for access road construction shall be allowed in areas of up to 5 percent sideslope. In areas of over 5 percent sideslope, road building that may be required shall conform to a 4 percent outslope. The roads shall be constructed to prevent channeling of runoff, and shoulders or berms that would channel runoff shall be avoided.

2.7.7 The OWNER will maintain all permanent access roads, including drainage facilities, which are constructed for use during the period of construction. In the event that a road would be left in place, the OWNER and LANDOWNER may enter agreements regarding maintenance for erosion control following construction.

2.7.8 Any use damage to existing private roads, including rutting, resulting from construction operation shall be repaired and restored to condition as good or better than original as soon as possible. Repair and restoration should be accomplished during and following construction as necessary to reduce erosion.

2.7.9 All permanent access road surfaces, including those under construction, will be prepared with the necessary erosion control practices as determined by the STATE INSPECTOR or the MANAGING AGENCY prior to the onset of winter.

2.7.10 Any necessary snow removal shall be done in a manner to preserve and protect road signs and culverts, to ensure safe and efficient transportation, and to prevent excessive erosion damage to roads, streams, and adjacent land.

2.7.11 At the conclusion of line construction, final maintenance will be performed on all existing private roads used for construction access by the CONTRACTOR. These roads will be returned to a condition as good or better than when construction began.

2.7.12 At least 30 days prior to construction of a new access road approach intersecting a state or federal highway, or of any structure encroaching upon a highway right-of-way, the OWNER shall submit to DOT a plan and profile map showing the location of the proposed construction. At least five days prior to construction, the OWNER shall provide the STATE INSPECTOR written documentation of this consultation and actions to be taken by the OWNER as provided in 2.6.1.

2.8 Equipment Operation

2.8.1 During construction, unauthorized cross-country travel and the development of roads other than those approved shall be prohibited. The OWNER shall be liable for any damage, destruction, or disruption of private property and land caused by his construction personnel and equipment as a result of unauthorized cross-country travel and/or road development.

2.8.2 To prevent excessive soil damage in areas where a graded roadway has not been constructed, the limits and locations of access for construction equipment and vehicles shall be clearly marked or specified at each new site before any equipment is moved to the site. Construction foremen and personnel should be well versed in recognizing these markers and shall understand the restriction on equipment movement that is involved.

2.8.3 Dust control measures shall be implemented on access roads where required by the MANAGING AGENCY or where dust would pose a nuisance to residents. Construction activities and travel shall be conducted to minimize dust. Water, straw, wood chips, dust palliative, gravel, combinations of these, or similar control measures may be used. Oil or similar petroleum derivatives shall not be used.

2.8.4 Work crew foremen shall be qualified and experienced in the type of work being accomplished by the crew they are supervising. Earthmoving equipment shall be operated only by qualified, experienced personnel. Correction of environmental damage resulting from operation of equipment by inexperienced personnel will be the responsibility of the OWNER. Repair of damage to a condition reasonably satisfactory to the LANDOWNER, MANAGING AGENCY, or, if necessary, DNRC would be required.

2.8.5 Sock lines will be strung using a helicopter to minimize disturbance of soils and vegetation.

2.8.6 Following construction in areas designated by the local weed control board as noxious weed areas, the CONTRACTOR shall thoroughly clean all vehicles and equipment to remove weed parts and seeds immediately prior to leaving the area.

2.9 Right-of-Way Clearing and Site Preparation

2.9.1 The STATE INSPECTOR shall be notified at least 10 days prior to any timber clearing.

2.9.2 During clearing of survey lines or the right-of-way, shrubs shall be preserved to the greatest extent possible. Shrub removal shall be limited to crushing where possible or cutting where necessary. Plants may be cut off at ground level, leaving roots undisturbed so that they may resprout.

2.9.3 Right-of-way clearing shall be kept to the minimum necessary to meet the requirements of the National Electric Safety Code. Trees to be saved within the clearing backlines and danger trees located outside the clearing backlines shall by marked. Clearing backlines in SENSITIVE AREAS will be indicated on plan and profile maps. All snags and old growth trees that do not endanger the line or maintenance equipment shall be preserved. In designated SENSITIVE AREAS, the STATE INSPECTOR shall approve clearing boundaries prior to clearing.

2.9.4 In no case should the entire nominal width of the right-of-way be cleared of trees up to the edge, unless approved by the STATE INSPECTOR and the LANDOWNER. Clearing should instead produce a "feathered edge" right-of-way configuration, where only specified hazard trees and those that interfere with construction or conductor clearance are removed. In areas where there is potential for long tunnel views of transmission lines or access roads as described in Addendum A, special care shall be taken to screen the lines from view. Where appropriate, special care shall be taken to leave a separating screen of vegetation where the right-of-way parallels or crosses highways and rivers.

2.9.5 During construction, care will be taken to avoid damage to small trees and shrubs on the right-of-way that do not interfere with the clearing requirements under Section 2.9.3 and would not grow to create a problem over a 10-year period.

2.9.6 Soil disturbance and earthmoving will be kept to a minimum. Clearing and site preparation activities shall be conducted consistent with the measures described in Section 2.11, Erosion and Sediment Control.

2.9.7 The OWNER shall be held liable for any unauthorized cutting, injury, or destruction to timber whether such timber is on or off the right-of-way.

2.9.8 Unless otherwise requested by the LANDOWNER or MANAGING AGENCY, felling shall be directional in order to minimize damage to remaining trees. Maximum stump height shall be no more than 12 inches on the uphill side or 1/3 the tree diameter, whichever is greater. Trees will not be pushed or pulled over. Stumps will not be removed unless they conflict with a structure, anchor, or roadway.

2.9.9 Special logging, clearing, or excavation techniques may be required in certain highly sensitive or fragile areas.

2.9.10 Crane landings shall be constructed with minimum disturbance considering the conditions present at each pole site. The STATE INSPECTOR shall review areas proposed foe disturbance based on the plan and profile an may require that disturbance be limited in identified SENSITIVE AREAS. The STATE INSPECTOR will be notified at least five days prior to the beginning of construction at those sites.

2.9.11 No motorized travel on, scarification of, or displacement of talus slopes shall be allowed except where approved by the STATE INSPECTOR and LANDOWNER or MANAGING AGENCY.

2.9.12 To avoid unnecessary ground disturbance, counterpoise should be placed or buried in disturbed areas whenever possible.

2.9.13 Slash resulting from project clearing that may be washed out by high water the following spring shall be removed and piled outside the floodplain before runoff. Instream slash resulting from project clearing must be removed within 24 hours.

2.9.14 Streamside trees will be felled away from streams rather than into or across streams.

2.10 Grounding

2.10.1 Grounding of fences, buildings, and other structures on and adjacent to the right-of-way shall be done according to the specifications of the National Electric Safety Code.

2.11 Erosion and Sediment Control

2.11.1 Clearing and grubbing for roads and rights-of-way, at stream crossings, and other areas of surface disturbance shall be carefully controlled to minimize silt or other water pollution downstream from the rights-of-way. Erosion control measures contained in the Soil and Water Conservation Handbook (KNF) shall be used to minimize erosion and sediment problems and will be required as appropriate following review of the plan and profile map(s) required under Section 0.9.

2.11.2 Roads shall cross drainage bottoms at sharp or nearly right angles and level with the streamed whenever possible. Temporary bridges, fords, culverts, or other structures to avoid stream bank damage will be installed.

2.11.3 Under no circumstances shall streamed materials be removed for use as backfill, embankments, road surfacing, or for other construction purposes.

2.11.4 No excavations shall be allowed on any river or perennial stream channels or floodways at locations likely to cause detrimental erosion or offer a new channel to the river or stream at times of flooding.

2.11.5 Installation of culverts, bridges, or other structures in perennial streams will be done in accordance with Section 2.11.11 following on-site inspections by the STATE INSPECTOR. All culverts shall be installed with the culvert inlet and outlet at natural stream grade or ground level. Water velocities or positioning of culverts shall not impair fish passage.

2.11.6 Following submittal of plan and profile maps, but prior to construction of access roads, bridges, fill slopes, culverts, or impoundments, or channel changes within the high-water mark of any perennial stream, lake, or pond, the OWNER shall discuss proposed activities with the STATE INSPECTOR, DFWP, local conservation district, and KNF personnel. This site review will determine the specific mitigation measures to minimize impacts appropriate to the conditions present.

2.11.7 No blasting shall be allowed in streams. Blasting may be allowed near streams if precautions are taken to protect the stream from debris and from entry of nitrates or other contaminants in the stream.

2.11.8 The OWNER shall maintain private roads while using them. All ruts made by machinery shall be filled or graded to prevent channeling. In addition, the OWNER must take measures to prevent the occurrence of erosion caused by wind or water during and after use of these roads. Some erosion-preventive measures include, but are not limited to, installing or using cross logs, drain ditches, water bars, and wind erosion inhibitors such as water, straw, gravel, or combinations of these.

2.11.9 The OWNER shall prevent material from being deposited in any watercourse or stream channel. Where necessary, measures such as hauling of fill material, construction of temporary barriers, or other approved methods shall be used to keep excavated materials and other extraneous materials out of watercourses. Any such materials entering watercourses shall be removed immediately.

2.11.10 The OWNER shall be responsible for the stability of all embankments created during construction. Embankments and backfills shall contain no stream sediments, frozen material, large roots, sod, or other materials which may reduce their stability.

2.11.11 Culverts, arch bridges, or other stream crossing structures shall be installed at all permanent crossings of flowing or dry watercourses where fill is likely to wash out during the life of the road. Culvert or bridge installation is prohibited in areas of important fish spawning beds identified by DFWP and during specified fish spawning seasons on less sensitive streams or rivers. All culverts shall be sized according to KNF guidelines as found in the Revised Hydraulic Guide, Kooteni National Forest

(1985) and Amendments. All culverts shall be installed at the time of road construction.

2.11.12 No fill material other than that necessary for road construction shall be piled within the high water zone of streams where floods can transport it directly into the stream. Excess floatable debris shall be removed from areas immediately above crossings to prevent obstruction of culverts or bridges during periods of high water.

2.11.13 No skidding of logs or driving of vehicles across a perennial watercourse shall be allowed, except via authorized construction roads.

2.11.14 No perennial watercourses shall be permanently blocked or diverted.

2.11.15 Skidding with tractors shall not be permitted within 100 feet of streams containing flowing water except in places designed in advance, and in no event shall skid roads be located on these streamcourses. Skid trails shall be located high enough out of draws, swales, and valley bottoms to permit diversion of runoff water to natural undisturbed forest ground cover.

2.11.16 Construction methods shall prevent accidental spillage of solid matter, contaminants, debris, petroleum products, and other objectionable pollutants and wastes into watercourses, lakes, and underground water sources. Catchment basins capable of containing the maximum accidental spill shall be installed at areas where fuel, chemicals, or oil are stored. Any accidental spills of such materials shall be cleaned up immediately.

2.11.17 To reduce the amount of sediment entering streams, a strip of undisturbed vegetation will be provided between areas of disturbance (road construction or tower construction) and streamcourses, and around first-order or larger streams that have a well defined streamcourse or aquatic or riparian vegetation, unless otherwise required by the LANDOWNER. Buffer strip width is measured from the high water line of a channel and will be as determined by the STATE INSPECTOR and MANAGING AGENCY. For braided streams with more than one discernible channel (ephemeral or permanent), the high water line of the outermost channel is used. In the event that vegetation cannot be left undisturbed, structural sediment containment, approved by the STATE INSPECTOR, must be substituted before soil disturbing activity commences.

2.11.18 When no longer needed, all temporary structures or fill installed to aid stream crossing shall be removed and the course of the stream re-established to prevent future erosion.

2.11.19 All temporary dams built on the right-of-way shall be removed after line construction unless otherwise approved by the STATE INSPECTOR. Dams allowed to remain shall be upgraded to permanent structures and shall be provided with spillways or culverts and with a continuous sod cover on their tops and downstream slopes. Spillways may be protected against erosion with riprap or equivalent means.

2.11.20 Damage resulting from erosion or other causes shall be repaired after completion of grading and before revegetation is begun.

2.11.21 Point discharge of water will be dispersed in a manner to avoid erosion or sedimentation of streams.

2.11.22 Riprap or other erosion control activities will be planned based on possible downstream consequences of activity, and during the low flow season if possible.

2.11.23 Water used in embankment material processing, aggregate processing, concrete curing, foundation and concrete life cleanup, and other waste water processes shall not be discharged into surface waters without a valid discharge permit from DHES.

2.12 Archaeological, Historical and Paleontological Resources

2.12.1 All construction activities shall be conducted so as to prevent damage to significant archaeological, historical, or paleontological resources.

2.12.2 Any relics, artifacts, fossils, or other items of historical, paleontological, or archaeological value shall be preserved in a manner agreeable to both the LANDOWNER and the State Historic Preservation Officer. If any such items are discovered during construction, the STATE INSPECTOR shall be notified immediately. Work which could disturb the materials or surrounding area must cease until the site can be properly evaluated by a qualified archaeologist (employed by the OWNER, representing SHPO, or KNF). For significant sites, recommendations will be made by the qualified archeologist. The STATE INSPECTOR or KNF may require that reasonable measures be followed to protect significant sites.

2.12.3 The OWNER shall conform to treatments approved for significant cultural sites by KNF, Montana State Historic Preservation Office (SHPO) and the Advisory Council on Historic Preservation (ACHP).

2.13 Prevention and Control of Fires

2.13.1 Burning, fire prevention, and fire control shall meet the requirements of the MANAGING AGENCY and/or the fire control agencies having jurisdiction. The STATE INSPECTOR shall be invited to attend all meetings with these agencies to discuss or prepare these plans. A copy of any plans developed shall be provided to the STATE INSPECTOR.

2.13.2 The OWNER shall direct the CONTRACTOR to comply with regulations of any county, town, state, or governing municipality having jurisdiction regarding fire laws and regulations.

2.13.3 Blasting caps and powder shall be stored only in approved areas and containers and always separate from each other.

2.13.4 The OWNER shall direct the CONTRACTOR to properly store and handle combustible material which could create objectionable smoke, odors, or fumes. The OWNER shall direct the CONTRACTOR not to burn refuse such as trash, rags, tires, plastics, or other debris, except as permitted by the county, town, state, or governing municipality having jurisdiction.

2.14 Waste Disposal

2.14.1 The OWNER shall direct the CONTRACTOR to use licensed solid waste disposal sites. Inert materials (Group III wastes) may be disposed of at Class III landfill sites; mixed refuse (Group II wastes) must be disposed of at Class II landfill sites.

2.14.2 Emptied pesticide containers or other chemical containers must be triple rinsed to render them acceptable for disposal in Class II landfills or for scrap recycling pursuant to ARM 16.44.202(12) for treatment or disposal. Pesticide residue and pesticide containers shall be disposed of in accordance with ARM 16.20.633(9).

2.14.3 All waste materials constituting a hazardous waste defined in ARM 16.44.303, and wastes containing any concentration of polychlorinated biphenlyls, must be transported to an approved designated hazardous waste management facility (as defined in ARM 16.44.202(12)) for treatment or disposal.

2.14.4 All used oil shall be hauled away and recycled or disposed of in a licensed Class II landfill authorized to accept liquid wastes or in accordance with Sections 2.14.2 and 2.14.3 above. There shall be no intentional release of crankcase oil or other toxic substances into streams or soil. In the event of an accidental spill into a waterway, the substances will be cleaned up and the Water Quality Bureau, DHES, will be contacted immediately.

2.14.5 Sewage shall not be discharged into streams or streambeds. The OWNER shall direct the CONTRACTOR to provide refuse containers and sanitary chemical toilets convenient to all principal points of operation. These facilities shall comply with applicable federal, state, and local health laws and regulations.

2.14.6 In order to reduce fire hazard, small trees and brush cut during construction should be chipped, burned, and/or scattered. Slash 3 inches in diameter or greater may be scattered in quantities of up to 15 tons/acre unless otherwise requested by the LANDOWNER. Tops, limbs, and brush less than 3 inches in diameter and 3 feet in length may be left in quantities less than 3 tons per acre except on cropland and residential land or where otherwise specified by the LANDOWNER. In certain cases, the STATE INSPECTOR will authorize chipping and scattering of tops, limbs, and brush in excess of 3 tons per acre as an erosion control measure. Merchantable timber should be decked and removed at the direction of the LANDOWNER or MANAGING AGENCY.

2.14.7 Refuse burning shall require the prior approval of the LANDOWNER and a Montana Open Burning Permit must be obtained from MDHES.

2.15 Special Measures

2.15.1 Poles with a low reflectivity constant should be used to reduce potential for visual contrast.

2.15.2 Crossings of rivers should be at right angles. Strategic placement of structures should be done as a means to screen views of the transmission line and to minimize the need for vegetation clearing.

2.15.3 Based on the analysis contained in the EIS and findings made by the BOARD, general mitigations also may apply to construction and operation of the project these measure are found in Attachment.

3.0 POST-CONSTRUCTION CLEANUP AND RECLAMATION

3.1 Cleanup

3.1.1 All litter resulting from construction is to be removed, to the satisfaction of the STATE INSPECTOR, from the right-of-way and along access roads leading to the right-of-way. Such litter shall be legally disposed of as soon as possible, but in no case later than within 60 days of completion of wire clipping. If requested by the LANDOWNER, the OWNER shall provide for removal of any additional construction-related debris discovered after this initial cleanup.

3.1.2 Insofar as practical, all signs of temporary construction facilities such as haul roads, work areas, buildings, foundations or temporary structures, stockpiles of excess or waste materials, or any other vestiges of construction shall be removed and the areas restored to as natural a condition as is practical, in consultation with the LANDOWNER.

3.2 Restoration, Reclamation, and Revegetation

3.2.1 Restoration, reclamation, and revegetation of the right-of-way, access roads, crane pads, splicing or stringing sites, borrow sites, gravel, fill, stone, aggregate excavation, or any other disturbance shall be consistent with the Reclamation and Revegetation Standards and provisions contained in 36.7.5502(10), ARM.

3.2.2 In agricultural areas where soil has been compacted by movement of construction equipment, the OWNER shall direct the CONTRACTOR to rip the soil deep enough to restore productivity, or if complete restoration is not possible, the OWNER shall compensate the LANDOWNER for lost productivity.

3.2.3 Earth next to access roads that cross streams shall be replaced at slopes less than the normal angle of repose for the soil type involved.

3.2.4 All drainage channels shall be restored to a gradient and width which will prevent accelerated gully erosion.

3.2.5 Drive-through dips, open-top box culverts, water bars, or cross drains shall be added to roads at the proper spacing and angle as necessary to prevent erosion (see Section 2.11.11).

3.2.6 Interrupted drainage systems shall be restored.

3.2.7 Seeding prescriptions to be used in revegetation, requirements for hydroseeding, fertilizing, and mulching will be jointly determined by representatives of the OWNER, DNRC, DSL, and other involved state and federal agencies.

3.2.8 Piling and windrowing of material for burning shall use methods that will prevent significant amounts of soil from being included in the material to be burned and minimize destruction of ground cover. Non mechanized methods are recommended if necessary to minimize soil erosion and vegetation disturbance. Piles shall be located so as to minimize danger to timber and damage to ground cover when burned.

3.2.9 During restoration in areas where topsoil has been stockpiled, the site will be graded to contours approved by the STATE INSPECTOR and the topsoil replaced on the surface. The STATE INSPECTOR may waive the requirement for topsoil replacement on a site-specific basis where additional disturbance at a site would increase erosion, sedimentation, or reclamation problems.

3.2.10 Excavated material not suitable or required for backfill shall be evenly filled back onto the cleared area prior to spreading any stockpiled soil. Large rocks and boulders uncovered during excavation and not buried in the backfill will be disposed of as approved by the STATE INSPECTOR and/or the LANDOWNER.

3.2.11 Application rates and timing of seeds and fertilizer, and purity and germination rated of seed mixtures, shall be as determined in consultation with DNRC and U.S. Forest Service. Reseeding shall be done at the first appropriate opportunity after construction ends.

3.2.12 Where appropriate, hydroseeding, drilling, or other appropriate methods shall be used to aid revegetation. Mulching with straw, wood chips, or other means shall be used where necessary.

3.2.13 All temporary roads shall be reclaimed (with the concurrence of the LANDOWNER). All temporary roadways shall be graded and scarified to permit the growth of vegetation and to discourage traffic. Permanent unsurfaced roadbeds not open to public use will be revegetated as soon after use as possible unless specified otherwise by the LANDOWNER.

4.0 OPERATION AND MAINTENANCE

4.1 Right-of-Way Management and Road Maintenance

4.1.1 Maintenance of the right-of-way and permanent access roads shall provide for the protection of SENSITIVE AREAS identified prior to and during construction. Maintenance activities off the right-of-way such as along access roads will be consistent with best management practices and environmental protection measures contained in these specifications.

4.1.2 Vegetation that has been saved through the construction process and which does not pose a hazard or potential hazard to the powerline, particularly that of value to fish and wildlife, shall be allowed to grow on the right-of-way.

4.1.3 In areas other than cropland, vegetation cover shall be maintained in the areas immediately adjacent to transmission towers in cooperation with the LANDOWNER.

4.1.4 Grass cover, water bars, cross drains, and the proper slope shall be maintained on permanent access roads and service roads in order to prevent soil erosion.

4.2 Maintenance Inspection

4.2.1 The OWNER shall have responsibility to correct soil erosion or revegetation problems on the right-of-way or access roads as they become known. Appropriate corrective action will be taken where necessary. The OWNER may, through agreement with the LANDOWNER or MANAGING AGENCY, provide a mechanism to identify and correct such problems.

4.2.2 Operation and maintenance inspections using ground vehicles shall be timed so that routine maintenance will be done when access roads are firm, dry, or frozen, wherever possible.

4.3 Correction of LANDOWNER Problems

4.3.1 When the facility causes interference with radio, TV, or other stationery communication systems after the facility is energized, the OWNER will correct the interference with mechanical corrections to facility hardware, or antennas, or will install remote antennas or repeater stations, or will use other reasonable means to correct the problem.

4.3.2 The OWNER will respond to complaints of interference by investigating complaints to determine the origin of the interference. If the interference is not caused by the facility, the OWNER shall so inform the person bringing the complaint,. The OWNER shall provide the STATE INSPECTOR with documentation of the evidence regarding the source of the interference if the person brings the complaint to the STATE INSPECTOR or the BOARD.

4.4 Herbicides and Weed Control

4.4.1 Weed control, including any application of herbicides in the right-of-way, will be in accordance with applicable state and federal laws and regulations. Additional recommendations of local weed control boards and provisions of a right-of-way maintenance agreements with LANDOWNERs may be adopted so long as they are consistent with the following requirements.

4.4.2 In areas disturbed by transmission facilities, the OWNER will cooperate with LANDOWNERs in control of noxious weeds as designed by the weed control board having jurisdiction in the county crossed by the line.

4.4.3 Proper herbicide application methods will be used to keep drift and nontarget damage to a minimum.

4.4.4 Herbicides must be applied according to label specifications and in accordance with Section 4.4.1 above. Only herbicides registered in compliance with applicable federal and state laws may be applied.

4.4.5 Herbicides shall not be sprayed during heavy rains or threat of heavy rains. Vegetation buffer zones shall be left along all identifiable stream channels. Herbicides shall not be used in any public water supply watershed identified by DHES.

4.4.6 All applications of herbicides must be performed by a licensed applicator.

4.4.7 During the second and third growing seasons following the completion of restoration and reseeding, the OWNER and STATE INSPECTOR shall inspect the right-of-way and access roads for newly established stands of noxious weeds. The county weed control supervisor shall be invited to attend this inspection In the event that stands of weeds are encountered, appropriate control measures shall be taken by the OWNER.

4.5 Monitoring

4.5.1 DNRC may continue to monitor operation and maintenance activities for the life of the project in order to ensure compliance with the specifications in this section.

4.5.2 The OWNER will be responsible to DNRC for the term of the RECLAMATION BOND. After this time, the OWNER will report to individual

LANDOWNERs and managing agencies except as specified in conditions to the certificate.

5.0 DECOMMISSIONING

5.1 Notice

5.1.1 One year prior to the anticipated date for decommissioning of the certified facility, the OWNER shall notify DNRC of the plans for decommissioning. The notice shall include information regarding the removal and salvage of equipment and plans for reclamation.

5.2 Approval of Plan required

5.2.1 The OWNER shall be responsible to DNRC for complying with reclamation standards established at the time of project approval, including applicable provisions of these specifications.

THE DNRC has identified the following areas as sensitive areas where additional review by the DNRC and the KNF would take place during final design. These areas and measures apply to a particular alternative or are common to all alternatives. Those areas affected by the alternative selected by the Board of Natural Resources and Conservation would be incorporated into the Environmental Specifications as proposed for amending in Chapter 4 by the DNRC. The listed areas are locations where KNF and DNRC would concentrate monitoring efforts for the transmission line. The following discussion corresponds to those numbered areas on Figure H-1.

WILDLIFE

Miller Creek Centerline

Area 1. An elk security area would be crossed in the Miller Creek headwaters. Gates should be installed on access roads to restrict recreational use of the area. No through roads should be built in the security area to avoid encroachment into secure elk habitat. Construction should be timed to avoid extensive activity in this area during hunting season.

Area 2. The centerline would cross a big game winter range on lower Miller Creek. Construction activities on winter range should not be allowed between December 1 to March 31 unless written approval is given by the agencies, to avoid displacement of wintering deer, elk, and moose.

North Miller Creek Centerline

Area 3. An elk security area would be crossed in the North Miller Creek headwaters. Gates should be installed on access roads to restrict recreational use of the area. No through roads should be built in the security area to avoid encroachment into secure elk habitat. Construction should be timed to avoid extensive construction activity in this area during hunting season.

Area 4. The centerline would cross a big game winter range on lower Miller Creek. Construction activities should not be allowed on winter range between December 1 to March 31 unless written approval is given by the agencies, to avoid displacement of wintering deer, elk, and moose.

Area 5. Structure locations on the ridge spur below PI-40 on the North Miller route (Alternative 5) should be placed to avoid the large trees in this area. The access road also should be designed to require no more than minimum clearing in these trees.

Swamp Creek Centerline

Area 6. Pole placement near the oxbow pond on the west bank of the Fisher River on the Swamp Creek route (Alternative 6) should avoid the need to remove any of the large trees south of the oxbow.

Sensitive Areas Common to All Centerlines

Because the existing old growth habitat is limited and difficult to replace, clearing in these areas should be minimized. In places of easy access, high maintenance line management may allow clearing a narrower right-of-way.

New access roads would be closed to vehicle travel. KNF may require additional spring timing restrictions on construction to minimize disturbance on grizzly bear using areas crossed by the line.

SOILS AND HYDROLOGY

All routes would cross sensitive areas with slopes exceeding 30 percent where road construction would cause greater disturbance than on level or gently rolling terrain. Intermittent streams also are crossed by all routes. Figure H-1 does not show all of these areas. The agencies and Noranda would review final road locations to determine how measures contained in Best Management Practices could be applied to minimize impacts based on site specific conditions.

The following discussion refers to the number code and shaded area on Figure H-1. Land types referred to are those described by Kuennen and Gerhardt (1984).

Sensitive Areas Common to All Centerlines

Area 1. Sedlak Park is a disturbed area that has been used in the past as a staging area for highway construction. Rerouting of Sedlak Creek should be done prior to substation construction and should take place during a period of low flow. The new channel should be dug prior to diverting the creek. The grade of new channel should approximate the grade of the present channel, and there should be no abrupt grade that would encourage headcutting of the channel. During construction of the substation, activity would be minimized adjacent to the new stream channel.

Area 2. The KNF has mapped this area as land type 252 (moderately dissected structural and fluvial breaklands on slopes greater than 60 percent), although inspection shows areas of erodible soils interspersed with glacial till, bedrock, and one landslide. Soil exposed by construction of about 1/4 mile of new road in this unit would tend to slump on steep cutbanks and would be difficult to revegetate. Given the steep slopes and close proximity to the Fisher River, sedimentation may occur when the road is constructed from PI-4 to PI-5. If structure PI-5 were located beside the haul road, impacts would be reduced. Prompt revegetation would be essential to reduce erosion and sedimentation.

Very steep sideslopes would be crossed by about 0.1 mile of new access road south of PI-4. Grades on this new road could exceed 30 percent. Bedrock and talus are exposed in an existing road cut below this area. Potential for soil erosion is high and would require additional review and approval when road locations are fully known to ensure sufficient reclamation measures are adopted. Revegetation standards should not apply to cut slopes where bedrock is exposed during construction.

Area 3. Soils in land type 112 (characterized by clayey lacustrine terraces on slopes of 0 to 25 percent) would be affected by construction of about

0.6 miles of new roads. Road grades are not excessive. These soils are erodible or have cut-and-fill slopes prone to failure, and revegetation is difficult. Potential for sediment delivery to streams is at least moderate. Seeding, mulching, and fertilization should be required to facilitate revegetation on cut slopes. In moist areas, willow, alder, and cottonwood shoots should be planted to help stabilize cut slopes.

Area 6. A wetland area is located at the proposed angle point, but a slight realignment (less than 500 feet) to the east would avoid placing the angle point in the wet area (Elliott, 1991). Final tower and road placement would be reviewed to ensure that wetland area is avoided. Stringing and tensioning activities would not be allowed in this area. Rock barriers or a gate should be placed to close this road after construction is complete. If wet areas restrict access during construction, steel mesh grates should be used to reduce rutting. If water is pumped from footing holes, it would not be directly discharged in streams or marshes. Sedimentation from discharged water could be reduced by pumping the water to a small temporary sediment retention pond or tank truck.

Area 7. Extensive road building and land leveling are proposed near Ramsey Creek. Mechanical measures should be taken to reduce sediment entering the creek. Reclamation should focus on prompt revegetation to minimize erosion and sedimentation. After the extent of disturbance is flagged, the agencies and Noranda would review the area to determine the additional mitigating measures that would be necessary to minimize erosion and sedimentation.

Area 15. This area should be spanned to avoid a wetland.

Additional Areas on the Miller Creek Centerline

Area 4. Very steep sideslopes on land type 355 (glacially scoured valley sideslopes with slopes from 20 to 50 percent) would be crossed by about 1/2 mile of new access roads. Road grades would vary from nearly level to over 20 percent. Reclamation measures in DNRC's Environmental Specifications would be used to avoid erosion and sedimentation. Revegetation standards should not apply to cut slopes if bedrock is exposed during construction.

Area 5. A wet area is located below a centerline span or immediately adjacent to it. The centerline should be realigned (less than 500 feet) to the east to avoid this area, or the structure at the north end of this area should be located on the uphill side of USFS Road 231. No construction activities should take place in the wet area without approval of the managing agency.

Area 12. Soils in land types 108 (lacustrine and alluvial materials on 0 to 15 percent slopes) and 112 (clayey lacustrine terraces on 0 to 25 percent slopes) would be affected by construction of about 0.6 miles of new roads. Road grades would vary from nearly level to about 10 percent. These soils are erodible or have cut-and-fill slopes prone to failure, and revegetation is difficult. Potential for sediment delivery to streams is at least moderate. Seeding, mulching, and fertilization should be required on cut slopes to facilitate revegetation. In moist areas, willow, alder, and cottonwood shoots should be planted to help stabilize cut slopes.

Area 16. A wetland, remnants of a river meander cut off by highway construction, is located downslope of the proposed line. The area would be spanned and no construction activities would take place in the wet area. Review of final design would identify any additional measures to avoid potential for sedimentation.

Additional Areas on the North Miller Creek Centerline

Area 10. About 1/3 mile of road would be located near a stream channel in land type 302 (warm and dry glaciated mountain slopes with southern exposure on slopes in the 20 to 60 percent range). Road grades would approach 30 percent on roads located 300 to 400 feet from the stream. Soils in this land type are erodible and difficult to revegetate. Cut banks tend to slump. Given the moderately steep slopes, soil characteristics, and close proximity to a stream channel, sedimentation could result. Additional measures to control sediment would be determined by KNF, DNRC, and Noranda after the road location is flagged and field inspection occurs.

Area 11. This area, land type 360 (strongly scoured ridgetops with slopes from 15 to 35 percent), has been mapped by KNF as having poor reclamation potential. Where bedrock is encountered on cut slopes, it is not likely that revegetation could be accomplished. Therefore, the inspector may have to waive revegetation requirements in these locations.

Area 13. Soils in land type 108 (lacustrine and alluvial materials on slopes of 0-15 percent) in the lower portion of Miller Creek would be affected by construction of about 0.3 miles of new road. Road grades would vary from nearly level to about 10 percent. These soils are erodible, have slopes prone to failure if cut, or are difficult to revegetate. Potential for sediment delivery to streams is at least moderate. Seeding, mulching, and fertilization should be required on cut slopes to facilitate revegetation. In moist areas, willow, alder, and cottonwood shoots should be planted to help stabilize cut slopes.

Additional Areas on the Swamp Creek Centerline

Area 8. On steep slopes in land type 355 (glacially scoured valley sideslopes from 20 to 50 percent), road building should be minimized and existing roads and trails used where possible to avoid ground disturbance. Rocky material in this land type can limit revegetation.

Area 9. Wetlands could be encountered where the Swamp Creek route would cross the Fisher River valley. Existing roads and trails should be used where possible. If wet areas restrict construction access, steel matting should be used to minimize rutting and change in bottom contours. If water needs to be pumped from footing holes, it should not be discharged in streams, marshes, or oxbows. If shallow groundwater must be pumped from a footing hole, sedimentation could be reduced by pumping the water to a small temporary sediment retention pond.

Area 14. Soils in land types 108 (lacustrine and alluvial materials on 0 to 15 percent slopes) and 302 (warm, dry south-facing mountainsides with slopes from 20 to 60 percent) would be affected by a small amount of road construction (about 0.5 miles). Road grades would vary from nearly level to about 13 percent on one 600-foot long road spur. These soils are erodible or have slopes prone to failure if they are cut, and revegetation is difficult. Potential for sediment delivery to streams is at least moderate. Seeding, mulching, and fertilization should be required on cut slopes to facilitate revegetation. In moist areas, willow, alder, and cottonwood shoots should be planted to help stabilize cut slopes.

VISUAL

The following numbered areas correspond to those on Figure H-1 visually sensitive areas.

Visually sensitive areas 1, 2, 3, 5, 6, 8, and 10 have moderate or high potential for visual impact and would occur along the U.S. 2 corridor, near Forest Service recreation areas, and at crossings of USFS Road 231. In these areas, DNRC would review and approve clearing boundaries prior to clearing to ensure that right-of-way clearing is kept to the minimum necessary to meet requirements of the National Electric Safety Code. Proposed tower heights would be evaluated by DNRC, KNF, and Noranda where KNF land would be crossed to determine if increased structure height would decrease right-of-way clearing substantially. Where appropriate, this measure would be implemented by DNRC, KNF, and Noranda.

Also, DNRC and KNF would identify areas where tree planting within the right-of-way would effectively reduce visual impact for recreational users visiting the Libby Creek Recreation Gold Panning Area (visually sensitive area #3).

At visually sensitive areas 4 and 9, aeronautical safety markings could be required at the crossings of the Fisher River. If marked for aeronautical safety, care should be taken to minimize right-of-way clearing and retain existing vegetation that screens painted or lighted structures from residences or highway travelers.

At visually sensitive area 7, right-of-way clearing along a prominent ridgeline would be reviewed to balance clearing requirements and visual impacts. In this area, DNRC, KNF, and Noranda would develop site specific reclamation and revegetation measures to minimize potential for long-term visual impacts due to ground disturbance in areas having severe reclamation constraints (Figure 4-5 in the draft EIS). Care should be taken in building access roads to avoid unnecessary soil disturbance, because of the severe reclamation restraints.

VISUALLY SENSITIVE AREAS:

Common to all Routes

1) Structure 3 to Structure 9
2) PI-3A to PI-4
3) PI-13 to crossing of Libby Creek Recreation Gold Panning Area

Miller Creek Centerline

4) PI-6 to Structure 24 (this segment is common to the Miller Creek and North Miller centerlines, if marked for aeronautical safety)
5) Structure 56 to PI-12
6) four crossings of USFS Road 231

North Miller Centerline

7) 3 structures both directions from PI-40C
8) PI-42 to PI-13 (this segment is common to the North Miller and Swamp Creek centerlines)

Swamp Creek Centerline

9) PI-36 to Structure 28 (if marked for aeronautical safety)
10) base of slope near Structure 30 to Structure 32

[Structure locations based on profile of 9/22/90 submitted to DNRC]