Table 2-2 Access Levels and Ground Disturbance (*cont.*)

Level 4	*Construct Road in Sloping Terrain (8 to 15 percent)*	Moderate ground disturbance for new access road construction; assume 1.2 to 1.5 miles of new road would be required for each mile of transmission line. Road construction would disturb approximately 2.0 to 2.5 acres per mile of transmission line.
Level 5	*Construct Road in Steep Terrain (15 to 30 percent)*	Moderate to high ground disturbance for new access road construction; assume approximately 1.5 to 2.0 miles of new road would be required for each mile of transmission line. Road construction would disturb approximately 2.5 to 3.4 acres per mile of transmission line.
Level 6	*Construct Road in Very Steep Terrain (over 30 percent)*	High to very high ground disturbance for new access road construction; assume approximately 2.0 to 3.0 miles of new road would be required for each mile of transmission line. Road construction would disturb approximately 3.4 to 5.0 acres per mile of transmission line.

All roads would be constructed in accordance with NorthWestern requirements for transmission line access roads (also refer to description above). In the event of a conflict between NorthWestern requirements and the requirements of the BLM and FS, the states of Montana, Idaho, or other agencies, the governing agency requirements would take precedence. Private landowners along the proposed roads would be consulted before construction begins.

Right of way access would be controlled primarily through the use of road gating. Road gating would be regulated with lock and key on private lands and would be managed according to state and federal management prescriptions on public lands. NorthWestern would develop a road manage plan that would address right of way access and managing encroachments of the right of way.

Structure Site Clearing

At each structure site, leveled areas (pads) would be needed to facilitate the safe operation of equipment, such as construction cranes. The leveled area required for the location and safe operation of large cranes would be approximately 30 by 40 feet. At each structure site, a work area of approximately 200 by 200 feet would be required for the location of structure footings, assembly of the structure, and the necessary crane maneuvers. The work area would be cleared of vegetation only to the extent necessary. After line construction, all pads not needed for normal transmission line maintenance would be graded to blend as near as possible with the natural contours, and renegotiated with indigenous plant species where required. Areas would be reseeded prior to the season(s) when precipitation is normally received.

Clearing of Right-of-Way

The clearing of some natural vegetation may be required. However, selective clearing would be performed only when necessary to provide for land surveying activities, electrical safety clearances, long-term maintenance and reliability of the transmission line. Within or adjacent to the right-of-way

Erosion and Sediment Control/Pollution Control During Construction

A construction Storm Water Pollution Prevention Plan (SWPPP) would be developed for the project for erosion, sediment and pollution control during construction. The SWPPP would be prepared to meet the requirements of the Montana Department of Environmental Quality's (MDEQ) General Permit to Discharge Storm Water through its storm water pollution control program (Montana Water Quality Act 75-5-401 et seq., MCA) associated with construction activities. The SWPPP would include both structural and non-structural best management practices (BMPs). Examples of structural BMPs could include installing silt curtains or other physical controls to divert flows from exposed soils, or otherwise limit runoff and pollutants from exposed areas. Examples of non-structural BMPs include management practices such as materials handling and waste disposal requirements and spill prevention methods. NorthWestern would prepare and submit a SWPPP meeting the conditions of the General Permit to Discharge Storm Water to the MDEQ along with a Notice of Intent (NOI) for construction activities prior to the start of projection construction.

Control of Noxious Weeds and Invasive Plants

NorthWestern will develop a Noxious Weed and Invasive Plant Control Plan to minimize the potential for the spread of weeds and invasive plants, and to minimize their spread within the project area. The plan will prescribe measures to prevent and control the spread of noxious weeds and invasive plants during and following construction of the project. The primary objectives of noxious weed and invasive plant control will be:

- To acquire information on the occurrence, distribution and abundance of noxious weeds and invasive plants in the project area prior to construction.
- To reduce/eliminate existing infestation and prevent the spread of new and existing populations of noxious weeds and invasive plants within the project area.
- To ensure any populations of rare plants within the project area are not negatively affected by control activities.
- To coordinate and consult with federal land management agencies (BLM and USFS), MDEQ and Montana county weed control districts regarding noxious weed control activities to be conducted by NorthWestern within the project area to ensure compatibility with existing weed control protocols and requirements.

NorthWestern is governed by the Western Electricity Coordinating Council (WECC) and the North American Reliabilty Corporation (NERC) for its vegetation management procedures and must maintain compliance with WECC and NERC standards for its right of way and vegetation management practices. NorthWestern's Transmission Vegetation Management Plan is included as an attachment. This management plan describes in detail the practices NorthWestern performs for right of way management including tree trimming and weed control.

Cleanup and Construction Waste Disposal

Construction sites, material storage yards, and access roads would be kept in an orderly condition throughout the construction period. Refuse and trash would be removed from the sites and disposed of in an approved manner. Oils and fuels would not be dumped along the line. Oils or chemicals would be hauled to a disposal facility authorized to accept such materials. No open burning of construction trash would occur without agency approval.

Petroleum products such as gasoline, diesel fuel, helicopter fuel, crankcase oil, lubricants, and cleaning solvents would be present within the transmission line corridor during construction. These products would be used to fuel, lubricate, and clean vehicles and equipment. These products would be containerized by fuel trucks or by approved containers. When not in use, hazardous materials would be properly stored to prevent drainage or accidents.

1. areas with little or no conflict with existing or planned land uses;
2. areas with no cultural resources, no valued or special status biological or water resources; and
3. areas with no hazards to construction or operation of a transmission line.

After completing the sensitivity analysis for each resource, a composite sensitivity map was prepared through an overlay process using geographic information system (GIS) of all the resource sensitivity maps. The composite was used to identify constraints and locational opportunities resulting from combinations of the three level of environmental sensitivity for the five major resource areas: visual, land use, biology, earth, and cultural. Alternative corridor locations were then plotted taking into account the composite sensitivity, the locations of existing transportation and utility corridors, topographic constraints, and utilization of public lands. The corridor width varied somewhat to reflect the locations of constraining environmental features, yet allow sufficient margin for planning within each corridor.

The preferred location criteria for electric transmission lines listed in Circular MFSA-2 Section 3.1 were considered and evaluated in the regional environmental study (refer to Volume IV-Regional Study Report) in which alternative corridors that were reasonable and feasible were identified.

More specifically, existing data and aerial imagery were used during the data collection process for the study area. A sensitivity analysis was completed and opportunities and constraints were determined to identify potential alternative corridors. The preferred location criteria were part of the data sets that were mapped according to an assigned sensitivity level of exclusion, high, medium or low.

After completing the sensitivity analysis for each resource, a composite sensitivity map was prepared through an overlay process using GIS of all of the resource sensitivity maps. The composite was used to identify constraints and locational opportunities resulting from the combinations of environmental sensitivity for all the data factors in the five major resource areas; visual, land use, biology, earth and cultural which included the preferred location criteria. The corridor widths varied somewhat to reflect the locations of constraining features, yet allow sufficient margin for planning within each corridor.

Key considerations in corridor identification included the following listed below. These considerations are paired with the preferred location criteria listed in Circular MFSA -2 Section 3.1

- *Locations parallel to existing transmission or existing utility corridors were maximized* ***(Preferred Location Criteria (1)(b)-where they utilize or parallel existing utility and/or transportation corridors).***
- *Proximity to existing roads that could be utilized for construction and operation access were maximized* ***(Preferred Location Criteria (1)(g)-in roaded areas where existing roads can be used for access to the facility during construction and maintenance and (1)(b)- where they utilize or parallel existing utility and/or transportation corridors).***
- *Features or areas of exclusion were avoided. These included existing residential areas, lands within incorporated boundaries, and ten acre average parcel size or less, which was considered to have the highest potential for residential development (****Preferred Location***

- ***Criteria (1)(c)-to allow for selection of a location in nonresidential areas, (1)(j)- a safe distance from residences and other areas of human concentration and (1)(i)-where the facility will create the least visual impact).***

- *Agricultural and pasture land was ranked high sensitivity and was avoided* ***(Preferred Location Criteria (1)(d)- on rangeland rather than crop land and on non irrigated or flood irrigated land rather than mechanically irrigated land).***

- *Locations in vacant/ undeveloped land were considered low sensitivity and a siting opportunity* ***(Preferred Location Criteria (1)(d)- (Preferred Location Criteria (1)(d)- on rangeland rather than crop land and on non irrigated or flood irrigated land rather than mechanically irrigated land).***

- *Known landslide areas were avoided and slopes greater than 20% were considered high sensitivity and avoided were possible* ***(Preferred Location Criteria (1)(f)-in geologically stable areas with non-erosive soils in flat or gently rolling terrain).***

- *Proximity to high density parcel sections (residential) developed areas and cities and towns, National Historic and Scenic trials and Scenic (National and State) Highways and Byways were minimized where foreground views of high sensitivity viewers of the project would be expected* ***(Preferred Location Criteria (1)(i)-where the facility will create the least visual impact).***

- *Visual Management Classes, (BLM Class I VRM and Forest Service Preservation VOQ areas) were rated exclusion and consisted of Wilderness Areas, Wilderness Study Areas, Areas of Critical Environmental Concern and were avoided* ***(Preferred Location Criteria (1)(i)- where the facility will create the least visual impact).***

- *The primary areas of moderate sensitivity in Montana included rivers and streams and associated floodplains. Avoidance of floodplains was not a consideration in corridor identification. As determined by final engineering design any structures placed in a floodplain would be placed on a high point so as to not impede or redirect flood flows or raise flood elevation. Damage to structures with these practices is expected to be minimal and normally does not occur* ***(Preferred Location Criteria (1)(h) so that structures need not be located on a floodplain).***

- *The identification of 18 primary corridors in Montana identified tended to follow existing utility corridors and existing road and highway corridors and the lower foothills in less rugged terrain of the mountains away from concentrations of agriculture and residential development. No corridors were located in areas of undisturbed forest* ***(Preferred Location Criteria (1)(e) in logged areas rather than undisturbed forest, in timbered areas).***

- *BLM Resource Management Plans and Forest Service Forest Plans were reviewed and considered in the corridor identification process. Generally public land is available for utility corridor development and is evaluated on a case by case basis by the federal agency. Within the BLM and Forest Service planning documents, avoidance areas are identified that are generally not available for utility corridor development. Exceptions may be permitted based on the type and need for the facility proposed, conflicts with other resource values and uses and availability of alternatives and/or mitigation measures. County Comprehensive*

> *Plans and Growth Policies were reviewed and considered to determine if they contained utility corridor conditional use policies and provisions. Of the ten Montana counties within the study area only one; Deer Lodge County had a utility corridor policy, which encouraged the use of existing corridors* ***(Preferred Location Criteria (1)(k) in accordance with applicable local, state or federal management plans when public lands are crossed).***

Planners and engineers from NorthWestern, as well as project planners and engineers from the consulting firm, POWER Engineers (POWER), were present during and participated in the identification of alternative corridors. Based upon the environmental data available for the regional studies, the selection participants determined that all reasonable alternatives had been identified. The resulting alternatives in Montana are being presented to the MDEQ for review in this MFSA application, and in the subsequent ER to the local, State, and Federal agency officials.

Approximately 1,372 miles of alternatives were identified in the 2006 regional study and subsequent refinements in 2007 (refer to Volume IV – Regional Study Report and Figure 2-14). The initial alternatives identified in the regional study and the subsequent 2007 need and alternatives refinements were reviewed through numerous field and aerial surveys by the environmental and engineering teams. The objective of the field reviews were to refine the broad “corridors” of the alternatives, and to delineate assumed centerlines based on environmental and engineering input, and to further the familiarity of the study team with the environmental, physiographic, and engineering characteristics of the study corridors. These assumed centerlines formed the basis for the study area for each alternative route that is the subject of environmental review in this document and the subsequent joint State of Montana and Federal EIS. The field review and delineation of the assumed centerlines was completed in the period of April 2007 to March 2008.

NorthWestern™
Energy

Electric Transmission Vegetation Management Program (TVMP)

Standard FAC-003-1

August 11, 2008

I. OBJECTIVES

1. Maintain reliable electric service by minimizing vegetation related outages on NorthWestern Energy's (NWMT) transmission facilities and structures. Facilitate compliance, as appropriate within the existing reliability and safety standards, including the North American Reliability Corporation (NERC) Reliability Standard FAC-003-1 *(See Attachment A)* as it applies to the Western Electricity Coordinating Council (WECC) Bulk Power* and Critical Path line segments. *(See Attachment B).*

   * For the purpose of this document, Bulk Power shall refer to all NorthWestern Energy Line Segments of 200kV and above not included as part of any Critical Path designation.

2. Improve power line safety and electric utility worker safety in accordance with the National Electric Safety Code (NESC) and Occupational Safety and Health Administration (OSHA) standards, which specify separation between electric lines and other objects and relevant worker safety practices.

3. Reduce the likelihood of wildfires and fire-induced interference with electric facilities by promoting compliance with applicable standards.

4. The Electric Transmission Maintenance Department and Vegetation Management Department shall jointly formulate and administer an active yearly proactive vegetation management plan (*See Appendix 1*).

5. Fully comply with WECC mandated certifications and reporting of vegetation caused outages on the NWMT line segments listed in Attachment B. (*See Appendix 2*).

II. PRACTICES

1. An aerial inspection of each of the existing rights-of-way of the transmission line segments subject to NERC Reliability Standard FAC-003-1 will occur at least once a year. Generally, this aerial inspection will begin in the March timeframe in the eastern portion of NWMT's transmission system. The aerial inspection will work its way westward and will generally be completed in the June/July timeframe. The detailed daily scheduling for these inspection flights shall be dependent upon helicopter availability, personnel availability, weather conditions, fire restrictions and with consideration for prevailing vegetation priorities. Consideration will additionally include an awareness of tree species, local growth patterns, terrain, elevation, and the combined movement of conductor and trees during varying electric transmission system operations and

seasonal weather environments (i.e. East to West itinerary). Responsible personnel for performing the aerial inspection will include NWMT's Manager of Vegetation Management and/or a NWMT Electric Transmission Maintenance Department representative. The required qualifications are:

- NWMT's Manager of Vegetation Management shall be a certified arborist or have a minimum of five years experience supervising electric transmission ROW. *(See Attachment G)*

- All contract vegetation management clearing crews shall be line clearance certified. *(See Attachment H)*

The following Table (*Page 13 of the 2006 Washington Forestry report*) will be utilized for anticipated and normalized vegetation growth rates during the annual aerial inspections as well as for general site observations:

Parameter	DF	PP	CW	AS	ES	LA	MH	LP	LMP	WI	JU
	- Average Growth Rate per Year (inches) -										
Growth	8.9	9.2	16.2	9.8	10.9	12.0	8.0	9.1	3.1	12.0	3.9

**DF=Douglas fir; PP=Ponderosa pine; CW=Black cottonwood; AS=Quaking aspen; ES=Engelmann spruce; LA=Western larch; MH=Mt. Hemlock; LP=Lodgepole pine; LMP=Limber pine; WI=Willow; JU=Juniper.*

Black cottonwood is the fastest growing species found on the NWMT electric transmission system, followed by western larch, and willow. Cottonwood and willow typically were found growing in the lower slopes in the stream corridors. Though precipitation is low in these areas, trees generally find adequate moisture to grow normally. Juniper and limber pine are very slow growing species. In most cases limber pine will not require control.

2. Compilation of the aerial inspection findings will be accomplished with an on-board computer system coupled with a GPS waypoint tracking device that will identify the appropriate line segment and be populated further with the following information:

    - **Priority Code 1** - Trees or other vegetation that are considered "burners" or are within the safety clearance zone for the operating voltage level of the individual electric transmission line. The Category 1 elements require immediate attention. Coordination with NWMT's System Operations Control Center (SOCC) will establish the proper protocol prior to accomplishing corrective actions. The SOCC phone number is *1-888-497-1000 Ext. 4252*, or *406-497-4252*. The Transmission Maintenance Department representative will immediately assign the required corrective action to the appropriate NWMT Division office via the most expedient method such as cell phone or two-way radio if the problem is determined to be an imminent threat to the electric transmission system.

Phone numbers for NWMT's Division offices are as follows:

- Billings Service Center..............406-655-2533
- Great Falls Service Center...........406-454-7130
- Helena Service Center...............406-443-8978
- Bozeman Service Center............406-582-4650
- Butte Service Center..................406-497-2012
- Missoula Service Center.............406-542-5910

- **Priority Code 2** – Trees or other vegetations that are considered "danger trees" and are within the "fall zone" of the individual electric transmission line. Category 2 elements shall be removed or mitigated as determined by the Manager of Vegetation Management and/or the Transmission Maintenance representative in consideration for whether these elements are positioned within or outside of the prescribed ROW.

3. Data from all annual aerial assessments are to be saved electronically and as a hard copy for future reference. The information compilation will include:

   - Spreadsheets (*See Attachment C*) identifying the date of assessment, appropriate line segment number, latitude and longitude, date of corrective action and description of corrective action taken. These spreadsheets are to be updated monthly in order to track progress of the correction processes and any re-evaluation of prioritizations.

4. All contract crews work under Service Agreement Contract with NWMT shall accomplish vegetation removal and trimming on all NWMT electric transmission line facilities pursuant to ANSI A300 specifications. *(See Attachment F)*

5. A compilation of historical clearing events concerning the NWMT electric transmission line segments listed in Attachment B will be recorded for future reference. A table listing the programmed vegetation management accomplished on these line segments will be updated yearly. *(See Attachment D)*

III. SPECIFICATIONS

1. The Institute of Electrical and Electronics Engineers, Inc. (IEEE) Standard 516™-2003 (*See Attachment E*). This standard is designed as a "Guide for Maintenance Methods on Energized Power Lines". The guide contains calculations and results for Minimum Air Insulation Distance (MAID), which is a proxy for the flashover distance. IEEE Standard 516™-2003 Table D.3 depicts MAID for various voltage levels where transient overvoltage factors are not known. Table D.5 depicts a range of MAID for various voltages and transient overvoltage factors. Both tables require an altitude adjustment for elevations. over 3,000 feet.

Table D.1—Altitude correction factor

Feet	Correction factor
0–3000	1.00
3001–4000	1.02
4001–5000	1.05
5001–6000	1.08
6001–7000	1.11
7001–8000	1.14
8001–9000	1.17
9001–10 000	1.20
10 001–12 000	1.25
12 000–14000	1.30
14 000–16 000	1.35
16 001–18 000	1.39
18 001–20 000	1.44

NOTES

1—The correction factor applies only to the MAID and not to the inadvertent movement factor:

a—For the MAID Tables, multiply the distance D given in Table D.2 through Table D.9 by the correction factor for altitude at which the work is being preformed.

b—For the MAD Tables, multiply the distance D given in Table D.11 through Table D.17, minus the inadvertent factor from Table D.10 by the correction factor for altitude at which the work is being performed, and then add in the inadvertent factor from Table D.10 again.

2—The data used to formulate this table was obtained from test data taken with standard atmospheric conditions. Standard atmospheric conditions are defined as temperatures above freezing, wind less than 15 mph, unsaturated air, normal barometer (30 inches of mercury at sea level), uncontaminated air, and clean and dry insulators. If standard atmospheric conditions do not exist, extra care must be taken.

3—If the actual altitude at the work location and current barometric pressure is not known, the altitude, corrected for the local current barometric pressure, can be determined by use of an aircraft type altimeter adjusted for a zero altitude at 30 inches of mercury at sea level.

4—For metric values, see Table 1.

Table D.3—Example of detailed calculations for MAID 60 Hz. Energized work, without tools in the air gap, when the transient overvoltage factors (T) is not known in feet

Voltage in kilovolts phase to phase	Distance in feet	
	Phase to ground	Phase to phase
72.6–121	2.45	3.56
138–145	2.94	4.27
161–169	3.42	4.96
230–242	5.14	7.46
345–362	9.44	13.69
500–550	14.68	22.61
765–800	20.44	33.53

NOTES

1—These distances take into consideration the highest transient overvoltage an employee will be exposed to on any system with air as the insulating medium and the maximum voltages shown.

2—Values are based on altitudes below 3000 feet. See Table D.1 for correction factors for higher altitudes. It is not necessary to correct for atmospheric conditions.

3—Table distances include a factor for inadvertent movement. See 7.2 for inadvertent movement considerations. These factors must be added to the values to obtain the total MAD.

4—The clear live tool length should be equal to or exceed these values for the indicated voltage ranges.

5—The data used to formulate this table was obtained from test data taken with standard atmospheric conditions. Standard atmospheric conditions are defined as temperatures above freezing, wind less than 15 mph, unsaturated air, normal barometer, uncontaminated air, and clean and dry insulators. If standard atmospheric conditions do not exist, extra care must be taken.

6—Data for this table was obtained from Table D.5 and Table D.8.

7—For metric values, see Table 5.

Table D.5—MAID phase to ground, 60 Hz energized work, using the transient overvoltage factor, without tools in the air gap in feet

V_{P-P} V_{P-G}	121 69.9	145 83.7	169 97.6	242 140	362 209	550 318	800 462
T	feet	feet	feet	feet	feet	feet	feet
1.5	1.05	1.26	1.47	2.10	3.14	4.96	8.67
1.6	1.12	1.34	1.57	2.24	3.35	5.44	9.61
1.7	1.19	1.43	1.66	2.38	3.56	5.94	10.61
1.8	1.26	1.51	1.76	2.52	3.77	6.46	11.64
1.9	1.33	1.60	1.86	2.66	3.98	7.00	12.73
2.0	1.40	1.68	1.96	2.80	4.19	7.63	13.95
2.1	1.47	1.76	2.05	2.94	4.39	8.21	15.14
2.2	1.54	1.85	2.15	3.08	4.70	8.81	16.37
2.3	1.61	1.93	2.25	3.22	5.00	9.43	17.64
2.4	1.68	2.01	2.35	3.36	5.32	10.07	19.07
2.5	1.75	2.10	2.44	3.50	5.65	10.80	20.44
2.6	1.82	2.18	2.54	3.64	5.98	11.48	
2.7	1.89	2.27	2.64	3.78	6.33	12.27	
2.8	1.96	2.35	2.74	3.92	6.74	13.08	
2.9	2.03	2.43	2.83	4.06	7.10	13.82	
3.0	2.10	2.52	2.93	4.20	7.47	14.68	
3.1	2.17	2.60	3.03	4.34	7.85		
3.2	2.24	2.68	3.03	4.52	8.23		
3.3	2.31	2.77	3.23	4.71	8.63		
3.4	2.38	2.85	3.32	4.90	9.03		
3.5	2.45	2.94	3.42	5.14	9.44		

NOTES

1—Distances listed are for standard atmospheric conditions. The data used to formulate this table was obtained from test data taken with standard atmospheric conditions. Standard atmospheric conditions are defined as temperatures above freezing, wind less than 15 mph, unsaturated air, normal barometer, uncontaminated air, and clean and dry insulators. If standard atmospheric conditions do not exist, extra care must be taken.

2—Values are based on altitudes below 3000 feet (see Table D.1).

3—Distances do not include any factor for inadvertent movement (see 7.2).

4—Tables were calculated using the formulas from 4.2.2.3 and rounded up.

5—Historical maximum p.u. transient overvoltage values (shown above the heavy line) for 121 to 362 kilovolts was 3 p.u., for 550 kilovolts was 2.4 p.u., and for 800 kilovolts was 2 p.u. The values listed below the heavy line are transient overvoltage p.u. values caused by the use of single break interrupters devices, which have introduced into the US market in the early 1990s. If these single break interrupting devices are not in use on your system, the historical values may still apply.

6—When the value of T being used in this table, has a significant decimal figure beyond the value listed in the Table D.9, the next higher value of T should be used. Example: T = 2.51; use T = 2.6.

7—For metric values, see Table 7.

2. NWMT Safety, Health, and Environmental Handbook Section 31.2 - Dealing with Violations of Approach Distance

   a. Federal laws restrict the general public in their approach of energized conductors (at least ten feet for voltages up to 50 kV). If NWMT employees observe violations of this rule, they must stop and warn those individuals or companies they see violating the rule. This warning must be documented on the card provided inside the "Overhead Power Line Safety for Contractors" brochure and submitted to the Safety, Health, and Environmental Services Department.

3. Application of Specifications

   - Tables D.3 and D.5, referenced in III-1, will be utilized as a guide by the personnel in the helicopter during the annual aerial inspections for determination and prioritization of necessary "hot-spot" and danger tree clearing.

   - Clearance 2 as defined under R1.2.2 of The North American Reliability Corporation (NERC) Standard FAC-003-1 will be as defined in Tables D.3 and D.5 above.

   - Clearance 1 as defined under R1.2.2 of The North American Reliability Corporation (NERC) Standard FAC-003-1 will be as defined in the following table:

Nominal Line Voltage	115kV and 161kV	230kV and 500kV
Absolute Approach Limit	16 Feet	25 Feet

IV. MITIGATION

1. If for any reason any requirements of this Transmission Vegetation Management Program (TVMP) cannot or will not be met, the Manager of Transmission Maintenance will be notified immediately. The Manager will then determine a resolution to the condition causing the TVMP to not be met.

V. VEGETATION MANAGEMENT PLANNING PROCEDURES

1. Upon completion of the yearly aerial assessments, the Electric Transmission Maintenance Department will evaluate in coordination with the Manager of Vegetation Management to determine the best course for accomplishing those work details identified on the annual spreadsheets.

2. Yearly proactive vegetation management will be determined and scheduled at the beginning of the calendar year by the Electric Transmission Maintenance Supervisor and the Manager of Vegetation Management. The yearly proactive vegetation management will be evaluated and determined relative to, and in consideration of, the following foundations:

    - The NWMT Transmission Assessment as accomplished by Washington Forestry Consultants, Inc. This document is in possession of the Electric Transmission Maintenance Department.

    - System Reliability data reflecting any systemic vegetation outages occurring on a particular line segment.

    - Approved budget to be coupled with the annual comprehensive aerial assessments and with consideration for the combined movement of trees and conductors, seasonal weather conditions, varying species yearly growth rates and line voltage.

    - Applicable NERC and WECC certifications regarding operating policies will be verified correct as part of the Vegetation Management Plan and signed by the appropriate Officer of NWMT as required.

VI. REVIEW AND APPROVAL

Last Updated or Revised	**August 11, 2008**
Reviewed by	[signature]
Reviewed by	[signature]
Reviewed by	
Reviewed by	
Reviewed by	
Approved by Manager - Transmission Maintenance	[signature]
Approved by Director of Transmission Operations	[signature]
Approved by Chief Transmission Officer	[signature]

APPENDIX 1

Annual Electric Transmission Vegetation Management Plan

I. ANNUAL PLAN PARAMETERS

A. The NorthWestern Energy (NWMT) annual vegetation management work scope shall be in compliance with the "NWMT Transmission Vegetation Management Program" (TVMP).

B. The proactive vegetation management proposal will be formulated in consideration of the NWMT /Washington Forestry Consultant's Assessment coupled with the results of the annual aerial assessments.

C. All projects will be managed and tracked within the NWMT Electric Transmission Project Status Database. The database information will be utilized to determine revisions to the original proposal, track progress and estimate expenses required to complete the individual projects.

D. Project completion time frames are in consideration for, but not limited to; affected landowner right-of-way access and easement constrictions (including State and Federal lands when present), circuit importance levels, clearing contractor/personnel availability, species growth rates in conjunction with prevailing weather conditions and other anticipations throughout the clearing margins.

E. Upon completion of any project, a certified NWMT arborist will perform an on-site inspection to verify compliance with all governing regulations and requirements.

F. Coordination of the NWMT TVMP with the appropriate Federal agencies to manage information on invasive, threatened and endangered species, and other agency concerns and agreements are as follows:

- Lolo National Forest – Thompson Falls to Saltese 115 kV
- Lewis & Clark National Forest – Broadview to Garrison 500kV # 1 and #2

II. LINE SEGMENT CLEARING HISTORY AND 2008 PLAN

A. The vegetation management history for WECC Bulk Power and Critical Path lines segments is as follows:

PROGRAMMED VEGETATION MANAGEMENT HISTORY					
WECC BULK POWER AND CRITICAL PATH LINE SEGMENTS					
SEGMENT NUMBER	CIRCUIT NAME	VOLTAGE	SEGMENT LENGTH	VEGETATED MILES	CLEARING HISTORY
0140	Thompson Falls to Saltese B	115	34.80	29.70	2003, 2007-2008*
0270	Thompson Falls to Burke (AVS) A	115	18.90	13.80	2003
0222	Anaconda Mill Creek to Dillon Salmon	161	63.91	6.08	2006
0223	Dillon Salmon to Big Grassy (PCF)	161	62.08	0.02	NA
0246	Anaconda Mill Creek to Garrison (BPA)	230	30.40	8.17	2005
0247	Ovando Switchyard to Great Falls 230 kV Switchyard	230	109.10	31.42	NA
0332	Anaconda Mill Creek to Three Rivers	230	71.08	4.01	2001
0333	Three Rivers to Wilsall	230	41.90	4.50	2004-2005
0249	Anaconda Mill Creek to Anaconda (BPA)	230	0.40	0.00	NA
0250	Anaconda Mill Creek to Antelope (PCF)	230	117.96	6.10	2001
0251	Billings Steam Plant to Yellowtail (PCF)	230	45.50	0.08	NA
0326	Great Falls 230 kV Switchyard to Judith Gap South	230	99.77	2.97	NA
0327	Judith Gap South to Broadview Switchyard	230	63.63	3.00	NA
0253	Alkali Creek to Billings Steam Plant Switchyard	230	8.80	0.00	NA
0254	Broadview Switchyard to Alkali Creek	230	18.40	0.00	NA
0255	Broadview Switchyard to Billings Steam Plant Switchyard	230	24.00	0.19	NA
0256	Hardin Auto to Crossover (WAPA)	230	4.40	0.00	NA
0257	Hardin Auto to Colstrip Switchyard	230	50.30	19.53	2004
0258	Shorey Road to Wilsall	230	96.50	14.96	2005
0259	Shorey Road to Alkali Creek	230	6.60	0.27	NA
0260	Shorey Road to Baseline	230	4.60	0.50	NA
0261	South Huntley to Billings Steam Plant	230	16.00	16.16	2005
0262	South Huntley to Crossover (WAPA)	230	26.20	0.00	NA
0267	Garrison (BPA) to Ovando Switchyard	230	32.60	11.98	2002
0328	Hot Springs to Placid Lake	230	62.75	19.00	1999
0329	Placid Lake to Ovando	230	26.95	23.11	1999
0263	Colstrip Switchyard to Broadview Switchyard A	500	112.70	NA	2005-2006
0264	Colstrip Switchyard to Broadview Switchyard B	500	115.90	NA	2005-2006
0265	Broadview Switchyard to Garrison (BPA) #1	500	133.00	NA	2007-2008*
0266	Broadview Switchyard to Garrison (BPA) #2	500	133.00	NA	2007-2008*

NOTE: "NA" designates line segments that have very little or no vegetated miles.

*Clearing on these line segments began in 2007 and will be completed in 2008.

The 2008 Electric Transmission Maintenance Proactive Vegetation Management plan is as follows:

Priority	Segment Number	Segment Name	kV	Scheduled Start Date	Scheduled Complete Date	Clearing Method	SAP Order Number (ET11)
1	0265	Broadview to Townsend #1	500	2/1/2008	7/1/2008	80% Mechanical 20% Manual	10019600
1	0266	Broadview to Townsend #2	500	2/1/2008	7/1/2008	80% Mechanical 20% Manual	10019601
2	0140	Thompson Falls to Saltese	115	7/21/2008	12/12/2008	80% Mechanical 20% Manual	10017426

B. Revisions to the 2008 Electric Transmission Vegetation Management Plan will be at the discretion of the Electric Transmission Maintenance Manager. Revisions will be based on prudent judgment relative to system reliability, budget constraints and best use of personnel.

C. See Attachment C for results regarding the 2007 reactive clearing efforts. The 2008 reactive clearing efforts occur subsequent to identification as a result of the ongoing 2008 annual aerial assessments.

III. COMPLIANCE

A. Routine on-site inspections to determine compliance to the 2008 Electric Transmission Vegetation Management Plan shall be accomplished by the Manager of Vegetation Management or a designated representative. Documentation of on-site visits shall include:

- Verification of schedules as specified in II-A will occur in a timely manner. A mitigation plan designed to bring projects back on schedule will be developed and verified monthly if necessary. The plan shall be in consideration of existing budgets, prevailing weather and environmental conditions, crew availability, and contractual obligations etc.

- The NWMT Manager of Vegetation Management will document safety reviews for all projects and personnel, as they occur. A tailboard meeting for all personnel will take place and be documented prior to the commencement of all projects.

- All activities shall be in compliance with the NWMT Safety Health and Environmental Handbook.

B. Budget tracking of the 2008 programmed Vegetation Management Plan budget will be reported by the Electric Transmission Maintenance Supervisor to the NWMT Financial Planning and Analysis Department with forecasted monthly budget estimates.

IV. DOCUMENTATION

A. The Supervisor of Electric Transmission Maintenance shall document updates as to clearing progress monthly in the NWMT Electric Transmission Project Status Database.

B. The 2008 Programmed Vegetation Management Proposal table will be updated at the completion of the yearly activities listed with an added column reflecting actual project costs similar to the 2007 completion table shown below.

Segment Number	Segment Description	Voltage	Percent Complete	SAP Order Number
0140	Thompson Falls to Saltese (Saltese to Crow Creek Section)	115	63%	10017426
0265	Broadview Switchyard to Garrison (BPA) #1	500	80%	10018510
0266	Broadview Switchyard to Garrison (BPA) #2	500	80%	10018511

V. CONTACTS

The division contact list for NWMT Electric Transmission line information is given below for each 2008 programmed clearing line segment. The System Operations Control Center (SOCC) phone number is *1-888-497-1000 Ext. 4252*, or *406-497-4252*.

Segment Number	Division	Service Center Phone #
0140	Missoula	406-542-5910
0265	Billings	406-655-2533
0265	Helena	406-443-8978
0266	Billings	406-655-2533
0266	Helena	406-443-8978

Administrative Contacts:

Scott Bernhardt – Manager of Vegetation Management
Office 406-497-2797
Cell 406-490-1863

Jim Lueck – Supervisor of Electric Transmission Maintenance
Office 406-497-3816
Cell 406-490-1870

ATTACHMENT A

North American Reliability Corporation (NERC)
Reliability Standard FAC-003-1

A. Introduction

1. **Title:** **Transmission Vegetation Management Program**
2. **Number:** FAC-003-1
3. **Purpose:** To improve the reliability of the electric transmission systems by preventing outages from vegetation located on transmission rights-of-way (ROW) and minimizing outages from vegetation located adjacent to ROW, maintaining clearances between transmission lines and vegetation on and along transmission ROW, and reporting vegetation-related outages of the transmission systems to the respective Regional Reliability Organizations (RRO) and the North American Electric Reliability Council (NERC).
4. **Applicability:**
   - **4.1.** Transmission Owner.
   - **4.2.** Regional Reliability Organization.
   - **4.3.** This standard shall apply to all transmission lines operated at 200 kV and above and to any lower voltage lines designated by the RRO as critical to the reliability of the electric system in the region.
5. **Effective Dates:**
   - **5.1.** One calendar year from the date of adoption by the NERC Board of Trustees for Requirements 1 and 2.
   - **5.2.** Sixty calendar days from the date of adoption by the NERC Board of Trustees for Requirements 3 and 4.

B. Requirements

R1. The Transmission Owner shall prepare, and keep current, a formal transmission vegetation management program (TVMP). The TVMP shall include the Transmission Owner's objectives, practices, approved procedures, and work specifications[1].

R1.1. The TVMP shall define a schedule for and the type (aerial, ground) of ROW vegetation inspections. This schedule should be flexible enough to adjust for changing conditions. The inspection schedule shall be based on the anticipated growth of vegetation and any other environmental or operational factors that could impact the relationship of vegetation to the Transmission Owner's transmission lines.

R1.2. The Transmission Owner, in the TVMP, shall identify and document clearances between vegetation and any overhead, ungrounded supply conductors, taking into consideration transmission line voltage, the effects of ambient temperature on conductor sag under maximum design loading, and the effects of wind velocities on conductor sway. Specifically, the Transmission Owner shall establish clearances to be achieved at the time of vegetation management work identified herein as Clearance 1, and shall also establish and maintain a set of clearances identified herein as Clearance 2 to prevent flashover between vegetation and overhead ungrounded supply conductors.

R1.2.1. Clearance 1 — The Transmission Owner shall determine and document appropriate clearance distances to be achieved at the time of transmission vegetation management work based upon local conditions and the expected time frame in which the Transmission Owner plans to return for future

[1] ANSI A300, Tree Care Operations – Tree, Shrub, and Other Woody Plant Maintenance – Standard Practices, while not a requirement of this standard, is considered to be an industry best practice.

vegetation management work. Local conditions may include, but are not limited to: operating voltage, appropriate vegetation management techniques, fire risk, reasonably anticipated tree and conductor movement, species types and growth rates, species failure characteristics, local climate and rainfall patterns, line terrain and elevation, location of the vegetation within the span, and worker approach distance requirements. Clearance 1 distances shall be greater than those defined by Clearance 2 below.

R1.2.2. Clearance 2 — The Transmission Owner shall determine and document specific radial clearances to be maintained between vegetation and conductors under all rated electrical operating conditions. These minimum clearance distances are necessary to prevent flashover between vegetation and conductors and will vary due to such factors as altitude and operating voltage. These Transmission Owner-specific minimum clearance distances shall be no less than those set forth in the Institute of Electrical and Electronics Engineers (IEEE) Standard 516-2003 (*Guide for Maintenance Methods on Energized Power Lines*) and as specified in its Section 4.2.2.3, Minimum Air Insulation Distances without Tools in the Air Gap.

R1.2.2.1 Where transmission system transient overvoltage factors are not known, clearances shall be derived from Table 5, IEEE 516-2003, phase-to-ground distances, with appropriate altitude correction factors applied.

R1.2.2.2 Where transmission system transient overvoltage factors are known, clearances shall be derived from Table 7, IEEE 516-2003, phase-to-phase voltages, with appropriate altitude correction factors applied.

R1.3. All personnel directly involved in the design and implementation of the TVMP shall hold appropriate qualifications and training, as defined by the Transmission Owner, to perform their duties.

R1.4. Each Transmission Owner shall develop mitigation measures to achieve sufficient clearances for the protection of the transmission facilities when it identifies locations on the ROW where the Transmission Owner is restricted from attaining the clearances specified in Requirement 1.2.1.

R1.5. Each Transmission Owner shall establish and document a process for the immediate communication of vegetation conditions that present an imminent threat of a transmission line outage. This is so that action (temporary reduction in line rating, switching line out of service, etc.) may be taken until the threat is relieved.

R2. The Transmission Owner shall create and implement an annual plan for vegetation management work to ensure the reliability of the system. The plan shall describe the methods used, such as manual clearing, mechanical clearing, herbicide treatment, or other actions. The plan should be flexible enough to adjust to changing conditions, taking into consideration anticipated growth of vegetation and all other environmental factors that may have an impact on the reliability of the transmission systems. Adjustments to the plan shall be documented as they occur. The plan should take into consideration the time required to obtain permissions or permits from landowners or regulatory authorities. Each Transmission Owner shall have systems and procedures for documenting and tracking the planned vegetation management work and ensuring that the vegetation management work was completed according to work specifications.

R3. The Transmission Owner shall report quarterly to its RRO, or the RRO's designee, sustained transmission line outages determined by the Transmission Owner to have been caused by vegetation.

R3.1. Multiple sustained outages on an individual line, if caused by the same vegetation, shall be reported as one outage regardless of the actual number of outages within a 24-hour period.

R3.2. The Transmission Owner is not required to report to the RRO, or the RRO's designee, certain sustained transmission line outages caused by vegetation: (1) Vegetation-related outages that result from vegetation falling into lines from outside the ROW that result from natural disasters shall not be considered reportable (examples of disasters that could create non-reportable outages include, but are not limited to, earthquakes, fires, tornados, hurricanes, landslides, wind shear, major storms as defined either by the Transmission Owner or an applicable regulatory body, ice storms, and floods), and (2) Vegetation-related outages due to human or animal activity shall not be considered reportable (examples of human or animal activity that could cause a non-reportable outage include, but are not limited to, logging, animal severing tree, vehicle contact with tree, arboricultural activities or horticultural or agricultural activities, or removal or digging of vegetation).

R3.3. The outage information provided by the Transmission Owner to the RRO, or the RRO's designee, shall include at a minimum: the name of the circuit(s) outaged, the date, time and duration of the outage; a description of the cause of the outage; other pertinent comments; and any countermeasures taken by the Transmission Owner.

R3.4. An outage shall be categorized as one of the following:

R3.4.1. Category 1 — Grow-ins: Outages caused by vegetation growing into lines from vegetation inside and/or outside of the ROW;

R3.4.2. Category 2 — Fall-ins: Outages caused by vegetation falling into lines from inside the ROW;

R3.4.3. Category 3 — Fall-ins: Outages caused by vegetation falling into lines from outside the ROW.

R4. The RRO shall report the outage information provided to it by Transmission Owner's, as required by Requirement 3, quarterly to NERC, as well as any actions taken by the RRO as a result of any of the reported outages.

C. Measures

M1. The Transmission Owner has a documented TVMP, as identified in Requirement 1.

M1.1. The Transmission Owner has documentation that the Transmission Owner performed the vegetation inspections as identified in Requirement 1.1.

M1.2. The Transmission Owner has documentation that describes the clearances identified in Requirement 1.2.

M1.3. The Transmission Owner has documentation that the personnel directly involved in the design and implementation of the Transmission Owner's TVMP hold the qualifications identified by the Transmission Owner as required in Requirement 1.3.

M1.4. The Transmission Owner has documentation that it has identified any areas not meeting the Transmission Owner's standard for vegetation management and any mitigating measures the Transmission Owner has taken to address these deficiencies as identified in Requirement 1.4.

M1.5. The Transmission Owner has a documented process for the immediate communication of imminent threats by vegetation as identified in Requirement 1.5.

M2. The Transmission Owner has documentation that the Transmission Owner implemented the work plan identified in Requirement 2.

M3. The Transmission Owner has documentation that it has supplied quarterly outage reports to the RRO, or the RRO's designee, as identified in Requirement 3.

M4. The RRO has documentation that it provided quarterly outage reports to NERC as identified in Requirement 4.

D. Compliance

1. Compliance Monitoring Process

1.1. Compliance Monitoring Responsibility

RRO

NERC

1.2. Compliance Monitoring Period and Reset

One calendar Year

1.3. Data Retention

Five Years

1.4. Additional Compliance Information

The Transmission Owner shall demonstrate compliance through self-certification submitted to the compliance monitor (RRO) annually that it meets the requirements of NERC Reliability Standard FAC-003-1. The compliance monitor shall conduct an on-site audit every five years or more frequently as deemed appropriate by the compliance monitor to review documentation related to Reliability Standard FAC-003-1. Field audits of ROW vegetation conditions may be conducted if determined to be necessary by the compliance monitor.

2. Levels of Non-Compliance

2.1. Level 1:

2.1.1. The TVMP was incomplete in one of the requirements specified in any subpart of Requirement 1, or;

2.1.2. Documentation of the annual work plan, as specified in Requirement 2, was incomplete when presented to the Compliance Monitor during an on-site audit, or;

2.1.3. The RRO provided an outage report to NERC that was incomplete and did not contain the information required in Requirement 4.

2.2. Level 2:

2.2.1. The TVMP was incomplete in two of the requirements specified in any subpart of Requirement 1, or;

2.2.2. The Transmission Owner was unable to certify during its annual self-certification that it fully implemented its annual work plan, or documented deviations from, as specified in Requirement 2.

2.2.3. The Transmission Owner reported one Category 2 transmission vegetation-related outage in a calendar year.

2.3. Level 3:

2.3.1. The Transmission Owner reported one Category 1 or multiple Category 2 transmission vegetation-related outages in a calendar year, or;

2.3.2. The Transmission Owner did not maintain a set of clearances (Clearance 2), as defined in Requirement 1.2.2, to prevent flashover between vegetation and overhead ungrounded supply conductors, or;

2.3.3. The TVMP was incomplete in three of the requirements specified in any subpart of Requirement 1.

2.4. Level 4:

2.4.1. The Transmission Owner reported more than one Category 1 transmission vegetation-related outage in a calendar year, or;

2.4.2. The TVMP was incomplete in four or more of the requirements specified in any subpart of Requirement 1.

E. Regional Differences

None Identified.

Version History

Version	Date	Action	Change Tracking
Version 1	TBA	1. Added "Standard Development Roadmap." 2. Changed "60" to "Sixty" in section A, 5.2. 3. Added "Proposed Effective Date: April 7, 2006" to footer. 4. Added "Draft 3: November 17, 2005" to footer.	01/20/06

Table 2-5 (cont.)

		Levelized Annual Cost		Performance (Line Losses)		System Operations		Environmental Impacts		Reliability		Engineering Considerations		Noise, Radio, & TV		Flood Plains	
Alternative	Mileage	Rank[1]	Comments	Rank	Comments	Rank	Comments	Rank	Comments[2]	Rank	Comments	Rank	Comments	Rank	Comments[3]	Rank	Comments
A1	113.1	3	Highest alternative in construction cost. ($157.5MM)	1	Line losses proportional to line length.	1	No discernable differences between A1 & A3 alternatives	1	30.5 miles of high residual impact	1	No discernable differences between A1 & A3 alternatives	1	Achieving compatibility with existing lines in an urban corridor is a significant engineering consideration.	2		2	No discernable differences among alternatives, however, design practices needed in or near the identified flood plains.
A2	121.7	1	Lowest alternative in construction cost. ($135.6MM)	2	Line losses proportional to line length.	3	Potential Significant Impacts to line rating due to proximity to BPA 500kV Common Cooridor	2	33.9 miles of high residual impact	3	Strong reliability concerns do to forest fires. Strong concerns for Bulk System reliability due to BPA common corridor.	3	Paralleling Colstrip Line in rugged terrain is considered the most challenging engineering alternative. Parallel lines can cause safety compliance issues for maintenance when one of the lines is de-energized.	1	Least number of sensitive receptors	2	No discernable differences among alternatives, however, design practices needed in or near the identified flood plains.
A3	128.8	2		3	Line losses proportional to line length.	2	No discernable differences between A1 & A3 alternatives	3	37.8 miles of high residual impact	2	No discernable differences between A1 & A3 alternatives	2	Achieving compatibility with existing lines in an urban corridor is a significant engineering consideration.	3	Most sensitive receptors	2	No discernable differences among alternatives, however, design practices needed in or near the identified flood plains.
B1	87.2	2	Costs almost equal for the B alternatives.	2	No discernable differences among alternatives	1	No discernable differences among alternatives	2	83.6 miles of high residual impact	1	Weather is relatively favorable. Therefore reliability of a well constructed line should be high.	1	Engineering challenge is low due to favorable terrain and relative lack of existing facilities	1	Least number of sensitive receptors	1	No flood plains identified.
B2	86.9	2	Costs almost equal for the B alternatives.	2	No discernable differences among alternatives	1	No discernable differences among alternatives	1	69.9 miles of high residual impact	2	Some portion of the line has some landslide potential.	2	More engineering care is needed for difficult terrain and landslide potential.	1	Low number of house w/in 1000'	1	No flood plains identified.
B3	88.3	2	Costs almost equal for the B alternatives.	2	No discernable differences among alternatives	1	No discernable differences among alternatives	3	117.3 miles of high residual impact	1	Weather is relatively favorable. Therefore reliability of a well constructed line should be high.	1	Engineering challenge is low due to favorable terrain and relative lack of existing facilities	2	Most sensitive receptors	1	No flood plains identified.
AB1	169.9	1	Lowest construction cost alternative between Townsend and Idaho border. ($155MM) Mileage or estimate does not include link to Mill Creek.	1	Lowest line losses between Townsend and Idaho border.	1	No discernable differences among alternatives	3	122 miles of high residual impact	1	Weather is relatively favorable. Therefore reliability of a well constructed line should be high.	1	Engineering challenge is low due to favorable terrain and relative lack of existing facilities	2	Fairly low number of houses within 1000'.	1	No flood plains identified.

Notes: [1] ranking is based on most favorable (1) to least favorable (3), [2] high residual imapcts are the remaining impacts after mitigation is applied to highly sensitive resources, [3] sensitive receptors are residential televisions and radios.