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December 28, 2007

Director of Engineering  
Public Service Commission  
P.O. Box 615  
Frankfort, KY 40602

**RECEIVED**  
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PUBLIC SERVICE  
COMMISSION

Re: Jackson Purchase Energy Corporation  
Vegetation Management Plan

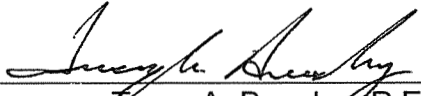
Mr. Welch:

Enclosed is a Board approved copy of Jackson Purchase Energy Corporation's (JPEC) submittal of the Vegetation Management Plan required by the Public Service Commission's order in Administrative Case No. 2006-00494. This plan was approved by our Board of Directors at their meeting on December 27, 2007, at 6:30 p.m.

If you need any additional information, please let us know.

Sincerely,

JACKSON PURCHASE ENERGY CORPORATION

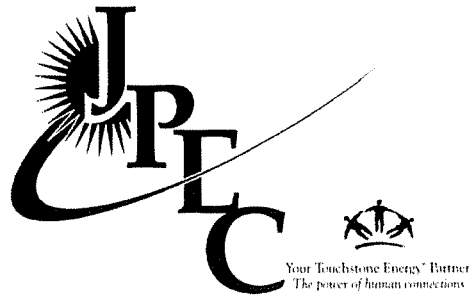
By   
Tracy A. Bensley, P.E.  
Vice President of Engineering & Operations

Cc: Mr. Kelly Nuckols, JPEC President/CEO



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# Jackson Purchase Energy Corporation



## Vegetation Management Plan

December 2007

JACKSON PURCHASE ENERGY CORPORATION  
Vegetation Management Plan  
December 2007

<u>SECTION</u>	<u>PAGE</u>
1.0 Introduction .....	1
2.0 Objective .....	1
3.0 Methods of Vegetation Management .....	1
3.1 Removal of Brush and Trees .....	1
3.2 Pruning .....	2
3.3 Brushing and Pre-Mow Cutting .....	2
3.4 Mowing .....	3
3.5 Hand Cutting .....	4
3.6 Burning .....	4
3.7 Herbicide Use/Chemical Control .....	4
3.8 Safe Use of Herbicides .....	5
3.9 Post-Treatment Evaluations .....	6
3.10 Danger Trees .....	6
4.0 Right-of-Way Clearing Cycle .....	7
5.0 Reliability .....	7
6.0 Determinations for Performing Maintenance .....	8
6.1 Frequency of Inspections .....	8
6.2 Nature of Inspections .....	9
6.3 Action Following Inspections .....	9
7.0 Evaluation of Plan's Effectiveness .....	9
8.0 Trade-a-Tree Program .....	10

<u>FIGURES</u>	<u>PAGE</u>
Figure 1 – Service Territory .....	11
Figure 2 – Drawing M1.30G .....	12

## **1.0 Introduction**

The purpose of this Vegetation Management Plan is to outline Jackson Purchase Energy Corporation's (hereafter referred to as JPEC) plan for managing vegetation in compliance with the Vegetation Management Plan (hereafter referred to as VMP) requirements of the order issued by the Kentucky Public Service Commission (hereafter referred to as PSC) pursuant to Administrative Case No. 2006-00494. JPEC manages approximately 1,800 miles of overhead power line right-of-ways within six counties in western Kentucky: Ballard, Carlisle, Graves, Livingston, Marshall, and McCracken (Figure 1).

## **2.0 Objective**

The objective of JPEC's VMP is to implement cost effective programs that will also minimize the instances of public safety hazards and maximize service reliability. This can be best achieved by permanently removing tall growing species that may come into contact with JPEC conductors as indicated by drawing M1.30G (Figure 2). A prime objective is the removal of as many of these trees as possible, both on and off the JPEC right-of-ways and easements. It is especially important to effect the removal of hazard trees both on and off JPEC right-of-ways. These are trees that have demonstrable weaknesses or flaws and have an imminent potential for failure, and the result of this failure is likely to result in contact with JPEC power lines. Although cutting down trees has an immediate visual effect and removes possible contact with conductors, there is a high probability that the stump will re-sprout. Re-sprouting is, therefore, controlled by chemical spraying to retard the re-growth of these trees within JPEC right-of-ways.

In cases where tree removal cannot be achieved, trees that may grow into the lines must be directionally pruned to eliminate the likelihood of contact. While it may be impossible to eliminate all line contact from trees or branches that fail or fall onto lines, trees growing into power lines can be effectively managed. A principal consideration of tree pruning programs should be the elimination of interruptions caused by trees growing into lines. This can be accomplished by developing and maintaining regular pruning cycles to ensure reasonable clearances are maintained.

## **3.0 Methods of Vegetation Management**

### **3.1 Removal of Brush and Trees**

In order to maintain required clearance specifications, brush and trees will be cut to ground level with chain saws or other appropriate tools. Herbicide will be applied to the cut stump area to prevent re-sprouting. This technique will be further described under the chemical control section.

### **3.2 Pruning**

Pruning is the reduction of tree growth through the use of proper arboricultural practices. Pruning is not the same as thinning, which refers to the indiscriminate cutting back of vegetation to a uniform distance. Pruning will be the acceptable practice in line clearing operations. Pruning requires the consideration of two factors:

- The clearances required to ensure line safety for the length of the cycle (normally 4 years); and,
- The health, shape and appearance of the tree upon completion of the work.

When pruning operations are undertaken, proper arboricultural pruning practices must be applied in order to optimize long-term clearances. Proper pruning methods will lengthen the control cycle and optimize desirable tree form. It will also influence the direction of branch growth so that trees can be pruned away from conductors.

Trimming methods such as heading back, rounding over and topping are discouraged by JPEC and will only be employed at the insistence of property owners. Natural pruning will be the preferred method employed under this VMP. With natural pruning, branches will be cut back to a lateral of at least one-third the size of the branch. Laterals will be cut back to main branches. In all possible cases, proper pruning methods and proper pruning cuts will be used.

The objectives of natural pruning are:

- To reduce or remove any limbs or branches that might contact lines; and;
- To minimize damage to the tree, and, as much as possible, to retain the natural appearance and form of the tree.

Natural pruning employs drop crotch pruning techniques. These use properly applied methods of cutting, properly made pruning cuts, and reduction of laterals and leaders to either the main stem or to an appropriate crotch. With these techniques, no more than one third of the crown of a tree will be removed. Pruning to influence the direction of future growth (called directional pruning), is also part of this practice.

### **3.3 Brushing and Pre-Mow Cutting**

Brushing (pre-mow cutting) is the removal (cutting to ground) of all vegetation that will eventually grow into lines. It is particularly appropriate for rural right-of-ways. With customer permission, brushing may be extended into private property adjacent to the right-of-

ways to improve long-term line security. Brushing can be accomplished with a variety of specialized mechanized equipment.

Pre-mow cutting involves the use of mechanized equipment to cut down all problem vegetation on a right-of-way in preparation for mowing. In preparation for mowing, pre-mow cutting must achieve the following:

- Vegetation must be removed to maintain clearance standards;
- All fence lines, power poles, guy wires, telecommunication pedestals, signs, stumps greater than 6 inches in diameter, and any other obstructions must be removed for a minimum distance of 3 feet on all sides;
- Within clearance areas, trees with a diameter of 4 inches or more at breast height must be cut down, unless otherwise directed;
- All trees that are dead, weak, diseased, top heavy, rotten or leaning towards the line will be cut down;
- Stumps will be cut flat and no taller than 4 inches from the ground;
- Steep slopes, ditch banks and other areas inaccessible to mowing will be cut, and the debris piled for disposal;
- All debris will be placed in areas accessible to the mower, and not within 3 feet of hazardous obstacles such as rocks and stumps greater than 6 inches in diameter, or in hazardous areas such as steep ditch bottoms; and,
- Debris will not be piled in environmentally sensitive areas such as in runoff areas, creek beds, or other areas prone to spring flooding.

### **3.4 Mowing**

Mowing is the use of mechanized mowers such as tractor-mounted mowers, grade all or hydro axes, to remove all vegetation from a right-of-way. With mowing, all vegetation is cut to the ground, leaving a level right-of-way. This technique facilitates the subsequent application of herbicide to deciduous vegetation to control re-sprouting. Well-timed and properly performed mowing can inhibit the re-growth of deciduous vegetation for several years. Mowing is less labor intensive, less expensive and is less hazardous to workers than hand cutting.

Mowing is not selective. Desirable species of vegetation are cut as well as the undesirable species. Because mowing mulches the brush using high speed, flail type action, this can spread debris and leave the right-of-way unsightly. Mowing may also open up the seedbed, allowing undesirable species to sprout from seed. Mowing is also limited by terrain.

Mowing is seasonably effective. Mowing after the spring flush of growth through late summer will inhibit growth better than mowing done at other times of the year. This is particularly important in areas where the problem vegetation is deciduous, and follow-up selective herbicide treatment is not possible. Mowing must be done to cut stubs as close to the ground as possible, which may necessitate the expense of mowing an area several times to reduce the stumps to ground level.

For maximum effectiveness, mowing should be followed in 2 to 3 years by the selective use of herbicides by spot treatment, or wipe-on application to individual stems, to control re-sprouting. An alternative to herbicide use would be to plough and reseed or replant with desirable, low-growing vegetation that will inhibit the growth of undesirable vegetation. This may not be practical or economical for large areas, but may be useful on private property adjacent to a right-of-way where grass, crops, native shrubs and bushes, and landscape trees and shrubs can be planted and maintained by the private landowner.

### **3.5 Hand Cutting**

Hand cutting involves the use of chain saws, brush cutters, or other hand-held equipment to remove undesirable vegetation. Hand cutting can be species-specific, enabling desirable vegetation to be left. The remaining desirable vegetation will inhibit the growth of tall growing species, and give the area a more landscaped look.

Hand cutting is compatible with the species-specific spot application of herbicides used to control re-sprouting of deciduous vegetation, single stem treatments or small patches of problem vegetation. The major disadvantage of hand cutting is that re-growth is not inhibited as well as it is by mowing.

The eight considerations listed under brushing and pre-mow cutting are all applicable to hand cutting. For maximum effectiveness, hand cutting, like mowing, should be followed immediately or within 1 year by the selective use of herbicides.

### **3.6 Burning**

While being a recognized physical control for problem vegetation, burning will generally not be utilized by JPEC.

### **3.7 Herbicide Use/Chemical Control**

Herbicides may be required on JPEC distribution right-of-ways to target specific types of vegetation problems. Herbicides will generally be used to selectively control deciduous vegetation and re-sprouting, to control individual stems or trees, or for the spot treatment of problem

vegetation following physical controls. Although a main objective of this VMP is to minimize the use of herbicides for vegetation management where viable alternatives exist, herbicides are an important tool in right-of-way vegetation management.

Although mowing, pruning, trimming and cutting remain important parts of JPEC's right-of-way maintenance program, these methods can be impractical, dangerous for the workers, incompatible with environmental protection values, labor intensive and expensive. In certain areas, mechanical methods cannot be used for vegetation control.

Steep terrain may limit access by mowers and can be dangerous for a chain saw operator. Exceedingly dense brush can create both a visibility and a physical hazard to workers and can result in an increased incidence of injuries due to slipping and tripping while operating power equipment.

Mechanical methods are non-selective, and can also lead to soil erosion by removing a high percentage of the vegetative ground cover. They can also damage compatible plant species such as low growing shrubs and grasses. Biodiversity is reduced when nonselective mechanical methods are used to remove most of the vegetation from a site.

Herbicide use has not been shown to impair applicator health provided that personal protective measures and equipment, as indicated on product labels, are adhered to. All herbicides proposed for use are selective in their mode of action. They will not affect grasses growing on a treatment site, thus reducing the chances of soil erosion. Due to their generally selective use (to control re-sprouting of deciduous vegetation), their impacts on biodiversity will be generally less than with mechanical methods. Effects on biodiversity that result from the use of herbicides have been shown to be temporary due to its non-residual nature.

Herbicide use is often the only practical and safe method of controlling vegetation where right-of-ways traverse rugged terrain or areas inaccessible to motorized equipment.

### **3.8 Safe Use of Herbicides**

Given the appropriate precautions, the use of herbicides for the management of problem vegetation on JPEC right-of-ways can be achieved with little or no hazard to the applicator, workers, bystanders, the public, fish and wildlife, and adjacent environmentally sensitive features. If the label directions and the procedures outlined in this VMP are adhered to, the hazard in using these products is very low.



The herbicide active ingredients proposed for targeting problem vegetation are of low or moderate mammalian toxicity, both orally and dermally, and are all of low residual soil activity.

### **3.9 Post-Treatment Evaluations**

All applications of herbicides for distribution right-of-way vegetation management under this VMP will be undertaken by contracts issued to qualified companies in possession of a valid Kentucky herbicide spraying license.

The JPEC contract administrator will evaluate the quality of the contractor's work by inspecting each treatment site treated with herbicides. The inspections will be undertaken during regularly planned patrols and inspections. The inspection will evaluate:

- The efficacy of the work that has been undertaken by the contractor; and,
- The contractor's adherence to the required environmental protection measures (such as no treatment zones around wells, water intakes, fish bearing and non fish bearing streams, within community watersheds, and near fish, wildlife and riparian areas, as appropriate).

### **3.10 Danger Trees**

JPEC also needs to remove trees outside of the cleared right-of-way area as needed to ensure that the VMP meets the goals and objectives of the plan. Typically easements allow for the removal of trees outside of the easement area that JPEC deems may have an impact to the safe and reliable operation of the line. Trees that are tall enough or are capable of growing tall enough over the next 4 year cycle are evaluated based on the criteria listed below. Danger trees that are deemed to be removed are marked and added to the vegetation cycle inventory for removal. If a tree does not pose a concern it will not be cut and will be reevaluated during subsequent vegetation cycle inventories and patrols.

If a tree is determined to be an imminent threat it is called a threat tree and necessary actions are taken to have it removed immediately.

## **Danger Tree Evaluation Criteria**

### **Species**

- Failure rates of tree species
- Tensile strengths of wood
- Longevity
- Rooting characteristics

### **Growth Patterns**

- Phototropism-tree growing towards sunlight
- Lean

### **Location**

- Slope
- Shallow soils
- Wet soils
- Stream banks
- Erosion

### **Structural Defects**

- Poorly attached leaders/crotches with included bark
- Multi-stems – co-dominate leaders
- Rubbing leaders or rubbing other trees

### **Disease/Insect damage**

- Defects caused by disease or insects

### **Decay – caused from**

- Storm damage
- Mechanical damage
- Disease
- Frost cracks
- Sun scald

## **4.0 Right-of-Way Clearing Cycle**

A 4 year vegetation management cycle has been established as an action threshold for JPEC. This vegetation management cycle has been time tested and is based on engineering design of the line, the growth rate potential of the vegetation, and minimum vegetation to conductor clearances.

## **5.0 Reliability**

JPEC must maintain vegetation to ensure the reliability of the distribution system. It is vital to the operation of the local distribution network that JPEC's VMP

minimizes tree caused unscheduled outages on its distribution line system. As a distribution cooperative, JPEC does not have to conform to any specific vegetation management reliability standards such as the NERC standard (FAC-003-1) that applies to transmission system operators and the ANSI standard (A300) that is a utility best management practice for transmission operators. However, JPEC recognizes the value to its members in providing reliable electric service.

Each distribution circuit on the JPEC system shall be monitored according to outage cause codes. JPEC shall use this data to determine the top five priority circuits requiring vegetation management for each year based on the number of outages per mile on each circuit attributed to vegetation. These circuits shall receive priority vegetation inspections in addition to JPEC's normal cycle trimming. Any issues discovered during these inspections shall be remedied immediately.

In addition to outages per mile, JPEC will also consider the SAIFI index per circuit in determining which circuits should receive such priority trimming maintenance. Any circuit whose SAIFI value increases by 15% over its most recent 5 year average shall be inspected for possible vegetation management issues.

Reports shall be generated and analyzed each January based on the preceding criteria. These reports shall include at a minimum the number of outages per mile on each circuit attributed to vegetation, the most current year SAIFI value for each circuit, and the preceding 5 year average SAIFI value for each circuit.

## **6.0 Determinations for Performing Maintenance**

Growth rates of vegetation vary due to species, soil, site conditions and climate conditions. JPEC currently inspects its entire distribution system on a 2 year cycle. It is therefore required that part of this 2 year inspection cycle include the specific purpose of detecting locations where line clearances are being compromised by vegetation growth.

### **6.1 Frequency of Inspections**

- A. Each line shall be inspected at least once every 2 years to determine where vegetation is not in compliance with the desired clearances.
- B. An inspection may be performed following a weather event that has the potential to cause changes in vegetation conditions such as heavy wet snows, ice accumulations, or high wind events.
- C. An inspection may be performed if reliability does not meet the requirements described above.
- D. An inspection may be performed if complaints of repeated blinks and/or outages are received from members.

- E. An inspection may be performed prior to line maintenance work that may put more than normal reliability requirements on a particular line or group of lines.

## **6.2 Nature of Inspections**

- A. All vegetation conditions that might immediately affect the operation or maintenance of the lines shall be observed and recorded.
- B. The following list is representative of observations to be made:
  - 1. Heights of vegetation in the distribution line right-of-way.
  - 2. Vegetation which is not in compliance with desired clearances.
  - 3. Any evidence of vegetation-conductor contact or burning caused by contact.
  - 4. Trees which, because of their condition, are an imminent threat to the lines and may be deemed a danger tree.
  - 5. Trees which, because of their condition, may be deemed a danger tree and need further evaluation prior to the next vegetation management cycle.
  - 6. Encroachment of trees along the edge of the right-of-way that may pose a threat to the reliability of the line prior to the next vegetation management cycle.

## **6.3 Action Following Inspections**

When vegetation is determined to be an imminent threat to the reliability of the line, the condition shall be immediately communicated to the JPEC Operations Department. Actions to avoid unscheduled interruption of service will be taken as needed by the Operations Department. Vegetation found not to be in compliance with the desired clearances but not an imminent threat shall be reported to the Operations Supervisor responsible for right-of-way management. Action shall be initiated within a reasonable time frame to obtain desired clearances until the next vegetation management cycle.

## **7.0 Evaluation of Plan's Effectiveness**

JPEC will evaluate the effectiveness of the VMP every 4 years. The following criteria shall be used in this evaluation:

- A. The reliability measurements of each circuit for the 4 year period. The SAIFI measurement and outages per mile attributed to vegetation shall be evaluated. The VMP shall be modified if an upward trend in these measurements is determined to exist.
- B. The number of customer complaints shall be logged and reviewed for this period. The VMP shall be modified if an upward trend in the

number of complaints logged and attributed to vegetation is determined to exist.

### **8.0 Trade-a-Tree Program**

When trees and other vegetation grow into primary power lines, they create a safety hazard. Further, trees in power lines are a leading cause of power outages for JPEC members. To ensure quality service, JPEC offers its members the option to “trade trees” or receive cash compensation for yard trees removed by JPEC.

Any JPEC member can participate in the program. After being contacted by a member about a tree, a JPEC field representative will be dispatched to the property to check the tree. If the field representative determines the tree will cause problems, we will remove the tree and “trade” the member for a new tree. The member can select to either “trade trees” and work with a participating nursery for a new tree to be planted away from power lines, or the member can elect to receive \$100 in lieu of trading.

If the member chooses to trade trees, he/she will be able to select his/her own tree and the location where the new tree will be planted. Of course JPEC will not allow the new tree to be planted under or near existing power lines. JPEC’s partner nurseries will advise the member as to the right tree for his/her needs and the best location for the new tree. The nursery will plant the tree at the best time of year as specified by American Nursery Standards within one year of the member’s request. Plus, the nursery will guarantee the new tree for a full year.

Figure 1

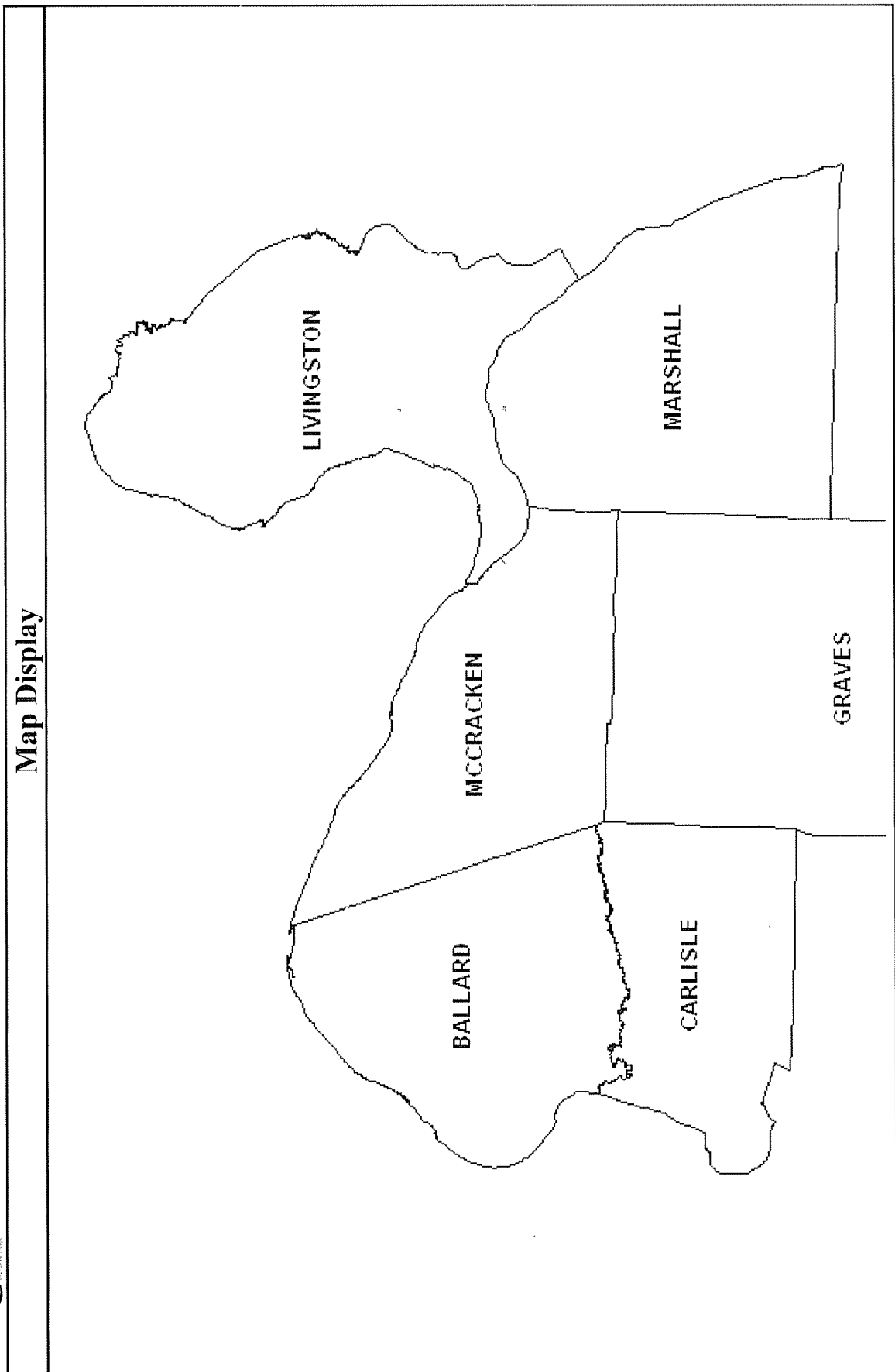
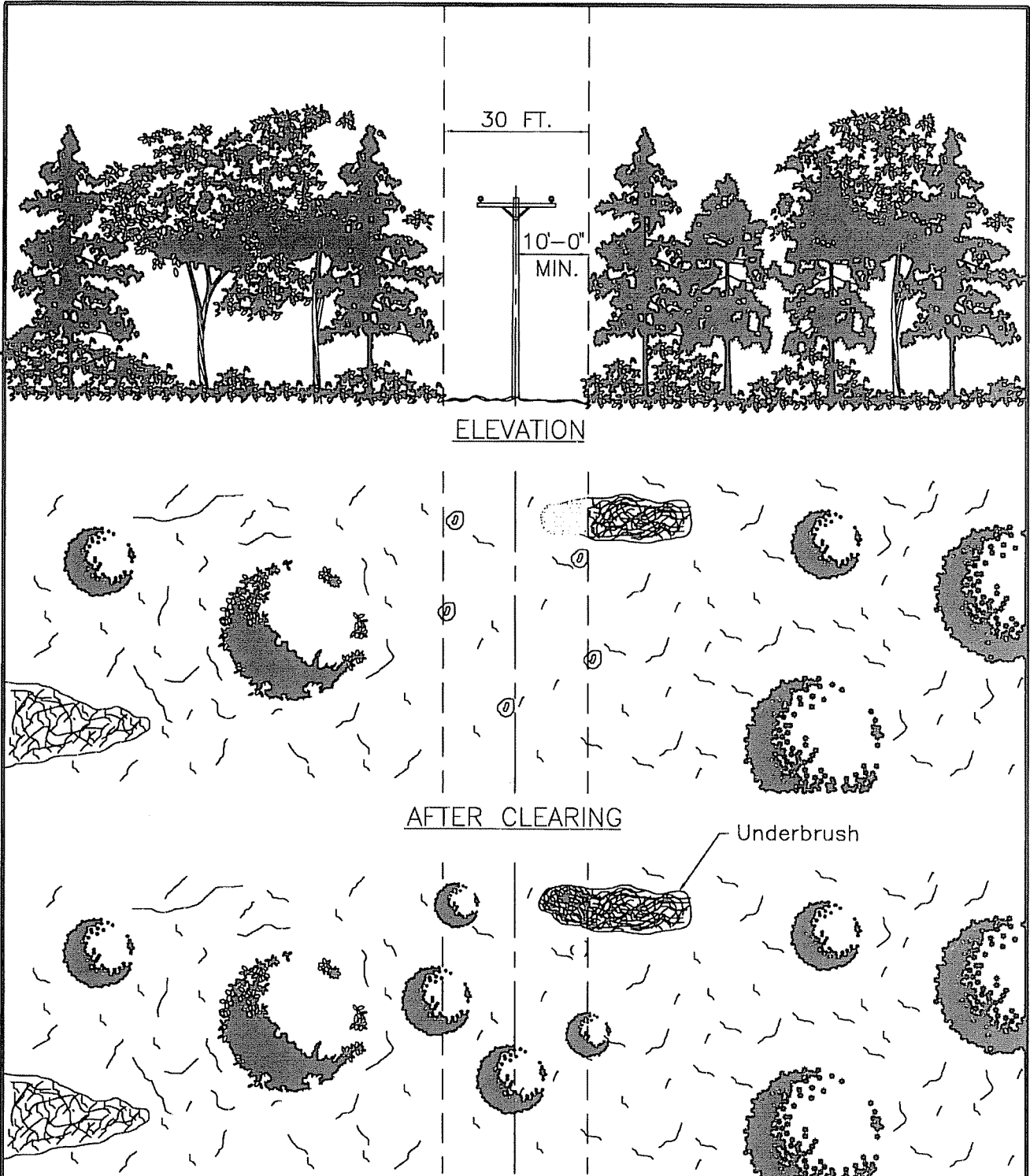


Figure 2



**NOTE:**

Change suffix of drawing number to designate clearing width. (e.g. M1.30G specifies 30 foot wide clearing).

JPEC maintains a 30' width right-of-way for single phase overhead lines and a 40' width right-of-way for multi-phase overhead lines.

**RIGHT-OF-WAY CLEARING GUIDE**

APRIL 2005

RUS

M1.30G  
(R1)