

Appendix 2B

Vegetation Maintenance

Vegetation maintenance serves five main purposes: (1) provides reliable, uninterrupted service to customers; (2) provides safe and efficient transmission of power along existing lines; (3) provides safe and reasonable access to the lines and structures for inspection and maintenance; (4) provides protection against wildfires by reducing the potential for fire ignition from vegetation in and around the power lines; and (5) reduces effects of fire damaging structures or causing power faults in the lines through decreasing fuel load under the lines.

Vegetation Maintenance Overview

APS maintains vegetation that could interfere with the power lines and towers, that could become a fuel load issue under the lines, and to provide vehicle access to the towers for maintenance and repair. Vegetation maintenance work is done within the right-of-way. This work is typically done routinely about every 3 to 10 years, although there are situations where hazardous vegetation may need to be treated out of cycle.

Annual inspections outside of vegetation maintenance may be conducted by air or ground and would have negligible effects to vegetation communities. When access is required for routine maintenance and repairs, the same precautions and procedures used during construction would be used to minimize ground disturbance and vegetation impacts.

Routine Vegetation Maintenance

Routine vegetation maintenance involves the cyclical treatment of vegetation approximately every 3 to 10 year utilizing mechanical, manual, and herbicide treatments as discussed below in the Vegetation Maintenance Methods section. Routine maintenance activities typically do not include ground disturbance, as they are conducted by relatively small crews using minimum equipment, and over a few hours to a few days time. There would be no new roads or access routes required for vegetation maintenance.

Hazard Vegetation Maintenance

Vegetation that present a hazard to the power line and structures require treatment on an ongoing basis outside the routine maintenance cycle. The need to treat hazard vegetation is not common due to the ongoing routine maintenance, but is occasionally required. These hazards can be categorized into three levels, and are treated slightly different for each level:

Level 1 Emergency Hazard - An emergency caused by vegetation occurs when vegetation is arcing to the line, has caused a power fault, is burning from contact or arcing with the line, and when all or a portion of a tree is in contact with the line from falling or growing into the wires. Emergencies due to vegetation on a large, 500 kV line are uncommon, but if it were to occur, it is a very serious event. APS must act immediately to eliminate the hazard no matter the weather or road conditions or time of day or year.

Level 2 Imminent Threat Hazard - There can be two types of imminent threat hazards: (1) a live or dead standing tree or vegetation having defects in the roots, butt, bole, or limbs, which predispose it to imminent mechanical failure which could damage whole or part of the power line or tower; and (2) an imminent threat hazard may also be a tree or branch that has come close enough to the power line such that it poses a safety risk to the public and tree workers. Imminent threat hazards must be treated as soon as possible once the hazard is identified. These hazards are typically treated within a week of identification.

Level 3 Off Cycle Hazard - This type of hazard includes any live or dead tree that poses a future threat to the power line or structures and cannot be left untreated for the next growing season or next maintenance cycle. These hazards do not pose an imminent threat but must be treated prior to the next growing season or out of cycle before it becomes an imminent threat. Treatment of Off Cycle trees may sometimes be scheduled around seasonal timing restrictions.

Vegetation Maintenance Methods

Mechanical Treatment Methods

Mechanical treatment involves the use of a mower to remove and mulch vegetation on site. The mower consists of a rotary cutting device mounted on an arm on a rubber tire or tracked vehicle that mulches trees and large shrubs from the top down. A mechanical mower may be used in the majority of the power line right-of-way for routine vegetation maintenance. The mower would not operate in areas with steep slopes, poor access, water drainages, or within cultural resource sites. Manual hand crews may be used to assist the mower operation in pruning or vegetation disposal.

Manual Treatment Methods

Hand crews are used for all hazard vegetation work and for some routine vegetation maintenance work. For routine vegetation maintenance, hand crews may be used to assist the mechanical mowers, to cut vegetation where mowers cannot be used, or as an alternative method to mechanical mowing. Hand crews consist of line clearance tree workers that use hand tools (chain saws, hand saws, rope) to cut down or prune vegetation. They typically only use pickup trucks as a means of travel to the work site, but may also use a bucket truck and/or chipper.

Herbicide Treatment Methods

The purpose of herbicide treatment is to efficiently maintain clearances obtained following mechanical and/or manual treatments. Herbicide treatment is ideally conducted within one to three growing seasons following the mechanical and/or manual treatments. Vegetation targeted for herbicide treatment includes most vegetation that is targeted for manual and mechanical treatment, the exception being saguaros would not be treated using herbicides. Herbicide treatment involves vegetation that is less than 10 feet tall whose physiology is such that it could encroach within the associated FAC-003 clearance distance, impact the reliability of the transmission line or transmission facilities (e.g., towers, guy wires, etc.), or poses a fire fuel load concern.

APS also proposes to treat any invasive species encountered during the course of an herbicide project within the permitted right-of-way where it is reasonable and prudent to do so and provided the herbicide being applied would be an effective treatment. All activities will be conducted within existing APS power line right-of-way.

Vegetation Maintenance Protocol

Protocol for hazard vegetation work is simple and typically only requires 2 to 6 tree workers accessing the area of concern to prune or remove the offending hazard vegetation. This work is usually completed within 1 to 2 working days. The resulting slash is cut such that it lies within 18 to 24 inches of the ground and is lopped and scattered within the right-of-way in the immediate area.

Protocol for routine vegetation maintenance requires more steps. The remainder of this section focuses on the protocol for routine maintenance work. Below lists the typical routine maintenance protocol:

1. Tall growing vegetation within the right-of-way is cut down and may be treated with herbicides according to the Herbicide Treatment Methods section above (note: see **Appendix 2A** for treatment of saguaro cactus; it would not be treated with herbicides).
2. For each tower along the line, all woody vegetation, including shrubs and trees, would be cut down and treated with herbicides (herbicide treatment excludes cacti) underneath the tower and 40 feet out from each footer of the tower.
3. Lower growing vegetation such as creosote bush and small cacti that do not fall within the 40 feet around the towers are left on site untreated unless: (1) the shrub or cacti blocks access on the existing access routes within the right-of-way; or (2) the shrub density is high causing a fuel load issue under the line. In the case of high density vegetation, the shrubs are thinned to a reasonable and safe density level while providing as much protection as possible to the line and structures in case of fire.
4. Where line spans high above canyons and slopes, either no treatment will be needed, or some thinning may be needed to break up fuels under the line. Typically no treatment is required if the line is 100 feet or greater above vegetation unless the fuel density is heavy and needs to be broken up by thinning.
5. Herbicide application targets vegetation 10 feet tall or smaller that was cut during manual or mechanical vegetation treatment. This treatment ideally is done one to three growing cycles following mechanical or manual treatment. The initial treatment applications are scheduled between April 1 and November 30 with a follow up application to be conducted one year later between April 1 and November 30.

6. Stumps from vegetation treatments are cut no greater than 12 inches above the ground and where possible are cut flush to the ground.
7. For the hand crew operations, slash is lopped and scattered throughout the immediate area in a manner such that debris lies within 18 to 24 inches of the ground. Where chippers are used, the chips are broadcast across the right-of-way no deeper than 4 inches in depth. For mower operations, the majority of vegetation, except larger logs, are mulched by the mower and material is broadcast across the right-of-way no deeper than 4 inches in depth.
8. Access for all treatment methods is done using only established roads and access routes to approach the right-of-way. There will be no new roads or access routes required for vegetation maintenance. If a portion of the power line right-of-way is inaccessible by road, the crew will drive to the nearest location and walk in to the right-of-way with the necessary equipment.
9. Vegetation maintenance crews will make every effort to keep impacts within the right-of-way to a minimum. APS will only work within the right-of-way when the soils are dry enough to prevent ruts.
10. All vehicles will be operated in a safe and prudent manner.