

GOVERNMENT OF PUERTO RICO
PUBLIC SERVICE REGULATORY BOARD
PUERTO RICO ENERGY BUREAU

JRSP - SECRETARIA
NEGOCIADO DE ENERGIA
DE PUERTO RICO

2019 AUG -9 PM 3: 12

IN RE: Review of the Puerto Rico Electric
Power Authority Comprehensive
Vegetation Management Program

Case No. NEPR-MI-2019-0005

SUBJECT: Submittal of Final Draft of the
Comprehensive Vegetation Management
Program

MOTION IN COMPLIANCE WITH RESOLUTION AND ORDER

TO THE HONORABLE PUERTO RICO ENERGY BUREAU:

Comes now the Puerto Rico Electric Power Authority ("PREPA"), and presents to the Puerto Rico Energy Bureau (Bureau) this Motion in Compliance with its Resolution and Order, dated April 12, 2019.

In compliance with the April 12, 2019 Resolution and Order, PREPA submits its Comprehensive Vegetation Management Program draft. The proposed document is subject to further review and its implementation is subject to the ongoing Vegetation Management Request for Proposal (RFP) process which should be finalized not later than December 2019, as well as to possible concession as part of PREPA's transformation process. The budget assigned for Fiscal Year 2019-2020 for vegetation management is \$87M, nevertheless, the projected budget for the following years is subject to the approval of the Puerto Rico Oversight and Management Board.

WHEREFORE, the Puerto Rico Electric Power Authority respectfully requests that the Honorable Puerto Rico Energy Bureau deems its April 12, 2019 Resolution and Order complied with.

RESPECTFULLY SUBMITTED, in San Juan, Puerto Rico, this 9th day of August, 2019.

Puerto Rico Electric Power Authority



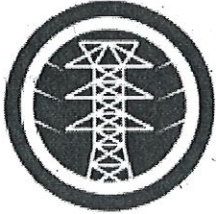
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CERTIFICATION OF FILING AND SERVICE

I HEREBY CERTIFY on August 9, 2019, I have sent the above Motion to the Puerto Rico Energy Bureau through its Clerk in person at the Clerk's office located at 268 Munoz Rivera Ave., Seaborne Building Plaza, Plaza Level, Ste. 202, San Juan, Puerto Rico 00918, and via email to secretaria@energia.pr.gov and to the office of its General Counsel via email to sugarte@energia.pr.gov, and legal@energia.pr.gov.



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**COMPREHENSIVE
VEGETATION MANAGEMENT
PROGRAM
DRAFT**

Aug 7, 2019

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1 General Information

Electrical utilities have the responsibility of delivering electrical power to its customer safely, and reliably. In order to accomplish the delivery of power from the source of generation to the end-user, the electricity must travel through the power lines of the transmission and distribution system. The vegetation that exists in Puerto Rico, can and does frequently grow to impede upon the transmission and distribution system causing safety and reliability hazards. Therefore, a comprehensive vegetation management program is needed to ensure the safe and reliable operation of the electrical infrastructure.

1.1 Program Objectives

The objectives of PREPA's comprehensive vegetation management program are to:

1. Maintain compliance with Federal and Puerto Rico safety, environmental, and vegetation management regulations
2. Protect the integrity of PREPA assets
3. Manage vegetation for the safe and reliable operation of the transmission, distribution systems, and substation facilities
4. Minimize vegetation related interruptions
5. Provide access to PREPA's electric facilities for maintenance and construction
6. Establish a vegetation management multi-year, cycle-based maintenance program for transmission, distribution, and substation facilities
7. Follow vegetation management industry standards and best management practices
8. Establish clear specifications for all aspects of vegetation management
9. Reduce short- and long-term vegetation management expenses
10. Establish and maintain good relations with consumers and landowners

1.2 Safety Policy

All PREPA and contractors performing vegetation management work shall adhere to Federal and Puerto Rico safety regulations.

- OSHA Standard 1910.269 is the Occupational Safety and Health Administration's vertical standard pertaining to work relating to the generation, transmission, and distribution of electricity. A specific section of OSHA 1910.269 requires that individuals performing tree work in proximity to electric hazards must be qualified and that their training is documented. OSHA 1910.269 also establishes minimum approach distances for tree workers based on their qualifications.
- ANSI Z133 is the American National Standard for Arboricultural Operations – Pruning, Maintaining, and Removing Trees and Cutting Brush. ANSI Z133 provides information that can be helpful in understanding and complying with the requirements contained in OSHA Standard 1910.269.

PREPA employees are also required to follow: PREPA's Safety Rules Manual, "*Manual General de Reglas de Seguridad*", and PREPA's Administrative Manual, "*Manual Administrativo*".

PREPA's Contractors are also responsible for developing, training, documenting, and following their own safety procedures.

1.3 Federal Regulations Regarding Vegetation Management

The National Electric Safety Code (NESC) requires the pruning or removal of interfering trees near overhead facilities. Section 218.A.1 states, "Vegetation that may damage ungrounded supply conductors should be pruned or removed. Vegetation management should be performed as experience has shown to be necessary. Factors to consider in determining the extent of vegetation management required include, but not limited to: line voltage class, species growth rates and failure characteristics, the vegetation's location in relation to the conductors, the potential combined movement of vegetation and conductors during routine winds, and sagging of conductors due to elevated temperatures.

1.4 Puerto Rico Regulations Regarding Vegetation Management

Puerto Rico's Energy Policy Act 1121, Article 1.16 requires that PREPA:

- Follow vegetation management industry best practices to protect the integrity of network assets
- Maintain at least ten (10) feet between the trees and easements for the transmission lines in accordance with the NESC
- Routinely patrol and disengage any vegetation or material close to the power lines
- Adopt the recommendations for tree trimming established by accepted industry standards, such as those established by the American National Standard (ANSI)
- Produce periodic and detailed reports of compliance with the vegetation program
- Establish an adequate and independent fund for the vegetation management program

2 Program Organization

PREPA is establishing a vegetation management department that will have centralized authority. The department will be responsible for establishing and maintaining vegetation clearances for transmission, distribution, and substation facilities. The department's staff positions include a department manager, regional supervisors, district supervisors, and an administrative assistant. Responsibilities are as follows.

2.1 Department Manager's Responsibilities

- Plans, organizes, and directs PREPA's comprehensive vegetation management program for transmission, distribution, and substation facilities
- Sets department's expectations, priorities, objectives, and goals
- Works with T&D operations management to develop and implement effective and efficient VM storm restoration plans to maximize use of VM resources

- Supports PREPA's zero tolerance safety policy for employees and contractors
- Acts as point of contact for internal and external stakeholders on vegetation management issues
- Works with various PREPA departments on vegetation management issues
- Responsible for Federal and Puerto Rico vegetation management regulatory compliance
- Supervision of internal vegetation management staff
- Provide technical expertise to PREPA's staff and employees
- Develops vegetation management scopes of work for contracts
- Works with procurement and purchasing departments to establish vegetation management contracts
- Oversees vegetation management contracts, including review and approval of invoices
- Provides regular vegetation management reports to management
- Develops and manages vegetation management budget
- Promotes integrated vegetation management and industry best practices
- Participates in vegetation management industry associations
- Develops contractor quality control measures and performance targets
- Develops a vegetation management data base to collect company and contractor work activities

2.2 Regional Supervisor's Responsibilities

- Plans, organizes, and directs PREPA's comprehensive vegetation management program for transmission, distribution, and substation facilities within assigned region(s)
- Supports PREPA's zero tolerance safety policy for employees and contractors
- Supports and implements defined VM storm restoration plan to maximize efficiency and effectiveness of VM resources during these events
- Acts as point of contact for internal and external stakeholders on vegetation management issues within assigned region(s)
- Works with various PREPA departments on vegetation management issues
- Responsible for Federal and Puerto Rico vegetation management regulatory compliance within assigned region(s)
- Supervises PREPA vegetation management staff
- Provide technical expertise to PREPA's staff and employees
- Oversees vegetation management contracts within assigned region(s)
- Provides vegetation management reports to management
- Develops and manages region's vegetation management budget
- Promotes integrated vegetation management and industry best practices
- Participates in vegetation management industry associations
- Creates annual and multi-year vegetation management work plans
- Conducts employee and contractor inspections to ensure compliance with PREPA standards

2.3 District Supervisor's Responsibilities

- Assists with planning, organizing, and directing PREPA's comprehensive vegetation management program for transmission, distribution, and substation facilities within assigned district(s)
- Supports PREPA's zero tolerance safety policy for employees and contractors
- Supports and implements defined VM storm restoration plan to maximize efficiency and effectiveness of VM resources during these events
- Acts as point of contact for internal and external stakeholders on vegetation management issues within assigned district(s)
- Works with various PREPA departments on vegetation management issues
- Responsible for Federal and Puerto Rico vegetation management regulatory compliance within assigned district(s)
- Investigates consumer requests for tree pruning and removal
- Investigates consumer complaints resulting from line clearance activities
- Supervises PREPA vegetation management employees
- Provide technical expertise to employees
- Manages PREPA assigned equipment and tools for employees
- Promotes integrated vegetation management and industry best practices
- Conducts employee and contractor inspections to ensure compliance with PREPA standards and accuracy of crew work reports

3 Integrated Vegetation Management

"Integrated vegetation management (IVM) is a system of managing plant communities in which managers set objectives, identify compatible and incompatible vegetation, consider action thresholds, and evaluate, select, and implement the most appropriate control method or methods to achieve their established objectives. The choice of control method or methods is based on considerations of their environmental impact and anticipated effectiveness, along with site characteristics, security, economics, current land use, and other factors"¹.

PREPA employees, along with contractors performing vegetation management work activities, shall follow ANSI A300 standards and the associated best management practices whenever possible. Emergency or storm restoration efforts are an exception to this requirement.

Work activities include the pruning and removal of trees, brush, and vines, herbicide applications, tree growth regulator applications, clearing of trees and brush by machinery, pole and guywire clearing, and debris disposal.

¹ Integrated Vegetation Management for Utility Rights of Way, Second Edition 2014, Randall H. Miller

3.1 Industry Standards

- “ANSI A300 is the American National Standard for the care and management of trees, shrubs, palms, and other woody landscape plants. ANSI A300 standards are intended for the development of work practices, written specifications, best practices, regulations and other measures of performance. These standards shall apply to any person or entity engaged in the management of trees, shrubs, palms, or other woody plants, including federal, state, or local agencies, arborists, consultants, arboricultural or landscape firms, and management or owners of property”²
 - i. “ANSI A300, Part 1, *Pruning*, is to provide performance standards for the pruning of trees, shrubs, palms, and other woody plants, and to guide the development of written specifications, best practices, training materials, regulations, and other performance measures”³
 - ii. “ANSI A300, Part 7, *Integrated Vegetation Management, Utility Rights of Way*, is to provide standards for developing specifications to implement an integrated approach to management of vegetation on utility rights of way”⁴
 - iii. “ANSI A300, Part 9, *Tree Risk Assessment, Tree Failure*, is to provide performance standards for the practice of tree risk assessment, and to guide the development of written specifications, best practices, training materials, regulations, and other performance measures”⁵

3.2 Industry Best Management Practices

- Best Management Practices, *Tree Pruning*, Revised 2008, Gilman & Lilly, is a companion publication to the ANSI A300, Part 1 Standard. This publication covers pruning objectives, methods, branch attachments, type of cuts, how much and when to prune, tools, and specifications.
- Best Management Practices, *Utility Pruning of Trees*, 2004, Kempter, is a companion publication to the ANSI A300, Part 1 Standard. This publication covers pruning objectives, safety, tools and equipment, utility pruning cuts, rural environments, and emergency service restoration.
- Best Management Practices, *Integrated Vegetation Management*, Second Edition, 2014, Miller, is a companion publication to the ANSI A300, Part 7 Standard. This publication covers communication, planning, and implementation. Specifically, it covers objectives, site evaluations, action thresholds, control methods (mechanical, chemical, biological, cultural), initial clearing and reclamation, debris disposal, monitoring, quality assurance, and record keeping.

² American National Standard A300

³ American National Standard A300, Part 1, Pruning

⁴ American National Standard A300, Part 7, Integrated Vegetation Management, Utility Rights of Way

⁵ American National Standard A300, Part 9, Tree Risk Assessment, Tree Failure

- Best Management Practices, *Tree Risk Assessment*, Second Edition, 2017, Smiley & Matheny & Lilly, is a companion publication to the ANSI A300, Part 9 Standard. This publication covers types of risk, approaches to risk, levels and scope of risk assessment, assessing targets, risk categorization, risk mitigation, and risk reporting.

4 Transmission Vegetation Management

The primary objective of the transmission vegetation management program is to keep transmission facilities clear of all incompatible trees, brush, vines, and other vegetation that could grow too close to conductors or otherwise interfere with the safe operation and maintenance of the facility. Incompatible vegetation is defined as vegetation that at maximum mature height could encroach within PREPA's safety clearance limits. This is accomplished by performing routine maintenance or incidental work on each transmission line including vegetation pruning, removal, mowing, and herbicide applications. Refer to PREPA's "Manual de Normas Construcion de Lineas de Transmision" for additional information.

4.1 Transmission Line Patrols

- PREPA performs aerial and ground patrols of its transmission lines on a scheduled basis to identify vegetation concerns. If vegetation concerns are identified, that information is communicated to the transmission dispatch center, region, or district based on the criticality of the issue. Vegetation conditions that are identified as an imminent threat to the integrity of the transmission system will be treated with the highest priority.
- PREPA will also utilize LiDAR (Light Detection and Ranging) or similar technology or methods to survey the transmission system to identify locations where vegetation requires intervention. The LiDAR survey will also help determine workload requirements and scheduling.

4.2 Multi-Year, Cycle-Based Maintenance Program

- PREPA will:
 - establish a maintenance cycle, in years, for each transmission line based on voltage, construction, conductor type, vegetation type and growth rates, and criticality.
 - create an annual work plan listing all transmission lines that are scheduled for a particular year. The plan will include priorities, anticipated start dates, completion dates, and budget.
 - establish yearly performance targets based on the annual work plan and will provide periodic reports to management showing progress.
 - perform inspections of employee and contract crews to ensure compliance with safety and environmental regulations, work specifications, and monitor productivity.

4.3 Phased Approach to Comprehensive Vegetation Management

PREPA will utilize a phased approach to establish a comprehensive vegetation management program. This approach allows PREPA to prioritize work based on vegetation conditions, current reliability metrics, customers, and budget. A description of the phases is:

- Phase 1 – Analyze reliability metrics to determine worst performing circuits
- Phase 2 – Determine most critical circuits based on voltage and load requirements
- Phase 3 – Perform a vegetation survey to determine conditions and workload requirements
- Phase 4 – First Maintenance Cycle.
 - The First Maintenance Cycle should be focused on improving reliability across the system in a cost-effective, and prudent manner. By solely pruning trees and other vegetation as well as removing problem trees within close proximity to the primary conductor, PREPA will improve system reliability and safety significantly in a relatively short period of time.
- Phase 5 – Second Maintenance Cycle.
 - After the First Maintenance Cycle has been completed for the transmission system, PREPA can begin to focus on reducing the vegetation density within the ROW by removing trees and utilizing herbicide applications.
 - The annual budget will determine the level of effort.
- Phase 6 – Third Maintenance Cycle and beyond.
 - Continue to concentrate on reducing the vegetation density by removing trees and utilizing herbicides.
 - Expenses per mile will continue to decline and service reliability will continue to improve.

4.4 Construction Projects

- PREPA's vegetation management department will receive, coordinate, inspect, and complete vegetation management in relation to construction projects from other PREPA departments.

4.5 Consumer Requests

- PREPA's vegetation management department will receive and inspect consumer requests regarding vegetation management to determine if work is needed. If work is needed, it will be scheduled based on criticality of the issue and communication with the consumer. If no work is needed, the consumer will be contacted.

4.6 Emergency and Storm Restoration

- PREPA's vegetation management department will work with other PREPA departments to acquire, coordinate, inspect, and supervise vegetation management resources such as tree crews and inspectors during emergency and storm restoration efforts.

4.7 Transmission Safety Clearance Limits

- Transmission conductors shall be kept clear of vegetation at all times. The following safety clearance limits apply.
 - 230kV – 20 feet
 - 115kV – 20 feet (lines 36300, 37400, 38300, 39000)
 - 115kV – 15 feet
 - 38 kV – 12 feet

4.8 Transmission Vegetation Clearing and Pruning Standards

- Before work begins, an arborist with experience and knowledge of the local vegetation should perform a vegetation assessment to determine the type of intervention required. The following priorities must be identified:
 - **Emergency conditions**
These are instances where the transmission line is in immediate danger due to existing or imminent vegetation contact that could result in an outage or safety related incident. The arborist must immediately contact PREPA's authorized representative regarding the emergency conditions.
 - **Intervention conditions**
These are instances where vegetation requires maintenance to prevent interference with the transmission line over the course of the maintenance cycle period.
 - **No-intervention conditions**
These are instances where vegetation does not require maintenance to prevent interference with the transmission line over the course of the maintenance cycle period.
- Trees and vegetation shall be cleared from the transmission conductors to the extent within the powerline right of way so that the vegetation does not violate the safety clearance limits during the maintenance cycle period.
- No overhanging branches are allowed on or over transmission conductors.
- Hazard trees outside the right of way tall enough that if they were to fall could pass within 10 feet of a transmission conductor shall be mitigated. Hazard trees pose an unacceptable risk to the safety and reliability of the transmission conductor. The risk may be due to factors such as disease, cracks, deadwood, leaning, uprooting, and erosion or failure in adverse weather.
- Fast growing trees, bamboo, and other vegetation that will grow into the safety clearance limits for transmission conductors prior to the next maintenance cycle shall be a priority for removal.
- Tree and vegetation stumps in the right of way shall be cut close to ground level and treated with herbicide.
- Vegetation growing around structures, poles, and guy wires shall be cleared to provide for a minimum of 10 feet of clearance. Vegetation cleared shall be treated with herbicide. Cone

type or kudzu guards shall be installed to prevent vines from climbing guy wires. Vines ascending structures, poles and guys shall be cut at ground level and again 10 feet above the ground. All growth between the two cuts shall be removed from the structure, pole, and guy wires. Vines shall be left above the highest cuts for safety reasons.

- Low growing compatible vegetation in the right of way is allowed except around structures, poles, guy wires, and where access is required. Low growing compatible vegetation is defined as vegetation at its maximum mature height would not grow within PREPA's safety clearance limits.
- Refer to PREPA's "Procedimiento de Desganche Indice" for additional information.

4.9 Wood Debris Disposal

- On urban transmission rights of way, wood debris such as limbs, brush, and logs, should be cleaned up before the crews move to a new location, especially in residential and commercial areas. Work sites should appear in a similar fashion as they were found before the work started. Raking and blowing may be needed at some locations.
- Wood debris should not be left on job sites overnight without permission from the landowner or PREPA's authorized representative.
- On rural transmission rights of way, wood debris should be chipped, mulched, or lopped and scattered and left on site when possible. Logs should be stacked on the edge of the right of way.
- Branches or "hangers" (a trimmed limb which is caught in a tree) shall not be left in trees.

4.10 Access Roads

- Access roads in the transmission rights of way should be wide enough to allow for vehicle traffic and material transport.
- The access road path on the rights of way should generally follow the centerline except where there are steep slopes, impassible creeks, or other obstructions.
- If access to the rights of way is required from adjacent roads or from other property, property owners must be contacted to seek approval.

4.11 Right of Way Widths

- Refer to PREPA's "Reglamento de Servidumbres Para la Autoridad de Energia Electrica" for additional information.
- Right of way widths for 230kV lines in urban areas are:
 - Single circuit – 40 feet
 - Double circuit in the same structure – 60 feet
- Right of way widths for 230kV lines in rural areas are:
 - Single circuit – 100 feet
 - Double circuit in the same structure – 100 feet
 - Double circuit in independent structures – 100 feet
- Right of way widths for 115kV lines in urban areas are:

- Single circuit – 30 feet
- Double circuit in the same structure – 40 feet
- Right of way widths for 115kV lines in rural areas are:
 - Single circuit – 100 feet
 - Double circuit in the same structure – 100 feet
 - Double circuit in independent structures – 100 feet
- Right of way widths for 38kV lines in urban areas are:
 - Single circuit – 25 feet
 - Double circuit in the same structure – 25 feet
- Right of way widths for 38kV lines in rural areas are:
 - Single circuit – 50 feet
 - Double circuit in the same structure – 50 feet
 - Double circuit in independent structures – 50 feet

5 Distribution Vegetation Management

The primary objective of the distribution vegetation management program is to keep distribution facilities clear of all incompatible trees, brush, vines, and other vegetation that could grow too close to conductors or otherwise interfere with the safe operation and maintenance of the facility. Incompatible vegetation is defined as vegetation that at maximum mature height could encroach within PREPA's safety clearance limits. The safety clearance limit for distribution primary conductors (4.16kV, 8.32kV, 13.2kV) is 12 feet. This is accomplished by performing routine maintenance or incidental work on each distribution circuit including vegetation pruning, removal, mowing, and herbicide applications.

5.1 Distribution Circuit Patrols

- PREPA performs ground patrols of its distribution circuits on a scheduled basis to identify vegetation concerns. If vegetation concerns are identified, that information is communicated to the distribution dispatch center, region or district based on the criticality of the issue. Vegetation conditions that are identified as an emergency will be treated with the highest priority.

5.2 Multi-Year, Cycle-Based Maintenance Program

- PREPA will:
 - establish a maintenance cycle, in years, for each distribution circuit based on voltage, construction, conductor type, vegetation type and growth rates, and criticality.
 - create an annual work plan listing all distribution circuits that are scheduled for a particular year. The plan will include priorities, anticipated starting and completion dates, and budget.
 - establish yearly performance targets based on the annual work plan and will provide periodic reports to management showing progress.

- perform inspections of employee and contract crews to ensure compliance with safety and environmental regulations, work specifications, and monitor productivity.

5.3 Phased Approach to Comprehensive Vegetation Management

PREPA will utilize a phased approach to establish a comprehensive vegetation management program. This approach allows PREPA to prioritize work based on vegetation conditions, current reliability metrics, customers, and budget. A description of the phases is:

- Phase 1 – Analyze reliability metrics to determine worst performing circuits
- Phase 2 – Determine most critical circuits based on customer type and count
- Phase 3 – Perform a vegetation survey to determine conditions and workload requirements
- Phase 4 – First Maintenance Cycle.
 - The First Maintenance Cycle should be focused on improving reliability across the system in a cost-effective, and prudent manner. By solely pruning trees and other vegetation as well as removing problem trees within close proximity with the primary conductor, PREPA will improve system reliability and safety significantly in a relatively short period of time.
- Phase 5 – Second Maintenance Cycle.
 - After the First Maintenance Cycle has been completed for the distribution system, PREPA can begin to focus on reducing the vegetation density within the ROW by removing trees and utilizing herbicide applications.
 - The annual budget will determine the level of effort.
- Phase 6 – Third Maintenance Cycle and beyond.
 - Continue to concentrate on reducing the vegetation density by removing trees and utilizing herbicides.
 - Expenses per mile will continue to decline and service reliability will continue to improve.

5.4 Service Reliability and Construction Projects

- PREPA will receive, coordinate, inspect, and complete vegetation management service reliability and construction projects from other PREPA departments.

5.5 Consumer Requests

- PREPA will receive and inspect consumer requests regarding vegetation management to determine if work is needed. If work is needed, it will be scheduled based on critically of the issue and communication with the consumer. If no work is needed, the consumer will be contacted.

5.6 Emergency and Storm Restoration

- The responsible PREPA office will work with other PREPA departments to acquire, coordinate, inspect, and supervise vegetation management resources such as tree crews and inspectors during emergency and storm restoration efforts.

5.7 Distribution Vegetation Clearing and Pruning Standards

- Before work begins, an arborist with experience and knowledge of the local vegetation should perform a vegetation assessment to determine the type of intervention required. The following priorities must be identified:
 - **Emergency conditions**
These are instances where the distribution circuit is in immediate danger due to existing or imminent vegetation contact that could result in an outage or safety related incident. The arborist must immediately contact PREPA's authorized representative regarding the emergency conditions.
 - **Intervention conditions**
These are instances where vegetation requires maintenance to prevent interference with the distribution circuit over the course of the maintenance cycle period.
 - **No-intervention conditions**
These are instances where vegetation does not require maintenance to prevent interference with the distribution circuit over the course of the maintenance cycle period.
- Trees and vegetation shall be cleared to provide for a minimum of 12 feet of clearance to the sides and below the primary conductor.
- Vegetation shall be cleared to provide for a minimum of 15 feet of clearance above the primary conductor. Branches above 15 feet shall be removed or shortened so that if they broke and fell, the falling branches would not impact the primary conductor.
- Hazard trees, outside the right of way, tall enough that if they were to fall, could pass within 5 feet of a distribution conductor shall be mitigated. Hazard trees pose an unacceptable risk to the safety and reliability of the distribution conductor. The risk may be due to factors such as disease, cracks, deadwood, leaning, uprooting, and erosion or failure in adverse weather.
- Fast growing trees, bamboo, and other vegetation that will grow into the safety clearance limits for distribution conductors prior to the next maintenance cycle shall be a priority for removal.
- Tree and vegetation stumps in the right of way shall be cut close to ground level and treated with herbicide.
- Vegetation growing around poles and guy wires shall be cleared to provide for a minimum of 5 feet of clearance. Vegetation cleared shall be treated with herbicide. Cone type or kudzu guards shall be installed to prevent vines from climbing guy wires. Vines ascending structures, poles and guys shall be cut at ground level and again beneath the lowest conductor and the guy wire insulators. All growth between the two cuts shall be removed from the pole and guy wires. Vines shall be left above the highest cuts for safety reasons.
- Insulated and bundled secondary (Triplex) up to the pole serving the customer, shall be cleared of vegetation to provide for a minimum of 5 feet of clearance.
- Service lines to the customer's meter shall be cleared of tree limbs that are applying significant pressure to prevent damage to the line and to prevent property damage.

- Low growing compatible vegetation in the right of way is allowed except around poles and guy wires and where access is required. Low growing compatible vegetation is defined as vegetation which at its maximum mature height would not grow within PREPA's safety clearance limits.

5.8 Wood Debris Disposal

- On urban distribution circuits, wood debris such as limbs, brush, and logs, should be cleaned up before the crews move to a new location, especially in residential and commercial areas. Work sites should appear in a similar fashion as they were found before the work began. Raking and blowing may be needed.
- Wood debris should not be left on job sites overnight without permission from the landowner or PREPA's authorized representative.
- On rural distribution circuits, wood debris should be chipped, mulched, or lopped and scattered and left on site when possible.² Logs should be stacked on the edge of the rights of way.
- Branches or "hangers" (a trimmed limb which is caught in a tree) shall not be left in trees.

5.9 Right of Way Widths

- Right of way widths for distribution circuits in urban and rural areas is 10 feet.

6 Substation Vegetation Management

The primary objective of the substation vegetation management program is to keep substation facilities clear of all weeds, trees, brush, vines, and other vegetation that could grow to interfere with the safe operation and maintenance of the facility. This is accomplished by performing routine maintenance or incidental work on the facility including herbicide applications, vegetation pruning and removal, and mowing.

6.1 Substation Inspections

- PREPA performs inspections of its substations on a scheduled basis to identify vegetation concerns. If vegetation concerns are identified, that information is communicated to PREPA's vegetation management department for mitigation.

6.2 Annual Work Plan

- PREPA will create an annual work plan listing all substations that are scheduled for maintenance. The plan will include type of vegetation management activities required and budget.
- PREPA will establish yearly performance targets based on the annual work plan and will provide periodic reports to management showing progress.
- PREPA will perform inspections of employee and contract crews to ensure compliance with safety and environmental regulations, work specifications, and monitor productivity.

6.3 Vegetation Clearing Standards

- Vegetation inside the substation fence will be kept clear of equipment and access areas by treating with herbicides or mowing.
- Vegetation, such as vines, will be kept clear of growing on the substation fence.
- Vegetation outside the substation fence will be cleared back to allow for access and security.
- Vegetation, such as trees, are not allowed to overhang the substation fence.
- Hazard trees, outside the substation fence, will be mitigated to prevent damage to the facility.

7 Environmental Issues

PREPA employees and contractors are required to follow all environmental regulations of the United States and Puerto Rico that may apply to vegetation management activities.

7.1 Threatened and Endangered Species

- Before work begins at a particular site, PREPA's environmental department must be contacted to determine if threatened or endangered species are present. If such species are present on site, best management practices (BPMs) must be followed.
- Reporting requirements to the USFWS may apply for specific work activities and locations.

7.2 Bird Nesting Period

- The USFWS has established nesting periods for specific birds in Puerto Rico.
- Before work begins during the nesting period, the work site must be inspected to determine if active bird nests are present. Active is defined as a nest having eggs or fledglings.
- If active nests are located, work is not allowed within a 200-meter perimeter.
- Work is allowed within the 200-meter perimeter after the nest becomes inactive.

7.3 Water Protection

- Machine clearing is not allowed adjacent to the banks of rivers, streams, and other bodies of water. Hand clearing will be performed in and adjacent to these areas.
- Vegetation will only be cleared in and around water sources if it has the potential to violate PREPA's safety clearance limits for transmission and distribution conductors.
- Any vegetation felled into water sources must be immediately removed.
- Herbicide applications in and around water sources must be made with products that are labeled for the site.

7.4 Soil Disturbance and Erosion

- Before work begins, the site must be inspected to determine its topography, vegetation type, drainage patterns, and soil characteristics in order to evaluate soil disturbance and erosion potential.
- Vegetation clearing may cause soil disturbance and create erosion issues and therefore may require control methods such as rough grading, excavation, backfill, installation of matting,

silt fences, or hay bales, seeding of slopes, water blockage or diversion, installation of stone or rip-rap, or other techniques.

- Every effort shall be made to preserve existing grass cover and other compatible vegetation in order to prevent erosion.

7.5 Spills

- If fuel, hydraulic fluid, oil, or herbicide spills occur from work activities, the spill will be cleaned up and disposed of according to regulations.
- PREPA's authorized representative and the environmental department will be immediately contacted to make them aware of the spill. The property owner will also be contacted.
- PREPA employees and contractors are required to have a Spill Emergency Response Plan on site.

7.6 Herbicide Applications

- PREPA employees and contractors are required to follow all Federal and Puerto Rico herbicide regulations.
- Licensing and record keeping requirements must be followed.
- Products must be applied according to the label.
- Crews must have a copy of the product label and Safety Data Sheet (SDS) on site.
- PREPA's environmental department must approve all herbicide products before use.
- Herbicide applications shall comply with the applicable sections of PREPA's Procedure 2-364-03, "Procedimiento para Uso de Herbicidas".

8 Consumer & Landowner Relations

PREPA employee and contract crews shall make a reasonable effort to notify property owners, as a courtesy, regarding planned vegetation management activities such as tree pruning, tree removal, pole clearing, and herbicide applications. PREPA employees and contractors shall maintain positive consumer and community relations and be professional at all times.

8.1 Notification Policy

- Tree pruning activities requires notification to property owners in person, by phone, or door hangers. Notification should occur at least two days in advance. If the property owner is unresponsive, the tree pruning should proceed as necessary and actions noted for reference.

8.2 Permission Policy

- Tree removal and herbicide applications require permission from the property owner unless a right of way easement document gives permission to do so. If permission is required, a signed document from the property owner must be obtained. If the property owner is unresponsive, the planned tree removal and herbicide applications should not occur. Tree pruning should proceed as necessary and actions noted for reference.

8.3 Refusal Policy

- If a consumer refuses to allow PREPA employee or contract crews to perform necessary tree pruning, tree removal, or pole clearing, the vegetation management department must be contacted immediately. The consumer will be contacted to resolve the situation. PREPA should use all available laws and easement rights to obtain required vegetation clearances in a professional and consumer friendly manner. All refusals should be tracked to ensure final resolutions are resolved.

8.4 PREPA Contact Numbers

- If a consumer needs to contact PREPA regarding a tree pruning, tree removal, or pole clearing request, or a complaint, they should call customer service at _____.

8.5 Professionalism

- PREPA employee and contract crews shall conduct themselves in a professional manner at all times. Crews shall present a polite, courteous, and friendly attitude.
- Crews shall wear a uniform with logo and a hard hat identifying supervisors from crew members.
- Crew individuals shall have an identification card with the individual's photograph, name, company name, and contact number. The ID card must be on person when on site.

9 Government Agency Relations

Before vegetation management work occurs on Federal, Puerto Rico, county, or city lands, PREPA must contact the agency to make them aware of planned activities. On site visits with the agency may be required to communicate plans and activities. Permission may be required from the agency before activities begin. Excellent communication is essential with these agencies.

10 Professional Organizations

PREPA will participate in organizations and associations such as the: Agronomist Association of Puerto Rico, International Society of Arboriculture, Utility Arborist Association, and others to seek expertise and knowledge in utility vegetation management. Participation in these organizations is essential in order to effectively develop and manage a comprehensive vegetation management program.

11 Vegetation Management Software Application

PREPA will use a vegetation management software application that will be used for planning, scheduling, and reporting. The application will: track transmission and distribution circuits and their maintenance schedule, record vegetation inspections and assessments, create and assign work orders, house production and expense records, create periodic reports of metrics, and keep historical data.

12 Vegetation Management Program Compliance

PREPA will perform an annual audit of the vegetation management program by a third party to determine the level of compliance with the requirements of Puerto Rico's Energy Policy Act 1121, Article 1.16. The audit will also provide recommendations to improve the program.