

# Construction, Operation, and Maintenance Plan

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## Bayfield – Pagosa 115kV Transmission Line Reauthorization



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## **LIST OF ACRONYMS AND ABBREVIATIONS**

ATV	All-Terrain Vehicle
BLM	Bureau of Land Management
BMP	Best Management Practices
CDPHE	Colorado Department of Public Health and Environment
CFR	Code of Federal Regulations
COMP	Construction, Operation, and Maintenance Plan
DBH	Diameter at breast height
DEM	Digital Elevation Model
EPA	U.S. Environmental Protection Agency
EPM	Environmental Protection Measures
FERC	Federal Energy Regulatory Commission
FLPMA	Federal Land Policy and Management Act
FSR	Forest System Road
GIS	Geographic Information System
IVM	Integrated vegetation management
kV	Kilovolt
MOU	Memorandum of Understanding
NEPA	National Environmental Policy Act
NERC	North American Energy Reliability Council
NESC	National Electric Safety Code
NFMA	National Forest Management Act
NPS	National Park Service
NVA	No vehicular access
OSHA	Occupational Safety & Health Administration
POL	Products other than logs
ROW	Right-of-way
RUS	Rural Utilities Service
SUP	Special Use Permit
SWMP	Storm Water Management Plan
Tri-State	Tri-State Generation and Transmission Association
TVMP	Transmission Vegetation Management Program
U.S.C.	United States Code
UL	Underwriters Laboratory
USFS	U.S. Department of Agriculture, Forest Service
USFWS	U.S. Fish and Wildlife Service
WUI	Wildland Urban Interface

# **1. BAYFIELD-PAGOSA 115 kV TRANSMISSION LINE AUTHORIZATION UNDER FLPMA**

## **1.1 Introduction**

This document details the Construction, Operation, and Maintenance Plan (COMP) for the operation and maintenance of the Bayfield to Pagosa 115 kilovolt (kV) Transmission Line (transmission line) and access routes across public lands administered by the U.S. Department of Agriculture, United States Forest Service (USFS), and San Juan National Forest. The transmission line is owned and operated by Tri-State Generation and Transmission Association, Inc. (Tri-State), but it was originally constructed by the Colorado Ute Electric Association (electrified on August 31, 1978). The USFS Special Use Permit (FS-2700-4), which expired December 31, 2005, authorized a 50-foot right-of-way (ROW) on either side of centerline and covered approximately 259 acres. The entire transmission line comprises a total of 36.6 miles, with 21.4 miles are on the San Juan National Forest. Figure 1 shows the location of the transmission line and land jurisdictions.

This COMP describes the activities required for the continued operation, maintenance, and administration of the transmission line under a new USFS Special Use Permit (SUP). The COMP also addresses the Environmental Protection Measures (EPMs) that Tri-State will implement to ensure that the operation and maintenance of the transmission line and its associated access are consistent with the San Juan National Forest's Management Plan, under the National Forest Management Act (NFMA). The proposed activities are consistent with provisions of the Pagosa Ranger District Travel Management Analysis, the Beaver Meadows – Sauls Creek Landscape Travel Management Plan, and associated Motor Vehicle Use Maps. The proposed operation and maintenance activities would be in compliance with the standards of the 2005 Energy Policy Act, Presidential Executive Order 13212, and the North American Energy Reliability Council (NERC) administered by the Federal Energy Regulatory Commission (FERC) to prevent utility outages, ensure safe operation, and reduce fire hazard.

## **1.2 Background and Need for New Special Use Permit**

Tri-State is a wholesale electric power producer/supplier that serves 44 rural electric cooperatives and public power districts in Colorado, Nebraska, New Mexico, and Wyoming. Tri-State's member distribution systems serve over 1.4 million consumers. Tri-State's mission is to provide efficient, cost-effective power to its members. Tri-State's headquarters and operations center are located in Westminster, Colorado, with field offices throughout the four-state area.

Tri-State owns and operates the 115kV overhead electric transmission line that extends from the Bayfield Substation to the Pagosa Substation. This transmission line is a "radial feed" (meaning it is the sole line providing transmission service to the area – as opposed to several circuits providing redundant/backup service to the area) and provides the primary source of the electric power to Pagosa Springs and surrounding areas in Archuleta County, Colorado. It is considered critical infrastructure and is therefore subject to NERC/FERC reliability standards.



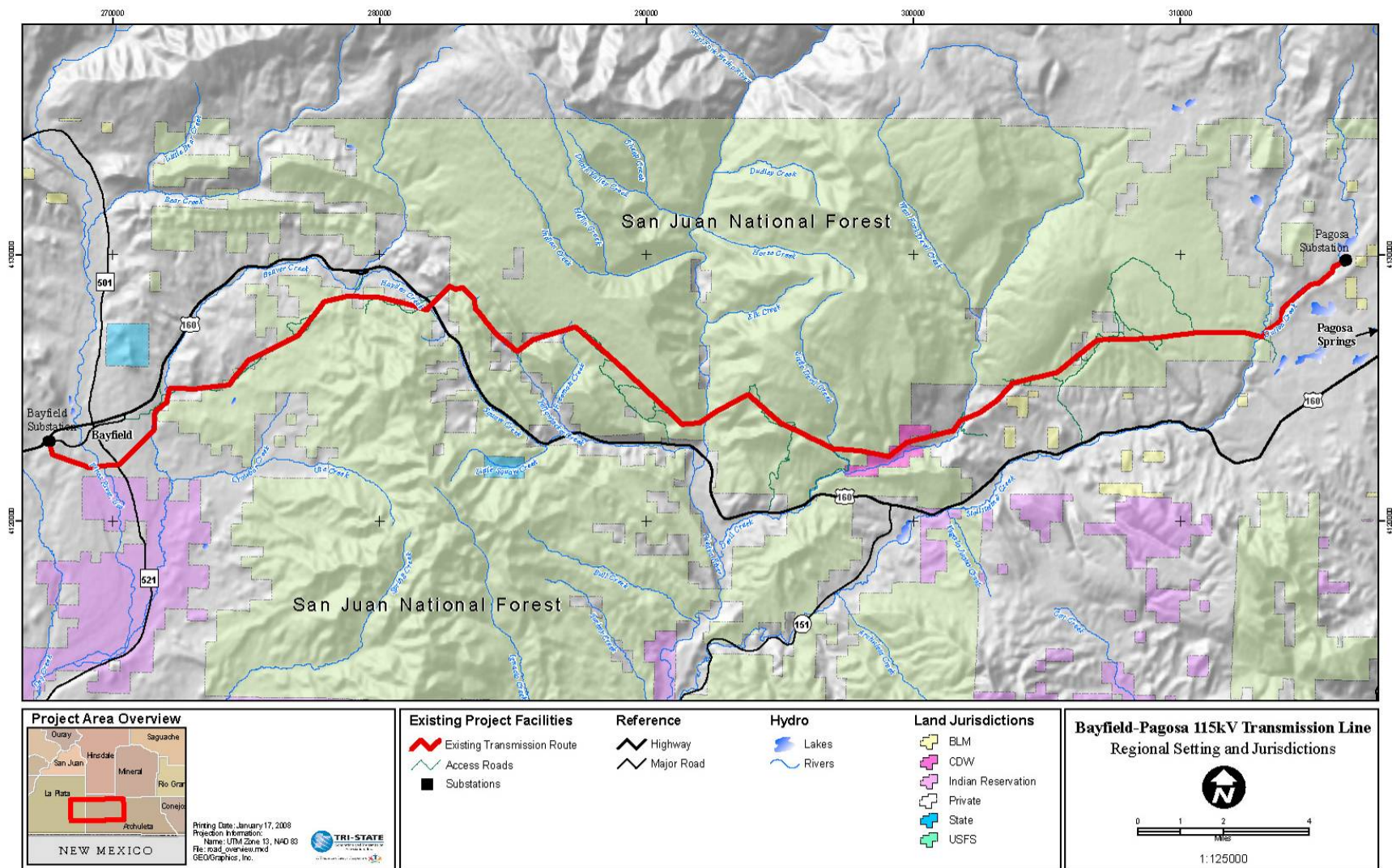


Figure 1. Bayfield-Pagosa 115kV Transmission Line Project Area

The original USFS SUP for this line did not specifically address and identify access routes for the long-term maintenance of the transmission line. Existing access to the transmission line on USFS land is via existing gravel roads, 2-track jeep trails, overland access with All-Terrain Vehicles (ATV) trails, and ATV, single-track mountain bike or foot trails. In general, much of the access that existed when the line was constructed in 1978 exists today but requires improvements to bring them up to current USFS standards.

Tri-State has prepared this COMP to address the following elements for the new USFS SUP:

- Continued operation and planned/routine maintenance, and emergency practices
- Identification of access roads for transmission maintenance activities
- Vegetation and noxious weed management for the transmission ROW

This COMP was developed in coordination with USFS resource staff to provide consistency with existing resource management priorities and guidelines.

### **Continued Operation and Maintenance of Existing Transmission Line**

The former USFS SUP for the transmission line (FS-2700-4) expired on December 31, 2005. A new USFS SUP may be issued by the USFS for the continued operation and maintenance of the Bayfield-Pagosa 115kV transmission line and access. As noted above, the 115kV transmission line is a radial line and subject to FERC/NERC reliability standards, which includes standards for vegetation management.

The proposed activities represent the reasonably foreseeable activities on the transmission line in the next five years. Electrified in 1978, the 32-year-old transmission line has not required extensive maintenance to date; however, the transmission line will most likely require increasing maintenance in the future to ensure that it meets or exceeds a typical 75-year life span. Replacement of structures, hardware, and conductors may be necessary in the future given the age of the transmission line, and normal rates of deterioration of wood poles and hardware. If supporting structures need to be replaced (poles, guy wires, anchors), heavy equipment (bucket or boom trucks) may be required. Access routes will need to be improved in order to complete standard and federally required operation and maintenance activities during the life of the permit. If the need arises for planned maintenance or construction activities that are outside the scope of activities described in this COMP, Tri-State would consult with the USFS, and the proper approvals and permits would be obtained for those activities. At this time, there are no plans to replace structures on Forest Service lands or complete any re-conductoring of the transmission line.

### **Vegetation Management Within and Adjacent to ROW**

The primary cause of electrical outages is trees or portions of trees located within or adjacent to the ROW, that grows into or falls on overhead electric power lines. While some of these outages cannot be prevented (due to storms, heavy winds, etc.), a good percentage can, and they are mitigated by managing the vegetation before it becomes a problem. Arcing can occur if the physical separation between trees and power lines is not properly maintained. Arcing distances vary depending on voltage and ambient conditions, but any branch in close proximity to a conductor can spark a fire. Utilities and regulators generally agree that keeping overhead conductors clear of trees and vegetation is critical to both electric

service reliability and fire prevention. Preventing outages and fires related to tree and power line conflicts are in the interest of public safety and are mandated by federal law.

Since the time when the line was constructed, new legislation, administrative actions, and Memorandums of Understanding (MOUs) have driven changes in the way federal land managers and utility companies manage transmission line right-of-ways. Most recently, transmission lines are being recognized and treated as an essential part of the nation's "critical infrastructure." Recent legislation and other actions designating energy infrastructure as critical infrastructure or otherwise requiring management and maintenance of such infrastructure include the following:

■ **National Fire Plan**

Adopted in August of 2000, the National Fire Plan shifts the focus of fire protection to Wildland Urban Interface (WUI) and emphasized five key items:

- Firefighting
- Rehabilitation of burned areas
- Hazardous fuels reduction
- Community assistance
- Accountability for fire management programs

■ **Executive Order 13212 (Signed May 2001)**

"Actions to Expedite Energy-Related Projects." Executive Order 13212 designates the power grid as being essential to national security and seeks to improve and expedite cooperation among federal agencies to ensure the supply and availability of energy for the country.

■ **Healthy Forests Initiative (Signed August 22, 2002)**

The Healthy Forests Initiative provides for the use of "Stewardship Contracting," which gave agencies authority to trade goods for services, expedites administrative procedures for hazardous fuels reduction and ecosystem restoration of federal lands, and provides for the use of Categorical Exclusions for fuel treatment projects:

- Up to 1,000 acres by mechanical methods
- Up to 4,500 acres by prescribed fire

■ **Healthy Forest Restoration Act of 2003 P.L. 108-148**

The Healthy Forest Restoration Act defines utility ROW corridors as WUI, provides as much as a 1.5-mile buffer zone adjacent to ROW, provides for streamlining the National Environmental Policy Act (NEPA) by encouraging community collaboration prior to document preparation, and focuses on reduction of hazardous fuels and removal of biomass.

■ **Energy Policy Act of 2005 P.L. 109-58 (Signed August 8, 2005)**

The Energy Policy Act requires federal agencies to expedite approvals that are necessary for owners or operators of electrical transmission lines to comply with applicable reliability standards, and directs NERC and FERC to develop and enforce electrical transmission reliability standards. The



standards became effective February 7, 2007, and stipulate that failure to meet standards may result in a \$1 million dollar per day penalty.

■ **MOU between Edison Electric Institute and Federal Agencies (USFS, BLM, NPS, USFWS and EPA) Confirmed May 25, 2006**

This MOU provides a framework to develop integrated vegetation management (IVM) practices for construction and maintenance of utility corridors and encourages agencies to expedite projects or review of permits to ensure security and reliability of utility transmission lines.

In response to changing legislation and industry standards, Tri-State has developed a Transmission Vegetation Management Program (TVMP) to ensure the vegetation treatment of its transmission ROWs is consistent with the NERC Vegetation Management Standard FAC-003-1. A copy of the TVMP is provided in Appendix A. The objective of the TVMP is to ensure the safe and reliable operation of Tri-State's transmission system in an environmentally sensitive, cost-effective manner while also protecting the forest from fire. Failure to comply with NERC-mandated vegetation management will result in FERC fines of up to \$1 million per day of violation.

NERC is a self-regulatory organization (non-government organization) that has statutory responsibility to regulate bulk power system users, owners, and operators through the adoption and enforcement of FERC standards for fair, ethical, and efficient practices. NERC is responsible for creating and revising Vegetation Management Standards for transmission lines that are operated at 230kV or higher, and transmission lines below 200kV designated by the Reliability Coordinator as being subject to this standard, including but not limited to those that cross federal lands owned by federal, state, provincial, public, private, or tribal entities.

The reliability objective of NERC's Vegetation Management Standard is to "prevent vegetation-related outages which could lead to cascading by effective vegetation maintenance while recognizing that certain outages such as those due to vandalism, human errors, and acts of nature are not preventable." Cascading events are defined by NERC as the uncontrolled successive loss of system elements triggered by an incident at any location. Cascading results in widespread electric service disruption that cannot be restrained from sequentially spreading beyond an area predetermined by study. Experience has shown that serious outages and operational issues have resulted from interference between overgrown vegetation and transmission lines (NERC 2008). To maintain electric reliability, it is critical that NERC's vegetation management standards are applied to applicable lines on federal, state, private, and public lands and easements (NERC 2008). It should be noted that NERC is currently revising the FAC-003-1 standard. Tri-State may need to adapt its vegetation management standards in the future to ensure compliance with these federal regulations and guidance. If the Tri State vegetation management standards were changed, the USFS would be notified prior to implementation of the new standards.

It is Tri-State's policy to proactively mitigate vegetation hazards and threats to power system safety and reliability to the extent reasonable and practical within three main areas of concern:

- Vegetation and fuels on the ROW
- Vegetation and fuels adjacent to the ROW
- Prevention of wildfire on and off the ROW

## **Access Route Improvements**

The original USFS SUP did not specifically address access routes for the transmission line. As part of the new SUP, Tri-State is proposing to improve existing travel routes and establish new access for maintenance purposes and emergency access. Existing access to the transmission line on USFS land is via existing gravel roads, 2-track jeep trails, overland access, ATV trails, and single-track mountain bike or foot trails. Access routes required from private lands adjacent to USFS lands are included in this COMP. In general, much of the access that existed when the line was constructed in 1978 exists today has not been maintained, and three temporary road segments were obliterated after completion of the transmission line construction. Access road improvements and long-term road maintenance are required for annual inspections, routine maintenance (including vegetation management) and emergency repairs that result in electrical outages activities. Once established, Tri-State's access routes that are not open to the public will be maintained by Tri State for the life of the SUP. Since original transmission line construction, additional gravel roads, and several well pads have been constructed by the oil and gas industry to access gas wells under separate USFS SUPs for gas development. In addition, scattered non-USFS system travel routes have developed through repeated public use. A summary and description of all proposed access road improvements are discussed in detail in this COMP.

## 2. CONSTRUCTION, OPERATION, AND MAINTENANCE PLAN

The following sections describe proposed continued transmission line operation and maintenance, vegetation management, and access route improvement activities. Future activities that fall outside those activities addressed in this COMP will be addressed with the USFS on a project-by-project basis. An annual meeting will be held between the USFS and Tri-State to allow for discussion of general operations, upcoming maintenance and construction activities, vegetation management, travel management concerns, and current conditions on the transmission line and access routes.

### 2.1 Continued Operation and Maintenance of 115kV Transmission Line

#### 2.1.1 Facility Design

The existing transmission line is typical of 115kV transmission line construction throughout western Colorado and primarily consists of wood pole H-frame structures, three electrical conductors, and two shield wires on top of the poles that provide lightning protection (see Figure 2). At angle points along the transmission line, there are three-pole structures used to provide line stability and to separate the conductors. There are also occasional three-pole “dead-end” structures (see Figure 3) engineered to provide additional strength to the transmission line at angle points and at river crossings, and prevent cascading of poles in the event of a catastrophic failure. The location of each structure is shown on the attached COMP map atlas (Appendix C). In total, the subject line includes 167 numbered transmission structures within the San Juan National Forest.

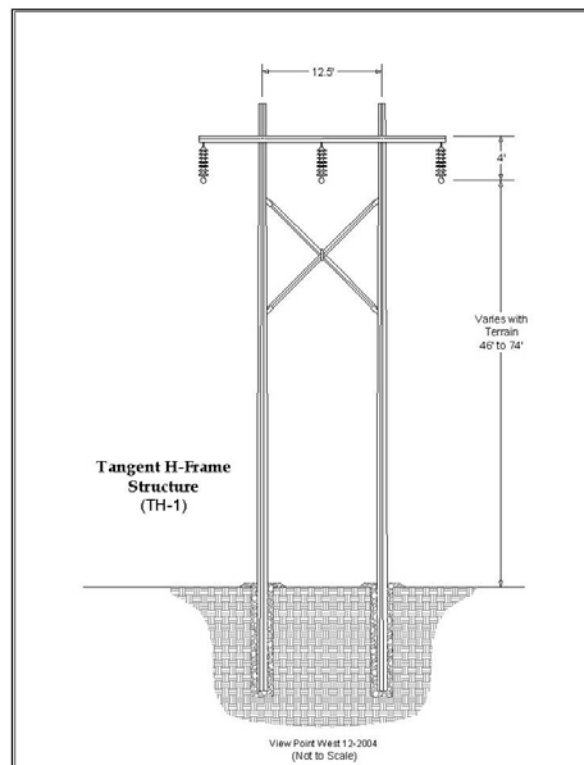
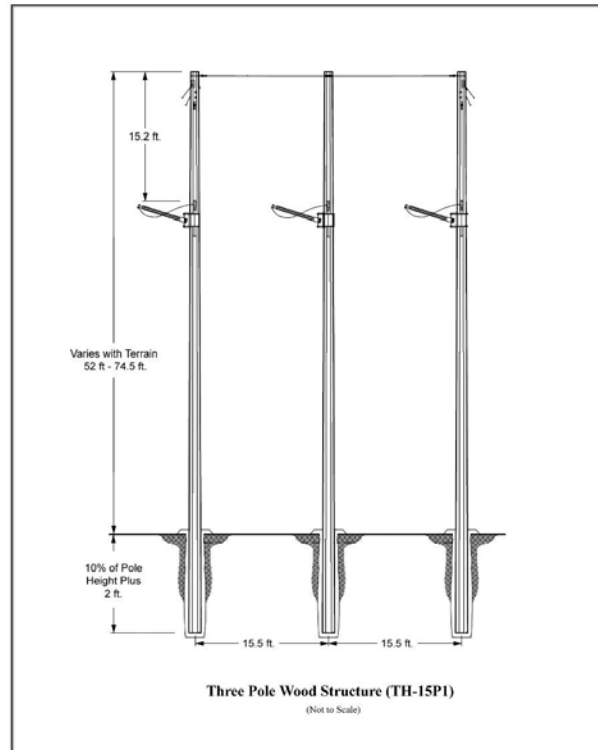


Figure 2. Typical 115kV H-Frame Wood Pole



**Figure 3. Typical 115kV Wood 3-Pole Structure**

## 2.1.2 Annual Inspections

To ensure the safety and reliability of the transmission line, Tri-State will continue to conduct annual on-the-ground and aerial visual inspections of the transmission line, including the conductors, insulators, supporting structures, hardware, shield wires, ground wires, guy wires, and anchors. Annual aerial or ground inspections will be conducted to identify encroaching vegetation in the transmission ROW. On-the-ground inspections involve the use of 4-wheel drive pickup trucks and ATVs. In general, pickup trucks are utilized on existing roads, and ATVs are utilized for off road type access. Aerial inspections are conducted from a helicopter. Routine annual inspections would occur during dry weather conditions. Routine ground inspections would also be scheduled in accordance with timing restrictions imposed by the USFS for travel management and special status and big game species (see Section 2.4 – EPM 14).

## 2.1.3 Maintenance Activities - Structures, Conductors, and Hardware

Annual inspections may identify weakening transmission line components that need to be replaced. Replacement of structures, hardware, and conductors will likely be necessary in the future given the age of the transmission line and normal rates of deterioration of wood poles and hardware. Additionally, future planning studies may reveal a need for increased capacity. When supporting structures need to be replaced (poles, guy wires, anchors), additional equipment may be required. If maintenance or replacement of the insulators, conductors, hardware, or shield wires is needed, large bucket and boom trucks will be used to access the transmission line using authorized access. Figure 4 shows a typical bucket truck, which is referred to in this COMP as the “design” vehicle.

Tri-State currently has no plan to replace conductors, structures, or other major hardware on Forest Service lands in the next five years (other than emergency repairs). However, the electric grid is a dynamic system that can change due to electrical load, population growth, and system reliability issues. The need for additional transmission line improvements, such as increased capacity, will be assessed through future planning studies based on the growth of residential and industrial activities in the area.

Height requirements for all structures are subject to the clearances outlined in the current version of the National Electric Safety Code (NESC). Any future changes to NESC's clearance requirements for the conductors may result in a need to increase the height of some structures. The USFS would be notified if any modifications to structure height—to meet NESC clearance—were required.

Tri-State obtains the majority of its funding from the Rural Utilities Service (RUS). The RUS provides standards for transmission line design and operation. Figures 2 and 3 illustrate the typical RUS approved H-frame and three-pole structure designs that would be used if structure replacements were needed in the future to support the 115kV circuit. Work areas at structure sites could be as large as 100 feet by 100 feet in size (depending on slope) and may require some grading to support bucket and/or boom trucks (see Figure 4), if replacements are required in the future. Work areas for structure replacement would be within the 100-foot ROW permitted for the transmission line. All regularly scheduled maintenance activities would be completed in compliance with EPMs, listed in Section 2.4.

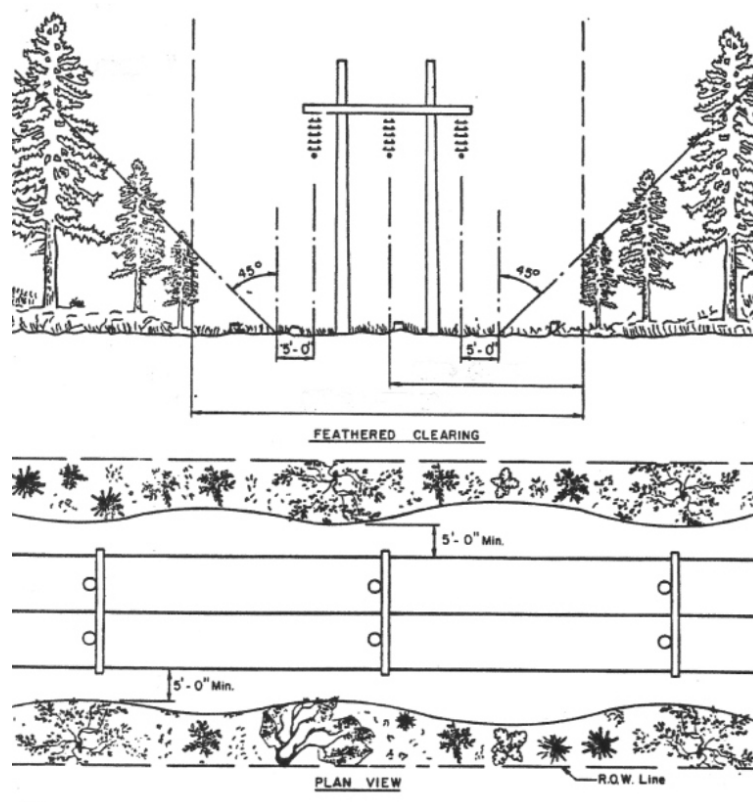


**Figure 4. Bucket Truck with Outriggers Down**



## 2.2 Vegetation Management of ROW

Historically, ROW maintenance has been limited to the removal of “hazard trees.” Essentially, encroaching vegetation was not addressed until it became a problem. Utilities like Tri-State are moving from a “reactive” to a “proactive” mode to ensure the long-term reliability of electric power lines and comply with new NERC requirements. It is the philosophy and practice of Tri-State’s Transmission Maintenance Department to manage vegetation on transmission line ROWs towards a “desired condition,” as depicted in Figure 5. In general, the optimum desired condition is one of stable, low growth plant communities, free from noxious or invasive plants, and without an accumulation of large amounts of vegetative debris from vegetation management activities in the wire zone. Low-growth plant communities preclude the risks associated with taller vegetation. These communities will typically be comprised of herbaceous plants and low growing shrubs or trees that are native to the local area. Border zone areas will normally be managed for trees that ascend in height with increasing distance from the transmission line. Where trees and other taller vegetation are required on the ROW to meet other environmental or visual objectives, the desired condition shall be to maintain the tree heights to provide the adequate 15-foot 8-inch clearance between the trees and conductors.



**Figure 5. Desirable Condition**

NERC standards for safe operation of overhead 115kV transmission lines include a minimum vegetation clearance standard of 15 feet, 8 inches. Periodic treatment will include cutting danger trees, already within the minimum clearance, and those trees likely to approach the clearance standard within 10 years, considering growth and mortality. Topping and trimming trees is less desirable.

For Clearance 1 distances as required by NERC FAC-003-1, Requirement R1.2.1, Tri-State has developed a Clearance Table (Table 1) that establishes the minimum clearance distances to be achieved at the time of transmission vegetation management work between vegetation and conductors for the various line voltages that Tri-State maintains. When trees growing either directly under or adjacent to the line encroach on the minimum clearances by 5 feet, they are either trimmed or removed completely to ensure the minimum clearances are maintained. In some situations, Tri-State will work with landowners to trim versus removing trees if maintenance crews determine trimming will meet FERC/NERC standards and minimize risk of a vegetation-induced outage. In various areas within Tri-State's Transmission System, the method in which Tri-State removes trees from the ROW can be governed by contracts, ROW easements, or SUPs, especially on government lands. However, the necessary treatment is governed by NERC/FERC standards and Tri-State's assessment of the potential for vegetation induced outages. The transmission line has to operate under FERC/NERC operating standards for vegetation management. These guidelines can be revised over time and the Tri State vegetation management standards must be adaptive to these changes. If the Tri State vegetation management standards were changed, the USFS would be notified prior to implementation of the new standard.

**Table 1. Transmission Line Right-of-Way Tree Trimming/Removal Requirements**

Line Voltage	Minimum Clearance after Removal between Conductor and Tree
34.5kV	13 feet 6 inches
69kV	15 feet
115kV	15 feet 8 inches
138kV	16 feet 4 inches
230kV	18 feet
345kV	20 feet 4 inches
Above distances allow for 5 feet of growth before trimming to specified clearance.	

The frequency of tree trimming and removal is determined by line location and type of trees that are found on the individual ROWs. Various types of trees have different growth rates that also affect the frequency of the tree trimming and cutting cycle. Typical growth rates for most of the tree species found within Bayfield – Pagosa transmission line ROW area are provided in Table 2.

**Table 2. Tree Growth and Average Mature Height**

Tree Species	Average Growth	Induced Growth	Average Mature
	Rate ft/year	Rate ft/year	Height
<b>Aspen</b>	1.25	3.0	45
<b>Boxelder</b>	1.5	3.0	40
<b>Juniper</b>	0.7	1.0	45
<b>Oak (Scrub)</b>	0.8	1.5	25

Tree Species	Average Growth	Induced Growth	Average Mature
<b>Piñon Pine</b>	0.5	0.7	35
<b>Ponderosa Pine</b>	1.0	1.0	70

Frequency of vegetation treatments varies by land cover types within and adjacent to the ROW, access condition, growth rate, and height of vegetation. Insect and disease outbreak within the ROW area may also affect vegetation treatment frequency and the number of trees to be removed. Desired conditions will vary and can be specific for each access to the ROW or unique section of ROW. In general, it is Tri-State's practice to modify the optimum desired condition to reasonably accommodate other important resource or management issues and work with the USFS to establish mutually acceptable practices while complying with NERC. However, the safe and reliable operation of the power transmission system will be the primary objective; all other resource and management issues are considered secondary.

General vegetation types applicable to the Bayfield-Pagosa transmission line are included in Table 3. This transmission line is predominantly located in ponderosa pine vegetation type, between 7,000 and 8,000 feet elevation, with most side slopes less than 25%. At the time of original construction, techniques such as feathering, topping, and trimming trees were used to minimize visual effects. However, NERC/FERC standards are evolving and so are the methods required to manage vegetation within transmission ROWs to maintain the line in a desired condition and comply with Federal Regulations.

Tri-State will create and maintain a desired condition (compatible vegetation for transmission line operation) within the ROW; the line will be inspected on an annual basis to identify trees that could affect system reliability and result in a federal violation. The approximate number and location of trees to be removed will be included in the annual inspection and annual meeting summary. Tri-State will provide the USFS a summary of the results of the annual inspection to discuss during the annual meeting. If during an annual inspection, a tree or group of trees is discovered that may present an imminent threat to the transmission line, it may be removed immediately. Table 3 shows the expected frequency of vegetative management by action and land cover type.

**Table 3. Vegetation Management Frequency for Bayfield-Pagosa Transmission Line ROW**

Land Cover	Expected Vegetation Management Actions	Typical Frequency
<b>Agricultural or Grassland</b>	None likely to be necessary due to adequate clearance/density.	None - Low
<b>Sagebrush</b>	Occasional thinning if fuel loads are excessive within the ROW.	None - Low
<b>Meadow</b>	Scattered danger trees may have to be trimmed/removed.	Low - Moderate
<b>Oak Scrub</b>	Occasional thinning if fuel loads are excessive within the ROW.	Low - Moderate

Land Cover	Expected Vegetation Management Actions	Typical Frequency
<b>Forest</b>	Remove danger trees that are within 15 feet of conductor. Thin vegetation if fuel load is excessive within the ROW.	Low - Moderate

Accumulations of vegetation debris from vegetation treatments may require mitigation to reduce risks from wildfire and enhance the fire survivability of the transmission facility. Line maintenance crews, in consultation with USFS, will identify the appropriate measures to manage fuel build up within the ROW. The following measures will be implemented to reduce wildfire risks:

- All salvageable saw timber from trees 8 inches diameter at breast height (DBH) and larger and products other than logs (POL - trees 5 to 8 inches DBH) within the ROW area would be available for sale to the public where practicable. A determination of public availability of wood products will be made in consultation with USFS.
- Where material remains within the ROW area, slash and boles would be mulched where possible, and otherwise would be scattered. At no point would scattered slash height exceed 18 inches above ground.
- Boles would be made to lie in contact with the ground to aid decomposition, if they are not mulched.
- Any chipped material should not exceed an average depth of 2 inches and a maximum depth of 6 inches.

Adequate access to each structure along the ROW is also essential to provide for efficient, cost-effective vegetation treatment activities. All Fire Prevention requirements included in Section V of the USFS Design Standards and Conditions (Appendix B) will be adhered to during operation and maintenance activities.

Achieving the desired vegetative condition on the ROW is a process that may take several iterations over an extended period of time. However, once defined, the desired condition serves as the guide for future vegetation management actions. All subsequent vegetation treatment activities would maintain/preserve the desired condition. Annual aerial or ground patrols will be conducted to locate areas where vegetation management on access routes and the ROW is of priority. The trees in each product class (POL and saw timber) in each vegetation management area will be counted at the time of the ground inspection.

An intensive vegetation management treatment to remove danger trees occurred in 2005 within segments of the transmission ROW. The line maintenance crews have completed work up to the vicinity of Structure 130 during maintenance activities from 2006 through 2009. Since that time, line maintenance crews have been completing vegetation management activities on the ROW as described above.

Tri-State proposes to use manual and mechanical methods to trim and remove vegetation from the ROW and create vegetation communities compatible with long-term maintenance and operation of the transmission line. These methods may include the use of hydro-axe, fellers, chippers, skidders, etc. Biological controls and herbicide controls would only be used with USFS approval. In areas designated as helicopter only access, Tri-State will continue to perform routine maintenance and vegetation

management on-foot to treat vegetation. All vegetation management activities will be completed in compliance with USFS timber/vegetation management design criteria and Watershed Conservation Practices Handbook guidelines, included in the USFS Design Standards and Conditions (Appendix B).

Each year in early summer, the USFS will be notified of the areas that have been identified for treatment and the approximate number of trees per product class in each area. The maintenance crews will then perform the maintenance activities in dry conditions in the late summer or early fall. EPM 8 in Section 2.4 includes vegetation clearing procedures that will be followed during vegetation maintenance activities. As practicable, all or most of the wood material that is of suitable condition for firewood will be removed from the line by individuals with USFS firewood permits or through the USFS small timber sale program. Tri-State will only remove vegetation from the ROW when the downed material poses a health and safety concern, limits access to the ROW and associated access roads, and if the fuel buildup exceeds 18 inches.

Tri-State will be responsible for vegetation management within the ROW guided by FERC/NERC standards. In areas adjacent to the ROW, Tri-State will cooperate with landowners and land management agencies to mitigate risks from hazardous fuels accumulation within the ROW, noxious weeds, and wildfire events as specified in the TVMP. Opportunities exist for future partnerships between Tri-State and the USFS to provide for fuels management and fire breaks. This COMP only addresses Tri-State's vegetation management requirements outlined under NERC. Future opportunities for cooperative fuels and wildfire management projects off the ROW would be addressed on a project by project basis and in coordination with the USFS.

Noxious weed management within the ROW area and access routes will be completed by the USFS under a management agreement covering all Tri State transmission lines on San Juan National Forest lands.

## **2.3 Access Route Improvements**

### **2.3.1 Existing Conditions, Access Improvement Levels, and Final Road Standards**

The following section describes the current condition of the transmission line ROW access routes and the proposed activities to improve access routes to allow for ongoing operation and maintenance. The proposed condition for all access would be a combination of Forest Service Maintenance Level 1, 2, and 3 Roads (dry condition use only) and Temporary Roads as described in the USFS Design Standards and Conditions for the project (Appendix B). Road engineers and USFS hydrology, forestry, cultural, and biological resource specialists evaluated the current condition and general location of all access routes. The proposed access routes were chosen to minimize impacts to resources while allowing access by the design vehicle in dry conditions. Tri-State's proposed Improvement Levels describe the level of construction activities that would be required to achieve the appropriate USFS Design Specification for all access routes.

The existing condition of the access varies widely from gravel county roads, open and closed USFS System Roads, and overland travel routes, to areas where only foot travel or helicopter use is currently appropriate and allowed. Some access routes have deteriorated from lack of use. Portions of the access to the transmission line, where it crosses USFS land, are along public county roads. Some of the access routes are private subdivision roads that are owned and maintained by homeowners associations, while



some are part of the USFS system of transportation management but are closed, by gate or earthen berm, to public use.

When the line was originally constructed in 1978, the USFS allowed the construction of three temporary roads. These roads were eliminated after construction was completed. All of the remaining access that was built when the line was constructed exists today, but has not been maintained, and improvements (re-construction and or maintenance) are necessary in many locations. Additional roads have been created over the past 22 years by other entities that were not associated with the original construction of the transmission line. These roads include gravel roads and several well pads to provide access to gas wells under separate USFS SUP for gas development. It is Tri-State's goal to re-establish access routes for long-term access to the transmission line.

All access was inspected during vegetative management activities in 2005 and additional field surveys were conducted during the COMP development in 2006, 2007 and 2010. The locations of all structures and access routes have been digitized. Structure locations and structure numbers are indicated on the maps in Appendix C. Many access route spurs on public lands are generally located within the 100-foot the ROW. However, some access route segments deviate from the transmission line ROW because of terrain (canyon crossings, steep hillsides, rock cliffs, etc.).

To the greatest extent feasible, Tri-State's goal is to establish access for the design vehicle (bucket truck-shown in Figure 4) to every transmission structure on US Forest Service lands. Twenty-nine (29) of the structures on USFS land would be accessible on foot or by helicopter only. These structures are identified on the COMP maps (structures 125,151, 153 to 167, 181 to 185, 191 to 195, 229, and 230 – see Map Sheets 11, 15, 16, 17, 18 and 22). Twenty-seven of these structures were originally constructed utilizing helicopter access only and will remain accessible only by foot or helicopter for both routine maintenance and emergency repair. Access to structure 125 and 151 are designated as helicopter or pedestrian access only.

Tri-State evaluated access to each structure and assigned an Improvement Level that specifies the amount of clearing and grading work required to enable the design vehicle to reach each structure. The design vehicle's high center of gravity requires the access routes to be nearly level (maximum 5% lateral grade) for safe passage. The desired future access road condition will allow the design vehicle to safely negotiate access to the transmission line ROW and structures in dry conditions. Access to all structures has been classified with an Improvement Level. These Improvement Levels have been applied to overland travel routes as well as existing road profiles. The activities needed under the Improvement Levels range from no treatment and minor vegetative trimming, to full road profile construction with more than 5 feet of cut and fill. Access route improvement would occur after issuance of the new SUP. The majority of construction would occur in two seasons, currently scheduled for summer/fall 2011 and summer/fall 2012. Construction activities for construction of complex and or sensitive access areas would be completed on an as needed basis.

The COMP maps (Appendix C) indicate where and to what degree access routes need to be improved. The degree of improvement needed to bring access to the desired future condition is documented according to seven (7) Improvement Levels. Tri-State's improvement classifications are defined as follows:

- **Existing Roads** – Well pad roads, improved native-surface and gravel-surface, and open USFS Classified System Roads that require no additional improvements for Tri-State access purposes. This COMP does not include any long-term maintenance activities for open USFS Classified Roads or county roads.
- **Improvement Level 1** – No clearing or grading is required, equipment can gain access with no improvement. This does not include existing (USFS classified, county, or private) road profiles, but refers to travel routes or overland travel on surfaces with <5% lateral grade and running surface slope less than 12%. Currently, the design vehicle can safely traverse the access in dry conditions and no improvement is necessary.
- **Improvement Level 2** – Access where no grading is required but where vegetation (sagebrush, oakbrush, saplings up to 2 inches in diameter, etc.) must be cleared to create a minimum 12-foot width for access by design vehicle. This includes closed USFS System Roads (USFS Maintenance Level 1 roads) and overland access routes that have vegetative encroachment.
- **Improvement Level 3** – Access where minor grading (generally less than 1 foot of cut or fill) is required. Includes clearing of vegetation (sagebrush, oak brush), cutting trees less than 8 inches diameter (non-merchantable ponderosa pine, Douglas fir, small piñon pine, and juniper), and the grading of rocky or rutted surfaces to create the minimum width for access by design vehicle. This may include closed USFS System Roads, other existing road profiles and existing overland travel routes that require minor grading and clearing.
- **Improvement Level 4** – Access improvements where moderate grading (generally 1 to 3 feet of cut or fill) is required. Includes clearing of vegetation (sagebrush, oak brush, etc.) and large trees greater than 8 inches diameter such as ponderosa pine, Douglas fir, etc. May require cut and fill slopes, drainage ditches, and sedimentation and erosion control measures. All drainage ditches and erosion control features would be constructed and installed at appropriate intervals per USFS specifications (Appendix B).
- **Improvement Level 5** – Access improvements where significant grading (generally 3 to 6 feet of cut or fill) is required. Includes clearing of vegetation (sagebrush, oak brush, etc.) and large trees greater than 8 inches diameter such as ponderosa pine, Douglas fir, etc. May require cut and fill slopes, drainages ditches, and sedimentation and erosion control measures. All drainage ditches and erosion control features would be constructed and installed at appropriate intervals per USFS specifications.
- **Improvement Level 6** - Armored low water crossings. Crossing will be constructed by grading and adding material as appropriate. No culverts will be placed in drainage channel. Any excavated bank material will be graded away from the crossing. Fill material, such as large river rock, will be added to stabilize bank slopes and crossing bottoms, as illustrated on a typical drawing and approved by the USFS.
- **Improvement Level 7** – Permanent Culvert Installation. Crossing is constructed by placing a culvert in the drainage and adding fill material, such as large river rock or rip-rap, to stabilize and firm stream bed, bank, and inlet. A catch basin or energy dissipation device may also be built per the project engineering analysis (design, size, and construction specifications). Culvert sizing will

include calculation of drainage area and peak flow analysis. Design and construction plans will be approved by the USFS prior to construction.

The access Improvement Level classifications are summarized by miles, acres, and ROW width in Tables 4, 5, and 6. The lengths of access routes and ROW areas are summarized for activities within the Transmission Line ROW area (Table 4), outside of the Transmission Line ROW area (Table 5) and for both within and outside the Transmission Line ROW (Table 6). Typical ROW access conditions and requirements for Improvement Levels 1 through 7 are illustrated in Figures 6 through 12. Access route improvements will be made in accordance with Tri-State Maintenance Improvement Levels to meet the USFS's Design Standards and Conditions (Appendix B).

The current status of USFS classified roads are displayed on the COMP Maps as either "Open" (USFS Levels 2, 3, 4, and 5) or "Closed" (USFS Level 1). The USFS Road levels are assigned based on the level of use and management objective. Table 7 provides a correlation between Tri-State Improvement Levels to current and future (proposed in this COMP) USFS road classifications. These standards are specific; however, roads will be designed in all cases to minimize resource damage and to a standard that is appropriate given the site-specific conditions and based on consultation with the USFS. The proposed access routes and transmission line ROW are located within the boundaries of the Beaver Meadows - Sauls Creek Landscape Travel Management area and the Pagosa District Travel Management area. The travel management plans for these areas designate vehicle travel routes and specify the types of vehicles that can travel on each route. Motorized travel outside of designated travel routes is closed to the public, but is allowed for permitted activities such as Special Use. Each short spur that directly accesses transmission line structures, beyond the established transportation system, was separately evaluated as to the current and desired future USFS Maintenance Level classification.

**Table 4. Summary of Tri-State Access Routes within Transmission Line ROW area by Improvement Level**

Tri-State's Improvement Level	Miles	Acres	Access Route ROW Width	Temporary Use Area Width/Acres	Number of Drainage Crossings
Existing Roads	1.29	N/A	N/A		
1	2.42	8.78	30		-
2	2.67	9.73	30		-
3	1.94	7.05	30		-
4	0.56	2.04	30	20/1.36	-
5	0.23	0.83	30	20/0.55	-
6	-	-	-		6
7	-	-	-		
<b>TOTAL USFS (without existing roads):</b>	<b>7.82</b>	<b>28.43</b>		<b>1.91</b>	<b>6</b>

**Table 5. Summary of Tri-State Access Routes Outside Transmission Line ROW Area by Improvement Level**

Tri-State's Improvement Level	Miles	Acres	Access Route ROW Width	Temporary Use Area Width/Acres	Number of Drainage Crossings
Existing Roads	34.68	N/A	N/A		
1	4.81	16.82	30		-
2	2.91	10.59	30		-
3	3.66	12.67	30		-
4	0.55	3.35	30	20/1.34	-
5	0.46	1.57	30	20/1.11	-
6	-	-	-		16
7	-	-	-		1
TOTAL USFS (without existing roads):	12.39	45.00		2.45 acres	17

**Table 6. Summary of Tri-State Access Routes, Both Inside and Outside Transmission Line ROW Area by Improvement Level**

Tri-State's Improvement Level	Miles	Acres	Access Route ROW Width	Temporary Use Area Width/Acres	Number of Drainage Crossings
Existing Roads	36	N/A	N/A		
1	7.22	26.27	30		-
2	5.59	20.32	30		-
3	5.60	20.35	30		-
4	1.12	4.06	30	20/2.71	-
5	0.69	2.49	30	20/1.66	-
6	-	-	-		22
7	-	-	-		1
TOTAL USFS (without existing roads):	20.22	73.49		4.37 acres	23

Tri State Improvement Level 4 and 5 access routes would require a 20 foot wide Temporary Use Area (TUA) to allow for construction and interim reclamation activities. Once final stabilization has been achieved per the project Storm Water Management Plan, all ground surface disturbing activities have been completed, and uniform vegetative cover has been established with a plant density of at least 70% of pre-disturbance levels, the temporary use will be complete.

**Table 7. Correlation of Tri-State Improvement Levels to USFS Classification Current and Future Conditions**

<b>USFS Classification Current/Future</b>	<b>Tri-State Improvement Classification</b>
FSR/FSR	Existing Access Roads
NVA/Temp A.	Improvement Level 1
NVA/Temp B.	Improvement level 2
NVA/FSR Level 1 (Dry)	Improvement Levels 3, 4, 5, 6 and 7

The table abbreviations are as follows:

**Current USFS Condition**

NVA No vehicular access  
FSR Classified Forest System Road

**Proposed Future USFS Condition**

TEMP A Overland Travel Route (non-system road)  
TEMP B Constructed Roadway (non-system road)  
LEVEL 1 D Improved to USFS Level 1 Road – dry condition (system road)

Tri-State will construct, improve, and/or maintain access at the USFS Level 1 (dry condition use) standard (see Appendix B) for all access routes that require cut and fill for construction (Tri-State Improvement Levels 3, 4, 5, 6, and 7). Prior to implementing access route improvements for Improvement Levels 3, 4, and 5, Tri-State will coordinate with USFS engineers in accordance with the USFS design standard. All access constructed to USFS Maintenance Level 1 standards will be permitted for Special Use for the duration of the permit term.

The proposed access routes and Tri State's Improvement Levels are shown on the COMP maps (Appendix C). The following access routes will be constructed on an as needed basis: 67, 72, 73, 97, 98, 131, 132, 133, 134, 152, 222, and 223. The access routes to structures 97 and 235 – 237 will be designed and constructed following recommendations in the geotechnical review (Sundale 2011). As shown on the COMP maps, access to structure 168 will be improvement level 1 (overland travel) utilizing ATV only. The proposed routes will be permitted and approved as part of this re-authorization, but the roads will be constructed on an as needed basis. Tri-State generally conducts annual inspections using existing and overland access on ATVs. The Forest Service Special Use Permit would authorize this continued use. Once the access routes are constructed, they will be maintained as the USFS Level 1 (dry condition use) standard (see Appendix B).

Gates or other closure device (boulders, fences, and/or signs) may be required in some areas to keep the public from utilizing Tri-State access roads. Gate/closure type and location will be determined in consultation with USFS staff. Typical USFS type gate construction will be utilized where gates are



installed. Standard gate design is provided in the USFS Design Standards and Conditions (Appendix B). Installed signs will be standard USFS design (see Appendix B) with specific wording provided by USFS; posts will be installed per the USFS design specification (Appendix B). For Tri State Improvement Level 1 access routes (overland travel) carsonite signs with approved language from USFS may be placed at the departure point of the access route from the existing FSR, as needed.

For Tri-State Improvement Level 1 (no clearing or grading required), the design standards for Temporary Roads A – Overland Travel Route will be met. For Tri-State Improvement Level 2 (vegetation clearing only), the design standards for Temporary Roads B – Constructed Roadways will be met. If soil disturbance occurs on Temporary Roads A or B access routes, areas of disturbance would be reclaimed per the interim reclamation standard (see Section 2.4, EPM 25). No gates will be installed for Improvement Level 1 and 2 access routes, except as shown on the COMP maps (Appendix C). If necessary, access to these routes will be controlled using boulders (if available at each site), signs, and/or other types of barriers. All temporary and permanent roads will be obliterated after the transmission line is taken out of operation.

An analysis of the slope of existing terrain traversed by the proposed access routes was completed with available Geographic Information System (GIS) data. The slopes were derived from USGS 10 meter Digital Elevation Models (DEMs). ArcGIS 3D Analyst was used to convert the DEM to a grid of slope estimates with 10 meter same spacing. This grid was then reclassified into areas with slopes less than 10%, between 10% and 20%, and greater than 20%. The grid was then converted to polygons and the polygons were intersected with the Improvement Level layer. Based on the analysis, approximately 2.7 miles of Improvement Level 3, 4, and 5 access routes would occur on slopes greater than 20%. For these sections of access route, engineering design will be completed and approved by the USFS.

A level area is also required near each transmission line structure in order to stabilize a bucket truck with outriggers if maintenance or repair is necessary on the line or associated structures. In many locations, the level area is the access route itself. However, for structures in difficult terrain, a level pad (approximately 100 feet by 100 feet) is typically constructed using either a track-hoe or bulldozer. Pad construction locations will be identified in coordination with the USFS prior to maintenance requiring a level pad site. Pad sites will be reseeded to re-establish vegetation per the interim reclamation standard (see Section 2.4, EPM 25) upon completion of transmission maintenance.



**Figure 6. Improvement Level 1 Access Route Condition**

**Tri-State's Improvement Level 1 (USFS Temp A and existing roads)** – Overland or existing access. No clearing or grading is required. No improvement required; road/trail is currently in satisfactory condition and presents no access problems for Tri-State maintenance equipment. On USFS land, approximately 7.22 miles of access routes fall into this category. A 30-foot wide ROW is being requested for Improvement Level 1 access routes.





**Figure 7. Improvement Level 2 Access Route Condition**

**Improvement Level 2 (USFS Temp B)** – Access where no grading is required but where vegetation (sagebrush, oak brush, saplings up to 2 inches in diameter, etc.) must be cleared to create a minimum 12-foot width for access by the design vehicle. This includes closed USFS System Roads and overland access routes that have vegetative encroachment. On USFS land, approximately 5.59 miles fall into this category. A 30-foot wide ROW is being requested for Improvement Level 2 access routes.



**Figure 8. Improvement Level 3 Access Route Condition**

**Improvement Level 3 (USFS Level 1 Dry)** – Access where minor grading (generally less than 1 foot of cut or fill) is required. Includes clearing of vegetation (sagebrush, oak brush) cutting trees less than 8 inches in diameter (non-merchantable ponderosa pine, Douglas fir, small piñon pines, and junipers), and the grading of rocky or rutted surfaces to create minimum width for access by the design vehicle. This may include closed USFS System Roads, other existing road profiles, and existing overland travel routes that require minor grading and clearing. On USFS land, approximately 5.60 miles of total access fall into this category. A 30-foot wide ROW is being requested for Improvement Level 3 access routes.





**Figure 9. Improvement Level 4 Access Route Condition**

**Improvement Level 4 (USFS Level 1 Dry)** – Access improvements where moderate grading (generally 1 to 3 feet of cut or fill) is required. Includes clearing of vegetation (sagebrush, oak brush, etc.) and large trees greater than 8 inches in diameter such as ponderosa pine, Douglas fir, etc. May require cut and fill slopes, drainage ditches, and sedimentation and erosion control measures. All drainage ditches and erosion control features would be constructed and installed at appropriate intervals per USFS specifications (Appendix B). On USFS land, approximately 1.12 miles of total access fall into this category. A 30-foot wide ROW, with a 20 foot wide Temporary Use Area is being requested for Improvement Level 4 access routes.





**Figure 10. Improvement Level 5 Access Route Condition**

**Improvement Level 5 (USFS Level 1 Dry)** – Access improvements where significant grading (generally 3 to 6 feet of cut or fill) is required. Includes clearing of vegetation (sagebrush, oak brush, etc.) and large trees greater than 8 inches diameter such as ponderosa pine, Douglas fir, etc. May require cut and fill slopes, drainage ditches, and sedimentation and erosion control measures. All drainage ditches and erosion control features would be constructed and installed at appropriate intervals per USFS specifications (Appendix B). On USFS land, approximately 0.69 miles of total access falls into this category. A 30-foot wide ROW with a 20 foot wide Temporary Use Area is being requested for Improvement Level 5 access routes.



**Figure 11. Improvement Level 6 Access Route Condition**

**Improvement Level 6 (USFS Level 1 Dry)** – Armored low water crossings. Crossing will be constructed by grading and adding material as appropriate. No culverts will be placed in drainage channel. Any excavated bank material will be graded away from the crossing. Fill material, such as large river rock, will be added to stabilize bank slopes and crossing bottoms, as illustrated on a typical drawing, and approved by the USFS. On USFS land, there are 22 Improvement Level 6 drainage crossings.





**Figure 12. Improvement Level 7 Access Route Condition**

**Improvement Level 7 (USFS Level 1 Dry) – Permanent Culvert Installation.** Crossing is constructed by placing a culvert in a drainage and adding fill material, such as large river rock or rip-rap, to stabilize and firm stream bed, bank, and inlet. A catch basin or energy dissipation device may also be built per the project engineering analysis (design, size, and construction specifications). Culvert sizing will include calculation of drainage area and peak flow analysis. Design and construction plans will be approved by the USFS prior to construction. On USFS land, there is one (1) Improvement Level 7 drainage crossing.

### **2.3.2 Access Route Maintenance Requirements**

After the access routes are established and/or improved, they would require minimal ongoing maintenance to allow the safe passage of equipment and personnel. It is expected that the majority of maintenance would focus on vegetation clearing to make room for the inspection vehicles. Vegetation bordering access routes will be typically trimmed as needed to allow unimpeded passage of trucks and equipment. Such trimming is usually accomplished utilizing hand held equipment. The timing of vegetation management is described in Section 2.2 above. Trimming or removal of vegetation is anticipated during routine maintenance of access routes, based on the character of the terrain and vegetation crossed by the transmission line. All maintenance activities will be completed in compliance

with the USFS Design Standards and Conditions for the transmission line (Appendix B). Tri-State will not be responsible or liable for regular maintenance activities on existing open FSR. Tri State will coordinate with USFS staff to reclaim or repair any damages that may occur on open FSR from future maintenance activities. The level of future reclamation required will be commensurate with use.

Culvert installation will be required at one (1) location, on Tri-State's proposed access routes. After installation, culvert function will be inspected annually and maintained as needed.

Maintenance of access is needed for four reasons: annual inspections, planned transmission line maintenance, vegetation management activities, and in response to emergency electrical outages. Emergency outages may be caused by lightning strikes, high winds, heavy snow and ice, vandalism, or equipment failure. Current access is marginally adequate for annual inspection and needs substantial improvement for planned transmission line maintenance and emergency electrical outages. The type of emergency, location, weather, or season will define the equipment required to restore service. Emergency response equipment can be different from inspection and maintenance equipment. For example, emergency access in the winter may require access to the project area using a track hoe to minimize resource damage but scheduled maintenance will not. The USFS will be notified and the minimum level of additional access improvements (such as use of a track hoe) will be made to accommodate the necessary emergency response equipment. All temporary access improvements or snow removal will be completed in compliance with the USFS Design Standards and Conditions (Appendix B). Interim reclamation and emergency access procedures are described further below.

### **Interim Reclamation of Access Routes**

The road prism for access routes will be maintained to allow for design vehicle travel. The areas of disturbance created by access route improvements for levels 3, 4, 5, 6, and 7 and any other temporary surface disturbances (such as temporary construction areas) will undergo interim reclamation by Tri-State as soon as possible after construction and regular maintenance activities are completed. These activities are described as "interim reclamation" measures, as they occur as part of the transmission line operation. Activities that will be completed as part of "interim reclamation" are described in Section 2.4, EPM 25. "Final reclamation" will be performed when the transmission line is no longer in service and/or removed from USFS property. Specific requirements for final reclamation are not addressed in detail in this COMP, as Tri-State has no plans to remove the transmission facilities from service. If the line is taken out of service and removed from USFS lands in the future, Tri-State will develop a detailed final reclamation plan for the ROW in accordance with the USFS requirements in place at that time.

Interim reclamation activities would be completed to stabilize the ROW and associated access while allowing long-term maintenance of the transmission line. In appropriate areas, cleared topsoil material will be segregated and spread on top of the disturbed area following completion of construction activities—providing a source of natural seeds. Disturbed areas will be reseeded utilizing a USFS specified seed mixture. Seeds will be applied according to the project revegetation plan and will be certified weed free. If drill seeding is not feasible due to terrain or other constraints, seed will be hand broadcast and raked in. For hand broadcasting, the seed rate will be doubled. Certified weed free straw mulch will also be spread over the disturbed area and crimped in as topography allows. Interim reclamation will be performed as soon as possible after ground disturbing and other maintenance activities are completed.

Monitoring for noxious and invasive species is currently conducted by USFS staff under a management agreement covering all Tri State transmission lines on San Juan National Forest lands. Appropriate mitigation and treatment are completed by USFS Rangeland Management Program staff on an annual basis. Records of all monitoring and treatment activities are maintained by USFS staff.

Interim reclamation activities will be deemed complete when vegetation within the disturbed areas recovers to at least 70% of the pre-existing condition. Areas of disturbance will be reseeded following the above-described procedures if vegetation is not adequately established within two years of initial seeding activities.

### **Maintenance Schedule and Emergency Access**

All regular maintenance and inspection activities on USFS lands will take place between May 1 and November 30. Vegetation management for both access routes and the transmission line ROW will also occur between May 1 and November 30, with the exception of emergency activities (danger trees). All regular scheduled maintenance, inspections, and vegetation management activities will be completed in dry ground conditions. All seasonal restrictions and protection buffers for threatened, endangered, or special status species described in Table 8, EPM 14, will be complied with for construction and maintenance activities. No motorized access outside these dates will occur, and access to USFS lands will be prohibited during winter closure, except in the case of emergencies. Snow plowing is not a part of routine maintenance; however, snow plowing may be required during winter emergencies.

USFS Level 1 (dry condition use) access routes will be re-graded periodically if necessary to retain the road prism. Re-grading of access routes will also be required if the movement of maintenance equipment and vehicles create ruts deeper than four inches over a 10-foot distance. Interim reclamation of all access routes and ROW areas disturbed by maintenance activities and equipment will take place as soon as possible after the activities are completed. All road maintenance activities will be completed in accordance with the USFS Design Standards and Conditions (Appendix B).

In the event of an electrical outage or other significant transmission line damage, emergency access may be necessary and will be allowed during any time of the year. In an emergency, Tri-State will notify the USFS as soon as possible once it is determined that access to the transmission line ROW area on USFS land is required. Any details about the type and schedule of activities that will be required to remedy the outage or transmission line damage will be provided to the USFS as soon as possible. Depending on access route conditions, a bulldozer may be utilized to pull a bucket truck or other equipment to an emergency repair area.

Tri-State will meet with USFS on site after the emergency in order to determine the rehabilitation required and to establish a rehabilitation work schedule. The purpose of the COMP is to identify acceptable access routes for emergency access at all times of the year. It is assumed that Tri-State will utilize the access permitted under this COMP. If for some unforeseen circumstance, access is required outside of the permitted access ROW, these roads would be temporary in nature and will be decommissioned per the USFS Design Standards and Conditions (Appendix B).



### 2.3.3 Access Route ROW Widths

The width of access route travel surfaces on public lands will be 12 to 14 feet wide, depending on slope and curve radius. On public lands, the ROW for access routes will be 30 feet wide for Tri-State Improvement Level 1, 2, and 3 access routes. For Tri-State Improvement Levels 4 and 5 access routes, the ROW will also be 30 feet wide with a 20 foot wide TUA to allow for construction and interim reclamation activities. All grading activities, side cast of materials, drainage structures, and other surface disturbance will be limited to the access route ROW. Where any access route is within the transmission line ROW, the width of the disturbed roadway area will continue to be 12 to 14 feet.

## 2.4 Environmental Protection Measures (EPMs)

Tri-State has adopted a number of EPMs that will be implemented as part of the COMP in order to ensure that access road improvement/construction and operation and maintenance of the existing 115kV transmission line and access routes are consistent with the objectives of USFS's approved Land Management Plans and approved travel management plans. These EPMs are listed in Table 8.

**Table 8. Environmental Protection Measures (EPMs)**

EPM No.	Description
1	<b>Authorized Activities:</b> All activities associated with the operation and maintenance of the Bayfield – Pagosa 115kV transmission line and access routes on Forest Service lands will take place within the authorized limits of the ROW Permit and approved access corridors.
2	<b>Training - ROW Permit:</b> Tri-State will inform their employees and contractors about activities permitted within the authorized ROW for the transmission line and access routes. As part of this measure, Tri-State will provide contractors and employees copies of these EPMs and COMP maps showing allowable activities and access route maintenance levels. A written record of the date and time of training activities for EPMs 2 and 3 and the companies and staff attending the training will be maintained in the Tri-State project file.
3	<b>Training - Regulatory:</b> Tri-State and its contractors will inform their employees about relevant federal and state regulations intended to protect cultural resources and special status biological resources. Training will include an explanation of the need to avoid known resource sites, confidentiality of known resource site locations, the requirement to cease work when previously undiscovered cultural resource items are encountered, the possibility of prosecution for removal of such items and/or damage to archaeological sites, the need to avoid harassing or disturbing wildlife, and prevention of destruction of active bird nests of any kind. If biological issues arise during maintenance activities, a qualified biologist would be contacted to assist in resolution of the issue. Regulatory training will also include training on applicable Storm Water Management Plan (SWMP) requirements and any Army Corps of Engineers permit requirements (e.g., Nationwide Permit Conditions - as applicable).
4	<b>Storm Water Management Plan:</b> A SWMP shall be developed to address erosion control for all applicable ground-disturbing activities. The plan shall conform to Best Management Practices and requirements of EPA and CDPHE. A copy of the SWMP will be provided to the authorized officer.
5	<b>Access Route Improvements:</b> All access routes will be improved according to the COMP and as agreed to by USFS.
6	<b>Access Route Maintenance:</b> All access routes will be maintained to provide a stable, well-drained travel surface. Tri-State will maintain proper drainage and prevent erosion on access roads by installing water bars, creating and cleaning bar ditches, and blading as necessary, per USFS specifications (Appendix B).



EPM No.	Description
7	<p><b>Transmission Line and Access Route Maintenance - Scheduling:</b> Routine transmission line and access road maintenance will occur during the period of May 1 to November 30. No construction or routine maintenance activities will be performed during periods when the soil is too wet to adequately support construction equipment. If such equipment creates ruts greater than 4-inches deep for a length greater than 10 feet, the soil shall be deemed too wet to adequately support construction equipment. If emergency line maintenance is required during the winter or spring months, care will be taken to minimize erosion and sedimentation (see EPM 10 below).</p>
8	<p><b>Transmission Line and Access Route Maintenance - Soil and Vegetation Disturbance:</b> Only the minimum amount of soil and vegetation necessary for the construction, reconstruction, and maintenance of the access routes and the transmission line will be disturbed. Where possible, topsoil will be segregated from sub-soils and returned to cover disturbed areas to facilitate re-growth of vegetation. Vegetation will only be cleared from those areas necessary to obtain adequate working width and turning radius space for maintenance equipment. The following procedures will be followed in clearing vegetation: (1) encroaching vegetation will be cut off at the base by either a mower (hydro-ax) or chainsaw, (2) trees will not be felled in such a way as to obstruct ditches, culverts or stream courses, (3) tree tops, limbs, and slash will be lopped and scattered to a depth of 18 inches, (4) main wood stems and tree boles will lie in contact with the ground to retain moisture, speed decay, and interrupt the overland flow of sediment. Bladed materials will be kept in the road driving surface with no side casting. Road cuts will be stabilized and reseeded as described in the USFS Design Standards and Conditions (Appendix B). Interim reclamation will be completed as described in EPM 25. Reclamation success will be monitored in conjunction with the project SWMP inspections. Reclamation success and SWMP monitoring status will be reported to the USFS as part of the annual project meeting. The proposed access routes will not be re-graded to natural contour since long-term access is required by Tri-State.</p>
9	<p><b>Access Route Maintenance - Water Bars:</b> Water bars required for proper drainage on access routes will be constructed and maintained per design standards and the drainage spacing table included in the USFS Design Standards and Conditions (Appendix B). Water bars are to be constructed to: (1) simulate the imaginary contour lines of the slope (ideally with a grade of 1 to 2%), (2) drain away from the disturbed area, and (3) begin and end in vegetation or rock whenever possible. Many of the water bars that were established during the initial construction of the transmission line are still in place. These water bars will be rehabilitated and/or maintained as needed.</p>
10	<p><b>Emergency Maintenance/Access:</b> Emergency access will be allowed during any time of the year. In the event of an emergency, Tri-State will notify the USFS as soon as possible.</p> <p>If emergency access to the transmission line is required during wet weather, if pole replacement or other emergency maintenance activities result in ground disturbance, or if substantial vehicle impacts occur to existing native vegetation, reclamation of disturbed areas will be completed as described in EPM 25. If emergency access to the transmission line is required during wet weather, if pole replacement or other emergency maintenance activities result in ground disturbance, or if substantial vehicle impacts occur to cultural resources, a mitigation plan will be agreed upon and implemented. Other emergency activities and associated mitigation may involve the temporary installation of culverts and the use of flow diversion structures and sediment traps (e.g., straw bale dikes, sediment filter fabric, etc.) below maintenance areas to trap sediment.</p> <p>Surface reclamation and revegetation of disturbed areas will be completed as soon as possible (after approval by the USFS) after any emergency maintenance that results in soil and vegetation disturbances along the access route or transmission line ROW. Reclamation will be completed as described in EPM 25.</p>
11	<p><b>Public Access:</b> Tri-State will make their access routes comply with public access rules and regulations in the surrounding area, as established by the Forest Service. Where public motorized use is not allowed, Tri-State will implement physical barriers to restrict public motorized uses on their access routes. Tri-State will not restrict public non-motorized access where it is otherwise allowed by Forest Service rules and regulations. In</p>

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	cases of emergency, if disturbance is required to permitted access roads or areas not outlined in this COMP and the level of access is outside of the designated road standards included in this COMP, the area would be blocked to motorized public access, and upon completion of construction, operation and maintenance activities, the roads and surrounding areas would be decommissioned per USFS Design Standards and Conditions (Appendix B).
12	<b>Cultural Resources - Protection of Known Sites:</b> In areas of sensitive cultural resources, a qualified archaeologist will, as appropriate, mark, flag, stake, or fence cultural sites prior to access route improvements and prior to any future surface disturbance activities (e.g., installation of new poles, pole replacements, etc.). The sites will be marked/flagged for avoidance immediately before maintenance/construction activities and the marking/flagging will be removed immediately after interim reclamation is completed. Construction and maintenance personnel will be trained to recognize the markers and understand the equipment movement restrictions involved. The fencing will be removed immediately after maintenance/improvement activities are completed. Site-specific cultural resource mitigation measures are provided in the SUP. Site-specific mitigation measures are described in Appendix D - Confidential.
13	<b>Cultural Resources - Inadvertent Discovery:</b> If any cultural resources are inadvertently unearthed or otherwise encountered during maintenance activities, work will cease in the area of the discovery until the resources can be identified and appropriate resource protection measures can be implemented. Tri-State will notify USFS officials.  Pursuant to 43 CFR 10.4(g), Tri-State must notify the authorized officer, by telephone, with written confirmation, immediately upon the discovery of human remains, funerary items, sacred objects, or objects of cultural patrimony. Further, pursuant to 43 CFR 10.4(c) and (d), Tri-State must stop activities in the vicinity of the discovery and protect it for 30 days or more or until notified to proceed by the authorized officer. Any inadvertent discovery will be kept confidential.
14	<b>Wildlife Resources – Seasonal Restrictions and Protection Buffers:</b> * Routine access route maintenance, annual inspections and routine transmission line maintenance will comply with the following recommended seasonal restrictions and protection buffers established by the Colorado Division of Wildlife and through consultation with the USFS whenever any of these species are found within 0.5 to 1 mile of the transmission ROW and associated access roads. Distances for disturbance buffers may be less based on local conditions such as visual screening, and exposure to previous disturbance. <ul style="list-style-type: none"><li>▪ Active golden eagle nests: No human encroachment within 0.5-mile radius of active nests from December 15 through July 15 (CDOW 2008).</li><li>▪ Active bald eagle nests: No human encroachment within 0.5-mile radius of active nests from November 15 through July 15 (San Juan Public Lands – SJPLO et al. 2011).</li><li>▪ Active peregrine falcon nests: No human encroachment within 0.5-mile radius of active nests from March 15 through July 31 (CDOW 2008).</li><li>▪ Active red-tailed hawk nests: No human encroachment within 0.125- to 0.25-mile radius of active nests depending on topography and vegetation from March 1 through July 15 (SJPLO et al. 2011).</li><li>▪ <b>Active northern goshawk nests: No human encroachment within 0.5-mile radius from March 1 through August 31 (SJPLO et al. 2011).</b> If an active nest is found, some vegetation management (including thinning understory trees and shrubs in nest areas outside the breeding season) may occur within a 30-acre nest area around a known goshawk nest.</li><li>▪ Bald eagle winter roosts: No activity within 0.25-mile radius (indirect line of sight) or 0.5-mile (direct line of sight) of winter bald eagle communal roosts from November 15 through March 15. Activity may be permitted at other periods. If periodic inspections or other activities are required within the buffer zone during the winter use period, activity should be restricted to the hours of 10:00 am and 2:00 pm. (CDOW 2008, SJPLO et al. 2011).</li></ul>

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	<ul style="list-style-type: none"> <li>▪ Bald eagle hunting perch areas: No human encroachment – spatial buffer to be determined by the project biologist, no specified radius of hunting perches within important foraging areas (CDOW 2008, SJPLO et al. 2011).</li> <li>▪ Big game winter range: No routine project activity during big game winter use periods from December 1 through April 30.</li> <li>▪ Southwestern willow flycatcher potential habitat: No construction activities within 0.25-mile of potential habitat between May 1 and August 15.</li> </ul> <p>*The above restrictions do not apply to emergency maintenance or repair activities. If it is determined that emergency actions may affect threatened or endangered species, consultation with U.S. Fish and Wildlife Service (USFWS) may be required after emergency actions are completed.</p> <p>Transmission line operation and maintenance activities will conform with relevant Avian Power Line Interaction Committee suggested practices.</p>
15	<p><b>Air Emissions and Noise:</b> Tri-State will properly maintain its road and transmission line maintenance equipment to minimize emissions and noise. Project activities will only occur during daylight hours to avoid noise after sunset (unless there is an electrical outage).</p> <p>Dust will be controlled during access route improvements by watering disturbed surfaces. The USFWS will be notified and consulted if the water source for maintenance improvements would come from the San Juan River, which is a tributary to the Colorado River. Water depletions in the Upper Colorado River and San Juan River Basins may affect federally listed species and/or critical habitat in Colorado and in downstream reaches in other states.</p> <p>Post seeding mulch will be utilized during reclamation activities to help reduce wind erosion and blowing dust per the interim reclamation standard (EPM 25). The mulch/stabilization will be implemented as soon as possible after completion of project activities to minimize potential fugitive dust generation as revegetation occurs.</p>
16	<p><b>Excess Soil Excavation:</b> Excess soil excavated from the holes of any poles requiring replacement or from the holes for any new poles that are added in the future will be evenly spread on native surface access routes (not gravel surface roads) in the immediate vicinity of the pole structure.</p>
17	<p><b>Covers for Structure Foundation Holes:</b> For any structure replacement or new structures installed in the future, foundation holes left open overnight will be covered. Covers will be secured in place and will be strong enough to prevent livestock or wildlife from falling through and into a hole.</p>
18	<p><b>Damaged Fences and Gates:</b> If damaged, fences, gates, and brace panels will be reconstructed to appropriate USFS standards as determined by the authorized officer.</p>
19	<p><b>Herbicides:</b> Tri-State or their representative will only use herbicides in the ROW if approved in advance by the USFS. Herbicide use, if proposed, will be part of an overall weed management plan for the project area. Herbicide use will be performed by a permitted applicator.</p>
20	<p><b>Noxious Weeds:</b> Tri-State will be responsible for noxious weed prevention within the limits of the ROW and access routes used solely for transmission line access. The USFS is currently completing monitoring and treatment activities for noxious weed management on the transmission line route under an agreement with Tri State. Under the agreement, USFS, as a representative of Tri-State, is responsible for consultation with the authorized officer and/or local authorities for acceptable weed control methods and development of a monitoring and treatment regime if infestations are identified.</p> <p>The following noxious weed management Best Management Practices (BMPs) will be implemented during construction and maintenance activities. All heavy equipment utilized during construction will be cleaned</p>

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	<p>prior to departure from the equipment storage facility, or upon return to the work area, to minimize introduction of noxious weed seed sources to the project area. Washing of equipment prior to transport from one work site to another is not recommended. On-site washing of equipment increases the chance of weed seed dispersal by the drainage of water off site. Equipment should have accumulations of mud “knocked off” instead. This method promotes containment of weed seeds on the work site. All seed mixes and mulch used for reclamation activities will be certified weed free.</p> <p>Interim reclamation of disturbed areas will be completed as described in EPM 25 below. After interim reclamation activities have been completed, the area of disturbance will be monitored by USFS for revegetation compliance and noxious weed infestation.</p> <p>In order to prevent the spread of noxious weeds into the project area, Tri-State or their representative will annually monitor the ROW area and treat noxious weeds as appropriate while vegetation is being re-established. Once disturbed areas have reached 70% of pre-disturbance vegetation density (SWMP Final Stabilization), noxious weed monitoring will be deemed complete. If necessary, noxious weed monitoring and management after the conditions of the storm water permit have been fulfilled would be coordinated between Tri State and the USFS.</p>
21	<p><b>Hazardous Materials:</b> Tri-State shall comply with all applicable federal laws and regulations existing or hereafter enacted or promulgated regarding toxic substances or hazardous materials. In any event, Tri-State shall comply with the Toxic Substance Control Act of 1976, as amended (15 U.S.C. 2601, et seq.) with regard to any toxic substances that are used, generated by, or stored on the ROW or on facilities authorized under this ROW Permit (see 40 CFR, Part 702-799 and especially, provisions on polychlorinated biphenyls, 40 CFR 761.1-761.193.). Additionally, any release of toxic substances (leaks, spills, etc.) in excess of the reportable quantity established by 40 CFR, Part 117 shall be reported as required by the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, section 102b. A copy of any report required or requested by any federal agency or state government as a result of a reportable release or spill of any toxic substance shall be furnished to the authorized officer concurrent with the filing of the report to the involved federal agency or state government.</p>
22	<p><b>Trash:</b> No burning of trash, litter, trees, brush, or other vegetative material shall be allowed under this permit. Trash created by maintenance crews will be removed from the site on a daily basis and disposed in a permitted solid waste disposal facility.</p>
23	<p><b>Public Health and Safety:</b> Tri-State shall comply with applicable State standards for public health and safety, environmental protection, construction, operation, and maintenance if these State standards are more stringent than federal (Occupational Safety and Health Administration) standards for similar projects.</p>
24	<p><b>Fire:</b> Tri-State shall comply with the fire prevention measures included in Section V of the USFS Design Standards and Conditions (Appendix B).</p>
25	<p><b>Interim Reclamation:</b> The following interim reclamation activities will be completed on all ROW areas where ground disturbing activities occur:</p> <ul style="list-style-type: none"> <li>▪ Temporary impacts from road construction/improvement as well as road damage caused from routing or emergency maintenance activities (ruts, bull dozer tracks, etc.) will be restored and re-claimed. This would include damage to drainages and arroyo crossings. Segregated topsoil (if present) will be spread on the soil surface prior to seeding.</li> <li>▪ The final contour of the access route will be generally out-sloped or gently crowned if a roadside ditch is present. The overall road prism that allows travel of the design vehicle will be maintained.</li> <li>▪ Areas of disturbance will be ripped to depths greater than six inches. The ripping activities will be competed perpendicular to grade as much as possible.</li> <li>▪ Seeding with a USFS specified seed mixture will be completed with a seed drill where possible and by broadcasting and raking in areas where a seed drill cannot access. Where seed is hand broadcasted, seeding</li> </ul>

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	<p>rates would be doubled.</p> <ul style="list-style-type: none"> <li>▪ Site specific reclamation methods may be required for sensitive resource areas.</li> <li>▪ All reseeded areas will be mulched with certified weed-free straw. The straw will be crimped/tacked to ensure coverage and to improve soil porosity.</li> <li>▪ Erosion control BMPs will be maintained per specifications provided in the project specific SWMP (see EPM 4)</li> </ul> <p>Areas that will not have vehicle travel (cut and fill slopes, temporary construction areas, etc.) will have downed woody material (lop and scatter material) spread across the surface to discourage travel and encourage revegetation, if this type of material is readily available.</p>

### **3. REFERENCES**

Colorado Division of Wildlife (CDOW). 2008. Recommended Buffer Zones and Seasonal Restrictions for Colorado Raptors. Denver, Colorado.

San Juan Public Lands Office (SJPLO), USDI BLM and USDA Forest Service. 2011b. Draft Raptor Standards and Guidelines for the Forest Plan Revision.

Sundale Associates, Inc. 2011. Engineering Recommendations for Erosion Control for Tri State Bayfield-Pagosa Transmission Line Reauthorization Permit Process. Durango, CO.

North American Electric Reliability Corporation (NERC). 2008. Transmission Vegetation Management. NERC Standard FAC-003-2 Technical Reference. Vegetation Management Standard Drafting Team.



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**APPENDIX A: TRI-STATE TRANSMISSION VEGETATION MANAGEMENT PROGRAM**

## **APPENDIX B: USFS DESIGN STANDARDS AND CONDITIONS**



## **APPENDIX C: COMP MAP ATLAS SHEETS 1-29**



## **APPENDIX D: CONFIDENTIAL**

**Appendix D contains information regarding specific locations of cultural resource sites. Due to the confidentiality of this information, Appendix D cannot be included in the public document, and is available only to regulatory reviewers and users of this document.**

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