Pinyon Pine Treatment Specifications

Directive:
This sheet provides treatment specifications to contractors performing vegetation management activities, such as cutting, removing, chipping, or masticating, Pinyon Pine trees in forested areas where Pinyon Pine tree Ips Beetle and/or Blister Rust Fungus is known to infest the area.

Purpose:
Ips Beetle: Cut Pinyon Pine trees may attract Pinyon Ips Beetles to an area because Ips Beetles detect the tree's stress toxins (such as ethylene and/or terpenes) emitted after cutting. Due to the communication pathway through scents between the Ips Beetles and trees, previously uninfected forested areas may experience widespread beetle infections, after being cut, causing damage to forest ecosystems.

Blister Rust: Pinyon Pine tree parts and *Ribes* shrubs (gooseberry, other currant species) infected with Blister Rust Fungus can spread fungal spores to uninfected Pinyon trees and/or *Ribes* shrubs with wind and other mechanical disturbances. Controlling where pruned/cut tree and shrub pieces are deposited assists in decreasing the spread of the fungal disease to the broader forested area.

This specification sheet details steps needed to reduce the stress signaling sent from the cut trees to the migrating Ips Beetles and the spread of Blister Rust Fungal Spores, but only apply if the Pinyon Pine trees within and/or adjacent to the treatment zones are found to be infested with or showing evidence of Ips Beetle and/or Blister Rust damage.

Identification:
Ips Beetle: Evidence of Pinyon Pine Ips beetle includes accumulation of fine, reddish-brown boring dust in bark crevices, and/or an accumulation of dust at the bottom of the tree trunk, and small pitch (sap) tubules on the bark. Othe indicators of infestation are rapidly fading, yellowing, or reddish-brown needles first evident at the top of the tree. If you see fading needles, it often means the tree was attacked the previous year, so check the green trees near the fading tree for the pitch tubes and boring dust. The adult Ips Beetles are small, 1/8 to 3/8-inch long, reddish-brown to black cylindrical beetles, identified by a distinctively hollowed-out, spiney abdomen (rear end). They fly in early spring, as soon as daytime temperatures consistently reach 50°F to 60°F, with peak flight activity often occurring April through September [Pinyon Ips beetles can have 3 to 5 generations take flight in one warm season) (see photos below)].

Blister Rust: Pinyon Pine Blister Rust *Cronartium occidentale* is a fungus that is spread through spores coming from *Ribes* shrubs and/or Pinyon Pine trees (part of the lifecycle of the fungus grows on the Ribes which is called the "alternate host" and the other stages of the fungus grows on the Pinyon Pine trees). In the Spring, Blister Rust has bright orange, powdery spores that may be viewable to observers. After spores have infected needles, shoots or cones it spreads to the branches and trunks of the trees. Other indicators of infection include creamy white blisters, and/or large amounts of sap oozing from cankers, sunken or swollen bark, dead branch tips, and/or growth pattern deformities in branches and trunks (see photos below). In nature spores move between the hosts by wind with human involvement spores can be transported on equipment and tools that touch infected plant parts.

Ips Beetle	Blister Rust
	
	
	

Pinyon Pine Ips Beetle

This specification details steps needed to deflect and/or reduce Ips beetle infestations in Pinyon Pine trees.

Specifications (Pruning):

Step 1) All project activities must occur between the fall and early spring months before the average daytime temperatures exceed 65 degrees. Target work temp ranges below this threshold.
Step 2) Reduce the size of the wound: The Pinyon Pine trees selected for pruning shall have all limbs removed from the tree at the trunk (branch collar) or at the internode of the connecting branch.
Step 3) Chipping: All limbs removed from the tree shall be chipped no greater than 4" in size and removed from the site.

Specifications (Removal):

Step 1) All trees selected for removal shall be cut as low to the ground as possible.
Step 2) Chipping: All limbs removed from the tree shall be chipped no greater than 4" in size and removed from the site.
Step 3) Trunk: All rounds should be A) removed from site and taken to an area void of Pinyon Pine trees, (preferred action) or B) cut into a maximum of 2-foot rounds for firewood if requested by the private property owner. The rounds must be stacked, and a large black plastic tarp must be put over the stack and sealed (buried into the dirt a few inches) and remain sealed for 6 months. This allows the cambium to dry out (the food source of the beetles) and not allowing any remaining larvae or beetles to finish their life cycle. It also traps any adult beetles that may fly out of the cut rounds. The wood stack should be away from all living Pinyon Pine trees.

Specifications (Chipping):

Chipping: If select tree is known to be infested with Ips Beetle at any stage of development the chipped material shall be chipped into a truck and taken away from the area and disposed of in an area void of Pinyon Pine trees.

Chipping select tree parts not exhibiting evidence of Ips Beetle infestations can be done so at or near the project site but the chipped material shall not exceed 4" in size and spread evenly throughout site not to exceed 2" deep.

Specifications (Mastication):

Step 1) Small to medium trees selected for removal by way of mastication shall be done so using appropriate equipment which will cut wood material into chips no greater than 4" in size and spread evenly through the area. However, this approach can only be utilized under strict adherence to appropriate temperatures. Any weather forecast's predicting temperatures to exceed 65 degrees may create conditions suitable for Ips Beetles to fly and be attracted to the cut wood. Refrain from masticating if temperatures exceed 65 degrees Fahrenheit. Ideal workday selection would feature weather forecast with temps well below this threshold.

Ips Beetle Post Treatment Monitoring/Reporting:
Following each tree pruning or removal pre and post treatment photographs shall be taken and entered into the NVE Field Maps Database for further review of the site. The site review will be performed by representatives from NV Energy or the Nevada Division of Forestry to ensure all chipped material remaining is no greater than 4" in size and spread evenly through the site leaving biomass layers no greater than 2" thick. The post treatment monitoring will also include sites where rounds were left at homeowners request for firewood use which must be securely covered with plastic tarps obtained by the homeowner. If found improperly covered the homeowner will be notified informing them of the purpose and intent. With the information provided in Field Maps, all project areas treated per specifications, known to be harboring Ips Beetle populations, may have Ips Beetle traps hung in neighboring trees for future monitoring.

Pinyon Blister Rust

This specification details steps needed to reduce the spread of Blister Rust Fungus if trees in the project area are infected.

Specification (Pruning Live Infested Trees):
Pruning Pinyon Pine trees infected with Blister Rust require all hand tools and/or equipment used between cuts to be sterilized with a disinfectant solution to ensure fungal spores present are not transferred to other parts of the same tree or to neighboring trees within the project zone. The disinfectant solution may consist of 70% isopropyl alcohol, 10% bleach, and 20% water or a ready-to-use store-bought disinfectant aerosol spray.

Specification (Chipping / Masticating Live Infested Trees):
Wood chips from an infected tree should be collected inside of an enclosed truck and taken to a landfill or other use sites void of Pinyon Pine trees. This will prevent the fungal spores from spreading to other non-infected Pinyon Pine trees and forests. Similarly, it is not recommended to masticate live trees infested with Blister Rust fungal spores during the spring and early summer months. In such cases the trees should be masticated during periods outside of fungal spore proliferation or cut and removed from site.

Specification (Chipping / Masticating Live Dead Trees):
Trees which are dead can be chipped and/or masticated any time of the year. If questioned whether the tree is entirely dead, the chipping and/or masticating can take place during the fall, winter, or late summer months and spread evenly throughout the project area as mulch no greater than 2" thick.

Post Treatment Monitoring/Reporting:
All trees found infested with Blister Rust and selected for treatment shall have before and after treatment photographs uploaded into the Field Maps Database noting the disease presence in the comment section. Using information post treatment surveys can be performed by NDF Foresters to verify if the Blister Rust had spread to new areas near to the treatment zone.

Summary:
This specification sheet was developed to provide required steps needed when NV Energy contract crews, who engage in vegetation management activities on trees selected for punning, cutting, chipping, or masticated, are working on Pinyon Pine trees which have been found infested with Pinyon Pine Ips Beetle and/or Blister Rust. The steps needed include proper identification of insect or disease presence, proper timing of treatment relevant to insect or fungal spore activity, movement and/or placement of generated biomass, and post treatment monitoring. The specification sheet was developed by staff from the NV Division of Forestry in support of NV Energy's vegetation management activates through Nevada forests.