

CHAPTER 2 – ALTERNATIVES

This chapter describes and compares the alternatives that were evaluated to meet the project needs of increasing electrical system capacity and reliability in the Blue Ridge area. The alternatives are presented in comparative form, defining the differences between each alternative and providing a clear basis for choice among options by the decision maker and the public. The following seven alternatives were considered:

- Alternative 1 - No Action
- Alternative 2 - Proposed Action
- Alternative 3 - Energy Conservation
- Alternative 4 - Alternative Generating Sources
- Alternative 5 - Alternative Transmission Systems
- Alternative 6 - Alternative Transmission Technologies
- Alternative 7 - Alternative Transmission Line Routes and Substation Sites

Two alternatives, the No-Action and Proposed Action, were analyzed in detail. The No-Action Alternative provides a scenario without utility improvements. The Proposed Action consists of construction of a transmission line and substation in combination with mitigation measures. One alternative route was evaluated in detail for the Proposed Action because no significant issues were identified for the project. Alternatives 3 through 7 were eliminated from detailed study after initial consideration because they would not adequately meet the project purpose and need.

ALTERNATIVES CONSIDERED IN DETAIL

Alternative 1 – No Action

Under Alternative 1, no transmission line or substation would be constructed. The existing 21kV line would continue to serve the area. There would be no ground disturbance or resource impacts.

Alternative 2 – Proposed Action

CNF is considering approval to allow APS to construct, operate, and maintain a substation and portions of a 69kV electric transmission line on Forest Service land. The action proposed by APS to meet the purpose and need consists of the following components, which have been grouped to show actions on Forest Service land and actions outside of the CNF.

Proposed Actions on the CNF:

- Construction of approximately 11 miles of corridor to accommodate the 39-mile-long 69kV electric transmission line between the existing substation in Winslow and a proposed substation in the Blue Ridge area.
- Construction of a new substation in Blue Ridge. The substation site, which is located on Forest Service land, will be approximately 2 acres in size including a cutback and safety zone around the substation. Site preparation may include cut and fill, grading, and recontouring.
- Geotechnical investigation of subsurface soil conditions at the substation site. This will involve drilling test holes using a drilling rig.
- Vegetation clearing along the right-of-way, at the substation site, and along the substation access road (approximately 55 acres).
- A small timber products sale (approximately 50 acres) will be conducted for the removal of vegetation from the substation site and utility right-of-way between the substation and Quayle Hill (approximately Milepost 32.5) on CNF land. Activities associated with the timber harvest and sale could include skidding, decking, hauling, and piling.
- Prescribed burning of the substation site, land between State Route (SR) 87 and the utility right-of-way corridor on CNF land, and lands adjacent to and surrounding the Bly Pit just west of SR 87 (approximately 1,300 acres). After prescribed burning is completed, the area will become part of a maintenance program with re-entry for prescribed burning occurring every 5 to 7 years.
- Utilization of two temporary laydown yard sites each approximately 300 feet by 300 feet in size (see Figure 1-1 for locations of sites).
- The access road to the substation site will be improved to an all-weather surface and graded. Graveling the surface with native materials is initially planned.
- A larger culvert will be installed on the east side of SR 87, pending coordination with the Arizona Department of Transportation (ADOT). The existing access gate will be changed from a single gate to a double gate.
- Drainage will be improved to divert runoff to swales along the substation access road, and improved on adjacent Forest Service roads. This may entail minor maintenance activities including blading.
- Security fence installation around the substation facilities. The fence will be a 10-foot-tall chain link fence with colored slats.
- Pole site clearing and excavation.

- Pole framing and setting.
- Conductor stringing.
- Cleanup and reclamation of disturbed areas.
- Maintenance of the right-of-way corridor and area surrounding the substation site, including tree trimming and vegetation clearing as needed to protect the structures. The transmission line will be inspected annually or as required using ground vehicles or on foot.

Proposed Actions outside of the CNF:

- Construction of approximately 28 miles of the 39-mile-long 69kV electric transmission line between the existing substation in Winslow and a proposed substation in the Blue Ridge area.
- Addition of a 69kV breaker to the Winslow Substation.
- Utilization of four temporary laydown yard sites, each approximately 300 feet by 300 feet in size (see Figure 1-1 for locations of sites).
- Pole site clearing and excavation.
- Pole framing and setting.
- Conductor stringing.
- Cleanup and reclamation of disturbed areas.
- Maintenance of the transmission line and right-of-way corridor including tree trimming and vegetation clearing as needed to protect the structures. The transmission line will be inspected annually or as required using ground vehicles or on foot.

The existing 21kV line that serves the Blue Ridge area from Payson will not be modified; this distribution line will continue to provide electricity to the area. APS plans to complete construction of the project by spring/summer 2006.

The Proposed Action is shown on Figure 1-1.

Transmission Line

The proposed transmission line is approximately 39 miles in length. Approximately 11 miles of the route are located on CNF land. The majority of the route (28 miles) is located on State Trust lands and private lands. The proposed route is located adjacent to the SR 87 right-of-way, except for the portion on the CNF, where the presence of existing roads afforded the opportunity to screen the line from viewers on the highway by placing the route approximately ¼ to ½ mile east of SR 87. The exact centerline of the transmission line on CNF land was determined by collaboration between the Forest Service, APS, and EPG and was chosen to best implement design criteria and mitigation measures stipulated in the EA.

The transmission line poles (Figure 2-1) will be single-circuit structures between 55 and 65 feet tall aboveground and spaced between 250 and 500 feet apart. Portions of the route in the Winslow area will have 12kV electric underbuild and communications underbuild. A portion of the line from the new substation in Blue Ridge, heading north for approximately 1 mile to Mogollon Trail Road, will be designed to have a 21kV overhead distribution line underbuilt on the poles in the future as an upgrade project.

Existing roads will be used for access on CNF land. There will be no upgrading of existing access roads; however, some maintenance may be conducted. In areas with no existing access (such as state and private land adjacent to SR 87), overland travel with rubber-tired vehicles will be used.

Right-of-way easements will be acquired for the line. Typically, the right-of-way width for the transmission line will be between 40 and 50 feet. This is required to meet clearance requirements for electric safety codes to provide working space for maintenance activities and protect adjacent uses from electrical hazards. Easements and other property rights necessary to construct the line will be acquired from private property owners and the Forest Service for the new transmission line right-of-way. APS will compensate private property owners for new easements.

Substation

The proposed substation site, located in Sections 30 and 29, T15N, R12E, will be interconnected with the new transmission line and existing 21kV distribution system. The substation site will require an area approximately 300 feet by 300 feet (2 acres) and be secured within a 10-foot-tall, chain link fence with colored slats (color to be chosen by Forest Service). Three strands of barbwire will be located on top of the fence, bringing the total height of the fence to 11 feet. The substation will be an unmanned facility monitored and controlled from the APS Energy Control Center in Phoenix.

Figure 2-1
8 ½ x 11 b/w
Proposed Structures Diagram

The connection with the existing 21kV distribution system will occur with underground 21kV feeder lines. Two switching cabinets will be placed on the southern side of the substation, just outside of the substation fence. The cabinets will be placed between the access gates planned for the southern side of the substation. The underground feeder lines will parallel the western side of the substation access road and interconnect with the existing distribution system in a switching cabinet on the eastern side of SR 87. From there, the line will continue west into the ADOT right-of-way and interconnect with the existing underground line. An underground splice box will be installed.

A future underground feeder will exit the eastern switching cabinet outside of the substation fence and will extend to the base of the nearest 69kV pole for future underbuild on the overhead line to Mogollon Trail Road. The underbuilt 21kV feeder line will be placed on the overhead poles in the future when the load growth in the area requires additional capacity. Figure 2-2 shows the general arrangement and layout of equipment within the proposed substation.

As described in Chapter 1, construction of the Proposed Action will result in a second source of power for the Blue Ridge and Happy Jack area. The introduction of a second source of electrical power is expected to provide public benefits by reducing the frequency of power interruptions and the length of time required to restore service in the event of an outage. It also will support future load growth and increased capacity. The 69kV transmission line and substation would be in operation year-round to provide reliable power to the communities in the Blue Ridge and Clear Creek Pines Units 1 and 2. The existing 21kV distribution will continue to serve the Blue Ridge area as well.

Vegetation Clearing and Timber Sale

An estimated 55 acres will be cleared for the right-of-way. A small timber products sale (approximately 50 acres) will be conducted for the removal of vegetation. Composition of the timber harvest could include juniper and pine of various size classes ranging from sapling to 24-inch diameter at breast height or greater. Vegetation clearing along the right-of-way and at the substation site will be conducted to remove trees and brush that interfere with the construction, operation, and maintenance of proposed facilities. Limited vegetation clearing also will be conducted to widen and reroute the substation access road off of SR 87 to between 12 to 20 feet wide.

Prescribed Burn

Since the early 1900s, wildfires have been actively suppressed and virtually removed from all southwestern ecosystems. This has resulted in a major increase in live fuel loadings, ladder fuels (trees, shrubs, and grasses), and continual buildup of dead fuel loadings (logs, branches, twigs, pine needles, leaves, and dead grasses). This buildup of fuels would cause a wildfire to become a catastrophic event during periods of drought and high to extreme fire danger levels. Public use of

forested areas, including recreation and homebuilding, has increased dramatically in recent years, increasing the threat and potential loss of property and lives if a catastrophic wildfire occurs.

Because of the existing fuels condition, the Forest Service will conduct a prescribed burn of the substation site area, land between SR 87 and the utility right-of-way corridor and lands adjacent to and surrounding the Bly Pit just west of SR 87 (approximately 1,300 acres) on Forest Service land. This burn will be conducted to reduce the fuel loads in the urban interface zone and introduce periodic fire burns to control large fires. Low ground fires will be used to reduce dead/down fuel loadings to less than an average of 5 tons per acre. An estimated 1,300 acres is tentatively scheduled to be burned during fall 2005 or spring 2006, prior to the line being energized.

Construction Activities

Transmission Line Construction

Construction activities include pole site clearing and hole excavation, pole framing and setting, conductor installation, and the development of temporary laydown yards.

Pole Site Clearing and Hole Excavation – The clearing of some natural shrub and grass vegetation may be required at pole sites; however, selective clearing will be performed only when necessary to provide for construction of the proposed project. The hole excavation and pole installation require vehicle access to the site.

Pole Framing and Setting – Pre-framed poles will be transported to each pole site by truck or helicopter and rigged with stringing sheaves to prepare for conductor installation. The poles are straightened upright by a rubber-tired boom truck and then backfilled.

Conductor Installation – Sites for tensioning equipment and pulling equipment are an area of approximately 60 feet by 150 feet, located approximately 10,000 feet apart. The pulling site requires two-thirds the area of the tension site.

Laydown Yard – A total of six temporary construction laydown yard sites will be needed to serve as parking for construction vehicles, equipment, and construction material storage. The sites, identified on Figure 1-1, are approximately 300 feet by 300 feet in size. No major earth-moving activities will be used to prepare these sites; however, ground disturbance and vegetation removal will occur. Upon completion of the proposed project, the laydown yards will be reclaimed. After completion of construction, laydown yards will be reseeded with appropriate native seed. Litter removal and blading may occur if deemed necessary.

Figure 2-2
11x17 b/w
Proposed Substation Layout

ALTERNATIVES CONSIDERED AND ELIMINATED FROM DETAILED STUDY

Alternative 3 – Energy Conservation

Energy conservation is the more efficient use of electricity by customers. APS is implementing or conducting several programs to promote various energy conservation measures. These include residential appliance and home efficiency programs, promotion of energy efficient air conditioning and heat pump units, commercial and industrial thermal storage, efficient lighting, efficient motors, and energy efficient systems for entire buildings.

Though energy conservation can somewhat reduce energy consumption, this alternative would only forestall the increase in energy demands for a short period of time. Customer growth in the Blue Ridge area has increased energy consumption. APS currently serves approximately 1,200 customers in the area, and expects their customer base to exceed 2,000 households over the next five years. Because energy conservation is voluntary on the part of the customer, conservation cannot be relied upon as a means of improving reliability of service. This alternative would fail to meet the purpose and need for the project since it would not improve system reliability or provide consistent increased capacity. As a result, this alternative was eliminated from consideration.

Alternative 4 – Alternative Generating Sources

This alternative proposes the construction of additional generating and transmission facilities. Such facilities would have to be large enough to satisfy current and future load growth projections. The installation and operation costs of a new gas or coal generating facility would be significant and not economically feasible. Factors such as noise, air, water, fuel cost, pipeline interconnections, facility siting, and permitting also must be considered. In addition, system reliability is not addressed since generation unit failure could result in an extended outage. At this time, APS currently generates and purchases a sufficient amount of electricity to serve the needs of customers.

Other generation facilities including distributive energy, solar, and wind were considered as alternatives. As stated above, APS has sufficient existing generation to provide for the future electrical loads in the region. These facilities would require excessive capital costs, and the environmental impacts associated with developing expansive wind or solar fields (over thousands of acres of land) would outweigh the benefits. For these reasons, alternative generation sources were eliminated from further consideration.

Alternative 5 – Alternative Transmission Systems

This alternative considers transmission systems ranging from new lines to the interconnection of existing facilities.

Rebuilding the existing 21kV line between Blue Ridge and Payson into a 69kV line was considered but eliminated. This option would provide Blue Ridge with a single radial line, similar to the existing condition. Capacity for load growth would be increased, but reliability would remain subject to any line outage. This alternative would not provide a second source of power to the Blue Ridge area, and therefore would not meet the purpose and need for the project.

A system alternative considered but eliminated included tapping into Western Area Power Administration's (WAPA) 345kV line where it crosses Forest Road 81 east of Lake Mary Road. A new substation would be required at that location, along with a new 69kV transmission line from the substation along Forest Roads 81 and 211 to SR 87. This alternative would not meet the purpose and need for the project as a result of uncertainty with capacity and ability to tap into the 345kV system, and construction and engineering costs associated with a new substation. Also there were potential conflicts with recreation use areas located adjacent to Forest Road 211. For these reasons, this alternative was eliminated from further consideration.

Alternative 6 – Alternative Transmission Technologies

Voltage options and underground construction were considered and are described below.

Voltages: The project is proposed as a single-circuit 69kV, with a portion of double-circuit 69kV in the Winslow area. Other voltage options are higher – 115kV and up. These higher voltage lines provide bulk transfer capability, but would provide an excessive amount of power needed for the Blue Ridge area. The existing 21kV line to Blue Ridge has been upgraded in recent years to the extent possible, but has reached its capacity. Alternative transmission line voltages would not fulfill the purpose and need of the Proposed Action, and were eliminated from further consideration.

Underground construction: Underground systems typically have been constructed under circumstances of short distances in which overhead lines are not feasible (e.g., in the vicinity of airports, urban centers). Underground line construction is often preferable to overhead lines due to reduced visual impacts after installation. However, the clearing, excavation, and access road construction associated with underground construction will create some visual impacts.

Cost is the key factor in eliminating this alternative. APS' experience shows that costs for an underground 69kV line may run 10 times higher than equivalent overhead lines. Costs are reduced for lower voltage cables (e.g., 12kV and lower) for many reasons including cost of cable, trench, and conduit. These same factors for 69kV underground installation are much more complex and very expensive due to the dissipation of heat factor for the higher voltage line and the requirement of a wider right-of-way for separation of adjoining facilities. Although underground lines are less likely to be affected by weather, maintenance costs are typically greater than the equivalent overhead lines, since outages are more difficult to locate and repair. Underground lines are vulnerable to washouts and incidental excavation. Outages for

underground lines could last days or weeks while the problem is being located and repaired. Overhead lines suffer outages more often, but they can usually be corrected within hours.

For the above reasons, undergrounding the proposed route, or portions of it, was eliminated from further study.

Alternative 7 – Alternative Transmission Line Routes and Substation Sites

During the preliminary alternative evaluation analysis, approximately 40 miles of alternative routes were considered but eliminated from further study [PR 12]. The alternative routes generally followed Chavez Pass Road south from the Meteor Crater area to Chavez Pass, and then turn east to cross Jacks Canyon and SR 87. These routes were not carried forward for reasons including costs to construct an additional substation for interconnection with the existing Coconino-Winslow 69kV line north of Interstate 40 (I-40), potential impacts to a roadless area and sensitive species such as Mexican spotted owl habitat in Jacks Canyon; visual impacts to recreation users in Jacks Canyon; and the potential presence of numerous sensitive cultural sites, including the Chavez Pass Ruins.

An alternative route in the Winslow area was considered and eliminated. This alternative originated at the Winslow Substation and headed south along North Cottonwood Avenue, across SR 87/Route 66, and across the railroad tracks. The alternative would have underbuilt an existing 12kV distribution line. After crossing the railroad tracks, the route turns west to underbuild a 12kV line parallel to Old Clear Creek Road. The route would then turn south at SR 87 and continue along the eastern side of the highway. The City of Winslow expressed concern about the route's proximity to residences, as well as potential airspace conflicts with the airport, and recommended the Transcon Lane option as a preferable alternative. As a result of the issues raised by the city of Winslow, this alternative was eliminated from further consideration.

An alternative substation site, located in Section 5, T14N, R12E next to the new Blue Ridge fire station, was considered but eliminated from further study. This substation site was located on private land. Issues with this site included siting overhead lines along SR 87 and compliance with Forest Service visual objectives for a retention corridor, and proximity to existing residences and subdivisions. For these reasons, this site was eliminated from further study.

MITIGATION MEASURES

Mitigation measures were developed to reduce, avoid, and/or compensate for the potential impacts the proposed activities may cause. As part of standard operating procedures, mitigation measures (Table 2-1) will be implemented throughout the lifetime of the project in order to reduce potential environmental impacts. Application and effectiveness of mitigation measures along the proposed route are described in the resource impact assessments in Chapter 3.

In addition to specific mitigation measures prescribed for the Proposed Action Alternative, all management activities implemented are required to follow Forest Plan Standards and Guidelines, Best Management Practices (BMPs) and any other applicable Forest Service policy [PR 13].

| TABLE 2-1 MITIGATION MEASURES REQUIRED FOR THE PROPOSED ACTION ALTERNATIVE | | |
|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| # | Objective | Mitigation Measure |
| Soil and Water | | |
| SW1 | Prevent contamination of waters from accidental spills. | The Spill Contingency Plan and Spill Prevention Control and Countermeasure Plan will be prepared to prevent oil products from entering the navigable waters of the United States. Oils or chemicals will be hauled to an approved site for disposal. Oil containment berms will be constructed in the substation in case of emergency. |
| SW2 | Protect surface and subsurface water quality from physical, chemical, and biological pollutants resulting from activities that are under special use permit. | The special use permit under which APS operates shall detail the conditions they must meet to continue operating, including measures necessary to comply with state and federal water quality standards. APS shall conform to all applicable state and local regulations governing water quality and sanitation. |
| SW3 | Prevent compaction, rutting, and gulying which may result in site degradation, sediment production, and turbidity. | If soil moisture will cause rutting by construction equipment (greater than 2 inches in depth) for a length greater than 25 feet, the movement of construction equipment will not be allowed on the right-of-way, access roads, or at the laydown yards or other areas for a period of 48 hours or as directed by the Forest Service. |
| SW4 | Comply with state and federal water quality standards by minimizing soil erosion through the stabilizing influence of vegetative ground cover. | This is a corrective practice to stabilize the soil surface of a disturbed area. The vegetation selected will be a mix of species that is best suited to meet the erosion control objective, with consideration for range, wildlife, timber, or fuels management objectives. Fertilization, along with placement of a tackifier, jute netting, or other soil surface stabilizing material, may be necessary to ensure vegetation is established. |
| SW5 | Minimize vegetation and surface disturbance outside of the right-of-way. | All construction vehicle movement outside of the right-of-way will be restricted to predesignated access areas, existing roads or as approved by the Forest Service. |
| SW6 | Minimize soil erosion. | All construction and maintenance activities will be conducted in a manner that will minimize disturbance to vegetation, drainage channels, and intermittent or perennial stream banks. All existing roads will be left in a condition equal to or better than their condition prior to construction of the proposed project. |
| SW7 | Minimize construction of new access roads and ground disturbance. | No access roads will be constructed between the substation site and the existing Forest Service access road to the east of the site. Only overland travel with rubber-tired vehicles will be used. |
| Heritage and Biological Resources | | |
| HBR1 | Comply with state and federal laws regarding antiquities and plants and wildlife. | Prior to construction, all construction personnel will be instructed on the protection of cultural and ecological resources. To assist in this effort, the instruction will address: (a) federal and state laws regarding antiquities and plants and wildlife, including collection and removal, (b) the importance of these resources and the purpose and necessity of protecting them. |

| TABLE 2-1 MITIGATION MEASURES REQUIRED FOR THE PROPOSED ACTION ALTERNATIVE | | |
|---------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| # | Objective | Mitigation Measure |
| HBR2 | Minimize impacts and disturbance to sensitive features. | To minimize the amount of sensitive features disturbed in designated areas, structures and access roads will be sited so as to avoid sensitive features such as but not limited to riparian areas, water courses, residential uses, and cultural sites, and/or to allow conductors to clearly span the features, within limits of standard structure design. Avoidance may be accomplished by spanning sensitive features or realigning the route, as approved by the Forest Service. |
| HBR3 | Minimize or avoid sensitive periods. | With the exception of emergency repair situations, the construction and maintenance activities in designated areas will be modified or curtailed during sensitive periods (e.g., eagle nesting and breeding periods) for candidate, proposed threatened and endangered, or other sensitive animal species. |
| HBR4 | Minimize risks to raptors. | Transmission line construction will follow the appropriate measures to minimize electrocution risks to raptors as detailed in Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 1996 (Avian Power Line Interaction Committee 1996). Conductors and grounding structures will be placed so that birds cannot span either a pair of conductors or a conductor and any grounded structure. |
| HBR5 | Minimize disturbance to golden eagles. | To minimize potential disturbance to golden eagles, helicopter construction methods will not be utilized from January through the end of April within 1 mile of the Sunset Mountains. |
| HBR6 | Minimize impacts to bald eagles. | To minimize potential disturbance impacts to bald eagles within ponderosa pine habitat, construction activities involving the use of heavy equipment or having the potential to disturb roosting eagles will be confined to between the hours of 0900 and 1600 each day in the area between the Blue Ridge Substation and Quayle Hill during the wintering bald eagle season (October 15 through April 1). This restriction includes helicopter flights; tree cutting or skidding; pole site clearing and excavation; pole framing and setting; conductor stringing; and the use of large machinery such as bulldozers, front-end loaders, drill rigs, or anything larger than a 1-ton pickup. Prescribed burning will occur outside of this period. |
| Visual Quality | | |
| VQ1 | Avoid permanent markings, and minimize ground disturbance. | The limits of construction activities will be predetermined, with activity restricted to and confined within those limits. No paint or permanent discoloring agents will be applied to rocks or vegetation to indicate survey or construction activity limits. Flagging may be used to delineate these areas. |
| VQ2 | Minimize ground disturbance, operational conflicts, and/or visual contrast. | To minimize ground disturbance, operational conflicts, and/or visual contrast, the structure design will be modified or an alternative structure type will be used. |

| TABLE 2-1 MITIGATION MEASURES REQUIRED FOR THE PROPOSED ACTION ALTERNATIVE | | |
|---------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| # | Objective | Mitigation Measure |
| VQ3 | Reduce visual impacts and structure contrast. | The poles will be made of dulled galvanized steel for the grassland portion of the route (generally between Milepost 0 and 20). On the forested portion of the route (generally from Milepost 20 to the substation site) the poles would be made of self-weathering steel. Self-weathering steel is preferred by the Forest Service to reduce visual impacts and frequency of maintenance. Insulators will be dark gray and wires nonreflective. |
| Air Quality | | |
| AQ1 | Comply with state and federal laws. | All requirements of those entities having jurisdiction over air quality matters will be adhered to and any necessary permits for construction activities will be obtained. |
| Noise | | |
| N1 | Minimize noise and interference issues. | APS will respond to complaints of line-generated radio or television interference by investigating the complaints and implementing appropriate mitigation measures. |
| Noxious Weeds | | |
| NW1 | Minimize the spread of noxious weeds. | To minimize the spread of noxious weeds, all construction vehicles and equipment will be cleaned before coming onto Forest Service lands. A high pressure hose will be used to clear the undercarriage; tire treads; grill; radiator; and beds of any mud, dirt, and plant parts that may potentially spread the seeds of noxious plants. Should there be concentrated areas of noxious weeds within the study area, additional treatment may be required to prevent the contamination of uninfested areas. Seeds utilized for the reclamation of disturbed areas will be certified weed free. |
| NW2 | Re-establish vegetation on severely disturbed soil to minimize weed spread. | For all construction, reconstruction, and maintenance activities, seed all disturbed soil after completion of work at each site – unless ongoing disturbance at the site will prevent seed establishment. In that case, seeding shall be done after final disturbance. Seed should be certified relatively weed-free and/or analyzed (as deemed appropriate) before purchase to ensure minimum weed content. Consider the following options: (a) fertilization concurrent with seed application, and follow-up fertilization; (b) applying relatively weed-free mulch with seeding; (c) double-seed, full rate at initial ground disturbance, and full rate again at the end of the project. Seed preference should be given to perennial native bunchgrasses for seeding (low nutrient demanding). |
| NW3 | Minimize weed spread caused by moving infested gravel and fill material to relatively weed-free locations. | Gravel and fill to be placed in relatively weed-free areas that are at moderate or high ecological risk to weed invasion must come from weed-free sources. Inspect gravel pits and fill sources to identify weed-free sources. |
| AQ | Air Quality | NW Noxious Weeds |
| HBR | Heritage and Biological Resources | SW Soil and Water |
| N | Noise | VQ Visual Quality |

MONITORING

All projects require periodic monitoring of resources or activities on a representative sample basis in order to establish long-term needs, assess the impacts of land-management activities, determine how well objectives have been met, and check compliance with established standards. Most of the monitoring activities will be ongoing as the project progresses through its various stages. The mitigation measures described previously include some monitoring activities. Table 2-2 describes monitoring activities to be conducted for the project.

| TABLE 2-2 MONITORING MEASURES REQUIRED FOR THE PROPOSED ACTION ALTERNATIVE | |
|---------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Objective | Monitoring Measure |
| Heritage Resources | |
| Minimize impacts to archaeological and cultural sites. | A member of the Hopi Cultural Preservation Office will be employed to conduct cultural resource avoidance monitoring for those portions of the project on Hopi and state land. |
| Minimize impacts to archaeological sites. | Maintain compliance with the National Historic Preservation Act of 1966. Avoid disturbance of known archaeological resources through barricading of known sites. Use of archaeological monitoring for construction activities within 100 feet of sites to be avoided for these portions of the project on the CNF. |
| Biological Resources | |
| Minimize impacts to bald eagles. | The Forest Service will conduct at least two surveys for bald eagles in ponderosa pine habitat during project construction. The timing of these surveys will be based upon the timing of the construction activities. If construction were initiated in the fall, the first survey would be conducted within 5 days of the return of the bald eagles to the Blue Ridge area (usually the middle of October). The second survey would be conducted in early to mid-December. If construction is not initiated prior to the arrival of bald eagles in the area, the first survey will be conducted within seven days prior to the beginning of construction in ponderosa pine habitat. In this situation, the second survey would be conducted one to two months later. |
| Air Quality | |
| Minimize impacts from smoke. | Prescribed burning will be monitored on a daily basis to ensure compliance with prescription and guidelines within the Project Burn Plan. |
| Comply with state and federal laws. | Smoke will be monitored on a daily basis and air quality will be managed at levels that are compliant with the Arizona Department of Environmental Quality. |
| Minimize impacts from smoke. | Smoke conditions around developed parcels of private property will be monitored to ensure that intense levels of smoke do not persist for more than 48 hours. |

| TABLE 2-2 | |
|-------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MONITORING MEASURES REQUIRED FOR THE PROPOSED ACTION ALTERNATIVE | |
| Objective | Monitoring Measure |
| Noxious Weeds | |
| Minimize spread or introduction of noxious weeds. | Periodic quarterly or monthly evaluations of reclamation will be completed by APS and reported to the Forest Service to ensure that reseeding and replanting are successful. Areas determined to be unsuccessful within two years after completion of construction will be reseeded or revegetated as directed by the Forest Service. Sites utilized for washing construction vehicles will be monitored to ensure that no noxious weeds were introduced to the area. Treatments will be prescribed if noxious weeds are present during subsequent surveys. |