Summary
On January 31, 2006, AEP announced plans for its 765kV Interstate Project (I-765kV Project) that will involve the construction of a high-voltage transmission line extending approximately 550 miles from West Virginia to New Jersey.

In keeping with the company’s strong dedication to sound environmental principles, AEP is committed to utilizing design, construction and maintenance techniques to establish a route that reasonably minimizes the overall impact on local residents, their property and the surrounding environment. To achieve this goal, AEP will use proven techniques as it has on other 765kV transmission projects, while incorporating new concepts and ideas to address typical aesthetic and land use issues.

During the last 35 years, AEP has constructed and operated 2,025 miles of 765kV line. During this time, the company has developed technologies and techniques that significantly reduce the impact of such projects on the environment and surrounding communities. To minimize the environmental impact of the I-765kV Project, AEP will employ those technologies and practices as described below:

I. Routing for Least Environmental Impact
When AEP selects a route for power line construction, initial emphasis is placed on avoiding impacts to individual homes and residential areas as well as other cultural resources such as historical sites, recreational areas, schools and cultural landmarks. AEP also considers natural resources including geology and hydrology, streams, springs and wetlands, unfragmented forests, wildlife, and sensitive species. One basic premise in this process is that, all other factors being equal, the shorter the route, the less the overall impact of the transmission line on the environment. AEP’s process begins with an assessment of a broad study area to identify major environmental constraints. As environmental data is collected and evaluated, preliminary corridors within the study area are identified. During the evaluation process, AEP seeks input from the public and federal and state authorities, and considers visual impact to the landscape. This process of detailed study and refinement of preliminary corridors culminates with the identification of a preferred and one or more alternative corridors that reasonably minimize the overall impact of the project.

Resources identified and considered in the corridor approval process include, but are not limited to, houses and residences; business and industry; schools and public institutions; transportation and aviation; public utilities; microwave and radio towers; navigation beacons; future land use; cultural landmarks; physiography such as topographic and landform features; geology; soils; hydrology (including springs, rivers, streams and ponds); wetlands; land cover including unfragmented and old-growth forests; wildlife; and rare, threatened and endangered species.

II. Line Design and Right-of-way Location
Once the route for a project is approved by the responsible state and federal agencies, AEP takes great care in determining the final right-of-way and tower locations in order to lessen the environmental and aesthetic impact while providing for safe, reliable service. When locating the right-of-way, AEP conducts visual studies at critical locations and develops simulations showing how the landscape will look after the line is constructed. An example of AEP’s visual studies is shown in the before and after construction photos in Figure 1. These photos demonstrate the care and attention to detail AEP strives to achieve in its representation of the final right-of-way location.
As the line location is finalized, AEP complies with all applicable federal statutes and regulations including the National Environmental Policy Act (NEPA), the National Historic Preservation Act, and the Endangered Species Act. AEP also complies with all applicable state and local statutes and regulations, adheres to all conditions stipulated by each state public utility commission having jurisdiction over the project and cooperates with other affected state environmental agencies.

Once the right-of-way and tower locations are finalized, AEP considers various mitigation techniques that can help reduce the impact of the project on the immediate area. For example, in the past AEP has successfully conducted site-specific studies with geology experts to avoid or minimize any potential impact to the groundwater supply; relocated an Appalachian Trail shelter to mitigate the visual impact to the shelter and its users; established wildlife feed patches within the right-of-way on private lands to foster wildlife habitats; identified flyways for raptors (such as hawks and eagles) and successfully installed bird diverters on the wires of the power line to help prevent birds from striking the line.

III. Engineering Design Techniques

1. Tower Selection
AEP has experience with several tower types on its 765kV network including 4-legged lattice structures, guyed-V towers and tubular pole type structures (see Figure 2). Over our 35-year history of building 765kV lines, AEP has been very successful with matching these different structure types with the various terrain and land uses encountered.
over our 765kV network. For the I-765kV Project, AEP will draw from our current designs whenever possible and take advantage of each tower’s individual characteristics in order to achieve the best fit for the proposed location.

2. Reduced Visual Impact with Darkened/Low Reflective Materials
Unlike electrical transmission lines built 50 years ago, AEP has been able to successfully blend its most recent lines in with the landscape by careful siting of the right-of-way and by using darkened or low-reflective materials (see Figure 3). These enhancements have proven to be a significant improvement in mitigating the visual impact of transmission lines.

The darkened effect is achieved by various treatments to the material surface during the fabrication process. Use of these materials results in a project where the towers and wires blend in very well with a rural landscape as demonstrated in the figures below (see Figures 4 & 5).
3. Audible Noise Mitigation

More than 2,000 miles of AEP’s 765kV network were built using four conductors per phase. Although the audible noise performance of such lines generally has been satisfactory, a six-conductor bundle was selected for AEP’s latest 765kV line under construction in West Virginia and Virginia to further reduce the noise level, particularly at higher elevations. In practical terms, the new design cuts the audible noise level in half for a person standing 100 ft. from the edge of the right-of-way. This improved design, which will be used in the proposed I-765kV Project, provides an added benefit of reduced levels of radio and television interference.
IV. Best Practice Construction Methods

Once a power line is sited and designed, AEP adheres to all applicable governmental regulations and best practice construction methods to maintain a safe job site and to facilitate compliance with environmental regulations such as erosion and sediment (“E&S”) control guidelines and NPDES (“National Pollutant Discharge Elimination System”) permits. AEP dedicates resources to the construction process to ensure the contractor complies with these regulations.

AEP is capable of designing and has experience with a wide range of foundations that are used for electrical transmission towers including steel grillage, piles, grouted anchors and concrete foundations. The foundations that are selected for a project depend on the tower type that is chosen, the nature of the terrain where the line is sited, and the existing land use.

AEP designs its towers to accommodate crane or helicopter erection. While most towers are built using a land crane, AEP has extensive experience with helicopter erection in remote and sensitive areas. An example where helicopter construction has been required is in federally designated roadless areas where material must be flown in to avoid road construction.

AEP takes its environmental responsibilities very seriously when building tower access roads for a project. Our top priority is to work with land owners and meet their requirements to the extent practicable and consistent with good environmental practices. Access road construction for large projects is handled by professional road contractors that are well-versed in drainage control and establishing vegetation around the roads and on the road bed after construction. The road contractor works with state and local agencies to ensure the drainage and erosion and sediment control measures are properly installed and maintained and best support the restoration effort.

During construction, AEP requires and implements a spill prevention control and countermeasure (SPCC) plan that protects all perennial and intermittent stream channels during construction.

Once construction is complete, the tower sites and access roads are revegetated with appropriate native vegetation to promote and maintain wildlife, reduce invasion pressure by non-native plant species, reduce bird nest parasitism and predation and restrict access by off-the-road vehicles (see Figure 6). AEP has worked closely with property owners and state wildlife agencies to establish wildlife habitat areas in the right-of-way.

Figure 6 – Hydro-seeding the right-of-way upon completion of work (left). Right-of-way returning to restored state (right).
V. Clearing & Right-of-way Maintenance

AEP has proven to be a leader in developing and implementing environmentally responsible right-of-way clearing techniques. On its most recent 765kV line project, AEP practices selective clearing of the right-of-way. Using this technique, AEP cuts only trees capable of growing tall enough to interfere with the power line. All low-growing species such as redbud and dogwood are considered compatible with power line operations and left in place. Figure 7 is an example of a selectively cut right-of-way.

AEP works with landowners before right-of-way clearing begins to determine how to fell the trees and lay the timber on the right-of-way or dispose of the timber if requested. AEP compensates the landowner for the lost timber costs. When clearing the right-of-way for a new power line, AEP does not clear areas where the conductor-to-ground clearance exceeds 100 feet. In other words, as long as there is no danger of contact between vegetation and the conductor, we generally will not cut trees in valleys and lower elevations except for those locations where trees are tall enough to threaten the safety and reliability of the line. This is demonstrated in Figures 1, 5 & 8. Typically, there is no need to clear the right-of-way as the conductor moves away from the tower and gains sufficient ground clearance. The area immediately around the tower is always cleared to facilitate safe construction.

The goal of AEP’s vegetation management program is to provide safe, reliable electric service in an environmentally friendly manner. AEP is a charter member of the U. S. Environmental Protection Agency’s Pesticide Environmental Stewardship Program and in 1999 was awarded the EPA’s “Excellence Award for Pesticide Risk Reduction.
Figure 8 – Notice the rights-of-way downhill from the towers have not been cleared. These are examples of 765kV rights-of-way clearing where the wires are at a safe distance above the trees and therefore do not have to be cut.