

***Avian Protection Plan***

*for*

**Energy Northwest's  
Packwood Lake Hydroelectric Project  
FERC No. 2244  
Lewis County, Washington**

Submitted to:



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**PACKWOOD LAKE HYDROELECTRIC PROJECT  
AVIAN PROTECTION PLAN**

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## **PACKWOOD LAKE HYDROELECTRIC PROJECT AVIAN PROTECTION PLAN**

### **1.0 INTRODUCTION**

The following plan describes measures to be undertaken by Energy Northwest to address potential impacts to avian species associated with the Packwood Lake Hydroelectric Project (Project) transmission line. Nearly all native North American avian species are protected from “take” (i.e., to hunt, capture, kill, harass, or possess) under the federal Migratory Bird Act of 1918, as amended (16 U.S.C. 703-712, et. seq.). Other laws and regulations that prohibit unauthorized take of birds include the federal Endangered Species Act (16 U.S.C. 1531-1543, et. seq.) and the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668C, et. seq.). Electric transmission and distributions systems are a potential source of bird electrocution or collision mortality, which may be considered “take.”

The extensive research has been devoted to the causes and solutions to address bird electrocution and collision mortality associated with electric transmission and distribution systems has been summarized by APLIC<sup>1</sup> (2006). This research has prompted state and federal resource agencies, in concert with the electric utility industry, to adopt various standards for structural designs and siting of new lines that avoid or minimize bird electrocutions and collisions. The key standard for avoidance of bird electrocutions is a minimum spacing of 60 inches between energized phases (i.e., energized electrical conductors) or between a phase and a grounding source (APLIC 2006). The key requirements for minimizing risk of collision mortality are removal of overhead ground wires and siting new lines to avoid major bird flight paths (APLIC 2006).

### **1.1 Project Description**

The Project transmission line begins at the powerhouse and terminates at the Packwood substation, spanning a distance of about 8,009 feet (about 1.5 miles) (Figure 1). Three conductors transmit electricity at 69 kV and are supported by a total of 31 poles. Between the powerhouse and Highway 12, the line follows the Project tailrace canal; the conductor arrangement on eight poles in this span is in the wishbone design (Figure 2), whereas the other five poles have a vertical conductor arrangement (Figure 3). Along Highway 12 to the Packwood substation, all of the 18 poles have a vertical conductor arrangement (Figure 4). The span along Highway 12, which also carries other lines and services not associated with the Project, was recently upgraded by Lewis County Public Utility District (PUD). Maintenance of the transmission line is performed by Lewis County PUD.

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<sup>1</sup>Avian Power Line Interaction Committee. APLIC members consist of the Edison Electric Institute and its member utilities, U.S. Fish and Wildlife Service, Rural Utilities Service and other electric utilities. APLIC first published “Suggested Practices for Raptor Protection on Power Lines: The State of the Art” in 1975 with periodic updates. APLIC is considered the industry standard.

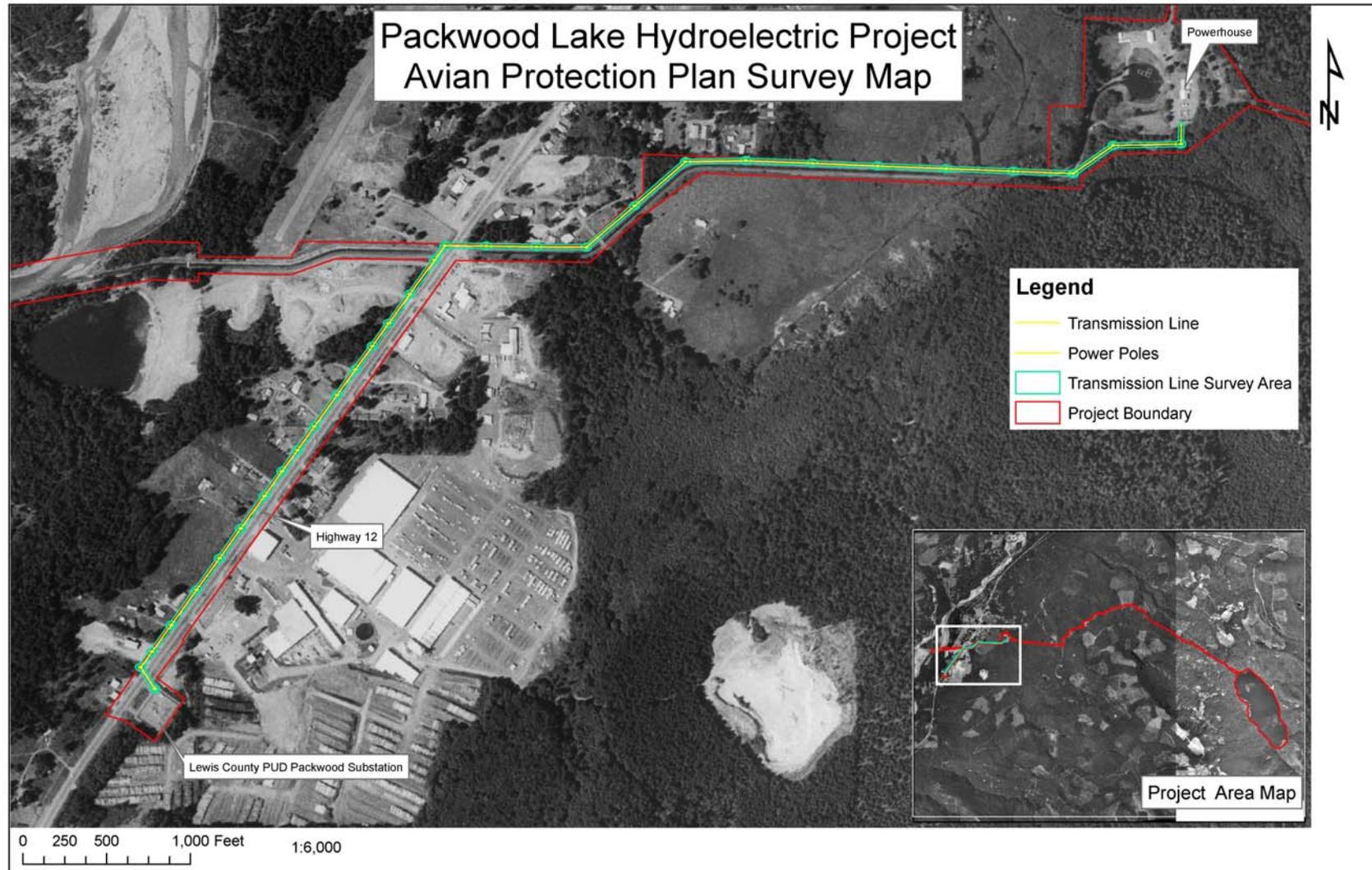
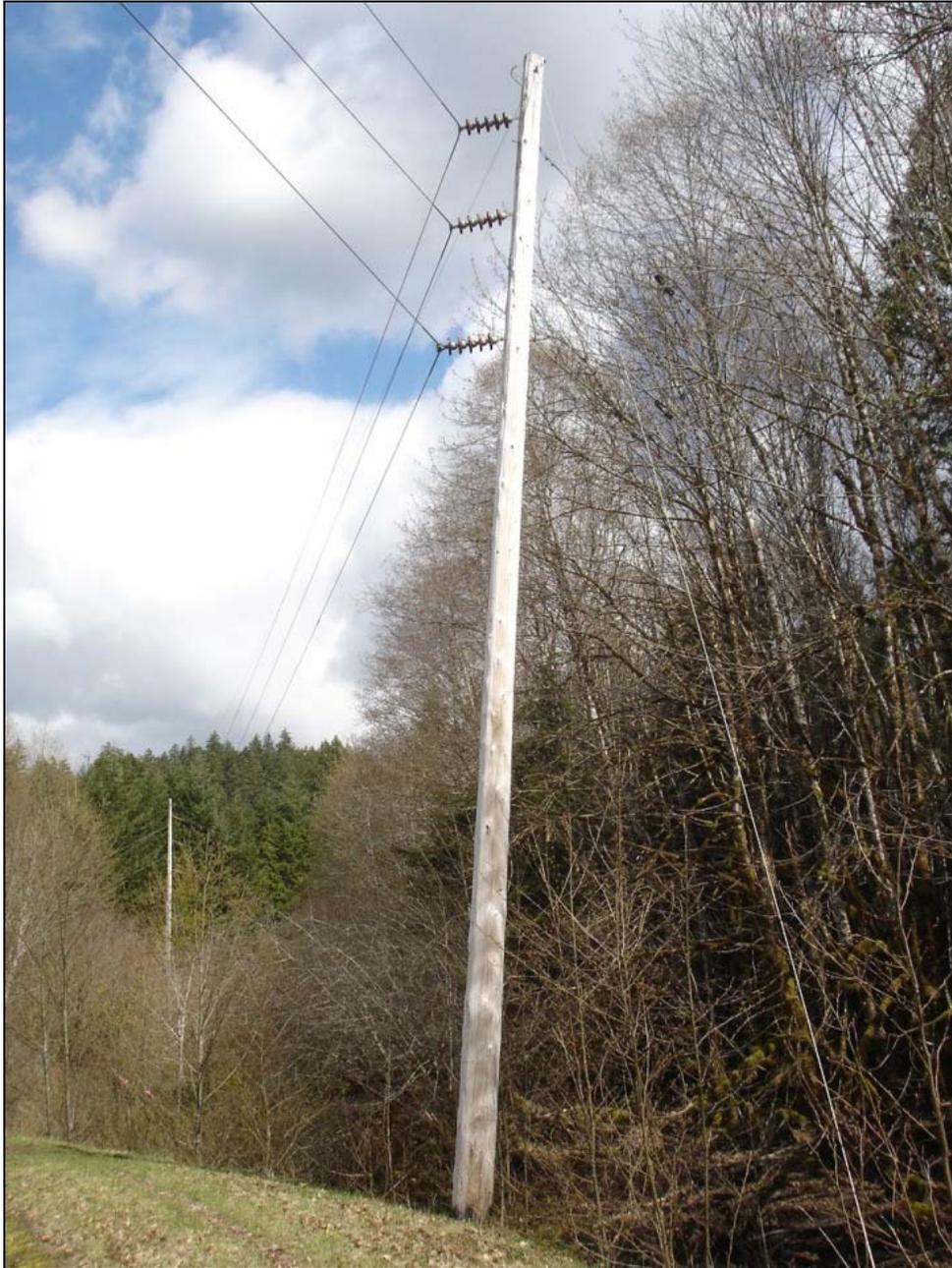


Figure 1. Packwood Lake Hydroelectric Project Avian Protection Survey Map



**Figure 2. Transmission line adjacent to project tailrace canal, showing wishbone conductor configuration.**



**Figure 3. Vertical conductor design used between the powerhouse and Highway 12.**



**Figure 4. Vertical conductor design used along Highway 12.**

Drawings of the wishbone and vertical, phase opposite designs are included (Appendix 1). The designs appear to conform to accepted standards for electrocution risk avoidance (i.e., adequate distance between phase conductors and between the phase conductors and a grounding source line), and are not equipped with overhead ground wires. Drawings of the vertical arrangement employed at turning points are not available. The conductor arrangements on the Project transmission line are not known to be hazardous to birds. Lewis County PUD has not experienced bird-related outages or known avian electrocutions with these designs, and the Project operators have not documented any bird collisions or problems.

## **1.2 Avian Species Addressed By This Plan**

This plan addresses all native avian species potentially occurring in the vicinity of the Project transmission line. However, species with wider wing spans are typically more at risk of electrocution or collision with electric transmission lines than smaller birds. Raptors (birds-of-prey) are the focus of most electrocution avoidance protection measures. Raptors that may occur in the vicinity of the Project transmission line include bald eagle, osprey, turkey vulture, red-tailed hawk, northern harrier, Cooper's hawk, sharp-shinned hawk, American kestrel, great horned owl, barn owl, barred owl, and western screech owl. Eagles and buteos (such as red-tailed hawk) are more commonly electrocuted than other raptors. Species unlikely to occur in the vicinity of the Project transmission line include golden eagle and northern spotted owl. Golden eagle is typically associated with extensive open, undeveloped habitats, usually characterized by topographic relief, cliffs and canyons. Northern spotted owl is known to occur elsewhere in the Project vicinity in association with structurally complex, late successional conifer forests.

Bald eagles are known to forage seasonally along the Cowlitz River (EES Consulting 2005), but there are no records of bald eagle nesting in the area. Information on bird occurrence along the transmission line is not available, but species composition is likely to reflect the predominant vegetation cover types around the transmission line corridor: Residential, Industrial and Roads (concentrated along Highway 12); and Palustrine Emergent Wetlands (Devine Tarbell & Associates 2007). Forested areas are limited in extent and occur mostly in small patches. Raptors are more likely to perch on transmission line structures in open areas where there are few tall perch sites than in forested habitats (APLIC 2006).

## **1.3 Potential Risks to Avian Species**

Avian species that occupy forests, perch or nest primarily on the ground, or are of small size are rarely electrocuted. High voltage transmission lines (69 kV or greater) tend to pose a much lower risk of electrocution than lower voltage lines because of the required conductor spacing and above-ground clearance (National Electrical Safety Code 1993). Risks increase in weather that hinders flight maneuverability, or when feathers are wet, thereby increasing conductivity.

Bird collisions with transmission lines generally become biologically significant only in very specific localized situations (e.g., where major flight paths between feeding and nesting/roosting areas are intersected by a transmission line), or under the influence of distracting lighting at night or adverse weather conditions (APLIC 2006). Overhead ground wires are the major engineering factor contributing to the potential for bird collisions because these narrow wires (often only 0.4-0.5 inches in diameter) may not be detected by birds, particularly under dim lighting.

Overall, the Project transmission line is not likely to pose significant risks to avian species. As noted, the drawings suggest that conductors are adequately spaced and configured to avoid bird electrocution. The line is not equipped with an overhead ground wire, suggesting the collision risk is also low.

## **2.0 COMPONENTS OF THE PLAN**

The Avian Protection Plan follows guidelines outlined by APLIC (2005) including adherence to construction design standards, risk assessment, avian incident reporting, mortality reduction measures, observer training, and public awareness.

### **2.1 Transmission Line Survey**

Within one year of license issuance, the Project transmission line will be surveyed by a trained observer to evaluate the potential for avian electrocution and collision. The survey will be conducted in May or June, during the bird breeding season. After review of the transmission line structural drawings, the observer will walk the right-of-way, recording data on structure configuration, evidence of avian activity, and presence of dead birds. An area spanning 15 feet on each side of the center of the right-of-way and a 25-ft. radius around each pole will be searched for bird carcasses, prey remains, pellets, and fecal whitewash. At each pole, the pole number and/or location coordinates will also be recorded along with the conductor configuration type, cover type(s) surrounding the pole, presence of bird carcasses, live birds observed, evidence of raptor use, and presence of avian nests. Representative structures of each type will be photographed, compared to the drawings, and evaluated for consistency with the current APLIC standards (APLIC 2006). Energy Northwest will upgrade or replace non-compliant transmission line configurations during scheduled line maintenance or upgrade projects. Because bird fatality or injury associated with the Project transmission line is likely to be rare and evidence of incidents may not be persistent (an injured or dead bird is liable to succumb to predators or scavengers), the transmission line survey is intended to gauge risk, rather than quantifying incident frequency.

### **2.2 Annual Surveys of Non-compliant Structures**

If there are structures identified in the initial survey that are designated to be rebuilt or retrofitted to comply with the APLIC standards, then annual surveys will be conducted until the upgrade or replacement occurs. The annual surveys will be performed by the project operators during the May or June period looking for evidence of mortality or

avian use as described above. The results of this survey will be documented and reported annually as a part of the Resource Coordination Plan annual report. Survey frequency and timing may be adjusted as necessary based on decisions made at the annual Resource Coordination Meeting. The annual surveys will be discontinued following completion of the line upgrade or replacement project.

### **2.3 Incident Reporting**

The Project operators will be instructed to report and document any observed incidence of avian injury or mortality attributable to the Project transmission line, including outages associated with bird electrocution. Incident logs will be reviewed annually, assessed for evidence of risk (see below), and the results reported to stakeholders.

### **2.4 Assessment**

If any Project transmission line structure is involved in a bird fatality or injury, Energy Northwest will evaluate the need for and feasibility of rebuilding or retrofitting structures to avoid or minimize future risk. Energy Northwest will follow an incident response process (Figure 5) similar to that used by other utilities and consistent with APLIC (2005) recommendations. Any rebuilding or replacement of the transmission line structures will be made to current APLIC configuration standards.

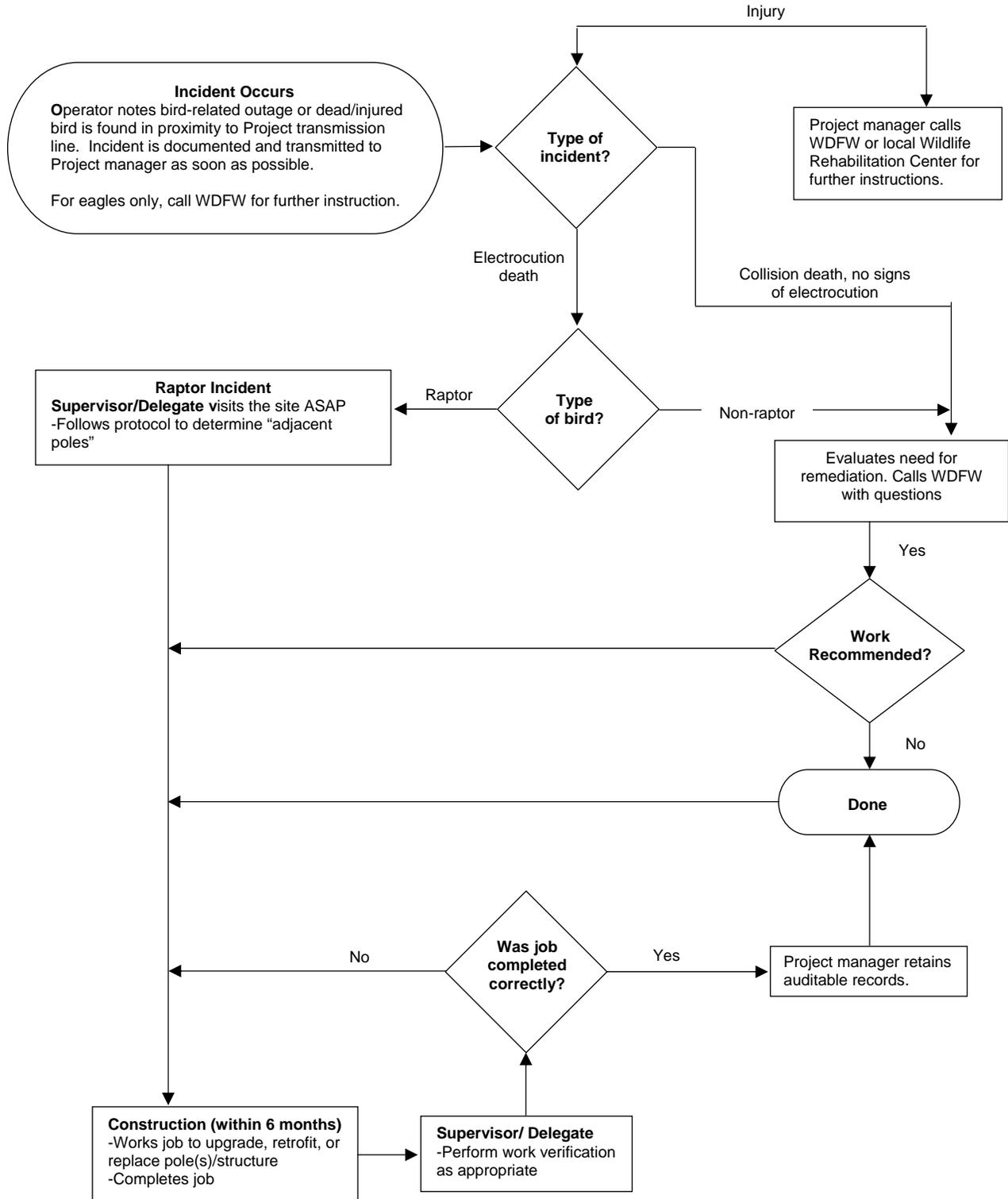
### **2.5 Stakeholder Consultation**

Starting with the second year after license issuance, Energy Northwest will discuss the results of the initial and subsequent avian surveys and any incident reports at the annual Resource Coordination Meeting. This meeting will provide an opportunity for the agencies and stakeholders to collaborate on the decision-making process and work together to provide recommendations that can be effectively implemented. Energy Northwest shall also discuss, when appropriate, its future plans for pole replacement or line upgrades.

## **3.0 COSTS AND SCHEDULE**

The cost for plan development is \$4,800. The cost of the initial transmission line survey and reporting occurring one year after license issuance is estimated at \$3,320. The subsequent annual surveys are estimated to cost \$1,328 per year (in 2008 dollars). Typical pole replacement costs are about \$3,500 per pole (based on May 2008 estimate from Lewis County PUD).

Figure 5. Avian Incident Response Work Flow Diagram



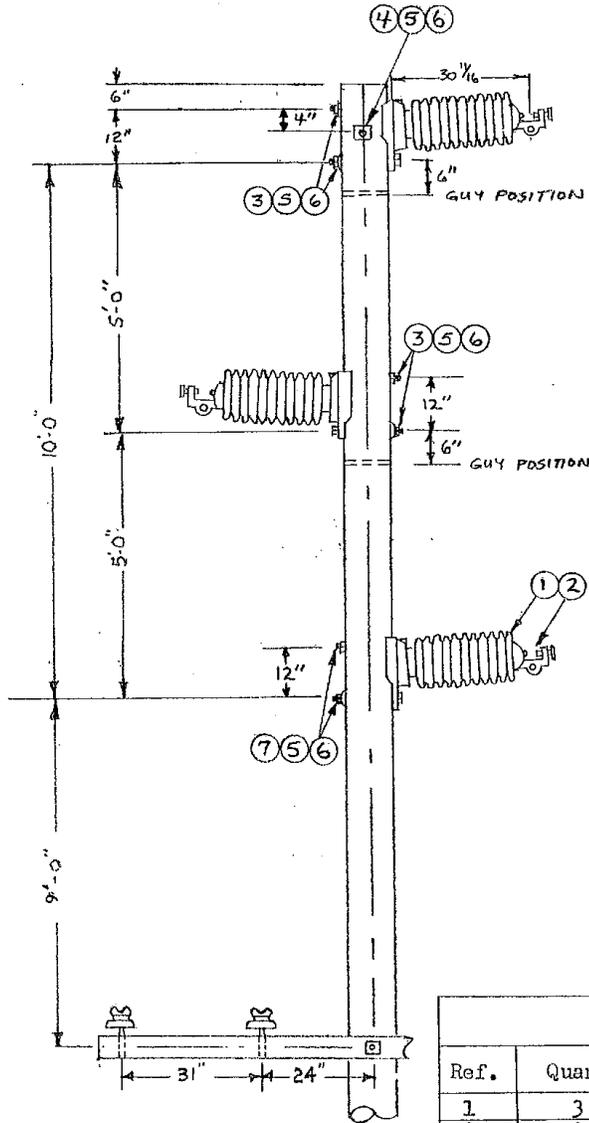
#### **4.0 LITERATURE CITED**

- APLIC (Avian Power Line Interaction Committee). 2005. Avian Protection Guidelines. A joint document prepared by the Edison Electric Institute's Avian Power Line Interaction Committee (APLIC) and U.S. Fish and Wildlife Service (USFWS).
- APLIC. 2006. Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006. Edison Electric Institute. Washington, D.C.
- Devine Tarbell & Associates, Inc. 2007. Final Vegetation Cover Type Mapping Study Report for Energy Northwest's Packwood Lake Hydroelectric Project, FERC No. 2244, Lewis County, Washington.
- EES Consulting, Inc. 2005. Revised Bald Eagle and Osprey Nest Survey Study Plan for Energy Northwest's Packwood Lake Hydroelectric Project, FERC No. 2244, Lewis County, Washington. August 22, 2005.
- National Electrical Safety Code. 1993. C2-1993. Published by the Institute of Electrical and Electronics Engineers, Inc. and the American National Standards Institute. New York, N.Y. 257

## **Appendix 1**

### **Transmission Line Structure Drawings**

MPS/SL



Note:  
 (a) 800# maximum design side angle loading.

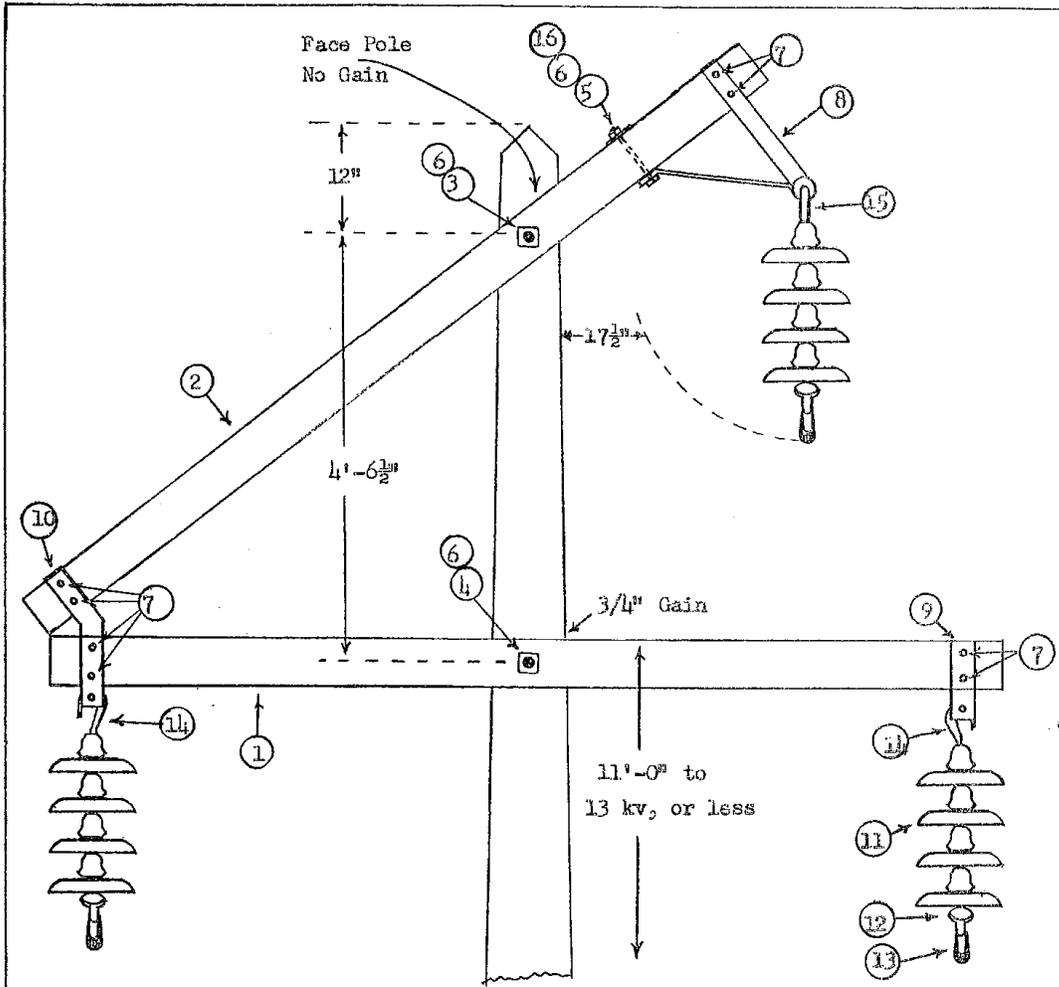
BILL OF MATERIAL		
Ref.	Quantity	Description
1	3	115KV Horiz Mount Line Post
2	3	Post Ins. Clamp (State Size)
3	4	3/4 x 12" Machine Bolt
4	1	3/4 x 10" Machine Bolt
5	8	3" x 3" Curved Washers
6	7	3/4" Spring Washer
7	2	3/4" x 1 1/4" Machine Bolts

115 KV CONSTRUCTION - - HORIZONTAL POST 0° - 7°

OVERHEAD LINE STANDARDS

PUBLIC UTILITY DISTRICT #1, LEWIS COUNTY

N-21



Note:  
 (a) The open side of the wishbones should face toward the center of the angle.  
 (b) On tangents the open side of the wishbone should be on the street side.

69 KV. HEAVY DUTY WISHBONE CONSTRUCTION OVERHEAD LINE STANDARDS PUBLIC UTILITY DISTRICT #1, LEWIS COUNTY	1 of 2 3 - 2
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