

Avoiding Raptor Electrocutions

**Dennis Rankin, Environmental Protection Specialist,
Engineering & Environmental Staff, RUS**

EXECUTIVE SUMMARY

Raptor electrocution has been identified as one of the major concerns of the U.S. Fish and Wildlife Service. The electrocution issue was first identified in the early 1970s and continues to be a problem. Raptors are protected by several laws which include the Endangered Species Act, the Eagle Protection Act and Migratory Bird Treaty Act. Guidelines for the protection of raptors are contained in the publication *Suggested Practices for Raptor Protection on Powerlines-The State of the Art in 1996*. *Suggested Practices* does not contain standardized drawings for utility structures and raptor prevention measures. In addition, it contains structures that are not RUS standard construction. Therefore, RUS has decided to publish a set of guidelines with standardized drawings for its approved facilities.

INTRODUCTION

Raptor electrocution continues to be one of the major wildlife concerns of the U.S. Fish and Wildlife Service (USFWS), especially in states west of the Mississippi River. Raptors (birds of prey) are a group of birds, which includes eagles, falcons, owls, kites, hawks, osprey and vultures. The USFWS - Division of Law Enforcement has documented the electrocution of 1,030 migratory birds from the states of Colorado, Kansas, Montana, Nebraska, North Dakota, South Dakota, Utah and Wyoming. These birds of prey are protected through several laws, which include the Endangered Species Act, the Eagle Protection Act and the Migratory Bird Treaty Act. Violations of these laws can result in fines and/or imprisonment.

The recent court decision involving Moon Lake Electric Association has given the raptor electrocution/bird collision issue high visibility. The USFWS has elevated the electrocution issue to one of its top priorities. News articles discussing the Moon Lake court decision, the raptor electrocution problem and solutions to make power line structures raptor friendly on the have appeared in major newspapers throughout the country. In addition CCN did a segment on the electrocution problem and its potential solutions.

EARLY HISTORY/BACKGROUND

The electrocution issue was first identified in the early 1970s when the USFWS were investigating eagle deaths from shooting and poisoning in the west. Large numbers of raptors were found under power lines. Members of government, industry and conservation organizations met to discuss the problem and identify inexpensive ways to minimize/eliminate raptor electrocutions. Raptors were being electrocuted through phase-to-phase and phase-to-ground contacts while perching on the poles. The Rural

Electrification Administration (REA) published guidelines to reduce the loss of eagles and other large birds due to the accidental electrocution by powerlines. It was found that pre-1962 REA standard construction was potentially the most hazardous due to its relatively flat construction and the use of steel crossarm braces. The guidelines (REA Bulletin 61-10) entitled *Powerline Contacts By Eagles and Other Large Birds* identified several measures to reduce accidental electrocution. These measures included the use of wooden crossarm braces, covered jumpers, pole top perches, gapped ground wires and the lowering of the crossarm (typical C-1 design). REA Bulletin 61-10 was revised in 1975 and 1979. The Edison Electric Institute also identified raptor protection measures and techniques and these were published in 1975 in a book entitled *Suggested Practices for Raptor Protection On Powerlines*.

The Raptor Research Institute revised the document in 1981 and it was published as *Suggested Practices for Raptor Protection On Powerlines – The State of the Art in 1981*. Many of the protection measures found in REA Bulletin 61-10 were also included in this revision. In 1983 REA decided to abolish Bulletin 61-10 and adopt *Suggested Practices* as its guidance document for raptor protection. The document was updated and revised and published in 1996. It was entitled *Suggested Practices for Raptor Protection On Powerlines – The State of the Art in 1996* and is the industry standard for raptor protection. *Suggested Practices* identifies different raptor protection measures, but does not contain standardized drawings especially for the pole top configurations. Several cooperatives had asked the Rural Utilities Service to issue standard drawings for several of the configurations in *Suggested Practices*. RUS issued several standard drawings in 1991 and 1992 in Items of Engineering Interest. In addition, several issues such narrow profile structures, the use of steel distribution poles and transformer problems are either not addressed or not addressed adequately in *Suggested Practices*. Due to the increased awareness of the electrocution problem, RUS has decided to publish a set of guidelines with standardized drawings, where applicable, for its approved facilities. A draft version should be ready in July 2000. The general format and a brief synopsis of the sections is included below.

RUS RAPTOR GUIDELINES

- **Introduction/Purpose**

A brief introduction and history of the problem will be included. The purpose of the guidelines will be to identify measures to make RUS standard structures raptor friendly. Construction specifications will be included. The guidelines will supplement *Suggested Practices*, but can be used as a stand-alone document.

- **U.S. Fish and Wildlife Service Statutes**

The Endangered Species Act, the Eagle Protection Act, the Migratory Bird Treaty Act, the Lacey Act and other pertinent statutes will be discussed.

- **RUS Requirements**

RUS requirements where applicable will be discussed. Certain types of construction will need RUS review and approval.

- **Preferred Raptor Protection Practices**

RUS will identify preferred protection practices based on effectiveness, reliability, safety, engineering and economics. It should be noted that different measures might be necessary depending on the individual situations.

- **Transmission Line Assemblies (34.5 kV and 69 kV)**

Although most transmission line phase-to-phase and phase-to-ground spacing is adequate, some 34.5 and 69 kV transmission line assemblies are not raptor friendly. These transmission assemblies and appropriate mitigation will be identified.

- **Single-Phase Pole Top Design Assemblies**

RUS believes its single-phase pole top assemblies are, for the most part, raptor safe. However, other raptor friendly designs will be identified. In addition, measures for single-phase poles with equipment will be discussed.

- **Multi-Phase Pole Top Design Assemblies**

Measures to make three-phase construction will be discussed including lowering the crossarm and the use of a ten-foot crossarm. The use of anti-perching devices will also be discussed. RUS continues to believe that its C-1 structure with an eight-foot crossarm is a relatively safe structure and will continue to evaluate it. Measures for structures with equipment will also be discussed.

- **Covered Conductors**

The use of covered conductors, as an alternative to make structures raptor friendly will be discussed.

- **Transformers (Insulated Transformer and Bushing Covers)**

The use of insulated transformer and bushing covers will be discussed. RUS believes that the majority of electrocutions occur on poles with transformers.

- **Overhead Equipment Assemblies**

Suggestions to make other overhead types of equipment raptor friendly will be included. Also riser poles and other specialty structures such as corner poles will be discussed. Standardized drawings will be included where feasible.

- **Narrow Profile Designs**

RUS must approve the use of narrow profile structures. These structures can increase raptor mortality, even for small raptors due to insufficient phase-to-phase and phase-to-ground spacing. Standardized drawings for narrow profile structures will be included. Suggestions for making narrow profile structures which are not raptor friendly safer will be included.

- **Non-Wood Pole Assemblies**

The use of steel poles as distribution structures poses an additional concern in protecting raptors. Because the steel pole itself serves as the ground, the phase-to-ground spacing can serve as a problem for smaller raptors. Raptor friendly designs will be identified and discussed. RUS must presently approve the use of steel distribution poles on a case-by-case basis. Guidelines for the approval of the use of steel distribution poles have been published.

- **Manufacture's List**

A list of manufactures that make products to minimize bird electrocutions and structures raptor friendly will be included.

- **Reference Material**

Reference material includes reports and videos on raptor protection, collision mortalities and animal-caused outages and where they can be obtained. A video concerning raptor electrocution was recently developed by several agencies, including RUS, utilities, consultants and several conservation groups. The video will be available to the public for a nominal fee.

- **Reporting Forms**

RUS is currently working with the U.S. Fish and Wildlife Service and other groups to develop a new reporting form that could be used consistently throughout the country.

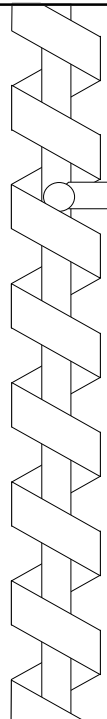
BIOGRAPHICAL SKETCH

DENNIS E. RANKIN

Mr. Rankin received a Bachelor of Arts Degree in Biology and a Master of Science Degree in Biology from West Virginia University.

He was employed by West Virginia University/Water Resource Research Institute as a research assistant from 1971 to 1973 working on the effects of acid mine drainage and thermal pollution. From 1973 to 1977 he was employed by Ecometrics, Inc., as a project analyst and manager. In 1977 and 1979 he worked as a project manager for the Ohio River Basin Energy Study and as a private consultant.

Employed by the Rural Electrification Administration since 1979, he has held the position of Environmental Protection Specialist dealing mainly with electric and telephone projects in the Western and Southwest areas of the United States. Mr. Rankin currently holds the position of Environmental Protection Specialist within the Engineering and Environmental Staff of the Water & Waste Disposal Division in the Rural Utilities Service.



RUS 2000 ELECTRIC ENGINEERING SEMINAR

AVOIDING RAPTOR ELECTROCUTIONS



WHAT IS A RAPTOR ?

- * **EAGLES**
- * **HAWKS**
- * **FALCONS**
- * **OSPREYS**
- * **KESTRELS**
- * **KITES**
- * **OWLS**
- * **GYRFALCONS**
- * **VULTURES**
- * **MERLINS**

THE NEW YORK TIMES, FRIDAY, DECEMBER 31, 1999

Agency Seeks Safeguards For Birds on Power Lines

Electric Utilities Face Federal Sanctions

By DENNIS BLANK

Power poles have always been a favorite perch for birds, especially eagles, hawks, owls and falcons which use them to spot their prey. About 150 of these raptors are electrocuted every year, but now the criminal prosecution of a Utah utility company for causing the deaths of birds has raised concerns among electric companies, particularly in the West.

Utilities say they could face large expenses, possibly running into millions of dollars, if they are forced to prevent the electrocutions.

"Everybody is running scared right now," said Monte Garrett, a biologist for PacifiCorp, a utility based in Portland, Ore., that has 50,000 miles of power lines in eight Western states. PacifiCorp has already spent \$8 million in the last 10 years retrofitting many of its lines, Mr. Garrett said, and it would cost the company at least \$200 million to bird-proof all its lines.

In August, Moon Lake Electric Association Inc., based in Roosevelt, Utah, was convicted under the Federal Eagle Protection Act and Migratory Bird Treaty Act of causing the deaths of 11 eagles, 4 hawks and an owl. A federal judge in Denver, Lewis J. Babcock, ordered Moon Lake Electric to pay a \$50,000 fine and donate \$50,000 to organizations dedicated to protecting wild birds. The company was also put on probation for three years.

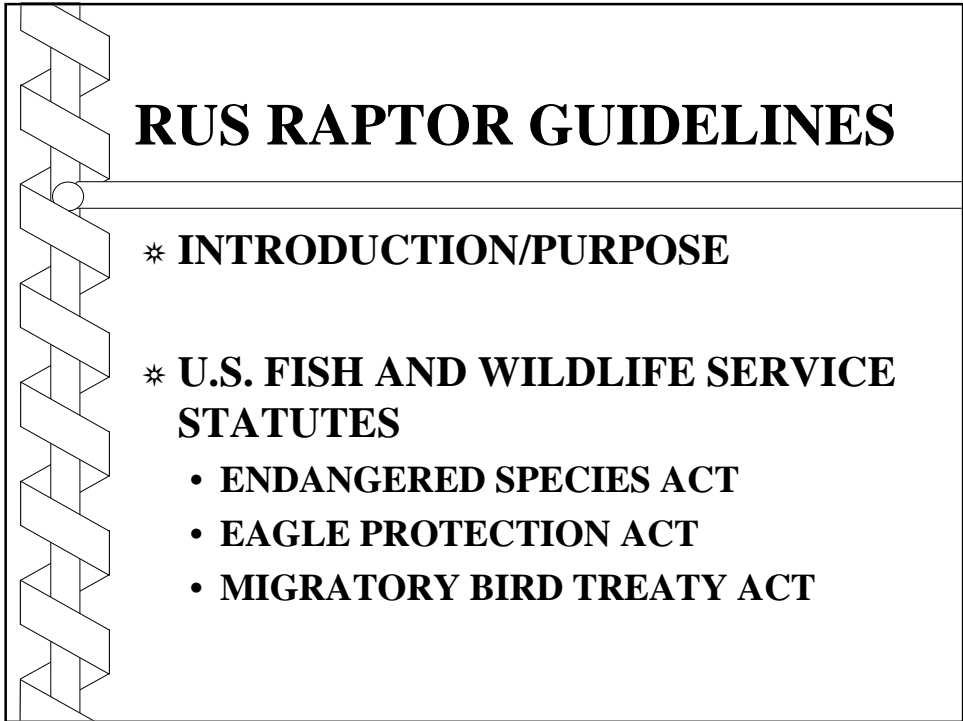
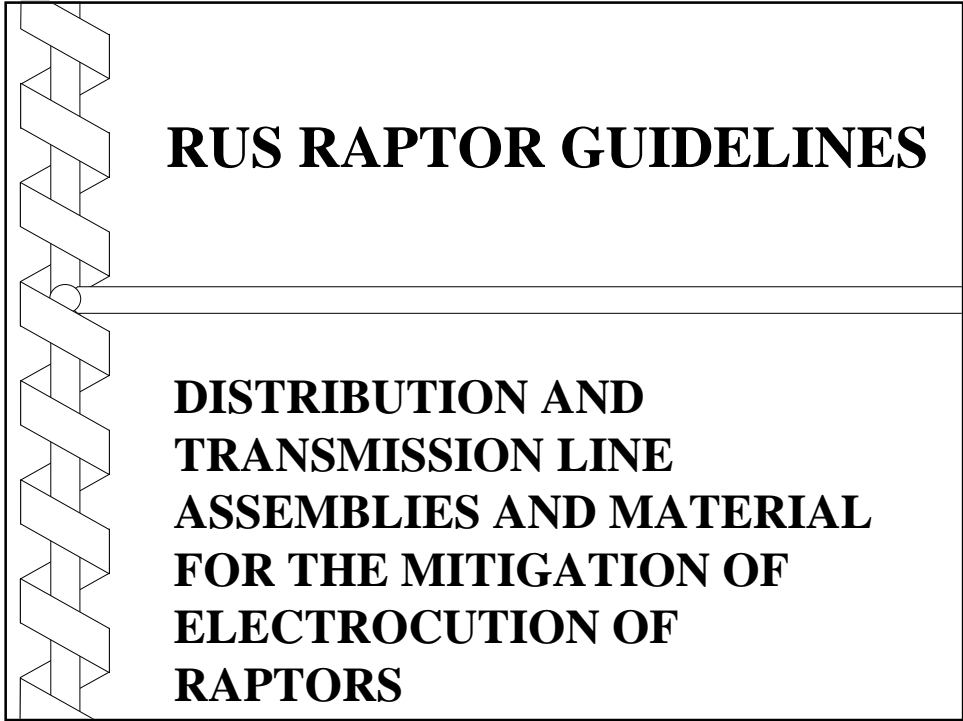
The United States Fish and Wildlife Service began the criminal prosecution of Moon Lake after the utility notified the service of the bird deaths — most of which had occurred near a remote Chevron oil field in Colorado — and asked for help in preventing

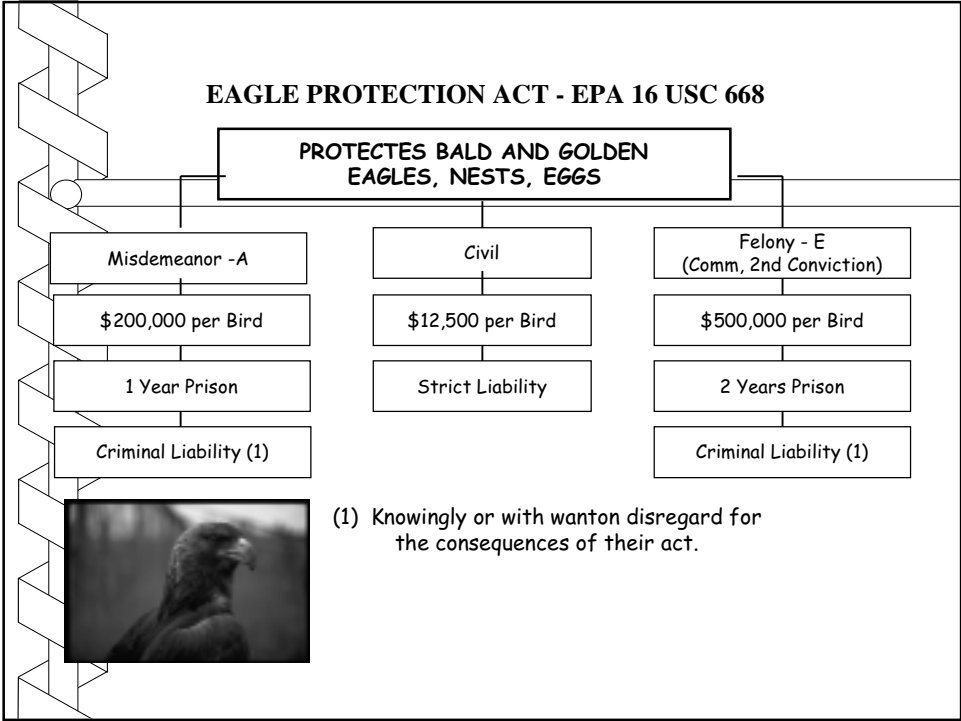
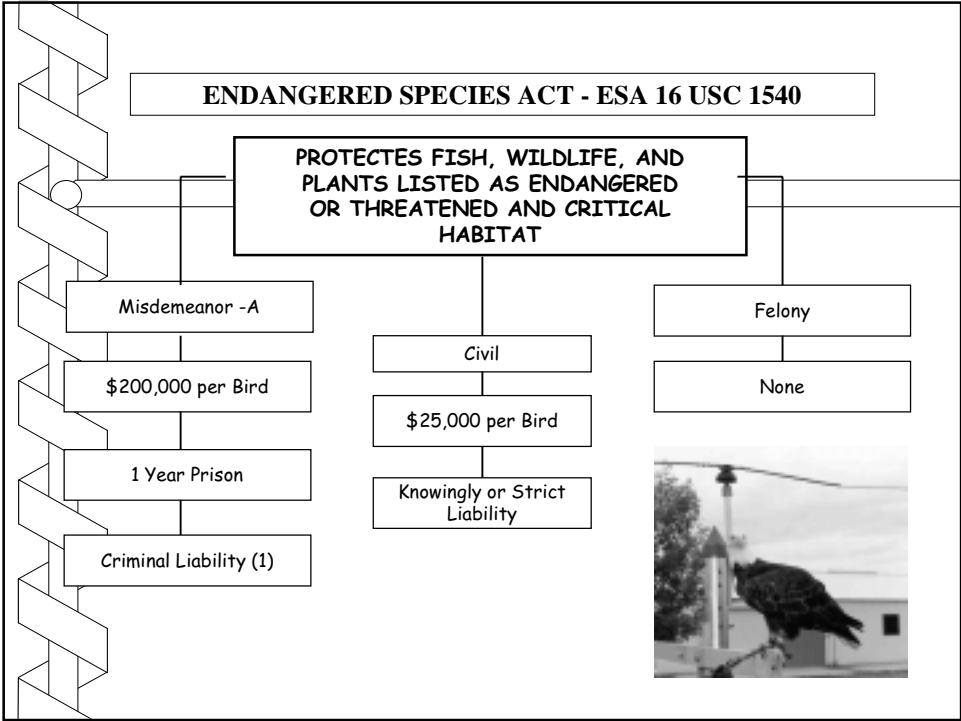
But Benito A. Perez, in charge of all the special agents at the Fish and Wildlife Service, said Moon Lake was prosecuted because it had not been moving fast enough to install those devices.

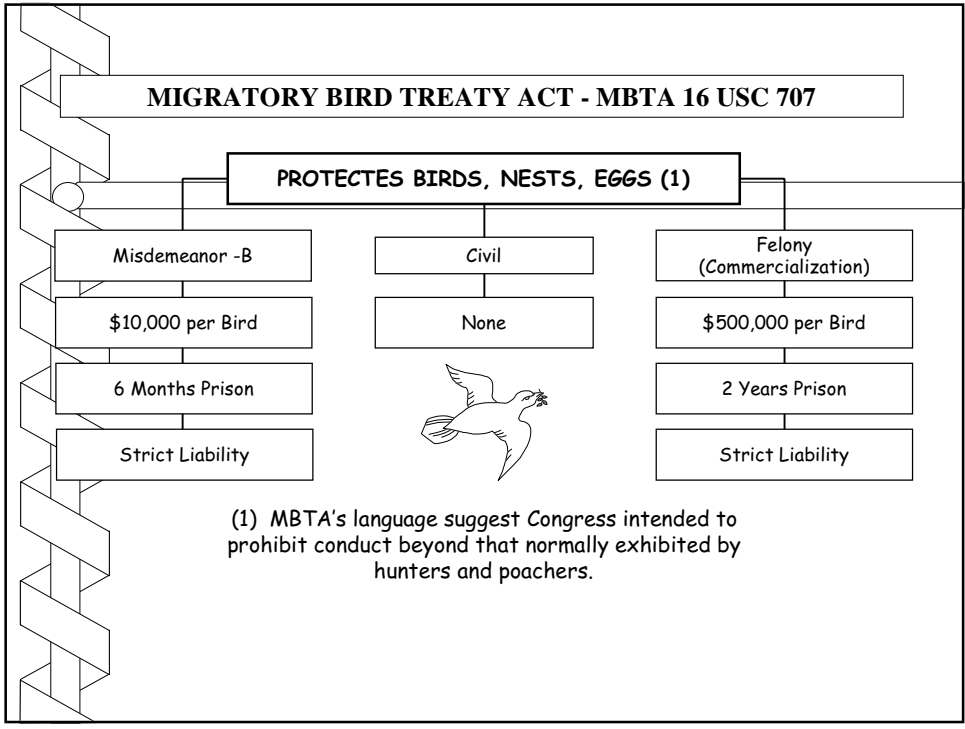
Moon Lake Electric said it had spent \$950,000 to retrofit more than 3,200 poles in Utah and Colorado at an average cost of \$300 a pole, with at least 600 more poles yet to do. It said it could absorb the cost without raise

BACKGROUND

- * **RUS BULLETIN 61-10 : POWERLINE CONTACTS BY EAGLES AND OTHER LARGE BIRDS (1972, REVISED 1975 & 1979)**
- * **SUGGESTED PRACTICES FOR RAPTOR PROTECTION (1975)**
- * **SUGGESTED PRACTICES FOR RAPTOR PROTECTION-STATE OF THE ART IN 1981**
- * **SUGGESTED PRACTICES FOR RAPTOR PROTECTION-STATE OF THE ART IN 1996**







RUS RAPTOR GUIDELINES

- * **RUS REQUIREMENTS**
- * **PREFERRED PRACTICES**

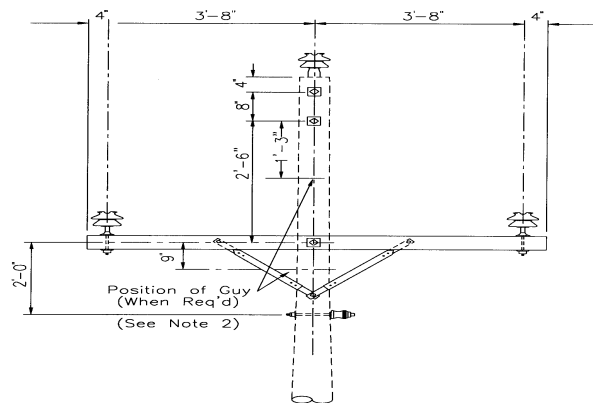
RUS RAPTOR GUIDELINES

* **TRANSMISSION LINE ASSEMBLIES
(34.5 kV AND 69 kV)**

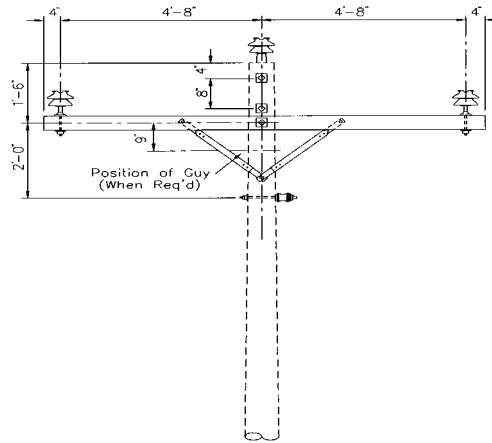
* **SINGLE-PHASE - POLE TOP
ASSEMBLIES**

* **MULTI-PHASE - POLE TOP
ASSEMBLIES**

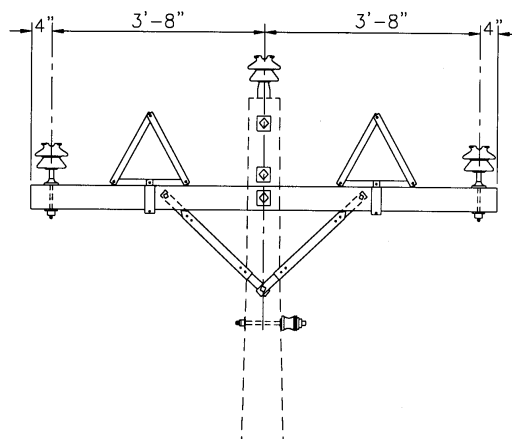
Crossarm Lowered



Ten-Foot Crossarm



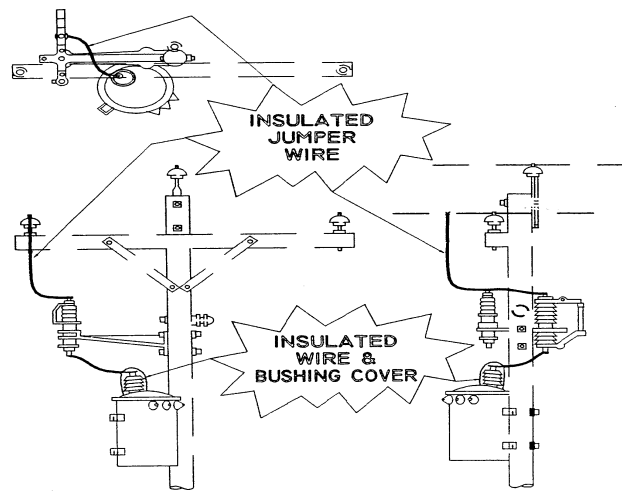
Triangles



RUS RAPTOR GUIDELINES

- * **COVERED CONDUCTORS**
- * **TRANSFORMERS**
 - **INSULATED TRANSFORMER COVERS**
 - **BUSHING COVERS**
 - **INSULATED STINGERS**
- * **OVERHEAD EQUIPMENT ASSEMBLIES**

Insulated Wires

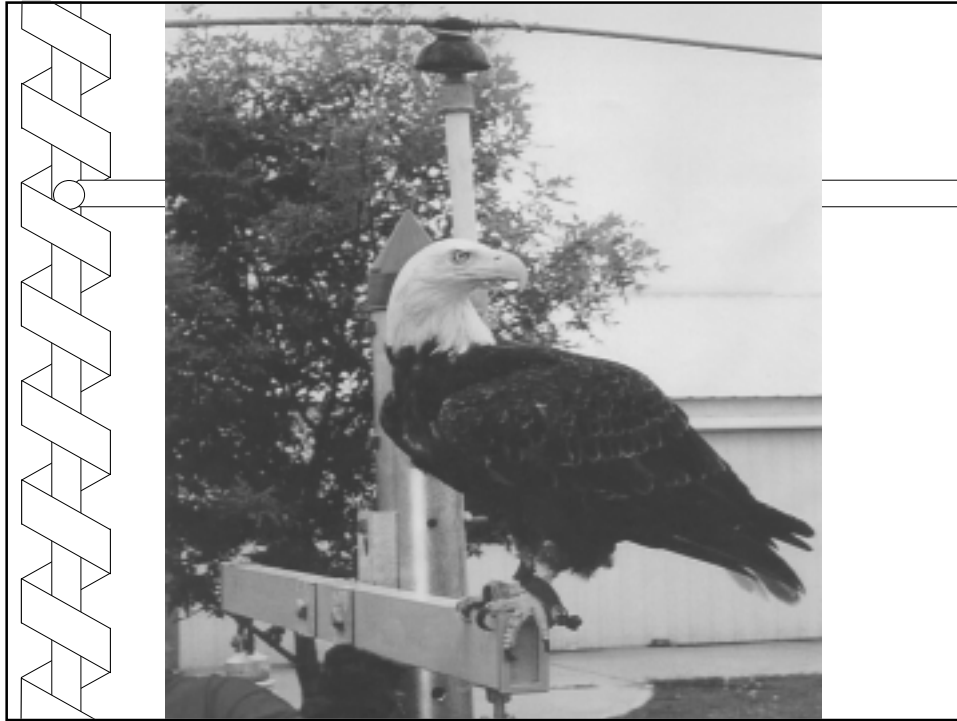


RUS RAPTOR GUIDELINES

*** NARROW PROFILE ASSEMBLIES**

*** NON-WOOD POLE ASSEMBLIES**





RUS RAPTOR GUIDELINES

*** APPENDIX**

- MANUFACTURERS' LIST**
- REFERENCE MATERIAL**
- REPORTING FORM**

RAPTOR REFERENCES

- * **Suggested Practices for Raptor Protection On Power Lines: State of the Art in 1996**
- * **Mitigating Bird Collisions With Power Lines: State of the Art in 1994**
- * **Animal-Caused Outages**
- * **Raptors At Risk**

