Shivani Sidhar
Regulatory Case Manager
San Diego Gas and Electric Company
8330 Century Park Court
San Diego, CA 92123-1530

September 2, 2016

Sent Via Electronic Mail and Sempra EDT

A.15-09-010
Wildfire Expense Memorandum Account

Michael Shames
San Diego Consumers' Action Network
6975 Camino Amero
San Diego, CA 92111

Re: SDG&E Response to SDCAN Data Request 01 – Wildfire Expense Memorandum Account

Dear Mr. Shames,

Attached please find SDG&E's response to SDCAN Data Request 01 (SDCAN-SDG&E-A.15-09-010-01), dated August 18, 2016. Due to size, SDG&E has sent the attachments referenced in this response via Sempra Electronic Data Transfer (EDT).

If you have any questions or require additional information, please feel free to contact me by phone at (858) 637-7914 or e-mail: **SSidhar@semprautilities.com**.

Sincerely,

Signed

Shivani Sidhar
Regulatory Case Manager

Enclosures

cc: Chris Lyons – SDG&E
Stacie Atkinson – SDG&E

SDCAN DATA REQUEST
SDCAN-SDG&E DR-01, Q1-13
SDG&E WEMA PROCEEDING - A.15-09-010
SDG&E RESPONSE
DATE RECEIVED: August 18, 1016
DATE RESPONDED: September 2, 2016

I. GENERAL OBJECTIONS

1. SDG&E objects generally to each request to the extent that it seeks information protected by the attorney-client privilege, the attorney work product doctrine, statutory mediation confidentiality (see Cal. Evid. Code §§ 1115-28) or any other applicable privilege or evidentiary doctrine. No information protected by such privileges will be knowingly disclosed.

2. SDG&E objects generally to each request that is overly broad and unduly burdensome. As part of this objection, SDG&E objects to discovery requests that seek "all documents" or "each and every document" and similarly worded requests on the grounds that such requests are unreasonably cumulative and duplicative, fail to identify with specificity the information or material sought, and create an unreasonable burden compared to the likelihood of such requests leading to the discovery of admissible evidence. Notwithstanding this objection, SDG&E will produce all relevant, non-privileged information not otherwise objected to that it is able to locate after reasonable inquiry.

3. SDG&E objects generally to each request to the extent that the request is vague, unintelligible, or fails to identify with sufficient particularity the information or documents requested and, thus, is not susceptible to response at this time.

4. SDG&E objects generally to each request that: (1) asks for a legal conclusion to be drawn or legal research to be conducted on the grounds that such requests are not designed to elicit facts and, thus, violate the principles underlying discovery; (2) requires SDG&E to do legal research or perform additional analyses to respond to the request; or (3) seeks access to counsel's legal research, analyses or theories.

5. SDG&E objects generally to each request to the extent it seeks information or documents that are not reasonably calculated to lead to the discovery of admissible evidence.

6. SDG&E objects generally to each request to the extent that it is unreasonably duplicative or cumulative of other requests.

7. SDG&E objects generally to each request to the extent that it would require SDG&E to search its files for matters of public record such as filings, testimony, transcripts, decisions, orders, reports or other information, whether available in the public domain or through FERC or CPUC sources.

8. SDG&E objects generally to each request to the extent that it seeks information or documents that are not in the possession, custody or control of SDG&E.

9. SDG&E objects generally to each request to the extent that the request would impose an undue burden on SDG&E by requiring it to perform studies, analyses or calculations or to create documents that do not currently exist.

10. SDG&E objects generally to each request that calls for information that contains trade secrets, is privileged or otherwise entitled to confidential protection by reference to statutory protection. SDG&E objects to providing such information absent an appropriate protective order. With respect to the Office of Ratepayer Advocates, however, SDG&E will produce such information subject to the requirements of Public Utilities Code Section 583 and General Order 66-C.

II. EXPRESS RESERVATIONS

1. No response, objection, limitation or lack thereof, set forth in these responses and objections shall be deemed an admission or representation by SDG&E as to the existence or nonexistence of the requested information or that any such information is relevant or admissible.

2. SDG&E reserves the right to modify or supplement its responses and objections to each request, and the provision of any information pursuant to any request is not a waiver of that right.

3. SDG&E reserves the right to rely, at any time, upon subsequently discovered information.

4. These responses are made solely for the purpose of this proceeding (A.15-09-010) and for no other purpose.

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III. RESPONSES

Request 1:

Please provide any and all documents and data related to any and all phase to phase and phase to ground faults on TL637 on October 21, 2007.

Objection: SDG&E objects to this request on the grounds set forth in General Objection 2 and 7. Subject to the foregoing objection, SDG&E responds as follows.

Response: The "Exhibits from Prior Proceedings" that SDG&E previously made available to the parties, in March and April 2016, contain responsive information. In particular, see the exhibits that were entered into the record of I.08-11-006 (Exhibits 1WR-6WR).

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Request 2:

Please provide a complete copy of SDG&E Transmission Design, Engineering and/or Construction Standards in effect on October 21, 2007.

Response: SDG&E expects to produce a responsive document on September 6, 2016.

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DATE RESPONDED: September 2, 2016

Request 3:

Please provide copies of all lab reports, photographs, correspondence and documents provided to C. Larry Davis, Esq. by Edward L. Clark, Jr. from October 21, 2007 to the present.

Objection: SDG&E objects to this request on the grounds set forth in General Objection 1-5.

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Request 4:

Please provide copies of any and all surveys or reports done by Osmose in 2006 and 2007 regarding TL637, including, but not limited to the "San Diego Gas & Electric Pole Detail Report prepared by Osmose Utilities Services, Inc., SDG&E Ref. Num. TR637, Job No. 0-15-603, including but not limited to Pole Inspection Detail Reports, Restorable Reject Poles Reports, Non-Restorable Reject Poles Reports, Poles Needing Maintenance Reports" including all charts, tables, summaries and photographs submitted with or attached to such reports.

Objection: SDG&E objects to this request on the grounds set forth in General Objection 2. Subject to the foregoing objection, SDG&E responds as follows.

Response: See "Osmose.zip" folder which is being sent via Sempra EDT.

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Request 5:

Please provide a complete copy of any and all surveys and/or reports done by EDM International, Inc. and Project Design Consultants for SDG&E regarding TL637 from October 21, 2007 to the present.

Objection: SDG&E objects to this request on the grounds set forth in General Objection 2. Subject to the foregoing objection, SDG&E responds as follows.

Response: See "EDM.zip" folder and "PDC.zip" folder which are being sent via Sempra EDT.

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Request 6:

Please provide a complete copy of all discovery productions produced by PAR Electrical Contractors and Herman Weissker to SDG&E from the 2007 Wildfire Litigation referenced in this application.

Objection: SDG&E objects to this request on the grounds set forth in General Objection 2. Subject to the foregoing objection, SDG&E responds as follows.

Response: See "PAR productions.zip" folder and "Weissker.zip" folder which are being sent via Sempra EDT.

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Request 7:

Please provide of a copy of the Power Line Fire Prevention Field Guide (2001 Edition)

Response:

See attached " 2001 Powerline Fire Prevention Field Guide.pdf."

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Request 8:

Please provide a copy of SDG&E's Wildfire Prevention and Fire Safety Guide in effect on October 21, 2007.

Response:

See attached " Wildland Fire Prevention & Fire Safety Guide.pdf."

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DATE RESPONDED: September 2, 2016

Request 9:

Please provide a complete copy of SDG&E's Hazardous Fire Conditions Red Flag Warning, Transmission Monitoring and Control (TMC1320) (2006 Edition).

Objection: SDG&E objects to this request on the grounds set forth in General Objection 10. This document contains confidential information, but SDG&E is willing to produce it to SDCAN, subject to entering into a Non-disclosure Agreement.

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Request 10:

If in the possession of SDG&E, please provide a complete copy of the California Department of Forestry and Fire Protection ("CalFire") Investigation Report of the Witch Fire (Case No. 07-CDF-570 and Incident No. 07-CA-MVU-10432) prepared by Fire Captain Specialist Matthew Gilbert and dated July 1, 2008, including all exhibits thereto and any and all photographs taken by Fire Captain Specialist Matthew Gilbert pursuant to his investigation of the Witch Fire, whether or not utilized in such Report; as well as complete copies of any and all Supplements and/or Updates to such July 1, 2008 Report. If SDG&E is not in possession of these documents, please so indicate with specificity.

Objection: SDG&E objects to this request on the grounds set forth in General Objection 7. Subject to the foregoing objection, SDG&E responds as follows.

Response:

A complete copy of the California Department of Forestry and Fire Protection ("CalFire") Investigation Report of the Witch Fire (Case No. 07-CDF-570 and Incident No. 07-CA-MVU-10432) can be found at:

http://www.calfire.ca.gov/fire_protection/downloads/redsheet/CA-MVU-010432_Complete.pdf

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Request 11:

If in the possession of SDG&E, please provide copies of any and all interview notes related to the interviews of any and all witnesses interviewed in relation to the preparation of the California Department of Forestry and Fire Protection Investigation Report by Fire Captain Specialist Matthew Gilbert dated July 1, 2008, including but not limited to interviews with Glenn Drown, Fire Captain Eric Johnson, Jeff Wood, Pilot Mike Venable (Tanker 73), Pilot Lynn McGrew (Tanker 71), Pilot Bill Hoskins (Tanker 70) and Pilot Bob Foster (Tanker 82). If SDG&E is not in possession of any these documents, please so indicate with specificity.

Objection: SDG&E objects to this request on the grounds set forth in General Objection 2. Subject to the foregoing objection, SDG&E responds as follows.

Response: See response to Request 10. SDG&E is not aware of any additional documents.

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DATE RESPONDED: September 2, 2016

Request 12:

If in the possession of SDG&E, please provide complete copies of any and all of CalFire's test results from any and all testing of evidence, at any time, relating to SDG&E's Transmission Line 637 from the October 21, 2007 fires If SDG&E is not in possession of these documents, please so indicate with specificity.

Objection: SDG&E objects to this request on the grounds set forth in General Objections 2 and 10. The evidence protocol material contains confidential information, but SDG&E is willing to produce it to SDCAN, subject to entering into a Non-disclosure Agreement.

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Request 13:

In relation to settlements with state agencies, please provide complete copies of the following:

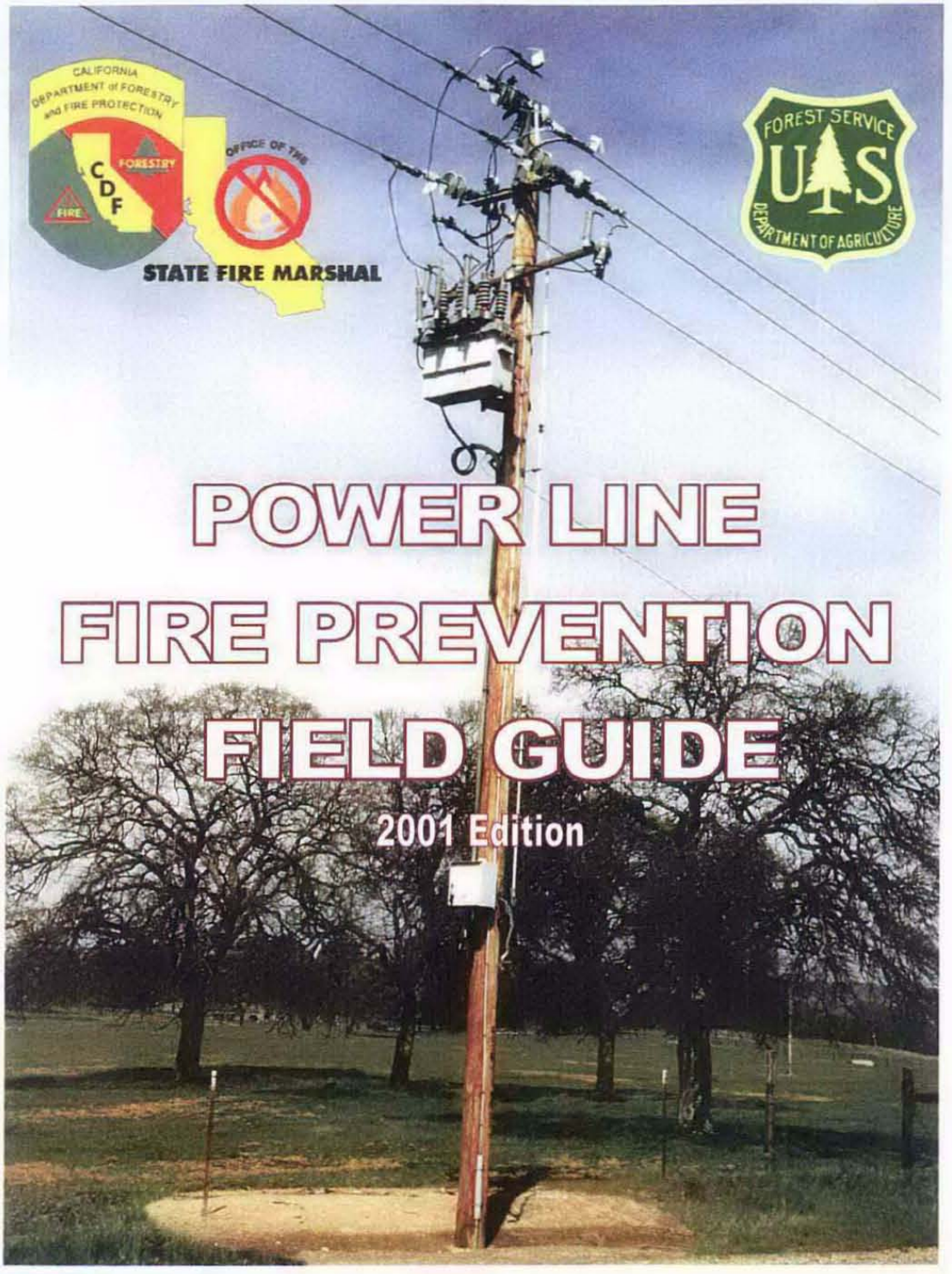
a. any and all Settlement Demands or documents referencing possible settlement to SDG&E/Sempra Energy from the California Department of Forestry and Fire Protection ("CalFire") and the California Department of Parks and Recreation;

b. any and all Settlement Agreements between SDG&E/Sempra Energy and the California Department of Forestry and Fire Protection ("CalFire") and the California Department of Parks and Recreation;

c. any and settlement checks paid by SDG&E in settlement of the claims by the California Department of Forestry and Fire Protection and the California Department of Parks and Recreation with regard to the Witch, Guejito, Rice and any other fire occurring in 2007, including but not limited to checks and/or wire transfer advices referencing payment to the California District Attorneys Association and/or the California General Fund.

d. any and all Settlement Agreements or documents referencing possible settlement between the California Department of Forestry and Fire Protection and San Diego Gas & Electric Co. and/or Sempra Energy from 2000 and the present.

Objection: SDG&E objects to this request on the grounds set forth in General Objections 1-5. SDG&E further objects to this request on the grounds that it calls for information that has been deferred to Phase 2 of this proceeding.



POWER LINE FIRE PREVENTION FIELD GUIDE

2001 Edition

Pacific Gas and Electric Company

SOUTHERN CALIFORNIA EDISON

An EDISON INTERNATIONAL℠ Company

SDGE

Power Line Fire Prevention Field Guide

March 27, 2001

Gray Davis
Governor
State of California

Mary D. Nichols
Secretary for Resources
The Resources Agency

Andrea E. Tuttle
Director
Department of Forestry and Fire Protection

John Tennant
State Fire Marshal
Department of Forestry and Fire Protection

Contents

Section 1

Section 1

Foreword

This Guide contains standards necessary to minimize wildland fires that may be caused by the operation and maintenance of electrical power lines. These standards are based upon the studies and experiences of fire agencies and power line operations personnel, as well as on federal regulations and the laws of the State of California. These standards are to be considered minimum guides. Field conditions may indicate the need for efforts beyond these minimums.

Except for sample copies retained for historical or reference purposes, all copies of prior editions should be withdrawn from circulation and destroyed. Moreover, regardless of the inferences that any reader may draw from any statement in this Guide, the law must be obeyed. Thus, if there is any conflict between any statement in this Guide and any applicable statute, regulation or order, the statute, regulation or order shall take precedence. Some of the applicable statutes and regulations are set forth in STATUTES AND REGULATIONS section of this Guide.

It is expected that all personnel who make condition inspections and surveys, inspections of power lines, or who prescribe hazard reduction work or other fire prevention measures will be thoroughly familiar with the contents of this Guide. They should use it, refer to it regularly and observe the principles and practices included herein.

This Guide was developed as a mutual undertaking by the California Department of Forestry and Fire Protection, the Pacific Gas and Electric Company, the Southern California Edison Company and the other electric utilities of California. Its purpose is to provide information to the personnel of the fire service agencies and electrical operators for minimum uniform application within the areas of their respective jurisdiction and franchise responsibilities. The Guide is not to be used as a substitute for proper training, but as a reference for personnel already familiar with the subject.

This edition of the Guide has been substantially revised not only to reflect changes in laws, regulations, policy and technology, but also to enhance its usefulness as a working field tool. This guide is not intended to dictate to electrical utilities the methods which they must use to construct their facilities. However, the guide does detail fire hazard reduction maintenance procedures for conductors and for certain items of hardware.

1.1. Introduction

It is our intent that this edition of the Power Line Fire Prevention Field Guide will continue the partnership between fire agencies and the electric utilities. By working together and sharing expertise, technology, communications, training and data gathering, we can enter a new era of fire prevention and savings to the taxpayers and shareholders, both in dollars and in the valuable California environment.

Partnership Projects should consist of ideas and projects which further both fire prevention and economic efficiency as well as savings for the electric utilities.

Of the most vital importance is communication between the fire agencies and the electric utilities. We must take the utmost advantage of the current communication technology available to us. We need to establish an electronic mail and bulletin board system in which all parties can freely and formally communicate. The fire agencies need to provide immediate notification to the electric utilities when fires involve their property and equipment. The electric utilities need to notify the fire agencies when their equipment or hardware cause fires unknown to the fire agencies. Critical to the prevention of fires caused by electrical power is knowing when and where they occur and building this information into a GIS database which is shared by the fire agencies and electric utilities for future models and projects.

Currently, electric utilities are making an effort to inventory and map their power lines, power poles, hardware and equipment in a GPS and GIS system database. Performance and statistical data can be used to monitor exempt and non-exempt hardware both inside and outside the established fire hazard severity zones.

An expansive database can be used to focus and monitor vegetation management and maintenance in the fire hazard severity zones. Tree inventories can be beneficial to both the fire protection agencies and the electric utilities in both planning and maintenance situations.

Power line maintenance and construction can become a part of the Fire Protection Planning process in the construction of residential settings in the Wildland/Urban interface areas which are constantly expanding and growing.

Working together with the local electric utility representatives in training programs, inspection programs, maintenance programs, mapping projects and fire protection planning, is an investment of time and money which will ultimately save time, money and the valuable natural resources of California for future generations.

2. Electric Power

Electricity differs from other products because it is manufactured and used at the same instant. However there are similarities between it and other manufactured goods. First, a factory is required for production. For electricity this is the generating station. Second, the product must be transported in bulk to a distribution center. This is accomplished by use of high-voltage transmission lines. Third, from the distribution center, the product must be placed in the hands of the customer. Electricity makes its final journey to the customer over distribution lines.

2.1 Generation

At the present time, there are only two practical methods for manufacturing electricity in the large quantities needed to supply an area such as California. They are hydro-electric generation, which utilizes falling water as a means of turning a turbine generator, and steam generation, which requires a fuel to convert water to steam, which in turn drives a turbine generator.

The voltage at which electricity is generated varies depending on the installation. This voltage is then boosted by step-up transformers at the generating plant to the high voltage required for transmission over long distances.

2.2 Transmission

The transmission voltages in common use are 50 kV to 500 kV. It is then transmitted over tower lines to centrally located transmission and distribution substations.

2.3 Distribution

Distribution voltages commonly in use are 2.4 kV to 35 kV. Distribution circuits supply transformers which reduce the voltage so that it can be utilized by the customer. The secondary voltages which are normally supplied to the customer are 120 volts to 480 volts.

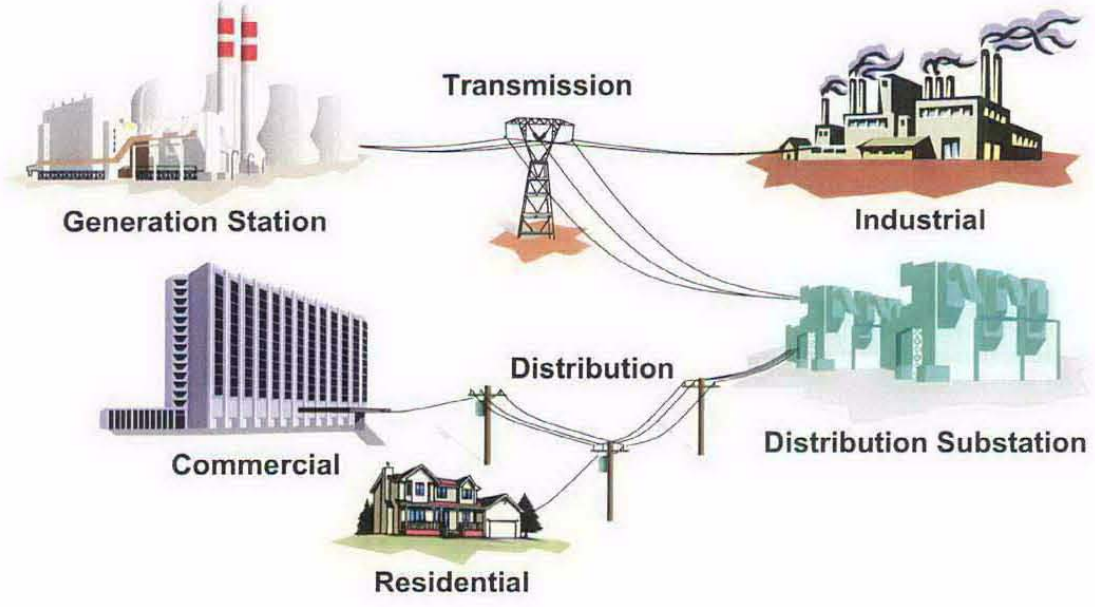
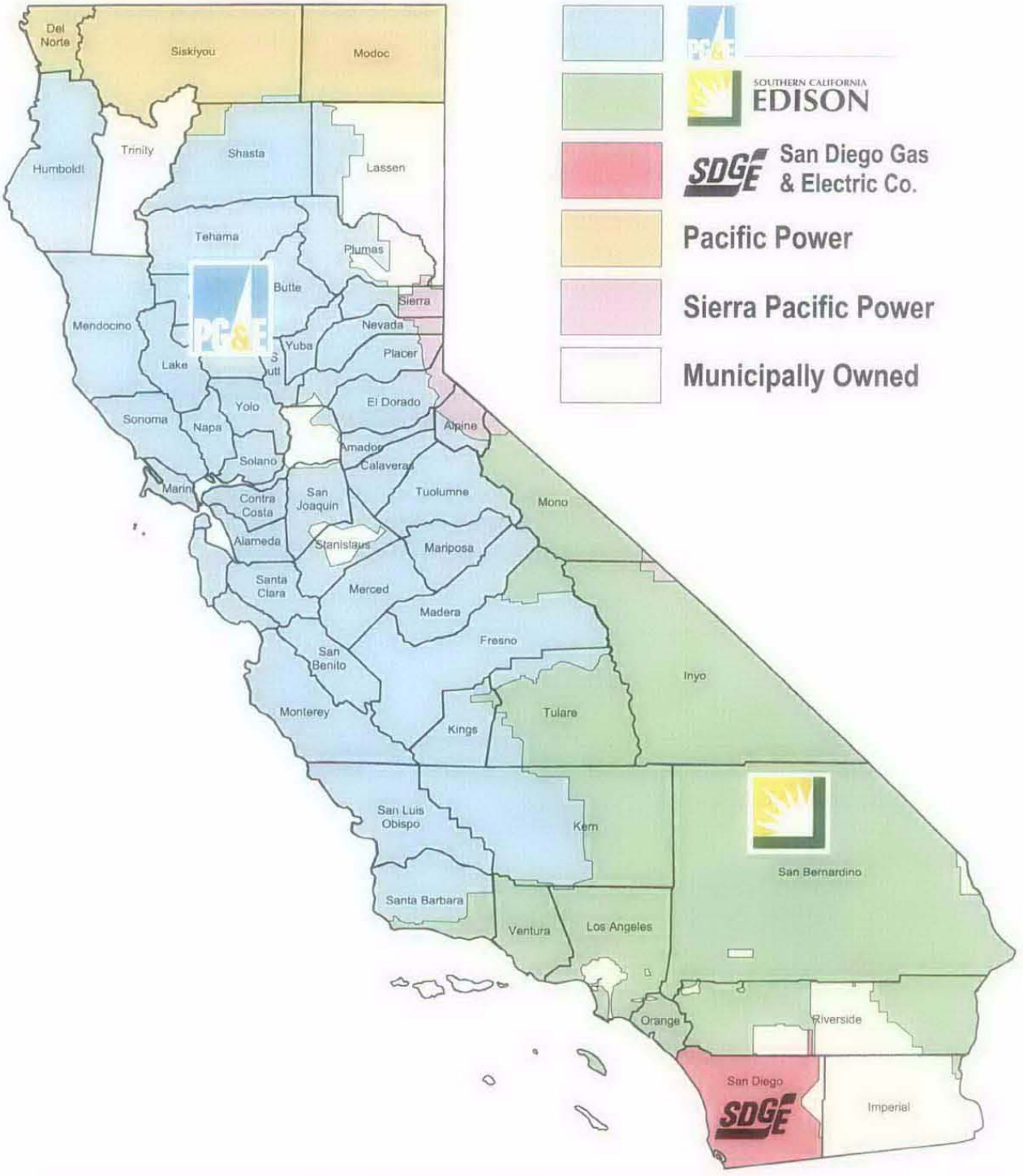


Figure 1

Major California Utility Companies



3. Fire Hazard

Electrical power presents an unusual hazard which brings about a mutual concern on the part of fire protection agencies and the electric utilities for making the transmission and distribution of electrical power as fire safe as possible. Fire protection agencies in their regulatory roles are concerned with public safety, loss and damage to natural resources and watershed as well as the costs of fire suppression. The electric utilities, both publicly and privately owned, are concerned with minimizing potential electrical fire hazards and minimizing interruptions of service to their customers.

This mutual concern has led to the creation of several editions of this Guide and now, to this revision. This Guide will be useful to, and used by, utility employees and the fire and resource protection agencies.

The potential exists that power line caused fires will become conflagrations during the long, hot and dry fire season commonly experienced in California. The very same weather conditions that contribute to power line faults also lead and contribute to the rapid spread of wildfire. The most critical of these weather factors is high wind, which is commonly accompanied by high temperatures and low humidity.

High, gusty winds may cause vegetation to sway into power lines, break off limbs or fall into power lines. High winds may also create vibrations in power lines that can lead to stress failures or cause loose connections to separate. Arcing usually accompanies such faults. Automatic reclosers re-energizing the line into the fault may cause repeated arcing and increase the probability of igniting vegetation.

4. Utility Pole/Tower Vegetation Clearance

The basic requirement for clearances around poles and towers is contained in Section 4292, of the California Public Resources Code (PRC). This section requires clearing of flammable fuels for a 10 foot radius from the outer circumference of certain poles and towers (non-exempt or subject poles or towers). Clearance requirements are based on the type of hardware affixed to the line at the pole or tower. The distances for clearance requirements must be measured horizontally, not along the surface of sloping ground.

For the specific procedures and requirements for compliance with Section 4292 of the Public Resources Code, see the Statutes and Regulations Section of this Guide.

5. Conductor Clearances

The basic requirements for clearances around electrical conductors are set forth in Section 4293, of the California Public Resources Code (PRC). This section requires clearance of all vegetation for a specific radial distance from conductors, based on the voltage carried by the conductors: four feet for voltages between 2,400 volts and 72,000 volts; six feet between 72,000 volts and 110,000 volts; and ten feet over 110,000 volts.

In addition this section requires the removal or trimming of trees, or portions of trees, that are dead, decadent, rotten, decayed or diseased and which may fall into or onto the line and trees leaning toward the line.

Although not required by law, a good safe practice, as reflected in many easements and use permits as well as the internal policies of several utilities, calls for a two foot radial clearance of all vegetation around any unprotected (without insulation) conductors energized at less than 2400 volts. The basic required clearances are considered minimum standards and often should be

exceeded. Some company policies require considerably more clearance as a general rule or in special situations, such as unusually long spans in high wind areas. This is especially true where the line is passing through an area of rapidly growing vegetation.

In many cases, the utility right-of-way or easement is considered the primary fire break by the fire agencies. The stacking or accumulation of debris resulting from tree trimming or removal operations should be avoided on these fire breaks. When these conditions exist, the debris should be chipped and scattered, avoiding the possibility of compromising the fire break.

6. Exemptions

Exemptions to the conductor clearance requirements are contained in Sections 4292, 4294, 4295 and 4296, PRC. Section 4293 authorizes other exemptions by administrative regulation. Exemptions are found in Title 14, Section 1257, California Code of Regulations.

The first exemption is in PRC Section 4292, which states that any line used exclusively as a communications circuit and so classed by the Public Utilities Commission, is exempt from the pole or tower clearance requirement. Railroad circuits, for instance, are used primarily for communication purposes but also provide power, more than 750 volts to operate track switches, and thus are not exempt.

Section 4292, PRC also authorizes the Director of Forestry and Fire Protection, and certain others, to make exceptions. Exceptions are contained in Section 1255, Title 14, Code of Regulations (CCR). These exceptions concern installed hardware and ground cover.

Section 4295 PRC recognizes private property rights by not requiring trespass if that is the only way in which clearance requirements can be maintained. It is not, however, intended as a loophole. Utilities are expected to make reasonable effort to secure permission to make the clearances and, if unsuccessful, to report their problem to the responsible fire protection agency. The agency can then attempt to persuade the property owner to allow the clearing.

Section 4296, PRC exempts lines carrying voltages of 750 volts or less. It has been found, however, that such lines, which are not insulated, can start fires. It is therefore considered good practice to maintain some clearance on these lines.

Section 1255, Title 14, exempts poles or towers where the conductors are continuous, or if not continuous, where they are joined by automatic, compression, copper or aluminum parallel groove connectors (i.e. Figures 3-20, 3-46 and 3-47). Automatic connectors are non-exempt if installed on jumper or other slack wires since they will not hold except under tension. Hot line tap or clamp connectors are exempt only if they are designed to absorb any expansion or contraction by applying spring tension on conductors (Figure 3-35). This section also exempts completely sealed and liquid filled equipment (Figures 3-6 through 3-11). Plate connectors are exempt, provided they are held together by two or more bolts (Figure 3-43). Solid blade, single-phase bypass switches and solid blade, single phase disconnect switches associated with circuit reclosers, sectionalizers and line regulators and Fargo FA 300 series piercing connectors when used with tree wire, are exempt. (Figures 3-36, 3-37).

The exemptions in Section 1255, Title 14, are related to the vegetation growing around the pole or tower. The subsections relate to essentially nonflammable vegetation that will not propagate fire. Subsection "c" covers vegetation maintained for the specific purpose of soil erosion and fire prevention. This is not intended as a loophole. The key words are "specific purpose", and they require a positive demonstration of this purpose in order to qualify.

7. Special Concerns

Legal considerations aside, special circumstances can exist that require additional hazard reduction measures in order to prevent fires or the liability that might arise from them.

Large birds and raptors are a fairly common hazard causing the need for special measures, as they frequently develop a liking for a particular pole or tower as a roosting place. Two fire prevention problems arise from this situation. First, their droppings build up on insulators to the extent that the potential exists for a flash-over between conductors and the crossarm. This situation can cause a line fault and the potential for glowing debris to fall from the pole to the ground. Secondly, during take-off or landing, their wings can touch two conductors simultaneously and create a short circuit. This situation can cause the bird to fall to the ground and ignite dry vegetation below the conductor. When such poles or towers are discovered, the ground should be cleared of all vegetation around them as a fire prevention measure. During inspections, an LE-38, LE-38A or USFS 5100-209 should be written, as advisory only, should these conditions be found. These situations may also be remedied with the installation of raptor construction (Figures 4-15 through 4-19).

Similar problems have been found and exist involving small birds and climbing animals resting on transformers. Some utilities use a plastic wildlife protection boot over one bushing of the transformer to prevent birds and animals from causing a direct short-circuit between the transformer bushings. Again, an advisory LE-38 should be written when these conditions are found.

Other conditions that may lead to potential fire problems are damaged hardware, damaged insulators, weather or bird damaged poles and broken strands on conductors. Porcelain insulators will allow a flash over if they lose too much of the skirt. Broken crossarms, damaged poles or bent brackets and braces can allow conductors to touch the ground or come into contact with each other. These situations, if not corrected, allow a potential wildfire to exist.

Not only do the aforementioned situations create potential fires, they lead to other problems which the utilities are anxious to repair as soon as possible. If you find any of these situations to exist, immediately notify the utility company having jurisdiction, that the conditions exist and the exact location of those conditions.

Vegetation should not be cleared from right-of-ways, except as necessary to effect required clearance around poles and towers, as the vegetation holds soil in place and presents a natural environmental appearance.

Situations exist in which the minimum legal clearance is clearly inadequate, such as localized high or turbulent winds found in canyons or extremely high local air temperatures in low elevation canyons.

Hazardous conditions may also occur from natural or man-made causes. Snags left from old burns or insect kills sharply increase the potential for dead or dying trees to fall into power lines. In these instances it may be necessary to fall or trim trees beyond the legally required distance from conductors.

Standard unprotected conductors, for primary distribution lines, and self-supporting aerial cable, can only be attached to trees in accordance with Title 14, Section 1257. However, in no case are conductors of any kind to be mounted to snags or dead trees.

8. Training

This Guide is to be used as a reference for personnel already familiar with the subject areas contained within.

This Guide is also to be used as the base level of knowledge necessary to perform adequate, accurate, and complete inspections which require that personnel using this guide be properly trained as to the application of the contents of this guide.

Training is available through the CDF Fire Academy, Region Office Fire Prevention Section or the CDF Unit Fire Prevention Bureau.

Inspection Policies

Basic Laws Pertaining to Power Line Operations Quick Reference Table

Public Resources Code

4 Feet .....2.4 - 72 kV

6 Feet .....72 - 110 kV

10 Feet .....Over 110 kV

California Code of Regulations Title 14, Article 4

9. Exemption Policy

Policy for Qualifying Electrical Equipment and Devices for Exemption from Public Resources Code Section 4292.

The utility will submit all exemption requests to CDF's Fire Prevention Engineering Section at Sacramento Headquarters and will include at least the following:

- Photograph's and description of equipment/devices tested (photo size 8 x 10 minimum)
- Description of testing procedures, i.e. ANSI Standard C37.40 - 1981
- Test results
- Professional Electrical Engineers conclusions

Written notification will be forwarded to the utility within 60 days after receipt of the request for exemption by CDF. Notification will consist of at least the following:

- Approval or denial of exemption
- Justification for the determination

9.1 Exemption Procedures:

Equipment and devices will be tested to ensure compliance according to the test procedures outlined in this standard prior to obtaining an exemption from Public Resources Code Section 4292 from the California Department of Forestry and Fire Protection.

- CDF Fire Prevention Engineering Section will be notified 30 days prior to an exemption test.
- The electrical tests, for determining compliance, will be conducted under the direction of an Electrical Engineer using test equipment capable of making and breaking preset loads. The current, voltage and starting and ending times shall be graphically recorded and become a permanent part of the documentation of the request for exemption.
- Tests will be conducted utilizing a fuel bed representative of flammable vegetation (dead, dried grass or equivalent), with a fine fuel moisture of 5% at 70° - 89° degrees Fahrenheit and an accompanying wind speed of 10 MPH or more.
- All equipment installed on lines shall be operated within the maximum manufacturers duty rating of the equipment or device.
- Equipment will be installed under actual field conditions according to manufacturers specifications while undergoing testing.
- Enclosed devices, i.e., reclosers, sectionalizers, autotransformers, non-expulsion devices etc., shall be designed so no external arcs/sparks or expelled hot particles will be generated during the operation.
- Open type or fixed devices, i.e., air switches, open link fuses, connectors, lightning arresters, manual by-pass switches and disconnects shall interrupt line current and short circuit current within the design range without creating arcs/sparks or hot particles that would ignite flammable vegetation.
- The equipment or overhead device, when installed according to the manufacturers recommendations, must be fire safe, by test, where exposed/anticipated electrical arcs or hot material could be generated.
- Overhead line equipment and devices that may generate exposed electrical arcs, sparks or hot material during their operation shall be designed to limit any such arcs, sparks or hot materials sufficiently to prevent the ignition of flammable vegetation.
- Igniting any portion of the test bed will disqualify the device when testing is conducted in the above described environment.

10. Inspection Policy

Both utilities and fire protection agencies have responsibilities for inspection of power lines. However, the reasons and purposes of their inspections are different. Although joint inspections are desirable and helpful, often they are not practical.

The utilities have an operational and management responsibility for inspecting their lines. They must determine what work needs to be done in order to comply with laws and use permits, and to prevent fires and avoid interruption of customer service. They also need to know, after the work is assigned, whether or not it has been done and to what standards.

The fire and resource protection agencies' inspection responsibilities are primarily regulatory. They should make inspections (spot checks) of as small or large an area as necessary (seldom a complete inspection of an entire circuit) to satisfy themselves that the electric utility complies with regulations. These inspections should normally be done in late spring or early summer. The protection agency should notify the utility in writing of its findings.

Correction of violations and maintenance of required clearances and other safety measures are the responsibility of the utilities. Much of the clearance work is done by contractors. Neither contractors nor utility company employees should pass by an obvious violation or other problem because it is not on their assigned work list. Also, fire protection agency personnel should never ignore an observed violation or piece of broken or damaged equipment. It should be reported to the utility, in writing, so that the defect may be promptly corrected.

The California Department of Forestry and Fire Protection, USDA Forest Service, US Bureau of Land Management, and other wildland protection agencies may initiate criminal actions to secure compliance with laws and ordinances. These agencies also may process civil actions for collection of fire suppression costs and damage to their resources. Protection agencies will not take indiscriminate actions. However, when violations are present and can be supported by facts, a citation or criminal complaint may be issued.

10.1 Utility Company Inspections

The responsibility for inspection of power lines for compliance with laws and regulations, rests exclusively with the utilities.

The most basic method of power line inspection is visual, conducted by ground or air. This method of inspection can determine accurately whether required clearances exist, structures are in need of repair, etc.

An infrared (IR) scan is used to detect components with thermal anomalies. Improper or loose connections, as well as most other incipient deterioration, create electrical resistance and, therefore, heat. Heat often cannot be detected visually but shows up clearly during an IR scan.

In terms of exposure, there are 5 to 10 times as many miles of distribution lines as transmission lines. Fire protection agency statistics show that more fires start from distribution lines than from transmission lines. Distribution circuits commonly carry more non-exempt hardware (clearance required) and are built with less conductor clearance than are transmission lines. Therefore, distribution lines should also receive frequent inspection.

The frequency of inspection of both transmission and distribution lines depends on various other factors, such as: type and growth rate of vegetation, accessibility to fire fighting forces, frequency of strong or gusty winds and fire history. Inspection schedules must be flexible enough to accomplish their purpose.

10.2 Fire Protection Agency Inspections

The fire protection agencies are charged with the responsibility of protecting the public from loss of life, property and resources by fire. They are also charged with enforcing the forest and fire laws. To accomplish these missions, they inspect power lines to prevent wildfires. Protection agency inspections do not, however, relieve public utilities of the responsibility of inspecting their own facilities. Public fire protection agencies do have a duty to make known to utilities those violations and defects noted during their inspections. Protection agency personnel will seldom make a complete inspection of an entire circuit. Their procedures include: spot inspections of individual poles, towers, spans, or short segments of circuits: general surveys (usually by air): compliance checks following prior notification of violations; detailed inspections of small areas (because of fire or complaint).

Most fire agency inspections are adequately conducted by visual inspection. Inspectors should be equipped with such aids as binoculars, magnifying glasses and cameras. The use of such equipment is particularly important when making fire-cause investigations, but can also be quite helpful in conducting inspections. Because of the danger of electrocution, fire agency personnel are NOT to attempt to physically or mechanically measure conductor clearances. Visual estimation is adequate.

The result of any fire agency inspection should be properly recorded. Each agency has its own forms and procedures for this purpose. Fire-cause investigations will usually be recorded on special forms. Other types of useful forms which are used by the CDF, USFS and BLM in California, are the California Fire Safety Inspection Report (LE –38, LE-38A) or the USFS version (5100-209), (Figure 2, page 1-15) (Figure 3, Page 1-16) Regardless of the format of the report, a copy should be sent or given to the operating utility. Reports should be specific enough for the utility to act on their findings and for the courts to relate them to complaints or other legal actions in the event such actions are filed.

Protection agency personnel frequently notice conditions on power lines that are not violations of fire laws or regulations but which may cause an electric fault, a hazard to linemen, a break in customer service, etc. When noticed, such items should be noted on the inspection report and/or reported to the utility immediately. Verbal notice is usually adequate but should be followed up with a written notice. Should a wildfire occur as a result of a fault, hazard or violation, etc., proper recording is necessary to establish liability and criminal negligence.

A planned program of inspections to gain compliance with fire prevention laws, aimed at reducing wildfire occurrence, will be carried out by the CDF. The program must be as long range and flexible as needs require.

As hazard and risk problems change, the emphasis of any fire prevention program must also change to meet the problem.

Success depends on the fire prevention inspector and the inspection program. The inspector's aim must be to handle all contacts in such a way that people will be favorably impressed and will have confidence in CDF.

The authority for the CDF, USFS, and BLM to enforce California forest and fire laws is Public Resources Code, Section 4119 that authorizes the Department or authorized agents to inspect all properties, except a dwelling's interior, to ascertain compliance with state forest and fire laws.

To perform the inspection successfully, the inspector should have specific tools:

A. Badge, name plate and shoulder patch.
B. Agency identification card.
C. The California Interagency Fire Safety Inspection Form and a notebook to record the inspection and to take notes of hazards and risks. Sketched maps aid in future inspections or fire fighting operations.
D. Copies of laws, ordinances and fire prevention material.
E. Prior inspection records.
F. Binoculars, camera and circuit maps if available.

After completing the inspection, the inspector should note all violations in writing on the Interagency Inspection Form and set a definite time limit for compliance. The time limit should be reasonable for the amount of work to be done. The inspector may consult the electric utility and jointly set the time limit, if within reason, since the work will more likely be completed on time.

The more critical the situation, the more urgent compliance becomes. However, weather conditions, stage of the vegetation cure and approaching windy seasons should dictate allowable time for the work's competition.

Follow-up inspection is absolutely necessary for effective inspections. The electric utility should understand that the inspector will be re-inspecting the violation immediately after the date set for compliance. If the inspector does not go back, the value of the inspection will be lost and a potential fire may still continue to exist.

10.3 Joint Inspections

Joint inspections are for the purpose of educating both fire protection agencies and electric utility personnel with possible violations and other power line problems. Joint inspections are not always possible because of time commitments or agency policy. They are, however, encouraged to the extent feasible, as they provide an excellent opportunity for mutual training, understanding and trust.

Usually the most productive form of joint inspection is the quick general survey of a complete circuit from either a motor vehicle or aircraft. Joint inspections should be documented.

10.4 Ground Inspections

Ground inspections may be made either in a motor vehicle or on foot. In either case, they are most efficiently performed by two-person teams. When inspecting from a vehicle, one team member should devote his entire attention to driving while the other observes the power line. The speed of the vehicle should be that needed for good observation.

Power lines often do not follow roads, or even off-road routes. Therefore, inspection must sometimes be done on foot. These segments often contain the greatest number of violations. In order to avoid wasting time, one person should walk the line while the other drives to a point where the line again crosses a road. If the line crosses the road and again goes cross-country, the team members can switch roles.

10.5 Aerial Inspections

Aerial inspection is an excellent means of covering a lot of territory quickly and at minimum cost. Some of the larger utilities own and operate their own aircraft. There are several contractors who fly regularly for both power and telephone utilities. Most protection agencies have aircraft

available. Several cost studies have shown that aerial inspection is less expensive than ground inspection in off-road situations that would otherwise require walking.

Helicopters may be used for power line inspections. Their maneuverability and ability to fly slowly and to hover makes them ideal for this purpose. Cost per flight hour is, however, from two to eight times that of an appropriate fixed-wing aircraft, and cost must be weighed in respect to the thoroughness of inspection needed. It has been demonstrated that with proper planning, preparation, training (of both pilot and observer) and experience, an adequate job of power line inspection can be accomplished from the air using either helicopters or fixed-wing aircraft. Results of aerial inspections should be ground checked until both pilot and observer have accumulated experience.

Aerial inspection is particularly good for spotting pole or tower clearances, leaning or dead trees not immediately adjacent to the line and the larger pieces of hardware requiring pole or tower clearance. It is also an excellent means of making infra-red inspections. A skilled observer can do many phases of power line inspection equally well from the air as from the ground. However, it is rather difficult to identify small items of hardware, conductor clearances or the less obvious tree defects accurately from the air.

11. Location Identification

Wildland fire protection agencies and electric utilities have two different systems of position or location identification. In order for communications (including inspection reports, inquiries regarding problems, etc.) to be meaningful, it is essential that both groups of people have at least a working knowledge of the other's system. There is not space here to completely define either system. Local joint training sessions should be utilized to acquaint personnel with these systems.

Most wildland fire protection agencies use the so called "GLO" (General Land Office) system of position location. This system defines locations by means of section, township and range. More detailed locations will be given by quarter section. This grid system is relatively easy to learn, but not always easy to apply accurately on the ground. The grid is usually superimposed on fire agency administrative maps, USGS topographic maps, and other maps. It is seldom shown on utility maps because it is not sufficiently precise to identify the location of an individual pole, tower, or conductor span.

The electric utilities, with some variation between systems, generally identify locations by circuit name, number and pole, tower or hardware number. Transmission lines usually are named and each pole or tower is numbered. One common system of such numbering is a fraction, the top number being the mile from the point of beginning and the bottom number being the number of the pole or tower within that mile. Other numbering systems are in use and the system used by a particular utility must be learned by fire agency personnel. Depending on the utility, distribution circuits may be numbered, named or both. Some utilities also number individual poles as well as just identify Subject Poles. Also, items of major equipment (e.g. automatic reclosers, switches, disconnects, etc.) are numbered. Poles without pole or equipment numbers must be located by reference to existing pole or equipment numbers (e.g. "fourth pole north of disconnect 6859", or "second pole west of pole 1892096E"). (See Figure 4 and 5, Page 1-17)

Figure 2

CALIFORNIA INTERAGENCY FIRE SAFETY INSPECTION LEGAL NOTICE

591651

INSPECTOR'S NAME: _____ DATE OF INSPECTION: ___/___/___
TITLE: _____ MONTH DAY YEAR

MAY BE CONTACTED AT: ( )

OTHERS PRESENT: _____

LOCATION OF INSPECTION:

INSPECTEE'S NAME: _____
ADDRESS: _____

FOLD LINE FOLD LINE

☐ NO VIOLATION OBSERVED AT THIS TIME. ☐ INSPECTION STICKER ATTACHED.
☐ YOU ARE HEREBY NOTIFIED TO CORRECT THE VIOLATIONS SPECIFIED BELOW.
☐ BEFORE OPERATING EQUIPMENT LISTED. ☐ VIOLATION TAG ATTACHED.
☐ REINSPECTION WILL BE MADE ON OR AFTER ___/___/___
MONTH DAY YEAR

☐ SEE "EXCERPTS FROM STATE AND FEDERAL LAWS" BELOW. NOTE SECTIONS CHECKED.

FOLD LINE FOLD LINE

EXCERPTS FROM STATE AND FEDERAL LAWS

(PRC) Public Resources Code
(H&SC) *Health & Safety Code*
(CAC) California Administrative Code

STATE LAW

LEGAL AUTHORITY

Certain Forest Service Officers are authorized to enforce State Fire Laws. They are:

1. Those who hold Wildatory Fire Warden and Peace Officer's appointments from the California Department of Forestry.
2. Other Forest Service employees designated annually pursuant to the joint Forest Service/California Department of Forestry Fire Cooperative Agreement.

PERMITS FOR BURNING

☐ A person shall not burn any brush, stumps, logs, fallen timber, fallowa, slash, grass, brush, forest, or other flammable material in any area requiring fire protection by the department or upon federal lands administered by the United States Department of Agriculture or Department of the Interior, unless he has a written permit from the department or its duly authorized representative or the authorized federal officer on federal lands administered by the United States Departments of Agriculture or Interior and in strict accordance with the terms of the permit. (PRC 4423)

CAMPFIRES

☐ A person shall not light, maintain, or use a campfire upon any brush, grass, or forest covered land which is the property of another person unless he first obtains a written permit from the owner, lessee, or agent of the owner or lessee of the property. If campsites have been established and posted for camping, a permit is not necessary. (PRC 4433)

USFS FORM R6-5100-209 (REV. 12/89)
CDF FORM LE-38 (REV. 12/89)

FIRE HAZARD REDUCTION AND EQUIPMENT

CLEARANCES AROUND STRUCTURES

Any person that owns, leases, controls, operates, or maintains any building or structure in, upon, or adjoining any mountainous or forest, brush, or grass covered lands, or any land covered with flammable material, shall do all the following:

☐ (a) Maintain around and adjacent to building or structure a firebreak for a distance of not less than 30 feet on each side or to the property line, whichever is nearer. This does not apply to single trees, ornamental shrubbery, or similar plants which are used as ground cover, if they do not form a means of rapidly transmitting fire from the native growth to any building or structure.

☐ (b) Maintain around and adjacent to any building or structure additional fire protection or firebreak which is located from 30 feet to 100 feet from each building or structure or to the property line, whichever is nearer, as may be required by the Director, because of extra hazardous conditions. Grass and other vegetation located more than 30 feet from such building or structure and less than 18 inches in height above the ground may be maintained where necessary to stabilize the soil and prevent erosion.

☐ (c) Remove that portion of any tree which extends within 10 feet of the outlet of any chimney or stovepipe.

☐ (d) Maintain any tree adjacent to or overhanging any building free of dead or dying wood.

☐ (e) Maintain the roof of any structure free of leaves, needles, or other dead vegetative growth.

☐ (f) Provide and maintain at all times a screen over the outlet of every chimney or stovepipe. The screen shall be constructed of noncombustible material with openings of not more than one-half inch in size. (PRC 4291)

INCINERATORS

Every person shall exercise reasonable care in the disposal of flammable material so that the material does not cause uncontrolled fire. A person shall not burn any flammable material in any incinerator within any area receiving fire protection by the Director or upon federal lands administered by the United States Department of Agriculture or Department of the Interior, unless the following minimum requirements are complied with:

☐ (a) The area within 10 feet of the incinerator is maintained clear of all flammable material and vegetation.

☐ (b) A screen constructed of a noncombustible material, with no greater than 1/4 inch mesh, or metal doors, cover each opening in the exterior to prevent the escape of burning material.

☐ (c) A permit is obtained prior to burning. (PRC 4446)

EQUIPMENT

During any time of the year when burning permits are required in an area, no person shall use or operate any motor, engine boiler, stationary equipment, welding equipment, cutting torch, tar pot, or grinding device which is located on or near any forest, brush, or grass covered land, without doing both of the following:

☐ (a) Clearing away all flammable material, including sangs, around such operation for 10 feet.

☐ (b) Maintain one serviceable round point shovel and one backpack pump water type fire extinguisher ready for use at the immediate area during the operation.

(CONTINUED ON REVERSE SIDE)

INSPECTEE COPY

7540-130-0038

FS 5100-209 and CDF LE-38

Figure 3

INTERAGENCY FIRE HAZARD INSPECTION NOTICE 012648

Inspector's Name: / Inspector's Phone #:	Inspection Date: / /	Ranger Unit ID	Batt. No.

Inspector's Title:
☐FC ☐FAE ☐FOR AIDE ☐FOR 2 ☐FPA
☐BC ☐FF-1 ☐FOR TECH ☐FPS 1 ☐Other
☐VIP ☐FF-2 ☐FOR 1 ☐FPS 2

Inspection No: ☐One ☐Two ☐Three

Assessor Parcel: Book - Page - Parcel

Inspectee:

Name

Street No | Dir | Street Name

City | State | Zip Code | Special Address

Phone Number | Latitude | Longitude

Location of Inspection:

Street No | Dir | Street Name

City | **Reinspection Date:** / /

Comments

Comments

Number Inspected (enter no.):

	Structures		Camp Fire		Fire Tools
	Mechanical Equipment		Open Burning		Miles
	Power Line Poles		Incinerator		Other
	Waste Disp Storage				

Special Use Permit ☐Y ☐N

Legal Action: ☐Admin ☐Citation ☐Complt ☐None ☐Other ☐Notice

Land Owner: ☐BIA ☐BLM ☐M.RES ☐NF ☐Other ☐Private

Protection Responsibility:

	SRA	LRA	FRA
BIA	☐	☐	☐
BLM	☐	☐	☐
CDF	☐	☐	☐
Contract County	☐	☐	☐
USFS	☐	☐	☐
Other	☐	☐	☐

Violation Reinspection ☐Y ☐N

Address Visible ☐Y ☐N

Fire Resistive Roof ☐Y ☐N

Inspected For and Number of Violations (see back):

Violation Code (ex. H&S, CFR)	Section (ex. 4291)	Sub-Section (ex. A, C)	No. of Violations

Type of Hazard:

Agriculture ☐ CampGround ☐ Comm Wood ☐ Construction ☐
Dwelling ☐ Mill ☐ Mineral ☐ Mtn Cabin ☐ Org Camp ☐ Power Line ☐
Railroad ☐ Resort ☐ Road ☐ Sales/Ops Area ☐ Waste Disposal ☐ Other ☐

Water Storage

Type of Vegetation
Grass ☐ Brush ☐ Oak/Woodland ☐ Conifer ☐

Form LE-38A (1/00)

THIS IS A LEGAL NOTICE OF FIRE HAZARD VIOLATIONS (IF NOTED ABOVE)

According to G.O. 95, poles and towers carrying circuits of over 750 volts must be marked as "High Voltage". Therefore, any pole or tower so marked can be identified as supporting either a primary distribution or a transmission line. The absence of such marking should not lead one to the assumption that only low voltage (secondary distribution) is present. Nearby poles on the same circuit should be checked as the marking may have fallen off of individual poles.

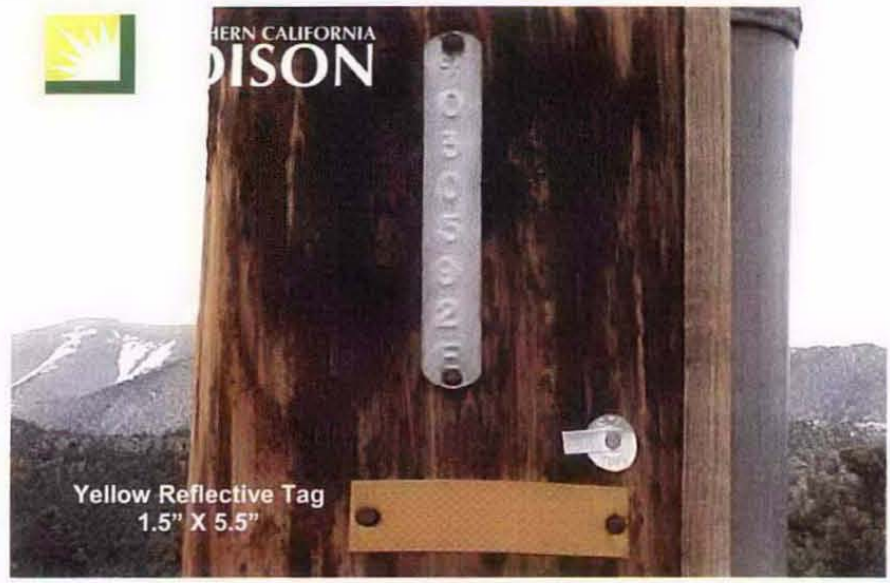


Figure 4. Non-Exempt Pole Identification
Southern California Edison

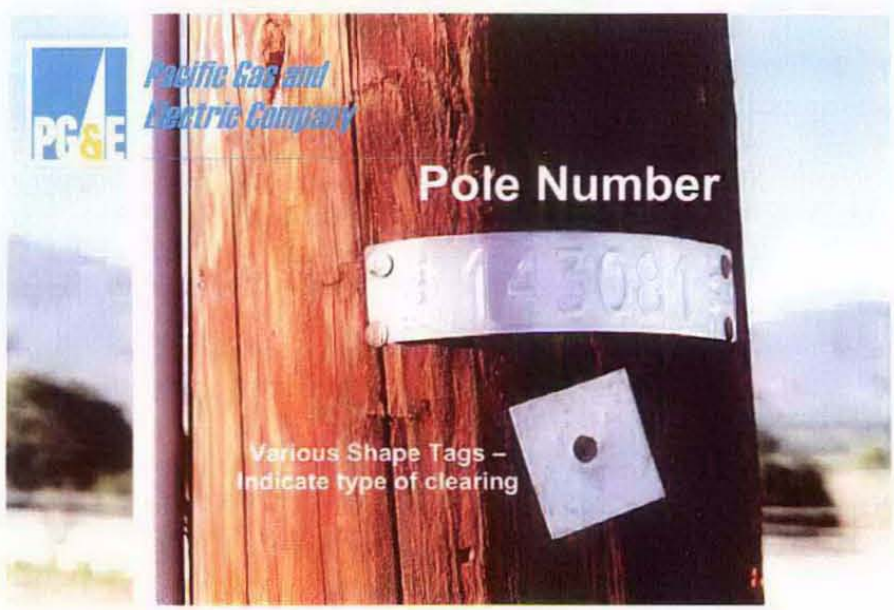


Figure 5. Non-Exempt Pole Identification
Pacific Gas and Electric

12. Hazardous Tree Identification

Falling trees or limbs can break conductors, damage poles, towers, other structures and equipment, or cause short circuits on power lines. Except in unusual circumstances (hurricane force winds, ice storms, etc.), healthy live trees seldom cause such problems. Trees are subject to injury, disease, insect and fungus attacks and ultimately death. When so afflicted, they become hazardous to power lines or any other improvements.

Most defects are readily apparent to the trained observer. However, some defects cannot be detected with a cursory glance. This chapter describes and illustrates some of the more common tree defects and ways to locate and evaluate them.

12.1 Recognizing Potential Root Defects

A. Undermined or severed roots caused by erosion or construction activity and roots loosened by saturated soils and winds resulting in 25% or more root exposure.
B. When grade is altered and 25% or more of the root system and/or the trunk of the tree is buried.
C. Root rot is a major cause of uprooted trees. Root rot can often be detected in hardwoods by open butt rot wounds at the ground line. In conifers, it is indicated by excessive casting of exterior needles, yellowing, abnormally short needles and internodes, rounding off of the upper crown, and fungus fruiting structures in the cambium layer at the root crown (ground level or on the trunk of the tree).
D. Root rot may also cause leaning trees.

Defective roots are particularly dangerous because of the risk they pose. ALL OR PART OF THE ENTIRE TREE MAY FALL, CAUSING SERIOUS INJURY TO PEOPLE OR DAMAGE TO PROPERTY, particularly during high winds.

13. Root Defects and Leaning Trees

Leaning trees should be removed when there is a potential for failure of either roots, butt or bole, which may result in contact with and/or damage to utility equipment. If corrective thinning will result in additional lean potential, consideration should be-given to removal. Many leaners are caused by outside factors (wind, soil conditions, etc.) which loosen or break the roots. Construction activities which sever roots or strike tree butts and boles also may cause trees to lean, as does the impact of falling trees, either natural or man caused. Humps and soil mounding on the opposite side of the lean direction are indicators of broken or loosened tree roots.

A leaner is often rendered more hazardous because of the presence of open fire wounds or cankers, especially if accompanied by rot. Wounds facing toward or directly opposite the direction of the lean will have the greatest weakening effect.

13.1 Recognizing Heart Rot

A. Open wounds showing visible rot.
B. Old wounds that have partially or fully healed over.
C. Conks anywhere on the bole of the tree
D. Hollow trunks detected by rapping on the tree trunk or by use of an increment borer.
E. Decreasing crown vigor.
F. Cracks or splits not caused by lightning and swelling cankers on the bole.

Heart rot/butt rot is a problem in mature and over-mature trees and is a major cause of breakage. In hardwoods, failures occur often in branches or in crotches than in the bole, but potential bole failures should not be overlooked.

Basal fire scars and mechanical injury to the bole are a major entry point for butt and heart rot. Species especially susceptible to this kind of defect are non-resinous conifers such as white fir. When examining these species, it is very important that fire scars are checked for the presence and amount of decay.

13.2 Degree of Hazard from Heart Rot or Butt Rot

A. Amount of radial wood remaining.
B. Basic form of the tree relative to weight distribution.
C. Rate of growth vs. the loss of strength due to decay.
D. Orientation to the prevailing winds. Potential of failure is greater if the wound faces the prevailing winds.
E. Other contributing factors (cracks, sap rot, leaning, root rot).

14. Trunk Deformities

Deformities can weaken the bole and increase the chance of breakage at the point of deformity. Deformations are caused by the following:

14.1 Dwarf Mistletoe Cankers

Swellings of the bole resulting from infection by dwarf-mistletoe are quite prevalent on both white and red firs. When these swellings first begin there is minimal weakening of the trunk. As the cambium in the oldest part of the swelling dies, structural weakening becomes more prevalent. Breakage at the canker location is likely to occur when the width of the dead face approaches half the circumference of these swellings. Trees in this condition should be removed. Cankers or otherwise flattened areas oriented to the windward or to the leeward side of the bole are more likely to fail than similar areas oriented parallel to the direction of strong winds.

Open dwarf-mistletoe cankers are sometimes found on the lower trunks of Ponderosa and Jeffrey pines, but resin infiltration prevents the wood from decaying. Therefore, such mistletoe cankers on these species have a lower likelihood of being hazardous, but should still be closely evaluated since some structural weakness might be possible.

Cankers, thought to result from infection by rust fungi, occur in pines. The wood around these cankers may remain sound for years, but trees with such cankers could eventually develop structural weaknesses, particularly when the depression is deep and located sixteen feet or more above the base of the tree.

14.2 Man Caused Deformities

Flattening of the tree trunk may be caused by the attachment of pieces of wood or steel members to trees to serve as cross arms for utility lines or for use as building supports. Fastening wires and cables around the trunk for various purposes deforms and weakens the tree. The guidelines for cankers and rusts can be used for evaluating risk.

Forked trees with tight v-shaped crotches are susceptible to splitting and breaking off at the crotch. This problem is prevalent mostly in mature trees in which the members of the fork have grown long and heavy. Hardwoods are more susceptible to this type of failure than conifers because of their wide, spreading crown which results in strong leverage at the crotch and other points of potential weakness.

The inspector should scrutinize forked trees carefully for signs of visible open cracks and splits, included bark, or for callus ridges outlining and closing older cracks. He should also look closely for signs of rot which follow such splits. Even in the absence of splits, rot is sometimes present in crotches to a degree sufficient to render the tree hazardous.

14.3 Combination Defects

When more than one defect or condition influencing the degree of hazard is present in a tree, it is said to have a combination or multiple defect. Often a tree with only one bole defect will not be weakened structurally enough to be considered hazardous but with a second or third defect, it may be hazardous. A number of different combinations involving two or more defects are possible. Therefore, the inspector should be alert for such combinations.

15. Defective Limbs

Limb failure occurs when the combined forces exerted on the limb exceed the strength of the limb at its weakest point. These forces include the weight of the limb itself, as well as the forces imposed by wind, snow, ice and rain. Most limb failures occur as a result of the presence of defects such as: decay, cracks, splits and breaks, holes from animals, birds (mostly woodpeckers) or insect activities and compression defect.

Hardwoods as a group are more susceptible to limb failures than are conifers because of basic differences in crown form, which in the hardwoods give rise to narrow, structurally weak crotches and also to long branches which become heavily weighted at the extremities. There is a tendency in hardwoods for trunk rot to extend into major limbs and increase the potential for limb failures. In this regard, the true oaks, the eucalyptus and the sycamores merit special attention.

15.1 Size of Limbs

Experience has shown that a very satisfactory degree of hazard control can be achieved by removal of defective limbs larger than a specified diameter and length. The detailed guidelines which follow are based on this concept.

15.2 Location of Limbs

A basic principle in tree hazard control is that a potential hazard exists only if there is reasonable probability of injury damage. Before a situation can be said to be potentially hazardous from tree limbs, two basic elements must be present: (a) defective limbs, and (b) limbs located so that in falling they have a reasonable probability of striking power lines.

15.3 Relative Durability of Wood

Dead limbs of most conifers will remain attached for a relatively long time in a safe condition because of their resinous character which renders the limbs resistant to decay. The exception to this exists with the dead wood of the true firs which, due to its non-resinous character, can be expected to decay faster than the dead limbs of other coniferous species. Consequently, the true firs and other conifers should be inspected with these facts in mind.

Dead limbs of hardwoods generally decay faster than do similar limbs in conifers. This faster rate of decay in turn means more rapid development of defective limbs in hardwoods than in conifers.

15.4 Weather Conditions

Weather conditions have an important influence on the number of dead and defective limbs in a tree. Limbs which have withstood snow and ice loads the previous winter are less likely to break and fall later during the milder weather. Many weak and defective limbs are eliminated under snow and ice conditions. This natural testing and elimination of defective and weak limbs does not occur in trees below the snowline: consequently, the limb hazard potential can be greater in such areas.

15.5 Guidelines for Dead Limb Hazard Control

A. Conifers - Remove dead tops and limbs when:
   1. Defects and weakness exist as a result of decay, breaking, cracking, splitting, woodpecker holes or insect activity.
   2. Limb size exceeds 3 inches in diameter and 6 feet in length.

B. Hardwoods - [Except true oaks and madrones]
   1. Remove all dead tops and limbs the same as for conifers.

C. True Oaks and Madrone
   1. Remove all dead tops and limbs, when limb size exceeds 2 inches in diameter and 4 feet in length.

D. Provide for Safety!

In applying these guidelines, the inspector should always bear in mind the fact that in areas with trees, whether natural or planted, the presence of power lines introduces a degree of risk. The inspector's job is to reduce the risk to a reasonable and acceptable level based on sound judgment and experience.

16. Top Defects

16.1 Dead Tops

Dead tops on living conifers, sometimes called "spike tops", may be hazardous in some cases. Experience indicates that spike tops in Sierra redwood, incense cedar, coast redwood, pines and Douglas fir can be considered non hazardous if not structurally weakened by defects such as bad cracks, splits or woodpecker holes, and also, if without bark, which could loosen and fall.

Dead tops in both White and California red firs must be considered hazardous, and such tops should be removed as soon as possible. Because of the non-resinous nature of the wood of these species, it is relatively non-durable and quite susceptible to attack and consequent weakening by decay fungi.

16.2 Broken Out Tops and Volunteer Tops

Conifers with tops that have broken out are not considered to be hazardous, even though there is rot present below the break and a short length of decayed trunk still remains. Volunteer tops that form following the loss of tops in conifers are not considered hazardous so long as such tops remain live. This is true whether such tops are single or multiple. When dead, such tops should be considered a hazard and should be removed. Live volunteer tops have been known to fail under heavy ice and snow loads. Therefore, volunteer tops in snow areas should be removed.

17. Other Crown Conditions

17.1 Thick Growth

Crowns with a heavy, thick growth of live limbs and branches are susceptible to limb failure (as well as bole and root failure) from winds. Corrective pruning is justified to prevent such failures.

17.2 Structure

The overall structure of many hardwoods, as well as some conifers, frequently includes a combination of potentially weak crotches and heavy limbs which render the limbs susceptible to failure at the crotches. Sometimes open cracks or callus ridges may be present as evidence of partial failure, but frequently no such evidence is visible. Through observation and experience, the tree hazard inspector should come to recognize such potentially hazardous conditions. General pruning to reduce limb and crown weight should be considered for control.

18. Techniques and Aids

The inspector should develop certain habits when checking for hazardous trees. Few defects are located at eye level, therefore, he/she must quickly scan the entire tree from the soil surrounding it to the top and the branches. Many conifers are over 100 feet tall, making naked eye inspection of the top and upper branches somewhat difficult, thus binoculars should be part of his equipment.

If any indication is noted of butt, heart or sapwood rot in the lower trunk, the extent of damage should be estimated. A quick, rough estimate can be made by tapping the trunk with an ax handle, night stick, or other similar instrument to determine whether or not it sounds hollow. More precise information can be obtained with an increment borer.

He/she should check the orientation of conks, flat areas, splits, crotches and other deformities in relation to the direction of the power line from the tree and to the prevailing wind direction. If there is little or no possibility that the tree, or a part thereof, might fall into the line, he should go on to the next tree.

Only a few types of defects are dangerous enough to require removal or thinning of the tree if found alone. On the other hand, almost any combination of two or more defects requires corrective action. Therefore, the inspector must always look at the overall situation.

When a tree is found which needs treatment, it must be properly identified for those who will do the work and for follow-up inspection. The tree should be marked with flagging, timber-marking paint or other means. It should be located by map, sketch, or bearing and distance from an identifiable object. In some cases, one or more photographs will be helpful.

An inspector should develop the habit of looking to both sides and to the rear as well as ahead. Many defective trees will be hidden from one direction but not from other directions. Similarly,many defects can only be seen from one or two sides of the tree.

Finally, particularly in dense stands, the inspector should make frequent side trips outside the cleared right-of-way. This is particularly true in coniferous stands. The screening vegetation along the edges of the right-of-way will often hide dangerous trees.

Statutes and Regulations
State Laws

This document has been designed to present only those laws and regulations, or portions thereof, which pertain more or less directly to power line fire prevention in California. As such, this document should only be used as a quick reference. For full and current text, meaning and proper context of laws and regulations, reference should be made to applicable codes, manuals, directives, etc.

Public Resources Code

Section 4021

Penalty

Except as otherwise provided, the willful or negligent commission of any of the acts prohibited or the omission of any of the acts required by Chapter 2 (commencing with Section 4251) to Chapter 6 (commencing with Section 4411), inclusive, of Part 2 of this division is a misdemeanor.

Section 4101

"Person" Defined

"Person" includes any agency of the state, county, city, district or other local public agency and any individual, firm, association, partnership, business trust, corporation or company.

Note: This definition includes publicly-owned utilities (e.g. REA's, SMUD, L.A. Dept. of Water and Power, etc.). It does not include federal agencies (e.g. Bureau of Reclamation, U.S. Army Corps of Engineers, etc.).

Section 4117

Local Ordinance

Any county, city, or district may adopt ordinances, rules or regulations to provide fire prevention regulations that are necessary to meet local conditions of weather, vegetation, or other fire hazards. Such ordinances, rules or regulations may be more restrictive than state statutes in order to meet local fire conditions.

Section 4119

Enforcing State Forest and Fire Laws Duty of State Officer

The Director of Forestry and Fire Protection, or his duly authorized agent, shall enforce the state forest and fire laws. He may inspect all properties, except the interior of dwellings, subject to the state forest and fire laws, for the purpose of ascertaining compliance with such laws.

Note: By interagency agreement, many employees of the U.S. Forest Service, Bureau of Land Management, National Park Service and certain county fire departments are "duly authorized agents" of the Director of Forestry and Fire Protection.

Section 4125

Classification of Lands as State Responsibility Areas for Fire Protection

The board shall classify all lands within the state, without regard to any classification of lands made by or for any federal agency or purpose, for the purpose of determining areas in which the financial responsibility of the state. The prevention and suppression of fires in all areas which are not so classified is primarily the responsibility of local or federal agencies, as the case may be.

Note: Specific Regulations under this Section can be found in Title 14 Sections 1220-1220.5, California Administrative Code.

Section 4126

State Responsibility Areas: Lands Included

The board shall include within state responsibility areas all of the following lands:

(a) Lands covered wholly or in part by forests or by trees producing or capable of producing forest products.

(b) Lands covered wholly or in part by timber, brush, undergrowth or grass, whether of commercial value or not, which protect the soil from excessive erosion, retard runoff of water or accelerate water percolation, if such lands are sources of water which is available for irrigation or for domestic or industrial use.

(c) Lands in areas which are principally used or useful for range or forage purposes, which are contiguous to the lands described in subdivisions (a) and (b).

Note: Specific Regulations under this Section can be found in Title 14, Sections 1220-1220.5, California Administrative Code.

Section 4127

State Responsibility Areas: Lands Excluded

The board shall not include within this state responsibility areas any of the following lands:

(a) Lands owned or controlled by the federal government or any agency of the federal government.

(b) Lands within the exterior boundaries of any city.

(c) Any other lands within the state which do not come within any of the classes which are described in Section 4126.

Note: Specific Regulations under this Section can be found in Title 14, Sections 1220-1220.5, California Administrative Code.

Section 4128

State Responsibility Areas: Boundaries

In establishing boundaries of state responsibility areas, the board may, for purposes of administrative convenience, designate roads, pipelines, streams or other recognizable landmarks as arbitrary boundaries.

Note: Specific Regulations under this Section can be found in Title 14, Sections 1220-1220.5, California Administrative Code.

Section 4171

Public Nuisances Defined

Any condition endangering public safety by creating a fire hazard and which exits upon any property which is included within any state responsibility area is a public nuisance.

Section 4290

Regulations Implementing Minimum Fire Safety Standards Related to Defensible Space Applicable to State Responsibility Lands

The board shall adopt regulations implementing minimum fire safety standards related to defensible space which are applicable to state responsibility area lands under the authority of the department. These regulations apply to the perimeters and access to all residential, commercial, and industrial building construction within state responsibility areas approved after July 1, 1989. The board may not adopt building standards, as defined in Section 18909 of the Health and Safety Code, under the authority of this section. As an integral part of fire safety standards, the State Fire Marshal has the authority to adopt regulations for roof coverings and openings into the attic areas of buildings specified in Section 13108.5 of the Health and Safety Code. The regulation apply to the placement of mobile homes as defined by National Fire Protection Association standards. These regulations do not apply where an application for a building permit was filed prior to July 1, 1989, or to parcel or tentative maps or other developments approved prior to July 1, 1989, if the final map for the tentative map is approved within the time prescribed by the local ordinance. The regulations shall include all of the following:

(a) Road standards for fire equipment access.
(b) Standards for signs identifying streets, roads, and buildings.
(c) Minimum private water supply reserves for emergency fire use.
(d) Fuel breaks and greenbelts.

These regulations do not supersede local regulations which equal or exceed minimum regulations adopted by the state.

Section 4291

Reduction of Fire Hazards Around Buildings

Any person that owns, leases, controls, operates, or maintains any building or structure in, upon, or adjoining any mountainous area or forest-covered lands, brush-covered lands, or grass-covered lands, or any land which is covered with flammable material, shall at all times do all of the following:

(a) Maintain around and adjacent to such building or structure a firebreak made by removing and clearing away, for a distance of not less than 30 feet on each side thereof or to the property line, whichever is nearer, all flammable vegetation or other combustible growth. This subdivision does not apply to single specimens of trees, ornamental shrubbery, or similar plants which are used as ground cover, if they do not form a means of rapidly transmitting fire from the native growth to any building or structure.

(b) Maintain around and adjacent to any such building or structure additional fire protection or firebreak made by removing all brush, flammable vegetation, or combustible growth which is located from 30 feet to 100 feet from such building or structure or to the property line, whichever is nearer, as may be required by the director if he finds that, because of extra hazardous conditions, a firebreak of only 30 feet around such building or structure is not sufficient to provide reasonable fire safety. Grass and other vegetation located more than 30 feet from such building or structure and less than 18 inches in height above the ground may be maintained where necessary to stabilize the soil and prevent erosion.

(c) Remove that portion of any tree which extends within 10 feet of the outlet of any chimney or stovepipe.

(d) Maintain any tree adjacent to or overhanging any building free of dead or dying wood.

(e) Maintain the roof of any structure free of leaves, needles, or other dead vegetative growth.

(f) Provide and maintain at all times a screen over the outlet of every chimney or stovepipe that is attached to any fireplace, stove, or other device that burns any solid or liquid fuel. The screen shall be constructed of nonflammable material with openings of not more than one-half inch in size.

(g) Except as provided in Section 18930 of the Health and Safety Code, the director may adopt regulations exempting structures with exteriors constructed entirely of nonflammable materials, or conditioned upon the contents and composition of same, he may vary the requirements respecting the removing or clearing away of flammable vegetation or other combustible growth with respect to the area surrounding said structures.

No such exemption or variance shall apply unless and until the occupant thereof, or if there be no occupant, then the owner thereof, files with the department, in such form as the director shall prescribe, a written consent to the inspection of the interior and contents of such structure to ascertain whether the provisions hereof and the regulations adopted hereunder are complied with at all times.

4291.1. (a) Notwithstanding Section 4021, a violation of Section 4291 is an infraction punishable by a fine of not less than one hundred dollars ($100), nor more than five hundred dollars($500). If a person is convicted of a second violation of Section 4291 within five years, that person shall be punished by a fine of not less than two hundred fifty dollars ($250), nor more than five hundred dollars ($500). If a person is convicted of a third violation of Section 4291 within five years, that person is guilty of a misdemeanor and shall be punished by a fine of not less than five hundred dollars ($500). If a person is convicted of a third violation of Section 4291 within five years, the department may perform or contract for the performance of work necessary to comply with Section 4291 and may bill the person convicted for the costs incurred, in which case the person convicted, upon payment of those costs, shall not be required to pay the fine. If a person convicted of a violation of Section 4291 is granted probation, the court shall impose as a term or condition of probation, in addition to any other term or condition of probation, that the person pay at least the minimum fine prescribed in this section.

(b) If a person convicted of a violation of Section 4291 produces in court verification prior to imposition of a fine by the court, that the condition resulting in the citation no longer exists, the court may reduce the fine imposed for the violation of Section 4291 to fifty dollars ($50).

Section 4292

Power Line Hazard Reduction

Except as otherwise provided in Section 4296, any person that owns, controls, operates, or maintains any electrical transmission or distribution line upon any mountainous land, or forest-covered land, brush-covered land, or grass-covered land shall, during such times and in such areas as are determined to be necessary by the director or the agency which has primary responsibility for fire protection of such areas, maintain around and adjacent to any pole or tower which supports a switch, fuse, transformer, lightning arrester, line junction, or dead end or corner pole, a firebreak which consists of a clearing of not less than 10 feet in each direction from the outer circumference of such pole or tower. This section does not, however, apply to any line which is used exclusively as telephone, telegraph, telephone or telegraph messenger call, fire or alarm line, or other line which is classed as a communication circuit by the Public Utilities Commission. The director or the agency which has primary fire protection responsibility for the protection of such areas may permit exceptions from the requirements of this section which are based upon the specific circumstances involved.

Section 4293

Power Line Clearance Required

Except as otherwise provided in Sections 4294 to 4296, inclusive, any person that owns, controls, operates, or maintains any electrical transmission or distribution line upon any mountainous land, or in forest-covered land, brush-covered land, or grass-covered land shall, during such times and in such areas as are determined to be necessary by the director or the agency which has primary responsibility for the fire protection of such areas, maintain a clearance of the respective distances which are specified in this section in all directions between all vegetation and all conductors which are carrying electric current:

(a) For any line which is operating at 2,400 or more volts, but less than 72,000 volts, four feet.

(b) For any line which is operating at 72,000 or more volts, but less than 110,000 volts, six feet.

(c) For any line which is operating at 110,000 or more volts, 10 feet.

In every case, such distance shall be sufficiently great to furnish the required clearance at any position of the wire, or conductor when the adjacent air temperature is 120 degrees Fahrenheit, or less. Dead trees, old decadent or rotten trees, trees weakened by decay or disease and trees or portions thereof that are leaning toward the line which may contact the line from the side or may fall on the line shall be felled, cut, or trimmed so as to remove such hazard. The director or the agency which has primary responsibility for the fire protection of such areas may permit exceptions from the requirements of this section which are based upon the specific circumstances involved.

Section 4294

Aerial Cable

A clearing to obtain line clearance is not required if self-supporting aerial cable is used. Forked trees, leaning trees, and any other growth which may fall across the line and break it shall, however, be removed.

Section 4295

Clearance Not Required

A person is not required by Section 4292 or 4293 to maintain any clearing on any land if such person does not have the legal right to maintain such clearing, nor do such sections require any person to enter upon or to damage property which is owned by any other person without the consent of the owner of the property.

Section 4296

Low Voltage Lines

Sections 4292 and 4293 do not apply if the transmission or distribution line voltage is 750 volts or less.

Section 4435

Origination of Fire-Negligence

If any fire originates from the operation or use of any engine, machine, barbecue, incinerator, railroad rolling stock, chimney or other device which may kindle a fire, the occurrence of the fire is prima facie evidence of negligence in the maintenance, operation, or use of such engine, machine, barbecue, incinerator, railroad rolling stock, chimney or other device. If such fire escapes from the place where it originated and it can be determined which person's negligence caused such a fire, such person is guilty of a misdemeanor.

Health and Safety Code

Section 13001

Causing Fire

Misdemeanor. Every person is guilty of a misdemeanor who, through careless or negligent action, throws or places any lighted cigarette, cigar, ashes, or other flaming or glowing substance, or any substance or thing which may cause a fire, in any place where it may directly or indirectly start a fire, or who uses or operates a welding torch, tar pot or any other device which may cause a fire, who does not clear the inflammable material surrounding the operation or take such other reasonable precautions necessary to insure against the starting and spreading of fire.

Section 13007

Liability for Damage

Any person who personally or through another willfully, negligently or in violation of law, sets fire to, allows fire to be set to or allows a fire kindled or attended by him to escape to, the property of another, whether privately or publicly owned, is liable to the owner of such property for any damages to the property caused by the fire.

Section 13009

Suppression Cost Collectible

(a) Any person who negligently, or in violation of the law, sets a fire, allows a fire to be set or allows a fire kindled or attended by him to escape onto any forest, range, or non-residential grass-covered land is liable for the expense of fighting the fire and such expense shall be a charge against that person. Such charge shall constitute a debt of such person and is collectible by the person, or by the federal, state, county, public or private agency, incurring such expenses in the same manner as in the case of an obligation under a contract, expressed or implied.

(b) Public agencies participating in fire suppression, rescue or emergency medical services as set forth in subdivision (a) may designate one or more participating agencies to bring an action to recover costs incurred by all of the participating agencies. An agency designated by the other participating agencies to bring an action pursuant to this section shall declare that authorization and its basis in the complaint, and shall itemize in the complaint the total amounts claimed under this section by each represented agency.

(c) Any costs incurred by the Department of Forestry is suppressing any wildland fire originating or spreading from a prescribed burning operation conducted by the department pursuant to a contract entered into pursuant to Article 2 (commencing with Section 4475) of Chapter 7 of Part 2 of Division 4 of the Public Resources Code shall not be collectable from any party to the contract, including any private consultant or contractor who entered into an agreement with that party pursuant to subdivision (d) of Section 4475.5 of that code, as provided in subdivision (a), to the extent that those costs were not incurred as a result of a violation of any provision of the contract.

(d) This section applies to all areas of the state, regardless of whether primarily wildlands, sparsely developed, or urban.

Section 13009.1

Liability of person who negligently sets fire; Burden of proof; Limitation on use of evidence.

(a) Any person (1) who negligently, or in violation of the law, sets a fire, allows a fire to be set or allows a fire kindled by him or her to escape onto any public or private property... is liable for both of the following:

(1) The cost of investigating and making any reports with respect to the fire.

(2) The costs relating to accounting for that fire and the collection of any funds pursuant to Section 13009, including, but not limited to, the administrative costs of operating a fire suppression cost recovery program.

The liability imposed pursuant to this paragraph is limited to the actual amount expended which is attributable to the fire.

(b) In any civil action brought for the recovery of costs provided in this section, the court in its discretion may impose the amount of liability for costs described in subdivision (a).

(c) The burden of proof as to liability shall be on the plaintiff and shall be by a preponderance of the evidence in an action alleging that the defendant is liable for costs pursuant to this section. The burden of proof as to the amount of costs recoverable shall be on the plaintiff and shall be by a preponderance of the evidence in any action brought pursuant to this section.

(d) Any testimony, admission, or any other statement made by the defendant in any proceeding brought pursuant to this section, or any evidence derived from the testimony, admission or other statement, shall not be admitted or otherwise used in any criminal proceeding arising out of the same conduct.

(e) The liability constitutes a debt of that person and is collectible by the person, or by the federal, state, county,public, or private agency, incurring those costs in the same manner as in the case of an obligation under a contract, expressed or implied.

(f) This section applies in all areas of the state, regardless of whether primarily wildlands, sparsely developed, or urban.

Section 13009.5

Charge for use of inmate labor

Where the Department of Forestry and Fire Protection utilizes labor for fighting fires, the charge for their use, for the purpose of Section 13009, shall be set by the Director of Forestry and Fire Protection. In determining the charges, he or she may consider, in addition to costs incurred by the department, the per capita cost to the state of maintaining the inmates.

Title 14, California Code of Regulations

Section 1250

Purpose

The purpose of Article 4 is to provide specific exemptions from: electric pole and tower firebreak clearance standards, electric conductor clearance standards and to specify when and where the standards apply.

Section 1251

Definitions

The following definitions apply to this article unless the context requires otherwise:

(a) Agency which has Primary Responsibility for Fire Protection means the public agency which is the primary agency responsible for fire prevention and suppression on mountainous or forest-covered land, brush-covered land or grass-covered land within it's respective jurisdiction.

(b) Conductor means a wire or a combination of wires, designed and manufactured for use in the transmission and distribution of electrical current.

(c) Connector means a splice or a splicing device approved for energized electrical connections.

(d) Duff means partially decayed leaves, needles, grass or other organic material accumulated on the ground.

(e) Firebreak means a natural or artificial barrier usually created by the removal or modification of vegetation and other flammable materials for the purpose of preventing the ignition or spread of fire.

(f) Hot line tap or clamp connector means a connector designed to be used with a grip-All Clamp stick (Shotgun) for connecting equipment jumper or tap conductors to an energized main line or running conductor.

(g) Outer Circumference means the exterior surface of a pole or tree at ground level or a series of straight lines tangent to the exterior of the legs of a tower at ground level.

(h) Self-supporting aerial cable means an assembly of abrasion resistant insulated conductors supported by a messenger cable which is normally grounded, designed and manufactured to carry electrical current for installation on overhead pole lines or other similar overhead structures.

(i) Tree wire means an insulated conductor covered with a high abrasion resistant, usually non-metallic, outer covering, designed and manufactured to carry electrical current for installation on overhead pole lines or other similar overhead structures.

Section 1252

Locations where PRC 4292, 4293 Apply

The minimum firebreak and clearance provision of PRC 4292-4296 are applicable upon any mountainous, forest-covered land, brush-covered land or grass-covered land within state responsibility area unless specifically exempted by 14 CCR, sections 1255 and 1257.

Section 1252.1

Official Area Maps

Areas where the provisions of PRC 4292-4296 apply are delineated on maps for state responsibility areas, as "Official Map State Responsibility Area for Fire Protection", filed in the Office of the Director, Fire Protection Section, 1416 Ninth Street, Sacramento, California 95814.

(a) The official maps are available during normal business office hours for viewing and copying.

(b) When, pursuant to PRC 4125-4128, the Board revises state responsibility area boundaries, the Director will forward a legal description of a boundary change(s) to the respective electric utility(s) serving the area(s).

Section 1252.2

Boundary Location - Roads Etc.

Where the boundaries of areas described in 14, CCR 1252, are along roads, highways, streets, railroads, streams, canals or rivers, the actual boundary shall be the center-line of the course of such roads, highways, streets, railroads, streams, canals and rivers.

Section 1252.3

Boundary Location - Section Lines, Etc.

Where the boundaries of the area described in 14, CCR, 1252, are on section township, range lines or on power line right-of-ways, the poles, towers and conductors located thereon are within the area described.

Section 1253

Time when PRC 4292-4296 Apply

The minimum firebreak and clearance provisions of PRC 4292-4296 are applicable when vegetation, whether living or dead, is flammable and will propagate fire:

(a) From May 1 through November 15 of each year in the counties of Butte, Colusa, Del Norte, Glenn, Humbolt, Lake, Lassen, Marin, Mendocino, Modoc, Napa, Nevada, Placer, Plumas, Shasta, Sierra, Siskiyou, Solano, Sonoma, Sutter, Tehama, Trinity, Yolo and Yuba:

(b) From April 15 through November 30 of each year in the counties of Alameda, Alpine, Amador, Calaveras, Contra Costa, El Dorado, Fresno, Kings, Madera, Mariposa, Merced, Monterey, Sacramento, San Benito, San Francisco, San Joaquin, San Mateo, Santa Clara, Santa Cruz, Stanislaus, Tulare and Tuolumne;

(c) From January 1 through December 31 of each year in the counties of Imperial, Inyo, Kern, Los Angeles, Mono, Orange, Riverside, San Bernardino, San Diego, San Luis Obispo, Santa Barbara and Ventura.

Section 1254

Minimum Clearance Provisions PRC 4292

The firebreak clearances required by PRC 4292 are applicable within an imaginary cylindrical space surrounding each pole or tower on which a switch, fuse, transformer or lightning arrester is attached and surrounding each deadend or corner pole, unless such pole or tower is exempt from minimum clearance requirements by provisions of 14, CCR, 1255 or PRC 4296. The radius of the cylindroid is 3.1 m (10 feet) measured horizontally from the outer circumference of the specified

pole or tower with height equal to the distance from the intersection of the imaginary vertical exterior surface of the cylindroid with the ground to an intersection with a horizontal plane passing through the highest point at which a conductor is attached to such pole or tower. Flammable vegetation and materials located wholly or partially within the firebreak space shall be treated as follows:

(a) At ground level - remove flammable materials, including but not limited to, ground litter, duff and dead or desiccated vegetation that will propagate fire, and;
(b) From 0 - 2.4 m (0-8 feet) above ground level remove flammable trash, debris or other materials, grass, herbaceous and brush vegetation. All limbs and foliage of living trees shall be removed up to a height of 2.4 m (8 feet).
(c) From 2.4 m (8 feet) to horizontal plane of highest point of conductor attachment remove dead, diseased or dying limbs and foliage from living sound trees and any dead, diseased or dying trees in their entirety.

Section 1255

Exemptions to Minimum Clearance Provisions - PRC 4292

The minimum clearance provisions of PRC 4292 are not required around poles and towers, including line junction, corner and dead end poles and towers:

(a) Where all conductors are continuous over or through a pole or tower; or
(b) Where all conductors are not continuous over or through a pole or tower, provided, all conductors and subordinate equipment are of the types listed below and are properly installed and used for the purpose for which they were designed and manufactured;
    (1) Compression connectors.
    (2) Automatic connectors.
    (3) Parallel groove connectors.
    (4) Hot line tap or clamp connectors that were designed to absorb any expansion or contraction by applying spring tension on the main line or running conductor and tap connector.
    (5) Fargo GA 300 series piercing connectors designed and manufactured for use with tree wire.
    (6) Flat plate connectors installed with not less than two bolts.
    (7) Tapered C-shaped member and wedge connectors.
    (8) Solid blade single-phase bypass switches and solid blade single-phase disconnect switches associated with circuit reclosers, sectionalizers and line regulators.
    (9) Equipment that is completely sealed and liquid filled.
    (10) Current limiting, non-expulsion fuses.
(c) On the following areas, if fire will not propagate thereon;
    (1) Fields planted to row crops.
    (2) Plowed or cultivated fields.
    (3) Producing vineyards that are plowed or cultivated.
    (4) Fields in nonflammable summer fallow.
    (5) Irrigated pasture land.
    (6) Orchards of fruit, nut or citrus trees that are plowed or cultivated.
    (7) Christmas tree farms that are plowed or cultivated.
    (8) Swamp, marsh or bog land.
(d) Where vegetation is maintained less than 30.48 cm (12 inches) in height, is fire resistant, and is planted and maintained for the specific purpose of preventing soil erosion and fire ignition.

Section 1256

Minimum Clearance Provisions - PRC 4293

Minimum clearance required by PRC 4293 shall be maintained with the specified distances measured at a right angle to the conductor axis at any location outward throughout an arc of 360 degrees.

Clearance shall include any position through which the conductor may move considering the size and material of which the conductor is made, span length, foreseeable wind velocities for any location and height, species and flammability of adjacent vegetation.

Section 1257

Exempt Minimum Clearance Provisions - PRC 4293

The minimum clearance provisions of PRC 4293 are not required:

(a) Where conductors are;
  (1) Insulated tree wire, maintained with the high density, abrasion resistant outer covering intact, or,
  (2) Insulated self-supporting aerial cable, maintained with the insulation intact, or,

(b) On areas described in 14, CCR, 1255 (c);

(c) Except;
  (1) Dead and decadent or rotten trees, trees weakened by decay or disease, leaning trees and portions thereof that are leaning toward conductor(s) and any other growth which may fall across the conductor and break it are removed or trimmed to remove such hazard.
  (2) The trunk of any tree is not required to be removed when sound and living, and is the supporting structure to which conductor(s) are attached.

Section 1258

Tree Lines

When electric conductors and subordinate elements are fastened to living, sound trees, commonly referred to as tree lines, the requirements of PRC 4292 and 4293 shall apply the same as to a pole or tower line.

Figure 6
PRC 4292
14 CCR 1251
Definition of Outer Circumference Examples
(Plan View at Ground Level)

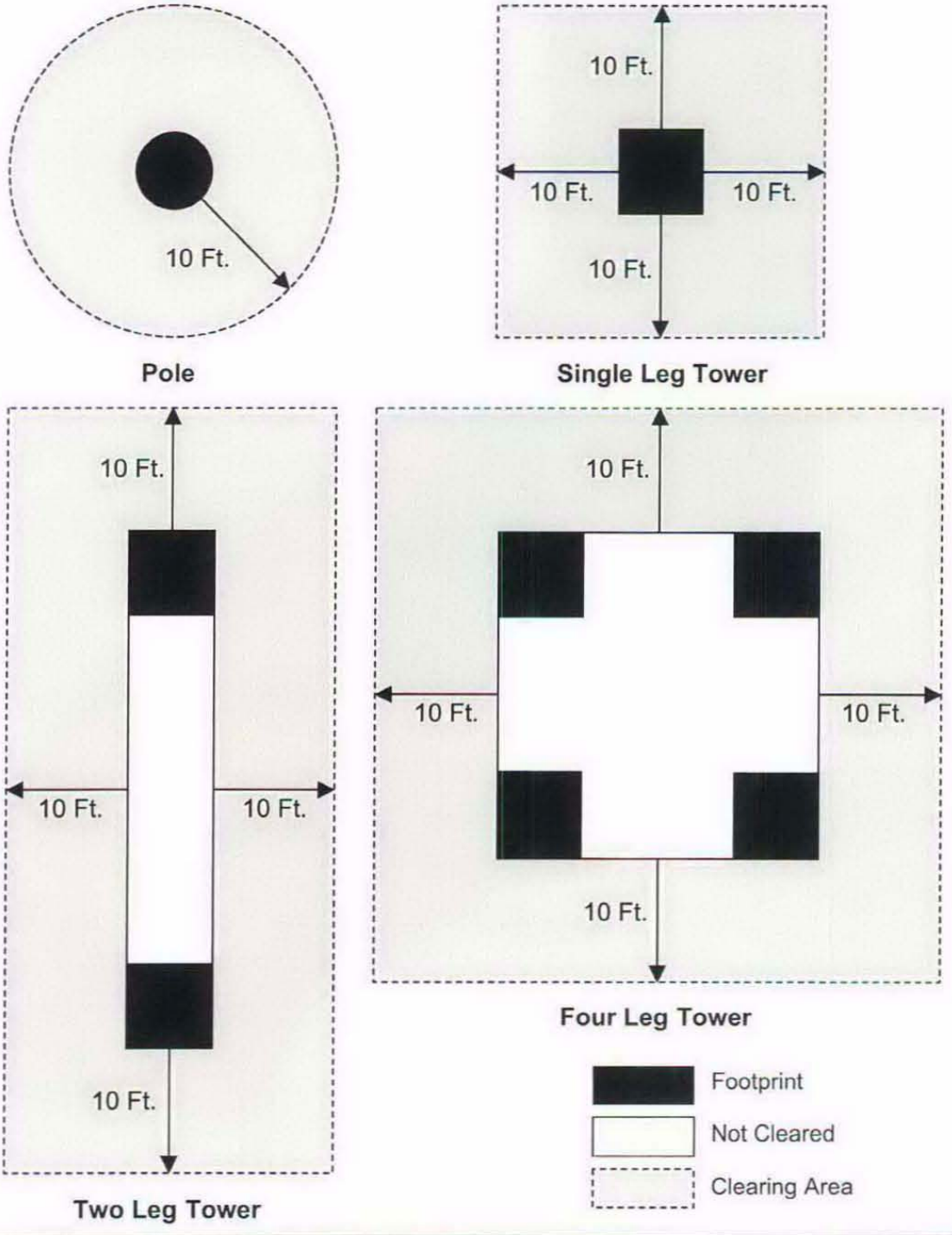
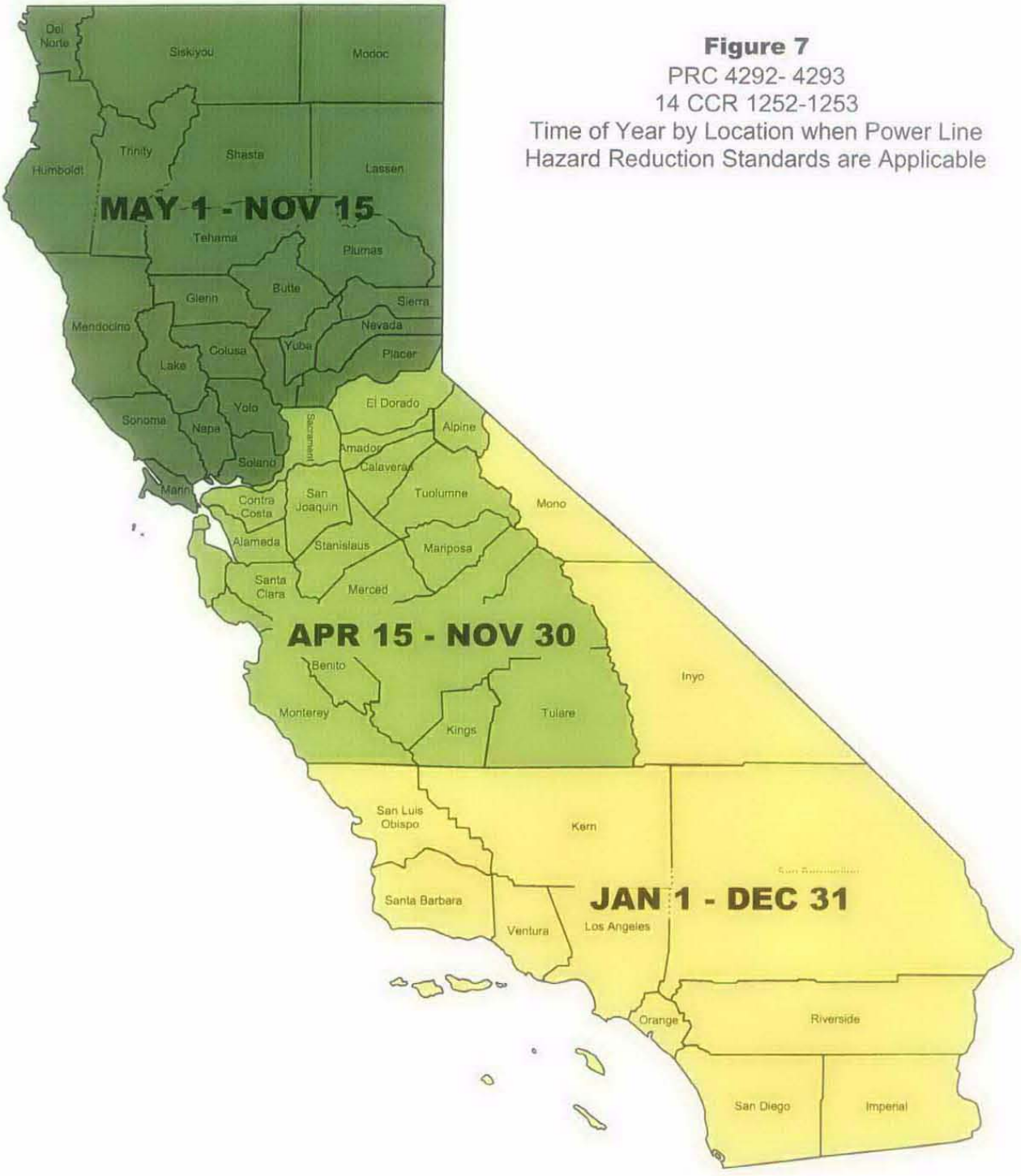


Figure 7
PRC 4292- 4293
14 CCR 1252-1253
Time of Year by Location when Power Line Hazard Reduction Standards are Applicable



SDGE0008577

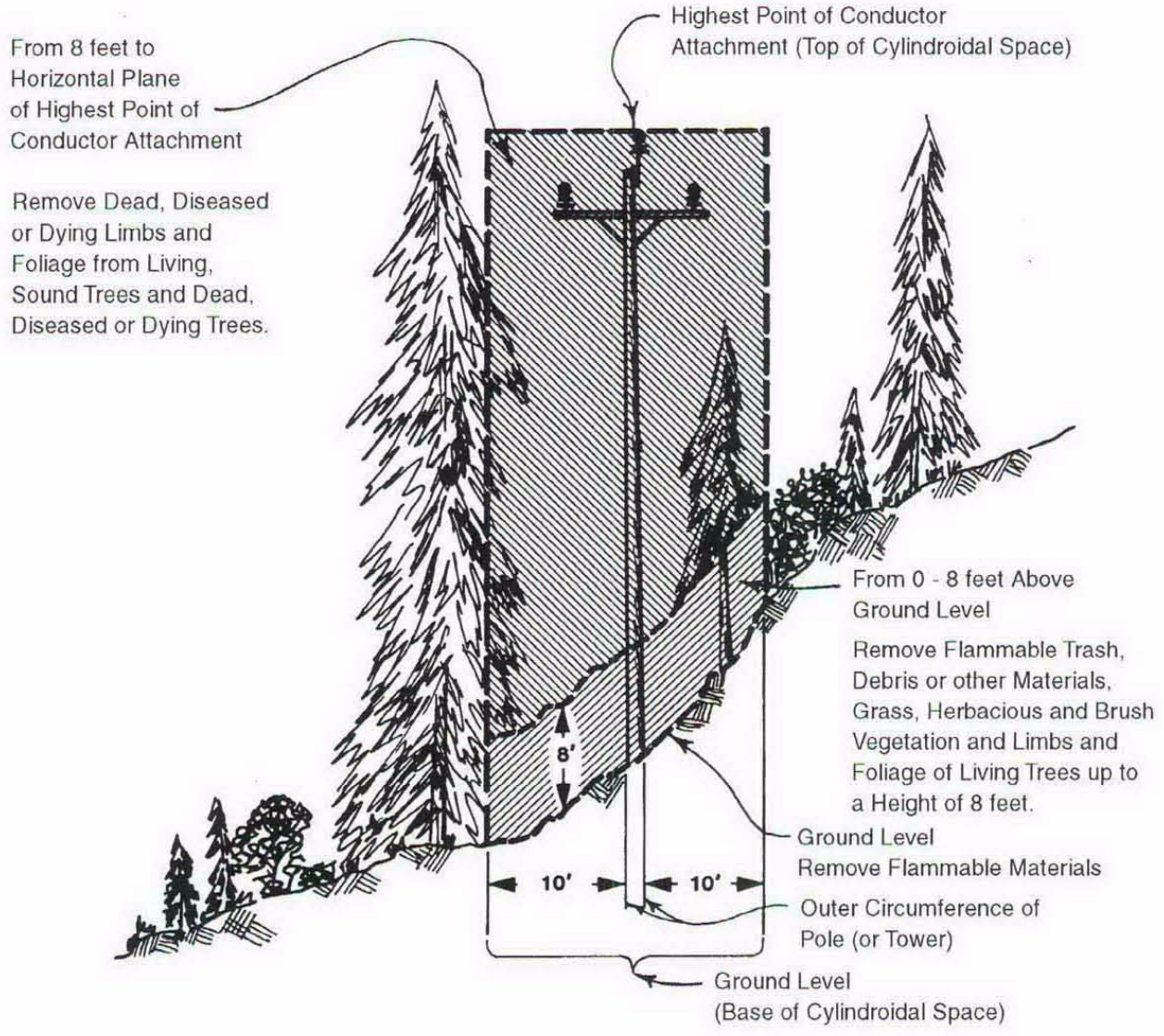
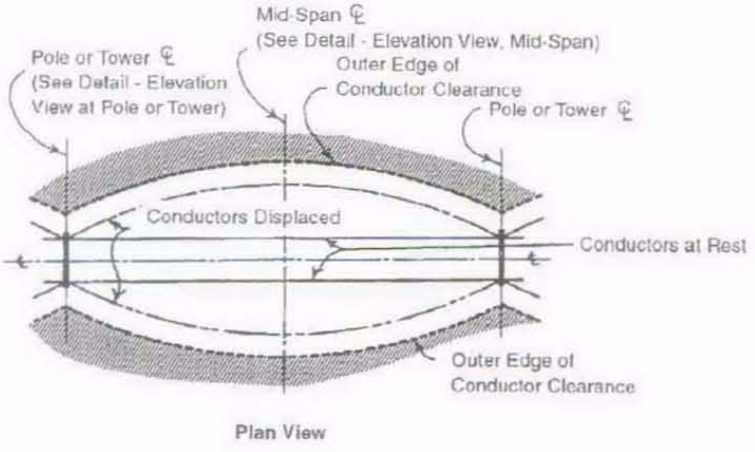


Figure 8
PRC 4292
14 CCR 1254
Fire Break Clearance Requirements
Around Poles and Towers



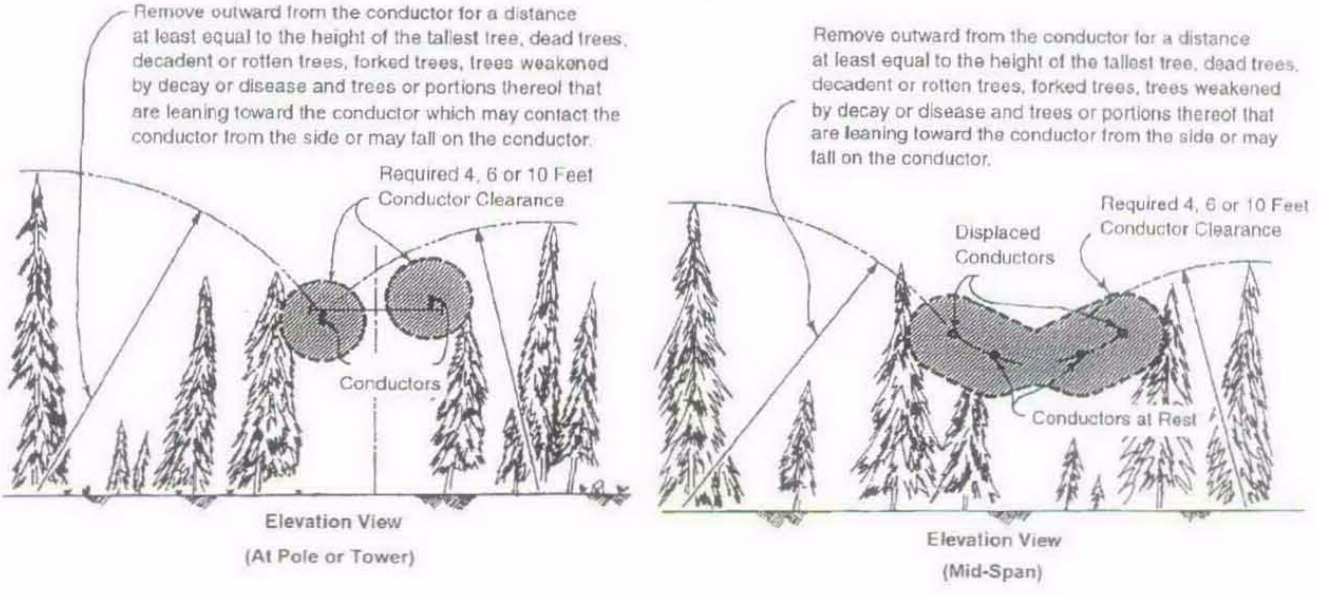


Figure 9
PRC 4293
14 CCR 1256
Conductor Clearance

ZONE B:
At any time in ZONE B between May 1 and the date the director declares, by proclamation, that hazardous fire conditions have abated for that year, or at any other time in ZONE B during any year the director has declared, by proclamation, that unusual fire hazard conditions exist in the area.

ZONE A:
A person shall not burn any brush, stumps, logs, fallen timber, fallows, slash, grass covered land, brush covered land, forest covered land, or other flammable material in any state responsibility area receiving fire protection by the department contract, or upon federal lands administered by the United States Department of Agriculture or the Department of the Interior, unless the person has a written permit from the Department or its duly authorized representative or the authorized federal officer on the federal lands administered by the United States Department of Agriculture or the Interior and in strict accordance with the terms of the permit at any time in ZONE A.

Figure 10
PRC 4423
Burning Permits; Zones; Times

General Order No. 95, (Public Utilities Commission)

This is a book containing a great many specific rules intended primarily to ensure safe construction, maintenance, operation or use of overhead electrical lines. Utility personnel must be intimately familiar with it.

Protection agency personnel should be generally familiar with it since, although they have no responsibility for enforcing it, they can be of great help to the utilities by observing and reporting to the utilities infractions such as broken insulators or crossarms, deformed structures, sagging conductors, etc.

Code of Federal Regulations

Section 261 - Prohibitions

Section 261.10

Occupancy and Use

The following are prohibited:

(a) Constructing, placing or maintaining any kind of road, trail, structure, fence, enclosure, communication equipment, or other improvement without a permit.

Section 261.50

Orders

(a) The Chief, each Regional Forester, each Experiment Station Director, the Administrator of the Lake Tahoe Basin Management Unit and each Forest Supervisor may issue orders which close or restrict the use of described areas within the area over which he has jurisdiction. An order may close an area to entry or may restrict the use of an area by applying any or all of the prohibitions authorized in this subpart or any portion thereof.

(b) The Chief, each Regional Forester, each Experiment Station Director, the Administrator of the Tahoe Basin Management Unit and each Forest Supervisor may issue orders which close or restrict the use of any forest development road or trail.

(c) Each order shall:

(1) For orders issued under paragraph (a) describe the area to which the order applies;

(2) For orders issued under paragraph (b), describe the road or trail to which order applies;

(3) Specify the times during which the prohibitions apply if applied only during limited times;

(4) State each prohibition which is applied;

(5) Be posted in accordance with Section 261.51.

(d) The prohibitions which are applied by an order are supplemental to the general prohibitions in Subpart A.

(e) An order may exempt any of the following persons from any of the prohibitions contained in the order:

(1) Persons with a permit authorizing the otherwise prohibited act or omission. The issuing officer may include in any permit such conditions as he considers necessary for the protection or administration of the road, trail, or National Forest System or for the promotion of the health, safety, or welfare of its users.

(2) Owners or lessees of land in the area.
(3) Residents in the area.
(4) Any Federal, State, or local officer, or member of an organized rescue or fire fighting force in the performance of an official duty.
(5) Persons engaged in a business, trade or occupation in the area.
(6) It is prohibited to violate the terms or conditions of a permit issued under (e) (1).
(7) Any person wishing to use a Forest development road or trail or a portion of the National Forest System, should contact the Forest Supervisor, Director, Administrator or District Ranger to ascertain the special restrictions which may be applicable thereto.

Section 261.52

Fire

When provided by an order, the following are prohibited:
(a) Building, maintaining, attending or using a fire, campfire or stove fire.
(b) Using an explosive.
(c) Smoking.
(d) Smoking, except inside a building or vehicle, or while seated in an area at least three feet in diameter that is barren or cleared of all flammable materials.
(e) Going into or being upon an area.
(f) Possessing, discharging or using any kind of fireworks or other Pyrotechnic device.
(g) Entering an area without any fire fighting tool prescribed by the order.
(h) Operating an internal combustion engine except on a road.
(i) Welding or operating acetylene or other torch with open flame.
(j) Operating or using any internal or external combustion engine on any timber-, brush- or grass- covered land, including trails traversing such land, without a spark arrester, maintained in effective working order, meeting either (i) Department of Agriculture, Forest Service Standard 5100-la; or (ii) the 80 percent efficiency level determined according to the appropriate Society of Automotive Engineers (SAE) recommended Practices J335 and J350.
(k) Violating any state law specified in the order concerning burning, fires or which is for the purpose of preventing, or restricting the spread of fires.

Note: Under this subsection (261.52(k)) any or all of the state statutes and regulations quoted in Parts I and II of Appendix B, as well as other state laws, may be adopted as federal regulations.

Local Ordinances

Local agencies may have more restrictive regulations. Check with your local fire department.

Terms and Conditions of Permits and Easements

These vary so widely depending on date of issuance, location, issuing authority and type of use that no general statements regarding them are relevant. Some are quite restrictive while others are so loose as to be almost meaningless. Most lie somewhere between the two extremes but two are seldom alike. Employees of both utilities and fire agencies should obtain copies of the specific permits and easements pertaining to the power lines for which they are responsible and become thoroughly familiar with them. Copies or resumes of them should be inserted in this Guide.

Section 2
Non-Exempt

Clearance Required

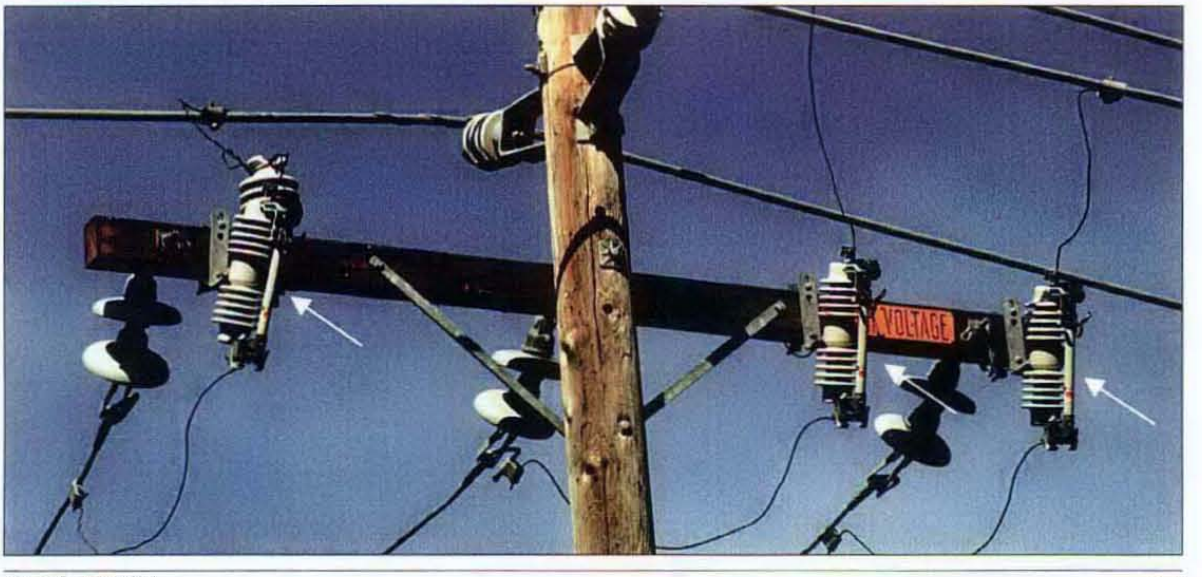
Universal Fuse

Figure 2-1
Universal Fuse

Round pull ring

Figure 2-2
Universal Fuse, Fuse link, Expulsion end of fuse

Figure 2-3
Arm Mounted Cutout with Universal Fuses



Open Link Fuse

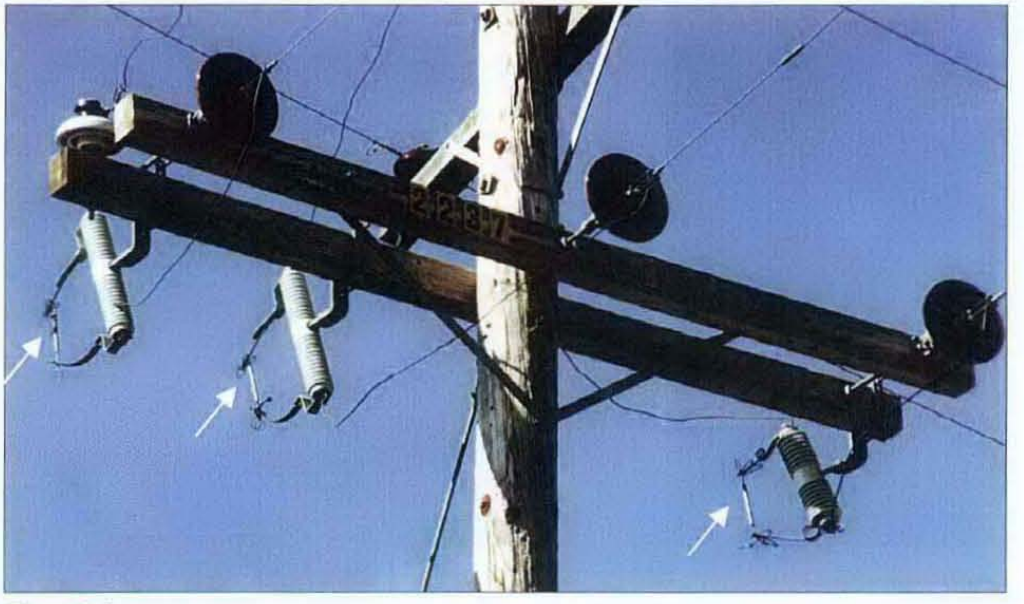
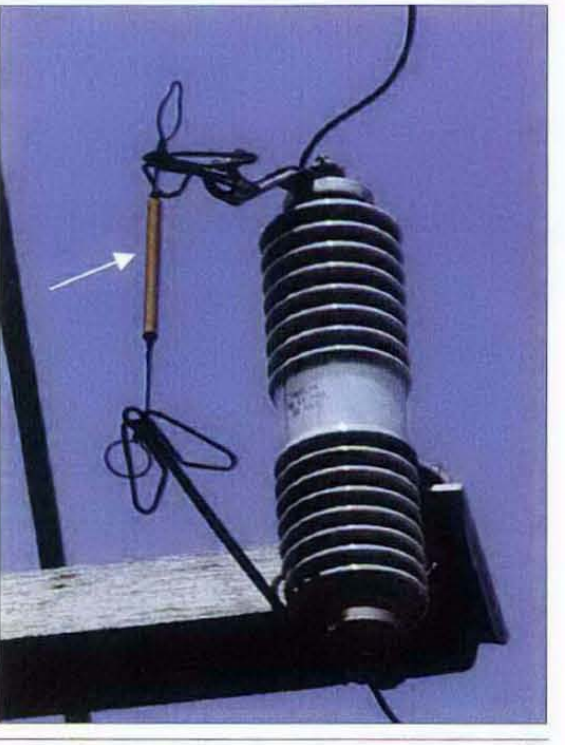


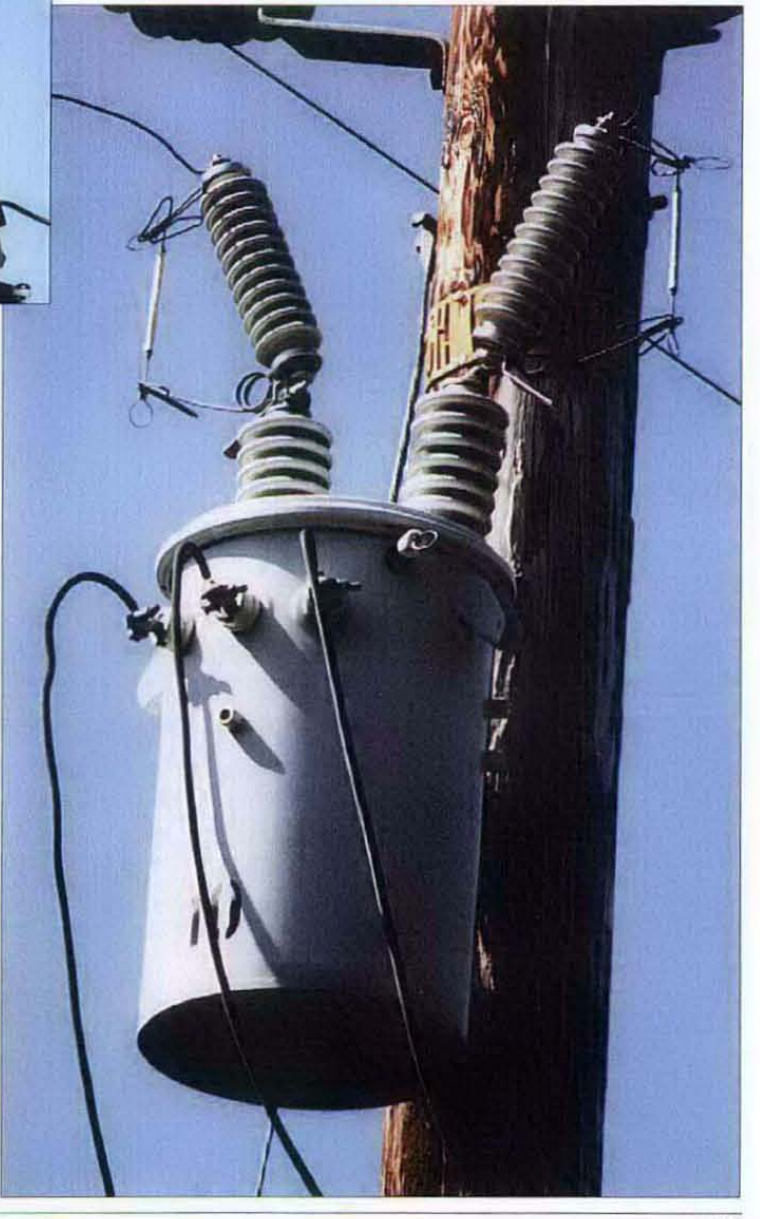
Figure 2-4
Arm Mounted Cutout with Open Link Fuse

Open Link Fuse



Open Link Fuse

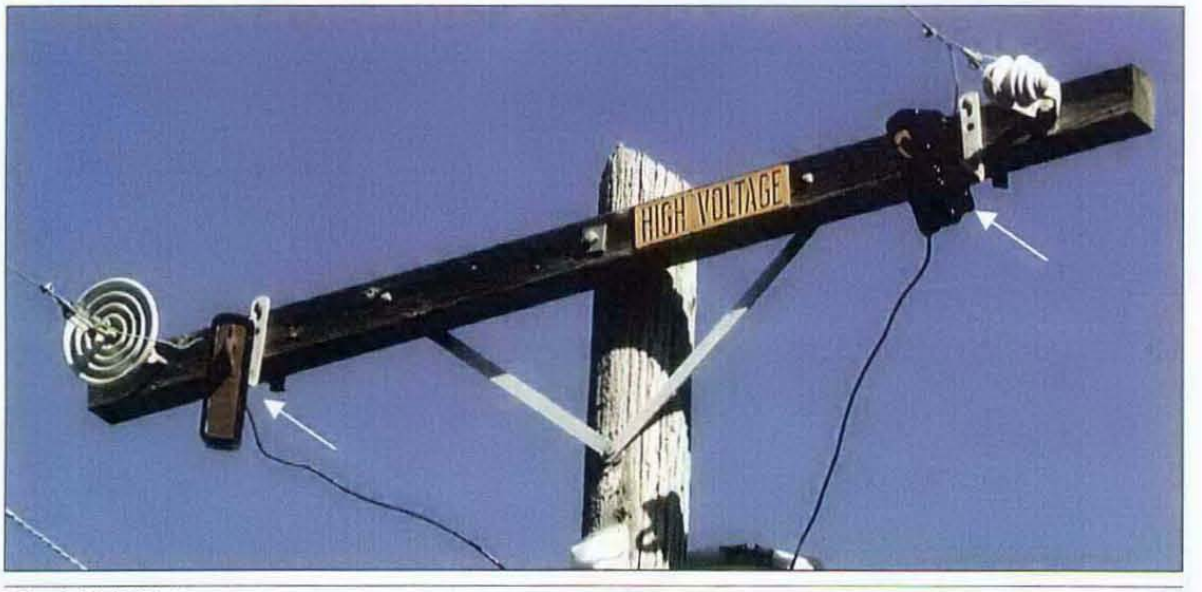
Figure 2-5
Bushing Mounted Cutout with Open Link Fuses



Enclosed Cutout w/ Universal Fuse

Figure 2-6
Enclosed Cutouts

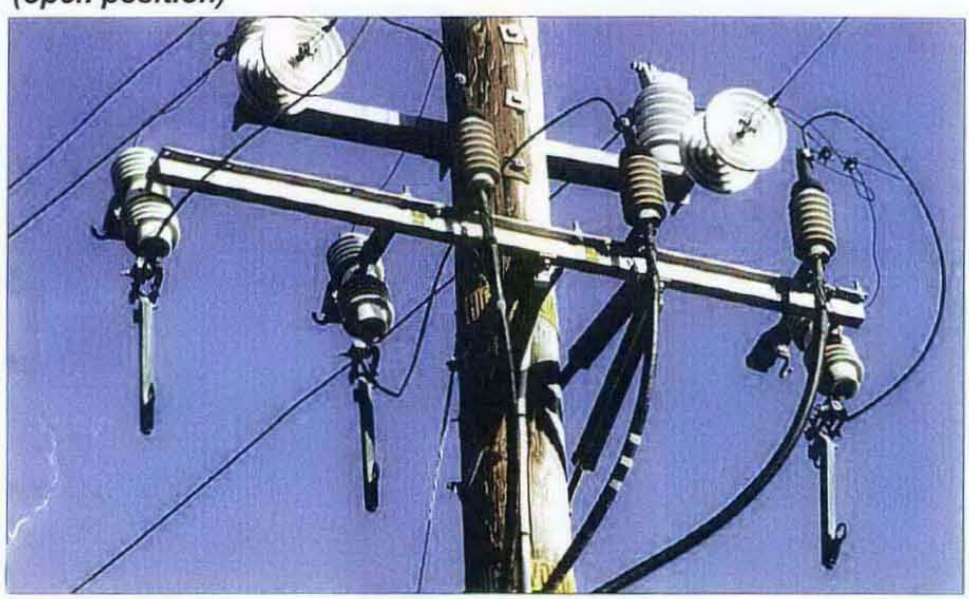
Figure 2-7
Arm Mounted Enclosed Cutout with Universal Fuses



Solid Blade Disconnect

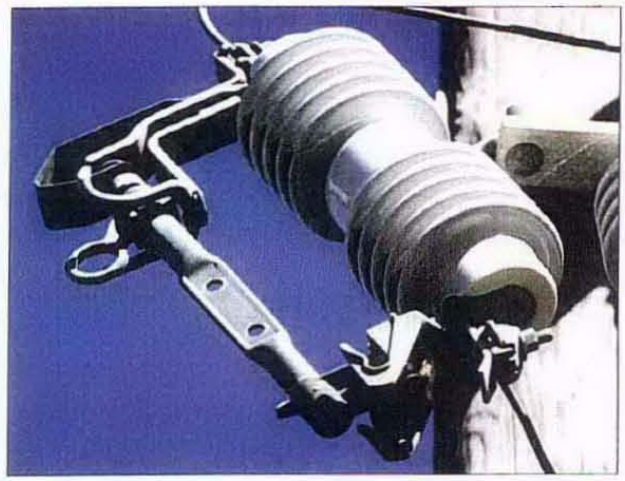
Figure 2-8
Arm Mounted Cutout with Solid Blade Disconnect
(closed position)

Figure 2-9
Arm Mounted Cutout with Solid Blade Disconnect
(open position)



Note: Solid Blade Disconnects are exempt under certain conditions. See pages 3-13, 3-14 and 3-15.

Solid Blade Disconnects



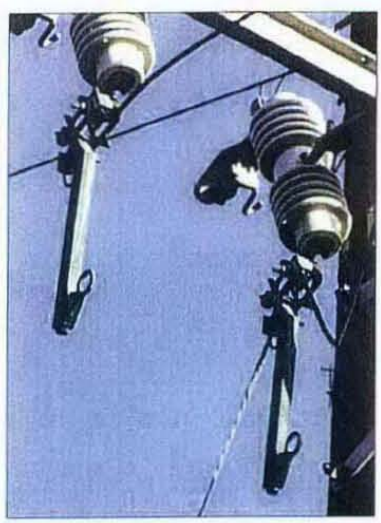


Figure 2-10
Solid Blade Disconnects

Note: Solid Blade Disconnects are exempt under certain conditions. See pages 3-13, 3-14 and 3-15.

Solid Blade Disconnect

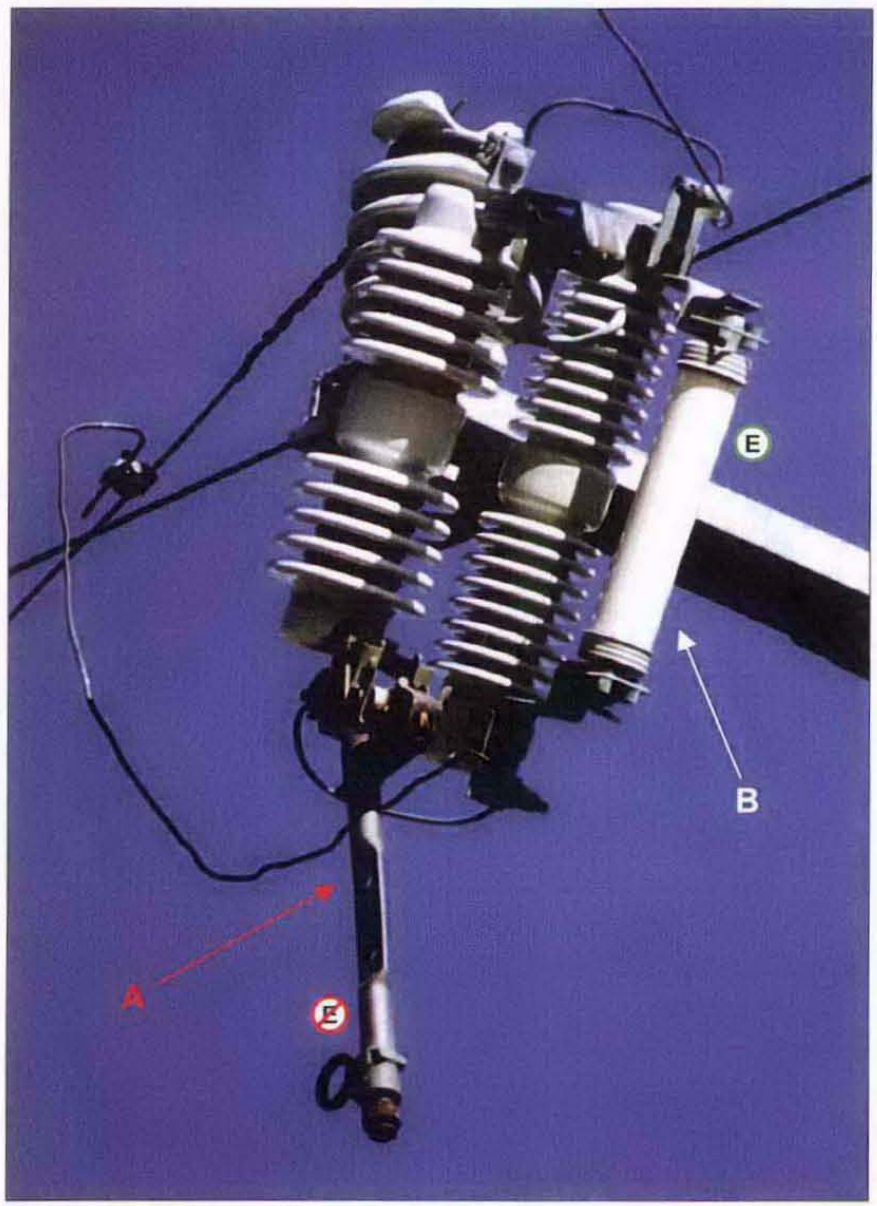


Figure 2-11
A. Solid Blade Bypass Disconnect in Open Position (E)
B. Arm Mounted Cutout with Non-Expulsion Fuse (E)

In-Line Disconnect

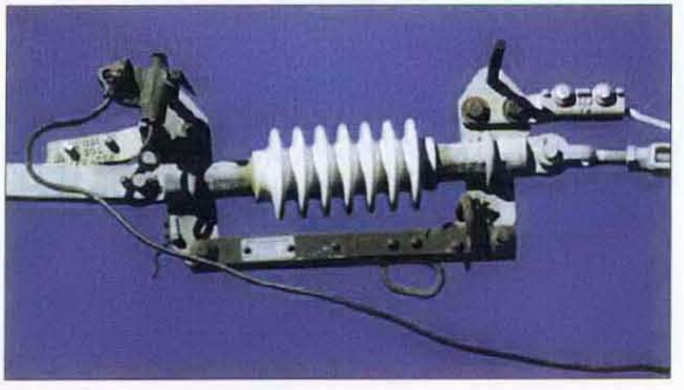
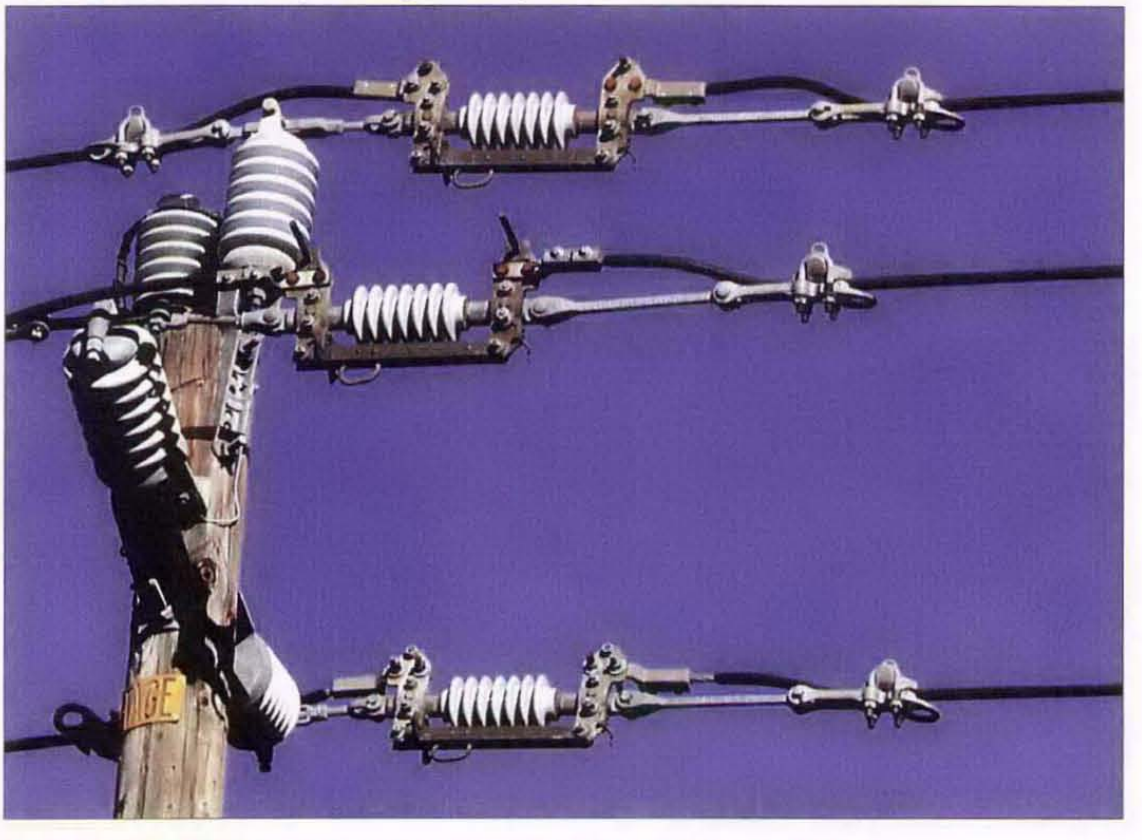


Figure 2-12
In-Line Disconnect *(closed position)*

Figure 2-13
In-Line Disconnects *(closed position)*



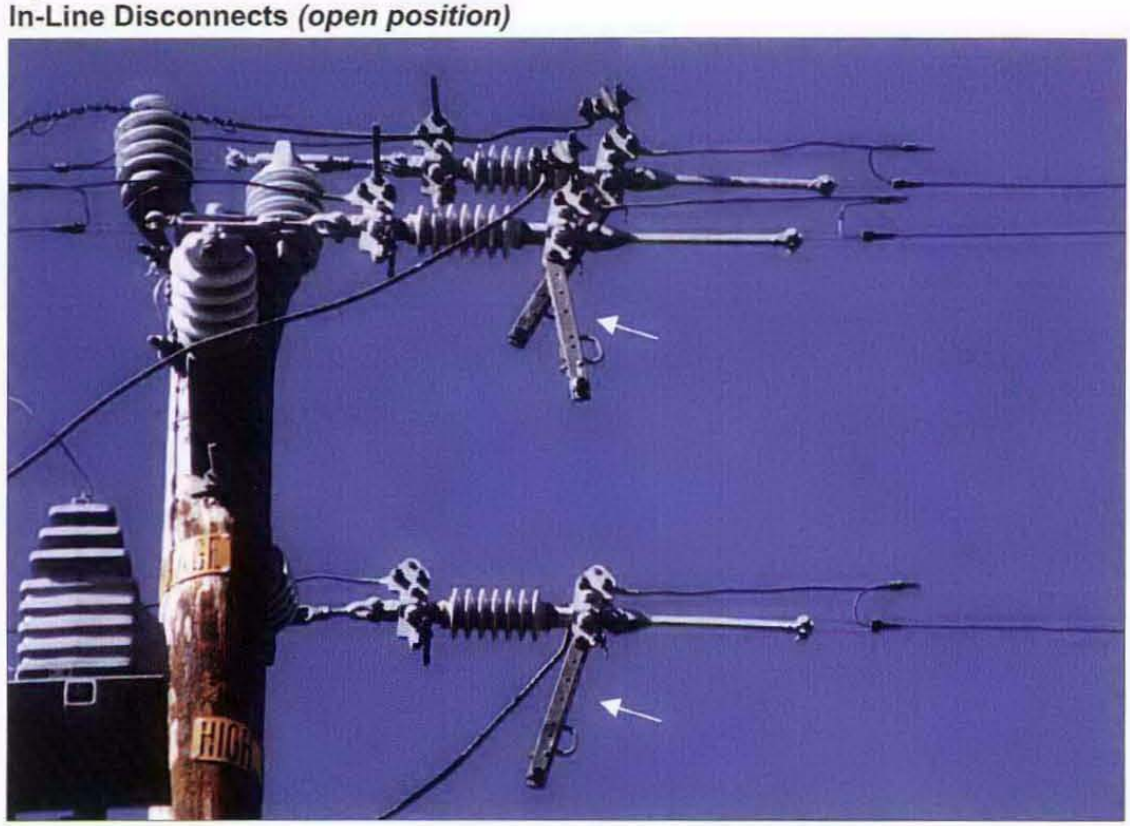
Note: In-Line Disconnects are exempt under certain conditions. See pages 3-13, 3-14 and 3-15.

In-Line Disconnect

Figure 2-14
In-Line Disconnect *(open position)*

Note: In-Line Disconnects are exempt under certain conditions. See pages 3-13, 3-14 and 3-15.

Figure 2-15
In-Line Disconnects *(open position)*



Lightning Arrester

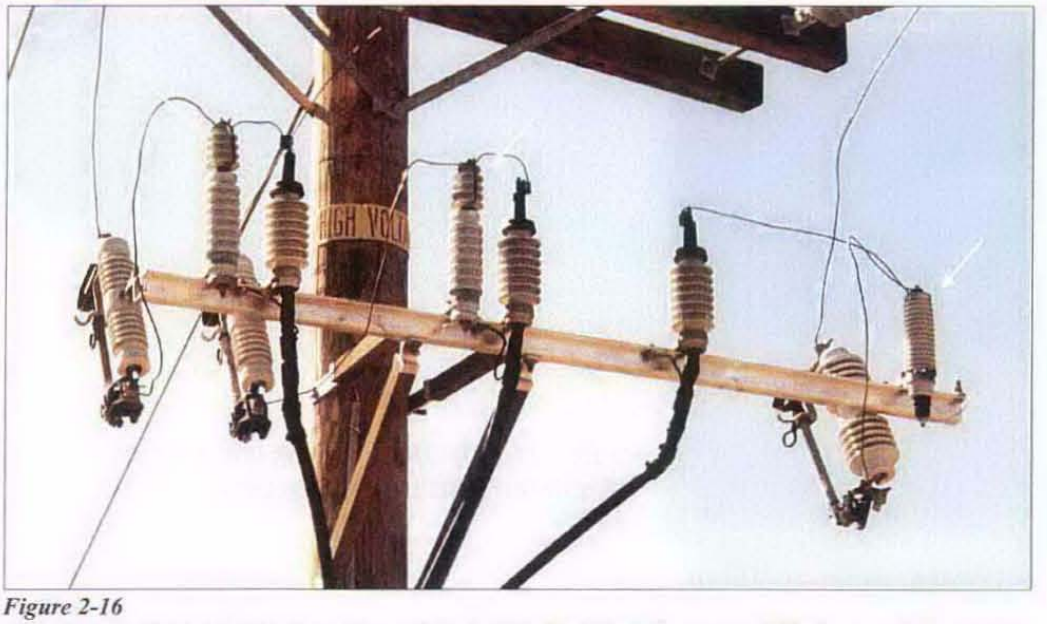
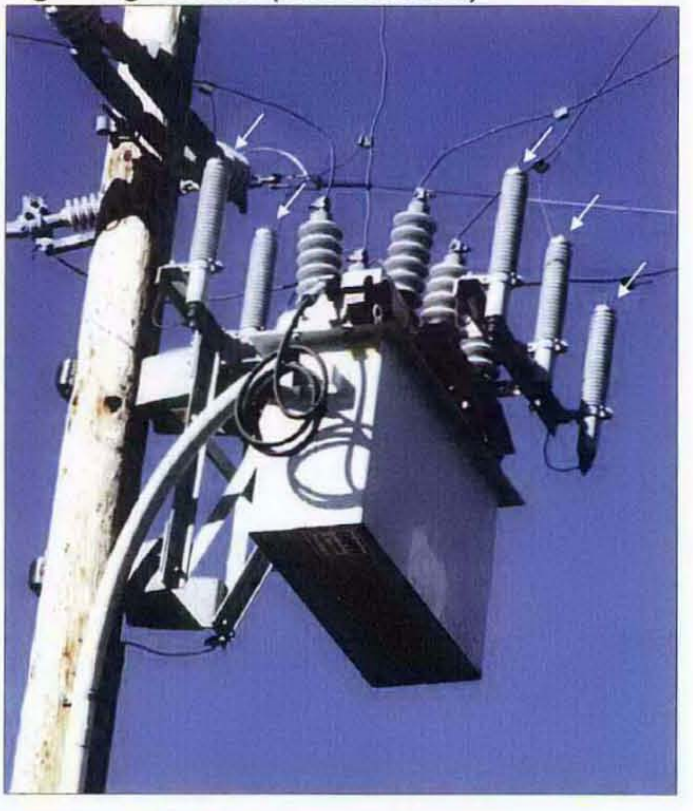


Figure 2-16
Arm Mounted Lightning Arrester (*with Cable Riser and Universal Fuses*)

Figure 2-17
Lightning Arrester *(with Recloser)*



Lightning Arrester

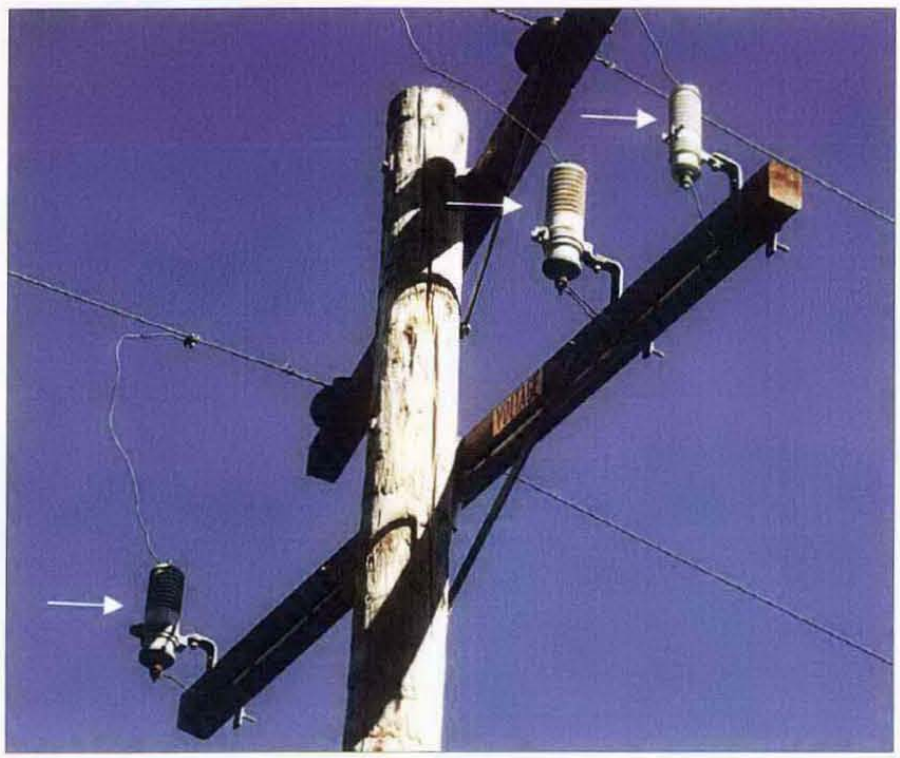
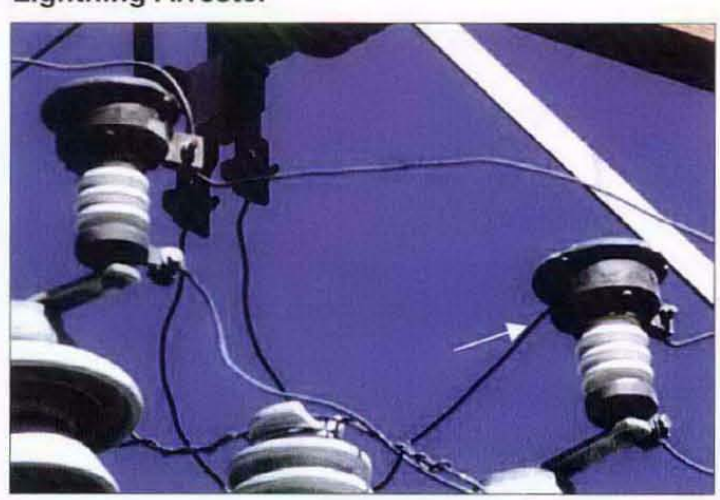


Figure 2-18
Lightning Arrester

Figure 2-19
Lightning Arrester



Non-Porcelain Lightning Arrester

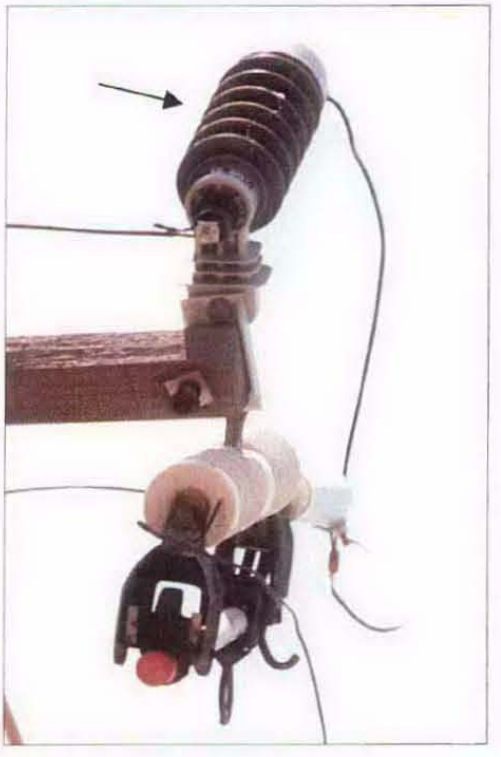
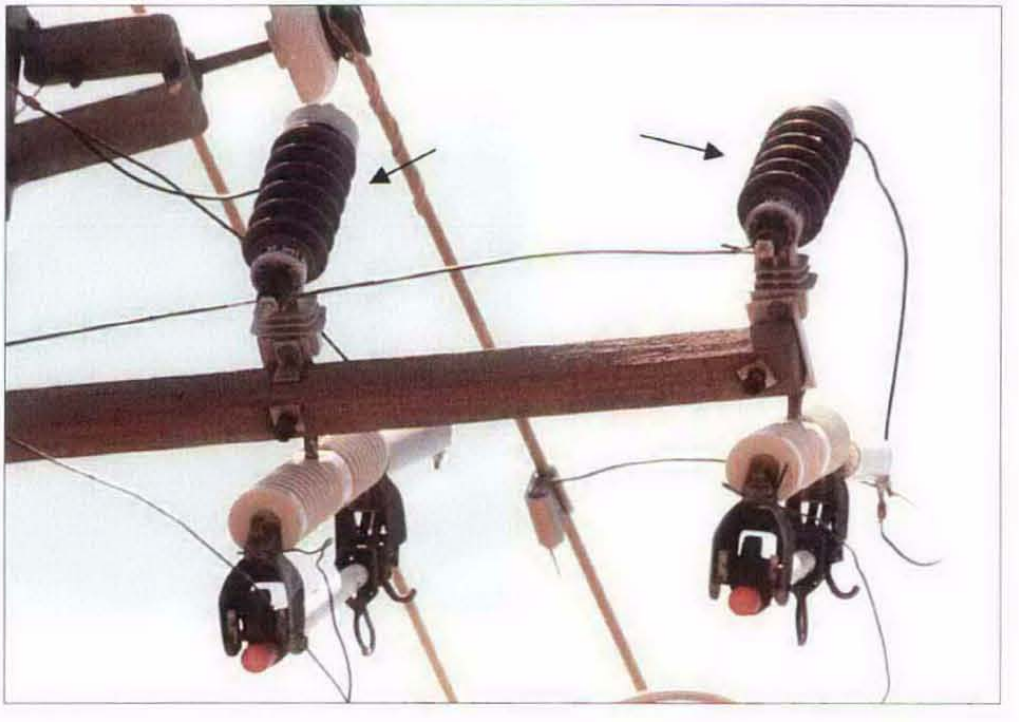


Figure 2-20
Non-Porcelain Lightning Arrester

Figure 2-21
Non-Porcelain Lightning Arrester



Lightning Arrester

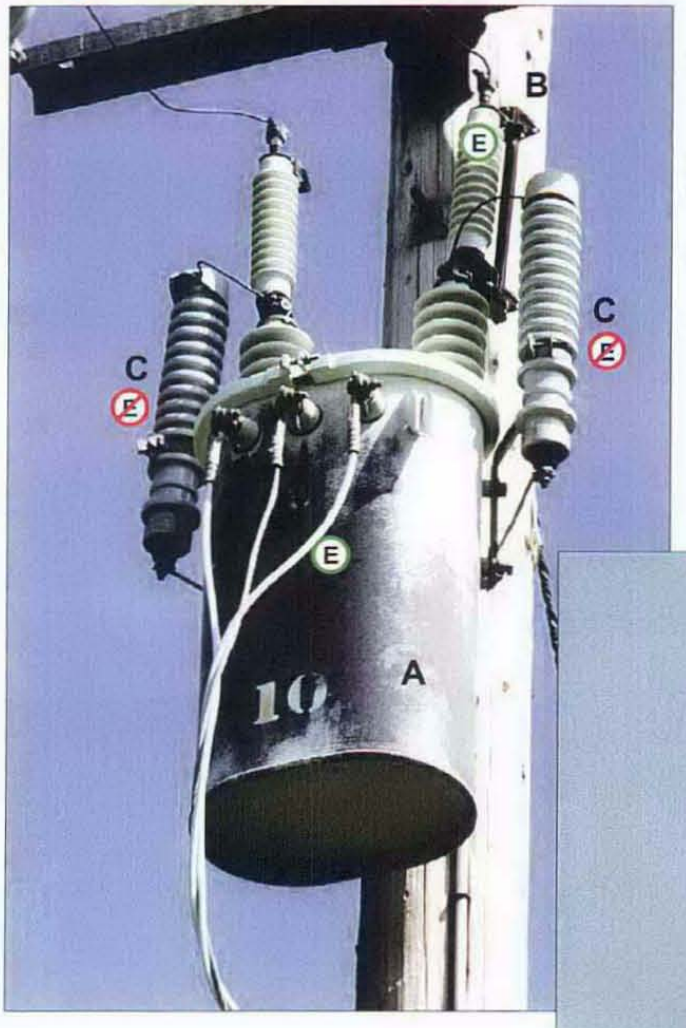


Figure 2-22
Transformer Mounted Lightning Arrester
A. Conventional Transformer (E)
B. Bushing Mounted Liquid Filled Fuse (E)
C. Lightning Arresters (E)

Figure 2-23
Gapped Lightning Arrester

Lightning Arrester

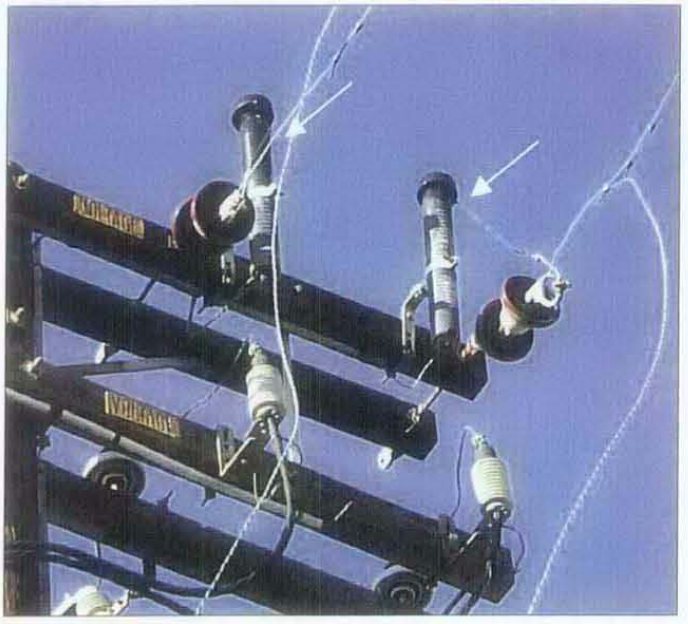
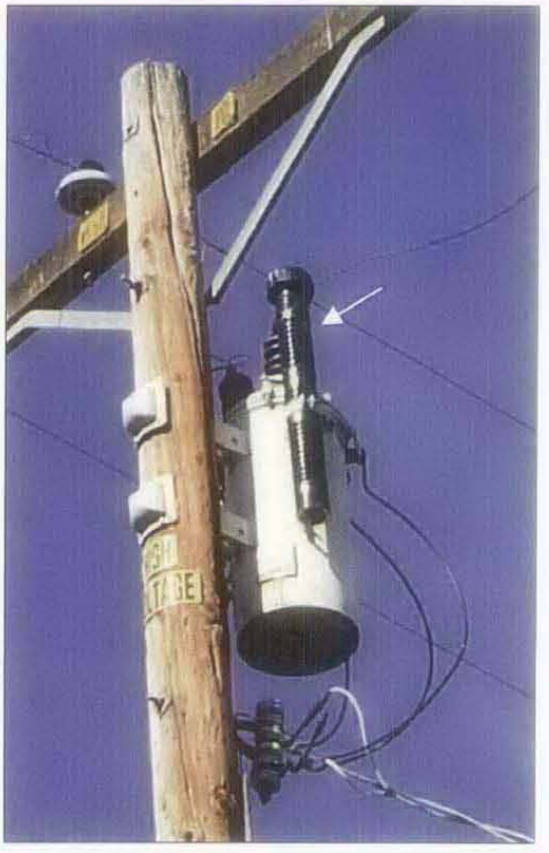


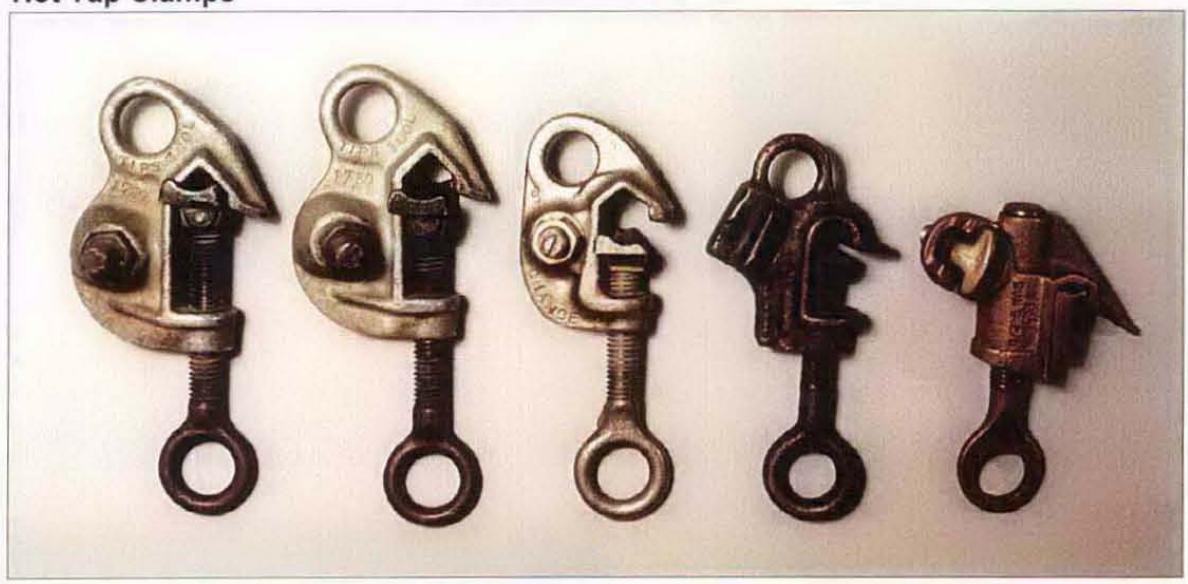
Figure 2-24
Lightning Arrester

Figure 2-25
Lightning Arrester

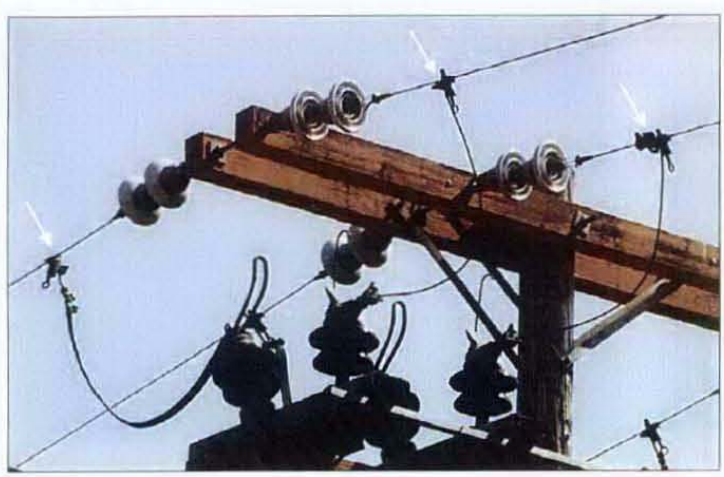


Hot Tap Clamp

Figure 2-26
Hot Tap Clamps



Compare with exempt hot tap clamps on page 3-20



Note: Some Hot Tap Clamps are exempt. See page 3-20.

Split Bolt Connector

Figure 2-27
Split Bolt Connectors (*various sizes*)

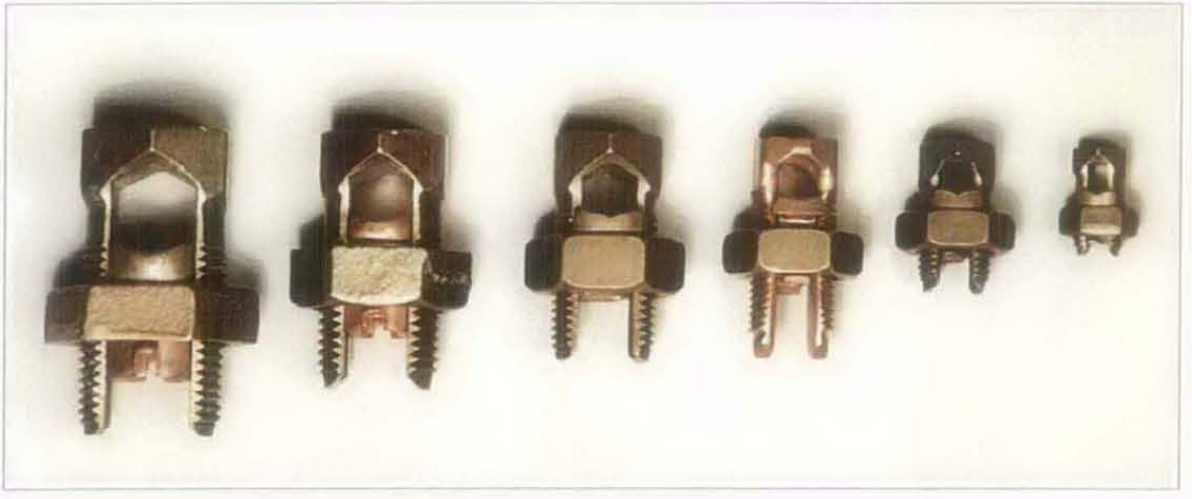
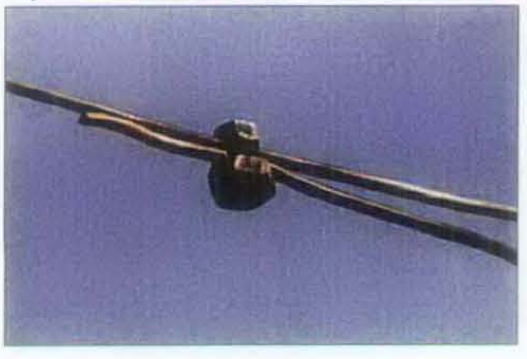
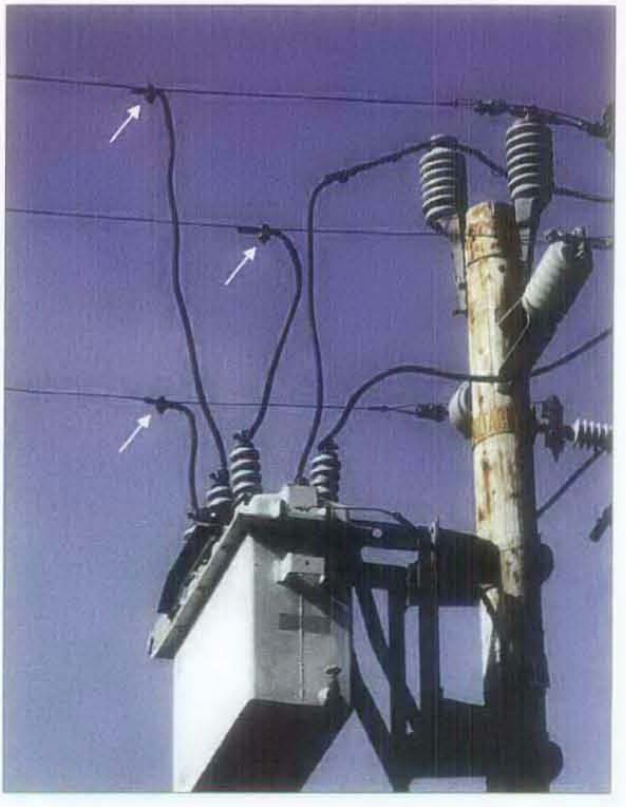


Figure 2-28
Split Bolt Connector





Note: Under certain conditions, split bolts are exempt. See page 3-22.

Other Connectors

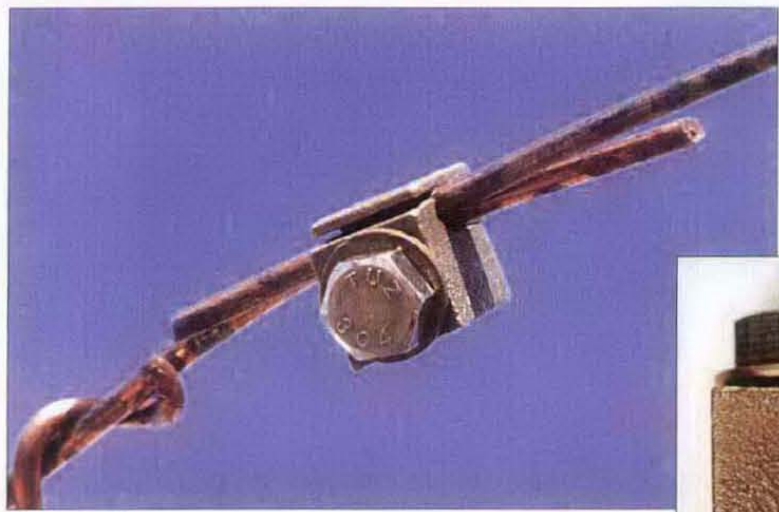


Figure 2-29
Fargo Connector

Figure 2-30
LM Connector

Grasshopper Air Switch

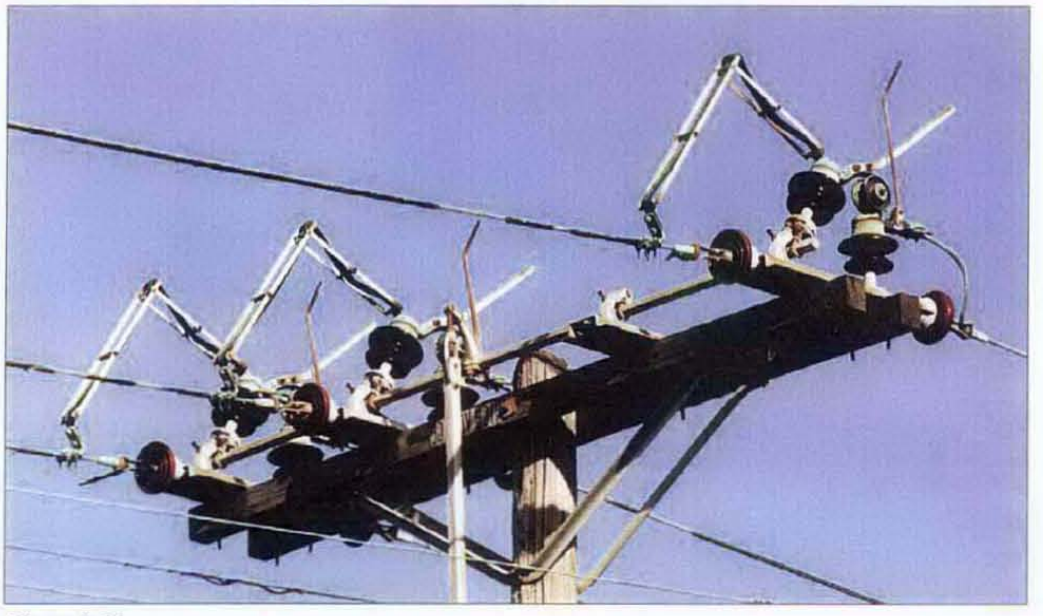
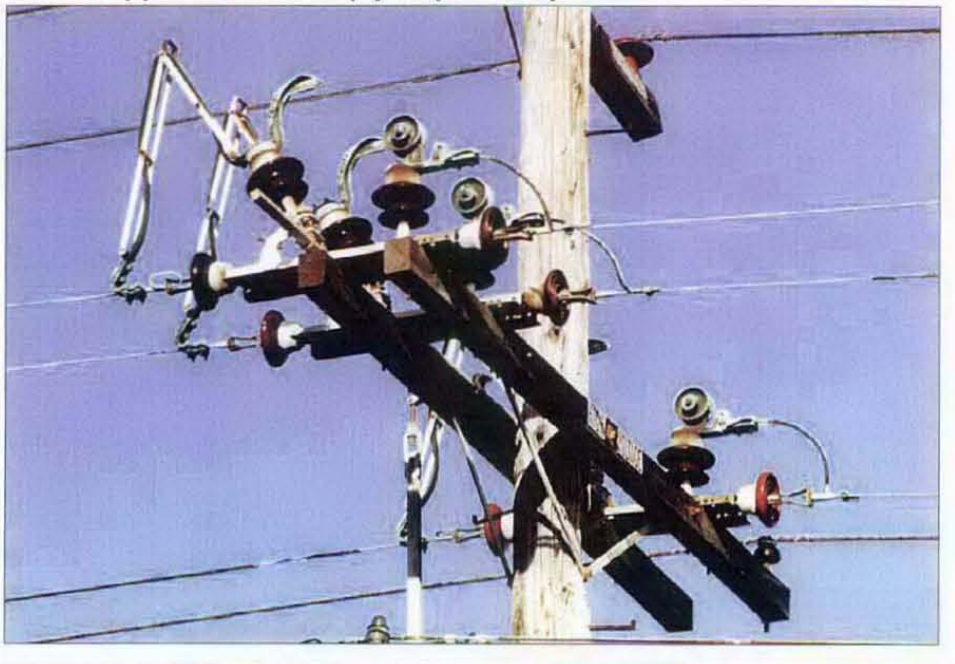


Figure 2-31
Grasshopper Air Switch *(closed position)*

Figure 2-32
Grasshopper Air Switch *(open position)*



Transmission Air Switch

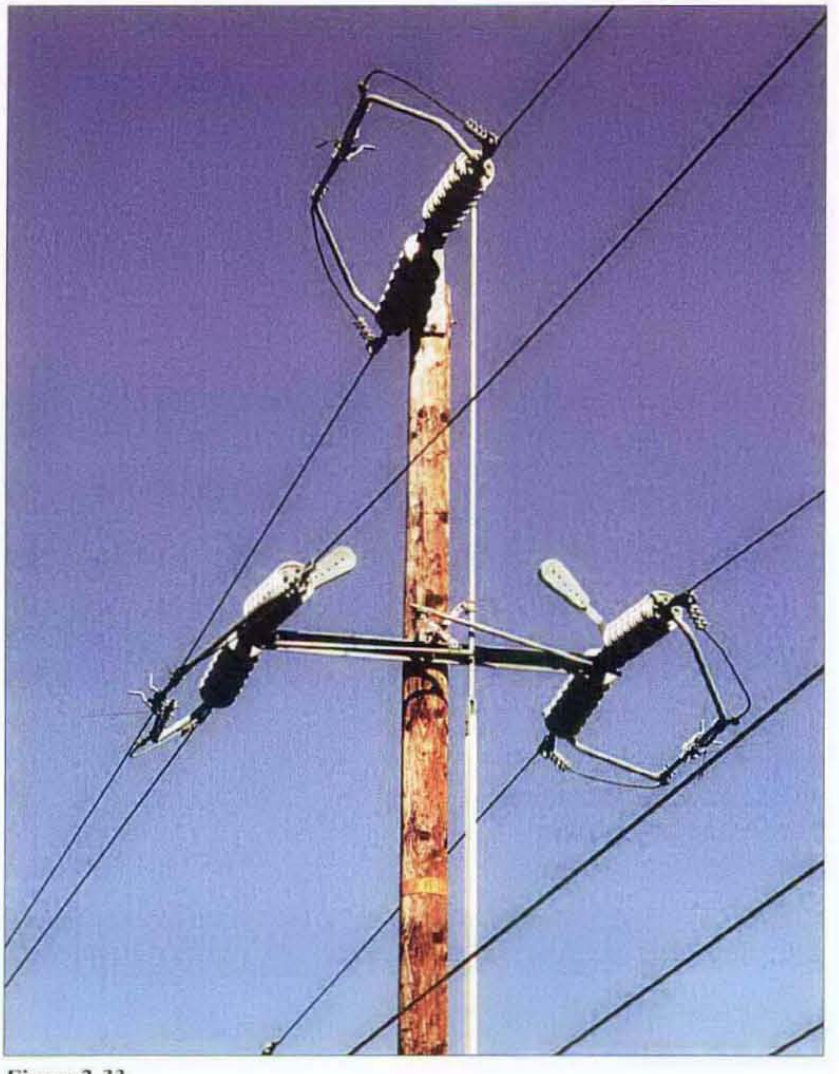
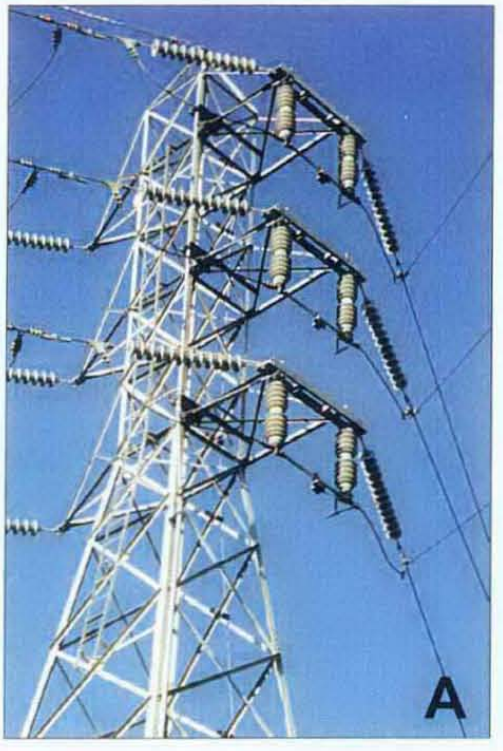


Figure 2-33
Transmission Air Switch, Pole Mounted 60kV *(closed position)*

Transmission Air Switch



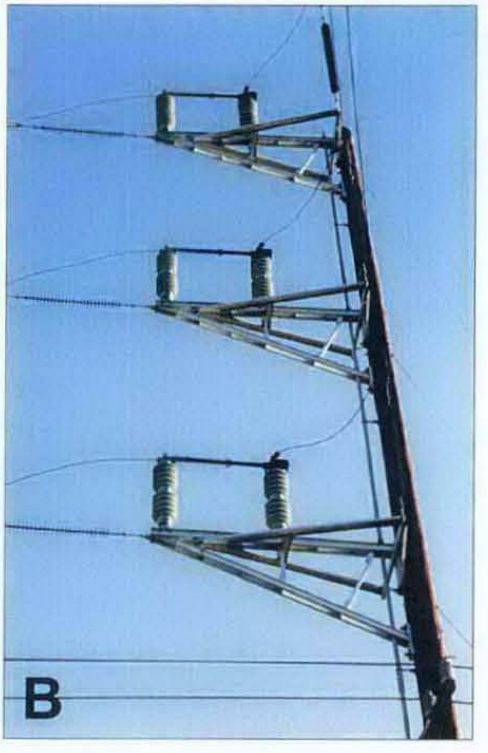


Figure 2-34
Transmission Air Switches
A. Tower Mounted *(closed position)*
B. Pole Mounted *(closed position)*
C. Tower Mounted *(open position)*

Section 3
Exempt

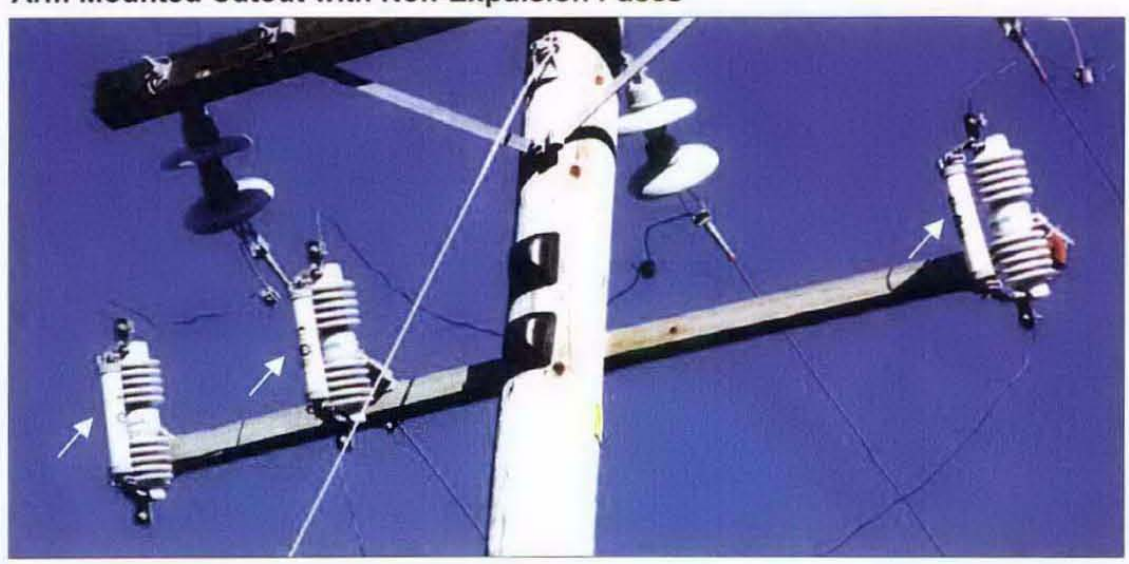
Clearance Not Required

Non-Expulsion Fuse

Figure 3-1
Arm Mounted Cutout with Non-Expulsion Fuse

Figure 3-2
Arm Mounted Cutout with Non-Expulsion Fuse

Figure 3-3
Arm Mounted Cutout with Non-Expulsion Fuses



Non-Expulsion Fuse

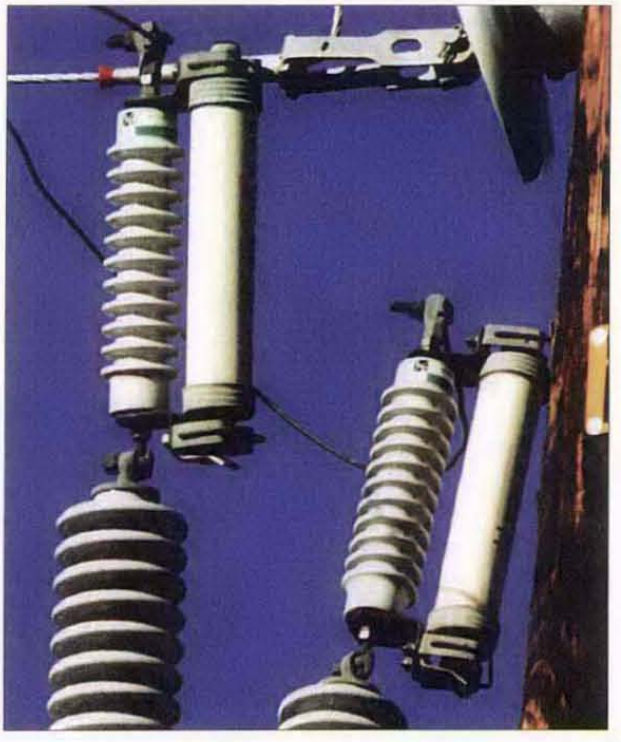


Figure 3.4
Bushing Mounted Cutout with Non-Expulsion Fuse

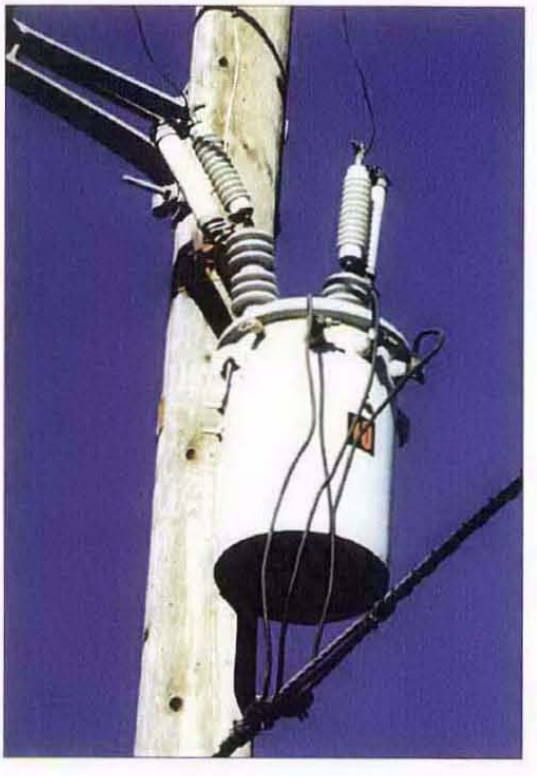
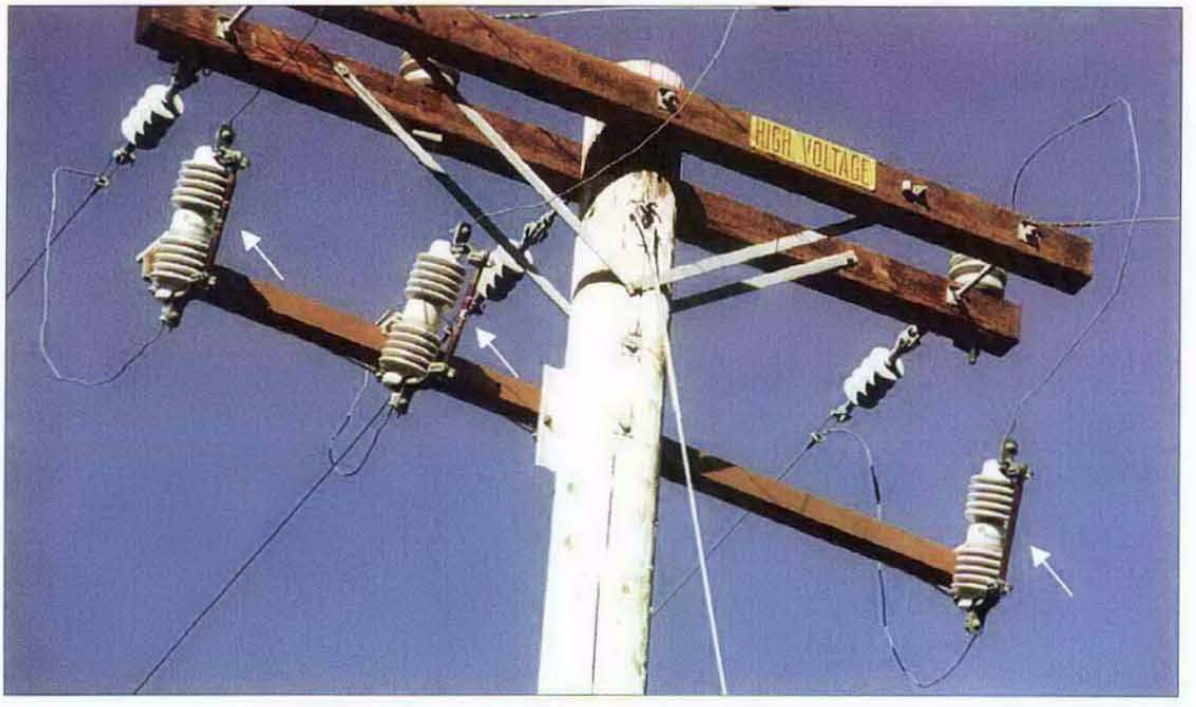


Figure 3-5
Bushing Mounted Cutout with Non-Expulsion Fuses

Liquid Filled Fuse

E

Figure 3-6
Arm Mounted Cutout with Liquid Filled Fuse



Liquid Filled Fuse

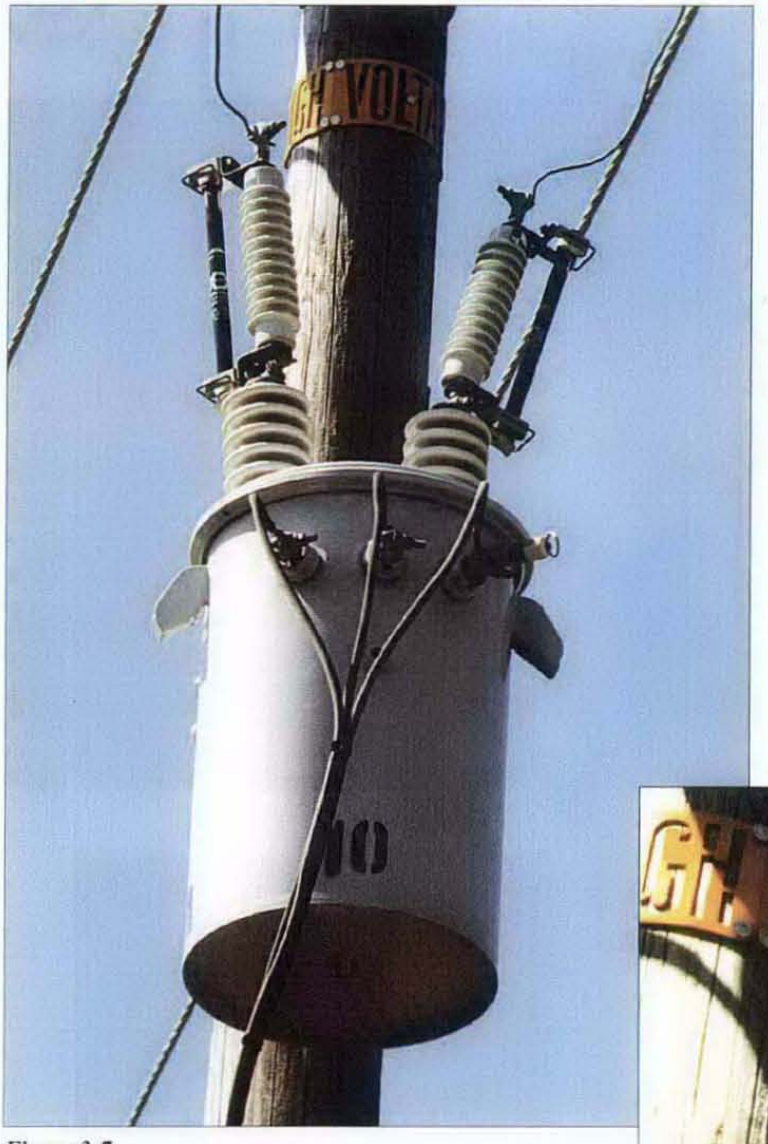


Figure 3-7
Bushing Mounted Cutout with Liquid Filled Fuse

SMU-20 Fuse

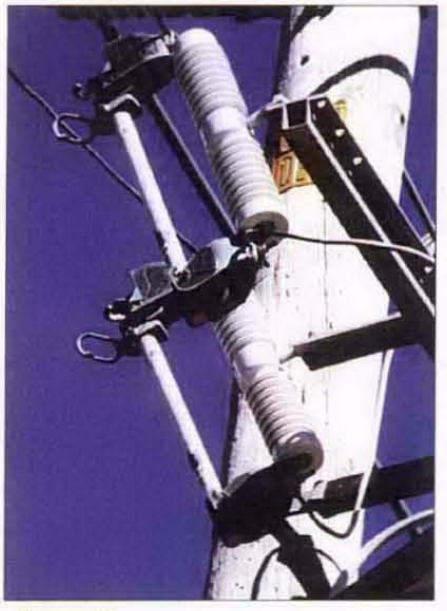


Figure 3-8
Arm Mounted Cutout with SMU-20 Fuses

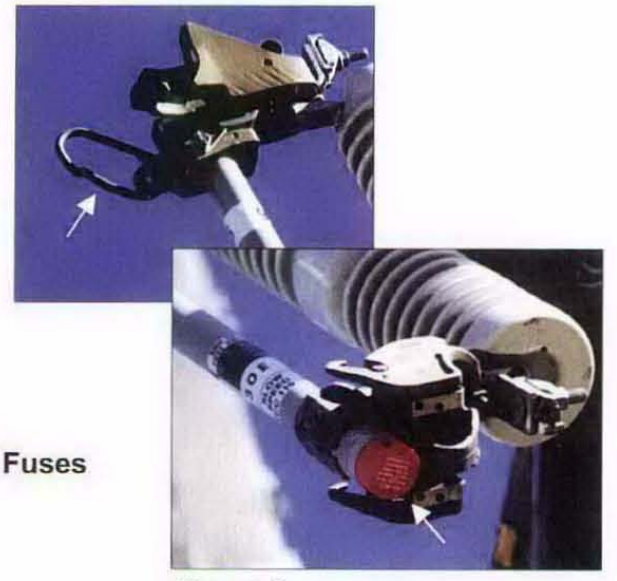
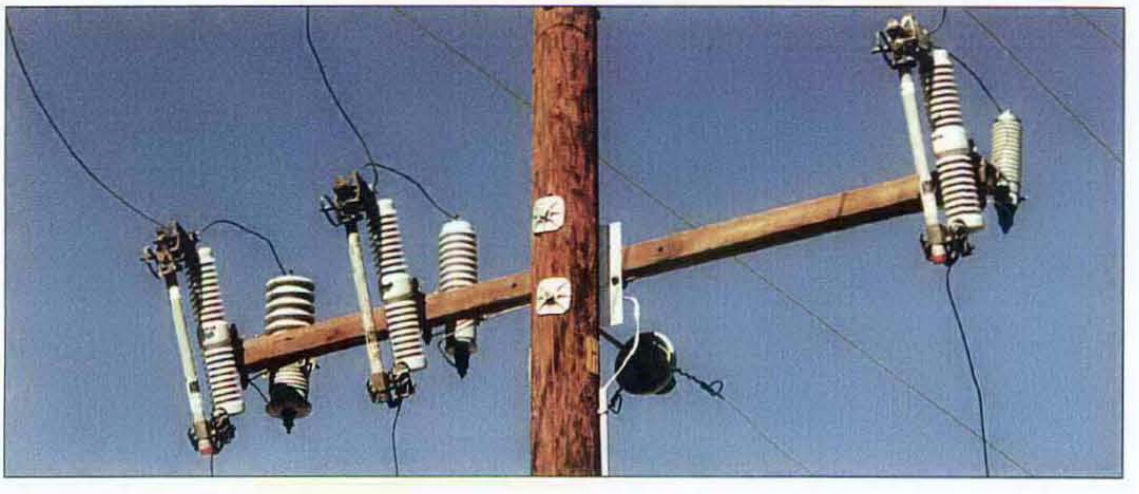


Figure 3-9
SMU-20 Fuse - Detail

Figure 3-10
Arm Mounted Cutout with SMU-20 Fuses



S&C Fault Tamer Fuse

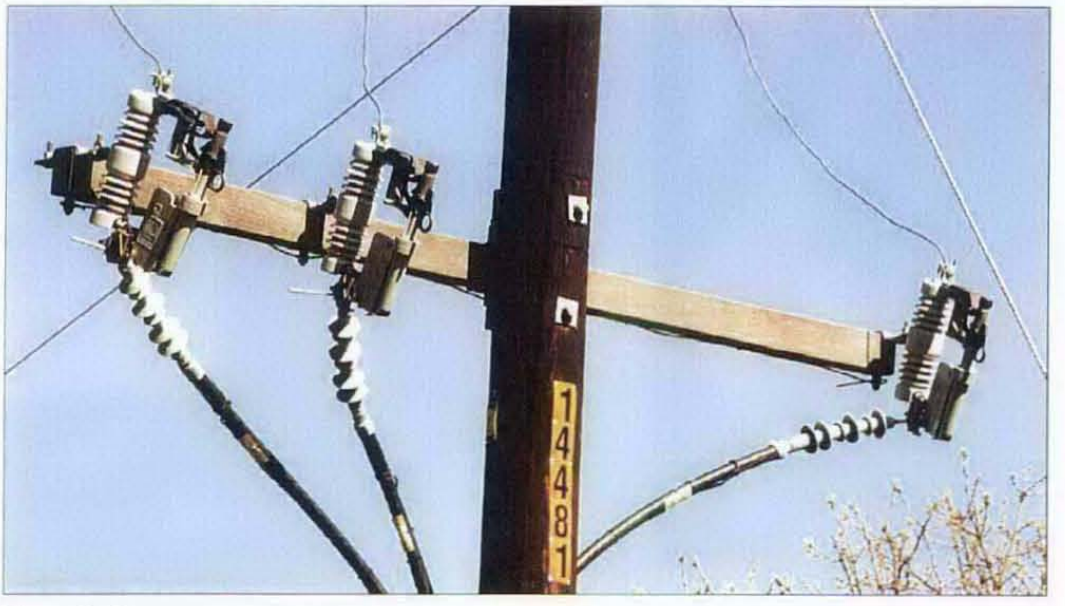
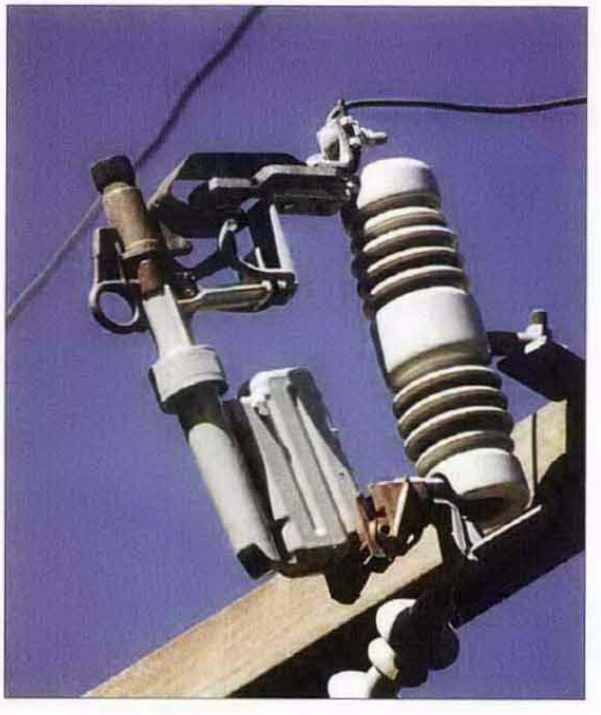


Figure 3-11
Arm Mounted Cutout with S&C Fault Tamer Fuse



600 Amp KPF Air Switch

Figure 3-12
600 Amp KPF Air Switch, Triangular Construction (*closed position*)

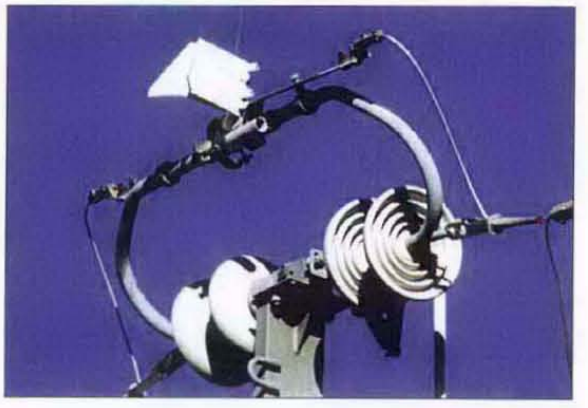
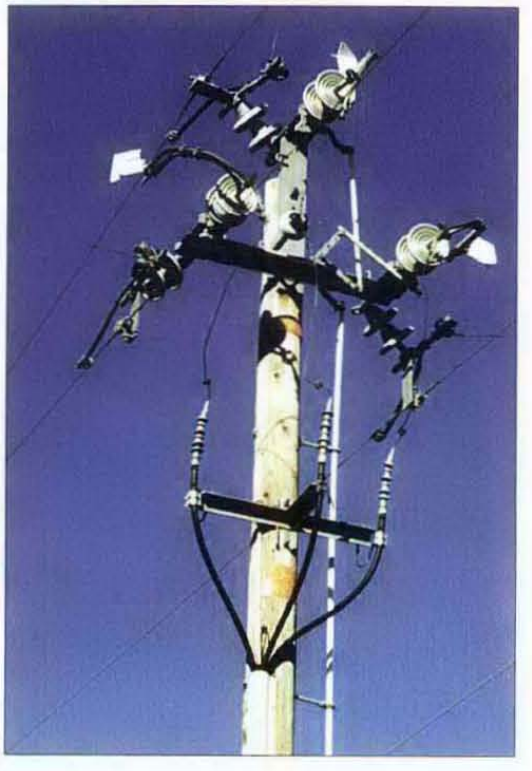
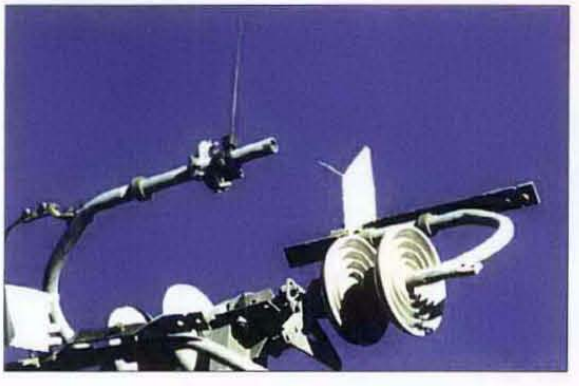


Figure 3-13
600 Amp KPF Air Switch, Triangular Construction (*open position*)



Note: Exemption does not apply in SDG&E's Service Territory

SDGE



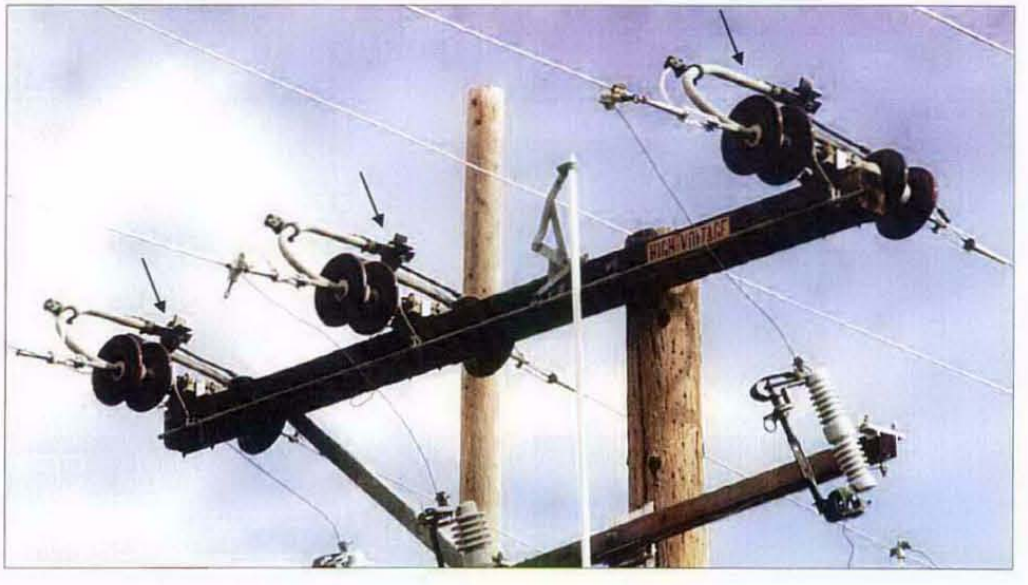
600 Amp KPF air Switch

Figure 3-14
600 Amp KPF Air Switch, Crossarm Construction (*closed position*)
With Arcing Horns and Snuffers

Note: Exemption does not apply in SDG&E's Service Territory

SDGE

Figure 3-15
600 Amp KPF Air Switch, Crossarm Construction (*closed position*)
Without Arcing Horns or Snuffers



Underarm Sidebreak Switch

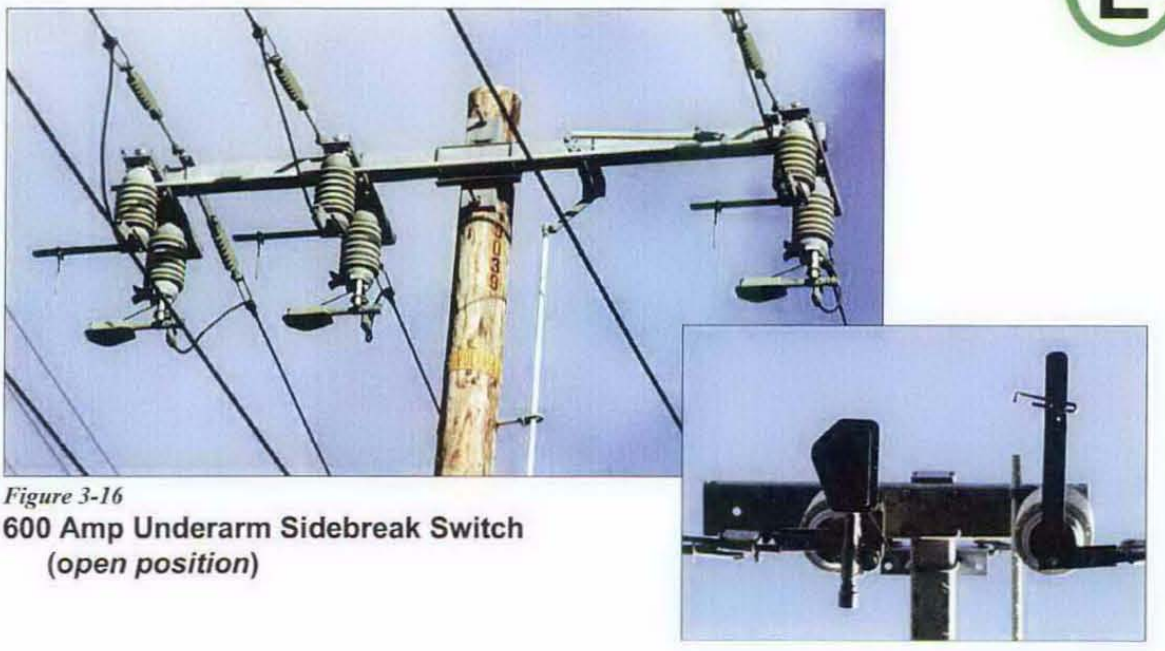


Figure 3-16
600 Amp Underarm Sidebreak Switch (*open position*)

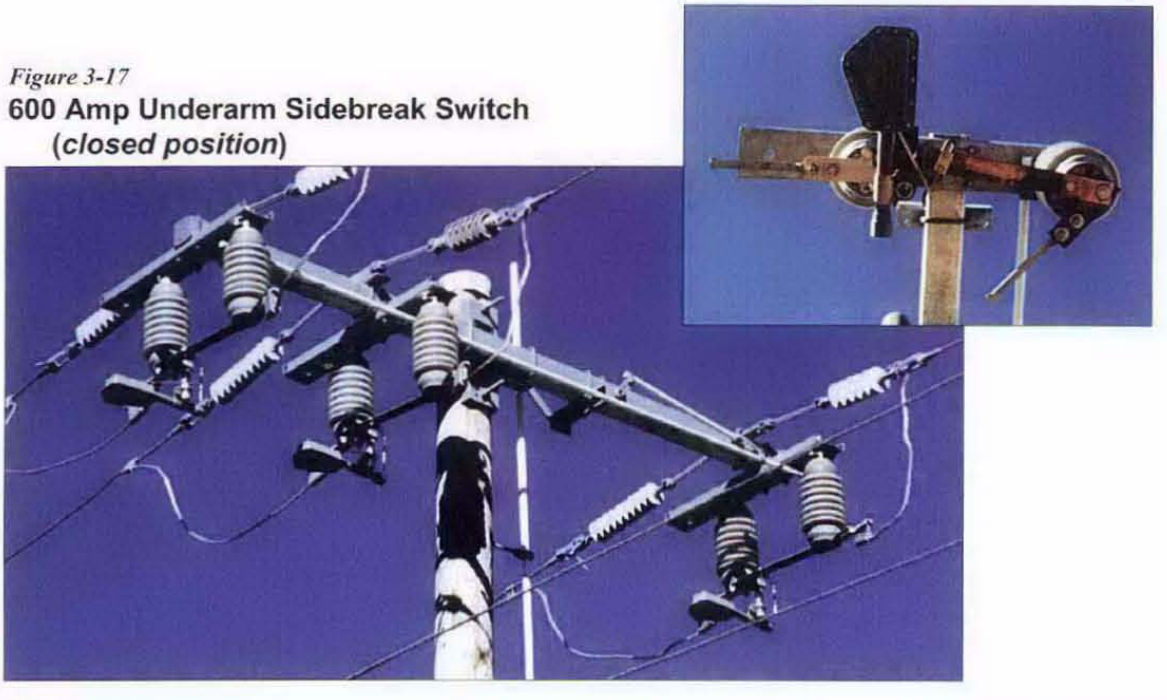


Figure 3-17
600 Amp Underarm Sidebreak Switch (*closed position*)

S&C Underarm Side-Break Switch

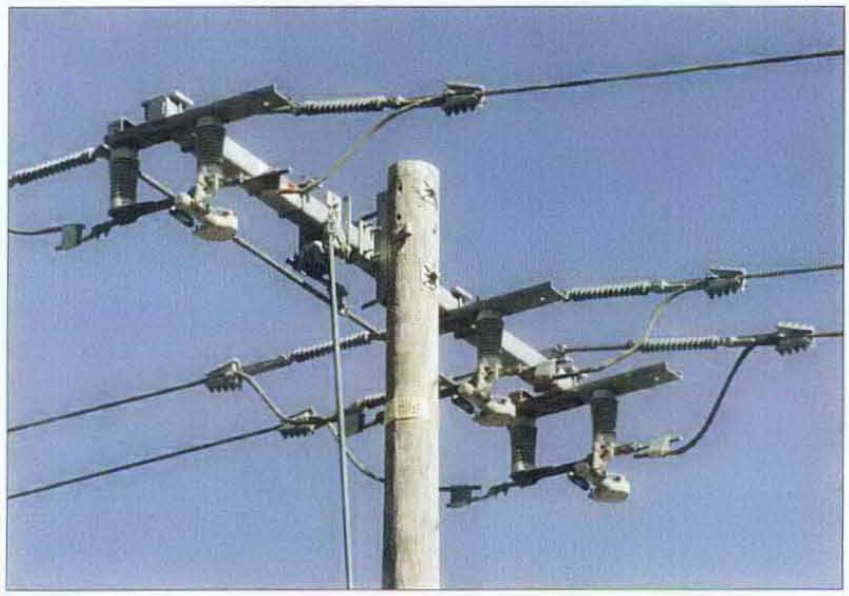


Figure 3-18
S&C Underarm Side-Break Switch
(*closed position*)

Figure 3-19
S&C Underarm Side-Break Switch
(*closed position*)

S&C Omni-Ruptor Switch

Figure 3-20
S&C Omni-Ruptor Switch, Triangular Construction (*open position*)

Figure 3-21
S&C Omni-Ruptor Switch, Tangent Construction (*closed position*)

Note: Upright version of Underarm Sidebreak Switch

S&C Scada-Mate Switch

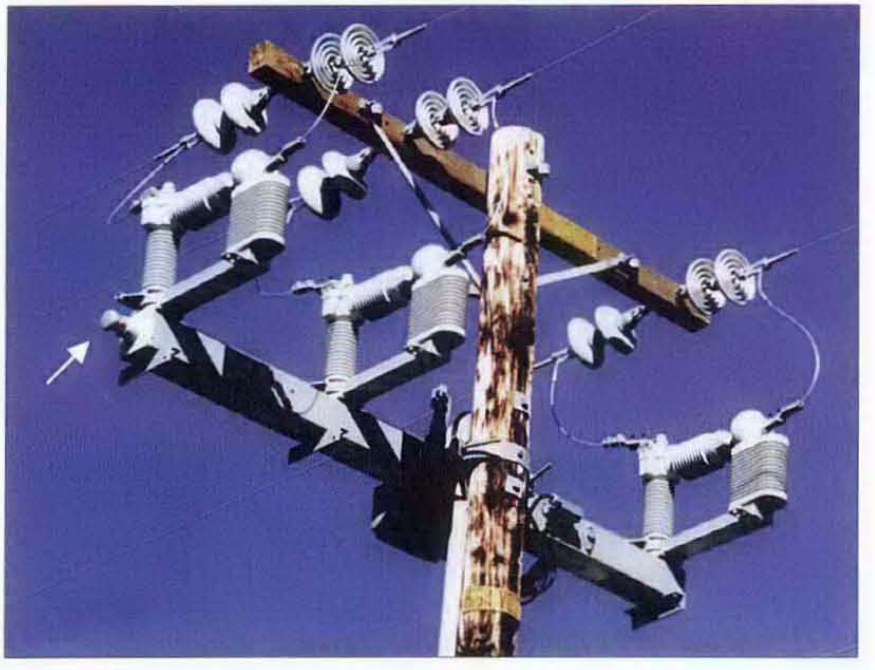


Figure 3-22
S&C Scada-Mate Switch

Open Position
Indicator Green
Letter "O" visible

Closed Position
Indicator Red
Letter "C" visible

Recloser

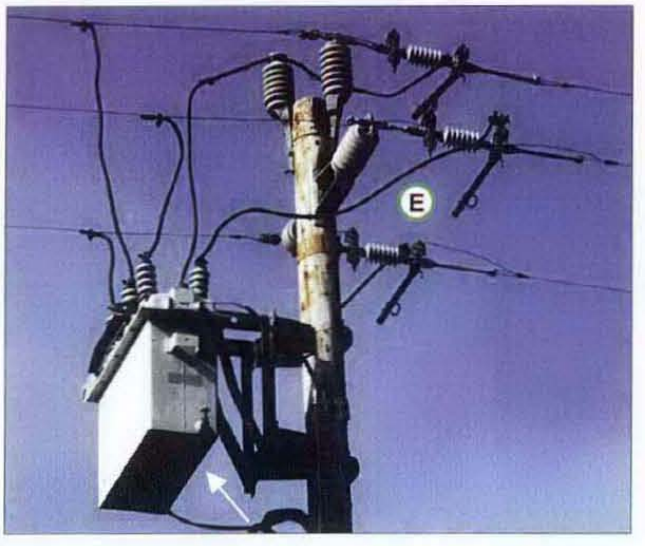
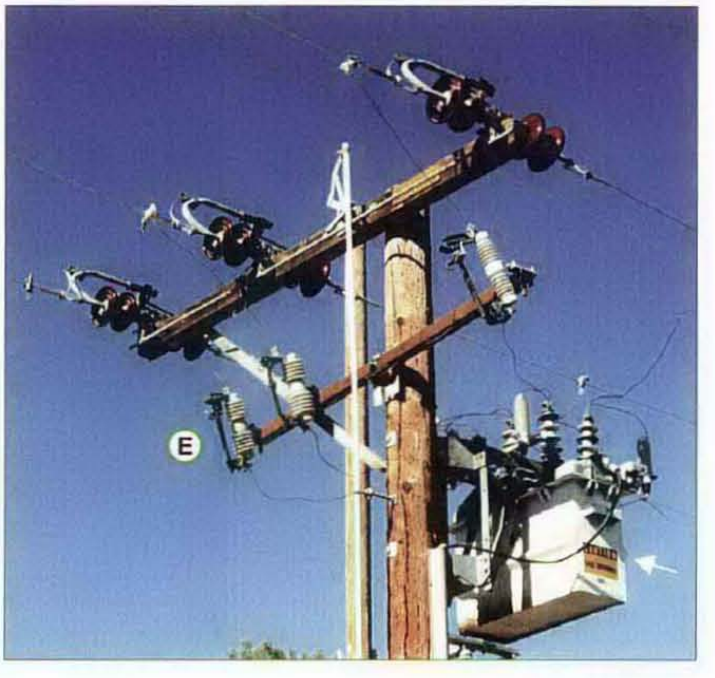


Figure 3-23
Recloser with In-Line Disconnects (*open position*)

Figure 3-24
Recloser with Solid Blade Disconnects (*closed position*)



Note: Only when used with Reclosers, Sectionalizers (page 3-14) or Voltage Regulators (page 3-15), **In-Line Disconnects** and **Solid Blade Disconnects** are exempt

Sectionalizer

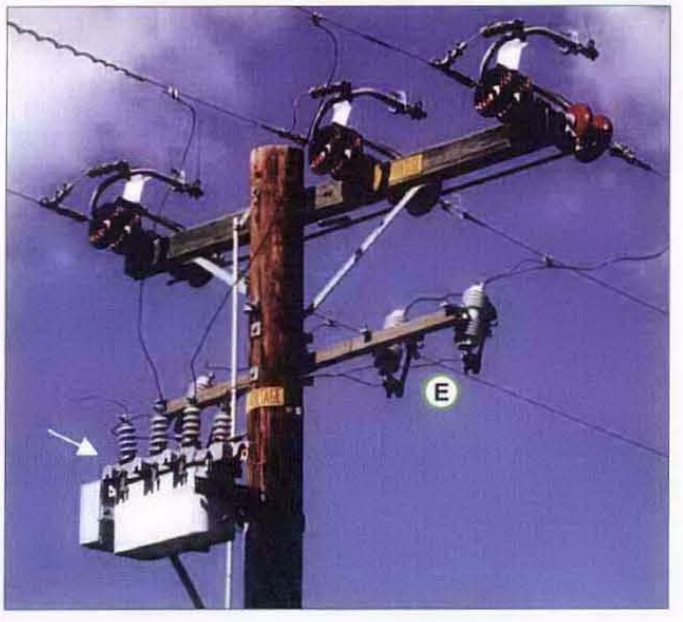
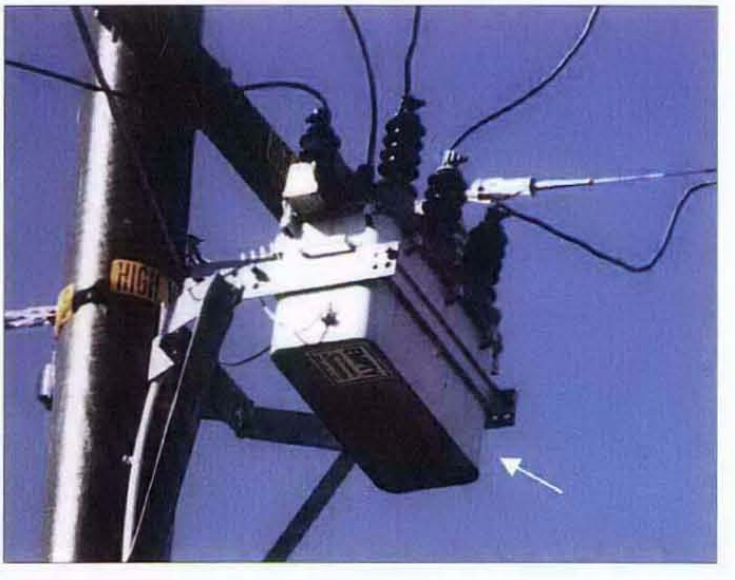


Figure 3-25
Sectionalizer with Solid Blade Disconnects

Figure 3-26
Sectionalizer



Note: Only when used with Reclosers (page 3-13), Sectionalizers or Voltage Regulators (page 3-15), **In-Line Disconnects** and **Solid Blade Disconnects** are exempt

Voltage Regulator

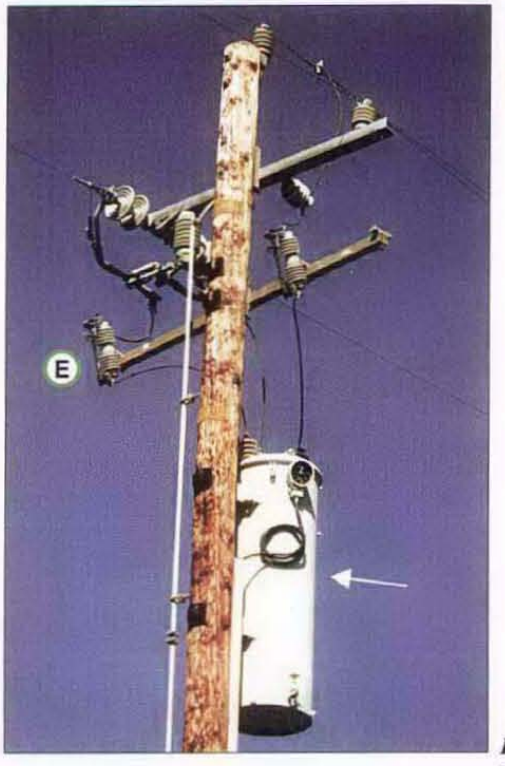
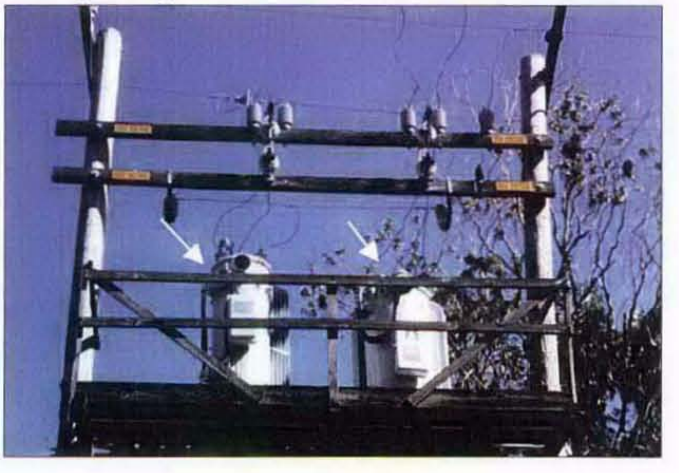


Figure 3-27
Voltage Regulator with Solid Blade Disconnects

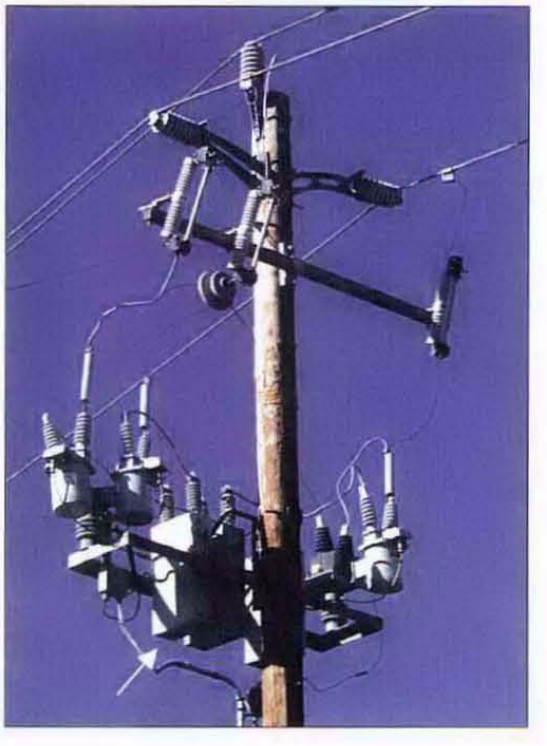
Figure 3-28
Voltage Regulator



Note: Only when used with Reclosers (page 3-13), Sectionalizers (page 3-14) or Voltage Regulators, **In-Line Disconnects** and **Solid Blade Disconnects** are exempt

Capacitor Bank

Figure 3-29
Capacitor Bank



Transformer

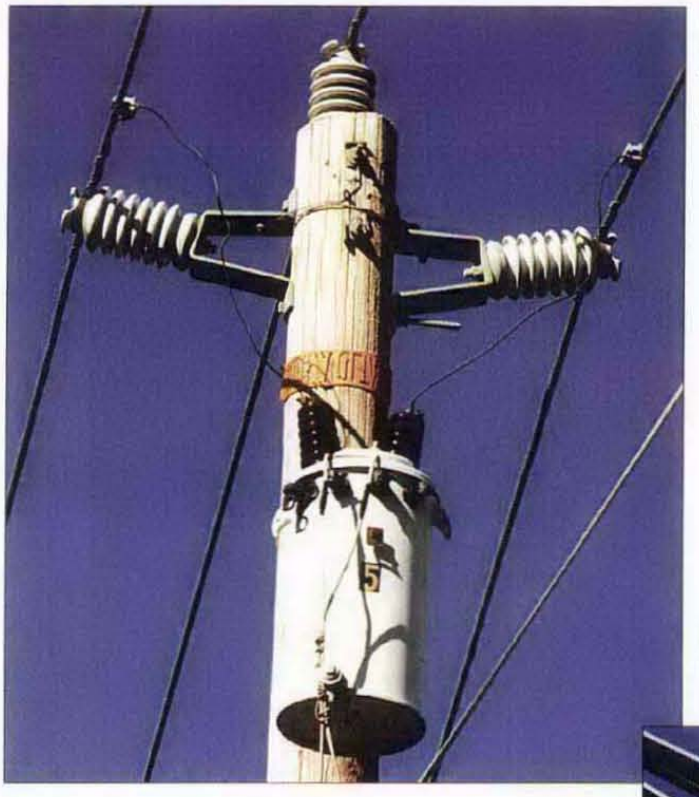
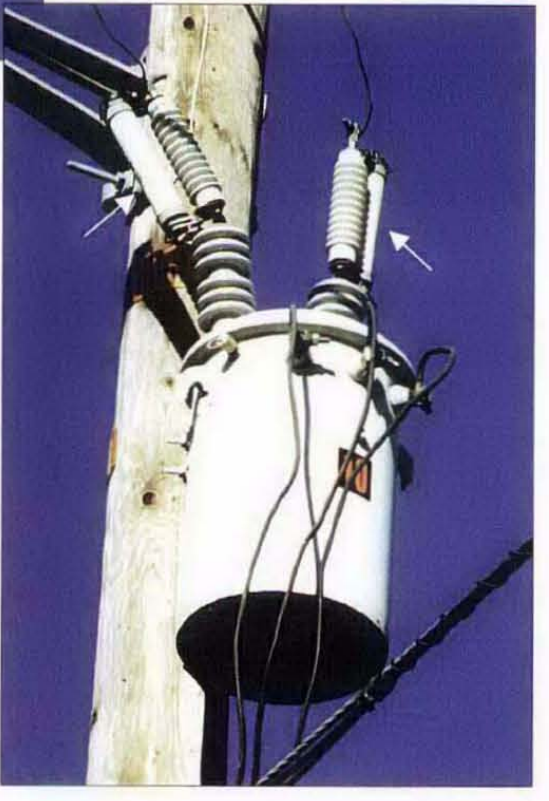


Figure 3-30
Self-Protected Transformer (no external cutouts or fuses)

Figure 3-31
Conventional Transformer with Exempt Fuses



Parallel Groove Connectors

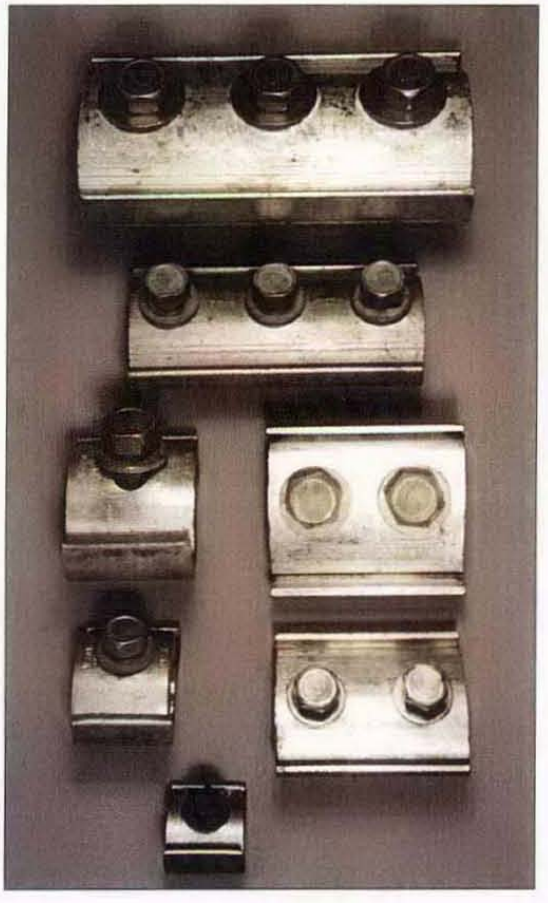


Figure 3-32
Parallel Groove Connectors

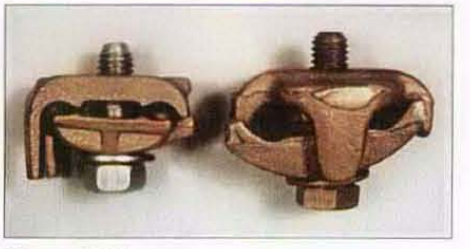
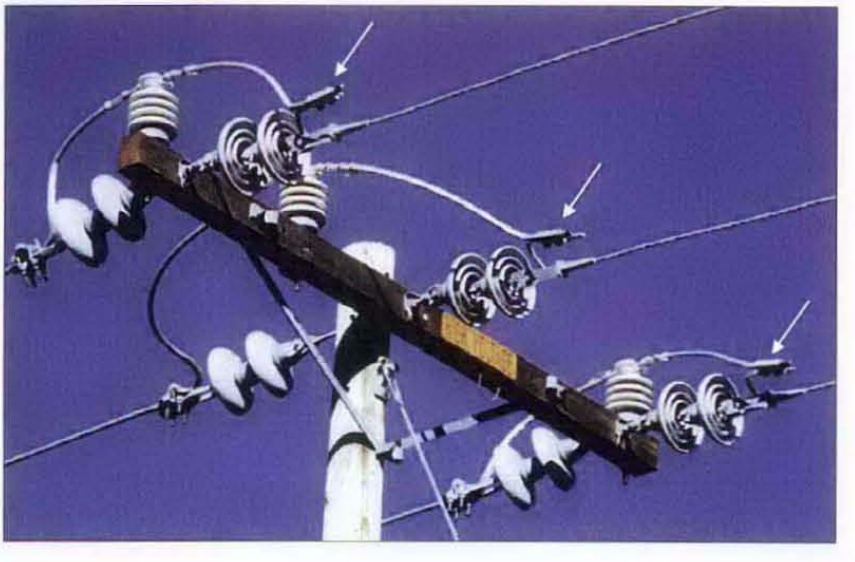


Figure 3-33
Parallel Groove Connectors - Copper



Parallel Groove Connectors

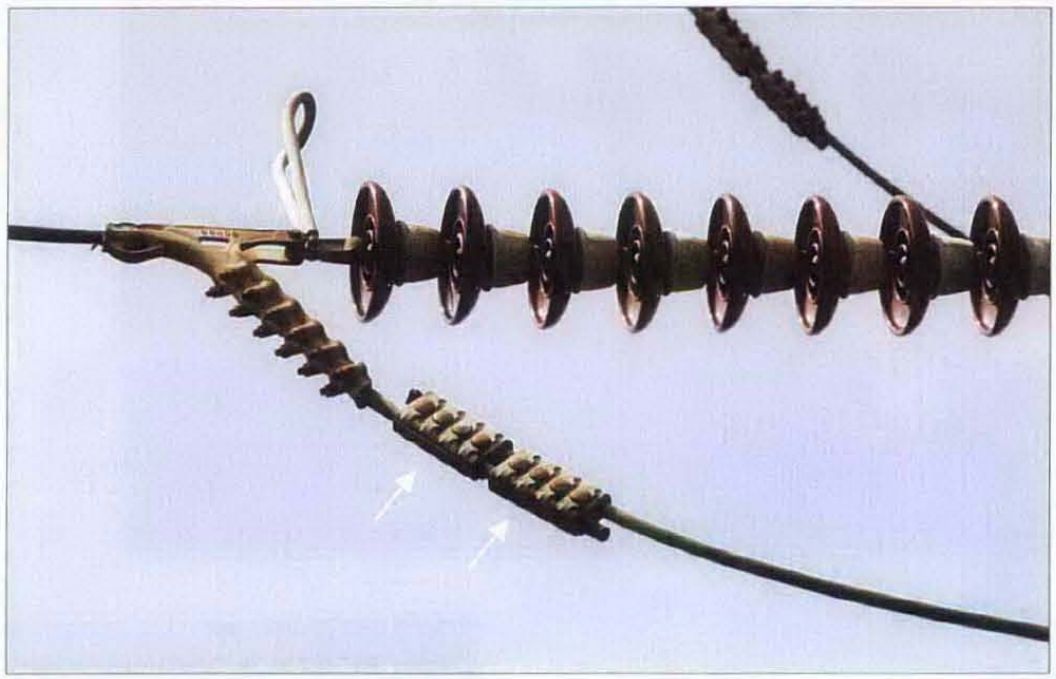


Figure 3-34
Transmission Deadend with Parallel Groove Connectors

Hot Tap Clamp

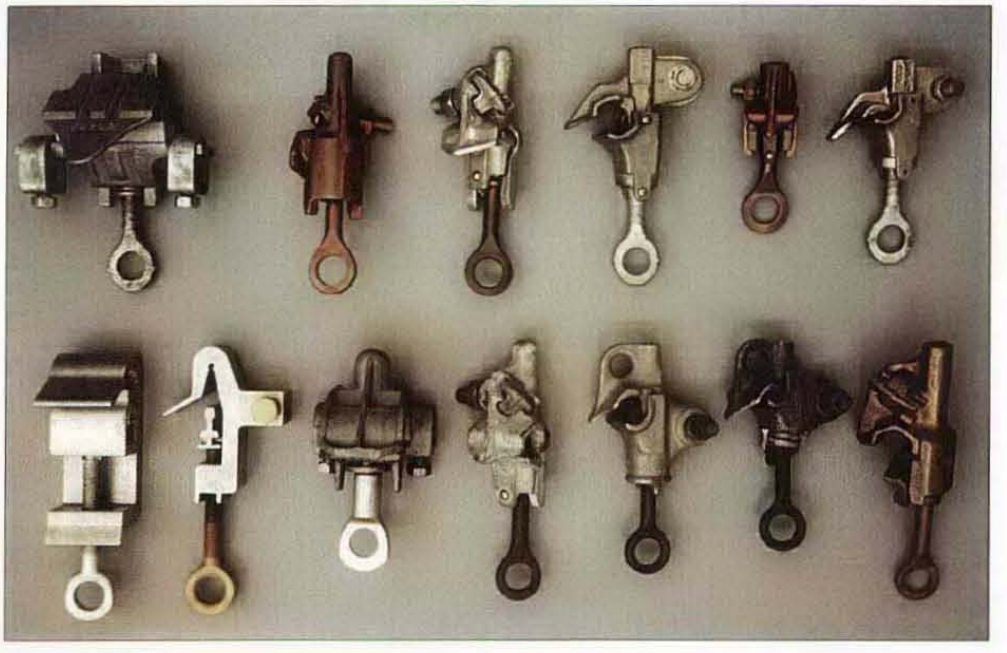


Figure 3-35
Hot Tap Clamps

Compare with non-exempt hot tap clamps on page 2-15

Note: Some Hot Tap Clamps are non-exempt. See page 2-15

Piercing Tap Clamp

E

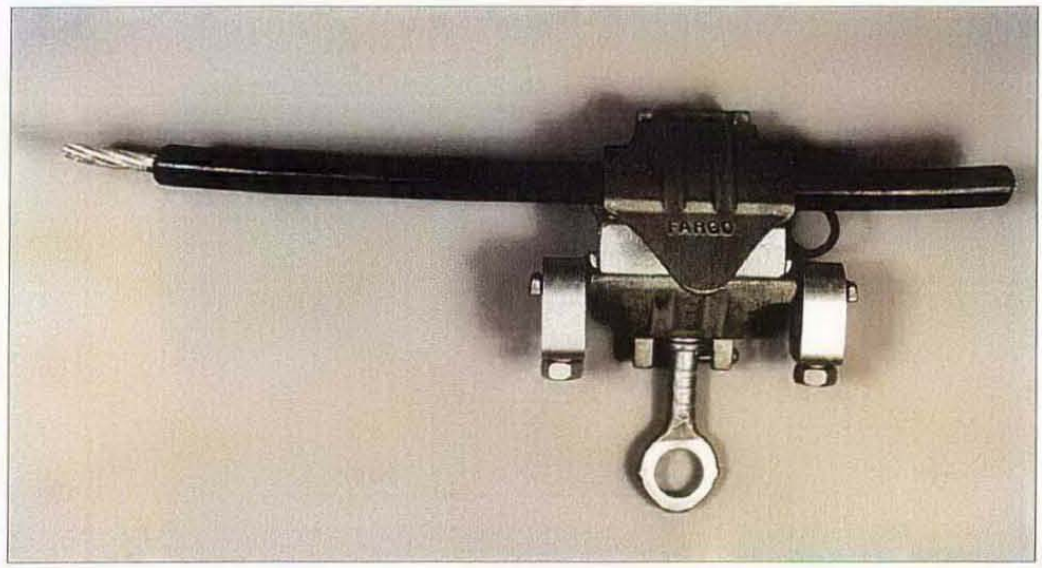
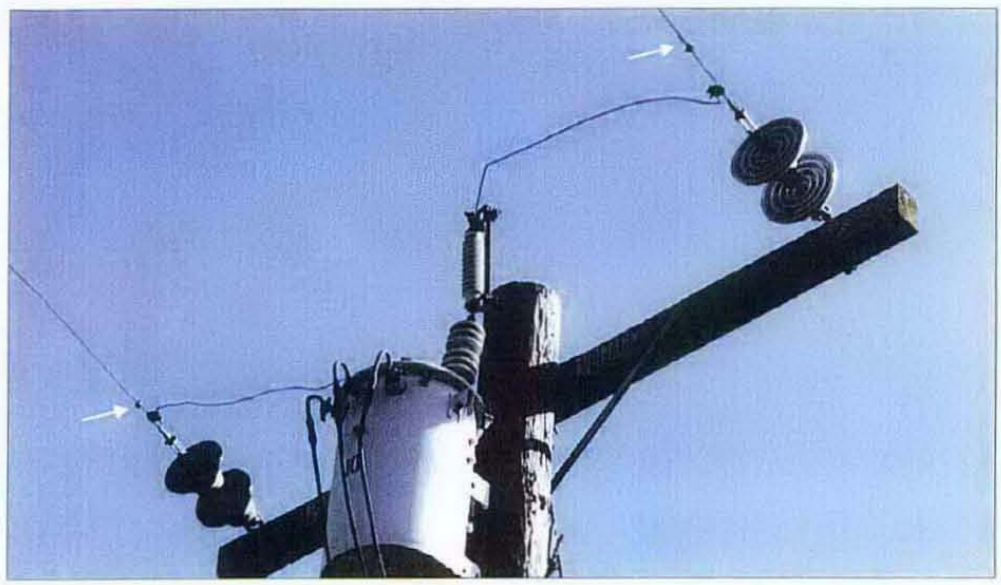


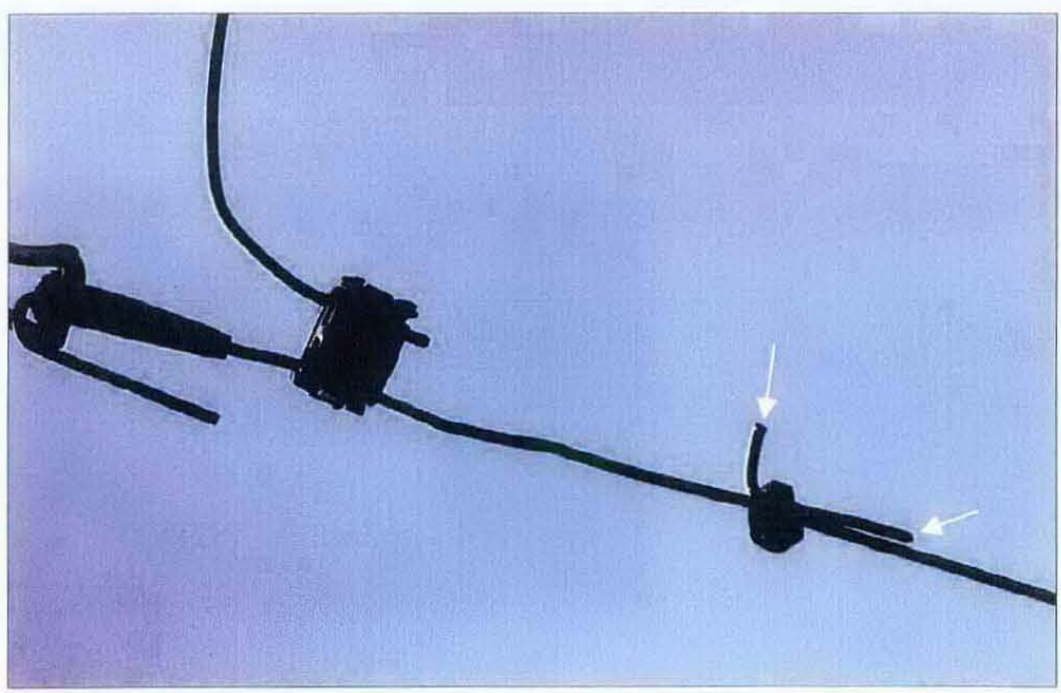
Figure 3-36
Piercing Hot Tap Clamp on Tree Wire

Figure 3-37
Piercing Hot Tap Clamp - Detail

Idle Split Bolt Connectors

Figure 3-38
Idle Split Bolt Connectors





Note: Split bolts are ONLY exempt when idle on the line. See page 2-16 for non-exempt split bolts.

Wedge Connectors

Figure 3-39
Bolted Wedge Connector

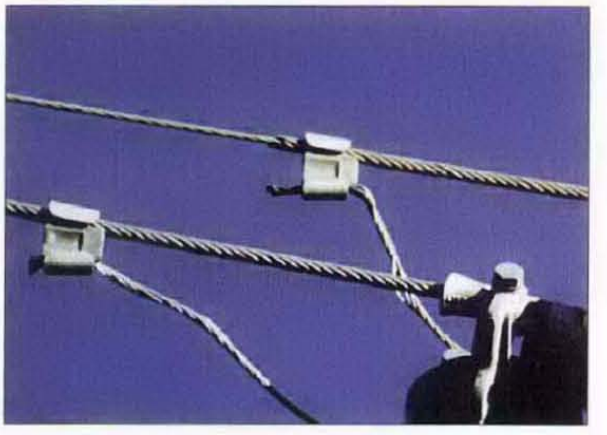


Figure 3-40
Fired Wedge Connectors

Compression Connectors

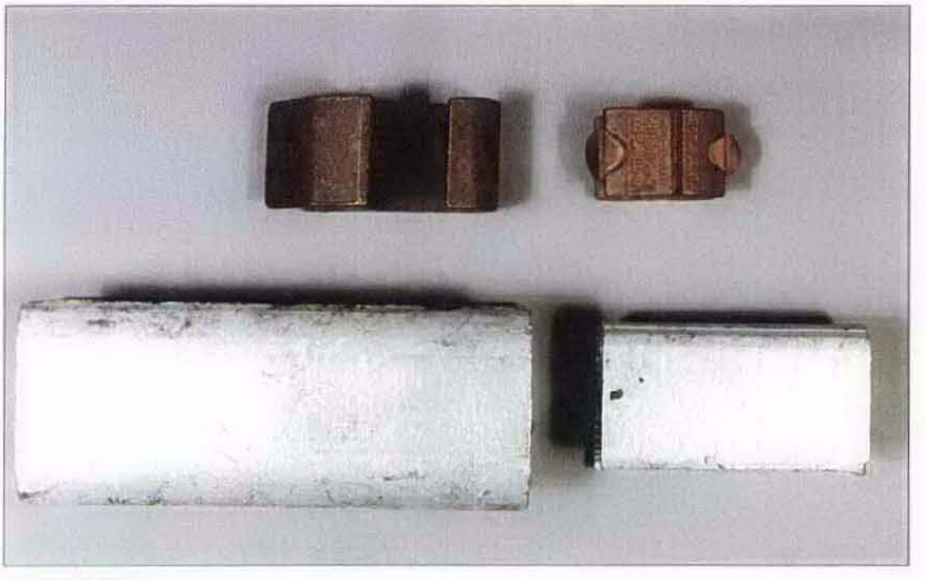


Figure 3-41
Compression Connectors

Bolted Flat Plate Connector

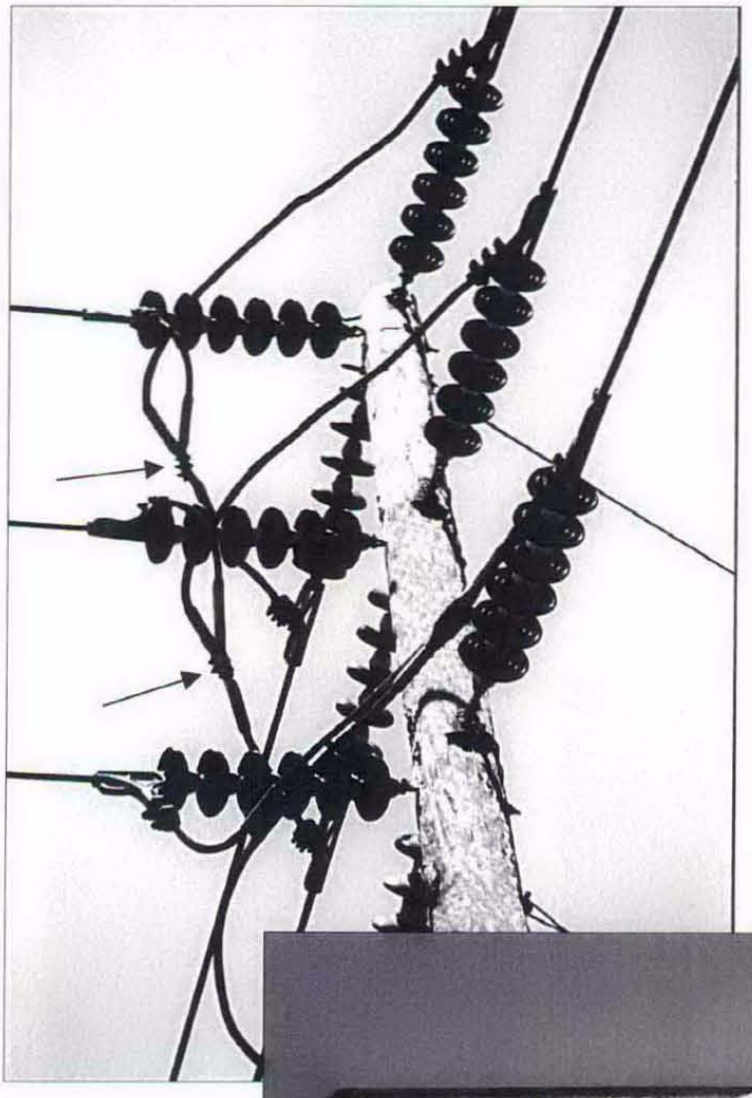


Figure 3-42
Transmission Vertical Deadend with Bolted Flat Plate Connector

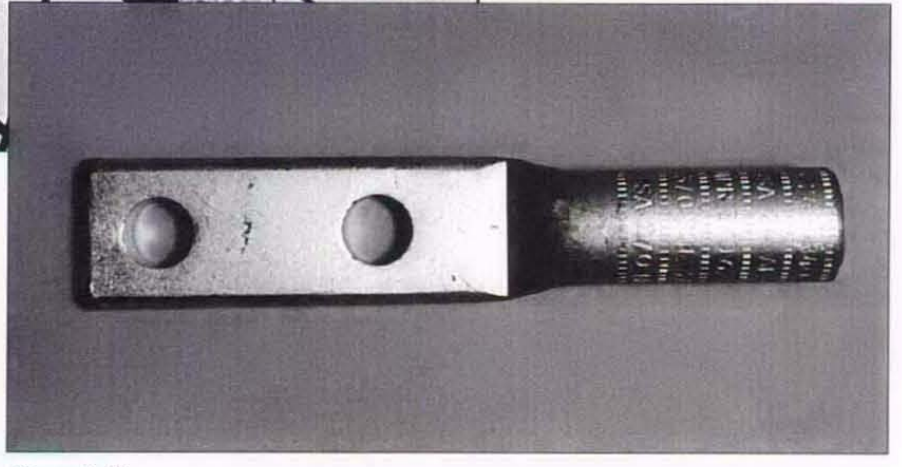


Figure 3-43
Bolted Flat Plate Connector

Automatic Deadend

Figure 3-44
Automatic Deadends

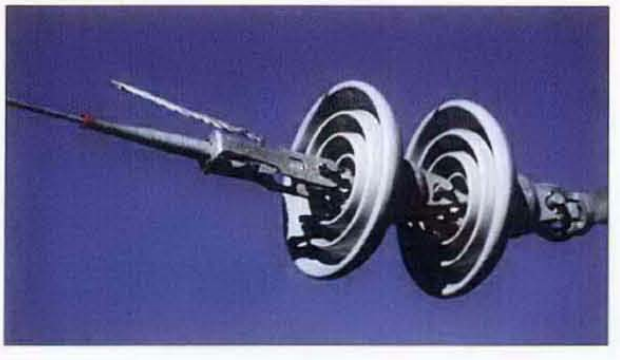


Figure 3-45
Automatic Deadends with Suspension Insulators

Splices

Figure 3-46
Line Splices

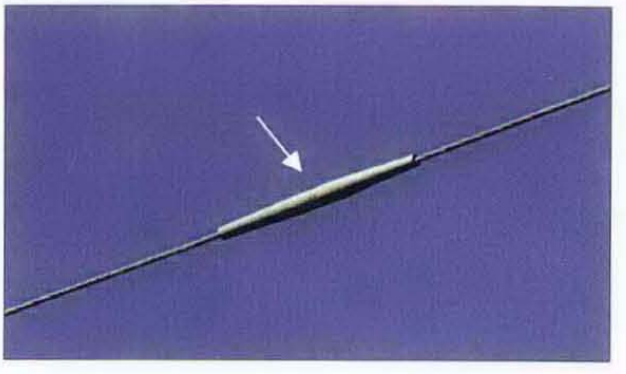


Figure 3-47
Automatic Line Splices

Section 4
Construction

Distribution Construction

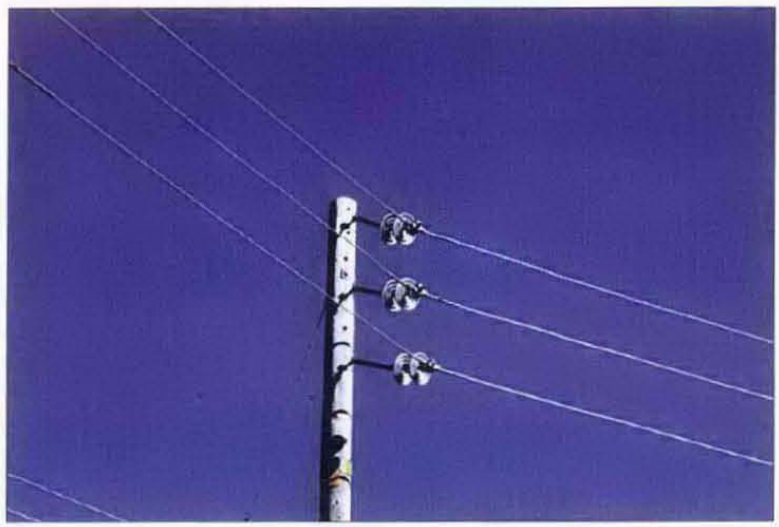
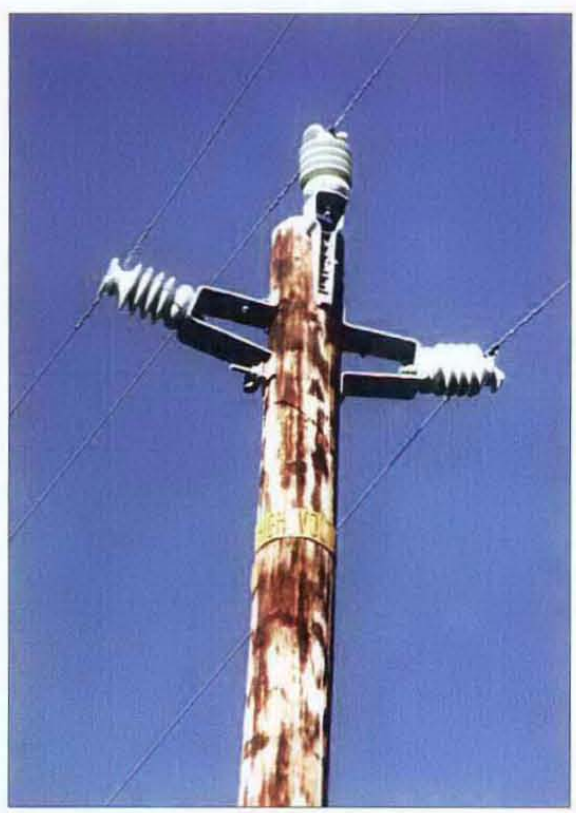


Figure 4-1
Vertical Angle

Figure 4-2
Triangular



Distribution Construction

Figure 4-3
Alley Arm

Figure 4-4
Crossarm (Tangent)

Distribution Construction

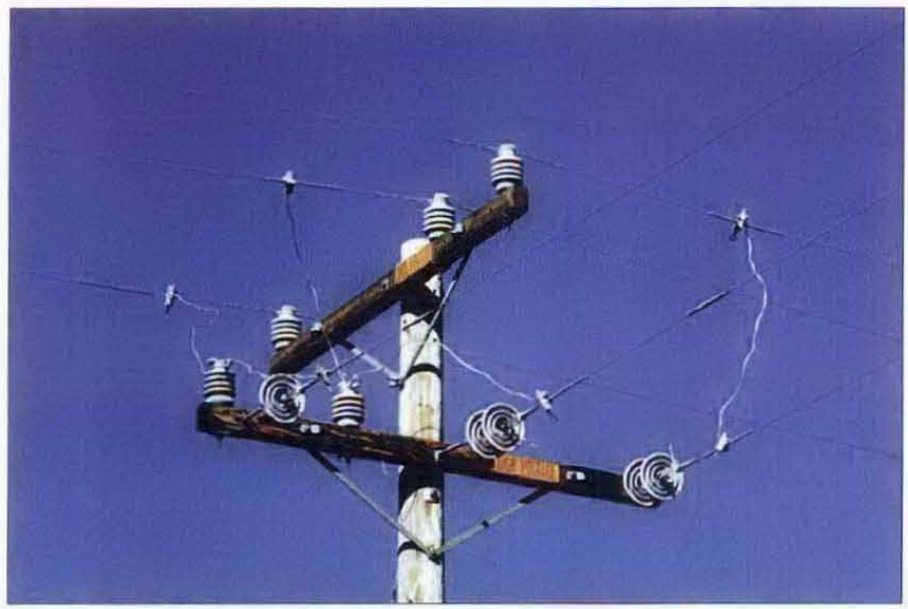
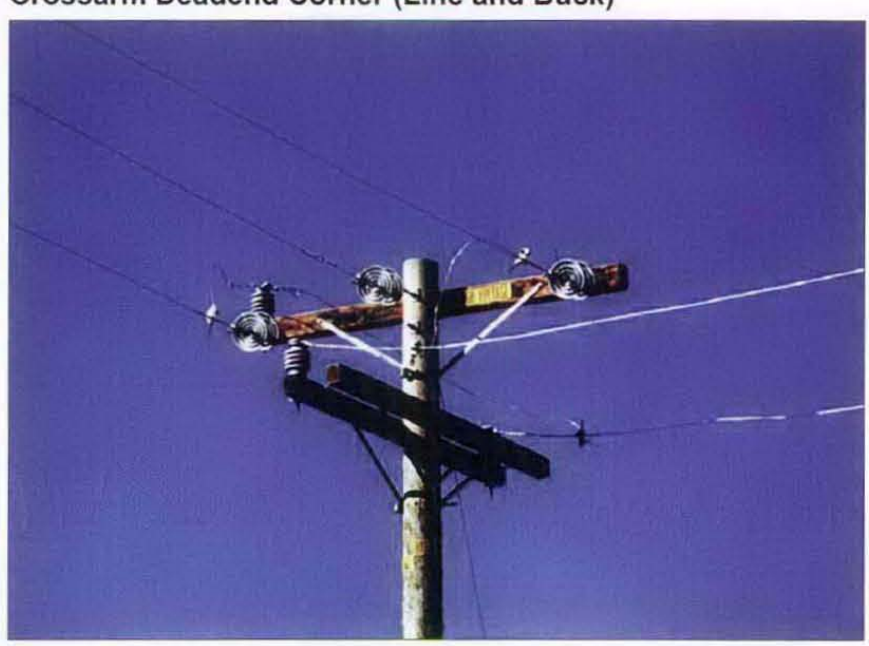


Figure 4-5
Tangent Crossarm with Deadend Tap (T-Tap)

Figure 4-6
Crossarm Deadend Corner (Line and Buck)



Distribution Construction

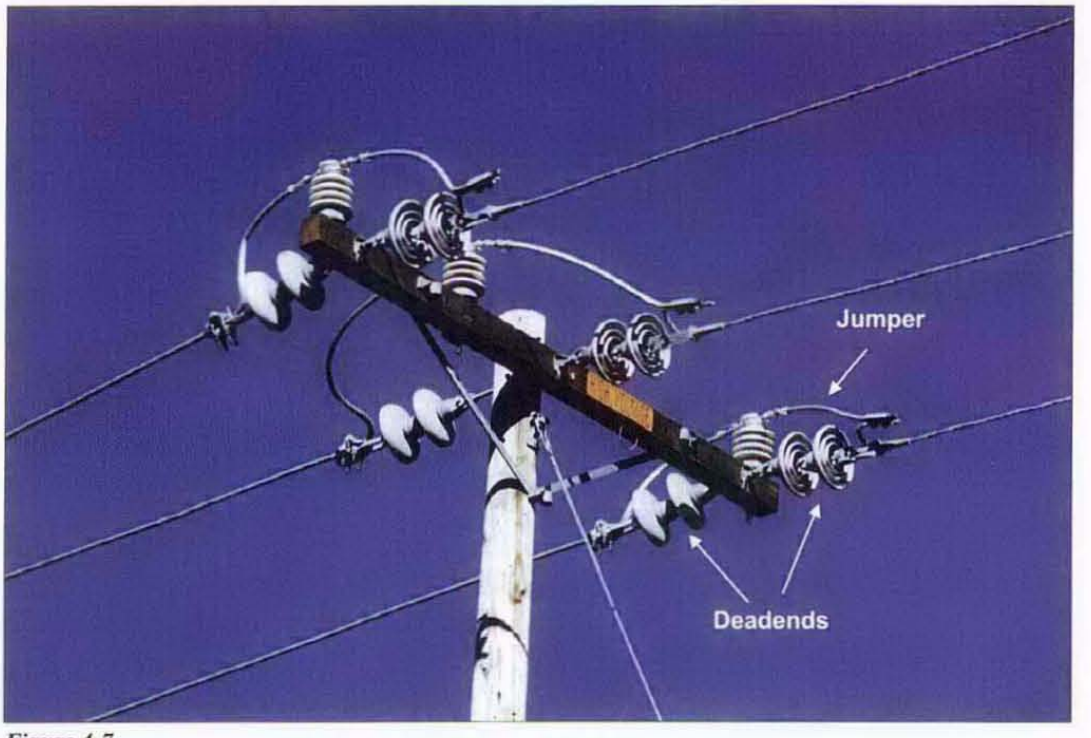
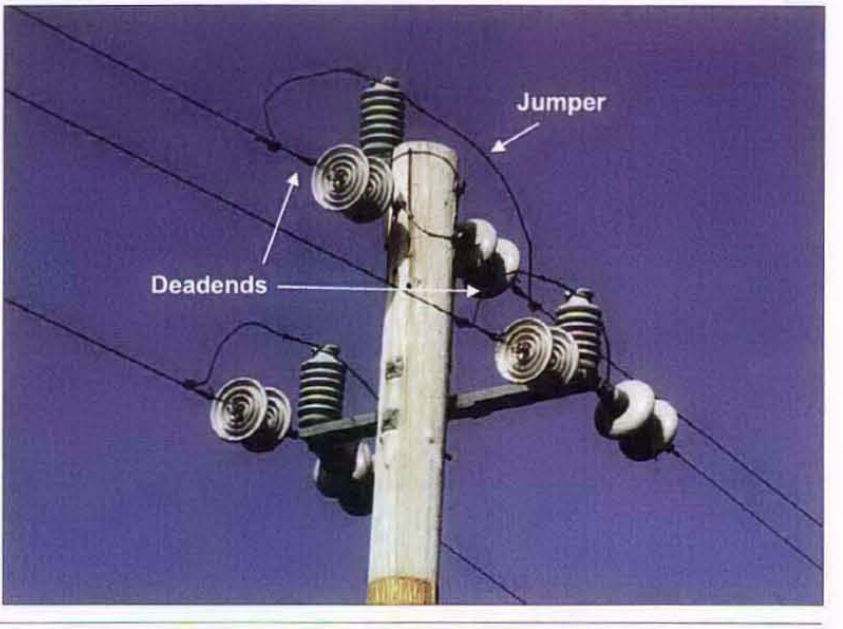


Figure 4-7
Crossarm Double Deadend

Figure 4-8
Triangular Double Deadend



Distribution Construction

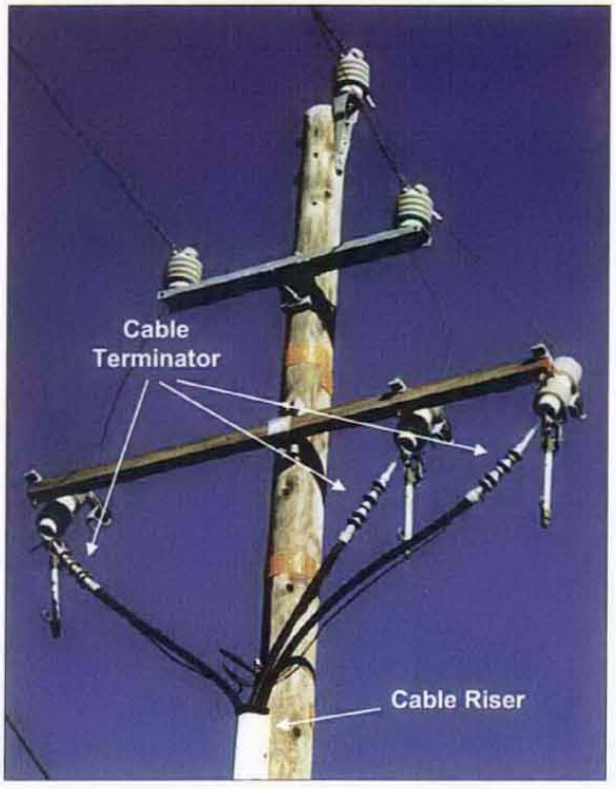
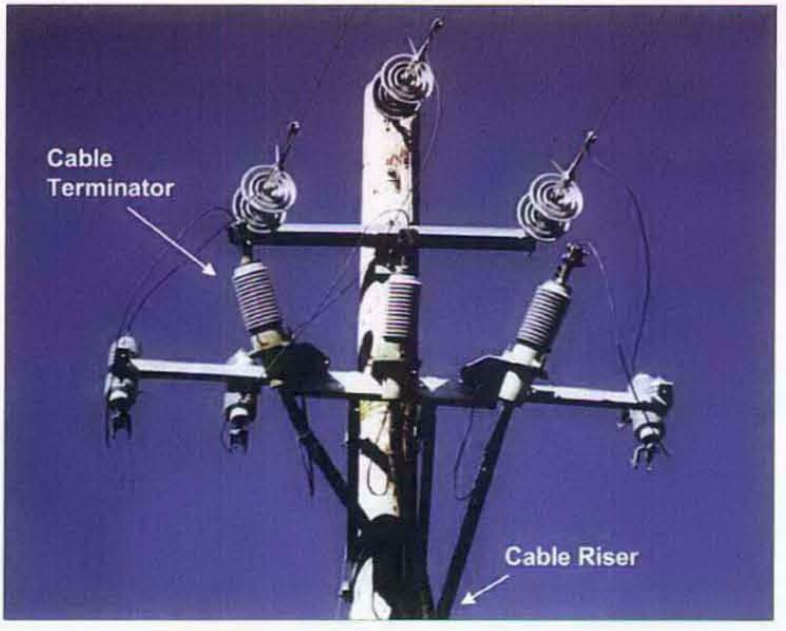


Figure 4-9
Cable Riser with Cable Terminator

Figure 4-10
Cable Riser with Cable Terminator



Distribution Construction

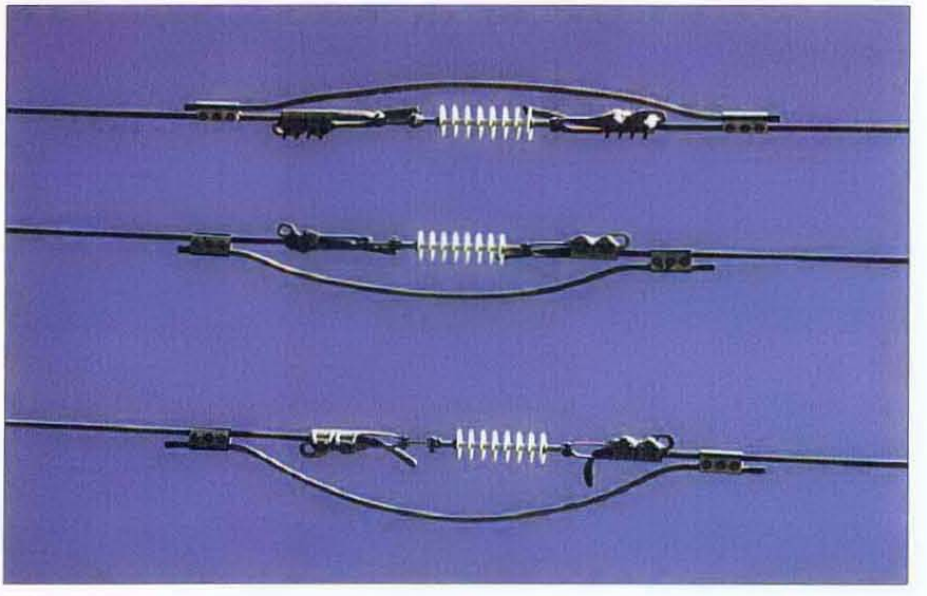
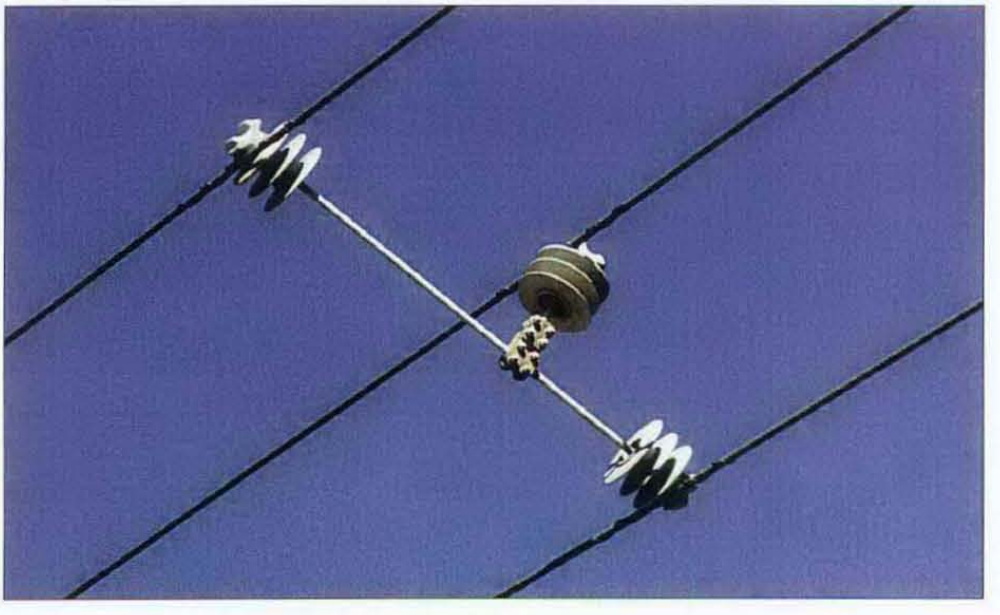


Figure 4-11
Line Opener

Figure 4-12
Long Span Conductor Spreader



Distribution Construction

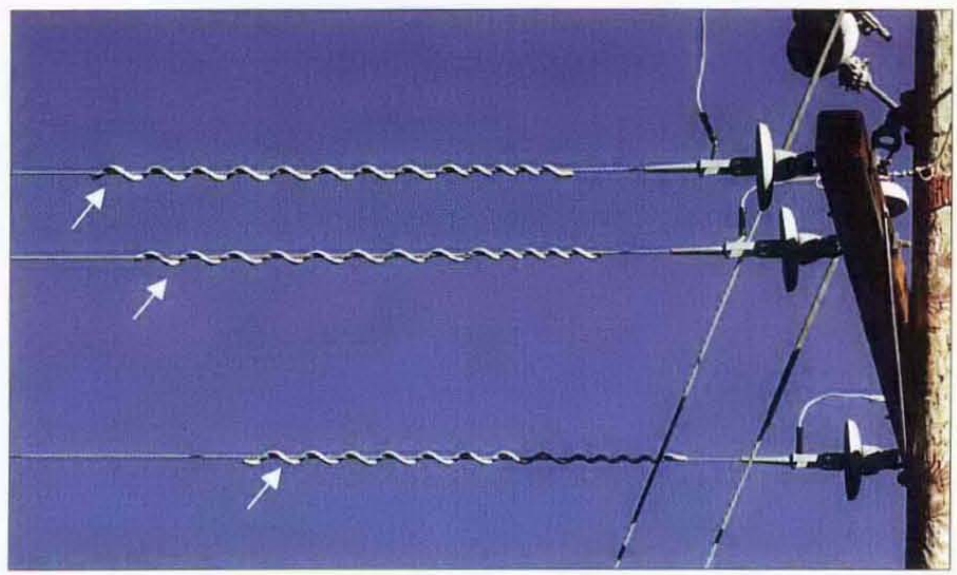
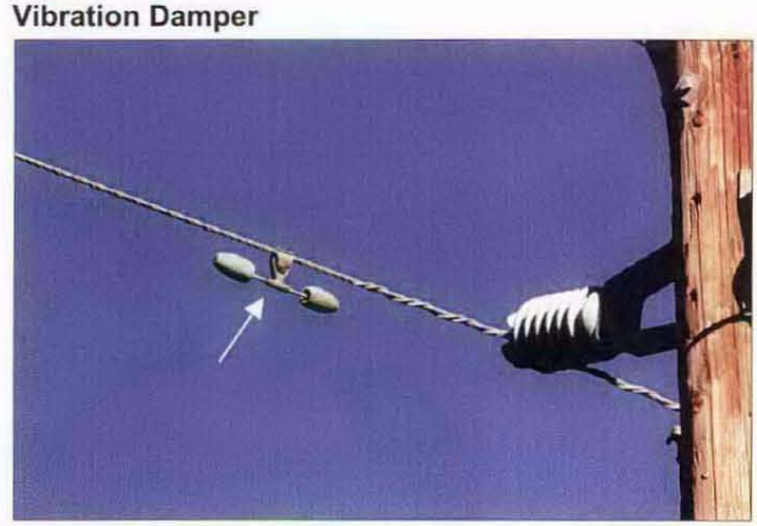


Figure 4-13
Vibration Damper

Figure 4-14
Vibration Damper



Animal Protection

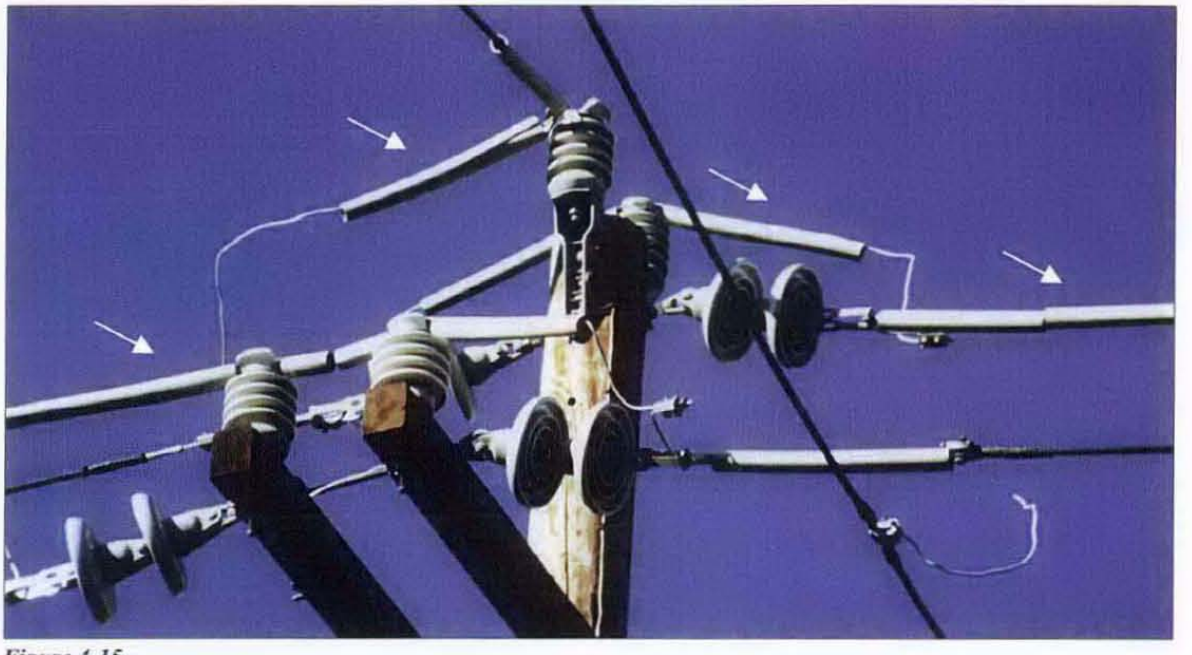
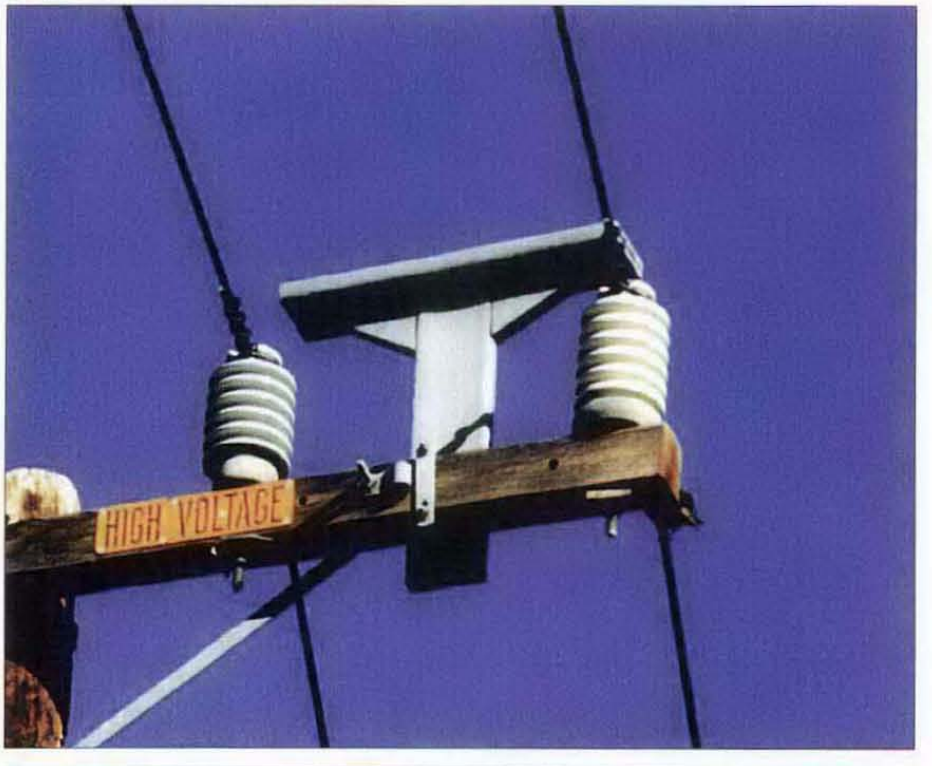


Figure 4-15
Insulated Conductor Covering

Figure 4-16
Raptor Perch



Animal Protection

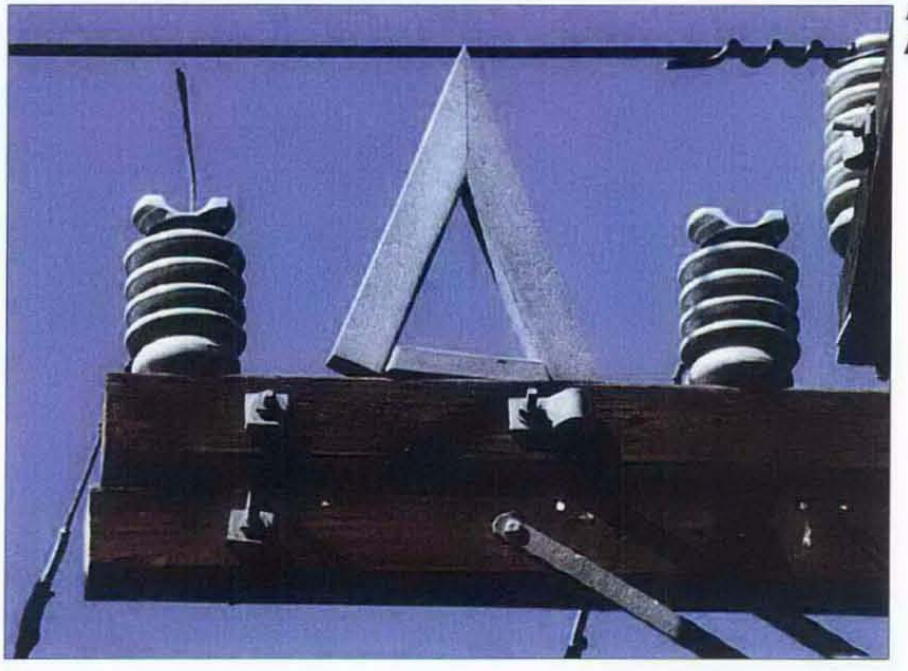


Figure 4-17
Anti-Perch Guard

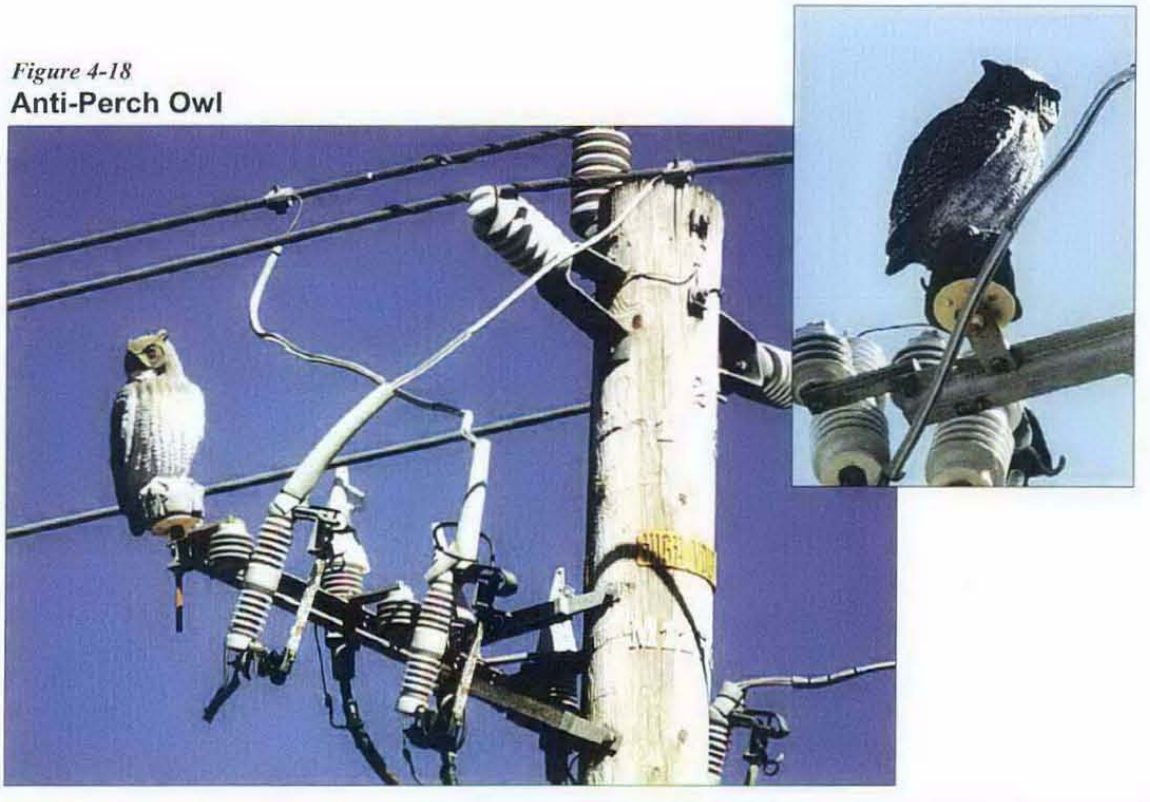
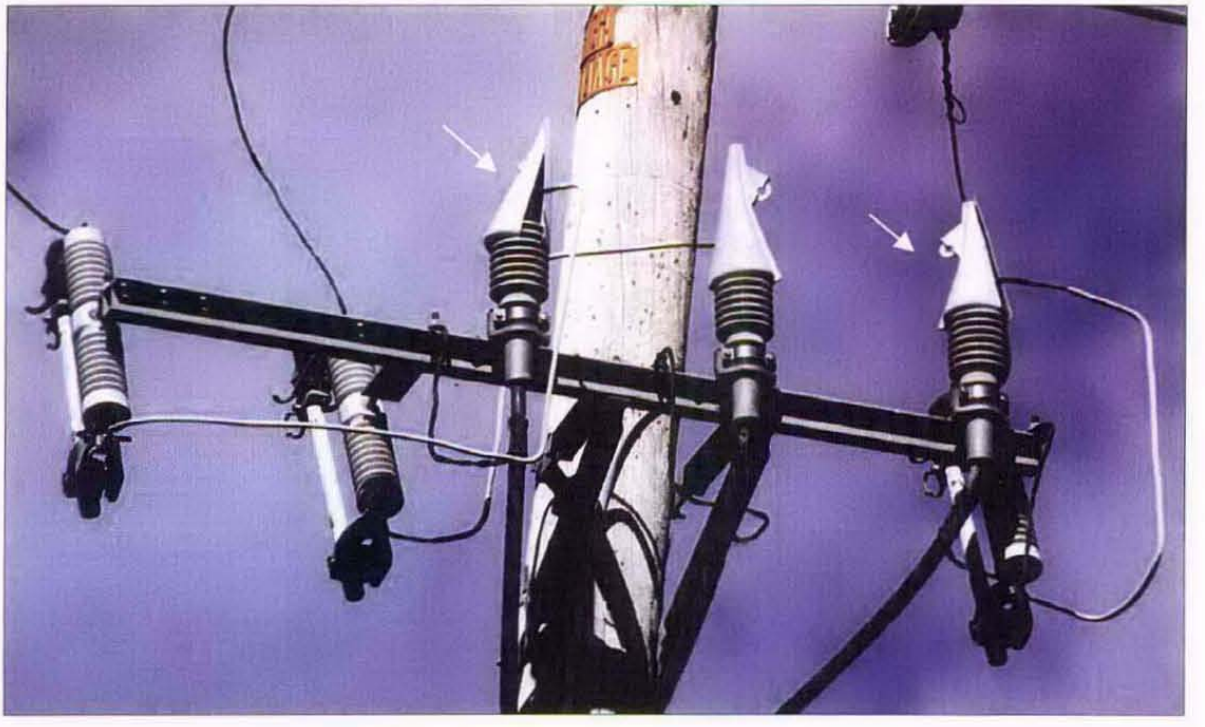


Figure 4-18
Anti-Perch Owl

Animal Protection



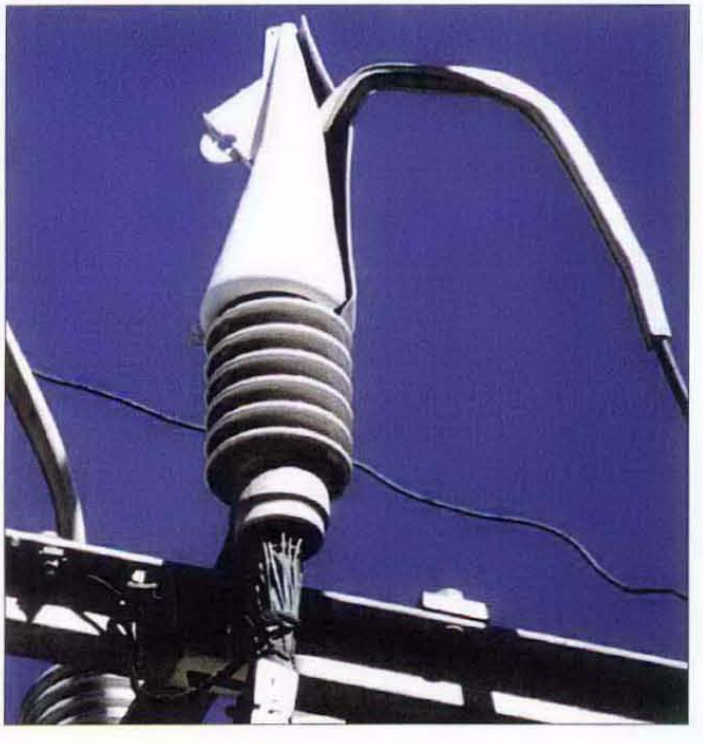


Figure 4-19
Squirrel Guard

Transmission Construction

Figure 4-20
Figure Four (4)

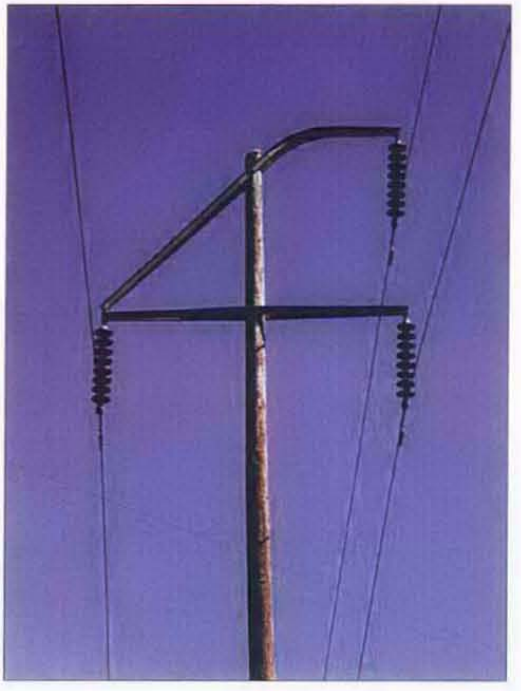


Figure 4-21
Vertical Post

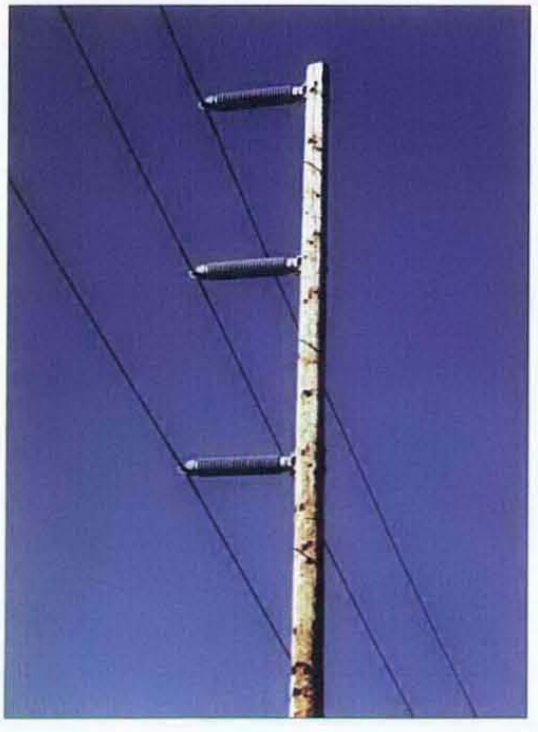
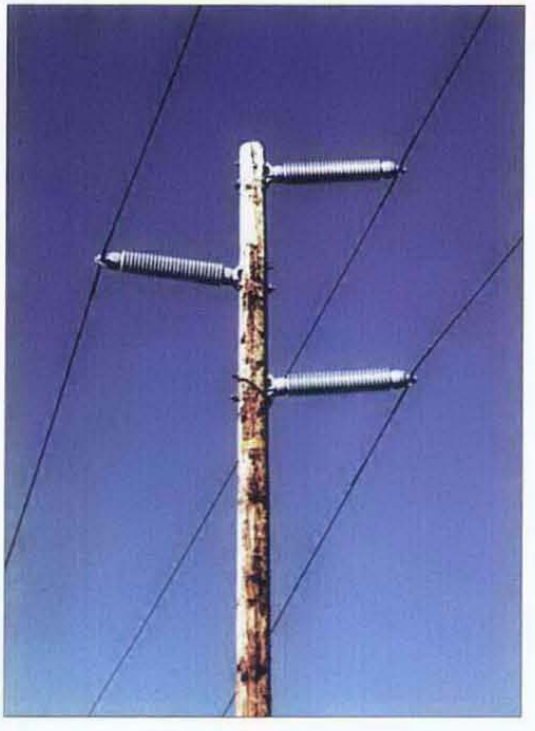


Figure 4-22
Triangular Post



Transmission Construction

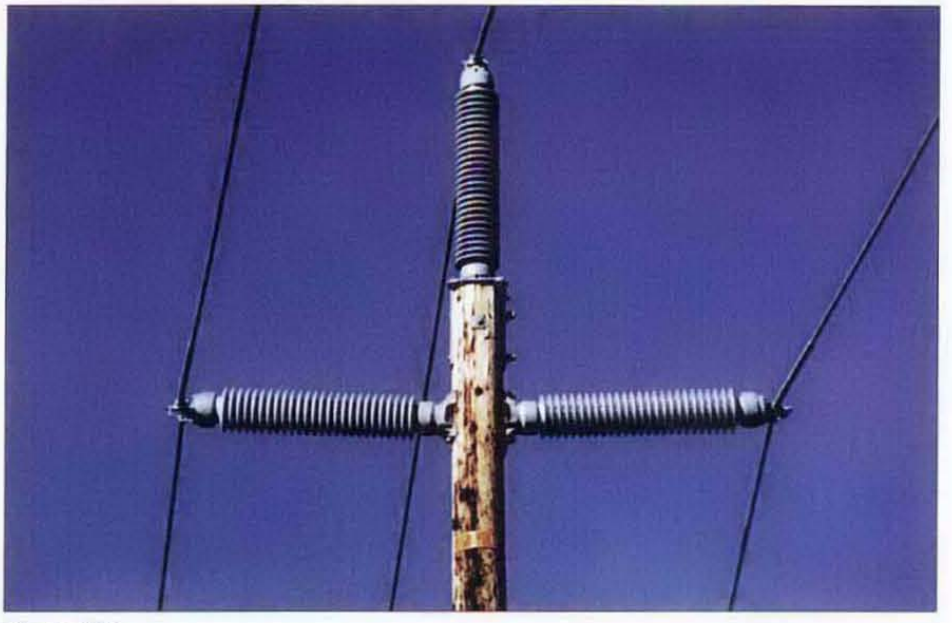
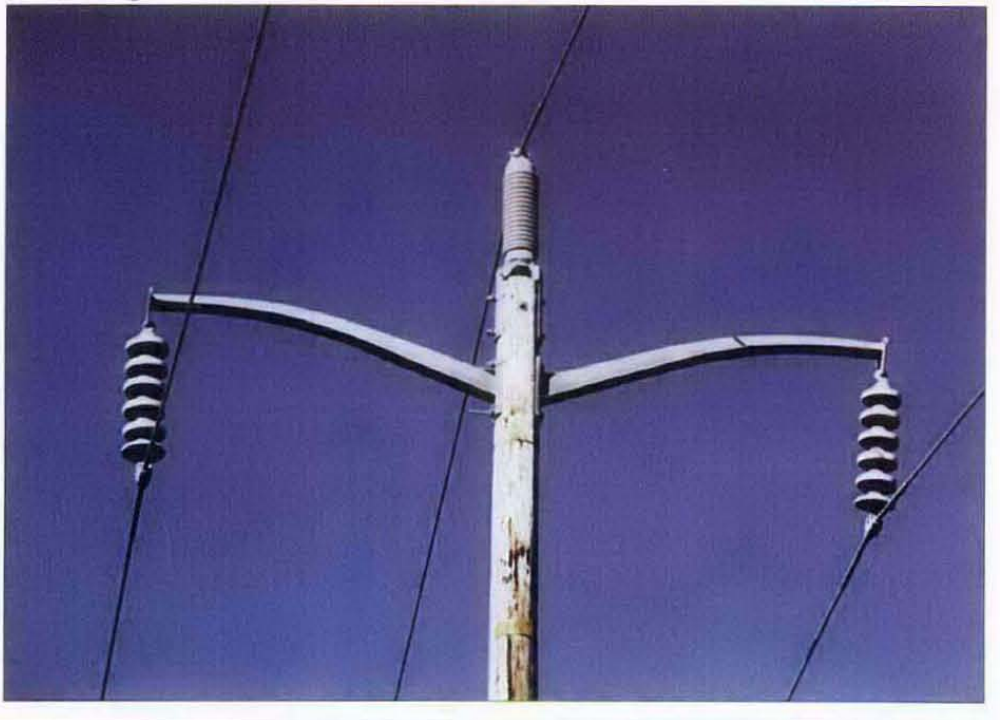


Figure 4-23
Triangular Configuration

Figure 4-24
Gull Wing



Transmission Construction

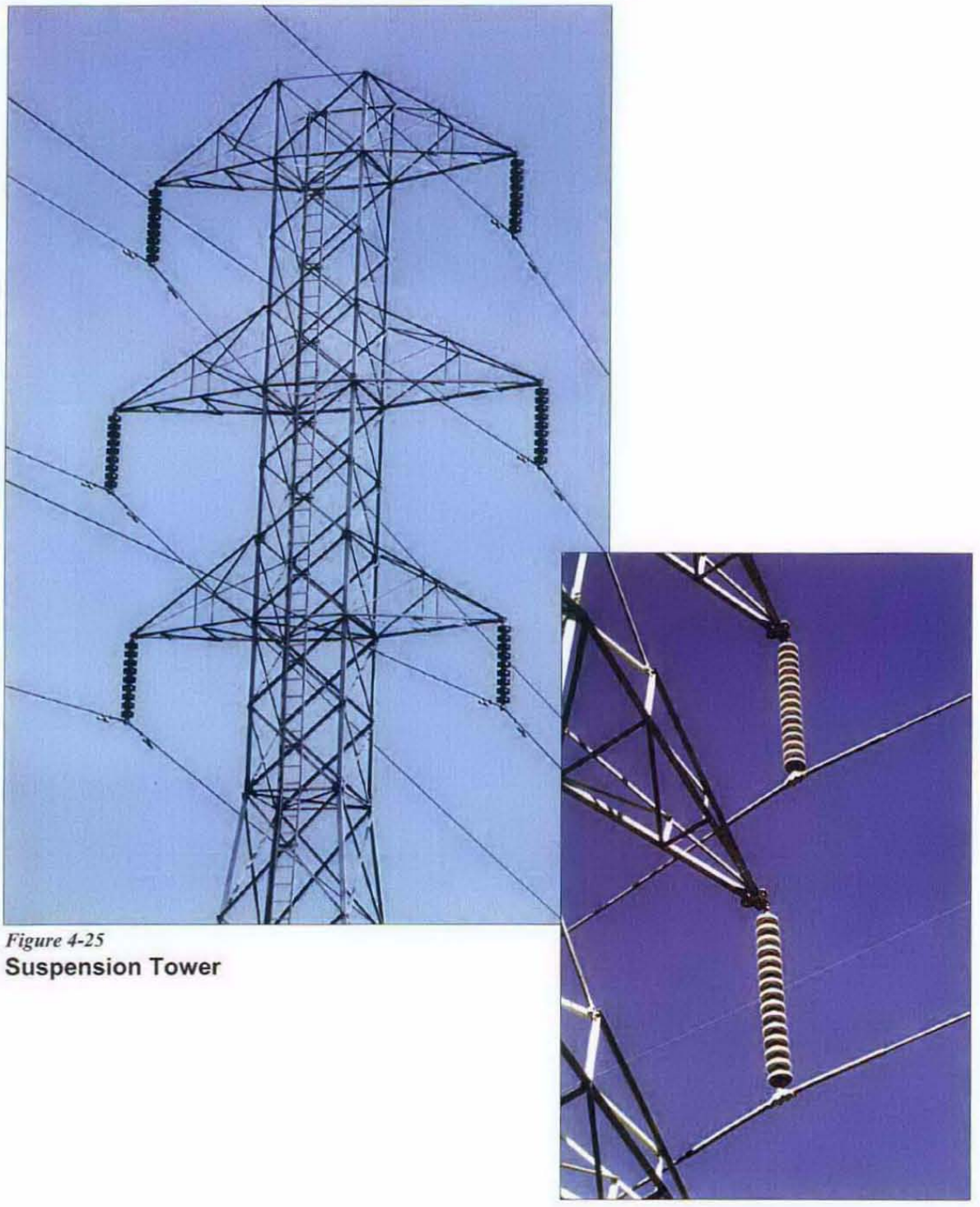


Figure 4-25
Suspension Tower

Transmission Construction

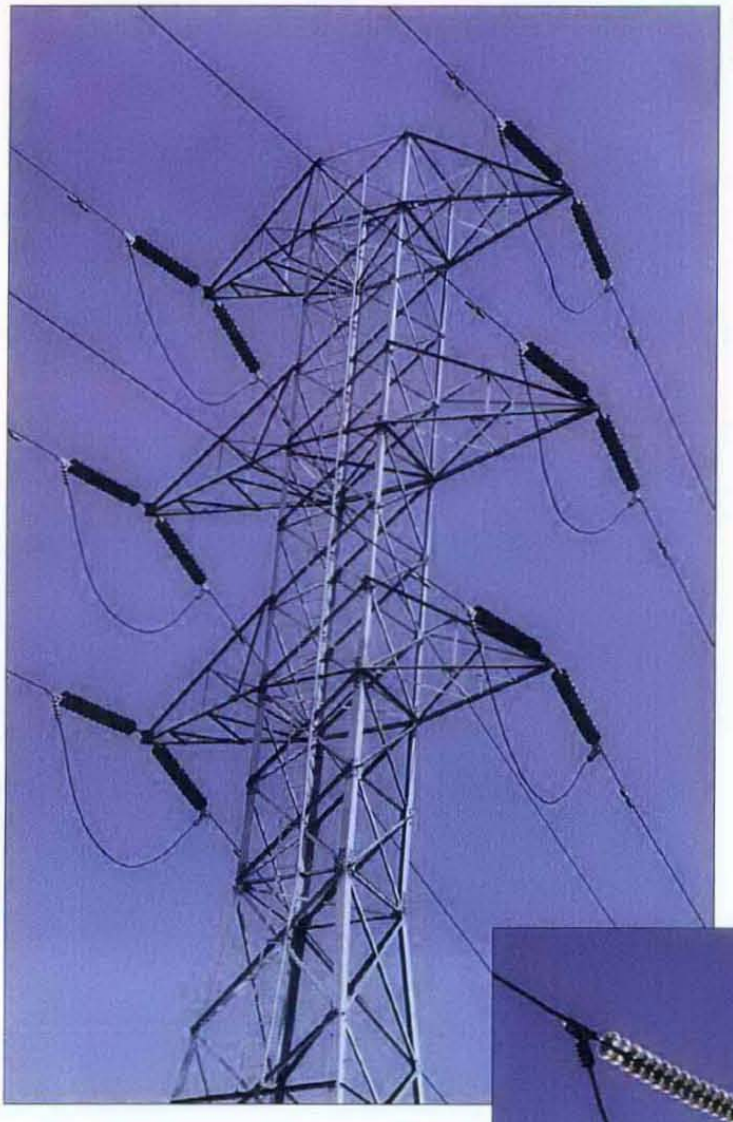
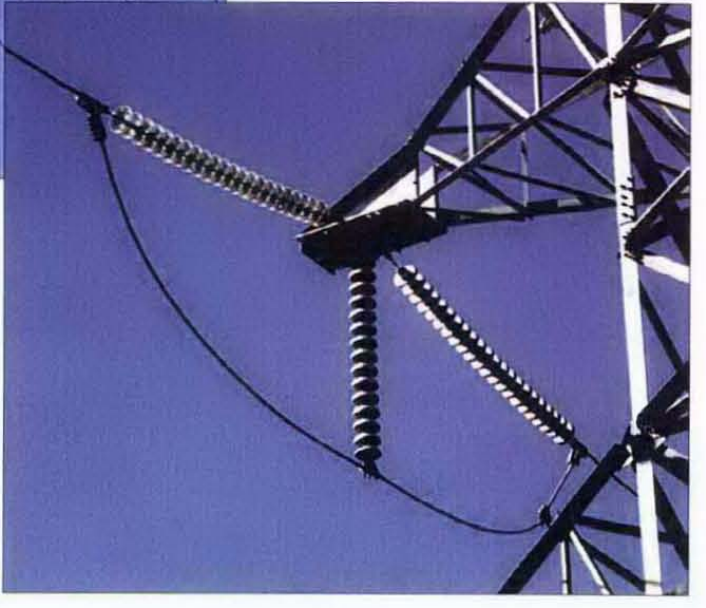
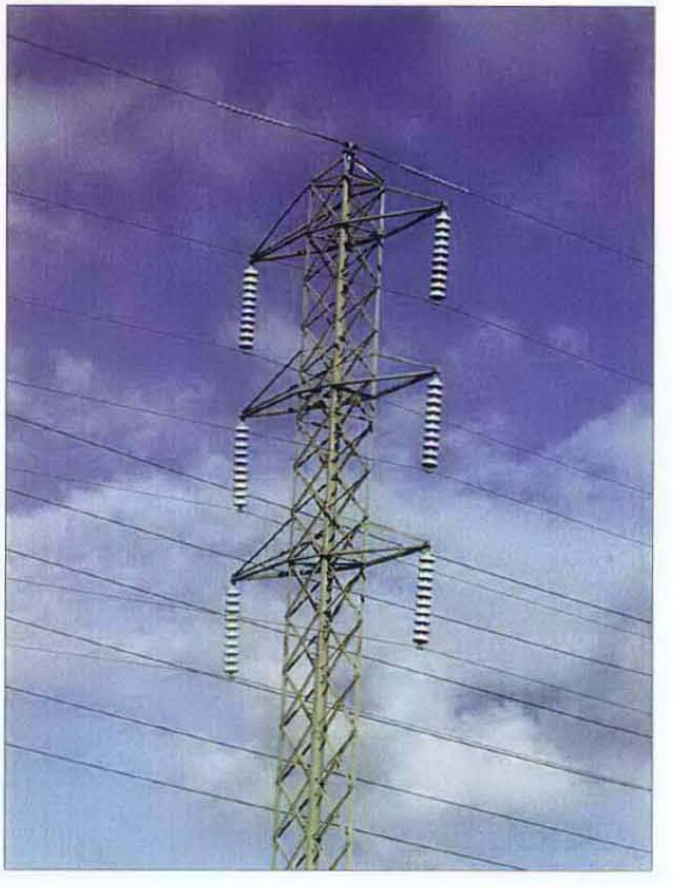


Figure 4-26
Deadend Tower



Transmission Construction

Figure 4-27
Tangent Transmission Tower with Static Line



Section 5
Bulletins/Correspondence

Section 6
List of Figures/Glossary of Terms

List of Photographs and Figures

Section 1: Introduction

Section 2: Non-Exempt Equipment

Section 3: Exempt Equipment

Section 4: Construction

Glossary of Terms

Ampere - Unit of electric current (One volt applied across one ohm of resistance will produce one ampere of current).

Armor Rods - Metal rods wrapped around conductors and attached to insulators that prevent wear and fatigue of the conductors.

Automatic Recloser - Pole mounted, oil-filled switch that will open a circuit automatically if faulted and then may close automatically to try to complete the circuit again.

Capacitor Bank - Pole mounted device for neutralizing inductive load to correct the power factor.

Circuit-Transmission - High voltage circuit (50-500 kV) between generating source and switchyard (substation).

Circuit-Distribution - Circuit between main switchyard and point of use.

Circuit-Primary Distribution - High voltage circuit (2.4-35 kV) between switchyard and service transformer.

Circuit-Secondary Distribution - Low voltage (750 volt, usually 120, 208, 240, or 480) circuit between transformer and point of use.

Clearance - Space cleared of vegetation as required by law, regulation, easement, etc., for the purpose of preventing power line-caused fires.

Clearance-Conductor - Distance from overhead open conductors which must be kept free of vegetation; distance varies depending on voltage carried by conductors.

Clearance-Pole - Radial space around base of pole or tower, measured horizontally, which must be kept free of flammable vegetation if certain hardware is in use overhead.

Conductor - Path through which an electric current flows, metal wire or cable.

Conductor-Unprotected - Uninsulated conductor.

Connector - Mechanical device used to join two conductors.

Connector-Automatic - Sleeve type connector requiring tension on the conductors to maintain connection; unsafe in non-tension situation.

Connector-Bolted - A device used for fastening two or more conductors together.

Connector-Compression - A device for joining two conductors together when a metal sleeve is used and mechanically or hydraulically pressed to secure tension (no bolts). For purpose of the PRC, a compression connector is considered to make the conductor continuous.

Connector-Fired Wedge - A connector joining the conductors by compressing them between two wedge-shaped objects. Exempt from clearance requirements.

Connector-Parallel Groove - A connector so designed that tightening of one or more bolts will compress sides of connector against conductors placed in performed grooves. Exempt from clearance requirements.

Connector-Plate - A connector joining the conductors by bolting two flat plates together. If two or more bolts are used, this type of connector is exempt from clearance requirements.

Corner Pole - Any pole (tower) where the conductors make an angle of 60 degrees or more from their previous alignment.

Current - Flow of electricity measured in amperes.

Current Limiting Fuse - A device used in conjunction with fuses near where heavy fault currents will occur.

Dead End - Point where the conductors end; other conductors in many cases will continue on and be connected to the preceding conductors by jumper wires and various forms of connectors.

Disconnect - See Pole Disconnect.

De-Energized - Dead, disconnected from electrical energy.

Energized - Live, connected to a source of electrical energy.

Exempt - Does not require clearance of flammable vegetation.

Fault - A break in the circuit, an unwanted path for electric current.

Fire Hazard - Dangerous accumulation of flammable fuels in wildland areas usually referring to vegetation.

Fuse-Cutout-A device designed to open the circuit in case of short or overload.

Fuse-Open Link (Trip-O-Link) - A non-exempt, low current (050 Amp) fuse.

Fuse-Universal - A non-exempt, medium capacity (50-100 Amp) fuse.

Fuse-Liquid Filled - An exempt type of fuse in which the fusible link is entirely enclosed in liquid.

Ground - To connect a line or piece of equipment to the earth.

Hot Clamp - A type of bolted connector which can be installed without de-energizing the circuit.

Insulation - Protective covering, around a conductor or other piece of equipment, which is a non-conductor of electricity (not just a weather resistant cover).

Insulator - Porcelain or non-ceramic unit used to support and separate conductors from each other and from ground (Air can also be an insulator).

Kilovolt - 1,000 volts (kV).

Lightning Arrester - A device designed to channel lightning or over voltage it to ground in order to protect the circuit or equipment from excessive fault current.

Non-Exempt - Requires clearance of flammable vegetation.

Ohm - Unit of resistance to flow of electric current (One ohm of resistance requires one volt of energy to push one ampere of current across it).

Phase - One wire or conductor of a circuit.

Pole Disconnect - Type of switch mounted on a pole (Blades are opened and closed manually one at a time). Same as disconnect.

Pole Switch - Switch mounted on a pole (All blades open and close together with one handle).

Regulator-Voltage - Pole-mounted device for correcting voltage.

Risk-Fire - Potential for ignition of fuels or an ignition agent.

Self-Supporting Aerial Cable - Several insulated conductors wrapped around a non-energized steel support cable, used primarily for service drops and secondary conductor.

Service Drop - Portion of the power line from the secondary distribution line to the point of use (between pole and house).

Split-bolt Connectors-Kearney - A type of bolted connector.

Switchyard-Substation - An area in which are located switches, transformers, circuit breakers, etc., and where voltages are changed to or from transmission levels.

Transformer - A device, mounted on a pole, pad, vault, or in a switchyard, encased in metal and used to reduce or increase voltage.

Transformer Conventional - A transformer with no internal fuses. Fuses are required between the transformer and the line.

Transformer-CP Self-Protected - Self-protected has internal fuses on the primary side and circuit breakers on the secondary side.

Transformer-CSP - Current surge protected same as CP but with externally mounted lightning arresters.

Tree Wire - Fully covered conductor .

Vibration Dampers - Hardware attached to conductors (usually near insulators) to inhibit fatigue from wind-caused vibration).

Volt - Unit of electric energy force (One volt is required to push one ampere of current across one ohm of resistance). Roughly analogous to psi of pressure in a fire hose.

SAN DIEGO GAS & ELECTRIC

WILDLAND FIRE PREVENTION & FIRE SAFETY GUIDE

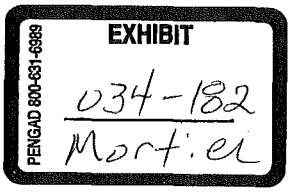
I. PURPOSE

Southern California provides one of the most dangerous natural wildland fuel scenarios and explosive fire weather potential in the world. Fire season generally runs from early May into November. Extended dry periods can bring us into fire season essentially any time of the year. SDG&E facilities, equipment, and activities present a potential wildland fire ignition risk which must be minimized to the extent reasonably possible. In the event of a fire, we must also be equipped to enable suppression efforts for small fires, thus possibly preventing a major fire. Most importantly, we must provide the resources and training necessary to keep our employees safe while working in the wildland areas. The intent of this document is to formalize some procedures and routine practices that will:

- Assist SDG&E employees in their understanding of fire prevention and improve their ability to prevent the start of any fire. The emphasis will be on wildland fires, especially during the critical times of the year when the fire risk is high.
- Set recommendations for certain tools and equipment to be present in our vehicles and on our work sites, when performing identified operational risks. This will assist with rapid extinguishment of small fires in the event one should occur.
- Incorporate State, Federal, and local requirements into our standard way of doing business to provide compliance with rules and regulations on a daily basis. This would include, but not be limited to: pertinent laws, Forest Practice Regulations, and "Special Use Permit" or "Right of Way" fire related requirements.
- Define restrictions mandated by "Red Flag Warnings", "Project Activity Levels", or other unique fire danger scenarios; provide means for determining when these restrictions are in effect, what activities they prohibit, and the precise locations to which they apply; and identify the notification procedures for all affected employees and contractors.
- Establish communication requirements when working in the wildland areas.
- Discuss additional and/or optional mitigation measures to reduce the risk of fire start in particularly hazardous situations or scenarios.
- Share some common sense practices, with regard to fire safety, that should be used in all activities to reduce the risk of fires and prevent injury to an employee as a result of a fire.

II. APPLICABILITY

This applies to SDG&E field personnel who will likely work in the wildland areas of the service territory during times that are conducive to wildland fire occurrence. This also includes Distribution and Transmission operating personnel who will be involved with field personnel in regards to safety, system reliability and/or restoration. Contractors performing work for SDG&E will be expected to comply with this Fire Plan as it relates to their activities as well.



III. DEFINITIONS

- Wildland Area
  - This is any area with significant wildland vegetation (trees, chaparral, grass, and ground litter) to support the ignition and spread of a wildland fire.
- State Responsibility Area (SRA)
  - This is the California Department of Forestry (CDF) jurisdiction for fire protection. It is comprised of primarily wildland vegetation or residential interface within the wildland areas.
- Fire Season
  - Fire season applies to those periods of time that the fire agencies determine conditions exist to be conducive to the start of wildland fires. The start and closing of each fire season is officially announced by the appropriate agencies. Other periods outside of fire season can be identified by "Proclamation" as having that same potential and thus requiring the same considerations.
- Pulaski
  - The Pulaski is an axe-like fire hand tool used primarily for cutting or grubbing forest fuels.
- McLeod
  - The McLeod is a fire hand tool used for raking and scraping forest fuels.
- Red Flag Warning
  - This is an early warning issued by the National Weather Service to advise occupants of the wildland areas of extreme fire weather conditions. Certain requirements and precautions are implied by this warning.
- Project Activity Levels
  - This is a federal program designed to reduce the risk of fire starts during forest related work on high fire danger days.

IV. PROCEDURES

EQUIPMENT & FACILITY RISK:

The nature of utility equipment and facilities in and of themselves presents a fire risk. As a result there are laws and regulations governing utilities in this regard. The following Public Resource Code (PRC) sections exist to reduce utility specific risks involved with wildland fire. SDG&E is proactive in insuring compliance with each of these on a continual basis.

- PRC Section 4290 - *Regulations Implementing Minimum Fire Safety Standards Related to Defensible Space Applicable to State Responsibility Lands.*
- PRC Section 4291 – *Reduction of Fire Hazards Around Buildings.*
- PRC Section 4292 – *Power Line Hazard Reduction, 10' clearance around power poles with non-exempt hardware.*
- PRC Section 4293 – *Power Line Clearance Required, between vegetation and conductors, 4' for 2,400-71,999 volts, 6' for 72,000-109,999 volts, and 10' for 110,000 and above.*

Some departments are tasked specifically with responsibility for compliance with these regulations. The SDG&E Vegetation Management Program, in the Construction Services Department, has an extensive tree pruning and removal program to provide adequate line clearance. They also treat all non-exempt power poles in the specified area to maintain the 10' clearance required by PRC 4292. Personnel from Land Services, Facilities, and Fire Coordination work together to meet defensible space requirements, as well as other fuel hazard reduction where applicable. **However, it is the responsibility of all SDG&E employees and contractors to support the company's efforts to comply with these regulations.**

OPERATIONAL RISKS:

The Control Centers, Dispatch Center, and Fire Coordinator will provide general information to SDG&E employees regarding fire season status. During these defined periods, the following SDG&E related activities present an elevated risk of fire ignition. Caution is critical during performance of any of these activities.

- Any off-road vehicle use.
- On highway activities located in particularly hazardous fuel conditions.
- Chain saw use of any kind.
- Operation of generators, pumps, augers, two-cycle motors, or other equipment capable of producing sparks or ample exhaust heat to cause ignition.
- Other tree removal equipment including but not limited to grinders, chippers, skidders, excavators, etc.
- Grinding and welding
- Blasting or other explosive work
- Working on energized electrical equipment or facilities.
- Smoking

TOOLS AND EQUIPMENT:

The following will be SDG&E recommendations regarding tools and equipment to be carried in or on described vehicles, or available at described work sites when engaged in any of the operational risks discussed above. These items will meet the California Forest Practice Rules; Public Resource Code Division 4, Chapter 6. Availability of this equipment will also meet the majority of the requirements mandated by the wildland fire agencies within the company service territory. Some additional project specific or weather specific requirements may be necessary and will be discussed later in this plan.

Passenger Vehicles (non-transient, performing work in the wildland areas);

- 1 round point shovel with overall length of at least 46"
- 1 serviceable fire extinguisher, minimum U.L. rated 2 BC, *rating found on fire ext. label)*

Trucks & 4 Wheel Drive Vehicles;

- 1 round point shovel with overall length of at least 46"
- 1 axe or "Pulaski"
- 1 (5) gallon backpack pump (optional) in lieu of or in addition to 2 BC rated extinguisher.

Heavy Machinery or Equipment (including tub grinders, whole tree chippers, drilling rigs, tractors, etc.);

- 1 round point shovel with overall length of at least 46"
- 1 axe or "Pulaski"
- 1 (5) gallon backpack pump or fully charged U.L. rated 4 BC or larger fire extinguisher

Chain Saw Use;

- 1 shovel within 25 feet of operation with unrestricted access
- or 1 serviceable fire extinguisher in their immediate possession

Major Operations Work Area (fire toolbox should be located on site, accessible to all);

- 1 (5) gallon backpack pump
- 2 axes or "Pulaskis"
- 2 "McLeod " fire tools
- Round point shovels 46" for each employee assigned to work site

Optional Considerations for Critically Hazardous Areas;

- Project Specific Fire Plan, developed with Fire Coordinator and/or Fire Department input.
- Water Supply, recommended 1500 gal. minimum (Tank, truck, or hydrant)
- Fire Hose (and associated accessories)
- Dozer or Tractor (capable of producing fire line)

FIRE PREVENTION & SAFETY CONSIDERATIONS:

The following Safety considerations will help to reduce the risk of fire start (Fire Prevention), as well as provide for the safety of company employees while working in the wildland areas (Fire Safety).

Fire Prevention

- At project initiation, conduct a formal "Safety Meeting" addressing fire concerns. Have regular tailboard fire safety meetings for the duration of the project.
- Smoke only in designated smoking areas or in a 10' clearing void of all grass and other vegetation.
- Avoid idling or parking in areas of brush, grass, or vegetation litter.
- Consider work hour restrictions where applicable. During critical fire weather, avoid working in the wildland areas during the hottest and driest part of the day.
- Use a "Fire Patrol" (person specifically assigned to mitigate fire hazards) on high fire danger days. Their duties would include: verification of compliance with the fire plan, observe activities for fire prevention & safety, and to re-check work area after the day's activities have been completed.
- Provide vegetation clearance or reduction around particularly hazardous work activities or work areas. Use special mitigation, as appropriate, to reduce the hazard.

Fire Safety

- Use proper P.P.E. (Personal Protective Equipment), standard SDG&E requirements apply. When working within an uncontrolled fire perimeter fire resistant clothing should be worn. Respiratory protection (painter's mask or bandana) is recommended as well.
- When working in or adjacent to a wildland fire, positive communications must be maintained internally using SDG&E work protocols. It is critical that employees have the ability to communicate with fire agencies as well, both for reporting fires and for the exchange of critical information during the duration of an incident.
- Work within the Incident Command System (ICS) while assigned to a fire incident. Understand the chain of command for the incident and who you are accountable to. Check in and check out when entering an uncontrolled fire perimeter.
- Pre-plan safety zones (areas large enough to safely retreat to) and escape routes (safe access to these safety zones) when working in the wildland areas during high fire danger days.
- Get proper rest during extended fire activity to avoid fatigue and help prevent accidents and/or injuries. It is recommended that you receive a minimum of 1 hour rest for every 2 hours worked.
- Exercise extreme caution when driving within a fire area and/or in smoky conditions. Beware of falling rocks, trees, and other debris as well as road obstructions and other traffic.

RED FLAG WARNINGS:

The Red Flag Warning System, a joint effort between state, federal and local fire agencies, was brought about after a very catastrophic 1970 Southern California fire season. The original intent was to pass along critical fire weather information to users and occupants in the wildland areas to bring about more prudent actions in all their wildland related activities. Currently SDG&E Grid Operations is operating under the direction of TMC1320, Hazardous Fire Conditions-Red Flag Warning, Transmission Monitoring and Control, 12/01/2003. Distribution Operations is operating under the direction of Electric Standard Practice No. 109, Hazardous Fire Conditions, June 01, 2000. When a Red Flag Warning is declared notifications take place as described in both

directives and the following actions take place: *(The affected area in both directives is identified on a map in an appendix, as the CDF protection area or SRA, State Responsibility Area)*

- Transmission lines and/or distribution circuits, which have tripped to lockout, will not be tested manually or remotely (see exception below) until the line or line segment has been patrolled or the cause of the interruption has been identified and isolated, or repaired. A line patrol is also required prior to replacing sectionalizing or transformer station fuses that have blown. *Exception: A transmission line may be tested, one time only, if the loss of another transmission facility could lead to system instability or cascading outages.*

- Customer outage time should be held to a minimum by sectionalizing, patrolling, and energizing segments of the circuit.

- A fireguard *(fire patrol)* will be assigned to any operation that has the potential to cause a fire.

- No open burning will be permitted.

- All fires will be extinguished.

- All non-critical line clearance tree pruning and removal activities will cease. Permission may be obtained to continue tree related work by contacting the Area Forester, Contract Administrator, System Forester, Vegetation Program Manager, or the Fire Coordinator. Approval will be granted on a case by case basis, depending on the situation.

- All Blasting will be discontinued.

- All grinding and welding will discontinue, except in enclosed buildings or within areas cleared of all flammable material for a radius of 15 feet.

- Vehicular travel will be restricted to cleared roads except in case of an emergency. In no case will vehicles with hot exhaust systems be driven over or parked in grassy areas.

- Smoking will not be permitted.

In addition to these requirements, extra caution should be used when performing any of the activities described as operational risks *(in an earlier section above)* while working in the State Responsibility Areas *(SRA)* or other wildland areas outside of the SRA.

PROJECT ACTIVITY LEVELS:

The United States Forest Service has another program it utilizes to reduce the risk of fire on National Forest land, particularly in the timber or mountain areas. It is referred to as Project Activity Levels *(PAL's).* The San Diego Forest Area Safety Taskforce *(FAST)* has adopted this system for other timber and mountain areas of San Diego County. The FAST group, which includes USFS and SDG&E representation, has developed a standard interpretation of how the PAL's system will be applied throughout San Diego County. Each day, at 4:00 p.m., the PAL level will be determined for the following day. It may be a different level for different geographic areas of the county. This information will be available by calling (760) 233-9507 *NRCS PAL hotline),* (619) 557-5262 *(U.S. Forest Service Dispatch),* or (619) 442-1615 *(CDF Dispatch).* Although the intent of the PAL system is to reduce the risk of fire start from timber harvesting activities, restrictions should apply to any potential fire starting activities. The designations and resulting restrictions are shown below. Each level is progressive carrying the requirements of the lower level with it.

PAL Level:	Restrictions or Requirements:
A	Work as required by contract, use permit, and existing forest practice rules.
B	Furnish Fire Patrol when high-speed rotary head equipment (masticator) is being used, during and for two hours after operations have ceased.
C	Following are prohibited after 1:00 p.m. o Use of high speed rotary head (masticator) o Blasting o To use chainsaws after 1:00 p.m. the following must be available (within 100'): ▪ Fire Patrol w/shovel or McLeod and 5 gallon backpack pump ▪ Fire Patrol must function as patrol, with no other functions ▪ Additional water available on site (truck, trailer, or hydrant)
D	The following are prohibited after 1:00 p.m. o Use of tractor, skidder, feller buncher, forwarder, or chipper o Mechanized loading and hauling, except log trucks o Felling dead material that has died more than 3 years prior (punky wood) o Mechanized slash disposal
Ev *(E with a variance)*	Operations are permitted between daylight and 8:00 p.m. as described under Level D with the following exception: No steel track-mounted equipment shall be operated
E	All potential fire causing activities cease at 1:00 p.m.

As complicated as this system may seem, a careful look reveals very few SDG&E related activities being affected by the daily PAL level, with the exception of vegetation management work. When performing activities in the mountainous area that have a potential to ignite a wildland fire, ascertain the PAL level for the area you are working in and apply the information discussed above.

OTHER CRITICAL FIRE DANGER PROCLAMATIONS:

The Fire Chiefs with jurisdictional responsibility for a given area have the authority to proclaim certain restrictions in extreme fire conditions or when they are experiencing a critical shortage of resources. These cases will be very rare and it will be incumbent on them to insure we are informed of any temporary changes in fire restrictions for a particular area. Upon notification we would be required to comply as appropriate.

RECOMMENDED FIRE RELATED TRAINING:

It is recommended that all field employees have some basic fire safety training on an annual basis. This could be accomplished in one hour at a monthly safety meeting just prior to fire season. Review and discussion of this Fire Plan would be one means for providing this training. For those employees who are likely to be called to work within or immediately

adjacent to an uncontrolled fire area, the following additional training is recommended: Two hours of Fire Safety, Incident Command System, and Basic Fire Behavior. For supervisors, managers, and company officers, who could be assigned as the SDG&E Incident Commander on a major incident, additional advanced Incident Command System training is advised. The Fire Coordinator would serve as the conduit for this training. He/She would provide the training, bring in qualified instructors, or qualify additional SDG&E employees as instructors, using the train the trainer approach to assist with this training.

EOC AND CONTROL CENTERS:

The Dispatch Center, Distribution Operations, Grid Operations, & EOC play a vital role in any fire emergency. Communications with these groups, when applicable, is critical. Provide information updates and feedback to each of these as their areas of responsibility become affected. This should continue through the duration of the incident. Early notification to the EOC of potential activation is recommended when appropriate. Notification procedures are identified in ESP 113 and should be followed as prescribed.

FIRE COORDINATION:

SDG&E has established a permanent position for Fire Coordinator. This position is essentially the company liaison to the fire services, both during an emergency and in the course of daily business. Back-up coordinators are available as well to cover off time for the primary coordinator and for when multiple incidents occur. Questions regarding this plan or other fire related inquiries should be made through the Fire Coordinator or acting coordinator. The Fire Coordinator would be a key contact for fire related training as well.

V. REFERENCES

- ESP 113 – Fire Coordination Electric Standard Practice
- TMC 1320 – Hazardous Fire Conditions-Red Flag Warning, Transmission Monitoring & Control
- ESP 109 – Hazardous Fire Conditions
- EOP 5700 – Incident Command System (ICS) for Major Incidents

VI. ATTACHMENT

State Responsibility Area (SRA) Map

State Responsibility Area