Alabama Power

Distribution Safety Briefing, Information Transfer, and Construction Manual 15 kV - 35 kV

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Form: 5-6482

Disclaimer Notice - Please Read Carefully

Alabama Power Company

Distribution Safety Briefing, Information Transfer and Construction Manual

The information contained in these specifications is the property of Alabama Power Company and the Southern Company Operating Companies. These specifications provide general safety requirements along with some of the more common distribution construction configurations. They do not cover all requirements for all situations associated with distribution construction. Contact the local Alabama Power Company representative for any questions regarding situations not covered in these specifications.

Disclosure of these specifications to any third party for any reason without the prior written consent of Alabama Power Company is strictly prohibited. By making these specifications available to an individual, Alabama Power Company and Southern Company do not assume any responsibility whatsoever for the individual's activities.

For occasions where this manual has been issued to you during mutual assistance storm restoration, upon completion of the restoration activities, return each manual to the Alabama Power Company representative coordinating the restoration activities in the assigned area, or mail to the following address:

Alabama Power Company
Distribution Engineering Services
600 North 18th Street
Birmingham, AL 35291-0715

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1 — GENERAL INFORMATION

A. SAFETY SUMMARY

The objective of this safety summary is to help safeguard the lives and physical welfare of everyone performing work on Alabama Power Company property. It is also intended to safeguard members of the public with whom contact is made in the course of day-to-day routine work or in efforts to restore service after a major storm.

It is impossible to provide a rule or work practice that will cover each and every individual precaution that must be taken. Consequently, everyone must follow all OSHA standards as a minimum. Within this summary is important information concerning safety as you work on the Alabama Power System. All workers should take any special precautions which may be necessary to protect fellow workers and the public.

If there are conditions encountered that are not fully understood by the personnel performing the work, they should consult with an Alabama Power Company representative regarding the safest way to handle the particular problem. Under no conditions should work be started without a complete understanding of the work to be performed. For any additional information that is not found in this manual, contact an Alabama Power Company representative.

B. SAFETY INSTRUCTIONS

YOUR SAFETY IS OUR PRIMARY CONCERN! NO JOB IS SO IMPORTANT THAT WE CANNOT TAKE TIME TO DO IT SAFELY!

- When in doubt, ask questions.
- Comply with all Occupational Safety & Health Administration (OSHA) and Department of Transportation (DOT) regulations.
- A job safety briefing shall be conducted before the start of each job. If the size or scope of a job changes, stop and perform another job safety briefing. Communication is critical.
- Verify the condition of poles before subjecting them to additional stress such as climbing or installing or removing equipment or conductors.
- All switching and clearances will be coordinated through personnel approved by Alabama Power Company (APC).
- APC will provide the Hazard Risk Category (HRC) due to an arc flash potential prior to any energized work being performed. Personnel shall wear appropriate FR clothing.
- Other utility companies may share common poles (multiple circuits on pole).
- All vehicle accidents, injuries and property damage are to be reported as soon as possible to the APC employee responsible for the area being worked.
- Before energizing any feed or lateral, it shall be patrolled for possible damage and other personnel working in the area.
- Be alert for feedback from generators and induced voltage. All conductors should be considered energized until a clearance is obtained, the circuit tested for the absence of voltage and grounded.

C. JOB SAFETY BRIEFING

Before starting every job, conduct a job safety briefing to assure that all crew members are aware and knowledgeable of hazards and safeguards required to complete the job safely. No job is so important that it has to be worked in such a manner that an injury may occur. It is recommended that a job briefing be held as follows:

- Prior to starting work.
- After any interruption in work.
- Upon discovering any unforeseensituation.
- Any time any member of the crew is unsure how to proceed safely.

Topics covered in the Job Safety Briefing should be:

- Hazards associated with thejob.
- The work procedures to beused.
- Special precautions.
- Energy source controls.
- Emergency/Rescue procedures
- The personal protective equipmentrequirements.
- System Voltage
- Pole Inspection and Tagging
- Ground Connections

Sectionalizing sketches should be reviewed and clearances discussed. Work should not proceed until each person understands what they are to do. The condition of ground connections should be inspected prior to applying temporary protective grounds and/or operating equipment that must be bonded to pole ground and system neutral (i.e. gang-switch pipes, electronic control boxes and regulator controls). If the grounding connection is missing it should be repaired or additional precautions taken to eliminate the hazard.

1. Hazard Risk Category (HRC) and FR Clothing Information

Personnel working on or near energized distribution or transmission lines or equipment are exposed to hazards from flames or electric arcs. Electric arcs or molten metal from faulted conductors or switching operations could ignite clothing or materials in the work area. FR clothing shall be worn.

The following table represents the available heat energy for common tasks on APC's secondary system. All workers are responsible for ensuring that their clothing provides protection that is at least equivalent to the available heat energy for the task being performed.

Equipment type	Nominal voltage range and cal/cm^2	
	50V to 250V	251V to 600V
Self-contained meters / cabinets	4 Calories	20 Calories
Pad-mounted transformers	4 Calories	4 Calories
CT meters and control wiring	4 Calories	4 Calories
Metal-clad switchgear / motor control centers	8 Calories	40 Calories
Pedestals / pull boxes / hand holes	4 Calories	8 Calories
Open air (includes lines)	4 Calories	4 Calories
Panel Boards: Single Phase (All) &Three Phase less than 100 Amps	4 Calories	8 Calories

Note: Heat energy information is based on the 2012 National Electric Safety Code Table 410-1 Clothing and clothing systems. Refer to the 2012 NESC Manual for additional information.

2. Overhead Primary EnergizedWork

Before performing energized work on an overhead primary distribution feeder, the available incident energy and the nominal voltage will be supplied by the system operator. The incident energy information will be provided by the category system shown in the following table. All workers performing energized work are required to wear clothing that provides protection that is at least equivalent to the available incident energy.

INCIDENT ENERGY (CAL/CM²)	CATEGORY
2 calories or less	0
4 calories or less	1
8 calories or less	2
25 calories or less	3
40 calories or less	4

3. Minimum Approach Distances(MAD)

Distribution voltages range from 4 kV to 34.5 kV. All APC distribution facilities are at or below 3000 feet (900 meters) above sea level. Verify the specific system voltage with your APC contact before beginning work in order to determine appropriate minimum approach distances. The following table is supplied for reference. Use your company's minimum approach distances if they are greater than the values supplied.

Distance to Employee		
Voltage in Kilovolts Phase to Phase*	**Phase to Ground Exposure (Feet-Inches)**	**Phase to Phase Exposure (Feet-Inches)**
0.00 to .300	Avoid contact	Avoid contact
.301 to .750	1 foot 1 inches	1 foot 1 inches
.751 to 15.0	2 feet 2 inches	2 feet 3 inches
15.1 to 36.0	2 feet 7 inches	3 feet 0 inches
36.1 to 46.0	2 feet 10 inches	3 feet 3 inches
46.1 to 72.5	3 feet 4 inches	4 feet 0 inches
72.6 to 121.0	3 feet 4 inches	4 feet 7 inches
121.1 to 145.0	3 feet 10 inches	5 feet 4 inches
145.1 to 169.0	4 feet 3 inches	6 feet 3 inches
169.1 to 242.0	5 feet 8 inches	9 feet 2 inches
242.1 to 362.0	9 feet 2 inches	14 feet 3 inches
362.1 to 550.0	11 feet 11 inches	19 feet 9 inches

4. Underground Manholes and Vaults (enclosed space)

Only a qualified person shall enter enclosed spaces. See representative for additional information on enclosed spacerequirements.

D. SWITCHING, CLEARANCES, AND HOLD TAGS

- All conductors and equipment shall be considered as energized until clearance has been obtained and equipment is tested and known to be de- energized and all conductors and equipment in excess of 600 voltsare GROUNDED.
- Switching and clearances will be handled as Alabama Power Company designates, provided that the procedures do not violate the safety rules of the visiting Company. Switching and clearances shall be recorded on Alabama Power Company approved forms or the visiting company switching forms. Clearances will be issued or may be self-obtained by the visiting company as the system operator designates.
- Southern Company DANGER HOLD TAGS will be used. Visiting Company hold tags may be used in conjunction with Southern Company DANGER HOLD TAGS as individual company safety rules specify, but not without Southern Company DANGER HOLD TAGS. Southern Company DANGER HOLD TAGS and Switching Order forms should be picked up at the receiving office or field location.
- The visiting company will follow its own safety rules except for switching and tagging procedures noted above and any other exceptions agreed to by both Companies.
- DANGER HOLD TAGS are used to forbid the closing of specific open switches or air gaps. The Southern Company DANGER HOLD TAGS provided for this application are red tags supplied with a twist tie for attaching them to the handle of a switch or to a structure supporting or adjacent to a disconnecting device. The tag must be securely and conspicuously placed and must be completely filled out.
- A switch or device bearing a DANGER HOLD TAG shall not be operated until the DANGER HOLD TAG has been removed. A DANGER HOLD TAG shall

not be removed until so directed by the same authority for whom the tag was placed

- Switching orders are records that must be turned in to the Alabama Power office or field location for retention, regardless of whether APCo forms or visiting company forms are used to record the switching.

E. IDMS TROUBLE DISPATCH

Positive Control is the authority of the System Operator to identify, track and direct activities that affect the safe and efficient operation of the Distribution System. Maintaining Positive Control of energy sources is vital to ensuring the safe and reliable operation of our electrical system.

The system shall be operated in accordance with the Southern Company Distribution Operating Procedures (SDOP). The Dispatch procedures do not supersede SDOP.

When Mutual Assistance is activated, SDOP 4.8 Mutual Assistance applies to non-company personnel.

Southern Distribution Operating Procedure Manual 2016
4.8 Mutual Assistance

"Southern Company participates in mutual assistance whereby non-company personnel not on the Official Switching and Clearance List may, under the direction of management, execute a switching order or be issued TOC.

Non-Company personnel shall operate the system in accordance with the SDOP and work under their own safe practice rules and work procedures."

Assigning Line Crews to a Case of Trouble

1. During Routine or Storm Trouble, when a Line Crew is assigned to a case of trouble the Dispatcher shall assign a Line Crew to the "Crew" column on the IDMS screen.
    a. When a **Qualified** Contract Line Crew is assigned to the case of trouble and they are NOT in IDMS, a temporary ID shall be created in IDMS for the Qualified Line Crew:
        - Contract Line Crew Lead/Foreman's Name - **Required**
        - Contract Line Crew Lead/Foreman's Contact # - **Required**
        - Contract Company Name - **Required**

b. When a **Non-Qualified Contract Line Crew** is assigned to the case of trouble the qualified person responsible for the Non-Qualified Contract Line Crew will be assigned in the Crew Column in IDMS.

2. The **Line Crew** will be notified of a case of trouble.
   a. The Dispatcher shall assign the Line Crew to the case of trouble in IDMS.

Personnel assigned to the case of trouble do not know that others are assigned to the same case of trouble. The Dispatcher will notify all personnel assigned to the same case of trouble that additional workers (Line Crew) will be working with them on the same case of trouble.

The Dispatcher assigning additional personnel shall:

1. Inform all personnel (initial and additional) assigned to the case of trouble that additional worker(s) (Evaluator/Tree Crew or another LOL / Line Crew) are also assigned to the case of trouble.
2. Give the initial person(s) assigned to the case of trouble the name and contact # of the additional personnel assigned.
3. Give the additional personnel the name and contact # of the initial person(s) assigned to the case of trouble AND instruct them to communicate with the initial personnel before performing any work on the case of trouble.
4. Request that each person(s) assigned to this case of trouble contact one another.

If there is **no phone/radio/data communication in the trouble area**, instruct additional personnel assigned that they shall physically locate and communicate with initial personnel before performing any tasks on the trouble case.

5. The additional personnel shall communicate with the initial personnel assigned to the case of trouble before the additional personnel begins work on the case of trouble.
6. **After this notification, all personnel assigned to this case of trouble shall** communicate with each other immediately and throughout the process of working this case of trouble including any time they leave or return to the trouble area.
7. **Upon completion of work**, additional personnel shall communicate with the Dispatcher stating their work is complete and they are leaving the trouble area.

8. If all work is NOT complete for the case of the trouble, the Dispatcher shall remove the Line Crew from the case of trouble in IDMS.

F. ENERGIZED LINE WORK

Alabama Power does not routinely perform energized line work during emergency restoration of service after a major storm. However, all energized line work for both routine work and storm restoration work, shall be coordinated through the system operator.

G. TEMPORARY SAFETY GROUNDING

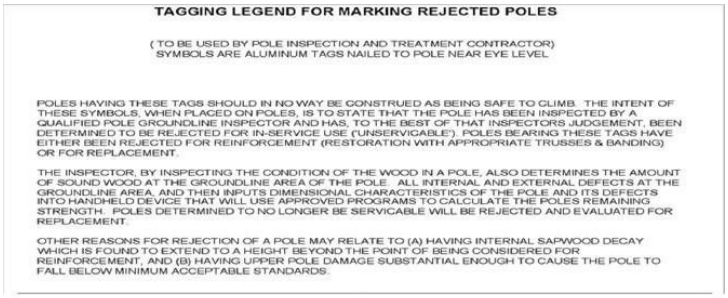
- The condition of ground connections should be inspected and/or repaired, prior to applying temporary protective grounds. (Note: Theft of copper grounding conductor is prevalent on the Alabama Power Company system.)
- The visiting company is responsible for following its own personal protective grounding practices.
- Temporary safety grounds must have a rating suitable for the available short circuit current. Typically, one #2/0 Cu temporary safety ground per phase will be adequate. The only location on the Alabama Power Company distribution system that requires parallel (2) #2/0 Cu temporary safety grounds per phase is the **East Birmingham #2 (13.2kV) location.**
- Induced voltage to distribution lines from other nearby energized lines is the result of electric field and magnetic field induction. This voltage can present a work hazard for line personnel. Extreme caution should be used where a conductor may accidentally contact a nearby energized circuit or where the potential for induced voltageexists.

H. POLE-MOUNTED CONTROL CABINETS

Alabama Power Company construction standards require pole-mounted control cabinets to be properly grounded by directly connecting the cabinet to the pole ground conductor using a minimum of #6 copper. If control cabinets are not properly grounded, an elevated voltage may exist at the control cabinet. BEFORE UNLOCKING A POLE MOUNTED CONTROL CABINET, THE CABINET SHOULD BE VERIFIED TO BE PROPERLY CONNECTED TO THE POLE GOUND CONDUCTOR.

I. POLE INSPECTION AND TAGGING

Alabama Power Company pole inspection contractors install a tag near eye level on the pole to identify the type and date of pole treatment. Additional tags are installed to identify poles that fail minimum strength requirements but meet restoration standards and to identify poles that fail minimum strength requirements that will be replaced. The tagging legend utilized by pole inspection contractors is provided below:



TAGGING LEGEND FOR MARKING REJECTED POLES

(TO BE USED BY POLE INSPECTION AND TREATMENT CONTRACTOR)
SYMBOLS ARE ALUMINUM TAGS NAILED TO POLE NEAR EYE LEVEL

POLES HAVING THESE TAGS SHOULD IN NO WAY BE CONSTRUED AS BEING SAFE TO CLIMB. THE INTENT OF THESE SYMBOLS, WHEN PLACED ON POLES, IS TO STATE THAT THE POLE HAS BEEN INSPECTED BY A QUALIFIED POLE GROUNDLINE INSPECTOR AND HAS, TO THE BEST OF THAT INSPECTORS JUDGEMENT, BEEN DETERMINED TO BE REJECTED FOR IN-SERVICE USE ('UNSERVICABLE'). POLES BEARING THESE TAGS HAVE EITHER BEEN REJECTED FOR REINFORCEMENT (RESTORATION WITH APPROPRIATE TRUSSES & BANDING) OR FOR REPLACEMENT.

THE INSPECTOR, BY INSPECTING THE CONDITION OF THE WOOD IN A POLE, ALSO DETERMINES THE AMOUNT OF SOUND WOOD AT THE GROUNDLINE AREA OF THE POLE. ALL INTERNAL AND EXTERNAL DEFECTS AT THE GROUNDLINE AREA, AND THEN INPUTS DIMENSIONAL CHARACTERISTICS OF THE POLE AND ITS DEFECTS INTO HANDHELD DEVICE THAT WILL USE APPROVED PROGRAMS TO CALCULATE THE POLES REMAINING STRENGTH. POLES DETERMINED TO NO LONGER BE SERVICABLE WILL BE REJECTED AND EVALUATED FOR REPLACEMENT.

OTHER REASONS FOR REJECTION OF A POLE MAY RELATE TO (A) HAVING INTERNAL SAPWOOD DECAY WHICH IS FOUND TO EXTEND TO A HEIGHT BEYOND THE POINT OF BEING CONSIDERED FOR REINFORCEMENT, AND (B) HAVING UPPER POLE DAMAGE SUBSTANTIAL ENOUGH TO CAUSE THE POLE TO FALL BELOW MINIMUM ACCEPTABLE STANDARDS.

DO NOT CLIMB TAGS

REJECTED FOR REINFORCEMENT		REJECTED FOR REPLACEMENT	
YELLOW EXAMPLE 1	NON-PRIORITY, REJECTED POLE. FAILS MINIMUM STRENGTH REQUIREMENTS, BUT MEETS RESTORATION STANDARDS. IF TREATMENT IS POSSIBLE, POLE HAS BEEN EXTERNALLY TREATED.	WHITE OR SILVER EXAMPLE 3	NON-PRIORITY, REJECTED POLE. FAILS MINIMUM STRENGTH REQUIREMENTS. FAILS MINUMUM RESTORATION REQUIREMENTS. POLE TO BE REPLACED. HAS NOT BEEN EXTERNALLY TREATED.
YELLOW YELLOW EXAMPLE 2	PRIORITY REJECTED POLE. FAILS MINIMUM STRENGTH REQUIREMENTS, BUT MEETS RESTORATION STANDARDS. IF TREATMENT IS POSSIBLE, POLE HAS BEEN EXTERNALLY TREATED.	WHITE OR SILVER WHITE OR SILVER EXAMPLE 4	PRIORITY REJECTED POLE. FAILS MINIMUM STRENGTH REQUIREMENTS. FAILS MINUMUM RESTORATION REQUIREMENTS. POLE TO BE REPLACED. HAS NOT BEEN EXTERNALLY TREATED.

Each pole should be inspected prior to work being performed or subjecting it to additional stress. This includes climbing, installing or removing equipment, installing or removing conductors, changing guying tensions, performing work on adjacent poles, or any other situation that could change the amount or direction of force applied to the pole. Prior to climbing any wood pole, a visual inspection and hammer test shall be performed. The hammer test shall consist of rapping the pole with a hammer starting near the ground line and continuing upwards circumferentially around the pole to a height of approximately 6 feet. Also, prod the pole as near the ground line as possible using a pole prod or screwdriver to check for decay.

J. TRAFFIC CONTROL AND ROADWAY SAFETY

The state of Alabama has adopted the federal DOT requirements for all state maintained roads and highways. Follow applicable traffic control procedures to protect yourself and the public.

K. ENVIRONMENTAL

- Report all oil spills to your Alabama Power Company representative.
- Do not transport leaking oil-filled equipment without proper containment measurements.
- Report all hazardous environmental concerns to your Alabama Power Company representative as they arediscovered.

L. INJURY REPORTING

- Each visiting company is to be responsible for their reporting procedures for their Company. In addition, all injuries must be reported as soon as possible to APC Safety and Health through the local Alabama Power Company office or field location. The information to be reported must include, at minimum, the injured name, Company, treating physician/hospital name and location, nature of the injury and status (if known), and supervision to be followed upwith.
- Information on emergency numbers, hospitals and doctors, and the availability of 911 numbers should be obtained from the Safety and Health representative at the receiving Alabama Power Company office or field location.

ME EMERGENCY EXCAVATIONPROCEDURES

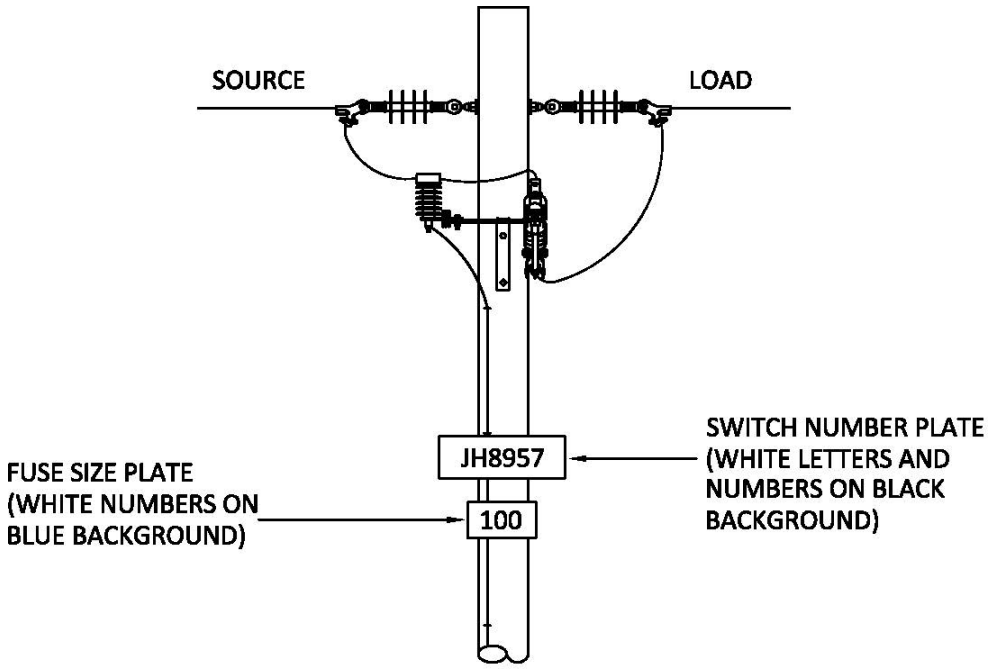
The procedures shown below are required to be compliant with the provisions of the Alabama Underground Damage Prevention Legislation which is Act 94-487 or Chapter 15 of Title 37 of the Code of Alabama:

1. Definition of emergency: “eliminate an imminent danger to life, health, property or public services” (Comment: Historically, excavations required to restore power outages have been considered to qualify under this definition of “emergency”.)
2. Compliance with Section 4 of the law (providing two working days’ notice prior to excavation) is not required for emergency excavation.
3. Emergencies during normal working hours should be called in to Alabama 811. The caller will be asked to confirm that the proposed excavation is truly an emergency as defined in the law. If a facility owner is known to have underground facilities in the area of proposed excavation, a follow-up call directly to the facility owner may be necessary to have their facilities located.

4. If the emergency occurs after normal office hours, the excavator should contact directly, each operator known to have underground facilities in the area.
5. The excavator shall take all necessary and reasonable precautions to avoid or minimize damage to existing underground facilities, some of which are outlined below:
    a. Work with the underground facility owners to have their facilities located prior to beginning emergency excavation.
    b. If all attempts have failed to have the facility owner locate their facilities, excavation may begin using detection equipment or non-invasive methods to determine the precise location of underground facilities.
    c. Use hand digging techniques, hydro-vac process, or other approved “soft dig” methods to avoid use of mechanized equipment to perform the excavation.
    d. For pole replacements, it is preferred to remove the old pole from the pole hole and install the new pole in the same hole. For these situations, the hole should only be cleaned out using non-mechanized equipment, unless all of the underground facilities have been located.
    e. Contact your local APC representative for additional help in having underground facilities located.

N. FUSE LINKS

- Alabama Power Company uses only QA and QR type expulsion fuse links and they are interchangeable with each other. All other types of fuse links should be removed from trucks of visiting crews upon arrival to avoid the possibility of non-standard fuses being installed.
- Transformer expulsion fuse sizes are designated on Plates SOE-14.001 and HE-2 of this manual. Additionally, current limiting fuse sizes used on the 25kV and 35kV systems are shown on Plates SOE-16.001 and HE-2, respectively.
- Sectionalizing point type QA/QR fuse sizes are designated on the pole by a blue fuse size plate as shown in the drawing below. If, for some reason, a fuse link is installed which is a size or type different from the size designated on the blue plate, the deviation shall be recorded on the switching order and Alabama Power Company personnel notified.



O. TRIPSAVER

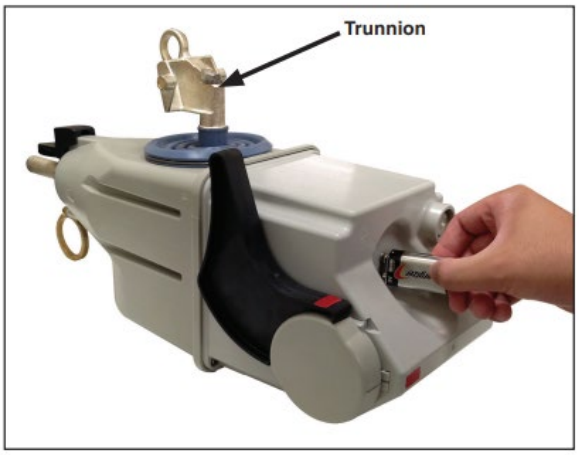


Figure 43. Manually resetting a TripSaver II Cutout-Mounted Recloser.

Quick Facts:

- Must be programmed **BEFORE** installation
- Only install at locations accessible by a bucket truck
- No external, manual opening lever **(requires LoadBuster to open)**

Opening

1. Use Loadbuster Tool to open TripSaver, similar to opening a fuse barrel.
2. TripSaver does **not** have a manual open lever to drop load.
3. Should be left in cradle for clearance, unless otherwise instructed.

Closing

1. Place the TripSaver II in the cutout cradle using gloved hands.
2. Using hot stick, swing the TripSaver II to within 45 degrees of the fully closed position in the cutout; once stable, complete the final closing and briefly hold in the closed position with the hot stick.

Obtaining EWP

1. Move black lever down. (Display will read “CLOSED NR”)
   Note: “Closed NR” display not required
2. Place tag at the base of the pole.

Note: When the ambient temperature is below -30°C (-22°F), the LCD screen will not refresh (complete LCD screen information can be read after refreshing the LCD screen with a 9-volt Lithium L522 battery).

P. CUSTOMER GENERATORS

Customers may have purchased and installed generators at any location. Extreme caution should be used in identifying possible feedback situations created by improperly installed generators. Generators may be installed at any location including houses, CATV and telephone power supplies, commercial and industrial locations.

REMEMBER TO ALWAYS INSTALL TEMPORARY SAFETY GROUNDS AS CLOSE TO THE WORKER AS POSSIBLE.

Q. FIBER AND COMMUNICATION CABLES

Fiberoptic cables are utilized by many telecommunication companies to transmit telephone signals, Internet communication, and cable television signals to customers throughout an area. During storm restoration efforts, fiberoptic communication cables may be down along with electrical facilities. Despite being on the ground, these fiberoptic cables may continue to be operational. Therefore, cutting a downed fiberoptic cable could disrupt telecommunication services in the area, including 911 emergency service for an extended period of time. In some instances, it may take weeks to repair the damage caused by cutting fiberoptic cables.

Thus, Alabama Power Company (APCO) has adopted a **"DO NOT CUT"** Policy regarding **company owned and non-company owned** fiberoptic cables. Exceptions to this policy will only be made in the instances of an emergency or Approval by an APCO representative.

An emergency includes a sudden, unexpected, or impending situation that may cause immediate injury, damage to property, and/or loss of life.

Approval by an APCO representative requires the Contractor to obtain the name and phone number of the APCO representative giving permission prior to cutting any fiberoptic cable.

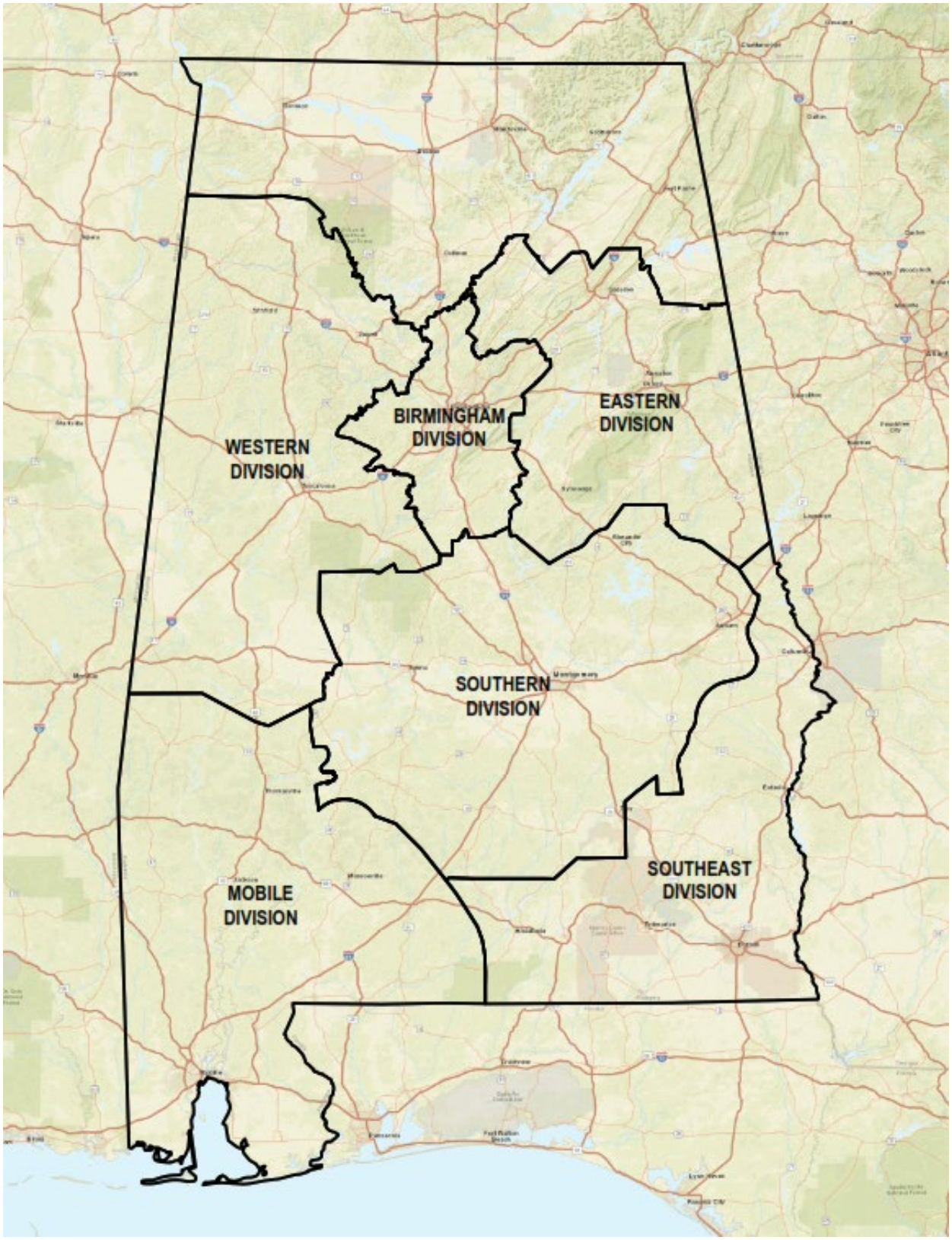
New fiber Marker

R. SYSTEM INFORMATION

The Alabama Power distribution system is a grounded "Y" system with voltages as follows:

Division	System Voltages (in kV)				
	2.4/ 4.16	**7.2/ 12.47**	**7.62/ 13.2**	**13.28/ 22.86**	**19.92/ 34.5**
Birmingham	X	X	X		X
Eastern	X	X	X		X
Southern	X	X			X
Western	X	X			
Mobile	X	X		X	
Southeast	X	X			

Contact the System Operator or the Alabama Power representative for any questions about the system voltage.

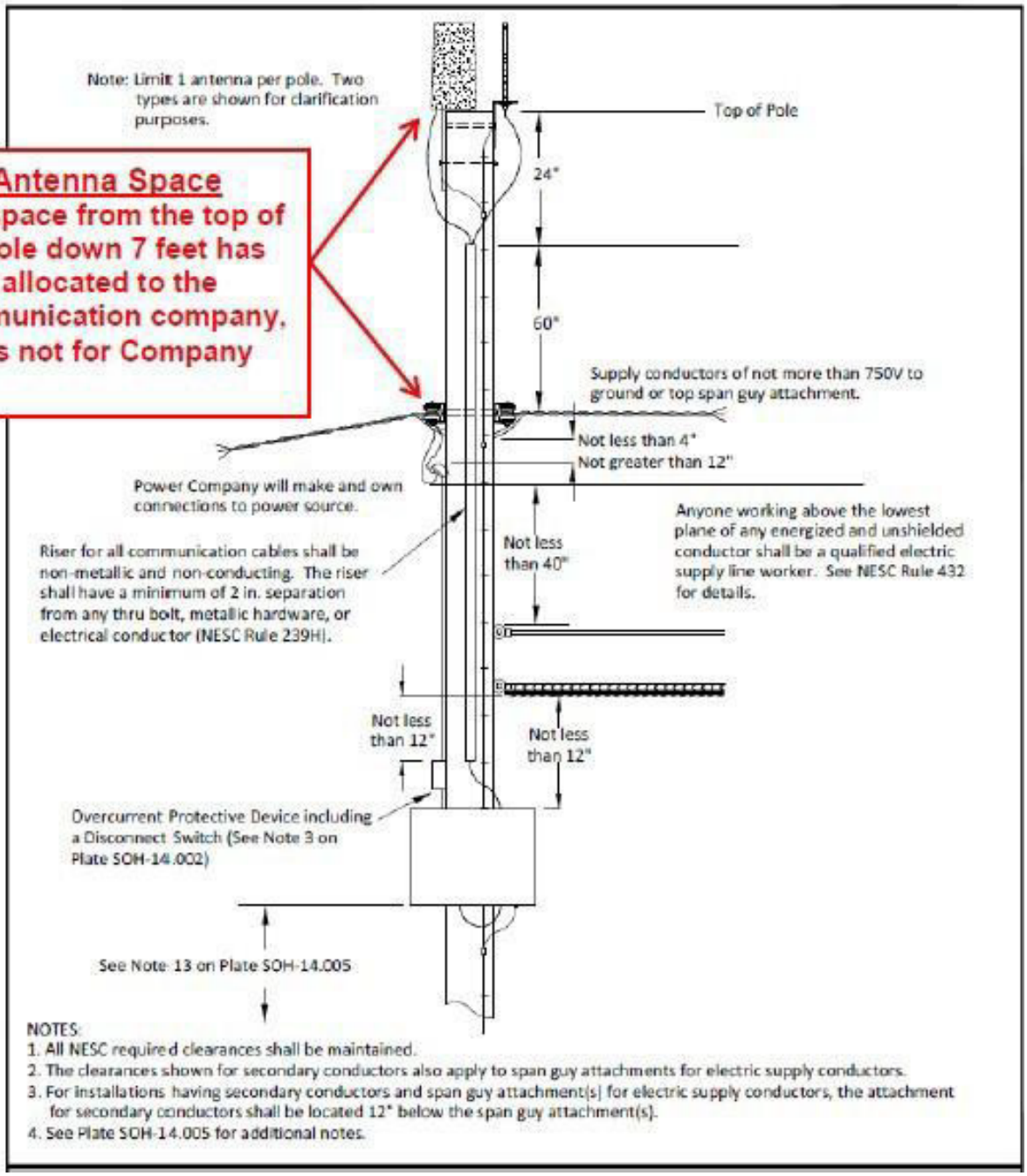

WESTERN
DIVISION
BIRMINGHAM
DIVISION
EASTERN
DIVISION
SOUTHERN
DIVISION
MOBILE
DIVISION
SOUTHEAST
DIVISION

S. RF ANTENNA AWARENESS

RF is everywhere. However, it is only at particular locations where RF levels are high enough that exposure becomes a concern. Some of the most common locations are cellular communication sites, broadcast sites such as TV and Radio, microwave sites, substations, rooftops, and with certain pole-mounted applications. At these locations, you should exercise a heightened awareness of your environment.

If work is required within 10 feet of a customer-owned antenna located in the top of a secondary pole or a customer-owned service pole, the power supply shall be disconnected. The antenna owner NOC (Network Operations Center) should be notified prior to disconnecting power to the antenna. When practical, advance notice of 24 hours should be given to the antenna owner prior to disconnecting power. The antenna owner NOC should be notified when our work is complete and on-site personnel should confirm that the antenna disconnect switch is in the closed position, or open position as circumstances may require.

Specification for Customer-Owned Antenna on Secondary Pole



2 — EMERGENCY RESTORATION

A. INTRODUCTION

Welcome to Alabama Power Company. We are glad you are here to assist us in restoring service to our customers after a major outage. Our objective is to reduce our customer outage time to a minimum, while doing so in a safe, orderly, and practical manner. Your presence here will help us meet that objective.

Safety is an important part of our Emergency Operating Procedures. We want you to know that your safety is important to us as you begin work on our electrical system.

This manual is provided to help orient you to our system. It contains the following information:

- A brief safety summary andinstructions
- Emergency Operating Procedures Guidelines
- Pole inspection and Tagging
- Staging Area Rules
- Staging Area Emergency Action Plans
- Incident Form
- Basic construction standards that are used on our system

Please take a few moments to review and become familiar with the contents of this manual. Obviously, we have not provided construction standards for all types of construction you may encounter, but we have provided the basic ones. Should you need information not included or have any questions, please contact the APC office or field location to which you have been assigned.

B. GUIDELINES FOR VISITING CREWS

The following are some guidelines for visiting utilities and contractors:

1. Alabama Power Company will not pay for room service, in room movies, video rentals, mini bar usage or personal entertainment of any kind.

2. Alabama Power Company will provide laundry service at designated points.

3. Sundry items will be provided at designatedpoints.

4. Alabama Power Company will provide transportation to and from the staging areas unless specifiedotherwise.

5. The length of stay will be mutually agreed upon by both utilities.

6. To plan for meals and bus transportation, Alabama Power Company will determine work hours including starting time and duration. For extended restoration efforts (requiring longer than 36 hours) the typical work schedule will be one that allows for an on-site dawn-to-dusk effort. Please contact the local Alabama Power Company office or staging area for coordination or any concerns in this area.

7. 24 hour advance notice should be provided for any meals not to be eaten at the assigned staging area.

8. Alabama Power Company will generally provide lodging at one person per bed in motel style rooms. If motel rooms are limited or not available, the best alternative arrangements will be made.

9. Visiting crews should remove all non-APC fuse links from vehicles upon arrival.

10. SEE, EEI, or other mutual assistance agreements supersede these guidelines.

C. Staging Area Rules

The following are rules which should be followed and enforced for crew staging locations which are logistically managed by Alabama Power Company. These rules apply to Southern Company employees, contractors, and all other personnel working for Southern. Implementation of these rules during emergency response must be expressly authorized by the Manager of Corporate Security. Violation of these rules may result in revocation of staging area access.

1. No Illegal drugs.
2. No alcoholic beverages.
3. No firearms.
4. All vehicles, packages, and persons are subject to search when entering or while located within the staging areacomplex.
5. Threats of any kind or acts of violence will not be tolerated.
6. Intimidation, harassment, or discrimination of any kind will not be tolerated.
7. Only authorized personnel will be admitted to the staging area.
8. For staging areas with sleeping quarters, staging area “Quiet Time” will be enforced from 10 p.m. until 5a.m.
9. Food, equipment, and material will be issued by Alabama Power personnel and is for use only to support restorationefforts.
10. No media or other members of the public should be admitted without express permission of staging area team leader.
11. Security violations should be immediately reported to the staging area security supervisor and Law Enforcement when appropriate.

D. Typical Staging Area Emergency Action Plan

_____
(Enter Staging Area Name /Location)

1. **Medical Emergency**
   - In the event of medical emergency, employees are to report injuries to their supervisor. Supervisors should call their Safety and Health contact provided during the briefing. Safety and Health will contact Disability Management as needed.

2. **Weather Emergency, in the staging area**
   - In the event of severe weather while at the staging area, you will be notified by _____(provide notification method, such as bullhorn, etc.).
   - Proceed immediately to the designated location: _____
   - Remain in the designated area until "all clear" is communicated.

3. **Weather Emergency, in the field**
   - Follow your company's policy on stopping elevated work.
   - If possible, seek shelter in a stable structure. Do not try to out run a tornado. If a stable structure is not available, get out of your vehicle. If you are caught outside during a tornado and there is no adequate shelter immediately available:
     - Avoid areas with many trees. Avoid vehicles. (Do not get under a bridge or overpass.)
     - Lie down flat in a gully, ditch, or low spot on the ground.
     - Protect your head with an object or with your arms.

4. **Fire or Evacuation Emergency for Sleeping Trailers**
   - In the event that an evacuation is necessary from sleeping quarters, notify supervisor or other personnel in the area immediately. Mass notification will be made by _____ (provide notification method, such as bullhorn, etc.).
   - In the event of a fire, fire extinguishers are located in the sleeping trailers. Only those individuals who are trained and authorized to do so may use the fire extinguisher. Personnel should always consider their personal safety first, by placing themselves in a location for safe evacuation while addressing the fire.
   - Evacuate using the closest door.
   - All personnel shall rally at _____ (enter location for safe rally). Personnel shall gather in workgroups to aid in accounting for all those present.

E. INCIDENT FORM

Please complete this report for safety-related incidents or events resulting in loss or damage to property. Be certain to describe in detail all aspects related to the incident (e.g., equipment in use, weather conditions, time of day, etc.). Thank you for your time and commitment to workplace safety.

REPORT IMMEDIATELY TO AN ALABAMA POWER SAFETY REPRESENTATIVE OR AN ALABAMA POWER COMPANY CONTACT PERSON.

Person(s) Involved:	
Company Name:	
Treating Physician/Hospital names:	
City & State of Company Headquarters:	
Description of Incident: Employee Injury_____Vehicle_____PropertyDamage_____	
Status of Incident:	
Date of Incident:	
Time of Incident:	
City Where Occurred:	
Regular Occupation of Employee:	
APC First Contact of Incident:	
Why Did it Happen?	
Action Taken:	
By Whom (optional):	Completion Date:

CONSTRUCTION MANUAL
15KV – 35KV

CONSTRUCTION MANUAL
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Oc t ober 22, 2014

15KV-25KV OVERHEAD CONSTRUCTION

ESACM-TOC.01

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Oc t ober 22, 2014

15KV-25KV UNDERGROUND CONSTRUCTION

35KV OVERHEAD CONSTRUCTION

15KV TO 25KV OVERHEAD CONSTRUCTION

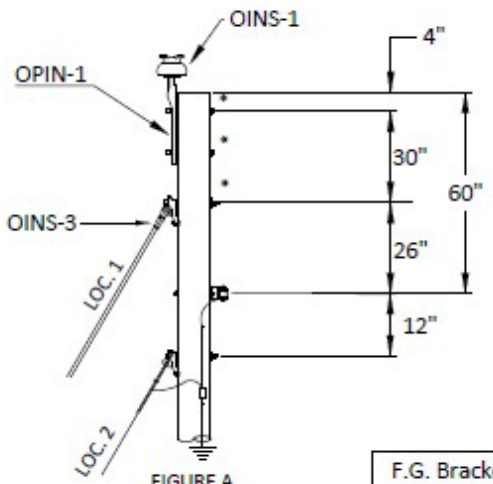


FIGURE A

F.G. Bracket Diameter	"A" Dimension
1-1/2"	8"
2"	10"

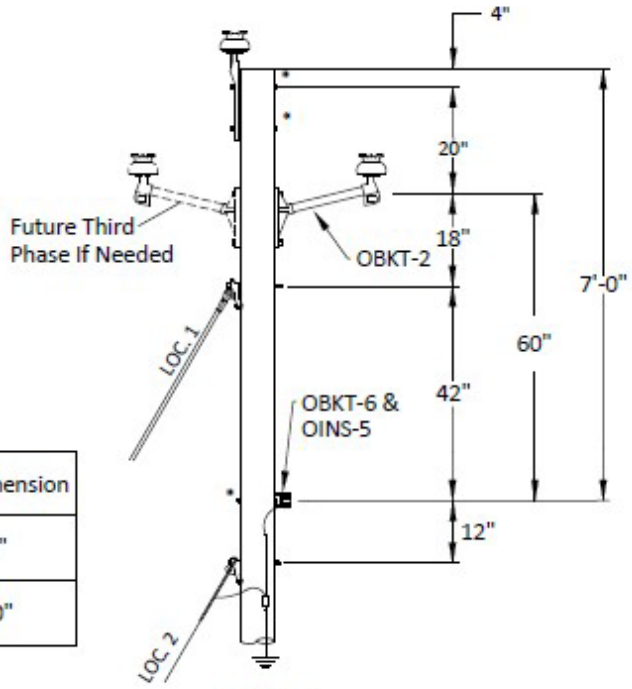


FIGURE B

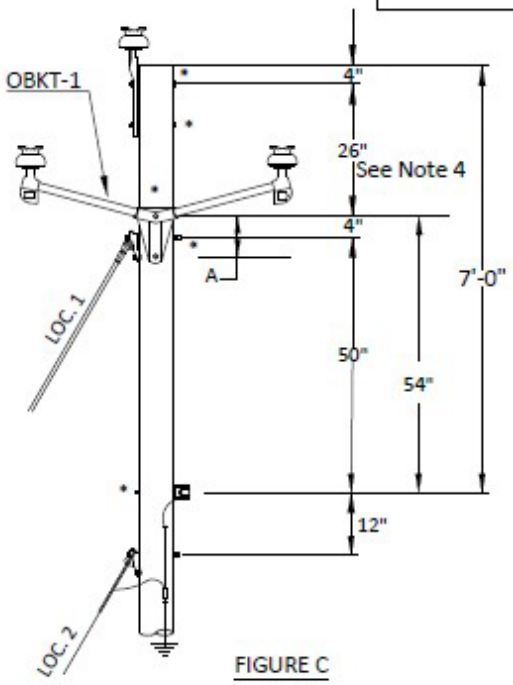


FIGURE C

* Denotes the use of a pre-drilled hole for a 40 ft. pole.

Notes:

1. This construction can be used for all conductor sizes. Use the appropriate diameter fiberglass bracket (1-1/2 in. or 2 in. diameter). See Plates SOB-41 for line angle and load span limitations.
2. This spacing should be increased to 84 in. if three (3) phase is anticipated. This spacing may be decreased to 40 in. if no transformer installation is anticipated and if the tables in Plates SOB-42 allow.
3. Guy requirements as determined by engineering calculations are noted as dashed lines with Loc. 1 and 2 notations to indicated order of installation. Guying not required on straight line (tangent) construction.
4. GPC - When replacing a 2 phase steel bracket having post type insulators with a 2 phase fiberglass bracket, this dimension may be reduced to 22 in.

SUBJECT OVERHEAD DISTRIBUTION

DETAIL LINE CONSTRUCTION - STANDARD CONFIGURATION

STRAIGHT LINE AND SMALL ANGLE CONSTRUCTION

Date	REVISED	Southern Company	
02-26-99	9-25-00, 01-26-02, 11-01-06, 12-30-11 02-21-13, 06-03-13, 8-29-17, 10-25-18, 11-04-19		A- SOB01001

SOB-01.001

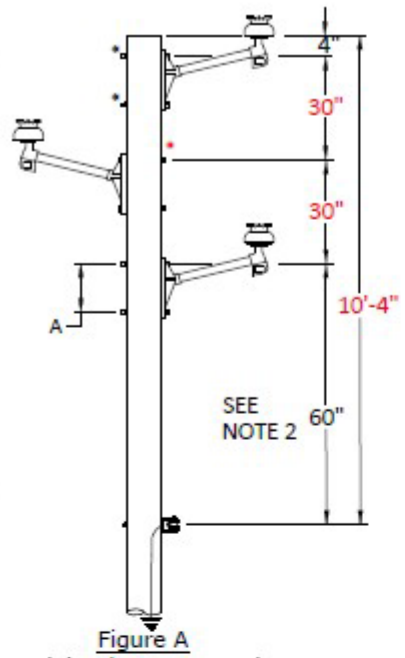


Figure A
Straight Line Construction
Only

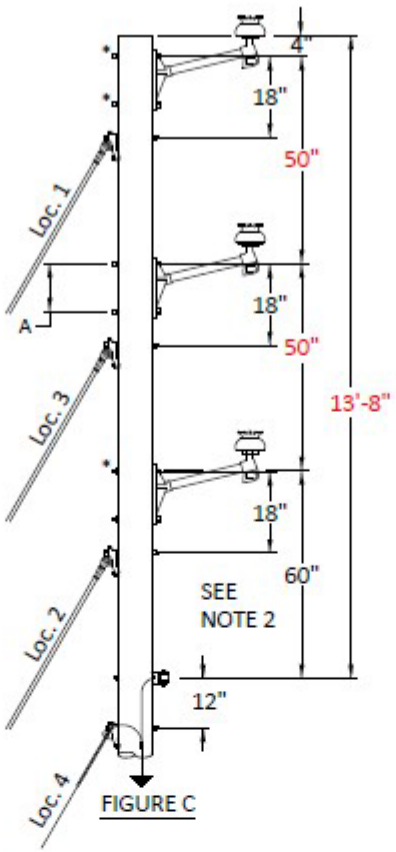


FIGURE C

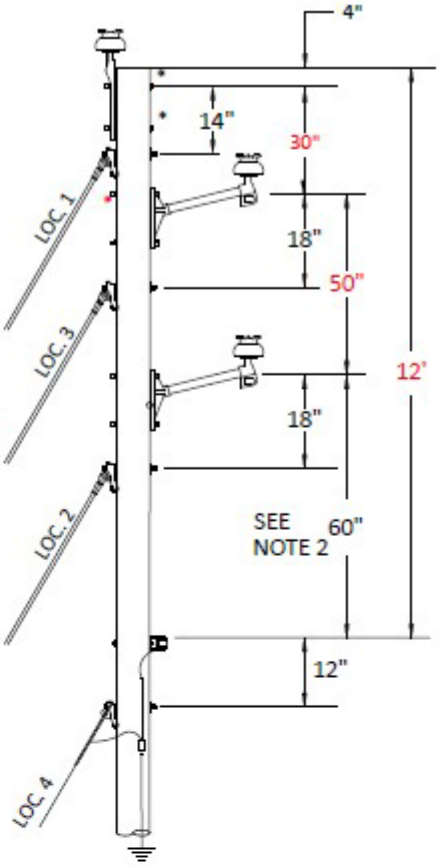


FIGURE D

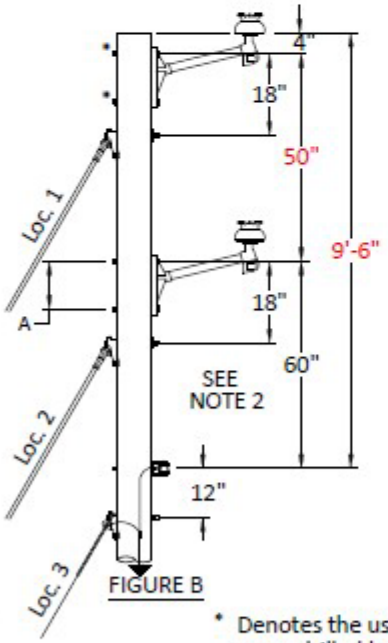


FIGURE B

* Denotes the use of a pre-drilled hole for a 40 ft. pole.

F.G. Bracket Diameter	"A" Dimension
1-1/2"	8"
2"	10"

Notes:

1. This construction can be used for all conductor sizes. Use the appropriate diameter fiberglass bracket (1-1/2 in. or 2 in. diameter). See Plates SOB-41 for line angle and load span limitations.
2. This spacing may be decreased to 50 in. if no transformer installation is anticipated and if the tables in Plates SOB-42 allow.
3. Guy requirements as determined by engineering calculations are noted as dashed lines with Loc. 1, 2, 3 and 4 notations to indicate order of installation. Guying not required on straight line (tangent) construction.

SUBJECT OVERHEAD DISTRIBUTION

DETAIL ALTERNATE CONFIGURATION - STRAIGHT LINE AND SMALL ANGLE CONSTRUCTION

Date 03-21-13 | REVISED 09-25-00, 01-26-02, 11-01-06, 12-30-11 06-03-13, 09-30-19 | Southern Company | A- SOB02001

SOB-02.001

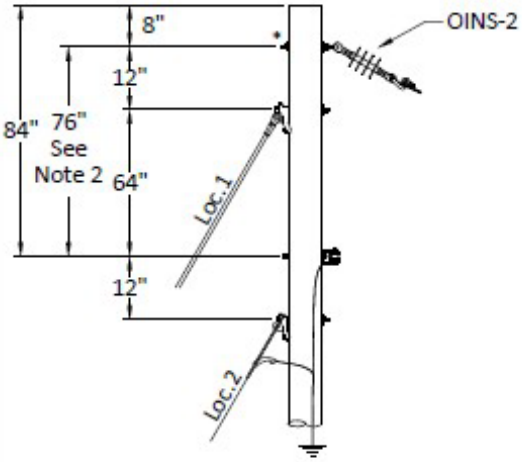


FIGURE A

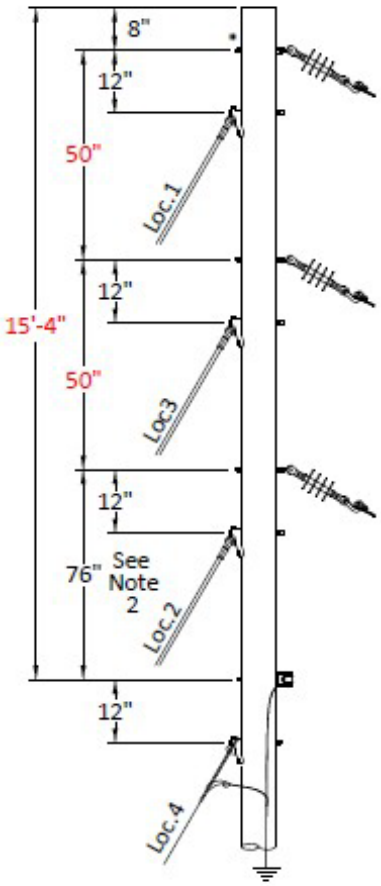


FIGURE C

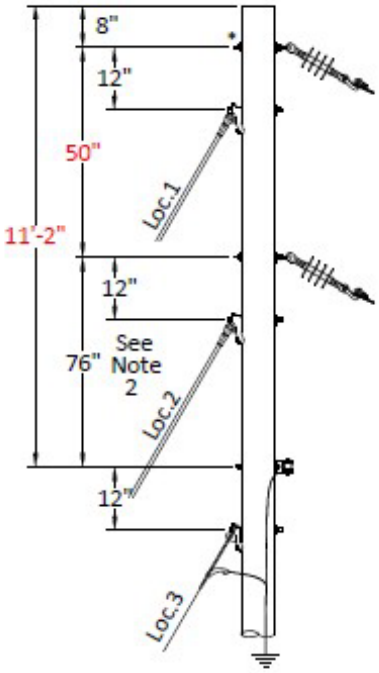


FIGURE B

NOTES:

1. This construction can be used for all conductor sizes. See Plates SOB-41 for line angle and load span limitations.
2. This spacing may be reduced to 60 in. if no transformer installation is anticipated, and if the tables in Plates SOB-42 allow.
3. Additional guy requirements as determined by engineering calculations are noted as dashed lines with Loc. 2, 3, or 4 notations to indicate order of installation.
4. For span lengths in excess of 450 ft, conductor spacings shown on Plate SOB-29 shall be used.

*Denotes the use of a pre-drilled hole for a 40 ft. pole.

SUBJECT	OVERHEAD DISTRIBUTION
DETAIL	LINE CONSTRUCTION - STANDARD CONFIGURATION
	SUSPENSION CONSTRUCTION
Date 02-26-99	REVISED 9-25-00, 01-26-02, 11-01-06, 06-23-08, 12-30-11, 09-30-19
Southern Company	A- SOB05001

SOB-05.001

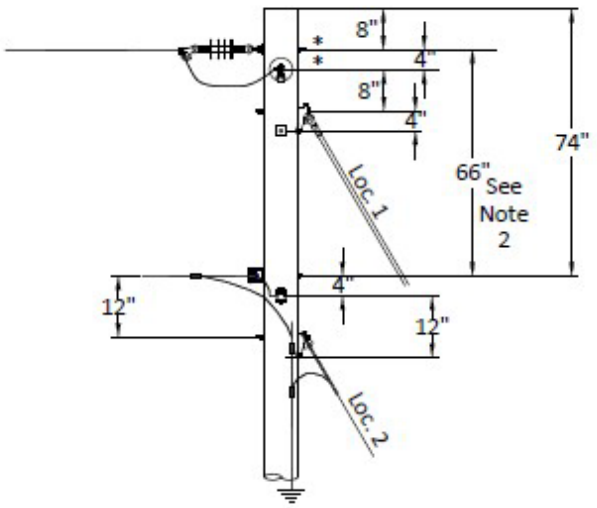


Figure A

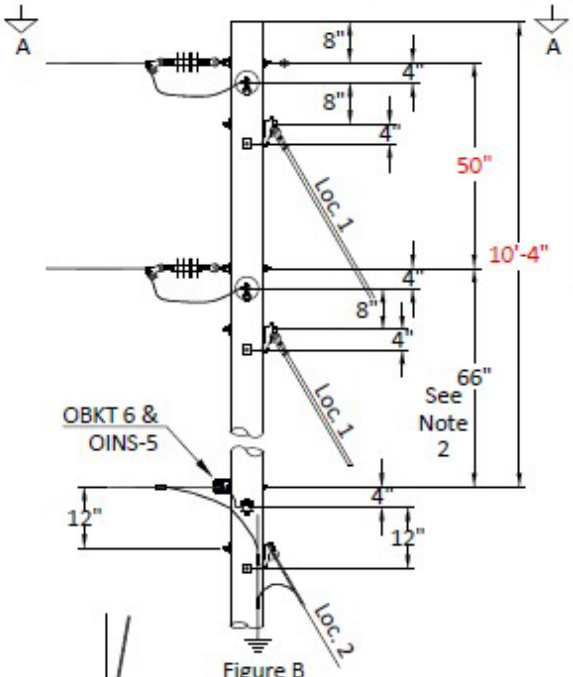
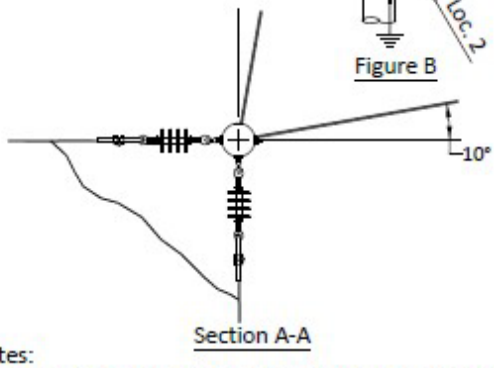


Figure B



Section A-A

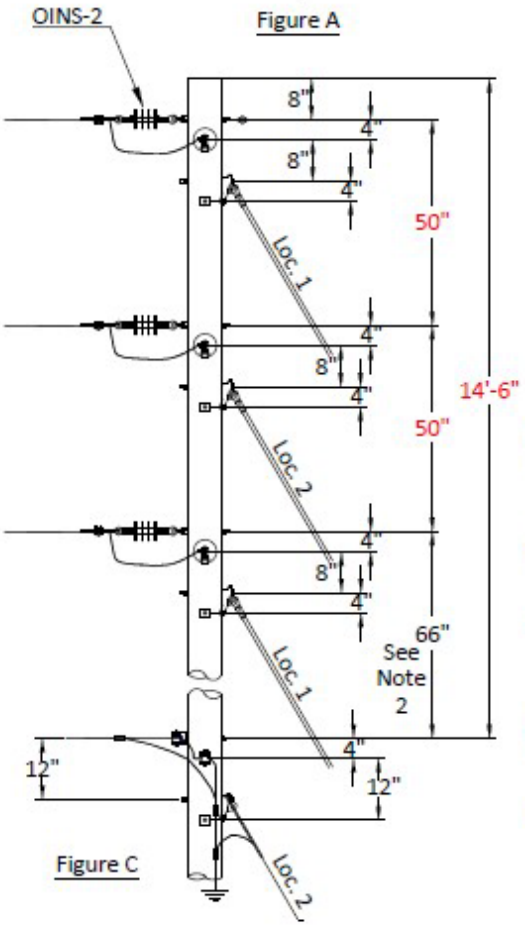


Figure C

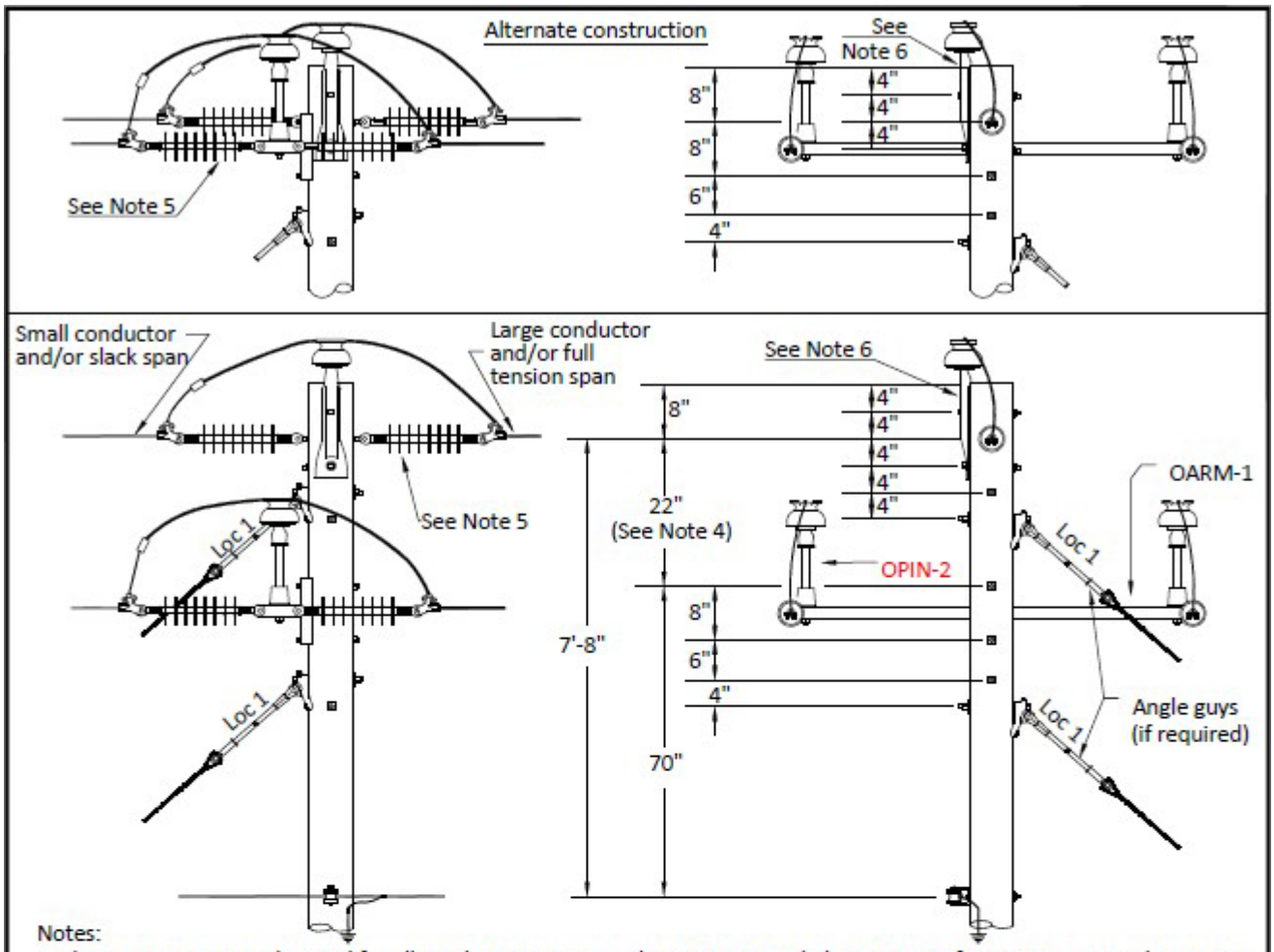
Notes:

1. This construction can be used for all conductor sizes. See Plates SOB-41 for line angle and load span limitations.
2. This spacing may be reduced to 50 in. if no transformer installation is anticipated, and if tables in Plates SOB-42 allow.
3. Additional guy requirements as determined by engineering calculations are noted as dashed lines with Loc. 2, 3, or 4 notations to indicate order of installation.
4. For span lengths in excess of 450 ft., conductor spacings shown on Plate SOB-29 shall be used.
5. See Plate SOB-00.003 for method of dead ending neutrals.

*Denotes the use of a pre-drilled hole for a 40 ft. pole.

SUBJECT	OVERHEAD DISTRIBUTION
DETAIL	LINE CONSTRUCTION - STANDARD CONFIGURATION VERTICAL CONSTRUCTION DOUBLE DEAD END ANGLE
Date 02-26-99	REVISED 09-25-00, 11-01-06, 12-30-11, 10-25-18 09-30-19
Southern Company	A- SOB06001

SOB-06.001



Notes:

1. This construction can be used for all conductor sizes. See Plates SOB-40 and Plates SOB-42 for maximum span limitations.
2. Install arm on side of pole opposite from the primary strain.
3. Arm shown is a 60 in. tubular steel arm. Maximum loaded tension for this arm is 4800 lbs. per conductor. For the 78 in. or 80 in. arm, the tension should be limited to 3636 lbs. Check with your appropriate distribution representative if an alternate arm is needed, since additional arms may be approved for this construction.
4. If pole space is limited, use the alternate construction shown.
5. At all dead end insulator locations, install 35kV dead end insulators (APC & MPC) or 25kV dead end insulators (GPC) at poles not having arresters.
6. For concrete and steel poles, install 18 inch fiberglass pole top pin (425389).
7. Position anchor to obtain a conductor clearance from all guy facilities as provided in the table below.

Conductor	Required clearance to:	
	Guy wire / fiberglass guy insulator metallic end fitting	Fiberglass guy insulator
Primary	11"	8"
Neutral/Secondary	6"	6"

* Denotes the use of a pre-drilled hole for a 40 ft. pole.

SUBJECT OVERHEAD DISTRIBUTION

DETAIL LINE CONSTRUCTION - TYPICAL CONSTRUCTION

PRIMARY DOUBLE DEAD END ON 60 IN. OR 80 IN. STEEL ARM

Date	REVISED	Southern Company	
02-26-99	09-25-00, 11-01-06, 10-21-10, 10-11-17 10-25-18		A- SOB08001

SOB-08.001

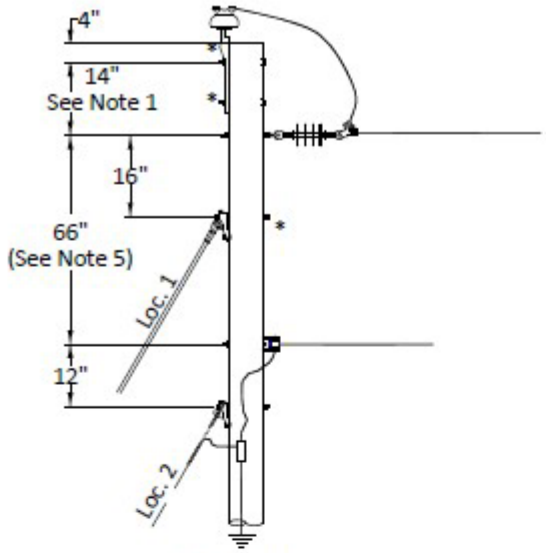


Figure A

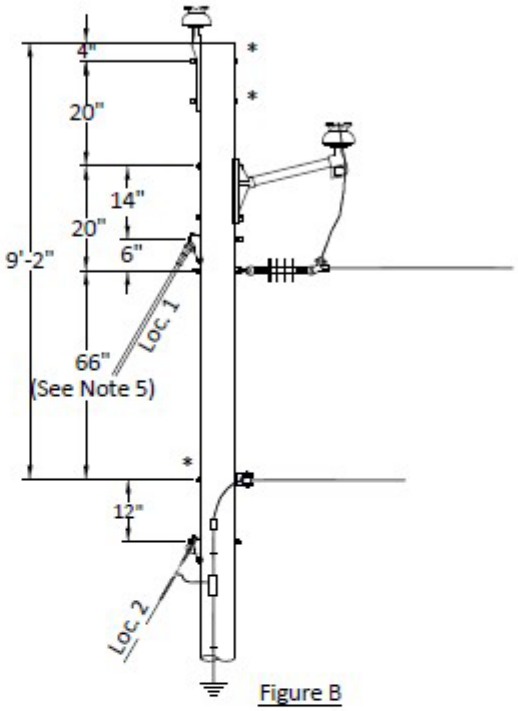


Figure B

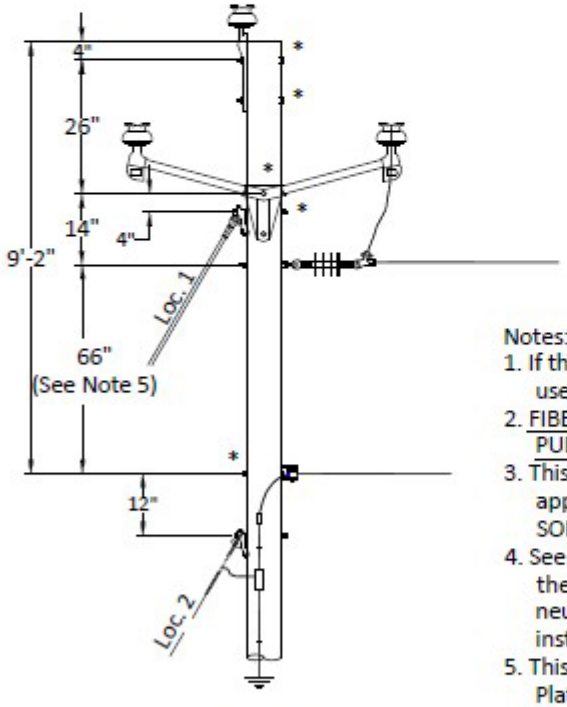


Figure C

Notes:

1. If this line is expected to be upgraded to a three phase line, use a dimension of 40 in. here.
2. FIBERGLASS BRACKET EYE MUST NOT BE USED FOR PRIMARY PULLOFFS, BUT MAY BE USED FOR STRINGING BLOCKS.
3. This construction can be used for all size conductors. Use the appropriate diameter bracket (1-1/2 in. or 2 in.). See Plates SOB-41, or if applicable, see Company-Specific plates.
4. See Plate SOB-00.003 for method of dead-ending neutrals. If the tap neutral is not required to be attached to the tangent neutral bracket, then the tap neutral bracket should be installed 4 in. below the tangent neutral bracket.
5. This dimension may be reduced to 50 in. if allowed by tables in Plates SOB-40 and Plates SOB-42.

*Denotes the use of a pre-drilled hole for a 40 ft. pole.

SUBJECT	OVERHEAD DISTRIBUTION
DETAIL	LINE CONSTRUCTION - STANDARD CONFIGURATION SINGLE PHASE PRIMARY LINE PULL-OFF
Date 02-26-99	REVISED 09-25-00, 11-01-06, 12-30-11, 09-30-19 11-04-19
Southern Company	A- SOB12001

SOB-12.001

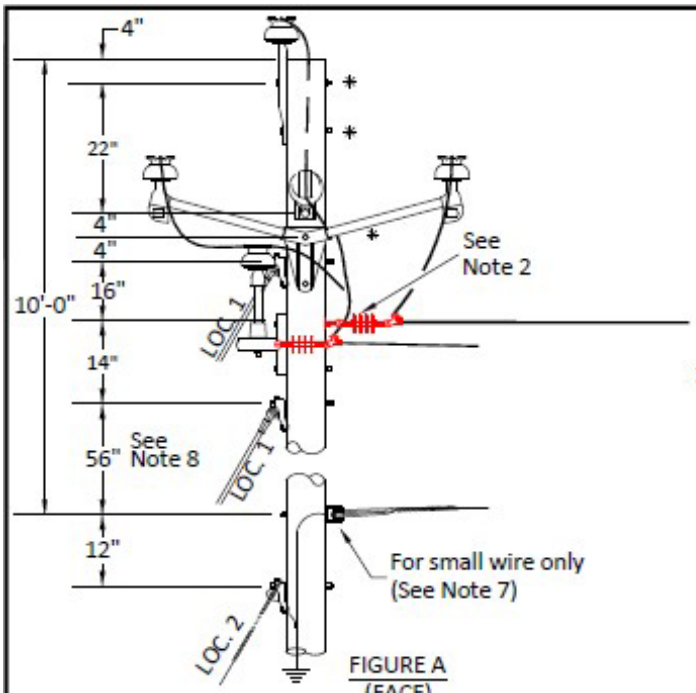


FIGURE A (FACE)

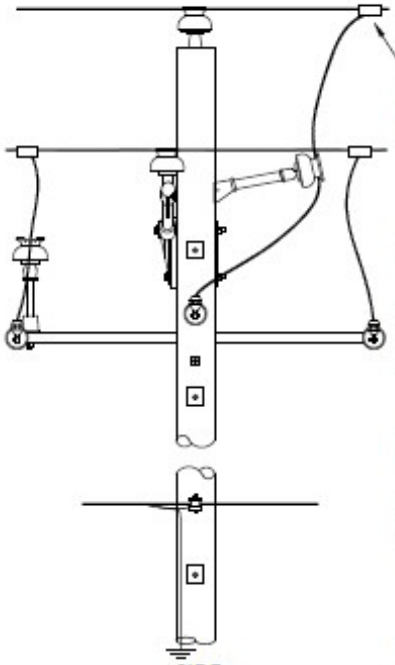


FIGURE A (SIDE)

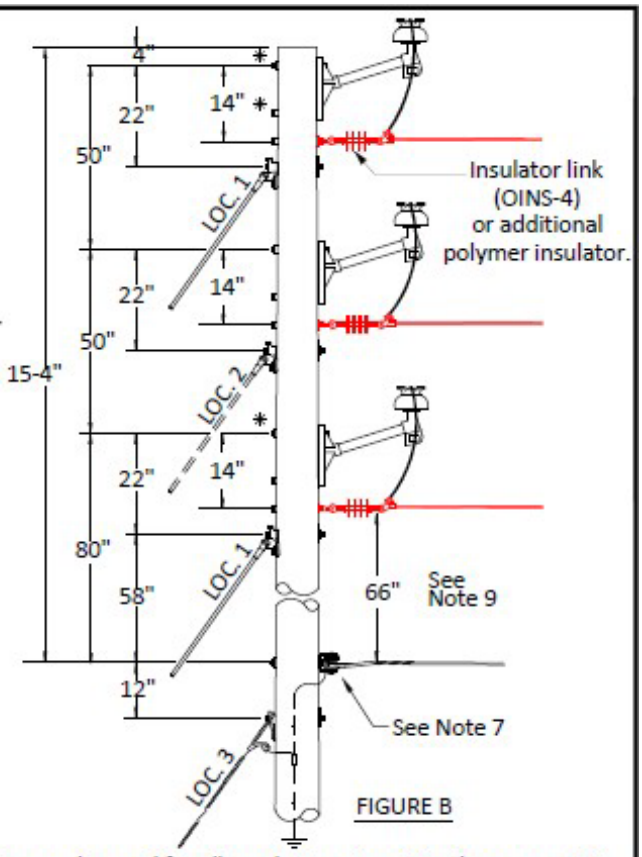


FIGURE B

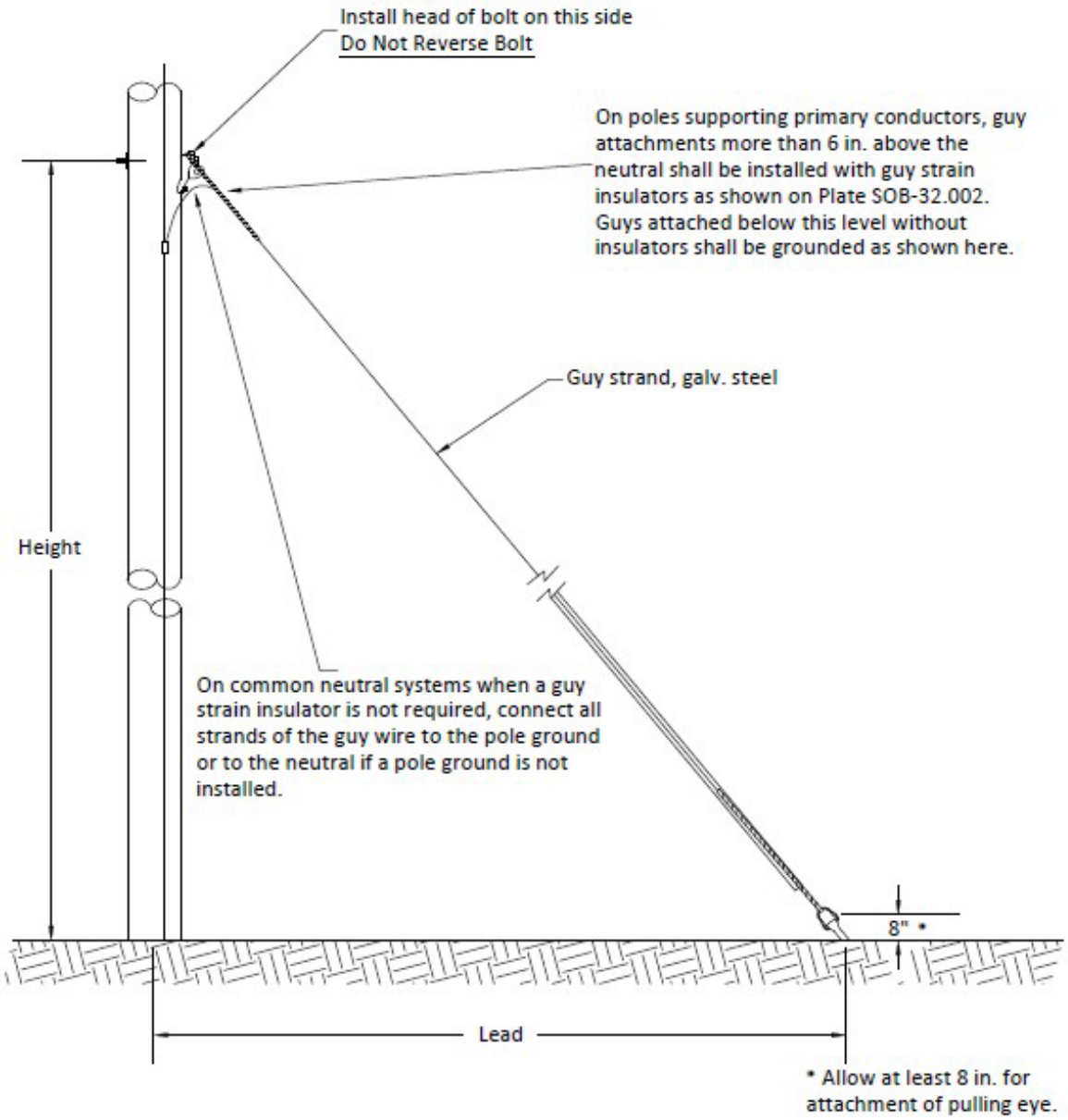
Notes:

1. This construction can be used for all conductor sizes. Use the appropriate diameter fiberglass bracket (1-1/2 in. or 2 in. diameter). See Plates SOB-41 for line angle and load span limitations, or if applicable, see Company Specific plates.
2. If working space is not a problem, then the middle phase pull-off in Figure "A" may be installed 6 in. above the top bolt of the steel pull-off arm.
3. FIBERGLASS BRACKET EYE MUST NOT BE USED FOR PRIMARY PULL-OFFS, BUT MAY BE USED FOR STRINGING BLOCKS.
4. Additional guy requirements as determined by engineering calculations are noted as dashed lines with Loc. 2 or 3 notations to indicate order of installation.
5. Figure "B" - If the pull-off is on the opposite side of the fiberglass brackets, use the same vertical spacing and overhead span guys.
6. Hot line clamps may also be used.
7. See Plate SOB-00.003 for method of dead-ending neutrals. If the tap neutral is not required to be attached to the tangent neutral bracket, then the tap neutral bracket should be installed 4 in. below the tangent neutral bracket.
8. The 56 in. dimension may be reduced to 20 in. where working space is not a problem and to facilitate this construction on poles which have neutrals at 84 in. from the pole top. Verify reduced spacing as per Plates SOB-42.
9. This dimension may be reduced to 50 in. if allowed by tables in Plates SOB-42.

*Denotes the use of a pre-drilled hole for a 40 ft. pole.

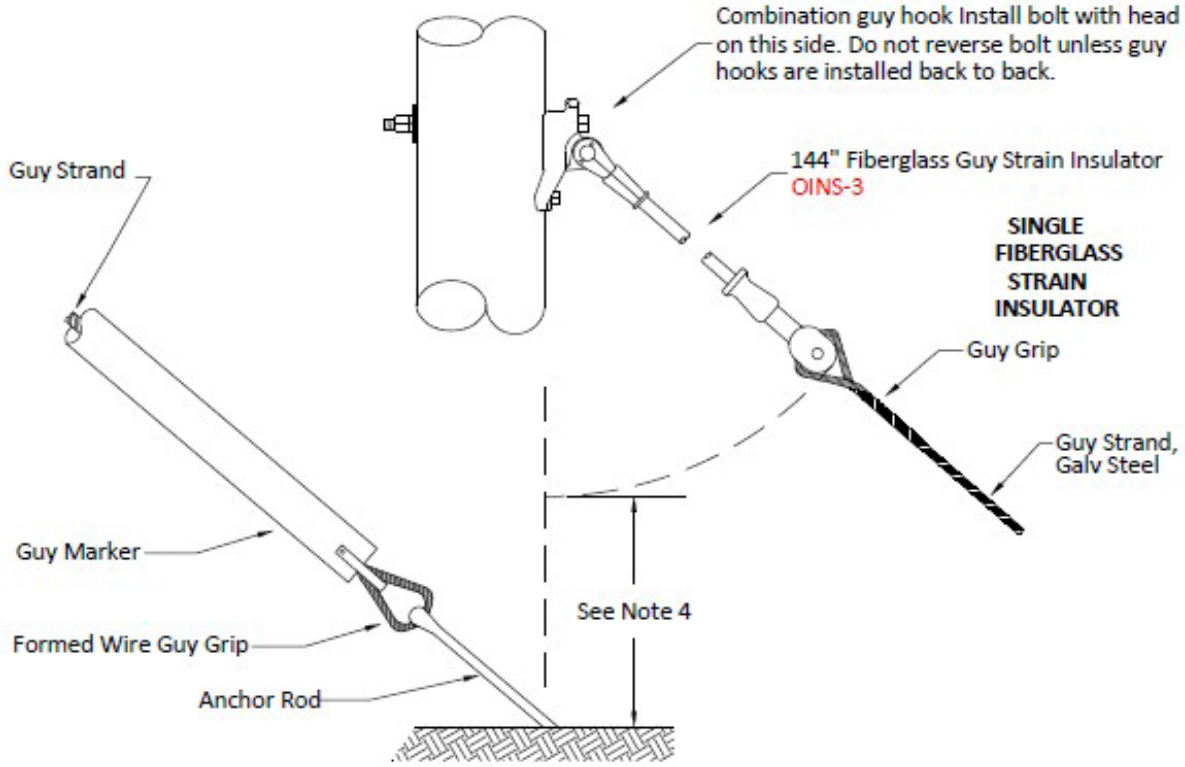
SUBJECT	OVERHEAD DISTRIBUTION
DETAIL	LINE CONSTRUCTION - STANDARD CONFIGURATION
	THREE PHASE PRIMARY LINE PULL-OFF
Date 02-26-99	REVISED 9-25-00, 01-26-02, 11-01-06, 09-10-09, 12-30-11, 10-25-18, 09-30-19, 11-04-19
Southern Company	A- SOB14001

SOB-14.001



SUBJECT	OVERHEAD DISTRIBUTION
DETAIL	LINE CONSTRUCTION - GUYING
	DOWN GUY ASSEMBLY WITHOUT GUY INSULATOR
Date 02-26-99	REVISED 09-25-00, 01-26-02, 11-01-06
Southern Company	A- SOB32001

SOB-32.001



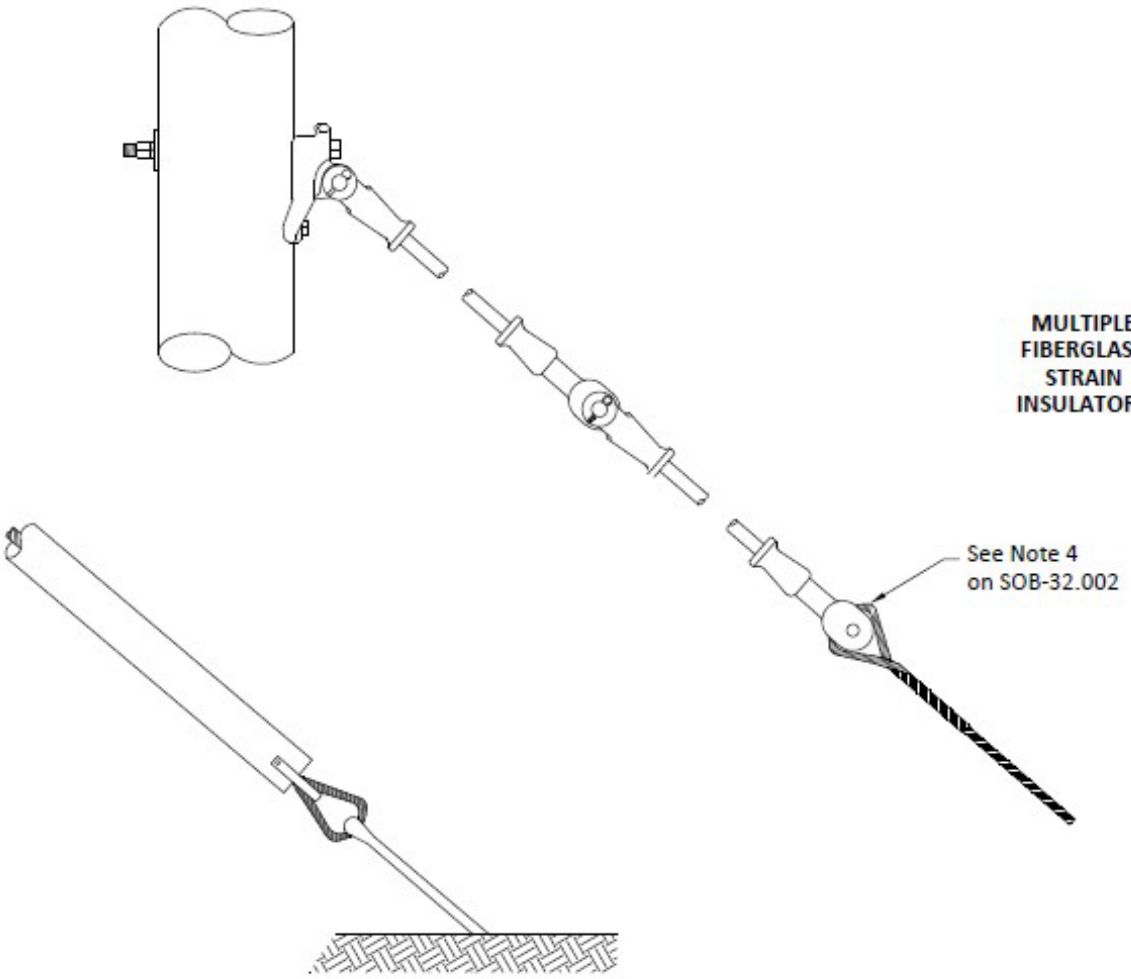
Notes:

1. On poles supporting primary conductors, all guy attachments more than 6 in. above the neutral shall be installed with a fiberglass strain insulator. Guys attached below this level may be installed as per SOB-32.001, without fiberglass guy strain insulators, but shall be grounded.
2. When fiberglass guy strain insulators are used, they shall be placed so that if any guy sags down upon another, the fiberglass guy strain insulator will not become ineffective. The clearances required in Note 5 below shall be maintained if the guy insulator becomes loose or broken such that it may contact energized conductors or equipment.
3. The ground end of all anchor guys shall be provided with a guy marker.
4. Bottom of fiberglass guy strain insulator shall be not less than 8 ft. above ground level even in a relaxed position.
5. Fiberglass guy strain insulators must be installed so that the lower metallic endfitting would be no less than 34 in. below any primary phase and not less than 6 in. below any secondary hot leg if the guy were to become loose or broken such that it may contact energized conductors or equipment.

SUBJECT	OVERHEAD DISTRIBUTION
DETAIL	LINE CONSTRUCTION -GUYING
	DOWN GUY ASSEMBLY WITH 144" FIBERGLASS STRAIN INSULATORS

Date 02-26-99	REVISED 09-25-00, 01-26-02, 11-01-06, 12-30-11 10-25-18	Southern Company	A- SOB32002

SOB-32.002



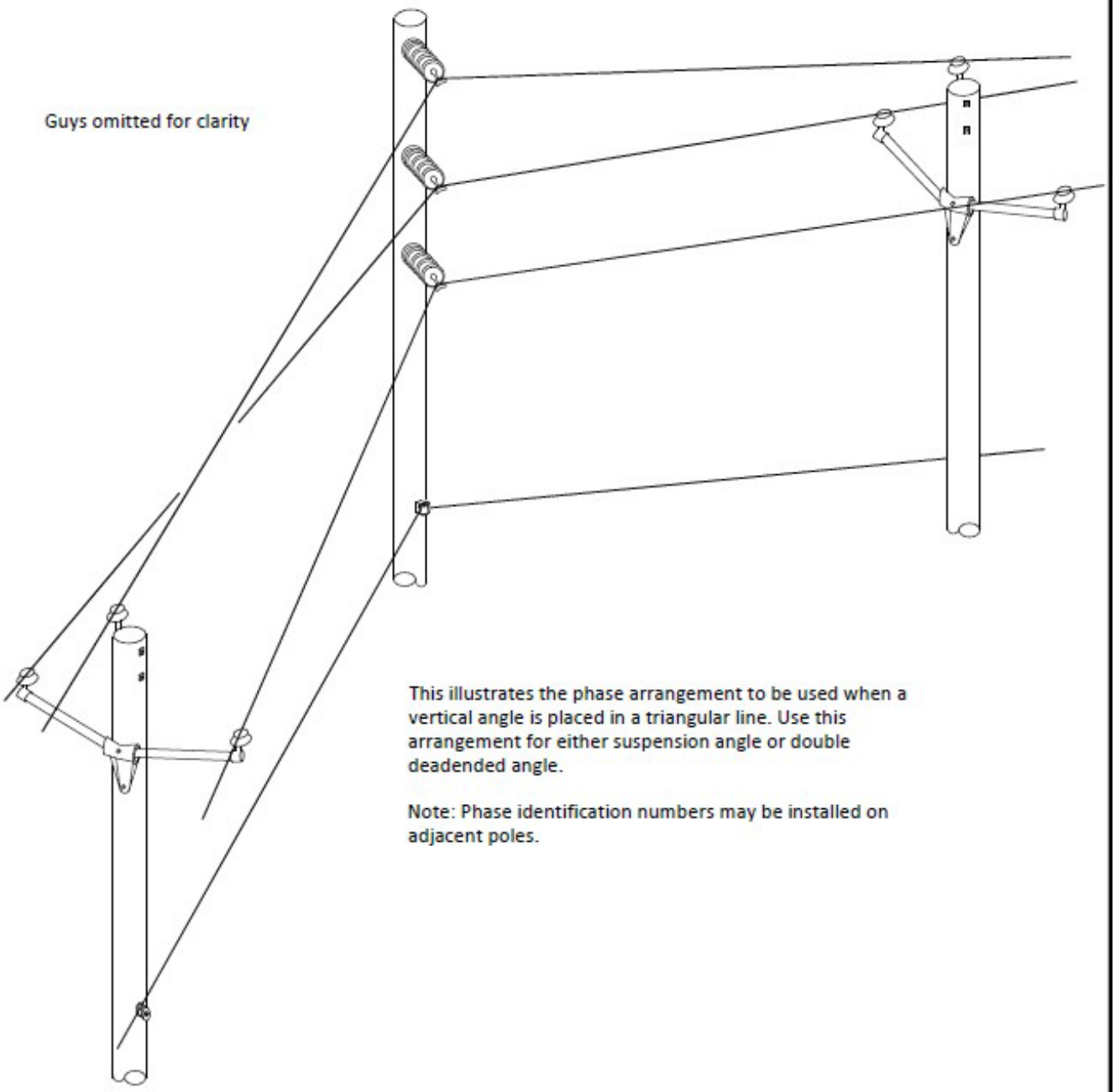
6. Fiberglass guy strain insulators and guy wire shall be installed so that the fiberglass portion of the strain insulator maintains not less than 8 in. from primary conductors and not less than 6 in. from any secondary hot leg.

7. If a guy is attached more than 6 in. above the neutral on a pole with both secondary and communication conductors, and if the guy lead must pass within 12 in. of a secondary hot leg, then a guy strain insulator must be installed so that the bottom metallic end fitting is below and at least 6 in. from the lowest secondary hot leg.

8. When necessary to meet the requirements of Notes 2, 5, 6, and 7, install two or more fiberglass guy strain insulators in series as shown above.

SUBJECT: OVERHEAD DISTRIBUTION			
DETAIL: LINE CONSTRUCTION - GUYING DOWN GUY ASSEMBLY WITH 144" FIBERGLASS STRAIN INSULATORS			
Date: 02-26-99	REVISED: 09-25-00, 01-26-02, 11-01-06	Southern Company	A- SOB32003

SOB-32.003

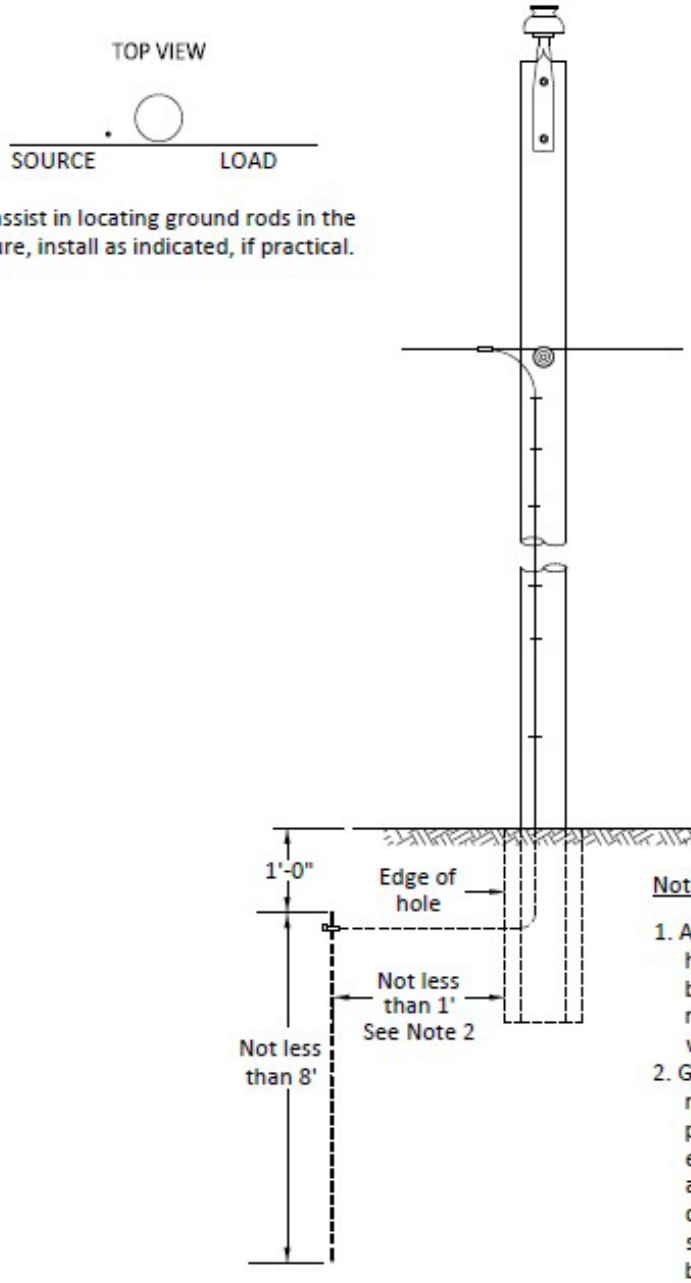


This illustrates the phase arrangement to be used when a vertical angle is placed in a triangular line. Use this arrangement for either suspension angle or double deadended angle.

Note: Phase identification numbers may be installed on adjacent poles.

SUBJECT: OVERHEAD DISTRIBUTION			
DETAIL: LINE CONSTRUCTION - PHASE ARRANGEMENT IN VERTICAL ANGLE			
Date 02-26-99	REVISED 09-25-00	Southern Company	A- SOB35001

SOB-35.001

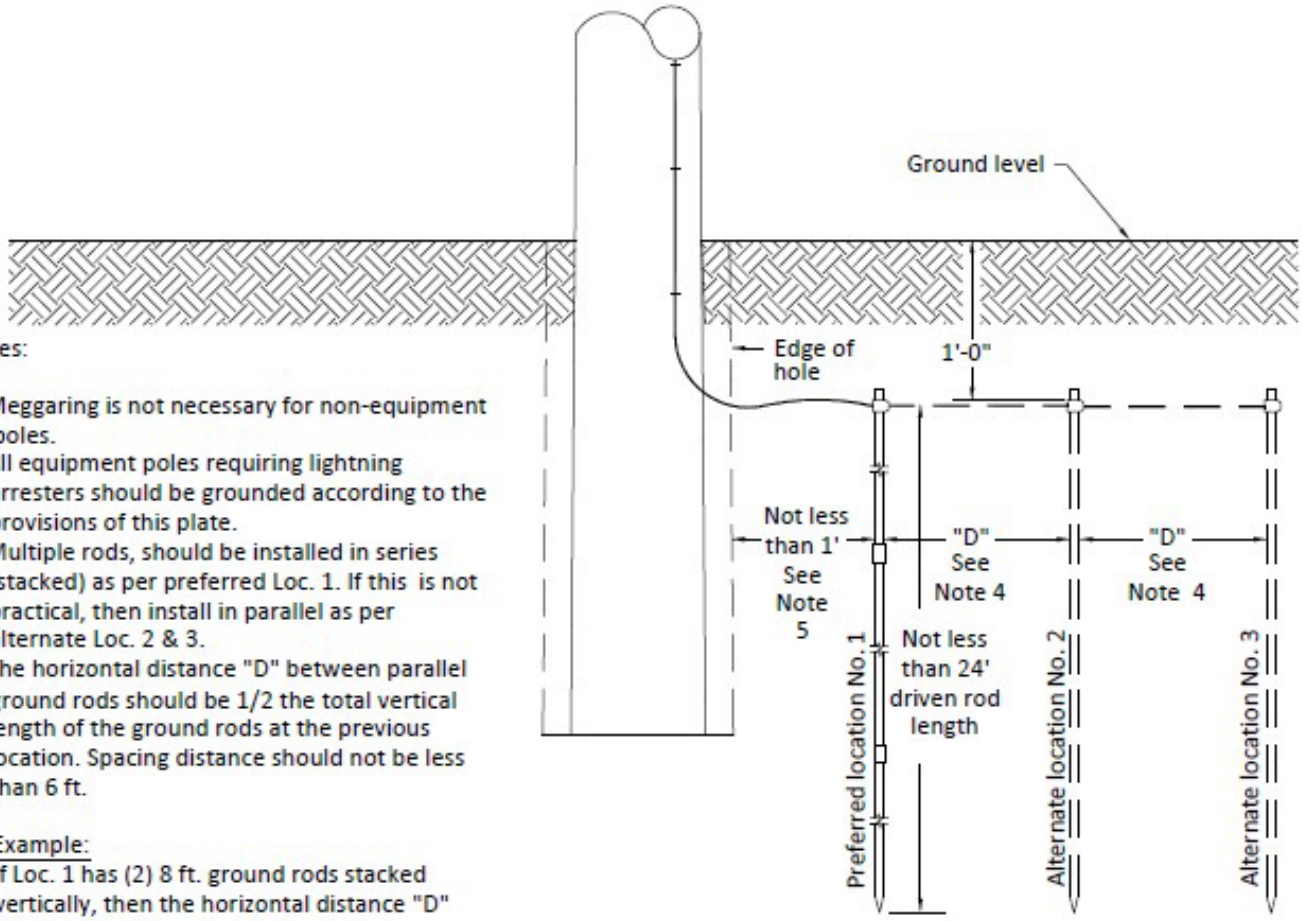


Notes:

1. All poles supporting primary conductors shall have at least one ground rod (total rod length to be not less than 8 ft. in length). Exception: This requirement does not apply to delta circuits which have no neutral conductor attached.
2. Ground rod should be driven in undisturbed soil not less than 1 ft. outside the hole. Where this is physically impractical due to sidewalks, excessive rock, or other obstacles, it is acceptable to install adjacent to the pole, a driven ground consisting of two (2) 8 ft. rods in series. The top of the rod should still be 1 ft. below grade as shown.
3. Ground wire should not be placed under riser shield or conduit.
4. Install ground wire on the side of the pole opposite traffic flow if practical.
5. Ground wire should not be coiled (butt wrapped) around the bottom of the pole.

SUBJECT: OVERHEAD DISTRIBUTION			
DETAIL: LINE CONSTRUCTION - GROUNDING GUIDELINES FOR NON-EQUIPMENT POLES			
Date: 02-26-99	REVISED: 09-25-00, 01-26-02, 11-01-06, 02-01-11, 01-10-12, 08-20-14	Southern Company	A- SOB37001

SOB-37.001



Notes:

1. Meggaring is not necessary for non-equipment poles.
2. All equipment poles requiring lightning arresters should be grounded according to the provisions of this plate.
3. Multiple rods, should be installed in series (stacked) as per preferred Loc. 1. If this is not practical, then install in parallel as per alternate Loc. 2 & 3.
4. The horizontal distance "D" between parallel ground rods should be 1/2 the total vertical length of the ground rods at the previous location. Spacing distance should not be less than 6 ft.

   Example:
   If Loc. 1 has (2) 8 ft. ground rods stacked vertically, then the horizontal distance "D" between Loc. 1 and Loc. 2 should be:

$$\frac{2 \times 8'}{2} = 8'$$

5. Ground rod should be driven in undisturbed soil not less than 1 ft. outside of pole hole. Where this is physically impractical due to sidewalks, excessive rock, or other obstacles, it is acceptable to install adjacent to the pole, a driven ground consisting of the equivalent of three (3) 8 ft. rods in series (if not meggared). If meggaring is used, refer to meggaring guidelines for number of rods required. The top of the rod should still be 1 ft. below grade as shown.
6. Ground wire should not be placed under riser shield or conduit.
7. Install ground wire on side of pole opposite traffic flow if practical.
8. Ground wire should not be coiled (butt wrapped) around the bottom of pole.

Meggaring

If meggaring is required then the following guidelines are recommended:

I. Meggar each ground rod installed until a 25 ohm resistance is achieved, or
II. If after 3 rods are installed and a 25 ohm resistance is still not achieved, then additional rods should be driven until:
   A. The change in resistance reading is less than 10% of the previous reading, or
   B. A maximum of 80 ft. of rod is installed.

Exception:
Different grounding requirements than the above may be utilized to achieve effective grounding as determined by local areas and conditions.

SUBJECT OVERHEAD DISTRIBUTION

DETAIL LINE CONSTRUCTION - GROUNDING GUIDELINES FOR EQUIPMENT POLES

Date 02-26-99	REVISED 09-25-00, 01-26-02, 10-31-07, 02-01-11	Southern Company	A- SOB37002

SOB-37.002

EQUIPMENT GROUNDING

Notes:

1. The pole ground conductor shall be connected directly to the common neutral as illustrated on Plate SOB-37.001.
2. Pole ground conductors shall have at least 2 in. of clearance from all through-bolts, washers, and lag screws.
3. All pole ground conductors to be #6 SD CU unless noted otherwise on a specific plate. #4 Copperweld may be substituted for #6 SD CU in areas prone to copper theft.
4. The following equipment shall be connected directly to the pole ground with a minimum of #6 CU:
   - Transformer tanks
   - Capacitor racks
   - Pole-mounted control cabinets of electronic OCR's, regulators, auto-boosters, etc.
   - Lighting brackets (may also be connected to the common neutral with #6 CU, if no pole ground is available)
   - Metallic U-guards/conduit containing secondary cables (may also be connected to the common neutral with #6 CU, if no pole ground is available)
   - Bare guy wire for secondary pole applications
   - Lightning arresters (Exception: When lightning arresters are grounded to a bracket, the grounding conductor for the bracket must be sized per Note #5 below)
5. Certain supply equipment not included in Note #4 such as recloser tanks, regulator tanks, auto-booster tanks, bare guy wire for primary pole applications, metallic U-guards/conduit containing primary cables, or primary hardware brackets (where specified) shall have a properly sized equipment grounding conductor. The entire equipment grounding conductor path between the equipment and the system neutral shall be sized based on the common neutral (Method A), or sized based on the available fault current (Method B) as per the Table below. If the pole ground is used as a part of the path between the equipment and the system neutral, then that part of the pole ground shall be sized not less than that determined by Method A or Method B.

Note: The lower pole ground conductor that connects the common neutral to the grounding electrode (ground rod) need not be larger than #6 CU, except where shown otherwise on specific plates. However, if a portion of the lower pole ground conductor is part of the equipment grounding conductor circuit path, that portion of the lower pole ground must be sized accordingly.

Methods to Determine Equipment Grounding Conductor Size		Equipment Grounding Conductor Size
Method A Neutral Size Method (ACSR, AAC, or AAAC)	Method B Phase-to-Ground Fault Current Method (Amps)	Line Sections Protected by Substation Devices or Electronic Reclosers
#4	Less than 2,612	#6 CU
#2	Less than 4,154	#4 CU
#1/0	Less than 6,605	#2 CU
#2/0	Less than 10,498	#1/0 CU
#4/0	Less than 13,245	#2/0 CU
336.4 or 397.5	Less than 21,057	#4/0 CU

Table Notes:

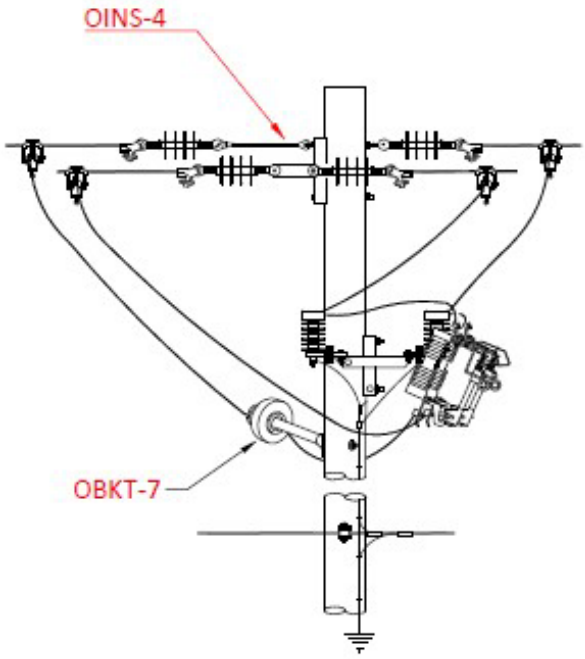
1. For line sections protected by line fuses or hydraulic line OCRs, the minimum size equipment grounding conductor is #6 copper.
2. For line sections having a copper neutral conductor and not meeting Table Note 1, the minimum size equipment grounding conductor is the same size as the neutral conductor.
3. If the specified equipment grounding conductor size is not available, the next larger size may be utilized.
4. For the purposes of this table, line sections under all type sectionalizers should be considered to be protected by the type of upstream device on the source side of the sectionalizer.
5. Fault currents are based on the assumption of 40° C initial temperature, 100° C final temperature, and a two second fault duration.

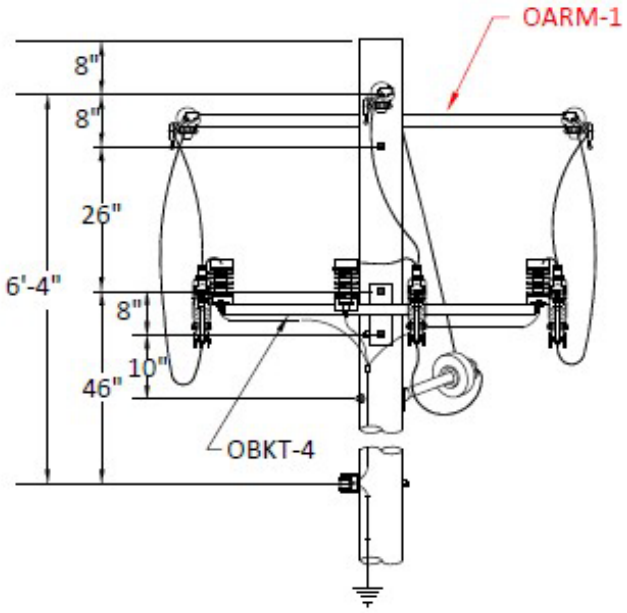
SUBJECT OVERHEAD DISTRIBUTION

DETAIL LINE CONSTRUCTION - EQUIPMENT GROUNDING

Date	REVISED	Southern Company	A- SOB37003
09-25-00	01-26-02, 11-01-06, 09-29-09, 10-16-12 12-12-13, 7-5-17		

SOB-37.003





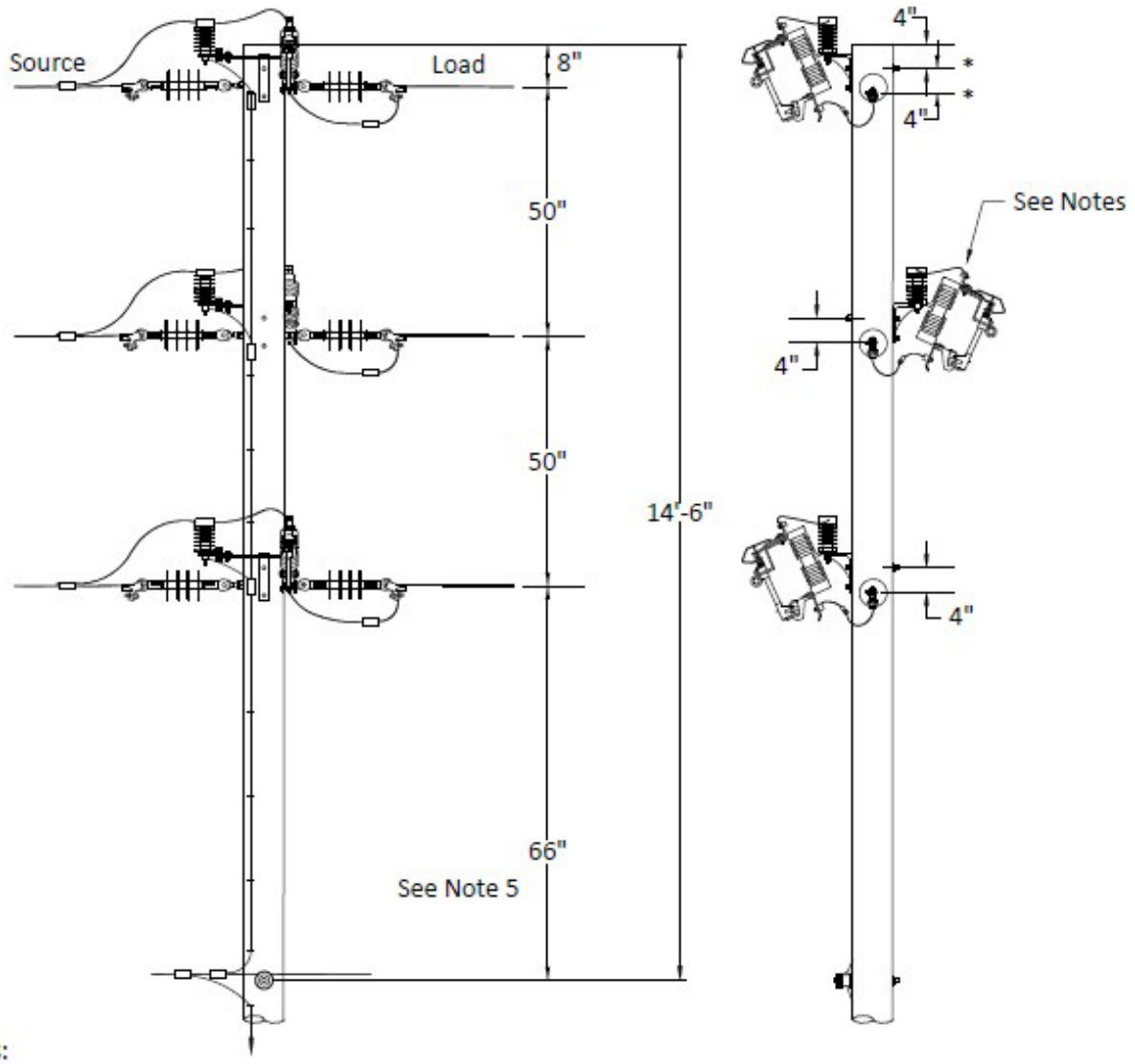
Notes:

1. The drawing shows provisions for installing arresters. The number of arresters to be used, if any, shall be specified by engineering.
2. If normal open point, remove fuse barrel and store in upright position on pole.
3. Transformers and U.D. terminations should not be installed on these poles.

SUBJECT	OVERHEAD DISTRIBUTION
DETAIL	SECTIONALIZING - THREE PHASE IN LINE CUTOUTS

Date 02/26/99	REVISED 09-25-00, 11-01-06, 11-13-18	Southern Company	A- SOD05001

SOD-05.001



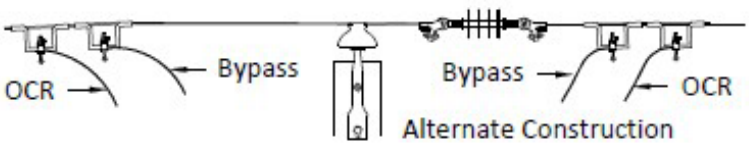
Notes:

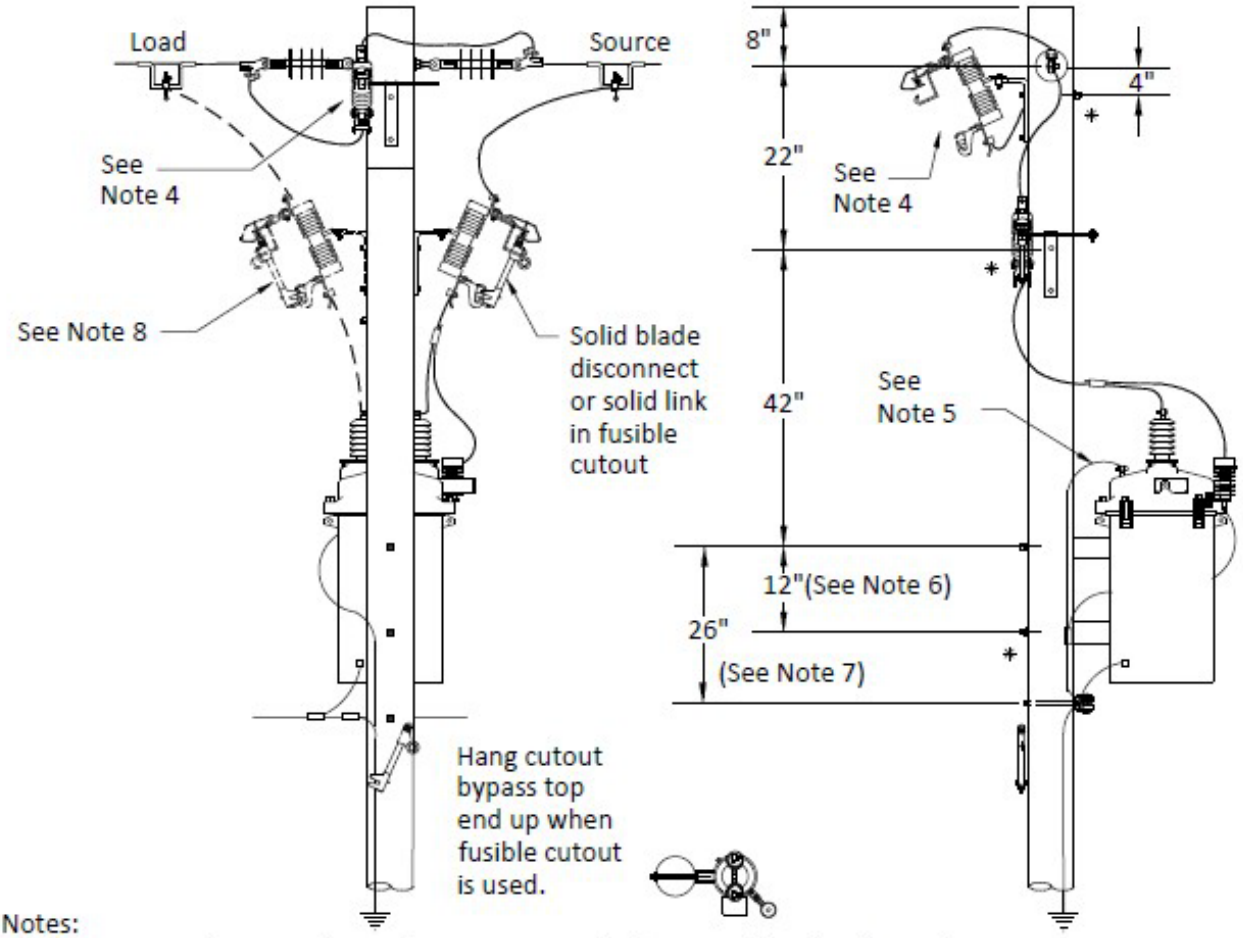
1. Use insulators of appropriate class for the required voltage.
2. The drawing shows provisions for installing arresters. The number of arresters to be used, if any, shall be specified by Engineering.
3. If normal open point, remove fuse barrel and store in the upright position on the pole.
4. Transformer and U.D. terminations should not be installed on these poles.
5. If arresters are not used, the center T-bracket can be rotated to the same side of the pole as other brackets. In this position, the cutouts must be staggered to prevent cutouts from discharging on each other and the 66 in. dimension may be reduced to 40 in.

*Denotes pre-drilled holes

SUBJECT: OVERHEAD DISTRIBUTION			
DETAIL: SECTIONALIZING - VERTICAL THREE PHASE LINE IN LINE FUSES			
Date 02/26/99	REVISED 09-25-00, 01-26-02, 11-01-06	Southern Company	A- SOD08001

SOD-08.001





Notes:

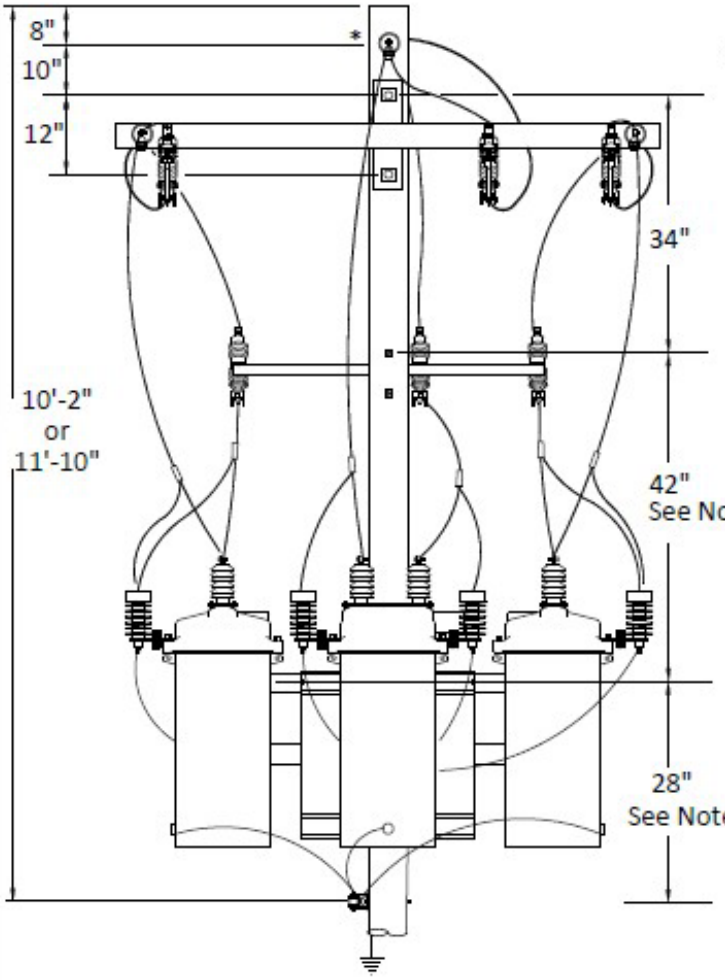
1. OCR cover can be rotated in 90° steps to orient bushings and hood in desired position.
2. Use wildlife guards and covered jumper wire in areas where wildlife is expected.
3. Use this construction where bypassing ability is desired.
4. Leave bypass out of cutout and hang with top side up on the pole when fusible cutout is used on bypass.
5. Ground recloser lid when grounding terminal is provided. Ground recloser tanks and arresters as per Plate SOB-37.003.
6. For type "D" reclosers, this dimension is 11-1/4 in. For type "DV" reclosers, this dimension is 23-1/4 in.
7. This dimension should be increased to 36 in for types V4L, D, DV, E, 4E, and V4E reclosers.
8. Install load side cutout or disconnect where deemed necessary.

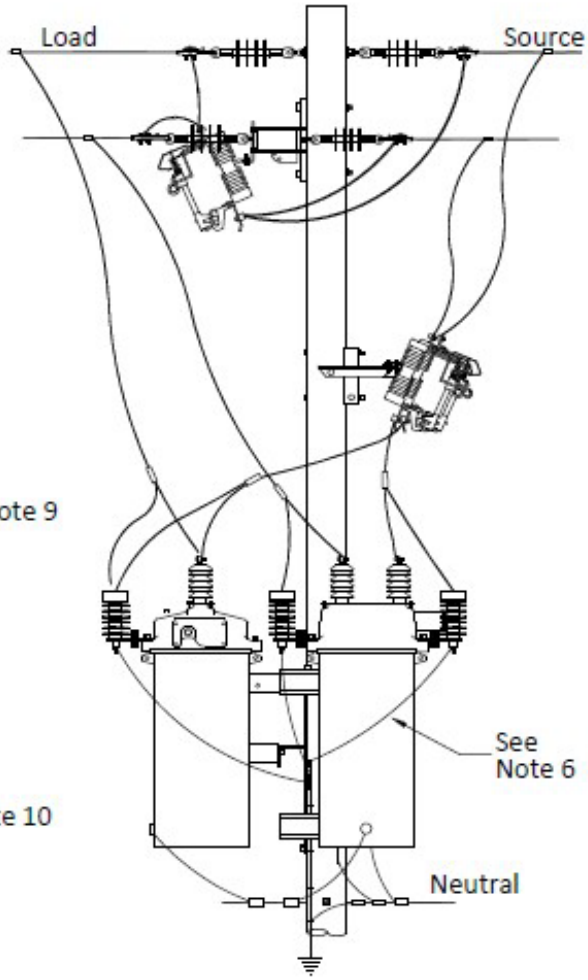
* - Denotes use of pre-drilled holes

SUBJECT	OVERHEAD DISTRIBUTION
DETAIL	SECTIONALIZING - HYDRAULIC OIL CIRCUIT RECLOSER
	LESS THAN 300 AMP CONSTRUCTION - (WITH BYPASS) - SINGLE PHASE INSTALLATION

Date 02-26-99	REVISED 09-25-00, 01-26-02, 11-01-06	Southern Company	A- SOD18001

SOD-18.001





Notes:

1. Type D & DV recloser: Release cover and rotate tank cover so that source-side bushings are connected to source cutouts as shown above.
2. For two recloser installation, omit center recloser, cutouts, and lightning arresters.
3. Install load/source side arresters on reclosers.
4. Type D & DV recloser only: The grounding lug on tank covers shall be connected to the system neutral.
5. Utilize wildlife protection.
6. This drawing shows arresters being grounded to the pole ground. Arresters may also be grounded directly to recloser tank.
7. Dead-end arm shown is a 4"x6"x96" fiberglass dead-end arm. Refer to SOB-09.501 and SOD-05.701 for arm details.
8. See Company Specific Plates for location of switch number, fuse size and type, (where applicable).
9. This distance may be increased to 54" if installed with type D or DV recloser.
10. This distance may be increased to 36" if installed with type D or DV recloser.

SUBJECT	OVERHEAD DISTRIBUTION
DETAIL	SECTIONALIZING - 3 SINGLE PHASE HYDRAULIC RECLOSERS
	COOPER TYPES H, 4H, V4H, V4L, L, E, 4E, V4E, D AND DV SERIES - WITH CUTOUT BYPASS SWITCHES

Date 09-25-00	REVISED 01-26-02, 11-01-06, 12-30-11	Southern Company	A- SOD21501

SOD-21.501

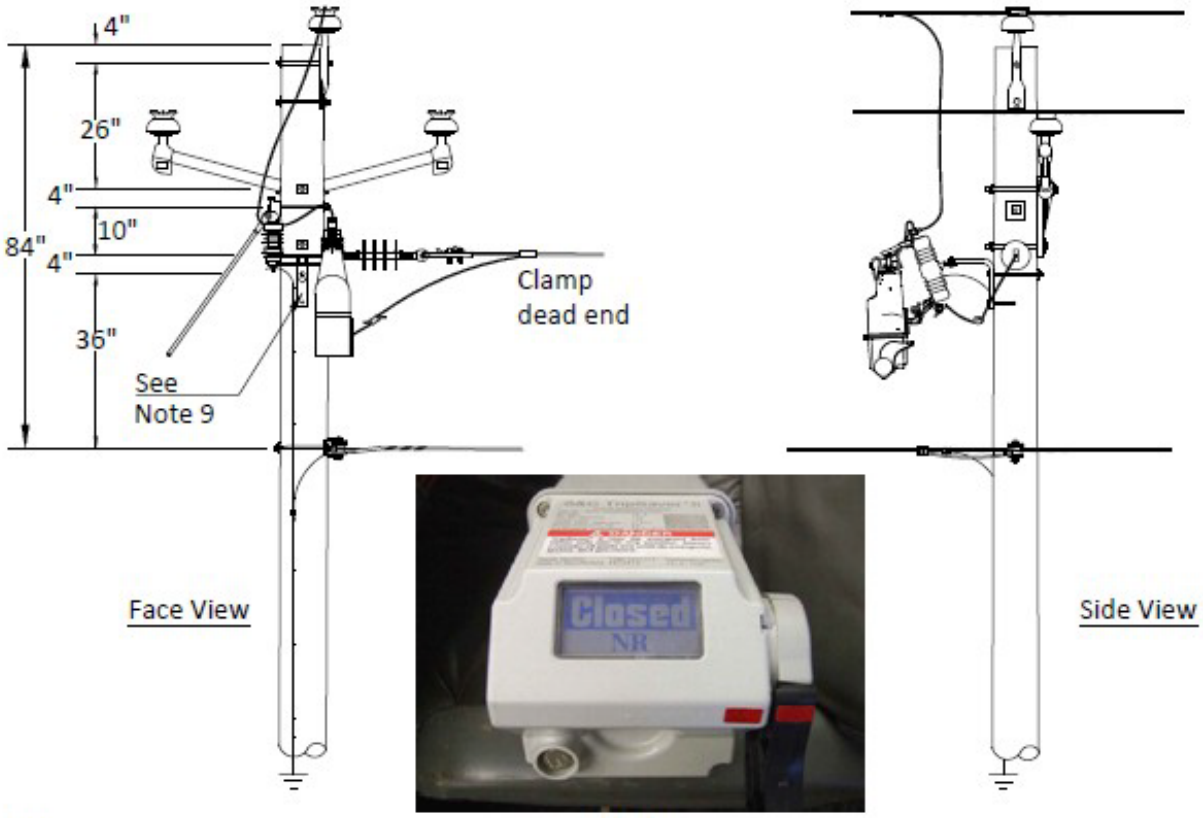


Fig 1

Notes:

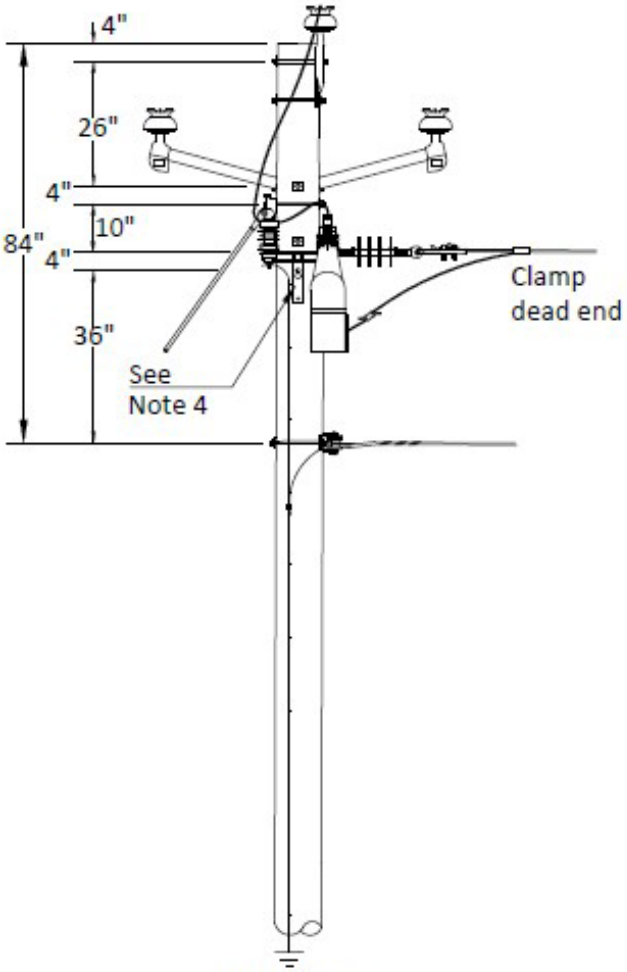
1. Maximum continuous current - 100 amps. Maximum interruption rating of 6,300 A.
2. The cutout furnished with the TripSaver is to be used with the TripSaver. Failure to use this cutout will void the manufacturer's operational warranty.
3. To obtain clearance, open the TripSaver to establish an air gap, but do not remove from the cutout body.
4. The TripSaver will close the internal vacuum bottle as it opens, so manual re-cocking is not required.
5. All TripSavers must be programmed before installation.
6. The internal vacuum interrupter cannot be manually operated.
7. Refer to Plate SOD-29.301 for TripSaver Maximo numbers.
8. If TripSaver is equipped with LO-BRK feature, then use of Load Buster tool is not required, otherwise it is recommended to use the Load Buster tool when opening the TripSaver. The TripSaver label designating loadbreak capability is shown in Figure 2.

Fig. 2

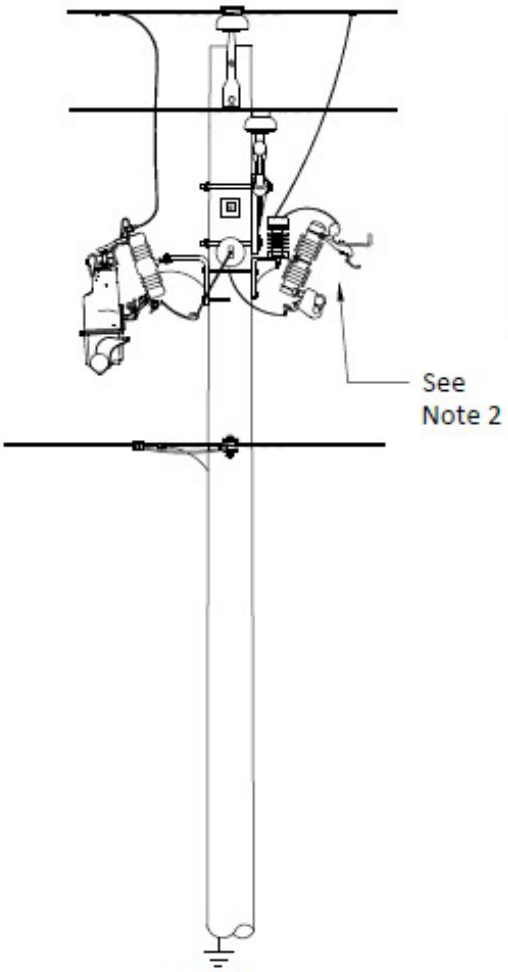
SUBJECT	OVERHEAD DISTRIBUTION
DETAIL	SECTIONALIZING - SINGLE PHASE S&C 100A 15KV & 25KV TRIPSAVER CUTOUT-MOUNTED RECLOSER (TAP CONSTRUCTION)

Date 04-10-15	REVISED 08-08-16, 05-28-19, 07-29-19, 10-14-19	Southern Company	A- SOD29101

SOD-29.101



Face View



Side View

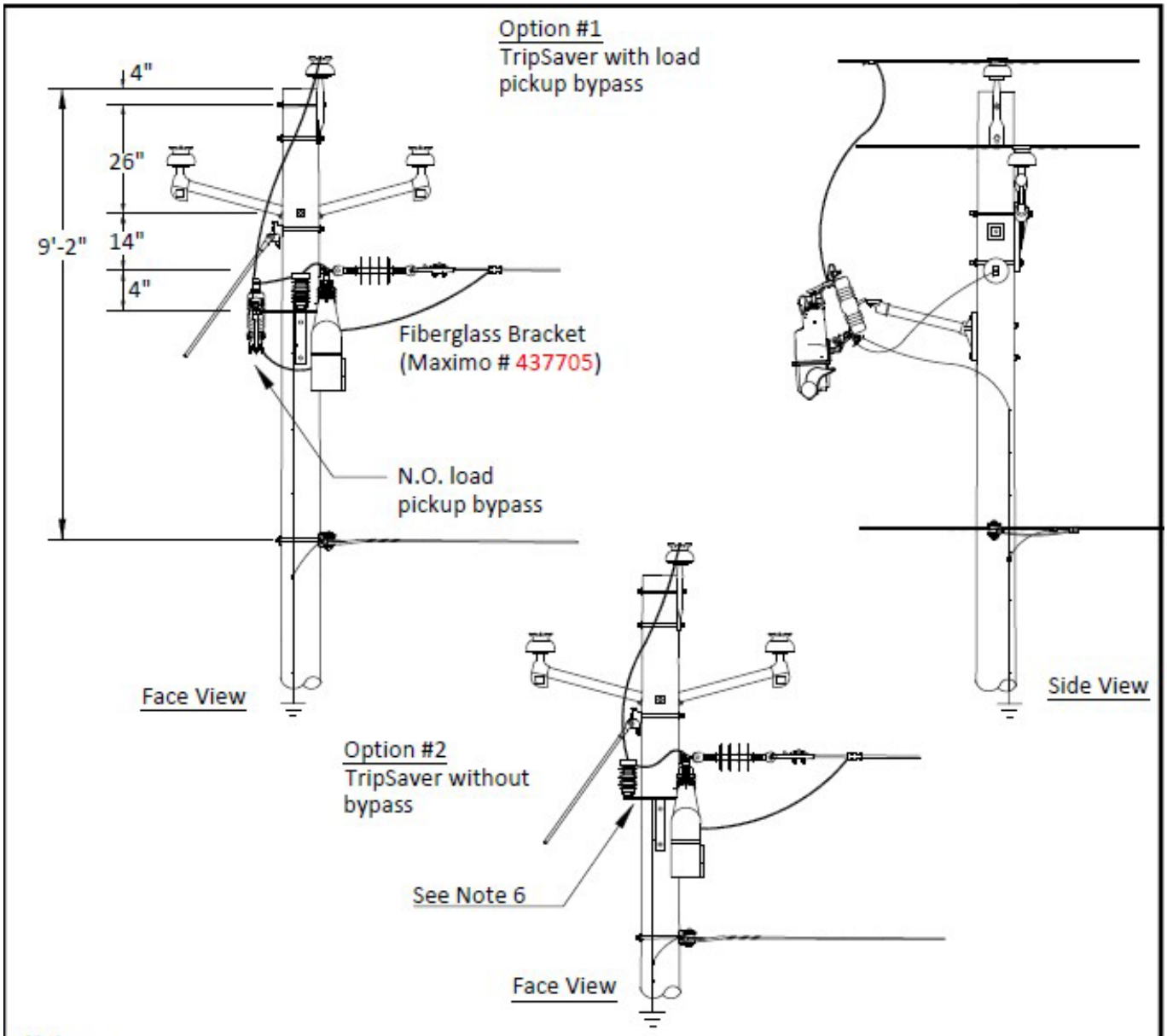
Notes:

1. Install appropriate fuse in bypass switch.
2. Leave barrel out of bypass switch and hang barrel with top side up on the pole when fusible cutout is used as the bypass switch.
3. To obtain clearance, open the TripSaver but do not remove from the cutout body and verify bypass switch is open.
4. Refer to Plate SOD-29.101 for additional notes, as applicable.

SUBJECT	OVERHEAD DISTRIBUTION
DETAIL	SECTIONALIZING - SINGLE PHASE S&C 100A 15KV & 25KV TRIPSAVER CUTOUT-MOUNTED RECLOSER WITH BYPASS (ALTERNATE TAP CONSTRUCTION)

Date 08-08-16	REVISED 10-14-19	Southern Company	A- SOD29102

SOD-29.102



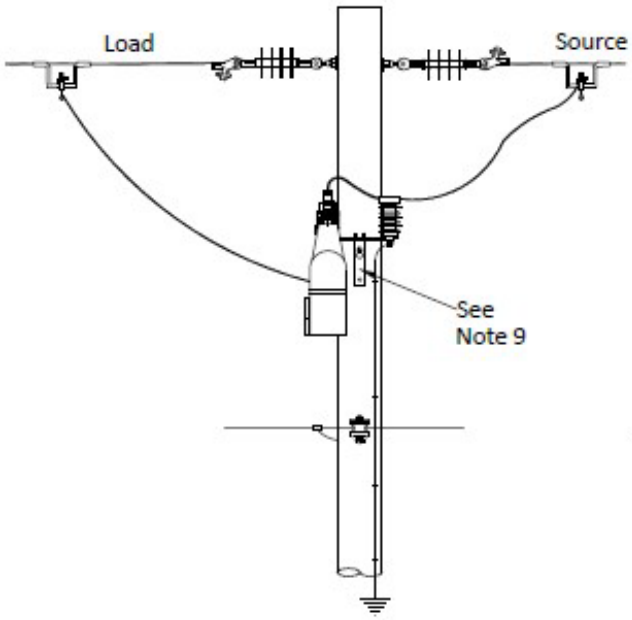
Notes:

1. Load pickup bypass switch is to be used when picking up load at the TripSaver site. Once closed, then the TripSaver can be closed and the bypass opened (do not remove barrel).
2. The cutout furnished with the TripSaver must be used with TripSaver. Failure to use will void manufacturer's warranty.
3. All TripSavers must be programmed before installation.
4. Refer to Plate SOD-29.301 for TripSaver Maximo numbers.
5. If using Option #2, install sectionalizing bracket (Maximo #3770) for arrester and TripSaver.

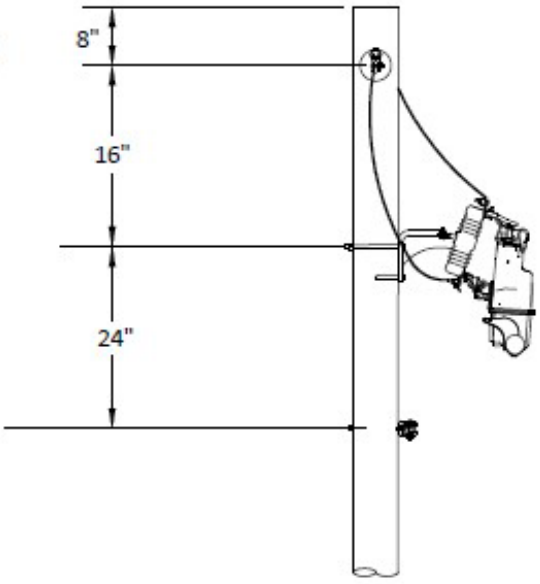
SUBJECT	OVERHEAD DISTRIBUTION
DETAIL	SECTIONLIZING - SINGLE PHASE S&C 100A 15KV & 25KV TRIPSAVER CUTOUT-MOUNTED RECLOSER (ALTERNATE TAP CONSTRUCTION)

Date 05-28-19	REVISED 10-14-19	Southern Company	A- SOD29103

SOD-29.103



Side View



Face View

Fig 1

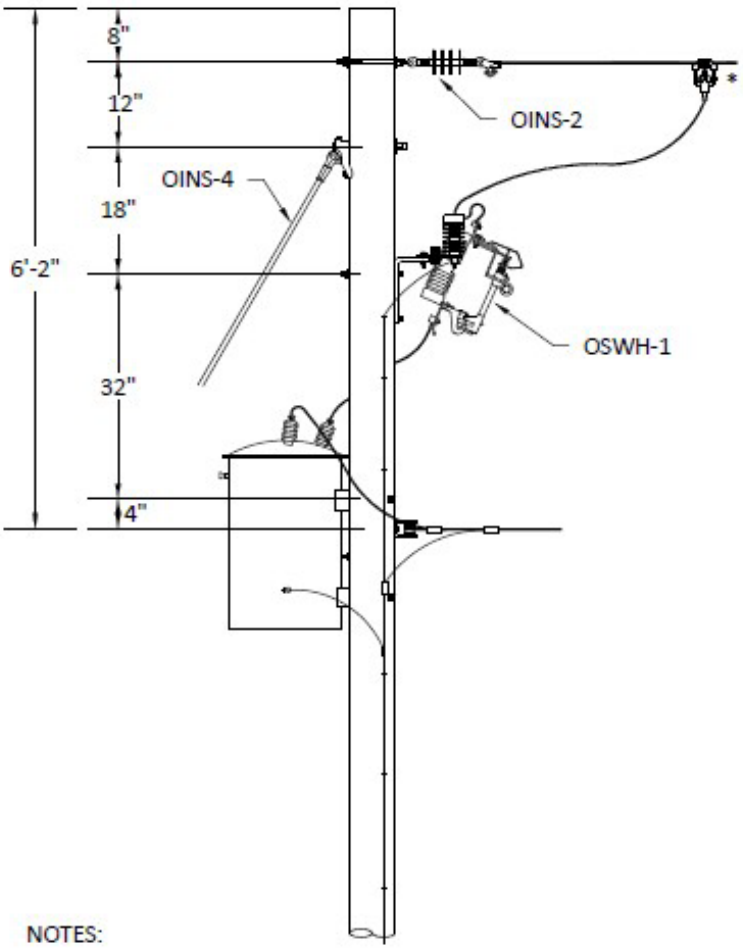
Notes:

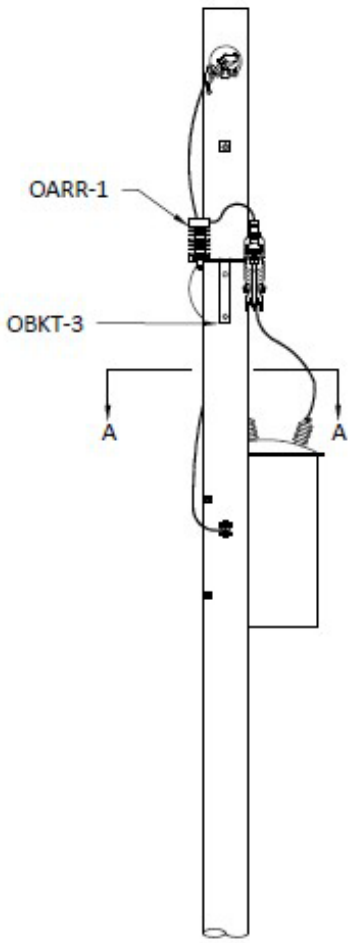
1. Maximum continuous current - 100 amps. Maximum interruption rating of 6,300 A.
2. The cutout furnished with the TripSaver is to be used with the TripSaver. Failure to use this cutout will void the manufacturer's operational warranty.
3. To obtain clearance, open the TripSaver to establish an air gap, but do not remove from the cutout body.
4. The TripSaver will close the internal vacuum bottle as it opens, so manual re-cocking is not required.
5. All TripSavers must be programmed before installation.
6. The internal vacuum interrupter cannot be manually operated.
7. Refer to Plate SOD-29.301 for TripSaver Maximo numbers.

SUBJECT	OVERHEAD DISTRIBUTION
DETAIL	SECTIONALIZING - SINGLE PHASE S&C 100A 15KV & 25KV TRIPSAVER CUTOUT-MOUNTED RECLOSER (IN-LINE CONSTRUCTION)

Date 08-08-16	REVISED 07-29-19, 10-14-19	Southern Company	A- SOD29201

SOD-29.201

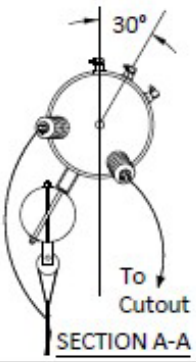




NOTES:

1. Connect transformer secondary neutral lead to system neutral and leave approximately 12 in. tail for service neutral connections.
2. Install a wildlife protector on the primary bushing that is connected to the primary conductor and install covered primary lead wire.
3. Avoid placing cutout directly above transformer.
4. If secondary is to extend in line, extend primary wire if practical to eliminate conflict between secondary and anchor guy.

* Other approved Company Specific methods, such as installing directly on primary conductor, may be used.



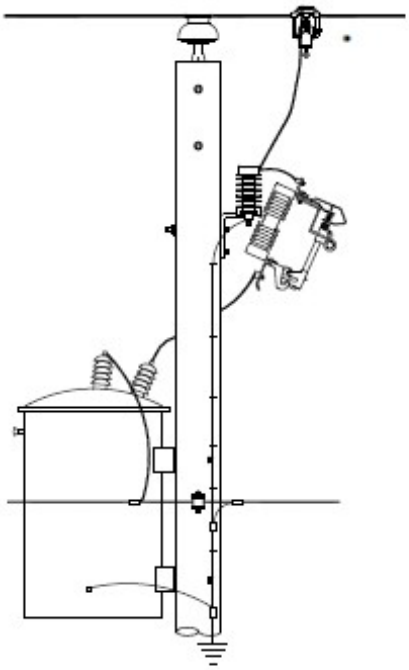
SECTION A-A

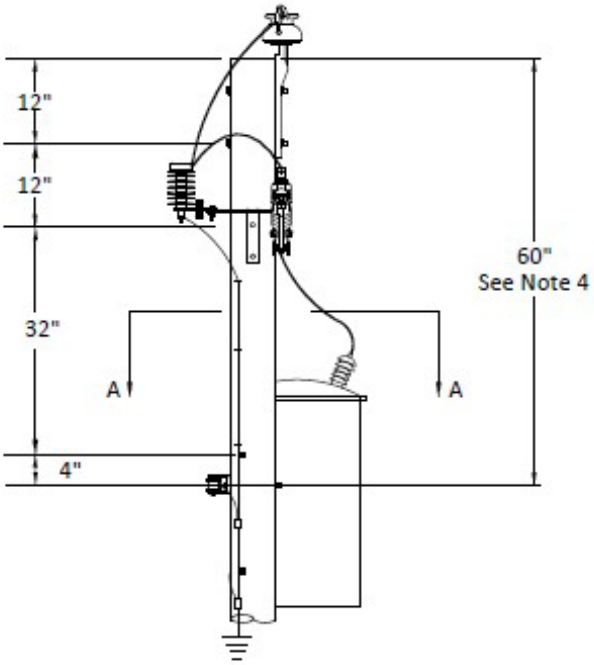
SUBJECT OVERHEAD DISTRIBUTION

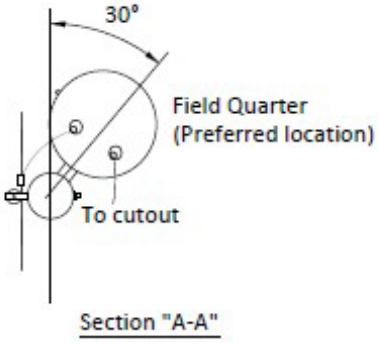
DETAIL TRANSFORMERS - SINGLE TRANSFORMER INSTALLATION - DEAD END POLE

Date	REVISED		
02-26-99	09-25-00, 11-01-06	Southern Company	A- SOE02001

SOE-02.001







Notes:

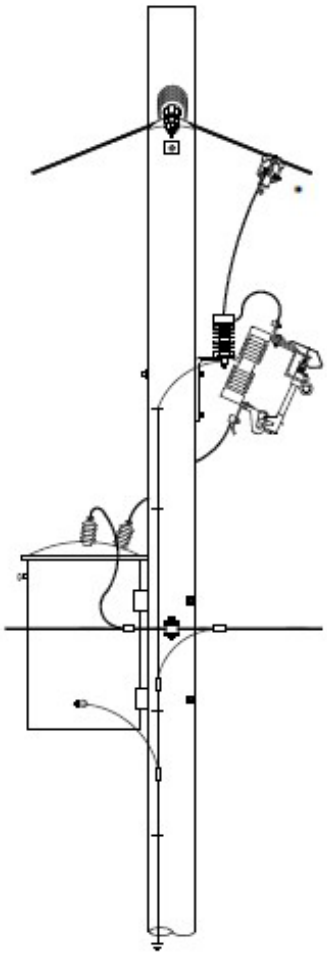
1. Connect transformer secondary neutral lead to system neutral and leave approximately 12 in. tail for service neutral connections.
2. Install a wildlife protector on the primary bushing that is connected to the primary conductor and install covered primary lead wire.
3. Avoid placing cutout directly above transformer.
4. This spacing should be increased to 84 in. if three (3) phase is anticipated. See Plate SOE-03.801.

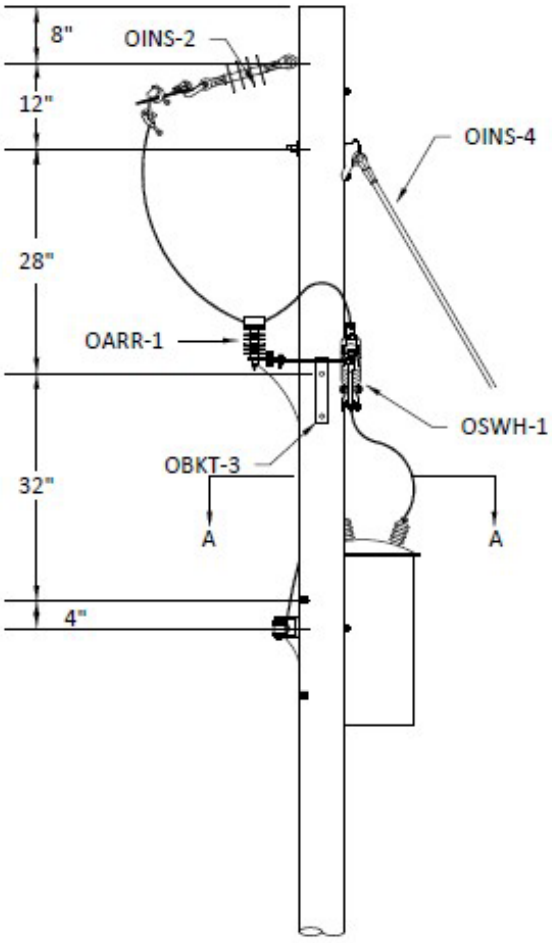
* Other approved Company Specific methods, such as installing directly on the primary conductor, may be used.

SUBJECT	OVERHEAD DISTRIBUTION
DETAIL	TRANSFORMERS - SINGLE TRANSFORMER INSTALLATION - SINGLE PHASE TANGENT POLE

Date 02-26-99	REVISED 09-25-00, 11-01-06	Southern Company	A- SOE03001

SOE-03.001





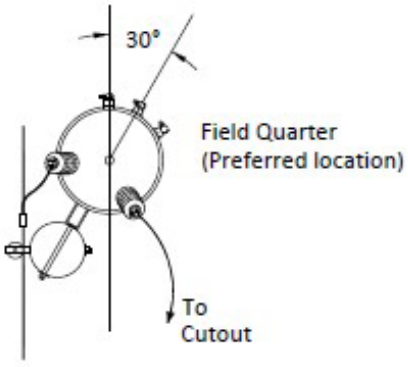
NOTES:

1. Connect transformer secondary neutral lead to system neutral and leave approximately 12 in. tail for service neutral connections.

2. Install a wildlife protector on the primary bushing that is connected to the primary conductor and install covered primary lead wire.

3. Avoid placing cutout directly above transformers.

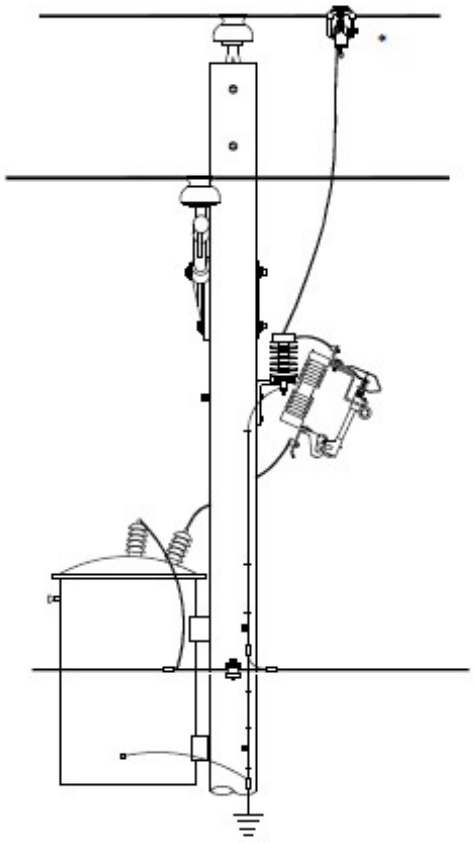
* Other approved Company Specific methods, such as installing directly on the primary conductor, may be used.

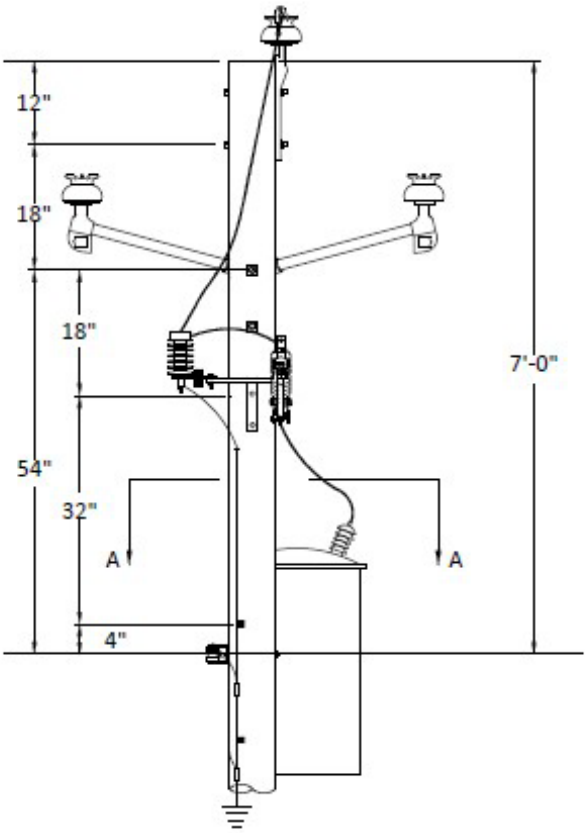


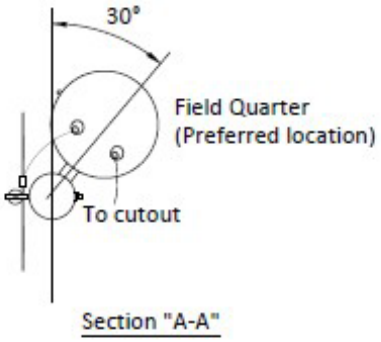
SECTION "A-A"

SUBJECT: OVERHEAD DISTRIBUTION			
DETAIL: TRANSFORMERS - SINGLE TRANSFORMER INSTALLATION - SUSPENSION POLE			
Date: 09-25-00	REVISED: 01-26-02, 11-01-06	Southern Company	A- SOE03501

SOE-03.501







Section "A-A"

Notes:

1. Connect transformer secondary neutral lead to system neutral and leave approximately 12 in. tail for service neutral connections.
2. Install a wildlife protector on the primary bushing that is connected to the primary conductor and install covered primary lead wire.
3. Avoid placing cutout directly above transformer. When practical, place T-bracket on opposite side of pole from primary bracket.

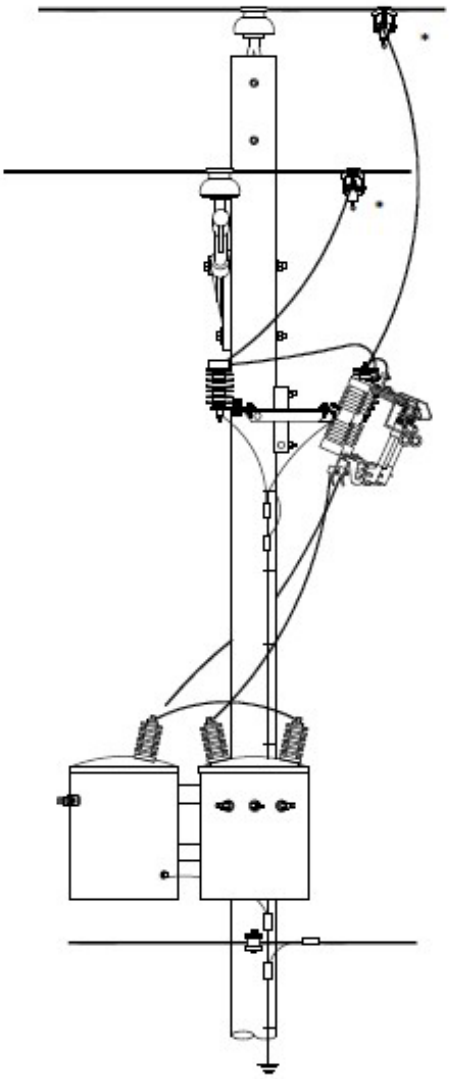
* Other approved Company Specific methods, such as installing directly on the primary conductor, may be used.

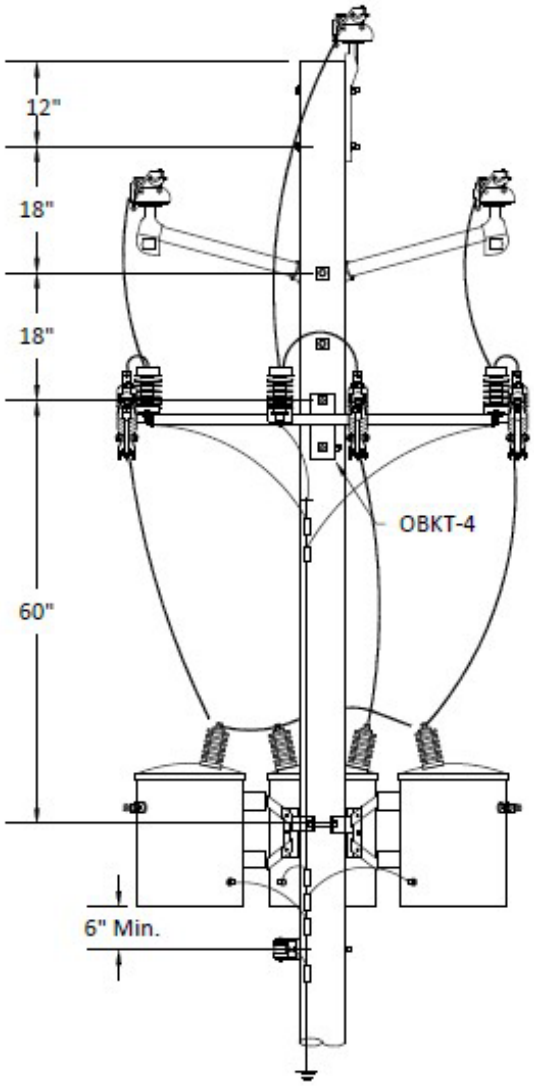
SUBJECT OVERHEAD DISTRIBUTION

DETAIL TRANSFORMERS - SINGLE TRANSFORMER INSTALLATION - THREE PHASE HORIZONTAL TANGENT POLE

Date 09-25-00	REVISED 11-01-06	Southern Company	A- SOE03801

SOE-03.801





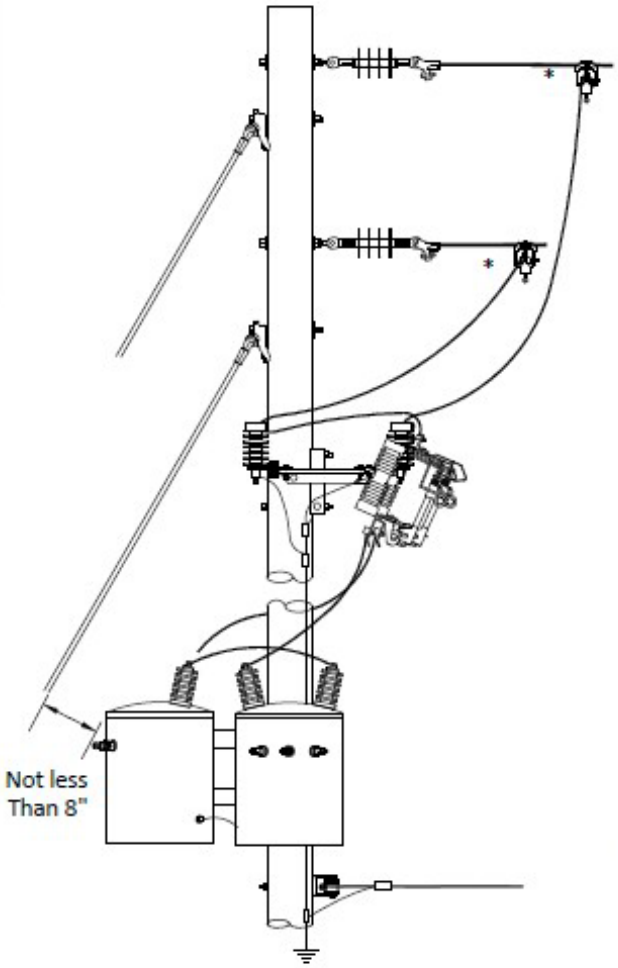
NOTES:

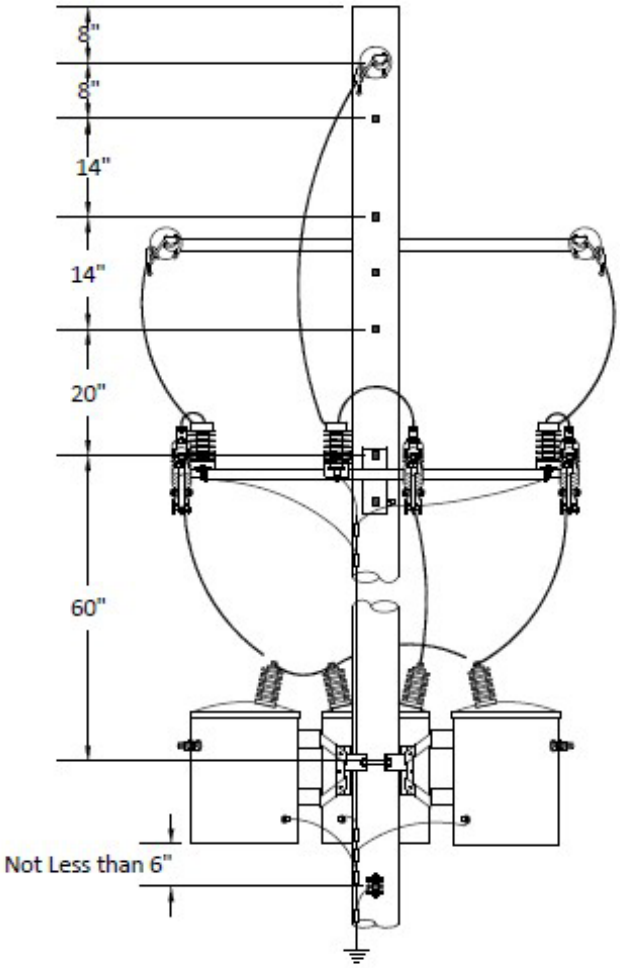
1. Install a wildlife protector on the primary bushing that is connected to the primary conductor and install covered primary lead wire.

* Other approved Company Specific methods, such as installing directly on the primary conductor may be used.

SUBJECT: OVERHEAD DISTRIBUTION			
DETAIL: TRANSFORMERS - THREE PHASE TRANSFORMER BANK - HORIZONTAL TANGENT POLE			
Date: 02-26-99	REVISED: 09-25-00, 11-01-06	Southern Company	A- SOE07001

SOE-07.001





NOTES:

1. On closed wye-delta banks, do not connect bank primary neutral to system neutral or pole ground.
2. Install a wildlife protector on the primary bushing that is connected to the primary conductor and install covered primary lead wire.
3. Transformers may be rotated to clear guys.
4. The middle phase conductor may be installed at the top bolt of the crossarm if pole space is limited.
5. Position of outside phase cutout and arrester may be swapped.
6. Install neutral guy (if needed) at 12 in. below the neutral.

* Other approved Company Specific methods, such as installing directly on the primary conductor, may be used.

SUBJECT	OVERHEAD DISTRIBUTION
DETAIL	TRANSFORMERS - THREE PHASE TRANSFORMER BANK - HORIZONTAL DEAD END POLE

Date 02-26-99	REVISED 09-25-00, 01-26-02, 11-01-06, 08-03-10	Southern Company	A- SOE09001

SOE-09.001

PRIMARY LEAD CHART

Primary Leads		
Size of single phase transformer (kVA)	Phase - neutral voltage 2.4 kV	Phase - neutral voltage 7.2 kV and above
500	# 2/0 Cu	# 6 Cu *
333	# 2/0 Cu	# 6 Cu *
250	# 2 Cu	# 6 Cu *
167	# 2 Cu	# 6 Cu *
100 and smaller	# 6 Cu *	# 6 Cu *

* #4 Cu may be substituted if #6 Cu is not available.

SUBJECT OVERHEAD DISTRIBUTION

DETAIL TRANSFORMERS - PRIMARY LEAD CHART

Date 02-26-99 | REVISED 09-25-00, 11-01-06 | Southern Company | A- SOE10001

SOE-10.001

SECONDARY LEAD CHARTS

Alabama Power Company					
Transformer Size (kVA)	Secondary Voltage				
	120/240	120/208 Y	480 Delta	277/480 Y	120/240 Delta
10	#2 Cu	#2 Cu	#2 Cu	#2 Cu	#2 Cu
15	#2 Cu	#4/0 Al #2/0 Cu	#2 Cu	#2 Cu	#2 Cu
25	#2 Cu	#4/0 Al #2/0 Cu	#2 Cu	#2 Cu	#4/0 Al #2/0 Cu
37.5	#4/0 Al #2/0 Cu	#4/0 Al	#2 Cu	#2 Cu	#4/0 Al
50	#4/0 Al	#500 Al	#4/0 Al #2/0 Cu	#4/0 Al #2/0 Cu	#500 Al
75	#4/0 Al	#1000 Al	#4/0 Al	#4/0 Al	#500 Al
100	#500 Al	#1000 Al	#500 Al	#500 Al	#1000 Al
167	#1000 Al	(2) #1000 Al	#1000 Al	#1000 Al	(2) #1000 Al
250	(2) #1000 Al	*	(2) #500 Al	(2) #500 Al	(3) #1000 Al
333	*	*	(2) #1000 Al	(2) #1000 Al	*
500	*	*	(3) #1000 Al	(3) #1000 Al	*

Georgia Power Company					
Transformer Size (kVA)	Secondary Voltage				
	120/240	120/208 Y	480 Delta	277/480 Y	120/240 Delta
10	#1/0 Cu	#1/0 Cu	#1/0 Al #1/0 Cu	#1/0 Al #1/0 Cu	#1/0 Al #1/0 Cu
15	#1/0 Cu	#4/0 Al #1/0 Cu	#1/0 Al #1/0 Cu	#1/0 Al #1/0 Cu	#1/0 Al #1/0 Cu
25	#1/0 Cu	#4/0 Al #1/0 Cu	#1/0 Al #1/0 Cu	#1/0 Al #1/0 Cu	#1/0 Al #1/0 Cu
37.5	#1/0 Cu	#350 Al #4/0 Cu	#1/0 Al #1/0 Cu	#1/0 Al #1/0 Cu	#4/0 Al #1/0 Cu
50	#4/0 Cu	#350 Al #4/0 Cu	#4/0 Al #1/0 Cu	#4/0 Al #1/0 Cu	#350 Al #4/0 Cu
75	#4/0 Cu	#750 Al	#4/0 Al #1/0 Cu	#4/0 Al #1/0 Cu	#750 Al
100	#750 AAC	#750 Al	#350 Al #4/0 Cu	#350 Al #4/0 Cu	#750 Al
167	(2) #750 AAC	(2) #750 Al	#750 Al	#750 Al	(2) #750 Al
250	(2) #750 AAC	*	(2) #350 Al	(2) #350 Al	(2) #750 Al
333	*	*	(2) #750 Al	(2) #750 Al	*
500	*	*	*	*	*

* Leads should be sized case by case. Most transformers 75 KVA and larger have spade terminals for paralleling conductors.

NOTE (Applies to all Companies):
For wye connected secondary, the conductor connecting the three neutral bushings shall be the same ampacity as the phase conductors.

SUBJECT OVERHEAD DISTRIBUTION

DETAIL TRANSFORMERS - SECONDARY LEAD CHARTS

Date 02-26-99 | REVISED 09-25-00, 11-01-06 | Southern Company | A- SOE11001

SOE-11.001

CLUSTER MOUNTS

Band-Type and Wing-Type Cluster Mount Loading Information					
Transformer Size	Cluster Mount	Bolt Size Required to Mount Wing Cluster to Pole* (in.)	Distance from Transformer (in.)**	Max. Recommended Transformer Load (lbs.) per Position	
				Band	Wing
3kVA - 37.5kVA	Small (Maximo #434615)	3/4	18 22	1000 820	1000 820
50kVA - 75kVA	Medium (Maximo #434616)	3/4	18 22	2500 2000	2000 1640
100kVA - 167kVA	Jumbo (Maximo #432343)	Wing Cluster not Available in Jumbo Size	14 18 22 26	5000 3900 3200 2700	NA

*Bolts to mount transformers to cluster are provided with both band and wing type clusters.
**This distance is measured from the center of the transformer to the outer edge of the transformer support lug (hanger bracket).

Notes for Cluster Mounts:

1. Adapter plates are available for mounting older transformers that have EEI-NEMA Type "C" hangers. Two plates are required for each installation.
2. 250kVA and larger transformer banks should be platform mounted.
3. The lifting eye of cluster mount brackets shall not be used for lifting purposes with transformers and regulators attached.
4. Small and medium band-type cluster mount brackets are no longer purchased.

Pole Range for Band-Type Cluster Mounts			
Cluster Mounts	Pole Diameter Range (in.)	Maximum Pole Diameter with Extension Plates (in.)	Number of Extension Plates Required
Small	6-1/2" - 11-1/2"	16-1/2	1
Standard	7-3/4" - 12-1/4"	17-1/2	2
Jumbo	9-1/2" - 14"	19	3

Notes For Band-Type Clusters:

1. If extension plates and/or an expansion kit are installed the above ratings still apply.
2. The proper installation of a cluster mount bracket requires the following process: First, evenly tighten nuts of the double arming bolt applying enough pressure to the aluminum ears to make the cluster self-supporting. Second, the nuts should then be tightened to a point that there is a noticeable deflection in the aluminum ears, a deflection of not less than 1/2 in. for each aluminum ear is necessary.
3. The jumbo cluster mount comes assembled for installation of transformer with 24 in. hanger spacing on the center and bottom mount. To install transformers with 36 in. hanger spacing, locate middle mount of cluster to the top position. Remember, all 24 in. hanger spaced transformers must use the center and lower mount positions.
4. It is acceptable to install a 1/2 in. lag screw or 1/2 in. through-bolt in the top slot of the center transformer bracket on all cluster bands. This one point attachment still allows the bands to be tightened normally around the pole and can limit slippage under conditions of excessive pole shrinkage.

SUBJECT OVERHEAD DISTRIBUTION

DETAIL TRANSFORMERS - CLUSTER MOUNTS

Date 01-26-02 | REVISED 01-26-02, 11-01-06, 05-06-09, 12-30-11 07-29-15 | Southern Company | A- SOE13001

SOE-13.001

PRIMARY FUSE TABLE FOR SINGLE PHASE TRANSFORMERS AND
OPEN WYE - OPEN DELTA, WYE-DELTA, AND WYE-WYE
TRANSFORMER BANKS

"KS" and "MS"										
Individual Transformer Size (kVA)	2.4kV	4.8kV	7.2kV	7.6kV	8.0kV	11.4kV	12kV	13.2kV	13.8kV	14.4kV
1.5	-	-	N/A	-	-	-	-	-	-	-
3	-	-	1	-	-	-	-	-	-	-
5	3	-	1	-	-	-	-	-	-	-
10	7	3	2	-	-	-	-	-	-	-
15	10	5	3	-	3	-	-	-	-	-
25	15	7	5	-	5	3	3	-	3	-
37.5	25	10	7	7	7	5	5	-	-	-
50	30	15	10	10	10	7	7	-	5	5
75	50	25	15	15	15	10	10	-	7	7
100	65	30	20	20	20	15	15	-	10	10
167	80	50	30	30	25	20	20	-	15	15
250	-	-	50	50	40	30	30	-	25	20
333	-	-	65	65	65	40	40	-	30	30
500	-	-	100**	100**	80	65	65	-	50	50

"X"										
Individual Transformer Size (kVA)	2.4kV	4.8kV	7.2kV	7.6kV	8.0kV	11.4kV	12kV	13.2kV	13.8kV	14.4kV
1.5	-	-	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3
3	2	1	1	-	1	1	1	-	1	1
5	-	1.5	1	-	1	1	1	-	1	1
10	-	-	2	2	2	1.5	1.5	-	1	1
15	-	-	-	2-1/2	-	2	2	-	2	1.5
25	-	-	-	4	-	-	-	-	3	2.5
37.5	-	-	-	-	-	-	-	-	4	4

"QA" and "QR"										
Individual Transformer Size (kVA)	2.4kV	4.8kV	7.2kV	7.6kV	8.0kV	11.4kV	12kV	13.2kV	13.8kV	14.4kV
1.5	-	-	1	1	-	-	-	1	-	-
3	2	-	1	1	-	-	-	-	-	-
5	5	-	1	1	-	-	-	1	-	-
10	10	-	2	2	-	-	-	1	-	-
15	15	-	5	5	-	-	-	1	-	-
25	25	-	8	8	-	-	-	2	-	-
37.5	40	-	10	10	-	-	-	7	-	-
50	50	-	15	15	-	-	-	8	-	-
75	75	-	25	25	-	-	-	10	-	-
100	100	-	30	30	-	-	-	15	-	-
167	125**	-	50	50	-	-	-	25	-	-
250	175**	-	75	75	-	-	-	40	-	-
333	200**	-	100	100	-	-	-	50	-	-
500	-	-	125**	125**	-	-	-	75	-	-

** Use only with 200 amp rated cutouts

SUBJECT OVERHEAD DISTRIBUTION

DETAIL TRANSFORMERS - PRIMARY FUSE SIZE FOR SINGLE PHASE TRANSFORMERS

Date 02-26-99 | REVISED 09-25-00, 11-01-06, 01-25-11, 12-17-12 05-26-16 | Southern Company | A- SOE14001

SOE-14.001

CURRENT LIMITING FUSE TABLE FOR CONVENTIONAL TRANSFORMERS

12kV System at Mississippi Power (7.2kV Transformer)	
Transformer Size	Series Current Limiting Fuse (8.3kV)
5	12K
10	12K
15	12K
25	12K
37.5	25K
50	25K
75	25K
100	25K
167	40K
250	K80
333	K80
500	K140

NOTE:

Use current limiting fuses for transformer protection in areas with available fault current above 16,000 amps.

23kV System at Mississippi Power (13.2kV Transformer)	
Transformer Size	Series Current Limiting Fuse (15.5kV)
5	12K
10	12K
25	12K
37.5	12K
50	25K
75	25K
100	40K
167	40K
250	40K
333	40K
500	K80

NOTE:

Use current limiting fuses for transformer protection in areas with available fault current above 10,000 amps.

23kV System at Alabama Power (13.2kV Transformer)		
Transformer Size	Series Current Limiting Fuse (15.5kV)	Cooper Tandem ELF Current Limiting Fuse (27kV)
1.5	12K	25K
10	12K	25K
15	12K	25K
25	12K	25K
37.5	12K	25K
50	12K	25K
75	12K	25K
100	25K	25K
167	25K	25K
250	40K	Not Applicable
333	40K	Not Applicable
500	80K	Not Applicable

SUBJECT OVERHEAD DISTRIBUTION

DETAIL TRANSFORMERS - CURRENT LIMITING FUSE TABLE FOR CONVENTIONAL TRANSFORMERS

Date 02-26-99 | REVISED 09-25-00, 06-11-08, 05-25-12, 10-28-13 06-01-18 | Southern Company | A- SOE16001

SOE-16.001

Southern Pine and Douglas Fir Pole Information							
Pole Class	1	2	3	4	5	6	7
Minimum Top Circumference (in.)	27	25	23	21	19	17	15
Minimum Top Diameter (in.)	8.6	8	7.3	6.7	6	5.4	4.8
Average Breaking Load (lbs.) (Applied 2' from top)	4,500	3,700	3,000	2,400	1,900	1,500	1,200

Length of pole	ANSI Defined Groundline	Recommended Setting Depth		Minimum Circumference at six feet from butt (in.) (Dimensions shown are for green wood. ANSI 05.1 allows for a 2% shrinkage after drying and treatment from these values.)						
(ft.)	(ft.	In Soil	In Rock							
30	5.5	5.5	3.5	36.5	34.0	32.0	29.5	27.5	25.0	23.5
35	6	6	4	39.0	36.5	34.0	31.5	29.0	27.0	25.0
40	6	6	4	41.0	38.5	36.0	33.5	31.0	28.5	
45	6.5	6.5	4.5	43.0	40.5	37.5	35.0	32.5	30.0	
50	7	7	5	45.0	42.0	39.0	36.5	34.0		
55	7.5	7.5	5	46.5	43.5	40.5	38.0			
60	8	8	5.5	48.0	45.0	42.0	39.0			
65	8.5	8.5	6	49.5	46.5	43.5	40.5			
70	9	9	6	51.0	48.0	45.0	41.5			
75	9.5	9.5	6.5	52.5	49.0	46.0				
80	10	10	7	54.0	50.5	47.0				
85	10.5	10.5	7.5	55.0	51.5	48.0				
90	11	11	8	56.0	53.0	49.0				
95	11	11		57.0	54.0					
100	11	11		58.5	55.0					

Approximate pole weights - CCA (Wet weight) and Creosote (lbs.) (Based on 0.6 PCF CCA Treatment and assuming 65 lbs./ft. ³)							
Pole Class / Pole Length (ft.)	1	2	3	4	5	6	7
30	1,326	1,157	1,001	865	754	657	559
35	1,703	1,482	1,281	1,112	962	832	722
40	2,119	1,833	1,593	1,378	1,196	1,034	897
45	2,555	2,217	1,918	1,664	1,443	1,255	1,086
50	3,029	2,626	2,275	1,976	1,742	1,482	1,281
55	3,530	3,062	2,652	2,301	1,996	1,729	
60	4,069	3,523	3,055	2,646	2,295	1,989	
65	4,622	4,004	3,471	3,016	2,613		
70	5,207	4,518	3,913	3,393	2,945		
75	5,818	5,051	4,375	3,790			
80	6,455	5,597	4,849	4,206			
85	7,124	6,169	5,350				
90	7,807	6,760	5,863				
95	8,515	7,378	6,396				
100	9,282	8,028	6,949				

Table I

Notes:
The SOCO Wood Pole Specifications (SES-PD-015) provides for the pole supplier to hold poles 45 days (November-February) and 30 days (March-October) to allow for pole drying. Poles with these drying times should have weights which are less than those shown above. Occasionally, when pole supplies are short, poles with less drying time may be received. In that case, the weights should approximate those shown in the table above.

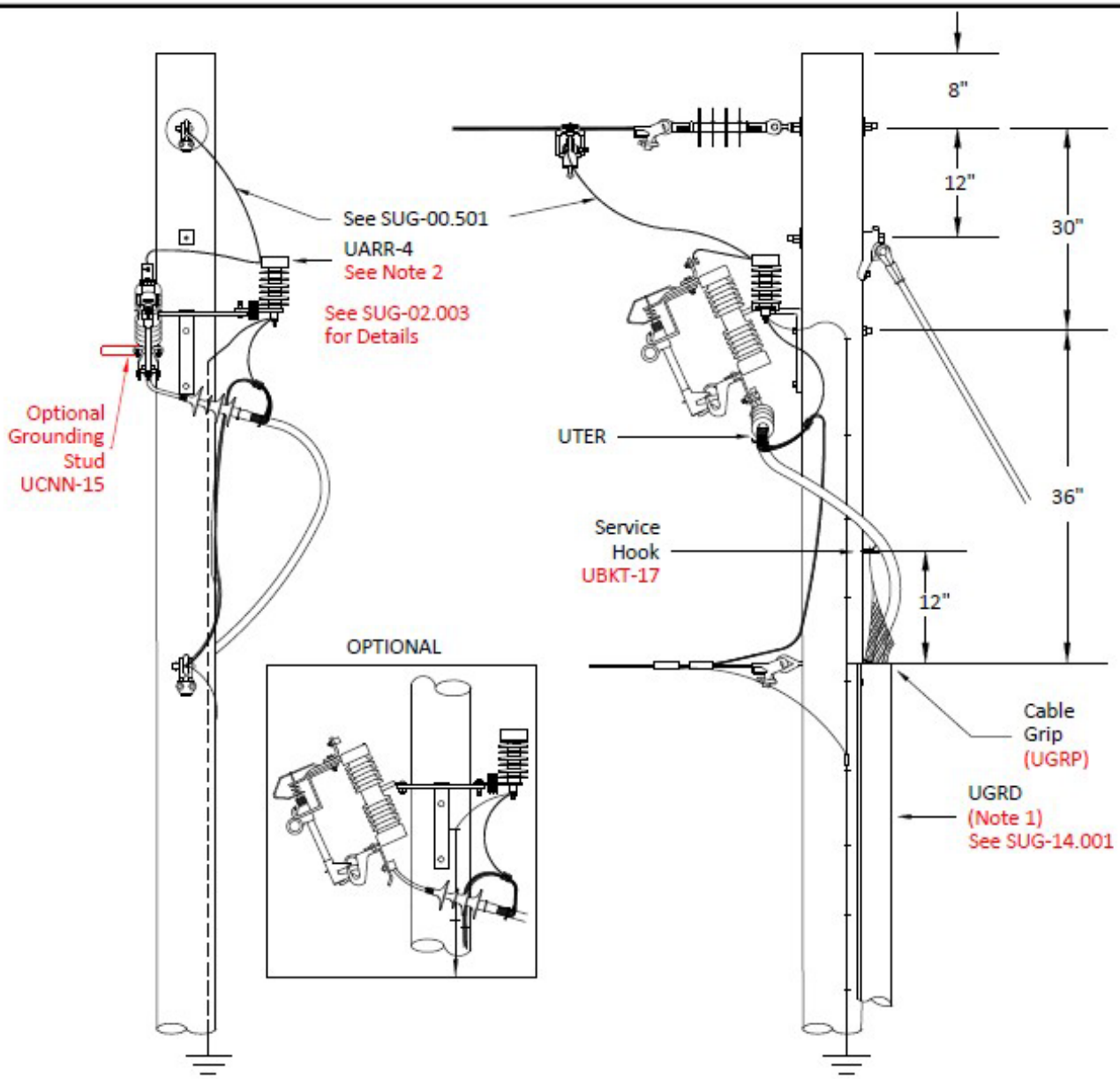
SUBJECT OVERHEAD DISTRIBUTION

DETAIL POLES - SOUTHERN PINE AND DOUGLAS FIR POLE INFORMATION

Date 02-26-99 | REVISED 09-25-00 | Southern Company | A- SOM01701

SOM-01.701

15KV TO 25KV UNDERGROUND CONSTRUCTION

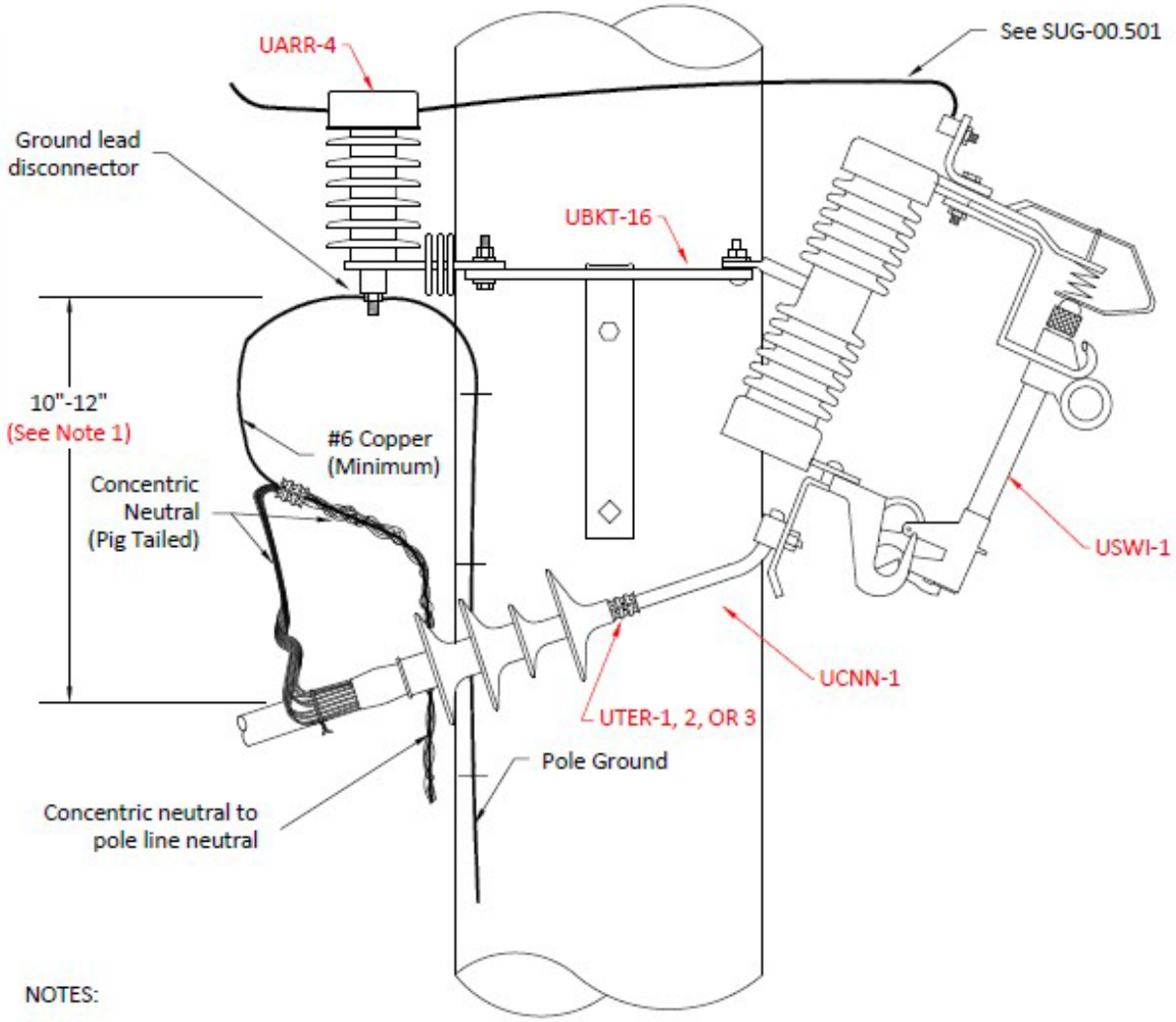


NOTES:

1. Install conduit or U-guard (Riser Shield) to the neutral. U-guard backing plate is only required for the first 8 ft. above ground.
2. Use heavy duty arrester.

SUBJECT: UNDERGROUND DISTRIBUTION			
DETAIL: RISERS - UNDERGROUND CIRCUIT FED FROM OVERHEAD SINGLE PHASE DEAD END			
Date: 02-26-99	REVISED: 09-25-00, 01-26-02, 12-14-09, 10-08-12	Southern Company	A- SUG02001

SUG-02.001

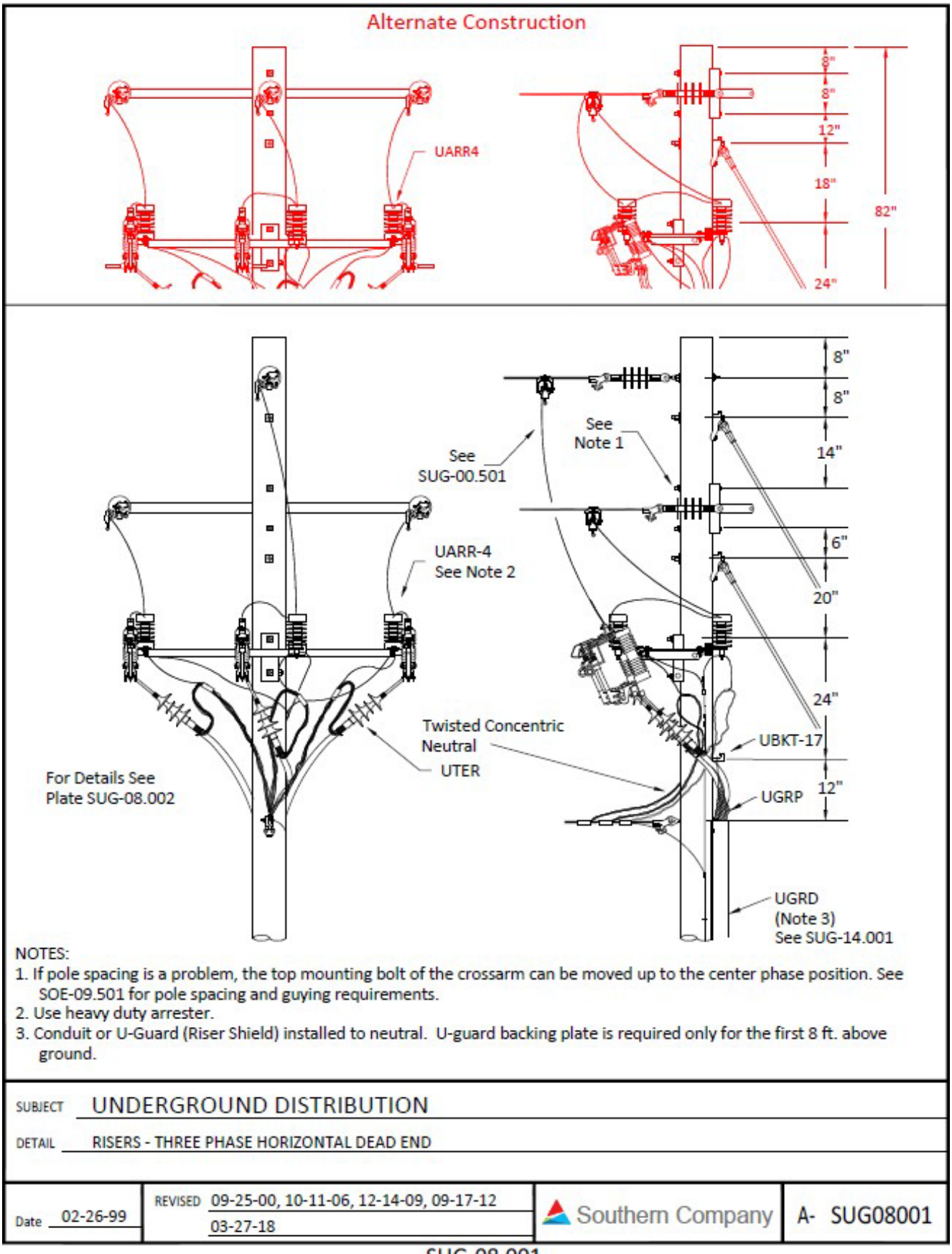


NOTES:

1. To enhance the arrester protection of the cable, the connection between the arrester ground lead disconnector and the cable neutral should be as short as possible. Ten to twelve inches maximum is recommended.
2. The cable riser should always be installed on the opposite side of the pole from the cutout and arrester mounting bracket.
3. To properly position the terminator under the arrester, the cable should always be trained around the pole on the arrester side of the mounting bracket.
4. Care should be taken to assure the cable terminator is not positioned such that the cutout barrel will contact the terminator when the cutout is in the open position.
5. The cable neutral should be connected directly to the pole line neutral with no reduction in size. The jumper from the concentric neutral to the arrester ground lead disconnector should not be less than #6 soft drawn bare copper conductor.

SUBJECT: UNDERGROUND DISTRIBUTION			
DETAIL: RISERS - CABLE NEUTRAL TO ARRESTER CONNECTION DETAIL			
Date: 02-26-99	REVISED: 09-25-00, 12-14-09, 10-08-12	Southern Company	A- SUG02003

SUG-02.003

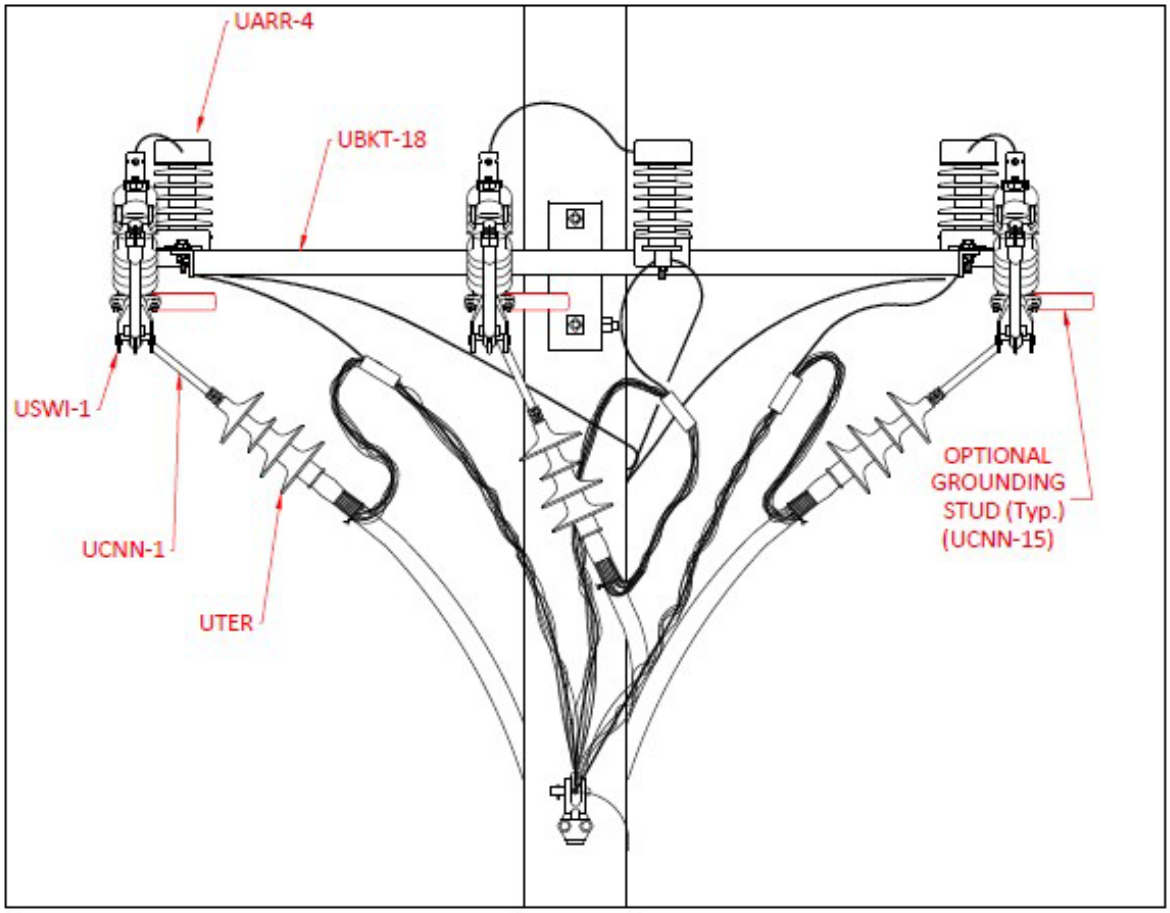


NOTES:
1. If pole spacing is a problem, the top mounting bolt of the crossarm can be moved up to the center phase position. See SOE-09.501 for pole spacing and guying requirements.
2. Use heavy duty arrester.
3. Conduit or U-Guard (Riser Shield) installed to neutral. U-guard backing plate is required only for the first 8 ft. above ground.

SUBJECT	UNDERGROUND DISTRIBUTION
DETAIL	RISERS - THREE PHASE HORIZONTAL DEAD END

Date	REVISED	Southern Company	
02-26-99	09-25-00, 10-11-06, 12-14-09, 09-17-12 03-27-18		A- SUG08001

SUG-08.001

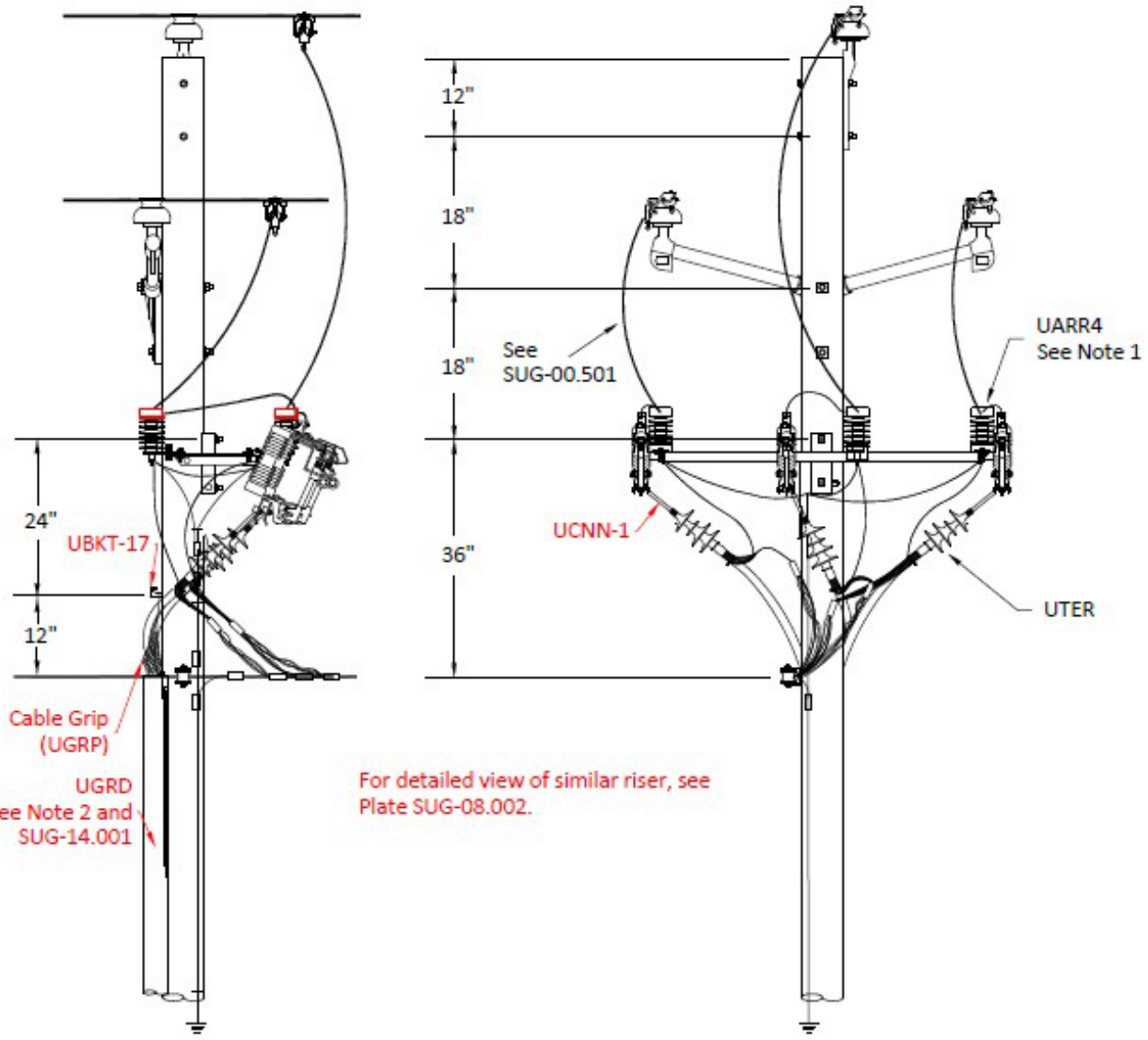


Notes for optional grounding stud:

1. Install grounding stud at cutout base for use with safety grounds (UCNN-15).
2. Install grounding stud on new or existing construction.
3. Ground stud is a permanent installation suitable for single phase, two phase or three phase risers.

SUBJECT UNDERGROUND DISTRIBUTION			
DETAIL RISERS - THREE PHASE HORIZONTAL DEAD END (DETAIL)			
Date 09-25-00	REVISED 01-26-02, 09-17-12	Southern Company	A- SUG08002

SUG-08.002

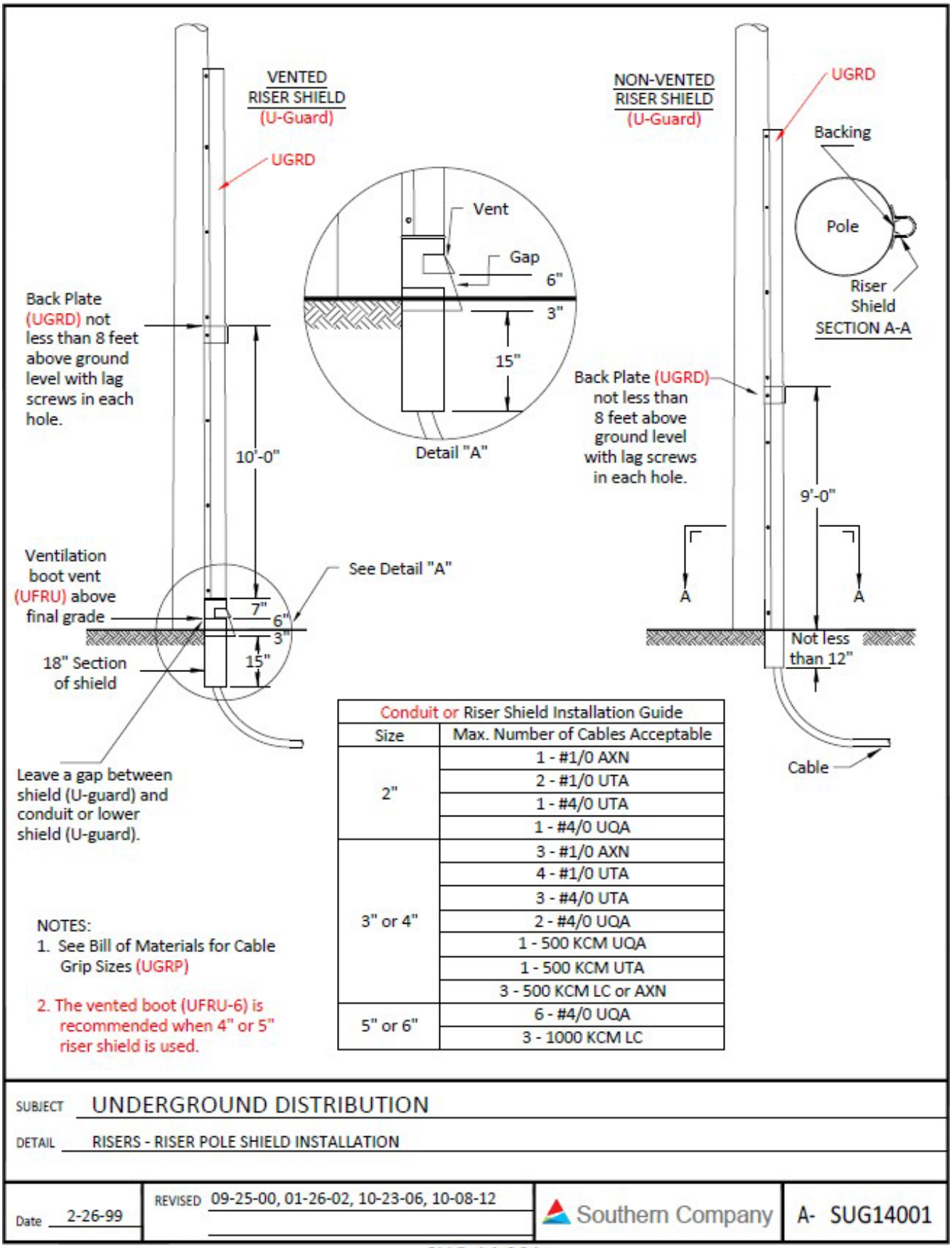


NOTES:

1. Use heavy duty arrester.
2. Install U-guard (Riser Shield) or conduit to neutral. U-guard backing plate is only required for the first 8 ft. above ground.

SUBJECT: UNDERGROUND DISTRIBUTION			
DETAIL: RISERS - THREE PHASE HORIZONTAL TANGENT			
Date: 01-26-02	REVISED: 12-14-09, 09-17-12	Southern Company	A- SUG10001

SUG-10.001



Conduit or Riser Shield Installation Guide	
Size	Max. Number of Cables Acceptable
2"	1 - #1/0 AXN
	2 - #1/0 UTA
	1 - #4/0 UTA
	1 - #4/0 UQA
3" or 4"	3 - #1/0 AXN
	4 - #1/0 UTA
	3 - #4/0 UTA
	2 - #4/0 UQA
	1 - 500 KCM UQA
	1 - 500 KCM UTA
	3 - 500 KCM LC or AXN
5" or 6"	6 - #4/0 UQA
	3 - 1000 KCM LC

NOTES:
1. See Bill of Materials for Cable Grip Sizes (UGRP)
2. The vented boot (UFRU-6) is recommended when 4" or 5" riser shield is used.

SUBJECT UNDERGROUND DISTRIBUTION

DETAIL RISERS - RISER POLE SHIELD INSTALLATION

Date 2-26-99 | REVISED 09-25-00, 01-26-02, 10-23-06, 10-08-12 | Southern Company | A- SUG14001

SUG-14.001

Riser Pole Fusing for Three Phase Pad Mounted Transformers with Bay-O-Net Fusing								
Operating Voltage	Three Phase Transformer (KVA)	Transformer Bay-O-Net Fuse Size	Minimum Riser Pole Fuse Size					SM-4/SMU-20 (Cubicle & Riser Power Fuse)
			QA/QR Riser Fuse Size		KS/MS Riser Fuse Size	K Riser Fuse Size	T Riser Fuse Size	
			Minimum for Inrush (Note 1)	Minimum for Coordination (Note 2)				
12.47 13.2 & 13.8 kV	45	5A	-	-	10A	40A	10A	15A
	75	6A	-	-	10A	40A	10A	15A
	112.5	8A	-	-	15A	-	-	25A
	150	12A	15A	30A	15A	40A	15A	25A
	225	15A	-	-	25A	-	-	50A
	300	25A	40A	75A	40A	50A	40A	65A
	500	40A	60A	125A	50A	80A	65A	100A
	750	50A	75A	125A	50A	80A	65A	100A
	1000	65A	125A	175A	65A	100A	80A	150A
	1500	100A	125A	200A (6)	100A	100A	100A	175A
	2000	125A	150A	200A (6)	100A	140A	140A	200A
	2500	125A	175A	200A (6)	100A	140A	140A	200A
19.8 & 20.78 kV	45	5A	-	-	10A	15A	-	15A
	75	5A	-	-	10A	15A	-	15A
	112.5	5A	-	-	10A	-	-	15A
	150	6A	-	-	10A	15A	-	15A
	225	12A	-	-	15A	20A	-	25A
	300	15A	-	-	20A	30A	-	30A
	500	25A	-	-	25A	50A	-	65A
	750	40A	-	-	40A	65A	-	80A
	1000	40A	-	-	50A	65A	-	100A
	1500	65A	-	-	65A	100A	-	125A
	2000	100A	-	-	80A	140A	-	200A
	2500	100A	-	-	80A	140A	-	200A
22.86 & 24.94 kV	45	5A	-	-	10A	15A	10A	15A
	75	5A	-	-	10A	15A	10A	15A
	112.5	5A	-	-	15A	20A	15A	15A
	150	6A	10A	20A	15A	20A	15A	20A
	225	8A	-	-	15A	20A	15A	20A
	300	12A	20A	30A	15A	20A	15A	25A
	500	25A	50A	100A	30A	50A	30A	50A
	750	25A	50A	100A	50A	50A	40A	65A
	1000	40A	50A	100A	50A	65A	40A	80A
	1500	50A	75A	150A	50A	80A	65A	125A
	2000	65A	100A	200A (6)	100A	140A	100A	175A
	2500	100A	125A	200A (6)	100A	200A	140A	200A
34.5 kV	150	5A	7A	15A	-	-	-	-
	300	8A	10A	25A	-	-	-	-
	500	15A	20A	50A	-	-	-	-
	750	25A	25A	100A	-	-	-	-
	1000	25A	40A	100A	-	-	-	-
	1500	50A	50A	150E*	-	-	-	-
	2000	50A	75A	150E*	-	-	-	-
	2500	65A	75A	150E*	-	-	-	-

* S&C SMU20 in SMD20 Cut-out

SUBJECT UNDERGROUND DISTRIBUTION

DETAIL FUSING - RISER POLE FUSING FOR THREE PHASE PAD MOUNTED TRANSFORMERS WITH BAY-O-NET FUSING

Date 02/26/99

REVISED 09-25-00, 10-26-06, 10-21-09, 08-02-12 3-25-13, 4-8-15

Southern Company

A- SUM05001

SUM-05.001

Three Phase Mini Pad (APC Only)

RISER POLE FUSING TABLE			
OPERATING VOLTAGE	KVA SIZE	VOLTS	ELF FUSE SIZE
12.47KV	75	208	6 AMP
	75	480	6 AMP
13.2KV	75	208	6 AMP
	75	480	6 AMP
34.5KV	75	208	6 AMP (27KV CUTOUT)
	75	480	6 AMP (27KV CUTOUT)

NOTES:

1. The size shown is the minimum fuse which will allow for transformer inrush of a single transformer. For multiple transformers, a larger fuse may be required. (See Note 5)

2. The size shown is the minimum fuse which coordinates with the internal transformer Bay-O-Net and current limiting fuses. A larger fuse may be used providing it coordinates with upstream devices.

3. The riser fuse chosen should, if at all possible, provide coordination with the upstream device. In addition, it is desirable for the riser fuse to coordinate with the internal transformer fuses.

4. For a single transformer application, coordination between the riser fuse and upstream device is normally more important than coordination of the riser fuse and transformer internal fuses. However, the fuse should not be sized below the minimum required for inrush.

5. For multiple transformers, the minimum fuse size required for coordination should be read from the row corresponding to the largest transformer on the loop. A larger fuse may be required to carry the combined inrush and loading of all transformers.

6. The 200 A fuse is the largest size available, but it will not coordinate with the transformer Bay-O-Net fuse.

7. In cases when the minimum size riser pole fuse will not coordinate with the upstream line device or substation breaker, a sectionalizer may be utilized on the riser pole. If a sectionalizer is used, the underground circuit must be within the protective zone of the upstream overcurrent protective device.

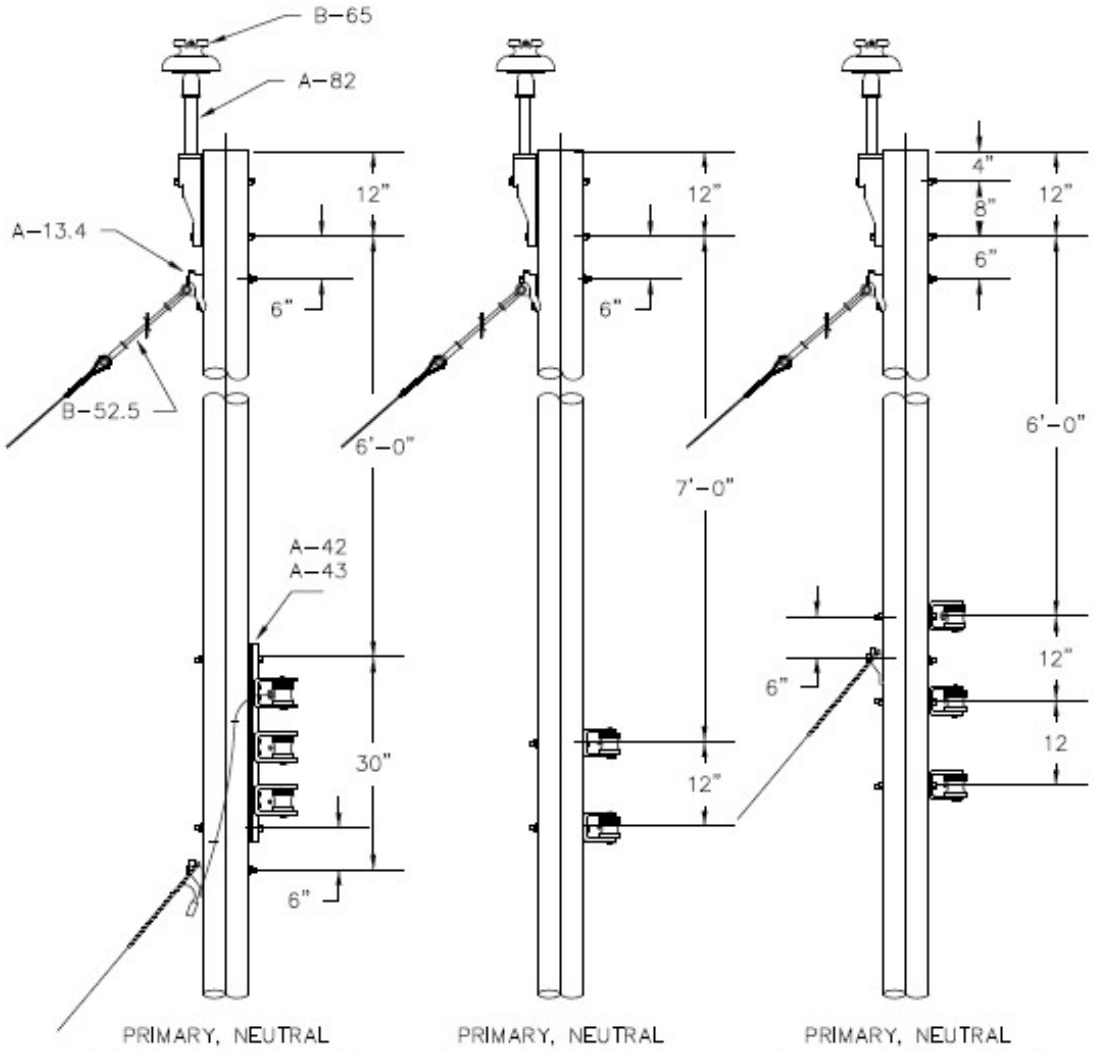
SUBJECT UNDERGROUND DISTRIBUTION

DETAIL FUSING - RISER POLE FUSING FOR SOUTHERN COMPANY THREE PHASE, PAD-MOUNTED DEAD FRONT TRANSFORMERS

Date 02/26/99 | REVISED 09-25-00, 08-02-12, 04-05-18 | Southern Company | A- SUM05002

SUM-05.002

15KV TO 25KV UNDERGROUND CONSTRUCTION

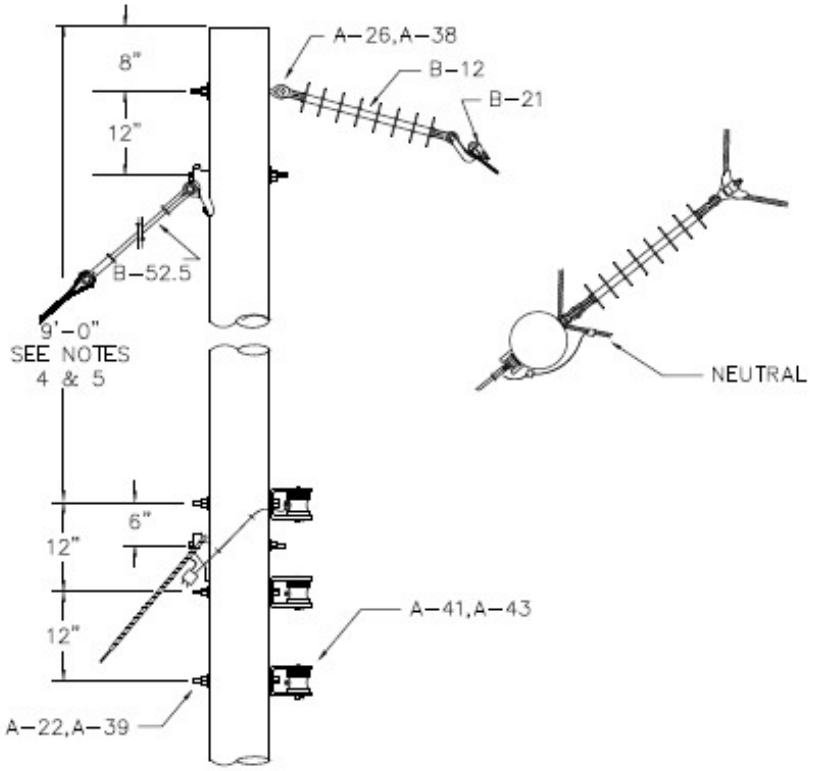


NOTES:

1. See Plate HB–30 for line angle and load span limitations.
2. See Plate HB–30.4 for primary and neutral spacing requirements.
3. Maximum span length for covered secondary is 200 feet. For spans in excess of 200 feet, see Plate HB–33.
4. Neutral spacings from top of pole as shown permit phase additions. For 12–35kV conversions where future phase additions or transformer installations are not expected, neutral spacings may be reduced to 60" provided they comply with Plate HB–30.4.

SUBJECT OVERHEAD DISTRIBUTION				
DETAIL TYPICAL CONSTRUCTION - SMALL ANGLE, SINGLE PHASE, COMMON NEUTRAL WITH OPEN WIRE COVERED SECONDARY - 35KV CLASS				
Date 06-30-09	SUPERSEDES HB032001 DATE 10–01–02	SHEET 1 OF 1 SHEETS	Alabama Power	A- HB03200I

HB-32



NOTES:

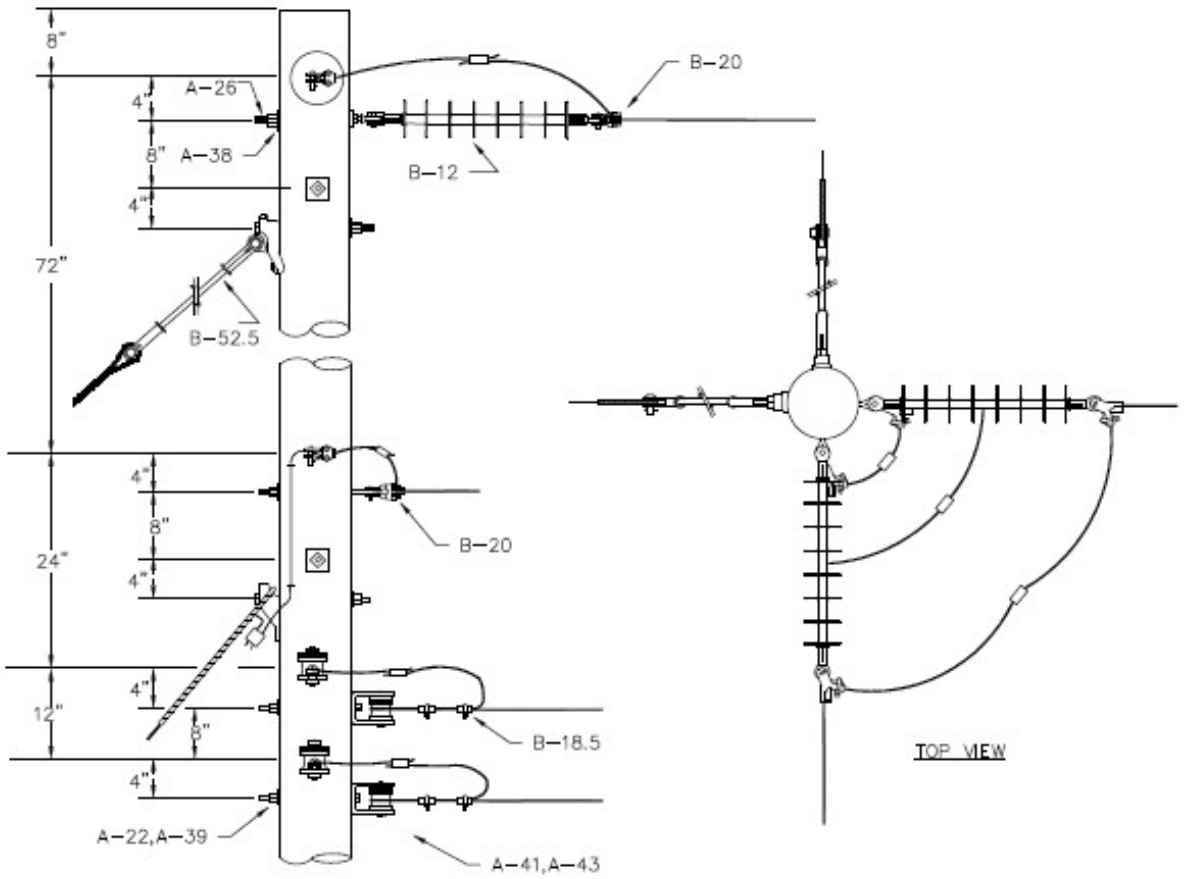
1. See Plate HB–30 for angle and load span limitations.
2. See Plate HB–30.4 for primary to neutral spacing requirements.
3. For spans in excess of 300 feet, see Plate SOA–13.001, Table 10 and Note A, for required separation between neutral and secondary conductors.
4. Neutral spacing from top of pole as shown permits addition of a transformer. If transformer installation is not expected, this spacing may be reduced to 6'–6" on new construction to permit use of a shorter pole.
5. This dimension does not allow for future phase additions.

SUBJECT OVERHEAD DISTRIBUTION

DETAIL TYPICAL CONSTRUCTION - SINGLE PHASE SUSPENSION WITH BARE SECONDARY

Date 06-30-09	SUPERSEDES HB034001 DATE 10–01–02	SHEET 1 OF 1 SHEETS	Alabama Power	A- HB034001

HB-34

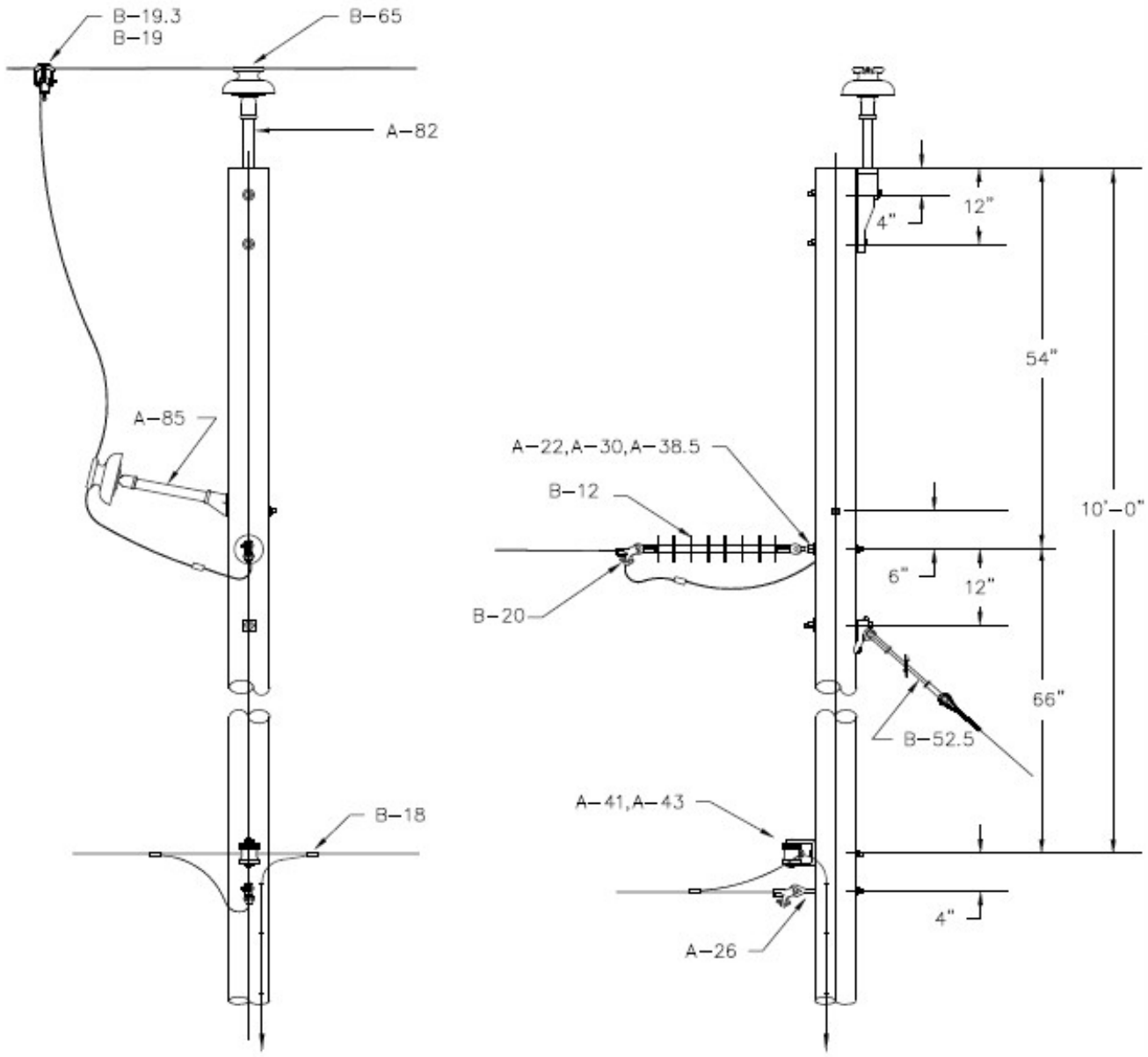


NOTES:

1. See Plate AOB–30.2 for line angle and tension limitations.
2. See Plate HB–30.4 for primary to neutral spacing requirements.
3. For spans in excess of 300 feet, see Plate SOA–13.001, Table 10 and Note A, for required neutral separation between neutral and secondary conductors.

SUBJECT OVERHEAD DISTRIBUTION				
DETAIL TYPICAL CONSTRUCTION - SINGLE PHASE DOUBLE DEAD END WITH BARE SECONDARY 35KV CLASS				
Date 06-30-09	SUPERSEDES HB035001 DATE 09–03–01	SHEET 1 OF 1 SHEETS	Alabama Power	A- HB035001

HB-35

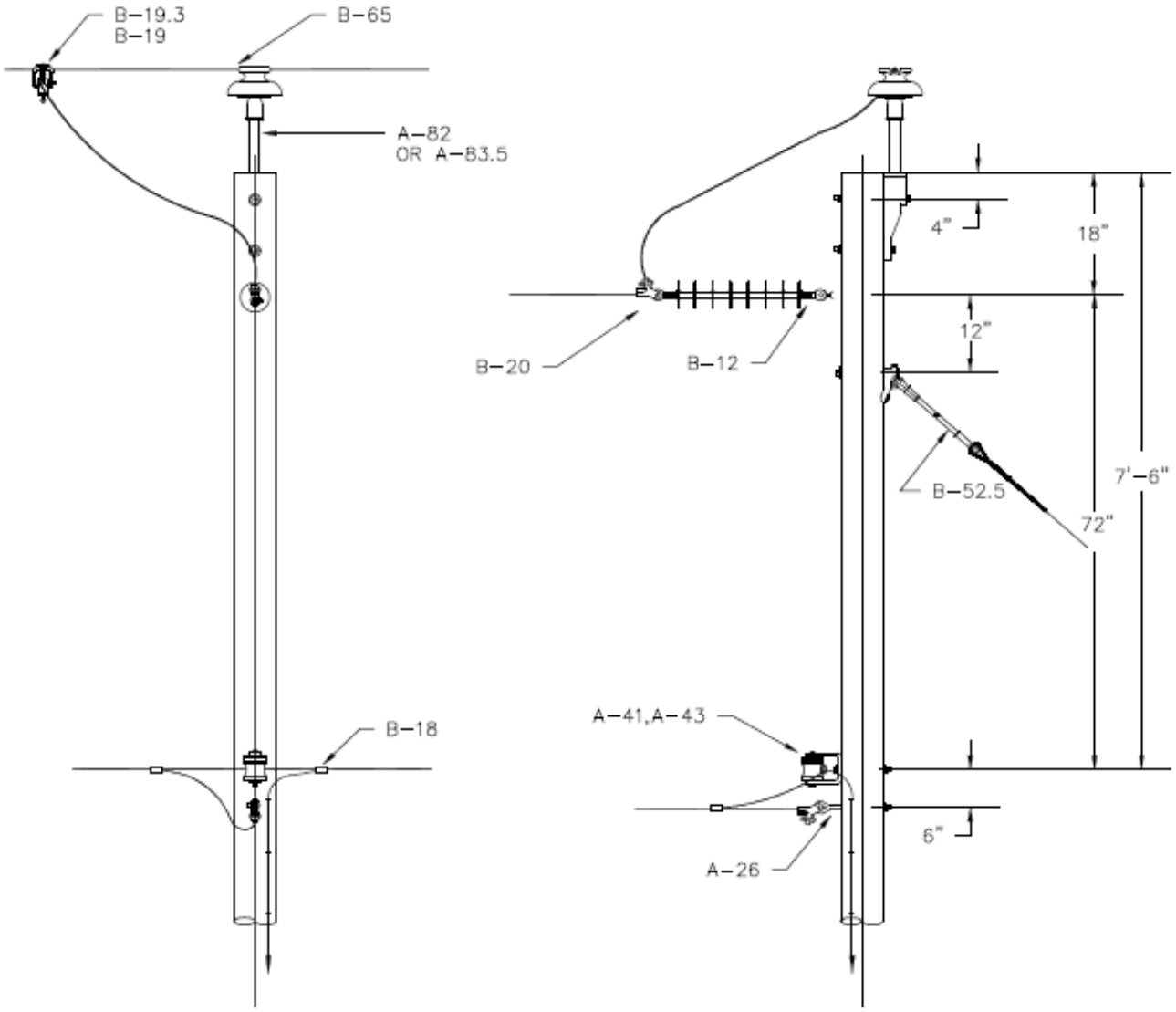


NOTES:

1. See Plate HB–30.4 for primary to neutral spacing requirements.
2. The construction shown on this plate permits later phase additions to the main line. The construction shown on sheet 2 may be used to avoid a pole replacement where it is known that phases will not be added in the future.

SUBJECT OVERHEAD DISTRIBUTION				
DETAIL TYPICAL CONSTRUCTION - SINGLE PHASE TAP FROM SINGLE PHASE LINE 35KV CLASS				
Date 06-30-09	SUPERSEDES HB037501 DATE 10–01–02	SHEET 1 OF 2 SHEETS	Alabama Power	A- HB03750I

HB-37.5



NOTES:

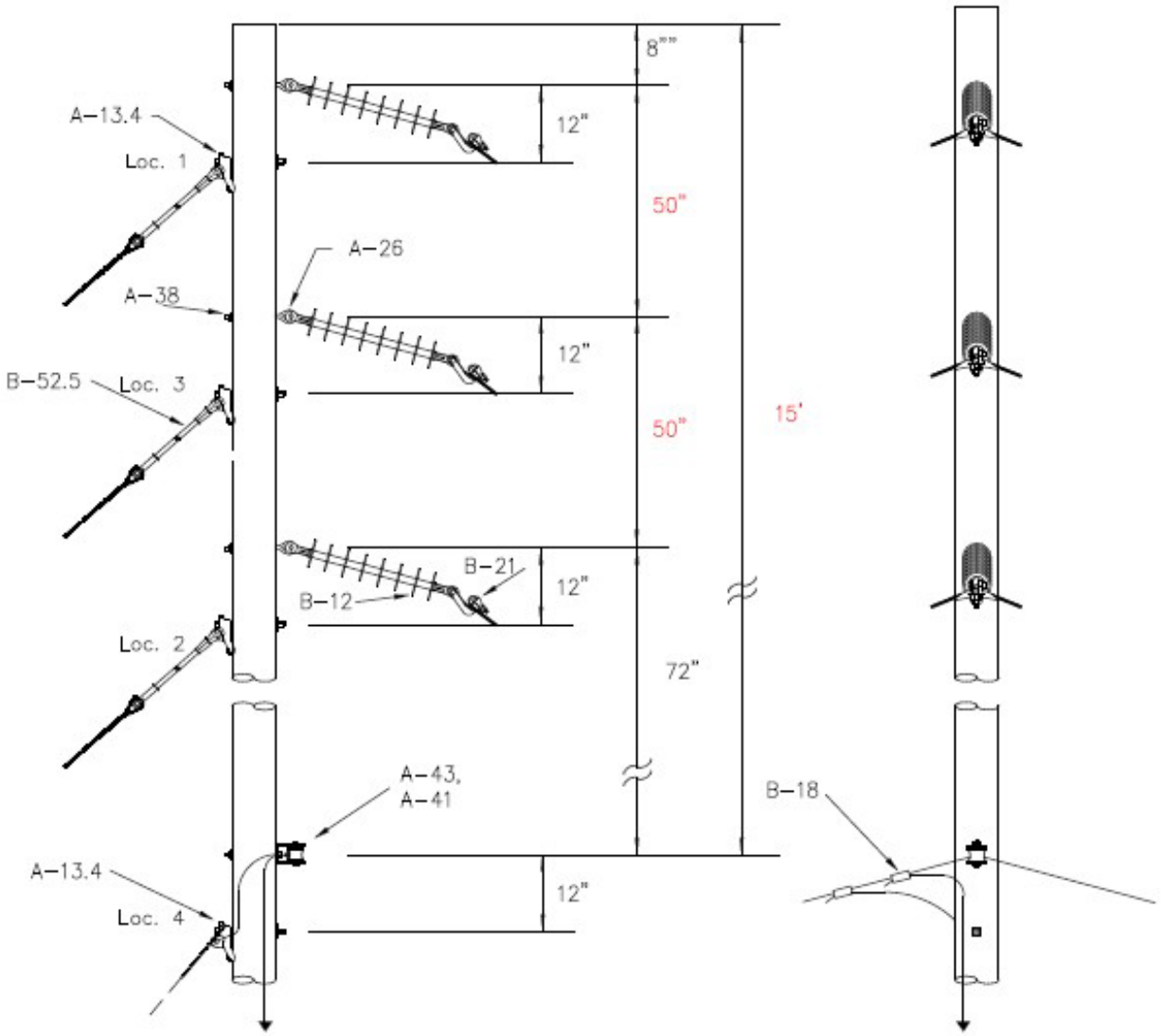
1. The construction shown on this plate is to be used where it is known that phases will not be added in the future. The construction shown on sheet 1 allows for future phase additions to the main line.

SUBJECT OVERHEAD DISTRIBUTION

DETAIL TYPICAL CONSTRUCTION - SINGLE PHASE TAP FROM SINGLE PHASE LINE - ALTERNATE
35KV CLASS

Date 06-30-09	SUPERSEDES HB037502 DATE 10-01-02	SHEET 2 OF 2 SHEETS	Alabama Power	A- HB037502

HB-37.5

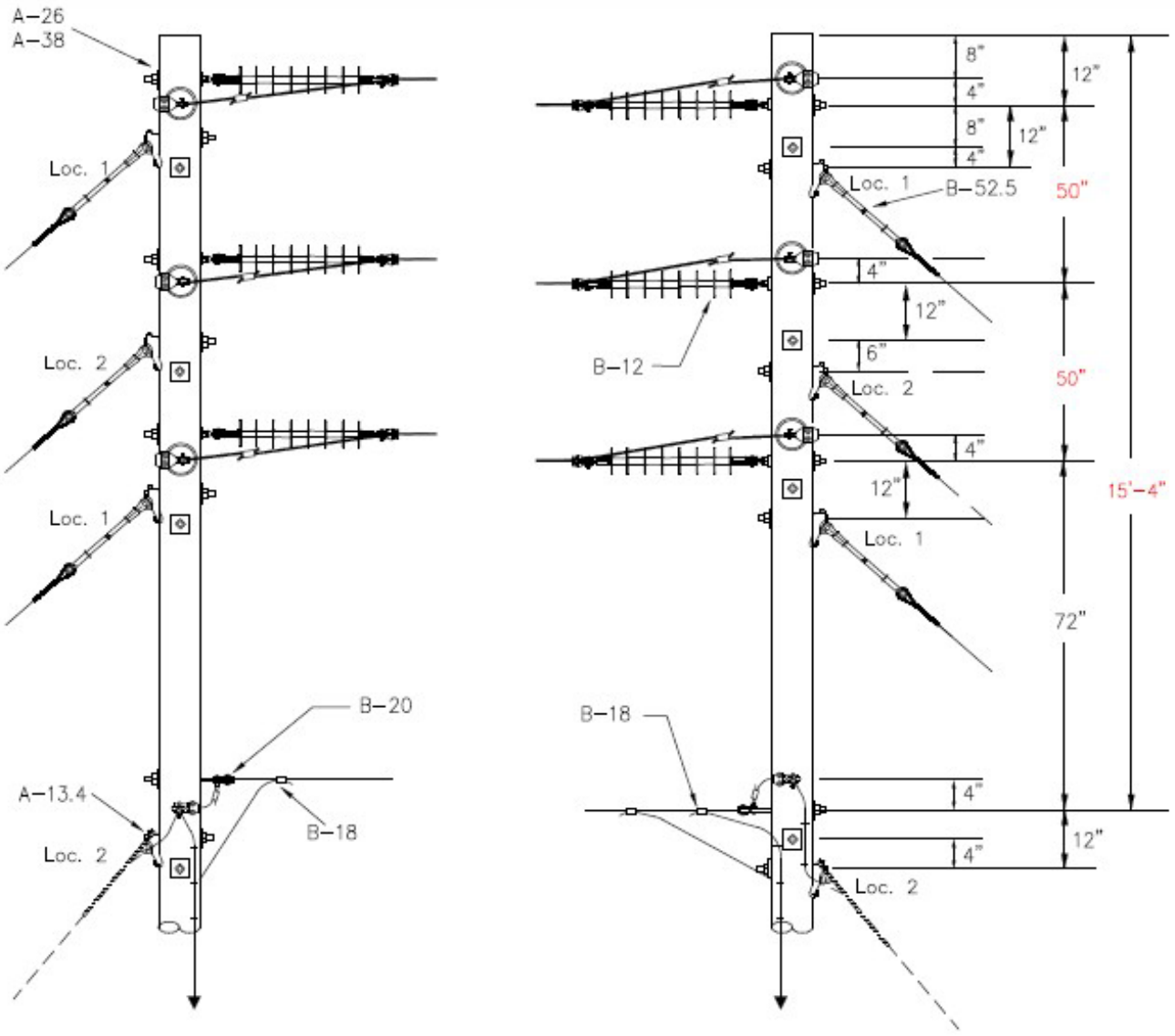


NOTES:

1. See Plate HB–30 for line angles and load span limitations.
2. See Plate HB–30.4 for primary to neutral spacing requirements.
3. For span lengths in excess of 450 feet, refer to Plate HB–87.

SUBJECT OVERHEAD DISTRIBUTION				
DETAIL TYPICAL CONSTRUCTION - THREE PHASE VERTICAL SUSPENSION 35KV CLASS				
Date 10-23-19	SUPERSEDES HB038001 DATE 06–30–09	SHEET 1 OF 1 SHEETS	Alabama Power	A- HB03800I

HB-38

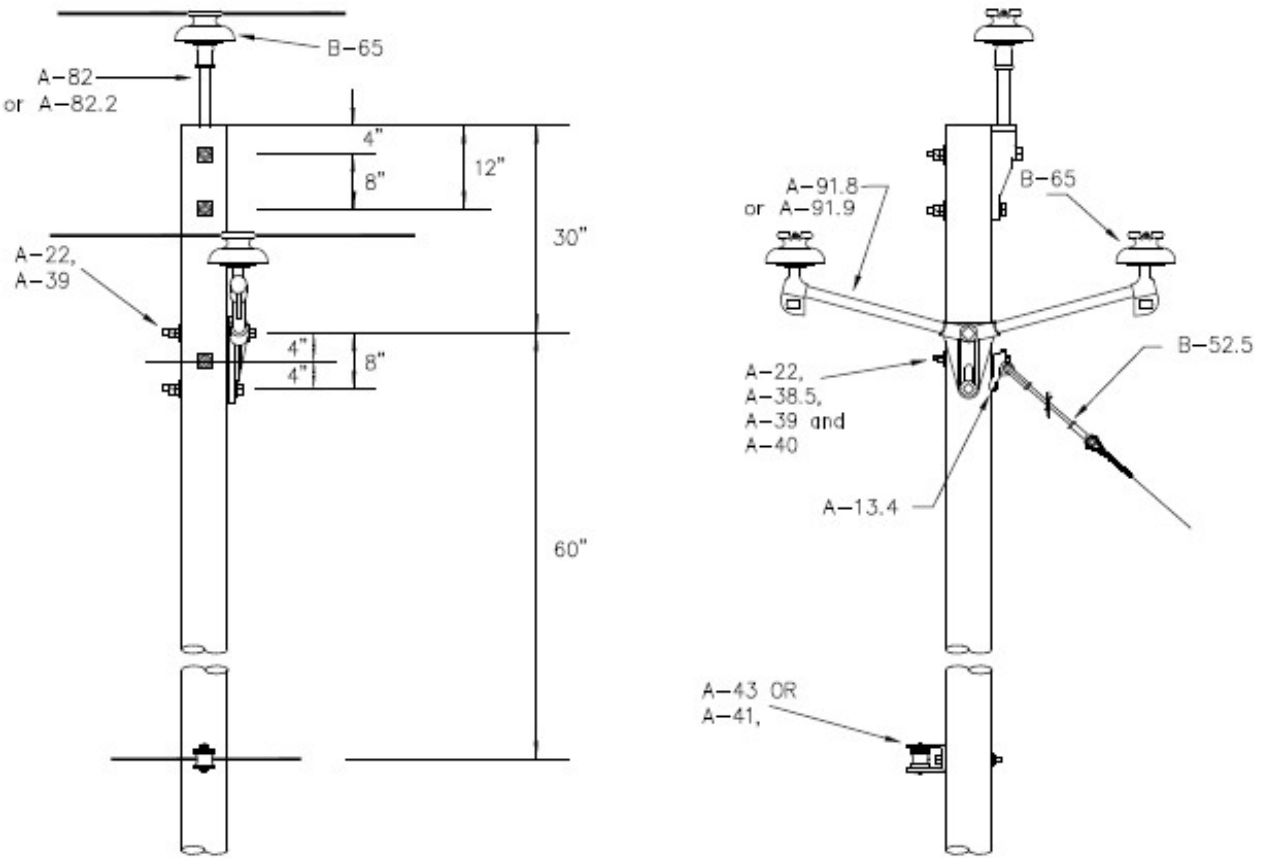


NOTES:

1. See Plate AOB–30.2 for tension limitations.
2. See Plate HB–30.4 for primary to neutral spacing requirements.
3. For span lengths in excess of 450 feet, refer to Plate HB–87.

SUBJECT OVERHEAD DISTRIBUTION				
DETAIL TYPICAL CONSTRUCTION - THREE PHASE VERTICAL DOUBLE DEAD END 35KV CLASS				
Date 10-23-19	SUPERSEDES HB039001 DATE 06–30–09	SHEET 1 OF 1 SHEETS	Alabama Power	A- HB039001

HB-39

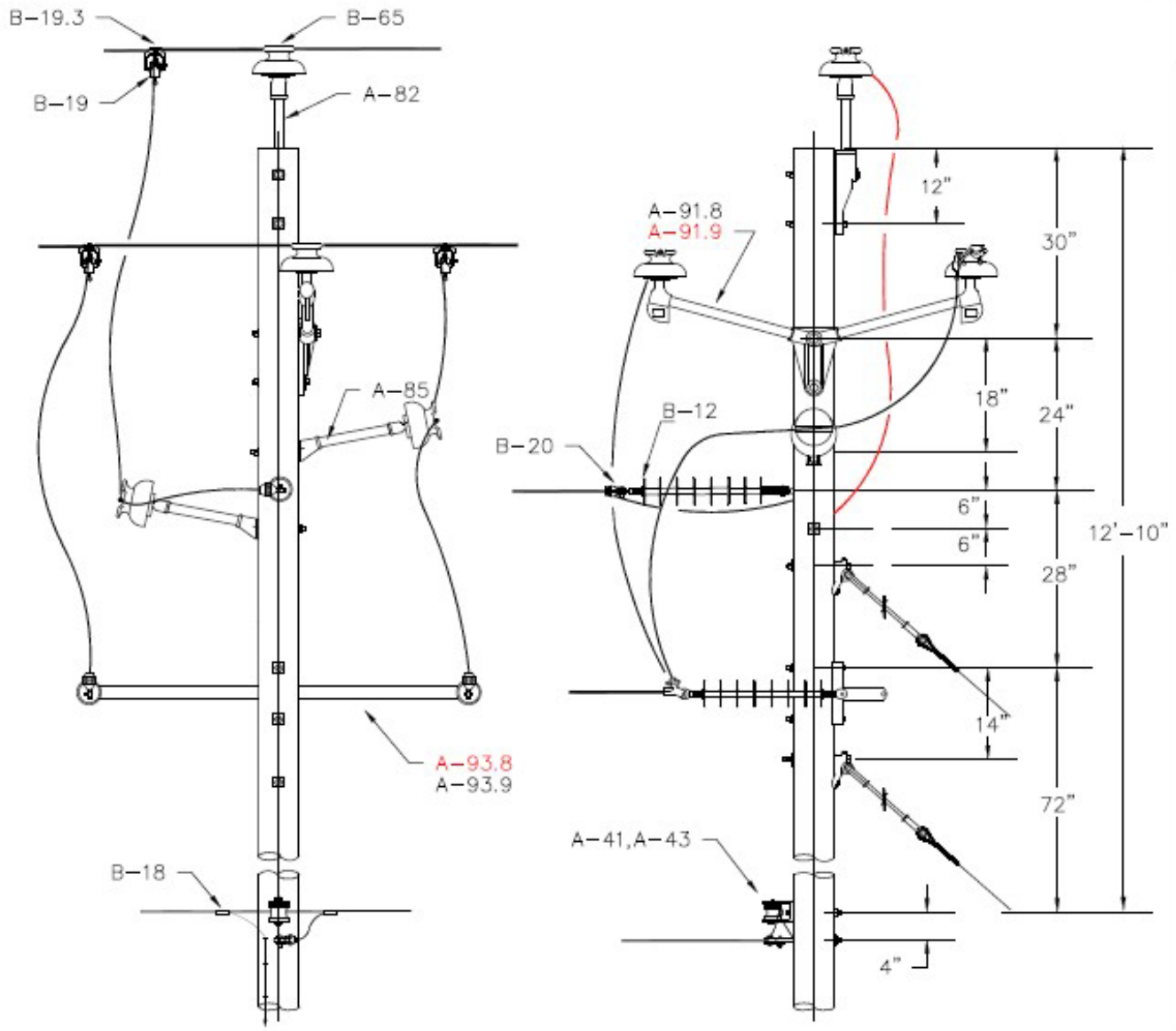


NOTES:

1. See Plate HB-30 for angle and load span limitations.
2. See Plate HB-30.4 and HB-30.6 for conductor spacing requirements.
3. Use construction on Sheet 1 if transformer installation is expected.

SUBJECT OVERHEAD DISTRIBUTION				
DETAIL TYPICAL CONSTRUCTION - PRIMARY ON TWO PHASE 48 INCH VERTICAL PIN FIBERGLASS BRACKET 35KV CLASS				
Date 06-30-09	SUPERSEDES HB071002 DATE 10-01-02	SHEET 2 OF 2 SHEETS	Alabama Power	A- HB071002

HB-71

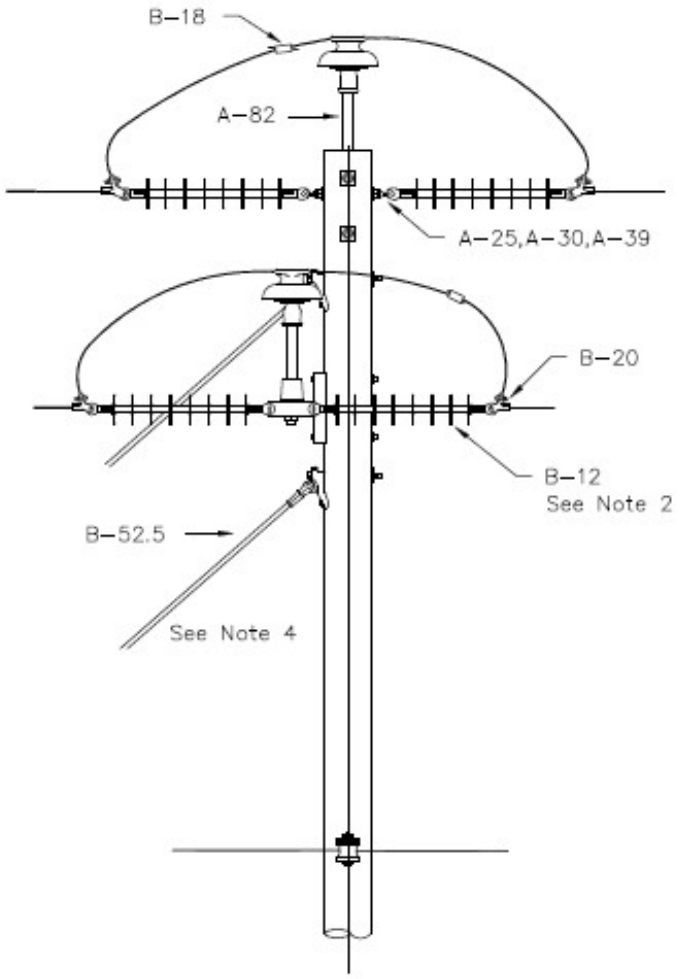


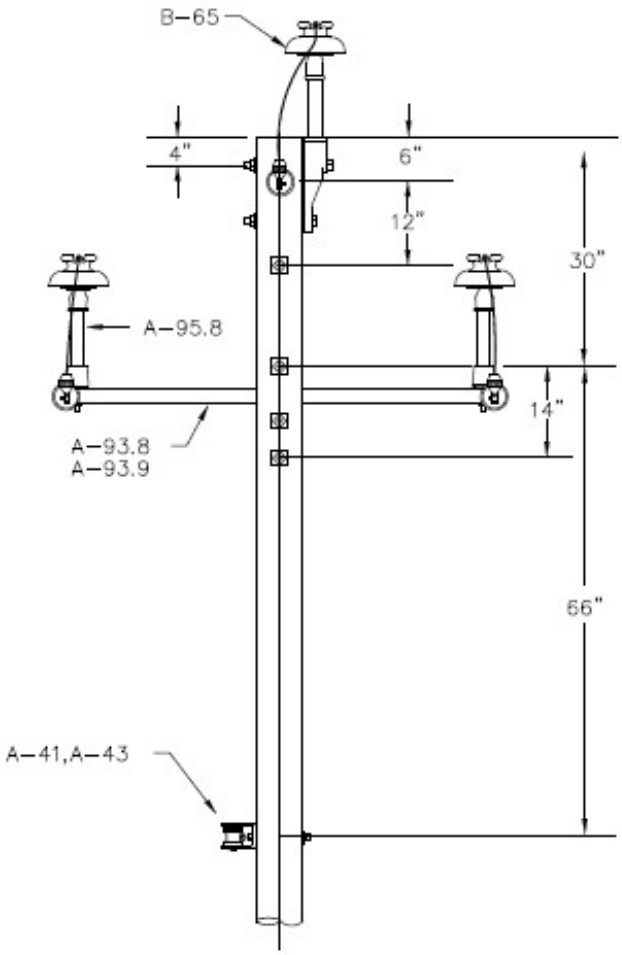
NOTES:

1. Always install arm on opposite side of pole from primary dead–end.
2. Refer to Plate AOB–30.2 for the maximum allowable loading for dead–end arms.
3. Spacing between top bolt of steel arm and neutral can be reduced to 56 inches in order to avoid a pole change out, provided this spacing is allowed per Plate HB–30.4.

SUBJECT OVERHEAD DISTRIBUTION				
DETAIL TYPICAL CONSTRUCTION - THREE PHASE PRIMARY TAP ON DEAD END ARM 35KV CLASS				
Date 06-30-09	SUPERSEDES HB077901 DATE 10-01-02	SHEET 1 OF 1 SHEETS	Alabama Power	A- HB077901

HB-77.9





NOTES:

1. If conductor tensions are unequal always install arm on opposite side of pole from primary with the higher tension.
2. Refer to plate AOB–30.2 for the maximum allowable difference in loaded conductor tension.
3. See Plates HB–30.4 and HB–30.6 for conductor spacing requirements.
4. Position anchor so that neutral is at least 6 inches from guy strand or guy insulator.

SUBJECT OVERHEAD DISTRIBUTION				
DETAIL TYPICAL CONSTRUCTION - THREE PHASE PRIMARY DOUBLE DEAD END TRIANGULAR CONFIGURATION - 35KV CLASS				
Date 06-30-09	SUPERSEDES HB083001 DATE 10–01–02	SHEET 1 OF 1 SHEETS	Alabama Power	A- HB083001

HB-83

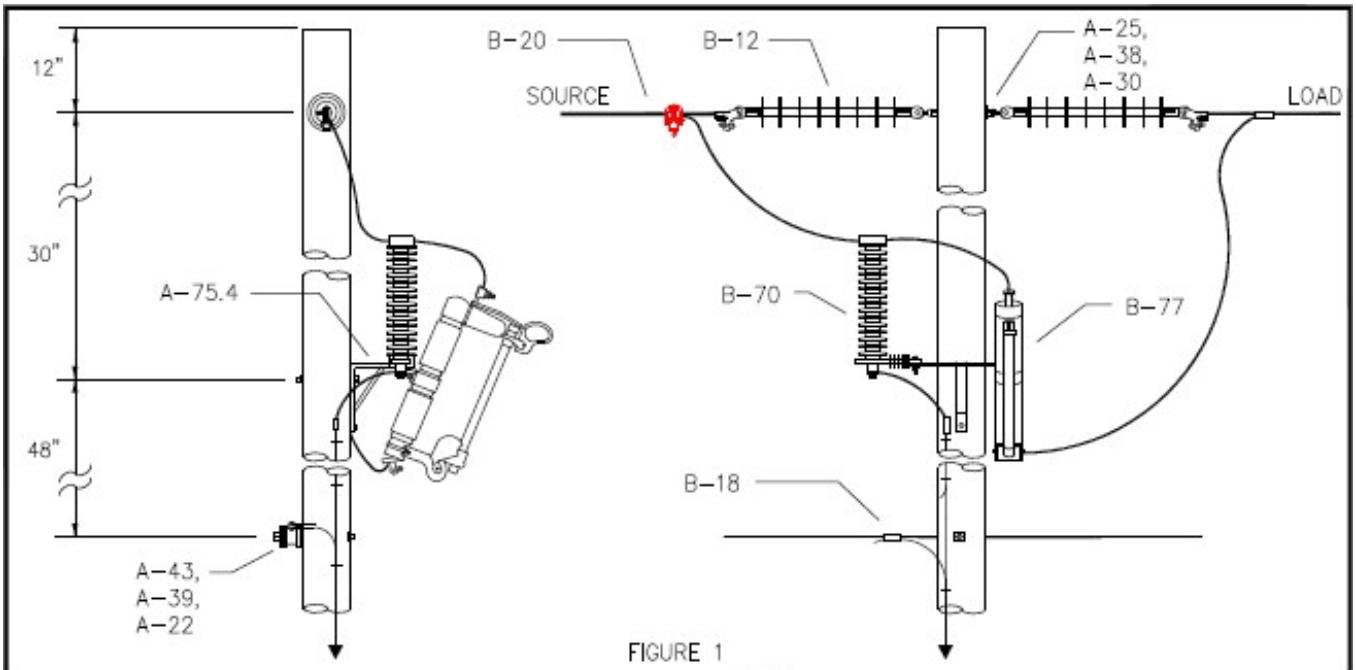


FIGURE 1

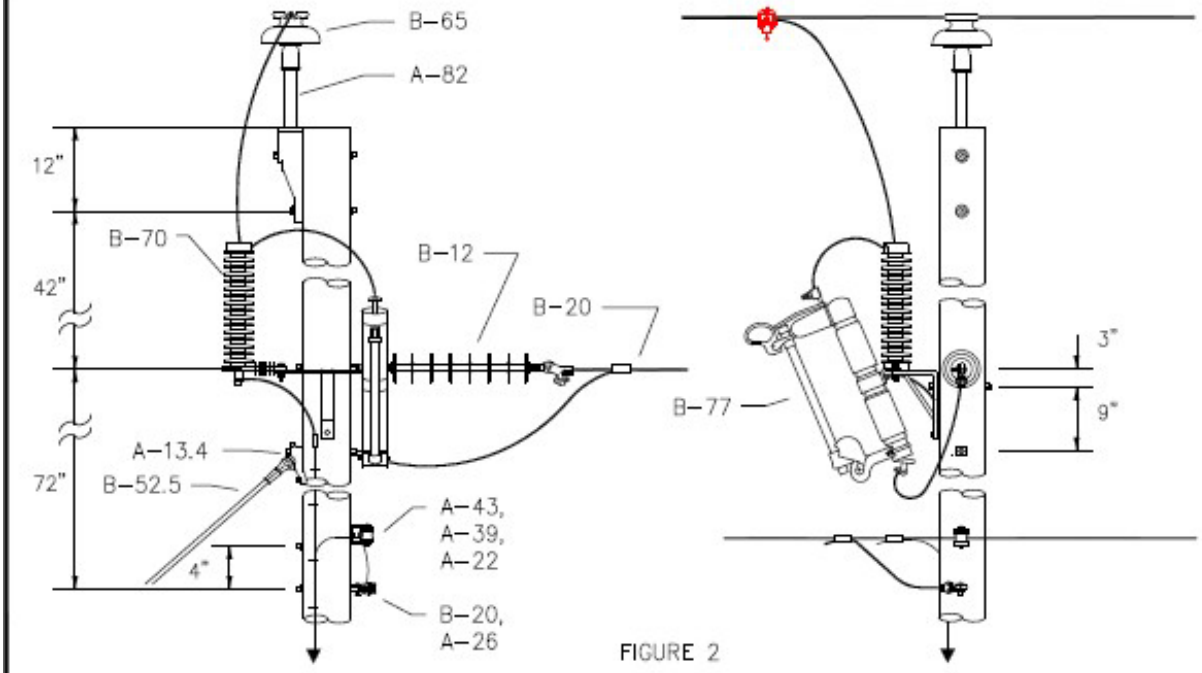


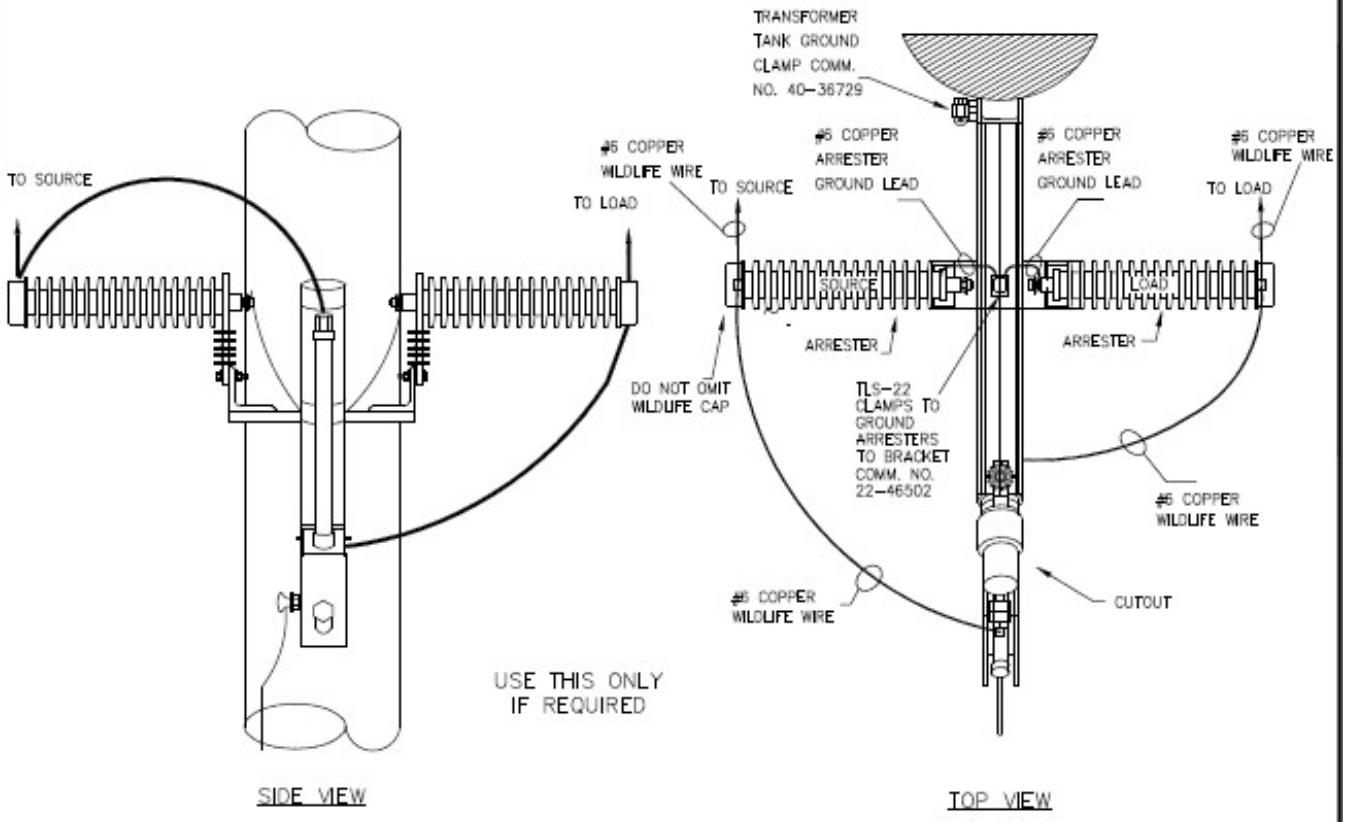
FIGURE 2

NOTES:

1. If this sectionalizing point is to be normally open both source side and load side arresters should be installed as per the detail on Sheet 2.

SUBJECT OVERHEAD DISTRIBUTION				
DETAIL SECTIONALIZING - CUTOUT ON SINGLE PHASE LINES 35KV CLASS				
Date 06-30-09	SUPERSEDES HD001001 DATE 10-01-02	SHEET 1 OF 2 SHEETS	Alabama Power	A- HD001001

HD-1

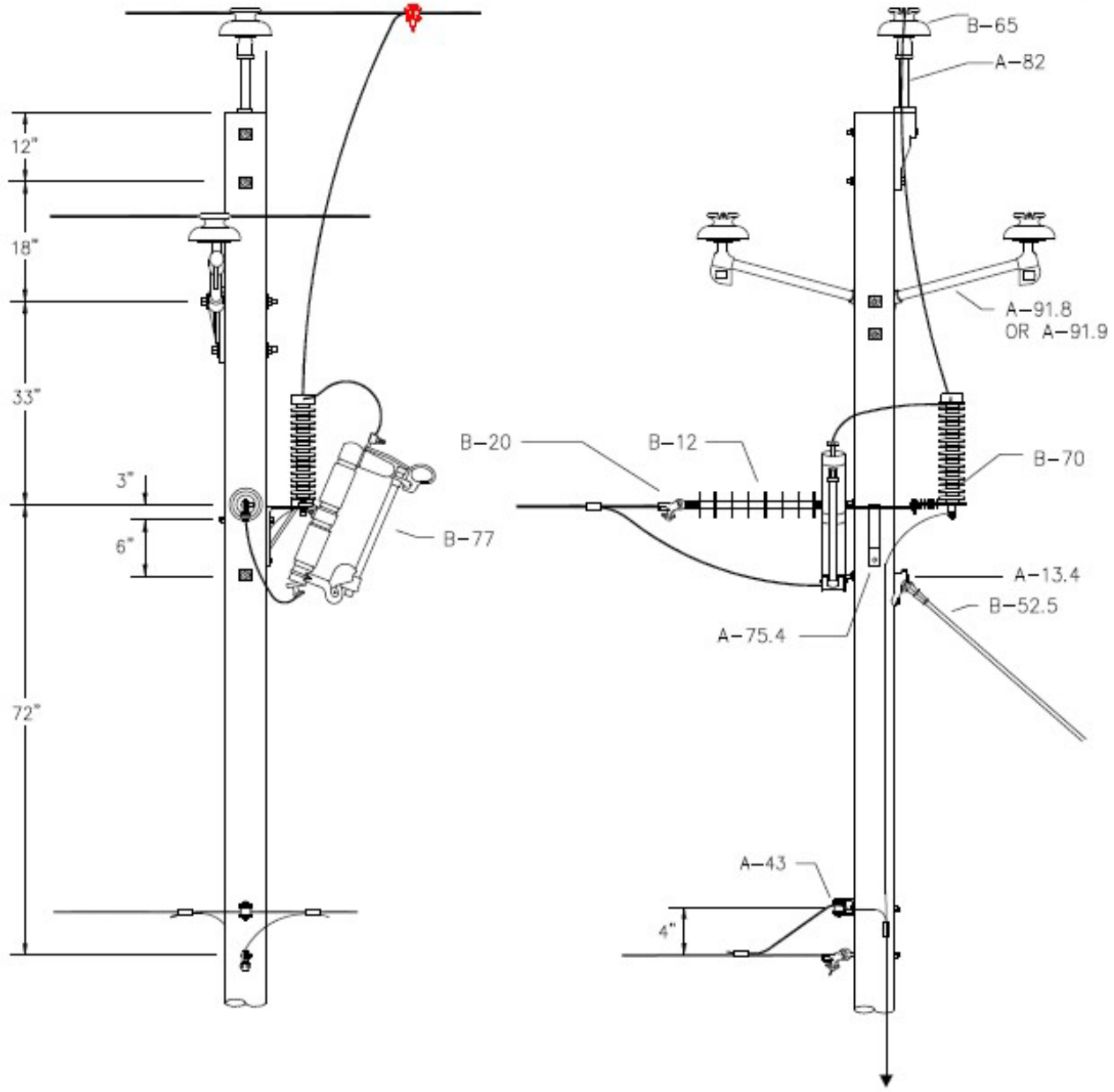


NOTES:

1. A guy may be installed if required, however, maintain 13 inches of minimum separation between the primary jumper and the fiberglass strain insulator.
2. Form jumpers so that a minimum of 18 inches separation is maintained between jumpers, open cutout barrels, and other energized parts.
3. Wildlife wire should be used on all primary jumpers.

SUBJECT OVERHEAD DISTRIBUTION				
DETAIL SECTIONALIZING - CUTOUT ON SINGLE PHASE LINES 35KV CLASS				
Date 06-30-09	SUPERSEDES HD001002 DATE 10-01-02	SHEET 2 OF 2 SHEETS	Alabama Power	A- HD001002

HD-1

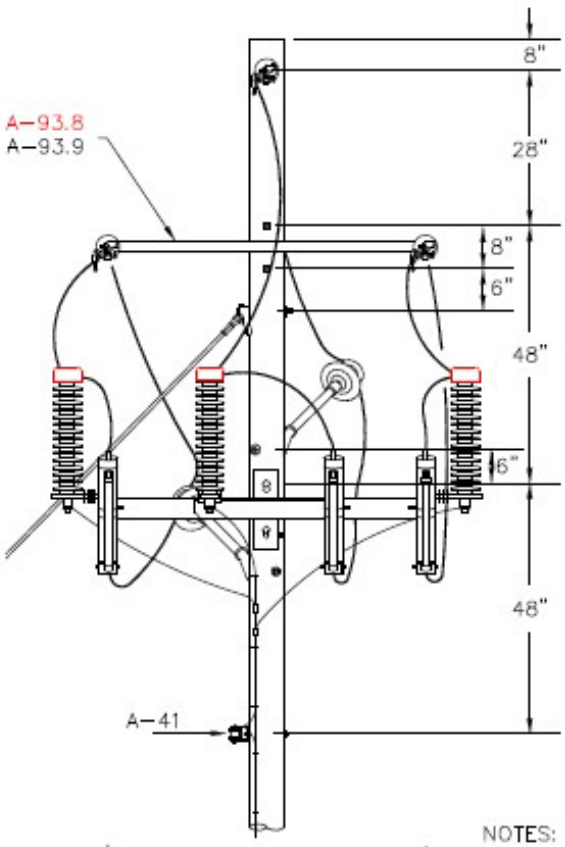


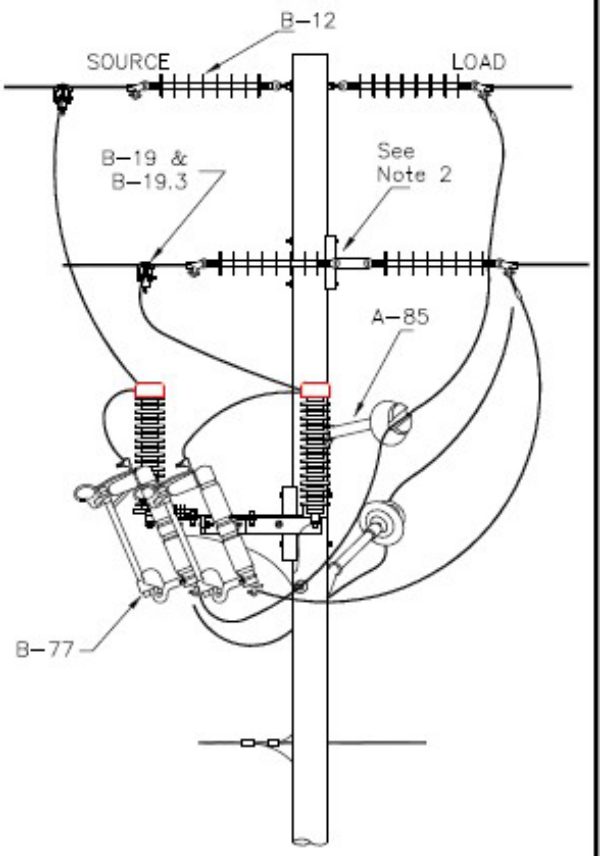
NOTES:

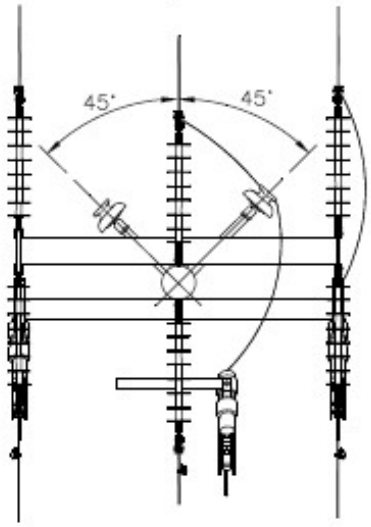
1. The construction shown on this plate is preferred. The construction shown on Plate HD-2.1 may be used to avoid a pole replacement.
2. If this sectionalizing point is to be normally open, both source and load side arresters should be installed as per the details on Plate HD-1.

SUBJECT: OVERHEAD DISTRIBUTION				
DETAIL: SECTIONALIZING - SINGLE PHASE FUSED TAP FROM THREE PHASE LINE - PREFERRED 35KV CLASS				
Date: 06-30-09	SUPERSEDES: HD002001 DATE: 10-01-02	SHEET 1 OF 1 SHEETS	Alabama Power	A- HD002001

HD-2







NOTES:

1. Always install cutouts on source side of pole.
2. It is preferred (but not required) that the primary arm and cutout bracket be on opposite sides of the pole.
3. Use a minimum of #4 solid copper jumpers and shape the jumpers to maintain the following clearances:

   A: 18 inches between primary jumpers or between primary jumper and grounded equipment.

   B: 13 inches between primary jumper and pole surface or between primary jumper and fiberglass strain insulator in guy.
4. If the sectionalizing point is to be normally open, both the source and load side arresters should be installed as per Sheet 3.
5. For maximum allowable line angle for this construction see Plate HB–83, Sheet 4.

ARRESTERS NOT SHOWN FOR CLARITY PURPOSES.

THE CONSTRUCTION SHOWN ON THIS SHEET IS FOR USE ON ANGLE POLES ONLY. FOR TANGENT CONSTRUCTION SEE SHEET 1.

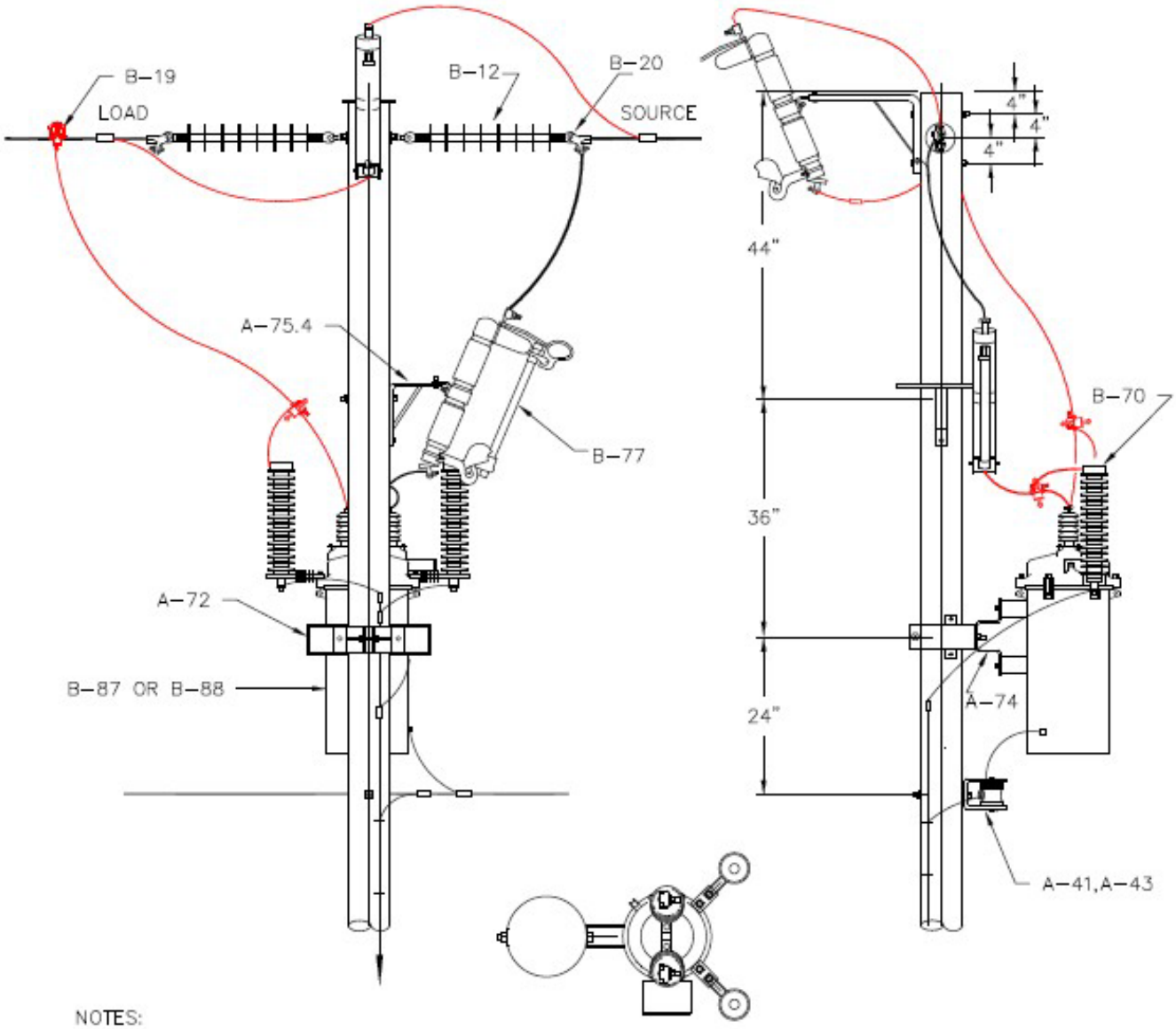
SUBJECT OVERHEAD DISTRIBUTION

DETAIL SECTIONALIZING - CUTOUTS MOUNTED ON THREE PHASE COMBINATION BRACKET
35KV CLASS

Date 06-30-09	SUPERSEDES HD005002 DATE 10–01–02	SHEET 2 OF 4 SHEETS	Alabama Power	A- HD005002

HD-5

35KV Overhead Construction

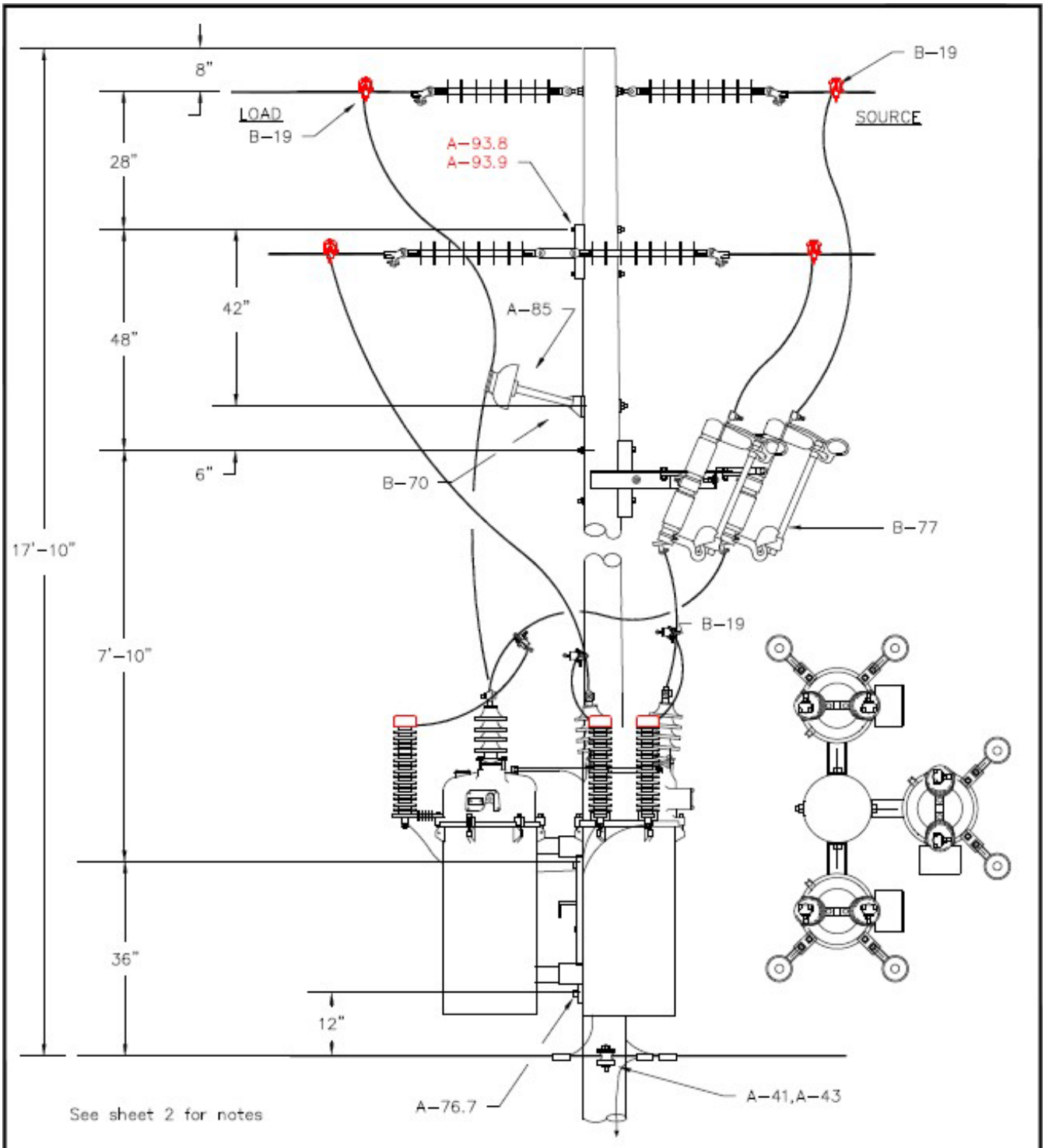


NOTES:

1. Connect recloser grounding lug to line neutral.
2. Release and rotate tank cover so that bushings and switch operating handle mount in position shown.
3. Use wildlife guards and wildlife jumper wire in areas where wildlife is suspected.
4. When fusible cutout is used on bypass, leave barrel out of bypass cutout and hang barrel with top side up on the pole.

SUBJECT: OVERHEAD DISTRIBUTION				
DETAIL: SECTIONALIZING - IØ 19.9KV PRIMARY COOPER TYPE E OR 4E OCR 35 KV CLASS SYSTEMS				
Date: 06-30-09	SUPERSEDES: HD030001 DATE: 10-01-02	SHEET 1 OF 1 SHEETS	Alabama Power	A- HD030001

HD-30



SUBJECT OVERHEAD DISTRIBUTION				
DETAIL SECTIONALIZING - TWO OR THREE IØ PRIMARY COOPER - TYPE DV OCR 35KV CLASS				
Date 06-30-09	SUPERSEDES HD032001 DATE 10–01–02	SHEET 1 OF 2 SHEETS	Alabama Power	A- HD032001

HD-32

FUSE TABLE
FOR CONVENTIONAL DISTRIBUTION TRANSFORMERS ON OVERHEAD LINES

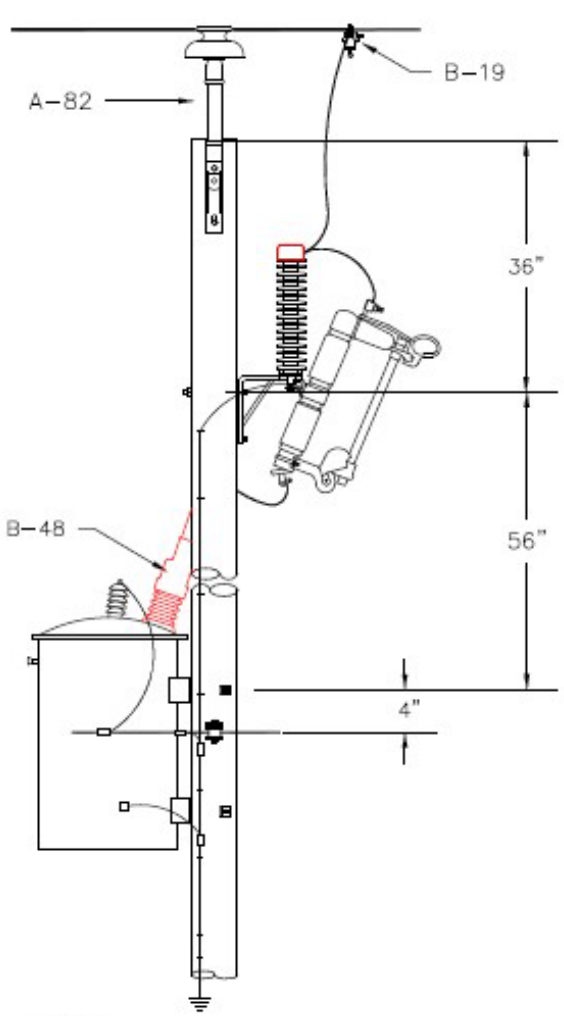
Trans. Size (KVA)	19.9 / 34.5Y KV Transformers			
	Full Load Amps 1–PH	Fuse Size		
		Expulsion (QA or QR) 1–PH Open Wye; 3–PH Wye	Series Current Limiting 23 KV	Tandem ELF Current limiting fuse (1346425)
10	–	–	–	31K
15	.75	1	12K	31K
25	1.26	1	12K	31K
37.5	1.88	2	12K	31K
50	2.51	5	12K	31K
75	3.77	8	12K	31K
100	5.03	10	12K	31K
167	8.39	20	25K	–
250	12.56	25	25K	–
333	–	–	–	–
500	25.13	50	40K	–

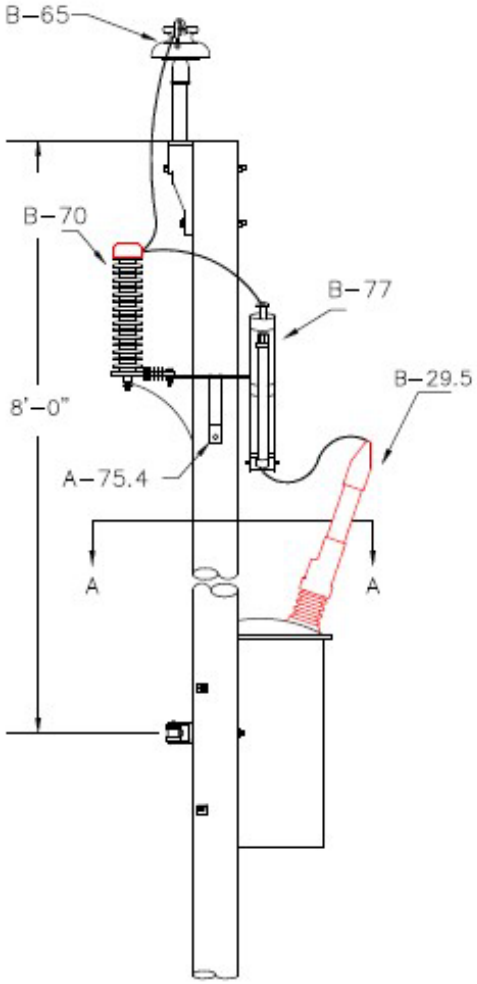
SUBJECT OVERHEAD DISTRIBUTION

DETAIL TRANSFORMERS - FUSE TABLE FOR CONVENTIONAL DISTRIBUTION
TRANSFORMERS - 35KV CLASS

Date 01-10-19	SUPERSEDES HE002001 DATE 06-30-09	SHEET 1 OF 1 SHEETS	Alabama Power	A- HE00200I

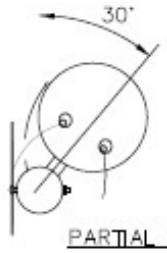
HE-2





NOTES:

1. Primary jumper to be 35 kv #6 copper wildlife wire.
2. Connect transformer primary and secondary neutral bushings and pole ground directly to line neutral.
3. Connect tank of conventional transformer directly to pole ground.
4. The construction on this plate is to be used where it is known that additional phases will not be added in the future. The construction shown on Plate HE–17.6 allows for future phase additions.
5. For detail of service see Plate AOE–4.1.



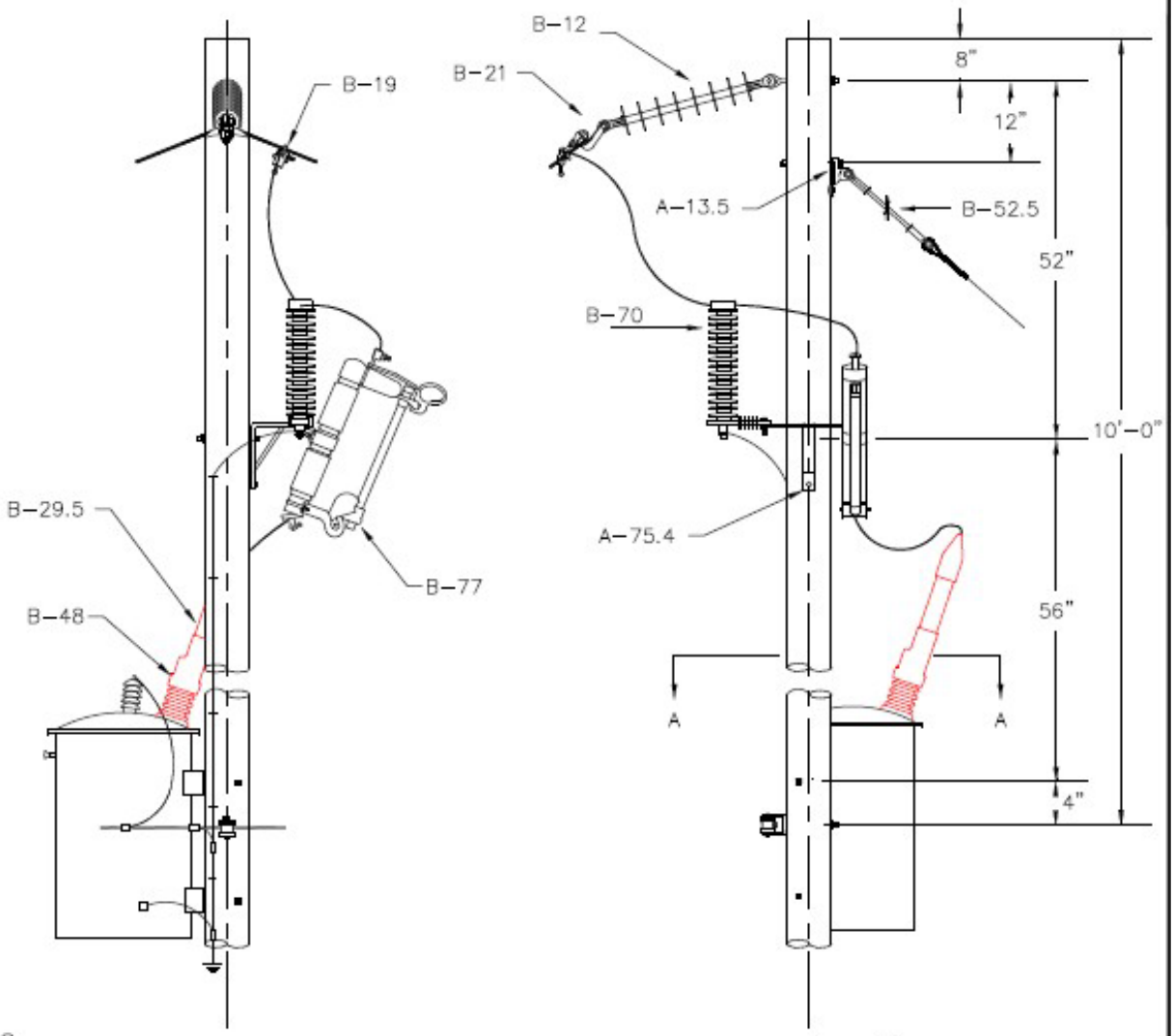
PARTIAL PLAN VIEW A–A

SUBJECT OVERHEAD DISTRIBUTION

DETAIL TRANSFORMERS - CONVENTIONAL WITH SINGLE PHASE TANGENT
35KV CLASS

Date	SUPERSEDES / DATE	SHEET / SHEETS		
06-30-09	SUPERSEDES HE017001 DATE 10–01–02	SHEET 1 OF 1 SHEETS	Alabama Power	A- HE017001

HE-17



NOTES:

1. Connect tank of conventional transformer directly to pole ground.
2. Connect transformer primary and secondary neutral bushings and pole ground to line neutral.
3. Primary jumpers to be 35KV #6 copper wildlife wire.
4. For details of service see Plate AOE-4.1.

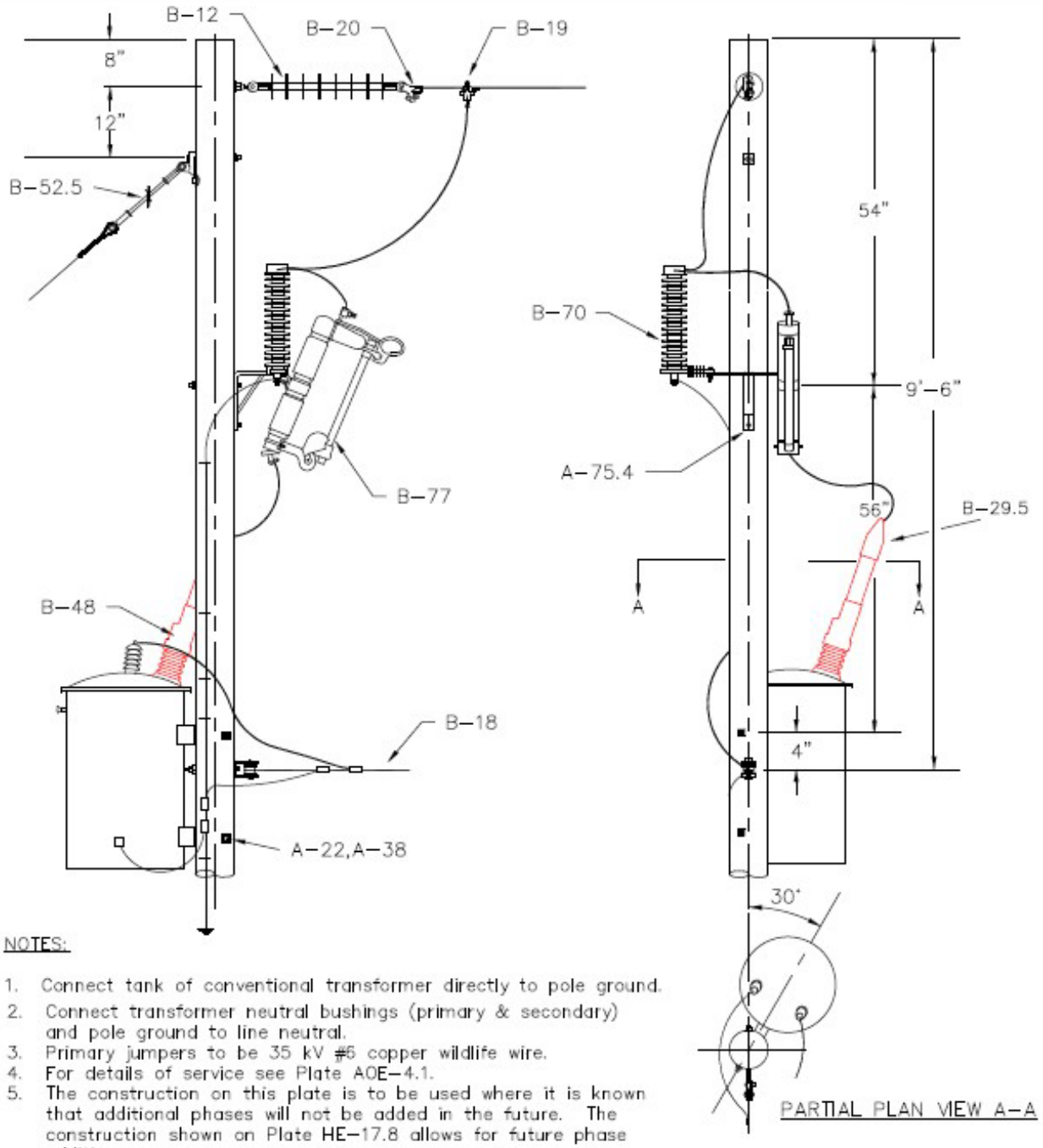
SUBJECT OVERHEAD DISTRIBUTION

DETAIL TRANSFORMERS - CONVENTIONAL WITH SINGLE PHASE ON PRIMARY ANGLE
35KV CLASS

Date 06-30-09	SUPERSEDES HE017201 DATE 10-01-02	SHEET 1 OF 1 SHEETS	Alabama Power	A- HE017201

HE-17.2

35KV Overhead Construction

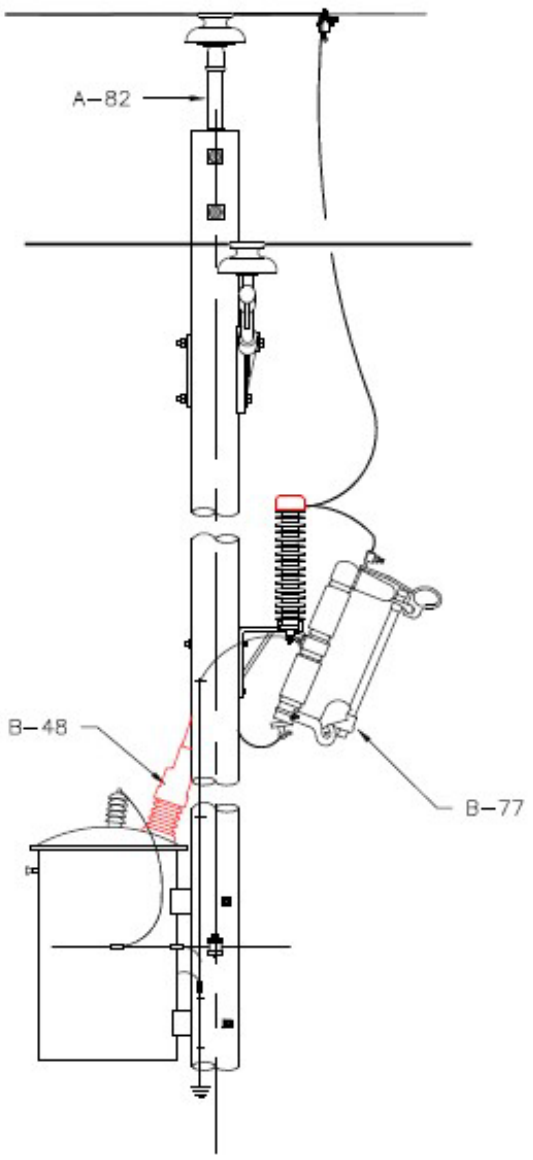


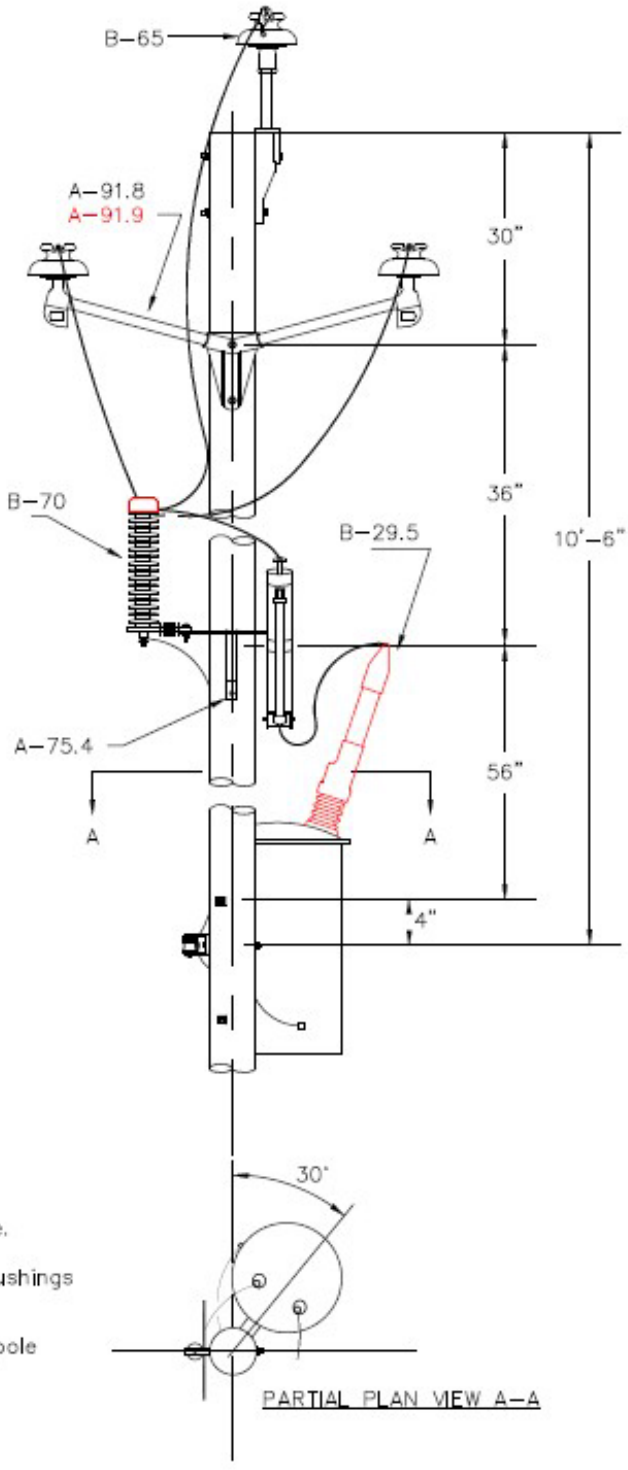
NOTES:

1. Connect tank of conventional transformer directly to pole ground.
2. Connect transformer neutral bushings (primary & secondary) and pole ground to line neutral.
3. Primary jumpers to be 35 kV #6 copper wildlife wire.
4. For details of service see Plate AOE–4.1.
5. The construction on this plate is to be used where it is known that additional phases will not be added in the future. The construction shown on Plate HE–17.8 allows for future phase additions.

SUBJECT OVERHEAD DISTRIBUTION				
DETAIL TRANSFORMERS - CONVENTIONAL WITH SINGLE PHASE DEAD END 35KV CLASS				
Date 06-30-09	SUPERSEDES HE017401 DATE 10-01-02	SHEET 1 OF 1 SHEETS	Alabama Power	A- HE017401

HE-17.4





NOTES:

1. All primary jumpers to be 35kV #6 copper wildlife wire.
2. Connect transformer primary and secondary neutral bushings and pole ground directly to line neutral.
3. Connect tank of conventional transformer directly to pole ground.
4. For details of service see Plate AOE–4.1.

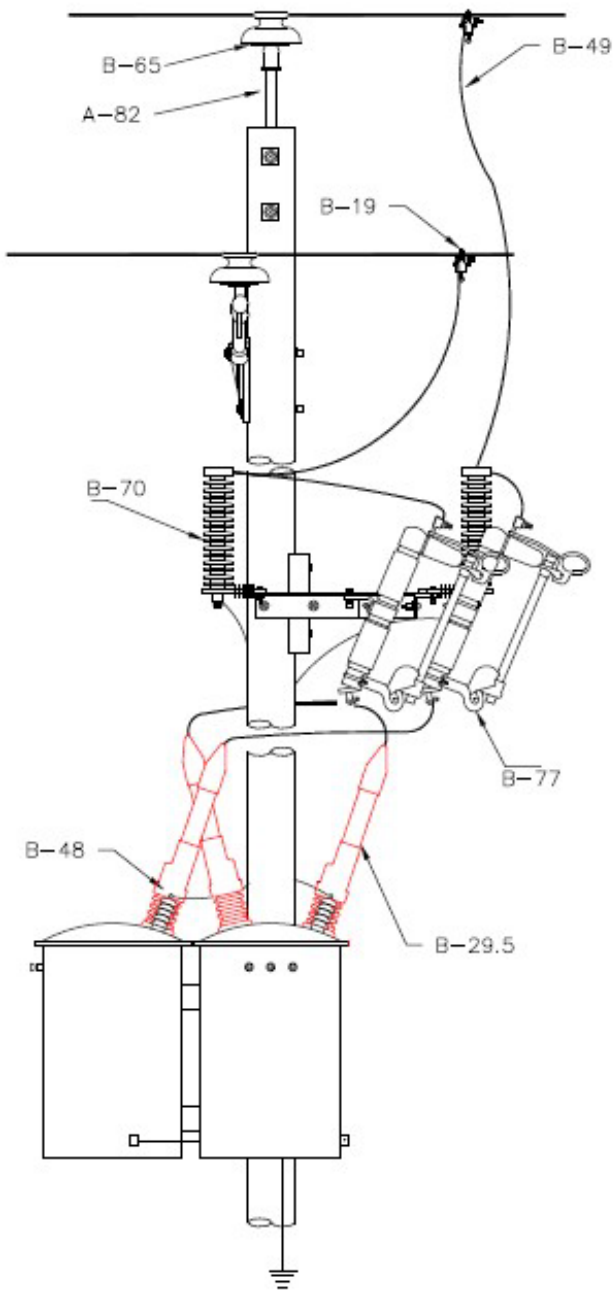
PARTIAL PLAN VIEW A–A

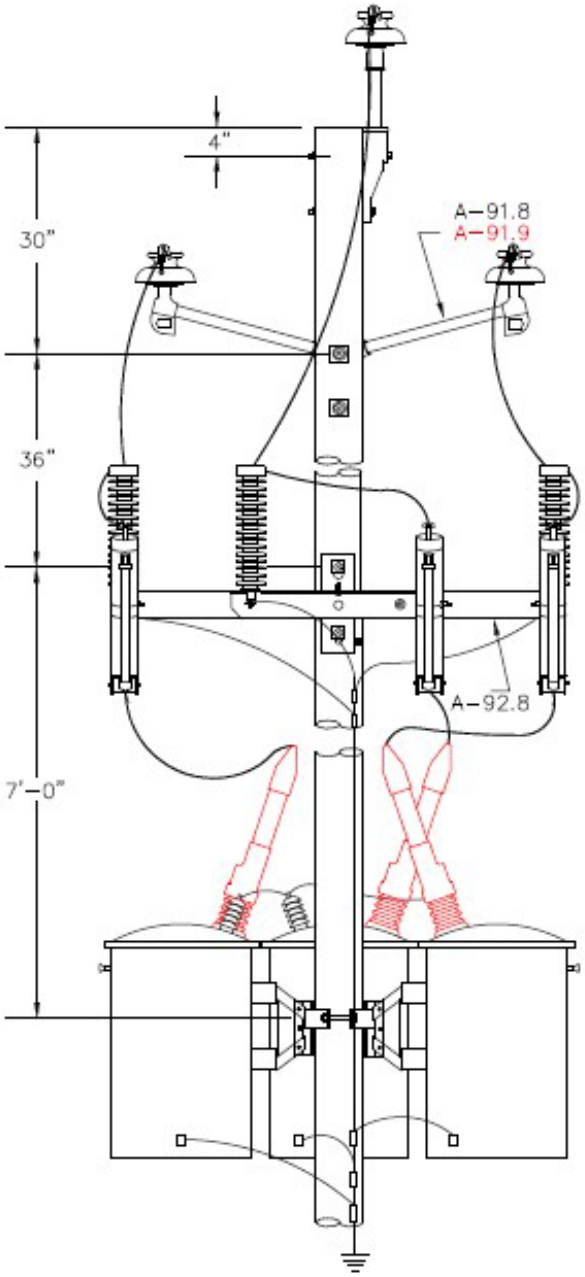
SUBJECT OVERHEAD DISTRIBUTION

DETAIL TRANSFORMERS - CONVENTIONAL WITH TWO PHASE 60" FIBERGLASS BRACKET
35KV CLASS

Date 06-30-09	SUPERSEDES HE017601 DATE 10–01–02	SHEET 1 OF 1 SHEETS	Alabama Power	A- HE01760I

HE-I7.6





SEE SHEET 2 FOR NOTES

SUBJECT OVERHEAD DISTRIBUTION				
DETAIL TRANSFORMERS - THREE PHASE BANK ON POLES WITH 60 INCH FIBERGLASS BRACKET 35KV CLASS				
Date 06-30-09	SUPERSEDES HE031001 DATE 10-01-02	SHEET 1 OF 2 SHEETS	Alabama Power	A- HE031001

HE-31

NOTES:

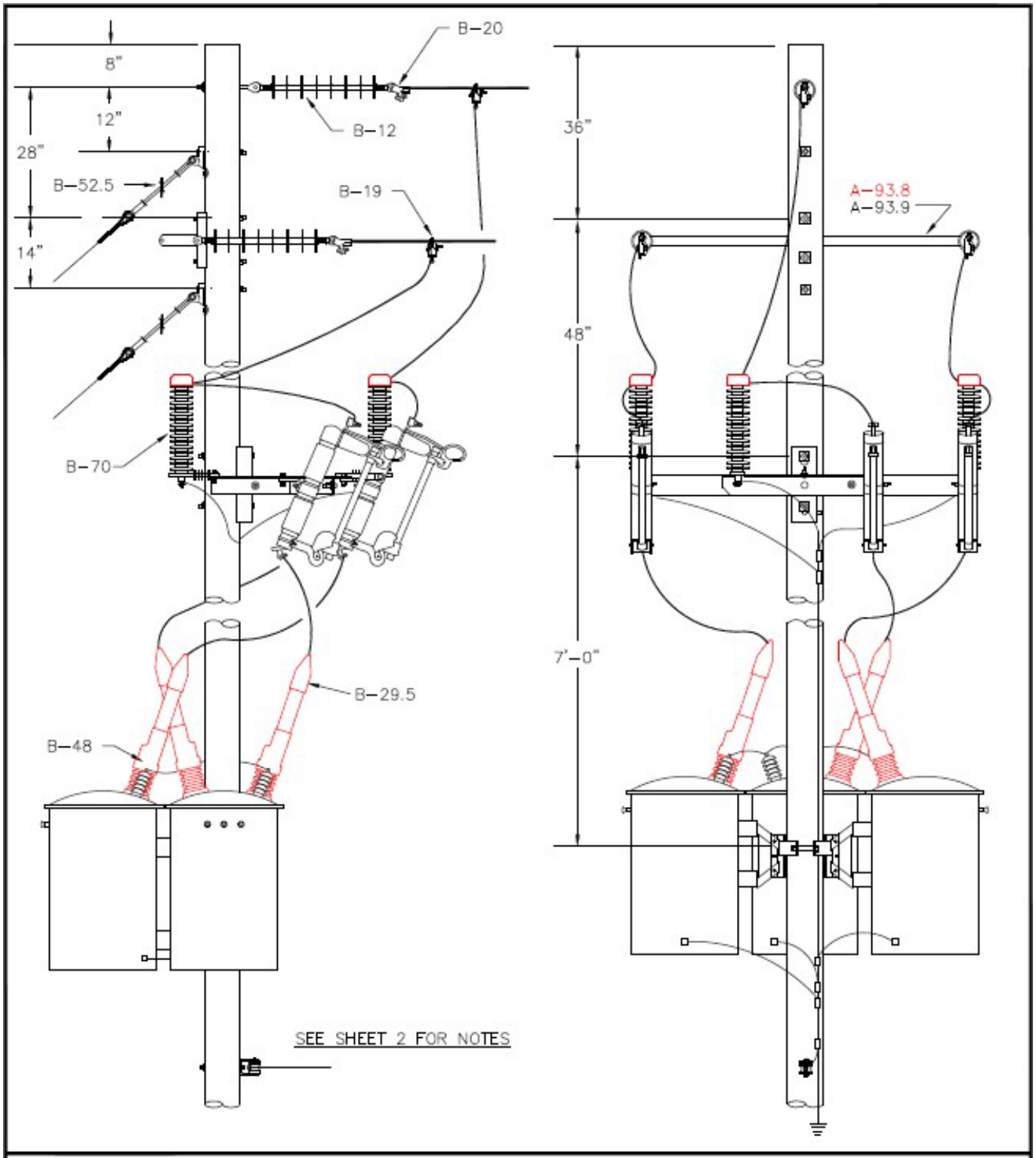
1. For wye–wye transformer banks, connect primary neutrals and secondary neutrals (as determined when secondary windings are paralleled) directly to line neutral. For wye–delta transformer banks, float primary neutral and connect secondary neutral bushing of lighting transformer directly to line neutral. See Plate HM–97 for temporary grounding of high side neutral on wye–delta banks while opening or closing transformer bank cutouts.
2. Connect transformer tanks directly to pole ground.
3. For mounting A–92.8 bracket, use two 5/8" bolts (spaced 8 inches apart), and two square washers.
4. For open wye–delta banks, mount transformers directly to pole as shown on Plate HE–30.

SUBJECT OVERHEAD DISTRIBUTION

DETAIL TRANSFORMERS - THREE PHASE BANK ON POLES WITH TWO PHASE 60" FIBERGLASS BRACKET
35KV CLASS

Date 06-30-09	SUPERSEDES HE031002 DATE 10–01–02	SHEET 2 OF 2 SHEETS	Alabama Power	A- HE031002

HE-31



SUBJECT OVERHEAD DISTRIBUTION

DETAIL TRANSFORMERS - THREE PHASE BANK ON DEAD END POLE
35KV CLASS

Date 06-30-09	SUPERSEDES HE035001 DATE 10-01-02	SHEET 1 OF 2 SHEETS	Alabama Power	A- HE035001

HE-35

NOTES:

1. For wye–wye transformer banks, connect primary neutrals and secondary neutrals (as determined when secondary windings are paralleled) directly to line neutral. For wye–delta transformer banks, float primary neutral and connect secondary neutral bushing of lighting transformer directly to line neutral. See Plate HM–97 for temporary grounding of high side neutral on wye–delta banks while opening or closing transformer bank cutouts.
2. Connect transformer tanks directly to pole ground.
3. For mounting A–92.8 bracket, use two 5/8" bolts (spaced 8 inches apart) and two square washers.
4. For open wye–delta banks, mount transformers directly to pole as shown on Plate HE–30.

SUBJECT OVERHEAD DISTRIBUTION

DETAIL TRANSFORMERS - THREE PHASE BANK ON DEAD END POLE

35KV CLASS

Date 06-30-09	SUPERSEDES HE035002 DATE 10–01–02	SHEET 2 OF 2 SHEETS	Alabama Power	A- HE035002

HE-35

Alabama Power

Safety and Health Orientation Checklist

Company Representative(s) shall review with the Contractor's site management all site-specific and Contract-specific safety and health requirements that are applicable to the Contractor's scope of work as defined in the written contract. In addition, Company Representative(s) will provide the Contractor with applicable electrical system characteristics, conditions and design information outlined in section 9 below. It is the Contractor's responsibility to convey this information to all of the Contractor's employees and subcontractors.

This Checklist is a tool that can be used by responsible Company personnel to ensure that basic safety and health issues are discussed with Contractor personnel. This checklist contains many topics that may or may not be applicable to the service being provided. For the items that do not apply to the work being performed, the form can be edited to remove these items or the item can be left unchecked which will signify that the item is not applicable.

The Checklist provides signature lines to document both the Company and Contractor representative that reviewed the information. Documentation of this review may or may not be required in all organizations. Contact your LSO or local Safety and Health representative to determine if signatures are required.

1. Personal Protection Equipment

- ☐ Head Protection
- ☐ Eye and Face Protection
- ☐ Foot Protection
- ☐ Hand Protection
- ☐ Traffic Vests
- ☐ Respiratory Protection
- ☐ Basic Work Clothing
- ☐ FR Clothing

2. General Safety

- ☐ Housekeeping
- ☐ Sanitation
- ☐ Illumination
- ☐ Materials Storage and Handling
- ☐ Signs and Barricades
- ☐ Ladders
- ☐ Scaffolds
- ☐ Manlifts – Use and Training
- ☐ Fall Protection
- ☐ Steel Erection
- ☐ Rigging and Lift Plans
- ☐ Crane Suspended Work Platforms
- ☐ Chain & Lever Hoists & Jacks
- ☐ Power Tools
- ☐ Grinders – Pedestal, Bench and Portable
- ☐ Hazardous Energy Control (Lockout/Tagout) and Clearance Procedures
- ☐ Excavation and Trenching
- ☐ Blasting Operations
- ☐ Confined Space Entry
- ☐ Welding, Cutting, Heating
- ☐ Compressed Gas Cylinders
- ☐ Transporting Personnel
- ☐ Working Over or Near Water
- ☐ Demolition Operations
- ☐ Atmospheric Monitoring

3. Major Equipment

- ☐ Mobile Cranes
- ☐ Forklift Operations
- ☐ Earth Moving Equipment
- ☐ Aerial lifts and Bucket Trucks
- ☐ Elevators
- ☐ Overhead Cranes
- ☐ Mobile Equipment Near Electric and Process Lines
- ☐ Vehicles, Carts and Gators

4. Electrical Safety

- ☐ Temporary Wiring
- ☐ Ground Fault Circuit Interrupter(GFCI)
- ☐ System Voltage
- ☐ Hazard Risk Category
- ☐ RF Antenna Awareness
- ☐ Available Fault Current
- ☐ Clearance / Switching Procedures
- ☐ Work On or Near Energized Electrical Circuits
- ☐ Welding and Portable Generators
- ☐ IDMS Trouble Dispatch

5. Occupational Health

- ☐ Hearing Conservation
- ☐ Hazard Communication Program
- ☐ Bloodborne Pathogens
- ☐ Lead Paint Abatement
- ☐ Inorganic Arsenic
- ☐ Hexavalent Chromium
- ☐ Silica
- ☐ Asbestos
- ☐ Abrasive Blasting
- ☐ Industrial Radiography
- ☐ Material Safety Data Sheets
- ☐ Combustible Dust Safety

6. Fire Protection and Prevention

- ☐ General Requirements
- ☐ Fire Extinguishers
- ☐ Fire Watch
- ☐ Flammable/Combustible Material Storage
- ☐ Hot Work Permits

7. Emergency Procedures and Alarms

- ☐ Fire
- ☐ Chemical Release
- ☐ Spill
- ☐ Injuries/illnesses
- ☐ WeatherRelated
- ☐ Security

8. Miscellaneous Issues

- ☐ Eating in the Plant
- ☐ First Aid/MedicalFacilities
- ☐ Reporting Occupational Injuries, Illnesses and Incidents
- ☐ Smoking
- ☐ Job Safety Analysis
- ☐ Fiber & Communication Cables
- ☐ Site Hazards
- ☐ Non-English Speaking Employees
- ☐ Safety Violations
- ☐ Corrective Actions
- ☐ Regulatory Agency Visits
- ☐ Use of Company Tools/Equipment

9. Information Transfer – Required when contractor's scope of work involves working on electric power generation, transmission and/or distribution installations and equipment or when constructing new electric transmission and distribution lines and equipment. Company Representatives will provide the following information relative to the safety of the work to be performed:

- ☐ Nominal voltages of lines andequipment
- ☐ Maximum switching-transient voltages
- ☐ Presence of induced voltages
- ☐ Presence of protective groundsand equipment conductors
- ☐ Locations of circuits, equipment, electric supply lines, communication lines, and fire protective services
- ☐ Condition of protective grounds andequipment grounding conductors
- ☐ Condition of poles
- ☐ Environmental conditions relating to safety
- ☐ Appropriate information needed for Contractor to perform safety assessments, such as enclosed spaces, minimum approach distances, incident energy, pole and tower design strength, etc.

10. Other Safety and Health

- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____

I have received a review of the Site-Specific and Contract-Specific Compliance and Safety, Health requirements checked above and the applicable information listed in Section 9. I understand these Southern Company expectations and I will ensure these requirements are communicated prior to work activity to all of my contract workers/representatives and all of the representatives of my subcontractors.

_____

Contractor or Site Manager (Print name) Date

_____

Contractor or Site Manager(Sign name) Date

_____

Company Representative Date

Alabama Power

Safety and Health Orientation Checklist

Company Representative(s) shall review with the Contractor's site management all site-specific and Contract-specific safety and health requirements that are applicable to the Contractor's scope of work as defined in the written contract. In addition, Company Representative(s) will provide the Contractor with applicable electrical system characteristics, conditions and design information outlined in section 9 below. It is the Contractor's responsibility to convey this information to all of the Contractor's employees and subcontractors.

This Checklist is a tool that can be used by responsible Company personnel to ensure that basic safety and health issues are discussed with Contractor personnel. This checklist contains many topics that may or may not be applicable to the service being provided. For the items that do not apply to the work being performed, the form can be edited to remove these items or the item can be left unchecked which will signify that the item is not applicable.

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- ☐ Scaffolds
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- ☐ Steel Erection
- ☐ Rigging and Lift Plans
- ☐ Crane Suspended Work Platforms
- ☐ Chain & Lever Hoists & Jacks
- ☐ Power Tools
- ☐ Grinders – Pedestal, Bench and Portable
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- ☐ Blasting Operations
- ☐ Confined Space Entry
- ☐ Welding, Cutting, Heating
- ☐ Compressed Gas Cylinders
- ☐ Transporting Personnel
- ☐ Working Over or Near Water
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- ☐ Atmospheric Monitoring

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- ☐ Vehicles, Carts and Gators

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- ☐ RF Antenna Awareness
- ☐ Available Fault Current
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- ☐ Lead Paint Abatement
- ☐ Inorganic Arsenic
- ☐ Hexavalent Chromium
- ☐ Silica
- ☐ Asbestos
- ☐ Abrasive Blasting
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- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____

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_____

Contractor or Site Manager (Print name) Date

_____

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_____

Company Representative Date


Alabama Power