



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

September 6, 2016

Sent Via Electronic Mail

A.15-09-010
Wildfire Expense Memorandum Account

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

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

Dear Mr. Shames,

Attached please find SDG&E's supplemental response to SDCAN Data Request 01 (SDCAN-SDG&E-A.15-09-010-01), dated August 18, 2016. The attached contains SDG&E's response to Request #2, which was the only response SDG&E was not able to complete in the responses SDG&E transmitted to you on September 2, 2016. With this response, SDG&E has now fully responded to SDCAN-SDG&E DR-01.

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

Sincerely,

Signed

Shivani Sidhar
Regulatory Case Manager

Enclosures

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

**SDCAN DATA REQUEST
SDCAN-SDG&E DR-01, Q1-13
SDG&E WEMA PROCEEDING - A.15-09-010
SDG&E SUPPLEMENTAL RESPONSE
DATE RECEIVED: August 18, 2016
DATE RESPONDED: September 06, 2016**

I. GENERAL OBJECTIONS

1. SDG&E objects generally to each request to the extent that it seeks information protected by the attorney-client privilege, the attorney work product doctrine, statutory mediation confidentiality (see Cal. Evid. Code §§ 1115-28) or any other applicable privilege or evidentiary doctrine. No information protected by such privileges will be knowingly disclosed.
2. SDG&E objects generally to each request that is overly broad and unduly burdensome. As part of this objection, SDG&E objects to discovery requests that seek “all documents” or “each and every document” and similarly worded requests on the grounds that such requests are unreasonably cumulative and duplicative, fail to identify with specificity the information or material sought, and create an unreasonable burden compared to the likelihood of such requests leading to the discovery of admissible evidence. Notwithstanding this objection, SDG&E will produce all relevant, non-privileged information not otherwise objected to that it is able to locate after reasonable inquiry.
3. SDG&E objects generally to each request to the extent that the request is vague, unintelligible, or fails to identify with sufficient particularity the information or documents requested and, thus, is not susceptible to response at this time.
4. SDG&E objects generally to each request that: (1) asks for a legal conclusion to be drawn or legal research to be conducted on the grounds that such requests are not designed to elicit facts and, thus, violate the principles underlying discovery; (2) requires SDG&E to do legal research or perform additional analyses to respond to the request; or (3) seeks access to counsel’s legal research, analyses or theories.
5. SDG&E objects generally to each request to the extent it seeks information or documents that are not reasonably calculated to lead to the discovery of admissible evidence.
6. SDG&E objects generally to each request to the extent that it is unreasonably duplicative or cumulative of other requests.
7. SDG&E objects generally to each request to the extent that it would require SDG&E to search its files for matters of public record such as filings, testimony, transcripts, decisions, orders, reports or other information, whether available in the public domain or through FERC or CPUC sources.
8. SDG&E objects generally to each request to the extent that it seeks information or documents that are not in the possession, custody or control of SDG&E.

**SDCAN DATA REQUEST
SDCAN-SDG&E DR-01, Q1-13
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SDG&E SUPPLEMENTAL RESPONSE
DATE RECEIVED: August 18, 1016
DATE RESPONDED: September 06, 2016**

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

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

II. EXPRESS RESERVATIONS

1. No response, objection, limitation or lack thereof, set forth in these responses and objections shall be deemed an admission or representation by SDG&E as to the existence or nonexistence of the requested information or that any such information is relevant or admissible.
2. SDG&E reserves the right to modify or supplement its responses and objections to each request, and the provision of any information pursuant to any request is not a waiver of that right.
3. SDG&E reserves the right to rely, at any time, upon subsequently discovered information.
4. These responses are made solely for the purpose of this proceeding (A.15-09-010) and for no other purpose.

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III. RESPONSES

Request 1:

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

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

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

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Request 2:

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

Response: See attached "Electric Transmission Standards.pdf".

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SDG&E WEMA PROCEEDING - A.15-09-010
SDG&E SUPPLEMENTAL RESPONSE
DATE RECEIVED: August 18, 2016
DATE RESPONDED: September 06, 2016**

Request 3:

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

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

**SDCAN DATA REQUEST
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SDG&E WEMA PROCEEDING - A.15-09-010
SDG&E SUPPLEMENTAL RESPONSE
DATE RECEIVED: August 18, 1016
DATE RESPONDED: September 06, 2016**

Request 4:

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

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

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

**SDCAN DATA REQUEST
SDCAN-SDG&E DR-01, Q1-13
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DATE RECEIVED: August 18, 2016
DATE RESPONDED: September 06, 2016**

Request 5:

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

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

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

SDCAN DATA REQUEST
SDCAN-SDG&E DR-01, Q1-13
SDG&E WEMA PROCEEDING - A.15-09-010
SDG&E SUPPLEMENTAL RESPONSE
DATE RECEIVED: August 18, 2016
DATE RESPONDED: September 06, 2016

Request 6:

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

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

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

**SDCAN DATA REQUEST
SDCAN-SDG&E DR-01, Q1-13
SDG&E WEMA PROCEEDING - A.15-09-010
SDG&E SUPPLEMENTAL RESPONSE
DATE RECEIVED: August 18, 2016
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Request 7:

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

Response:

See attached “ 2001 Powerline Fire Prevention Field Guide.pdf.”

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SDG&E WEMA PROCEEDING - A.15-09-010
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DATE RECEIVED: August 18, 1016
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Request 8:

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

Response:

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

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Request 9:

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

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

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SDG&E WEMA PROCEEDING - A.15-09-010
SDG&E SUPPLEMENTAL RESPONSE
DATE RECEIVED: August 18, 2016
DATE RESPONDED: September 06, 2016

Request 10:

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

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

Response:

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

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

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SDG&E WEMA PROCEEDING - A.15-09-010
SDG&E SUPPLEMENTAL RESPONSE
DATE RECEIVED: August 18, 1016
DATE RESPONDED: September 06, 2016

Request 11:

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

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

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

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SDCAN-SDG&E DR-01, Q1-13
SDG&E WEMA PROCEEDING - A.15-09-010
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Request 12:

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

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

SDCAN DATA REQUEST
SDCAN-SDG&E DR-01, Q1-13
SDG&E WEMA PROCEEDING - A.15-09-010
SDG&E SUPPLEMENTAL RESPONSE
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Request 13:

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

- a. any and all Settlement Demands or documents referencing possible settlement to SDG&E/Sempra Energy from the California Department of Forestry and Fire Protection (“CalFire”) and the California Department of Parks and Recreation;
- b. any and all Settlement Agreements between SDG&E/Sempra Energy and the California Department of Forestry and Fire Protection (“CalFire”) and the California Department of Parks and Recreation;
- c. any and settlement checks paid by SDG&E in settlement of the claims by the California Department of Forestry and Fire Protection and the California Department of Parks and Recreation with regard to the Witch, Guejito, Rice and any other fire occurring in 2007, including but not limited to checks and/or wire transfer advices referencing payment to the California District Attorneys Association and/or the California General Fund.
- d. any and all Settlement Agreements or documents referencing possible settlement between the California Department of Forestry and Fire Protection and San Diego Gas & Electric Co. and/or Sempra Energy from 2000 and the present.

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


The background of the entire page is a grayscale photograph of a high-voltage transmission tower. The tower is a lattice structure, and power lines are visible extending from it across the horizon. The image has a grainy, halftone-like texture.

Electric Transmission Standards

Engineering Services
Department

TRANSMITTAL



A  Sempra Energy utility

APRIL 20, 2009

TO: ELECTRIC TRANSMISSION STANDARDS
BOOK HOLDERS

This transmits the following documents:

DOCUMENT NO.	NO. OF SHTS.	REV. NO.	DESCRIPTION/TITLE
19000	6	J	OVERHEAD ASSEMBLIES, SECTION TABLE OF CONTENTS
19410	1	E	POLYMER V-STRONG INSULATOR, 230KV STEEL STRUCTURE
19415	1	D	POLYMER RESTRAINED V-STRING INSULATOR, 230KV STEEL POLE
19425	1	C	POLYMER RESTRAINED V-STRING INSULATOR, OUTSIDE ANGLE, 230KV STEEL TOWER
19430	1	C	POLYMER RESTRAINED V-STRING INSULATOR, INSIDE ANGLE, BOTTOM X-ARM, 230KV STEEL TOWER
19435	1	C	POLYMER RESTRAINED V-STRING INSULATOR, INSIDE ANGLE, BOTTOM X-ARM, 230KV STEEL TOWER
19458	1	C	POLYMER DEAD-END INSULATOR, 2-BUNDLE CONDUCTORS - ACSS, 230KV STEEL STRUCTURE

The Above Item(s) Is/Are:

- For Your Use/Action
- For Your Information
- Per Your Request

- For Your Approval
- For Your Review/Comment
- Approved As Submitted

- Disapproved, Revise Prior to Using
- Include Comments in Next Revision
- Your Response is Required By _____ (Date)

Attachments

Signature: 
G. A. AKIN

ELECTRIC TRANSMISSION STANDARDS

PREPARED BY:

TRANSMISSION ENGINEERING

SAN DIEGO GAS AND ELECTRIC

**FOR OH STANDARDS INQUIRES
CONTACT: S. FLYNN ORTIZ (858) 654-8252**


**FOR UG STANDARDS INQUIRIES
CONTACT: A. L. (AL) SOTOA (858) 654-8284**

**INFORMATION CONTAINED IN THIS DOCUMENT IS PROPRIETARY TO SDG&E.
DISTRIBUTION OUTSIDE OF THE COMPANY MUST BE PRE-APPROVED BY
TRANSMISSION ENGINEERING MANAGER.**

SECTION

TITLE


12000	DESIGN AIDS
13000	POLE TOP ARRANGEMENTS - WOOD
14000	CONDUCTORS AND ACCESSORIES (LATER)
15000	GUYS AND ANCHORS
16000	RESERVED
17000	POLES AND POLE TOP ARRANGEMENTS – STEEL
18000	RESERVED
19000	OVERHEAD ASSEMBLIES
20000 – 24000	RESERVED
25000 – 30000	OVERHEAD FIELD MAINTENANCE (LATER)
31000 – 44000	UNDERGROUND STANDARDS
45000 – 49999	UNDERGROUND FIELD MAINTENANCE (LATER)

A	ADDED NEW SECTIONS	RLR	WPH	WVT	04/25/02	C					
-	ORIGINAL ISSUE	KSM	GV	WPH	09/01/97	B	UPDATE	RLR	WPH	<i>WVT</i>	8/31/06
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE
TRANSMISSION ENGINEERING						SCALE:					
 TABLE OF CONTENTS						DWG. NO			SHEET NO.		
						GTC			1 OF 1		

Design Aids

<u>DWG. NO.</u>	<u>REV.</u>	<u>TITLE</u>	<u>NO. OF SHEETS</u>
12000	E	SECTION TABLE OF CONTENTS	1
12200	B	MAXIMUM WIND SPANS, 69KV WOOD POLE CONSTRUCTION	24
12300	O	BUCKLING CAPACITY, WOOD POLES	9
12500	A	STEEL WOOD-EQUIVALENT (SW) POLES	1
12540	B	CONDUCTOR AND OHGW ACCESSORY CROSS-REFERENCE	1
12560	O	G. O. 95 CLEARANCE RULES 37 AND 38	1

D	UPDATED LIST	RLR	WPH	WVT	07/03/07	C	UPDATE	RLR	WPH	WVT	3/1/07
--	ORIGINAL ISSUE	KSM	WVT	WPH	09/01/97	E	UPDATE	RLR	WPH	<i>SDG</i>	9/18/08
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

TRANSMISSION ENGINEERING						SCALE:					
	DESIGN AIDS					DWG. NO			SHEET NO.		
	SECTION TABLE OF CONTENTS					12000			1 OF 1		

SCOPE:

This standard provides general information regarding maximum allowable wind spans for 69kV, wood pole construction.

USES:

A. New Construction


The maximum wind span data included on the remaining sheets of this standard can be used for selecting span lengths and pole classes for new 69kV transmission lines. Wind span data for Factors of Safety of 3 shall be used for Grade B construction and Factors of Safety of 4 shall be used for Grade A construction.

B. Reconductoring

The maximum wind span data included on the remaining sheets of this standard can be used for evaluating the adequacy of the classes of existing poles when an existing 69kV wood pole line is to be reconducted. Wind span data for Factors of Safety of 2 (2/3 of the new construction factor of safety of 3) shall be used for Grade B construction and 2.667 (2/3 of the new construction Factor of Safety of 4) shall be used for Grade A construction. These reduced Factors of Safety are in accordance with the requirements of Rule 44.2 of G.O. 95. Higher safety factor will be considered on a case by case basis for critical facilities.

If the existing pole classes are not adequate for the new conductor size and the existing span lengths, select one or any combination of the following:

1. **Replace Poles** – Replace the poles with new poles of the necessary class. When determining the required pole classes for the replacement poles, factors of safety of 3 for Grade B construction and 4 for Grade A construction must be used.
2. **Add Wind Anchors** - Add wind anchors to poles of inadequate class.

A	REVISE NOTE	KSM	WVT	WPH	9/1/97	C					
--	ORIGINAL ISSUE	KSM	WVT	WPH	8/1/97	B	CHANGED NOTE 5	RLR	WPH	<i>WVT</i>	4/25/02
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE
TRANSMISSION ENGINEERING						SCALE:					
		MAXIMUM WIND SPANS 69KV WOOD POLE CONSTRUCTION				DWG. NO			SHEET NO.		
						12200			1 OF 24		

3. **Intersect Poles** – Install intersect poles to reduce wind spans. Addition of an intersect pole in every other span usually provides an adequate reduction in (wind) span length. When determining the required class for the intersect poles, factors of safety of 3 for Grade B construction and 4 for Grade A construction must be used.

4. **Use Steel Poles.**

C. Addition of Communication Cables


The maximum wind span data included on the remaining sheets of this standard can be used for evaluating the adequacy of the classes of existing poles when one or more communication cables are to be added to an existing 69kV wood pole line. Wind span data for a Factor of Safety no less than 2.667 (2/3 of the new construction Factor of Safety of 4 for Grade A construction) shall be used for evaluating the adequacy of the existing pole classes. Higher safety factor will be considered on a case by case basis for critical facilities.

If the existing pole classes are not adequate for addition of the communication cable(s), Select one or any combination of the following:

1. **Replace Poles** - Replace the poles with new poles of the required class. When determining the required class for the replacement poles, a factor of safety of 4 Grade A construction must be used.
2. **Add Wind Anchors** – Add wind anchors to poles of inadequate class.
3. **Intersect Poles** – Install intersect poles to reduce wind spans. Addition of an intersect pole in every other span usually provides an adequate reduction in (wind) span length. When determining the required class for the intersect pole, a factor of safety of 4 for Grade A construction must be used.
4. **Use Steel Poles.**

D. Addition of Distribution Underbuilds

Same requirements as Item B above.

A	REVISE NOTE	KSM	WVT	WPH	9/1/97	C						
—	ORIGINAL ISSUE	KSM	WVT	WPH	8/1/97	B	CHANGED NOTE 5	RLR	WPH	WVT		4/25/02
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	
TRANSMISSION ENGINEERING						SCALE:						
		MAXIMUM WIND SPANS 69KV WOOD POLE CONSTRUCTION				DWG. NO			SHEET NO.			
						12200			2 OF 24			


OTHER CONFIGURATIONS:

A. Two Communication Cables

Maximum wind spans for poles with two communication conductors can be determined, for the 69kV wood pole constructions shown on the subsequent sheets of this specification, by interpolating between the span lengths for one and three communication conductors.

B. Other Configurations, Conductor Size, etc.

Maximum wind spans for structure configurations, pole classes, conductor sizes, etc. not reflected on the subsequent sheets of this specification shall be referred to Transmission Engineering for project specific calculations.

A	REVISE NOTE	KSM	WVT	WPH	9/1/97	C					
--	ORIGINAL ISSUE	KSM	WVT	WPH	8/1/97	B	CHANGED NOTE 5	RLR	WPH	<i>WVT</i>	4/25/02
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE
TRANSMISSION ENGINEERING						SCALE:					
		MAXIMUM WIND SPANS 69KV WOOD POLE CONSTRUCTION				DWG. NO			SHEET NO.		
						12200			3 OF 24		

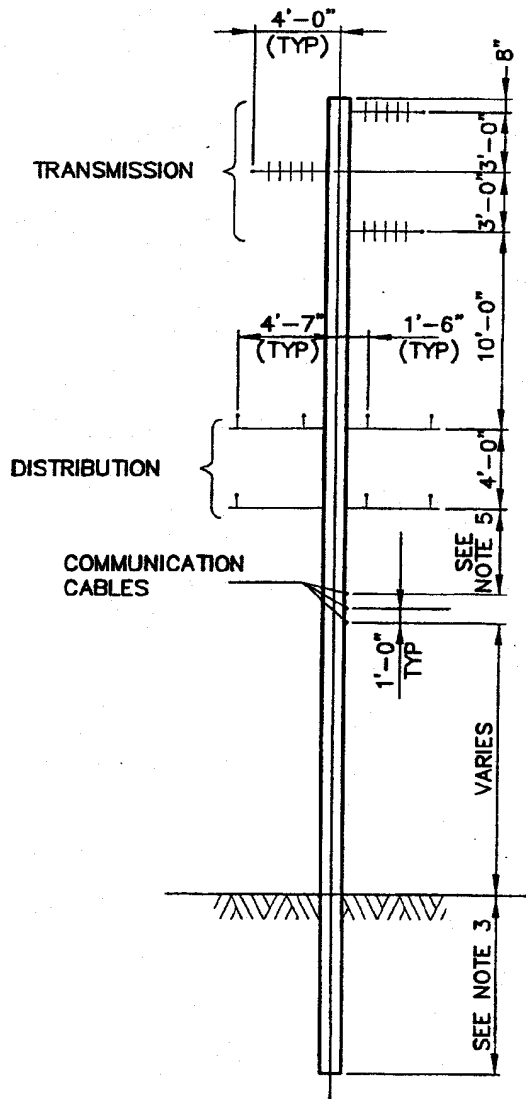
CLASS 1 DOUGLAS FIR

TRANSMISSION CONDUCTOR: 1033KCMIL ACSR/AW

DISTRIBUTION CONDUCTOR: 636 KCMIL ACSR/AW

COMMUNICATION CABLE: 1 INCH DIAMETER AND 300#/1000' WEIGHT

FACTOR OF SAFETY: 2



MAXIMUM WIND SPANS - FT

POLE HT (FT)	DISTRIBUTION UNDERBUILD								
	NONE			4 WIRE			7 WIRE		
	COMM CABLES			COMM CABLES			COMM CABLES		
	0	1	3	0	1	3	0	1	3
50	741	639	496	465	435	387	374	356	329
55	722	618	475	440	409	360	349	334	306
60	705	602	459	421	393	344	334	318	289
65	696	591	450	411	378	328	319	303	273
70	686	579	441	399	370	320	311	295	265
75	683	573	433	391	361	314	301	285	258
80	677	569	432	388	357	306	298	281	250
85	655	553	414	378	340	294	286	269	239
90	636	535	403	358	328	288	272	259	230
95	622	522	392	348	319	270	263	247	222
100	623	521	392	346	316	271	264	248	222

NOTES

1. SPAN LENGTHS CONSIDERING POLE STRENGTH ONLY.
2. WEIGHT SPAN IS ASSUMED TO BE EQUAL TO WIND SPAN.
3. EMBEDMENT DEPTH IS 10 PERCENT OF POLE HEIGHT PLUS TWO FEET.
4. P-DELTA EFFECTS INCLUDED, BASED ON IEEE STANDARD 751.
5. FOR ANALYSIS PURPOSE ONLY, THE DIMENSION IS ASSUMED TO BE 6' TO THE LOWEST DISTRIBUTION OR 20' TO THE LOWEST TRANSMISSION, AS APPLICABLE.

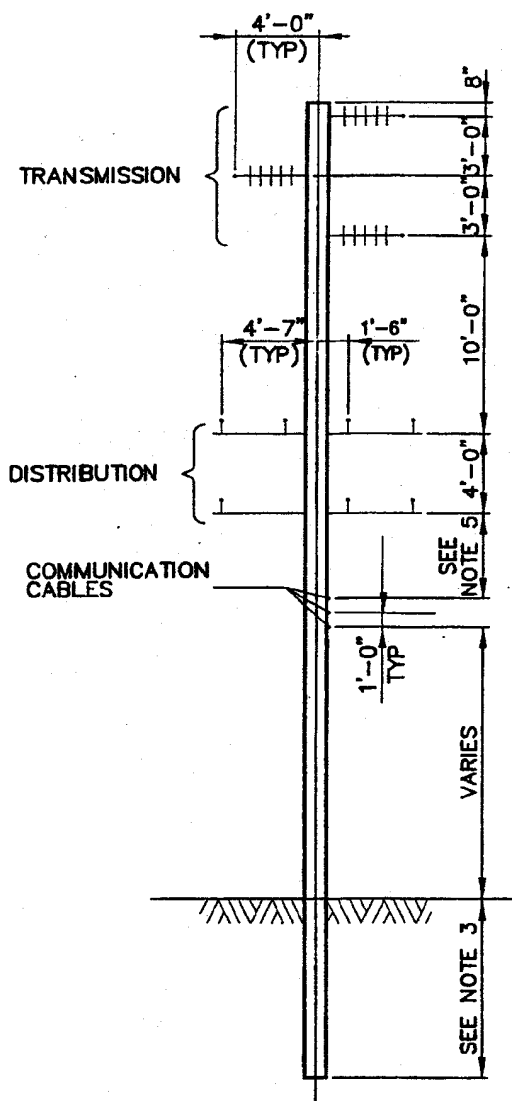
A	UPDATE FORM	KSM	GV	WPH	8/01/97	C					
-	ORIGINAL ISSUE	SDT	LB	WPH	8/12/94	B	CHANGED NOTE 5	WDF	WPH	WPH	4/25/02
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

SDGE	TRANSMISSION ENGINEERING						SCALE: NONE	
	MAXIMUM WIND SPANS SINGLE CIRCUIT 69kV TYPE WPI DF-1 POLES S.F.=2						DWG. NO.	SHT. NO.
							12200	4 of 24

12200B04

CLASS 1 DOUGLAS FIR

TRANSMISSION CONDUCTOR: 1033KCMIL ACSR/AW
 DISTRIBUTION CONDUCTOR: 636 KCMIL ACSR/AW
 COMMUNICATION CABLE: 1 INCH DIAMETER AND 300#/1000' WEIGHT
 FACTOR OF SAFETY: 2.667



POLE HT (FT)	MAXIMUM WIND SPANS - FT								
	DISTRIBUTION UNDERBUILD								
	NONE			4 WIRE			7 WIRE		
	COMM CABLES			COMM CABLES			COMM CABLES		
	0	1	3	0	1	3	0	1	3
50	599	504	382	360	336	295	289	274	253
55	576	485	366	341	316	275	266	255	229
60	558	467	349	326	302	260	253	241	215
65	548	457	340	312	287	250	243	227	205
70	538	446	334	304	279	238	235	220	197
75	530	441	325	298	273	232	230	214	192
80	524	435	322	290	269	227	222	210	187
85	505	419	309	278	253	217	212	200	178
90	489	405	299	268	243	208	203	191	170
95	475	393	289	258	234	200	195	184	164
100	475	391	280	255	234	200	195	184	159

NOTES

- SPAN LENGTHS CONSIDERING POLE STRENGTH ONLY.
- WEIGHT SPAN IS ASSUMED TO BE EQUAL TO WIND SPAN.
- EMBEDMENT DEPTH IS 10 PERCENT OF POLE HEIGHT PLUS TWO FEET.
- P-DELTA EFFECTS INCLUDED, BASED ON IEEE STANDARD 751.
- FOR ANALYSIS PURPOSE ONLY, THE DIMENSION IS ASSUMED TO BE 6' TO THE LOWEST DISTRIBUTION OR 20' TO THE LOWEST TRANSMISSION, AS APPLICABLE.

A	UPDATE FORM	KSM	GV	WPH	8/01/97	C					
-	ORIGINAL ISSUE	SDT	LB	WPH	8/12/94	B	CHANGED NOTE 5	WDF	WPH	WY	4/25/02
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

SDGE	TRANSMISSION ENGINEERING						SCALE: NONE		12200805
	MAXIMUM WIND SPANS SINGLE CIRCUIT 69kV TYPE WPI DF-1 POLES S.F.=2.667						DWG. NO.	SHT. NO.	
							12200	5of24	

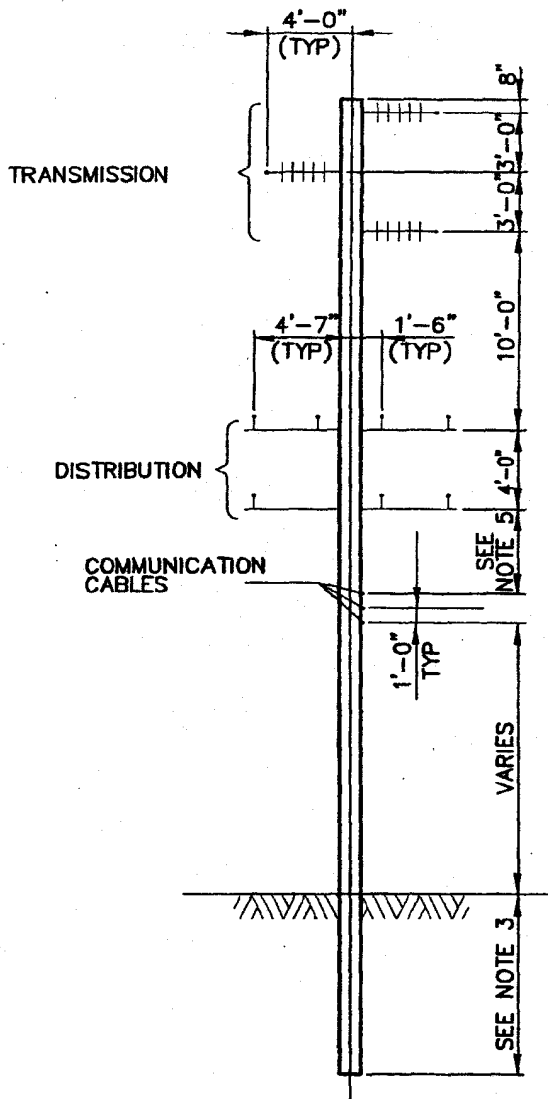
CLASS 1 DOUGLAS FIR

TRANSMISSION CONDUCTOR: 1033KCMIL ACSR/AW

DISTRIBUTION CONDUCTOR: 636 KCMIL ACSR/AW

COMMUNICATION CABLE: 1 INCH DIAMETER AND 300#/1000' WEIGHT

FACTOR OF SAFETY: 3



MAXIMUM WIND SPANS - FT									
POLE HT (FT)	DISTRIBUTION UNDERBUILD								
	NONE			4 WIRE			7 WIRE		
	COMM CABLES			COMM CABLES			COMM CABLES		
	0	1	3	0	1	3	0	1	3
50	491	416	322	305	283	251	246	234	214
55	475	403	310	286	268	236	227	219	198
60	466	394	300	275	256	224	216	208	187
65	456	383	289	267	248	211	208	195	178
70	448	378	284	261	237	205	202	189	171
75	446	371	280	252	232	200	197	184	166
80	441	369	278	249	229	196	193	180	163
85	426	355	267	238	219	187	181	172	151
90	413	344	258	229	210	179	173	165	144
95	401	334	246	221	202	172	166	158	138
100	401	331	246	221	202	172	166	158	137

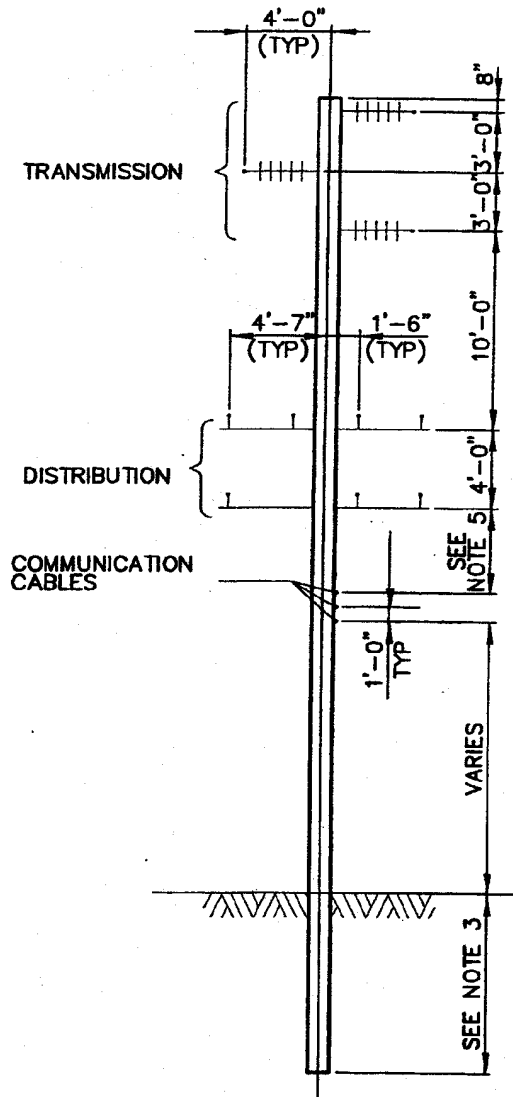
NOTES

1. SPAN LENGTHS CONSIDERING POLE STRENGTH ONLY.
2. WEIGHT SPAN IS ASSUMED TO BE EQUAL TO WIND SPAN.
3. EMBEDMENT DEPTH IS 10 PERCENT OF POLE HEIGHT PLUS TWO FEET.
4. P-DELTA EFFECTS INCLUDED, BASED ON IEEE STANDARD 751.
5. FOR ANALYSIS PURPOSE ONLY, THE DIMENSION IS ASSUMED TO BE 6' TO THE LOWEST DISTRIBUTION OR 20' TO THE LOWEST TRANSMISSION, AS APPLICABLE.

A	UPDATED FORM	KSM	GV	WPH	8/01/97	C					
-	ORIGINAL ISSUE	SAT	LB	WPH	8/12/94	B	CHANGED NOTE 5	WDF	WPH	(initials)	4/25/02
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

	TRANSMISSION ENGINEERING				SCALE: NONE	
	MAXIMUM WIND SPANS SINGLE CIRCUIT 69kV TYPE WPI DF-1 POLES S.F.=3				DWG. NO.	SHT. NO.
					12200	6 of 24

12200B06



CLASS 1 DOUGLAS FIR

TRANSMISSION CONDUCTOR: 1033KCMIL ACSR/AW
 DISTRIBUTION CONDUCTOR: 636 KCMIL ACSR/AW
 COMMUNICATION CABLE: 1 INCH DIAMETER AND 300#/1000' WEIGHT
 FACTOR OF SAFETY: 4

POLE HT (FT)	MAXIMUM WIND SPANS - FT								
	DISTRIBUTION UNDERBUILD								
	NONE			4 WIRE			7 WIRE		
	COMM CABLES			COMM CABLES			COMM CABLES		
	0	1	3	0	1	3	0	1	3
50	356	303	234	221	205	-	175	-	-
55	345	292	223	209	193	170	164	-	-
60	337	283	215	200	184	164	155	146	-
65	330	277	209	193	176	151	148	139	-
70	321	271	204	187	171	145	143	134	-
75	318	267	200	183	166	141	139	130	-
80	315	260	197	175	163	137	135	126	-
85	302	249	188	167	154	130	128	119	-
90	290	238	180	159	147	123	122	113	-
95	279	229	172	152	140	117	116	108	-
100	279	229	172	151	139	116	115	107	93

NOTES

- SPAN LENGTHS CONSIDERING POLE STRENGTH ONLY.
- WEIGHT SPAN IS ASSUMED TO BE EQUAL TO WIND SPAN.
- EMBEDMENT DEPTH IS 10 PERCENT OF POLE HEIGHT PLUS TWO FEET.
- P-DELTA EFFECTS INCLUDED, BASED ON IEEE STANDARD 751.
- FOR ANALYSIS PURPOSE ONLY, THE DIMENSION IS ASSUMED TO BE 6' TO THE LOWEST DISTRIBUTION OR 20' TO THE LOWEST TRANSMISSION, AS APPLICABLE.

A	UPDATED FORM	KSM	GV	WPH	8/01/97	C						
-	ORIGINAL ISSUE	SDT	LB	WPH	8/12/94	B	CHANGED NOTE 5	WDF	WPH	WV	4/25/02	
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	
TRANSMISSION ENGINEERING							SCALE: NONE					
SDGE	MAXIMUM WIND SPANS SINGLE CIRCUIT 69kV TYPE WPI DF-1 POLES S.F.=4						DWG. NO.		SHT. NO.			
							12200		7of24			

12200B07

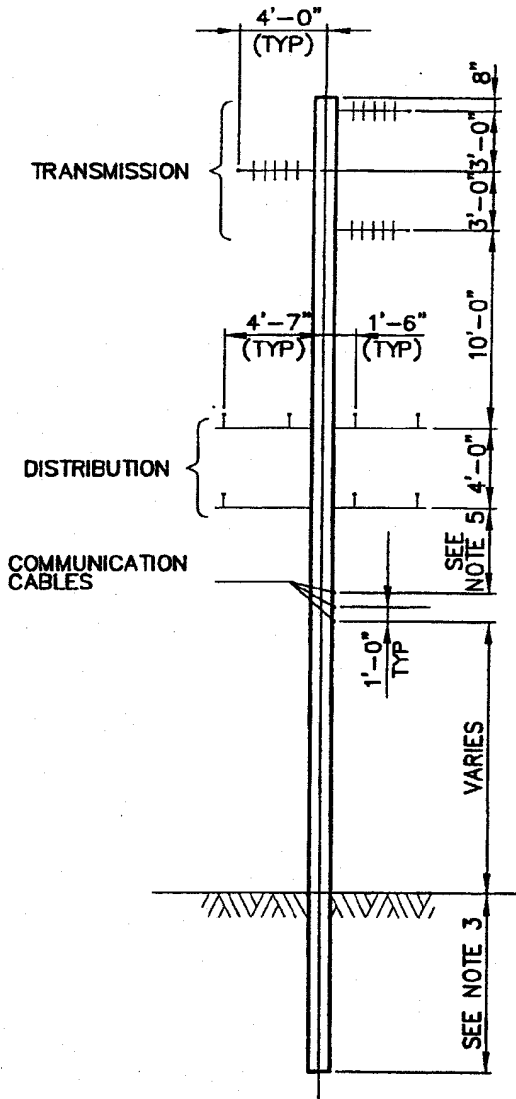
CLASS H2 DOUGLAS FIR

TRANSMISSION CONDUCTOR: 1033KCMIL ACSR/AW

DISTRIBUTION CONDUCTOR: 636 KCMIL ACSR/AW

COMMUNICATION CABLE: 1 INCH DIAMETER AND 300#/1000' WEIGHT

FACTOR OF SAFETY: 2



MAXIMUM WIND SPANS - FT

POLE HT (FT)	DISTRIBUTION UNDERBUILD								
	NONE			4 WIRE			7 WIRE		
	COMM CABLES			COMM CABLES			COMM CABLES		
	0	1	3	0	1	3	0	1	3
50	1077	921	713	670	625	554	536	515	474
55	1038	885	678	631	589	517	502	479	437
60	1036	880	672	620	575	500	487	463	423
65	1016	858	650	595	550	479	467	442	398
70	996	837	637	575	534	459	448	423	382
75	1006	848	641	577	533	460	445	419	377
80	969	813	612	551	505	434	424	398	357
85	960	806	604	541	499	427	413	391	350
90	953	797	601	533	490	418	409	383	341
95	949	794	596	527	483	414	402	379	337
100	928	771	577	512	469	401	389	363	326

NOTES

- SPAN LENGTHS CONSIDERING POLE STRENGTH ONLY.
- WEIGHT SPAN IS ASSUMED TO BE EQUAL TO WIND SPAN.
- EMBEDMENT DEPTH IS 10 PERCENT OF POLE HEIGHT PLUS TWO FEET.
- P-DELTA EFFECTS INCLUDED, BASED ON IEEE STANDARD 751.
- FOR ANALYSIS PURPOSE ONLY, THE DIMENSION IS ASSUMED TO BE 6' TO THE LOWEST DISTRIBUTION OR 20' TO THE LOWEST TRANSMISSION, AS APPLICABLE.

A	UPDATE FORM	KSM	GV	WPH	8/01/97	C						
-	ORIGINAL ISSUE	SDT	LB	WPH	8/12/94	B	CHANGED NOTE 5	WDF	WPH	6/17	4/25/02	
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	

SDGE	TRANSMISSION ENGINEERING						SCALE: NONE	
	MAXIMUM WIND SPANS SINGLE CIRCUIT 69KV TYPE WPI DF-H2 POLES S.F.=2						DWG. NO.	SHT. NO.
							12200	8 of 24

12200508

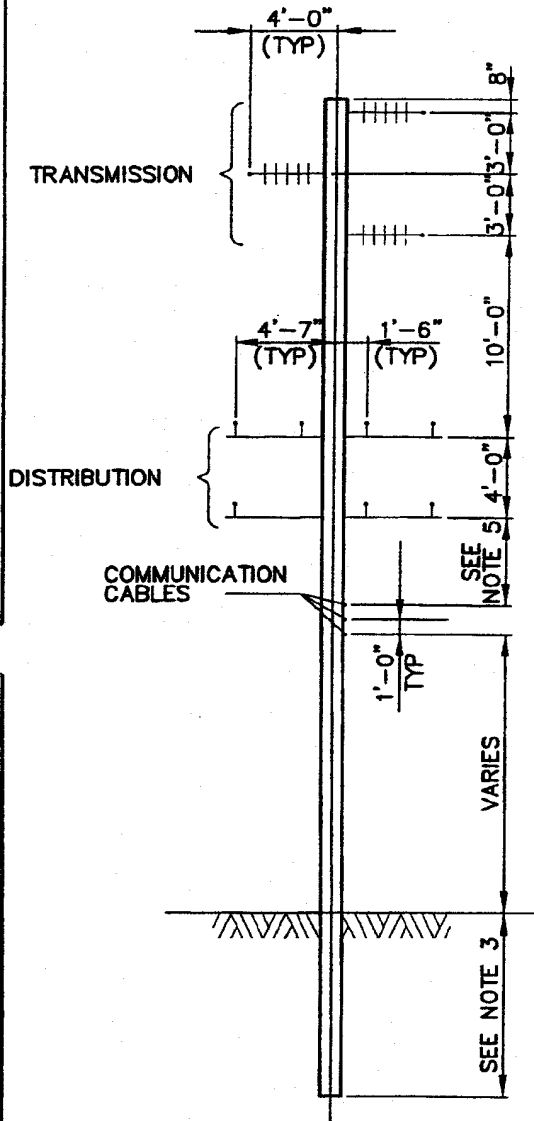
CLASS H2 DOUGLAS FIR

TRANSMISSION CONDUCTOR: 1033KCMIL ACSR/AW

DISTRIBUTION CONDUCTOR: 636 KCMIL ACSR/AW

COMMUNICATION CABLE: 1 INCH DIAMETER AND
300#/1000' WEIGHT

FACTOR OF SAFETY: 3



MAXIMUM WIND SPANS - FT									
POLE HT (FT)	DISTRIBUTION UNDERBUILD								
	NONE			4 WIRE			7 WIRE		
	COMM CABLES			COMM CABLES			COMM CABLES		
	0	1	3	0	1	3	0	1	3
50	712	606	467	442	414	362	354	337	312
55	685	583	445	413	385	337	330	313	287
60	685	579	442	407	377	328	318	304	273
65	671	564	424	391	362	313	304	289	258
70	656	549	414	376	346	301	292	274	247
75	664	553	418	378	347	296	292	273	245
80	635	530	399	359	329	281	277	258	231
85	631	526	391	350	324	275	268	253	226
90	625	518	387	346	315	270	263	249	222
95	620	517	385	343	312	267	260	245	214
100	603	501	373	331	301	257	251	236	206

NOTES

1. SPAN LENGTHS CONSIDERING POLE STRENGTH ONLY.
2. WEIGHT SPAN IS ASSUMED TO BE EQUAL TO WIND SPAN.
3. EMBEDMENT DEPTH IS 10 PERCENT OF POLE HEIGHT PLUS TWO FEET.
4. P-DELTA EFFECTS INCLUDED, BASED ON IEEE STANDARD 751.
5. FOR ANALYSIS PURPOSE ONLY, THE DIMENSION IS ASSUMED TO BE 6' TO THE LOWEST DISTRIBUTION OR 20' TO THE LOWEST TRANSMISSION, AS APPLICABLE.

A	UPDATE FORM	KSM	GV	WPH	8/01/97	C						
-	ORIGINAL ISSUE	SDT	LB	WPH	8/12/94	B	CHANGED NOTE 5	WDF	WPH	WPH	4/25/02	
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	
TRANSMISSION ENGINEERING								SCALE: NONE				
SDGE	MAXIMUM WIND SPANS SINGLE CIRCUIT 69kV TYPE WPI DF-H2 POLES S.F.=3							DWG. NO.		SHT. NO.		
								12200		9 of 24		

12200B09

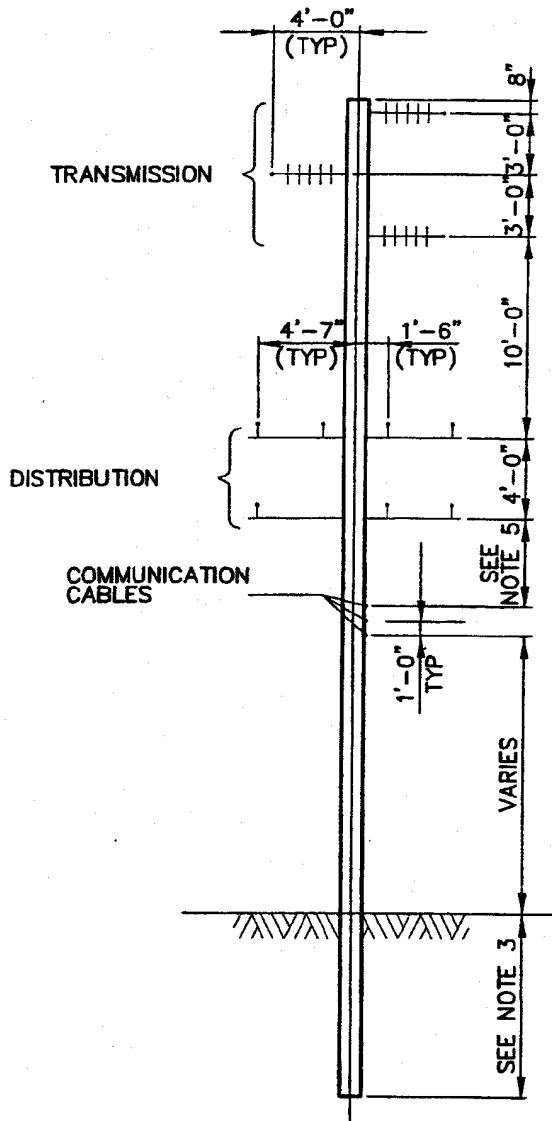
CLASS H2 DOUGLAS FIR

TRANSMISSION CONDUCTOR: 1033KCMIL ACSR/AW

DISTRIBUTION CONDUCTOR: 636 KCMIL ACSR/AW

COMMUNICATION CABLE: 1 INCH DIAMETER AND 300#/1000' WEIGHT

FACTOR OF SAFETY: 4



MAXIMUM WIND SPANS - FT									
POLE HT (FT)	DISTRIBUTION UNDERBUILD								
	NONE			4 WIRE			7 WIRE		
	COMM CABLES			COMM CABLES			COMM CABLES		
	0	1	3	0	1	3	0	1	3
50	522	447	344	325	302	265	259	247	-
55	502	424	326	302	283	245	240	228	-
60	503	422	319	296	276	238	233	220	198
65	486	409	307	284	264	225	222	209	186
70	476	399	298	274	250	216	213	199	177
75	483	399	300	274	249	215	212	198	175
80	458	380	285	259	235	202	199	186	164
85	453	375	280	254	230	197	191	181	160
90	449	371	276	246	226	193	187	178	156
95	445	368	273	242	222	189	184	174	153
100	430	354	263	232	213	181	176	167	146

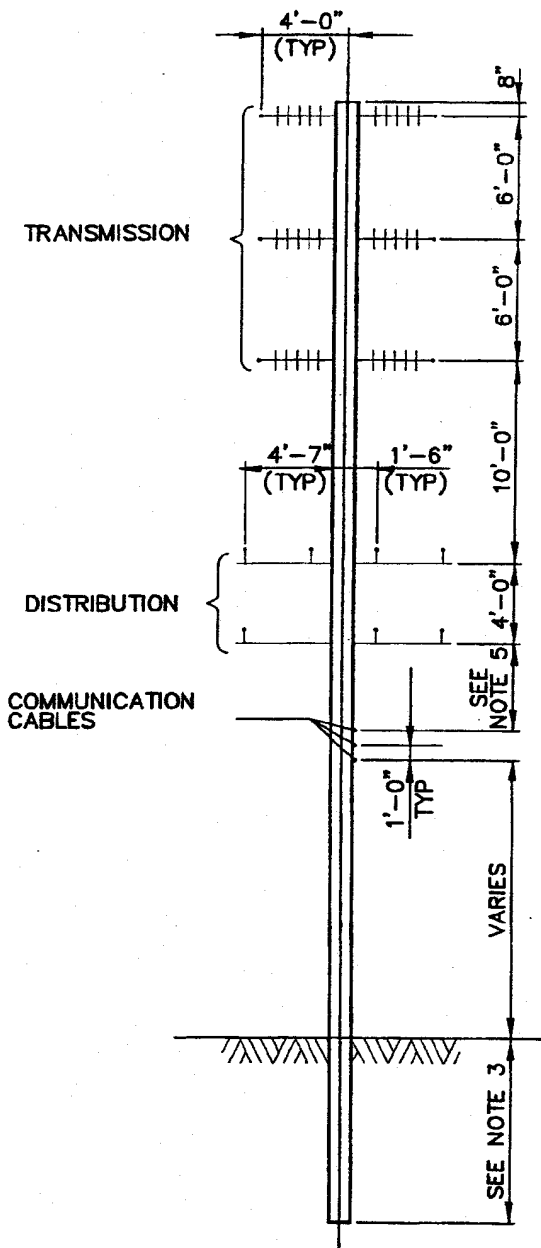
NOTES

- SPAN LENGTHS CONSIDERING POLE STRENGTH ONLY.
- WEIGHT SPAN IS ASSUMED TO BE EQUAL TO WIND SPAN.
- EMBEDMENT DEPTH IS 10 PERCENT OF POLE HEIGHT PLUS TWO FEET.
- P-DELTA EFFECTS INCLUDED, BASED ON IEEE STANDARD 751.
- FOR ANALYSIS PURPOSE ONLY, THE DIMENSION IS ASSUMED TO BE 6' TO THE LOWEST DISTRIBUTION OR 20' TO THE LOWEST TRANSMISSION, AS APPLICABLE.

A	UPDATE FORM	KSM	GV	WPH	8/01/97	C						
-	ORIGINAL ISSUE	SDT	LB	WPH	8/12/94	B	CHANGED NOTE 5	WDF	WPH	WV	4/25/02	
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	

SDGE	TRANSMISSION ENGINEERING						SCALE: NONE					
	MAXIMUM WIND SPANS SINGLE CIRCUIT 69kV TYPE WPI DF-H2 POLES S.F.=4						DWG. NO.			SHT. NO.		
							12200			10 of 24		

12200B10



CLASS 1 DOUGLAS FIR

TRANSMISSION CONDUCTOR: 1033KCMIL ACSR/AW

DISTRIBUTION CONDUCTOR: 636 KCMIL ACSR/AW

COMMUNICATION CABLE: 1 INCH DIAMETER AND 300#/1000' WEIGHT

FACTOR OF SAFETY: 2

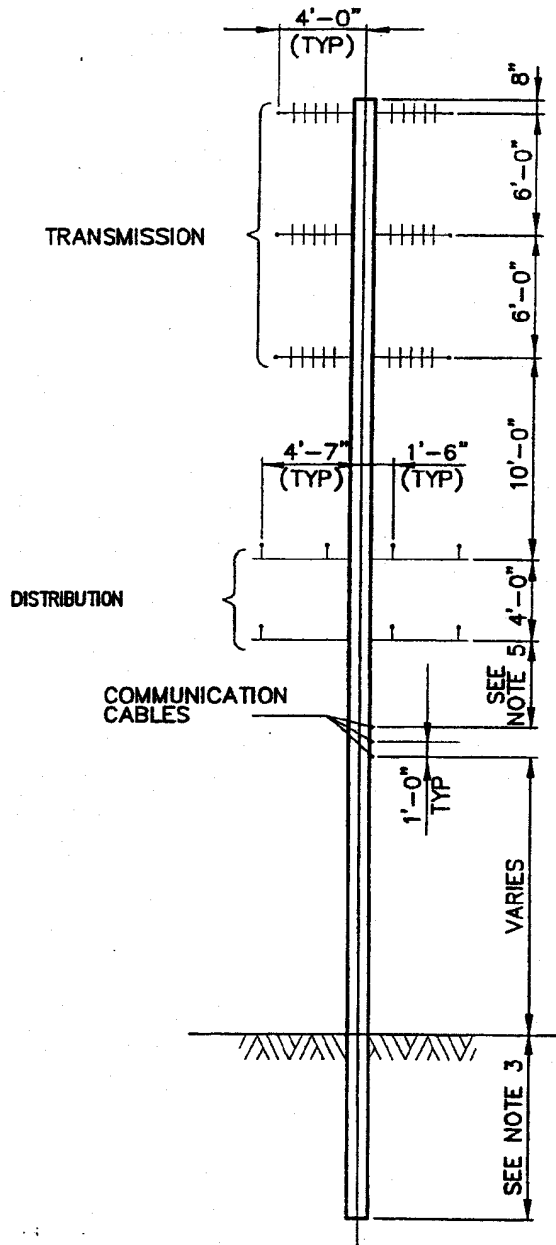
MAXIMUM WIND SPANS - FT									
POLE HT (FT)	DISTRIBUTION UNDERBUILD								
	NONE			4 WIRE			7 WIRE		
	0	1	3	0	1	3	0	1	3
50	402	375	333	314	302	286	274	268	257
55	388	359	316	296	288	270	256	253	239
60	376	351	307	287	273	254	246	237	227
65	372	342	296	276	266	245	238	229	214
70	365	338	292	271	260	239	229	223	207
75	360	332	285	264	253	231	225	215	202
80	356	328	284	262	250	228	222	212	195
85	346	318	274	253	241	219	210	204	186
90	333	309	262	241	229	211	203	197	179
95	325	297	255	234	223	200	196	186	173
100	325	301	257	236	224	201	197	187	173

NOTES

- SPAN LENGTHS CONSIDERING POLE STRENGTH ONLY.
- WEIGHT SPAN IS ASSUMED TO BE EQUAL TO WIND SPAN.
- EMBEDMENT DEPTH IS 10 PERCENT OF POLE HEIGHT PLUS TWO FEET.
- P-DELTA EFFECTS INCLUDED, BASED ON IEEE STANDARD 751.
- FOR ANALYSIS PURPOSE ONLY, THE DIMENSION IS ASSUMED TO BE 6' TO THE LOWEST DISTRIBUTION OR 20' TO THE LOWEST TRANSMISSION, AS APPLICABLE.

A	UPDATE FORM	KSM	GV	WPH	8/01/97	C						
-	ORIGINAL ISSUE	SDT	LB	WPH	8/12/94	B	CHANGED NOTE 5	WDF	WPH	WV	4/25/02	
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	
TRANSMISSION ENGINEERING								SCALE: NONE				
SDGE MAXIMUM WIND SPANS TWIN CIRCUIT 69kV TYPE TC-WPI DF-1 POLES S.F.=2								DWG. NO.		SHT. NO.		
								12200		11 of 24		

12200B11



CLASS 1 DOUGLAS FIR

TRANSMISSION CONDUCTOR: 1033KCMIL ACSR/AW

DISTRIBUTION CONDUCTOR: 636 KCMIL ACSR/AW

COMMUNICATION CABLE: 1 INCH DIAMETER AND 300#/1000' WEIGHT

FACTOR OF SAFETY: 2.667

POLE HT (FT)	MAXIMUM WIND SPANS - FT								
	DISTRIBUTION UNDERBUILD								
	NONE			4 WIRE			7 WIRE		
	COMM CABLES			COMM CABLES			COMM CABLES		
	0	1	3	0	1	3	0	1	3
50	334	309	267	262	252	237	229	227	216
55	316	291	253	242	235	215	212	205	196
60	306	280	239	231	223	202	199	192	183
65	298	273	231	222	210	192	190	183	173
70	289	263	225	216	203	185	184	176	161
75	285	259	221	211	198	180	179	170	156
80	279	256	218	203	194	176	171	166	152
85	268	246	205	194	185	167	163	158	144
90	258	237	197	186	177	160	155	151	137
95	250	229	191	179	171	154	149	145	131
100	251	226	191	179	171	149	149	141	130

NOTES

- SPAN LENGTHS CONSIDERING POLE STRENGTH ONLY.
- WEIGHT SPAN IS ASSUMED TO BE EQUAL TO WIND SPAN.
- EMBEDMENT DEPTH IS 10 PERCENT OF POLE HEIGHT PLUS TWO FEET.
- P-DELTA EFFECTS INCLUDED, BASED ON IEEE STANDARD 751.
- FOR ANALYSIS PURPOSE ONLY, THE DIMENSION IS ASSUMED TO BE 6' TO THE LOWEST DISTRIBUTION OR 20' TO THE LOWEST TRANSMISSION, AS APPLICABLE.

A	UPDATE FORM	KSM	GV	WPH	8/01/97	C						
-	ORIGINAL ISSUE	SDT	LB	WPH	8/12/94	B	CHANGED NOTE 5	WDF	WPH	WV	4/25/02	
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	

	TRANSMISSION ENGINEERING				SCALE: NONE					
	MAXIMUM WIND SPANS TWIN CIRCUIT 69kV TYPE TC-WPI DF-1 POLES S.F.=2.667								DWG. NO.	SHT. NO.
									12200	12 of 24

12200B12

CLASS 1 DOUGLAS FIR

TRANSMISSION CONDUCTOR: 1033KCMIL ACSR/AW

DISTRIBUTION CONDUCTOR: 636 KCMIL ACSR/AW

COMMUNICATION CABLE: 1 INCH DIAMETER AND 300#/1000' WEIGHT

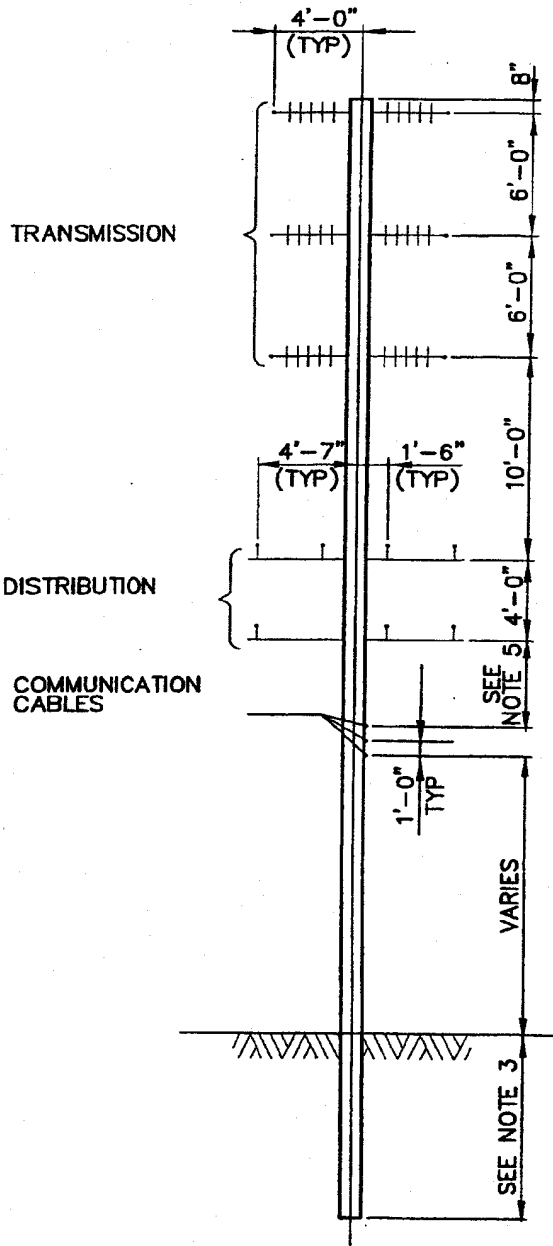
FACTOR OF SAFETY: 3


MAXIMUM WIND SPANS - FT

POLE HT (FT)	DISTRIBUTION UNDERBUILD								
	NONE			4 WIRE			7 WIRE		
	COMM CABLES			COMM CABLES			COMM CABLES		
	0	1	3	0	1	3	0	1	3
50	265	245	217	204	197	184	177	173	-
55	253	236	207	195	187	173	166	162	153
60	247	230	200	187	179	164	159	154	144
65	242	225	191	178	173	158	153	148	138
70	239	217	187	174	169	153	149	143	133
75	233	215	184	171	162	149	146	140	129
80	232	213	182	169	159	147	143	137	126
85	224	205	175	162	152	140	137	131	120
90	216	198	169	156	146	134	127	125	114
95	210	192	163	150	141	129	123	120	110
100	211	189	163	151	141	125	122	116	109

NOTES

- SPAN LENGTHS CONSIDERING POLE STRENGTH ONLY.
- WEIGHT SPAN IS ASSUMED TO BE EQUAL TO WIND SPAN.
- EMBEDMENT DEPTH IS 10 PERCENT OF POLE HEIGHT PLUS TWO FEET.
- P-DELTA EFFECTS INCLUDED, BASED ON IEEE STANDARD 751.
- FOR ANALYSIS PURPOSE ONLY, THE DIMENSION IS ASSUMED TO BE 6' TO THE LOWEST DISTRIBUTION OR 20' TO THE LOWEST TRANSMISSION, AS APPLICABLE.



A	UPDATE FORM	KSM	GV	WPH	8/01/97	C						
-	ORIGINAL ISSUE	SDT	LB	WPH	8/12/94	B	CHANGED NOTE 5	WDF	WPH	WPH	4/25/02	
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	
TRANSMISSION ENGINEERING								SCALE: NONE				
 MAXIMUM WIND SPANS TWIN CIRCUIT 69KV TYPE TC-WPI DF-1 S.F.=3								DWG. NO.		SHT. NO.		
								12200		13 of 24		

12200B13

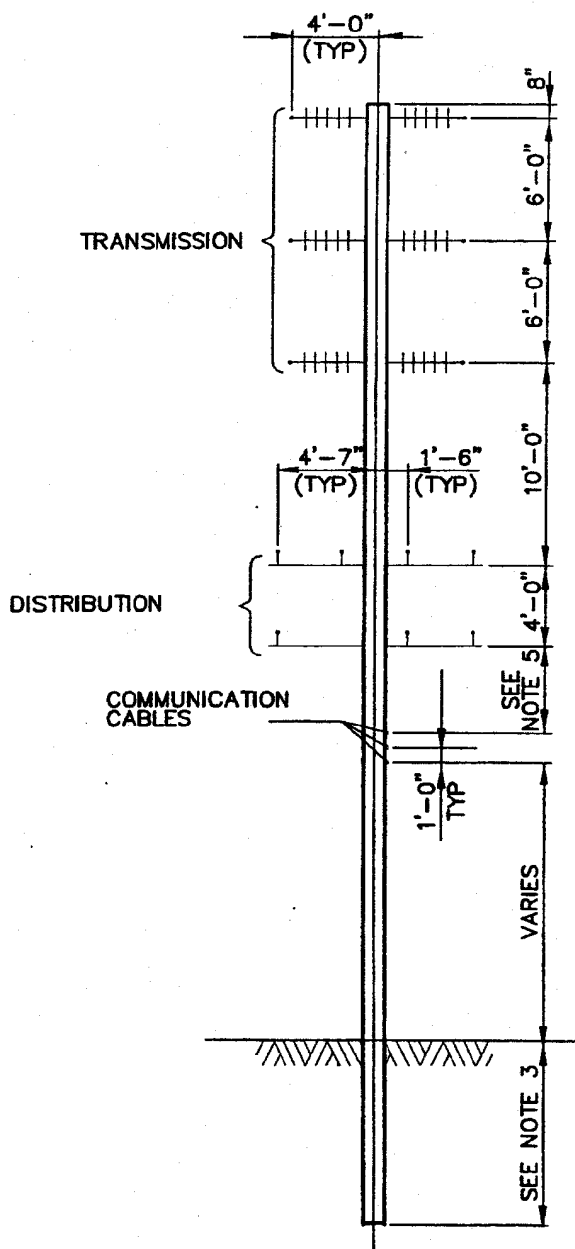
CLASS 1 DOUGLAS FIR

TRANSMISSION CONDUCTOR: 1033KCMIL ACSR/AW

DISTRIBUTION CONDUCTOR: 636 KCMIL ACSR/AW

COMMUNICATION CABLE: 1 INCH DIAMETER AND 300#/1000' WEIGHT

FACTOR OF SAFETY: 4



MAXIMUM WIND SPANS - FT									
POLE HT (FT)	DISTRIBUTION UNDERBUILD								
	NONE			4 WIRE			7 WIRE		
	COMM CABLES			COMM CABLES			COMM CABLES		
	0	1	3	0	1	3	0	1	3
50	192	178	-	-	-	-	-	-	-
55	185	170	-	-	-	-	-	-	
60	180	165	141	-	-	-	-	-	
65	175	160	136	127	-	-	-	-	
70	172	157	133	123	-	-	-	-	
75	166	154	130	121	114	-	-	-	
80	164	152	128	118	112	-	-	-	
85	156	145	121	112	106	-	-	-	
90	150	139	116	107	101	-	-	-	
95	144	133	111	102	96	-	-	-	
100	144	133	110	102	95	-	83	-	

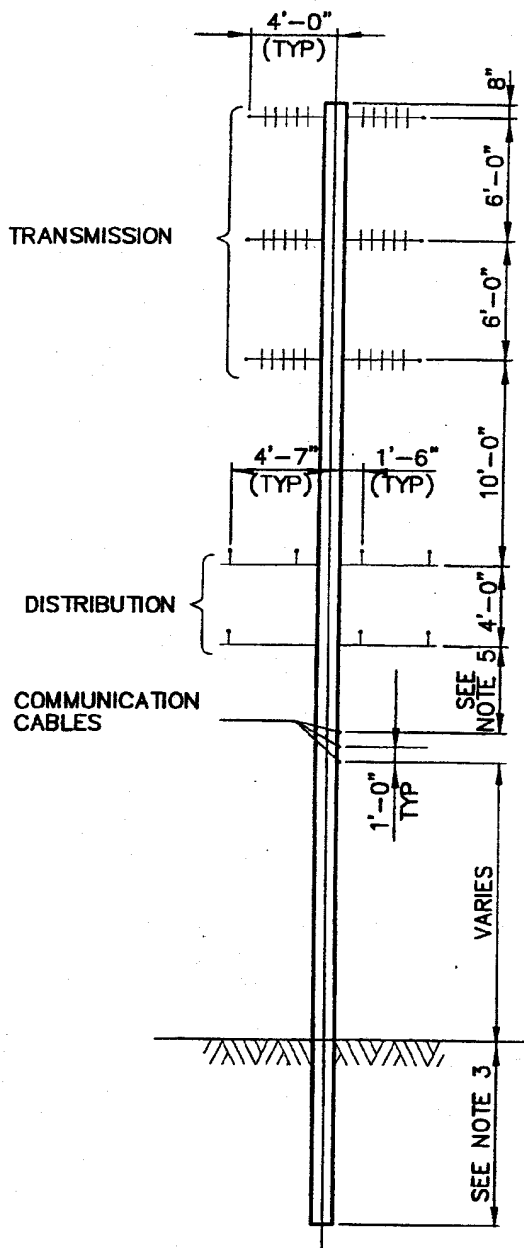
NOTES

- SPAN LENGTHS CONSIDERING POLE STRENGTH ONLY.
- WEIGHT SPAN IS ASSUMED TO BE EQUAL TO WIND SPAN.
- EMBEDMENT DEPTH IS 10 PERCENT OF POLE HEIGHT PLUS TWO FEET.
- P-DELTA EFFECTS INCLUDED, BASED ON IEEE STANDARD 751.
- FOR ANALYSIS PURPOSE ONLY, THE DIMENSION IS ASSUMED TO BE 6' TO THE LOWEST DISTRIBUTION OR 20' TO THE LOWEST TRANSMISSION, AS APPLICABLE.

A	UPDATE FORM	KSM	GV	WPH	8/01/97	C					
-	ORIGINAL ISSUE	SDT	LB	WPH	8/12/94	B	CHANGED NOTE 5	WDF	WPH	WV	4/25/02
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

	TRANSMISSION ENGINEERING							SCALE: NONE	
	MAXIMUM WIND SPANS							DWG. NO.	SHT. NO.
	TWIN CIRCUIT 69kV TYPE TC-WPI							12200	14 of 24
DF-1 POLES S.F.=4									

12200B14



CLASS H2 DOUGLAS FIR

TRANSMISSION CONDUCTOR: 1033KCMIL ACSR/AW

DISTRIBUTION CONDUCTOR: 636 KCMIL ACSR/AW

COMMUNICATION CABLE: 1 INCH DIAMETER AND 300#/1000' WEIGHT

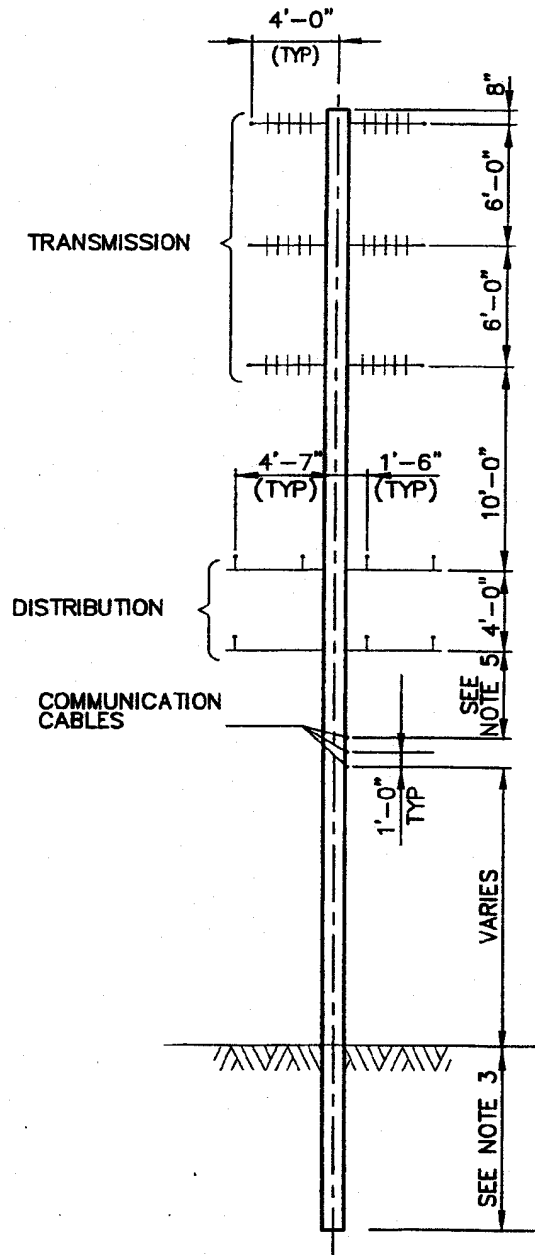
FACTOR OF SAFETY: 2

MAXIMUM WIND SPANS - FT									
POLE HT (FT)	DISTRIBUTION UNDERBUILD								
	NONE			4 WIRE			7 WIRE		
	COMM CABLES			COMM CABLES			COMM CABLES		
	0	1	3	0	1	3	0	1	3
50	580	544	476	452	436	411	394	386	373
55	556	519	453	425	411	384	370	360	345
60	554	514	446	417	401	371	359	347	330
65	539	498	433	403	387	356	345	333	314
70	526	485	419	389	372	341	331	321	302
75	532	488	420	389	371	341	328	318	297
80	509	470	402	372	354	324	313	303	282
85	503	463	399	368	350	315	308	294	276
90	499	457	393	362	343	312	301	290	268
95	495	453	387	356	341	305	299	288	266
100	483	442	377	346	327	295	290	275	257

NOTES

- SPAN LENGTHS CONSIDERING POLE STRENGTH ONLY.
- WEIGHT SPAN IS ASSUMED TO BE EQUAL TO WIND SPAN.
- EMBEDMENT DEPTH IS 10 PERCENT OF POLE HEIGHT PLUS TWO FEET.
- P-DELTA EFFECTS INCLUDED, BASED ON IEEE STANDARD 751.
- FOR ANALYSIS PURPOSE ONLY, THE DIMENSION IS ASSUMED TO BE 6' TO THE LOWEST DISTRIBUTION OR 20' TO THE LOWEST TRANSMISSION, AS APPLICABLE.

A	UPDATE FORM	KSM	GV	WPH	8/01/97	C						
-	ORIGINAL ISSUE	SDT	LB	WPH	8/12/94	B	CHANGED NOTE 5	WDF	WPH	WV	4/25/02	
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	
TRANSMISSION ENGINEERING								SCALE: NONE				
SDGE	MAXIMUM WIND SPANS							DWG. NO.		SHT. NO.		1220015
	TWIN CIRCUIT 69kV TYPE TC-WPI							12200		15of24		
	DF-H2 POLES S.F.=2											



CLASS H2 DOUGLAS FIR

TRANSMISSION CONDUCTOR: 1033KCMIL ACSR/AW
 DISTRIBUTION CONDUCTOR: 636 KCMIL ACSR/AW

COMMUNICATION CABLE: 1 INCH DIAMETER AND
 300#/1000' WEIGHT

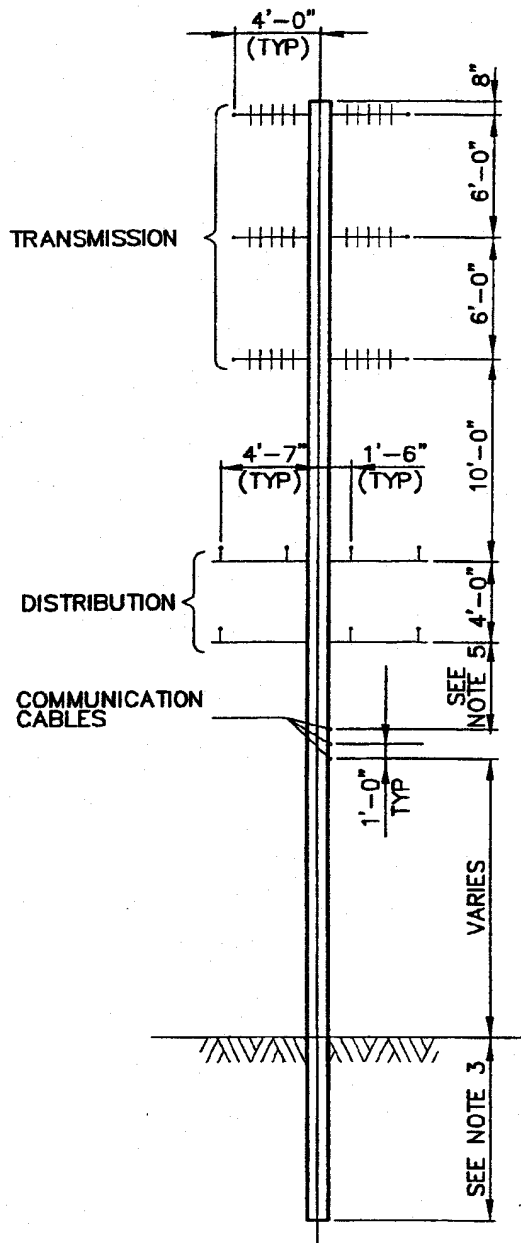
FACTOR OF SAFETY: 3

MAXIMUM WIND SPANS - FT									
POLE HT (FT)	DISTRIBUTION UNDERBUILD								
	NONE			4 WIRE			7 WIRE		
	COMM CABLES			COMM CABLES			COMM CABLES		
	0	1	3	0	1	3	0	1	3
50	384	359	312	294	288	269	258	253	242
55	369	339	296	278	271	250	241	235	222
60	365	338	293	274	262	244	236	228	215
65	356	328	283	264	251	233	222	218	204
70	345	317	271	256	243	220	214	210	195
75	350	321	273	254	244	220	214	205	194
80	335	307	261	242	232	208	203	194	183
85	328	304	257	238	224	204	200	191	179
90	326	297	255	235	221	201	197	187	171
95	325	296	253	229	219	198	190	185	169
100	316	287	241	222	211	191	184	178	162

NOTES

1. SPAN LENGTHS CONSIDERING POLE STRENGTH ONLY.
2. WEIGHT SPAN IS ASSUMED TO BE EQUAL TO WIND SPAN.
3. EMBEDMENT DEPTH IS 10 PERCENT OF POLE HEIGHT PLUS TWO FEET.
4. P-DELTA EFFECTS INCLUDED, BASED ON IEEE STANDARD 751.
5. FOR ANALYSIS PURPOSE ONLY, THE DIMENSION IS ASSUMED TO BE 6' TO THE LOWEST DISTRIBUTION OR 20' TO THE LOWEST TRANSMISSION, AS APPLICABLE.

A	UPDATE FORM	KSM	GV	WPH	8/01/97	C						
-	ORIGINAL ISSUE	SDT	LB	WPH	8/12/94	B	CHANGED NOTE 5	WDF	WPH	WPH	4/25/02	
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	
TRANSMISSION ENGINEERING							SCALE: NONE					
SDGE	MAXIMUM WIND SPANS TWIN CIRCUIT 69kV TYPE TC-WPI DF-H2 POLES S.F.=3							DWG. NO.		SHT. NO.		12200B16
								12200		16 of 24		



CLASS H2 DOUGLAS FIR

TRANSMISSION CONDUCTOR: 1033KCMIL ACSR/AW

DISTRIBUTION CONDUCTOR: 636 KCMIL ACSR/AW

COMMUNICATION CABLE: 1 INCH DIAMETER AND 300#/1000' WEIGHT

FACTOR OF SAFETY: 4

MAXIMUM WIND SPANS - FT									
POLE HT (FT)	DISTRIBUTION UNDERBUILD								
	NONE			4 WIRE			7 WIRE		
	COMM CABLES			COMM CABLES			COMM CABLES		
	0	1	3	0	1	3	0	1	3
50	283	262	228	215	-	-	-	-	-
55	267	250	216	202	194	-	-	-	-
60	266	248	212	199	190	-	-	-	-
65	258	236	204	191	181	-	160	-	-
70	252	229	198	184	175	158	154	148	-
75	254	231	198	184	174	157	153	147	-
80	242	219	188	175	165	148	145	138	-
85	235	216	185	171	161	144	141	135	-
90	232	213	182	168	158	141	138	132	121
95	230	211	180	166	156	139	136	130	118
100	222	203	173	159	150	133	130	124	113

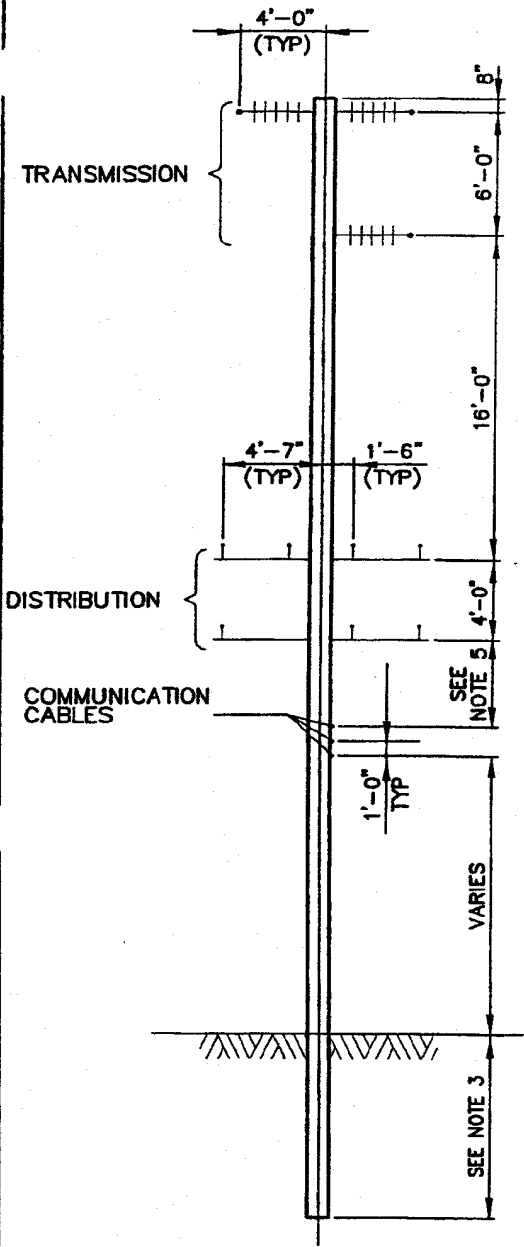
NOTES

1. SPAN LENGTHS CONSIDERING POLE STRENGTH ONLY.
2. WEIGHT SPAN IS ASSUMED TO BE EQUAL TO WIND SPAN.
3. EMBEDMENT DEPTH IS 10 PERCENT OF POLE HEIGHT PLUS TWO FEET.
4. P-DELTA EFFECTS INCLUDED, BASED ON IEEE STANDARD 751.
5. FOR ANALYSIS PURPOSE ONLY, THE DIMENSION IS ASSUMED TO BE 6' TO THE LOWEST DISTRIBUTION OR 20' TO THE LOWEST TRANSMISSION, AS APPLICABLE.

A	UPDATE FORM	KSM	GV	WPH	8/01/97	C						
-	ORIGINAL ISSUE	SDT	LB	WPH	8/12/94	B	CHANGED NOTE 5	WDF	WPH	WV	4/25/02	
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	

	TRANSMISSION ENGINEERING						SCALE: NONE					
	MAXIMUM WIND SPANS TWIN CIRCUIT 69kV TYPE TC-WPI DF-H2 POLES S.F.=4						DWG. NO.			SHT. NO.		
							12200			17 of 24		

12200B17



CLASS 1 DOUGLAS FIR

TRANSMISSION CONDUCTOR: 1033KCMIL ACSR/AW

DISTRIBUTION CONDUCTOR: 636 KCMIL ACSR/AW

COMMUNICATION CABLE: 1 INCH DIAMETER AND 300#/1000' WEIGHT

FACTOR OF SAFETY: 2

MAXIMUM WIND SPANS - FT									
POLE HT (FT)	DISTRIBUTION UNDERBUILD								
	NONE			4 WIRE			7 WIRE		
	COMM CABLES			COMM CABLES			COMM CABLES		
	0	1	3	0	1	3	0	1	3
50	724	683	603	479	457	417	393	380	362
55	707	657	569	453	429	389	369	355	333
60	691	637	541	437	411	365	348	336	308
65	683	623	520	421	394	351	336	319	294
70	674	612	507	409	385	340	323	309	283
75	667	604	494	404	374	328	317	298	271
80	667	598	488	397	370	323	308	293	265
85	645	576	466	382	352	309	296	281	253
90	627	560	450	366	340	294	285	266	243
95	610	542	436	356	329	284	272	257	234
100	615	543	434	354	327	284	273	258	229

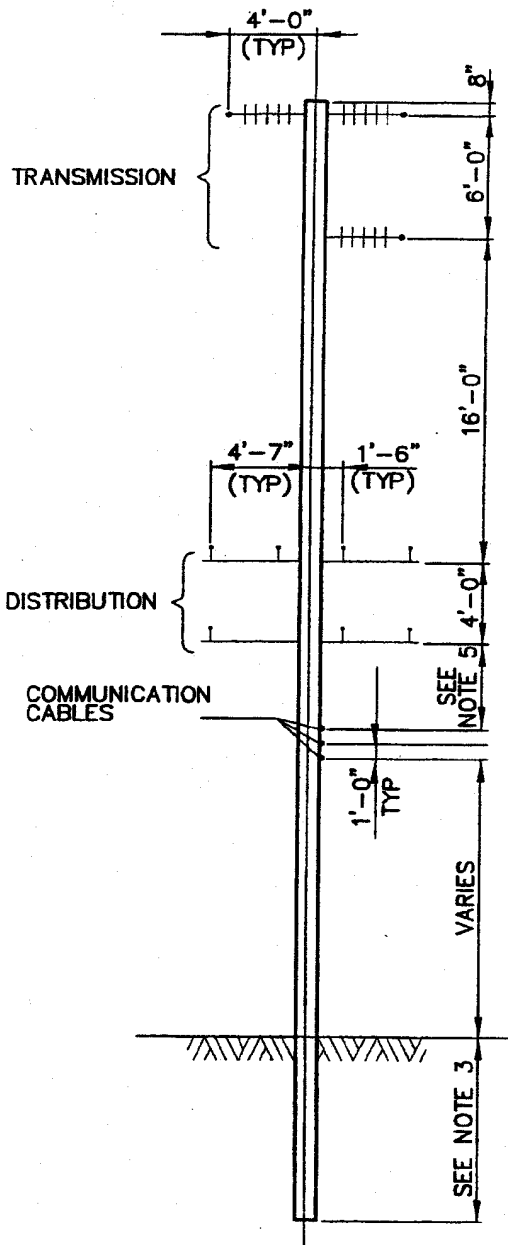
NOTES

1. SPAN LENGTHS CONSIDERING POLE STRENGTH ONLY.
2. WEIGHT SPAN IS ASSUMED TO BE EQUAL TO WIND SPAN.
3. EMBEDMENT DEPTH IS 10 PERCENT OF POLE HEIGHT PLUS TWO FEET.
4. P-DELTA EFFECTS INCLUDED, BASED ON IEEE STANDARD 751.
5. FOR ANALYSIS PURPOSE ONLY, THE DIMENSION IS ASSUMED TO BE 6' TO THE LOWEST DISTRIBUTION OR 20' TO THE LOWEST TRANSMISSION, AS APPLICABLE.

A	UPDATE FORM	KSM	GV	WPH	8/01/97	C						
-	ORIGINAL ISSUE	SDT	LB	WPH	8/12/94	B	CHANGED NOTE 5	WDF	WPH	WVT	4/25/02	
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	

	TRANSMISSION ENGINEERING						SCALE: NONE					
	MAXIMUM WIND SPANS SINGLE CIRCUIT 69kV TYPE 2/1-WPI DF-1 POLES S.F.=2						DWG. NO.			SHT. NO.		
							12200			18 of 24		

12200B18



CLASS 1 DOUGLAS FIR

TRANSMISSION CONDUCTOR: 1033KCMIL ACSR/AW

DISTRIBUTION CONDUCTOR: 636 KCMIL ACSR/AW

COMMUNICATION CABLE: 1 INCH DIAMETER AND 300#/1000' WEIGHT

FACTOR OF SAFETY: 2.667

POLE HT (FT)	MAXIMUM WIND SPANS - FT								
	DISTRIBUTION UNDERBUILD								
	NONE			4 WIRE			7 WIRE		
	COMM CABLES			COMM CABLES			COMM CABLES		
	0	1	3	0	1	3	0	1	3
50	541	462	356	356	337	309	292	282	265
55	526	449	343	335	318	287	269	262	243
60	514	435	333	322	304	267	256	294	227
65	509	429	322	313	289	255	246	234	216
70	502	421	318	302	282	247	239	226	207
75	497	418	314	297	276	240	229	220	197
80	494	413	312	293	268	236	225	215	192
85	479	400	297	277	256	221	215	205	182
90	462	388	287	247	246	211	207	193	174
95	450	374	279	258	238	203	199	185	167
100	451	377	281	259	238	203	199	185	166

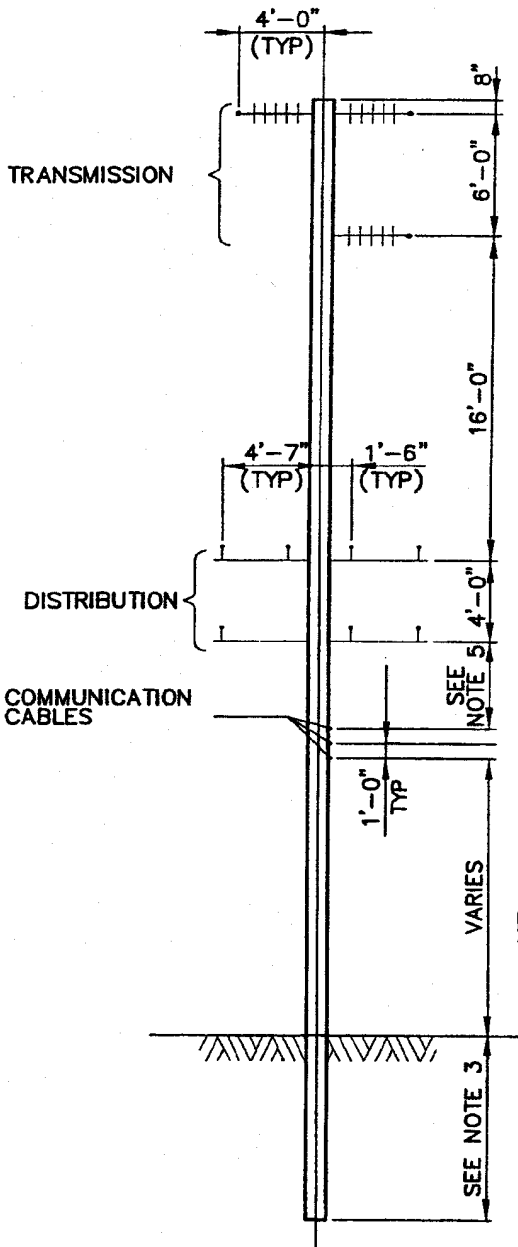
NOTES

- SPAN LENGTHS CONSIDERING POLE STRENGTH ONLY.
- WEIGHT SPAN IS ASSUMED TO BE EQUAL TO WIND SPAN.
- EMBEDMENT DEPTH IS 10 PERCENT OF POLE HEIGHT PLUS TWO FEET.
- P-DELTA EFFECTS INCLUDED, BASED ON IEEE STANDARD 751.
- FOR ANALYSIS PURPOSE ONLY, THE DIMENSION IS ASSUMED TO BE 6' TO THE LOWEST DISTRIBUTION OR 20' TO THE LOWEST TRANSMISSION, AS APPLICABLE.

A	UPDATE FORM	KSM	GV	WPH	8/01/97	C						
-	ORIGINAL ISSUE	SDT	LB	WPH	8/26/96	B	CHANGED NOTE 5	WDF	WPH	WY	4/25/02	
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	

	TRANSMISSION ENGINEERING						SCALE: NONE	
	MAXIMUM WIND SPANS SINGLE CIRCUIT 69KV TYPE 2/1-WPI DF-1 POLES S.F.=2.667						DWG. NO.	SHT. NO.
							12200	19 of 24

12200B19



CLASS 1 DOUGLAS FIR

TRANSMISSION CONDUCTOR: 1033KCMIL ACSR/AW

DISTRIBUTION CONDUCTOR: 636 KCMIL ACSR/AW

COMMUNICATION CABLE: 1 INCH DIAMETER AND 300#/1000' WEIGHT

FACTOR OF SAFETY: 3

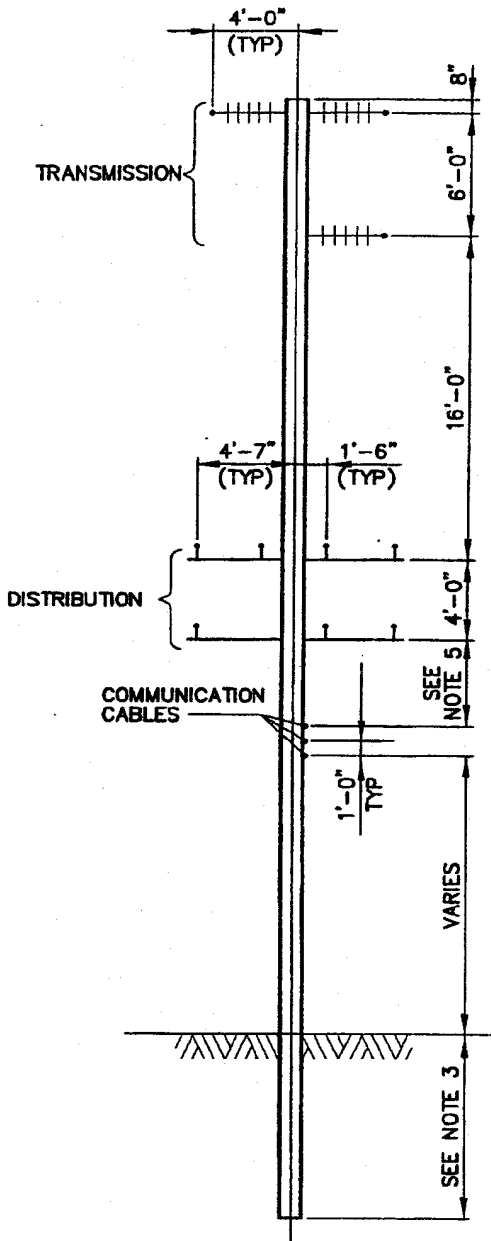
MAXIMUM WIND SPANS - FT									
POLE HT (FT)	DISTRIBUTION UNDERBUILD								
	NONE			4 WIRE			7 WIRE		
	COMM CABLES			COMM CABLES			COMM CABLES		
	0	1	3	0	1	3	0	1	3
50	480	449	391	312	299	271	255	247	240
55	465	428	368	296	278	252	239	229	213
60	453	416	350	284	265	237	227	216	199
65	448	403	337	271	255	227	213	207	188
70	441	396	323	264	248	219	207	200	180
75	439	391	316	259	242	209	201	190	174
80	434	384	310	256	234	204	198	186	170
85	420	369	296	245	224	194	188	177	161
90	408	357	284	236	215	185	180	169	153
95	396	345	274	223	206	178	173	162	147
100	396	347	273	223	206	177	173	161	146

NOTES

- SPAN LENGTHS CONSIDERING POLE STRENGTH ONLY.
- WEIGHT SPAN IS ASSUMED TO BE EQUAL TO WIND SPAN.
- EMBEDMENT DEPTH IS 10 PERCENT OF POLE HEIGHT PLUS TWO FEET.
- P-DELTA EFFECTS INCLUDED, BASED ON IEEE STANDARD 751.
- FOR ANALYSIS PURPOSE ONLY, THE DIMENSION IS ASSUMED TO BE 6' TO THE LOWEST DISTRIBUTION OR 20' TO THE LOWEST TRANSMISSION, AS APPLICABLE.

A	UPDATE FORM	KSM	GV	WPH	8/01/97	C						
-	ORIGINAL ISSUE	SDT	LB	WPH	8/26/96	B	CHANGED NOTE 5	WDF	WPH	4/25/02		
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	

SDGE	TRANSMISSION ENGINEERING						SCALE: NONE					
	MAXIMUM WIND SPANS						DWG. NO.			SHT. NO.		
	SINGLE CIRCUIT 69KV TYPE 2/1-WPI						12200			20 of 24		
DF-1 POLES S.F.=3						12200B20						



CLASS 1 DOUGLAS FIR

TRANSMISSION CONDUCTOR: 1033KCMIL ACSR/AW

DISTRIBUTION CONDUCTOR: 636 KCMIL ACSR/AW

COMMUNICATION CABLE: 1 INCH DIAMETER AND 300#/1000' WEIGHT

FACTOR OF SAFETY: 4

MAXIMUM WIND SPANS - FT									
POLE HT (FT)	DISTRIBUTION UNDERBUILD								
	NONE			4 WIRE			7 WIRE		
	COMM CABLES			COMM CABLES			COMM CABLES		
	0	1	3	0	1	3	0	1	3
50	348	324	283	226	-	-	-	-	-
55	338	310	265	213	200	-	-	-	
60	330	299	251	203	190	-	-	-	
65	324	291	240	196	182	-	152	-	
70	316	284	231	190	175	-	146	-	
75	313	279	225	185	170	147	142	-	
80	310	271	219	182	167	143	138	130	
85	298	258	208	172	158	135	130	123	
90	286	247	198	164	150	127	124	116	
95	276	237	188	157	143	121	118	110	
100	276	236	187	156	142	120	117	109	

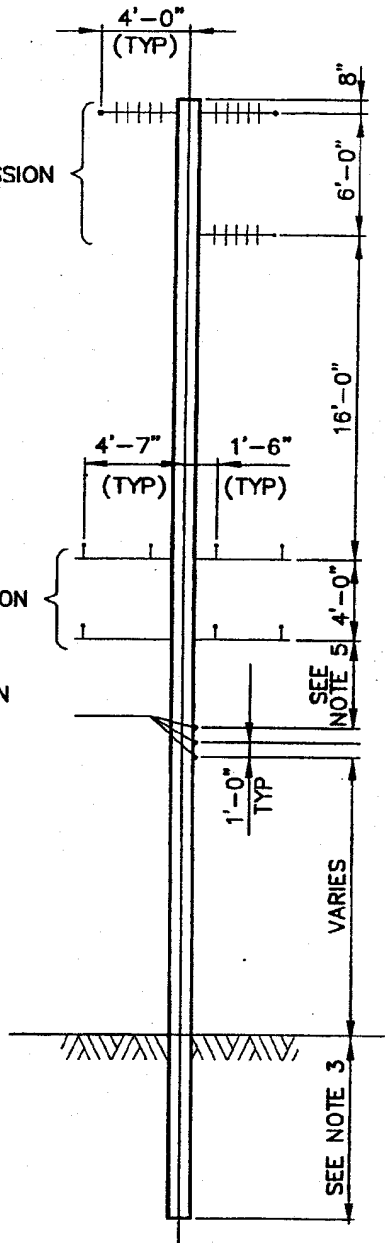
NOTES

- SPAN LENGTHS CONSIDERING POLE STRENGTH ONLY.
- WEIGHT SPAN IS ASSUMED TO BE EQUAL TO WIND SPAN.
- EMBEDMENT DEPTH IS 10 PERCENT OF POLE HEIGHT PLUS TWO FEET.
- P-DELTA EFFECTS INCLUDED, BASED ON IEEE STANDARD 751.
- FOR ANALYSIS PURPOSE ONLY, THE DIMENSION IS ASSUMED TO BE 6' TO THE LOWEST DISTRIBUTION OR 20' TO THE LOWEST TRANSMISSION, AS APPLICABLE.

A	UPDATE FORM	KSM	GV	WPH	8/01/97	C						
-	ORIGINAL ISSUE	SDT	LB	WPH	8/12/94	B	CHANGED NOTE 5	WDF	WPH	WPH	4/25/02	
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	

	TRANSMISSION ENGINEERING						SCALE: NONE					
	MAXIMUM WIND SPANS SINGLE CIRCUIT 69KV TYPE 2/1 - WPI DF-1 POLES S.F.=4						DWG. NO.			SHT. NO.		
							12200			21 of 24		

12200B21



CLASS H2 DOUGLAS FIR

TRANSMISSION CONDUCTOR: 1033KCMIL ACSR/AW

DISTRIBUTION CONDUCTOR: 636 KCMIL ACSR/AW

COMMUNICATION CABLE: 1 INCH DIAMETER AND 300#/1000' WEIGHT

FACTOR OF SAFETY: 2

MAXIMUM WIND SPANS - FT									
POLE HT (FT)	DISTRIBUTION UNDERBUILD								
	NONE			4 WIRE			7 WIRE		
	COMM CABLES			COMM CABLES			COMM CABLES		
	0	1	3	0	1	3	0	1	3
50	1048	989	871	693	660	601	566	552	520
55	1012	941	811	651	615	556	523	507	474
60	1016	935	790	639	599	535	510	487	454
65	993	903	754	613	575	509	484	464	425
70	975	882	730	592	553	486	463	442	407
75	990	887	729	593	551	485	464	441	399
80	950	853	690	563	522	456	437	414	377
85	942	839	676	552	514	447	430	407	368
90	936	832	669	548	505	437	421	397	358
95	936	828	660	541	497	433	417	393	353
100	917	802	640	521	482	414	400	380	337

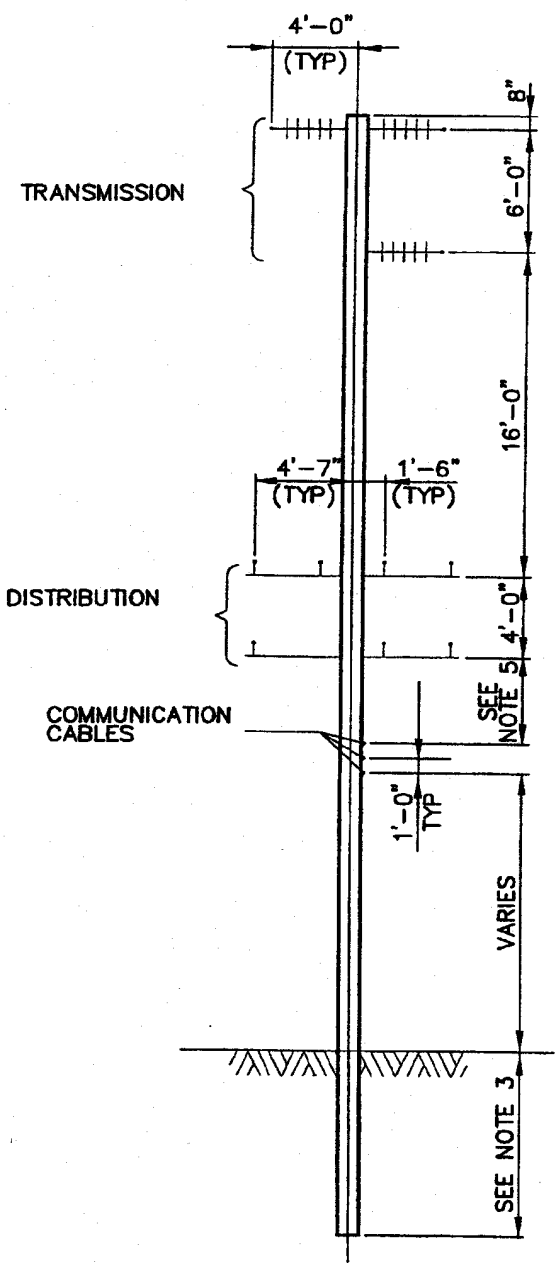
NOTES

1. SPAN LENGTHS CONSIDERING POLE STRENGTH ONLY.
2. WEIGHT SPAN IS ASSUMED TO BE EQUAL TO WIND SPAN.
3. EMBEDMENT DEPTH IS 10 PERCENT OF POLE HEIGHT PLUS TWO FEET.
4. P-DELTA EFFECTS INCLUDED, BASED ON IEEE STANDARD 751.
5. FOR ANALYSIS PURPOSE ONLY, THE DIMENSION IS ASSUMED TO BE 6' TO THE LOWEST DISTRIBUTION OR 20' TO THE LOWEST TRANSMISSION, AS APPLICABLE.

A	UPDATE FORM	KSM	GV	WPH	8/01/97	C						
-	ORIGINAL ISSUE	SDT	LB	WPH	8/12/94	B	CHANGED NOTE 5	WDF	WPH	WPH	4/25/02	
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	

	TRANSMISSION ENGINEERING						SCALE: NONE					
	MAXIMUM WIND SPANS SINGLE CIRCUIT 69KV TYPE 2/1-WPI DF-H2 POLES S.F.=2						DWG. NO.			SHT. NO.		
							12200			22 of 24		

12200B22



CLASS H2 DOUGLAS FIR

TRANSMISSION CONDUCTOR: 1033KCMIL ACSR/AW
 DISTRIBUTION CONDUCTOR: 636 KCMIL ACSR/AW

COMMUNICATION CABLE: 1 INCH DIAMETER AND
 300#/1000' WEIGHT

FACTOR OF SAFETY: 3

MAXIMUM WIND SPANS - FT									
POLE HT (FT)	DISTRIBUTION UNDERBUILD								
	NONE			4 WIRE			7 WIRE		
	COMM CABLES			COMM CABLES			COMM CABLES		
	0	1	3	0	1	3	0	1	3
50	696	648	570	455	432	395	372	360	339
55	671	619	528	425	403	364	341	332	308
60	672	611	515	418	390	347	332	317	295
65	655	593	492	398	373	329	316	300	277
70	645	575	471	385	359	316	304	288	264
75	654	581	470	387	360	314	299	286	257
80	625	552	446	368	337	296	283	270	241
85	622	546	437	358	331	285	277	260	235
90	617	542	427	354	326	280	272	255	230
95	612	535	422	350	322	276	269	251	226
100	595	518	406	338	310	265	255	241	217

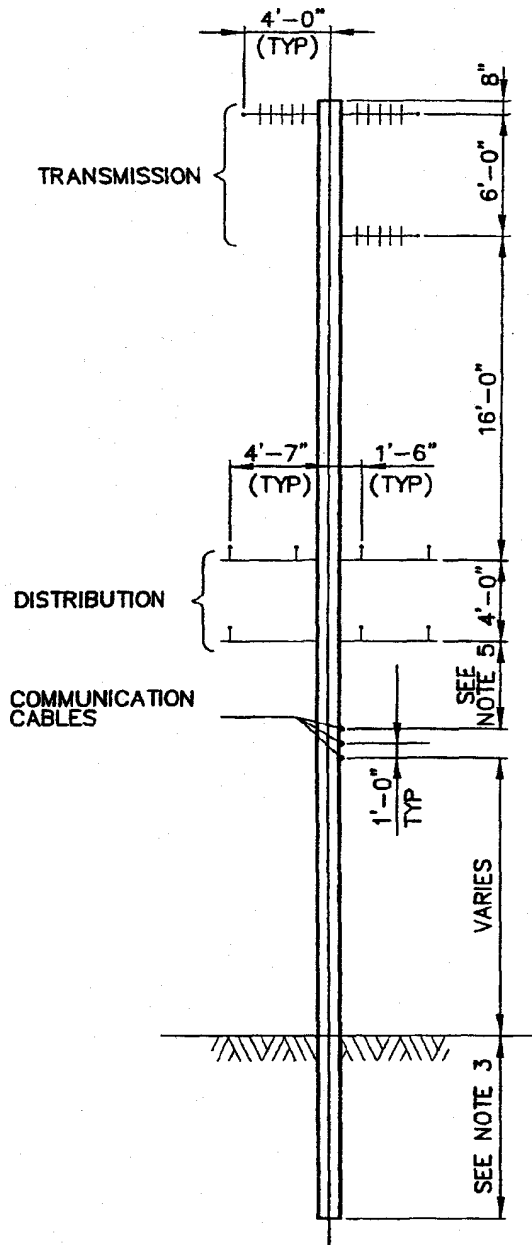
NOTES

- SPAN LENGTHS CONSIDERING POLE STRENGTH ONLY.
- WEIGHT SPAN IS ASSUMED TO BE EQUAL TO WIND SPAN.
- EMBEDMENT DEPTH IS 10 PERCENT OF POLE HEIGHT PLUS TWO FEET.
- P-DELTA EFFECTS INCLUDED, BASED ON IEEE STANDARD 751.
- FOR ANALYSIS PURPOSE ONLY, THE DIMENSION IS ASSUMED TO BE 6' TO THE LOWEST DISTRIBUTION OR 20' TO THE LOWEST TRANSMISSION, AS APPLICABLE.

A	UPDATE FORM	KSM	GV	WPH	8/01/97	C						
-	ORIGINAL ISSUE	SDT	LB	WPH	8/12/94	B	CHANGED NOTE 5	WDF	WPH	lovt	4/25/02	
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	

SDGE	TRANSMISSION ENGINEERING						SCALE: NONE					
	MAXIMUM WIND SPANS						DWG. NO.			SHT. NO.		
	SINGLE CIRCUIT 69kVB TYPE 2/1-WPI DF-H2 POLES S.F.=3						12200			23 of 24		

12200B23



CLASS H2 DOUGLAS FIR

TRANSMISSION CONDUCTOR: 1033KCMIL ACSR/AW

DISTRIBUTION CONDUCTOR: 636 KCMIL ACSR/AW


COMMUNICATION CABLE: 1 INCH DIAMETER AND 300#/1000' WEIGHT

FACTOR OF SAFETY: 4

POLE HT (FT)	MAXIMUM WIND SPANS - FT								
	DISTRIBUTION UNDERBUILD								
	NONE			4 WIRE			7 WIRE		
	COMM CABLES			COMM CABLES			COMM CABLES		
	0	1	3	0	1	3	0	1	3
50	510	477	416	332	315	-	269	-	-
55	492	454	386	312	293	262	248	-	-
60	494	445	375	305	285	252	240	230	-
65	478	430	357	288	271	237	228	217	-
70	469	418	339	278	261	226	218	206	-
75	471	421	337	278	260	224	216	204	184
80	451	396	318	263	241	210	204	192	172
85	446	390	309	257	235	204	198	186	166
90	443	384	304	253	230	200	194	182	162
95	436	380	299	249	226	196	191	178	158
100	421	366	286	239	217	187	182	170	150

NOTES

- SPAN LENGTHS CONSIDERING POLE STRENGTH ONLY.
- WEIGHT SPAN IS ASSUMED TO BE EQUAL TO WIND SPAN.
- EMBEDMENT DEPTH IS 10 PERCENT OF POLE HEIGHT PLUS TWO FEET.
- P-DELTA EFFECTS INCLUDED, BASED ON IEEE STANDARD 751.
- FOR ANALYSIS PURPOSE ONLY, THE DIMENSION IS ASSUMED TO BE 6' TO THE LOWEST DISTRIBUTION OR 20' TO THE LOWEST TRANSMISSION, AS APPLICABLE.

A	UPDATE FORM	KSM	GV	WPH	8/01/97	C						
-	ORIGINAL ISSUE	SDT	LB	WPH	8/12/94	B	CHANGED NOTE 5	WDF	WPH	WPH	4/25/02	
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	
 TRANSMISSION ENGINEERING MAXIMUM WIND SPANS SINGLE CIRCUIT 69KV TYPE 2/1-WPI DF-H2 POLES S.F.=4								SCALE: NONE				
								DWG. NO.	SHT. NO.			
								12200	24 of 24			

12200B24


SCOPE:

This standard provides buckling capacity for wood poles.

ASSUMPTIONS:

The buckling tables were developed based on the following assumptions:

1. The Gere and Carter method is employed.
2. Factor of Safety is 1.0. It is the users responsibility to divide the buckling capacity on the tables by an appropriate safety factor when comparing the axial load in the pole to the buckling capacity.
3. The support condition is assumed to be pinned-pinned and a k factor of 1.0 is used.
4. The pole is embedded 10% of the overall length plus an additional 2 feet. If a shallower embedment depth is utilized or if a pole is topped off, the tables will provide a conservative capacity. If the embedment depth is deeper, the user will need to calculate the buckling capacity manually.
5. Pole sizes are based on ANSI 05.1-1987.
6. Modulus of Elasticity for Western Red Cedar, E = 1,120,000 psi.
7. Modulus of Elasticity for Douglas Fir; E = 1,920,000 psi.

A						C					
--	ORIGINAL ISSUE	CCY	FJE	WPH	8/26/96	B					
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE
TRANSMISSION ENGINEERING						SCALE:					
		BUCKLING CAPACITY WOOD POLES				<i>DWG. NO</i>			<i>SHEET NO.</i>		
						12300			1 OF 9		

USE OF TABLES:

The user must first select the proper table to match the pole type and class. Next, the type of load and guy attachment must be considered. On poles with strain (dead-end) assemblies that are backguyed in-line (Fig. 1) or poles with strain (dead-end) assemblies that have bisector guys (Fig. 2), the attachment height (unbraced length) shall be the lowest guy attachment point. In cases where a suspension assembly is backguyed in-line (Fig. 3) or when a span guy is backguyed in-line (Fig. 4) the attachment height (unbraced length) shall be considered to be the average height of all the guy attachment points.

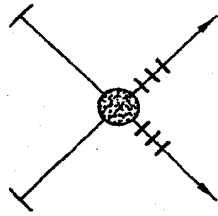


Fig. 1

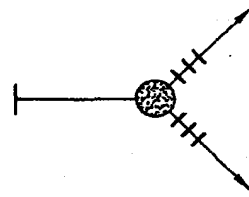


Fig. 2

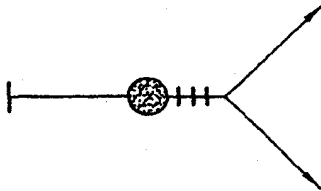


Fig. 3



Fig. 4

The cases shown in Figs. 1 and 2 provide restraint in both the transverse and longitudinal planes; whereas the cases in Figs. 3 and 4, less degree of restraint is provided.

						C						
-	ORIGINAL ISSUE	CCY	FJE	WPH	8/26/96	B						
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	
TRANSMISSION ENGINEERING								SCALE: NONE				
SDGE	BUCKLING CAPACITY WOOD POLES						DWC. NO.		SHT. NO.		1230002	
							12300		2 of 9			

The user then selects the appropriate table and references the proper attachment height (vertical axis) and pole length (horizontal axis) to find the buckling capacity of the pole. The capacity found has a factor of safety of 1.0. To apply the desired allowable working capacity, the user shall divide the buckling capacity by the required factor safety. This value shall then be compared to the total axial load found in the pole equal to the sum of all axial loads developed by the vertical component of the guys (due to wire tension and wind on the wire), the weight of wires, hardware and insulators and the pole weight for the section of pole above the guy attachment point.

A step by step usage summary is as follows:

1. Select the proper table to match the pole type and class.
2. Determine the proper guy attachment height.

Lowest guy attachment point if strain (deadend) assemblies have in-line of bisector guys.

Average height of all the guy attachment points if a suspension assembly or a span guy Has in-line guys.


3. Find buckling capacity on table based on proper attachment height and pole length.
4. Divide capacity by appropriate safety factor.
5. Determine axial load in the pole under the General Order 95 Light Loading condition.

Due to wire tension and wind on the wire.

Due to weight of the wire, hardware and insulators.

Due to the pole weight for the section of the pole above the attachment height.

6. Sum all axial load components.
7. Compare total axial load in pole with the pole capacity found divided by the appropriate safety factor.

A							C				
---	ORIGINAL ISSUE	CCY	FJE	WPH	8/26/96		B				
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE
TRANSMISSION ENGINEERING						SCALE:					
		BUCKLING CAPACITY WOOD POLES				<i>DWG. NO</i>			<i>SHEET NO.</i>		
						12300			3 OF 9		

ATTCH. HT. A.G. (FT)	POLE LENGTH (FT)															
	50	55	60	65	70	75	80	85	90	95	100	105	110			
18	564,000	647,235	738,395	838,075	946,865	1,065,356	1,194,148	1,290,899	1,392,526	1,499,264	1,662,830	1,783,469	1,909,973			
20	436,980	502,939	575,193	654,225	740,515	834,544	936,797	1,014,342	1,095,769	1,181,271	1,311,349	1,407,990	1,509,305			
22	345,092	398,398	456,804	520,714	590,524	666,633	749,439	812,836	879,385	949,252	1,054,778	1,133,736	1,216,527			
24	276,794	320,573	368,566	421,081	478,484	541,098	609,259	661,941	717,229	775,263	862,284	927,869	996,638			
26	224,880	261,321	301,275	345,032	392,878	445,096	501,972	546,352	592,917	641,787	714,539	769,771	827,684			
28	184,670	215,348	248,998	285,871	326,212	370,265	418,275	456,097	495,772	537,408	598,943	646,093	695,347			
30	153,022	179,100	207,718	239,095	273,444	310,978	351,908	384,462	418,606	454,434	507,005	547,505	589,974			
32	127,768	150,121	174,665	201,592	231,089	263,342	298,537	326,799	356,438	387,536	432,840	468,000	504,870			
34	107,376	126,673	147,877	171,156	196,675	224,598	255,088	279,808	305,731	332,930	372,268	403,025	435,281			
36	90,736	107,502	125,937	146,192	168,413	192,745	219,333	241,099	263,923	287,870	322,257	349,344	377,754			
38	77,035	91,681	107,799	125,523	144,983	166,309	189,630	208,906	229,120	250,330	280,567	304,565	329,737			
40	65,663	78,518	92,680	108,267	125,396	144,183	164,744	181,904	199,900	218,785	245,514	266,888	289,312			
42	56,155	67,488	79,985	93,753	108,898	125,524	143,735	159,083	175,180	192,074	215,814	234,943	255,013			
44		58,184	69,255	81,465	94,910	109,683	125,880	139,664	154,123	169,300	190,476	207,668	225,710			
46		50,292	60,132	70,999	82,977	96,153	110,611	123,037	136,074	149,761	168,722	184,234	200,517			
48			52,336	62,037	72,743	84,532	97,461	108,721	120,516	132,903	149,939	163,985	178,732			
50			45,641	54,326	63,922	74,502	86,135	96,332	107,037	118,282	133,637	146,397	159,796			
52			39,868	47,662	56,286	65,805	76,284	85,561	95,303	105,541	119,422	131,047	143,256			
54				41,880	49,648	58,233	67,695	76,157	85,047	94,392	106,973	117,591	128,750			
56				36,846	43,857	51,617	60,180	67,915	76,045	84,596	96,026	105,750	115,971			
58					38,789	45,815	53,580	60,665	68,117	75,958	86,365	95,290	104,674			
60					34,338	40,713	47,766	54,268	61,111	68,315	77,810	86,018	94,653			
62						36,212	42,629	48,606	54,901	61,532	70,211	77,774	85,734			
64						32,231	38,079	43,581	49,381	55,496	63,442	70,423	77,774			
66							34,038	39,111	44,463	50,109	57,395	63,849	70,649			
68							30,442	35,124	40,069	45,290	51,980	57,957	64,256			
70							27,235	31,561	36,135	40,969	47,121	52,662	58,506			
72								28,372	32,607	37,087	42,750	47,894	53,323			
74								25,511	29,436	33,593	38,812	43,592	48,641			
76									26,582	30,443	35,256	39,704	44,404			
78									24,008	27,597	32,041	36,182	40,563			
80										25,023	29,128	32,988	37,074			
82										22,691	26,487	30,067	33,902			
84											24,098	27,448	31,012			
86											21,906	25,045	28,377			
88											19,921	22,853	25,970			
90												20,853	23,771			
92												19,926	21,757			
94													19,913			
96													18,223			

FACTOR OF SAFETY 1.0 *

UNITS = POUNDS

* Divide capacity by appropriate factor of safety



SAN DIEGO GAS & ELECTRIC

BUCKLING CAPACITY
DOUGLAS FIR CLASS 1

DWG. NO. 12300
SHT. NO. 4 of 9

REV	ORIGINAL	CYY	FJE	WPH	08/26/1996
	CHANGE				

ATTCH. HT. A.G. (FT)	POLE LENGTH (FT)															
	50	55	60	65	70	75	80	85	90	95	100	105	110			
18	708,227	835,548	946,573	1,067,181	1,198,025	1,339,751	1,493,009	1,658,453	1,781,778	1,969,035	2,107,370	2,252,005	2,473,141			
20	549,505	649,676	737,843	833,932	937,575	1,050,197	1,172,026	1,303,593	1,402,550	1,551,567	1,662,521	1,778,506	1,954,670			
22	434,601	514,968	586,378	663,972	748,193	839,479	938,265	1,044,989	1,125,985	1,246,953	1,337,734	1,432,616	1,575,779			
24	349,130	414,654	473,434	537,317	606,679	681,886	763,305	851,304	918,691	1,018,512	1,094,016	1,172,919	1,291,188			
26	284,111	338,252	387,294	440,608	498,512	561,323	629,350	702,909	759,746	843,253	906,919	973,443	1,072,500			
28	233,709	278,952	320,339	365,344	414,245	467,311	524,811	587,016	635,514	706,192	760,505	817,250	901,191			
30	194,004	232,178	267,447	305,814	347,519	392,798	441,886	495,015	536,812	597,232	644,032	692,925	764,774			
32	162,282	194,769	225,079	258,084	293,938	332,905	375,172	420,942	457,276	509,377	550,056	592,550	654,588			
34	136,660	164,488	190,727	219,297	250,384	284,170	320,838	360,567	392,391	437,659	473,287	510,503	564,479			
36	115,724	139,718	162,579	187,484	214,599	244,087	276,107	310,822	338,881	378,476	409,889	442,703	489,981			
38	98,467	119,259	139,298	161,132	184,919	210,804	238,930	269,441	294,327	329,165	357,028	386,132	427,792			
40	84,126	102,246	119,882	139,121	160,095	182,935	207,768	234,725	256,912	287,727	312,571	338,524	375,429			
42	72,123	87,974	103,571	120,598	139,176	159,422	181,450	205,377	225,251	252,637	274,895	298,148	330,998			
44		75,930	89,777	104,907	121,430	139,449	159,070	180,398	198,275	222,716	242,742	263,667	293,033			
46		65,707	78,043	91,536	106,283	122,380	139,922	159,005	175,146	197,043	215,132	234,034	260,389			
48		68,008	80,079	93,284	107,712	123,448	140,580	155,205	171,489	191,286	208,421	228,158	258,158			
50		59,386	70,214	82,074	95,044	109,203	124,631	137,923	155,676	174,891	191,286	208,421	232,158			
52		51,946	61,984	72,363	84,054	96,829	110,761	122,875	138,933	158,933	174,891	191,286	216,158			
54			54,278	63,916	74,480	86,034	98,647	109,717	122,795	136,709	149,709	167,369	186,178			
56			47,825	56,542	66,107	76,582	88,027	98,166	111,401	122,795	136,709	149,709	167,369			
58				50,083	58,761	68,276	78,683	87,989	98,166	111,401	122,795	136,709	150,801			
60				44,407	52,295	60,954	70,435	78,992	89,998	100,046	110,512	121,465	136,151			
62					46,587	54,480	63,132	71,016	81,079	89,964	99,268	109,717	123,153			
64					41,536	48,740	56,649	63,923	73,141	81,348	89,947	99,268	111,584			
66						43,640	50,878	57,600	66,056	73,649	81,609	89,947	101,257			
68						39,096	45,730	51,949	59,717	66,753	74,132	81,609	92,011			
70						35,042	41,127	46,889	54,034	60,561	67,412	74,132	83,714			
72							37,005	42,348	48,927	54,990	61,358	67,412	76,250			
74							33,305	38,265	44,329	49,967	55,893	61,358	69,521			
76								34,588	40,183	45,431	50,951	55,893	63,442			
78								31,271	36,437	41,327	46,474	50,951	57,939			
80									33,049	37,608	42,411	46,474	52,949			
82									29,979	34,233	38,719	42,411	48,416			
84										31,166	35,359	38,719	44,293			
86										28,376	32,297	35,359	40,537			
88										25,835	29,504	32,297	37,110			
90											26,953	29,504	33,981			
92											24,621	26,953	31,119			
94												24,621	28,499			
96													26,099			
													23,898			

FACTOR OF SAFETY 1.0 *

UNITS = POUNDS

* Divide capacity by appropriate factor of safety

SDGE				SAN DIEGO GAS & ELECTRIC			
BUCKLING CAPACITY				DWG. NO. 12300			
DOUGLAS FIR CLASS H1				SHT. NO. 5 of 9			
TRANSMISSION ENGINEERING							
REV	CHANGE	PREP	CHK'D	APPROV	DATE		
B							
A	ORIGINAL	CYY	FJE	WPH	08/28/1996		

ATTCH. HT. A.G. (FT)	POLE LENGTH (FT)														
	50	55	60	65	70	75	80	85	90	95	100	105	110		
18	908,097	1,028,234	1,195,940	1,340,324	1,496,112	1,715,194	1,844,729	2,038,967	2,247,437	2,470,859	2,635,590	2,885,586	3,068,554		
20	704,898	800,476	932,764	1,047,623	1,171,562	1,344,814	1,448,989	1,603,623	1,769,638	1,947,618	2,079,902	2,279,167	2,426,045		
22	557,760	635,310	741,732	834,927	935,499	1,075,244	1,160,697	1,286,272	1,421,134	1,565,763	1,674,126	1,836,150	1,956,432		
24	448,287	512,233	599,242	676,097	759,047	873,611	944,856	1,048,515	1,159,877	1,279,347	1,369,582	1,503,506	1,603,639		
26	364,988	418,432	490,532	554,778	624,131	719,337	779,548	866,296	959,523	1,059,574	1,135,751	1,247,981	1,332,496		
28	300,398	345,574	406,005	460,331	516,988	599,022	650,499	723,941	802,899	887,669	952,733	1,047,888	1,120,059		
30	249,503	288,064	339,210	385,601	435,704	503,649	548,095	610,895	678,440	750,985	807,116	888,607	950,860		
32	208,843	242,034	285,884	325,637	368,801	426,977	465,681	519,848	578,131	640,755	688,602	760,002	814,170		
34	175,987	204,744	242,271	276,935	314,398	364,580	398,537	445,610	496,283	550,755	593,587	654,870	702,365		
36	149,107	174,215	206,683	236,953	269,682	313,252	343,239	384,420	428,772	476,470	514,280	567,987	609,912		
38	126,958	148,988	177,236	203,821	232,579	270,626	297,261	333,500	372,549	414,564	448,139	495,489	532,719		
40	108,546	127,969	152,668	176,135	201,533	234,927	258,706	290,764	325,325	362,531	392,504	434,471	467,709		
42	93,130	110,329	132,018	152,826	175,360	204,803	226,130	254,622	285,356	318,459	345,343	382,718	412,534		
44		95,427	114,547	133,071	153,145	179,210	198,417	223,846	251,292	280,871	305,088	338,516	365,380		
46		82,765	99,678	116,227	134,175	157,334	174,695	197,477	222,081	248,612	270,512	300,527	324,824		
48			86,956	101,788	117,887	138,531	154,276	174,757	196,889	220,770	240,643	267,688	289,744		
50			76,018	89,349	103,833	122,290	136,611	155,080	175,052	196,615	214,706	239,155	259,239		
52			66,574	78,587	91,652	108,196	121,258	137,960	156,033	175,559	192,077	214,243	232,587		
54				69,237	81,050	95,915	107,859	123,000	139,398	157,127	172,248	192,398	209,198		
56				61,086	71,789	85,173	96,118	109,878	124,791	140,926	154,802	173,165	188,589		
58					63,672	75,746	85,795	98,325	111,917	126,635	139,396	156,168	170,362		
60					56,535	67,446	76,689	88,122	100,534	113,985	125,745	141,097	154,185		
62						60,117	68,634	79,083	90,438	102,754	113,612	127,690	139,793		
64						53,629	61,487	71,052	81,458	92,754	102,797	115,728	126,922		
66							55,131	63,900	73,450	83,827	93,129	105,028	115,405		
68							49,466	57,516	66,291	75,837	84,466	95,431	105,067		
70							44,406	51,804	59,878	68,670	76,686	86,803	95,763		
72								46,583	54,120	62,227	69,682	79,030	87,372		
74								42,084	48,942	56,425	63,366	72,013	79,789		
76									44,276	51,191	57,659	65,666	72,923		
78									40,065	46,460	52,494	59,915	66,684		
80										42,178	47,612	54,695	61,034		
82										38,297	43,560	49,951	55,883		
84											39,696	45,833	51,188		
86											36,178	41,698	46,904		
88											32,972	38,107	42,889		
90											34,826	39,407	39,407		
92											31,827	36,127	36,127		
94												33,120	33,120		
96												30,361	30,361		

FACTOR OF SAFETY 1.0 *

UNITS = POUNDS

* Divide capacity by appropriate factor of safety

REV		CHANGE		CYC	FJE	WPH	DATE	SAN DIEGO GAS & ELECTRIC		DWG. NO.	SHT. NO.
								BUCKLING CAPACITY			
								DOUGLAS FIR CLASS H2			
								TRANSMISSION ENGINEERING			



ATTCH. HT. A.G. (FT)	POLE LENGTH (FT)													
	50	55	60	65	70	75	80	85	90	95	100	105	110	
18	453,514	536,001	628,455	708,611	795,103	888,355	988,784	1,086,805	1,212,833	1,299,224	1,429,525	1,525,679	1,671,489	
20	348,702	413,612	486,432	550,159	618,922	693,066	772,932	858,858	951,182	1,020,564	1,124,303	1,201,483	1,317,642	
22	273,177	325,257	383,743	435,412	491,164	551,290	616,071	685,789	760,721	817,558	901,807	965,000	1,059,397	
24	217,271	259,728	307,458	350,029	395,969	445,523	498,930	556,424	618,241	665,565	735,114	787,708	865,689	
26	174,961	210,032	249,506	285,053	323,421	364,819	409,449	457,513	509,211	549,154	607,359	651,735	717,044	
28	142,338	171,631	204,645	234,665	267,075	302,056	339,783	380,430	424,168	458,273	507,554	545,432	600,771	
30	116,785	141,484	169,358	194,956	222,601	252,451	284,658	319,373	356,744	386,155	428,297	460,954	508,315	
32	96,488	117,492	141,220	163,228	187,007	212,684	240,423	270,326	302,533	328,113	364,463	392,863	433,749	
34	80,204	98,172	118,513	137,571	158,441	180,441	204,492	230,443	258,408	280,823	312,415	337,299	372,865	
36	66,984	82,455	99,999	116,605	134,569	153,997	174,994	197,662	222,104	241,875	269,515	291,464	322,609	
38	56,165	69,553	84,766	99,315	115,065	132,112	150,547	170,463	191,950	209,491	233,815	253,289	280,726	
40	47,242	58,880	72,132	84,939	98,817	113,849	130,117	147,704	166,691	182,334	203,852	221,223	245,520	
42	39,833	49,989	61,579	72,901	85,181	98,495	112,916	128,517	145,373	159,387	178,513	194,079	215,699	
44		42,537	52,710	62,755	73,663	85,501	98,336	112,233	127,258	139,865	156,936	170,944	190,263	
46		36,258	45,213	54,154	63,877	74,440	85,904	98,327	111,771	123,154	138,449	151,103	168,433	
48			38,847	46,827	55,519	64,974	75,246	86,388	98,456	108,769	122,520	133,990	149,590	
50			33,416	40,557	48,347	56,833	66,063	76,087	86,953	96,324	108,724	119,154	133,241	
52			28,765	35,188	42,166	49,802	58,117	67,158	76,968	85,507	96,721	106,232	118,990	
54				30,521	36,821	43,705	51,214	59,387	68,266	76,065	86,233	94,928	106,513	
56				26,501	32,181	38,400	45,194	52,599	60,652	67,793	77,033	85,001	95,545	
58					28,142	33,770	39,928	46,649	53,968	60,519	68,934	76,251	85,870	
60					24,617	29,716	35,307	41,418	48,082	54,102	61,780	68,513	77,305	
62						26,159	31,241	36,806	42,883	48,424	55,443	61,649	69,700	
64						23,030	27,656	32,730	38,279	43,387	49,813	55,543	62,928	
66							24,486	29,118	34,193	38,908	44,799	50,097	56,882	
68							21,679	25,912	30,557	34,915	40,323	45,228	51,470	
70							19,189	23,060	27,316	31,348	36,318	40,865	46,615	
72								20,519	24,422	28,155	32,728	36,948	42,251	
74								18,252	21,834	25,293	29,504	33,424	38,320	
76									19,515	22,723	26,604	30,249	34,773	
78									17,436	20,412	23,991	27,382	31,567	
80										18,331	21,634	24,792	28,665	
82										16,456	19,505	22,447	26,034	
84											17,580	20,322	23,646	
86											15,837	18,394	21,477	
88												16,643	19,503	
90												15,052	17,706	
92												13,605	16,068	
94													14,574	
96													13,211	

FACTOR OF SAFETY 1.0 *

UNITS = POUNDS

* Divide capacity by appropriate factor of safety

(Usage of WRC subject to approval. Check pole availability prior to ordering.)

SDGE				SAN DIEGO GAS & ELECTRIC			
BUCKLING CAPACITY				DWG. NO. 12300			
WESTERN RED CEDAR CL-1				SHT. NO. 7 of 9			
TRANSMISSION ENGINEERING							
REV	DESCRIPTION	DATE	BY	CHKD	APP'D	DATE	BY
A	ORIGINAL		CYY	FJE	WPH	08/28/1996	
B	CHANGE						

ATTCH. HT. A.G. (FT)	POLE LENGTH (FT)														
	50	55	60	65	70	75	80	85	90	95	100	105	110		
18	578,324	677,751	788,346	911,017	1,016,102	1,128,764	1,249,466	1,378,665	1,516,813	1,664,365	1,821,776	1,937,736	2,112,600		
20	445,111	523,515	610,783	707,653	791,351	881,075	977,207	1,080,118	1,190,178	1,307,756	1,433,222	1,526,426	1,665,867		
22	349,071	412,112	482,334	560,344	628,331	701,212	779,303	862,915	952,354	1,047,926	1,149,937	1,226,363	1,339,783		
24	277,941	329,445	386,863	450,704	506,829	566,995	631,471	700,518	774,396	853,360	937,670	1,001,354	1,095,150		
26	224,078	266,717	314,295	367,246	414,206	464,552	518,515	576,317	638,179	704,320	774,961	828,765	907,399		
28	182,523	218,218	258,088	302,505	342,248	384,862	430,547	479,497	531,901	587,948	647,827	693,815	760,510		
30	149,952	180,118	213,851	251,471	285,433	321,858	360,919	402,783	447,617	495,586	546,853	586,552	643,691		
32	124,077	149,778	178,552	210,681	239,948	271,346	305,028	341,141	379,830	421,239	465,513	500,082	549,461		
34	103,279	125,329	150,049	177,685	203,090	230,355	259,615	291,000	324,637	360,654	399,179	429,507	472,506		
36	86,393	105,424	126,792	150,713	172,906	196,735	222,319	249,774	279,212	310,748	344,493	371,279	408,973		
38	72,561	89,072	107,642	128,461	147,957	168,901	191,399	215,555	241,470	269,243	298,977	322,774	356,015		
40	61,143	75,534	91,747	109,954	127,163	145,664	165,550	186,913	209,844	234,432	260,769	282,022	311,490		
42	51,655	64,245	78,459	94,448	109,706	126,122	143,778	162,757	183,142	205,012	228,450	247,519	273,768		
44		54,776	67,281	81,375	94,955	109,577	125,316	142,247	160,443	179,977	200,924	218,106	241,588		
46		46,789	57,825	70,288	82,415	95,486	109,568	124,727	141,030	158,543	177,334	192,875	213,962		
48			49,785	60,838	71,701	83,421	96,060	109,677	124,333	140,088	157,003	171,108	190,112		
50			42,920	52,747	62,502	73,041	84,417	96,686	109,901	124,118	139,392	152,234	169,414		
52			37,035	45,790	54,571	64,071	74,338	85,421	97,389	110,234	124,065	135,790	151,366		
54				39,787	47,707	56,289	65,576	75,612	86,442	98,112	110,669	121,402	135,562		
56				34,590	41,747	49,514	57,932	67,039	76,878	87,489	98,915	108,763	121,666		
58					36,555	43,597	51,241	59,521	68,476	78,145	88,565	97,620	109,404		
60					32,019	38,414	45,366	52,908	61,074	69,900	79,421	87,763	98,547		
62						33,862	40,194	47,073	54,532	62,603	71,317	79,016	88,904		
64						29,855	35,629	41,913	48,736	56,127	64,116	71,234	80,315		
66							31,592	37,339	43,587	50,365	57,701	64,290	72,643		
68							28,013	33,274	39,004	45,228	51,971	58,080	65,775		
70							24,837	29,657	34,916	40,637	46,844	52,514	59,611		
72								26,431	31,263	36,527	42,246	47,514	54,068		
74								23,551	27,993	32,840	38,114	43,015	49,074		
76									25,061	29,529	34,397	38,959	44,566		
78									22,430	26,550	31,046	35,297	40,489		
80										23,866	28,022	31,985	36,798		
82											25,289	28,986	33,450		
84												22,817	30,410		
86													27,647		
88													21,557		
90													22,840		
92													17,663		
94													18,844		
96													17,103		

FACTOR OF SAFETY 1.0 *

UNITS = POUNDS

* Divide capacity by appropriate factor of safety

(Usage of WRC subject to approval. Check pole availability prior to ordering.)

SDGE		SANDIEGO GAS & ELECTRIC	
BUCKLING CAPACITY		DWG. NO. 12300	
WESTRN RED CEDAR CL-H1		SHT. NO. 8 of 9	
REV.	CHANGE	DATE	TRANSMISSION ENGINEERING
B			
A			
	ORIGINAL	CYY	FJE
	CHANGE	PREP	CHKD
		WPH	APPRD
		08/26/1996	DATE

ATTCH. HT. A.G. (FT)	POLE LENGTH (FT)															
	50	55	60	65	70	75	80	85	90	95	100	105	110			
18	700,002	831,960	979,291	1,143,318	1,325,377	1,484,820	1,701,923	1,889,341	2,089,774	2,303,911	2,467,766	2,706,281	2,960,380			
20	539,236	643,198	759,381	888,849	1,032,680	1,159,527	1,331,319	1,480,523	1,640,139	1,810,722	1,942,274	2,132,390	2,334,994			
22	423,280	506,796	600,226	704,443	820,329	923,256	1,061,904	1,183,062	1,312,719	1,451,333	1,559,067	1,713,650	1,878,443			
24	337,359	405,530	481,878	567,129	662,020	746,904	860,633	960,634	1,067,688	1,182,180	1,271,862	1,399,630	1,535,885			
26	272,262	328,651	391,877	462,556	541,309	612,267	706,831	790,500	880,107	975,978	1,051,660	1,158,723	1,272,941			
28	222,014	269,179	322,132	381,397	447,506	507,506	587,040	657,859	733,735	814,950	879,563	970,327	1,067,194			
30	182,607	222,434	267,210	317,387	373,423	424,658	492,212	552,749	617,640	687,128	742,842	820,561	903,542			
32	151,283	185,187	223,361	266,198	314,096	358,219	416,086	468,279	524,254	584,222	632,679	699,809	771,513			
34	126,089	155,154	187,933	224,768	266,008	304,286	354,224	399,560	448,207	500,352	542,815	601,239	663,672			
36	105,620	130,687	159,007	190,881	226,616	260,038	303,412	343,051	385,610	431,253	468,712	519,900	574,827			
38	88,841	110,575	135,174	162,906	194,044	223,394	261,282	296,141	333,591	373,778	407,017	452,132	500,389			
40	74,980	93,909	115,378	139,624	166,889	192,792	226,056	256,869	289,995	325,564	355,212	395,185	437,963			
42	63,452	80,003	98,817	120,105	144,084	167,046	196,382	223,744	253,181	284,809	311,378	346,963	386,065			
44		68,328	84,875	103,635	124,804	145,241	171,217	195,614	221,881	250,123	274,033	305,847	339,930			
46		58,472	73,070	89,658	108,410	126,663	149,746	171,579	195,105	220,420	242,019	270,570	301,176			
48			63,025	77,734	94,396	110,750	131,328	150,931	172,073	194,840	214,418	240,131	267,711			
50			54,440	67,516	82,360	97,053	115,450	133,104	152,161	172,700	190,501	213,731	238,663			
52			47,072	58,722	71,977	85,212	101,701	117,642	134,867	153,448	169,679	190,726	213,330			
54				51,126	62,987	74,935	89,748	104,176	119,784	136,636	151,474	170,593	191,141			
56				44,544	55,176	65,983	79,317	92,405	106,579	121,898	135,493	152,903	171,627			
58					48,368	58,160	70,185	82,079	94,977	108,933	121,415	137,303	154,403			
60					42,419	51,304	62,165	72,994	84,752	97,489	108,973	123,501	138,150			
62						45,279	55,103	64,978	75,714	87,359	97,942	111,250	125,598			
64						39,972	48,869	57,885	67,704	78,366	88,134	100,346	113,523			
66						43,354	51,596	60,586	70,363	79,393	89,616	90,616	102,737			
68						38,464	46,007	54,249	63,224	71,582	81,911	81,911	93,076			
70						34,122	41,031	48,594	56,843	64,589	74,105	74,105	84,405			
72							36,593	43,539	51,128	58,313	67,093	67,093	76,604			
74							32,628	39,013	46,001	52,672	60,780	60,780	69,573			
76								34,964	41,393	47,593	55,087	55,087	63,224			
78								31,309	37,247	43,012	49,945	49,945	57,482			
80									33,510	38,875	45,293	45,293	52,280			
82									30,139	35,134	41,079	41,079	47,560			
84										31,746	37,257	37,257	43,273			
86										28,677	33,786	33,786	39,374			
88										25,892	30,832	30,832	35,823			
90											27,762	27,762	32,588			
92												25,149	29,636			
94													26,941			
96													24,479			

FACTOR OF SAFETY 1.0 *

UNITS = POUNDS

* Divide capacity by appropriate factor of safety

(Usage of WRC subject to approval. Check pole availability prior to ordering.)

SDGE				SAN DIEGO GAS & ELECTRIC			
ORIGINAL		CHANGE		BUCKLING CAPACITY		DWG. NO.	
				WESTRN RED CEDAR CL-H2		12300	
REV.		CHK'D	APPROV.	DATE			SHT. NO.
							9 OF 9
TRANSMISSION ENGINEERING							

Table 1: Class 1: Wood Poles to SW Poles Conversion

Existing Wood Pole Length (ft)	GRADE A or GRADE B	
	Valmont Catalog Number for Equivalent SW Pole	Valmont SW Pole Maximum Allowable G.O. 95 Groundline Moment (k-ft)
40	S-040-74	59
45	S-045-84	65
50	S-050-95	72
55	S-055-105	79
60	S-060-116	81
65	S-065-126	88
70	S-070-136	95
75	S-075-147	103
80	S-080-157	112
85	S-085-168	120
90	S-090-178	129
95	S-095-189	138
100	S-100-199	148
105	S-105-209	157
110	S-110-220	161
115	S-115-230	171
120	S-120-240	181

Table 2: Class H-2: Wood Poles to SW Poles Conversion

Existing Wood Pole Length (ft)	GRADE A		GRADE B	
	Valmont Catalog Number for Equivalent SW Pole	Valmont SW Pole Maximum Allowable G.O. 95 Groundline Moment (k-ft)	Valmont Catalog Number for Equivalent SW Pole	Valmont SW Pole Maximum Allowable G.O. 95 Groundline Moment (k-ft)
40	S-040-74	59	S-040-90	75
45	S-045-84	65	S-045-103	81
50	S-050-95	72	S-050-115	89
55	S-055-105	79	S-055-153	117
60	S-060-116	81	S-060-169	119
65	S-065-126	88	S-065-184	129
70	S-070-136	95	S-070-199	139
75	S-075-147	103	S-075-214	149
80	S-080-157	112	S-080-230	159
85	S-085-168	120	S-085-245	169
90	S-090-178	129	S-090-260	181
95	S-095-189	138	S-095-275	192
100	S-100-199	148	S-100-290	203
105	S-105-209	157	S-105-305	215
110	S-110-220	161	S-110-321	219
115	S-115-230	171	S-115-336	232
120	S-120-240	181	S-120-351	245

NOTES:

1. CONTACT CIVIL/STRUCTURAL ENGINEERING IF GUYING IS REQUIRED.
 2. THE ABOVE INFORMATION ASSUMES G.O. 95 AND ANSI 05.1 REQUIREMENTS HAVE BEEN MET FOR THE WOOD POLES.
 3. REQUIRED POLE LENGTH IS THE END-TO-END LENGTH IN FEET.
 4. CALCULATIONS BASED ON EMBEDMENT DEPTH OF 10% OF THE TOTAL POLE LENGTH PLUS 2 FEET.
 5. VALMONT SW CATALOG NUMBER DETERMINED BY COMPARING THE PUBLISHED ULTIMATE MOMENT CAPACITY VALUES FROM THE VALMONT SW CATALOG TO THE G.O. 95 REQUIRED MINIMUM STEEL POLE ULTIMATE MOMENT VALUES.
 6. A SAFETY FACTOR FOR STEEL OF 1.5 WAS USED FOR BOTH GRADE A AND GRADE B SW POLES.
 7. A SAFETY FACTOR OF 4.0 WAS USED FOR GRADE A WOOD POLES AND A SAFETY FACTOR OF 3.0 WAS USED FOR GRADE B WOOD POLES.
 8. CIVIL/STRUCTURAL ENGINEERING SHALL CHECK THE EMBEDMENT OF ANY SW POLE LONGER THAN 90 FEET.
 9. THE TABLES SHALL BE USED ONLY FOR REPLACING THE EXISTING WOOD POLES WITH THE SW POLES, SAME LOADING ASSUMED.
- CONTACT CIVIL/STRUCTURAL ENGINEERING IF NEW CONSTRUCTION OR DIFFERENT LOADING IS REQUIRED.

CORRECTIONS & CLARIFICATIONS		LD	AKY	TLM	10/16/06			TRANSMISSION ENGINEERING		SCALE:	NONE
ORIGINAL		PH	TLM	TLM	9/15/06			STEEL WOOD (SW) EQUIVALENT POLES		DWG. NO.	12500
CHANGE		BY	CEED/APPT	DATE	REF	DATE	REF	SDGE			1 of 1

CONDUCTOR AND OHGW ACCESSORY CROSS-REFERENCE

CONDUCTOR	DIAMETER (IN.)	WEIGHT (#FT.)	STOCK NUMBER	D. E. CLAMP(1)/ COMP. D. E. (4)	POST INSUL. CLAMP	SUSP. CLAMP	SUSP. CLAMP W/SOCKET EYE	JUMPER SLEEVE	TENSION SLEEVE	REPAIR SLEEVE	SPACER (2)	DAMPER (3)
ACSS/AW												
3/0 (6/1) ACSS/AW	0.502	0.2194	812032	230672	229686				653120			300352
WITH LINE GUARD	0.744	0.39788	397568	229728	229728	232224		650264	653312	650224	663262	300416
336.4 (26/7) ACSS/AW	0.720	0.4399	811904	231700	229728							
WITH LINE GUARD	1.013	0.7848	397664	230686	229760	232160		650656	653536	650226		300480
636 (24/7) ACSS/AW	0.977	0.7848	811888	230686	229728							
WITH LINE GUARD	1.341	1.1337	397728	230686	229760	232192		650336	667236	650220	663264	300512
1033.5 (45/7) ACSS/AW	1.212	1.1337	811808	230686	229760	232192						
WITH LINE GUARD	1.712	2.4366	397760	999276	229782	232352			999280	650222	999286	999283
2156 (84/19) ACSS/AW	1.762	2.4366	999289	999276								
WITH LINE GUARD	2.634		999436		999322							
ACSS/AW												
605 (30/19) ACSS/AW	0.994	0.8626	811854	649860	229728				653510		663682	300480
WITH LINE GUARD	1.358	0.977	397730	652678	229760	232352		654850	652680		663682	300480
636 (24/7) ACSS/AW	0.977	0.7848	811850	652678	229728							
WITH LINE GUARD	1.341	1.1106	397728	652682	229760	232192		654852	652684		663684	300512
900 (54/7) ACSS/AW	1.162	1.1106	811830	652682	229760	232192						
WITH LINE GUARD	1.662	1.1337	397740	652674	229782	232352		654854	652676			
1033.5 (45/7) ACSS/AW	1.212	1.1337	811820	652674	229760	232192						
WITH LINE GUARD	1.712		397760		229782	232352						
COPPER												
1/0 (7)	0.368	0.3259	813568	231264	227824	232448			653600			
4/0 (7)	0.522	0.6536	813728	231328	227824	232448		650784	654144			
250 (19)	0.574	0.7718	813688	231328	227872	232448		650752				
400 (19)	0.726	1.2351	812416	231488	227872	232480		650848	654336			
OTHERS												
1109 (24/13) ACAR	1.212	1.0372	811780	230686	229760				667236			300512
WITH LINE GUARD	1.712		397760		229792	232352						
394.5 (19) AAC-5005	0.721	0.3703	813888	231700	229728				653344			300416
WITH LINE GUARD	1.013		367864		229760	232160						
OHGW												
7#10 AW, 10M (7)	0.306	0.165	811020	999325					654856			300300
7#6 AW (7)	0.385	0.2618	999267	999325					999281			999284
12" EHS (7)	0.495	0.517	999288	999326					999282			999285

- NOTES:
- DEAD END CLAMPS ARE PROVIDED WITH SOCKET EYES.
 - SPACERS LISTED FOR ACSS CONDUCTORS ARE HAIRPIN TYPE FOR 2-BUNDLES. HI-TEMP SERIES CLAMP TYPE SPACERS ARE LISTED FOR ACSS CONDUCTORS.
 - DAMPERS LISTED ARE STOCKBRIDGE TYPE DAMPERS.
 - COMPRESSION DEAD ENDS FOR ACSS CONDUCTORS INCLUDE THE JUMPER TERMINALS. JUMPER TERMINAL FOR 2156 ACSS (S999276) TO BE ORDERED SEPARATELY.
 - LIGHT SHADED AREAS INDICATE STOCK NUMBERS ARE EITHER NOT AVAILABLE OR NOT APPLICABLE.

PREVIOUSLY ASSIGNED AS DWG. 14900

				TRANSMISSION ENGINEERING				DWG. NO.	SHT. NO.		
B	UPDATE	RLR	WPH	WWT	7/3/07	E		12540	1 OF 1		
A	UPDATE ACSS SPACERS	RLR	WPH	WWT	3/1/07	D					
-	ORIGINAL ISSUE	RLR	WPH	WWT	8/3/06	C					
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE



CONDUCTOR AND OHGW ACCESSORY CROSS-REFERENCE

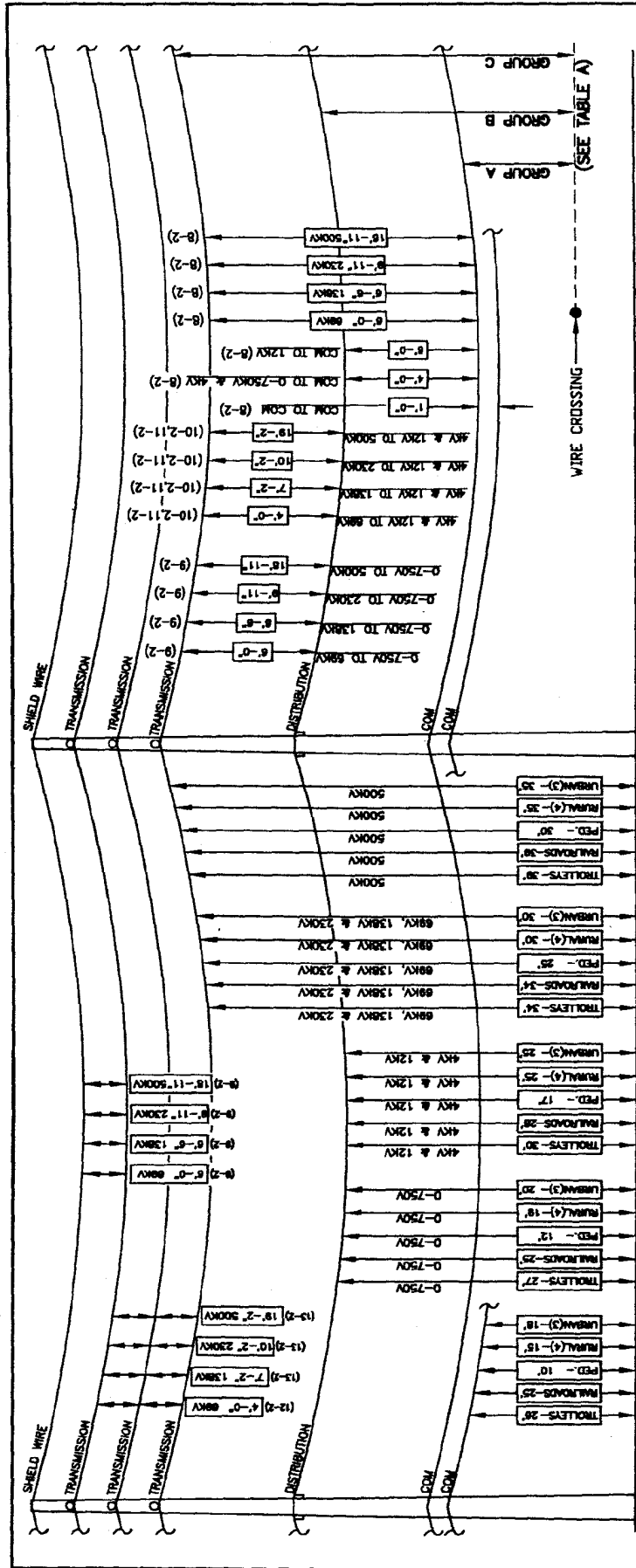



TABLE A

WIRE X'ING	REF (2)	GROUP A	GROUP B	GROUP C
GUY # 12560	(1-2)	COM	0-750V 4KV	12KV 138KV 230KV 500KV
COM	(3-2)	2	4	8
0-750V	(4-2)	2	4	8
4KV	(5-2)	2	4	8
12KV	(6-2)	2	4	8
138KV	(7-2)	2	4	8
230KV	(8-2)	2	4	8
500KV	(9-2)	2	4	8


- NOTES**
- CLEARANCES ARE SET FORTH AT 60°F AND NO WIND UNLESS OTHERWISE NOTED.
 - NUMBERS IN PARENTHESES DENOTE G. O. 95 CASE AND TABLE NUMBERS.
 - THE CLEARANCE REQUIREMENT IS APPLICABLE TO CONDUCTORS CROSSING OR ALONG THOROUGHFARES IN URBAN DISTRICTS OR CROSSING THOROUGHFARES IN RURAL DISTRICTS. THE CLEARANCE REQUIREMENT IS APPLICABLE TO ABOVE GROUND CONDUCTORS ALONG THOROUGHFARES IN RURAL DISTRICTS OR ACROSS OTHER AREAS CAPABLE OF BEING TRAVERSED BY VEHICLES OR AGRICULTURAL EQUIPMENT.
 - ADDITIONAL BUFFERS SHALL BE ADDED AS APPROPRIATE TO ALLOW FOR VARIATIONS IN SURVEY, SAG, ETC.
 - REFER TO TABLES 1 AND 2 IN G. O. 95 FOR OTHER MODIFICATIONS TO THE MIN. CLEARANCES PROVIDED ON THIS DRAWING.
 - REFER TO CASE 18, TABLE 2 FOR OTHER RADIAL SEPARATION REQUIREMENTS FOR GUYS.
 - SEE RULE 54.4-43 FOR REQUIREMENTS OVER SWIMMING POOLS.
 - CLEARANCE REQUIREMENTS FOR 500KV LINES SHALL BE ESTABLISHED ON A PROJECT-SPECIFIC BASIS.

TRANSMISSION ENGINEERING		SCALE: NONE
G. O. 95 CLEARANCES		DWG. NO. 12560
RULES 37 & 38		SHEET NO. 1 of 1
DATE	BY	CHECKED/APPY
DATE	BY	CHECKED/APPY
DATE	BY	CHECKED/APPY
DATE	BY	CHECKED/APPY
DATE	BY	CHECKED/APPY


<u>DWG. NO.</u>	<u>REV.</u>	<u>TITLE</u>	<u>NO. OF SHEETS</u>
13000	G	POLE TOP ARRANGEMENTS - WOOD AND SW SECTION TABLE OF CONTENTS	6
13001	D	POLE TOP INDEX, 69KV WOOD POLE	6
13003	B	COMMENTARY ON POLE-TOP INDEX FOR WOOD POLES	5
13100	C	POLE TOP ARRANGEMENT, TYPE WPI, SINGLE CIRCUIT, 69KV WOOD POLE	3
13101	D	POLE TOP ARRANGEMENT, TYPE WPI (SHORT POLY), SINGLE CKT., 69KV WOOD POLE	3
13103	B	POLE TOP ARRANGEMENT, TYPE 2/1 WPI, SINGLE CIRCUIT, 69KV WOOD POLE	3
13105	D	POLE TOP ARRANGEMENT, TYPE ZPI, SINGLE CIRCUIT, 69KV WOOD POLE	3
13110	D	POLE TOP ARRANGEMENT, TYPE ZPI, SINGLE CIRCUIT, 69KV WOOD POLE	3
13115	D	POLE TOP ARRANGEMENT, TYPE Y, SINGLE CIRCUIT, ACSR, 69KV WOOD POLE	3
13116	A	POLE TOP ARRANGEMENT, TYPE Y, SINGLE CIRCUIT, ACSS, 69KV WOOD POLE	3
13120	C	POLE TOP ARRANGEMENT, TYPE YPI, SINGLE CIRCUIT, ACSR, 69KV WOOD POLE	3

G	UPDATED LIST	RLR	WPH	<i>pa</i>	9/18/08	F	UPDATED LIST	RLR	WPH	WVT	4/3/08
--	ORIGINAL ISSUE	KSM	GV	WPH	9/01/97	E	UPDATED LIST	RLR	WPH	WVT	8/31/06
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE
TRANSMISSION ENGINEERING						SCALE:					
	POLE TOP ARRANGEMENTS – WOOD AND SW SECTION TABLE OF CONTENTS					DWG. NO			SHEET NO.		
						13000			1 OF 6		


<u>DWG. NO.</u>	<u>REV.</u>	<u>TITLE</u>	<u>NO. OF SHEETS</u>
13121	A	POLE TOP ARRANGEMENT, TYPE YPI, SINGLE CIRCUIT, ACSS 69KV WOOD POLE	3
13125	B	POLE TOP ARRANGEMENT, TYPE X-DELTA 3, SINGLE CIRCUIT, ACSR, 69KV WOOD POLE	3
13126	C	POLE TOP ARRANGEMENT, TYPE X-DELTA 30, SINGLE CIRCUIT, ACSR, 69KV WOOD POLE	3
13127	A	POLE TOP ARRANGEMENT, TYPE X-DELTA 3, SINGLE CIRCUIT, ACSS, 69KV WOOD POLE	3
13128	B	POLE TOP ARRANGEMENT, TYPE X-DELTA 30, SINGLE CIRCUIT, ACSS, 69KV WOOD POLE	3
13130	B	POLE TOP ARRANGEMENT, TYPE ZPI SGL. CKT. CONVERTIBLE TO DBL. CKT., 69KV WOOD POLE	3
13135	C	POLE TOP ARRANGEMENT, TYPE 2/1 WPI, SGL. CKT. CONVERTIBLE TO DBL. CKT., 69KV WOOD POLE	3
13155	B	POLE TOP ARRANGEMENT, TYPE 2/1 X3, SGL. CKT. CONVERTIBLE TO DBL. CKT., ACSR 69KV WOOD POLE	3
13156	C	POLE TOP ARRANGEMENT, TYPE 2/1 X30, SGL. CKT. CONVERTIBLE TO DBL. CKT., ACSR 69KV WOOD POLE	3

G	UPDATED LIST	RLR	WPH	<i>AAK</i>	9/18/08	F	UPDATED LIST	RLR	WPH	WVT	4/3/08
--	ORIGINAL ISSUE	KSM	GV	WPH	9/1/97	E	UPDATED LIST	RLR	WPH	WVT	8/31/06
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE
TRANSMISSION ENGINEERING						SCALE:					
	POLE TOP ARRANGEMENTS – WOOD AND SW SECTION TABLE OF CONTENTS					DWG. NO			SHEET NO.		
						13000			2 OF 6		

<u>DWG. NO.</u>	<u>REV.</u>	<u>TITLE</u>	<u>NO. OF SHEETS</u>
13157	A	POLE TOP ARRANGEMENT, TYPE 2/1 X3, SGL. CKT. CONVERTIBLE TO DBL. CKT., ACSS 69KV WOOD POLE	3
13158	B	POLE TOP ARRANGEMENT, TYPE 2/1 X30, SGL. CKT. CONVERTIBLE TO DBL. CKT., ACSS 69KV WOOD POLE	3
13165	C	POLE TOP ARRANGEMENT, TYPE DC-WPI, DOUBLE CIRCUIT, 69KV WOOD POLE	3
13175	C	POLE TOP ARRANGEMENT, TYPE DC-X30, DOUBLE CIRCUIT, ACSR, 69KV WOOD POLE	3
13176	D	POLE TOP ARRANGEMENT, TYPE DC- X30, DOUBLE CIRCUIT, ACSR, 69KV WOOD POLE	3
13177	A	POLE TOP ARRANGEMENT, TYPE DC- X3, DOUBLE CIRCUIT, ACSS, 69KV WOOD POLE	3
13178	B	POLE TOP ARRANGEMENT, TYPE DC-X30, DOUBLE CIRCUIT, ACSS, 69KV WOOD POLE	3
13180	D	POLE TOP ARRANGEMENT, TYPE DC-H, DOUBLE CIRCUIT, ACSR, 69KV WOOD POLE	3
13190	E	POLE TOP ARRANGEMENT 69KV WOOD CABLE POLE, ACSR	3


G	UPDATED LIST	RLR	WPH	<i>RLR</i>	9/18/08	F	UPDATED LIST	RLR	WPH	WVT	4/3/08
--	ORIGINAL ISSUE	KSM	GV	WPH	9/1/97	E	UPDATED LIST	RLR	WPH	WVT	8/31/06
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE
TRANSMISSION ENGINEERING						SCALE:					
	POLE TOP ARRANGEMENTS – WOOD AND SW SECTION TABLE OF CONTENTS					DWG. NO			SHEET NO.		
						13000			3 OF 6		

<u>DWG. NO.</u>	<u>REV.</u>	<u>TITLE</u>	<u>NO. OF SHEETS</u>
13001SW	O	POLE TOP INDEX, 69kV SW POLES	5
13100SW	O	POLE TOP ARRANGEMENT, TYPE WPI, SINGLE CIRCUIT, 69kV SW POLE	3
13102SW	O	POLE TOP ARRANGEMENT, TYPE 2/1 WPI, SINGLE CIRCUIT, 69kV SW POLE	3
13103SW	O	POLE TOP ARRANGEMENT, TYPE 2/1 WPI, SINGLE CIRCUIT, 69kV SW POLE	3
13105SW	O	POLE TOP ARRANGEMENT, TYPE ZPI, SINGLE CIRCUIT, 69kV SW POLE	3
13110SW	O	POLE TOP ARRANGEMENT, TYPE Z45, SINGLE CIRCUIT, 69kV SW POLE	3
13115SW	O	POLE TOP ARRANGEMENT, TYPE Y, SINGLE CIRCUIT-ACSR, 69kV SW POLE	3
13120SW	O	POLE TOP ARRANGEMENT, TYPE YPI, SINGLE CIRCUIT-ACSR, 69kV SW POLE	3
13125SW	O	POLE TOP ARRANGEMENT, TYPE X-DELTA 3, SINGLE CIRCUIT-ACSR, 69kV SW POLE	3
13126SW	O	POLE TOP ARRANGEMENT, TYPE X-DELTA 30, SINGLE CIRCUIT-ACSR, 69kV SW POLE	3


G	UPDATED LIST	RLR	WPH	<i>RLR</i>	9/18/08	F	UPDATED LIST	RLR	WPH	WVT	4/3/08
--	ORIGINAL ISSUE	KSM	GV	WPH	9/1/97	E	UPDATED LIST	RLR	WPH	WVT	8/31/06
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE
TRANSMISSION ENGINEERING						SCALE:					
	POLE TOP ARRANGEMENTS – WOOD AND SW SECTION TABLE OF CONTENTS					DWG. NO			SHEET NO.		
						13000			4 OF 6		

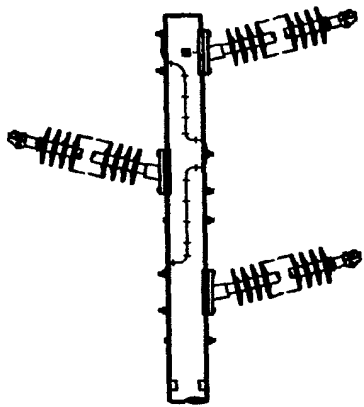
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13165SW	O	POLE TOP ARRANGEMENT, TYPE DC-WPI, DOUBLE CIRCUIT, 69KV SW POLE	3
13200SW	O	POLE TOP ARRANGEMENT, TYPE WPI-EXP, SINGLE CIRCUIT, 69KV SW POLE	3
13202SW	O	POLE TOP ARRANGEMENT, TYPE 2/1 WPI-EXP, SINGLE CIRCUIT, 69KV SW POLE	3
13204SW	O	POLE TOP ARRANGEMENT, TYPE ZPI-EXP, SINGLE CIRCUIT, 69KV SW POLE	3
13210SW	O	POLE TOP ARRANGEMENT, TYPE Y-EXP, SINGLE CIRCUIT-ACSR, 69KV SW POLE	3
13211SW	O	POLE TOP ARRANGEMENT, TYPE Y-EXP, SINGLE CIRCUIT-ACSS, 69KV SW POLE	3
13212SW	O	POLE TOP ARRANGEMENT, TYPE YPI-EXP, SINGLE CIRCUIT-ACSR, 69KV SW POLE	3
13213SW	O	POLE TOP ARRANGEMENT, TYPE YPI-EXP, SINGLE CIRCUIT-ACSS, 69KV SW POLE	3
13301	E	POLE TOP INDEX, SINGLE CIRCUIT, 138KV WOOD POLE	3
13302	C	POLE TOP ARRANGEMENT, TYPE WPI, SINGLE CIRCUIT, 138KV WOOD POLE	3
13303	A	POLE TOP ARRANGEMENT, TYPE 2/1 WPI, SINGLE CIRCUIT, 138KV WOOD POLE	3
13304	B	POLE TOP ARRANGEMENT, TYPE ZPI, SINGLE CIRCUIT, 138KV WOOD POLE	3

G	UPDATED LIST	RLR	WPH	<i>RLR</i>	9/18/08	F	UPDATED LIST	RLR	WPH	WWT	4/3/08
--	ORIGINAL ISSUE	KSM	GV	WPH	9/1/97	E	UPDATED LIST	RLR	WPH	WWT	8/31/06
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

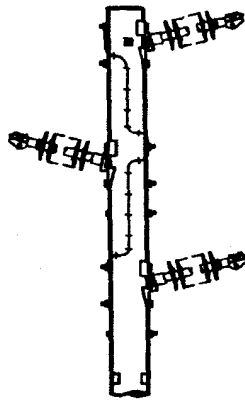
TRANSMISSION ENGINEERING						SCALE:					
	POLE TOP ARRANGEMENTS – WOOD AND SW SECTION TABLE OF CONTENTS					DWG. NO			SHEET NO.		
						13000			5 OF 6		

<u>DWG. NO.</u>	<u>REV.</u>	<u>TITLE</u>	<u>NO. OF SHEETS</u>
13306	C	POLE TOP ARRANGEMENT, TYPE Z30, SINGLE CIRCUIT, 138kV WOOD POLE	3
13308	C	POLE TOP ARRANGEMENT, TYPE Z45, SINGLE CIRCUIT, 138kV WOOD POLE	3
13310	B	POLE TOP ARRANGEMENT, TYPE Y, SINGLE CIRCUIT, ACSR, 138kV WOOD POLE	3
13311	C	POLE TOP ARRANGEMENT, TYPE Y, SINGLE CIRCUIT, ACSS, 138kV WOOD POLE	3
13312	C	POLE TOP ARRANGEMENT, TYPE YPI, SINGLE CIRCUIT, ACSR, 138kV WOOD POLE	3
13313	C	POLE TOP ARRANGEMENT, TYPE YPI, SINGLE CIRCUIT, ACSS, 138kV WOOD POLE	3
13315	O	POLE TOP ARRANGEMENT, TYPE X-DELTA 3 SINGLE CIRCUIT-ACSR, 138kV WOOD POLE	4
13320	A	POLE TOP ARRANGEMENT, TYPE DC-WPI, DOUBLE CIRCUIT, 138kV WOOD POLE	2
13340	A	POLE TOP ARRANGEMENT 138KV TANGENT H-FRAME	2
13345	A	POLE TOP ARRANGEMENT 138KV H-FRAME TANGENT DEADEND-ACSR	2

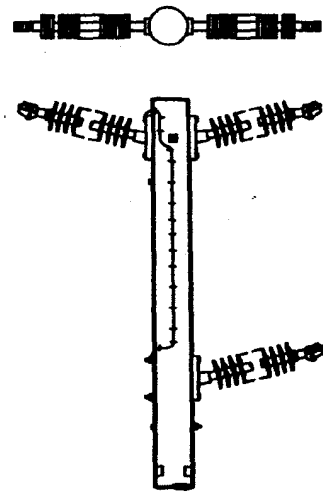
G	UPDATED LIST	RLR	WPH	<i>DLH</i>	9/18/08	F	UPDATED LIST	RLR	WPH	WVT	4/3/08
--	ORIGINAL ISSUE	KSM	GV	WPH	9/1/97	E	UPDATED LIST	RLR	WPH	WVT	8/31/06
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE
TRANSMISSION ENGINEERING						SCALE:					
	POLE TOP ARRANGEMENTS – WOOD AND SW SECTION TABLE OF CONTENTS					DWG. NO			SHEET NO.		
						13000			6 OF 6		



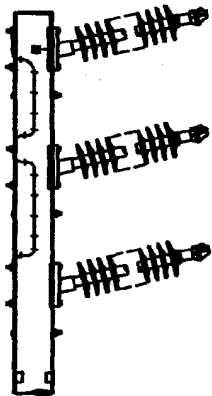
TYPE WPI
 DWG. 13100
 LINE ANGLE 0-15°



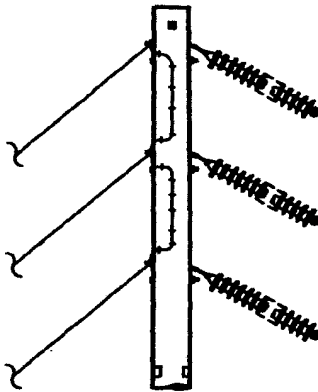
TYPE WPI(SHORT POLY)
 DWG. 13101
 LINE ANGLE 0-15°



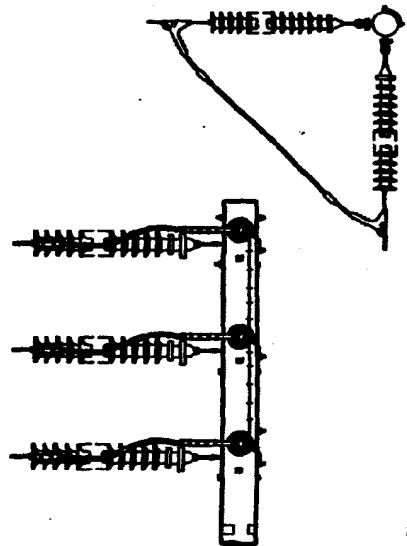
TYPE 2/1 WPI
 DWG. 13103
 LINE ANGLE 0-15°



TYPE ZPI
 DWG. 13105
 LINE ANGLE 0-15°



TYPE Z45
 DWG. 13110
 LINE ANGLE 30°-45°



TYPE Y-ACSR
 DWG. 13115
 LINE ANGLE 75°-90°

B	UPDATED INDEX	WDF	WPH	WCT	4/25/02	E						
A	ADDED SHEET 2	CMM	DRB	WPH	3/23/00	D	UPDATED INDEX	PM	WPH	WJ	7/21/06	
-	ORIGINAL	KSM	GV	WPH	8/01/97	C	UPDATED INDEX	WDF	SFO	WPH	WCT	4/25/02
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	

TRANSMISSION ENGINEERING

SCALE: NONE

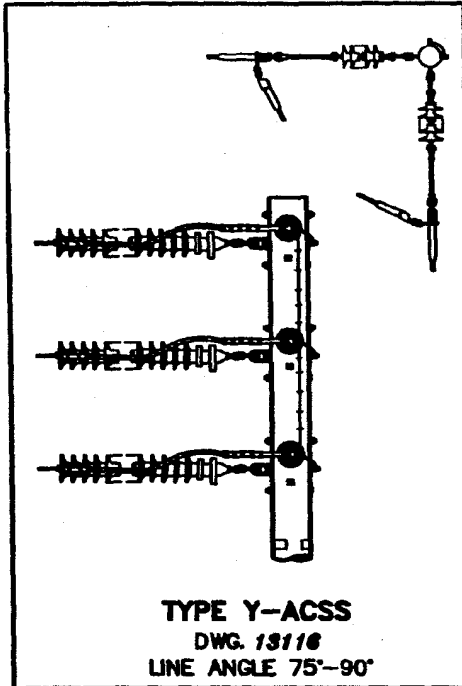


**POLE TOP INDEX
 SINGLE CIRCUIT
 69kV WOOD POLE**

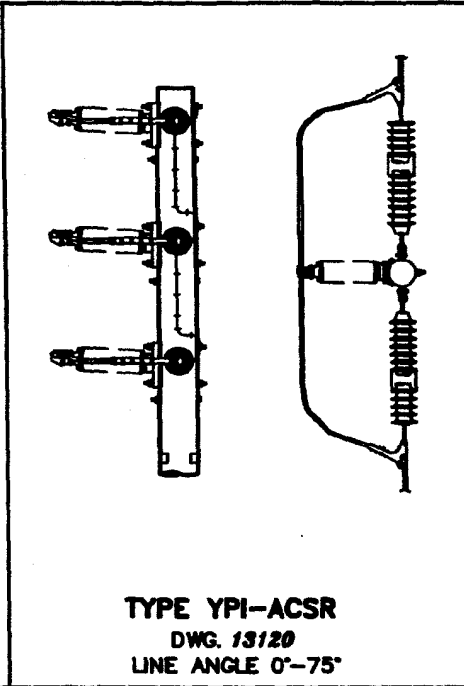
DWG. NO.
13001

SHT. NO.
1 of 6

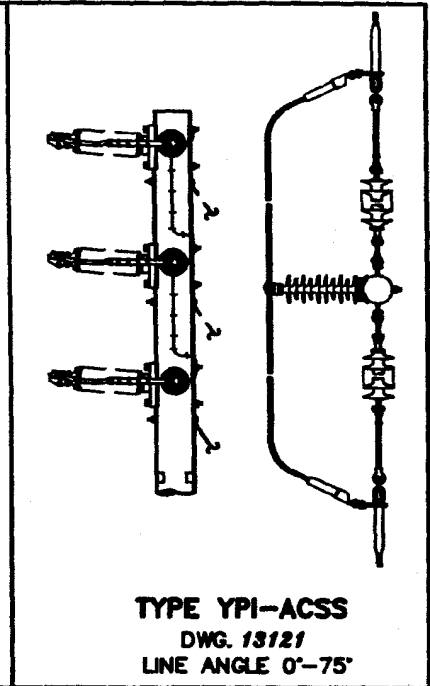
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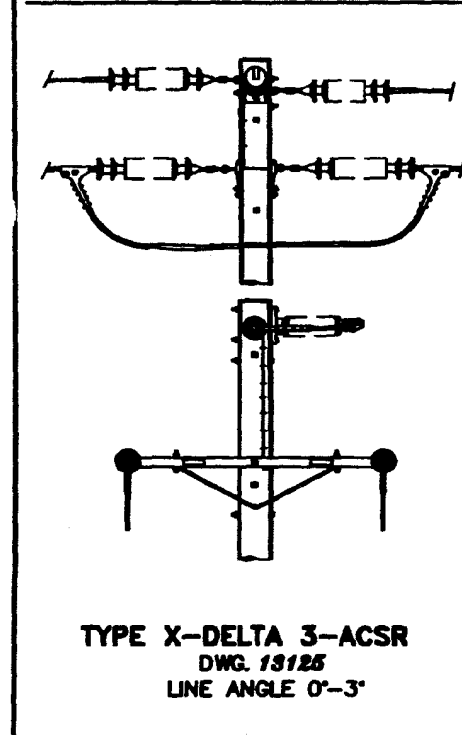
TYPE Y-ACSS
 DWG. 13116
 LINE ANGLE 75°-90°



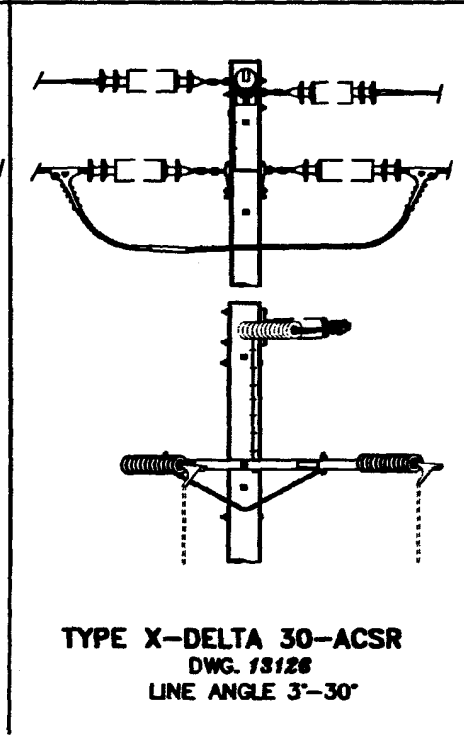
TYPE YPI-ACSR
 DWG. 13120
 LINE ANGLE 0°-75°



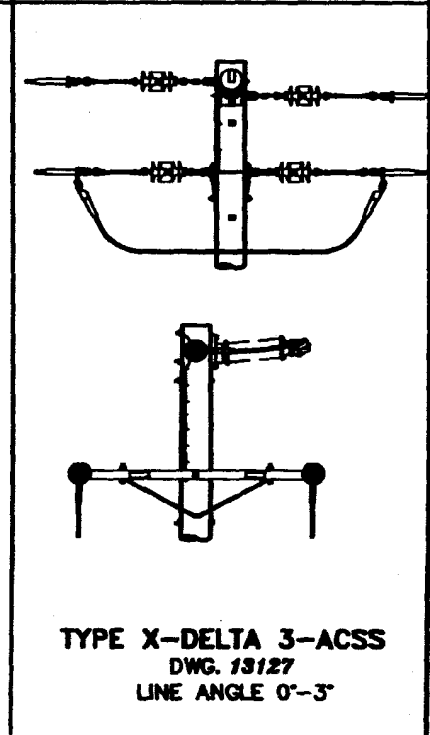
TYPE YPI-ACSS
 DWG. 13121
 LINE ANGLE 0°-75°



TYPE X-DELTA 3-ACSR
 DWG. 13125
 LINE ANGLE 0°-3°



TYPE X-DELTA 30-ACSR
 DWG. 13126
 LINE ANGLE 3°-30°



TYPE X-DELTA 3-ACSS
 DWG. 13127
 LINE ANGLE 0°-3°

B	UPDATED INDEX	WDF	WPH	WCT	4/25/02	E					
A	ADDED SHEET 2	CMM	DRB	WPH	3/23/00	D	UPDATED INDEX	PM	WPH	WV	7/21/06
-	ORIGINAL	KSM	GV	WPH	8/01/97	C	UPDATED INDEX	WDF	SFO WPH	WCT	4/25/02
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

TRANSMISSION ENGINEERING

SCALE: NONE

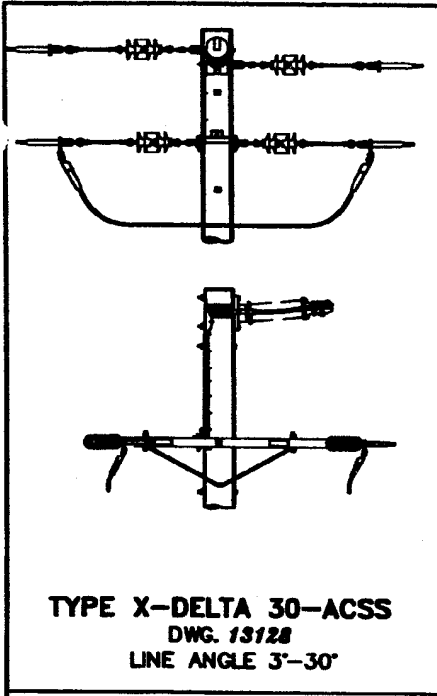


**POLE TOP INDEX
 SINGLE CIRCUIT
 69kV WOOD POLE**

DWG. NO.
 13001

SHT. NO.
 2 of 6

13001D02



TYPE X-DELTA 30-ACSS
 DWG. 13128
 LINE ANGLE 3°-30°

B	UPDATED INDEX	WDF	WPH	WCT	4/25/02	E						
A	ADDED SHEET 2	CMM	DRB	WPH	3/23/00	D	UPDATED INDEX	PM	WPH	WV	7/21/06	
-	ORIGINAL	KSM	GV	WPH	8/01/97	C	UPDATED INDEX	WDF	SFO WPH	WCT	4/25/02	
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	

TRANSMISSION ENGINEERING

SCALE: NONE



POLE TOP INDEX
 SINGLE CIRCUIT
 69kV WOOD POLE

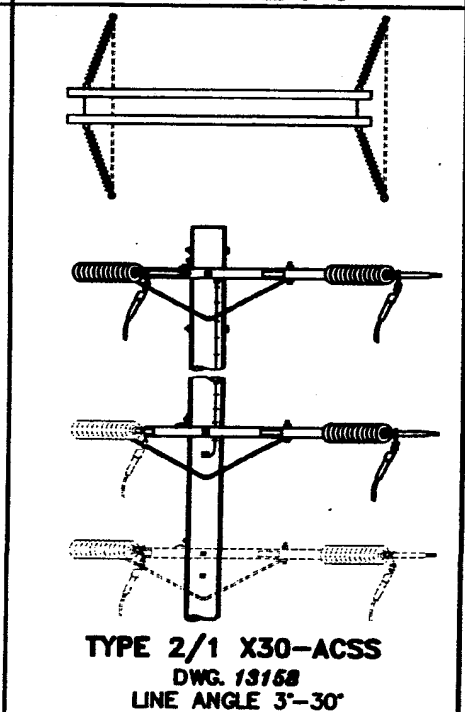
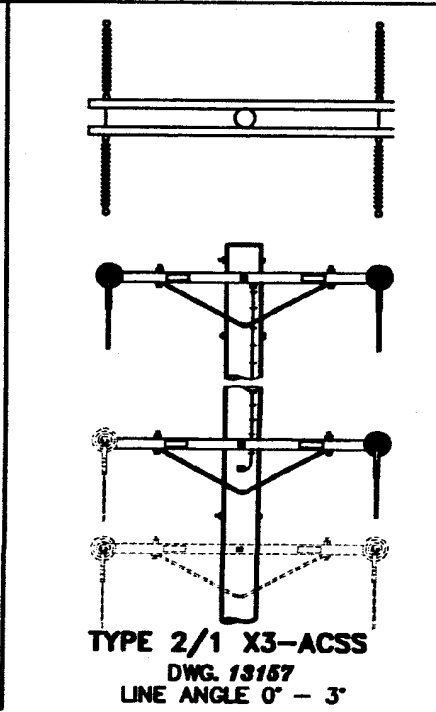
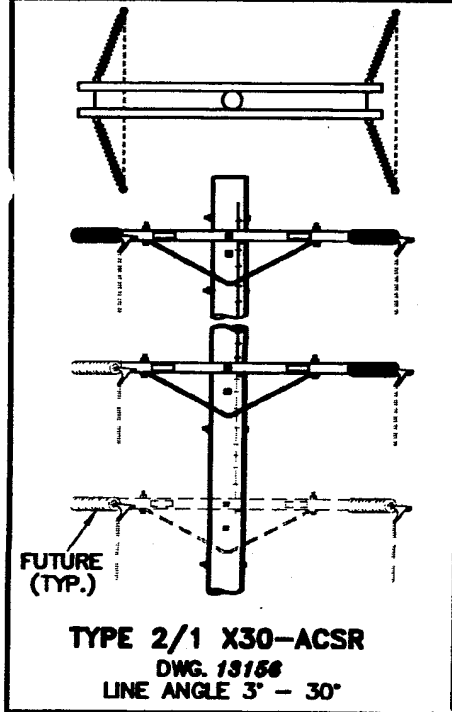
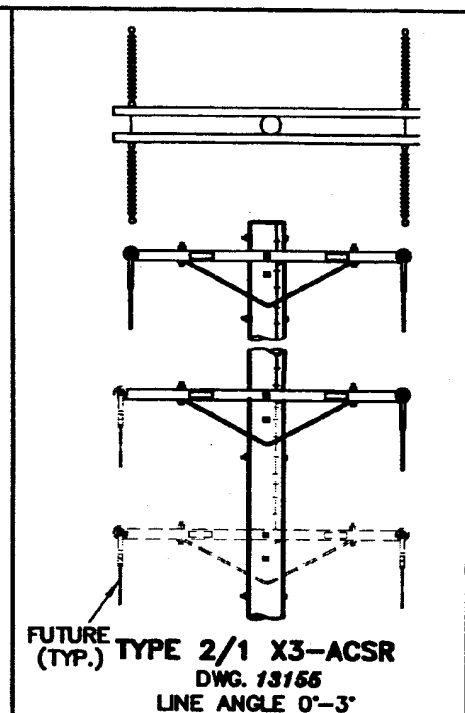
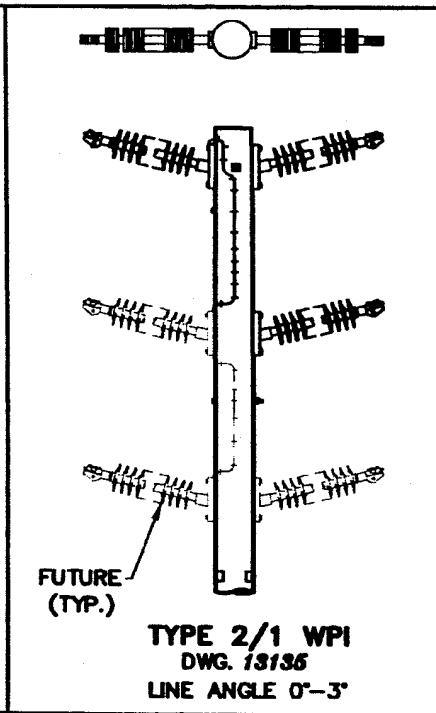
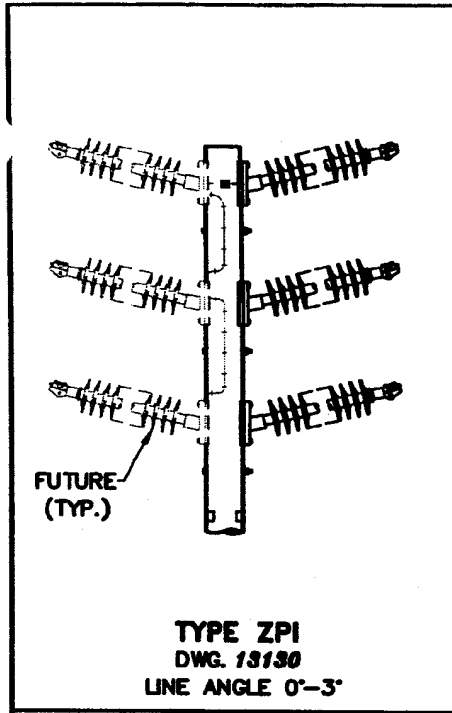
DWG. NO.

SHT. NO.

13001

3 of 6

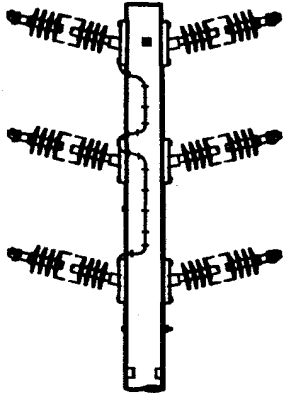
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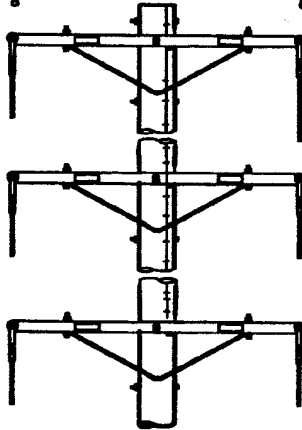
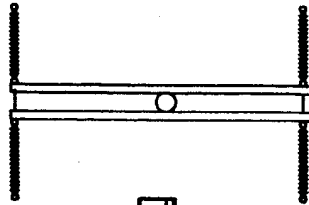
B	UPDATED INDEX	WDF	WPH	WCT	4/25/02	E						
A	ADDED SHEET 2	CMM	DRB	WPH	3/23/00	D	UPDATED INDEX	PM	WPH	WV	7/21/06	
-	ORIGINAL	KSM	GV	WPH	8/01/97	C	UPDATED INDEX	WDF	SFO	WPH	WCT	4/25/02
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	

TRANSMISSION ENGINEERING						SCALE: NONE						
SDGE	POLE TOP INDEX						DWG. NO.		SHT. NO.			
	SINGLE CIRCUIT CONVERTIBLE TO DOUBLE CIRCUIT						13001		4 of 6			
	69kV WOOD POLE											

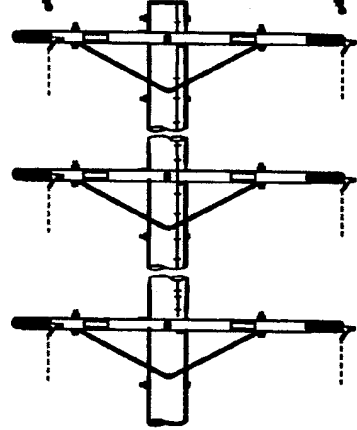
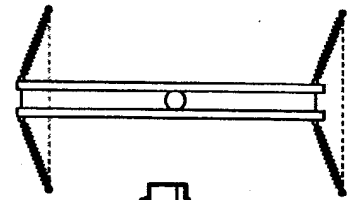
13001D04



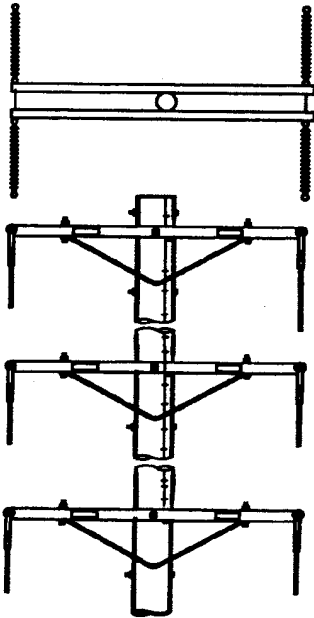
TYPE DC-WPI
 DWG. 13165
 LINE ANGLE 0°-3°



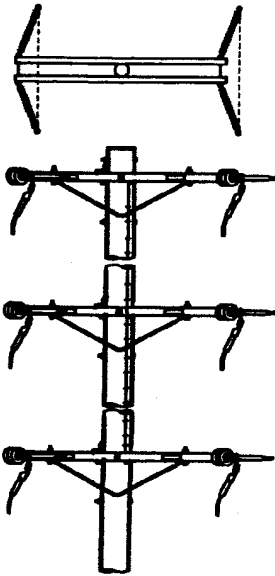
TYPE DC-X3-ACSR
 DWG. 13176
 LINE ANGLE 0°-3°



TYPE DC-X30-ACSR
 DWG. 13178
 LINE ANGLE 3°-30°



TYPE DC-X3-ACSS
 DWG. 13177
 LINE ANGLE 0°-3°



TYPE DC-X30-ACSS
 DWG. 13178
 LINE ANGLE 3°-30°

(RESERVED)

B	UPDATED INDEX	WDF	WPH	WCT	4/25/02	E						
A	ADDED SHEET 2	CMM	DRB	WPH	3/23/00	D	UPDATED INDEX	PM	WPH	LoV	7/21/06	
-	ORIGINAL	KSM	GV	WPH	8/01/97	C	UPDATED INDEX	WDF	SFO	WPH	WCT	4/25/02
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	

TRANSMISSION ENGINEERING

SCALE: NONE



POLE TOP INDEX
DOUBLE CIRCUIT
69kV WOOD POLE

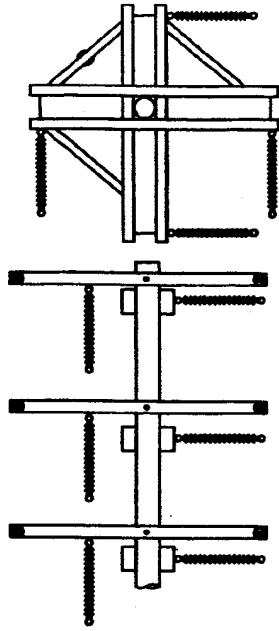
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SHT. NO.

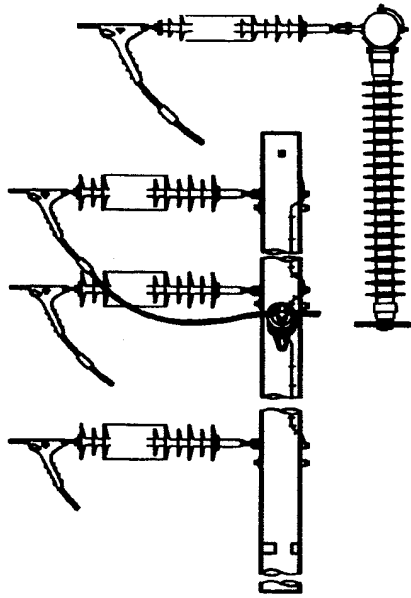
13001

5 of 6

13001D05



TYPE DC-H-ACSR
 DWG. 13180
 LINE ANGLE 90±



TYPE CABLE POLE-ACSR
 DWG. 13190

(RESERVED)

(RESERVED)

(RESERVED)

(RESERVED)

B	UPDATED INDEX	WDF	WPH	WCT	4/25/02	E					
A	ADDED SHEET 2	CMM	DRB	WPH	3/23/00	D	UPDATED INDEX	PM	WPH	WY	7/21/06
—	ORIGINAL	KSM	GV	WPH	8/01/97	C	UPDATED INDEX	WDF	SFO	WPH	WCT 4/25/02
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

TRANSMISSION ENGINEERING

SCALE: NONE



POLE TOP INDEX
SINGLE CIRCUIT CABLE POLE
69kV WOOD POLE

DWG. NO.

SHT. NO.

13001

6 of 6

13001D06

COMMENTARY ON POLE-TOP INDEX FOR 69KV WOOD POLES

69kV SINGLE CIRCUIT

13100 – WPI – Single Circuit, Poly Post, 0-15 Degrees


The post insulator conductor clamp allows up to a 15 degree line angle. Do not use this standard if a second circuit is anticipated for the pole. Check the pole for guy requirements if line angle exists.

13101 – WPI – Single Circuit, Poly Post, 0-15 Degrees

This standard is the same as **13100** except that it uses a short polymer post insulator. It is used primarily as a replacement for existing insulators. This standard should only be used in low contamination areas (Districts 2 & 3 per OH Std. 287) and with Manager's approval.

13103 – 2/1 WPI – Single Circuit, Poly Post, 0-15 Degrees

This standard is the preferred pole-top arrangement for a single circuit for its lower EMF value. Conductor clamp supports a 15 degree line angle. Check the pole for guy requirements if line angle exists.

A	GENERAL UPDATE	RLR	WPH	WVT	08/01/03	C					
--	ORIGINAL ISSUE	WDF	WPH	WVT	04/25/02	B	UPDATE	RLR	WPH	<i>WVT</i>	8/31/06
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE
TRANSMISSION ENGINEERING						SCALE:					
		COMMENTARY ON POLE-TOP INDEX 69KV WOOD POLES				DWG. NO			SHEET NO.		
						13003			1 of 5		

13105 – ZPI – Single Circuit, Poly Post, 0-15 Degrees

This standard requires a taller pole. But it works well when only a narrow right of way is available. Conductor clamps allows for a 15 degree line angle. Check the pole for guy requirements if line angle exists.

13110 – Z45 – Single Circuit, Running Angle, 30-45 Degrees.

Use this standard for running angles from 30 to 45 degrees. The conductor clamp must be good for 22.5 degree departure angle on each side. Check conductor to pole surface clearance (3' min.) for small line angles with heavy vertical loads. Guys are required. This configuration eliminates the need for dead-ending but requires a taller pole. Do not use this configuration for ACSS conductors due to concern of aluminum crushing.

13115, 13116 – Y – Single Circuit, Dead-End, 75-90 Degrees

Use this standard for dead ends with large angles. Due to the larger line angle, jumper insulator is not required to maintain clearance. Guys are required.


13120, 13121 – YPI - Single Circuit, Dead-End, 0-75 degrees

Use this standard for dead end up to 75 degrees. Need jumper insulator to maintain jumper clearance. Guys are required if a line angle exists.

13125, 13127 – X-DELTA 3 – Single Circuit, Dead-End, 0-3 Degrees

Use this standard where a suspension pole would be subject to uplift, when lower profile installation is desirable, or if in-line guying is required to account for differential line tension. This standard uses 5 3/4" x 5 3/4" x 10' double heavy crossarms. Use for vertical load up to 1,000 lbs per attachment unless otherwise approved.

(Note: Crossarm strength must be checked; special arm design may be required.) Check pole for guy requirements.

A	GENERAL UPDATE	RLR	WPH	WVT	08/01/03	C					
--	ORIGINAL ISSUE	WDF	WPH	WVT	04/25/02	B	UPDATE	RLR	WPH	<i>WVT</i>	8/31/06
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE
TRANSMISSION ENGINEERING						SCALE:					
	COMMENTARY ON POLE-TOP INDEX 69KV WOOD POLES					DWG. NO			SHEET NO.		
						13003			2 of 5		

13126, 13128 – X-Delta 30 – Single Circuit, Dead-End, 3-30 Degrees

Use this standard to dead-end up to 30 degree line angle. This standard uses 5 3/4" x 5 3/4" x 12' double heavy crossarms and thrust plate. Use for vertical load up to 1,000 lbs per attachment unless otherwise approved. Guys are required. Compared to the YPI configuration, this standard has a lower profile.

69KV SINGLE CIRCUIT CONVERTIBLE TO DOUBLE CIRCUIT

13130 – ZPI – Single Circuit Initial, Double Circuit Ultimate, Post Poly, 0-3 Degrees

Check the pole for guy requirements if line angle exists. This pole-top configuration makes future installation easier but is less desirable for EMF consideration at its single circuit position. Guys, when required, need to be rearranged when future circuit is installed. The line angle is restricted to 3 degrees maximum due to limitation of cantilever strength of the wood pole.


13135 – 2/1 WPI – Single Circuit Initial, Double Circuit Ultimate, Post Poly, 0-3 Degrees

Provide ground clearance for future conductors at a lower level on the pole. Check the pole for guy requirements if a line angle exists. Guys, when required, need to be rearranged when future circuit is installed. The line angle is restricted to 3 degrees maximum due to limitation of cantilever strength of the wood pole.

13155, 13157 – 2/1 X3 - Single Circuit Initial, Double Circuit Ultimate, Dead-End, 0-3 Degrees

Use this standard where a suspension pole would be in uplift or in-line guying is required to account for differential line tension. This standard shows 5 3/4" x 5 3/4" x 10' double heavy crossarms, but crossarm strength must be checked and special arm design may be required. Maximum vertical load shall not exceed 1,000 lbs per attachment unless otherwise approved. Provide ground clearance for future conductors at a lower level on the pole. Check the pole for guy requirements.

A	GENERAL UPDATE	RLR	WPH	WVT	08/01/03	C					
--	ORIGINAL ISSUE	WDF	WPH	WVT	04/25/02	B	UPDATE	RLR	WPH	WVT	8/31/06
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

TRANSMISSION ENGINEERING						SCALE:					
	COMMENTARY ON POLE-TOP INDEX 69KV WOOD POLES					DWG. NO			SHEET NO.		
						13003			3 of 5		

13156, 13158 – 2/1 X30 – Single Circuit Initial, Double Circuit Ultimate, Dead-End 3-30 Degrees

Use this standard for dead-end up to 30 degrees. Provide ground clearance for future conductors at a lower level on the pole. Guys are required. This standard uses 5 3/4" x 5 3/4" x 12' double heavy crossarms and thrust plates. The longer crossarm is used to maintain jumper clearance. Vertical load is limited to 1000 lbs. per attachment unless otherwise approved.

69kV DOUBLE CIRCUIT

13165 – DC –WPI – Double Circuit, Post Poly, 0-3 Degrees


This is the standard for double circuit post insulators on wood poles. Check the pole for guy requirements if line angle exists. The line angle is restricted to 3 degrees maximum due to limitation of cantilever strength of un-guyed portion of the wood pole. Check the pole guy requirements.

13175, 13177 – DC-X3 – Double Circuit Dead-End 0-3 Degrees

Use this standard where a suspension pole would be subject to uplift or in-line guying is required to account for differential line tension. This standard shows 5 3/4" x 5 3/4" x 10' double heavy crossarms, but crossarm strength must be checked and a special arm design may be required. Maximum vertical load shall not exceed 1,000 lbs per attachment unless otherwise approved. Check the pole for guy requirements. Note that the horizontal conductor spacing is greater than the horizontal spacing for pole tops with horizontal post insulators and may control right-of-way width and separation spacing of parallel lines.

13176, 13178 – DC-X30 – Double Circuit Dead-End 3-30 Degrees

Use this standard for dead-end up to 30 degree line angle. This standard uses 5 3/4" x 5 3/4" x 12' double heavy crossarms. Guys are required. The vertical load limit and comments regarding right-of-way width are the same as those stated for standard 13175 and 13177.

A	GENERAL UPDATE	RLR	WPH	WVT	08/01/03	C					
–	ORIGINAL ISSUE	WDF	WPH	WVT	04/25/02	B	UPDATE	RLR	WPH	WVT	8/31/06
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE
TRANSMISSION ENGINEERING						SCALE:					
	COMMENTARY ON POLE-TOP INDEX 69KV WOOD POLES					DWG. NO			SHEET NO.		
						13003			4 of 5		

13180 – DC-H – Double Circuit Dead-End 90 Degrees


Use this standard for a 90 degree dead-end. This standard uses 5 3/4" x 5 3/4" x 12' double heavy crossarms. Guys are required. Steel pole would be preferred for this application.

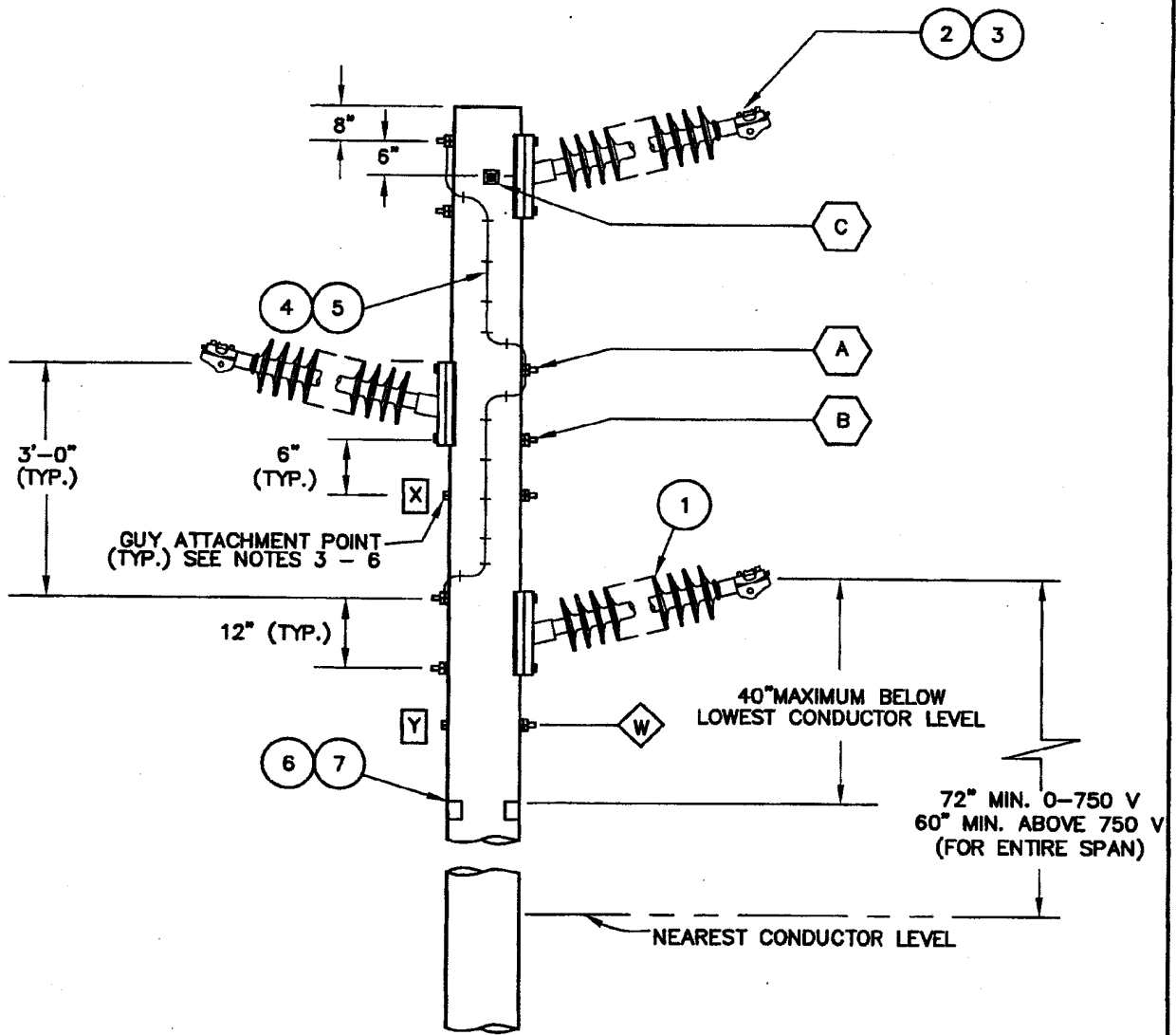
13190 – Single Circuit Wood Cable Pole

This standard depicts the overhead conductor configuration of a single circuit cable pole. Refer to the underground standards for details of the terminations. Use steel cable pole when double circuit capability is required on a single pole.

GENERAL NOTES:

1. Use two single circuit guyed dead-end poles (standards **13115-Y** or **13120-YPI**) or a single steel pole for double circuit line with line angles between 30 and 90 degrees.
2. In cases where guys are required but cannot be used due to clearance or right of way limitation, or where a wood pole standard will not work, consider a steel pole for that location.
3. A "Warning High Voltage Above Keep Off" sign shall be attached to each wood pole approximately 9 feet above ground line with roofing nails as per Distribution Overhead Standard 208.4 The signs and nails are built into the wood pole assemblies in BSE.
4. Unless otherwise noted, all load ratings for hardware in the bills of material are ultimate strengths in pounds (Lbs.) or kips (K).

A	GENERAL UPDATE	RLR	WPH	WVT	08/01/03	C					
—	ORIGINAL ISSUE	WDF	WPH	WVT	04/25/02	B	UPDATE	RLR	WPH	<i>WVT</i>	8/31/06
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE
TRANSMISSION ENGINEERING						SCALE:					
	COMMENTARY ON POLE-TOP INDEX 69KV WOOD POLES					DWG. NO			SHEET NO.		
						13003			5 of 5		



NOTES:

1. LINE ANGLE NOT TO EXCEED 15 DEGREES.
2. VERTICAL LOAD ON POST INSULATOR NOT TO EXCEED 1250 LBS. WITHOUT PRIOR APPROVAL.
3. FOR GUYING, INSTALL IN ORDER .
4. FOR WIND LOAD, GUY ATTACHMENT MUST BE AT OR BELOW POINT .
5. SEE SECTION **15000** FOR GUY DETAILS.
6. SEE JOB PACKAGE FOR GUYING REQUIREMENTS.

A	NOTE CHANGES	SDF	DRB	WPH	3/23/00	C	REV. SHT. 3	WDF	GV WPH	WPH WWT	6/1/04
-	ORIGINAL ISSUE	KSM	GV	WPH	8/1/97	B	ADDED ACSS	WDF	SFO WPH	WWT	8/1/03
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE



TRANSMISSION ENGINEERING

**POLE TOP ARRANGEMENT
TYPE WPI SINGLE CIRCUIT
69kV WOOD POLE**

SCALE: NONE

DWG. NO.

SHT. NO.

13100

1 of 3

13100C01

BILL OF MATERIAL

ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
1	3	429298	INSULATOR, POST, POLYMER, 41"-44" LONG. BENDABLE GAIN BASE AND CLAMPTOP, 4,000 LBS. CANTILEVER BREAKING LOAD	356
2		SEE SHT.3 TABLE A	CLAMP, POST INSULATOR	356
3		SEE SHT.3 TABLE A	GUARD, LINE (IF REQUIRED)	356
4	1#	812928	WIRE, CU. SOFT #8 (LBS.)	355
5	1/4#	678528	STAPLES, 1-1/4" (LBS.)	355
6	1/8#	492192	NAIL, RFG. 1 3/4"#11 GALVANIZED (LBS.)	355
7	2	647648	SIGN, HIGH VOLTAGE	355
A	3	19022	ASSEMBLY, BOLT, 3/4" POST BONDED INSULATOR MTG., ONE SIDE TOP	355
B	3	19022	ASSEMBLY, BOLT, 3/4" POST INSULATOR MTG., ONE SIDE BOTTOM	355
C	1	19001	ASSEMBLY, BOLT, 5/8" SPLIT	355

A	CHANGED ITEM 6	SDF	DRB	WPH	3/23/00	C	REV. SHT. 3	WDF	GV WPH	WVT	6/1/04	13100C02
-	ORIGINAL ISSUE	KSM	GV	WPH	8/1/97	B	ADDED ACSS	WDF	SFO WPH	WVT	8/1/03	
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	



	TRANSMISSION ENGINEERING						SCALE: NONE	
	POLE TOP ARRANGEMENT TYPE WPI SINGLE CIRCUIT 69kV WOOD POLE						DWG. NO.	SHT. NO.
							13100	2of3

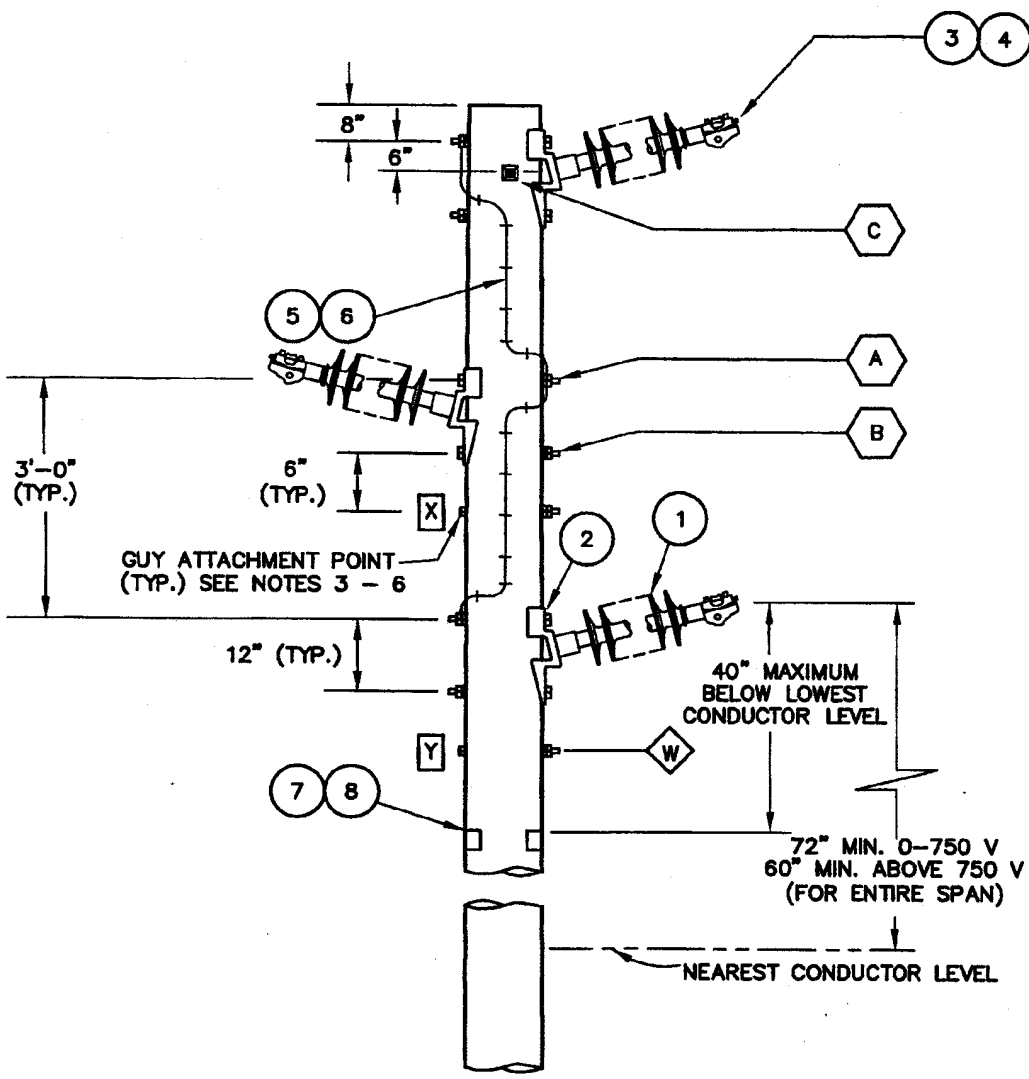
TABLE A

ITEM	QTY.	STOCK NO. or <i>STD. NO.</i>	DESCRIPTION	CONDUCTOR SIZE
2	3	229696	CLAMP, POST INSULATOR, RANGE 0.35-0.84"	3/0 ACSR/AW 6/1
3	3	397568	GUARD, LINE, O.D. 0.744", LENGTH 29"	
2	3	229760	CLAMP, POST INSULATOR, RANGE 1.0-1.5"	336.4 ACSR/AW 26/7
3	3	397664	GUARD, LINE, O.D. 1.013", LENGTH 37"	
2	3	229760	CLAMP, POST INSULATOR, RANGE 1.0-1.5"	636 ACSR/AW 24/7
3	3	397728	GUARD, LINE, O.D. 1.34", LENGTH 45"	636 ACSS/AW 24/7
2	3	229792	CLAMP, POST INSULATOR, RANGE 1.5-2.0"	900 ACSS/AW 54/7
3	3	397760	GUARD, LINE, O.D. 1.662", LENGTH 53"	
2	3	229792	CLAMP, POST INSULATOR, RANGE 1.5-2.0"	1,033.5 ACSR/AW 45/7
3	3	397760	GUARD, LINE, O.D. 1.713", LENGTH 53"	1,033.5 ACSS/AW 45/7

A	ADDED SHT. 3	SDF	DRB	WPH	3/23/00	C	CORRECTED LINE GUARD OD FOR 3/0	WDF	WPH	WWT	6/1/04
-		---	---	---	---	B	ADDED ACSS	WDF	SFO	WWT	8/1/03
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

	TRANSMISSION ENGINEERING							SCALE: NONE			
	POLE TOP ARRANGEMENT TYPE WPI SINGLE CIRCUIT 69kV WOOD POLE							DWG. NO.		SHT. NO.	
								13100		3of3	

13100C03



NOTES:

1. LINE ANGLE NOT TO EXCEED 15 DEGREES.
2. VERTICAL LOAD ON POST INSULATOR NOT TO EXCEED 700 LBS. W/O PRIORITY APPROVAL.
3. FOR GUYING, INSTALL IN ORDER .
4. FOR WIND LOAD, GUY ATTACHMENT MUST BE AT OR BELOW POINT .
5. SEE SECTION 15000 FOR GUY DETAILS.
6. SEE JOB PACKAGE FOR GUYING REQUIREMENTS.
7. PRIORITY APPROVAL REQUIRED BEFORE USING 13101.

D	REV. SHT. 3	WDF	GV WPH	WVT	6/1/04	C	ADDED ACSS	WDF	SFO WPH	WVT	8/1/03
-	ORIGINAL ISSUE	KSM	GV	WPH	8/1/97	B	REVISED NOTES	WDF	WPH	WVT	4/25/02
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

	TRANSMISSION ENGINEERING				SCALE: NONE	
	POLE TOP ARRANGEMENT				DWG. NO.	SHT. NO.
	TYPE WPI (SHORT POLY) SINGLE CIRCUIT				13101	1 of 3
69kV WOOD POLE				13101D01		

BILL OF MATERIAL

ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
1	3	428960	INSULATOR, 27" POST, POLYMER W/STUD BASE AND CLAMPTOP END FITTING, 2,200 LBS CANTILEVER BREAKING LOAD	356
2	3	125728	BASE, HOZ. GAIN, INSULATOR	356
3		SEE SHT.3 TABLE A	CLAMP, POST INSULATOR	356
4		SEE SHT.3 TABLE A	GUARD, LINE (IF REQUIRED)	356
5	1#	812928	WIRE, CU. SOFT #8 (LBS.)	355
6	1/4#	678528	STAPLES, 1-1/4" (LBS.)	355
7	1/8#	492192	NAIL, RFG.1-3/4", #11, GALV. (LBS.)	355
8	2	647648	SIGN, HIGH VOLTAGE	355
A	3	19022	ASSEMBLY, BOLT, 3/4" POST BONDED INSULATOR MTG., ONE SIDE TOP	355
B	3	19005	ASSEMBLY, BOLT, 5/8" POST INSULATOR MTG., ONE SIDE BOTTOM	355
C	1	19001	ASSEMBLY, BOLT, 5/8" SPLIT	355

D	REV. SHT. 3	WDF	CV WPH	WY 6/1/04	C	ADDED ACSS	WDF	SFO WPH	WWT	8/1/03	13101D02
-	ORIGINAL ISSUE	KSM	GV	WPH 10/30/97	B	CHANGED ITEM 7	WDF	WPH	WWT	4/25/02	
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	



	TRANSMISSION ENGINEERING				SCALE: NONE	
	POLE TOP ARRANGEMENT TYPE WPI (SHORT POLY) SINGLE CIRCUIT 69kV WOOD POLE				DWG. NO.	SHT. NO.
					13101	2 of 3

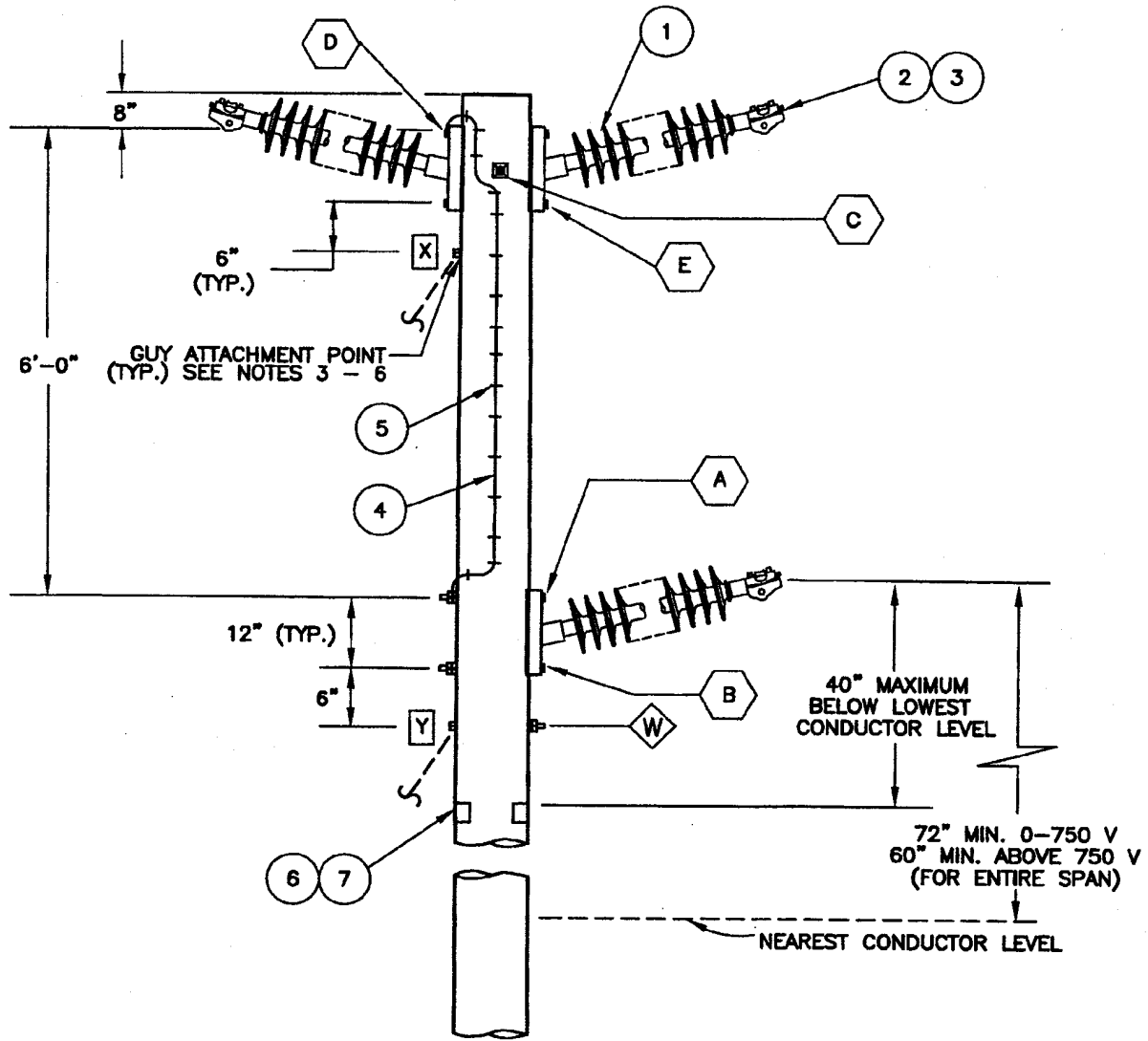
TABLE A

ITEM	QTY.	STOCK NO. OR STD. NO.	DESCRIPTION	CONDUCTOR SIZE
2	3	229696	CLAMP, POST INSULATOR, RANGE 0.35-0.84"	3/0 ACSR/AW 6/1
3	3	397568	GUARD, LINE, O.D. 0.744", LENGTH 29"	
2	3	229760	CLAMP, POST INSULATOR, RANGE 1.0-1.5"	336.4 ACSR/AW 26/7
3	3	397664	GUARD, LINE, O.D. 1.013", LENGTH 37"	
2	3	229760	CLAMP, POST INSULATOR, RANGE 1.0-1.5"	636 ACSR/AW 24/7
3	3	397728	GUARD, LINE, O.D. 1.34", LENGTH 45"	636 ACSS/AW 24/7
2	3	229792	CLAMP, POST INSULATOR, RANGE 1.5-2.0"	900 ACSS/AW 54/7
3	3	397760	GUARD, LINE, O.D. 1.662", LENGTH 53"	
2	3	229792	CLAMP, POST INSULATOR, RANGE 1.5-2.0"	1,033.5 ACSR/AW 45/7
3	3	397760	GUARD, LINE, O.D. 1.713", LENGTH 53"	1,033.5 ACSS/AW 45/7

D	CORRECTED LINE GUARD OD FOR 3/0	WDF	GV WPH	WVT	6/1/04	C	ADDED ACSS	WDF	SFO WPH	WVT	8/1/03
-	ORIGINAL ISSUE	KSM	GV	WPH	10/30/97	B	ADDED SHT. 3	WDF	WPH	WVT	4/25/02
PRV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

	TRANSMISSION ENGINEERING						SCALE: NONE			
	POLE TOP ARRANGEMENT TYPE WPI (SHORT POLY) SINGLE CIRCUIT 69KV WOOD POLE						DWG. NO.		SHT. NO.	
							13101		3of3	

13101D03



NOTES:

1. LINE ANGLE NOT TO EXCEED 15 DEGREES.
2. VERTICAL LOAD ON POST INSULATOR NOT TO EXCEED 1250 LBS. WITHOUT PRIOR APPROVAL.
3. FOR GUYING INSTALL IN ORDER X Y.
4. FOR WIND LOAD, GUY ATTACHMENT MUST BE AT OR BELOW POINT W.
5. SEE SECTION 15000 FOR GUY DETAILS.
6. SEE JOB PACKAGE FOR GUYING REQUIREMENTS.

A	ADDED ACSS	WDF	SFO WPH	WVT	8/1/03	C					
-	ORIGINAL ISSUE	WDF	WPH	WVT	4/25/02	B	REV. SHT. 3	WDF	EV WPH	WVT	6/1/04
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE



TRANSMISSION ENGINEERING
POLE TOP ARRANGEMENT
TYPE 2/1 WPI SINGLE CIRCUIT
69kV WOOD POLE

SCALE: NONE	
DWG. NO.	SHT. NO.
13103	1 of 3

13103B01

BILL OF MATERIAL

ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
1	3	429298	INSULATOR, POST, POLYMER 41-44" LONG, BENDABLE GAIN BASE AND CLAMPTOP, 4,000 LBS CANTILEVER BREAKING LOAD	356
2		SEE SHT. 3 TABLE A	CLAMP, POST INSULATOR	356
3		SEE SHT. 3 TABLE A	GUARD, LINE (IF REQUIRED)	356
4	1#	812928	WIRE, CU. SOFT #8 (LBS.)	355
5	1/4#	678528	STAPLES, 1-1/4" (LBS.)	355
6	1/8#	492192	NAIL, RFG. 1 3/4 - #11 GALV. (LBS.)	355
7	2	647648	SIGN, HIGH VOLTAGE	355
A	1	19022	ASSEMBLY, BOLT, 3/4" POST BONDED INSULATOR MTG., ONE SIDE TOP	355
B	1	19022	ASSEMBLY, BOLT, 3/4" POST INSULATOR MTG., ONE SIDE BOTTOM	355
C	1	19001	ASSEMBLY, BOLT, 5/8" SPLIT	355
D	1	19024	ASSEMBLY, BOLT, 3/4" POST BONDED INSULATOR MTG., BOTH SIDES TOP	355
E	1	19024	ASSEMBLY, BOLT, 3/4" POST INSULATOR MTG., BOTH SIDES BOTTOM	355

A	ADDED ACSS	WDF	SFO WPH	WVT	8/1/03	C					
-	ORIGINAL ISSUE	WDF	WPH	WVT	4/25/02	B	REV. SHT. 3	WDF	WPH	WVT	6/1/04
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

13103B02


	TRANSMISSION ENGINEERING		SCALE: NONE	
	POLE TOP ARRANGEMENT TYPE 2/1 WPI SINGLE CIRCUIT 69KV WOOD POLE		DWG. NO.	SHT. NO.
			13103	2 of 3

TABLE A

ITEM	QTY.	STOCK NO. OF STD. NO.	DESCRIPTION	CONDUCTOR SIZE
2	3	229696	CLAMP, POST INSULATOR, RANGE 0.35-0.84"	3/0 ACSR/AW 6/1
3	3	397568	GUARD, LINE, O.D. 0.744", LENGTH 29"	
2	3	229760	CLAMP, POST INSULATOR, RANGE 1.0-1.5"	336.4 ACSR/AW 26/7
3	3	397664	GUARD, LINE, O.D. 1.013", LENGTH 37"	
2	3	229760	CLAMP, POST INSULATOR, RANGE 1.0-1.5"	636 ACSR/AW 24/7
3	3	397728	GUARD, LINE, O.D. 1.34", LENGTH 45"	636 ACSS/AW 24/7
2	3	229792	CLAMP, POST INSULATOR, RANGE 1.5-2.0"	900 ACSS/AW 54/7
3	3	397760	GUARD, LINE, O.D. 1.662", LENGTH 53"	
2	3	229792	CLAMP, POST INSULATOR, RANGE 1.5-2.0"	1,033.5 ACSR/AW 45/7
3	3	397760	GUARD, LINE, O.D. 1.713", LENGTH 53"	1,033.5 ACSS/AW 45/7

A	ADDED ACSS	WDF	SFO WPH	WVT	8/1/03	C							
-	ORIGINAL ISSUE	WDF	WPH	WVT	4/25/02	B	CORRECTED LINE GUARD OD FOR 3/0	WDF	WPH	WVT	6/1/04		
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE		

13103B003



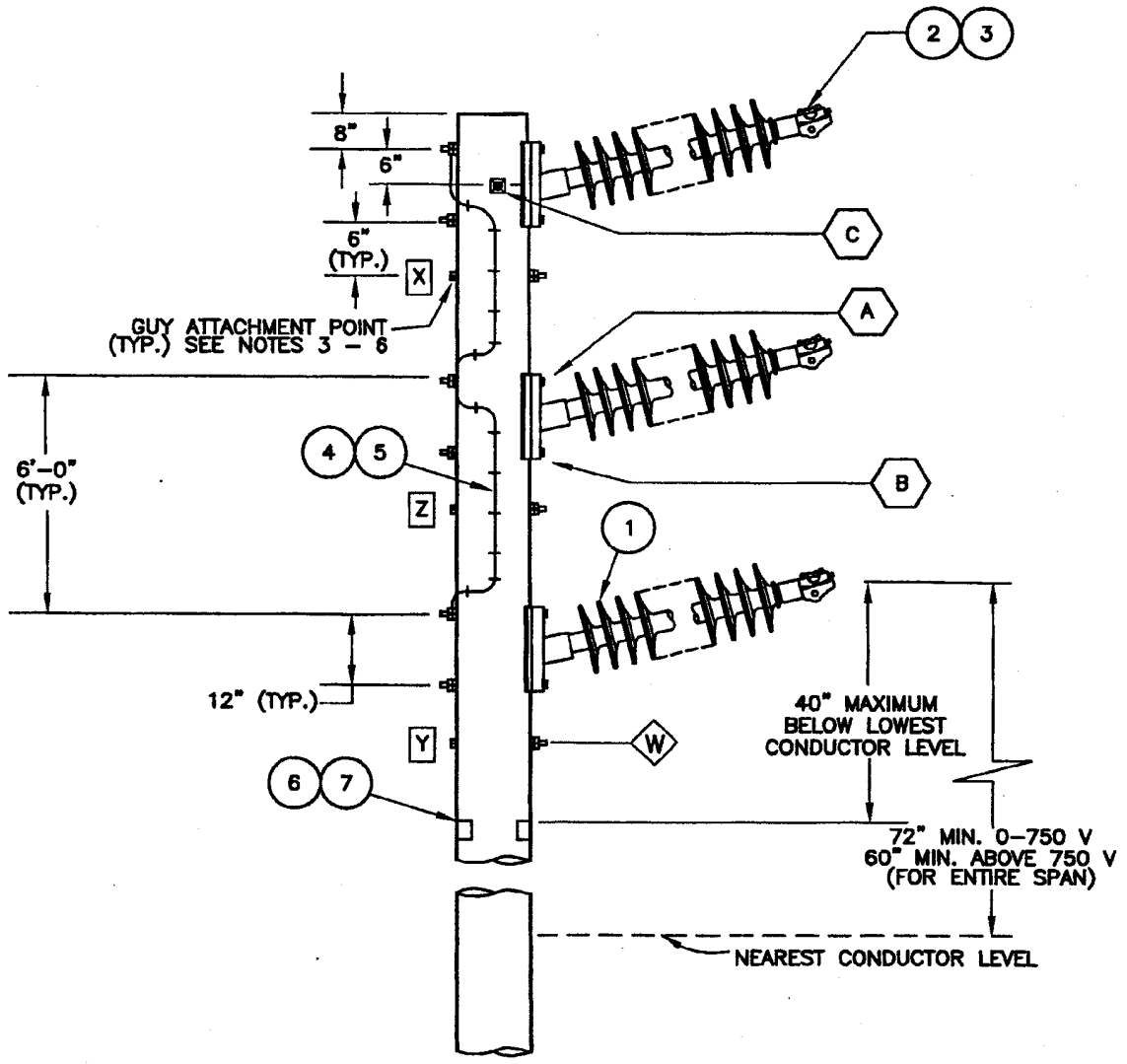
TRANSMISSION ENGINEERING

SCALE: NONE

**POLE TOP ARRANGEMENT
TYPE 2/1 WPI SINGLE CIRCUIT
69KV WOOD POLE**

DWG. NO. SHT. NO.

13103 3 of 3



NOTES:

1. LINE ANGLE NOT TO EXCEED 15 DEGREES.
2. VERTICAL LOAD ON POST INSULATOR NOT TO EXCEED 1250 LBS. WITHOUT PRIOR APPROVAL.
3. FOR GUYING, INSTALL IN ORDER .
4. FOR WIND LOAD, GUY ATTACHMENT MUST BE AT OR BELOW POINT .
5. SEE SECTION 16000 FOR GUY DETAILS.
6. SEE JOB PACKAGE FOR GUYING REQUIREMENTS.

D	REV. SHT. 3	WDF	CV WPH	WPH WPH	6/1/04	C	ADDED ACSS	WDF	SFO WPH	WVT	8/1/03
-	ORIGINAL ISSUE	KSM	GV	WPH	6/14/95	B	ADDED NOTE 6	WDF	WPH	WVT	4/25/02
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

	TRANSMISSION ENGINEERING				SCALE: NONE	
	POLE TOP ARRANGEMENT TYPE ZPI SINGLE CIRCUIT 69KV WOOD POLE				DWG. NO.	SHT. NO.
					13105	1 of 3

13105D01

BILL OF MATERIAL


ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
1	3	429298	INSULATOR, POST, POLYMER, 41-44" LONG, BENDABLE GAIN BASE AND CLAMPTOP, 4,000 LBS CANTILEVER BREAKING LOAD	356
2		SEE SHT.3 TABLE A	CLAMP, POST INSULATOR	356
3		SEE SHT.3 TABLE A	GUARD, LINE (IF REQUIRED)	356
4	1#	812928	WIRE, CU. SOFT #8 (LBS.)	355
5	1/4#	678528	STAPLES, 1-1/4" (LBS.)	355
6	1/8#	492192	NAIL, RFG.1-3/4", #11, GALV. (LBS.)	355
7	2	647648	SIGN, HIGH VOLTAGE	355
A	3	19022	ASSEMBLY, BOLT, 3/4" POST BONDED INSULATOR MTG., ONE SIDE TOP	355
B	3	19022	ASSEMBLY, BOLT, 3/4" POST INSULATOR MTG., ONE SIDE BOTTOM	355
C	1	19001	ASSEMBLY, BOLT, 5/8" SPLIT	355

D	REV. SHT. 3	WDF	GV WPH	WWT	6/1/04	C	ADDED ACSS	WDF	SFO WPH	WWT	8/1/03	13105D02
-	ORIGINAL ISSUE	KSM	GV	WPH	6/24/95	B	REVISED DESC. ITEM 1	WDF	WPH	WWT	4/25/02	
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	
		TRANSMISSION ENGINEERING						SCALE: NONE				
		POLE TOP ARRANGEMENT TYPE ZPI SINGLE CIRCUIT 69KV WOOD POLE						DWC. NO.		SHT. NO.		
								13105		2of3		

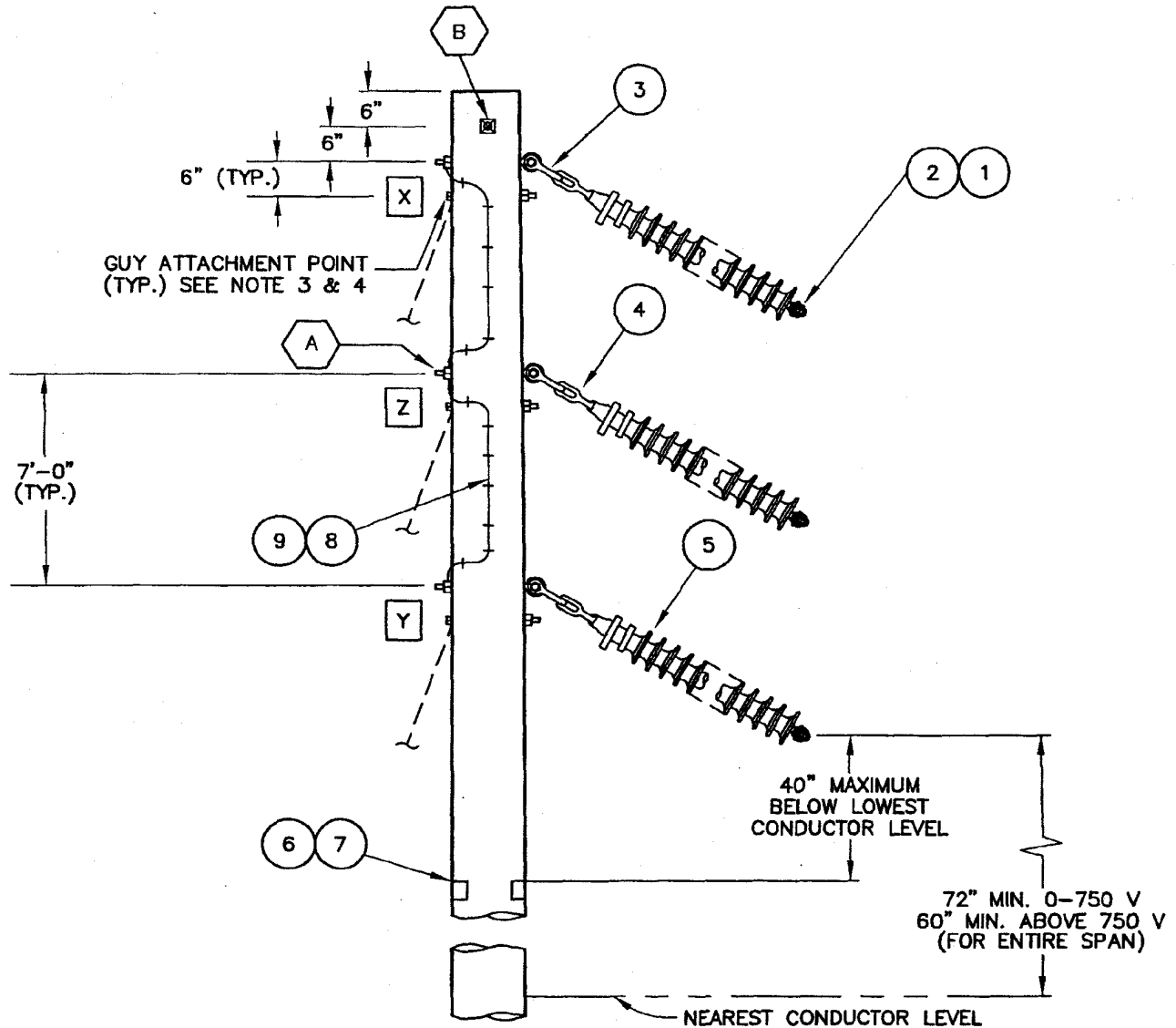
TABLE A

ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	CONDUCTOR SIZE
2	3	229696	CLAMP, POST INSULATOR, RANGE 0.35-0.84"	3/0 ACSR/AW 6/1
3	3	397568	GUARD, LINE, O.D. 0.744", LENGTH 29"	
2	3	229760	CLAMP, POST INSULATOR, RANGE 1.0-1.5"	336.4 ACSR/AW 26/7
3	3	397664	GUARD, LINE, O.D. 1.013", LENGTH 37"	
2	3	229760	CLAMP, POST INSULATOR, RANGE 1.0-1.5"	636 ACSR/AW 24/7
3	3	397728	GUARD, LINE, O.D. 1.34", LENGTH 45"	636 ACSS/AW 24/7
2	3	229792	CLAMP, POST INSULATOR, RANGE 1.5-2.0"	900 ACSS/AW 54/7
3	3	397760	GUARD, LINE, O.D. 1.662", LENGTH 53"	
2	3	229792	CLAMP, POST INSULATOR, RANGE 1.5-2.0"	1,033.5 ACSR/AW 45/7
3	3	397760	GUARD, LINE, O.D. 1.713", LENGTH 53"	1,033.5 ACSS/AW 45/7

D	CORRECTED LINE GUARD OD FOR 3/0	WDF	GV WPH	WVT	6/1/04	C	ADDED ACSS	WDF	SFO WPH	WVT	8/1/03
-	ORIGINAL ISSUE	KSM	GV	WPH	6/14/95	B	ADDED SHT. 3	WDF	WPH	WVT	4/25/02
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

	TRANSMISSION ENGINEERING				SCALE: NONE			
	POLE TOP ARRANGEMENT TYPE ZPI SINGLE CIRCUIT 69kV WOOD POLE				DWG. NO.		SHT. NO.	
					13105		3 of 3	

13105D03



NOTES:

1. FOR USE WITH LINE ANGLES FROM 30 - 45 DEGREES.
2. MAXIMUM CONDUCTOR DESIGN TENSION NOT TO EXCEED 4000 LBS.
3. FOR GUYING, INSTALL IN ORDER **X|Y|Z**. SEE SECTION **15000** FOR GUY DETAILS.
4. SEE JOB PACKAGE FOR GUYING REQUIREMENTS.
5. THIS STANDARD IS NOT APPLICABLE FOR ACSS CONDUCTOR. USE "YPI-ACSS" ON DWG. NO. 13121 AS SUBSTITUTE.

D	REV. SHT. 3	WDF	GV WPH	WPH WPH	6/1/04	C	ADDED NOTE 5 ON SHT. 1	WDF	SFO WPH	WVT	8/1/03
-	ORIGINAL ISSUE	KSM	GV	WPH	3/01/97	B	CHANGED NOTES & PH. SP.	WDF	WPH	WVT	4/25/02
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

SDGE	TRANSMISSION ENGINEERING						SCALE: NONE	
	POLE TOP ARRANGEMENT TYPE Z45 SINGLE CIRCUIT 69kV WOOD POLE						DWG. NO.	SHT. NO.
							13110	1 of 3

13110D01

BILL OF MATERIAL

ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
1		SEE SHT.3 TABLE A	CLAMP, SUSPENSION, WITH SOCKET EYE (SEE NOTE 1.)	356
2		SEE SHT.3 TABLE A	GUARD, LINE (IF REQ'D)	356
3	3	636436	SHACKLE, ANCHOR, 30K	356
4	3	337542	EYE, OVAL BALL, 30K	356
5	3	431200	INSULATOR, SUSPENSION, POLYMER 45-47" LONG, BALL (HOT END) AND SOCKET, 25,000 LBS ULT. TENSILE STRENGTH	356
6	1/8#	492192	NAIL, RFG. 1-3/4", #11, GALV. (LBS.)	355
7	2	647648	SIGN, HIGH VOLTAGE	355
8	1/4#	678528	STAPLES, 1-1/4" (LBS.)	355
9	1#	812928	WIRE, CU. SOFT #8 (LBS.)	355
A	3	19009	ASSEMBLY, SHOULDER EYE BOLT, 3/4", BONDED, 18.3K	355
B	1	19001	ASSEMBLY, BOLT, 5/8" SPLIT	355

D	REV. SHT. 3	WDF	GV WPH	WVT	6/1/04	C	ADDED NOTE TO SHT. 1	WDF	SFO WPH	WVT	8/1/03
-	ORIGINAL ISSUE	KSM	GV	WPH	8/01/97	B	CHANGED NOTES & PH. SP.	WDF	WPH	WVT	4/25/02
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

13110D02



TRANSMISSION ENGINEERING

SCALE: NONE

**POLE TOP ARRANGEMENT
TYPE Z45 SINGLE CIRCUIT
69KV WOOD POLE**

DWG. NO.

SHT. NO.


13110

2 of 3

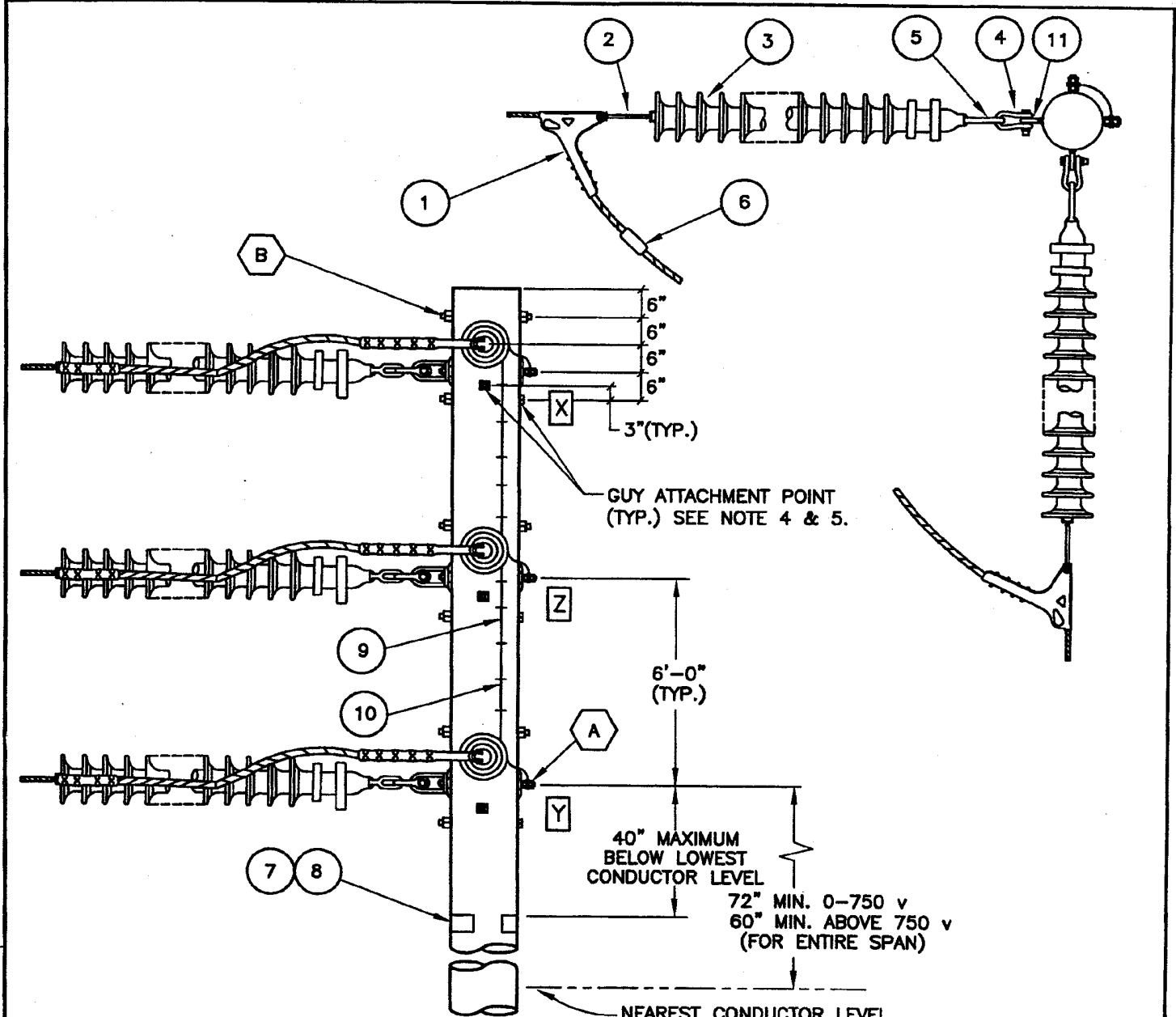
TABLE A

ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	CONDUCTOR SIZE
1	3	232224	CLAMP, SUSPENSION W/SOCKET EYE, RANGE 0.40-0.85", 18K	3/0 ACSR/AW 6/1
2	3	397568	GUARD, LINE, DIA. 0.744", LENGTH, 29"	
1	3	232160	CLAMP, SUSPENSION W/SOCKET EYE, RANGE 0.75-1.19", 25K	336.4 ACSR/AW 26/7
2	3	397664	GUARD, LINE, DIA. 1.013", LENGTH, 37"	
1	3	232192	CLAMP, SUSPENSION W/SOCKET EYE, RANGE 1.25-1.82", 25K	636 ACSR/AW 24/7
2	3	397728	GUARD, LINE, DIA. 1.34", LENGTH, 29"	
1	3	232192	CLAMP, SUSPENSION W/SOCKET EYE, RANGE 1.25-1.82", 25K	1,033.5 ACSR/AW 45/7
2	3	397760	GUARD, LINE, DIA. 1.713", LENGTH, 53"	

D	CORRECTED LINE GUARD OD FOR 3/0	WDF	GV WPH	WVT WPH	6/1/04	C	ADDED NOTE TO SHT. 1	WDF	SFO WPH	WVT	8/1/03
-	ORIGINAL ISSUE	KSM	GV	WPH	8/01/97	B	CHANGED NOTES & PH. SP.	WDF	WPH	WVT	4/25/02
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

	TRANSMISSION ENGINEERING				SCALE: NONE			
	POLE TOP ARRANGEMENT TYPE Z45 SINGLE CIRCUIT 69KV WOOD POLE				DWG. NO.		SHT. NO.	
					13110		3of3	

13110D03



NOTES:

1. **CAUTION:** DO NOT ATTEMPT TO ALIGN STRAIN CLAMP WITH WIRE UNDER TENSION - TWISTING MAY CAUSE FAILURE OF INSULATOR ROD.
2. USE FOR LINE ANGLE 75 TO 90 DEGREES.
3. MAXIMUM CONDUCTOR DESIGN TENSION NOT TO EXCEED 4000 LBS.
4. FOR GUYING INSTALL IN ORDER YZ. SEE SECTION 15000 FOR GUY DETAILS.
5. SEE JOB PACKAGE FOR GUYING REQUIREMENTS.

D	REV. SHT. 3	WDF	WPH	WVT	6/1/04	C	CHANGED TITLE	WDF	SFO	WPH	WVT	8/1/03
-	ORIGINAL ISSUE	KSM	GV	WPH	8/01/97	B	ADDED SHT. 3 REVISED DE	WDF	WPH	WVT		4/25/02
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	

SDGE	TRANSMISSION ENGINEERING						SCALE: NONE		13115D01
	POLE TOP ARRANGEMENT TYPE Y SINGLE CIRCUIT-ACSR 69kV WOOD POLE						DWG. NO.	SHT. NO.	
							13115	1 of 3	

BILL OF MATERIAL

ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
1		SEE SHT.3 TABLE A	CLAMP, STRAIN, WITHOUT SOCKET EYE	356
2		SEE SHT.3 TABLE A	EYE, SOCKET, HOT LINE, 30K	356
3	6	431200	INSULATOR, SUSPENSION, POLYMER, 45-47" LONG, BALL (HOT END) AND SOCKET, 25,000 LBS ULT. TENSILE STRENGTH	356
4	6	636436	SHACKLE, ANCHOR, 30K	356
5	6	337542	EYE, OVAL BALL, 30K	356
6		SEE SHT.3 TABLE A	CONNECTOR, JUMPER	356
7	1/8#	492192	NAIL, RFG.1-3/4", #11, GALV. (LBS.)	355
8	2	647648	SIGN, HIGH VOLTAGE	355
9	1#	812928	WIRE, CU. SOFT #8 (LBS.)	355
10	1/4#	678528	STAPLES, 1-1/4" (LBS.)	355
A	6	19026	ASSEMBLY BOLT, 3/4", BONDED	355
B	1	19001	ASSEMBLY BOLT, 5/8" SPLIT	355
11	6	235648	EYELET, STD., 3/4"	355

D	REV. SHT. 3	WDF	WPH	LYT	6/1/04	C	CHANGED TITLE	WDF	SFO	WPH	WVT	8/1/03	13115D02
-	ORIGINAL ISSUE	KSM	GV	WPH	8/01/97	B	ADDED SHT. 3 REVISED DE	WDF	WPH	WVT	4/25/02		
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE		



	TRANSMISSION ENGINEERING		SCALE: NONE	
	POLE TOP ARRANGEMENT TYPE Y SINGLE CIRCUIT-ACSR 69kV WOOD POLE		DWG. NO.	SHT. NO.
			13115	2of3

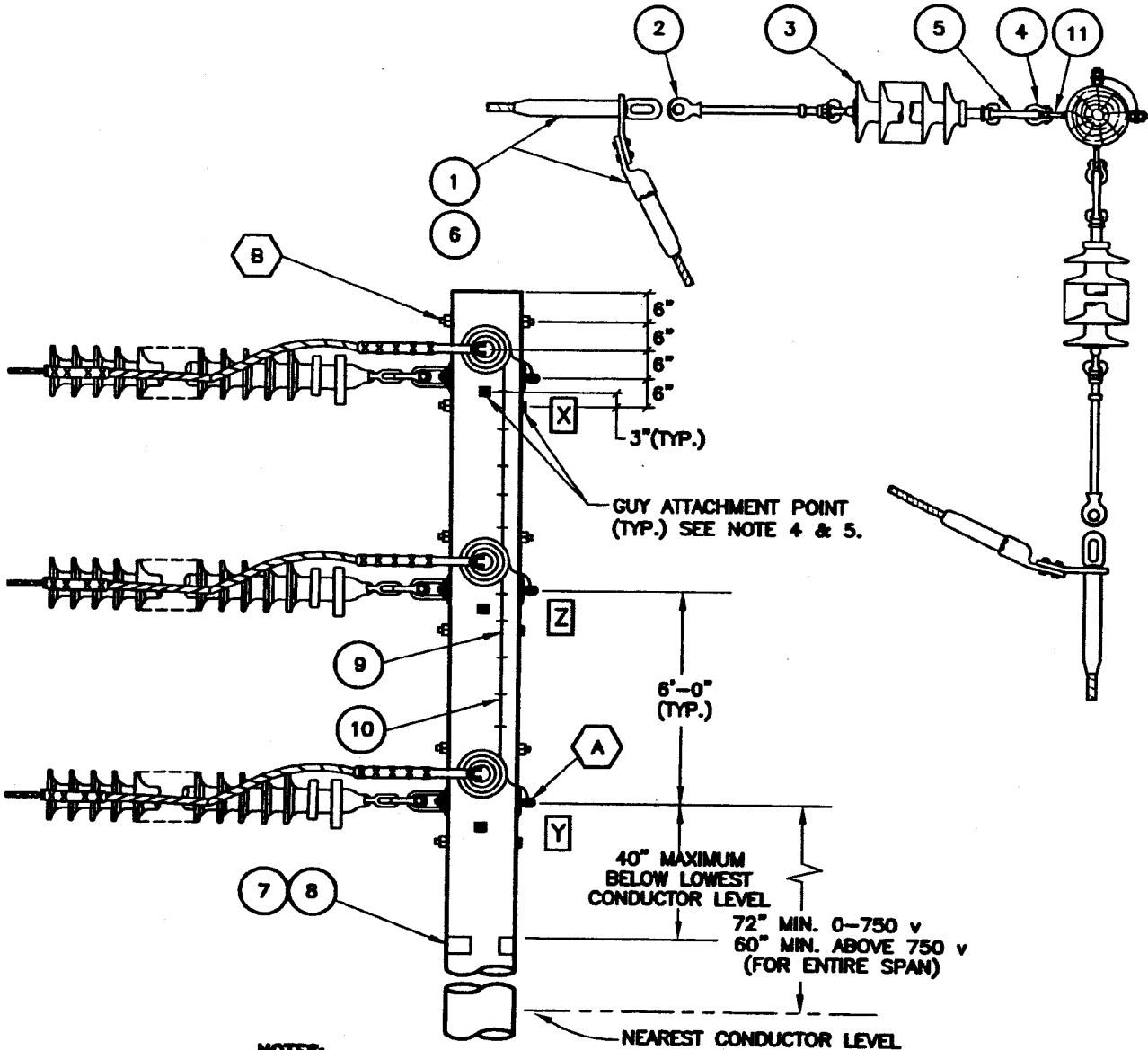
TABLE A

ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	CONDUCTOR SIZE
1	6	230672	CLAMP, STRAIN, ALUMINUM, RANGE, 0.20-0.57", 15K	3/0
2	6	337602	EYE, SOCKET HOTLINE, EYE 11/16" WIDE, 30K	ACSR/AW 6/1
6	3	256472	CONNECTOR, COMPRESSION ALUM., JUMPER	
1	6	231700	CLAMP, STRAIN, ALUMINUM, RANGE, 0.47-0.88", 25K	336.4 ACSR/AW
2	6	337604	EYE, SOCKET HOTLINE EYE, 3/4" WIDE, 30K	26/7
6	3	650264	SLEEVE, ALUM., JUMPER	
1	6	230686	CLAMP, STRAIN, ALUMINUM, RANGE, 0.71-1.318", 30K	636
2	6	337622	EYE, SOCKET HOTLINE, EYE 1 3/8" WIDE, 30K	ACSR/AW 24/7
6	3	650656	SLEEVE, ALUM., JUMPER	
1	6	230686	CLAMP, STRAIN, ALUMINUM, RANGE, 0.71-1.318", 30K	1,033.5 ACSR/AW
2	6	337622	EYE, SOCKET HOTLINE EYE, 1 3/8" WIDE, 30K	45/7
6	3	650336	SLEEVE, ALUMINUM, JUMPER	

D	CORRECTED STRAIN CLAMP STOCK NO. FOR 336 ACSR	WDF	GV WPH	WVT	6/1/04	C	CHANGED TITLE	WDF	SFO WPH	WVT	8/1/03
-	ORIGINAL ISSUE	KSM	GV	WPH	8/01/97	B	ADDED SHT. 3 REVISED DE	WDF	WPH	WVT	4/25/02
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

	TRANSMISSION ENGINEERING				SCALE: NONE	
	POLE TOP ARRANGEMENT TYPE Y SINGLE CIRCUIT-ACSR 69KV WOOD POLE				DWG. NO.	SHT. NO.
					13115	3of3

13115D03



NOTES:

1. **CAUTION:** DO NOT ATTEMPT TO ALIGN STRAIN CLAMP WITH WIRE UNDER TENSION - TWISTING MAY CAUSE FAILURE OF INSULATOR ROD.
2. USE FOR LINE ANGLE 75 TO 90 DEGREES.
3. MAXIMUM CONDUCTOR DESIGN TENSION NOT TO EXCEED 4000 LBS.
4. FOR GUYING INSTALL IN ORDER **[X][Y][Z]**. SEE SECTION 16000 FOR GUY DETAILS.
5. SEE JOB PACKAGE FOR GUYING REQUIREMENTS.

B						E							
A	UPDATED ITEM 6 QTY.	PM	WPH	WVT	8/15/06	D							
	ORIGINAL	WDF	SFO	WVT	8/01/03	C							
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE		

TRANSMISSION ENGINEERING

SCALE: NONE



**POLE TOP ARRANGEMENT
TYPE Y SINGLE CIRCUIT-ACSS
69kV WOOD POLE**

DWG. NO.

SHT. NO.

13116

1 of 3

13116A01

BILL OF MATERIAL

ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
1	6	SEE SHT. 3 TABLE A	DEAD END, COMPRESSION	356
2	6	236048	Y-CLEVIS, SOCKET, HOTLINE, 30K	356
3	6	431200	INSULATOR, SUSPENSION, POLYMER, 45-47" LONG, BALL (HOT END) & SOCKET. 25K SPECIFIED MECHANICAL LOAD	356
4	6	636436	SHACKLE, ANCHOR, 30K	356
5	6	337542	EYE, OVAL BALL, 30K	356
6	3#	246950	FILLER COMPOUND (LBS)	356
7	1/8#	492192	NAIL, RFG.1-3/4", #11, GALV. (LBS.)	355
8	2	647648	SIGN, HIGH VOLTAGE	355
9	1#	812928	WIRE, CU. SOFT #8 (LBS.)	355
10	1/4#	678528	STAPLES, 1-1/4" (LBS.)	355
A	6	19028	ASSEMBLY BOLT, 3/4", BONDED	355
B	1	19001	ASSEMBLY BOLT, 5/8" SPLIT	355
11	6	235648	EYELET, STD., 3/4"	355

B						E					
A	UPDATED ITEM 6 QTY.	PM	WPH	WVT	8/15/08	D					
	ORIGINAL	WDF	SFO WPH	WVT	8/01/03	C					
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

SDGE	TRANSMISSION ENGINEERING POLE TOP ARRANGEMENT TYPE Y SINGLE CIRCUIT-ACSS 69kV WOOD POLE	SCALE: NONE	
		DWG. NO.	SHT. NO.
		13116	2 of 3

13116A02

TABLE A

ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	ACCT NO.
			636 ACSS/AW 24/7 (ROOK/AW)	
1	6	652678	DEAD END, COMPRESSION, FOR 636 ROOK/ACSS/AW CONDUCTOR, FULL TENSION WITH STEEL EYE, 4-HOLE NEMA PAD & TERMINAL CONNECTOR	356
			900 ACSS/AW 54/7 (CANARY/AW)	
1	6	652682	DEAD END, COMPRESSION, FOR 900 CANARY/ACSS/AW CONDUCTOR, FULL TENSION WITH STEEL EYE, 4-HOLE NEMA PAD & TERMINAL CONNECTOR	356
			1033.5 ACSS/AW 45/7 (ORTOLAN/AW)	
1	6	652674	DEAD END, COMPRESSION, FOR 1033.5 ORTOLAN/ACSS /AW CONDUCTOR, FULL TENSION WITH STEEL EYE, 4-HOLE NEMA PAD & TERMINAL CONNECTOR	356

DIE SIZE TABLE		
CONDUCTOR	STEEL DIE	ALUMINUM DIE
ROOK	12SH	27AH
CANARY	14SH	30AH
ORTOLAN	10SH	34AH

NOTE:

INSTALLATION OF THE COMPRESSION DEAD ENDS & COMPRESSION SPLICES, INCLUDING THE PROPER DIRECTION OF COMPRESSION, SHALL STRICTLY FOLLOW MANUFACTURE'S INSTRUCTIONS.

B						E					
A	UPDATED ITEM 6 QTY.	PM	WPH	WV	8/15/06	D					
	ORIGINAL	WDF	SFO	WVT	8/01/03	C					
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

TRANSMISSION ENGINEERING

SCALE: NONE



**POLE TOP ARRANGEMENT
TYPE Y SINGLE CIRCUIT-ACSS
69KV WOOD POLE**

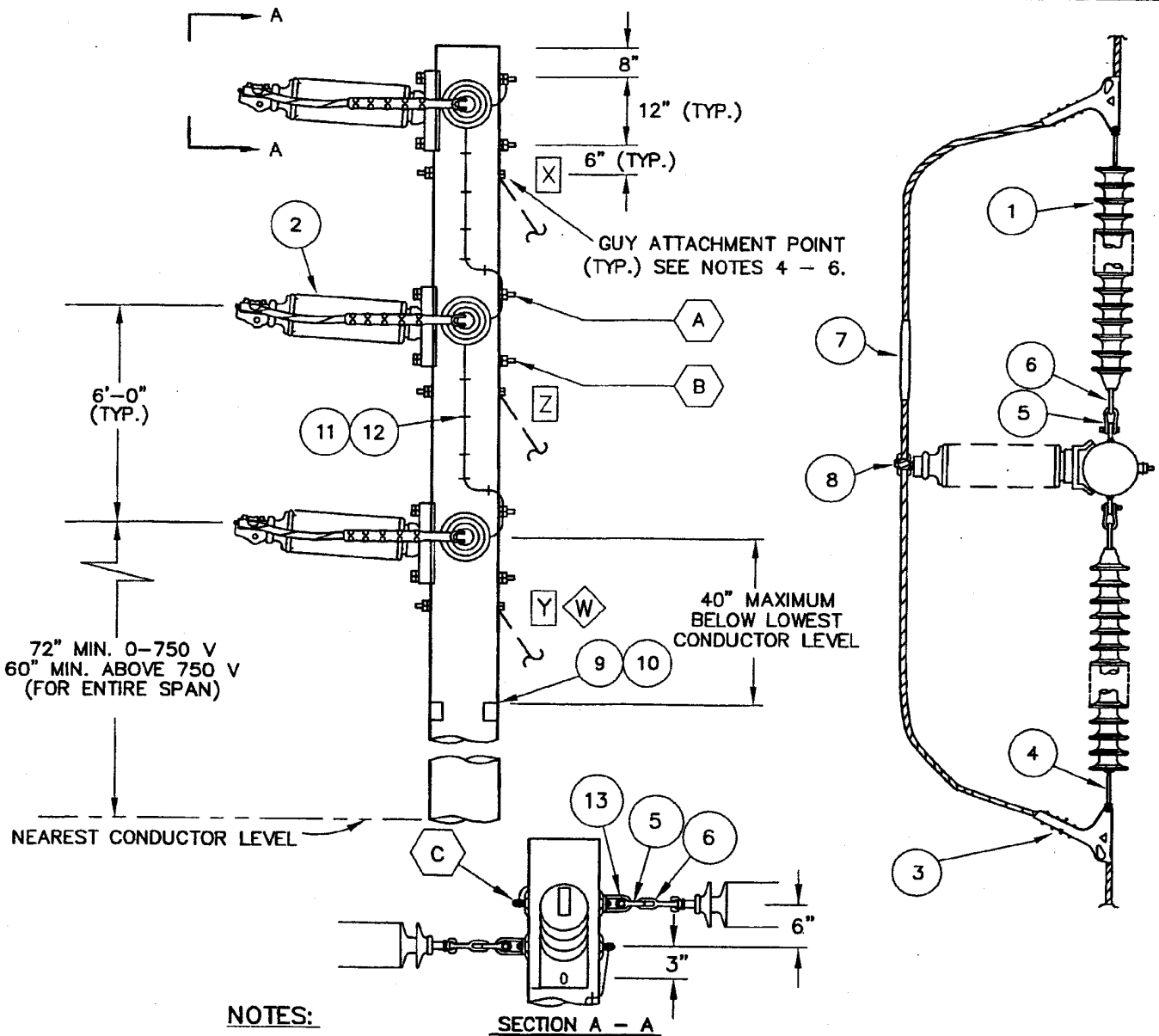
DWG. NO.

SHT. NO.

13116

3 of 3

13116A03



NOTES:

1. **CAUTION:** DO NOT ATTEMPT TO ALIGN STRAIN CLAMP WITH WIRE UNDER TENSION - TWISTING MAY CAUSE FAILURE OF INSULATOR ROD.
2. LINE ANGLE 0 TO 75 DEGREES.
3. MAXIMUM CONDUCTOR DESIGN TENSION NOT TO EXCEED 4000 LBS.
4. FOR WIND LOAD, GUY ATTACHMENT MUST BE AT OR BELOW POINT W.
5. FOR GUYING INSTALL IN ORDER XYZ SEE SECTION 15000 FOR GUY DETAILS.
6. SEE JOB PACKAGE FOR GUYING REQUIREMENTS.

A	CHGD ITEMS C, 4, 5 & 6	JLH	DRB	WPH	3/23/00	C	CHANGED TITLE	WDF	SFO WPH	WVT	8/1/03
-	ORIGINAL ISSUE	KSM	GV	WPH	8/01/97	B	REVISED DE	WDF	WPH	WVT	4/25/02
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE



TRANSMISSION ENGINEERING
POLE TOP ARRANGEMENT
TYPE YPI SINGLE CIRCUIT-ACSR
69kV WOOD POLE

SCALE: NONE

DWG. NO.

SHT. NO.

13120

1 of 3

13120C01

BILL OF MATERIAL

ITEM	QTY.	STOCK NO. or <i>STD. NO.</i>	DESCRIPTION	ACCT. NO.
1	6	431200	INSULATOR, SUSPENSION, POLYMER, 45-47" LONG, BALL (HOT END) AND SOCKET, 25,000 LBS ULT. TENSILE STRENGTH	356
2	3	429298	INSULATOR, POST, POLYMER, 41-44" LONG, BENDABLE GAIN BASE AND CLAMPTOP, 4,000 LBS CANTILEVER LOAD (SEE NOTE 1)	356
3		SEE SHT.3 TABLE A	CLAMP, STRAIN, WITHOUT SOCKET EYE	356
4		SEE SHT.3 TABLE A	EYE, SOCKET, HOTLINE, 30K	356
5	6	636436	SHACKLE, ANCHOR, 30K	356
6	6	337542	EYE, OVAL BALL, 30K	356
7		SEE SHT.3 TABLE A	CONNECTOR, JUMPER	356
8		SEE SHT.3 TABLE A	CLAMP, POST INSULATOR	356
9	1/8#	492192	NAIL, RFG.1-3/4", #11, GALV. (LBS.)	355
10	2	647648	SIGN, HIGH VOLTAGE	355
11	1/4#	678528	STAPLES, 1-1/4" (LBS.)	355
12	2#	812928	WIRE, CU. SOFT #8 (LBS.)	355
A	3	19022	ASSEMBLY, BOLT, 3/4" POST BONDED INSULATOR MTG., ONE SIDE TOP	355
B	3	19022	ASSEMBLY, BOLT, 3/4" POST INSULATOR MTG., ONE SIDE BOTTOM	355
C	6	19026	ASSEMBLY BOLT, 3/4" BONDED	355
13	6	235648	EYELET, STD. 3/4"	355

NOTE 1: SHORT BASE POLY - STK#428960, BASE STK#125728 & BOLTS **STD#19009, STD#19022** - MAY BE SUBSTITUTED WITH APPROVAL IF REPLACING PORCELAIN INSULATORS FOR CARRYING JUMPERS ONLY.

A	CHANGED ITEMS C, 4, 5, & 6	JLH	DRB	WPH	3/23/00	C	CHANGED TITLE	WDF	SFO WPH	WVT	8/1/03
-	ORIGINAL ISSUE	KSM	GV	WPH	8/01/97	B	REVISED DE	WDF	WPH	WVT	4/25/02
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

13120C02



TRANSMISSION ENGINEERING
POLE TOP ARRANGEMENT
TYPE YPI SINGLE CIRCUIT-ACSR
69kV WOOD POLE


SCALE: NONE

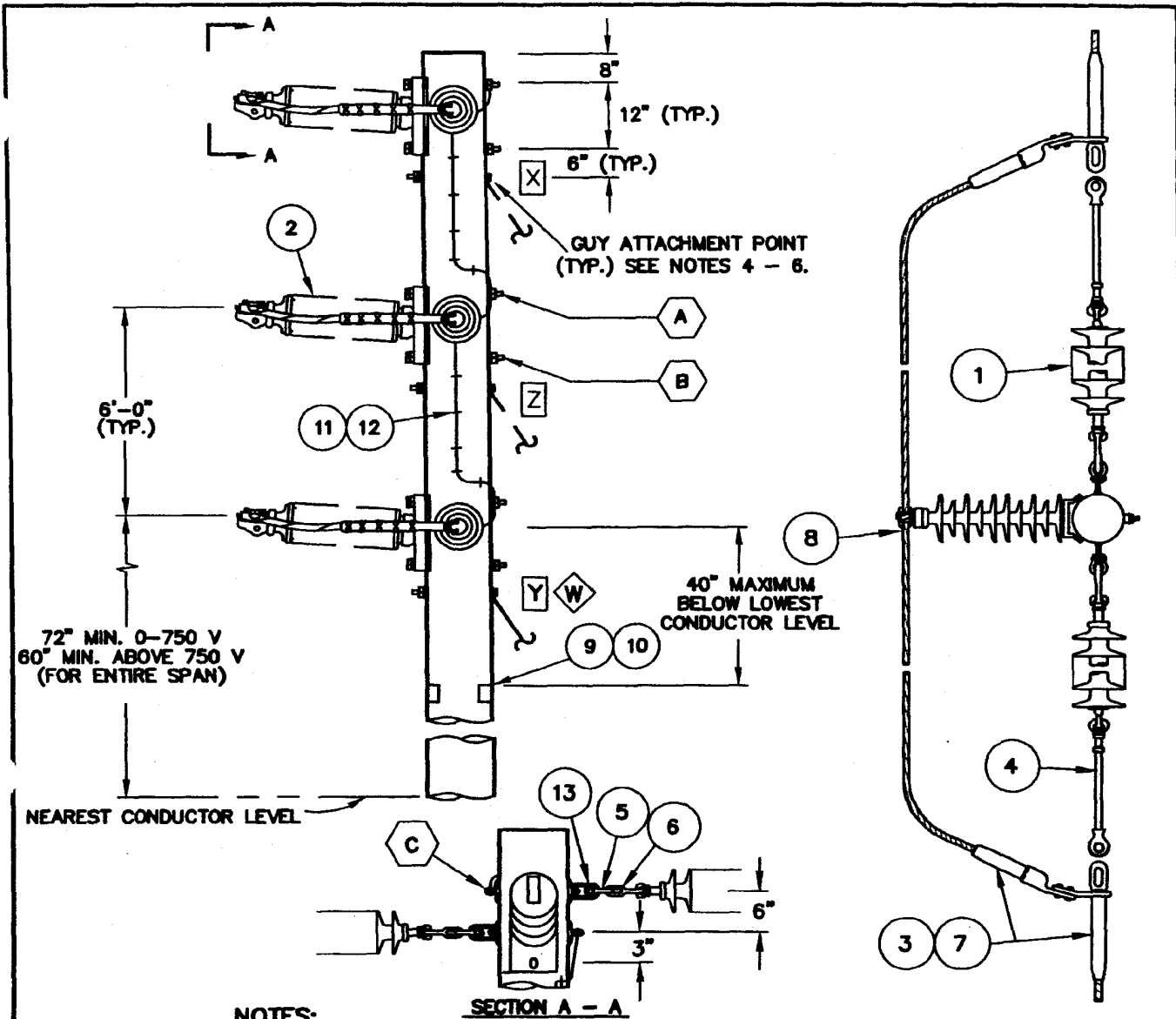
DWG. NO.	SHT. NO.
13120	2 of 3

TABLE A

ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	CONDUCTOR SIZE
3	6	230672	CLAMP, STRAIN, ALUMINUM, RANGE, 0.20-0.57", 15K	3/0 ACSR/AW 6/1
4	6	337602	EYE, SOCKET HOTLINE, EYE 11/16" WIDE, 30K	
7	3	256472	CONNECTOR, COMPRESSION, ALUM., JUMPER	
8	3	229696	CLAMP, POST INSULATOR, RANGE 0.35-0.84"	
3	6	231700	CLAMP, STRAIN, ALUMINUM, RANGE, 0.47-0.88", 25K	336.4 ACSR/AW 26/7
4	6	337604	EYE, SOCKET HOTLINE, EYE 3/4" WIDE, 30K	
7	3	650264	SLEEVE, ALUM., JUMPER	
8	3	229696	CLAMP, POST INSULATOR, RANGE, 0.35-0.84"	
3	6	230686	CLAMP, STRAIN, ALUMINUM, RANGE, 0.71-1.318", 30K	636 ACSR/AW 24/7
4	6	337622	EYE, SOCKET HOTLINE, EYE 1 3/8" WIDE, 30K	
7	3	650656	SLEEVE, ALUM., JUMPER	
8	3	229728	CLAMP, POST INSULATOR, RANGE 0.7-1.06"	
3	6	230686	CLAMP, STRAIN, ALUMINUM, RANGE, 0.71-1.318", 30K	1,033.5 ACSR/AW 45/7
4	6	337622	EYE, SOCKET HOTLINE, EYE 1 3/8" WIDE, 30K	
7	3	650336	SLEEVE, ALUM., JUMPER	
8	3	229760	CLAMP, POST INSULATOR, RANGE 1.0-1.5"	

A	ADDED SHT. 3	JLH	DRB	WPH	3/23/00	C	CHANGED TITLE	WDF	SFO	WPH	WYT	8/1/03
-	ORIGINAL ISSUE	KSM	GV	WPH	8/01/97	B	REVISED DE	WDF	WPH	WVT		4/25/02
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	

	TRANSMISSION ENGINEERING						SCALE: NONE					
	POLE TOP ARRANGEMENT						DWG. NO.		SHT. NO.		13120C03	
	TYPE YPI SINGLE CIRCUIT-ACSR						13120		3of3			
69KV WOOD POLE												



NOTES:

1. **CAUTION:** DO NOT ATTEMPT TO ALIGN STRAIN CLAMP WITH WIRE UNDER TENSION - TWISTING MAY CAUSE FAILURE OF INSULATOR ROD.
2. LINE ANGLE 0 TO 75 DEGREES.
3. MAXIMUM CONDUCTOR DESIGN TENSION NOT TO EXCEED 4000 LBS.
4. FOR WIND LOAD, GUY ATTACHMENT MUST BE AT OR BELOW POINT **W**.
5. FOR GUYING INSTALL IN ORDER **X|Y|Z** SEE SECTION 15000 FOR GUY DETAILS.
6. SEE JOB PACKAGE FOR GUYING REQUIREMENTS.

B						E					
A	CORRECTED SHT 3	PM	WPH	WV	7/21/06	D					
	ORIGINAL	WDF	SFO WPH	WWT	8/1/03	C					
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

TRANSMISSION ENGINEERING

SCALE: NONE



**POLE TOP ARRANGEMENT
TYPE YPI SINGLE CIRCUIT-ACSS
69kV WOOD POLE**

DWG. NO.
13121

SHT. NO.
1 of 3

13121A01

BILL OF MATERIAL

ITEM	QTY.	STOCK NO or STD. NO.	DESCRIPTION	ACCT. NO.
1	6	431200	INSULATOR, SUSPENSION, POLYMER, 45-47" LONG, BALL (HOT END) AND SOCKET, 25K SPECIFIED MECHANICAL LOAD	356
2	3	429298	INSULATOR, POST, POLYMER, 41-44" LONG, BENDABLE GAIN BASE AND CLAMPTOP, 4,000 LBS CANTILEVER LOAD (SEE NOTE 1)	356
3	6	SEE SHT. 3 TABLE A	DEAD END, COMPRESSION	356
4	6	236048	Y-CLEVIS, SOCKET, HOTLINE, 30K	356
5	6	636436	SHACKLE, ANCHOR, 30K	356
6	6	337542	EYE, OVAL BALL, 30K	356
7	3	246950	FILLER COMPOUND (LBS)	356
8	3	SEE SHT. 3 TABLE A	CLAMP, POST INSULATOR	356
9	1/8#	492192	NAIL, RFG. 1-3/4", #11, GALV. (LBS.)	355
10	2	647648	SIGN, HIGH VOLTAGE	355
11	1/4#	678528	STAPLES, 1-1/4" (LBS.)	355
12	2#	812928	WIRE, CU. SOFT #8 (LBS.)	355
A	3	19022	ASSEMBLY, BOLT, 3/4" POST BONDED INSULATOR MTG., ONE SIDE TOP	355
B	3	19022	ASSEMBLY, BOLT, 3/4" POST INSULATOR MTG., ONE SIDE BOTTOM	355
C	6	19028	ASSEMBLY BOLT, 3/4" BONDED	355
13	6	235648	EYELET, STD. 3/4"	355

NOTE 1: SHORT BASE POLY - STK#428960, BASE STK#125728 & BOLTS ~~STD#19009~~ ~~STD#19022~~ - MAY BE SUBSTITUTED WITH APPROVAL IF REPLACING PORCELAIN INSULATORS FOR CARRYING JUMPERS ONLY.

B											
A	CORRECTED SHT 3	PM	WPH	WV	7/21/08	D					
	ORIGINAL	WDF	SFO WPH	WVT	8/1/03	C					
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE


	TRANSMISSION ENGINEERING	SCALE: NONE	
	POLE TOP ARRANGEMENT	DWG. NO.	SHT. NO.
	TYPE YPI SINGLE CIRCUIT-ACSS	13121	2 of 3
	69kV WOOD POLE		13121A02

TABLE A


ITEM	QTY.	STOCK NO. OF STD. NO.	DESCRIPTION	ACCT NO.
636 ACSS/AW 24/7 (ROOK/AW)				
3	6	652678	DEAD END, COMPRESSION, FOR 636 ROOK/ACSS/AW CONDUCTOR, FULL TENSION WITH STEEL EYE, 4-HOLE NEMA PAD & TERMINAL CONNECTOR	356
8	3	229728	CLAMP, POST INSULATOR, RANGE 0.70-1.06"	356
900 ACSS/AW 54/7 (CANARY/AW)				
3	6	652682	DEAD END, COMPRESSION, FOR 900 CANARY/ACSS/AW CONDUCTOR, FULL TENSION WITH STEEL EYE, 4-HOLE NEMA PAD & TERMINAL CONNECTOR	356
8	3	229760	CLAMP, POST INSULATOR, RANGE 1.00-1.50"	356
1033.5 ACSS/AW 45/7 (ORTOLAN/AW)				
3	6	652674	DEAD END, COMPRESSION, FOR 1033.5 ORTOLAN/ACSS /AW CONDUCTOR, FULL TENSION WITH STEEL EYE, 4-HOLE NEMA PAD & TERMINAL CONNECTOR	356
8	3	229760	CLAMP, POST INSULATOR, RANGE 1.00-1.50"	356

DIE SIZE TABLE

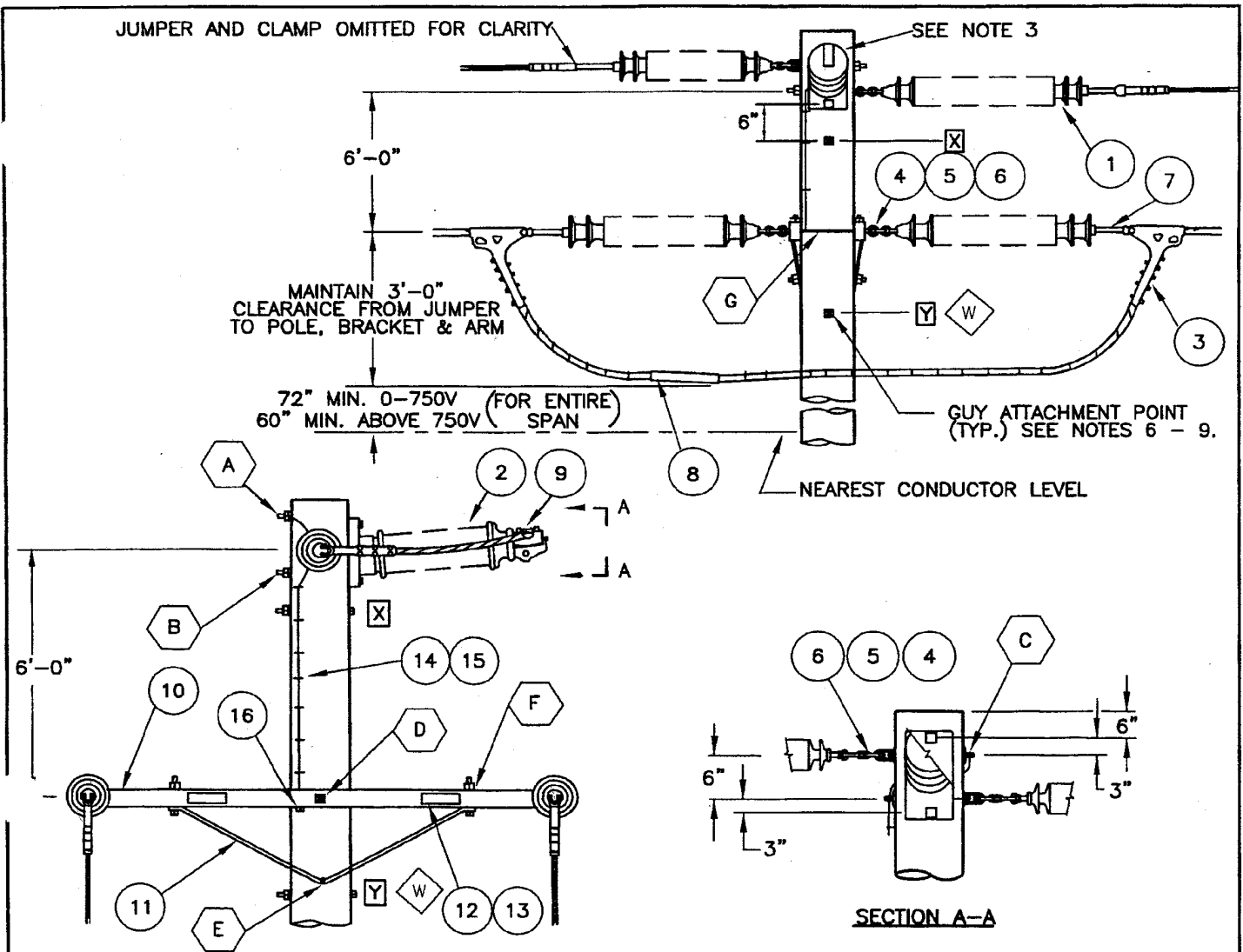
CONDUCTOR	STEEL DIE	ALUMINUM DIE
ROOK	12SH	27AH
CANARY	14SH	30AH
ORTOLAN	10SH	34AH

NOTE:

INSTALLATION OF THE COMPRESSION DEAD ENDS & COMPRESSION SPLICES, INCLUDING THE PROPER DIRECTION OF COMPRESSION, SHALL STRICTLY FOLLOW MANUFACTURE'S INSTRUCTIONS.

B						E					
A	CORRECTED SHT 3	PM	WPH	WVT	7/21/06	D					
	ORIGINAL	WDF	SFO WPH	WVT	8/1/03	C					
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE
TRANSMISSION ENGINEERING							SCALE: NONE				
	POLE TOP ARRANGEMENT TYPE YPI SINGLE CIRCUIT-ACSS 69kV WOOD POLE						DWG. NO.	SHT. NO.			
							13121	align="center">3 of 3			

15121A03



NOTES:

1. **CAUTION:** DO NOT ATTEMPT TO ALIGN STRAIN CLAMP WITH WIRE UNDER TENSION – TWISTING MAY CAUSE FAILURE OF INSULATOR ROD.
2. **CAUTION:** ANGLE BETWEEN GUY AND POLE MUST BE IN ACCORDANCE WITH GO-95 REQUIREMENTS FOR SEPARATION BETWEEN CONDUCTORS AND HARDWARE.
3. INSTALL HORIZONTAL POST INSULATOR ON INSIDE OF ANGLE.
4. INSTALL HIGHER TENSION DEADEND IN LOWER POSITION AT POLE TOP TO PROVIDE GUY CLEARANCE WHEN GUYING FOR TENSION CHANGE.
5. MAXIMUM CONDUCTOR DESIGN TENSION NOT TO EXCEED 4000 LBS.
6. FOR GUYING INSTALL IN ORDER . SEE SECTION 15000 FOR GUY ATTACHMENT DETAILS.
7. USE FIBERGLASS LINK 15309 IN VICINITY OF JUMPER LOOPS.
8. FOR WIND LOAD, GUY ATTACHMENT MUST BE AT OR BELOW POINT .
9. SEE JOB PACKAGE FOR GUYING REQUIREMENTS.
10. LINE ANGLE 0° – 3°.

A	CHANGED ITEMS 5 & 6	WDF	WPH	WVT	4/25/02	C						
-	ORIGINAL ISSUE	KSM	GV	WPH	8/01/97	B	CHANGED TITLE	WDF	SFO	WPH	WVT	8/1/03
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	

	TRANSMISSION ENGINEERING						SCALE: NONE	
	POLE TOP ARRANGEMENT TYPE X-DELTA 3 SINGLE CIRCUIT-ACSR 69kV WOOD POLE						DWG. NO.	SHT. NO.
							13125	1 of 3

13125B01

BILL OF MATERIAL

ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
1	6	431200	INSULATOR, SUSPENSION, POLYMER, 45-47" LONG, BALL (HOT END) AND SOCKET 25,000 LBS ULT. TENSILE STRENGTH	356
2	1	429298	INSULATOR, POST, POLYMER, 41-44" LONG, BENDABLE GAIN BASE AND CLAMPTOP, 4,000 LBS CANTILEVER BREAKING LOAD	356
3		SEE SHT.3 TABLE A	CLAMP, STRAIN, WITH OUT SOCKET EYE	356
4	6	235648	EYELET, STANDARD, 3/4" BOLT	356
5	6	636436	SHACKLE, ANCHOR 30K	356
6	6	337542	EYE, OVAL BALL, 30K	356
7		SEE SHT.3 TABLE A	EYE, SOCKET, HOTLINE, 30K	356
8		SEE SHT.3 TABLE A	CONNECTOR, JUMPER	356
9		SEE SHT.3 TABLE A	CLAMP, POST INSULATOR	356
10	2	294144	CROSSARM, 5 3/4"x5 3/4"x10'	355
11	2	164128	BRACE, CROSSARM, ANGLE 5'-0"	355
12	1/10#	492224	NAIL, RFG. 7/8" #11, GAVL. (LBS)	355
13	2	647648	SIGN, HIGH VOLTAGE	355
14	1/4#	678528	STAPLES, 1 1/4" (LBS)	355
15	2#	812928	WIRE, CU. SOFT #8 (LBS.)	355
16	1	269632	CONNECTOR, SPLIT BOLT	355
A	1	19022	ASSEMBLY, BOLT, 3/4" POST BONDED INSULATOR MTG., ONE SIDE TOP	355
B	1	19022	ASSEMBLY, BOLT, 3/4" POST INSULATOR MTG., ONE SIDE BOTTOM	355
C	2	19026	ASSEMBLY, BOLT, 3/4", BONDED	355
D	1	19012	ASSEMBLY, BOLT, 3/4" THRU	355
E	1	19016	ASSEMBLY, BOLT, 5/8" X-ARM BRACE	355
F	4	19016	ASSEMBLY, BOLT, 1/2" X-ARM BRACE	355
G	2	19010	ASSEMBLY, BOLT, 3/4" SPACE, BONDED	355

A	CHANGED ITEMS 5 & 6	WDF	WPH	WVT	4/25/02	C					
-	ORIGINAL ISSUE	KSM	GV	WPH	8/01/97	B	CHANGED TITLE	WDF	SFO	WPH	8/1/03
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

13125B02



TRANSMISSION ENGINEERING

POLE TOP ARRANGEMENT
TYPE X-DELTA 3 SINGLE CIRCUIT-ACSR
69kV WOOD POLE


SCALE: NONE

DWG. NO.	SHT. NO.
13125	2 of 3

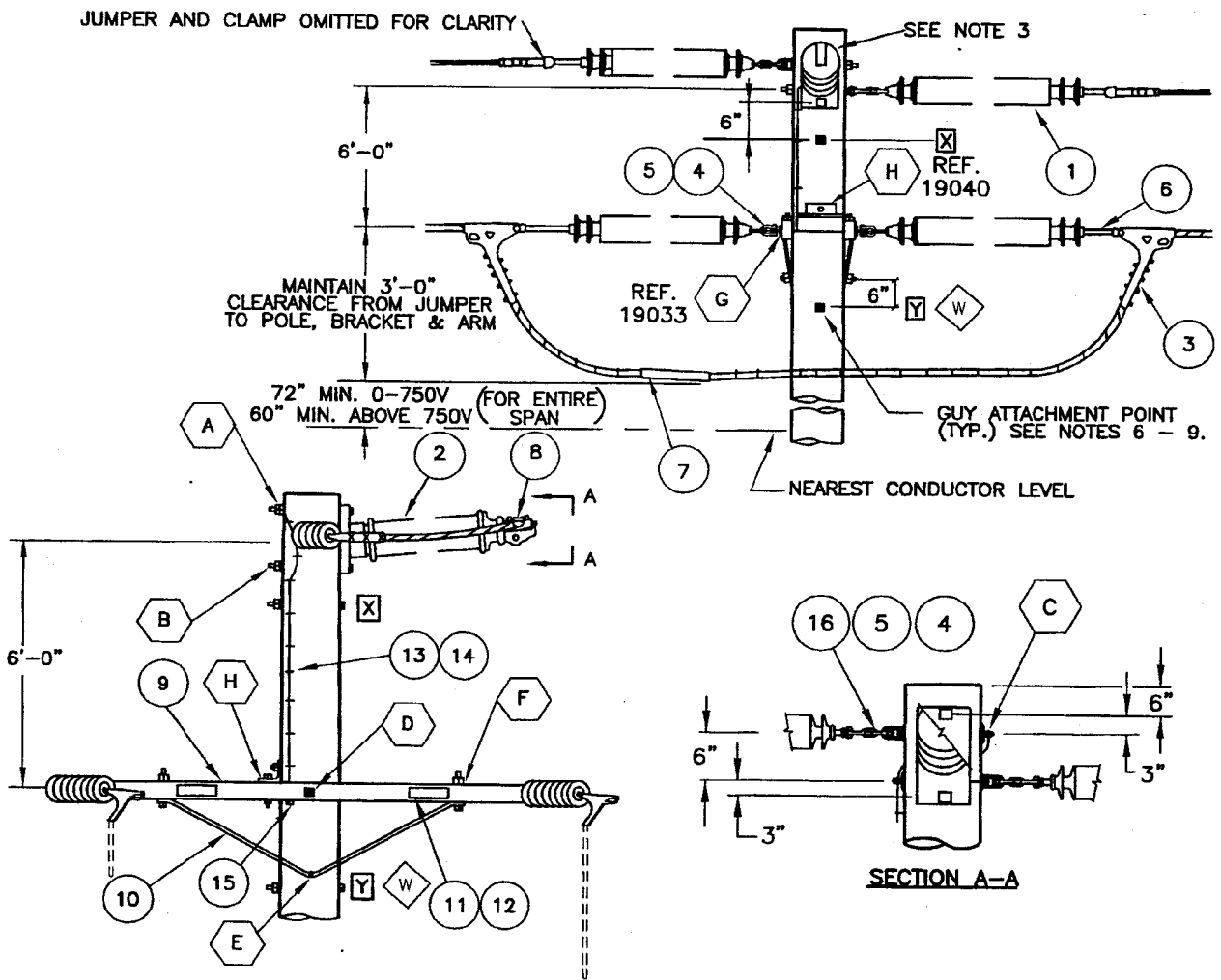
TABLE A

ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	CONDUCTOR SIZE
3	6	230672	CLAMP, STRAIN, ALUMINUM, RANGE 0.20 - 0.57", 15K	3/0 ACSR/AW
7	6	337602	EYE, SOCKET HOTLINE, EYE 11/16" WIDE, 30K	
8	3	256472	CONNECTOR, COMPRESSION, ALUM JUMPER	
9	1	229696	CLAMP, POST INSULATOR, RANGE 0.35-0.84"	6/1
3	6	231700	CLAMP, STRAIN, ALUMINUM, RANGE 0.47 - 0.88", 25K	336.4 ACSR/AW 26/7
7	6	337604	EYE, SOCKET HOTLINE, EYE 3/4" WIDE, 30K	
8	3	650264	SLEEVE, ALUM. JUMPER	
9	1	229696	CLAMP, POST INSULATOR, RANGE 0.35-0.84"	
3	6	230686	CLAMP, STRAIN, ALUMINUM, RANGE 0.71-1.318", 30K	636 ACSR/AW 24/7
7	6	337622	EYE, SOCKET HOTLINE, EYE 1 3/8" WIDE, 30K	
8	3	650656	SLEEVE, ALUM. JUMPER	
9	1	229728	CLAMP, POST INSULATOR, RANGE 0.7-1.06"	
3	6	230686	CLAMP, STRAIN, ALUMINUM, RANGE 0.71-1.318", 30K	1,033.5 ACSR/AW 45/7
7	6	337622	EYE, SOCKET HOTLINE, EYE 1 3/8" WIDE, 30K	
8	3	650336	SLEEVE, ALUM., JUMPER	
9	1	229760	CLAMP, POST INSULATOR, RANGE 1.0-1.5"	

A	ADDED SHEET 3.	WDF	WPH	WVT	4/25/02	C						
-	ORIGINAL ISSUE	KSM	GV	WPH	8/01/97	B	CHANGED TITLE	WDF	SFO WPH	WVT	8/1/03	
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	

	TRANSMISSION ENGINEERING						SCALE: NONE					
	POLE TOP ARRANGEMENT TYPE X-DELTA 3 SINGLE CIRCUIT-ACSR 69KV WOOD POLE						DWG. NO.			SHT. NO.		
							13125			3of3		

13125B03



NOTES:

1. **CAUTION:** DO NOT ATTEMPT TO ALIGN STRAIN CLAMP WITH WIRE UNDER TENSION – TWISTING MAY CAUSE FAILURE OF INSULATOR ROD.
2. **CAUTION:** ANGLE BETWEEN GUY AND POLE MUST BE IN ACCORDANCE WITH GO-95 REQUIREMENTS FOR SEPARATION BETWEEN CONDUCTORS AND HARDWARE.
3. INSTALL HORIZONTAL POST INSULATOR ON INSIDE OF ANGLE.
4. INSTALL HIGHER TENSION DEADEND IN LOWER POSITION AT POLE TOP TO PROVIDE GUY CLEARANCE WHEN GUYING FOR TENSION CHANGE.
5. MAXIMUM CONDUCTOR DESIGN TENSION NOT TO EXCEED 4000 LBS.
6. FOR GUYING INSTALL IN ORDER . SEE SECTION 15000 FOR GUY ATTACHMENT DETAILS.
7. USE FIBERGLASS LINK 15309 IN VICINITY OF JUMPER LOOPS.
8. FOR WIND LOAD, GUY ATTACHMENT MUST BE AT OR BELOW POINT .
9. SEE JOB PACKAGE FOR GUYING REQUIREMENTS.
10. LINE ANGLE 3° – 30°.

REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE
A	UPDATE DRAWING	WDF	WPH	WVT	4/25/02	C	ADDED REF.	WDF	<input checked="" type="checkbox"/> WPH	WVT	6/1/04
-	ORIGINAL ISSUE	KSM	DRB	WPH	3/23/00	B	CHANGED TITLE	WDF	<input checked="" type="checkbox"/> SFO	WVT	8/1/03

SDGE	TRANSMISSION ENGINEERING				SCALE: NONE	
	POLE TOP ARRANGEMENT				DWG. NO.	SHT. NO.
	TYPE X-DELTA 30				13126	1 of 3
SINGLE CIRCUIT-ACSR				13126C01		
69KV WOOD POLE						

BILL OF MATERIAL

ITEM	QTY.	STOCK NO. or <i>STD. NO.</i>	DESCRIPTION	ACCT. NO.
1	6	431200	INSULATOR, SUSPENSION, POLYMER, 45-47" LONG, BALL (HOT END) AND SOCKET 25,000 LBS ULT. TENSILE STRENGTH	356
2	1	429298	INSULATOR, POST, POLYMER, 41-44" LONG, BENDABLE GAIN BASE AND CLAMPTOP, 4,000 LBS CANTILEVER BREAKING LOAD	356
3		SEE SHT.3 TABLE A	CLAMP, STRAIN, WITH OUT SOCKET EYE	356
4	6	636436	SHACKLE, ANCHOR, 30K	356
5	6	337542	EYE, OVAL BALL, 30K	356
6		SEE SHT.3 TABLE A	EYE, SOCKET, HOTLINE, 30K	356
7		SEE SHT.3 TABLE A	CONNECTOR, JUMPER	356
8		SEE SHT.3 TABLE A	CLAMP, POST INSULATOR	356
9	2	294176	CROSSARM, 5 3/4"x5 3/4"x12'	355
10	2	164160	BRACE, CROSSARM, ANGLE 6'	355
11	1/10#	492224	NAIL, RFG. 7/8" #11, GAVL. (LBS)	355
12	2	647648	SIGN, HIGH VOLTAGE	355
13	1/4#	678528	STAPLES, 1 1/4" (LBS)	355
14	2#	812928	WIRE, CU. SOFT #8 (LBS.)	355
15	1	269632	CONNECTOR, SPLIT BOLT	355
A	1	19022	ASSEMBLY, BOLT, 3/4" POST BONDED INSULATOR MTG., ONE SIDE TOP	355
B	1	19022	ASSEMBLY, BOLT, 3/4" POST INSULATOR MTG., ONE SIDE BOTTOM	355
C	2	19026	ASSEMBLY, BOLT, 3/4", BONDED	355
D	1	19012	ASSEMBLY, BOLT, 3/4" THRU	355
E	1	19016	ASSEMBLY, BOLT, 5/8" X-ARM BRACE	355
F	4	19016	ASSEMBLY, BOLT, 1/2" X-ARM BRACE	355
G	2	19033	ASSEMBLY, TEE DEADEND	355
H	1	19040	ASSEMBLY, THRUST PLATE	355
16	2	235648	EYELET, STANDARD, 3/4"	356

A	UPDATE DRAWING	WDF	WPH	WVT	4/25/02	C	REV. SHT. 1	WDF	WPH	WVT	6/1/04	13125C02
-	ORIGINAL ISSUE	SDF	DRB	WPH	3/23/00	B	CHANGED TITLE	WDF	SFO	WVT	8/1/03	
REV	CHANGE	BY	CHKD	APPY	DATE	REV	CHANGE	BY	CHKD	APPY	DATE	



	TRANSMISSION ENGINEERING				SCALE: NONE	
	POLE TOP ARRANGEMENT TYPE X-DELTA 30 SINGLE CIRCUIT-ACSR 69kV, WOOD POLE				DWG. NO.	SHT. NO.
					13126	2 of 3

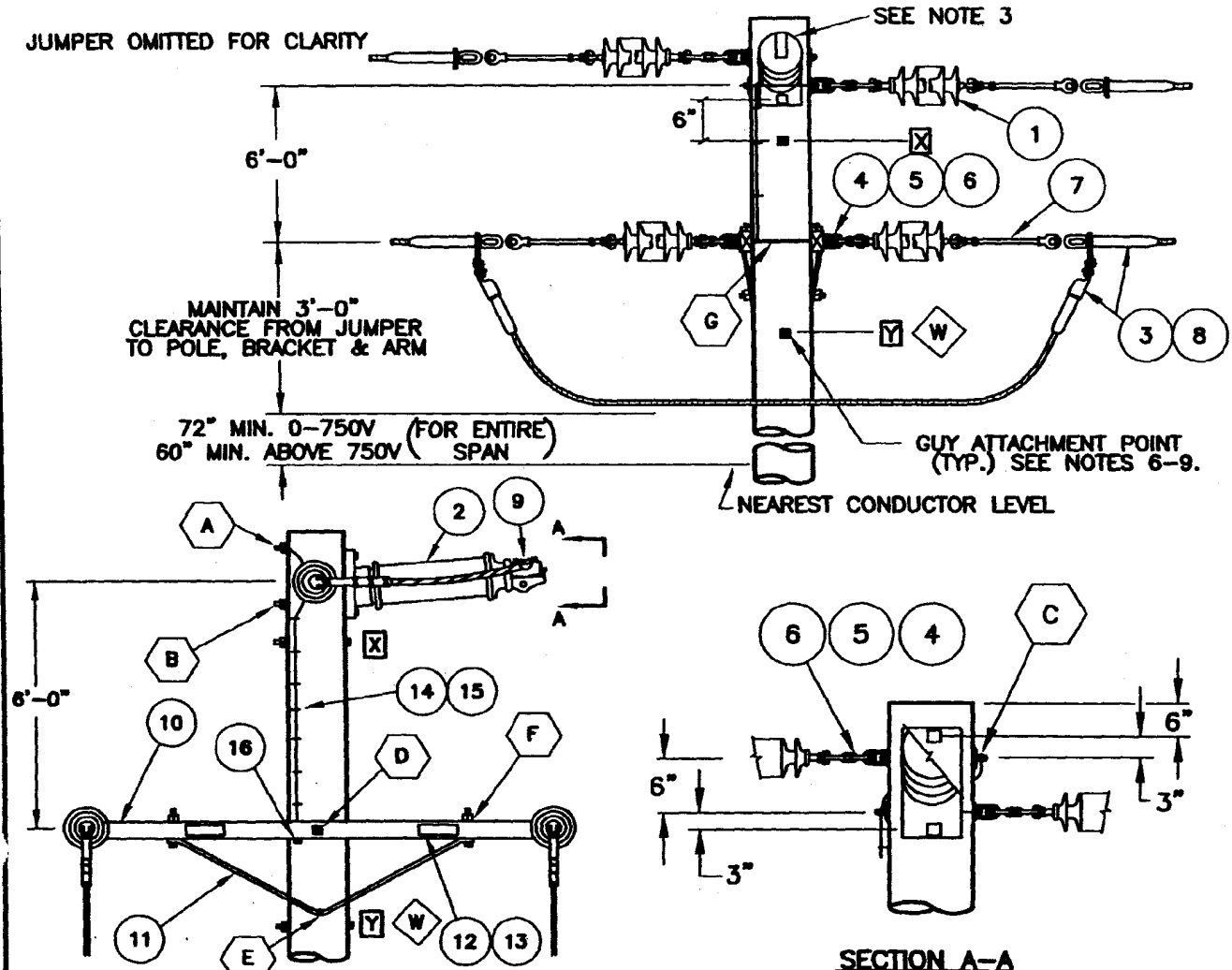
TABLE A

ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	CONDUCTOR SIZE
3	6	230672	CLAMP, STRAIN, ALUMINUM, RANGE 0.20 – 0.57", 15K	3/0 ACSR/AW 6/1
6	6	337602	EYE, SOCKET HOTLINE, EYE 11/16" WIDE, 30K	
7	3	256472	COMPRESSION, ALUM., JUMPER	
8	1	229696	CLAMP, POST INSULATOR, RANGE 0.35–0.84"	
3	6	231700	CLAMP, STRAIN, ALUMINUM, RANGE 0.47 – 0.88", 25K	336.4 ACSR/AW 26/7
6	6	337604	EYE, SOCKET HOTLINE, EYE 3/4" WIDE, 30K	
7	3	650264	SLEEVE, ALUM., JUMPER	
8	1	229696	CLAMP, POST INSULATOR, RANGE 0.35–0.84"	
3	6	230686	CLAMP, STRAIN, ALUMINUM, RANGE 0.71–1.318", 30K	636 ACSR/AW 24/7
6	6	337622	EYE, SOCKET HOTLINE, EYE 1 3/8" WIDE, 30K	
7	3	650656	SLEEV, ALUM., JUMPER	
8	1	229728	CLAMP, POST INSULATOR, RANGE 0.7–1.06"	
3	6	230686	CLAMP, STRAIN, ALUMINUM, RANGE 0.71–1.318", 30K	1,033.5 ACSR/AW 45/7
6	6	337622	EYE, SOCKET HOTLINE, EYE 1 3/8" WIDE, 30K	
7	3	650336	SLEEVE, ALUM., JUMPER	
8	1	229760	CLAMP, POST INSULATOR, RANGE 1.0–1.5"	

A	UPDATE DRAWING	WDF	WPH	WVT	4/25/02	C	REV. SHT. 1	WDF	WPH	WVT	6/1/04	13126C03
-	ORIGINAL ISSUE	SDF	DRB	WPH	3/23/00	B	CHANGED TITLE	WDF	SFO	WVT	8/1/03	
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	

	TRANSMISSION ENGINEERING				SCALE: NONE	
	POLE TOP ARRANGEMENT				DWC. NO.	
	TYPE X-DELTA 30				SHT. NO.	
SINGLE CIRCUIT-ACSR				13126		
69kV WOOD POLE				3of3		

JUMPER OMITTED FOR CLARITY



NOTES:

1. CAUTION: DO NOT ATTEMPT TO ALIGN STRAIN CLAMP WITH WIRE UNDER TENSION - TWISTING MAY CAUSE FAILURE OF INSULATOR ROD.
2. CAUTION: ANGLE BETWEEN GUY AND POLE MUST BE IN ACCORDANCE WITH GO-95 REQUIREMENTS FOR SEPARATION BETWEEN CONDUCTORS AND HARDWARE.
3. INSTALL HORIZONTAL POST INSULATOR ON INSIDE OF ANGLE.
4. INSTALL HIGHER TENSION DEADEND IN LOWER POSITION AT POLE TOP TO PROVIDE GUY CLEARANCE WHEN GUYING FOR TENSION CHANGE.
5. MAXIMUM CONDUCTOR DESIGN TENSION NOT TO EXCEED 4000 LBS.
6. FOR GUYING INSTALL IN ORDER . SEE SECTION 16000 FOR GUY ATTACHMENT DETAILS.
7. USE FIBERGLASS LINK 16300 IN VICINITY OF JUMPER LOOPS.
8. FOR WIND LOAD, GUY ATTACHMENT MUST BE AT OR BELOW POINT .
9. SEE JOB PACKAGE FOR GUYING REQUIREMENTS.
10. LINE ANGLE $\theta - 3^\circ$.

B						E					
A	UPDATED QTY ITEM 8	PM	WDF	WVT	8/15/06	D					
	ORIGINAL	WDF	SFO MPH	WVT	8/01/03	C					
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

TRANSMISSION ENGINEERING

SCALE: NONE



**POLE TOP ARRANGEMENT
TYPE X-DELTA 3 SINGLE CIRCUIT-ACSS
69kV WOOD POLE**

DWG. NO.
13127

SHT. NO.
1 of 3

13127A01

BILL OF MATERIAL

ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
1	6	431200	INSULATOR, SUSPENSION, POLYMER, 45-47" LONG, BALL (HOT END) AND SOCKET 25K SPECIFIED MECHANICAL LOAD	356
2	1	429298	INSULATOR, POST, POLYMER, 41-44" LONG, BENDABLE GAIN BASE AND CLAMPTOP, 4,000 LBS CANTILEVER BREAKING LOAD	356
3	6	SEE SHT.3 TABLE A	DEAD END, COMPRESSION	356
4	6	235648	EYELET, STANDARD, 3/4" BOLT	356
5	6	636436	SHACKLE, ANCHOR 30K	356
6	6	337542	EYE, OVAL BALL, 30K	356
7	6	236048	Y-CLEVIS, SOCKET, HOTLINE, 30K	356
8	3#	246950	FILLER COMPOUND (LBS)	356
9	1	SEE SHT.3 TABLE A	CLAMP, POST INSULATOR	356
10	2	294144	CROSSARM, 5 3/4"x5 3/4"x10'	355
11	2	164128	BRACE, CROSSARM, ANGLE 5'-0"	355
12	1/10#	492224	NAIL, RFG. 7/8" #11, GAVL. (LBS)	355
13	2	647648	SIGN, HIGH VOLTAGE	355
14	1/4#	678528	STAPLES, 1 1/4" (LBS)	355
15	2#	812928	WIRE, CU. SOFT #8 (LBS.)	355
16	1	269632	CONNECTOR, SPLIT BOLT	355
A	1	19022	ASSEMBLY, BOLT, 3/4" POST BONDED INSULATOR MTG., ONE SIDE TOP	355
B	1	19022	ASSEMBLY, BOLT, 3/4" POST INSULATOR MTG., ONE SIDE BOTTOM	355
C	2	19026	ASSEMBLY, BOLT, 3/4", BONDED	355
D	1	19012	ASSEMBLY, BOLT, 3/4" THRU	355
E	1	19016	ASSEMBLY, BOLT, 5/8" X-ARM BRACE	355
F	4	19016	ASSEMBLY, BOLT, 1/2" X-ARM BRACE	355
G	2	19010	ASSEMBLY, BOLT, 3/4" SPACE, BONDED	355

B											
A	UPDATED QTY ITEM 8	PM	WDF	LoV	8/15/06	D					
	ORIGINAL	WDF	SFO WPH	WVT	8/01/03	C					
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE



TRANSMISSION ENGINEERING						SCALE: NONE					
	POLE TOP ARRANGEMENT					DWG. NO.		SHT. NO.		13127A02	
	TYPE X-DELTA 3 SINGLE CIRCUIT-ACSS					13127		2 of 3			
	69kV WOOD POLE										

TABLE A

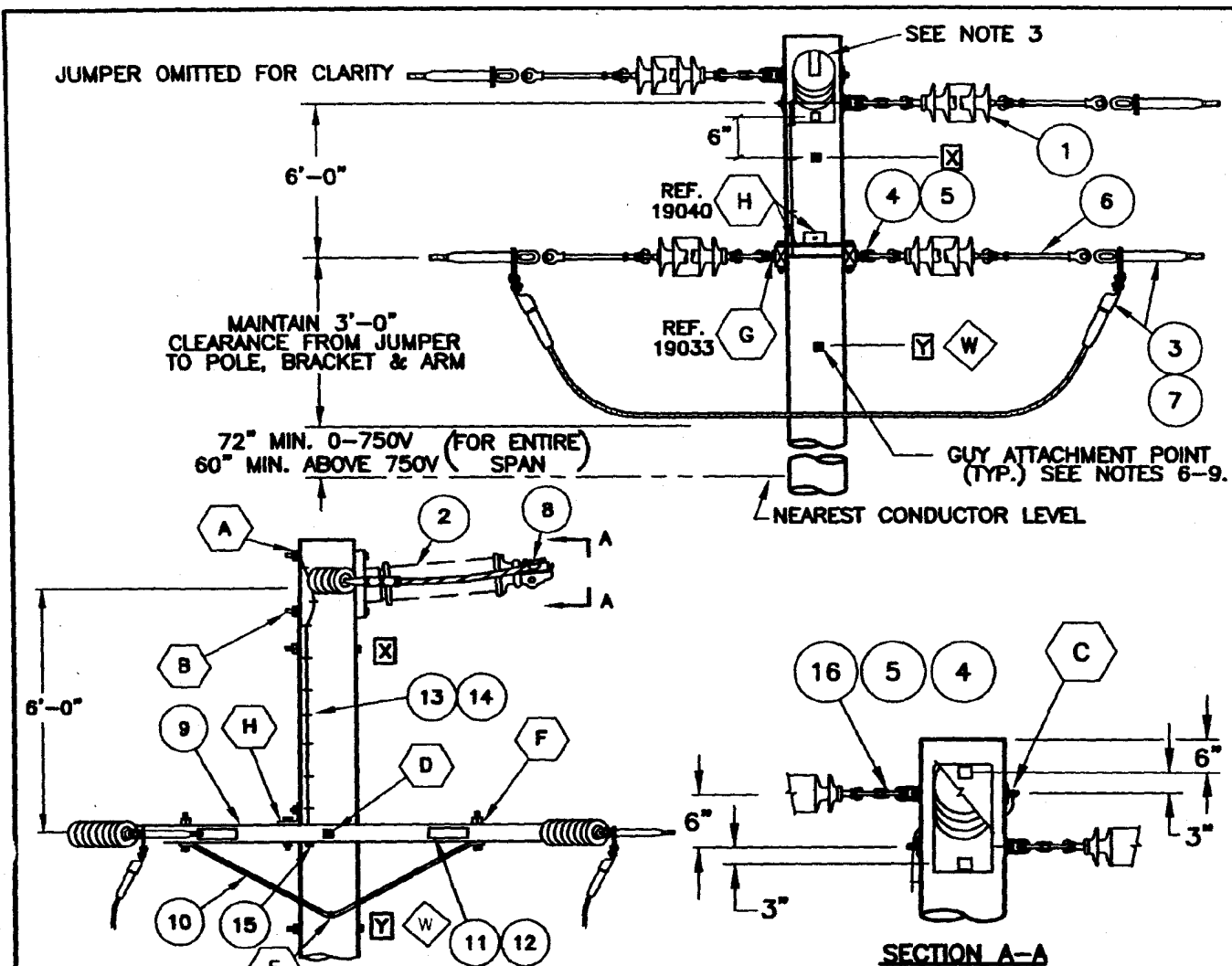
ITEM	QTY.	STOCK NO. OF STD. NO.	DESCRIPTION	ACCT NO.
636 ACSS/AW 24/7 (ROOK/AW)				
3	6	652678	DEAD END, COMPRESSION, FOR 636 ROOK/ACSS/AW CONDUCTOR, FULL TENSION WITH STEEL EYE, 4-HOLE NEMA PAD & TERMINAL CONNECTOR	356
9	1	229728	CLAMP, POST INSULATOR, RANGE 0.70-1.06"	356
900 ACSS/AW 54/7 (CANARY/AW)				
3	6	652682	DEAD END, COMPRESSION, FOR 900 CANARY/ACSS/AW CONDUCTOR, FULL TENSION WITH STEEL EYE, 4-HOLE NEMA PAD & TERMINAL CONNECTOR	356
9	1	229760	CLAMP, POST INSULATOR, RANGE 1.00-1.50"	356
1033.5 ACSS/AW 45/7 (ORTOLAN/AW)				
3	6	652674	DEAD END, COMPRESSION, FOR 1033.5 ORTOLAN/ACSS/AW CONDUCTOR, FULL TENSION WITH STEEL EYE, 4-HOLE NEMA PAD & TERMINAL CONNECTOR	356
9	1	229760	CLAMP, POST INSULATOR, RANGE 1.00-1.50"	356

DIE SIZE TABLE		
CONDUCTOR	STEEL DIE	ALUMINUM DIE
ROOK	12SH	27AH
CANARY	14SH	30AH
ORTOLAN	10SH	34AH

NOTE:
 INSTALLATION OF THE COMPRESSION DEAD ENDS & COMPRESSION SPLICES, INCLUDING THE PROPER DIRECTION OF COMPRESSION, SHALL STRICTLY FOLLOW MANUFACTURE'S INSTRUCTIONS.

B						E					
A	UPDATED QTY ITEM 8	PM	WDF	WVT	8/15/06	D					
	ORIGINAL	WDF	SFO	WVT	8/01/03	C					
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE
TRANSMISSION ENGINEERING							SCALE: NONE				
	POLE TOP ARRANGEMENT						DWG. NO.		SHT. NO.		
	TYPE X-DELTA 3 SINGLE CIRCUIT-ACSS						13127		3 of 3		
	69kV WOOD POLE										

13127A03



NOTES:

1. **CAUTION: DO NOT ATTEMPT TO ALIGN STRAIN CLAMP WITH WIRE UNDER TENSION - TWISTING MAY CAUSE FAILURE OF INSULATOR ROD.**
2. **CAUTION: ANGLE BETWEEN GUY AND POLE MUST BE IN ACCORDANCE WITH GO-95 REQUIREMENTS FOR SEPARATION BETWEEN CONDUCTORS AND HARDWARE.**
3. **INSTALL HORIZONTAL POST INSULATOR ON INSIDE OF ANGLE.**
4. **INSTALL HIGHER TENSION DEADEND IN LOWER POSITION AT POLE TOP TO PROVIDE GUY CLEARANCE WHEN GUYING FOR TENSION CHANGE.**
5. **MAXIMUM CONDUCTOR DESIGN TENSION NOT TO EXCEED 4000 LBS.**
6. **FOR GUYING INSTALL IN ORDER [X] [Y]. SEE SECTION 16000 FOR GUY ATTACHMENT DETAILS.**
7. **USE FIBERGLASS LINK 15300 IN VICINITY OF JUMPER LOOPS.**
8. **FOR WIND LOAD, GUY ATTACHMENT MUST BE AT OR BELOW POINT [W].**
9. **SEE JOB PACKAGE FOR GUYING REQUIREMENTS.**
10. **LINE ANGLE 3° - 30°.**

B	UPDATED QTY	ITEM 7	PM	WPH	WWT	8/15/06	E							
A	ADDED REF.		WDF	GV	WWT	8/01/04	D							
	ORIGINAL		WDF	SFO	WWT	8/01/03	C							
REV	CHANGE		BY	CHKD	APPV	DATE	REV	CHANGE		BY	CHKD	APPV	DATE	
TRANSMISSION ENGINEERING										SCALE: NONE				
SDGE	POLE TOP ARRANGEMENT										DWG. NO.		SHT. NO.	
	TYPE X-DELTA 30 SINGLE CIRCUIT-ACSS										13128		1 of 3	
	69kV WOOD POLE													
13128801														

BILL OF MATERIAL

ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
1	6	431200	INSULATOR, SUSPENSION, POLYMER, 45-47" LONG, BALL (HOT END) AND SOCKET 25K SPECIFIED MECHANICAL LOAD	356
2	1	429298	INSULATOR, POST, POLYMER, 41-44" LONG, BENDABLE GAIN BASE AND CLAMPTOP, 4,000 LBS CANTILEVER BREAKING LOAD	356
3	6	SEE SHT.3 TABLE A	DEAD END, COMPRESSION	356
4	6	636436	SHACKLE, ANCHOR, 30K	356
5	6	337542	EYE, OVAL BALL, 30K	356
6	6	236048	Y-CLEVIS, SOCKET, HOTLINE, 30K	356
7	3#	246950	FILLER COMPOUND (LBS)	356
8	1	SEE SHT.3 TABLE A	CLAMP, POST INSULATOR	356
9	2	294176	CROSSARM, 5 3/4"x5 3/4"x12'	355
10	2	164160	BRACE, CROSSARM, ANGLE 6'	355
11	1/10#	492224	NAIL, RFG. 7/8" #11, GAVL. (LBS)	355
12	2	647648	SIGN, HIGH VOLTAGE	355
13	1/4#	678528	STAPLES, 1 1/4" (LBS)	355
14	2#	812928	WIRE, CU. SOFT #8 (LBS.)	355
15	1	269632	CONNECTOR, SPLIT BOLT	355
A	1	19022	ASSEMBLY, BOLT, 3/4" POST BONDED INSULATOR MTG., ONE SIDE TOP	355
B	1	19022	ASSEMBLY, BOLT, 3/4" POST INSULATOR MTG., ONE SIDE BOTTOM	355
C	2	19026	ASSEMBLY, BOLT, 3/4", BONDED	355
D	1	19012	ASSEMBLY, BOLT, 3/4" THRU	355
E	1	19016	ASSEMBLY, BOLT, 5/8" X-ARM BRACE	355
F	4	19016	ASSEMBLY, BOLT, 1/2" X-ARM BRACE	355
G	2	19033	ASSEMBLY, TEE DEADEND	355
H	1	19040	ASSEMBLY, THRUST PLATE	355
16	2	235648	EYELET, STANDARD, 3/4"	356

B	UPDATED QTY ITEM 7	PM	WPH	WVT	8/15/06	E					
A	ADDED REF.	WDF	CV	WPH	8/01/04	D					
	ORIGINAL	WDF	SFD	WPH	8/01/03	C					
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

TRANSMISSION ENGINEERING						SCALE: NONE						
	POLE TOP ARRANGEMENT						DWG. NO.			SHT. NO.		
	TYPE X-DELTA 30 SINGLE CIRCUIT-ACSS						13128			2 of 3		
	69KV WOOD POLE											

13128B02


TABLE A

ITEM	QTY.	STOCK NO. OF STD. NO.	DESCRIPTION	ACCT NO.
636 ACSS/AW 24/7 (ROOK/AW)				
3	6	652678	DEAD END, COMPRESSION, FOR 636 ROOK/ACSS/AW CONDUCTOR, FULL TENSION WITH STEEL EYE, 4-HOLE NEMA PAD & TERMINAL CONNECTOR	356
8	1	229728	CLAMP, POST INSULATOR, RANGE 0.70-1.06"	356
900 ACSS/AW 54/7 (CANARY/AW)				
3	6	652682	DEAD END, COMPRESSION, FOR 900 CANARY/ACSS/AW CONDUCTOR, FULL TENSION WITH STEEL EYE, 4-HOLE NEMA PAD & TERMINAL CONNECTOR	356
8	1	229760	CLAMP, POST INSULATOR, RANGE 1.00-1.50"	356
1033.5 ACSS/AW 45/7 (ORTOLAN/AW)				
3	6	652674	DEAD END, COMPRESSION, FOR 1033.5 ORTOLAN/ACSS/AW CONDUCTOR, FULL TENSION WITH STEEL EYE, 4-HOLE NEMA PAD & TERMINAL CONNECTOR	356
8	1	229760	CLAMP, POST INSULATOR, RANGE 1.00-1.50"	356

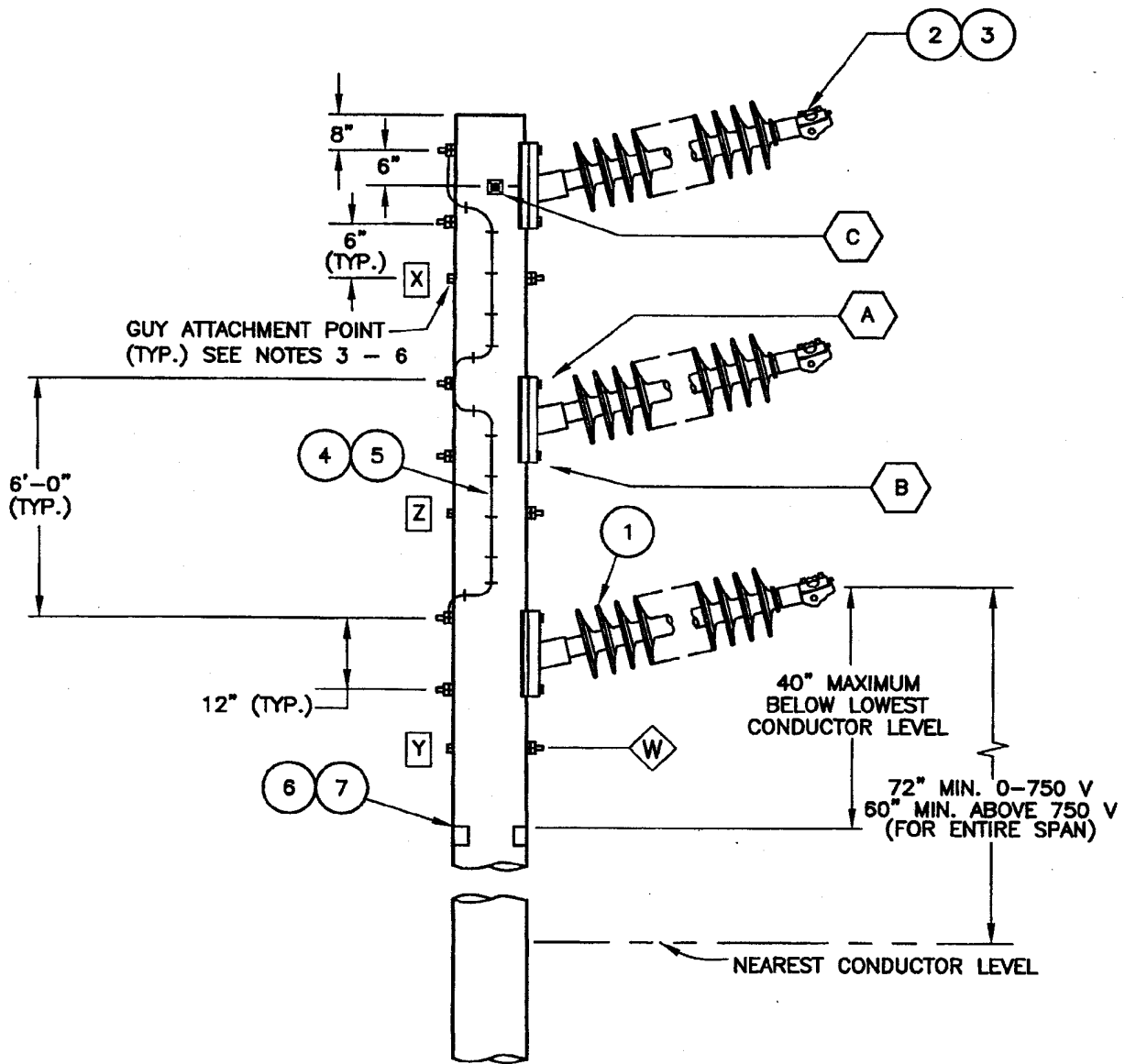
DIE SIZE TABLE		
CONDUCTOR	STEEL DIE	ALUMINUM DIE
ROOK	12SH	27AH
CANARY	14SH	30AH
ORTOLAN	10SH	34AH

NOTE:
 INSTALLATION OF THE COMPRESSION DEAD ENDS & COMPRESSION SPLICES, INCLUDING THE PROPER DIRECTION OF COMPRESSION, SHALL STRICTLY FOLLOW MANUFACTURE'S INSTRUCTIONS.

B	UPDATED QTY ITEM 7	PM	WPH	WVT	8/15/06	E						
A	ADDED REF.	WDF	GV WPH	WVT	6/01/04	D						
	ORIGINAL	WDF	SFO WPH	WVT	8/01/03	C						
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	

TRANSMISSION ENGINEERING						SCALE: NONE	
	POLE TOP ARRANGEMENT					DWG. NO.	
	TYPE X-DELTA 30 SINGLE CIRCUIT-ACSS					13128	
	69kV WOOD POLE					SHT. NO. 3 of 3	

13128B03



NOTES:

1. LINE ANGLE NOT TO EXCEED 3 DEGREES.
2. VERTICAL LOAD ON POST INSULATOR NOT TO EXCEED 1250 LBS. WITHOUT PRIOR APPROVAL.
3. FOR GUYING, INSTALL IN ORDER .
4. FOR WIND LOAD, GUY ATTACHMENT MUST BE AT OR BELOW POINT .
5. SEE SECTION 15000 FOR GUY DETAILS.
6. SEE JOB PACKAGE FOR GUYING REQUIREMENTS.

A	ADDED ACSS	WDF	SFO WPH	WVT	8/1/03	C						
-	ORIGINAL ISSUE	WDF	WPH	WVT	4/25/02	B	REV. SHT. 3	WDF	<input checked="" type="checkbox"/> WPH	WVT	6/1/04	
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	



TRANSMISSION ENGINEERING
POLE TOP ARRANGEMENT
TYPE ZPI
SGL. CKT. CONVERTIBLE TO DBL. CKT.
69kV WOOD POLE

SCALE: NONE

DWG. NO.

SHT. NO.

13130

1 of 3

13130B01

BILL OF MATERIAL

ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
1	3	429298	INSULATOR, POST, POLYMER, 41-44" LONG, BENDABLE GAIN BASE AND CLAMPTOP, 4,000 LBS CANTILEVER BREAKING LOAD	356
2		SEE SHT.3 TABLE A	CLAMP, POST INSULATOR	356
3		SEE SHT.3 TABLE A	GUARD, LINE	356
4	1#	812928	WIRE, CU. SOFT #8 (LBS.)	355
5	1/4#	678528	STAPLES, 1-1/4" (LBS.)	355
6	1/8#	492192	NAIL, RFG.1-3/4", #11, GALV. (LBS.)	355
7	2	647648	SIGN, HIGH VOLTAGE	355
A	3	19022	ASSEMBLY, BOLT, 3/4" POST BONDED INSULATOR MTG., ONE SIDE TOP	355
B	3	19022	ASSEMBLY, BOLT, 3/4" POST INSULATOR MTG., ONE SIDE BOTTOM	355
C	1	19001	ASSEMBLY, BOLT, 5/8" SPLIT	355

A	ADDED ACSS	WDF	SFO WPH	WWT	8/1/03	C					
-	ORIGINAL ISSUE	WDF	WPH	WWT	4/25/02	B	REV. SHT. 3	WDF	WPH	WWT	6/1/04
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

13130B02


	TRANSMISSION ENGINEERING	SCALE: NONE	
	POLE TOP ARRANGEMENT	DWG. NO.	SHT. NO.
	TYPE ZPI	13130	2of3
	SGL. CKT. CONVERTIBLE TO DBL. CKT.		
	69KV WOOD POLE		

TABLE A

ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	CONDUCTOR SIZE
2	3	229696	CLAMP, POST INSULATOR, RANGE 0.35-0.84"	3/0 ACSR/AW 6/1
3	3	397568	GUARD, LINE, O.D. 0.744", LENGTH 29"	
2	3	229760	CLAMP, POST INSULATOR, RANGE 1.0-1.5"	336.4 ACSR/AW 26/7
3	3	397664	GUARD, LINE, O.D. 1.013", LENGTH 37"	
2	3	229760	CLAMP, POST INSULATOR, RANGE 1.0-1.5"	636 ACSR/AW 24/7
3	3	397728	GUARD, LINE, O.D. 1.34", LENGTH 45"	636 ACSS/AW 24/7
2	3	229792	CLAMP, POST INSULATOR, RANGE 1.5-2.0"	900 ACSS/AW 54/7
3	3	397760	GUARD, LINE, O.D. 1.662", LENGTH 53"	
2	3	229792	CLAMP, POST INSULATOR, RANGE 1.5-2.0"	1,033.5 ACSR/AW 45/7
3	3	397760	GUARD, LINE, O.D. 1.713", LENGTH 53"	1,033.5 ACSS/AW 45/7

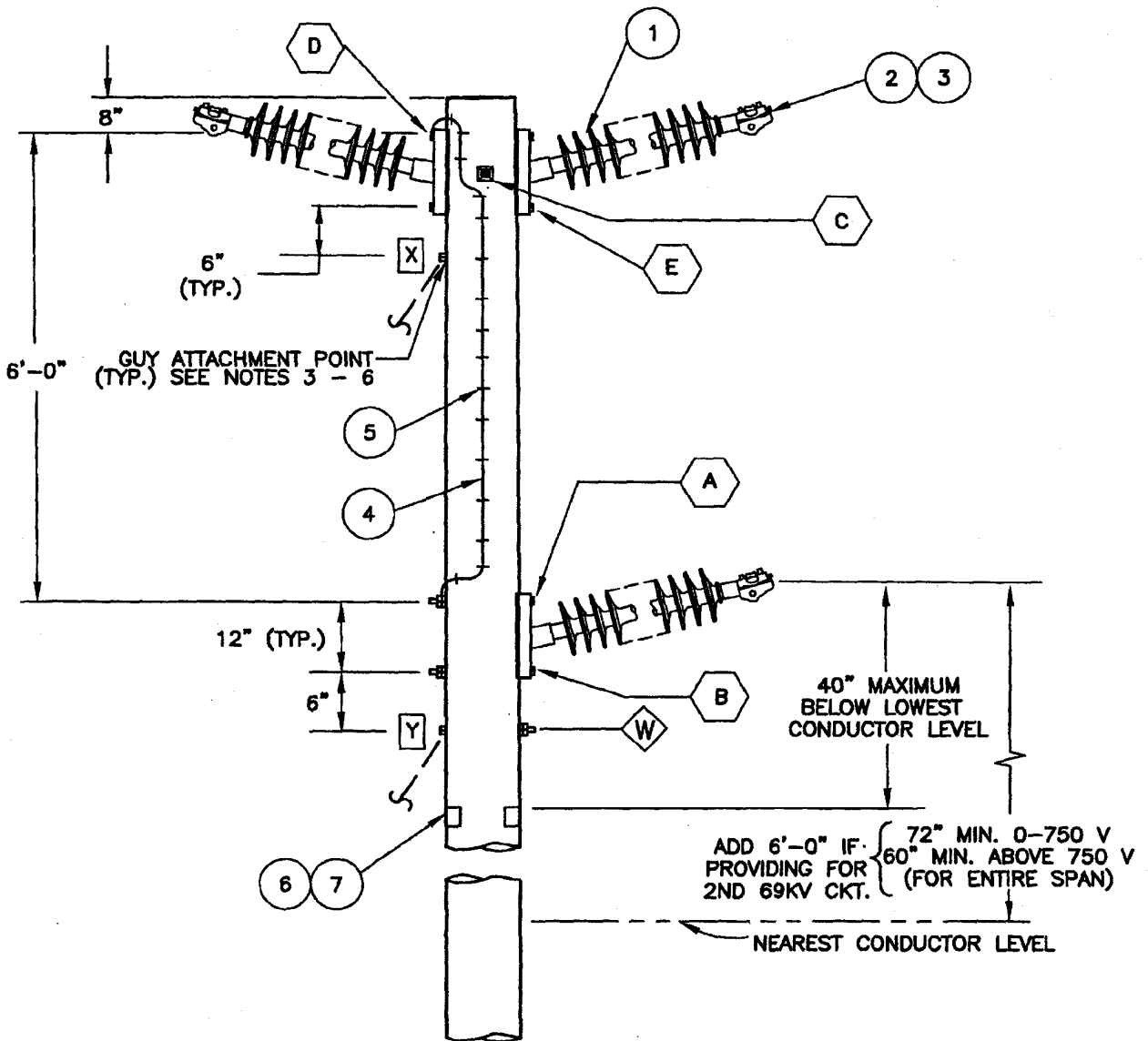
A	ADDED ACSS	WDF	SFO WPH	WVT	8/1/03	C						
-	ORIGINAL ISSUE	WDF	WPH	WVT	4/25/02	B	CORRECTED LINE GUARD OD FOR 3/0	WDF	WPH	WVT	6/1/04	
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	

13130803



TRANSMISSION ENGINEERING
POLE TOP ARRANGEMENT
TYPE ZPI
SGL. CKT. CONVERTIBLE TO DBL. CKT.
69kV WOOD POLE

SCALE: NONE
DWG. NO. 13130
SHT. NO. 3 of 3



NOTES:

1. LINE ANGLE NOT TO EXCEED 3 DEGREES.
2. VERTICAL LOAD ON POST INSULATOR NOT TO EXCEED 1250 LBS. WITHOUT PRIOR APPROVAL.
3. FOR GUYING INSTALL IN ORDER .
4. FOR WIND LOAD, GUY ATTACHMENT MUST BE AT OR BELOW POINT .
5. SEE SECTION **15000** FOR GUY DETAILS.
6. SEE JOB PACKAGE FOR GUYING REQUIREMENTS.

A	NOTE CHANGES	WDF	WPH	WVT	4/25/02	C	REV. SHT. 3	WDF	<input checked="" type="checkbox"/> WPH	<input checked="" type="checkbox"/> WVT	5/27/04
-	ORIGINAL ISSUE	KSM	GV	WPH	8/01/97	B	ADDED ACSS	WDF	<input checked="" type="checkbox"/> SFO	<input checked="" type="checkbox"/> WVT	8/1/03
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

SDGE	TRANSMISSION ENGINEERING						SCALE: NONE		13135C01
	POLE TOP ARRANGEMENT TYPE 2/1 WPI						DWG. NO.	SHT. NO.	
	SGL. CKT. CONVERTIBLE TO DBL. CKT. 69kV WOOD POLE						13135	1 of 3	

BILL OF MATERIAL

ITEM	QTY.	STOCK NO or STD. NO.	DESCRIPTION	ACCT. NO.
1	3	429298	INSULATOR, POST, POLYMER 41-44" LONG, BENDABLE GAIN BASE AND CLAMPTOP, 4,000 LBS CANTILEVER BREAKING LOAD	356
2		SEE SHT. 3 TABLE A	CLAMP, POST INSULATOR	356
3		SEE SHT. 3 TABLE A	GUARD, LINE	356
4	1#	812928	WIRE, CU. SOFT #8 (LBS.)	355
5	1/4#	678528	STAPLES, 1-1/4" (LBS.)	355
6	1/8#	492192	NAIL, RFG. 1 3/4 - #11 GALV. (LBS.)	355
7	2	647648	SIGN, HIGH VOLTAGE	355
A	1	19022	ASSEMBLY, BOLT, 3/4" POST BONDED INSULATOR MTG., ONE SIDE TOP	355
B	1	19022	ASSEMBLY, BOLT, 3/4" POST INSULATOR MTG., ONE SIDE BOTTOM	355
C	1	19001	ASSEMBLY, BOLT, 5/8" SPLIT	355
D	1	19024	ASSEMBLY, BOLT, 3/4" POST BONDED INSULATOR MTG., BOTH SIDES TOP	355
E	1	19024	ASSEMBLY, BOLT, 3/4" POST INSULATOR MTG., BOTH SIDES BOTTOM	355

A	NOTE CHANGES	WDF	WPH	WVT	4/25/02	C	REV. SHT. 3	WDF	GV WPH	WVT	6/1/04	13135C02
-	ORIGINAL ISSUE	KSM	GV	WPH	8/01/97	B	ADDED ACSS	WDF	SFO WPH	WVT	8/1/03	
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	



	TRANSMISSION ENGINEERING		SCALE: NONE	
	POLE TOP ARRANGEMENT TYPE 2/1 WPI		DVG. NO.	SHT. NO.
	SGL. CKT. CONVERTIBLE TO DBL. CKT. 69kV WOOD POLE		13135	2 of 3

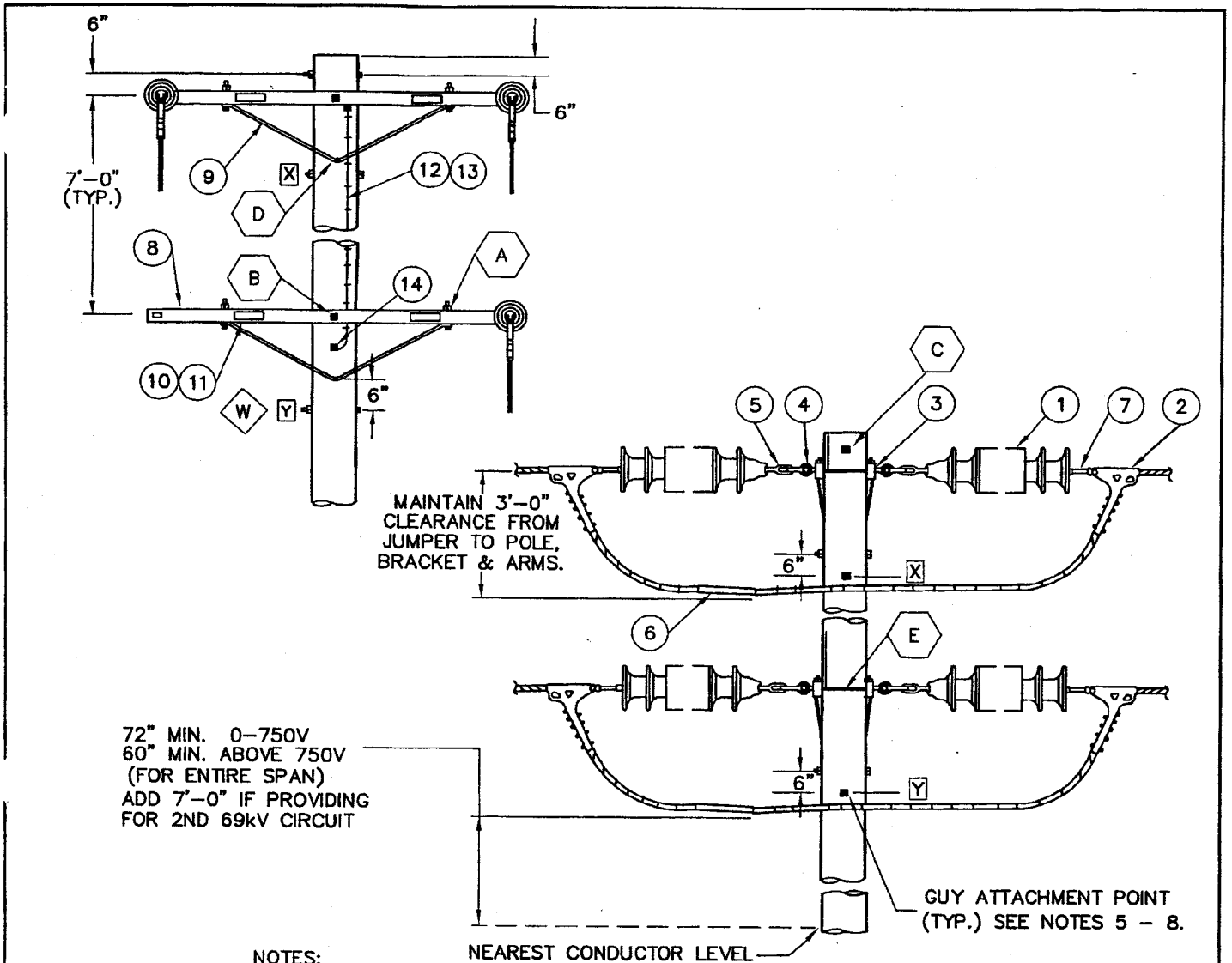
TABLE A

ITEM	QTY.	STOCK NO. OR STD. NO.	DESCRIPTION	CONDUCTOR SIZE
2	3	229696	CLAMP, POST INSULATOR, RANGE 0.35-0.84"	3/0 ACSR/AW 6/1
3	3	397568	GUARD, LINE, O.D. 0.744", LENGTH 29"	
2	3	229760	CLAMP, POST INSULATOR, RANGE 1.0-1.5"	336.4 ACSR/AW 26/7
3	3	397664	GUARD, LINE, O.D. 1.013", LENGTH 37"	
2	3	229760	CLAMP, POST INSULATOR, RANGE 1.0-1.5"	636 ACSR/AW 24/7
3	3	397728	GUARD, LINE, O.D. 1.34", LENGTH 45"	636 ACSS/AW 24/7
2	3	229792	CLAMP, POST INSULATOR, RANGE 1.5-2.0"	900 ACSS/AW 54/7
3	3	397760	GUARD, LINE, O.D. 1.662", LENGTH 53"	
2	3	229792	CLAMP, POST INSULATOR, RANGE 1.5-2.0"	1,033.5 ACSR/AW 45/7
3	3	397760	GUARD, LINE, O.D. 1.713", LENGTH 53"	1,033.5 ACSS/AW 45/7

A	ADDED SHT. 3	WDF	WPH	WVT	4/25/02	C	CORRECTED LINE GUARD OD FOR 3/0	WDF	WPH	WVT	6/1/04
-	ORIGINAL ISSUE	KSM	GV	WPH	8/01/97	B	ADDED ACSS	WDF	SFO	WVT	8/1/03
REF	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

	TRANSMISSION ENGINEERING				SCALE: NONE	
	POLE TOP ARRANGEMENT TYPE 2/1 WPI SGL. CKT. CONVERTIBLE TO DBL. CKT. 69kV WOOD POLE				DWG. NO.	SHT. NO.
					13135	3 of 3

13135C03



72" MIN. 0-750V
 60" MIN. ABOVE 750V
 (FOR ENTIRE SPAN)
 ADD 7'-0" IF PROVIDING
 FOR 2ND 69KV CIRCUIT

NOTES:

1. **CAUTION:** DO NOT ATTEMPT TO ALIGN STRAIN CLAMP WITH WIRE UNDER TENSION - TWISTING MAY CAUSE FAILURE OF INSULATOR ROD.
2. **CAUTION:** WHEN USED IN AN ANGLE CONFIGURATION, THE ANGLE THE GUY MAKES WITH THE POLE MUST BE IN ACCORDANCE WITH GO-95 REQUIREMENTS FOR SEPARATION BETWEEN CONDUCTORS AND HARDWARE.
3. LINE ANGLE 0 - 3 DEGREES.
4. MAXIMUM DESIGN TENSION NOT TO EXCEED 4000 LBS.
5. FOR GUYING INSTALL IN ORDER . SEE SECTION 15000 FOR GUY ATTACHMENT DETAILS.
6. USE FIBERGLASS LINK 15309 IN VICINITY OF JUMPER LOOPS.
7. FOR WIND LOAD, GUY ATTACHMENT MUST BE AT OR BELOW POINT .
8. SEE JOB PACKAGE FOR GUY REQUIREMENTS.

A	CHANGED ITEMS 4, 5, & 7	WDF	WPH	WVT	4/25/02	C						
-	ORIGINAL ISSUE	KSM	GV	WPH	8/01/97	B	CHANGED TITLE	WDF	SFO	WPH	WVT	8/1/03
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	



TRANSMISSION ENGINEERING
POLE TOP ARRANGEMENT
 TYPE 2/1 X3
 SGL. CKT. CONVERTIBLE TO DBL. CKT.-ACSR
 69kV WOOD POLE

SCALE: NONE	
DWG. NO.	SHT. NO.
13155	1 of 3

13155B01

BILL OF MATERIAL

ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
1	6	431200	INSULATOR, SUSPENSION, POLYMER, 45-47" LONG, BALL (HOT END) AND SOCKET 25,000 LBS ULT. TENSILE STRENGTH	356
2		SEE SHT.3 TABLE A	CLAMP, STRAIN WITHOUT SOCKET EYE	356
3	6	235648	EYELET, STANDARD, 3/4" BOLT	355
4	6	636436	SHACKLE, ANCHOR, 30K	355
5	6	337542	EYE OVAL, BALL, 30K	356
6		SEE SHT.3 TABLE A	CONNECTOR, JUMPER	355
7		SEE SHT.3 TABLE A	EYE, SOCKET, HOTLINE, 30K	356
8	4	294144	CROSSARM, 5-3/4" X 5-3/4" X 10'	355
9	4	164128	BRACE, CROSSARM, ANGLE 5'	355
10	1/5#	492224	NAIL, RFG. 7/8"-#11 GALV. (LBS)	355
11	4	647648	SIGN, HIGH VOLTAGE	355
12	1#	678528	STAPLES, 1-1/4" (LBS)	355
13	2.5#	812928	WIRE, CU. SOFT #8 AWG (LBS)	355
14	2	269632	CONNECTOR, SPLIT BOLT	355
A	8	19016	ASSEMBLY, BOLT, 1/2" X-ARM BRACE	355
B	2	19012	ASSEMBLY, BOLT, 3/4" THRU	355
C	1	19001	ASSEMBLY, BOLT, 5/8" SPLIT	355
D	2	19016	ASSEMBLY, BOLT, 5/8" X-ARM BRACE	355
E	4	19010	ASSEMBLY, BOLT, 3/4" SPACE, BONDED	355

A	CHANGED ITEMS 4, 5, & 7	WDF	WPH	WVT	4/25/02	C						
-	ORIGINAL ISSUE	KSM	GV	WPH	8/01/97	B	CHANGED TITLE	WDF	SFO	WPH	WVT	8/1/03
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	


13155B02

	TRANSMISSION ENGINEERING	SCALE: NONE	
	POLE TOP ARRANGEMENT TYPE 2/1 X3	DWG. NO.	SHT. NO.
	SGL. CKT. CONVERTIBLE TO DBL. CKT.-ACSR 69KV WOOD POLE	13155	2 of 3

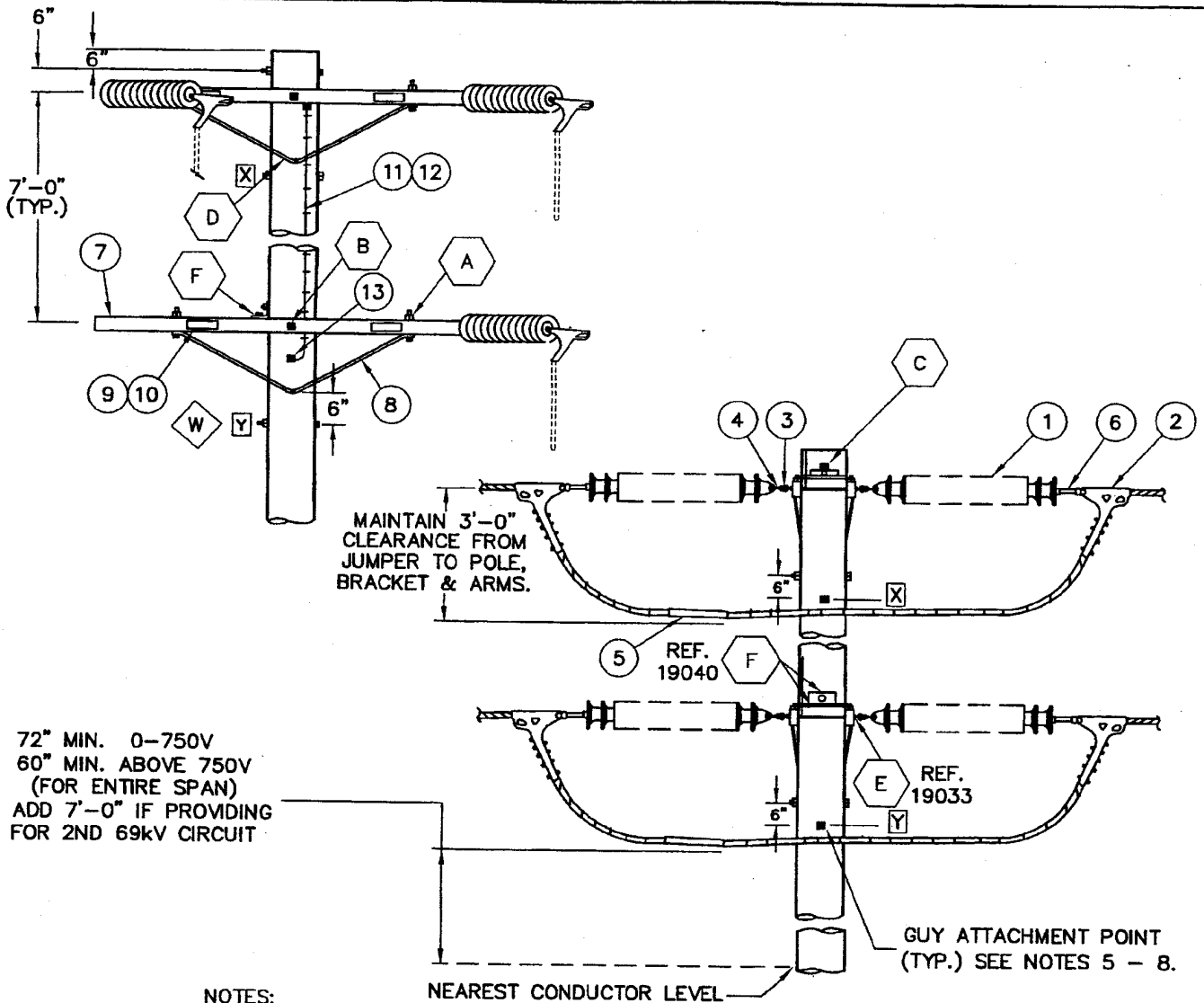
TABLE A

ITEM	QTY.	STOCK NO. OR STD. NO.	DESCRIPTION	CONDUCTOR SIZE
2	6	230672	CLAMP, STRAIN, ALUMINUM, RANGE .20 - .57", 15K	3/0 ACSR/AW 6/1
6	3	256472	CONNECTOR, COMPRESSION, ALUM., JUMPER	
7	6	337602	EYE, SOCKET HOTLINE, EYE 11/16" WIDE, 30K	
2	6	231700	CLAMP, STRAIN, ALUMINUM, RANGE 0.47-0.88", 25K	336.4 ACSR/AW 26/7
6	3	650264	SLEEVE, ALUM., JUMPER	
7	6	337604	EYE, SOCKET HOTLINE, EYE 3/4" WIDE, 30K	
2	6	230686	CLAMP, STRAIN, ALUMINUM, RANGE 0.71-1.318", 30K	636 ACSR/AW 24/7
6	3	650656	SLEEVE, ALUM., JUMPER	
7	6	337622	EYE, SOCKET HOTLINE, EYE 1 3/8" WIDE, 30K	
2	6	230686	CLAMP, STRAIN, ALUMINUM, RANGE 0.71-1.318", 30K	1,033.5 ACSR/AW 45/7
6	3	650336	SLEEVE, ALUM., JUMPER	
7	6	337622	EYE, SOCKET HOTLINE, EYE 1 3/8" WIDE, 30K	

A	ADDED SHT. 3	WDF	WPH	WVT	4/25/02	C						
-	ORIGINAL ISSUE	KSM	GV	WPH	8/01/97	B	CHANGED TITLE	WDF	SFO	WPH	COV	8/1/03
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	

	TRANSMISSION ENGINEERING							SCALE: NONE				
	POLE TOP ARRANGEMENT TYPE 2/1 X3							DWG. NO.		SHT. NO.		
	SGL. CKT. CONVERTIBLE TO DBL. CKT.-ACSR 69KV WOOD POLE							13155		3of3		

13155B03



72" MIN. 0-750V
 60" MIN. ABOVE 750V
 (FOR ENTIRE SPAN)
 ADD 7'-0" IF PROVIDING
 FOR 2ND 69KV CIRCUIT

NOTES:

1. **CAUTION:** DO NOT ATTEMPT TO ALIGN STRAIN CLAMP WITH WIRE UNDER TENSION - TWISTING MAY CAUSE FAILURE OF INSULATOR ROD.
2. **CAUTION:** WHEN USED IN AN ANGLE CONFIGURATION, THE ANGLE THE GUY MAKES WITH THE POLE MUST BE IN ACCORDANCE WITH GO-95 REQUIREMENTS FOR SEPARATION BETWEEN CONDUCTORS AND HARDWARE.
3. LINE ANGLE 3 - 30 DEGREES.
4. MAXIMUM DESIGN TENSION NOT TO EXCEED 4000 LBS.
5. FOR GUYING INSTALL IN ORDER . SEE SECTION 15000 FOR GUY ATTACHMENT DETAILS.
6. USE FIBERGLASS LINK 15309 IN VICINITY OF JUMPER LOOPS.
7. FOR WIND LOAD, GUY ATTACHMENT MUST BE AT OR BELOW POINT .
8. SEE JOB PACKAGE FOR GUY REQUIREMENTS.

A	NOTE GHANGE	WDF	WPH	WVT	4/25/02	C	ADDED REF.	WDF	<input checked="" type="checkbox"/> WPH	<input checked="" type="checkbox"/> WVT	6/1/04
-	ORIGINAL ISSUE	SDF	DRB	WPH	3/23/00	B	CHANGED TITLE	WDF	<input checked="" type="checkbox"/> SFO	<input checked="" type="checkbox"/> WPH	8/1/03
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE



TRANSMISSION ENGINEERING
POLE TOP ARRANGEMENT
TYPE 2/1 X30
SGL. CKT. CONVERTIBLE TO DBL. CKT.-ACSR
69KV WOOD POLE

SCALE: NONE	
DWG. NO.	SHT. NO.
13156	1 of 3

13156C01

BILL OF MATERIAL

ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
1	6	431200	INSULATOR, SUSPENSION, POLYMER, 45-47" LONG, BALL (HOT END) AND SOCKET 25,000 LBS ULT. TENSILE STRENGTH	356
2		REF TO TABLE A	CLAMP, STRAIN WITHOUT SOCKET EYE	356
3	6	636436	SHACKLE, ANCHOR, 30K	355
4	6	337542	EYE, OVAL BALL, 30K	355
5		REF TO TABLE A	CONNECTOR, JUMPER	355
6		REF TO TABLE A	EYE, SOCKET, HOTLINE, 30K	356
7	4	294176	CROSSARM, 5-3/4"x5-3/4"x12'	355
8	4	164160	BRACE, CROSSARM ANGLE, 6'	355
9	1/5#	492224	NAIL, RFG. 7/8"-#11 GALV. (LBS)	355
10	4	647648	SIGN, HIGH VOLTAGE	355
11	1#	678528	STAPLES, 1-1/4" (LBS)	355
12	2.5#	812928	WIRE, CU. SOFT #8 AWG (LBS)	355
13	2	269632	CONNECTOR, SPLIT BOLT	355
A	8	19016	ASSEMBLY, BOLT, 1/2" X-ARM BRACE	355
B	2	19012	ASSEMBLY, BOLT, 3/4" THRU	355
C	1	19001	ASSEMBLY, BOLT, 5/8" SPLIT	355
D	2	19016	ASSEMBLY, BOLT, 5/8" X-ARM BRACE	355
E	3	19033	ASSEMBLY, TEE DEADEND	355
F	2	19040	ASSEMBLY, THRUST PLATE	355

A	NOTE GHANGE	WDF	WPH	WVT	4/25/02	C	REV. SHT. 1	WDF	WPH	WVT	6/1/04	13156C02	
-	ORIGINAL ISSUE	SDF	DRB	WPH	3/23/00	B	CHANGED TITLE	WDF	SFO	WPH	WVT		8/1/03
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE		



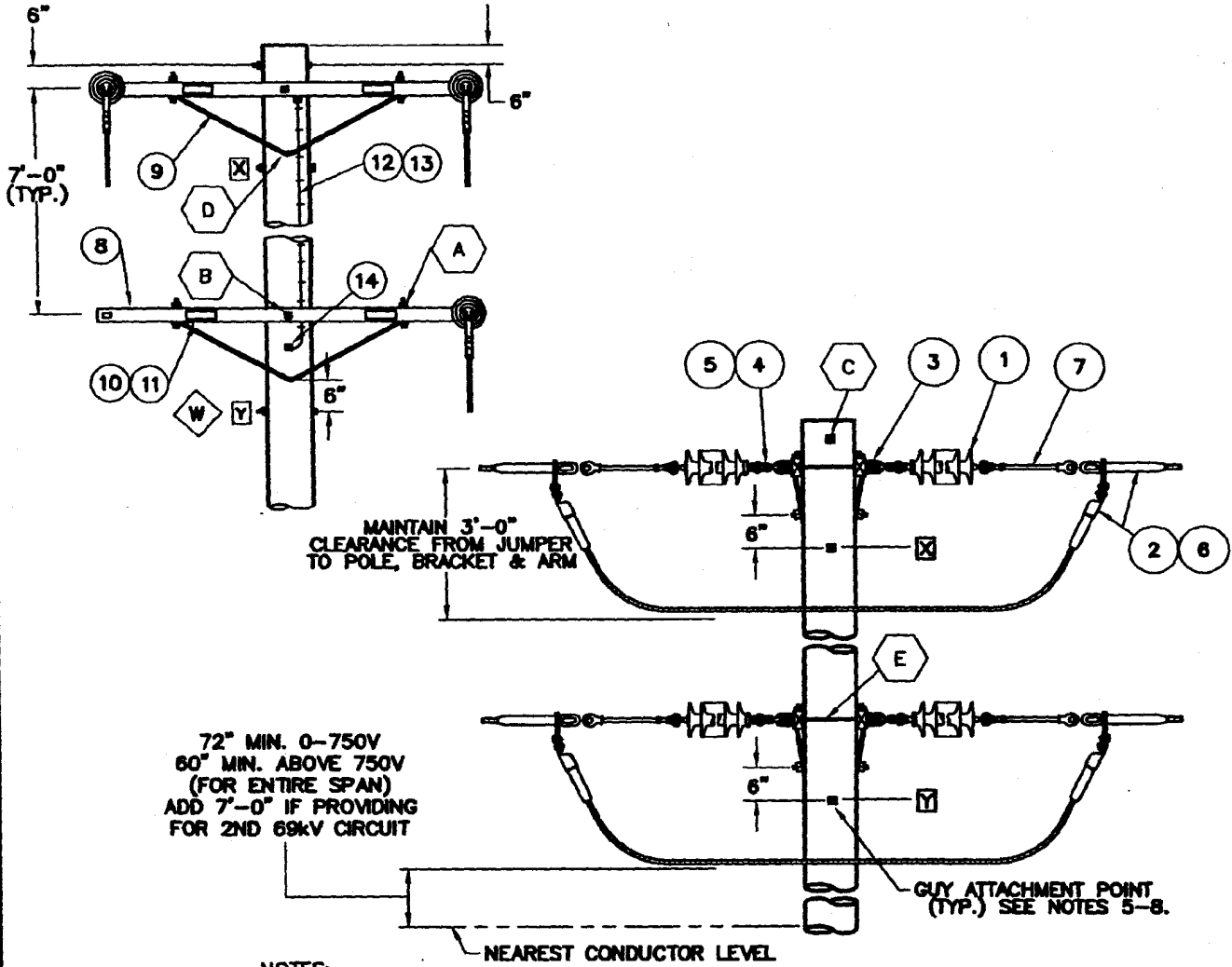
	TRANSMISSION ENGINEERING	SCALE: NONE	
	POLE TOP ARRANGEMENT TYPE 2/1 X30	DWG. NO.	SHT. NO.
	SGL. CKT. CONVERTIBLE TO DBL. CKT.-ACSR 69KV WOOD POLE	13156	2 of 3

TABLE A

ITEM	QTY.	STOCK NO. OR STD. NO.	DESCRIPTION	CONDUCTOR SIZE
2	6	230672	CLAMP, STRAIN, ALUMINUM, RANGE 0.20-0.57", 15K	3/0 ACSR/AW 6/1
5	3	256472	CONNECTOR, COMPRESSION, ALUM., JUMPER	
6	6	337602	EYE, SOCKET HOTLINE, EYE 11/16" WIDE, 30K	
2	6	231700	CLAMP, STRAIN, ALUMINUM, RANGE 0.47-0.88", 25K	336.4 ACSR/AW 26/7
5	3	650264	SLEEVE, ALUM., JUMPER	
6	6	337604	EYE, SOCKET HOTLINE, EYE 3/4" WIDE, 30K	
2	6	230686	CLAMP, STRAIN, ALUMINUM, RANGE 0.71-1.318", 30K	636 ACSR/AW 24/7
5	3	650656	SLEEVE, ALUM., JUMPER	
6	6	337622	EYE, SOCKET HOTLINE, EYE 1 3/8" WIDE, 30K	
2	6	230686	CLAMP, STRAIN, ALUMINUM, RANGE 0.71-1.318", 30K	1,033.5 ACSR/AW 45/7
5	3	650336	SLEEVE, ALUM., JUMPER	
6	6	337622	EYE, SOCKET HOTLINE, EYE 1 3/8" WIDE, 30K	

A	NOTE CHANGE	WDF	WPH	WVT	4/25/02	C	REV. SHT. 1	WDF	WPH	WVT	6/1/04	13156C03
-	ORIGINAL ISSUE	SDF	DRB	WPH	3/23/00	B	CHANGED TITLE	WDF	SFO	WVT	8/1/03	
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	
TRANSMISSION ENGINEERING								SCALE: NONE				
	POLE TOP ARRANGEMENT TYPE 2/1 X30							DWG. NO.		SHT. NO.		
	SGL. CKT. CONVERTIBLE TO DBL. CKT.-ACSR 69KV WOOD POLE							13156		3of3		



72" MIN. 0-750V
 60" MIN. ABOVE 750V
 (FOR ENTIRE SPAN)
 ADD 7'-0" IF PROVIDING
 FOR 2ND 69kV CIRCUIT

NOTES:

- CAUTION:** DO NOT ATTEMPT TO ALIGN STRAIN CLAMP WITH WIRE UNDER TENSION - TWISTING MAY CAUSE FAILURE OF INSULATOR ROD.
- CAUTION:** WHEN USED IN AN ANGLE CONFIGURATION, THE ANGLE THE GUY MAKES WITH THE POLE MUST BE IN ACCORDANCE WITH GO-95 REQUIREMENTS FOR SEPARATION BETWEEN CONDUCTORS AND HARDWARE.
- LINE ANGLE 0 - 3 DEGREES.
- MAXIMUM DESIGN TENSION NOT TO EXCEED 4000 LBS.
- FOR GUYING INSTALL IN ORDER . SEE SECTION 15000 FOR GUY ATTACHMENT DETAILS.
- USE FIBERGLASS LINK 16300 IN VICINITY OF JUMPER LOOPS.
- FOR WIND LOAD, GUY ATTACHMENT MUST BE AT OR BELOW POINT .
- SEE JOB PACKAGE FOR GUY REQUIREMENTS.

B						E					
A	UPDATED QTY ITEM 6	PM	WPH	WVT	8/15/06	D					
	ORIGINAL	WDF	SFO WPH	WVT	8/01/06	C					
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

TRANSMISSION ENGINEERING

SCALE: NONE

**POLE TOP ARRANGEMENT
 TYPE 2/1 X3**

DWG. NO.

SHT. NO.

**SGL. CKT. CONVERTIBLE TO DBL/ CKT.-ACSS
 69kV WOOD POLE**

13157

1 of 3

13157A01



BILL OF MATERIAL

ITEM	QTY.	STOCK NO. OR STD. NO.	DESCRIPTION	ACCT. NO.
1	6	431200	INSULATOR, SUSPENSION, POLYMER, 45-47" LONG, BALL (HOT END) AND SOCKET 25,000 LBS ULT. TENSILE STRENGTH	356
2		SEE SHT.3 TABLE A	DEAD END, COMPRESSION	356
3	6	235648	EYELET, STANDARD, 3/4" BOLT	355
4	6	636436	SHACKLE, ANCHOR, 30K	355
5	6	337542	EYE OVAL, BALL, 30K	356
6	3#	246950	FILLER COMPOUND (LBS)	355
7	6	236048	Y-CLEVIS, SOCKET, HOTLINE, 30K	356
8	4	294144	CROSSARM, 5-3/4" X 5-3/4" X 10'	355
9	4	164128	BRACE, CROSSARM, ANGLE 5'	355
10	1/5#	492224	NAIL, RFG. 7/8"-#11 GALV. (LBS)	355
11	4	647648	SIGN, HIGH VOLTAGE	355
12	1#	678528	STAPLES, 1-1/4" (LBS)	355
13	2.5#	812928	WIRE, CU. SOFT #8 AWG (LBS)	355
14	2	269632	CONNECTOR, SPLIT BOLT	355
A	8	19016	ASSEMBLY, BOLT, 1/2" X-ARM BRACE	355
B	2	19012	ASSEMBLY, BOLT, 3/4" THRU	355
C	1	19001	ASSEMBLY, BOLT, 5/8" SPLIT	355
D	2	19016	ASSEMBLY, BOLT, 5/8" X-ARM BRACE	355
E	4	19010	ASSEMBLY, BOLT, 3/4" SPACE, BONDED	355

B											
A	UPDATED QTY ITEM 6	PM	WPH	WVT	8/15/06	D					
	ORIGINAL	WDF	SFO WPH	WVT	8/01/06	C					
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

TRANSMISSION ENGINEERING	SCALE: NONE	
 POLE TOP ARRANGEMENT TYPE 2/1 X3 SGL. CKT. CONVERTIBLE TO DBL/ CKT.-ACSS 69KV WOOD POLE	DWG. NO.	SHT. NO.
	13157	2 of 3
	13157A02	

TABLE A

ITEM	QTY.	STOCK NO. OF STD. NO.	DESCRIPTION	ACCT NO.
			636 ACSS/AW 24/7 (ROOK/AW)	
2	6	652678	DEAD END, COMPRESSION, FOR 636 ROOK/ACSS/AW CONDUCTOR, FULL TENSION WITH STEEL EYE, 4-HOLE NEMA PAD & TERMINAL CONNECTOR	356
			900 ACSS/AW 54/7 (CANARY/AW)	
2	6	652682	DEAD END, COMPRESSION, FOR 900 CANARY/ACSS/AW CONDUCTOR, FULL TENSION WITH STEEL EYE, 4-HOLE NEMA PAD & TERMINAL CONNECTOR	356
			1033.5 ACSS/AW 45/7 (ORTOLAN/AW)	
2	6	652674	DEAD END, COMPRESSION, FOR 1033.5 ORTOLAN/ACSS /AW CONDUCTOR, FULL TENSION WITH STEEL EYE, 4-HOLE NEMA PAD & TERMINAL CONNECTOR	356


DIE SIZE TABLE

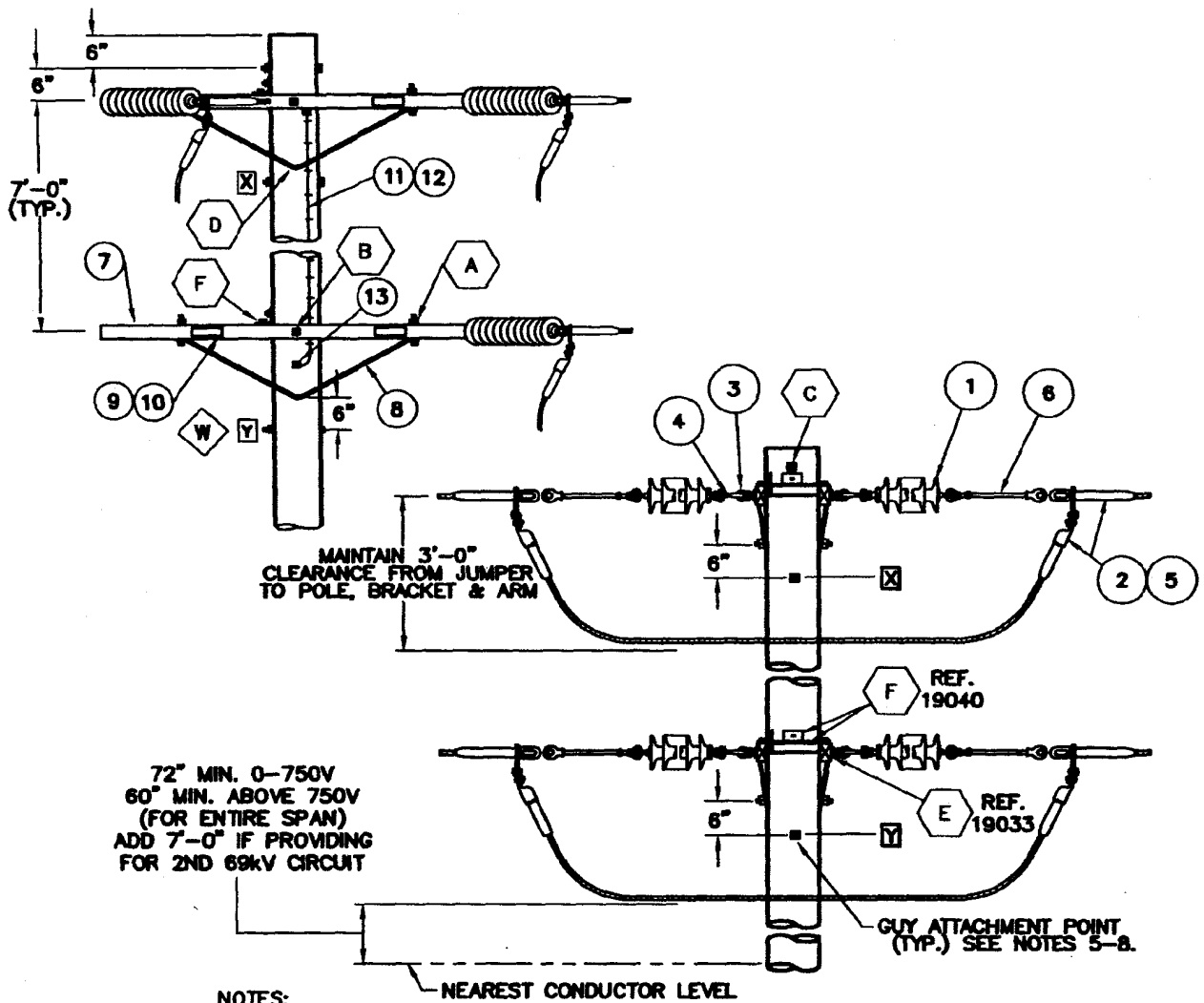
CONDUCTOR	STEEL DIE	ALUMINUM DIE
ROOK	12SH	27AH
CANARY	14SH	30AH
ORTOLAN	10SH	34AH

NOTE:

INSTALLATION OF THE COMPRESSION DEAD ENDS & COMPRESSION SPLICES, INCLUDING THE PROPER DIRECTION OF COMPRESSION, SHALL STRICTLY FOLLOW MANUFACTURE'S INSTRUCTIONS.

B						E			
A	UPDATED QTY ITEM 6	PM	WPH	WWT	8/15/08	D			
	ORIGINAL	WDF	SFO WPH	WWT	8/01/08	C			
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD APPV DATE

	TRANSMISSION ENGINEERING				SCALE: NONE	
	POLE TOP ARRANGEMENT				DWG. NO.	SHT. NO.
	TYPE 2/1 X3				13157	3 of 3
SGL. CKT. CONVERTIBLE TO DBL/ CKT.-ACSS						
69KV WOOD POLE						
						13157A03



72" MIN. 0-750V
60" MIN. ABOVE 750V
(FOR ENTIRE SPAN)
ADD 7'-0" IF PROVIDING
FOR 2ND 69kV CIRCUIT

NOTES:

1. **CAUTION:** DO NOT ATTEMPT TO ALIGN STRAIN CLAMP WITH WIRE UNDER TENSION - TWISTING MAY CAUSE FAILURE OF INSULATOR ROD.
2. **CAUTION:** WHEN USED IN AN ANGLE CONFIGURATION, THE ANGLE THE GUY MAKES WITH THE POLE MUST BE IN ACCORDANCE WITH GO-95 REQUIREMENTS FOR SEPARATION BETWEEN CONDUCTORS AND HARDWARE.
3. LINE ANGLE 3 - 30 DEGREES.
4. MAXIMUM DESIGN TENSION NOT TO EXCEED 4000 LBS.
5. FOR GUYING INSTALL IN ORDER $\square Y$. SEE SECTION 15000 FOR GUY ATTACHMENT DETAILS.
6. USE FIBERGLASS LINK 15309 IN VICINITY OF JUMPER LOOPS.
7. FOR WIND LOAD, GUY ATTACHMENT MUST BE AT OR BELOW POINT $\square W$.
8. SEE JOB PACKAGE FOR GUY REQUIREMENTS.

B	UPDATED QTY ITEM 5	PM	WPH	WWT	8/15/06	E					
A	ADDED REF. ON SHEET 1 CHANGED QTY ON SHT. 2	WDF	GV WPH	WWT	8/0/04	D					
	ORIGINAL	WDF	SFD WPH	WWT	8/01/03	C					
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

TRANSMISSION ENGINEERING

SCALE: NONE



**POLE TOP ARRANGEMENT
TYPE 2/1 X30
SGL. CKT. CONVERTIBLE TO DBL/ CKT.--ACSS
69kV WOOD POLE**

DWG. NO.

SHT. NO.

13158

1 of 3

13158B01

BILL OF MATERIAL

ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
1	6	431200	INSULATOR, SUSPENSION, POLYMER, 45-47" LONG, BALL (HOT END) AND SOCKET 25,000 LBS ULT. TENSILE STRENGTH	356
2		REF TO TABLE A	DEAD END, COMPRESSION	356
3	6	636436	SHACKLE, ANCHOR, 30K	355
4	6	337542	EYE OVAL, BALL, 30K	355
5	3#	246950	FILLER COMPOUND	355
6	6	REF TO TABLE A	Y-CLEVIS, SOCKET, HOTLINE, 30K	356
7	4	294176	CROSSARM, 5-3/4" X 5-3/4" X 12'	355
8	4	164160	BRACE, CROSSARM, ANGLE 6'	355
9	1/5#	492224	NAIL, RFG. 7/8"-#11 GALV. (LBS)	355
10	4	647648	SIGN, HIGH VOLTAGE	355
11	1#	678528	STAPLES, 1-1/4" (LBS)	355
12	2.5#	812928	WIRE, CU. SOFT #8 AWG (LBS)	355
13	2	269632	CONNECTOR, SPLIT BOLT	355
A	8	19016	ASSEMBLY, BOLT, 1/2" X-ARM BRACE	355
B	2	19012	ASSEMBLY, BOLT, 3/4" THRU	355
C	1	19001	ASSEMBLY, BOLT, 5/8" SPLIT	355
D	2	19016	ASSEMBLY, BOLT, 5/8" X-ARM BRACE	355
E	3	19033	ASSEMBLY, TEE DEAD END	355
F	2	19040	ASSEMBLY, THRUST PLATE	355

B	UPDATED QTY ITEM 5	PM	WPH	WY	8/15/06	E					
A	ADDED REF. ON SHEET 1 CHANGED QTY ON SHT. 2	WDF	GV WPH	WWT	8/0/04	D					
	ORIGINAL	WDF	SFO WPH	WWT	8/01/03	C					
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

TRANSMISSION ENGINEERING				SCALE: NONE	
	POLE TOP ARRANGEMENT TYPE 2/1 X30			DWG. NO.	SHT. NO.
	SGL. CKT. CONVERTIBLE TO DBL/ CKT.-ACSS 69KV WOOD POLE			13158	2 of 3

13158B02

TABLE A

ITEM	QTY.	STOCK NO. OF STD. NO.	DESCRIPTION	ACCT NO.
			636 ACSS/AW 24/7 (ROOK/AW)	
2	6	652678	DEAD END, COMPRESSION, FOR 636 ROOK/ACSS/AW CONDUCTOR, FULL TENSION WITH STEEL EYE, 4-HOLE NEMA PAD & TERMINAL CONNECTOR	356
			900 ACSS/AW 54/7 (CANARY/AW)	
2	6	652682	DEAD END, COMPRESSION, FOR 900 CANARY/ACSS/AW CONDUCTOR, FULL TENSION WITH STEEL EYE, 4-HOLE NEMA PAD & TERMINAL CONNECTOR	356
			1033.5 ACSS/AW 45/7 (ORTOLAN/AW)	
2	6	652674	DEAD END, COMPRESSION, FOR 1033.5 ORTOLAN/ACSS /AW CONDUCTOR, FULL TENSION WITH STEEL EYE, 4-HOLE NEMA PAD & TERMINAL CONNECTOR	356

DIE SIZE TABLE		
CONDUCTOR	STEEL DIE	ALUMINUM DIE
ROOK	12SH	27AH
CANARY	14SH	30AH
ORTOLAN	10SH	34AH

NOTE:
 INSTALLATION OF THE COMPRESSION DEAD ENDS & COMPRESSION SPLICES, INCLUDING THE PROPER DIRECTION OF COMPRESSION, SHALL STRICTLY FOLLOW MANUFACTURE'S INSTRUCTIONS.

B	UPDATED QTY ITEM 5	PM	WPH	WY	8/15/06	E					
A	ADDED REF. ON SHEET 1 CHANGED QTY ON SHT. 2	WDF	WPH	WWT	8/0/04	D					
	ORIGINAL	WDF	SFO WPH	WWT	8/01/03	C					
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

TRANSMISSION ENGINEERING

SCALE: NONE



**POLE TOP ARRANGEMENT
 TYPE 2/1 X30
 SGL. CKT. CONVERTIBLE TO DBL/ CKT.-ACSS
 69KV WOOD POLE**

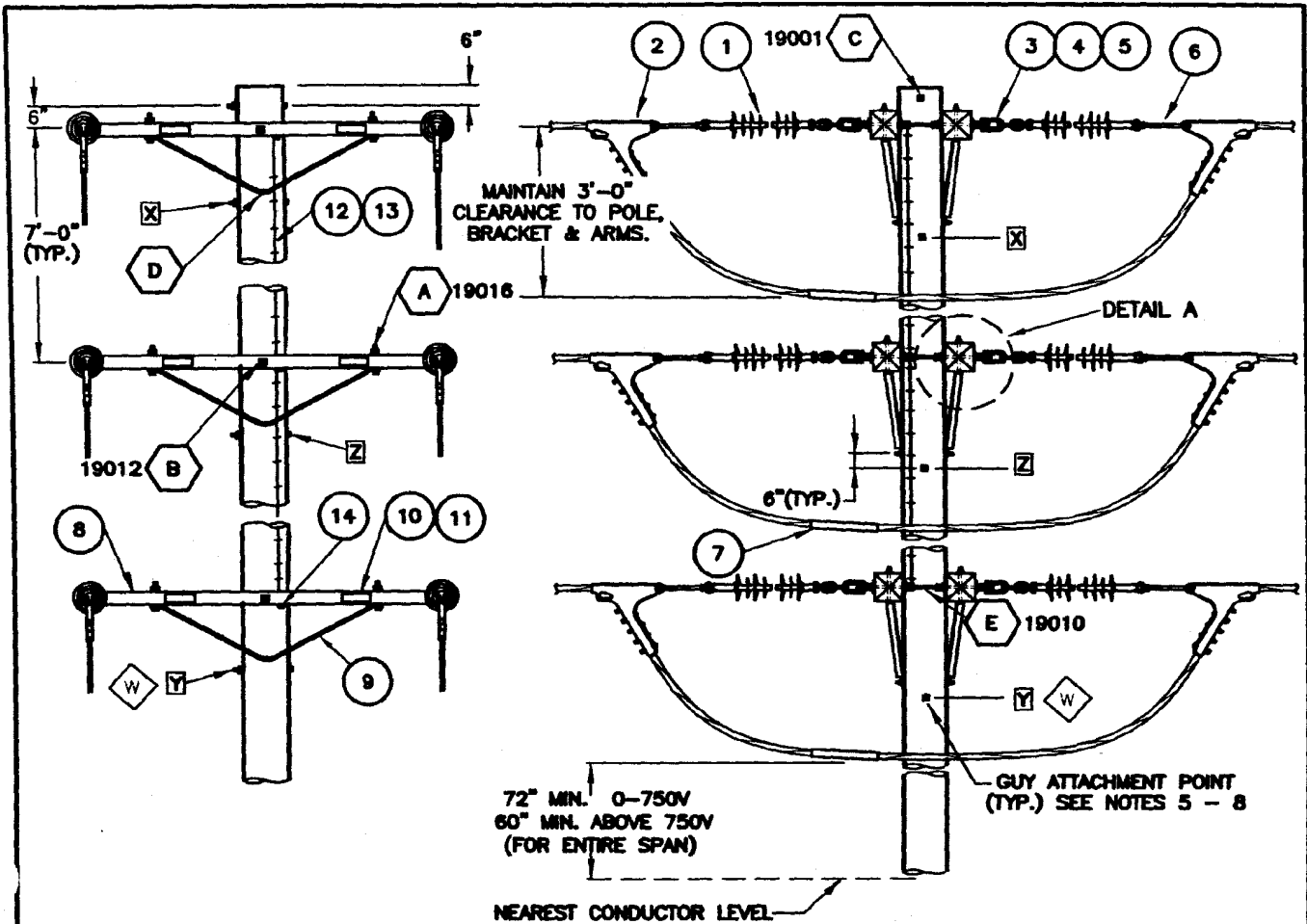
DWG. NO.

SHT. NO.

13158

3 of 3

13158B03

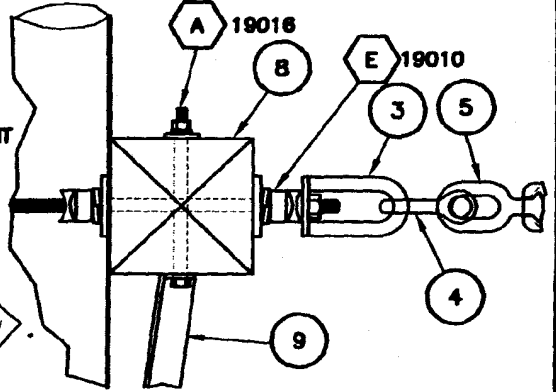


72" MIN. 0-750V
 80" MIN. ABOVE 750V
 (FOR ENTIRE SPAN)

NEAREST CONDUCTOR LEVEL

NOTES:

1. **CAUTION:** DO NOT ATTEMPT TO ALIGN STRAIN CLAMP WITH WIRE UNDER TENSION - TWISTING MAY CAUSE FAILURE OF INSULATOR ROD.
2. **CAUTION:** WHEN USED IN ANGLE CONFIGURATION, GUY ARRANGEMENT MUST MEET THE GO-95 REQUIREMENTS FOR SEPARATION BETWEEN CONDUCTORS AND GUYS.
3. LINE ANGLE 0- 3 DEGREES.
4. MAXIMUM CONDUCTOR DESIGN TENSION NOT TO EXCEED 4000 LBS.
5. FOR GUYING INSTALL IN ORDER SEE SECTION 16000 FOR GUY ATTACHMENT DETAILS.
6. USE FIBERGLASS LINK 16300 IN VICINITY OF JUMPER LOOPS.
7. FOR WIND LOAD, GUY ATTACHMENT MUST BE AT OR BELOW POINT
8. SEE JOB PACKAGE FOR GUY REQUIREMENTS.



DETAIL A

B	CHANGED TITLE	WDF	SFO WPH	WWT	8/1/03	E					
A	CHGD ITEMS 4, 5 & 6	WDF	WPH	WWT	4/25/02	D					
	ORIGINAL	KSM	GV	WPH	8/1/97	C	ADDED DETAIL	PM	WPH	WY 7/21/06	
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

SDGE	TRANSMISSION ENGINEERING	SCALE: NONE	
	POLE TOP ARRANGEMENT	DWG. NO.	SHT. NO.
	TYPE DC-X3 DOUBLE CIRCUIT-ACSR	13175	1 of 3
	69kV WOOD POLE		13175C01

BILL OF MATERIAL

ITEM	QTY.	STOCK NO. <i>STD. NO.</i>	DESCRIPTION	ACCT. NO.
1	12	431200	INSULATOR, SUSPENSION, POLYMER, 45-47" LONG, BALL (HOT END) AND SOCKET 25,000 LBS ULT. TENSILE STRENGTH	356
2		REF. TO TABLE A	CLAMP, STRAIN WITHOUT SOCKET EYE	356
3	12	235648	EYELET, STANDARD, 3/4" BOLT	356
4	12	636436	SHACKLE, ANCHOR, 30K	356
5	12	337542	EYE, OVAL BALL, 30K	356
6		REF. TO TABLE A	EYE, SOCKET, HOTLINE, 30K	356
7		REF. TO TABLE A	CONNECTOR, JUMPER SLEEVE	355
8	6	294144	CROSSARM, 5-3/4" x 5-3/4" x 10'	355
9	6	164128	BRACE, CROSSARM, ANGLE 5°	355
10	1/3#	492224	NAIL, RFG. 7/8" #11 GALV. (LBS.)	355
11	6	647648	SIGN, HIGH VOLTAGE	355
12	1#	678528	STAPLES, 1-1/4" (LBS.)	355
13	2.5#	812928	WIRE, CU. SOFT, #8 AWG (LBS.)	355
14	3	269632	CONNECTOR, SPLIT BOLT	355
A	12	19016	ASSEMBLY, BOLT, 1/2" X-ARM BRACE	355
B	3	19012	ASSEMBLY, BOLT, 3/4" THRU	355
C	1	19001	ASSEMBLY, BOLT, 5/8" SPLIT	355
D	3	19016	ASSEMBLY, BOLT, 5/8" X-ARM BRACE	355
E	6	19010	ASSEMBLY, BOLT, 3/4" SPACE BONDED	355

B	CHANGED TITLE	WDF	SFO WPH	WVT	8/1/03	E					
A	CHGD ITEMS 4, 5 & 6	WDF	WPH WPH	WVT	4/25/02	D					
	ORIGINAL	KSM	GV WPH	WPH	8/1/97	C	ADDED DETAIL	PM	WPH WVT	7/21/06	
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE



	TRANSMISSION ENGINEERING	SCALE: NONE	13175C02
POLE TOP ARRANGEMENT		DWG. NO.	
TYPE DC-X3 DOUBLE CIRCUIT-ACSR		SHT. NO.	
69kV WOOD POLE		13175	2 of 3

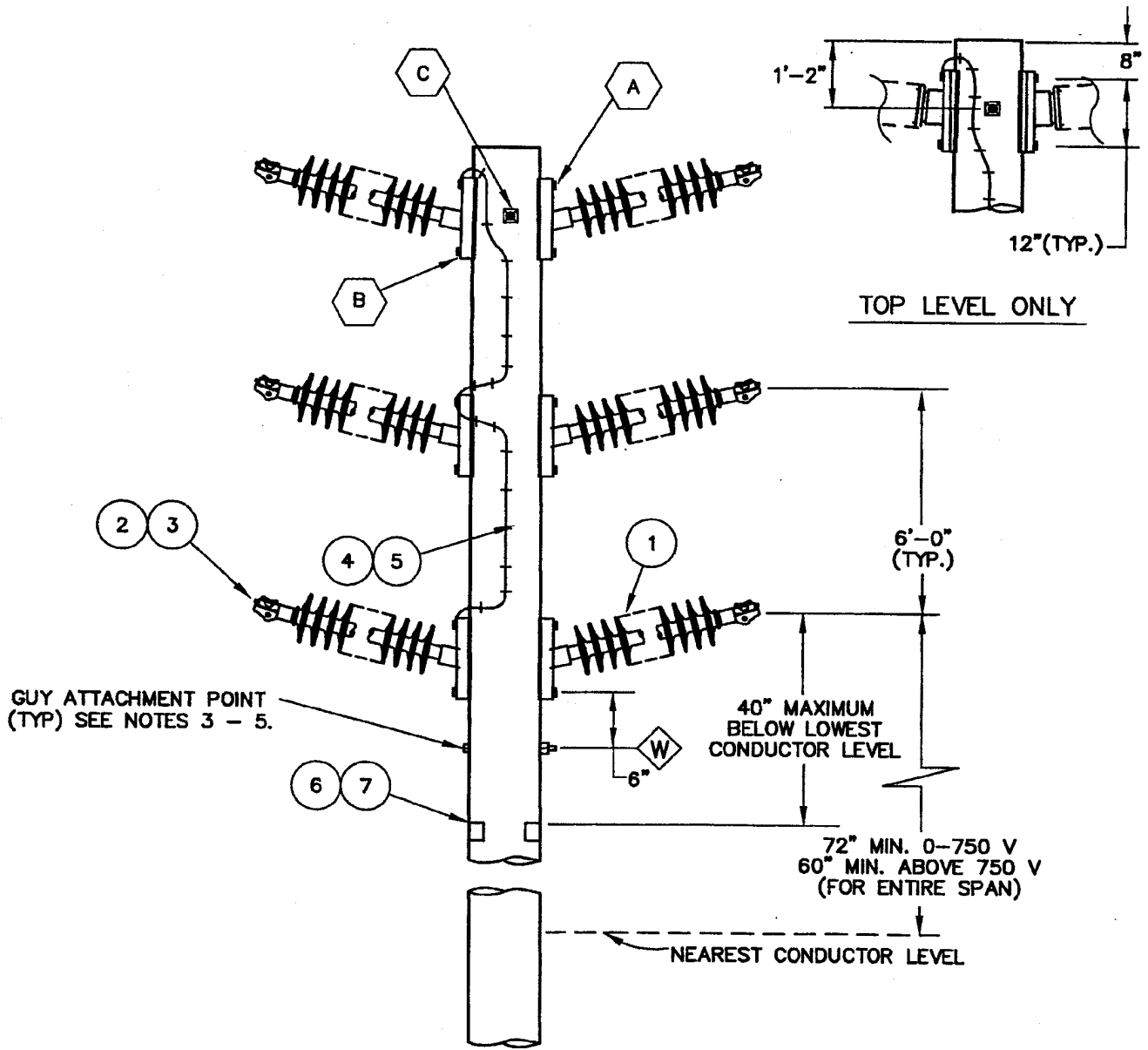
TABLE A

ITEM	QTY.	STOCK NO. OR STD. NO.	DESCRIPTION	CONDUCTOR SIZE
2	12	230672	CLAMP, STRAIN, ALUMINUM, RANGE 0.20-0.57", 15K	3/0
6	12	337602	EYE, SOCKET HOTLINE, EYE 1 1/16" WIDE, 30K	ACSR/AW
7	6	256472	CONNECTOR, COMPRESSION, ALUM., JUMPER	6/1
2	12	231700	CLAMP, STRAIN, ALUMINUM, RANGE 0.47-0.88", 25K	336.4
6	12	337604	EYE, SOCKET HOTLINE, EYE 3/4" WIDE, 30K	ACSR/AW
7	6	650264	SLEEVE, ALUM., JUMPER	26/7
2	12	230686	CLAMP, STRAIN, ALUMINUM, RANGE 0.71-1.318", 30K	636
6	12	337622	EYE, SOCKET HOTLINE, EYE 1 3/8" WIDE, 30K	ACSR/AW
7	6	650656	SLEEVE, ALUM., JUMPER	24/7
2	12	230686	CLAMP, STRAIN, ALUMINUM, RANGE 0.71-1.318", 30K	1,033.50
6	12	337622	EYE, SOCKET HOTLINE, EYE 1 3/8" WIDE, 30K	ACSR/AW
7	6	650336	SLEEVE, ALUM., JUMPER	45/7

B	CHANGED TITLE	WDF	SFO WPH	WVT	8/1/03	E					
A	CHGD ITEMS 4, 5 & 6	WDF	WPH	WVT	4/25/02	D					
	ORIGINAL	KSM	GV	WPH	8/1/97	C	ADDED DETAIL	PM	WPH	WVT 7/21/06	
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

TRANSMISSION ENGINEERING							SCALE: NONE			
	POLE TOP ARRANGEMENT TYPE DC-X3 DOUBLE CIRCUIT-ACSR 69KV WOOD POLE						DWG. NO.		SHT. NO.	
							13175		3 of 3	

13175C03



NOTES:

1. LINE ANGLE NOT TO EXCEED 3 DEGREES.
2. VERTICAL LOAD ON POST INSULATOR NOT TO EXCEED 1250 LBS. WITHOUT PRIOR APPROVAL.
3. GUY ATTACHMENT MUST BE AT OR BELOW POINT .
4. SEE SECTION **15000** FOR GUY DETAILS.
5. SEE JOB PACKAGE FOR GUYING REQUIREMENTS.

A	ADDED SHEET 3	WDF	WPH	WWT	4/25/02	C	REV. SHT. 3	WDF	WPH	WWT	6/1/04
-	ORIGINAL ISSUE	KSM	GV	WPH	8/01/97	B	ADDED ACSS	WDF	SFO	WWT	8/1/03
RRV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE



TRANSMISSION ENGINEERING
POLE TOP ARRANGEMENT
TYPE DC-WPI DOUBLE CIRCUIT
69kV WOOD POLE

SCALE: NONE

DWG. NO.
13165

SHT. NO.
1 of 3

13165C01

BILL OF MATERIAL

ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
1	6	429298	INSULATOR, POST, POLYMER, 41-44" LONG, BENDABLE GAIN BASE AND CLAMPTOP, 4,000 LBS CANTILEVER BREAKING LOAD	356
2		SEE SHT.3 TABLE A	CLAMP, POST INSULATOR	356
3		SEE SHT.3 TABLE A	GUARD, LINE (IF REQUIRED)	356
4	1#	812928	WIRE, CU. SOFT #8 (LBS.)	355
5	1/4#	678528	STAPLES, 1-1/4" (LBS.)	355
6	1/8#	492192	NAIL, RFG.1-3/4", #11, GALV. (LBS.)	355
7	2	647648	SIGN, HIGH VOLTAGE	355
A	3	19024	ASSEMBLY, BOLT, 3/4" (BONDED) POST INSULATOR MTG., BOTH SIDES	355
B	3	19024	ASSEMBLY, BOLT, 3/4" POST INSULATOR MTG., BOTH SIDES	355
C	1	19001	ASSEMBLY, BOLT, 5/8" SPLIT	355

A	ADDED SHEET 3	WDF	WPH	WVT	4/25/02	C	REV. SHT. 3	WDF	WPH	WVT	6/1/04
-	ORIGINAL ISSUE	KSM	GV	WPH	8/01/97	B	ADDED ACSS	WDF	SFO	WVT	8/1/03
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

13165C02



	TRANSMISSION ENGINEERING		SCALE: NONE	
	POLE TOP ARRANGEMENT TYPE DC WPI DOUBLE CIRCUIT 69kV WOOD POLE		DWG. NO.	SHT. NO.
			13165	2of3

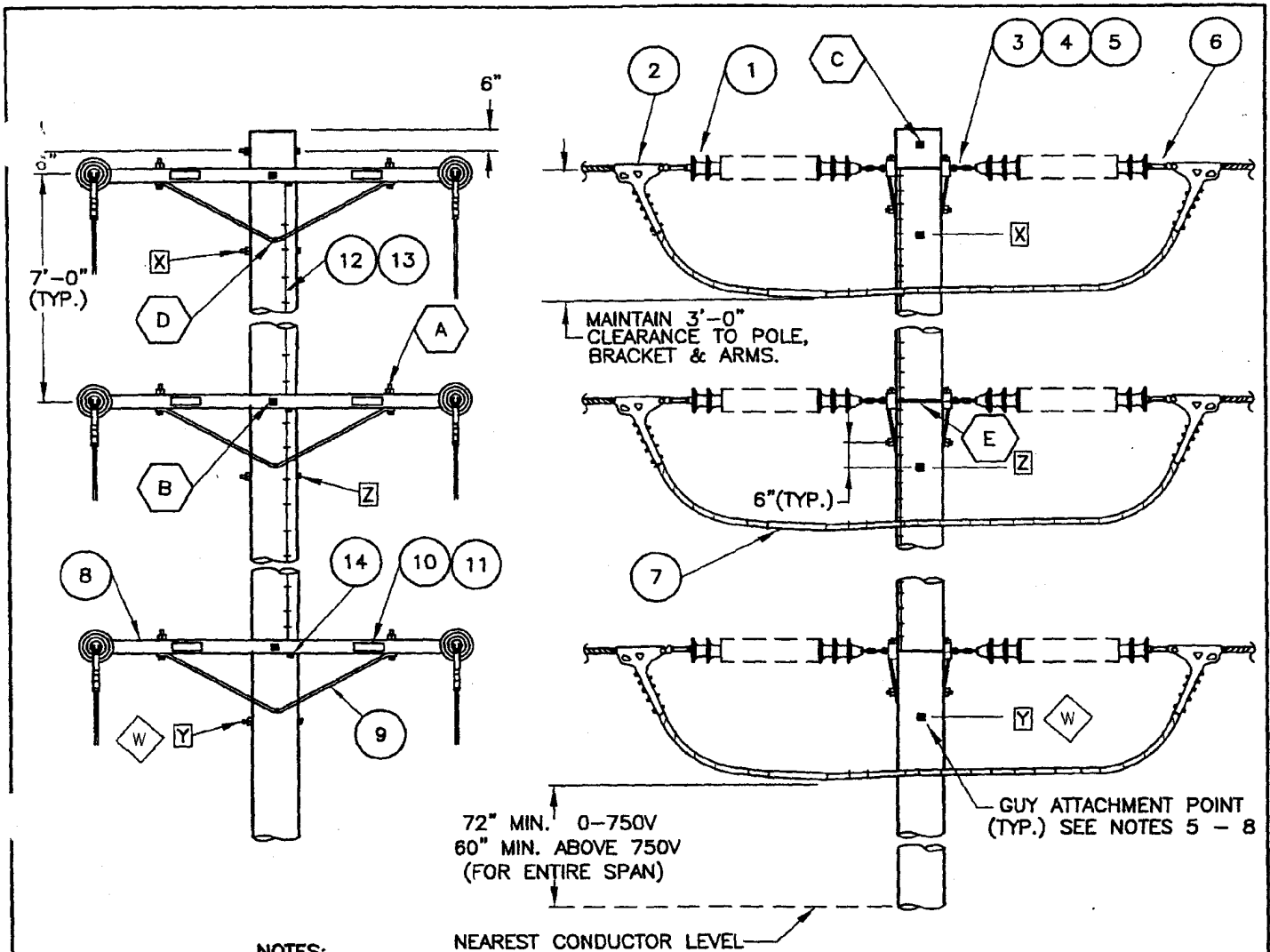
TABLE A

ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	CONDUCTOR SIZE
2	6	229696	CLAMP, POST INSULATOR, RANGE 0.35-0.84"	3/0 ACSR/AW 6/1
3	6	397568	GUARD, LINE, O.D. 0.744", LENGTH 29"	
2	6	229760	CLAMP, POST INSULATOR, RANGE 1.0-1.5"	336.4 ACSR/AW 26/7
3	6	397664	GUARD, LINE, O.D. 1.013", LENGTH 37"	
2	6	229760	CLAMP, POST INSULATOR, RANGE 1.0-1.5"	636 ACSR/AW 24/7
3	6	397728	GUARD, LINE, O.D. 1.34", LENGTH 45"	636 ACSS/AW 24/7
2	6	229792	CLAMP, POST INSULATOR, RANGE 1.5-2.0"	900 ACSS/AW 54/7
3	6	397760	GUARD, LINE, O.D. 1.662", LENGTH 53"	
2	6	229792	CLAMP, POST INSULATOR, RANGE 1.5-2.0"	1,033.5 ACSR/AW 45/7
3	6	397760	GUARD, LINE, O.D. 1.713", LENGTH 53"	1,033.5 ACSS/AW 45/7

A	ADDED SHT. 3	WDF	WPH	WVT	4/25/02	C	QTY. NO. CHANGED	WDF	WPH	WVT	5/25/04
-	ORIGINAL ISSUE	KSM	GV	WPH	8/1/97	B	ADDED ACSS	WDF	SFO	WVT	8/1/03
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

	TRANSMISSION ENGINEERING						SCALE: NONE			
	POLE TOP ARRANGEMENT TYPE DC WPI DOUBLE CIRCUIT 69kV WOOD POLE						DWG. NO.		SHT. NO.	
							13165		3of3	

13165C03



NOTES:

1. **CAUTION:** DO NOT ATTEMPT TO ALIGN STRAIN CLAMP WITH WIRE UNDER TENSION - TWISTING MAY CAUSE FAILURE OF INSULATOR ROD.
2. **CAUTION:** WHEN USED IN ANGLE CONFIGURATION, GUY ARRANGEMENT MUST MEET THE GO-95 REQUIREMENTS FOR SEPARATION BETWEEN CONDUCTORS AND GUYS.
3. LINE ANGLE 0- 3 DEGREES.
4. MAXIMUM CONDUCTOR DESIGN TENSION NOT TO EXCEED 4000 LBS.
5. FOR GUYING INSTALL IN ORDER SEE SECTION 15000 FOR GUY ATTACHMENT DETAILS.
6. USE FIBERGLASS LINK 15309 IN VICINITY OF JUMPER LOOPS.
7. FOR WIND LOAD, GUY ATTACHMENT MUST BE AT OR BELOW POINT .
8. SEE JOB PACKAGE FOR GUY REQUIREMENTS.

A	CHANGED ITEMS 4, 5, & 6	WDF	WPH	WVT	4/25/02	C						
-	ORIGINAL ISSUE	KSM	GV	WPH	8/01/97	B	CHANGED TITLE	WDF	SFO	WPH	WVT	8/1/03
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	

SDGE	TRANSMISSION ENGINEERING							SCALE: NONE				
	POLE TOP ARRANGEMENT							DWG. NO.		SHT. NO.		
	TYPE DC-X3 DOUBLE CIRCUIT-ACSR							13175		1 of 3		
69kV WOOD POLE							13175B01					

BILL OF MATERIAL

ITEM	QTY.	STOCK NO. STD. NO.	DESCRIPTION	ACCT. NO.
1	12	431200	INSULATOR, SUSPENSION, POLYMER, 45-47" LONG, BALL (HOT END) AND SOCKET 25,000 LBS ULT. TENSILE STRENGTH	356
2		REF. TO TABLE A	CLAMP, STRAIN WITHOUT SOCKET EYE	356
3	12	235648	EYELET, STANDARD, 3/4" BOLT	356
4	12	636436	SHACKLE, ANCHOR, 30K	356
5	12	337542	EYE, OVAL BALL, 30K	356
6		REF. TO TABLE A	EYE, SOCKET, HOTLINE, 30K	356
7		REF. TO TABLE A	CONNECTOR, JUMPER SLEEVE	355
8	6	294144	CROSSARM, 5-3/4' x 5-3/4' x 10'	355
9	6	164128	BRACE, CROSSARM, ANGLE 5'	355
10	.3#	492224	NAIL, RFG. 7/8" #11 GALV. (LBS.)	355
11	6	647648	SIGN, HIGH VOLTAGE	355
12	1#	678528	STAPLES, 1-1/4" (LBS.)	355
13	2.5#	812928	WIRE, CU. SOFT, #8 AWG (LBS.)	355
14	3	269632	CONNECTOR, SPLIT BOLT	355
A	12	19016	ASSEMBLY, BOLT, 1/2" X-ARM BRACE	355
B	3	19012	ASSEMBLY, BOLT, 3/4" THRU	355
C	1	19001	ASSEMBLY, BOLT, 5/8" SPLIT	355
D	3	19016	ASSEMBLY, BOLT, 5/8" X-ARM BRACE	355
E	6	19010	ASSEMBLY, BOLT, 3/4" SPACE BONDED	355

A	CHANGED ITEMS 4, 5, & 6	WDF	WPH	WVT	4/25/02	C					
-	ORIGINAL ISSUE	KSM	GV	WPH	8/01/97	B	CHANGED TITLE	WDF	SFO WPH	WVT	8/1/03
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

13175B02



	TRANSMISSION ENGINEERING				SCALE: NONE	
	POLE TOP ARRANGEMENT TYPE DC-X3 DOUBLE CIRCUIT-ACSR 69kV WOOD POLE				DWG. NO.	SHT. NO.
					13175	2of3

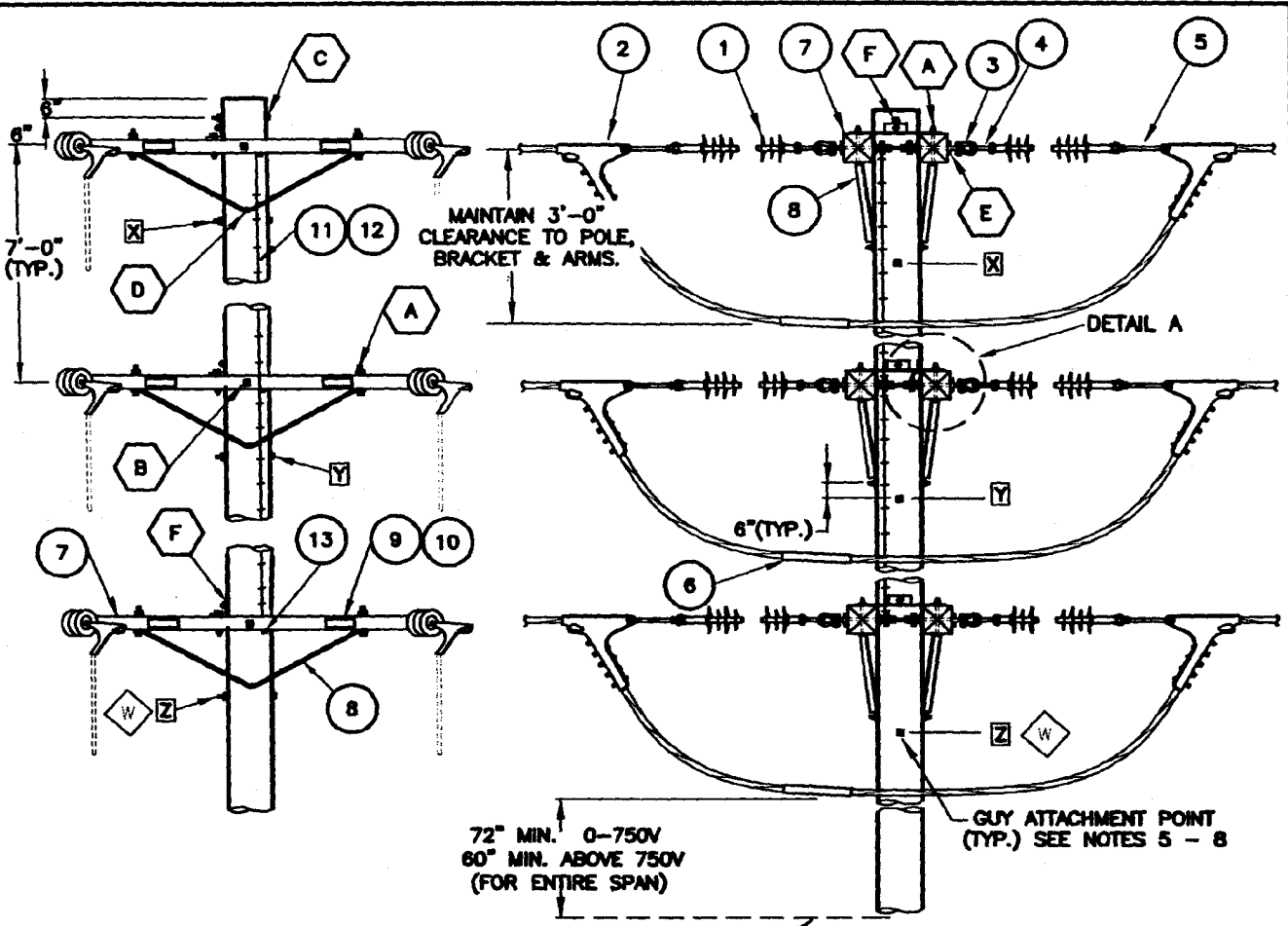
TABLE A

ITEM	QTY.	STOCK NO. OR STD. NO.	DESCRIPTION	CONDUCTOR SIZE
2	12	230672	CLAMP, STRAIN, ALUMINUM, RANGE 0.20-0.57", 15K	3/0 ACSR/AW 6/1
6	12	337602	EYE, SOCKET HOTLINE, EYE 11/16" WIDE, 30K	
7	6	256472	CONNECTOR, COMPRESSION, ALUM., JUMPER	
2	12	231700	CLAMP, STRAIN, ALUMINUM, RANGE 0.47-0.88", 25K	336.4 ACSR/AW 26/7
6	12	337604	EYE, SOCKET HOTLINE, EYE 3/4" WIDE, 30K	
7	6	650264	SLEEVE, ALUM., JUMPER	
2	12	230686	CLAMP, STRAIN, ALUMINUM, RANGE 0.71-1.318", 30K	636 ACSR/AW 24/7
6	12	337622	EYE, SOCKET HOTLINE, EYE 1 3/8" WIDE, 30K	
7	6	650656	SLEEVE, ALUM., JUMPER	
2	12	230686	CLAMP, STRAIN, ALUMINUM, RANGE 0.71-1.318", 30K	1,033.50 ACSR/AW 45/7
6	12	337622	EYE, SOCKET HOTLINE, EYE 1 3/8" WIDE, 30K	
7	6	650336	SLEEVE, ALUM., JUMPER	

A	ADDED SHT. 3	WDF	WPH	WVT	4/25/02	C					
-	ORIGINAL ISSUE	KSM	GV	WPH	8/01/97	B	CHANGED TITLE	WDF	SFO WPH	WVT	8/1/03
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

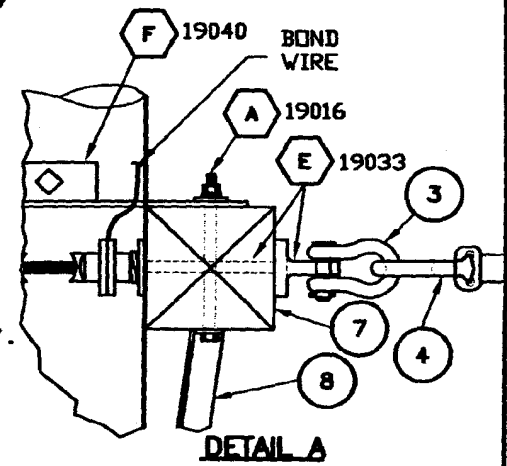
	TRANSMISSION ENGINEERING						SCALE: NONE				
	POLE TOP ARRANGEMENT TYPE DC-X3 DOUBLE CIRCUIT-ACSR 69kV WOOD POLE						DWG. NO.		SHT. NO.		13175B03
							13175		3of3		

D:\VAC\EL\TRANS STANDARDS\ELECTRIC TRANSMISSION STANDARD\13000 POLE TOP ARRANGEMENTS-WOOD\13176\13176DR



NOTES:

1. **CAUTION:** DO NOT ATTEMPT TO ALIGN STRAIN CLAMP WITH WIRE UNDER TENSION - TWISTING MAY CAUSE FAILURE OF INSULATOR ROD.
2. **CAUTION:** WHEN USED IN ANGLE CONFIGURATION, GUY ARRANGEMENT MUST MEET THE GO-95 REQUIREMENTS FOR SEPARATION BETWEEN CONDUCTORS AND GUYS.
3. LINE ANGLE 0- 3 DEGREES.
4. MAXIMUM CONDUCTOR DESIGN TENSION NOT TO EXCEED 4000 LBS.
5. FOR GUYING INSTALL IN ORDER X|Y|Z SEE SECTION 16000 FOR GUY ATTACHMENT DETAILS.
6. USE FIBERGLASS LINK 16300 IN VICINITY OF JUMPER LOOPS.
7. FOR WIND LOAD, GUY ATTACHMENT MUST BE AT OR BELOW POINT W.
8. SEE JOB PACKAGE FOR GUY REQUIREMENTS.



B	CHANGED TITLE	WDF	SFO WPH	WVT	8/1/03	E					
A	UPDATED DRAWING	WDF	WPH	WVT	4/25/02	D	ADDED DETAIL	PM	WPH	WVT	6/6/06
	ORIGINAL	SDF	DRB	WPH	3/23/00	C	ADDED REF.	WDF	GV WPH	WVT	6/1/04
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

TRANSMISSION ENGINEERING						SCALE: NONE						
SDGE	POLE TOP ARRANGEMENT						DWG. NO.		SHT. NO.			
	TYPE DC-X30 DOUBLE CIRCUIT-ACSR						13176		1 of 3			
69kV WOOD POLE												

13176001

BILL OF MATERIAL

ITEM	QTY.	STOCK NL STD. NO.	DESCRIPTION	ACCT. NL
1	12	431200	INSULATOR, SUSPENSION, POLYMER, 45-47" LONG, BALL (HOT END) AND SOCKET 25,000 LBS ULT. TENSILE STRENGTH	356
2		REF. TO TABLE A	CLAMP, STRAIN WITHOUT SOCKET EYE	356
3	12	636436	SHACKLE, ANCHOR, 30K	356
4	12	337542	EYE, OVAL BALL, 30K	356
5		REF. TO TABLE A	EYE, SOCKET, HOTLINE, 30K	356
6		REF. TO TABLE A	CONNECTOR, JUMPER SLEEVE	355
7	6	294176	CROSSARM, 5-3/4' x 5-3/4' x 12'	355
8	6	164160	BRACE, CROSSARM, ANGLE 6'	355
9	1/3#	492224	NAIL, RFG. 7/8" #11 GALV. (LBS.)	355
10	6	647648	SIGN, HIGH VOLTAGE	355
11	1#	678528	STAPLES, 1-1/4" (LBS.)	355
12	2.5#	812928	WIRE, CU. SOFT, #8 AWG (LBS.)	355
13	3	269632	CONNECTOR, SPLIT BOLT	355
A	12	19016	ASSEMBLY, BOLT, 1/2" X-ARM BRACE	355
B	3	19012	ASSEMBLY, BOLT, 3/4" THRU	355
C	1	19001	ASSEMBLY, BOLT, 5/8" SPLIT	355
D	3	19016	ASSEMBLY, BOLT, 5/8" X-ARM BRACE	355
E	6	19033	ASSEMBLY, TEE DEAD END	355
F	3	19040	ASSEMBLY, THRUST PLATE	355

B	CHANGED TITLE	WDF	SFO WPH	WWT	8/1/03	E					
A	UPDATED DRAWING	WDF	WPH	WWT	4/25/02	D	ADDED DETAIL	PM	WPH	6/21/06	7/21/06
	ORIGINAL	SDF	DRB	WPH	3/23/00	C	ADDED REF.	WDF	GV WPH	WWT	6/1/04
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE


TRANSMISSION ENGINEERING							SCALE: NONE				
POLE TOP ARRANGEMENT							DWG. NO.		SHT. NO.		
TYPE DC-X30 DOUBLE CIRCUIT-ACSR							13176		2 of 3		
69kV WOOD POLE							13176D02				

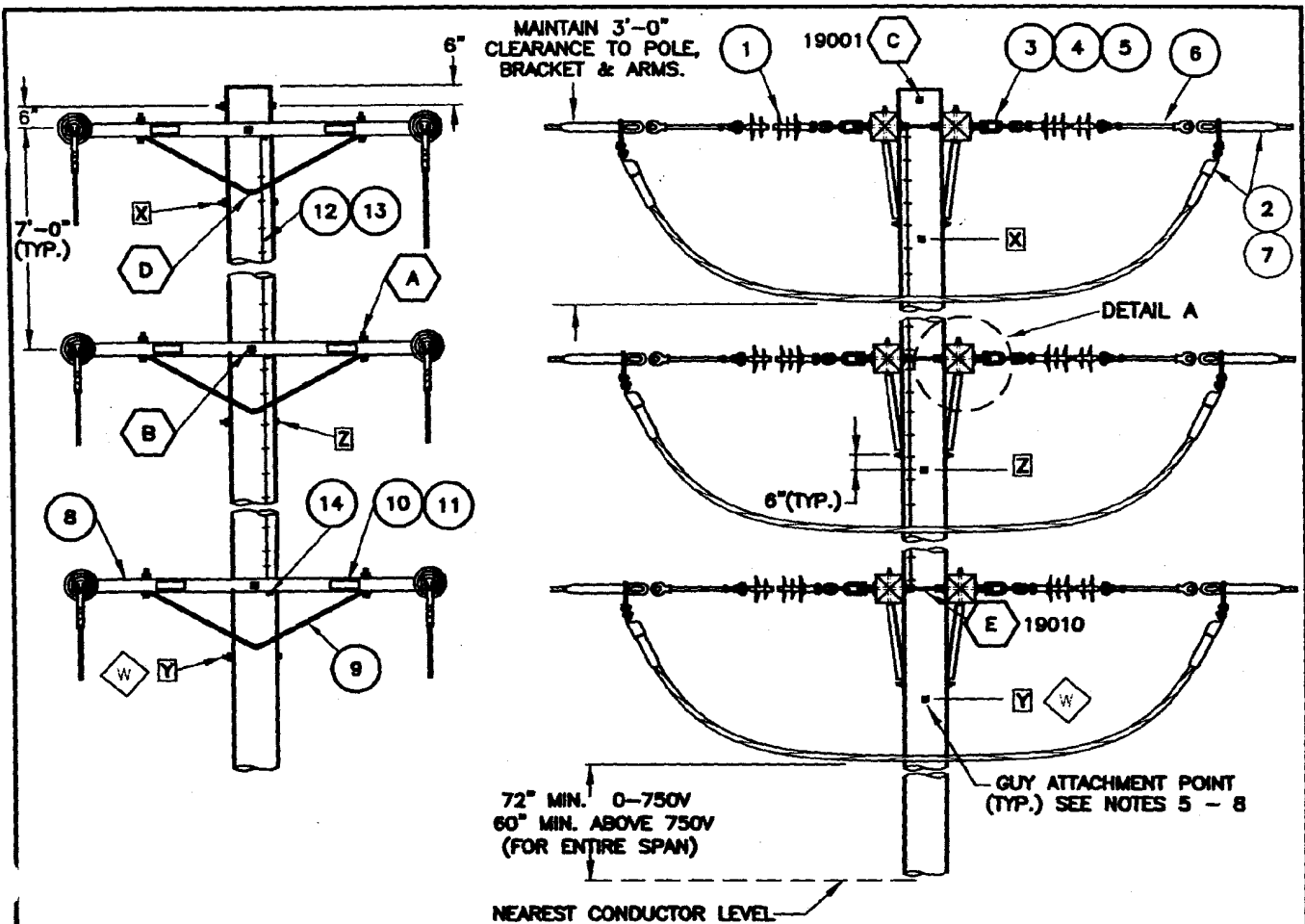


TABLE A

ITEM	QTY.	STOCK NO. OR STD. NO.	DESCRIPTION	CONDUCTOR SIZE
2	12	230672	CLAMP, STRAIN, ALUMINUM, RANGE 0.20-0.57', 15K	3/0 ACSR/AW 6/1
5	12	337602	EYE, SOCKET HOTLINE, EYE 11/16" WIDE, 30K	
6	6	256472	CONNECTOR, COMPRESSION, ALUM., JUMPER	
2	12	231700	CLAMP, STRAIN, ALUMINUM, RANGE 0.47-0.88', 25K	336.4 ACSR/AW 26/7
5	12	337604	EYE, SOCKET HOTLINE, EYE 3/4" WIDE, 30K	
6	6	650264	SLEEVE, ALUM., JUMPER	
2	12	230686	CLAMP, STRAIN, ALUMINUM, RANGE 0.71-1.318', 30K	636 ACSR/AW 24/7
5	12	337622	EYE, SOCKET HOTLINE, EYE 1 3/8" WIDE, 30K	
6	6	650656	SLEEVE, ALUM., JUMPER	
2	12	230686	CLAMP, STRAIN, ALUMINUM, RANGE 0.71-1.318', 30K	1,033.5 ACSR/AW 45/7
5	12	337622	EYE, SOCKET HOTLINE, EYE 1 3/8" WIDE, 30K	
6	6	650336	SLEEVE, ALUM., JUMPER	

B	CHANGED TITLE	WDF	SFO WPH	WWT	8/1/03	E						
A	UPDATED DRAWING	WDF	WPH	WWT	4/25/02	D	ADDED DETAIL	PM	WPH	WWT	7/12/06	
	ORIGINAL	SDF	DRB	WPH	3/23/00	C	ADDED REF.	WDF	GV WPH	WWT	6/1/04	
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	

TRANSMISSION ENGINEERING							SCALE: NONE			13176D03
	POLE TOP ARRANGEMENT TYPE DC-X30 DOUBLE CIRCUIT-ACSR 69KV WOOD POLE						DWG. NO.	SHT. NO.		
							13176	3 of 3		



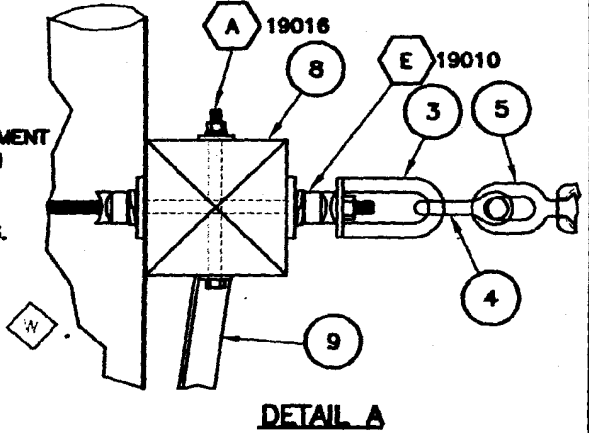
72" MIN. 0-750V
60" MIN. ABOVE 750V
(FOR ENTIRE SPAN)

GUY ATTACHMENT POINT
(TYP.) SEE NOTES 5 - 8

NEAREST CONDUCTOR LEVEL

NOTES:

1. **CAUTION:** DO NOT ATTEMPT TO ALIGN STRAIN CLAMP WITH WIRE UNDER TENSION - TWISTING MAY CAUSE FAILURE OF INSULATOR ROD.
2. **CAUTION:** WHEN USED IN ANGLE CONFIGURATION, GUY ARRANGEMENT MUST MEET THE GO-95 REQUIREMENTS FOR SEPARATION BETWEEN CONDUCTORS AND GUYS.
3. LINE ANGLE 0- 3 DEGREES.
4. MAXIMUM CONDUCTOR DESIGN TENSION NOT TO EXCEED 4000 LBS.
5. FOR GUYING INSTALL IN ORDER **X****Y****Z** SEE SECTION 15000 FOR GUY ATTACHMENT DETAILS.
6. USE FIBERGLASS LINK 16800 IN VICINITY OF JUMPER LOOPS.
7. FOR WIND LOAD, GUY ATTACHMENT MUST BE AT OR BELOW POINT **W**.
8. SEE JOB PACKAGE FOR GUY REQUIREMENTS.



DETAIL A

B						E					
A	ADDED DETAIL A	PM	WPH	WV	7/21/08	D					
	ORIGINAL	KSM	GV	WPH	8/1/97	C					
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

TRANSMISSION ENGINEERING						SCALE: NONE					
SDGE	POLE TOP ARRANGEMENT										13177A01
	TYPE DC-X3 DOUBLE CIRCUIT-ACSS										
	69kV WOOD POLE										
						DWG. NO.			SHT. NO.		
						13177			1 of 3		

BILL OF MATERIAL

ITEM	QTY.	STOCK NO. <i>STD. NO.</i>	DESCRIPTION	ACCT. NO.
1	12	431200	INSULATOR, SUSPENSION, POLYMER, 45-47" LONG, BALL (HOT END) AND SOCKET 25K SPECIFIED MECHANICAL LOAD	356
2		REF. TO TABLE A	DEAD END, COMPRESSION	356
3	12	235648	EYELET, STANDARD, 3/4" BOLT	356
4	12	636436	SHACKLE, ANCHOR, 30K	356
5	12	337542	EYE, OVAL BALL, 30K	356
6	12	236048	Y-CLEVIS, SOCKET, 30K	356
7	6#	246950	FILLER COMPOUND (LBS.)	355
8	6	294144	CROSSARM, 5-3/4" x 5-3/4" x 10'	355
9	6	164128	BRACE, CROSSARM, ANGLE 5'	355
10	1/3#	492224	NAIL, RFG. 7/8" #11 GALV. (LBS.)	355
11	6	647648	SIGN, HIGH VOLTAGE	355
12	1#	678528	STAPLES, 1-1/4" (LBS.)	355
13	2.5#	812928	WIRE, CU. SOFT, #8 AWG (LBS.)	355
14	3	269632	CONNECTOR, SPLIT BOLT	355
A	12	19018	ASSEMBLY, BOLT, 1/2" X-ARM BRACE	355
B	3	19012	ASSEMBLY, BOLT, 3/4" THRU	355
C	1	19001	ASSEMBLY, BOLT, 5/8" SPLIT	355
D	3	19018	ASSEMBLY, BOLT, 5/8" X-ARM BRACE	355
E	6	19010	ASSEMBLY, BOLT, 3/4" SPACE BONDED	355

B														
A	ADDED DETAIL A	PM	WPH	[Signature]	7/21/06	D								
	ORIGINAL	KSM	GV	WPH	8/1/97	C								
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE			


TRANSMISSION ENGINEERING						SCALE: NONE			
	POLE TOP ARRANGEMENT					DWC. NO.		SHT. NO.	
	TYPE DC-X3 DOUBLE CIRCUIT-ACSS					13177		2 of 3	
69kV WOOD POLE					13177A02				

TABLE A				
ITEM	QTY.	STOCK NO. OF STD. NO.	DESCRIPTION	ACCT NO.
			636 ACSS/AW 24/7 (ROOK/AW)	
2	12	652678	DEAD END, COMPRESSION, FOR 636 ROOK/ACSS/AW CONDUCTOR, FULL TENSION WITH STEEL EYE, 4-HOLE NEMA PAD & TERMINAL CONNECTOR	356
			900 ACSS/AW 54/7 (CANARY/AW)	
2	12	652682	DEAD END, COMPRESSION, FOR 900 CANARY/ACSS/AW CONDUCTOR, FULL TENSION WITH STEEL EYE, 4-HOLE NEMA PAD & TERMINAL CONNECTOR	356
			1033.5 ACSS/AW 45/7 (ORTOLAN/AW)	
2	12	652674	DEAD END, COMPRESSION, FOR 1033.5 ORTOLAN/ACSS/AW CONDUCTOR, FULL TENSION WITH STEEL EYE, 4-HOLE NEMA PAD & TERMINAL CONNECTOR	356

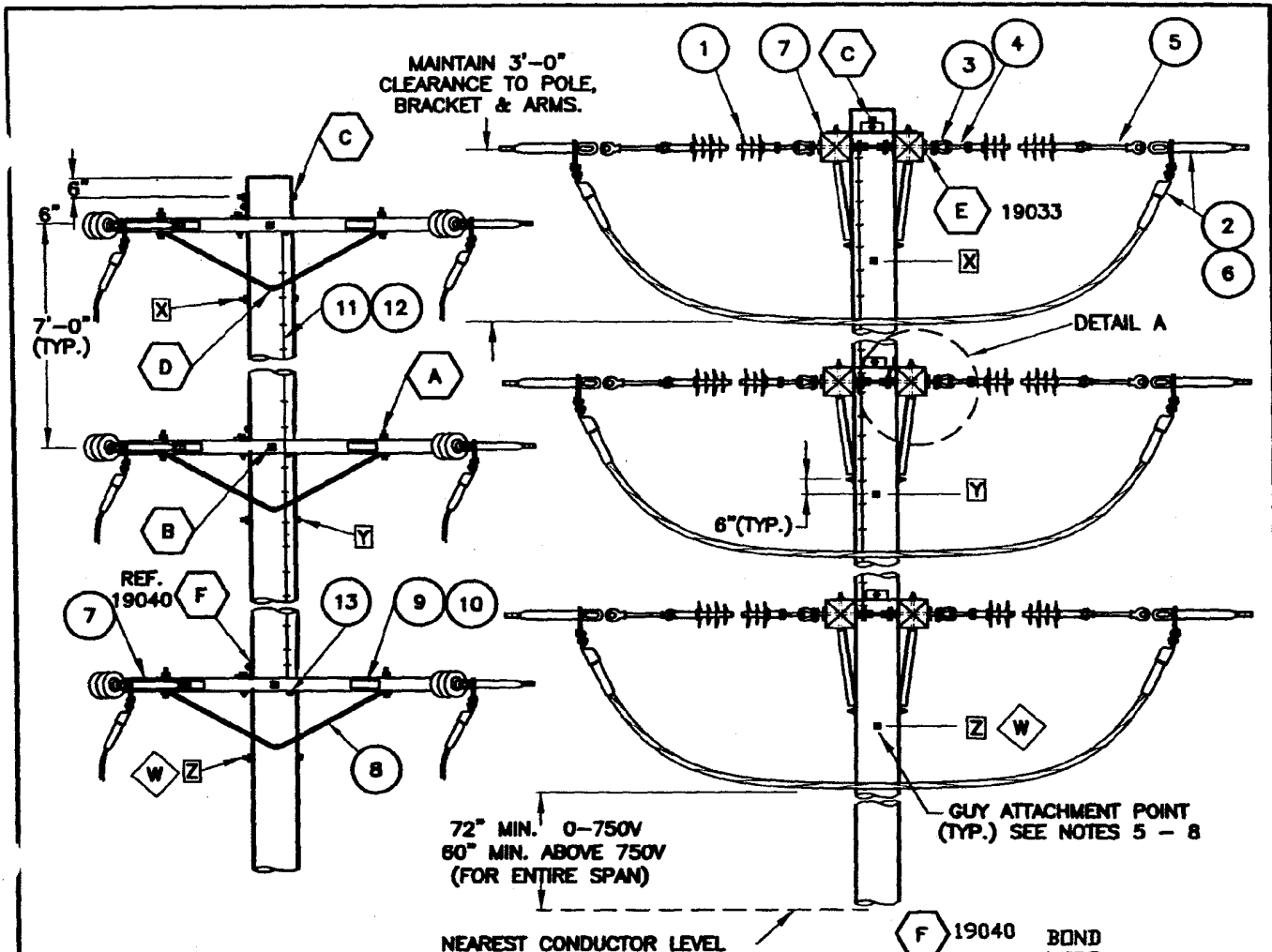
DIE SIZE TABLE		
CONDUCTOR	STEEL DIE	ALUMINUM DIE
ROOK	12SH	27AH
CANARY	14SH	30AH
ORTOLAN	10SH	34AH

NOTE:
 INSTALLATION OF THE COMPRESSION DEAD ENDS & COMPRESSION SPLICES, INCLUDING THE PROPER DIRECTION OF COMPRESSION, SHALL STRICTLY FOLLOW MANUFACTURE'S INSTRUCTIONS.

B						E					
A	ADDED DETAIL A	PM	WPH	WPH	7/21/08	D					
	ORIGINAL	KSM	GV	WPH	8/1/97	C					
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

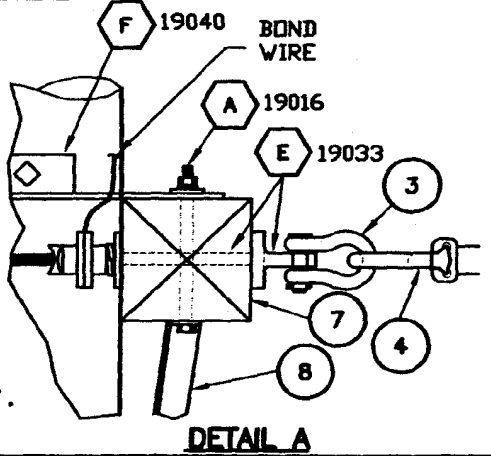
TRANSMISSION ENGINEERING						SCALE: NONE			
	POLE TOP ARRANGEMENT TYPE DC-X3 DOUBLE CIRCUIT-ACSS 69kV WOOD POLE					DWG. NO.		SHT. NO.	
						13177		3 of 3	

13177A03



NOTES:

1. **CAUTION:** DO NOT ATTEMPT TO ALIGN STRAIN CLAMP WITH WIRE UNDER TENSION - TWISTING MAY CAUSE FAILURE OF INSULATOR ROD.
2. **CAUTION:** WHEN USED IN ANGLE CONFIGURATION, GUY ARRANGEMENT MUST MEET THE GO-95 REQUIREMENTS FOR SEPARATION BETWEEN CONDUCTORS AND GUYS.
3. LINE ANGLE 3 - 30 DEGREES.
4. MAXIMUM CONDUCTOR DESIGN TENSION NOT TO EXCEED 4000 LBS.
5. FOR GUYING INSTALL IN ORDER SEE SECTION 15000 FOR GUY ATTACHMENT DETAILS.
6. USE FIBERGLASS LINK 15300 IN VICINITY OF JUMPER LOOPS.
7. FOR WIND LOAD, GUY ATTACHMENT MUST BE AT OR BELOW POINT .
8. SEE JOB PACKAGE FOR GUY REQUIREMENTS.



REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE
B	ADDED DETAIL	PM	WPH	WVT	7/21/06	E					
A	ADDED REF.	WDF	SFO WPH	WVT	6/1/04	D					
	ORIGINAL	WDF	SFO WPH	WVT	8/1/03	C					


	TRANSMISSION ENGINEERING	SCALE: NONE	
	POLE TOP ARRANGEMENT	DWG. NO.	SHT. NO.
	TYPE DC-X30 DOUBLE CIRCUIT-ACSS 69kV WOOD POLE	13178	1 of 3

15178801

BILL OF MATERIAL

ITEM	QTY.	STOCK NO. <i>STD. NO.</i>	DESCRIPTION	ACCT. NO.
1	12	431200	INSULATOR, SUSPENSION, POLYMER, 45-47" LONG, BALL (HOT END) AND SOCKET 25K SPECIFIED MECHANICAL LOAD	356
2		REF. TO TABLE A	DEAD END, COMPRESSION	356
3	12	636436	SHACKLE, ANCHOR, 30K	356
4	12	337542	EYE, OVAL BALL, 30K	356
5	12	236048	Y-CLEVIS, SOCKET, HOTLINE, 30K	356
6	6#	246950	FILLER COMPOUND (LBS.)	355
7	6	294176	CROSSARM, 5-3/4" x 5-3/4" x 12'	355
8	6	164160	BRACE, CROSSARM, ANGLE 6'	355
9	1/3#	492224	NAIL, RFG. 7/8" #11 GALV. (LBS.)	355
10	6	647648	SIGN, HIGH VOLTAGE	355
11	1#	678528	STAPLES, 1-1/4" (LBS.)	355
12	2.5#	812928	WIRE, CU. SOFT, #8 AWG (LBS.)	355
13	3	269632	CONNECTOR, SPLIT BOLT	355
A	12	19016	ASSEMBLY, BOLT, 1/2" X-ARM BRACE	355
B	3	19012	ASSEMBLY, BOLT, 3/4" THRU	355
C	1	19001	ASSEMBLY, BOLT, 5/8" SPLIT	355
D	3	19016	ASSEMBLY, BOLT, 5/8" X-ARM BRACE	355
E	6	19033	ASSEMBLY, TEE DEAD END	355
F	3	19040	ASSEMBLY, THRUST PLATE	355

B	ADDED DETAIL	PM	WPH	WY	7/21/06	E					
A	ADDED REF.	WDF	SFO WPH	WWT	6/1/04	D					
	ORIGINAL	WDF	SFO WPH	WWT	8/1/03	C					
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

TRANSMISSION ENGINEERING						SCALE: NONE			
	POLE TOP ARRANGEMENT TYPE DC-X30 DOUBLE CIRCUIT-ACSS 69KV WOOD POLE					DWG. NO.		SHT. NO.	
						13178		2 of 3	

13178B02

TABLE A

ITEM	QTY.	STOCK NO. OF STD. NO.	DESCRIPTION	ACCT NO.
			636 ACSS/AW 24/7 (ROOK/AW)	
2	12	652678	DEAD END, COMPRESSION, FOR 636 ROOK/ACSS/AW CONDUCTOR, FULL TENSION WITH STEEL EYE, 4-HOLE NEMA PAD & TERMINAL CONNECTOR	356
			900 ACSS/AW 54/7 (CANARY/AW)	
2	12	652682	DEAD END, COMPRESSION, FOR 900 CANARY/ACSS/AW CONDUCTOR, FULL TENSION WITH STEEL EYE, 4-HOLE NEMA PAD & TERMINAL CONNECTOR	356
			1033.5 ACSS/AW 45/7 (ORTOLAN/AW)	
2	12	652674	DEAD END, COMPRESSION, FOR 1033.5 ORTOLAN/ACSS /AW CONDUCTOR, FULL TENSION WITH STEEL EYE, 4-HOLE NEMA PAD & TERMINAL CONNECTOR	356

DIE SIZE TABLE

CONDUCTOR	STEEL DIE	ALUMINUM DIE
ROOK	12SH	27AH
CANARY	14SH	30AH
ORTOLAN	10SH	34AH

NOTE:

INSTALLATION OF THE COMPRESSION DEAD ENDS & COMPRESSION SPLICES, INCLUDING THE PROPER DIRECTION OF COMPRESSION, SHALL STRICTLY FOLLOW MANUFACTURE'S INSTRUCTIONS.

B	ADDED DETAIL	PM	WPH	WVT	7/21/06	E					
A	ADDED REF.	WDF	SFO WPH	WVT	6/1/04	D					
	ORIGINAL	WDF	SFO WPH	WVT	8/1/03	C					
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

TRANSMISSION ENGINEERING

SCALE: NONE



**POLE TOP ARRANGEMENT
TYPE DC-X30 DOUBLE CIRCUIT-ACSS
69KV WOOD POLE**

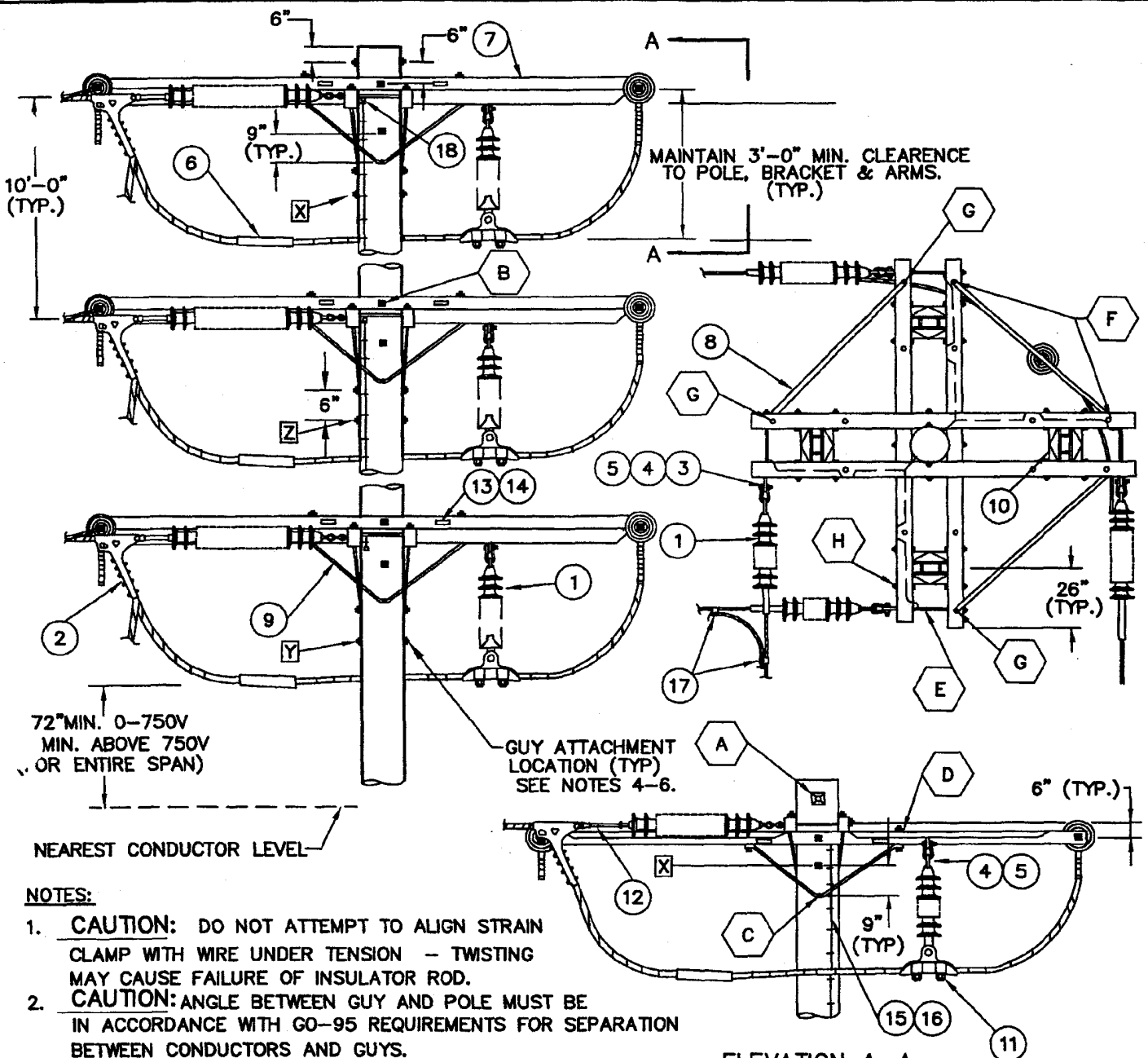
DWG. NO.

SHT. NO.

13178

3 of 3

13178B01



ELEVATION A-A

NOTES:

1. **CAUTION:** DO NOT ATTEMPT TO ALIGN STRAIN CLAMP WITH WIRE UNDER TENSION - TWISTING MAY CAUSE FAILURE OF INSULATOR ROD.
2. **CAUTION:** ANGLE BETWEEN GUY AND POLE MUST BE IN ACCORDANCE WITH GO-95 REQUIREMENTS FOR SEPARATION BETWEEN CONDUCTORS AND GUYS.
3. MAXIMUM CONDUCTOR DESIGN TENSION NOT TO EXCEED 4000 LBS.
4. FOR GUYING INSTALL IN ORDER **X|Y|Z** BOTH DIRECTIONS. SEE SECTION 15000 FOR GUY ATTACHMENT DETAILS.
5. USE FIBERGLASS LINK 15309 IN VICINITY OF JUMPER LOOPS.
6. SEE JOB PACKAGE FOR GUYING REQUIREMENTS.
7. BOND WIRES MUST CLEAR ALL BRACES AND ASSOCIATED HARDWARE BY AT LEAST 3".

D	UPDATED ITEMS 11, F & G ON SHTS. 1 & 2	WDF	GV WPH	AYT	6/1/04	C	CHANGED TITLE	WDF	SFO WPH	WVT	8/1/03
-	ORIGINAL ISSUE	KSM	GV	WPH	8/01/97	B	UPDATED DRAWING	WDF	WPH	WVT	4/25/02
RFV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE



TRANSMISSION ENGINEERING

**POLE TOP ARRANGEMENT
TYPE DC-H DOUBLE CIRCUIT-ACSR
69kV WOOD POLE**

SCALE: NONE	
DWG. NO.	SHT. NO.
13180	1 of 3

13180D01

BILL OF MATERIAL

ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
1	15	431200	INSULATOR, SUSPENSION, POLYMER, 45-47" LONG, BALL (HOT END) AND SOCKET 25,000 LBS ULT. TENSILE STRENGTH	356
2		REF. TO TABLE A	CLAMP, STRAIN, WITHOUT SOCKET EYE	356
3	12	235648	EYELET, STANDARD, 3/4"	355
4	15	636436	SHACKLE, ANCHOR, 30K	356
5	15	337542	EYE, OVAL BALL, 30K	356
6		REF. TO TABLE A	CONNECTOR, JUMPER SLEEVE	356
7	12	294176	CROSSARM, 5-3/4" x 5-3/4" x 12'	355
8	9	164416	BRACE, HORIZONTAL, ANGLE, 7'	355
9	12	164160	BRACE, CROSSARM ANGLE 6'	355
10	12	165796	BRACKET, DOUBLE ARMING	355
11		REF. TO TABLE A	CLAMP, SUSPENSION WITHOUT SOCKET EYE	356
12		REF. TO TABLE A	EYE, SOCKET, HOTLINE, 30K	356
13	3/5#	492224	NAIL, RFG. 7/8"-#11 GALV. (LBS.)	355
14	12	647648	SIGN, HIGH VOLTAGE	355
15	1#	678528	STAPLES, 1-1/4" (LBS)	355
16	6#	812928	WIRE, CU. SOFT, #8 AWG (LBS)	355
17		REF. TO TABLE A	CONNECTOR, WEDGE	355
18	6	269632	CONNECTOR, SPLIT BOLT	355
A	1	19001	ASSEMBLY, BOLT, 5/8" SPLIT	355
B	6	19012	ASSEMBLY, BOLT, 3/4" THRU	355
C	6	19016	ASSEMBLY, BOLT, 5/8" X-ARM BRACE	355
D	24	19016	ASSEMBLY, BOLT, 1/2" X-ARM BRACE	355
E	12	19010	ASSEMBLY, BOLT, 3/4" SPACE	355
F	6	19004	ASSEMBLY, BOLT, 5/8" BONDED, X-ARM	355
G	12	19002	ASSEMBLY, BOLT, 5/8" X-ARM	355
H	48	19002	ASSEMBLY, BOLT, 5/8" X-ARM	355

D	UPDATED ITEMS 11, F & G ON SHTS. 1 & 2	WDF	GV WPH	LVT	6/1/04	C	CHANGED TITLE	WDF	SFO WPH	WVT	8/1/03	13180D02
-	ORIGINAL ISSUE	KSM	GV	WPH	8/01/97	B	UPDATED DRAWING	WDF	WPH	WVT	4/25/02	
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	



TRANSMISSION ENGINEERING

POLE TOP ARRANGEMENT
TYPE DC-H DOUBLE CIRCUIT-ACSR
69KV WOOD POLE


SCALE: NONE

DWG. NO.	SHT. NO.
13180	2 of 3

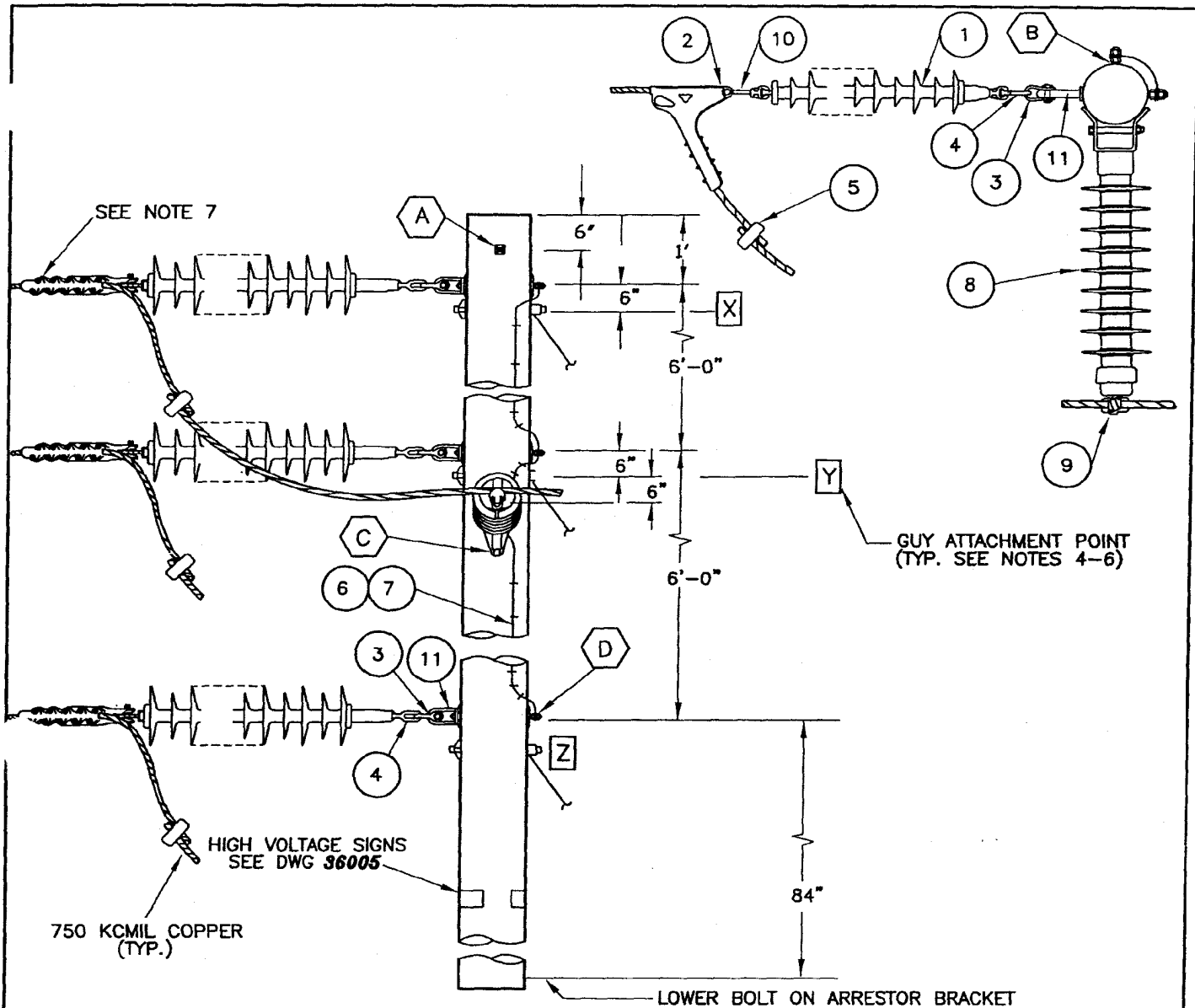
TABLE A

ITEM	QTY.	STOCK NO. OR STD. NO.	DESCRIPTION	CONDUCTOR SIZE
2	12	230672	CLAMP, STRAIN, ALUMINUM, RANGE 0.20-0.57", 15K	3/0 ACSR/AW 6/1
6	3	256472	CONNECTOR, COMPRESSION, ALUM., JUMPER	
11	3	232224	CLAMP, SUSPENSION, RANGE 0.4-0.85"	
12	12	337602	EYE, SOCKET HOTLINE, EYE 11/16" WIDE, 30K	
17	6	227968	CONNECTOR, PARALLEL GROVE, 3/0	
2	12	231700	CLAMP, STRAIN, ALUMINUM, RANGE 0.4-0.88", 25K	336.4 ACSR/AW 26/7
6	3	650264	SLEEVE, ALUM., JUMPER	
11	3	232224	CLAMP, SUSPENSION, RANGE 0.4-0.85"	
12	12	337604	EYE, SOCKET HOTLINE, EYE 3/4" WIDE, 30K	
17	6	269730	CONNECTOR, WEDGE, 336.4	
2	12	230686	CLAMP, STRAIN, ALUMINUM, RANGE 0.71-1.318K", 30K	636 ACSR/AW 24/7
6	3	650656	SLEEVE, ALUM., JUMPER	
11	3	232160	CLAMP, SUSPENSION, RANGE 0.7-1.19"	
12	12	337622	EYE, SOCKET HOTLINE, EYE 1 3/8" WIDE, 30K	
17	6	269784	CONNECTOR, WEDGE, 636	
2	12	230686	CLAMP, STRAIN, ALUMINUM, RANGE 0.71-1.318", 30K	1,033.50 ACSR/AW 45/7
6	3	650336	SLEEVE, ALUM., JUMPER	
11	3	232192	CLAMP, SUSPENSION, RANGE 1.25-1.82"	
12	12	337622	EYE, SOCKET HOTLINE, EYE 1 3/8" WIDE, 30K	
17	6	269766	CONNECTOR, WEDGE, 1,033.5	

D	REV. SHTS. 1 & 2	WDF	WPH	WVT	6/1/04	C	CHANGED TITLE	WDF	SFO	WPH	WVT	8/1/03
-	ORIGINAL ISSUE	---	---	---	---	B	UPDATED DRAWING	WDF	WPH	WVT		4/25/02
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	

	TRANSMISSION ENGINEERING				SCALE: NONE			
	POLE TOP ARRANGEMENT TYPE DC-H DOUBLE CIRCUIT-ACSR 69kV WOOD POLE				DWG. NO.		SHT. NO.	
					13180		3of3	

13180D03



NOTES:

1. **CAUTION:** DO NOT ATTEMPT TO ALIGN STRAIN CLAMP WITH WIRE UNDER TENSION - TWISTING MAY CAUSE FAILURE OF INSULATOR ROD.
2. FOR USE WITH DWINGS 11022-01 OR 11505-01.
3. MAXIMUM CONDUCTOR DESIGN TENSION NOT TO EXCEED 4000 LBS. UNLESS OTHERWISE APPROVED.
4. FOR GUYING INSTALL IN ORDER .
5. SEE SECTION **15000** FOR GUY DETAILS.
6. SEE JOB PACKAGE FOR GUYING REQUIREMENTS.
7. ALIGN STRAIN CLAMPS ITEM #2 TO GIVE BEST CLEARANCE.

C	UPDATED TITLE & SHT.3	WDF	SFO WPH	WVT	8/1/03	E	REVISED ITEM 5 FOR 1033 ACSR SHT 3	PM	WPH	WVT	2/22/05
B	MISC. UPDATE	WDF	WPH	WVT	4/25/02	D	DELETED H. VOLTAGE SIGNS	PM	CV WPH	WVT	8/15/04
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

SDGE	TRANSMISSION ENGINEERING						SCALE: NONE	
	POLE TOP ARRANGEMENT 69KV WOOD CABLE POLE-ACSR						DWG. NO.	SHT. NO.
							13190	1 of 3

13190E01

BILL OF MATERIAL

ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
1	3	431200	INSULATOR, SUSPENSION, POLYMER, 45-47" LONG, BALL (HOT END) AND SOCKET 25K SPECIFIED MECHANICAL LOAD	356
2	3	SEE SHT. 3 TABLE A	CLAMP, STRAIN, WITHOUT SOCKET EYE	356
3	3	636436	SHACKLE, ANCHOR, 30K	356
4	3	337542	EYE, OVAL, BALL, 30K	356
5	3	SEE SHT. 3 TABLE A	CONNECTOR, JUMPER	356
6	1#	812928	WIRE, CU. SOFT #8 (LBS.)	355
7	1/4#	678528	STAPLES, 1-1/4" (LBS.)	355
8	1	429298	INSULATOR POST, POLYMER, 41-44" LONG, BENDABLE GAIN BASE AND CLAMPTOP, 4,000 LBS CANTILEVER BREAKING LOAD	355
9	1	227872	CLAMP, POST INSULATOR, GALV., RANGE 0.7 TO 1.06"	356
10	3	SEE SHT. 3 TABLE A	EYE, SOCKET, HOT LINE 30KIP	356
11	3	235648	EYELET, STD., 3/4"	356
A	1	19001	ASSEMBLY, BOLT, 5/8" SPLIT	355
B	1	19022	ASSEMBLY, BOLT, 3/4" POST BONDED INSULATOR MTG., ONE SIDE TOP	355
C	1	19022	ASSEMBLY, BOLT, 3/4" POST INSULATOR MTG., ONE SIDE BOTTOM	355
D	3	19026	ASSY, BOLT, 3/4" BONDED	355

C	UPDATED TITLE & SHT.3	WDF	SFO WPH	WVT	8/1/03	E	REVISED ITEM 5 FOR 1033 ACSR SHT 3	PM	WPH	WVT	2/22/05
B	MISC. UPDATE	WDF	WPH	WVT	4/25/02	D	DELETED H. VOLTAGE SIGNS	PM	GV WPH	WVT	8/15/04
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

13190E02


	TRANSMISSION ENGINEERING				SCALE: NONE	
	POLE TOP ARRANGEMENT 69KV WOOD CABLE POLE-ACSR				DWG. NO.	SHT. NO.
					13190	2 of 3


TABLE A

ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	CONDUCTOR
2	3	231700	CLAMP, STRAIN, ALUMINUM, RANGE .47 - .88",25K	336.4 ACSR/AW 26/7
12	3	337604	EYE, SOCKET HOTLINE, EYE 3/4" WIDE, 30K	
5	3	228032	CONNECTOR, TWO-BOLT, 336.4 ACSR TO 750 KCMIL COPPER	
2	3	230686	CLAMP, STRAIN, ALUMINUM, RANGE .71 - 1.38",30K	636 ACSR/AW 24/7
12	3	337622	EYE, SOCKET HOTLINE, EYE 1 - 3/8" WIDE, 30K	
5	3	269791	CONNECTOR, WEDGE, 636 ACSR TO 750 KCMIL COPPER	
2	3	230686	CLAMP, STRAIN, ALUMINUM, RANGE .71 - 1.38",30K	1033.5 ACSR/AW 45/7
12	3	337622	EYE, SOCKET HOTLINE, EYE 1 - 3/8" WIDE, 30K	
5	3	269789	CONNECTOR, WEDGE, 1033 ACSR TO 750 KCMIL COPPER	

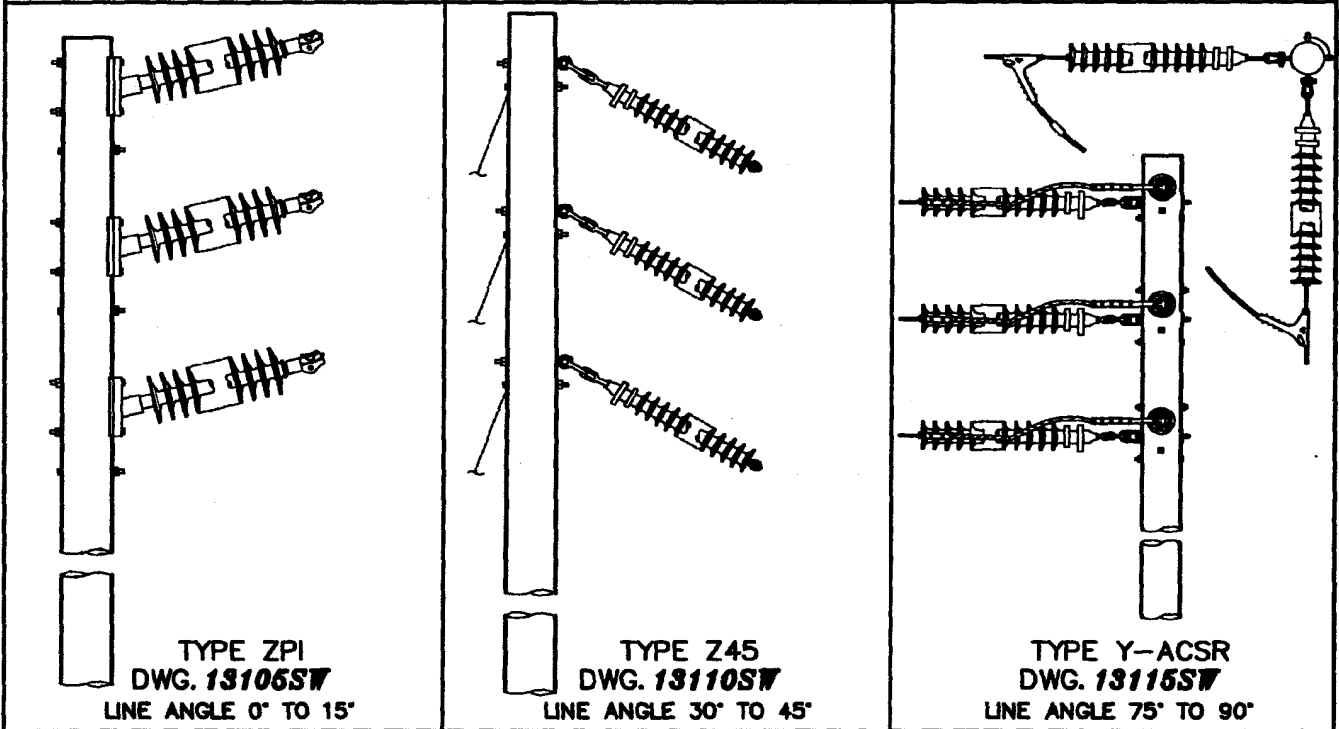
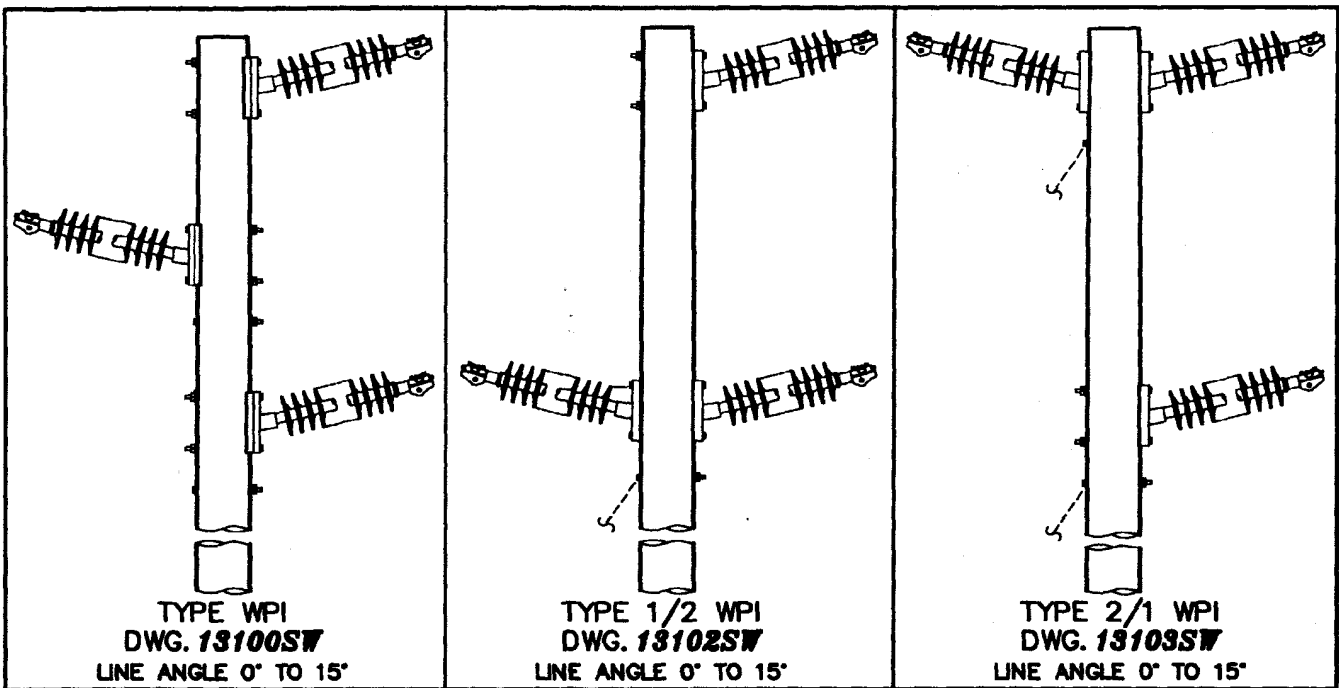
NOTE:

1. PLACE COPPER WIRE AT THE SAME LEVEL OR BELOW ALUMINUM WIRE IN THE CONNECTOR.

C	UPDATED TITLE & SHT.3	WDF	SFO WPH	WVT	8/1/03	E	REVISED ITEM 5 FOR 1033 ACSR SHT 3	PM	WPH	WVT	2/22/05
B	MISC. UPDATE	WDF	WPH	WVT	4/25/02	D	DELETED H. VOLTAGE SIGNS	PM	GV WPH	WVT	8/15/04
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

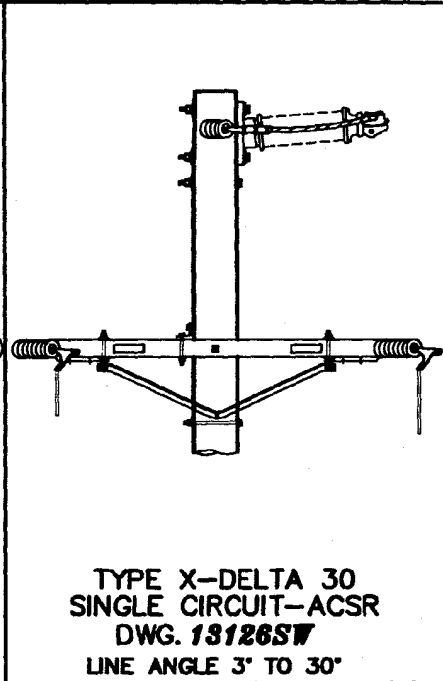
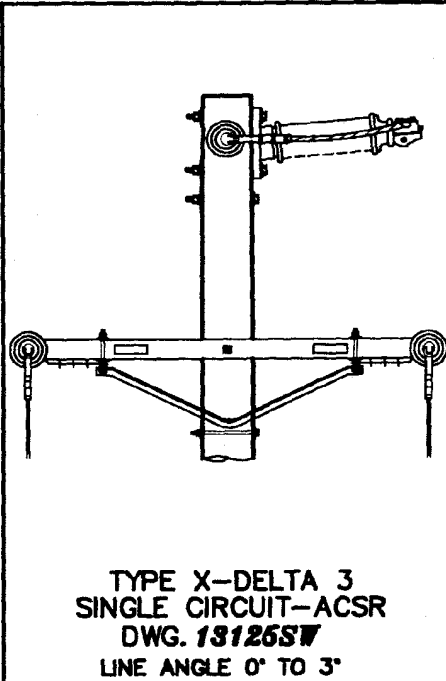
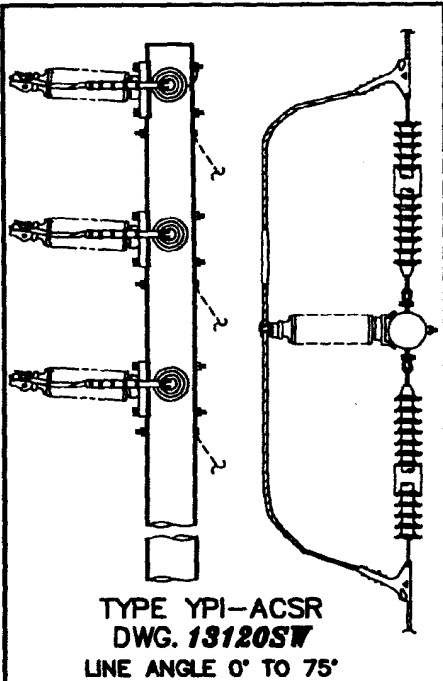
	TRANSMISSION ENGINEERING						SCALE: NONE	
	POLE TOP ARRANGEMENT 69kV WOOD CABLE POLE-ACSR						DWC. NO.	SHT. NO.
							13190	3of3

13190E03



-	ORIGINAL ISSUE	LLD	WPH	<i>ack</i>	9/12/08								
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE		


SDGE	TRANSMISSION ENGINEERING	SCALE: NONE	
	POLE TOP INDEX SINGLE CIRCUIT 69KV SW POLES	DWG. NO.	SHT. NO.
		13001SW	1 of 5

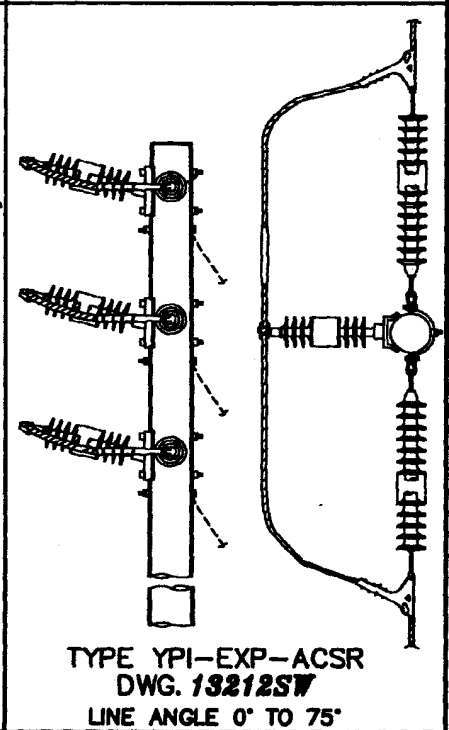
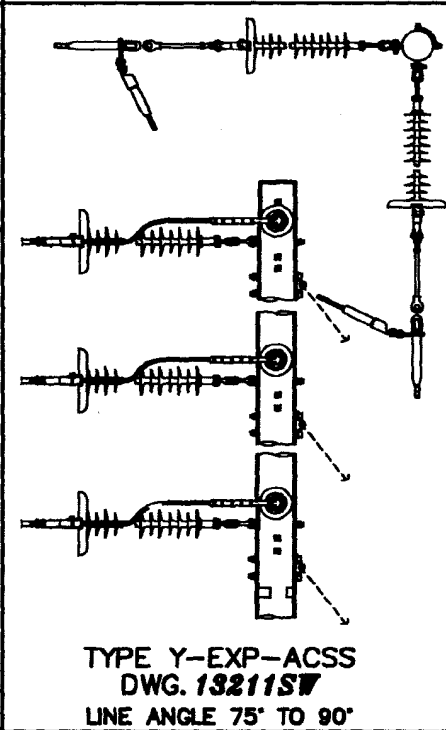
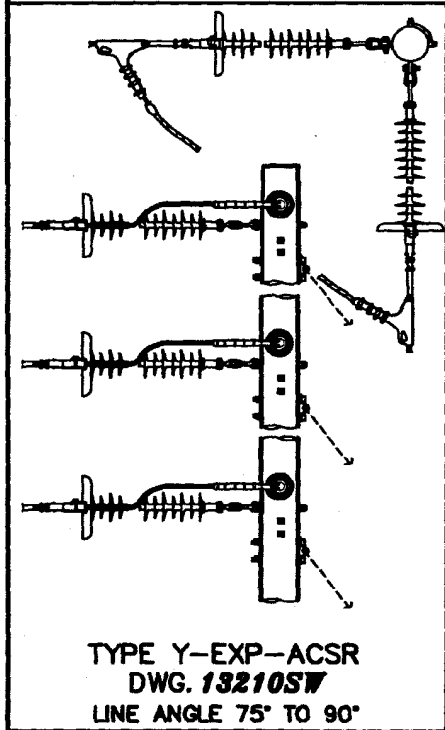
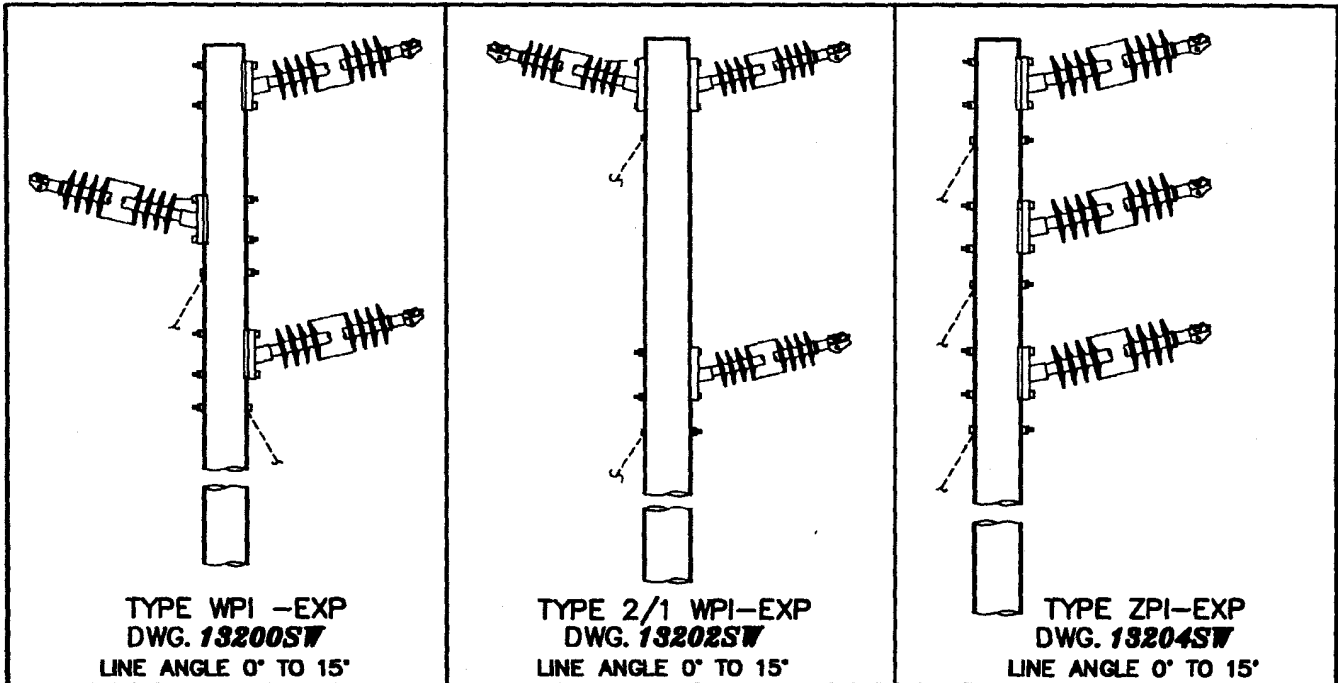


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(RESERVED)

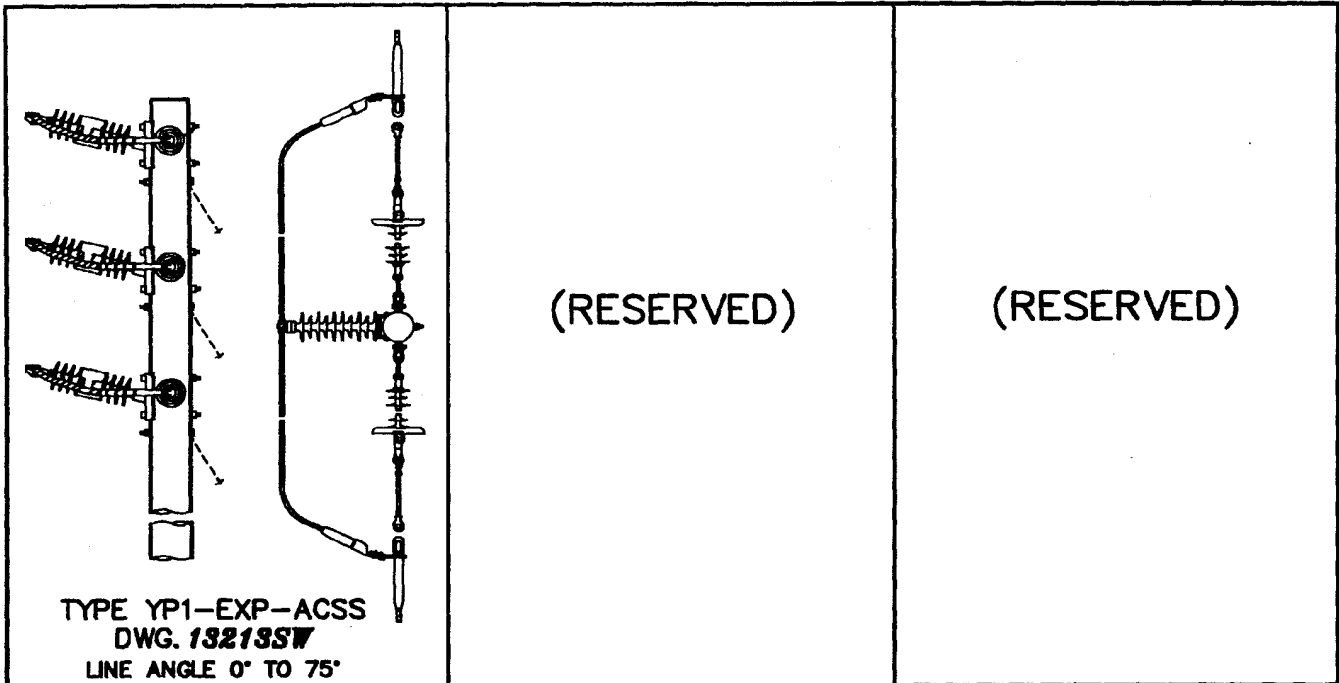
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-	ORIGINAL ISSUE	LLD	WPH	QAA	9/12/08								
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE		
TRANSMISSION ENGINEERING										SCALE: NONE			
	POLE TOP INDEX SINGLE CIRCUIT 69KV SW POLES										DWG. NO.	SHT. NO.	
											13001SW	2 of 5	



—	ORIGINAL ISSUE	LLD	WPH	204	9/12/08														
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE								

SDGE	POLE TOP INDEX EXPANDED SINGLE CIRCUIT 69kV SW POLES	SCALE: NONE	
		DWG. NO.	SHT. NO.
		13001SW	3 of 5



(RESERVED)

(RESERVED)

(RESERVED)

(RESERVED)

(RESERVED)

-	ORIGINAL ISSUE	LLD	WPH	<i>DDA</i>	9/12/08								
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE		

TRANSMISSION ENGINEERING

SCALE: NONE



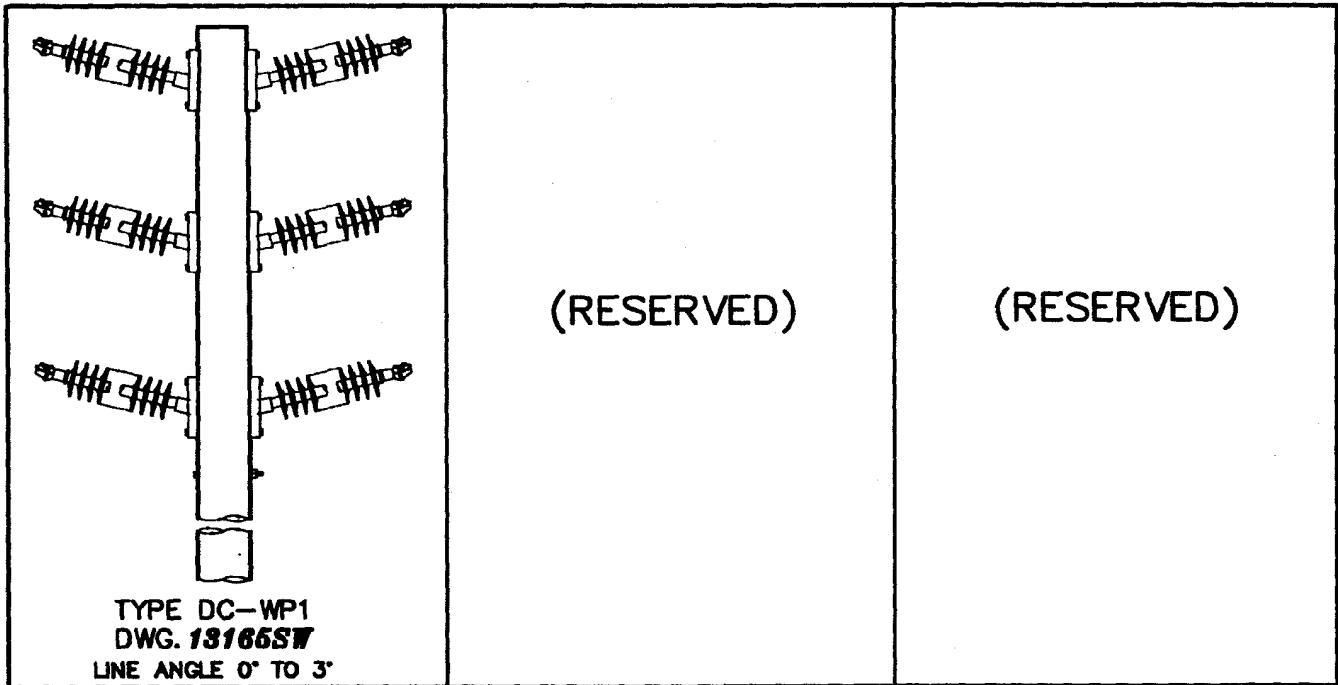
**POLE TOP INDEX
EXPANDED SINGLE CIRCUIT
69KV SW POLES**

DWG. NO.

SHT. NO.

13001SW

4 of 5



(RESERVED)

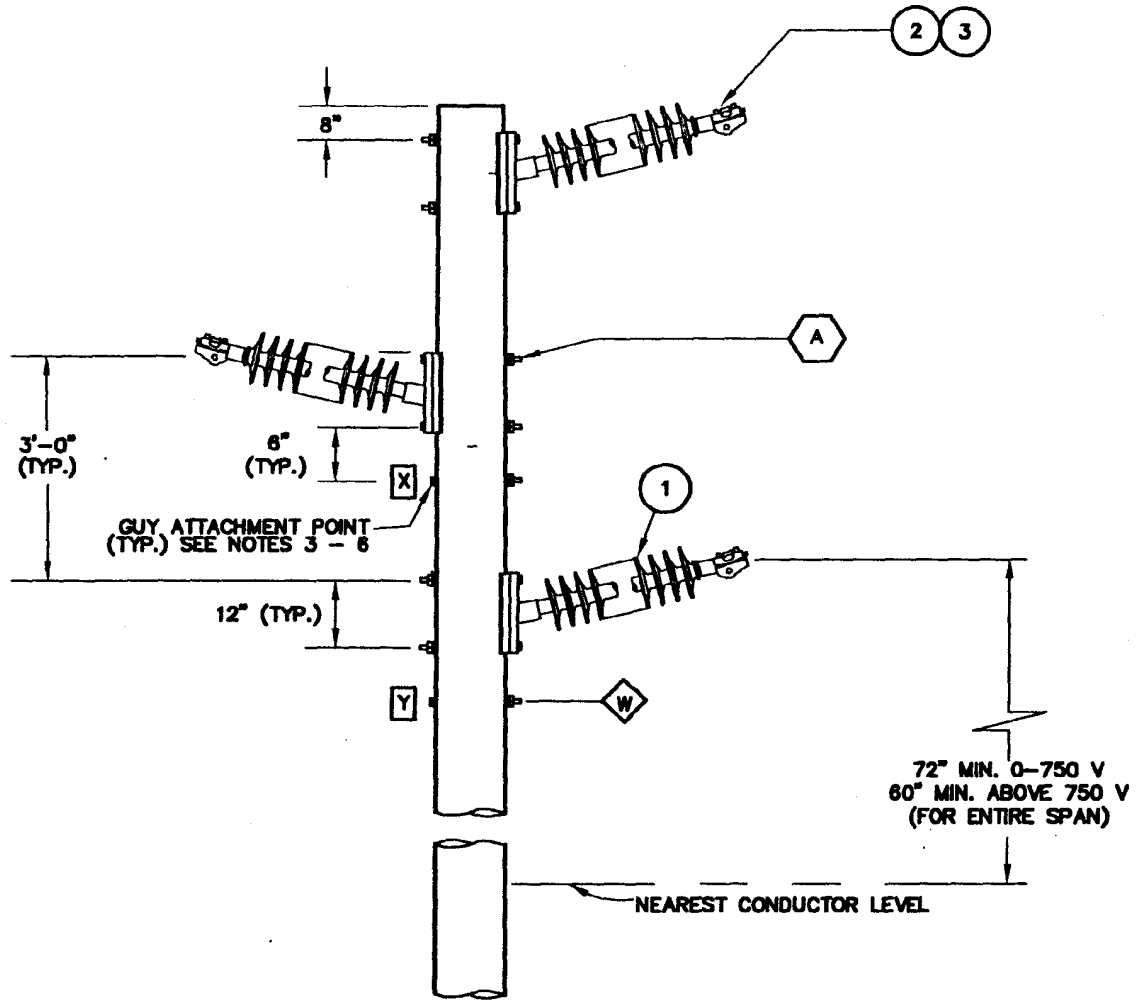
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(RESERVED)

(RESERVED)

(RESERVED)

REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE
-	ORIGINAL ISSUE	LLD	WPH	QW	9/12/08						
TRANSMISSION ENGINEERING								SCALE: NONE			
	POLE TOP INDEX DOUBLE CIRCUIT 69kV SW POLES						DWG. NO.		SHT. NO.		
							13001SW		5 of 5		



NOTES:

1. LINE ANGLE NOT TO EXCEED 15 DEGREES.
2. VERTICAL LOAD ON POST INSULATOR NOT TO EXCEED 1250 LBS. WITHOUT PRIOR APPROVAL.
3. FOR GUYING, INSTALL IN ORDER .
4. FOR WIND LOAD, GUY ATTACHMENT MUST BE AT OR BELOW POINT .
5. SEE SECTION **15000** FOR GUY DETAILS.
6. SEE JOB PACKAGE FOR GUYING REQUIREMENTS.

	ORIGINAL	LLD	WPH	2016	5/20/08						
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

TRANSMISSION ENGINEERING						SCALE: NONE						
SDGE	POLE TOP ARRANGEMENT TYPE WPI SINGLE CIRCUIT 69kV SW POLE						DWG. NO.			SHT. NO.		
							13100SW			1 of 3		

BILL OF MATERIAL

ITEM	QTY.	STOCK NO. or <i>STD. NO.</i>	DESCRIPTION	ACCT. NO.
1	3	429298	INSULATOR, POST, POLYMER, 41"-44" LONG. BENDABLE GAIN BASE AND CLAMPTOP, 4,000 LBS. CANTILEVER BREAKING LOAD	356
2		SEE SHT.3 TABLE A	CLAMP, POST INSULATOR	356
3		SEE SHT.3 TABLE A	GUARD, LINE (IF REQUIRED)	356
A	6	<i>19022SW</i>	ASSEMBLY, BOLT, 3/4" POST INSULATOR MTG., ONE SIDE	355

			/					/			
	ORIGINAL	LLD	WPH	<i>OCG</i>	5/20/08			/			
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE


TRANSMISSION ENGINEERING						SCALE: NONE					
POLE TOP ARRANGEMENT TYPE WPI SINGLE CIRCUIT 69KV SW POLE						<i>DWG. NO.</i>			<i>SHT. NO.</i>		
						13100SW			2 of 3		

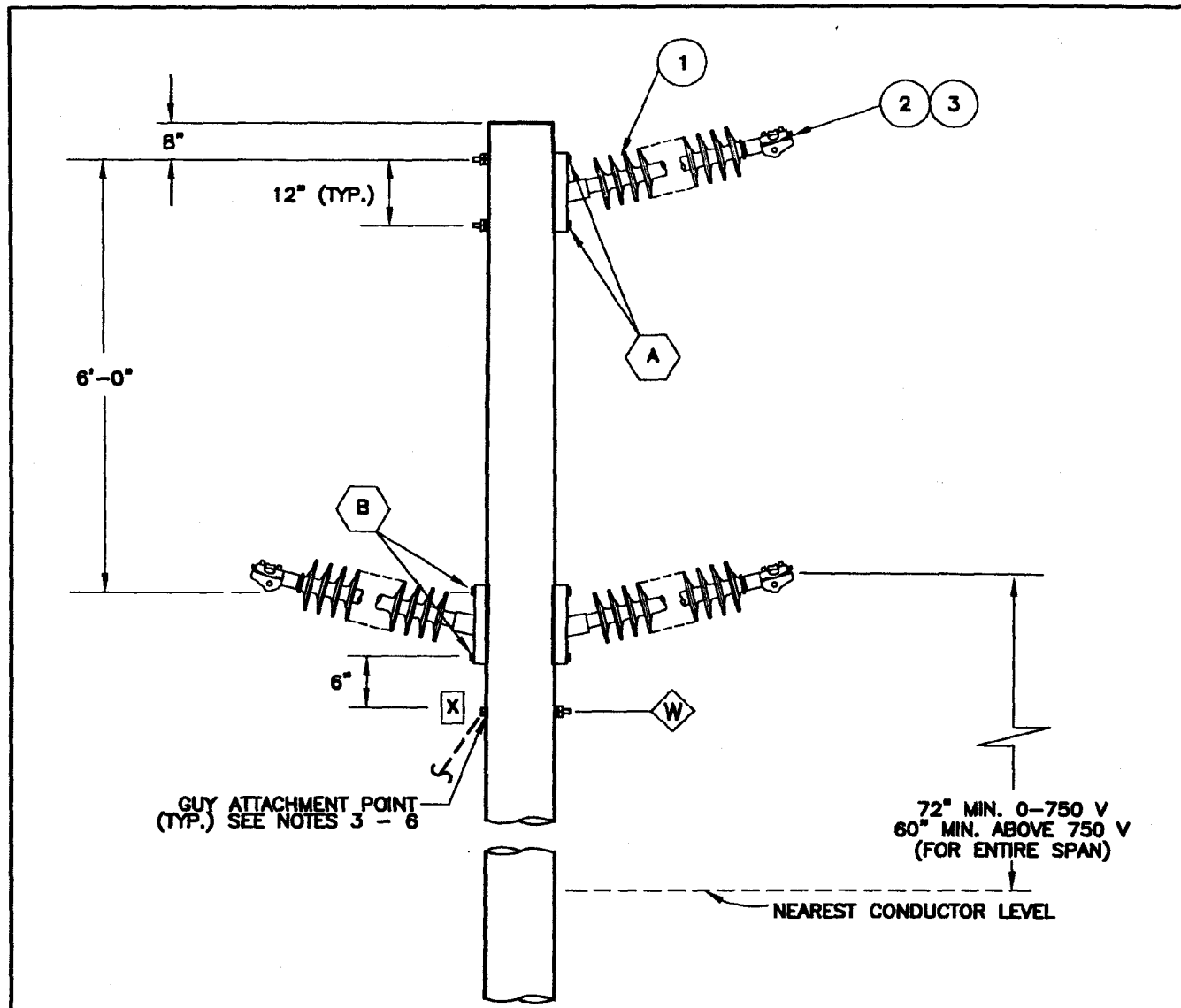
13100SW

TABLE A

ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	CONDUCTOR SIZE
2	3	229696	CLAMP, POST INSULATOR, RANGE 0.35-0.84"	3/0 ACSR/AW 6/1
3	3	397568	GUARD, LINE, O.D. 0.744", LENGTH 29"	
2	3	229760	CLAMP, POST INSULATOR, RANGE 1.0-1.5"	336.4 ACSR/AW 26/7
3	3	397664	GUARD, LINE, O.D. 1.013", LENGTH 37"	
2	3	229760	CLAMP, POST INSULATOR, RANGE 1.0-1.5"	636 ACSR/AW 24/7
3	3	397728	GUARD, LINE, O.D. 1.34", LENGTH 45"	636 ACSS/AW 24/7
2	3	229792	CLAMP, POST INSULATOR, RANGE 1.5-2.0"	900 ACSS/AW 54/7
3	3	397760	GUARD, LINE, O.D. 1.662", LENGTH 53"	
2	3	229792	CLAMP, POST INSULATOR, RANGE 1.5-2.0"	1,033.5 ACSR/AW 45/7
3	3	397760	GUARD, LINE, O.D. 1.713", LENGTH 53"	1,033.5 ACSS/AW 45/7

	ORIGINAL	LLD	WPH	<i>DGK</i>	5/20/08							
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	

	TRANSMISSION ENGINEERING				SCALE: NONE	
	POLE TOP ARRANGEMENT				DWG. NO.	SHT. NO.
	TYPE WPI SINGLE CIRCUIT				13100SW	3 of 3
69kV SW POLE					13100SW	



NOTES:

1. LINE ANGLE NOT TO EXCEED 15 DEGREES.
2. VERTICAL LOAD ON POST INSULATOR NOT TO EXCEED 1250 LBS. WITHOUT PRIOR APPROVAL.
3. FOR WIND LOAD, GUY ATTACHMENT MUST BE AT OR BELOW POINT **W**.
4. SEE SECTION 15000 FOR GUY DETAILS.
5. SEE JOB PACKAGE FOR GUYING REQUIREMENTS.


	ORIGINAL	LLD	WPH	QCW	5/20/08						
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

TRANSMISSION ENGINEERING							SCALE: NONE				
SDGE	POLE TOP ARRANGEMENT TYPE 1/2 WPI SINGLE CIRCUIT 69kV SW POLE						DWG. NO.			SHT. NO.	
							13102SW			1 of 3	

BILL OF MATERIAL

ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
1	3	429298	INSULATOR, POST, POLYMER 41-44" LONG, BENDABLE GAIN BASE AND CLAMPTOP, 4,000 LBS CANTILEVER BREAKING LOAD	356
2		SEE SHT.3 TABLE A	CLAMP, POST INSULATOR	356
3		SEE SHT.3 TABLE A	GUARD, LINE (IF REQUIRED)	356
A	2	<i>19022SW</i>	ASSEMBLY, BOLT, 3/4" POST INSULATOR MTG., ONE SIDE	355
B	2	<i>19024SW</i>	ASSEMBLY, BOLT, 3/4" POST INSULATOR MTG., BOTH SIDES	355

		LLD	WPH	<i>2008</i>	5/20/08						
<i>REV</i>	<i>CHANGE</i>	<i>BY</i>	<i>CHKD</i>	<i>APPV</i>	<i>DATE</i>	<i>REV</i>	<i>CHANGE</i>	<i>BY</i>	<i>CHKD</i>	<i>APPV</i>	<i>DATE</i>


TRANSMISSION ENGINEERING						SCALE: NONE						
	POLE TOP ARRANGEMENT TYPE 1/2 WPI SINGLE CIRCUIT 69KV SW POLE						<i>DWG. NO.</i>			<i>SHT. NO.</i>		
							13102SW			2 of 3		

13103SW

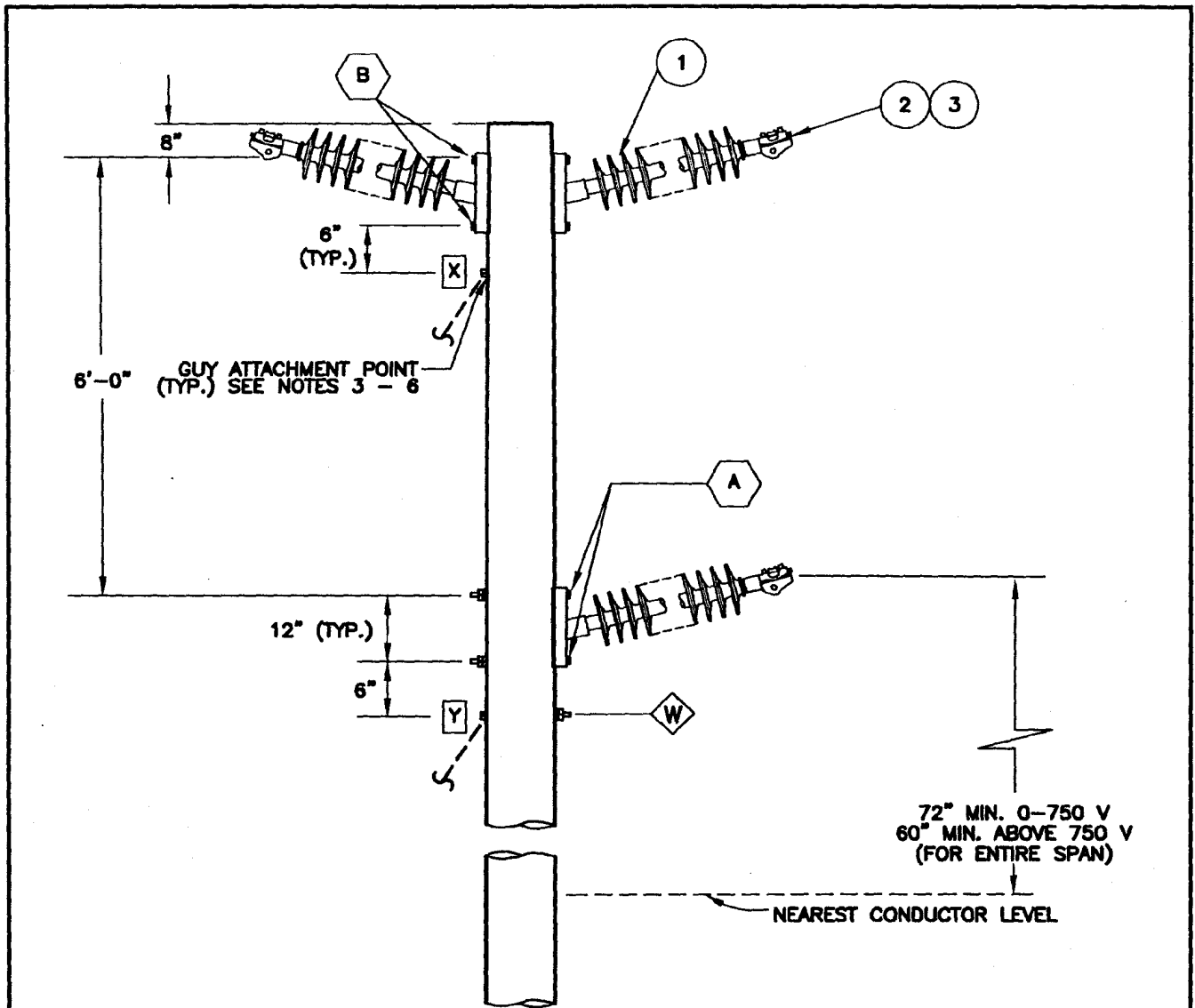
TABLE A

ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	CONDUCTOR SIZE
2	3	229696	CLAMP, POST INSULATOR, RANGE 0.35-0.84"	3/0 ACSR/AW 6/1
3	3	397568	GUARD, LINE, O.D. 0.744", LENGTH 29"	
2	3	229760	CLAMP, POST INSULATOR, RANGE 1.0-1.5"	336.4 ACSR/AW 26/7
3	3	397664	GUARD, LINE, O.D. 1.013", LENGTH 37"	
2	3	229760	CLAMP, POST INSULATOR, RANGE 1.0-1.5"	636 ACSR/AW 24/7
3	3	397728	GUARD, LINE, O.D. 1.34", LENGTH 45"	636 ACSS/AW 24/7
2	3	229792	CLAMP, POST INSULATOR, RANGE 1.5-2.0"	900 ACSS/AW 54/7
3	3	397760	GUARD, LINE, O.D. 1.662", LENGTH 53"	
2	3	229792	CLAMP, POST INSULATOR, RANGE 1.5-2.0"	1,033.5 ACSR/AW 45/7
3	3	397760	GUARD, LINE, O.D. 1.713", LENGTH 53"	1,033.5 ACSS/AW 45/7

	ORIGINAL	LLD	WPH	296	5/20/08						
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

TRANSMISSION ENGINEERING						SCALE: NONE						
	POLE TOP ARRANGEMENT TYPE 1/2 WPI SINGLE CIRCUIT 69KV SW POLE						DWG. NO.			SHT. NO.		
							13102SW			3 of 3		

13103SW



NOTES:

1. LINE ANGLE NOT TO EXCEED 15 DEGREES.
2. VERTICAL LOAD ON POST INSULATOR NOT TO EXCEED 1250 LBS. WITHOUT PRIOR APPROVAL.
3. FOR GUYING INSTALL IN ORDER Y.
4. FOR WIND LOAD, GUY ATTACHMENT MUST BE AT OR BELOW POINT W.
5. SEE SECTION 15000 FOR GUY DETAILS.
6. SEE JOB PACKAGE FOR GUYING REQUIREMENTS.

	ORIGINAL	LLD	WPH	244	5/20/08						
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

TRANSMISSION ENGINEERING						SCALE: NONE			
SDGE	POLE TOP ARRANGEMENT TYPE 2/1 WPI SINGLE CIRCUIT 69kV SW POLE					DWG. NO.		SHT. NO.	
						13103SW		1 of 3	
						13103SW		1 of 3	

13103SW

BILL OF MATERIAL				
ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
1	3	429298	INSULATOR, POST, POLYMER 41-44" LONG, BENDABLE GAIN BASE AND CLAMPTOP, 4,000 LBS CANTILEVER BREAKING LOAD	356
2		SEE SHT.3 TABLE A	CLAMP, POST INSULATOR	356
3		SEE SHT.3 TABLE A	GUARD, LINE (IF REQUIRED)	356
A	2	19022SW	ASSEMBLY, BOLT, 3/4" POST INSULATOR MTG., ONE SIDE	355
B	2	19024SW	ASSEMBLY, BOLT, 3/4" POST INSULATOR MTG., BOTH SIDES	355

	ORIGINAL	LLD	WPH	<i>Qia</i>	5/20/08						
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE



TRANSMISSION ENGINEERING						SCALE: NONE				
	POLE TOP ARRANGEMENT TYPE 2/1 WPI SINGLE CIRCUIT 69kV SW POLE					DWG. NO.		SHT. NO.		13103SW
						13103SW		2 of 3		

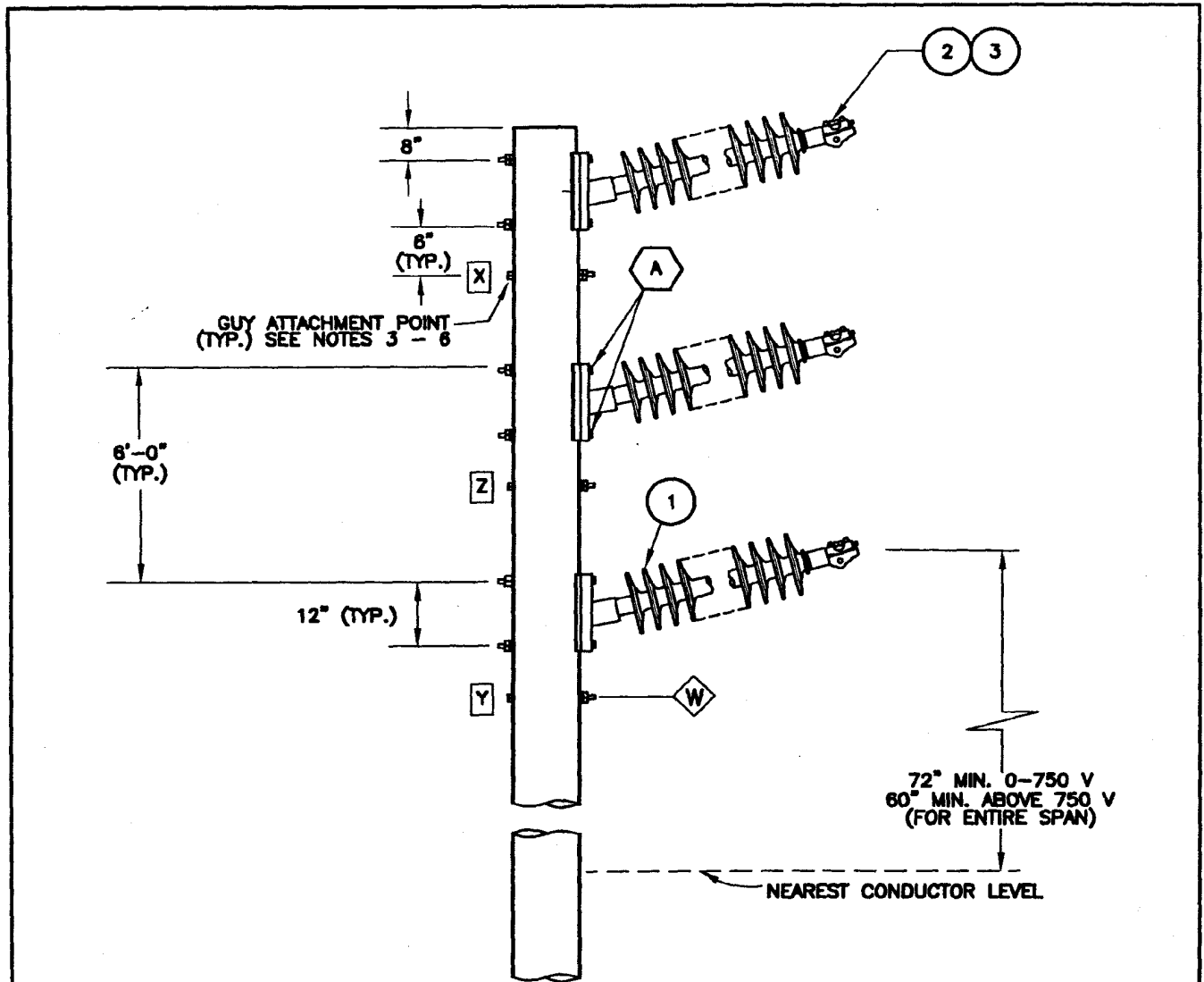
TABLE A

ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	CONDUCTOR SIZE
2	3	229696	CLAMP, POST INSULATOR, RANGE 0.35-0.84"	3/0 ACSR/AW 6/1
3	3	397568	GUARD, LINE, O.D. 0.744", LENGTH 29"	
2	3	229760	CLAMP, POST INSULATOR, RANGE 1.0-1.5"	336.4 ACSR/AW 26/7
3	3	397664	GUARD, LINE, O.D. 1.013", LENGTH 37"	
2	3	229760	CLAMP, POST INSULATOR, RANGE 1.0-1.5"	636 ACSR/AW 24/7
3	3	397728	GUARD, LINE, O.D. 1.34", LENGTH 45"	636 ACSS/AW 24/7
2	3	229792	CLAMP, POST INSULATOR, RANGE 1.5-2.0"	900 ACSS/AW 54/7
3	3	397760	GUARD, LINE, O.D. 1.662", LENGTH 53"	
2	3	229792	CLAMP, POST INSULATOR, RANGE 1.5-2.0"	1,033.5 ACSR/AW 45/7
3	3	397760	GUARD, LINE, O.D. 1.713", LENGTH 53"	1,033.5 ACSS/AW 45/7

	ORIGINAL	LLD	WPH	206	5/20/08						
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

	TRANSMISSION ENGINEERING				SCALE: NONE	
	POLE TOP ARRANGEMENT TYPE 2/1 WPI SINGLE CIRCUIT 69kV SW POLE				DWG. NO.	
					13103SW	
				SHT. NO.		
				3 of 3		

13103SW



NOTES:

1. LINE ANGLE NOT TO EXCEED 15 DEGREES.
2. VERTICAL LOAD ON POST INSULATOR NOT TO EXCEED 1250 LBS. WITHOUT PRIOR APPROVAL.
3. FOR GUYING, INSTALL IN ORDER .
4. FOR WIND LOAD, GUY ATTACHMENT MUST BE AT OR BELOW POINT .
5. SEE SECTION 15000 FOR GUY DETAILS.
6. SEE JOB PACKAGE FOR GUYING REQUIREMENTS.

	ORIGINAL	LLD	WPH	294h	5/20/08						
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE


TRANSMISSION ENGINEERING						SCALE: NONE				
SDGE	POLE TOP ARRANGEMENT TYPE ZPI SINGLE CIRCUIT 69kV SW POLE					DWG. NO.		SHT. NO.		13105SW
						13105SW		1 of 3		

13105SW

BILL OF MATERIAL

ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
1	3	429298	INSULATOR, POST, POLYMER, 41-44" LONG, BENDABLE GAIN BASE AND CLAMPTOP, 4,000 LBS CANTILEVER BREAKING LOAD	356
2		SEE SHT.3 TABLE A	CLAMP, POST INSULATOR	356
3		SEE SHT.3 TABLE A	GUARD, LINE (IF REQUIRED)	356
A	6	19022SW	ASSEMBLY, BOLT, 3/4" POST INSULATOR MTG., ONE SIDE	355

			/								
	ORIGINAL	LLD	WPH	<i>WPH</i>	5/20/08						
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE


	TRANSMISSION ENGINEERING	SCALE: NONE	
	POLE TOP ARRANGEMENT TYPE ZPI SINGLE CIRCUIT 69KV SW POLE	DWG. NO.	SHT. NO.
		13105SW	2 of 3

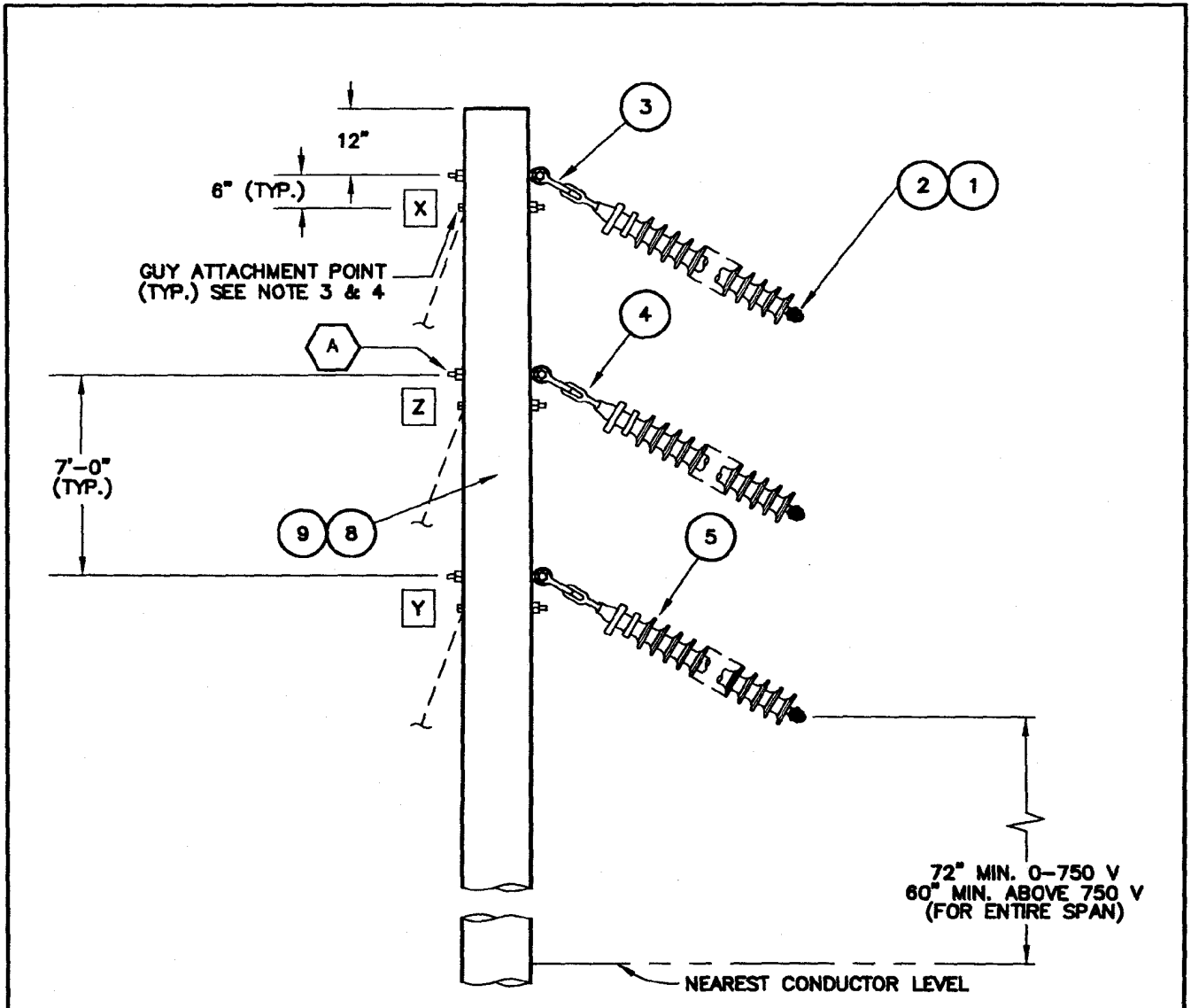
13105SW

TABLE A

ITEM	QTY.	STOCK NO. OF STD. NO.	DESCRIPTION	CONDUCTOR SIZE
2	3	229696	CLAMP, POST INSULATOR, RANGE 0.35-0.84"	3/0 ACSR/AW 6/1
3	3	397568	GUARD, LINE, O.D. 0.744", LENGTH 29"	
2	3	229760	CLAMP, POST INSULATOR, RANGE 1.0-1.5"	336.4 ACSR/AW 26/7
3	3	397664	GUARD, LINE, O.D. 1.013", LENGTH 37"	
2	3	229760	CLAMP, POST INSULATOR, RANGE 1.0-1.5"	636 ACSR/AW 24/7
3	3	397728	GUARD, LINE, O.D. 1.34", LENGTH 45"	636 ACSS/AW 24/7
2	3	229792	CLAMP, POST INSULATOR, RANGE 1.5-2.0"	900 ACSS/AW 54/7
3	3	397760	GUARD, LINE, O.D. 1.662", LENGTH 53"	
2	3	229792	CLAMP, POST INSULATOR, RANGE 1.5-2.0"	1,033.5 ACSR/AW 45/7
3	3	397760	GUARD, LINE, O.D. 1.713", LENGTH 53"	1,033.5 ACSS/AW 45/7

	ORIGINAL	LLD	WPH	ΔQA	5/20/08						
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

TRANSMISSION ENGINEERING						SCALE: NONE						
	POLE TOP ARRANGEMENT TYPE ZPI SINGLE CIRCUIT 69KV SW POLE						DWG. NO.			SHT. NO.		
							13105SW			3 of 3		



NOTES:

1. FOR USE WITH LINE ANGLES FROM 30 - 45 DEGREES.
2. MAXIMUM CONDUCTOR DESIGN TENSION NOT TO EXCEED 4000 LBS.
3. FOR GUYING, INSTALL IN ORDER .
SEE SECTION 15000 FOR GUY DETAILS.
4. SEE JOB PACKAGE FOR GUYING REQUIREMENTS.
5. THIS STANDARD IS NOT APPLICABLE FOR ACSS CONDUCTOR.
USE "YPI-ACSS" ON DWG. NO. 13121 AS SUBSTITUTE.

	ORIGINAL	LLD	WPH	ORR	5/20/08						
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE


TRANSMISSION ENGINEERING						SCALE: NONE			
SDGE	POLE TOP ARRANGEMENT TYPE Z45 SINGLE CIRCUIT 69kV SW POLE					DWG. NO.		SHT. NO.	
						13110SW		1 of 3	

13110SW

BILL OF MATERIAL

ITEM	QTY.	STOCK NO. or <i>STD. NO.</i>	DESCRIPTION	ACCT. NO.
1		SEE SHT.3 TABLE A	CLAMP, SUSPENSION, WITH SOCKET EYE (SEE NOTE 1.)	356
2		SEE SHT.3 TABLE A	GUARD, LINE (IF REQ'D)	356
3	3	636436	SHACKLE, ANCHOR, 30K	356
4	3	337542	EYE, OVAL BALL, 30K	356
5	3	431200	INSULATOR, SUSPENSION, POLYMER 45-47" LONG, BALL (HOT END) AND SOCKET, 25,000 LBS ULT. TENSILE STRENGTH	356
A	3	19009	ASSEMBLY, SHOULDER EYE BOLT, 3/4", BONDED, 18.3K	355

			/					/			
	ORIGINAL	LLD	WPH	024	5/20/08			/			
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE


	TRANSMISSION ENGINEERING	SCALE: NONE	
	POLE TOP ARRANGEMENT TYPE Z45 SINGLE CIRCUIT 69KV SW POLE	DWC. NO.	SHT. NO.
		13110SW	2 of 3

13110SW

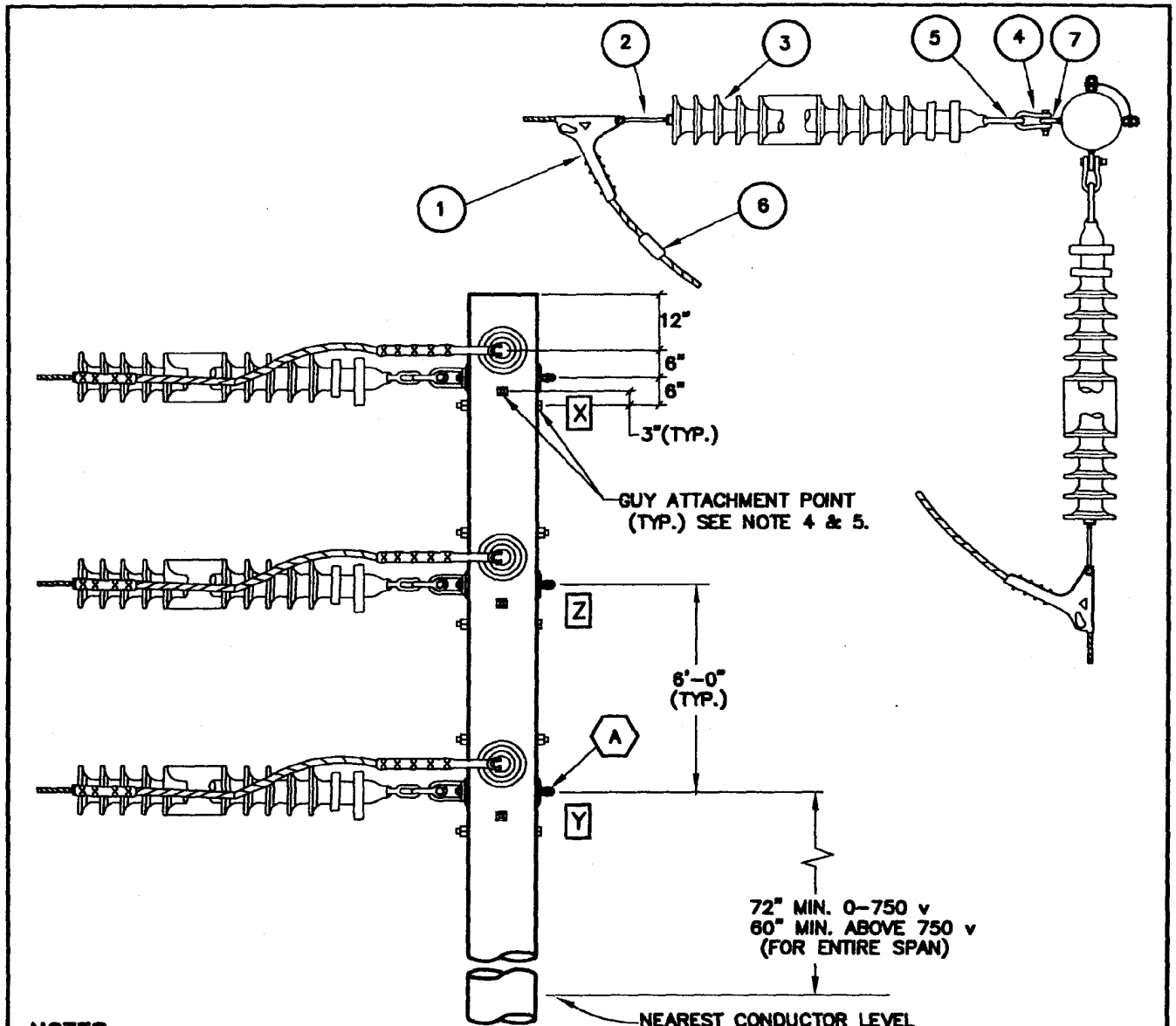
TABLE A

ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	CONDUCTOR SIZE
1	3	232224	CLAMP, SUSPENSION W/ SOCKET EYE, RANGE 0.40-0.85', 18K	3/0 ACSR/AW 6/1
2	3	397568	GUARD, LINE, DIA. 0.744', LENGTH, 29'	
1	3	232160	CLAMP, SUSPENSION W/ SOCKET EYE, RANGE 0.75-1.19', 25K	336.4 ACSR/AW 26/7
2	3	397664	GUARD, LINE, DIA. 1.013', LENGTH, 37'	
1	3	232192	CLAMP, SUSPENSION W/ SOCKET EYE, RANGE 1.25-1.82', 25K	636 ACSR/AW 24/7
2	3	397728	GUARD, LINE, DIA. 1.34', LENGTH, 45'	
1	3	232192	CLAMP, SUSPENSION W/ SOCKET EYE, RANGE 1.25-1.82', 25K	1,033.5 ACSR/AW 45/7
2	3	397760	GUARD, LINE, DIA. 1.713', LENGTH, 53'	

	ORIGINAL	LLD	WPH	DCG	5/20/08							
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	

TRANSMISSION ENGINEERING						SCALE: NONE						
	POLE TOP ARRANGEMENT TYPE Z45 SINGLE CIRCUIT 69KV SW POLE						DWG. NO.			SHT. NO.		
							13110SW			3 of 3		

13110SW



NOTES:

1. **CAUTION:** DO NOT ATTEMPT TO ALIGN STRAIN CLAMP WITH WIRE UNDER TENSION – TWISTING MAY CAUSE FAILURE OF INSULATOR ROD.
2. USE FOR LINE ANGLE 75 TO 90 DEGREES.
3. MAXIMUM CONDUCTOR DESIGN TENSION NOT TO EXCEED 4000 LBS.
4. FOR GUYING INSTALL IN ORDER . SEE SECTION 15000 FOR GUY DETAILS.
5. SEE JOB PACKAGE FOR GUYING REQUIREMENTS.

	ORIGINAL	LLD	WPH	RDA	5/20/08						
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE


TRANSMISSION ENGINEERING						SCALE: NONE			
SDGE	POLE TOP ARRANGEMENT TYPE Y SINGLE CIRCUIT-ACSR 69kV SW POLE					DWG. NO.		SHT. NO.	
						13115SW		1 of 3	

13115SW

BILL OF MATERIAL

ITEM	QTY.	STOCK NO. or <i>STD. NO.</i>	DESCRIPTION	ACCT. NO.
1		SEE SHT.3 TABLE A	CLAMP, STRAIN, WITHOUT SOCKET EYE	356
2		SEE SHT.3 TABLE A	EYE, SOCKET, HOT LINE, 30K	356
3	6	431200	INSULATOR, SUSPENSION, POLYMER, 45-47" LONG, BALL (HOT END) AND SOCKET, 25,000 LBS ULT. TENSILE STRENGTH	356
4	6	636436	SHACKLE, ANCHOR, 30K	356
5	6	337542	EYE, OVAL BALL, 30K	356
6		SEE SHT.3 TABLE A	CONNECTOR, JUMPER	356
7	6	235648	EYELET, STD., 3/4"	355
A	6	19028SW	ASSEMBLY BOLT, THRU, 3/4",	355

	ORIGINAL	LLD	WPH	5/20/08							
<i>REV</i>	<i>CHANGE</i>	<i>BY</i>	<i>CHKD</i>	<i>APPV</i>	<i>DATE</i>	<i>REV</i>	<i>CHANGE</i>	<i>BY</i>	<i>CHKD</i>	<i>APPV</i>	<i>DATE</i>


	TRANSMISSION ENGINEERING	SCALE: NONE	
	POLE TOP ARRANGEMENT TYPE Y SINGLE CIRCUIT-ACSR 69KV SW POLE	DWG. NO.	SHT. NO.
		13115SW	2 of 3

13115SW

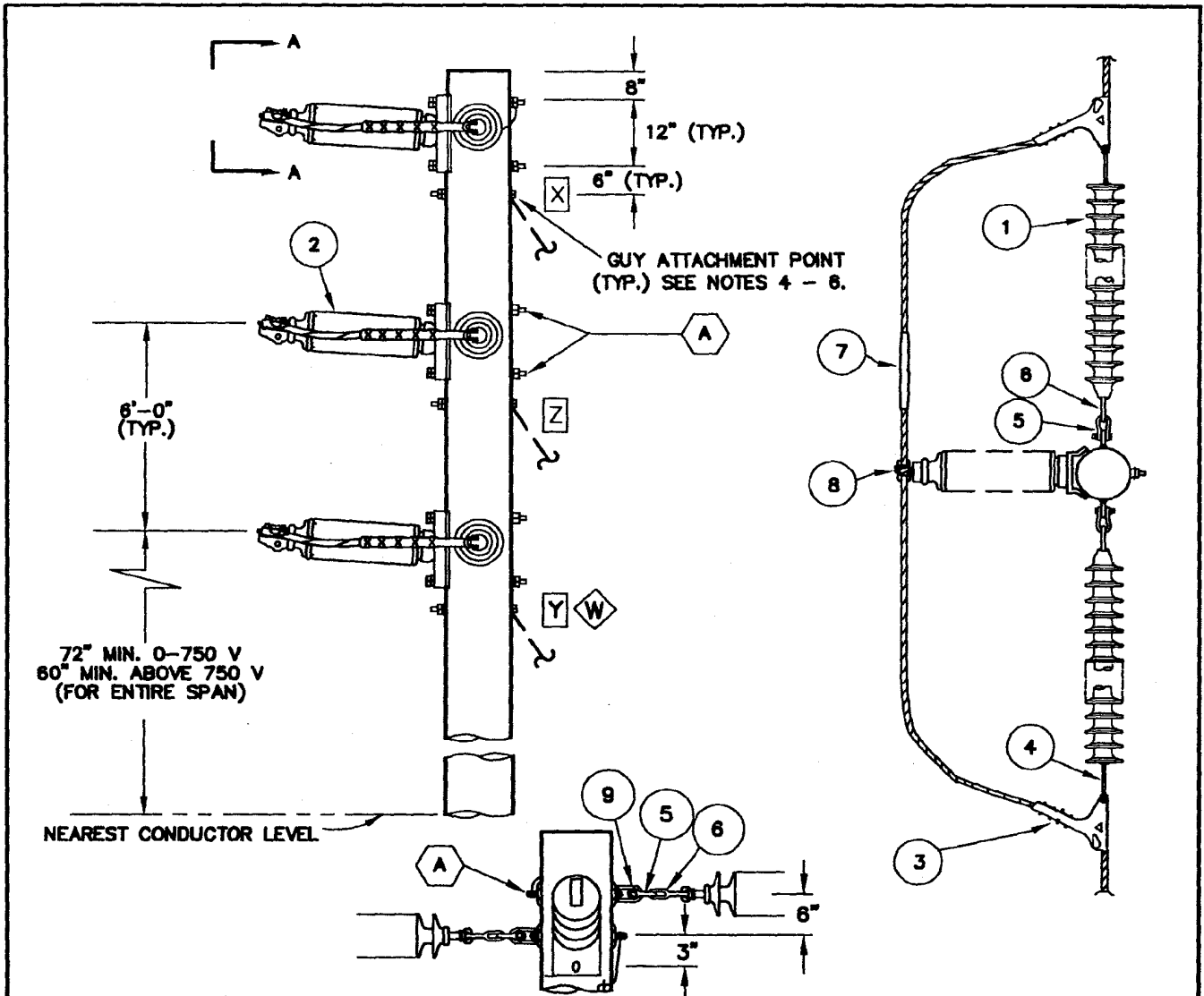
TABLE A

ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	CONDUCTOR SIZE
1	6	230672	CLAMP, STRAIN, ALUMINUM, RANGE, 0.20-0.57", 15K	3/0 ACSR/AW 6/1
2	6	337602	EYE, SOCKET HOTLINE, EYE 11/16" WIDE, 30K	
6	3	256472	CONNECTOR, COMPRESSION ALUM., JUMPER	
1	6	231700	CLAMP, STRAIN, ALUMINUM, RANGE, 0.47-0.88", 25K	336.4 ACSR/AW 26/7
2	6	337604	EYE, SOCKET HOTLINE EYE, 3/4" WIDE, 30K	
6	3	650264	SLEEVE, ALUM., JUMPER	
1	6	230686	CLAMP, STRAIN, ALUMINUM, RANGE, 0.71-1.318", 30K	636 ACSR/AW 24/7
2	6	337622	EYE, SOCKET HOTLINE, EYE 1 3/8" WIDE, 30K	
6	3	650656	SLEEVE, ALUM., JUMPER	
1	6	230686	CLAMP, STRAIN, ALUMINUM, RANGE, 0.71-1.318", 30K	1,033.5 ACSR/AW 45/7
2	6	337622	EYE, SOCKET HOTLINE EYE, 1 3/8" WIDE, 30K	
6	3	650336	SLEEVE, ALUMINUM, JUMPER	

	ORIGINAL	LLD	WPH	<i>WPH</i>	5/20/08							
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	

	TRANSMISSION ENGINEERING				SCALE: NONE	
	POLE TOP ARRANGEMENT TYPE Y SINGLE CIRCUIT-ACSR 69KV SW POLE				DWG. NO.	SHT. NO.
					13115SW	3 of 3

13115SW



NOTES:

1. **CAUTION:** DO NOT ATTEMPT TO ALIGN STRAIN CLAMP WITH WIRE UNDER TENSION - TWISTING MAY CAUSE FAILURE OF INSULATOR ROD.
2. LINE ANGLE 0 TO 75 DEGREES.
3. MAXIMUM CONDUCTOR DESIGN TENSION NOT TO EXCEED 4000 LBS.
4. FOR WIND LOAD, GUY ATTACHMENT MUST BE AT OR BELOW POINT **W**.
5. FOR GUYING, INSTALL IN ORDER **X****Y****Z**.
SEE SECTION 16000 FOR GUY DETAILS.
6. SEE JOB PACKAGE FOR GUYING REQUIREMENTS.

	ORIGINAL	LLD	WPH	<i>pcw</i>	5/20/08						
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

SDGE	TRANSMISSION ENGINEERING	SCALE: NONE	
	POLE TOP ARRANGEMENT	DWG. NO.	SHT. NO.
	TYPE YPI SINGLE CIRCUIT-ACSR	13120SW	1 of 3
	69kV SW POLE		13120SW

BILL OF MATERIAL

ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
1	6	431200	INSULATOR, SUSPENSION, POLYMER, 45-47" LONG, BALL (HOT END) AND SOCKET, 25,000 LBS ULT. TENSILE STRENGTH	356
2	3	429298	INSULATOR, POST, POLYMER, 41-44" LONG, BENDABLE GAIN BASE AND CLAMPTOP, 4,000 LBS CANTILEVER LOAD (SEE NOTE 1)	356
3		SEE SHT.3 TABLE A	CLAMP, STRAIN, WITHOUT SOCKET EYE	356
4		SEE SHT.3 TABLE A	EYE, SOCKET, HOTLINE, 30K	356
5	6	636436	SHACKLE, ANCHOR, 30K	356
6	6	337542	EYE, OVAL BALL, 30K	356
7		SEE SHT.3 TABLE A	CONNECTOR, JUMPER	356
8		SEE SHT.3 TABLE A	CLAMP, POST INSULATOR	356
A	6	19022SW	ASSEMBLY, BOLT, 3/4" POST UNBONDED INSULATOR MTG., ONE SIDE	355
B	6	19026SW	ASSEMBLY, BOLT, THRU, 3/4"	355
13	6	235648	EYELET, STD. 3/4"	355

	ORIGINAL	LLD	WPH	DQH	5/20/08						
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE


TRANSMISSION ENGINEERING						SCALE: NONE					
POLE TOP ARRANGEMENT TYPE YPI SINGLE CIRCUIT-ACSR 69kV SW POLE						DWG. NO.			SHT. NO.		
						13120SW			2 of 3		

13120SW

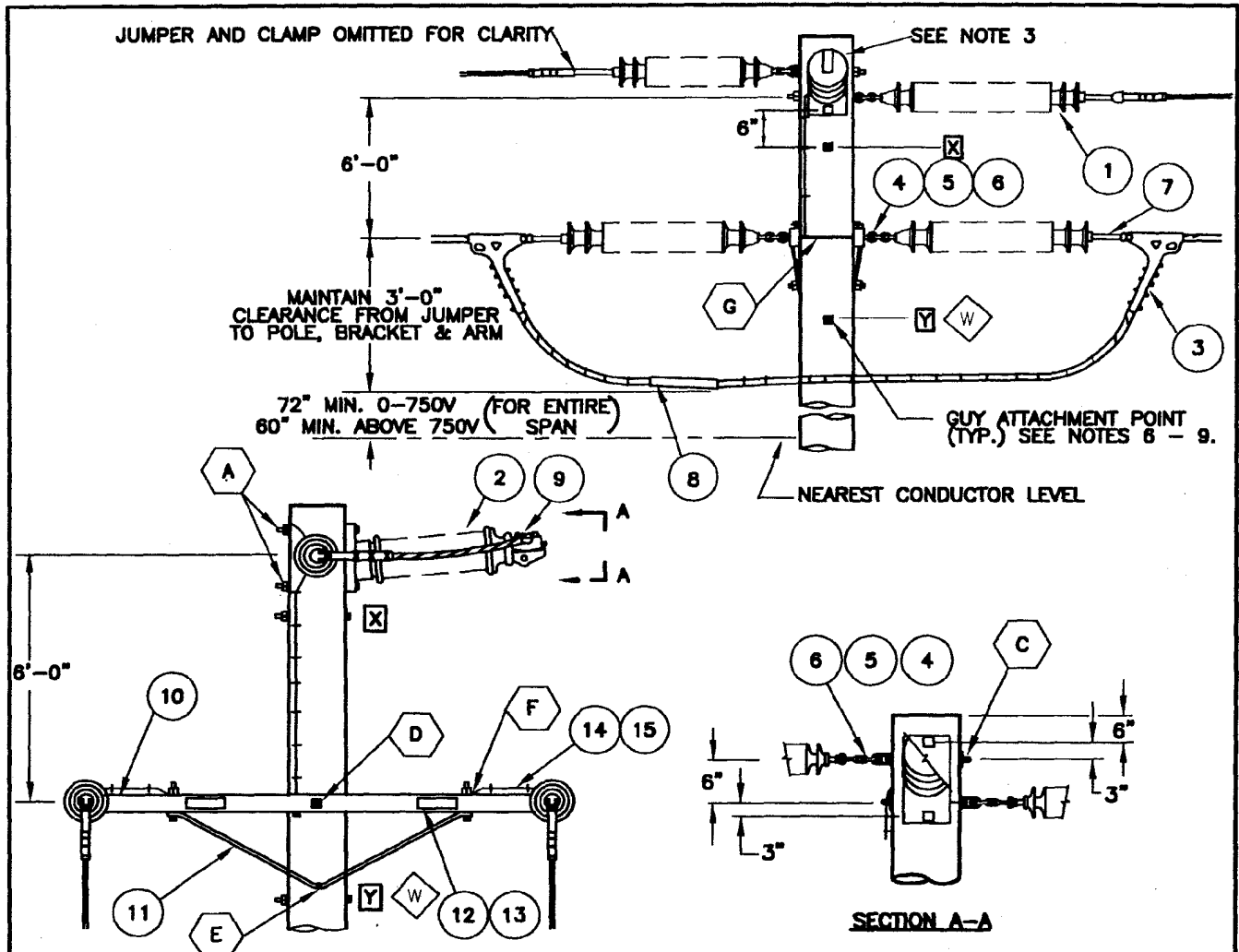
TABLE A

ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	CONDUCTOR SIZE
3	6	230672	CLAMP, STRAIN, ALUMINUM, RANGE, 0.20-0.57", 15K	3/0 ACSR/AW 6/1
4	6	337602	EYE, SOCKET HOTLINE, EYE 1 1/16" WIDE, 30K	
7	3	256472	CONNECTOR, COMPRESSION, ALUM., JUMPER	
8	3	229696	CLAMP, POST INSULATOR, RANGE 0.35-0.84"	
3	6	231700	CLAMP, STRAIN, ALUMINUM, RANGE, 0.47-0.88", 25K	336.4 ACSR/AW 26/7
4	6	337604	EYE, SOCKET HOTLINE, EYE 3/4" WIDE, 30K	
7	3	650264	SLEEVE, ALUM., JUMPER	
8	3	229696	CLAMP, POST INSULATOR, RANGE, 0.35-0.84"	
3	6	230686	CLAMP, STRAIN, ALUMINUM, RANGE, 0.71-1.318", 30K	636 ACSR/AW 24/7
4	6	337622	EYE, SOCKET HOTLINE, EYE 1 3/8" WIDE, 30K	
7	3	650656	SLEEVE, ALUM., JUMPER	
8	3	229728	CLAMP, POST INSULATOR, RANGE 0.7-1.06"	
3	6	230686	CLAMP, STRAIN, ALUMINUM, RANGE, 0.71-1.318", 30K	1,033.5 ACSR/AW 45/7
4	6	337622	EYE, SOCKET HOTLINE, EYE 1 3/8" WIDE, 30K	
7	3	650336	SLEEVE, ALUM., JUMPER	
8	3	229760	CLAMP, POST INSULATOR, RANGE 1.0-1.5"	

	ORIGINAL	LLD	WPH	24h	5/20/08							
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	

	TRANSMISSION ENGINEERING				SCALE: NONE	
	POLE TOP ARRANGEMENT				DWG. NO.	SHT. NO.
	TYPE YPI SINGLE CIRCUIT-ACSR				13120SW	3 of 3
69kV SW POLE						

13120SW



NOTES:

1. **CAUTION:** DO NOT ATTEMPT TO ALIGN STRAIN CLAMP WITH WIRE UNDER TENSION - TWISTING MAY CAUSE FAILURE OF INSULATOR ROD.
2. **CAUTION:** ANGLE BETWEEN GUY AND POLE MUST BE IN ACCORDANCE WITH GO-95 REQUIREMENTS FOR SEPARATION BETWEEN CONDUCTORS AND HARDWARE.
3. INSTALL HORIZONTAL POST INSULATOR ON INSIDE OF ANGLE.
4. INSTALL HIGHER TENSION DEADEND IN LOWER POSITION AT POLE TOP TO PROVIDE GUY CLEARANCE WHEN GUYING FOR TENSION CHANGE.
5. MAXIMUM CONDUCTOR DESIGN TENSION NOT TO EXCEED 4000 LBS.
6. FOR GUYING, INSTALL IN ORDER $\boxed{X}\boxed{Y}$. SEE SECTION 16000 FOR GUY ATTACHMENT DETAILS.
7. USE FIBERGLASS LINK 16308 IN VICINITY OF JUMPER LOOPS.
8. FOR WIND LOAD, GUY ATTACHMENT MUST BE AT OR BELOW POINT $\diamond W$.
9. SEE JOB PACKAGE FOR GUYING REQUIREMENTS.
10. LINE ANGLE $0^\circ - 3^\circ$.

	ORIGINAL	LLD	WPH	206	5/20/08						
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

SDGE	TRANSMISSION ENGINEERING	SCALE: NONE	
	POLE TOP ARRANGEMENT	DWG. NO.	SHT. NO.
	TYPE X-DELTA 3 SINGLE CIRCUIT-ACSR 69kV SW POLE	13125SW	1 of 3

13125SW

BILL OF MATERIAL

ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
1	6	431200	INSULATOR, SUSPENSION, POLYMER, 45-47" LONG, BALL (HOT END) AND SOCKET 25,000 LBS ULT. TENSILE STRENGTH	356
2	1	429298	INSULATOR, POST, POLYMER, 41-44" LONG, BENDABLE GAIN BASE AND CLAMPTOP, 4,000 LBS CANTILEVER BREAKING LOAD	356
3		SEE SHT.3 TABLE A	CLAMP, STRAIN, WITH OUT SOCKET EYE	356
4	6	235648	EYELET, STANDARD, 3/4" BOLT	356
5	6	636436	SHACKLE, ANCHOR 30K	356
6	6	337542	EYE, OVAL BALL, 30K	356
7		SEE SHT.3 TABLE A	EYE, SOCKET, HOTLINE, 30K	356
8		SEE SHT.3 TABLE A	CONNECTOR, JUMPER	356
9		SEE SHT.3 TABLE A	CLAMP, POST INSULATOR	356
10	2	294144	CROSSARM, 5 3/4"x5 3/4"x10'	355
11	2	164128	BRACE, CROSSARM, ANGLE 5'-0"	355
12	1/10#	492224	NAIL, RFG. 7/8" #11, GAVL. (LBS)	355
13	2	647648	SIGN, HIGH VOLTAGE	355
14	1/4#	678528	STAPLES, 1 1/4" (LBS)	355
15	2#	812928	WIRE, CU. SOFT #8 (LBS.)	355
A	2	1902SW	ASSEMBLY, BOLT, 3/4" POST INSULATOR MTG., ONE SIDE	355
			(BLANK)	
C	2	19026SW	ASSEMBLY, BOLT, 3/4"	355
D	1	19012	ASSEMBLY, BOLT, 3/4", THRU	355
E	1	19016	ASSEMBLY, BOLT, 5/8", X-ARM BRACE	355
F	4	19016	ASSEMBLY, BOLT, 1/2", X-ARM BRACE	355
G	2	19010SW	ASSEMBLY, BOLT, 3/4", SPACE, BONDED	355


	ORIGINAL	LLD	WPH	RA	5/20/08						
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

TRANSMISSION ENGINEERING						SCALE: NONE	
	POLE TOP ARRANGEMENT					DWG. NO.	SHT. NO.
	TYPE X-DELTA 3 SINGLE CIRCUIT-ACSR					13125SW	2 of 3
	69kV SW POLE						

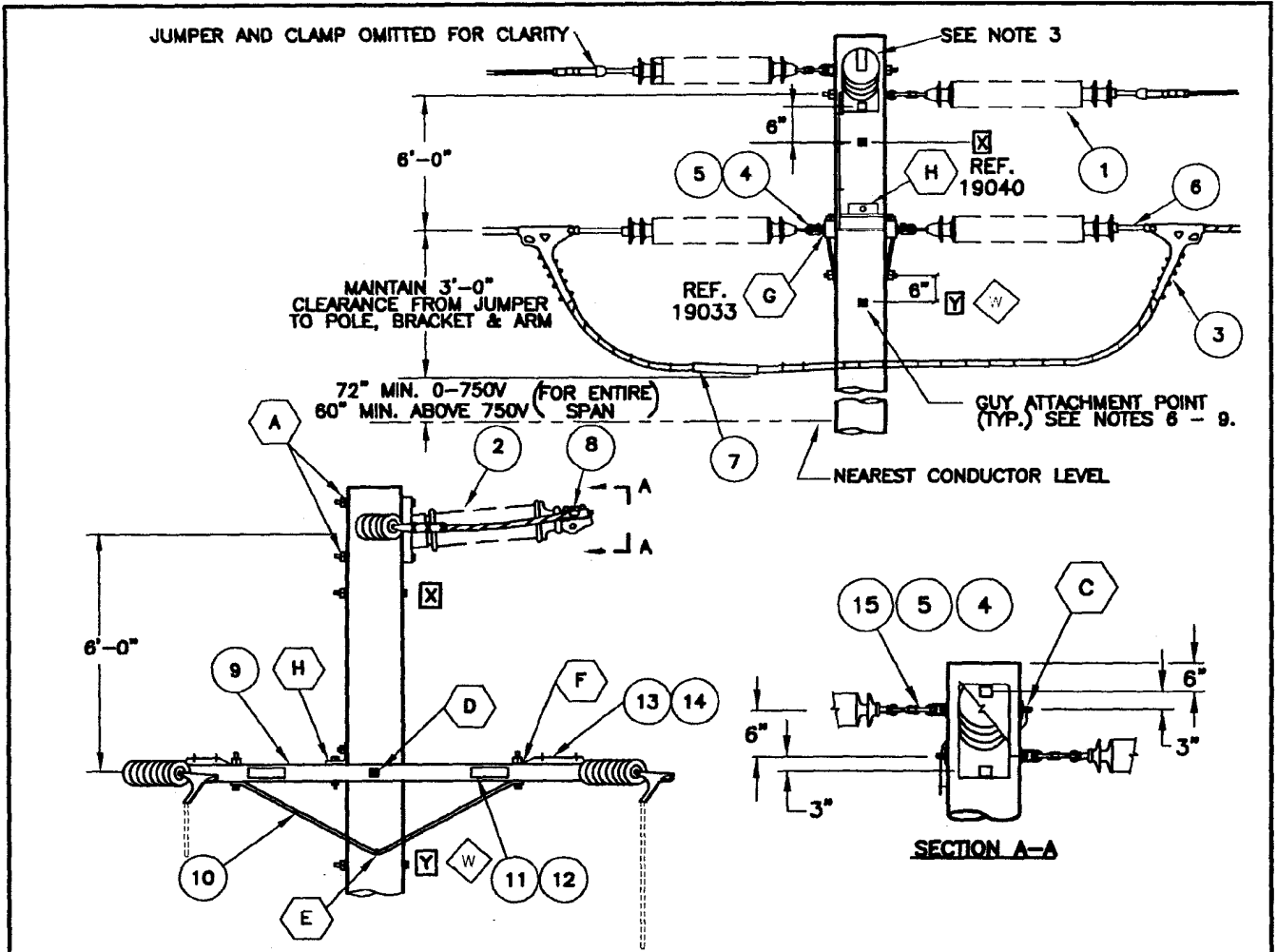
13125SW

TABLE A

ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	CONDUCTOR SIZE
3	6	230672	CLAMP, STRAIN, ALUMINUM, RANGE 0.20 - 0.57", 15K	3/0 ACSR/AW 6/1
7	6	337602	EYE, SOCKET HOTLINE, EYE 11/16" WIDE, 30K	
8	3	256472	CONNECTOR, COMPRESSION, ALUM JUMPER	
9	1	229696	CLAMP, POST INSULATOR, RANGE 0.35-0.84"	
3	6	231700	CLAMP, STRAIN, ALUMINUM, RANGE 0.47 - 0.88", 25K	336.4 ACSR/AW 26/7
7	6	337604	EYE, SOCKET HOTLINE, EYE 3/4" WIDE, 30K	
8	3	650264	SLEEVE, ALUM. JUMPER	
9	1	229696	CLAMP, POST INSULATOR, RANGE 0.35-0.84"	
3	6	230686	CLAMP, STRAIN, ALUMINUM, RANGE 0.71-1.318", 30K	636 ACSR/AW 24/7
7	6	337622	EYE, SOCKET HOTLINE, EYE 1 3/8" WIDE, 30K	
8	3	650656	SLEEVE, ALUM. JUMPER	
9	1	229728	CLAMP, POST INSULATOR, RANGE 0.7-1.06"	
3	6	230686	CLAMP, STRAIN, ALUMINUM, RANGE 0.71-1.318", 30K	1,033.5 ACSR/AW 45/7
7	6	337622	EYE, SOCKET HOTLINE, EYE 1 3/8" WIDE, 30K	
8	3	650336	SLEEVE, ALUM., JUMPER	
9	1	229760	CLAMP, POST INSULATOR, RANGE 1.0-1.5"	

	ORIGINAL	LLD	WPH	<i>WPH</i>	5/20/08							
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	
TRANSMISSION ENGINEERING								SCALE: NONE				
	POLE TOP ARRANGEMENT TYPE X-DELTA 3 SINGLE CIRCUIT-ACSR 69kV SW POLE						DWC. NO.		SHT. NO.			
							13125SW		3 of 3			

13125SW



NOTES:

1. **CAUTION:** DO NOT ATTEMPT TO ALIGN STRAIN CLAMP WITH WIRE UNDER TENSION - TWISTING MAY CAUSE FAILURE OF INSULATOR ROD.
2. **CAUTION:** ANGLE BETWEEN GUY AND POLE MUST BE IN ACCORDANCE WITH GO-95 REQUIREMENTS FOR SEPARATION BETWEEN CONDUCTORS AND HARDWARE.
3. INSTALL HORIZONTAL POST INSULATOR ON INSIDE OF ANGLE.
4. INSTALL HIGHER TENSION DEADEND IN LOWER POSITION AT POLE TOP TO PROVIDE GUY CLEARANCE WHEN GUYING FOR TENSION CHANGE.
5. MAXIMUM CONDUCTOR DESIGN TENSION NOT TO EXCEED 4000 LBS.
6. FOR GUYING INSTALL IN ORDER . SEE SECTION 15000 FOR GUY ATTACHMENT DETAILS.
7. USE FIBERGLASS LINK 15309 IN VICINITY OF JUMPER LOOPS.
8. FOR WIND LOAD, GUY ATTACHMENT MUST BE AT OR BELOW POINT .
9. SEE JOB PACKAGE FOR GUYING REQUIREMENTS.
10. LINE ANGLE 3° - 30°.

	ORIGINAL	LLD	WPH	2011	5/20/08						
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE


TRANSMISSION ENGINEERING						SCALE: NONE						
SDGE	POLE TOP ARRANGEMENT TYPE X-DELTA 30 SINGLE CIRCUIT-ACSR 69kV SW POLE						DWG. NO.			SHT. NO.		
							13126SW			1 of 3		

13126SW

BILL OF MATERIAL

ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
1	6	431200	INSULATOR, SUSPENSION, POLYMER, 45-47" LONG, BALL (HOT END) AND SOCKET 25,000 LBS ULT. TENSILE STRENGTH	356
2	1	429298	INSULATOR, POST, POLYMER, 41-44" LONG, BENDABLE GAIN BASE AND CLAMPTOP, 4,000 LBS CANTILEVER BREAKING LOAD	356
3		SEE SHT.3 TABLE A	CLAMP, STRAIN, WITH OUT SOCKET EYE	356
4	6	636436	SHACKLE, ANCHOR, 30K	356
5	6	337542	EYE, OVAL BALL, 30K	356
6		SEE SHT.3 TABLE A	EYE, SOCKET, HOTLINE, 30K	356
7		SEE SHT.3 TABLE A	CONNECTOR, JUMPER	356
8		SEE SHT.3 TABLE A	CLAMP, POST INSULATOR	356
9	2	294176	CROSSARM, 5 3/4"x5 3/4"x12'	355
10	2	164160	BRACE, CROSSARM, ANGLE 6'	355
11	1/10#	492224	NAIL, RFG. 7/8" #11, GAVL. (LBS)	355
12	2	647648	SIGN, HIGH VOLTAGE	355
13	1/4#	678528	STAPLES, 1 1/4" (LBS)	355
14	2#	812928	WIRE, CU. SOFT #8 (LBS.)	355
15	2	235648	EYELET, STANDARD, 3/4"	356
A	2	19022SW	ASSEMBLY, BOLT, 3/4" POST INSULATOR MTG., ONE SIDE	355
			(BLANK)	
C	2	19026SW	ASSEMBLY, BOLT, 3/4", BONDED	355
D	1	19012	ASSEMBLY, BOLT, 3/4", THRU	355
E	1	19016	ASSEMBLY, BOLT, 5/8", X-ARM BRACE	355
F	4	19016	ASSEMBLY, BOLT, 1/2", X-ARM BRACE	355
G	2	19033SW	ASSEMBLY, TEE, DEADEND	355
H	1	19040SW	ASSEMBLY, THRUST PLATE	355

	ORIGINAL	LLD	WPH	AGG	5/20/08						
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE


	TRANSMISSION ENGINEERING	SCALE: NONE	
	POLE TOP ARRANGEMENT TYPE X-DELTA 30 SINGLE CIRCUIT-ACSR 69KV SW POLE	DWG. NO. 13126SW	SHT. NO. 2 of 3

13126SW

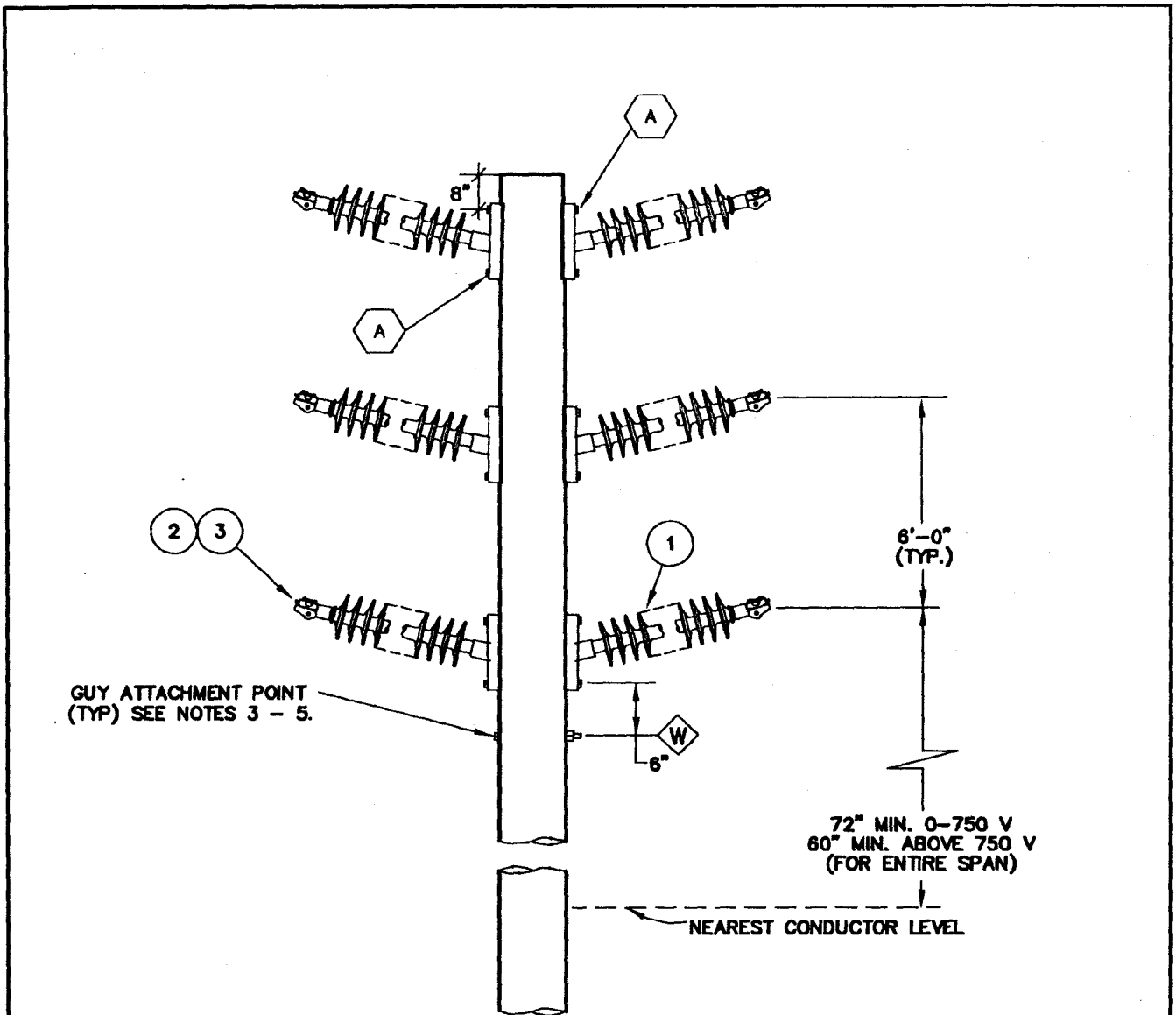
TABLE A

ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	CONDUCTOR SIZE
3	6	230672	CLAMP, STRAIN, ALUMINUM, RANGE 0.20 - 0.57", 15K	3/0 ACSR/AW 6/1
6	6	337602	EYE, SOCKET HOTLINE, EYE 11/16" WIDE, 30K	
7	3	256472	COMPRESSION, ALUM., JUMPER	
8	1	229696	CLAMP, POST INSULATOR, RANGE 0.35-0.84"	
3	6	231700	CLAMP, STRAIN, ALUMINUM, RANGE 0.47 - 0.88", 25K	336.4 ACSR/AW 26/7
6	6	337604	EYE, SOCKET HOTLINE, EYE 3/4" WIDE, 30K	
7	3	650264	SLEEVE, ALUM., JUMPER	
8	1	229696	CLAMP, POST INSULATOR, RANGE 0.35-0.84"	
3	6	230686	CLAMP, STRAIN, ALUMINUM, RANGE 0.71-1.318", 30K	636 ACSR/AW 24/7
6	6	337622	EYE, SOCKET HOTLINE, EYE 1 3/8" WIDE, 30K	
7	3	650656	SLEEV, ALUM., JUMPER	
8	1	229728	CLAMP, POST INSULATOR, RANGE 0.7-1.06"	
3	6	230686	CLAMP, STRAIN, ALUMINUM, RANGE 0.71-1.318", 30K	1,033.5 ACSR/AW 45/7
6	6	337622	EYE, SOCKET HOTLINE, EYE 1 3/8" WIDE, 30K	
7	3	650336	SLEEVE, ALUM., JUMPER	
8	1	229760	CLAMP, POST INSULATOR, RANGE 1.0-1.5"	

	ORIGINAL	LLD	WPH	<i>WPH</i>	5/20/08						
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

	TRANSMISSION ENGINEERING				SCALE: NONE	
	POLE TOP ARRANGEMENT TYPE X-DELTA 30 SINGLE CIRCUIT-ACSR 69kV SW POLE				DWG. NO.	SHT. NO.
					13126SW	3 of 3

13126SW



NOTES:

1. LINE ANGLE NOT TO EXCEED 3 DEGREES.
2. VERTICAL LOAD ON POST INSULATOR NOT TO EXCEED 1250 LBS. WITHOUT PRIOR APPROVAL.
3. GUY ATTACHMENT MUST BE AT OR BELOW POINT $\diamond W$.
4. SEE SECTION 16000 FOR GUY DETAILS.
5. SEE JOB PACKAGE FOR GUYING REQUIREMENTS.

	ORIGINAL	LLD	WPH	WPH	5/20/08						
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

TRANSMISSION ENGINEERING						SCALE: NONE						
SDGE	POLE TOP ARRANGEMENT TYPE DC-WPI DOUBLE CIRCUIT 69kV SW POLE						DWG. NO.			SHT. NO.		
							13165SW			1 of 3		

BILL OF MATERIAL

ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
1	6	429298	INSULATOR, POST, POLYMER, 41-44" LONG, BENDABLE GAIN BASE AND CLAMPTOP, 4,000 LBS CANTILEVER BREAKING LOAD	356
2		SEE SHT.3 TABLE A	CLAMP, POST INSULATOR	356
3		SEE SHT.3 TABLE A	GUARD, LINE (IF REQUIRED)	356
A	6	19024SW	ASSEMBLY, BOLT, 3/4" POST INSULATOR MTG., BOTH SIDES	355

	ORIGINAL	LLD	WPH	<i>QWA</i>	5/20/08						
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE


TRANSMISSION ENGINEERING	SCALE: NONE	
POLE TOP ARRANGEMENT TYPE DC-WPI DOUBLE CIRCUIT 69kV SW POLE	DWG. NO.	SHT. NO.
	13165SW	2 of 3

13165SW

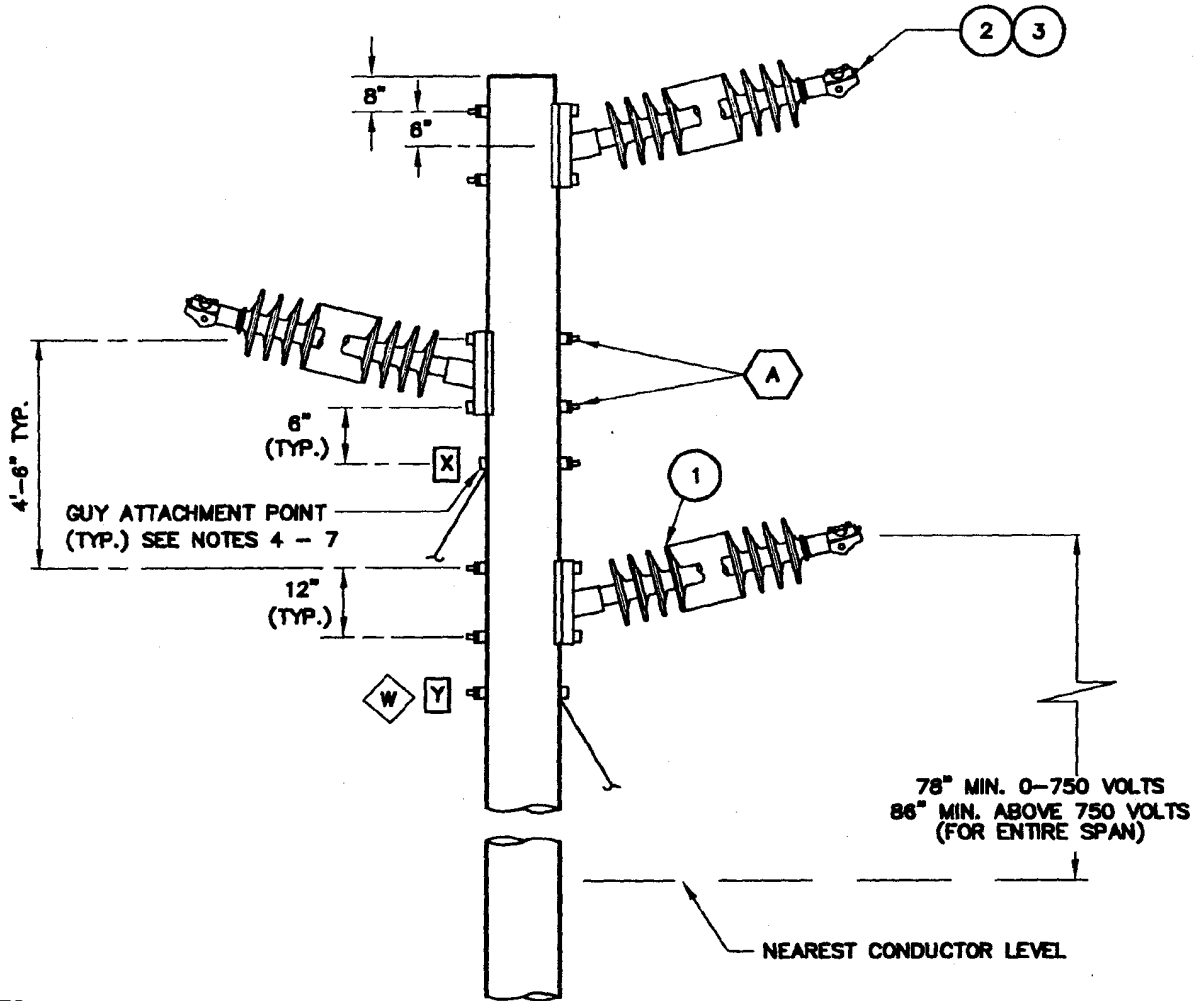
TABLE A

ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	CONDUCTOR SIZE
2	6	229696	CLAMP, POST INSULATOR, RANGE 0.35-0.84"	3/0 ACSR/AW 6/1
3	6	397568	GUARD, LINE, O.D. 0.744", LENGTH 29"	
2	6	229760	CLAMP, POST INSULATOR, RANGE 1.0-1.5"	336.4 ACSR/AW 26/7
3	6	397664	GUARD, LINE, O.D. 1.013", LENGTH 37"	
2	6	229760	CLAMP, POST INSULATOR, RANGE 1.0-1.5"	636 ACSR/AW 24/7
3	6	397728	GUARD, LINE, O.D. 1.34", LENGTH 45"	636 ACSS/AW 24/7
2	6	229792	CLAMP, POST INSULATOR, RANGE 1.5-2.0"	900 ACSS/AW 54/7
3	6	397760	GUARD, LINE, O.D. 1.662", LENGTH 53"	
2	6	229792	CLAMP, POST INSULATOR, RANGE 1.5-2.0"	1,033.5 ACSR/AW 45/7
3	6	397760	GUARD, LINE, O.D. 1.713", LENGTH 53"	1,033.5 ACSS/AW 45/7

	ORIGINAL	LLD	WPH	<i>WPH</i>	5/20/08							
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	

TRANSMISSION ENGINEERING						SCALE: NONE	
	POLE TOP ARRANGEMENT TYPE DC-WPI DOUBLE CIRCUIT 69kV SW POLE					DWG. NO.	SHT. NO.
						13165SW	3 of 3

13165SW



NOTES:

1. LINE ANGLE NOT TO EXCEED 15 DEGREES.
2. MAXIMUM CONDUCTOR DESIGN TENSION NOT TO EXCEED 4000 LBS. PER PHASE.
3. VERTICAL LOAD ON POST INSULATOR NOT TO EXCEED 1000 LBS. FOR GRADE "B" AND 800 LBS. FOR GRADE "A" CONSTRUCTION WITHOUT PRIOR APPROVAL.
4. FOR GUYING, INSTALL IN ORDER .
5. FOR WIND LOAD, GUY ATTACHMENT MUST BE AT OR BELOW POINT .
6. SEE SECTION 15000 FOR GUY DETAILS.
7. SEE JOB PACKAGE FOR GUYING REQUIREMENTS.

	ORIGINAL	LLD	WPH	<i>WPH</i>	4/17/08							
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	

TRANSMISSION ENGINEERING						SCALE: NONE		13200SW-1
SDGE	POLE TOP ARRANGEMENT TYPE WPI-EXP SINGLE CIRCUIT 69kV SW POLE					DWG. NO.	SHT. NO.	
						13200SW	1 of 3	

BILL OF MATERIAL

ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
1	3	429332	INSULATOR, POST, POLYMER, 64-69" LONG, BENDABLE GAIN BASE AND CLAMPTOP, 2,600 LBS CANTILEVER BREAKING LOAD	356
2		SEE SHT. 3 TABLE A	CLAMP, POST INSULATOR	356
3		SEE SHT. 3 TABLE A	GUARD, LINE	356
A	6	19022SW	ASSEMBLY, BOLT 3/4" BONDED POST INSULATOR MTG. ONE SIDED, TOP	355

	ORIGINAL	LLD	WPH	<i>WIA</i>	4/17/08						
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE



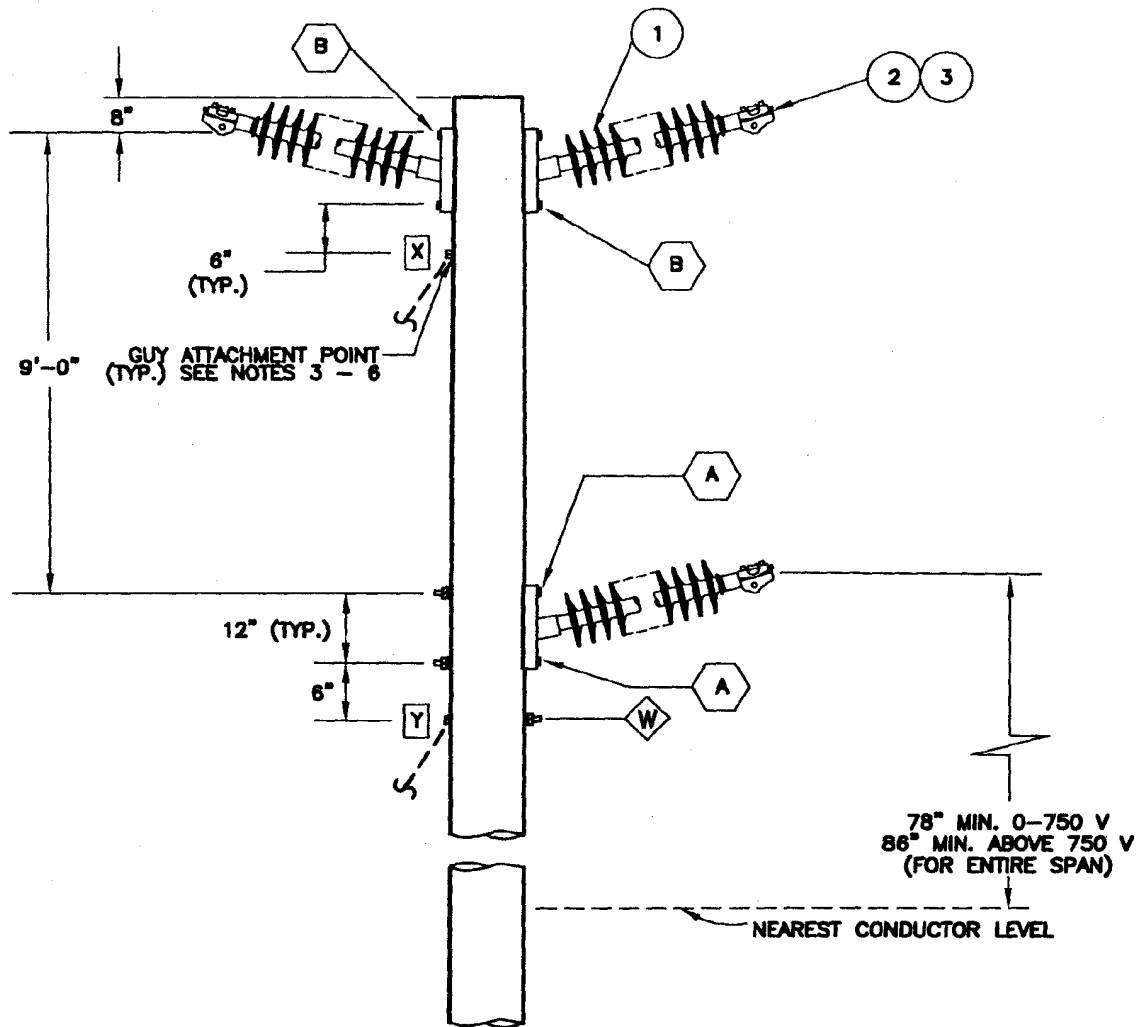
	TRANSMISSION ENGINEERING	SCALE: NONE	
	POLE TOP ARRANGEMENT TYPE WPI-EXP SINGLE CIRCUIT 69kV SW POLE	DWG. NO. 13200SW	SHT. NO. 2 of 3
			13200SW-2

TABLE A

ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	CONDUCTOR SIZE
2	3	229696	CLAMP, POST INSULATOR, RANGE 0.35-0.84"	3/0 ACSR/AW 6/1
3	3	397568	GUARD, LINE, O.D. 0.744", LENGTH 29"	
2	3	229760	CLAMP, POST INSULATOR, RANGE 1.0-1.5"	336.4 ACSR/AW 26/7
3	3	397664	GUARD, LINE, O.D. 1.013", LENGTH 37"	
2	3	229760	CLAMP, POST INSULATOR, RANGE 1.0-1.5"	636 ACSR/AW 24/7
3	3	397728	GUARD, LINE, O.D. 1.34", LENGTH 45"	636 ACSS/AW 24/7
2	3	229792	CLAMP, POST INSULATOR, RANGE 1.5-2.0"	900 ACSS/AW 54/7
3	3	397760	GUARD, LINE, O.D. 1.662", LENGTH 53"	
2	3	229792	CLAMP, POST INSULATOR, RANGE 1.5-2.0"	1,033.5 ACSR/AW 45/7
3	3	397760	GUARD, LINE, O.D. 1.713", LENGTH 53"	1,033.5 ACSS/AW 45/7

	ORIGINAL	LLD	WPH	<i>Dhe</i>	4/17/08							
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	

	TRANSMISSION ENGINEERING				SCALE: NONE	
	POLE TOP ARRANGEMENT				DWG. NO.	SHT. NO.
	TYPE WPI-EXP SINGLE CIRCUIT				13200SW	3 of 3
69KV SW POLE				13200SW-3		



NOTES:

1. LINE ANGLE NOT TO EXCEED 15 DEGREES.
2. MAXIMUM CONDUCTOR DESIGN TENSION NOT TO EXCEED 4000 LBS. PER PHASE.
3. VERTICAL LOAD ON POST INSULATOR NOT TO EXCEED 1000 LBS. FOR GRADE "B" AND 800 LBS. FOR GRADE "A" CONSTRUCTION WITHOUT PRIOR APPROVAL.
4. FOR GUYING, INSTALL IN ORDER .
5. FOR WIND LOAD, GUY ATTACHMENT MUST BE AT OR BELOW POINT .
6. SEE SECTION 15000 FOR GUY DETAILS.
7. SEE JOB PACKAGE FOR GUYING REQUIREMENTS.

	ORIGINAL	LLD	WPH	DEY	4/17/08						
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

TRANSMISSION ENGINEERING						SCALE: NONE	
SDGE	POLE TOP ARRANGEMENT					DWG. NO.	SHT. NO.
	TYPE 2/1 WPI-EXP SINGLE CIRCUIT					13202SW	1 of 3
69kV SW POLE							

13202SW-1

BILL OF MATERIAL

ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
1	3	429332	INSULATOR, POST, POLYMER 64-69" LONG, BENDABLE GAIN BASE AND CLAMPTOP, 2,600 LBS CANTILEVER BREAKING LOAD	356
2		SEE SHT.3 TABLE A	CLAMP, POST INSULATOR	356
3		SEE SHT.3 TABLE A	GUARD, LINE	356
A	2	19022SW	ASSEMBLY, BOLT, 3/4" POST INSULATOR MTG., ONE SIDE, BOTTOM	355
B	2	19024SW	ASSEMBLY, BOLT, 3/4" POST INSULATOR MTG., BOTH SIDES, TOP	355

			/								
	ORIGINAL	LLD	WPH	<i>ONS</i>	4/17/08						
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE



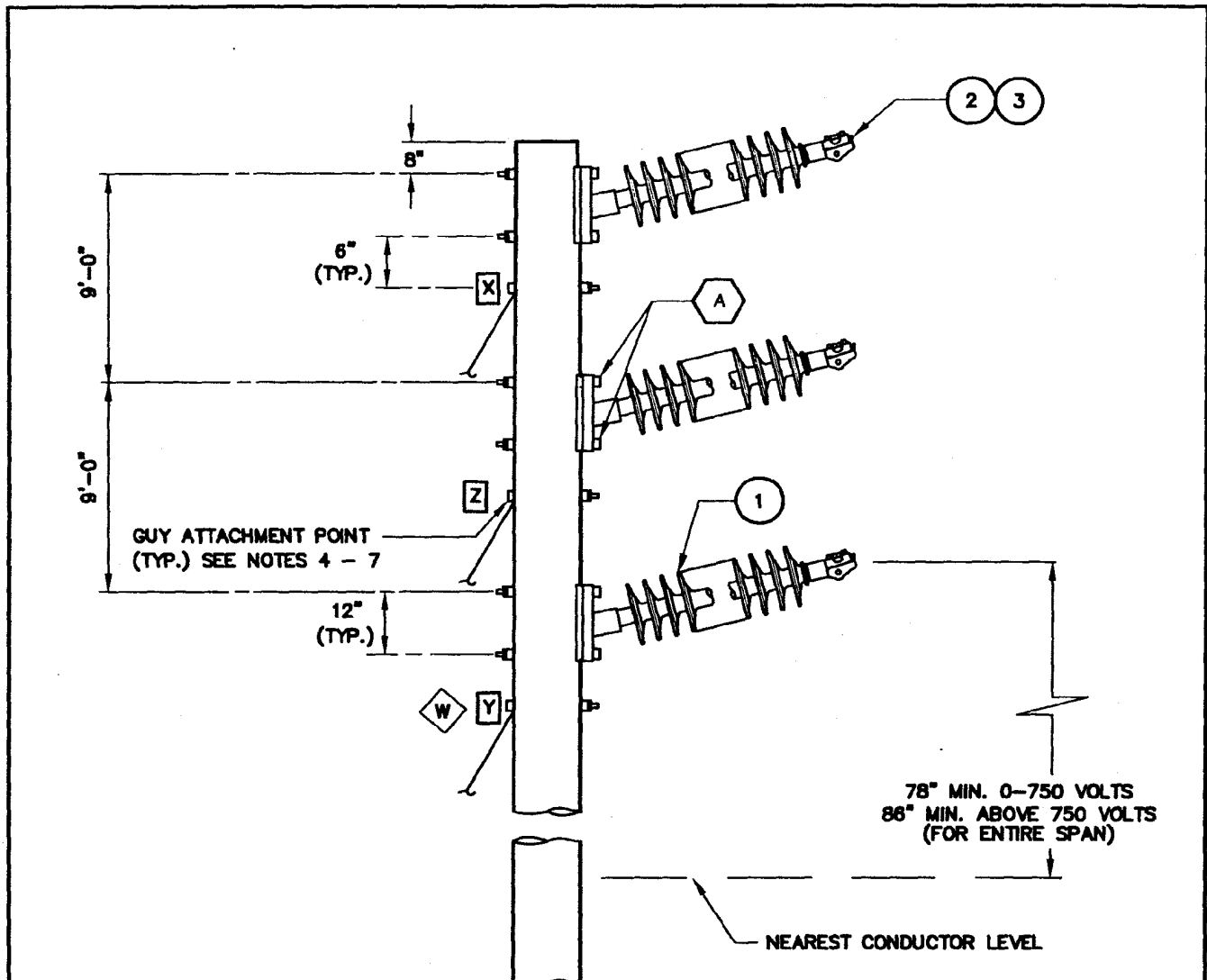
TRANSMISSION ENGINEERING						SCALE: NONE		13202SW-2
	POLE TOP ARRANGEMENT					DWG. NO.	SHT. NO.	
	TYPE 2/1 WPI-EXP SINGLE CIRCUIT					13202SW	2 of 3	
69kV SW POLE								

TABLE A

ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	CONDUCTOR SIZE
2	3	229696	CLAMP, POST INSULATOR, RANGE 0.35-0.84"	3/0 ACSR/AW 6/1
3	3	397568	GUARD, LINE, O.D. 0.774", LENGTH 29"	
2	3	229760	CLAMP, POST INSULATOR, RANGE 1.0-1.5"	336.4 ACSR/AW 26/7
3	3	397664	GUARD, LINE, O.D. 1.013", LENGTH 37"	
2	3	229760	CLAMP, POST INSULATOR, RANGE 1.0-1.5"	636 ACSR/AW 24/7
3	3	397728	GUARD, LINE, O.D. 1.34", LENGTH 45"	636 ACSS/AW 24/7
2	3	229792	CLAMP, POST INSULATOR, RANGE 1.5-2.0"	900 ACSS/AW 54/7
3	3	397760	GUARD, LINE, O.D. 1.662", LENGTH 53"	
2	3	229792	CLAMP, POST INSULATOR, RANGE 1.5-2.0"	1,033.5 ACSR/AW 45/7
3	3	397760	GUARD, LINE, O.D. 1.713", LENGTH 53"	1,033.5 ACSS/AW 45/7

	ORIGINAL	LLD	WPH	297	4/17/08							
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	

TRANSMISSION ENGINEERING						SCALE: NONE		13202SW-3	
	POLE TOP ARRANGEMENT TYPE 2/1 WPI-EXP SINGLE CIRCUIT 69kV SW POLE					DWG. NO.			SHT. NO.
						13202SW			3 of 3



NOTES:

1. LINE ANGLE NOT TO EXCEED 15 DEGREES.
2. MAXIMUM CONDUCTOR DESIGN TENSION NOT TO EXCEED 4000 LBS. PER PHASE.
3. VERTICAL LOAD ON POST INSULATOR NOT TO EXCEED 1000 LBS. FOR GRADE "B" AND 800 LBS. FOR GRADE "A" CONSTRUCTION WITHOUT PRIOR APPROVAL.
4. FOR GUYING, INSTALL IN ORDER **X|Y|Z**.
5. FOR WIND LOAD, GUY ATTACHMENT MUST BE AT OR BELOW POINT **W**.
6. SEE SECTION 16000 FOR GUY DETAILS.
7. SEE JOB PACKAGE FOR GUYING REQUIREMENTS.

	ORIGINAL	LLD	WPH	<i>Dia</i>	4/17/08						
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

TRANSMISSION ENGINEERING						SCALE: NONE		13204SW-1
SDGE	POLE TOP ARRANGEMENT TYPE ZPI-EXP SINGLE CIRCUIT 69kV SW POLE					DWG. NO.	SHT. NO.	
						13204SW	1 of 3	

BILL OF MATERIAL

ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
1	3	429332	INSULATOR, POST, POLYMER, 64-69" LONG, BENDABLE GAIN BASE AND CLAMPTOP, 2,600 LBS CANTILEVER BREAKING LOAD	356
2		SEE SHT. 3 TABLE A	CLAMP, POST INSULATOR	356
3		SEE SHT. 3 TABLE A	GUARD, LINE	356
A	6	19022SW	ASSEMBLY, BOLT 3/4" BONDED POST INSULATOR MOUNTING ONE SIDED	355

			/					/			
	ORIGINAL	LLD	WPH	<i>WPH</i> 4/17/08				/			
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE


TRANSMISSION ENGINEERING						SCALE: NONE					
POLE TOP ARRANGEMENT TYPE ZPI-EXP SINGLE CIRCUIT 69KV SW POLE						DWC. NO.			SHT. NO.		
						13204SW			2 of 3		

13204SW-2

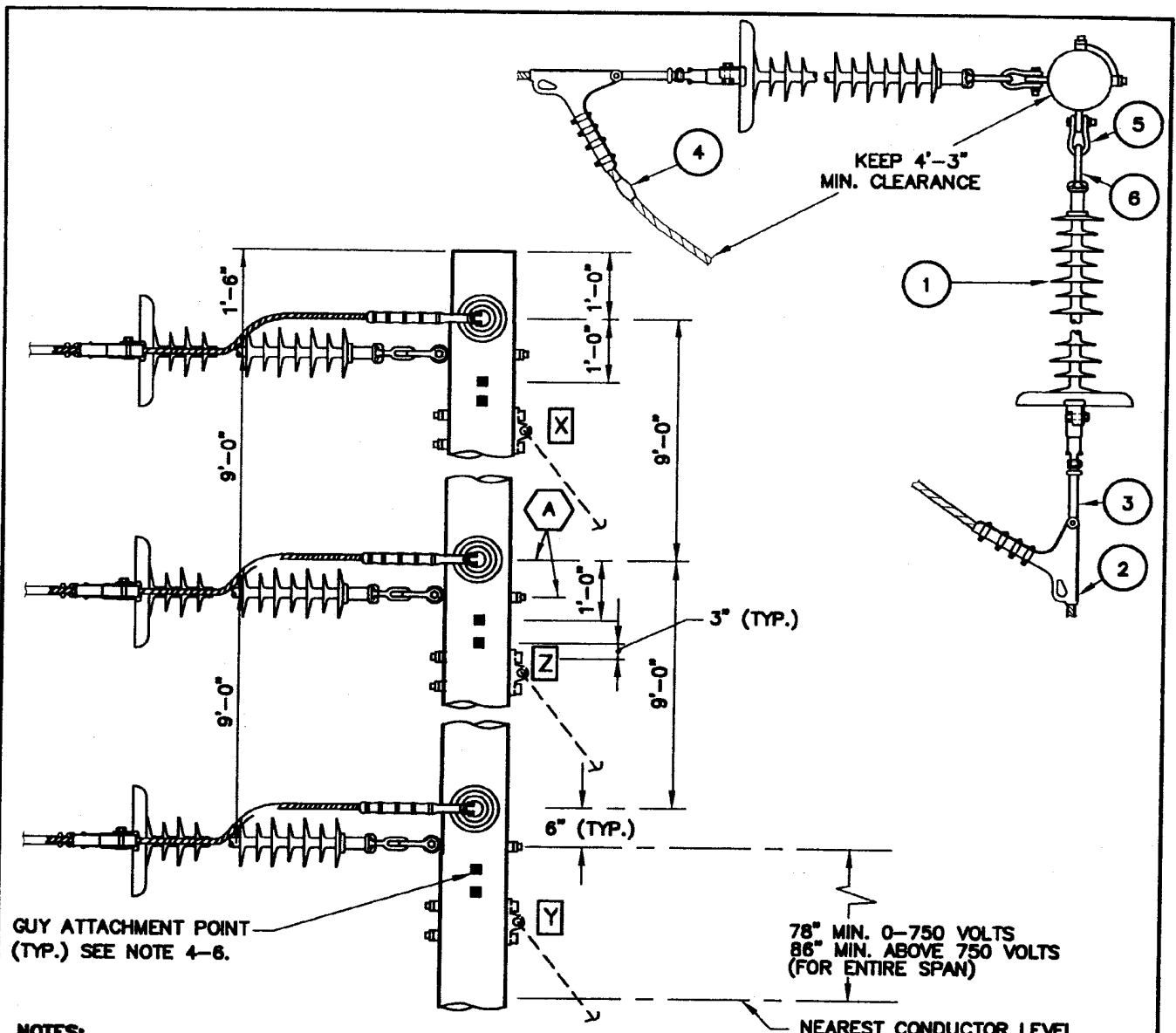
TABLE A

ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	CONDUCTOR SIZE
2	3	229696	CLAMP, POST INSULATOR, RANGE 0.35-0.84"	3/0 ACSR/AW 6/1
3	3	397568	GUARD, LINE, O.D. 0.744", LENGTH 29"	
2	3	229760	CLAMP, POST INSULATOR, RANGE 1.0-1.5"	336.4 ACSR/AW 26/7
3	3	397664	GUARD, LINE, O.D. 1.013", LENGTH 37"	
2	3	229760	CLAMP, POST INSULATOR, RANGE 1.0-1.5"	636 ACSR/AW 24/7
3	3	397728	GUARD, LINE, O.D. 1.34", LENGTH 45"	636 ACSS/AW 24/7
2	3	229792	CLAMP, POST INSULATOR, RANGE 1.5-2.0"	900 ACSS/AW 54/7
3	3	397760	GUARD, LINE, O.D. 1.662", LENGTH 53"	
2	3	229792	CLAMP, POST INSULATOR, RANGE 1.5-2.0"	1033.5 ACSR/AW 45/7
3	3	397760	GUARD, LINE, O.D. 1.713", LENGTH 53"	1033.5 ACSS/AW 45/7

	ORIGINAL	LLD	WPH	2/19	4/17/08							
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	

TRANSMISSION ENGINEERING						SCALE: NONE			
	POLE TOP ARRANGEMENT TYPE ZPI-EXP SINGLE CIRCUIT 69KV SW POLE					DWG. NO.		SHT. NO.	
						13204SW		3 of 3	

13204SW-3



GUY ATTACHMENT POINT
(TYP.) SEE NOTE 4-6.

78" MIN. 0-750 VOLTS
86" MIN. ABOVE 750 VOLTS
(FOR ENTIRE SPAN)

NEAREST CONDUCTOR LEVEL

NOTES:

1. **CAUTION:** DO NOT ATTEMPT TO ALIGN STRAIN CLAMP WITH WIRE UNDER TENSION - TWISTING MAY CAUSE FAILURE OF INSULATOR ROD.
2. USE FOR LINE ANGLES 75 TO 90 DEGREES.
3. MAXIMUM CONDUCTOR DESIGN TENSION NOT TO EXCEED 4000 LBS.
4. FOR GUYING INSTALL IN ORDER .
5. SEE SECTION 15000 FOR GUY DETAILS.
6. SEE JOB PACKAGE FOR GUYING REQUIREMENTS.

	ORIGINAL	LLD	WPH	2/14/17/08							
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

TRANSMISSION ENGINEERING						SCALE: NONE			
SDGE	POLE TOP ARRANGEMENT					DWG. NO.		SET. NO.	
	TYPE Y-EXP SINGLE CIRCUIT-ACSR					13210SW		1 of 3	
69kV SW POLE									13210SW-1

BILL OF MATERIAL

ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
1	6	431396	INSULATOR, SUSPENSION FOR DEAD-END APPLICATION, 138kV, W/CORONA RING, SILICONE RUBBER, 25K SPECIFIED MECHANICAL LOAD, SECTION LENGTH 66"-68", BALL (HOT END) AND SOCKET END FITTINGS	356
2		SEE SHT. 3 TABLE A	CLAMP, STRAIN, WITHOUT SOCKET-EYE	356
3		SEE SHT. 3 TABLE A	EYE, SOCKET, HOTLINE, 30K	356
4		REF. TO TABLE A	CONNECTOR, JUMPER	356
5	6	636436	SHACKLE, ANCHOR, 30K	356
6	6	337542	EYE, OVAL BALL, 30K	356
A	6	19009SW	ASSEMBLY, SHOULDER EYE BOLT, 3/4"	355

			/					/			
	ORIGINAL	LLD	WPH	DGG	4/17/08			/			
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE



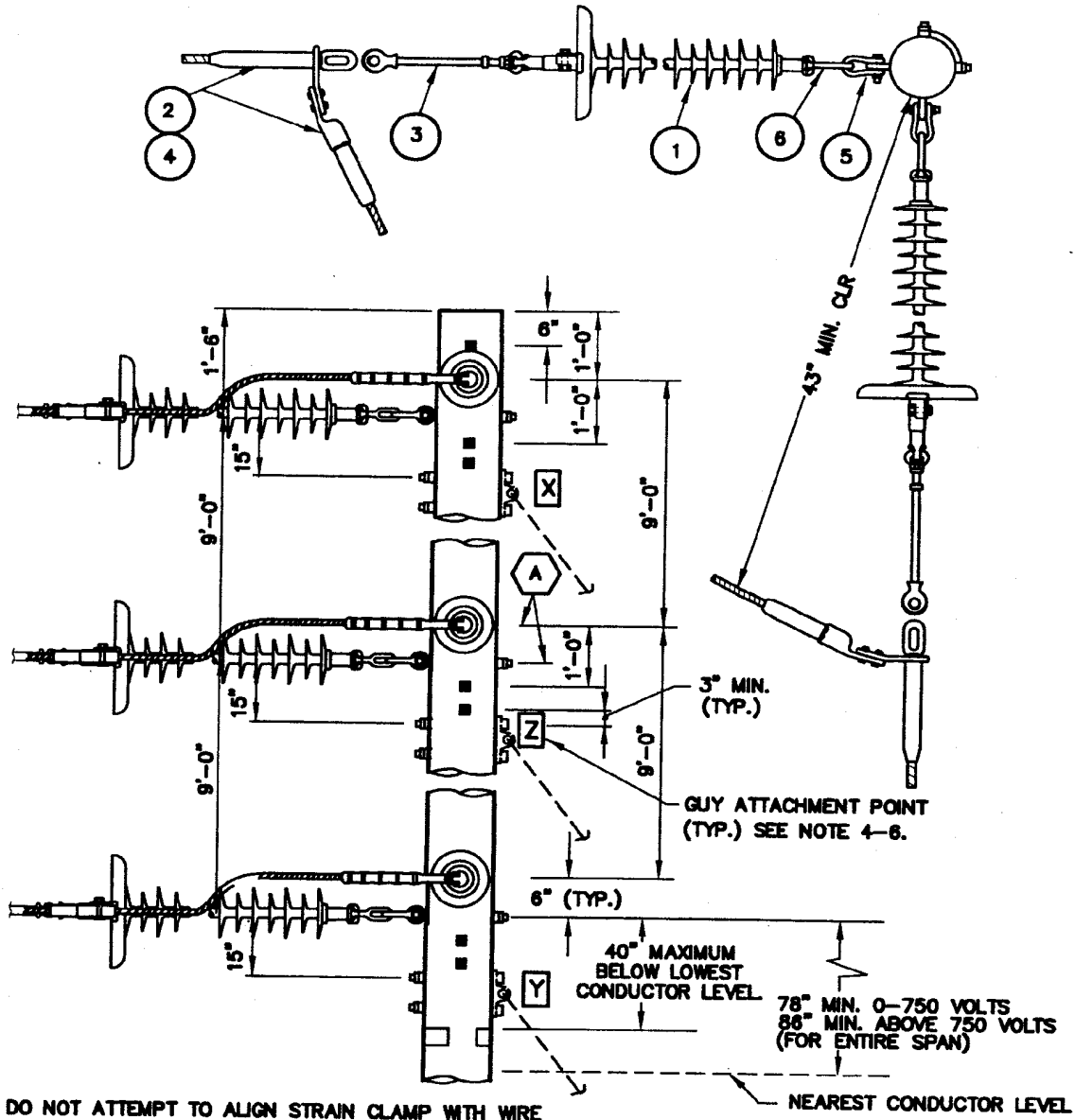
TRANSMISSION ENGINEERING						SCALE: NONE		13210SW-2
	POLE TOP ARRANGEMENT TYPE Y-EXP SINGLE CIRCUIT-ACSR 69kV SW POLE					DWG. NO.	SHT. NO.	
						13210SW	2 of 3	

TABLE A

ITEM	QTY.	STOCK NO. OR STD. NO.	DESCRIPTION	CONDUCTOR SIZE
2	6	230672	CLAMP, STRAIN, ALUMINUM, RANGE 0.20-0.57", 15K	3/0 ACSR/AW 6/1
3	6	337602	EYE, SOCKET HOTLINE, EYE 1 1/16" WIDE, 30K	
4	3	256472	CONNECTOR, COMPRESSION, ALUM., JUMPER	
2	6	231700	CLAMP, STRAIN, ALUMINUM, RANGE 0.47-0.88", 25K	336.4 ACSR/AW 26/7
3	6	337604	EYE, SOCKET HOTLINE, EYE 3/4" WIDE, 30K	
4	3	650264	SLEEVE, ALUM., JUMPER	
2	6	230686	CLAMP, STRAIN, ALUMINUM, RANGE 0.71-1.318", 30K	636 ACSR/AW 24/7
3	6	337622	EYE, SOCKET HOTLINE, EYE 1 3/8" WIDE, 30K	
4	3	650656	SLEEVE, ALUM., JUMPER	
2	6	230686	CLAMP, STRAIN, ALUMINUM, RANGE 0.71-1.318", 30K	1,033.5 ACSR/AW 45/7
3	6	337622	EYE, SOCKET HOTLINE, EYE 1 3/8" WIDE, 30K	
4	3	650336	SLEEVE, ALUM., JUMPER	

	ORIGINAL	LLD	WPH	264	4/17/08						
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

TRANSMISSION ENGINEERING						SCALE: NONE		13210SW-3
	POLE TOP ARRANGEMENT TYPE Y-EXP SINGLE CIRCUIT-ACSR 69KV SW POLE					DWG. NO.	SHT. NO.	
						13210SW	3 of 3	



NOTES:

1. **CAUTION:** DO NOT ATTEMPT TO ALIGN STRAIN CLAMP WITH WIRE UNDER TENSION - TWISTING MAY CAUSE FAILURE OF INSULATOR ROD.
2. USE FOR LINE ANGLES 75 TO 90 DEGREES.
3. MAXIMUM CONDUCTOR DESIGN TENSION NOT TO EXCEED 5000 LBS.
4. FOR GUYING INSTALL IN ORDER .
5. SEE SECTION 16000 FOR GUY DETAILS.
6. SEE JOB PACKAGE FOR GUYING REQUIREMENTS.

A	ORIGINAL	LLD	WPH	<i>WPH</i>	9/10/08						
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

TRANSMISSION ENGINEERING

SCALE: NONE



**POLE TOP ARRANGEMENT
TYPE Y-EXP SINGLE CIRCUIT-ACSS
69KV SW POLE**

DWG. NO.

SHT. NO.

13211SW

1 of 3

BILL OF MATERIAL

ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
1	6	431396	INSULATOR, SUSPENSION FOR DEAD-END APPLICATION, 138kV, W/CORONA RING, SILICONE RUBBER, 25K SPECIFIED MECHANICAL LOAD, SECTION LENGTH 66"-68", BALL (HOT END) AND SOCKET END FITTINGS	356
2		SEE SHT. 3 TABLE A	DEAD END, COMPRESSION	356
3	6	236048	Y-CLEVIS, SOCKET, HOTLINE, 30K	356
4	3 LBS.	246950	FILLER COMPOUND	356
5	6	636436	SHACKLE, ANCHOR, 30K	356
6	6	337542	EYE, OVAL BALL, 30K	356
A	6	19009SW	ASSEMBLY, SHOULDER EYE BOLT, 3/4" BONDED	355



A	ORIGINAL	LLD	WPH	<i>WPH</i>	9/10/08								
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE		
TRANSMISSION ENGINEERING								SCALE: NONE					
	POLE TOP ARRANGEMENT							DWG. NO.			SHT. NO.		
	TYPE Y-EXP SINGLE CIRCUIT-ACSS							13211SW			2 of 3		
69KV SW POLE													

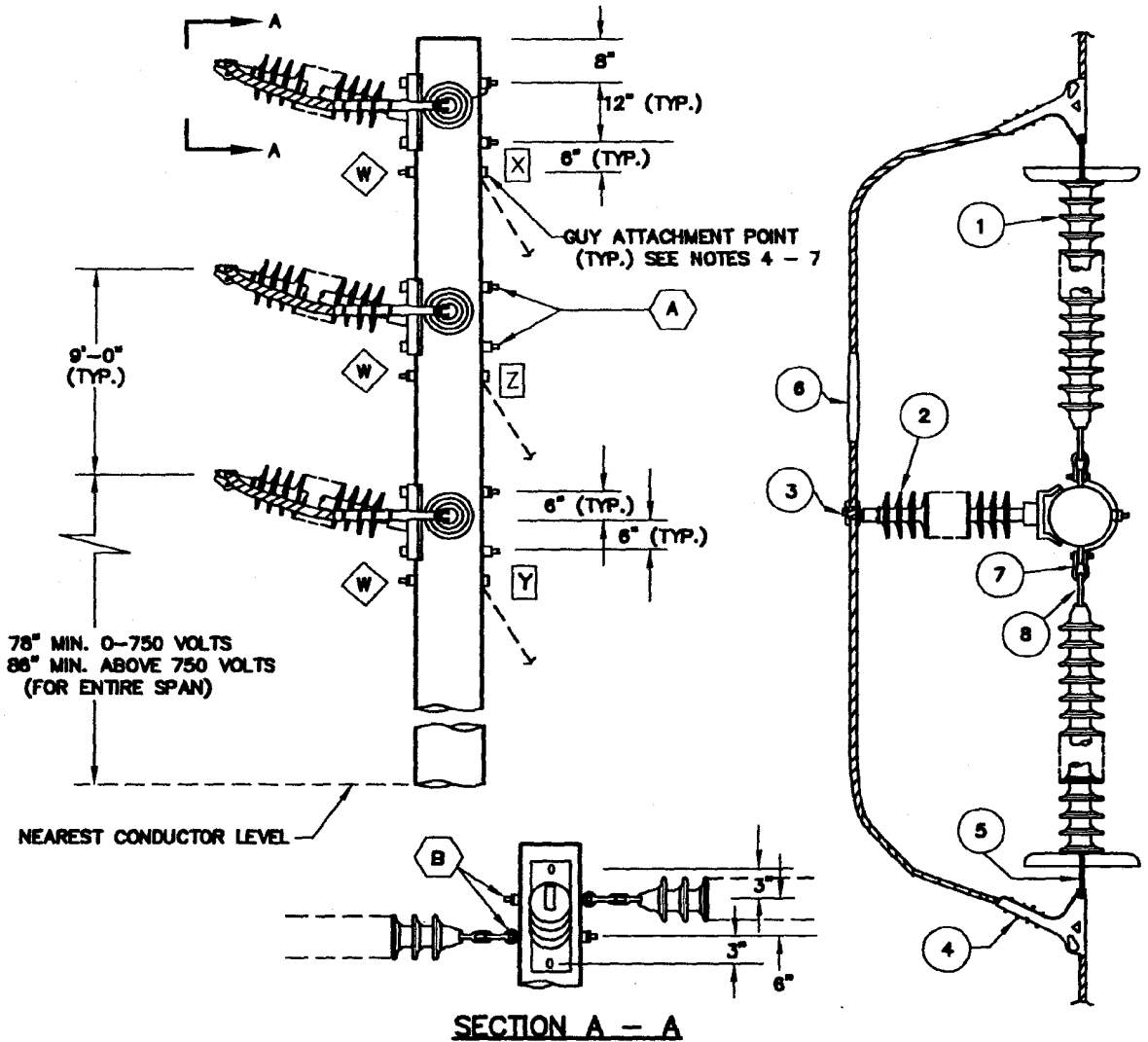
TABLE A				
ITEM	QTY.	STOCK NO. OF STD. NO.	DESCRIPTION	ACCT NO.
			636 ACSS/AW 24/7 (ROOK/AW)	
2	6	652678	DEAD END, COMPRESSION, FOR 636 ROOK/ACSS/AW CONDUCTOR, FULL TENSION WITH STEEL EYE, 4-HOLE NEMA PAD AND TERMINAL CONNECTOR	356
			900 ACSS/AW 54/7 (CANARY/AW)	
2	6	652682	DEAD END, COMPRESSION, FOR 900 CANARY/ACSS/AW CONDUCTOR, FULL TENSION WITH STEEL EYE, 4-HOLE NEMA PAD AND TERMINAL CONNECTOR	356
			1033.5 ACSS/AW 45/7 (ORTOLAN/AW)	
2	6	652674	DEAD END, COMPRESSION, FOR 1033.5 ORTOLAN/ACSS/AW CONDUCTOR, FULL TENSION WITH STEEL EYE, 4-HOLE NEMA PAD AND TERMINAL CONNECTOR	356
			605 ACSS/AW 30/19 (TEAL/AW)	
2	6	ALCOA DE E33129SSAC	DEAD END, COMPRESSION, FOR 605 TEAL/ ACSS/AW CONDUCTOR, FULL TENSION WITH STEEL EYE, 4-HOLE NEMA PAD AND TERMINAL CONNECTOR	356

DIE SIZE TABLE		
CONDUCTOR	STEEL DIE	ALUMINUM DIE
ROOK	12SH	27AH
CANARY	14SH	30AH
ORTOLAN	10SH	34AH
TEAL	14SH	27AH

NOTE:

INSTALLATION OF THE COMPRESSION DEAD ENDS & COMPRESSION SPLICES, INCLUDING THE PROPER DIRECTION OF COMPRESSION, SHALL STRICTLY FOLLOW MANUFACTURER'S INSTRUCTIONS.

A	ORIGINAL	LLD	WPH	<i>WPH</i>	9/10/08								
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE		
TRANSMISSION ENGINEERING								SCALE: NONE					
	POLE TOP ARRANGEMENT TYPE Y-EXP SINGLE CIRCUIT-ACSS 69KV SW POLE							DWG. NO.		SHT. NO.			
								13211SW		3 of 3			



SECTION A - A

NOTES:

1. CAUTION: DO NOT ATTEMPT TO ALIGN STRAIN CLAMP WITH WIRE UNDER TENSION - TWISTING MAY CAUSE FAILURE OF INSULATOR ROD.
2. LINE ANGLE 0 TO 75 DEGREES.
3. MAXIMUM CONDUCTOR DESIGN TENSION NOT TO EXCEED 4000 LBS.
4. FOR WIND LOAD, GUY ATTACHMENT MUST BE AT OR LOWER BELOW POINT **W**.
5. FOR GUYING, INSTALL IN ORDER **X** **Y** **Z**.
6. SEE SECTION 15000 FOR GUY DETAILS.
7. SEE JOB PACKAGE FOR GUYING REQUIREMENTS.

	ORIGINAL	LLD	WPH	DAK	4/17/08						
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

TRANSMISSION ENGINEERING

SCALE: NONE



**POLE TOP ARRANGEMENT
TYPE YPI-EXP SINGLE CKT-ACSR
69kV SW POLE**

DWG. NO.

SHT. NO.

13212SW

1 of 3

13212SW-1

BILL OF MATERIAL

ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
1	6	431396	INSULATOR, SUSPENSION FOR DEAD END APPLICATION, 138kV WITH CORONA RING, SILICONE RUBBER, 25K SPECIFIED MECHANICAL LOAD, SECTION LENGTH 66"-68", BALL (HOT END) AND SOCKET END FITTINGS.	356
2	3	429332	INSULATOR, POST, POLYMER, 64-69" LONG, BENDABLE GAIN BASE AND CLAMPTOP, 2,600 LBS CANTILEVER BREAKING LOAD	356
3		SEE SHT. 3 TABLE A	CLAMP, POST INSULATOR	356
4		SEE SHT. 3 TABLE A	CLAMP, STRAIN, WITHOUT SOCKET EYE	356
5		SEE SHT. 3 TABLE A	EYE, SOCKET, HOTLINE, 30K	356
6		SEE SHT. 3 TABLE A	CONNECTOR, JUMPER	356
7	6	636436	SHACKLE, ANCHOR, 30K	356
8	6	337542	EYE, OVAL BALL, 30K	356
A	6	19022SW	ASSEMBLY, BOLT 3/4" POST INSULATOR MTG., ONE SIDE	355
B	6	19009SW	ASSEMBLY, SHOULDER EYEBOLT, 3/4"	355



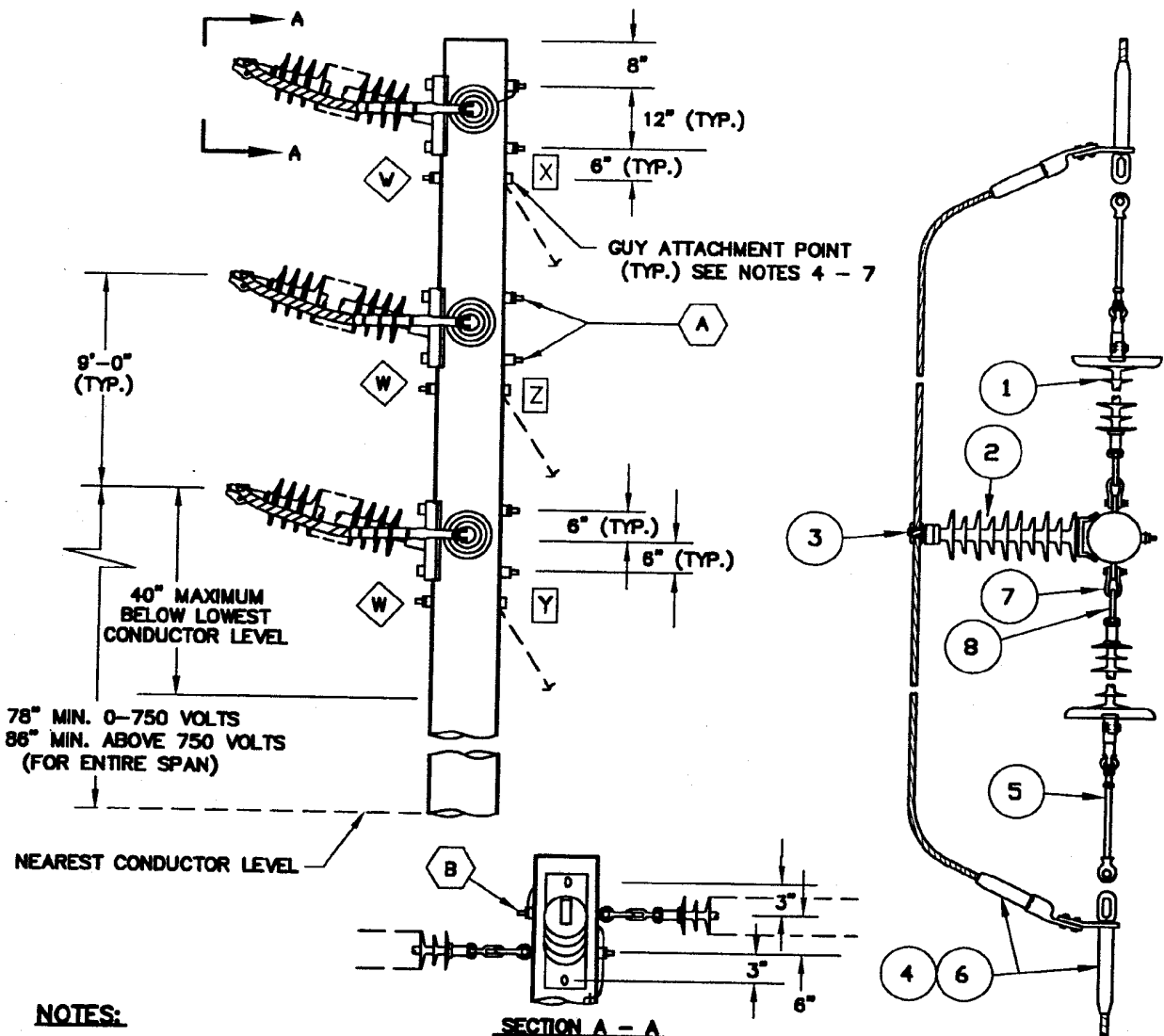
	ORIGINAL	LLD	WPH	Dah	4/17/08						
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE
TRANSMISSION ENGINEERING							SCALE: NONE				
	POLE TOP ARRANGEMENT						DWG. NO.		SHT. NO.		
	TYPE YPI-EXP SINGLE CKT-ACSR						13212SW		2 of 3		
69kV SW POLE											

TABLE A

ITEM	QTY.	STOCK NO. OR STD. NO.	DESCRIPTION	CONDUCTOR SIZE
3	3	229696	CLAMP, POST INSULATOR, RANGE 0.35-0.84"	3/0 ACSR/AW 6/1
4	6	230672	CLAMP, STRAIN, ALUMINUM, RANGE 0.20-0.57", 15K	
5	6	337602	EYE, SOCKET HOTLINE, EYE 11/16" WIDE, 30K	
6	3	256472	CONNECTOR, COMPRESSION, ALUM., JUMPER	
3	3	229696	CLAMP, POST INSULATOR, RANGE 0.35-0.84"	336.4 ACSR/AW 26/7
4	6	231700	CLAMP, STRAIN ALUMINUM, RANGE 0.47-0.88", 25K	
5	6	337604	EYE, SOCKET HOTLINE, EYE 3/4" WIDE, 30K	
6	3	650264	SLEEVE, ALUM., JUMPER	
3	3	229728	CLAMP, POST INSULATOR, RANGE 0.7-1.06"	636 ACSR/AW 24/7
4	6	230686	CLAMP, STRAIN, ALUMINUM, RANGE 0.71-1.318", 30K	
5	6	337622	EYE, SOCKET HOTLINE, EYE 1 3/8" WIDE, 30K	
6	3	650656	SLEEVE, ALUM., JUMPER	
3	3	229760	CLAMP, POST INSULATOR, RANGE 1.0-1.5"	1,033.5 ACSR/AW 45/7
4	6	230686	CLAMP, STRAIN, ALUMINUM, RANGE 0.71-1.318", 30K	
5	6	337622	EYE, SOCKET HOTLINE, EYE 1 3/8" WIDE, 30K	
6	3	650336	SLEEVE, ALUM., JUMPER	

	ORIGINAL	LLD	WPH	2/16	4/17/08						
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

TRANSMISSION ENGINEERING						SCALE: NONE		13212SW-3
	POLE TOP ARRANGEMENT TYPE YPI-EXP SINGLE CKT-ACSR 69kV SW POLE					DWG. NO.	SHT. NO.	
						13212SW	3 of 3	



NOTES:

1. **CAUTION:** DO NOT ATTEMPT TO ALIGN STRAIN CLAMP WITH WIRE UNDER TENSION - TWISTING MAY CAUSE FAILURE OF INSULATOR ROD.
2. LINE ANGLE 0 TO 75 DEGREES.
3. MAXIMUM CONDUCTOR DESIGN TENSION NOT TO EXCEED 5000 LBS.
4. FOR WIND LOAD, GUY ATTACHMENT MUST BE AT OR BELOW POINT W.
5. FOR GUYING INSTALL IN ORDER Y Z.
6. SEE SECTION 15000 FOR GUY DETAILS.
7. SEE JOB PACKAGE FOR GUYING REQUIREMENTS.

A	ORIGINAL	LLD	WPH	DCH	9/12/08						
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE
TRANSMISSION ENGINEERING								SCALE: NONE			
	POLE TOP ARRANGEMENT TYPE YPI-EXP SINGLE CIRCUIT-ACSS 69KV SW POLE							DWG. NO.		SHT. NO.	
								13213SW		1 of 3	

BILL OF MATERIAL

ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
1	6	431396	INSULATOR, SUSPENSION FOR DEAD-END APPLICATION, 138kV, W/CORONA RING, SILICONE RUBBER, 25K SPECIFIED MECHANICAL LOAD, SECTION LENGTH 66"-68", BALL (HOT END) AND SOCKET END FITTINGS	356
2	3	429332	INSULATOR, POST, POLYMER, 64-69" LONG, BENDABLE GAIN BASE AND CLAMPTOP, 2,600 LBS CANTILEVER BREAKING LOAD	356
3		SEE SHT. 3 TABLE A	CLAMP, POST INSULATOR	356
4		SEE SHT. 3 TABLE A	DEAD END COMPRESSION	356
5	6	236048	Y-CLEVIS, SOCKET, HOTLINE, 30K	356
6	6 LBS.	246950	FILLER COMPOUND	356
7	6	636436	SHACKLE, ANCHOR, 30K	356
8	6	337542	EYE, OVAL BALL, 30K	356
A	6	19022SW	ASSEMBLY, BOLT 3/4" POST INSULATOR MTG., ONE SIDE	355
B	6	19009SW	ASSEMBLY, SHOULDER EYEBOLT, 3/4"	355


A	ORIGINAL	LLD	WPH	<i>Dah</i>	9/12/08						
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE
TRANSMISSION ENGINEERING								SCALE: NONE			
	POLE TOP ARRANGEMENT						DWG. NO.		SHT. NO.		
	TYPE YPI-EXP SINGLE CIRCUIT-ACSS						13213SW		2 of 3		
69KV SW POLE											

TABLE A


ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	ACCT NO.
636 ACSS/AW 24/7 (ROOK/AW)				
4	6	652678	DEAD END, COMPRESSION, FOR 636 ROOK/ACSS/AW CONDUCTOR, FULL TENSION WITH STEEL EYE, 4-HOLE NEMA PAD AND TERMINAL CONNECTOR	356
3	3	229728	CLAMP, POST INSULATOR, RANGE 0.70-1.06"	356
900 ACSS/AW 54/7 (CANARY/AW)				
4	6	652682	DEAD END, COMPRESSION, FOR 900 CANARY/ACSS/AW CONDUCTOR, FULL TENSION WITH STEEL EYE, 4-HOLE NEMA PAD AND TERMINAL CONNECTOR	356
3	3	229760	CLAMP, POST INSULATOR, RANGE 1.00-1.50"	356
1033.5 ACSS/AW 45/7 (ORTOLAN/AW)				
4	6	652674	DEAD END, COMPRESSION, FOR 1033.5 ORTOLAN/ACSS /AW CONDUCTOR, FULL TENSION WITH STEEL EYE, 4-HOLE NEMA PAD AND TERMINAL CONNECTOR	356
3	3	229760	CLAMP, POST INSULATOR, RANGE 1.00-1.50"	356
605 ACSS/AW 30/19 (TEAL/AW)				
4	6	649860	DEAD END, COMPRESSION, FOR 605 TEAL/ACSS/AW CONDUCTOR, FULL TENSION WITH STEEL EYE, 4-HOLE NEMA PAD AND TERMINAL CONNECTOR	356
3	3	229728	CLAMP, POST INSULATOR, RANGE 0.70-1.06"	356

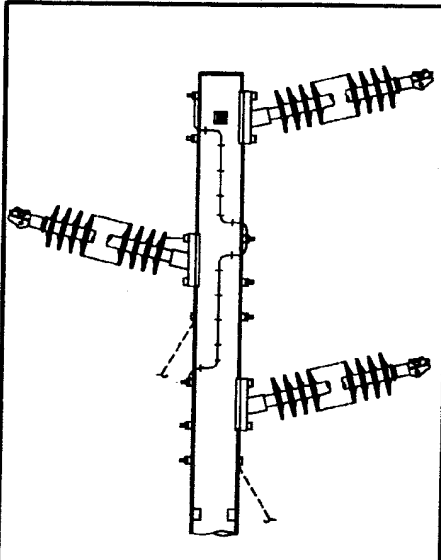
DIE SIZE TABLE

CONDUCTOR	STEEL DIE	ALUMINUM DIE
ROOK	12SH	27AH
CANARY	14SH	30AH
ORTOLAN	10SH	34AH
TEAL	14SH	27AH

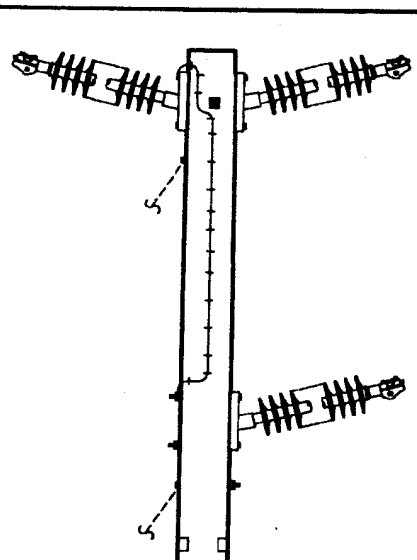
NOTE:

INSTALLATION OF THE COMPRESSION DEAD ENDS & COMPRESSION SPLICES, INCLUDING THE PROPER DIRECTION OF COMPRESSION, SHALL STRICTLY FOLLOW MANUFACTURER'S INSTRUCTIONS.

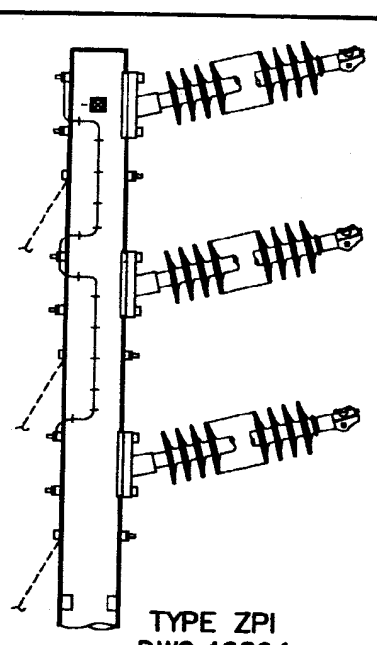
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REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	
TRANSMISSION ENGINEERING								SCALE: NONE				
	POLE TOP ARRANGEMENT TYPE YPI-EXP SINGLE CIRCUIT-ACSS 69KV SW POLE							DWG. NO.	SHT. NO.			
								13213SW	3 of 3			



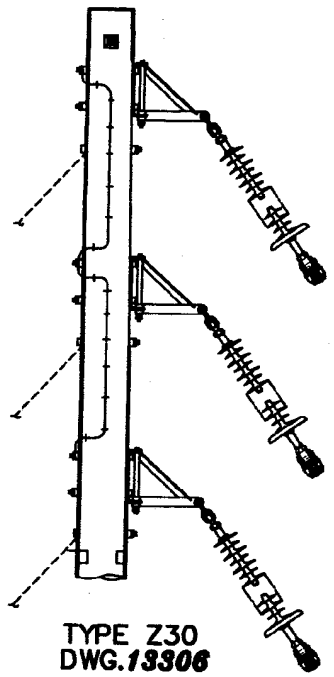
TYPE WPI
DWG. 13302
LINE ANGLE 0° TO 15°



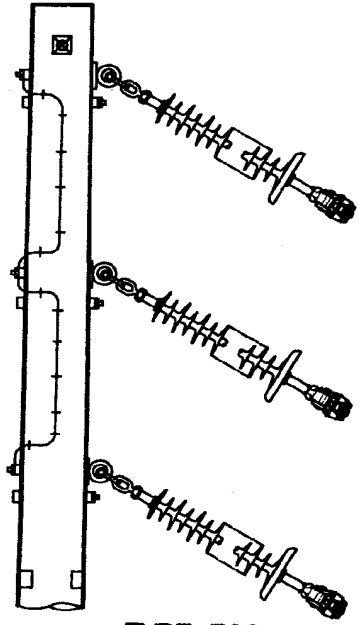
TYPE 2/1 WPI
DWG. 13303
LINE ANGLE 0° TO 15°



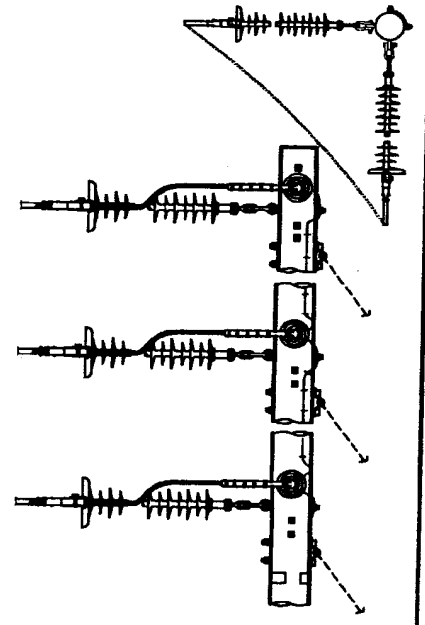
TYPE ZPI
DWG. 13304
LINE ANGLE 0° TO 15°



TYPE Z30
DWG. 13306
LINE ANGLE 15° TO 30°



TYPE Z60
DWG. 13308
LINE ANGLE 30° TO 45°



TYPE Y - ACSR
DWG. 13310
LINE ANGLE 75° TO 90°

B	ADDED DC - WPI	PM	WPH	WVT	8/20/04	E	UPDATED INDEX	LLD	WPH	<i>WVT</i>	9/12/08
A	UPDATED INDEX	PM	SFO WPH	WVT	8/1/03	D	ADDED CORONA RING	LLD	WPH	WVT	4/3/08
	ORIGINAL	AS	DRB	WPH	3/23/00	C	ADDED H-FRAMES AND COMMENTARY	PM	WPH	WVT	7/21/06
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

TRANSMISSION ENGINEERING

SCALE: NONE



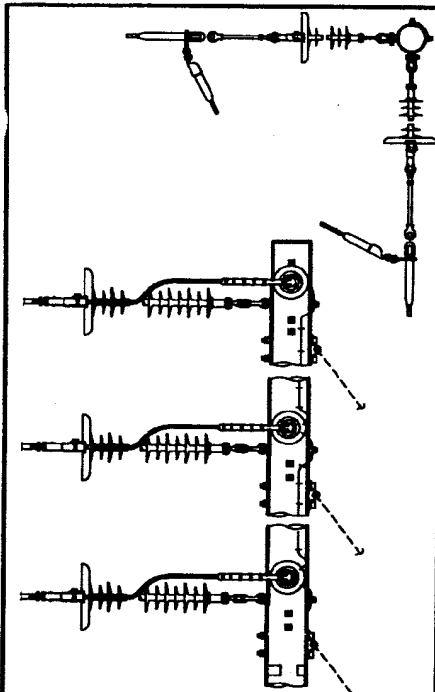
**POLE TOP INDEX
138KV WOOD POLES**

DWG. NO.

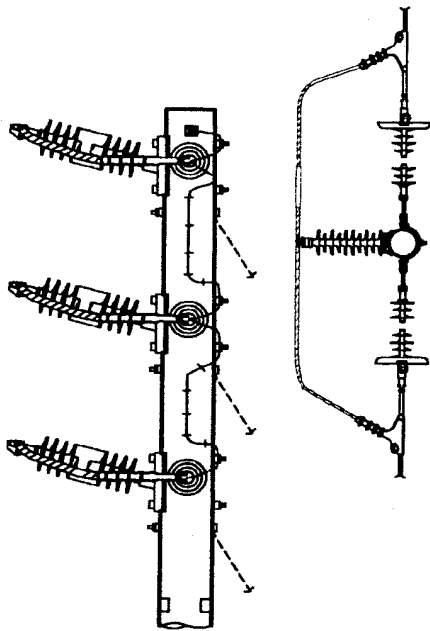
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13301

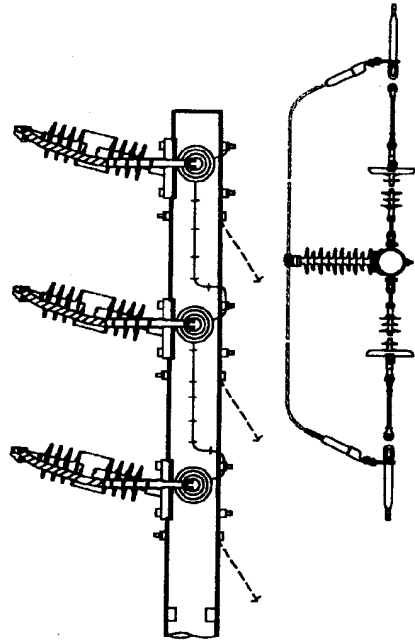
1 of 3



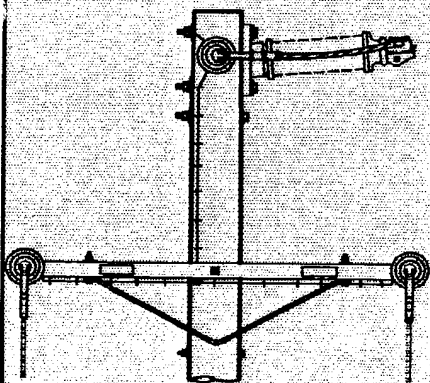
TYPE Y - ACSS
DWG. 13311
LINE ANGLE 75° TO 90°



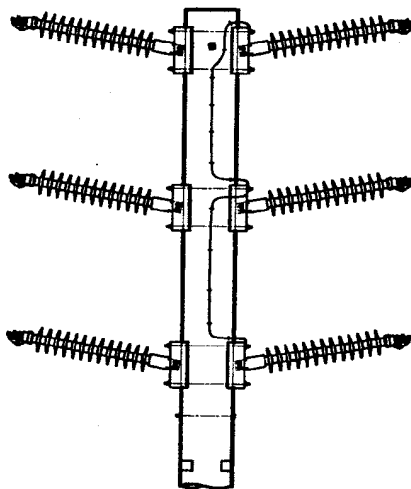
TYPE YPI-ACSR
DWG. 13312
LINE ANGLE 0° TO 75°



TYPE YPI - ACSS
DWG. 13313
LINE ANGLE 0° TO 75°



TYPE X-DELTA 3
DWG. 13315
LINE ANGLE 0° TO 3°



TYPE DC - WPI
DWG. 13320
LINE ANGLE 0° TO 3°

(RESERVED)

B	ADDED DC - WPI	PM	WPH	WVT	8/20/04	E	UPDATED INDEX	LLD	WPH	<i>Qaa</i>	9/12/08
A	UPDATED INDEX	PM	SFO WPH	WVT	8/1/03	D	ADDED CORONA RING	LLD	WPH	WVT	4/3/08
	ORIGINAL	AS	DRB	WPH	3/23/00	C	ADDED H-FRAMES AND COMMENTARY	PM	WPH	WVT	7/21/06
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

TRANSMISSION ENGINEERING

SCALE: NONE



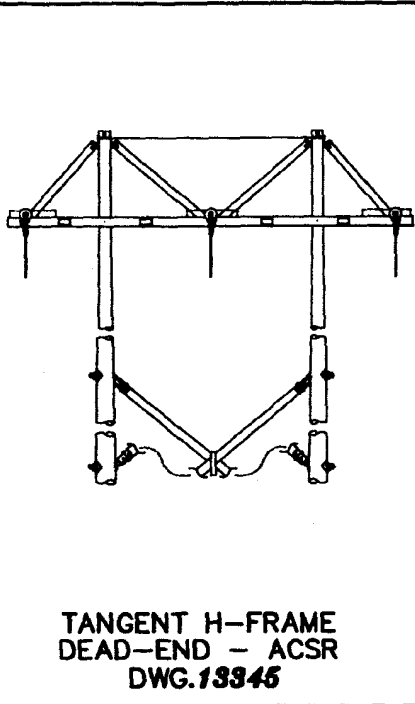
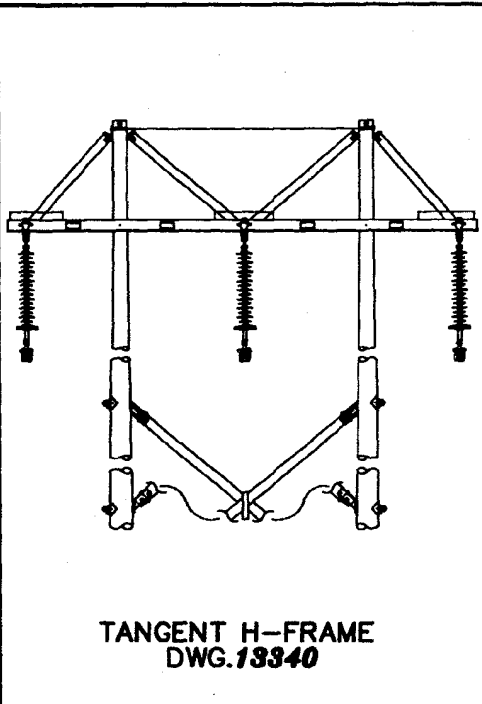
POLE TOP INDEX
138kV WOOD POLES

DWG. NO.

SHT. NO.

13301

2 of 3



(RESERVED)

(RESERVED)

(RESERVED)

(RESERVED)

B	ADDED DC - WPI	PM	WPH	WVT	8/20/04	E	UPDATED INDEX	LLD	WPH	<i>WPH</i>	9/12/08
A	UPDATED INDEX	PM	SFO WPH	WVT	8/1/03	D	ADDED CORONA RING	LLD	WPH	WVT	4/3/08
	ORIGINAL	AS	DRB	WPH	3/23/00	C	ADDED H-FRAMES AND COMMENTARY	PM	WPH	WVT	7/21/08
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

TRANSMISSION ENGINEERING

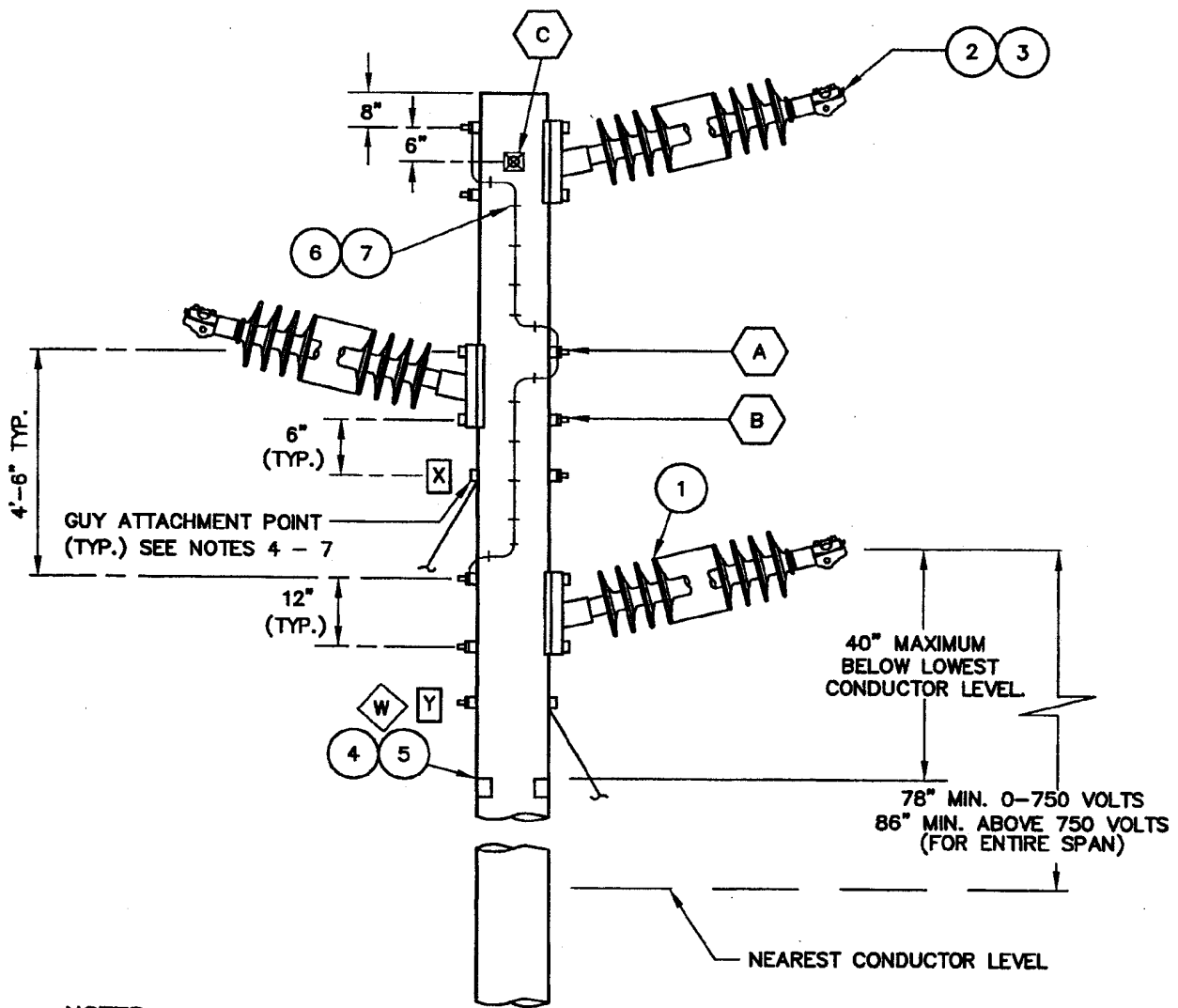
SCALE: NONE



POLE TOP INDEX
138KV WOOD POLES

DWG. NO.
13301

SHT. NO.
3 of 3



NOTES:

1. LINE ANGLE NOT TO EXCEED 15 DEGREES.
2. MAXIMUM CONDUCTOR DESIGN TENSION NOT TO EXCEED 5000 LBS. PER PHASE.
3. VERTICAL WORKING LOAD ON POST INSULATOR NOT TO EXCEED 1000 LBS. FOR GRADE "B" AND 800 LBS. FOR GRADE "A" CONSTRUCTION WITHOUT PRIOR APPROVAL.
4. FOR GUYING, INSTALL IN ORDER .
5. FOR WIND LOAD, GUY ATTACHMENT MUST BE AT OR BELOW POINT .
6. SEE SECTION 15000 FOR GUY DETAILS.
7. SEE JOB PACKAGE FOR GUYING REQUIREMENTS.

A	ADDED ACSS	PM	SFO WPH	WVT	8/1/03	C	REV. SHT. 3	WDF	GV WPH	6/1/04	
	ORIGINAL ISSUE	WDF	DRB	WPH	3/23/00	B	ADDED 605 TEAL	PM	GV DW	WVT	4/1/04
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE


SDGE	TRANSMISSION ENGINEERING						SCALE: NONE	
	POLE TOP ARRANGEMENT TYPE WPI SINGLE CIRCUIT 138kV WOOD POLE						DWG. NO.	SHT. NO.
							13302	1 of 3

13302C01

BILL OF MATERIAL

ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
1	3	429332	INSULATOR, POST, POLYMER, 64-69" LONG, BENDABLE GAIN BASE AND CLAMPTOP, 2,600 LBS CANTILEVER BREAKING LOAD	356
2		SEE SHT. 3 TABLE A	CLAMP, POST INSULATOR	356
3		SEE SHT. 3 TABLE A	GUARD, LINE	356
4	1/8 LB.	492192	NAIL, RF'ING, 1-3/4", #11, GALV. (LBS)	355
5	2	647648	SIGN, "HIGH VOLTAGE"	355
6	1/4 LB.	678528	STAPLES, 1-1/4"	355
7	1 LB.	812928	WIRE, CU, SOFT #8	355
A	3	19022	ASSEMBLY, BOLT 3/4" BONDED POST INSULATOR MTG. ONE SIDED, TOP	355
B	3	19022	ASSEMBLY, BOLT 3/4" THRU POST INSULATOR MTG. ONE SIDED, BOTTOM	355
C	1	19001	ASSEMBLY, BOLT, 5/8" SPLIT	355

A	ADDED ACSS	PM	SFO WPH	WVT	8/1/03	C	REV. SHT. 3	WDF	GV WPH	WVT	6/1/04
	ORIGINAL ISSUE	AS	DRB	WPH	3/23/00	B	ADDED 605 TEAL	PM	GV	WVT	4/1/04
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE


	TRANSMISSION ENGINEERING						SCALE: NONE					
	POLE TOP ARRANGEMENT TYPE WPI SINGLE CIRCUIT 138kV WOOD POLE						DWG. NO.			SHT. NO.		
							13302			2 of 3		

13302C02

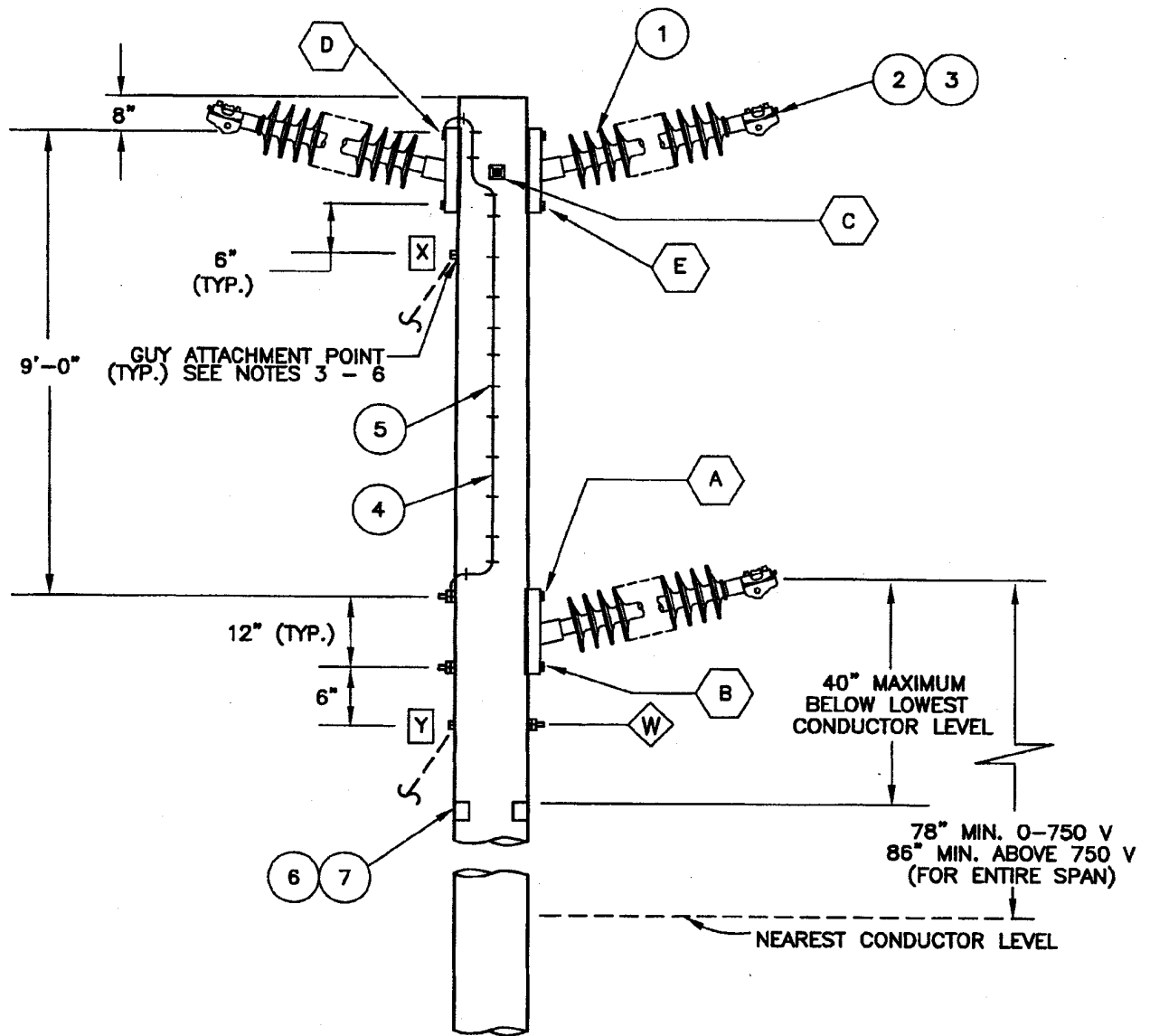
TABLE A

ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	CONDUCTOR SIZE
2	3	229696	CLAMP, POST INSULATOR, RANGE 0.35-0.84"	3/0 ACSR/AW 6/1
3	3	397568	GUARD, LINE, O.D. 0.744", LENGTH 29"	
2	3	229760	CLAMP, POST INSULATOR, RANGE 1.0-1.5"	336.4 ACSR/AW 26/7
3	3	397664	GUARD, LINE, O.D. 1.013", LENGTH 37"	
2	3	229760	CLAMP, POST INSULATOR, RANGE 1.0-1.5"	636 ACSR/AW 24/7
3	3	397728	GUARD, LINE, O.D. 1.34", LENGTH 45"	
2	3	229792	CLAMP, POST INSULATOR, RANGE 1.5-2.0"	900 ACSS/AW 54/7
3	3	397760	GUARD, LINE, O.D. 1.662", LENGTH 53"	
2	3	229792	CLAMP, POST INSULATOR, RANGE 1.5-2.0"	1,033.5 ACSR/AW 45/7
3	3	397760	GUARD, LINE, O.D. 1.713", LENGTH 53"	
2	3	229760	CLAMP, POST INSULATOR, RANGE 1.0-1.5"	605 ACSS/AW 30/19
3	3	MG-0153	GUARD, LINE, O.D. 1.358", LENGTH 45"	

A	ADDED ACSS	PM	SFO WPH	WVT	8/1/03	C	DWG. UPDATE	WDF	GV WPH	WVT	6/1/04	
	ORIGINAL ISSUE	AS	DRB	WPH	3/23/00	B	ADDED 605 TEAL	PM	GV	DW	WVT	4/1/04
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	

	TRANSMISSION ENGINEERING						SCALE: NONE	
	POLE TOP ARRANGEMENT TYPE WPI SINGLE CIRCUIT 138kV WOOD POLE						DWG. NO.	SHT. NO.
							13302	3 of 3

13302C03



NOTES:

1. LINE ANGLE NOT TO EXCEED 15 DEGREES.
2. MAXIMUM CONDUCTOR DESIGN TENSION NOT TO EXCEED 5000 LBS. PER PHASE.
3. VERTICAL LOAD ON POST INSULATOR NOT TO EXCEED 1000 LBS. FOR GRADE "B" & 800 LBS. FOR GRADE "A" CONSTRUCTION WITHOUT PRIOR APPROVAL.
4. FOR GUYING INSTALL IN ORDER .
5. FOR WIND LOAD, GUY ATTACHMENT MUST BE AT OR BELOW POINT .
6. SEE SECTION 15000 FOR GUY DETAILS.
7. SEE JOB PACKAGE FOR GUYING REQUIREMENTS.

A	GHANGED NOTE 3	WDF	EV WPH	WY	6/1/04	C					
-	ORIGINAL ISSUE	PM	SFO WPH	WY	8/1/03	B					
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE



TRANSMISSION ENGINEERING
POLE TOP ARRANGEMENT
TYPE 2/1 WPI SINGLE CIRCUIT
138kV WOOD POLE

SCALE: NONE

DWG. NO.

SHT. NO.

13303

1 of 3

13303A01

BILL OF MATERIAL				
ITEM	QTY.	STOCK NO or STD. NO.	DESCRIPTION	ACCT. NO.
1	3	429332	INSULATOR, POST, POLYMER 64-69" LONG, BENDABLE GAIN BASE AND CLAMPTOP, 2,600 LBS CANTILEVER BREAKING LOAD	356
2		SEE SHT.3 TABLE A	CLAMP, POST INSULATOR	356
3		SEE SHT.3 TABLE A	GUARD, LINE	356
4	1 LB.	812928	WIRE, CU. SOFT #8	355
5	1/4 LB.	678528	STAPLES, 1-1/4"	355
6	1/8 LB.	492192	NAIL, RFG. 1 3/4 - #11 GALV.	355
7	2	647648	SIGN, HIGH VOLTAGE	355
A	1	19022	ASSEMBLY, BOLT, 3/4" POST BONDED INSULATOR MTG., ONE SIDE TOP	355
B	1	19022	ASSEMBLY, BOLT, 3/4" POST INSULATOR MTG., ONE SIDE BOTTOM	355
C	1	19001	ASSEMBLY, BOLT, 5/8" SPLIT	355
D	1	19024	ASSEMBLY, BOLT, 3/4" POST BONDED INSULATOR MTG., BOTH SIDES TOP	355
E	1	19024	ASSEMBLY, BOLT, 3/4" POST INSULATOR MTG., BOTH SIDES BOTTOM	355

A	CHANGED STOCK NO. FOR ITEM 1	WDF	WPH	WPH	6/1/04	C					
-	ORIGINAL ISSUE	PM	SFO	WPH	8/1/03	B					
PPV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

13303A02


	TRANSMISSION ENGINEERING		SCALE: NONE	
	POLE TOP ARRANGEMENT TYPE 2/1 WPI SINGLE CIRCUIT 138k WOOD POLE		DWG. NO.	SHT. NO.
			13303	2 of 3

TABLE A

ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	CONDUCTOR SIZE
2	3	229696	CLAMP, POST INSULATOR, RANGE 0.35-0.84"	3/0 ACSR/AW 6/1
3	3	397568	GUARD, LINE, O.D. 0.744", LENGTH 29"	
2	3	229760	CLAMP, POST INSULATOR, RANGE 1.0-1.5"	336.4 ACSR/AW 26/7
3	3	397664	GUARD, LINE, O.D. 1.013", LENGTH 37"	
2	3	229760	CLAMP, POST INSULATOR, RANGE 1.0-1.5"	636 ACSR/AW 24/7
3	3	397728	GUARD, LINE, O.D. 1.34", LENGTH 45"	636 ACSS/AW 24/7
2	3	229792	CLAMP, POST INSULATOR, RANGE 1.5-2.0"	900 ACSS/AW 54/7
3	3	397760	GUARD, LINE, O.D. 1.662", LENGTH 53"	
2	3	229792	CLAMP, POST INSULATOR, RANGE 1.5-2.0"	1,033.5 ACSR/AW 45/7
3	3	397760	GUARD, LINE, O.D. 1.713", LENGTH 53"	1,033.5 ACSS/AW 45/7

A	CORRECTED LINE GUARD OD FOR 3/0	WDF	GV/WPH	<i>[Signature]</i>	6/1/04	C					
-	ORIGINAL ISSUE	PM	SFO/WPH	<i>[Signature]</i>	8/1/03	B					
PRV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

13303A03



TRANSMISSION ENGINEERING
POLE TOP ARRANGEMENT
TYPE 2/1 WPI SINGLE CIRCUIT
138KV WOOD POLE

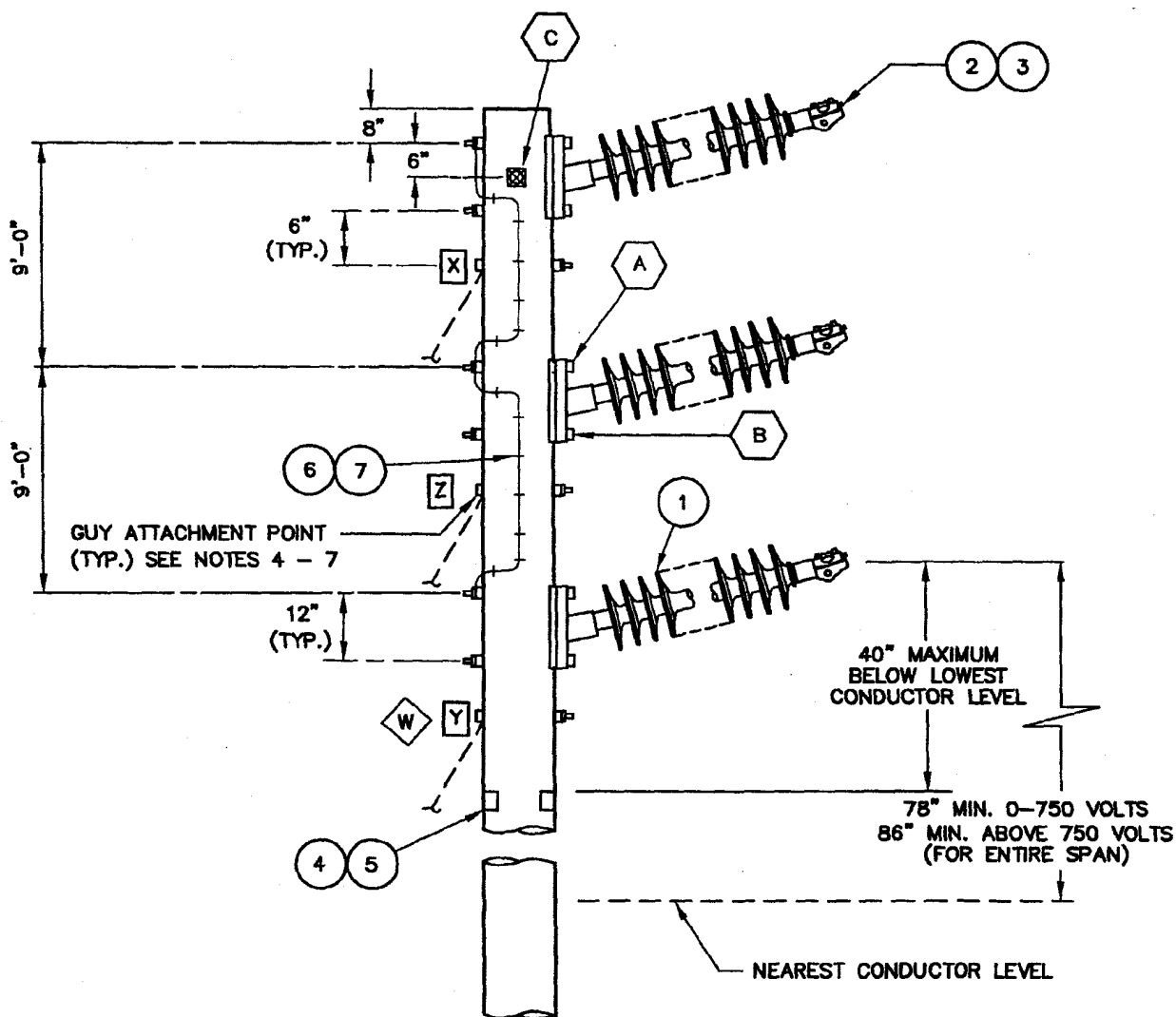
SCALE: NONE

DWG. NO.

SHT. NO.

13303

3 of 3



NOTES:

1. LINE ANGLE NOT TO EXCEED 15 DEGREES.
2. MAXIMUM CONDUCTOR DESIGN TENSION NOT TO EXCEED 5000 LBS.
3. VERTICAL WORKING LOAD ON POST INSULATOR NOT TO EXCEED 1000 LBS. FOR GRADE "B" AND 800 LBS. FOR GRADE "A" CONSTRUCTION WITHOUT PRIOR APPROVAL.
4. FOR GUYING, INSTALL IN ORDER Y Z .
5. FOR WIND LOAD, GUY ATTACHMENT MUST BE AT OR BELOW POINT W .
6. SEE SECTION 15000 FOR GUY DETAILS.
7. SEE JOB PACKAGE FOR GUYING REQUIREMENTS.

A	ADDED ACSS	PM	SFO WPH	WVT	8/1/03	C						
-	ORIGINAL ISSUE	AS	DRB WPH		3/23/00	B	REV. SHT. 3	WDF	<input checked="" type="checkbox"/> WPH	<input checked="" type="checkbox"/> WPH	6/1/04	
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	
TRANSMISSION ENGINEERING							SCALE: NONE					
SDGE	POLE TOP ARRANGEMENT TYPE ZPI SINGLE CIRCUIT 138kV WOOD POLE						DWG. NO.		SHT. NO.		13304801	
							13304		1 of 3			

BILL OF MATERIAL

ITEM	QTY.	STOCK NO. or <i>STD. NO.</i>	DESCRIPTION	ACCT. NO.
1	3	429332	INSULATOR, POST, POLYMER, 64-69" LONG, BENDABLE GAIN BASE AND CLAMPTOP, 2,600 LBS CANTILEVER BREAKING LOAD	356
2		SEE SHT. 3 TABLE A	CLAMP, POST INSULATOR	356
3		SEE SHT. 3 TABLE A	GUARD, LINE	356
4	1/8 LB.	492192	NAIL, RF'ING, 1-3/4", #11, GALV. (LBS)	355
5	2	647648	SIGN, "HIGH VOLTAGE"	355
6	1/3 LB.	678528	STAPLES, 1-1/4"	355
7	1-1/2 LB.	812928	WIRE, CU, SOFT #8	355
A	3	19022	ASSEMBLY, BOLT 3/4" BONDED POST INSULATOR MTG. ONE SIDED, TOP	356
B	3	19022	ASSEMBLY, BOLT 3/4" THRU POST INSULATOR MTG. ONE SIDED, BOTTOM	356
C	1	19001	ASSEMBLY, BOLT, 5/8" SPLIT	356

A	ADDED ACSS	PM	SFO WPH	WVT	8/1/03	C							13304B02
-	ORIGINAL ISSUE	AS	DRB	WPH	3/23/00	B	REV. SHT. 3	WDF	WPH	WPH	6/1/04		
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE		



	TRANSMISSION ENGINEERING				SCALE: NONE	
	POLE TOP ARRANGEMENT TYPE ZPI SINGLE CIRCUIT 138kV WOOD POLE				DWG. NO.	SHT. NO.
					13304	2 of 3

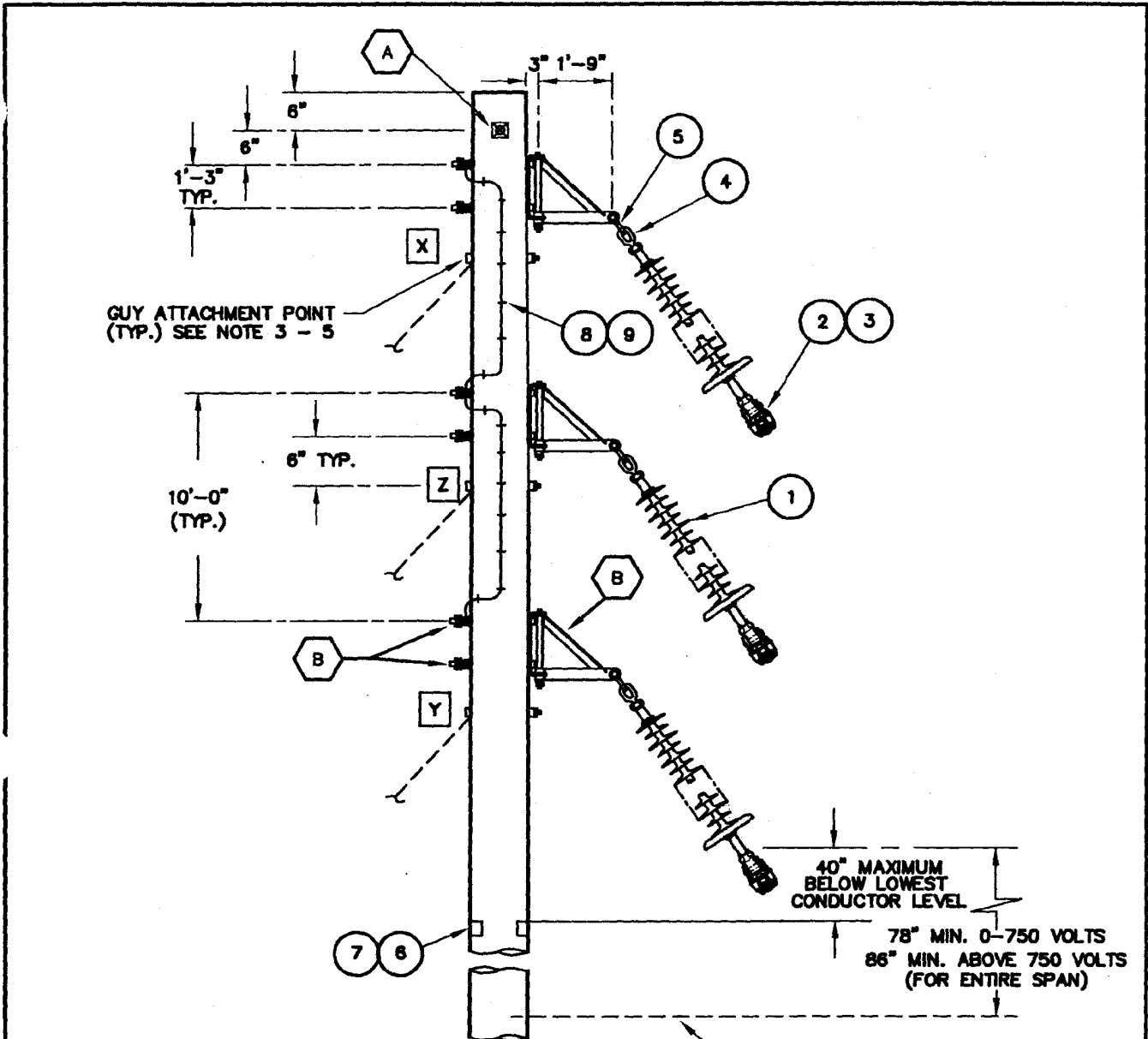
TABLE A

ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	CONDUCTOR SIZE
2	3	229696	CLAMP, POST INSULATOR, RANGE 0.35-0.84"	3/0 ACSR/AW 6/1
3	3	397568	GUARD, LINE, O.D. 0.744", LENGTH 29"	
2	3	229760	CLAMP, POST INSULATOR, RANGE 1.0-1.5"	336.4 ACSR/AW 26/7
3	3	397664	GUARD, LINE, O.D. 1.013", LENGTH 37"	
2	3	229760	CLAMP, POST INSULATOR, RANGE 1.0-1.5"	636 ACSR/AW 24/7
3	3	397728	GUARD, LINE, O.D. 1.34", LENGTH 45"	636 ACSS/AW 24/7
2	3	229792	CLAMP, POST INSULATOR, RANGE 1.5-2.0"	900 ACSS/AW 54/7
3	3	397760	GUARD, LINE, O.D. 1.662", LENGTH 53"	
2	3	229792	CLAMP, POST INSULATOR, RANGE 1.5-2.0"	1,033.5 ACSR/AW 45/7
3	3	397760	GUARD, LINE, O.D. 1.713", LENGTH 53"	1,033.5 ACSS/AW 45/7

A	ADDED ACSS	PM	SFO WPH	WVT	8/1/03	C						
-	ORIGINAL ISSUE	AS	DRB	WPH	3/23/00	B	CORRECTED LINE GUARD OD FOR 3/0	WDF	EJ WPH	6/1/04		
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	

	TRANSMISSION ENGINEERING						SCALE: NONE					
	POLE TOP ARRANGEMENT TYPE ZPI SINGLE CIRCUIT 138KV WOOD POLE						DWG. NO.			SHT. NO.		
							13304			3 of 3		

13304B03



NOTES:

1. FOR USE WITH LINE ANGLES FROM 15 - 30 DEGREES.
2. MAXIMUM CONDUCTOR DESIGN TENSION NOT TO EXCEED 5000 LBS.
3. FOR GUYING, INSTALL IN ORDER .
4. SEE SECTION 15000 FOR GUY DETAILS.
5. SEE JOB PACKAGE FOR GUYING REQUIREMENTS.


A	ADDED ACSS	PM	WPH/SFO	WVT	8/1/03	C	ADDED CORONA RING	LLD	WPH	WVT	4/3/08
-	ORIGINAL ISSUE	AS	DRB	WPH	3/23/00	B	REV. SHTS 2 & 3	WDF	WPH	WVT	6/1/04
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

SDGE	TRANSMISSION ENGINEERING	SCALE: NONE	
	POLE TOP ARRANGEMENT TYPE Z30 SINGLE CIRCUIT 138KV WOOD POLE	DWG. NO. 13306	SHT. NO. 1 of 3
			13306-1

BILL OF MATERIAL

ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
1	3	431396	INSULATOR, SUSPENSION, 138kV, WITH CORONA RING, SILICONE RUBBER, 25K SPECIFIED MECHANICAL LOAD, SECTION LENGTH 66"-68", BALL (HOT END) AND SOCKET END FITTINGS.	356
2		SEE SHT. 3 TABLE A	CLAMP, SUSPENSION, WITH SOCKET-EYE	356
3		SEE SHT. 3 TABLE A	GUARD, LINE	356
4	3	337542	EYE, OVAL, BALL, 30K	356
5	3	636436	SHACKLE ANCHOR, 30K	356
6	1/8 LB.	492192	NAIL, RF'ING, 1-3/4", #11, GALV. (LBS)	355
7	2	647648	SIGN, "HIGH VOLTAGE"	355
8	1/3 LB.	678528	STAPLES, 1-1/4"	355
9	1-1/2 LB.	812928	WIRE, CU. SOFT #8	355
A	1	19001	ASSEMBLY, BOLT, 5/8" SPLIT	355
B	3	19036	ASSEMBLY, SWINGING BRACKET	355

A	ADDED ACSS	PM	SFO WPH	WVT	8/1/03	C	ADDED CORONA RING	LLD	WPH	WVT	4/3/08	
-	ORIGINAL ISSUE	AS	DRB	WPH	3/23/00	B	CHANGED ACCT. NO. FOR ITEM A	WDF	WPH	WVT	8/1/04	
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	


	TRANSMISSION ENGINEERING	SCALE: NONE	
	POLE TOP ARRANGEMENT TYPE Z30 SINGLE CIRCUIT 138kV WOOD POLE	DWG. NO.	SHT. NO.
		13306	2 of 3

13306-2

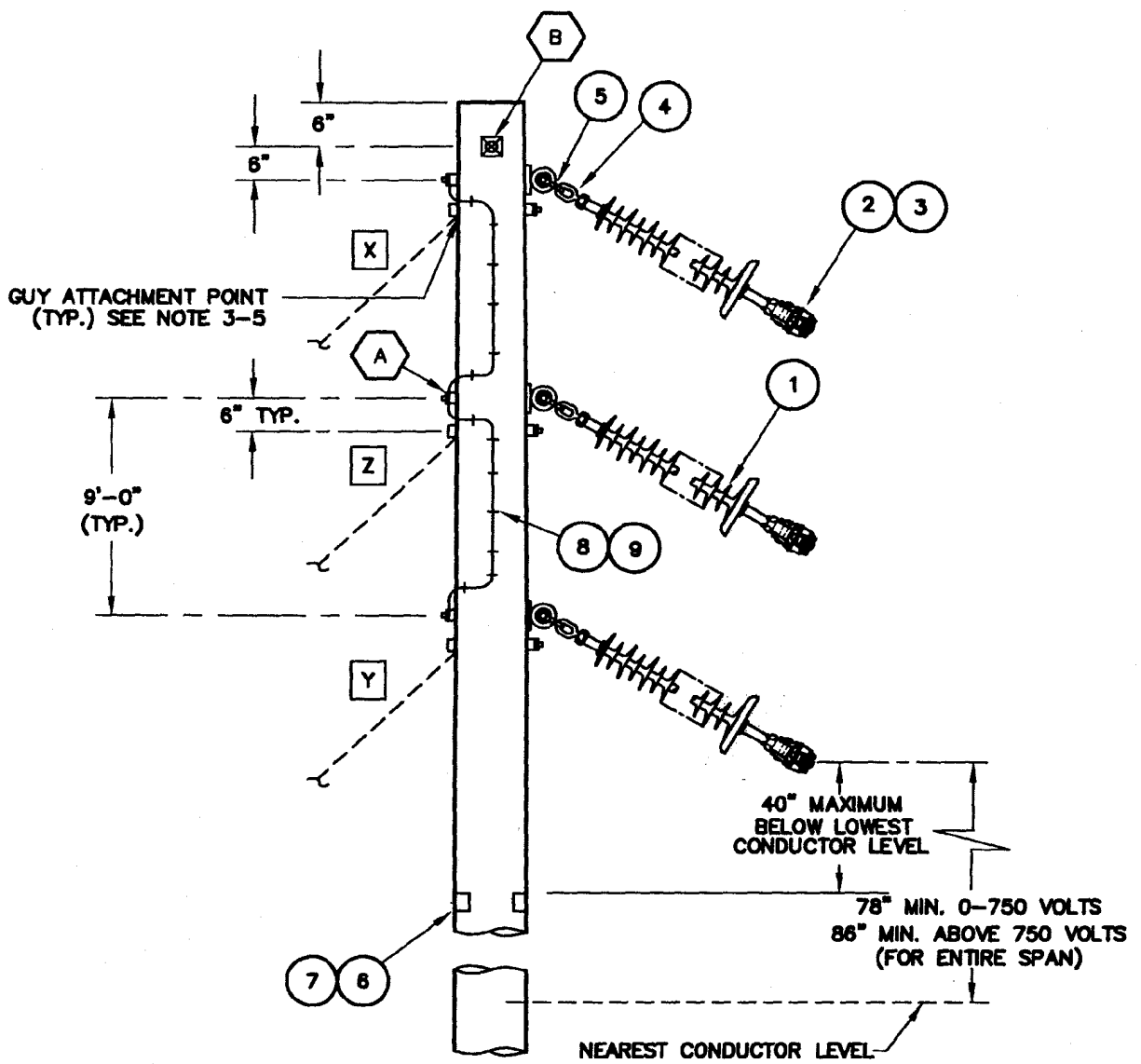
TABLE A

ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	CONDUCTOR SIZE
2	3	232224	CLAMP, SUSPENSION W/ SOCKET EYE, RANGE 0.4"-0.84"	3/0 ACSR/AW 6/1
3	3	397568	GUARD, LINE, O.D. 0.744", LENGTH 29"	
2	3	232160	CLAMP, SUSPENSION W/ SOCKET EYE, RANGE 0.7"-1.12"	336.4 ACSR/AW 26/7
3	3	397664	GUARD, LINE, O.D. 1.013", LENGTH 37"	
2	3	232192	CLAMP, SUSPENSION W/ SOCKET EYE, RANGE 1.25"-1.82"	636 ACSR/AW 24/7
3	3	397728	GUARD, LINE, O.D. 1.342", LENGTH 45"	
2	3	232192	CLAMP, SUSPENSION W/ SOCKET EYE, RANGE 1.25"-1.82"	900 ACSS/AW 54/7
3	3	397760	GUARD, LINE, O.D. 1.712", LENGTH 53"	
2	3	232192	CLAMP, SUSPENSION W/ SOCKET EYE, RANGE 1.25"-1.82"	1033.5 ACSR/AW 45/7 1033.5 ACSS/AW 45/7
3	3	397760	GUARD, LINE, O.D. 1.712", LENGTH 53"	

REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE
A	ADDED ACSS	PM	SFO WPH	WVT	8/1/03	C	ADDED CORONA RING	LLD	WPH	WVT	4/3/08
-	ORIGINAL ISSUE	AS	DRB	WPH	3/23/00	B	GEN. UPDATE OF TABLE A	WDF	WPH	WVT	6/1/04

	TRANSMISSION ENGINEERING						SCALE: NONE					
	POLE TOP ARRANGEMENT TYPE Z30 SINGLE CIRCUIT 138kV WOOD POLE						DWG. NO.			SHT. NO.		
							13306			3 of 3		

13306-3



GUY ATTACHMENT POINT (TYP.) SEE NOTE 3-5

9'-0" (TYP.)

40" MAXIMUM BELOW LOWEST CONDUCTOR LEVEL

78" MIN. 0-750 VOLTS
86" MIN. ABOVE 750 VOLTS (FOR ENTIRE SPAN)

NEAREST CONDUCTOR LEVEL

1. FOR USE WITH LINE ANGLES FROM 30 - 45 DEGREES.
2. MAXIMUM CONDUCTOR DESIGN TENSION NOT TO EXCEED 5000 LBS.
3. FOR GUYING, INSTALL IN ORDER
4. SEE SECTION 15000 FOR GUY DETAILS.
5. SEE JOB PACKAGE FOR GUYING REQUIREMENTS.
6. THIS STANDARD IS NOT APPLICABLE FOR ACSS CONDUCTOR. USE "YPI-ACSS" ON DWG. NO. 13313 AS SUBSTITUTE.


A	ADDED NOTE ON SHT. 1	PM	SFO WPH	WVT	8/1/03	C	ADDED CORONA RING	LLD	WPH	WVT	4/3/08	
-	ORIGINAL ISSUE	AS	DRB	WPH	3/23/00	B	REV. SHTS. 2 & 3	WDF	WPH	WVT	6/1/04	
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	

TRANSMISSION ENGINEERING							SCALE: NONE					
SDGE	POLE TOP ARRANGEMENT TYPE Z45 SINGLE CIRCUIT 138kV WOOD POLE						DWG. NO.			SHT. NO.		
							13308			1 of 3		
							13308-1					

BILL OF MATERIAL

ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
1	3	431396	INSULATOR, SUSPENSION, 138kV, WITH CORONA RING, SILICONE RUBBER, 25K SPECIFIED MECHANICAL LOAD, SECTION LENGTH 66"-68", BALL (HOT END) AND SOCKET END FITTINGS.	356
2		SEE SHT. 3 TABLE A	CLAMP, SUSPENSION, WITH SOCKET-EYE	356
3		SEE SHT. 3 TABLE A	GUARD, LINE	356
4	3	337542	EYE, OVAL, BALL, 30K	356
5	3	636436	SHACKLE ANCHOR, 30K	356
6	1/8 LB.	492192	NAIL, RF'ING, 1-3/4", #11, GALV. (LBS)	355
7	2	647648	SIGN, "HIGH VOLTAGE"	355
8	1/3 LB.	678528	STAPLES, 1-1/4"	355
9	1-1/2 LB.	812928	WIRE, CU. SOFT #8	355
A	3	19009	ASSEMBLY, SHOULDER EYE BOLT, 3/4" BONDED	355
B	3	19001	ASSEMBLY, BOLT, 5/8" SPLIT	355

A	ADDED NOTE ON SHT. 1	PM	SFO WPH	WVT	8/1/03	C	ADDED CORONA RING	LLD	WPH	WVT	4/3/08	
	ORIGINAL ISSUE	AS	DRB	WPH	3/23/00	B	CORRECTED ACCT. NOS. FOR ITEMS A & B	WDF	WPH	WVT	6/1/04	
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	


	TRANSMISSION ENGINEERING	SCALE: NONE	
	POLE TOP ARRANGEMENT TYPE Z45 SINGLE CIRCUIT 138kV WOOD POLE	DWG. NO.	SHT. NO.
		13308	2 of 3

13308-2

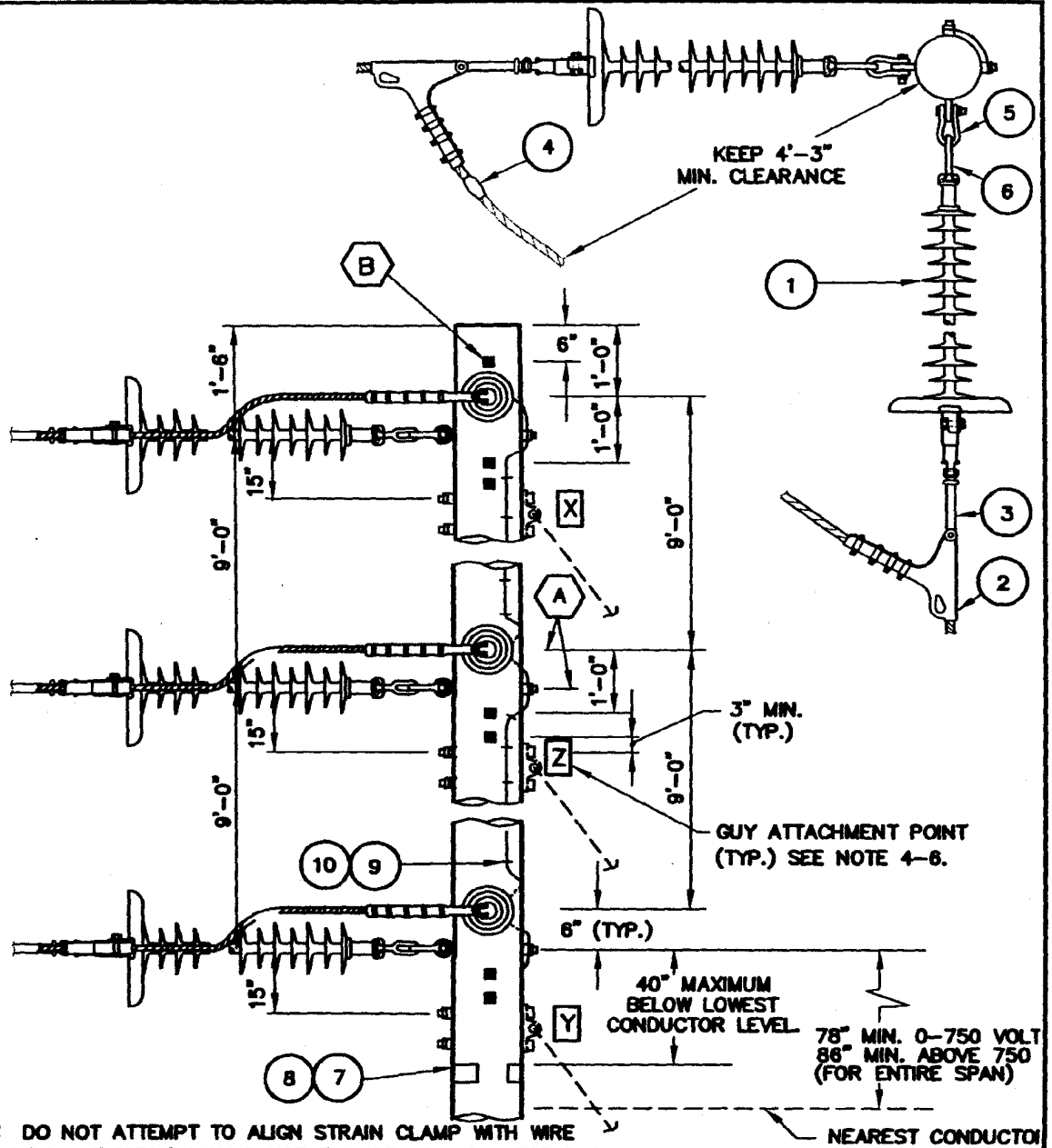
TABLE A

ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	CONDUCTOR SIZE
2	3	232224	CLAMP, SUSPENSION W/ SOCKET EYE, RANGE 0.4"-0.84"	3/0 ACSR/AW 6/1
3	3	397568	GUARD, LINE, O.D. 0.744", LENGTH 29"	
2	3	232160	CLAMP, SUSPENSION W/ SOCKET EYE, RANGE 0.7"-1.12"	336.4 ACSR/AW 26/7
3	3	397664	GUARD, LINE, O.D. 1.013", LENGTH 37"	
2	3	232192	CLAMP, SUSPENSION W/ SOCKET EYE, RANGE 1.25"-1.82"	636 ACSR/AW 24/7
3	3	397728	GUARD, LINE, O.D. 1.342", LENGTH 45"	
2	3	232192	CLAMP, SUSPENSION W/ SOCKET EYE, RANGE 1.25"-1.82"	1033.5 ACSR/AW 45/7
3	3	397760	GUARD, LINE, O.D. 1.712", LENGTH 53"	

A	ADDED NOT TO SHT. 1	PM	SFO WPH	WVT	8/1/03	C	ADDED CORONA RING	LLD	WPH	WVT	4/3/08
	ORIGINAL ISSUE	AS	DRB	WPH	3/23/00	B	CORRECTED LINE GUARD O.D. FOR 3/0	WDF	WPH	WVT	6/1/04
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

	TRANSMISSION ENGINEERING				SCALE: NONE	
	POLE TOP ARRANGEMENT TYPE Z45 SINGLE CIRCUIT 138kV WOOD POLE				DWG. NO.	SHT. NO.
					13308	3 of 3

13308-3



NOTES:

1. **CAUTION:** DO NOT ATTEMPT TO ALIGN STRAIN CLAMP WITH WIRE UNDER TENSION - TWISTING MAY CAUSE FAILURE OF INSULATOR ROD.
2. USE FOR LINE ANGLES 75 TO 90 DEGREES.
3. MAXIMUM CONDUCTOR DESIGN TENSION NOT TO EXCEED 5000 LBS.
4. FOR GUYING INSTALL IN ORDER .
5. SEE SECTION 16000 FOR GUY DETAILS.
6. SEE JOB PACKAGE FOR GUYING REQUIREMENTS.

B	ADDED CORONA RINGS	PM	WPH	WJ	8/15/06	E					
A	CHANGED TITLE	PM	SFO WPH	WVT	8/1/03	D					
	ORIGINAL	AS	DRB	WPH	3/23/00	C					
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

TRANSMISSION ENGINEERING

SCALE: NONE



**POLE TOP ARRANGEMENT
TYPE Y SINGLE CIRCUIT-ACSR
138kV WOOD POLE**

DWG. NO.

SHT. NO.

13310

1 of 3

13310B01

BILL OF MATERIAL

ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
1	6	431396	INSULATOR, SUSPENSION FOR DEAD-END APPLICATION, 138kV, W/CORONA RING, SILICONE RUBBER, 25K SPECIFIED MECHANICAL LOAD, SECTION LENGTH 66"-68", BALL (HOT END) AND SOCKET END FITTINGS	356
2		SEE SHT. 3 TABLE A	CLAMP, STRAIN, WITHOUT SOCKET-EYE	356
3		SEE SHT. 3 TABLE A	EYE, SOCKET, HOTLINE, 30K	356
4		REF. TO TABLE A	CONNECTOR, JUMPER	356
5	6	636436	SHACKLE, ANCHOR, 30K	356
6	6	337542	EYE, OVAL BALL, 30K	356
7	1/8 LB.	492192	NAIL, RF'ING, 1-3/4", #11, GALV. (LBS)	355
8	2	647648	SIGN, "HIGH VOLTAGE"	355
9	1/3 LB.	678528	STAPLES, 1-1/4"	355
10	1-1/2 LB.	812928	WIRE, CU, SOFT #8	355
A	6	19009	ASSEMBLY, SHOULDER EYE BOLT, 3/4" BONDED	355
B	1	19001	ASSEMBLY, BOLT, 5/8", SPLIT	355


B	ADDED CORONA RINGS	PM	WPH	WVT	8/15/06	E					
A	CHANGED TITLE	PM	SFO WPH	WVT	8/1/03	D					
	ORIGINAL	AS	DRE	WPH	3/23/00	C					
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

TRANSMISSION ENGINEERING						SCALE: NONE				
	POLE TOP ARRANGEMENT TYPE Y SINGLE CIRCUIT-ACSR 138kV WOOD POLE					DWG. NO.		SHT. NO.		
						13310		2 of 3		
								13310B02		

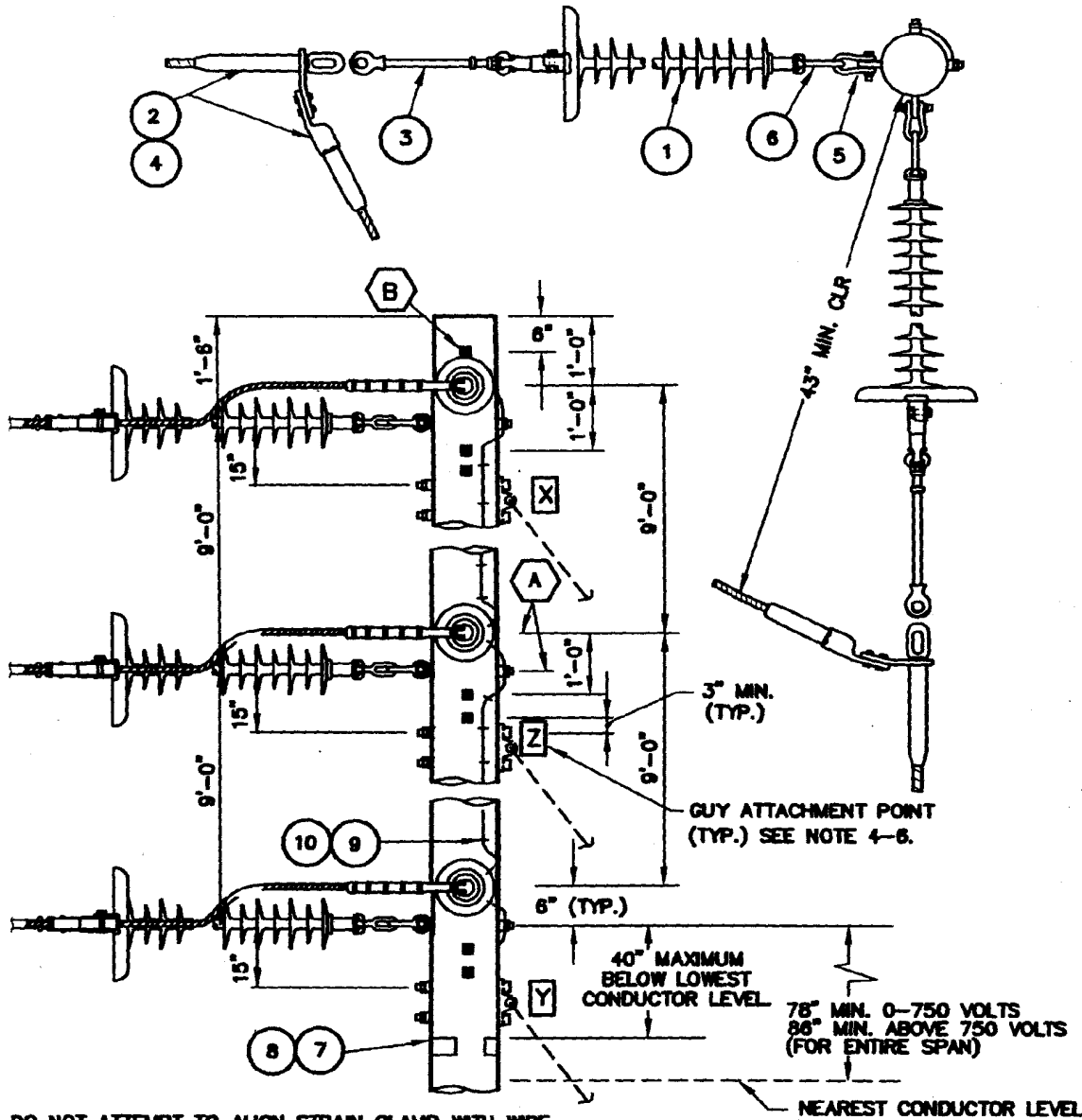
TABLE A

ITEM	QTY.	STOCK NO. OR STD. NO.	DESCRIPTION	CONDUCTOR SIZE
2	6	230672	CLAMP, STRAIN, ALUMINUM, RANGE 0.20-0.57", 15K	3/0 ACSR/AW 6/1
3	6	337602	EYE, SOCKET HOTLINE, EYE 11/16" WIDE, 30K	
4	3	256472	CONNECTOR, COMPRESSION, ALUM., JUMPER	
2	6	231700	CLAMP, STRAIN, ALUMINUM, RANGE 0.47-0.88", 25K	336.4 ACSR/AW 26/7
3	6	337604	EYE, SOCKET HOTLINE, EYE 3/4" WIDE, 30K	
4	3	650264	SLEEVE, ALUM., JUMPER	
2	6	230686	CLAMP, STRAIN, ALUMINUM, RANGE 0.71-1.318", 30K	636 ACSR/AW 24/7
3	6	337622	EYE, SOCKET HOTLINE, EYE 1 3/8" WIDE, 30K	
4	3	650656	SLEEVE, ALUM., JUMPER	
2	6	230686	CLAMP, STRAIN, ALUMINUM, RANGE 0.71-1.318", 30K	1,033.5 ACSR/AW 45/7
3	6	337622	EYE, SOCKET HOTLINE, EYE 1 3/8" WIDE, 30K	
4	3	650336	SLEEVE, ALUM., JUMPER	

B	ADDED CORONA RINGS	PM	WPH	WTT	8/15/06	E					
A	CHANGED TITLE	PM	SFO	WWT	8/1/03	D					
	ORIGINAL	AS	DRB	WPH	3/23/00	C					
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

TRANSMISSION ENGINEERING							SCALE: NONE			
	POLE TOP ARRANGEMENT TYPE Y SINGLE CIRCUIT-ACSR 138KV WOOD POLE						DWG. NO.		SHT. NO.	
							13310		3 of 3	

13310803



NOTES:

1. **CAUTION:** DO NOT ATTEMPT TO ALIGN STRAIN CLAMP WITH WIRE UNDER TENSION - TWISTING MAY CAUSE FAILURE OF INSULATOR ROD.
2. USE FOR LINE ANGLES 75 TO 90 DEGREES.
3. MAXIMUM CONDUCTOR DESIGN TENSION NOT TO EXCEED 5000 LBS.
4. FOR GUYING INSTALL IN ORDER .
5. SEE SECTION 15000 FOR GUY DETAILS.
6. SEE JOB PACKAGE FOR GUYING REQUIREMENTS.

B	REV. SHTS. 2 & 3	WDF	GV WPH	WVT	8/1/04	E					
A	ADDED 605 TEAL	PM	GV DW	WVT	4/1/04	D					
	ORIGINAL	PM	SFO WPH	WVT	8/1/03	C	ADDED CORONA RINGS	PM	WPH	WVT	8/15/08
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

TRANSMISSION ENGINEERING

SCALE: NONE



**POLE TOP ARRANGEMENT
TYPE Y SINGLE CIRCUIT-ACSS
138kV WOOD POLE**

DWG. NO.

SHT. NO.

13311

1 of 3

13311C01

BILL OF MATERIAL

ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
1	6	431396	INSULATOR, SUSPENSION FOR DEAD-END APPLICATION, 138kV, W/CORONA RING, SILICONE RUBBER, 25K SPECIFIED MECHANICAL LOAD, SECTION LENGTH 66"-68", BALL (HOT END) AND SOCKET END FITTINGS	356
2		SEE SHT. 3 TABLE A	DEAD END, COMPRESSION	356
3	6	236048	Y-CLEVIS, SOCKET, HOTLINE, 30K	356
4	3 LBS.	246950	FILLER COMPOUND	356
5	6	636436	SHACKLE, ANCHOR, 30K	356
6	6	337542	EYE, OVAL BALL, 30K	356
7	1/8 LB.	492192	NAIL, RF'ING, 1-3/4", #11, GALV.	355
8	2	647648	SIGN, "HIGH VOLTAGE"	355
9	1/3 LB.	678528	STAPLES, 1-1/4"	355
10	1-1/2 LB.	812928	WIRE, CU, SOFT #8	355
A	6	19009	ASSEMBLY, SHOULDER EYE BOLT, 3/4" BONDED	355
B	1	19001	ASSEMBLY, BOLT, 5/8", SPLIT	355

B	REV. SHTS. 2 & 3	WDF	GV WPH	WVT	6/1/04	E					
A	ADDED 605 TEAL	PM	GV DW	WVT	4/1/04	D					
	ORIGINAL	PM	SFO WPH	WVT	8/1/03	C	ADDED CORONA RINGS	PM	WPH WVT	8/15/06	
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

SDGE	TRANSMISSION ENGINEERING POLE TOP ARRANGEMENT TYPE Y SINGLE CIRCUIT-ACSS 138kV WOOD POLE	SCALE: NONE	
		DWC. NO.	SHT. NO.
		13311	2 of 3

13311C02


TABLE A				
ITEM	QTY.	STOCK NO. OF STD. NO.	DESCRIPTION	ACCT NO.
			636 ACSS/AW 24/7 (ROOK/AW)	
2	6	652678	DEAD END, COMPRESSION, FOR 636 ROOK/ACSS/AW CONDUCTOR, FULL TENSION WITH STEEL EYE, 4-HOLE NEMA PAD AND TERMINAL CONNECTOR	356
			900 ACSS/AW 54/7 (CANARY/AW)	
2	6	652682	DEAD END, COMPRESSION, FOR 900 CANARY/ACSS/AW CONDUCTOR, FULL TENSION WITH STEEL EYE, 4-HOLE NEMA PAD AND TERMINAL CONNECTOR	356
			1033.5 ACSS/AW 45/7 (ORTOLAN/AW)	
2	6	652674	DEAD END, COMPRESSION, FOR 1033.5 ORTOLAN/ACSS /AW CONDUCTOR, FULL TENSION WITH STEEL EYE, 4-HOLE NEMA PAD AND TERMINAL CONNECTOR	356
			605 ACSS/AW 30/19 (TEAL/AW)	
2	6	ALCOA DE E33129SSAC	DEAD END, COMPRESSION, FOR 605 TEAL/ ACSS/AW CONDUCTOR, FULL TENSION WITH STEEL EYE, 4-HOLE NEMA PAD AND TERMINAL CONNECTOR	356

DIE SIZE TABLE		
CONDUCTOR	STEEL DIE	ALUMINUM DIE
ROOK	12SH	27AH
CANARY	14SH	30AH
ORTOLAN	10SH	34AH
TEAL	14SH	27AH

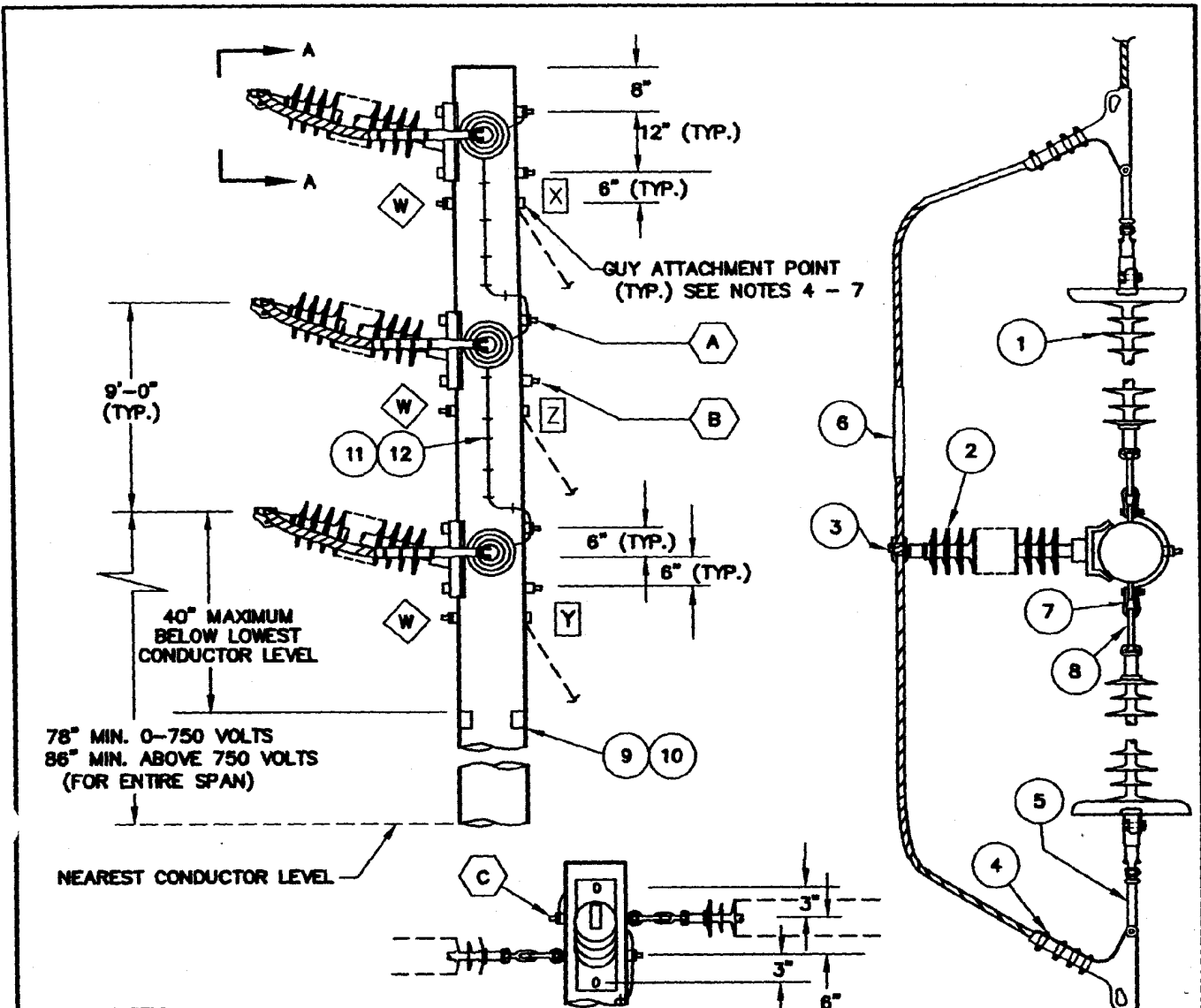
NOTE:

INSTALLATION OF THE COMPRESSION DEAD ENDS & COMPRESSION SPLICES, INCLUDING THE PROPER DIRECTION OF COMPRESSION, SHALL STRICTLY FOLLOW MANUFACTURER'S INSTRUCTIONS.

B	REV. SHTS. 2 & 3	WDF	GV WPH	WWT	6/1/04	E					
A	ADDED 605 TEAL	PM	GV DW	WWT	4/1/04	D					
	ORIGINAL	PM	SFO WPH	WWT	8/1/03	C	ADDED CORONA RINGS	PM	WPH WWT	8/15/06	
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

TRANSMISSION ENGINEERING							SCALE: NONE			
	POLE TOP ARRANGEMENT TYPE Y SINGLE CIRCUIT-ACSS 138kV WOOD POLE						DWG. NO.		SHT. NO.	
							13311		3 of 3	

13311C03



NOTES:

1. **CAUTION:** DO NOT ATTEMPT TO ALIGN STRAIN CLAMP WITH WIRE UNDER TENSION - TWISTING MAY CAUSE FAILURE OF INSULATOR ROD.
2. LINE ANGLE 0 TO 75 DEGREES.
3. MAXIMUM CONDUCTOR DESIGN TENSION NOT TO EXCEED 5000 LBS.
4. FOR WIND LOAD, GUY ATTACHMENT MUST BE AT OR BELOW POINT **W**.
5. FOR GUYING INSTALL IN ORDER **X** **Y** **Z**.
6. SEE SECTION 15000 FOR GUY DETAILS.
7. SEE JOB PACKAGE FOR GUYING REQUIREMENTS.

SECTION A - A

B	MISC. UPDATE	WDF	GV WPH	WVT	8/1/04	E						
A	CHANGED TITLE & NOTE	PM	SFO WPH	WVT	8/1/03	D						
	ORIGINAL	AS	DRB	WPH	3/23/00	C	ADDED CORONA RINGS	PM	WPH	WVT	8/15/08	
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	

TRANSMISSION ENGINEERING

SCALE: NONE



**POLE TOP ARRANGEMENT
TYPE YPI SINGLE CIRCUIT-ACSR
138kV WOOD POLE**

DWG. NO.

SHT. NO.

13312

1 of 3

13312C01

BILL OF MATERIAL

ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
1	6	431396	INSULATOR, SUSPENSION FOR DEAD-END APPLICATION, 138kV, W/CORONA RING, SILICONE RUBBER, 25K SPECIFIED MECHANICAL LOAD, SECTION LENGTH 66"-68", BALL (HOT END) AND SOCKET END FITTINGS	356
2	3	429332	INSULATOR, POST, POLYMER, 64-69" LONG, BENDABLE GAIN BASE AND CLAMPTOP, 2,600 LBS CANTILEVER BREAKING LOAD	356
3		SEE SHT. 3 TABLE A	CLAMP, POST INSULATOR	356
4		SEE SHT. 3 TABLE A	CLAMP, STRAIN, WITHOUT SOCKET EYE	356
5		SEE SHT. 3 TABLE A	EYE, SOCKET, HOTLINE, 30K	356
6		SEE SHT. 3 TABLE A	CONNECTOR, JUMPER	356
7	6	636436	SHACKLE, ANCHOR, 30K	356
8	6	337542	EYE, OVAL BALL, 30K	356
9	1/8 LB.	492192	NAIL, RF'ING, 1-3/4", #11, GALV. (LBS)	355
10	2	647648	SIGN, "HIGH VOLTAGE"	355
11	1/3 LB.	678528	STAPLES, 1-1/4"	355
12	1-1/2 LBS.	812928	WIRE, CU, SOFT #8	355
A	3	19022	ASSEMBLY, BOLT 3/4" BONDED POST INSULATOR MTG., ONE SIDE TOP	355
B	3	19022	ASSEMBLY, BOLT 3/4" THRU POST INSULATOR MTG, ONE SIDE BOTTOM	355
C	6	19009	ASSEMBLY, SHOULDER EYEBOLT, 3/4" BONDED	355


B	MISC. UPDATE	WDF	GV WPH	WVT	6/1/04	E					
A	CHANGED TITLE & NOTE	PM	SFO WPH	WVT	8/1/03	D					
	ORIGINAL	AS	DRB	WPH	3/23/00	C	ADDED CORONA RINGS	PM	WPH WVT	8/15/06	
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

TRANSMISSION ENGINEERING							SCALE: NONE			
	POLE TOP ARRANGEMENT TYPE YPI SINGLE CIRCUIT-ACSR 138kV WOOD POLE						DWG. NO.	SHT. NO.		
							13312	2 of 3		
							13312C02			

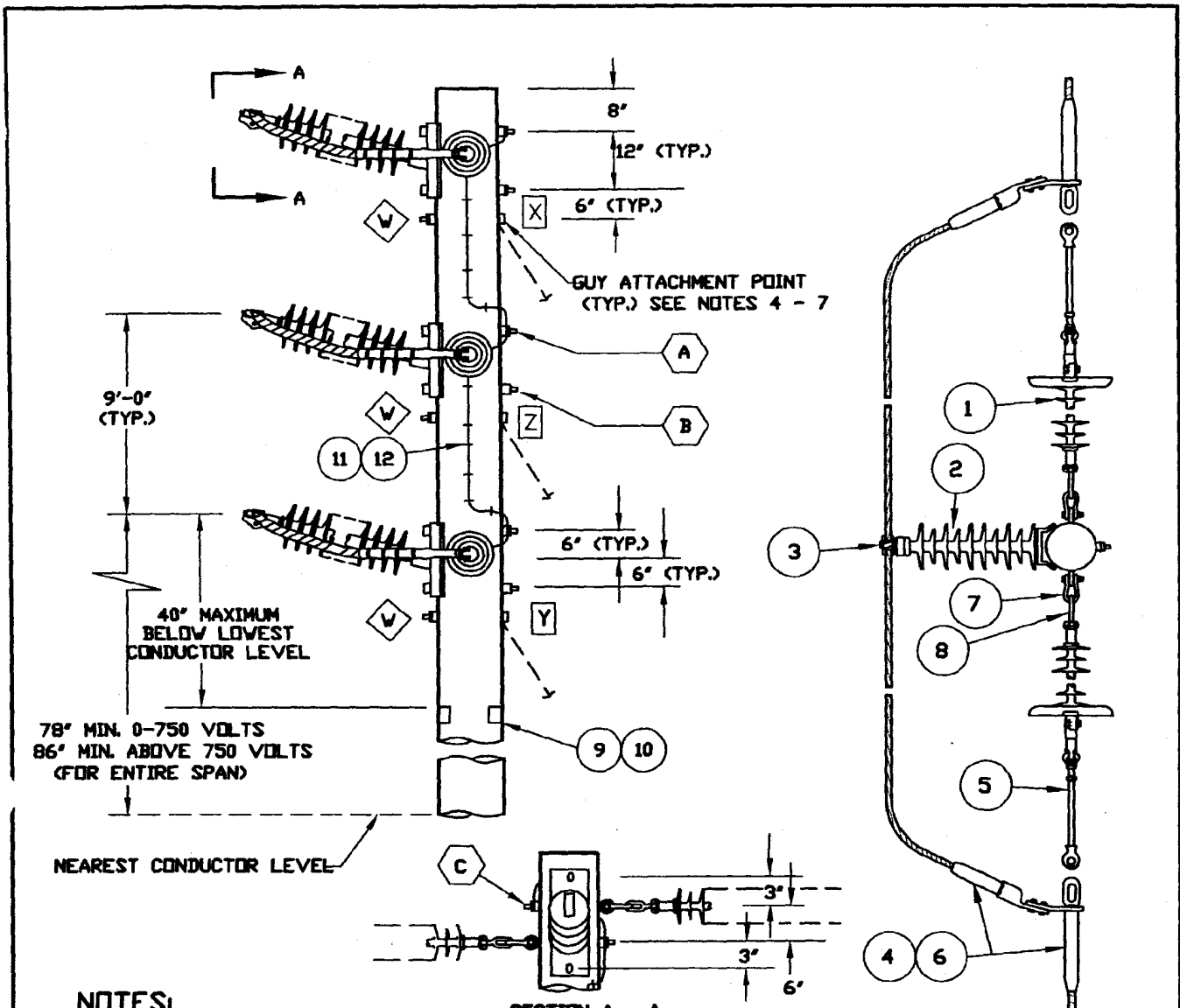
TABLE A

ITEM	QTY.	STOCK NO. OR STD. NO.	DESCRIPTION	CONDUCTOR SIZE
3	3	229696	CLAMP, POST INSULATOR, RANGE 0.35-0.84"	3/0 ACSR/AW 6/1
4	6	230672	CLAMP, STRAIN, ALUMINUM, RANGE 0.20-0.57", 15K	
5	6	337602	EYE, SOCKET HOTLINE, EYE 11/16" WIDE, 30K	
6	3	256472	CONNECTOR, COMPRESSION, ALUM., JUMPER	
3	3	229696	CLAMP, POST INSULATOR, RANGE 0.35-0.84"	336.4 ACSR/AW 26/7
4	6	231700	CLAMP, STRAIN ALUMINUM, RANGE 0.47-0.88", 25K	
5	6	337604	EYE, SOCKET HOTLINE, EYE 3/4" WIDE, 30K	
6	3	650264	SLEEVE, ALUM., JUMPER	
3	3	229728	CLAMP, POST INSULATOR, RANGE 0.7-1.06"	636 ACSR/AW 24/7
4	6	230686	CLAMP, STRAIN, ALUMINUM, RANGE 0.71-1.318", 30K	
5	6	337622	EYE, SOCKET HOTLINE, EYE 1 3/8" WIDE, 30K	
6	3	650656	SLEEVE, ALUM., JUMPER	
3	3	229760	CLAMP, POST INSULATOR, RANGE 1.0-1.5"	1,033.5 ACSR/AW 45/7
4	6	230686	CLAMP, STRAIN, ALUMINUM, RANGE 0.71-1.318", 30K	
5	6	337622	EYE, SOCKET HOTLINE, EYE 1 3/8" WIDE, 30K	
6	3	650336	SLEEVE, ALUM., JUMPER	

B	MISC. UPDATE	WDF	GV WPH	WVT	8/1/04	E					
A	CHANGED TITLE & NOTE	PM	SFO WPH	WVT	8/1/03	D					
	ORIGINAL	AS	DRB WPH	3/23/00	C	ADDED CORONA RINGS	PM	WPH WVT	8/15/06		
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

TRANSMISSION ENGINEERING						SCALE: NONE						
	POLE TOP ARRANGEMENT TYPE YPI SINGLE CIRCUIT-ACSR 138KV WOOD POLE						DWG. NO.			SHT. NO.		
							13312			3 of 3		

13312C03



NOTES:

SECTION A - A

1. **CAUTION:** DO NOT ATTEMPT TO ALIGN STRAIN CLAMP WITH WIRE UNDER TENSION - TWISTING MAY CAUSE FAILURE OF INSULATOR ROD.
2. LINE ANGLE 0 TO 75 DEGREES.
3. MAXIMUM CONDUCTOR DESIGN TENSION NOT TO EXCEED 5000 LBS.
4. FOR WIND LOAD, GUY ATTACHMENT MUST BE AT OR BELOW POINT W.
5. FOR GUYING INSTALL IN ORDER X Y Z.
6. SEE SECTION 6000 FOR GUY DETAILS.
7. SEE JOB PACKAGE FOR GUYING REQUIREMENTS.

B	MISC. UPDATE	WDF	GV WPH	WWT	6/1/04	E					
A	ADD 605 TEAL	PM	GV DW	WWT	4/1/04	D					
	ORIGINAL	PM	SFO WPH	WWT	8/1/03	C	ADDED CORONA RINGS	PM	WPH	2006/8/15/06	
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

TRANSMISSION ENGINEERING

SCALE: NONE



**POLE TOP ARRANGEMENT
TYPE YPI SINGLE CIRCUIT-ACSS
138KV WOOD POLE**

DWG. NO.

SHT. NO.

13313

1 of 3

13313C01

BILL OF MATERIAL

ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
1	6	431396	INSULATOR, SUSPENSION FOR DEAD-END APPLICATION, 138kV, W/CORONA RING, SILICONE RUBBER, 25K SPECIFIED MECHANICAL LOAD, SECTION LENGTH 66"-68", BALL (HOT END) AND SOCKET END FITTINGS	356
2	3	429332	INSULATOR, POST, POLYMER, 64-69" LONG, BENDABLE GAIN BASE AND CLAMPTOP, 2,600 LBS CANTILEVER BREAKING LOAD	356
3		SEE SHT. 3 TABLE A	CLAMP, POST INSULATOR	356
4		SEE SHT. 3 TABLE A	DEAD END COMPRESSION	356
5	6	236048	Y-CLEVIS, SOCKET, HOTLINE, 30K	356
6	6 LBS.	246950	FILLER COMPOUND	356
7	6	636436	SHACKLE, ANCHOR, 30K	356
8	6	337542	EYE, OVAL BALL, 30K	356
9	1/8 LB.	492192	NAIL, RF'ING, 1-3/4", #11, GALV.	355
10	2	647648	SIGN, "HIGH VOLTAGE"	355
11	1/3 LB.	678528	STAPLES, 1-1/4"	355
12	1-1/2 LB.	812928	WIRE, CU, SOFT #8	355
A	3	19022	ASSEMBLY, BOLT 3/4" BONDED POST INSULATOR MTG., ONE SIDE TOP	355
B	3	19022	ASSEMBLY, BOLT 3/4" THRU POST INSULATOR MTG, ONE SIDE BOTTOM	355
C	6	19009	ASSEMBLY, SHOULDER EYEBOLT, 3/4" BONDED	355

B	MISC. UPDATE	WDF	GV WPH	WWT	6/1/04	E					
A	ADD 605 TEAL	PM	GV DW	WWT	4/1/04	D					
	ORIGINAL	PM	SFD WPH	WWT	8/1/03	C	ADDED CORONA RINGS	PM	WPH WWT	8/15/06	
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE


TRANSMISSION ENGINEERING						SCALE: NONE					
	POLE TOP ARRANGEMENT TYPE YPI SINGLE CIRCUIT-ACSS 138kV WOOD POLE						DWG. NO. 13313		SHT. NO. 2 of 3		13313C02

TABLE A

ITEM	QTY.	STOCK NO. OF STD. NO.	DESCRIPTION	ACCT NO.
636 ACSS/AW 24/7 (ROOK/AW)				
4	6	652678	DEAD END, COMPRESSION, FOR 636 ROOK/ACSS/AW CONDUCTOR, FULL TENSION WITH STEEL EYE, 4-HOLE NEMA PAD AND TERMINAL CONNECTOR	356
3	3	229728	CLAMP, POST INSULATOR, RANGE 0.70-1.06"	356
900 ACSS/AW 54/7 (CANARY/AW)				
4	6	652682	DEAD END, COMPRESSION, FOR 900 CANARY/ACSS/AW CONDUCTOR, FULL TENSION WITH STEEL EYE, 4-HOLE NEMA PAD AND TERMINAL CONNECTOR	356
3	3	229760	CLAMP, POST INSULATOR, RANGE 1.00-1.50"	356
1033.5 ACSS/AW 45/7 (ORTOLAN/AW)				
4	6	652674	DEAD END, COMPRESSION, FOR 1033.5 ORTOLAN/ACSS/AW CONDUCTOR, FULL TENSION WITH STEEL EYE, 4-HOLE NEMA PAD AND TERMINAL CONNECTOR	356
3	3	229760	CLAMP, POST INSULATOR, RANGE 1.00-1.50"	356
605 ACSS/AW 30/19 (TEAL/AW)				
4	6	649860	DEAD END, COMPRESSION, FOR 605 TEAL/ACSS/AW CONDUCTOR, FULL TENSION WITH STEEL EYE, 4-HOLE NEMA PAD AND TERMINAL CONNECTOR	356
3	3	229728	CLAMP, POST INSULATOR, RANGE 0.70-1.06"	356

DIE SIZE TABLE		
CONDUCTOR	STEEL DIE	ALUMINUM DIE
ROOK	12SH	27AH
CANARY	14SH	30AH
ORTOLAN	10SH	34AH
TEAL	14SH	27AH

NOTE:
 INSTALLATION OF THE COMPRESSION DEAD ENDS & COMPRESSION SPLICES, INCLUDING THE PROPER DIRECTION OF COMPRESSION, SHALL STRICTLY FOLLOW MANUFACTURER'S INSTRUCTIONS.

B	MISC. UPDATE	WDF	GV WPH	WVT	6/1/04	E					
A	ADD 605 TEAL	PM	GV DW	WVT	4/1/04	D					
	ORIGINAL	PM	SFO WPH	WVT	8/1/03	C	ADDED CORONA RINGS	PM	WPH WVT	8/15/06	
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

TRANSMISSION ENGINEERING

SCALE: NONE

**POLE TOP ARRANGEMENT
 TYPE YPI SINGLE CIRCUIT-ACSS
 138kV WOOD POLE**

DWG. NO.

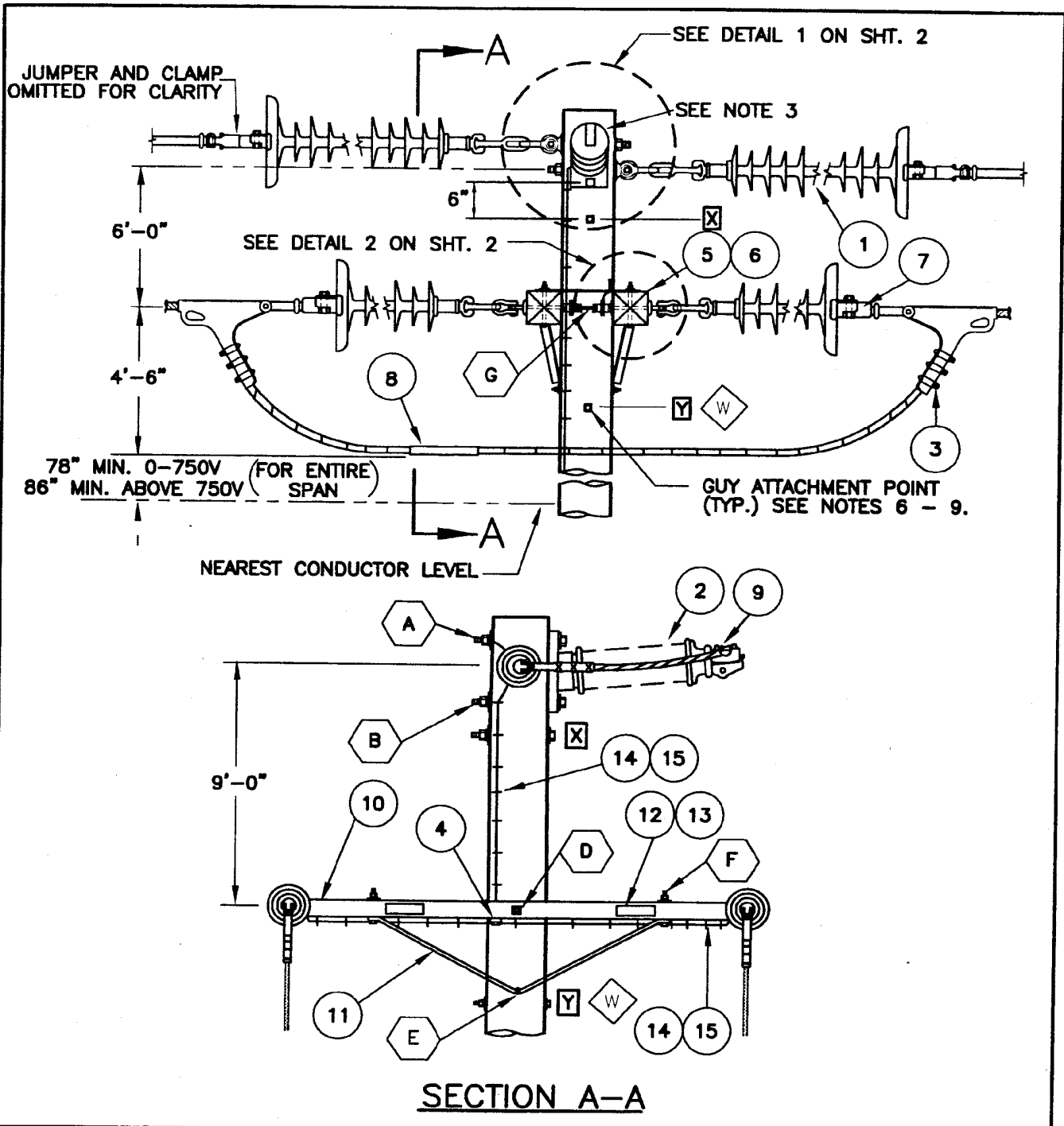
SHT. NO.

13313

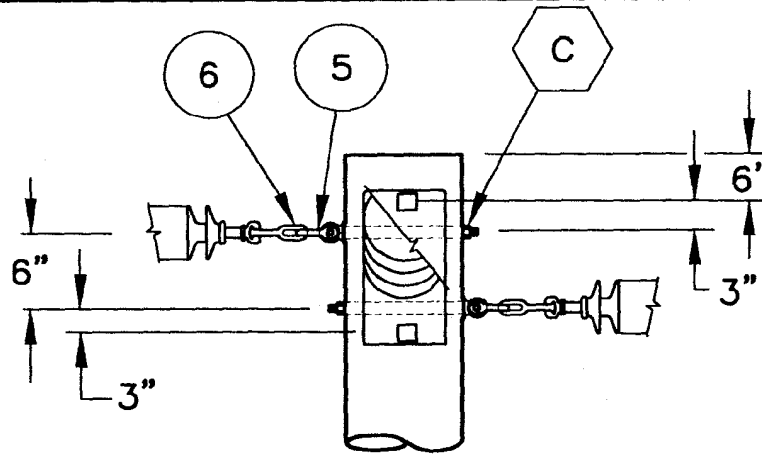
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13313C03

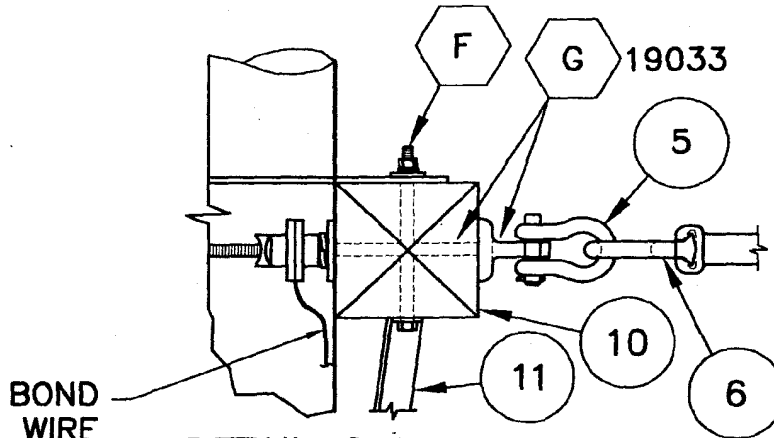




	ORIGINAL	LLD	WPH	246	6/24/08								
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE		
TRANSMISSION ENGINEERING								SCALE: NONE					
SDGE	POLE TOP ARRANGEMENT						DWG. NO.			SHT. NO.			
	TYPE X-DELTA 3 SINGLE CIRCUIT-ACSR						13315			1 of 4			
138KV WOOD POLE													



DETAIL 1



DETAIL 2

NOTES:

1. **CAUTION:** DO NOT ATTEMPT TO ALIGN STRAIN CLAMP WITH WIRE UNDER TENSION – TWISTING MAY CAUSE FAILURE OF INSULATOR ROD.
2. **CAUTION:** ANGLE BETWEEN GUY AND POLE MUST BE IN ACCORDANCE WITH GO-95 REQUIREMENTS FOR SEPARATION BETWEEN CONDUCTORS AND HARDWARE.
3. INSTALL HORIZONTAL POST INSULATOR ON INSIDE OF ANGLE.
4. INSTALL HIGHER TENSION DEADEND IN LOWER POSITION AT POLE TOP TO PROVIDE GUY CLEARANCE WHEN GUYING FOR TENSION CHANGE.
5. MAXIMUM CONDUCTOR DESIGN TENSION NOT TO EXCEED 5000 LBS. MAX. CONDUCTOR DIFFERENTIAL TENSION SHALL NOT EXCEED 1500 LBS/WIRE.
6. FOR GUYING INSTALL IN ORDER . SEE SECTION 15000 FOR GUY ATTACHMENT DETAILS.
7. USE FIBERGLASS LINK 15309 IN VICINITY OF JUMPER LOOPS.
8. FOR WIND LOAD, GUY ATTACHMENT MUST BE AT OR BELOW POINT W .
9. SEE JOB PACKAGE FOR GUYING REQUIREMENTS.
10. LINE ANGLE 0° – 3°.

	ORIGINAL	LLD	WPH	2004	6/24/08							
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	
TRANSMISSION ENGINEERING								SCALE: NONE				
SDGE	POLE TOP ARRANGEMENT						DWC. NO.		SHT. NO.			
	TYPE X-DELTA 3 SINGLE CIRCUIT-ACSR						13315		2 of 4			
138kV WOOD POLE												

BILL OF MATERIAL

ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
1	6	431396	INSULATOR, SUSPENSION, 138kV, W/ CORONA RING, SILICONE RUBBER, 25K SPECIFIED MECHANICAL LOAD, SECTION LENGTH 66"-68", BALL (HOT END) AND SOCKET END FITTINGS	356
2	1	429298	INSULATOR, POST, POLYMER, 41-44" LONG, BENDABLE GAIN BASE AND CLAMPTOP, 4,000 LBS CANTILEVER BREAKING LOAD	356
3		SEE SHT.3 TABLE A	CLAMP, STRAIN, WITH OUT SOCKET EYE	356
4	1	269632	CONNECTOR, SPLIT BOLT	356
5	6	636436	SHACKLE, ANCHOR 30K	356
6	6	337542	EYE, OVAL BALL, 30K	356
7		SEE SHT.3 TABLE A	EYE, SOCKET, HOTLINE, 30K	356
8		SEE SHT.3 TABLE A	CONNECTOR, JUMPER	356
9		SEE SHT.3 TABLE A	CLAMP, POST INSULATOR	356
10	2	294144	CROSSARM, 5 3/4"x5 3/4"x10'	355
11	2	164128	BRACE, CROSSARM, ANGLE 5'-0"	355
12	1/10#	492224	NAIL, RFG. 7/8" #11, GALV. (LBS)	355
13	2	647648	SIGN, HIGH VOLTAGE	355
14	1/4#	678528	STAPLES, 1 1/4" (LBS)	355
15	2#	812928	WIRE, CU. SOFT #8 (LBS.)	355
A	1	19022	ASSEMBLY, BOLT, 3/4" POST BONDED INSULATOR MTG., ONE SIDE, TOP	355
B	1	19022	ASSEMBLY, BOLT, 3/4" POST INSULATOR MTG., ONE SIDE, BOTTOM	355
C	2	19009	ASSEMBLY, SHOULDER EYE, BOLT, 3/4", BONDED	355
D	1	19012	ASSEMBLY, BOLT, 3/4", THRU	355
E	1	19016	ASSEMBLY, BOLT, 5/8" X-ARM BRACE	355
F	4	19016	ASSEMBLY, BOLT, 1/2" X-ARM BRACE	355
G	2	19033	ASSEMBLY, TEE, DEAD-END, BONDED	355



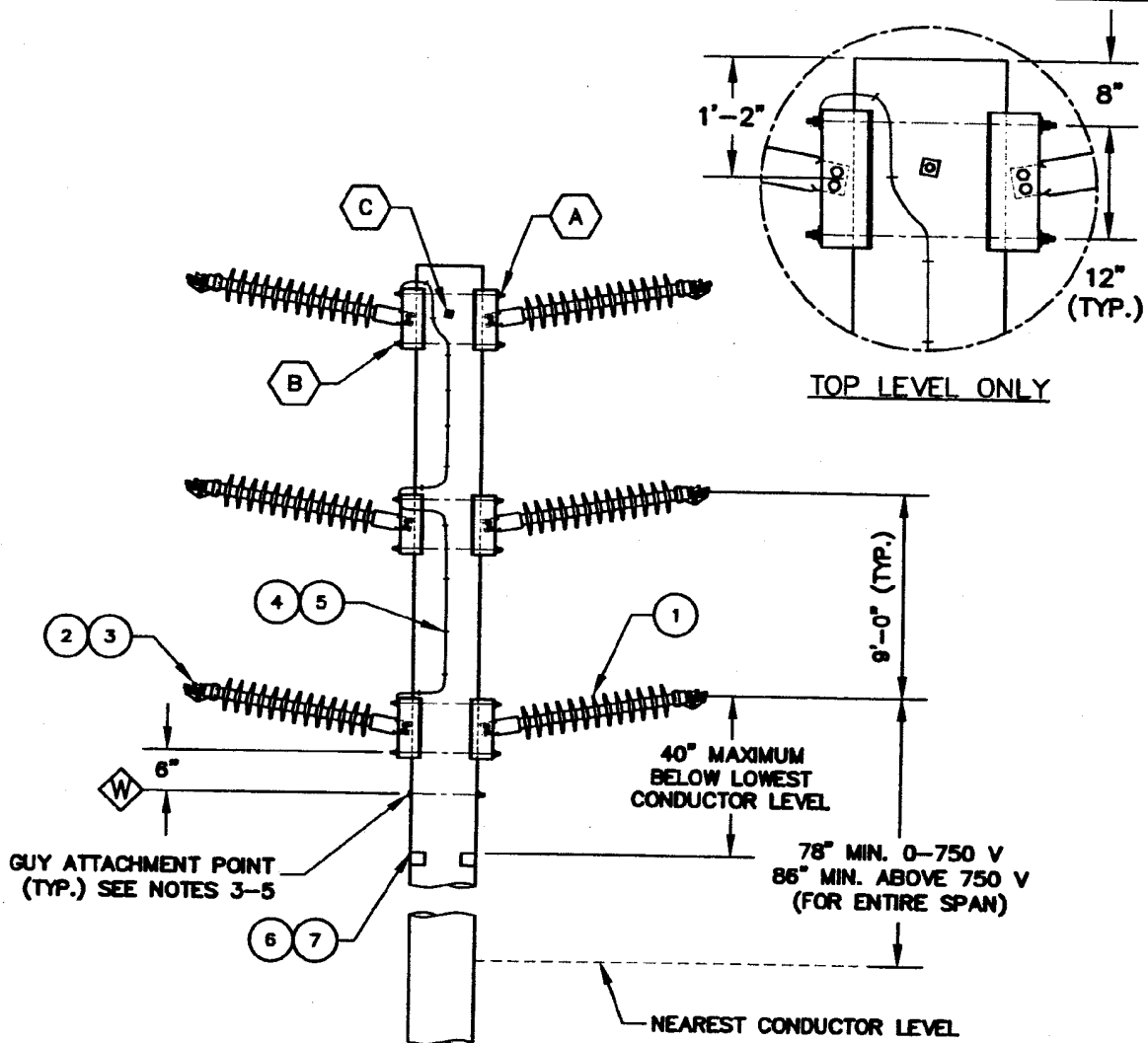
	ORIGINAL	LLD	WPH	Jan	6/24/08						
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE
TRANSMISSION ENGINEERING								SCALE: NONE			
	POLE TOP ARRANGEMENT							DWC. NO.		SHT. NO.	
	TYPE X-DELTA 3 SINGLE CIRCUIT-ACSR 138kV WOOD POLE							13315		3 of 4	

TABLE A

ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	CONDUCTOR SIZE
3	6	230672	CLAMP, STRAIN, ALUMINUM, RANGE 0.20 - 0.57", 15K	3/0 ACSR/AW 6/1
7	6	337602	EYE, SOCKET HOTLINE, EYE 11/16" WIDE, 30K	
8	3	256472	CONNECTOR, COMPRESSION, ALUM JUMPER	
9	1	229696	CLAMP, POST INSULATOR, RANGE 0.35-0.84"	336.4 ACSR/AW 26/7
3	6	231700	CLAMP, STRAIN, ALUMINUM, RANGE 0.47 - 0.88", 25K	
7	6	337604	EYE, SOCKET HOTLINE, EYE 3/4" WIDE, 30K	
8	3	650264	SLEEVE, ALUM. JUMPER	636 ACSR/AW 24/7
9	1	229696	CLAMP, POST INSULATOR, RANGE 0.35-0.84"	
3	6	230686	CLAMP, STRAIN, ALUMINUM, RANGE 0.71-1.318", 30K	
7	6	337622	EYE, SOCKET HOTLINE, EYE 1 3/8" WIDE, 30K	1,033.5 ACSR/AW 45/7
8	3	650656	SLEEVE, ALUM. JUMPER	
9	1	229728	CLAMP, POST INSULATOR, RANGE 0.7-1.06"	
3	6	230686	CLAMP, STRAIN, ALUMINUM, RANGE 0.71-1.318", 30K	1,033.5 ACSR/AW 45/7
7	6	337622	EYE, SOCKET HOTLINE, EYE 1 3/8" WIDE, 30K	
8	3	650336	SLEEVE, ALUM., JUMPER	
9	1	229760	CLAMP, POST INSULATOR, RANGE 1.0-1.5"	

	ORIGINAL	LLD	WPH	<i>CCW</i>	6/24/08							
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	
TRANSMISSION ENGINEERING								SCALE: NONE				
	POLE TOP ARRANGEMENT TYPE X-DELTA 3 SINGLE CIRCUIT-ACSR 138 KV WOOD POLE						DWG. NO.		SHT. NO.			
							13315		4 of 4			



NOTES:

1. LINE ANGLE NOT TO EXCEED 3 DEGREES.
2. VERTICAL LOAD ON POST INSULATOR NOT TO EXCEED 1000 LBS. FOR GRADE "B" AND 800 LBS. FOR GRADE "A" CONSTRUCTION WITHOUT PRIOR APPROVAL.
3. FOR WIND LOAD, GUY ATTACHMENT MUST BE AT OR BELOW POINT **W**.
4. SEE SECTION 15000 FOR GUY DETAILS.
5. SEE JOB PACKAGE FOR GUYING REQUIREMENTS.

B						E					
A	UPDATED CLEARANCE	PM	WPI	UV	7/21/08	D					
	ORIGINAL	PM	GV/DW	WVT	4/1/04	C					
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

TRANSMISSION ENGINEERING

SCALE: NONE



**POLE TOP ARRANGEMENT
TYPE DC-WPI DOUBLE CIRCUIT
138kV WOOD POLE**

DWG. NO.
13320

SHT. NO.
1 of 2

13320A01

BILL OF MATERIALS

ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
1	6	429332	INSULATOR, POST, POLYMER, 64"-69" LONG, BENDABLE GAIN BASE AND CLAMPTOP, 2,600 LBS. CANTALEVER BREAKING LOAD	356
2		SEE TABLE A	CLAMP, POST INSULATOR	356
3		SEE TABLE A	GUARD, LINE (IF REQUIRED)	356
4	1#	812928	WIRE, CU. SOFT #8 (LBS.)	355
5	1/4#	678528	STAPLE, 1-1/4" (LBS.)	355
6	1/8#	492192	NAIL, RFG. 1-3/4", #11, GALV. (LBS.)	355
7	2	647648	SIGN, HIGH VOLTAGE	355
A	3	19024	ASSEMBLY, BOLT, 3/4" (BONDED) POST INSULATOR MTG., BOTH SIDES	355
B	3	19024	ASSEMBLY, BOLT, 3/4" POST INSULATOR MTG., BOTH SIDES	355
C	1	19001	ASSEMBLY, BOLT, 5/8" SPLIT	355

TABLE A

ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	CONDUCTOR SIZE
2	6	229696	CLAMP, POST INSULATOR, RANGE 0.35- 0.84"	3/0 ACSR/AW 6/1
3	6	397568	GUARD, LINE, DIA. 0.774", LENGTH, 29"	
2	6	229760	CLAMP, POST INSULATOR, RANGE 1.0- 1.5"	336.4 ACSR/AW 26/7
3	6	397664	GUARD, LINE, DIA. 1.013", LENGTH, 37"	
2	6	229760	CLAMP, POST INSULATOR, RANGE 1.0- 1.5"	636 ACSR/AW ACSS/AW 24/7
3	6	397728	GUARD, LINE, DIA. 1.34", LENGTH, 45"	
2	6	229792	CLAMP, POST INSULATOR, RANGE 1.0- 2.0"	1033.5 ACSR/AW ACSS/AW 45/7
3	6	397760	GUARD, LINE, DIA. 1.713", LENGTH, 537"	

B											
A	UPDATED CLEARANCE	PM	WPH	WWT	7/21/06	D					
	ORIGINAL	PM	GV DW	WWT	4/1/04	C					
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

TRANSMISSION ENGINEERING						SCALE: NONE						
	POLE TOP ARRANGEMENT TYPE DC-WPI DOUBLE CIRCUIT 138kV WOOD POLE						DWG. NO. 13320			SHT. NO. 2 of 2		

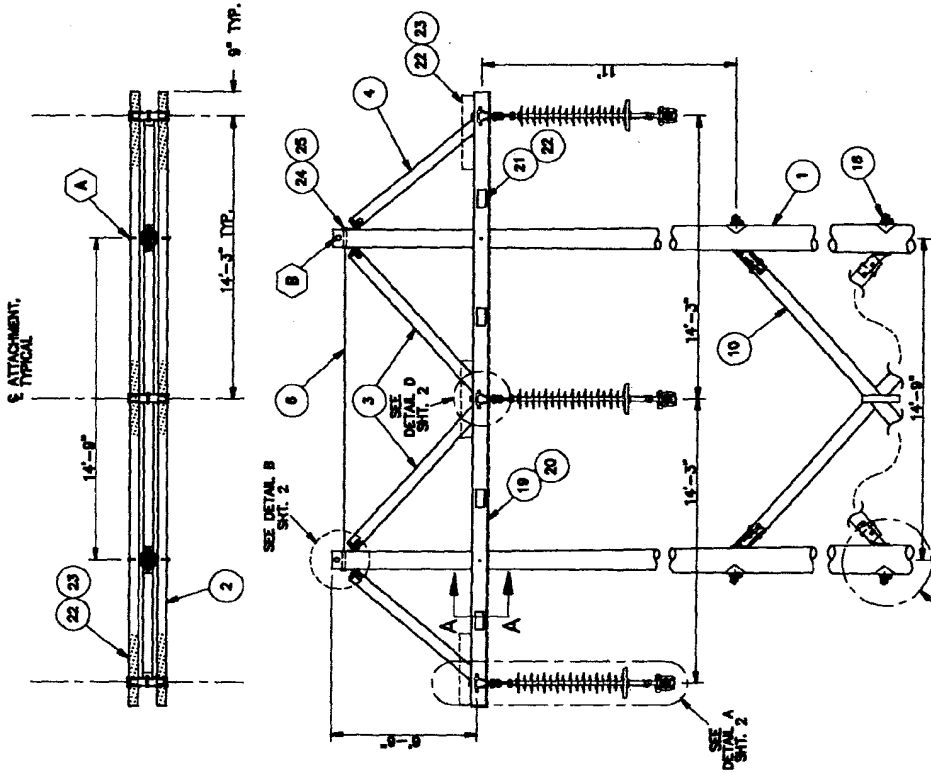
13320A02

BILL OF MATERIAL

ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
1	2	-	POLES, SIZE AS REQ'D.	355
2	2	294448	CROSSARM DOUGLAS FIR 3/4"x8 3/4"x30"	355
3	2	164830	BRACE, VEE, 8'-6" CTC	355
4	2	164832	BRACE, VEE, 8'-2 1/2" CTC	355
5	3	883280	SPACER, GALV. METAL FITTING W/ HDW	355
6	15'	811268	WIRE, GUY, 3/8", GALV.	355
7	2	363248	GRIP, GUY, 3/8", GALV.	355
8	4	369802	GRID, GAIN, 4"x4"	355
9	2	358144	EYELET, BOLT, GUY, 3/4"	356
10	AS REQ'D	164806	X-BRACE, 14'-9" SPACING, W/ HDW	355
11	4	369800	PLATE, GAIN, FLAT FOR 7/8" BOLT	355
12	3	838436	SHACKLE, ANCHOR, 30K	358
13	3	337942	EYE, OVAL, BALL, 30K	356
14	3	431386	INSULATOR, SUSPENSION, 138KV, W/ CORONA RING, SILICONE RUBBER, 25K SPECIFIED MECHANICAL LOAD, SECTION LENGTH 66"-68", BALL (HOT END) AND SOCKET END FITTINGS	356
15	3	SEE TABLE A	CLAMP, SUSPENSION	356
16	3	SEE TABLE A	GUARD, LINE	356
17	3	156194	STUD, BENT, 7/8"x8", W/ NUTS & LOCKNUTS	355
18	4	798720	WASHER, SPRING 7/8"	355
19	1/2 LB	878828	STAPLES, 1-1/4" FENCE GALV.	355
20	5 LB	812928	WIRE, CO. SOFT #8	355
21	4	647648	SIGN, HIGH VOLTAGE (SETS)	355
22	1 LB	482224	MAIL, RFC. #11 GALVANIZED, 7/8"	355
23	6	396190	GUARD, BIRD, NIKALITE	355
24	2	153440	BOLT, MACH., 3/4"x14"	
25	2	798498	WASHER, DBL COIL SPR., 3/4"	
A	2	19030	ASSTY. BOLT, GALV. MACH., 7/8"x22"	355
B	2	19001	ASSTY. BOLT, GALV. MACH., 5/8", SPLIT	355

TABLE A

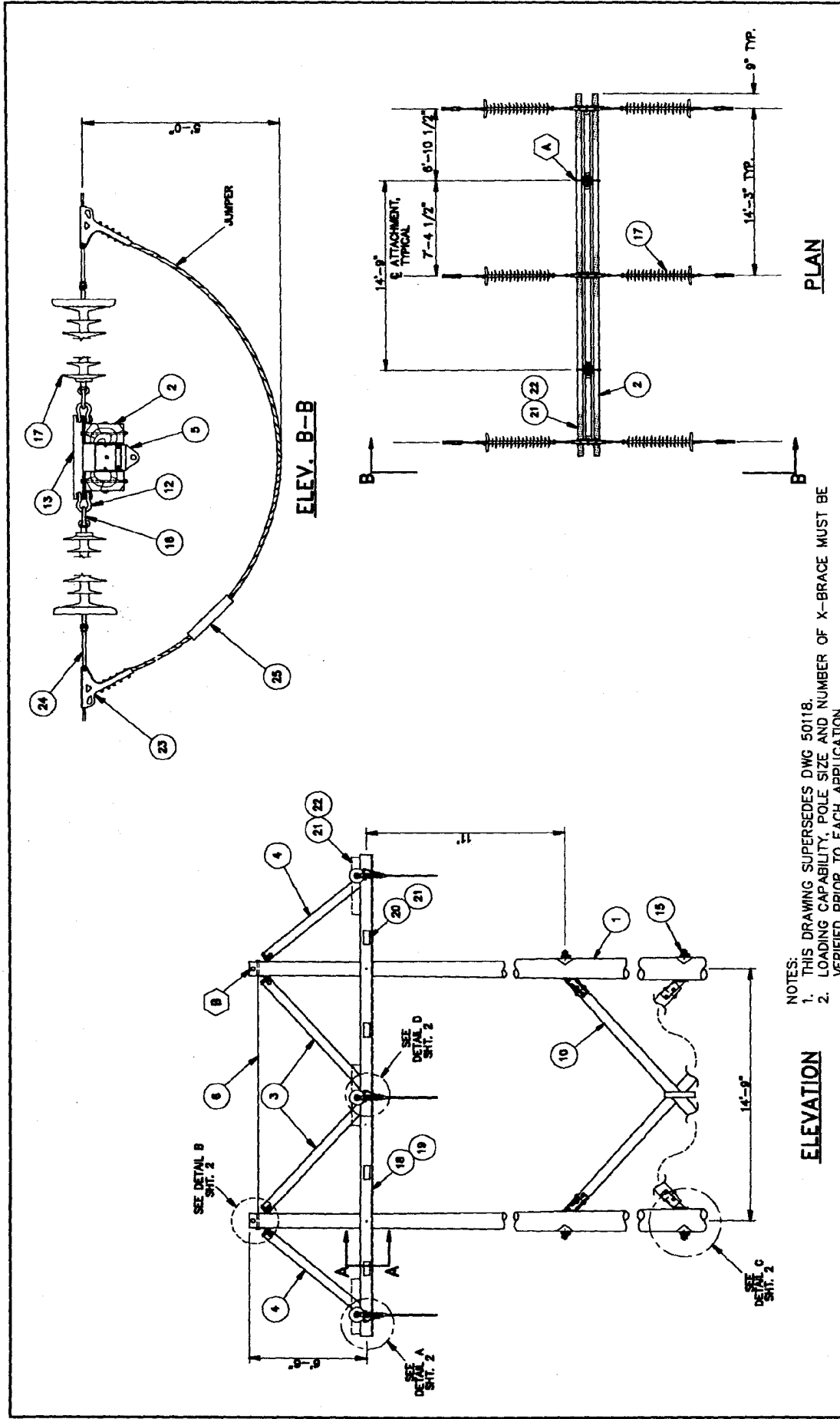
ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
15	3	356.4 (2677)	ACSR/AW (LINNET)	
16	3	232160	CLAMP, SUSPENSION, ALUM. ALLOY, W/ SOCKET EYE, RANGE 0.75"-1.19", 25K	356
16	3	397684	GUARD, LINE, LENGTH 37", O.D. 1.013"	356
15	3	232192	CLAMP, SUSPENSION, ALUM. ALLOY, W/ SOCKET EYE, RANGE 1.25"-1.82", 25K	356
16	3	397728	GUARD, LINE, LENGTH 45", O.D. 1.342"	356
15	3	232192	CLAMP, SUSPENSION, ALUM. ALLOY, W/ SOCKET EYE, RANGE 1.25"-1.82", 25K	356
16	3	397740	GUARD, LINE, LENGTH 45", O.D. 1.662"	356
15	3	232192	CLAMP, SUSPENSION, ALUM. ALLOY, W/ SOCKET EYE, RANGE 1.25"-1.82", 25K	356
16	3	397760	GUARD, LINE, LENGTH 53", O.D. 1.712"	356
15	3	232448	CLAMP, SUSPENSION, DUCTILE IRON, GALV. W/ SOCKET EYE, RANGE 0.3"-0.7", 15K	356



NOTES:
 1. THIS DRAWING SUPERSEDES DWG 11413.
 2. LOADING CAPABILITY, POLE SIZE AND NUMBER OF X-BRACE MUST BE VERIFIED PRIOR TO EACH APPLICATION.

REV	BY	CHKD	APPY	DATE	REV	BY	CHKD	APPY	DATE
B									
A	LLD	PM		4/3/08	D				
	ORIGINAL			7/21/06	C				
	CELANESE								

TRANSMISSION ENGINEERING		SCALE: NONE
POLE TOP ARRANGEMENT		DWG. NO. 13340
138KV TANGENT		
H-FRAME		1 of 2



ELEVATION

NOTES:
 1. THIS DRAWING SUPERSEDES DWG 50118.
 2. LOADING CAPABILITY, POLE SIZE AND NUMBER OF X-BRACE MUST BE VERIFIED PRIOR TO EACH APPLICATION.

PLAN

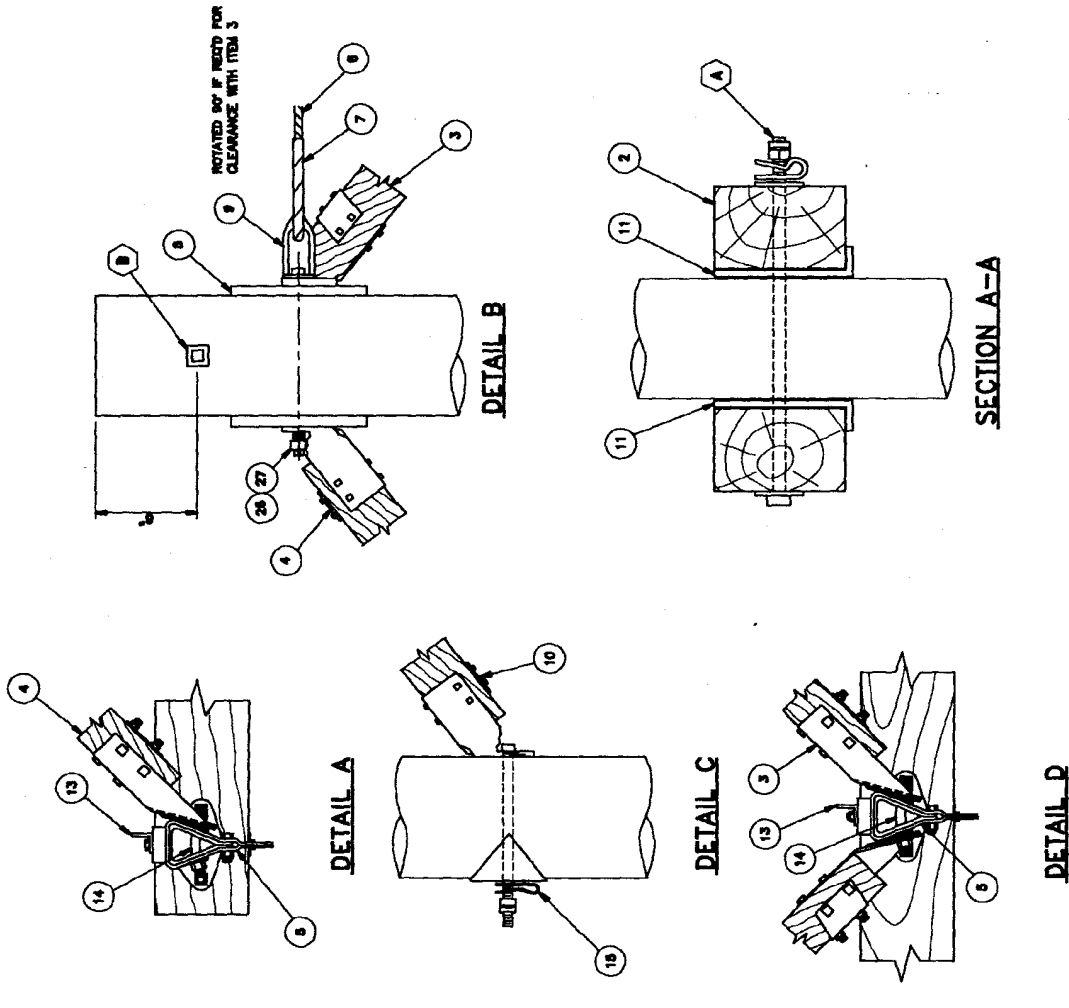
REV	DATE	BY	CHKD	DATE	REASON	SCALE	NOTES	
B								
A	4/3/08	LD	PM		UPDATED B-B, SHT. 1 ORIGINAL			
	7/21/08				BY CRED/APPT DATE			
					BY CRED/APPT DATE			
TRANSMISSION ENGINEERING POLE TOP ARRANGEMENT 138KV H-FRAME TANGENT DEAD-END - ACSR							DWG. NO. 13345	SFT. NO. 1 of 2

BILL OF MATERIAL

ITEM	QTY.	STOCK NO. OR STD. NO.	DESCRIPTION	ACCT. NO.
1	2		POLES, SIZE AS REQ'D.	355
2	2	284448	CROSSARM DOUGLAS FIR 3-3/4" X 8-3/4" X 30'	355
3	2	164450	BRACE, VEE, 8"-8" CTC	355
4	2	164432	BRACE, VEE, 8"-2 1/2" CTC	355
5	3	643240	SPACER, GALV METAL FITTING W/ HDW	355
6	15'	811208	WIRE, CUT, 3/8", GALV.	355
7	2	393248	CRIP, CUT, 3/8", GALV.	355
8	4	589684	GRID, GALV, 8 3/4" X 4", 15/16" BOLT HOLE	358
9	2	538144	EYELET, BOLT, CUT, 3/4"	358
10	AS REQ'D	164603	Z-BRACE, 14'-9" SPACING, W/ HDW	355
11	4	589600	PLATE, GALV, FLAT FOR 7/8" BOLT	355
12	6	656456	SHACKLE, ANCHOR, 30K	356
13	3	164018	BRACKET, DEADEND, 3" X 3" X 1/2", 25" LONG	356
14	3	156184	STUD, BENT 7/8" FOR SPACER	358
15	4	788720	WASHER, SPRING 7/8"	355
16	6	337642	EYE, OVAL, BALL, 30K	356
17	6	431396	INSULATOR, SUSPENSION, 138KV, W/ CORONA RING, SILICONE RUBBER, 25K SPECIFIED MECHANICAL LOAD, SECTION LENGTH 66"-68", BALL (HOT END) AND SOCKET END FITTINGS	356
18	1/2 LB	878528	STAPLES, 1-1/4" FENCE GALV.	355
19	5 LB	812928	WIRE, CU, SOFT #8	355
20	4	647648	IRON, HIGH VOLTAGE (SETS)	353
21	2 LB	492234	MAIL, RFC, #11 GALVANIZED, 7/8"	355
22	6	598190	GUARD, BRD, NIXALITE	355
23	6	SEE TABLE A	CLAMP, STRAIN, GALV, W/O SOCKET EYE	355
24	6	SEE TABLE A	EYE, SOCKET, HOTLINE	355
25	3	SEE TABLE A	SLEEVE, JUMPER	355
26	2	153440	BOLT, MACH., 3/4" X 14"	355
27	2	788488	WASHER, DBL COIL SPR., 3/4"	355
28	2	19030	ASST. BOLT, GALV, MACH., 7/8" X 23"	355
29	2	19001	ASST. BOLT, GALV, MACH., 5/8", SPLIT	355

TABLE A

ITEM	QTY.	STOCK NO. OR STD. NO.	DESCRIPTION	ACCT. NO.
23	6	230872	3/8" ACSR/AW 6/1	356
24	6	337602	CLAMP, STRAIN, ALUMINUM, RANGE 0.2"-0.57", 15K	356
25	3	258472	EYE, SOCKET, HOTLINE, EYE 1/4" WIDE, 30K	356
23	6	231700	CONNECTOR, COMPRESSION, ALUM., JUMPER	356
24	6	337604	3364.4 (20/7) ACSR/AW	356
25	3	650284	CLAMP, STRAIN, ALUMINUM, RANGE 0.47"-0.88", 15K	356
23	6	230888	EYE, SOCKET, HOTLINE, EYE 1/4" WIDE, 30K	356
24	6	337602	EYE, SOCKET, HOTLINE, EYE 1-3/8" WIDE, 30K	356
25	3	650556	SLEEVE, ALUM., JUMPER	356
23	6	230688	100B.3 (48/7) ACSR/AW	356
24	6	337602	CLAMP, STRAIN, ALUMINUM, RANGE 0.71"-1.318", 30K	356
25	3	650556	EYE, SOCKET, HOTLINE, EYE 1-3/8" WIDE, 30K	356
23	6	230688	SLEEVE, ALUM., JUMPER	356
24	6	337602	CLAMP, STRAIN, ALUMINUM, RANGE 0.71"-1.318", 30K	356
25	3	650556	EYE, SOCKET, HOTLINE, EYE 1-3/8" WIDE, 30K	356



REV	BY	CHKD	APPLY	DATE	RET	CHANGE	BY	CHKD	APPLY	DATE	RET	SCALE:
B												NONE
A	LLD	PM		4/3/06	D							
RET				4/27/21/06	C							


TRANSMISSION ENGINEERING
POLE TOP ARRANGEMENT
138KV H-FRAME
TANGENT DEAD-END - ACSR

SCALE: NONE
 DWG. NO. 13345
 SET. NO. 2 of 2



Guys & Anchors

<u>DWG. NO.</u>	<u>REV.</u>	<u>TITLE</u>	<u>NO. OF SHEETS</u>
15000	B	SECTION TABLE OF CONTENTS	1
15100	A	GUY WIRE SIZE AND ANCHOR SELECTION PROCEDURE	4
15300	A	GUY HOOK	2
15305	A	POLE EYE PLATE	2
15305SW	O	POLE EYE PLATE	2
15306	O	GUY, DOUBLE POLE EYE	2
15306SW	O	DOUBLE POLE EYE PLATE	2
15308	O	PORCELAIN STRAIN INSULATOR	1
15309	O	FIBERGLASS STRAIN GUY INSULATOR	1
15310	A	PROTECTED CROSSPLATE ANCHORS	3
15312	O	HEAD GUY AND ANCHOR GUY WITH GUY HOOK	2
15313	O	HEAD GUY AND ANCHOR GUY WITH GUY PLATE	2
15313SW	O	HEAD GUY AND ANCHOR GUY WITH GUY PLATE	2

A	ADDED NEW DWGS	RLR	WPH	WVT	04/25/02	C					
--	ORIGINAL ISSUE	KSM	GV	WPH	09/01/97	B	UPDATED LIST	RLR	WPH	<i>294</i>	9/18/08
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE
TRANSMISSION ENGINEERING						SCALE:					
		GUYS AND ANCHORS SECTION TABLE OF CONTENTS				DWG. NO			SHEET NO.		
						15000			1 OF 1		

SCOPE:

This standard outlines the methodology for determining sizes for in-line, bisector and span guys.

PROCEDURE:

1. Determine Resultant Conductor Tension:

A. In-line Guy

Resultant Conductor Tension = Conductor Design Tension

B. Bisector Guy

Resultant Conductor Tension = 2 X Conductor Design Tension X Sin (Line Angle/2)

Note: In determining conductor design tension, include proper numbers of subconductors and phases supported by the guy wire under consideration.

2. Determine Guy Tension (Refer to Figure 1):

A. Calculate guy angle "A",

where $A = \text{Arc Tan (Lead/Height)}$

B. Determine guy tension "T",

where $T = (\text{Resultant Conductor Tension})/\text{Sin } A$

3. Select Guy Wire Size in Accordance with Table 1. Use Galvanized Steel Guy Wire Only.

4. Refer to Drawings **15308 & 15309** for guy insulator details, if used.


5. Select proper crossplate anchor and rod sizes as per Table 2 (Sheet 4 of 4).

Where soil cave-in or high water table is expected during excavation, screw anchor or other type of installation may be used as determined by Civil/Structural Engineering.

Notes:

1. Poles with down guy(s) shall be checked against buckling per Standard Drawing No. **12300**.

2. Bolt stress must be checked. Applications with guy angle "A" less than 30° must be pre-approved.

A	REVISED NOTES	RLR	DRB	WPH	09/09/99	C					
—	ORIGINAL ISSUE	KSM	GV	WPH	08/01/97	B					
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE
TRANSMISSION ENGINEERING							SCALE:				
		GUY WIRE AND ANCHOR SELECTION PROCEDURE					DWG. NO.		SHEET NO.		
							15100		1 OF 4		

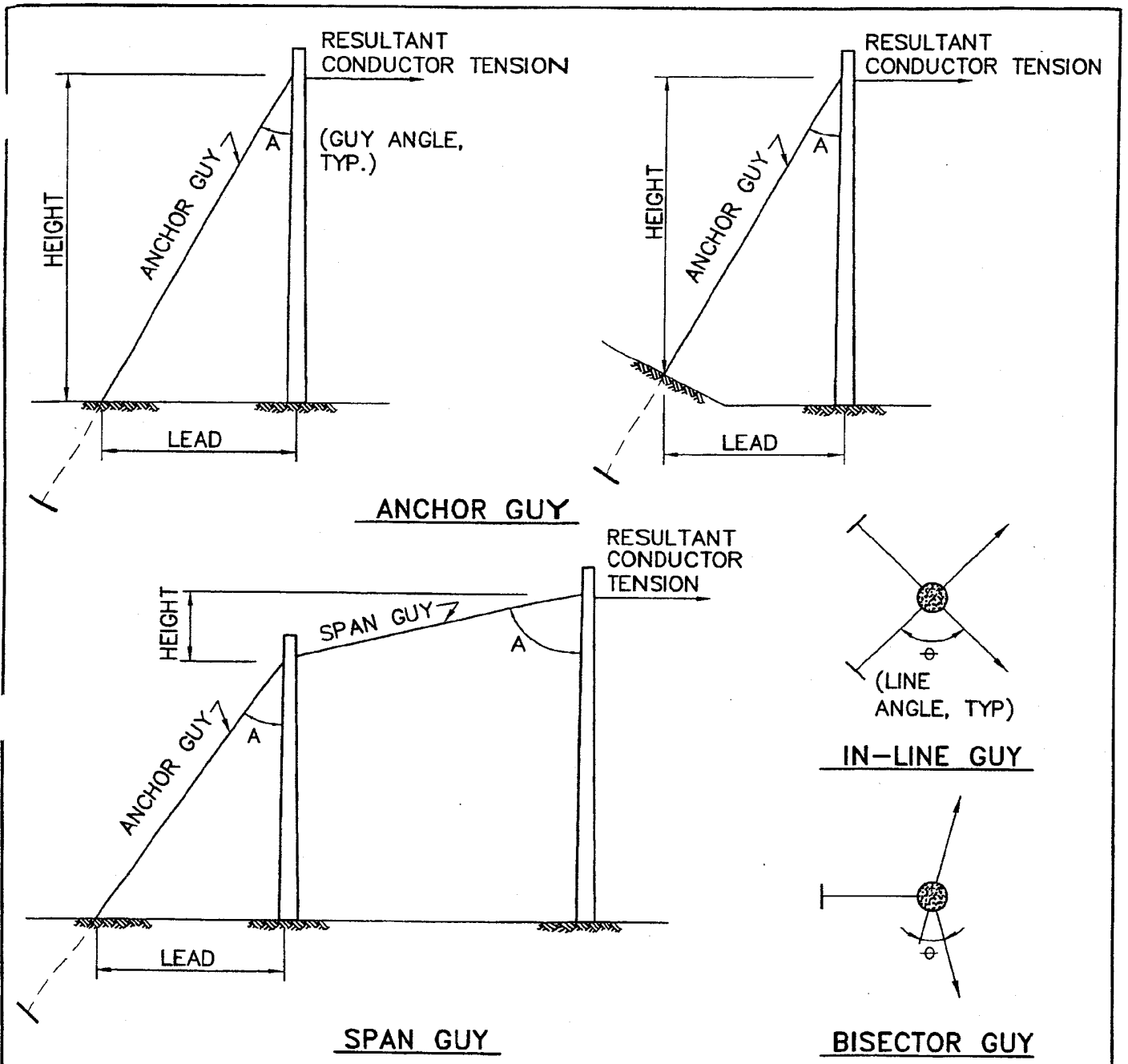


FIGURE 1 GUY CONFIGURATIONS

A	REV. SHTS. 1 & 3	FJP	DRB	WPH	9/9/99	C						
-	ORIGINAL ISSUE	FJP	GV	WPH	8/01/97	B						
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	

SDGE	TRANSMISSION ENGINEERING						SCALE: NONE		15100A02
	GUY WIRE AND ANCHOR SELECTION PROCEDURE						DWG. NO.	SHT. NO.	
							15100	2 of 4	

EXAMPLE:

Determine the size of the span and anchor guys required for a 69kV, wood pole transmission line with one conductor per phase and a conductor design tension of 4,000 pounds. The following are given:

Line Angle = 30 Deg. Anchor Guy Angle = 45 Deg. Span Guy Angle = 80 Deg.

Refer to Figure 1 for guy wire configuration.

STEP 1: Determined resultant conductor tension.

$$\text{Resultant Conductor Tension} = 2 \times 4,000 \times \text{SIN} (30 \text{ Deg.}/2) = 2071\#$$

STEP 2: Determine Span Guy Tension.

$$\begin{aligned} \text{Span Guy Tension} &= \text{Resultant Conductor Tension} / \text{SIN } 80 \text{ Deg.} \\ &= 2071\# / 0.985 = 2103\# \end{aligned}$$

STEP 3: From Table 1, select 1/4 inch guy wire for the span guy.

STEP 4: Calculate Anchor Guy Tension.

$$\begin{aligned} \text{Anchor Guy Tension} &= \text{Resultant Conductor Tension} / \text{SIN } 45 \text{ Deg.} \\ &= 2071\# / 0.707 = 2929\# \end{aligned}$$

STEP 5: From Table 1, select 5/16 inch guy wire for the anchor guy.

STEP 6: From Table 2, select 20" crossplate with 1" x 10' rod for anchor.


A	REVISED STEP #4	RLR	DRB	WPH	09/09/99	C					
—	ORIGINAL ISSUE	KSM	GV	WPH	08/01/97	B					
<i>REV</i>	<i>CHANGE</i>	<i>BY</i>	<i>CHKD</i>	<i>APPV</i>	<i>DATE</i>	<i>REV</i>	<i>CHANGE</i>	<i>BY</i>	<i>CHKD</i>	<i>APPV</i>	<i>DATE</i>
TRANSMISSION ENGINEERING							SCALE:				
	GUY WIRE AND ANCHOR SELECTION PROCEDURE						DWG. NO.		SHEET NO.		
							15100		3 OF 4		

TABLE 1 GALVANIZED STEEL GUY WIRE

NOMINAL DIAMETER (INCHES)	1/4 (2)	5/16	3/8	7/16	1/2 (3)
STOCK NUMBER	811360	811328	811296	811264	811232
NUMBER OF STRANDS	3	7	7	7	7
POUND PER 100 FEET	11.67	22.5	27.3	39.9	51.7
WORKING STRENGTH (LBS) F.S. = 2	2,250	3,000	5,750	(1) 9,000	(1) 12,500

Notes:


1. When strain insulators are used to sectionalize guy wire, the loading must not exceed the working strength of the insulator (6,000 lbs for stock no.# 430912, 10,000 lbs for stock no.# 430884 and fiberglass stain insulator "Grade A" stock no.# 430882).
2. Not normally used.
3. Special order item.

TABLE 2 CROSS PLATE AND ANCHOR ROD ASSEMBLY

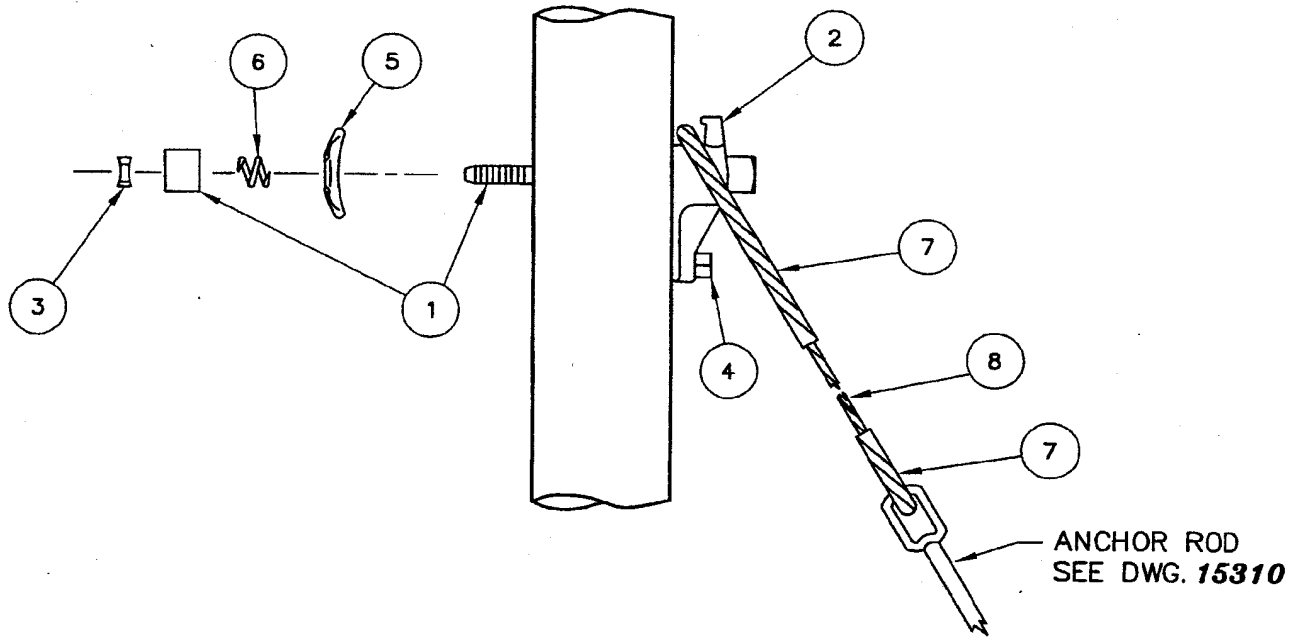
TYPE OF ANCHOR	NOMINAL SQUARE INCHES	ROD SIZE	HOLDING POWER (LBS) F.S. = 2			
			HARD GROUND (1)	MEDIUM GROUND (1)	SOFT GROUND (1)	KIT STOCK NUMBER
20" CROSS PLATE GALV.	250	1" X 10'	17,000	13,000	7,000	604480
24" CROSS PLATE GALV.	400	1" X 10'	18,000(2)	16,000	9,000	604512

Notes:

1. Soil classification definitions: HARD GROUND: Rock, hardpan, shale or sandstone. MEDIUM GROUND: Clay or moist ground which can be firmly tamped. SOFT GROUND: Loose sand or loam with little bond.
2. Rod strength at safety factor of two limits this value.
3. If more than 18,000 lbs. holding power is necessary and soil is non-corrosive, install two anchors, or use the triple helix type SS anchor.

A	CORRECTED NOTE 2	KSM	DRB	WPH	9/9/99	C						
-	ORIGINAL ISSUE	KSM	GV	WPH	8/1/97	B						
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	
	TRANSMISSION ENGINEERING							SCALE: NONE				
	GUYING GUY WIRE AND ANCHOR SELECTION PROCEDURE							DWG. NO.		SHT. NO.		
								15100		4 of 4		

15100A04



ELEVATION

NOTES:

1. FOR APPLICATIONS WITH RESULTANT CONDUCTOR TENSION 3000 LBS OR LESS.
2. STRAIN INSULATOR(S) OR FIBERGLASS LINK(S) SHALL BE INSTALLED TO MEET G.O. 95 REQUIREMENTS FOR SECTIONALIZATION OF GUYS IN PROXIMITY TO CONDUCTORS.

A	ADDED NOTE 2	FJP	DRB	WPH	9/9/99	C						
-	ORIGINAL ISSUE	FJP	GV	WPH	8/1/97	B						
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	

SDGE	TRANSMISSION ENGINEERING						SCALE: NONE	
	GUY HOOK						DWG. NO.	SHT. NO.
							15300	1of2

15300A01

BILL OF MATERIAL


ITEM	QTY	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
1	1	153440	BOLT, MACH. 3/4" X 14" W/NUT	355.630
2	1	415084	HOOK, GUY 3/4" WITH LAG HOLE	355.630
3	1	504576	LOCKNUT, MF 3/4"	355.630
4	1	621568	SCREW, LAG, 1/2" X 4"	355.630
5	1	797760	WASHER, 4" SQ. CURVED RIB	355.630
6	1	798496	WASHER, 3/4" DBL COIL SPRING	355.630
7		USE TABLE A	GRIP GALV. GUY	355.630
8	AS REQ'D	USE TABLE A	WIRE, GUY GALV.	355.630

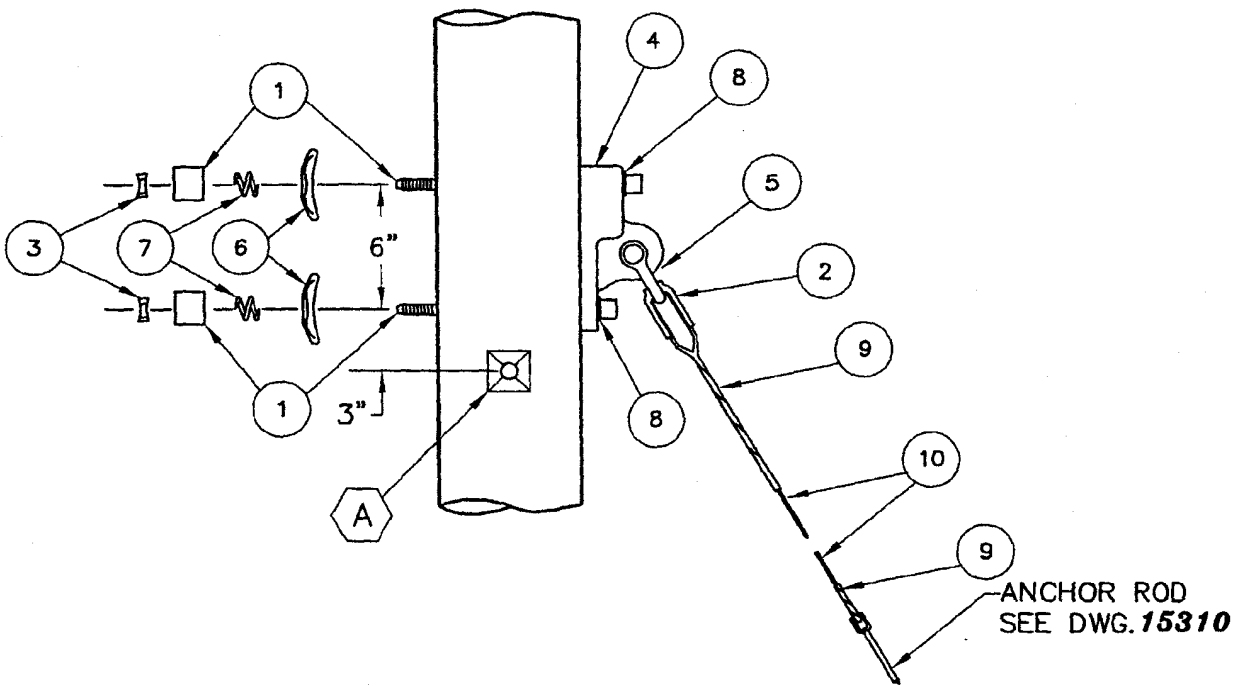
TABLE A GUY WIRE & GRIP BILL OF MATERIAL

ITEM	QTY	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
7	2	393216	GRIP, GUY 1/4"	355.630
8	AS REQ'D	811360	WIRE, GUY 1/4"	355.630
7	2	393280	GRIP, GUY 5/16"	355.630
8	AS REQ'D	811328	WIRE, GUY 5/16"	355.630
7	2	393248	GRIP, GUY 3/8"	355.630
8	AS REQ'D	811296	WIRE, GUY 3/8"	355.630
7	2	393312	GRIP, GUY 7/16"	355.630
8	AS REQ'D	811264	WIRE, GUY 7/16"	355.630

NOTE:

- TWO(2) EXTRA GRIPS REQUIRED FOR EACH STAIN INSULATOR.

A	ADDED NOTE 2 SH. 1	FJP	DRB	WPH	9/9/99	C						
-	ORIGINAL ISSUE	FJP	GV	WPH	8/1/97	B						
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	
	TRANSMISSION ENGINEERING							SCALE: NONE				
	GUY HOOK							DWG. NO.	SHT. NO.			
								15300	2 of 2			



ELEVATION

NOTES:

1. FOR APPLICATIONS WITH RESULTANT CONDUCTOR TENSION 5,000 LBS OR LESS.
2. STRAIN INSULATOR(S) OR FIBERGLASS LINK(S) SHALL BE INSTALLED TO MEET G.O. 95 REQUIREMENTS FOR SECTIONALIZATION OF GUYS IN PROXIMITY TO CONDUCTORS.

A	ADDED NOTE 2	FJP	DRB	WPH	9/9/99	C															
-	ORIGINAL ISSUE	FJP	GV	WPH	8/1/97	B															
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE										
TRANSMISSION ENGINEERING												SCALE: NONE									
POLE EYE PLATE												DWG. NO.		SHT. NO.							
												15305		1 of 2							

15305A01

BILL OF MATERIAL

ITEM	QTY	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
1	2	153440	BOLT, MACH. 3/4" X 14" W/NUT	355.630
2	1	736600	THIMBLE	355.630
3	2	504576	LOCKNUT, MF 3/4"	355.630
4	1	542944	PLATE, POLE EYE (3/4" MOUNTING BOLT)	355.630
5	1	636436	SHACKLE, ANCHOR 30,000 LBS.	355.630
6	2	797760	WASHER, 4" SQ. CURVED RIB	355.630
7	2	798496	WASHER, 3/4" DBL. COIL SPRING	355.630
8	2	800256	WASHER, 3/4" RD. FLAT	355.630
9		USE TABLE A	GRIP, GUY GALV.	355.630
10	AS REQ'D	USE TABLE A	WIRE, GUY GALV.	355.630
A	1	19001	ASSEMBLY: BOLT, 5/8", SPLIT	355.630

TABLE A GUY WIRE & GRIP BILL OF MATERIAL

ITEM	QTY	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
9	2	393216	GRIP, GUY 1/4"	355.630
10	AS REQ'D	811360	WIRE, GUY 1/4"	355.630
9	2	393280	GRIP, GUY 5/16"	355.630
10	AS REQ'D	811328	WIRE, GUY 5/16"	355.630
9	2	393248	GRIP, GUY 3/8"	355.630
10	AS REQ'D	811296	WIRE, GUY 3/8"	355.630
9	2	393312	GRIP, GUY 7/16"	355.630
10	AS REQ'D	811264	WIRE, GUY 7/16"	355.630
9	2	393184	GRIP, GUY 1/2"	355.630
10	AS REQ'D	811232	WIRE, GUY 1/2"	355.630

NOTE:

- TWO(2) EXTRA GRIPS REQUIRED FOR EACH STAIN INSULATOR.

A	ADDED NOTE 2 SH. 1	FJP	DRB	WPH	9/9/99	C					
-	ORIGINAL ISSUE	FJP	GV	WPH	8/1/97	B					
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

15305A02



TRANSMISSION ENGINEERING

POLE EYE PLATE

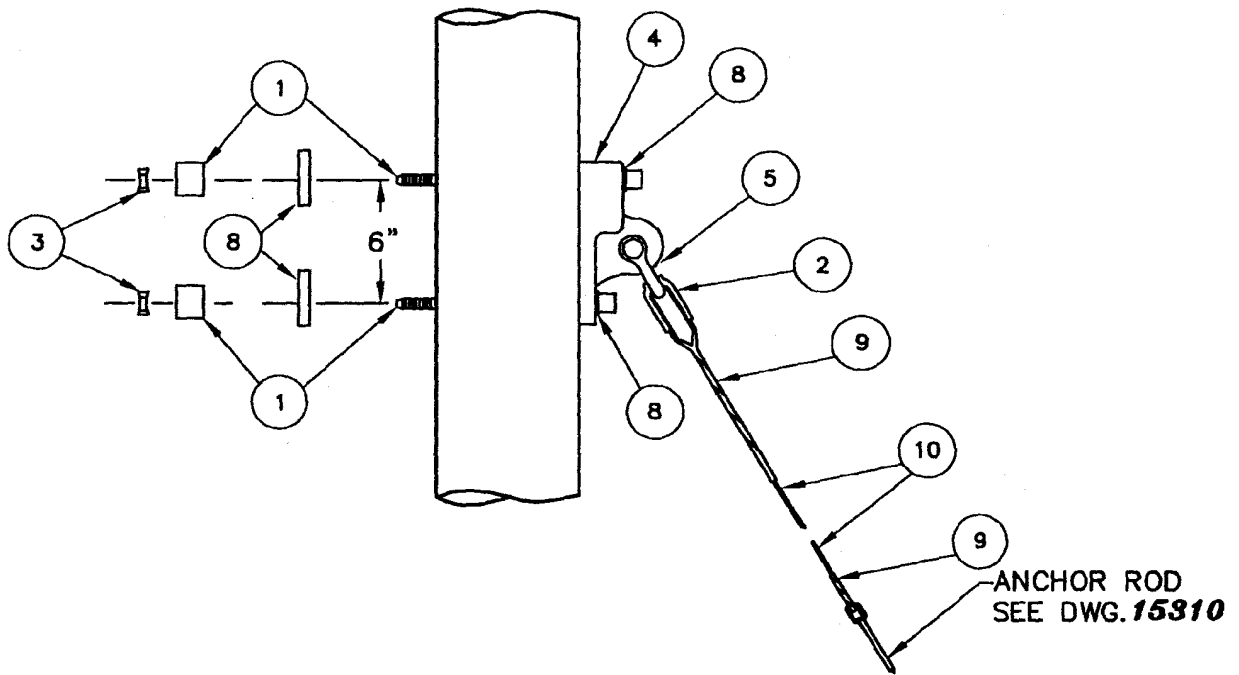
SCALE: NONE

DWG. NO.

SHT. NO.

15305

2 of 2



ELEVATION

NOTES:

1. FOR APPLICATIONS WITH RESULTANT CONDUCTOR TENSION 5,000 LBS OR LESS.
2. STRAIN INSULATOR(S) OR FIBERGLASS LINK(S) SHALL BE INSTALLED TO MEET G.O. 95 REQUIREMENTS FOR SECTIONALIZATION OF GUYS IN PROXIMITY TO CONDUCTORS.

B													
-	ORIGINAL ISSUE	LLD	WPH	CHK	4/23/08								
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE		
SDGE	TRANSMISSION ENGINEERING										SCALE: NONE		
	POLE EYE PLATE										DWG. NO.	SHT. NO.	
											15305SW	1 of 2	

BILL OF MATERIAL

ITEM	QTY	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
1	2	153472	BOLT, MACH. 3/4" X 16" W/NUT	355.630
2	1	736600	THIMBLE	355.630
3	2	504576	LOCKNUT, MF 3/4"	355.630
4	1	542944	PLATE, POLE EYE (3/4" MOUNTING BOLT)	355.630
5	1	636436	SHACKLE, ANCHOR 30,000 LBS.	355.630
			(BLANK)	
			(BLANK)	
8	4	799048	WASHER, SQ., FLAT, 2-1/4" X 2-1/4" X 3/16", 13/16" HOLE	355.630
9		USE TABLE A	GRIP, GUY GALV.	355.630
10	AS REQ'D	USE TABLE A	WIRE, GUY GALV.	355.630
A	1	19001	ASSEMBLY: BOLT, 5/8", SPLIT	355.630

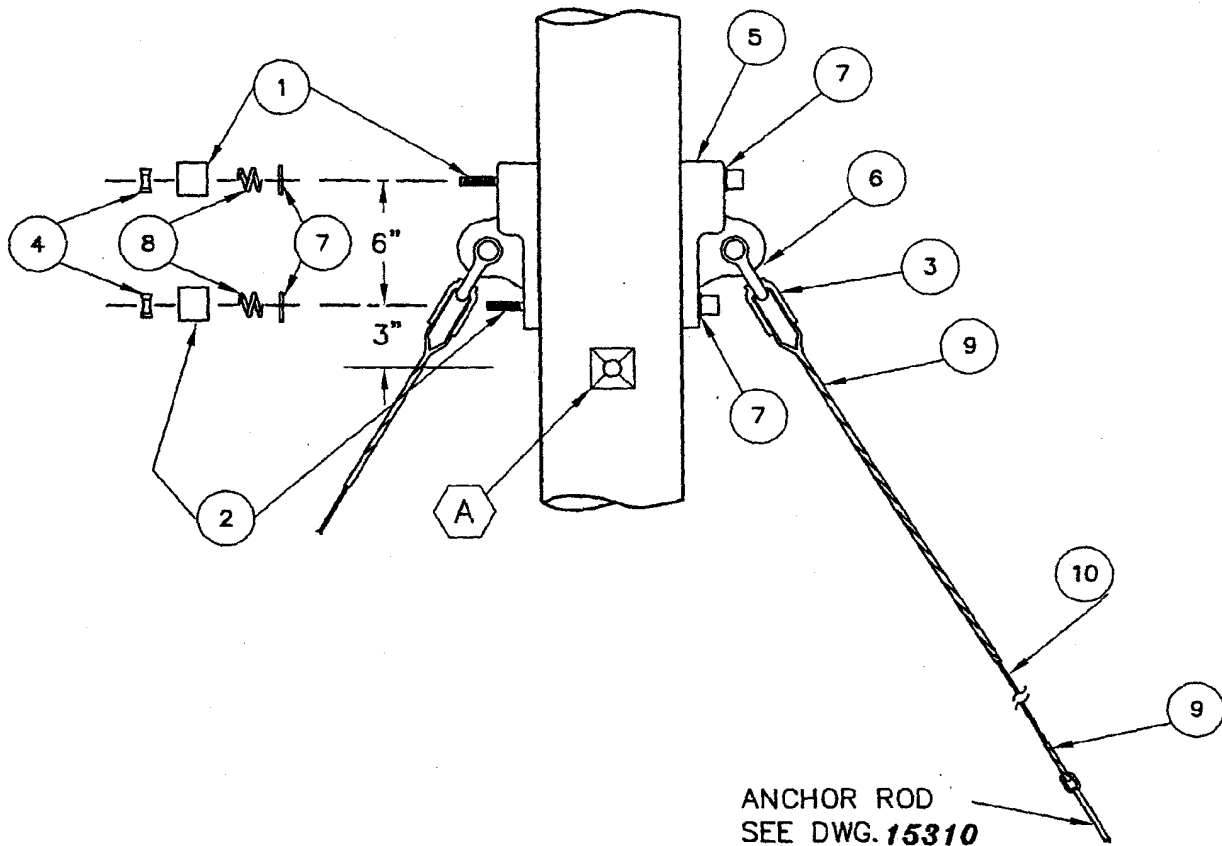
TABLE A GUY WIRE & GRIP BILL OF MATERIAL

ITEM	QTY	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
9	2	393216	GRIP, GUY 1/4"	355.630
10	AS REQ'D	811360	WIRE, GUY 1/4"	355.630
9	2	393280	GRIP, GUY 5/16"	355.630
10	AS REQ'D	811328	WIRE, GUY 5/16"	355.630
9	2	393248	GRIP, GUY 3/8"	355.630
10	AS REQ'D	811296	WIRE, GUY 3/8"	355.630
9	2	393312	GRIP, GUY 7/16"	355.630
10	AS REQ'D	811264	WIRE, GUY 7/16"	355.630
9	2	393184	GRIP, GUY 1/2"	355.630
10	AS REQ'D	811232	WIRE, GUY 1/2"	355.630

NOTE:

- TWO(2) EXTRA GRIPS REQUIRED FOR EACH STAIN INSULATOR.

-	ORIGINAL ISSUE	LLD	WPH	<i>[Signature]</i>	4/23/08							
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	
	TRANSMISSION ENGINEERING							SCALE: NONE				
	POLE EYE PLATE							DWG. NO.	SHT. NO.			
								15305SW	2 of 2			



NOTES:

1. IF REQUIRED FOR CLEARANCE, THREADED END OF BOLT ITEM (2) SHALL BE CUT OFF AND COATED WITH GALVONOX.
2. STRAIN INSULATOR(S) OR FIBER LINK(S) SHALL BE INSTALLED TO MEET G.O.95 REQUIREMENTS FOR SECTIONALIZATION OF GUYS IN PROXIMITY TO CONDUCTORS.

A						C							
-	ORIGINAL ISSUE	KSM	DRB	WPH	8/9/99	B							
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE		

15306001



TRANSMISSION ENGINEERING

DOUBLE POLE EYE PLATE

SCALE: NONE

DWG. NO. SHT. NO.


15306 1 of 2

BILL OF MATERIAL

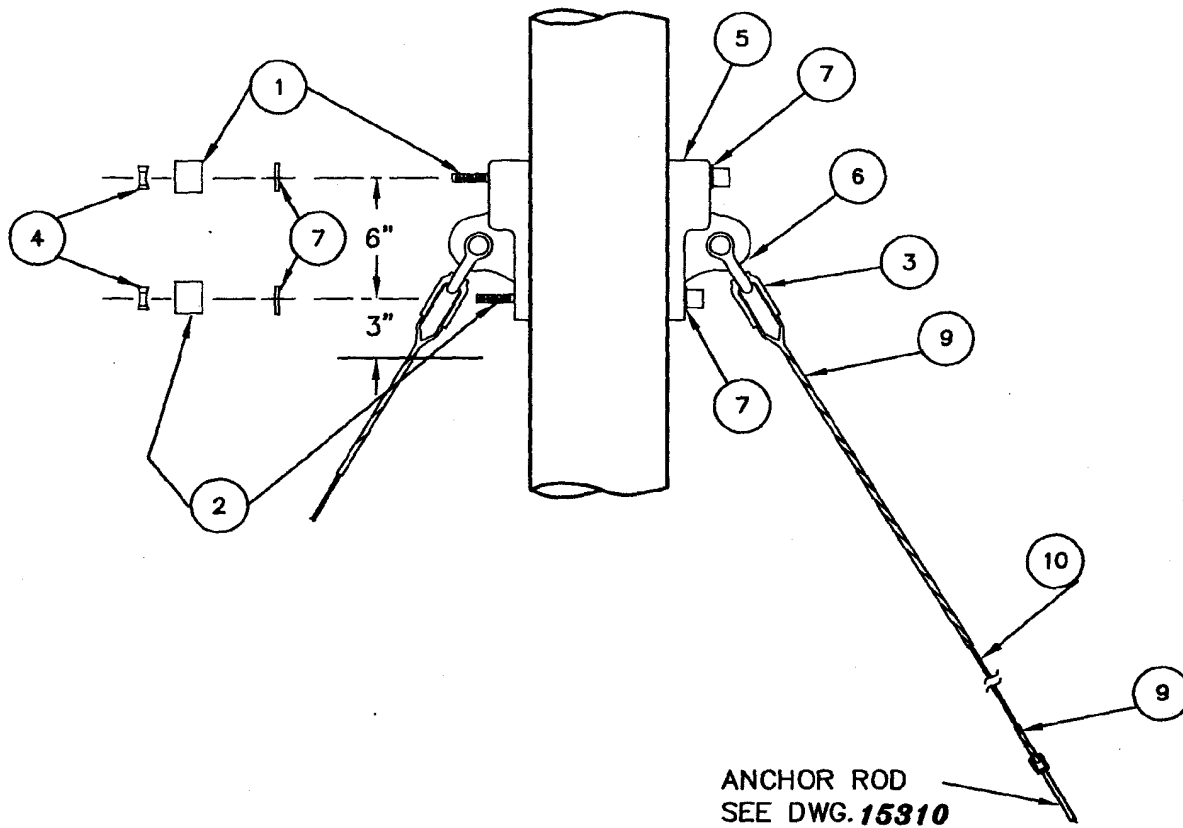
ITEM	QTY	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
1	1	153472	BOLT, MACH. 3/4" X 16" W/NUT	355.630
2	1	153440	BOLT, MACH. 3/4" X 14" W/NUT	355.630
3	2	736600	THIMBLE	355.630
4	2	504576	LOCKNUT, MF 3/4"	355.630
5	2	542944	PLATE, POLE EYE(3/4" MOUNTING BOLT)	355.630
6	2	636436	SHACKLE, ANCHOR 30,000 LBS.	355.630
7	4	800256	WASHER, 3/4" ROUND FLAT, 2" O.D.	355.630
8	2	798496	WASHER, 3/4" DOUBLE COIL, SPRING	355.630
9		USE TABLE A	GRIP, GUY GALV.	355.630
10	AS REQ'D	USE TABLE A	WIRE, GUY GALV.	355.630
A	AS REQ'D	19001	ASSEMBLY, BOLT, 5/8", SPLIT	355.630

TABLE A GUY WIRE & GRIP BILL OF MATERIAL

ITEM	QTY	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
9	4	393216	GRIP, GUY 1/4"	355.630
10	AS REQ'D	811360	WIRE, GUY 1/4"	355.630
9	4	393280	GRIP, GUY 5/16"	355.630
10	AS REQ'D	811328	WIRE, GUY 5/16"	355.630
9	4	393248	GRIP, GUY 3/8"	355.630
10	AS REQ'D	811296	WIRE, GUY 3/8"	355.630
9	4	393312	GRIP, GUY 7/16"	355.630
10	AS REQ'D	811264	WIRE, GUY 7/16"	355.630
9	4	393184	GRIP, GUY 1/2"	355.630
10	AS REQ'D	811232	WIRE, GUY 1/2"	355.630

A						C							
-	ORIGINAL ISSUE	KSM	DRB	WPH	9/9/99	B							
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE		
		TRANSMISSION ENGINEERING						SCALE: NONE					
		DOUBLE POLE EYE PLATE						DWG. NO.	SHT. NO.				
								15306	2 of 2				

15306002



ANCHOR ROD
SEE DWG. 15310

NOTES:

1. IF REQUIRED FOR CLEARANCE, THREADED END OF BOLT ITEM (2) SHALL BE CUT OFF AND COATED WITH GALVONOX.
2. STRAIN INSULATOR(S) OR FIBER LINK(S) SHALL BE INSTALLED TO MEET G.O.95 REQUIREMENTS FOR SECTIONALIZATION OF GUYS IN PROXIMITY TO CONDUCTORS.


A						C						
-	ORIGINAL ISSUE	LLD	WPH	<i>WPH</i>	4/23/08	B						
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	
SDGE	TRANSMISSION ENGINEERING							SCALE: NONE				
	DOUBLE POLE EYE PLATE							DWG. NO.	SHT. NO.			
								15306SW	1 of 2			

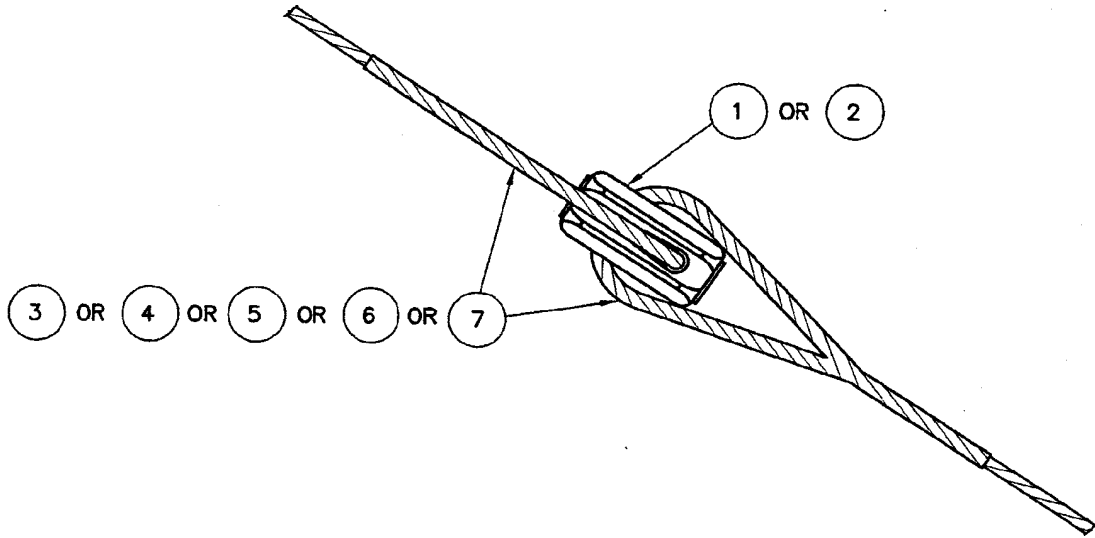
BILL OF MATERIAL

ITEM	QTY	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
1	1	1153504	BOLT, MACH. 3/4" X 18" W/NUT	355.630
2	1	153472	BOLT, MACH. 3/4" X 16" W/NUT	355.630
3	2	736600	THIMBLE	355.630
4	2	504576	LOCKNUT, MF 3/4"	355.630
5	2	542944	PLATE, POLE EYE(3/4" MOUNTING BOLT)	355.630
6	2	636436	SHACKLE, ANCHOR 30,000 LBS.	355.630
7	4	799048	WASHER, SQ., FLAT, 2-1/4" X 2-1/4" X 3/16", 13/16"HOLE	355.630
			(BLANK)	
9		USE TABLE A	GRIP, GUY GALV.	355.630
10	AS REQ'D	USE TABLE A	WIRE, GUY GALV.	355.630

TABLE A GUY WIRE & GRIP BILL OF MATERIAL

ITEM	QTY	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
9	4	393216	GRIP, GUY 1/4"	355.630
10	AS REQ'D	811360	WIRE, GUY 1/4"	355.630
9	4	393280	GRIP, GUY 5/16"	355.630
10	AS REQ'D	811328	WIRE, GUY 5/16"	355.630
9	4	393248	GRIP, GUY 3/8"	355.630
10	AS REQ'D	811296	WIRE, GUY 3/8"	355.630
9	4	393312	GRIP, GUY 7/16"	355.630
10	AS REQ'D	811264	WIRE, GUY 7/16"	355.630
9	4	393184	GRIP, GUY 1/2"	355.630
10	AS REQ'D	811232	WIRE, GUY 1/2"	355.630

A						C					
-	ORIGINAL ISSUE	LLD	WPH	CAH	4/23/08	B					
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE
	TRANSMISSION ENGINEERING							SCALE: NONE			
	DOUBLE POLE EYE PLATE							DWG. NO.		SHT. NO.	
								15306SW		2 of 2	

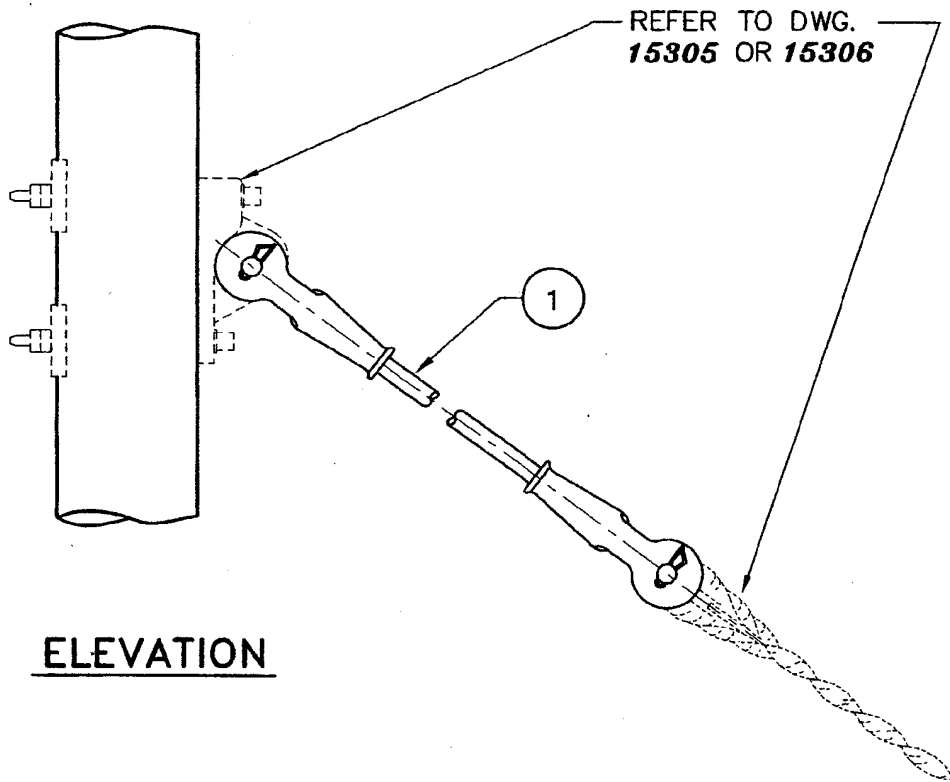


BILL OF MATERIAL

ITEM	QTY	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
1	1	430912	INSULATOR STRAN CLASS 54-2 6000 LBS. WORKING LOAD	355.630
2	1	430884	INSULATOR STRAN CLASS 54-3 10,000 LBS. WORKING LOAD	355.630
3	2	393216	GRIP, GUY 1/4"	355.630
4	2	393280	GRIP, GUY 5/16"	355.630
5	2	393248	GRIP, GUY 3/8"	355.630
6	2	393312	GRIP, GUY 7/16"	355.630
7	2	393184	GRIP, GUY 1/2"	355.630

A						C							
-	ORIGINAL ISSUE	FJP	DRB	WPH	9/9/99	B							
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE		
TRANSMISSION ENGINEERING							SCALE: NONE						
SDGE	PORCELAIN STRAIN INSULATOR							DWG. NO.			SHT. NO.		
								15308			1 of 1		

15308001



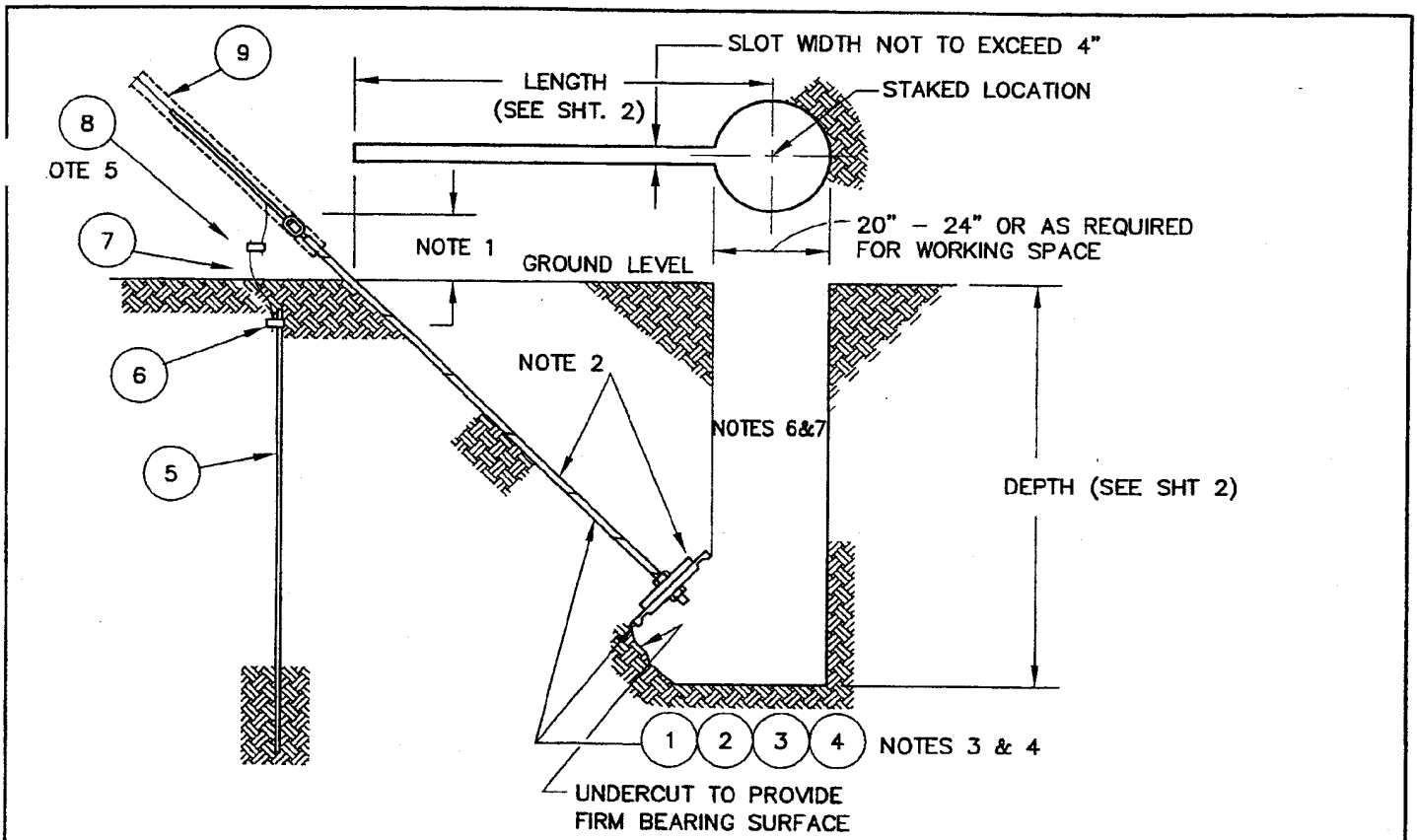
BILL OF MATERIAL

ITEM	QTY	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
1	1	430882	INSULATOR, GUY STRAIN FIBERGLASS 10'-0"	355.630

NOTES:

- OTHER MATERIAL IS SHOWN ON DWG. **15305** OR **15306**
- ITEM ① IS RATED AT 10,000 LBS. MAXIMUM WORKING STRENGTH (S.F. = 3).

A							C								15309001
-	ORIGINAL ISSUE	FJP	DRB	WPH	9/9/99	B									
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE				
SDGE							TRANSMISSION ENGINEERING				SCALE: NONE				
							FIBERGLASS STRAIN GUY INSULATOR				DWG. NO.		SHT. NO.		
											15309		1 of 1		



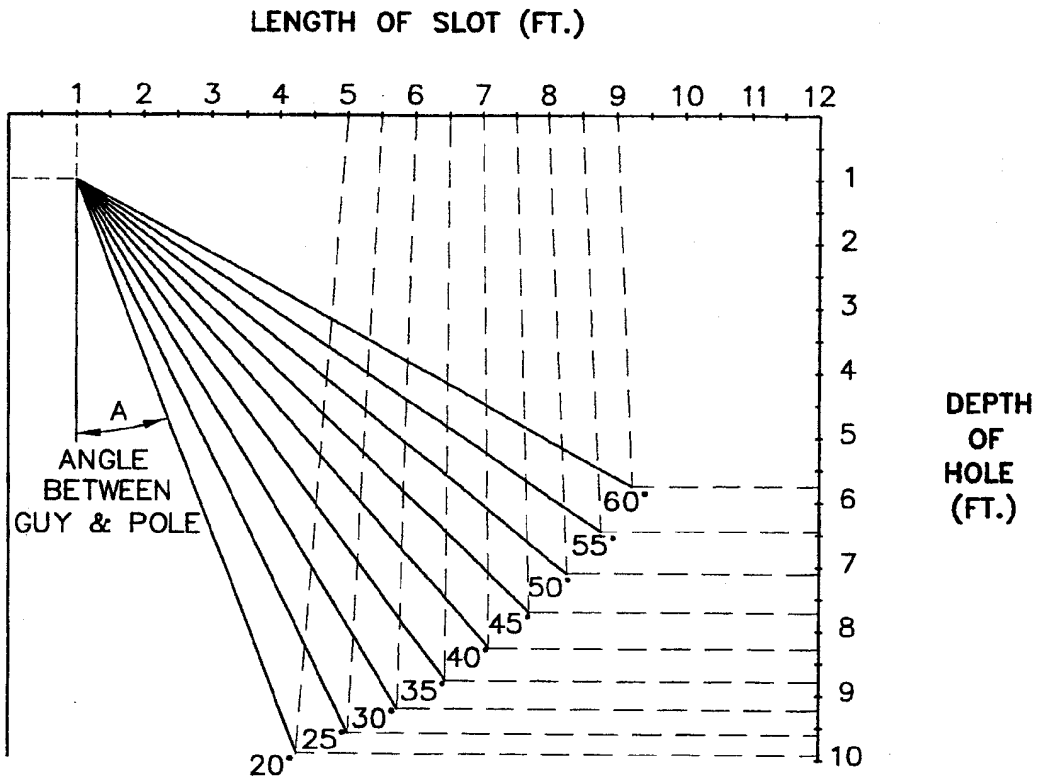
NOTES:

1. IN AREAS WHICH HAVE DRIFTING SAND, EYE OF GROUND ROD SHALL BE INSTALLED 12" ABOVE GROUND LEVEL. ELSEWHERE 8" IS SUFFICIENT.
2. PROTECTED ANCHOR AND ANCHOR RODS ARE FURNISHED SEPARATELY BY STOREROOM. THEY WILL BE ISSUED AS A KIT TO BE ASSEMBLED AT THE JOB SITE.
3. ATTACH ANCHOR PLATE TO ROD WITH ONE NUT ABOVE AND ONE BELOW PLATE.
4. AFTER ASSEMBLY TYPE 1170 PRIMER AND PROTECTO WRAP TAPE ARE TO BE APPLIED TO THREADS, NUTS, AND ANY OTHER EXPOSED AREAS OF ANCHOR ASSEMBLY.
5. ON ALL NEW INSTALLATIONS AND WHENEVER POSSIBLE ON EXISTING GUYS, INSTALL CONNECTOR ON TAIL OF GUY WIRE, NOT ON TENSIONED WIRE.
6. BACKFILL PER TRANSMISSION ENGINEERING CONSTRUCTION SPECIFICATION.
7. WHEN INSTALLING ANCHOR, ONLY SOIL IN AUGERED HOLE AND TRENCH FOR ROD ARE TO BE DISTURBED - ALL OTHER SOIL TO BE VIRGIN SOIL. IF ANCHOR CANNOT BE INSTALLED IN THIS MANNER, OTHER ANCHORING METHODS SHALL BE USED AS DIRECTED BY TRANSMISSION ENGINEERING.

A	REVISED NOTE 5	WDF	DRB	WPH	9/9/99	C						
-	ORIGINAL ISSUE	FJP	GV	FJP	8/1/97	B						
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	

	TRANSMISSION ENGINEERING				SCALE: NONE			
	PROTECTED CROSSPLATE ANCHORS				DWG. NO.		SHT. NO.	
	20" & 24" INSTALLATION				15310		1 of 3	

15310A01



BASED ON 10' ANCHOR ROD
WITH ROD 8" VERTICALLY ABOVE GROUND.

A	REV. DIMENSIONS	FJP	DRB	WPH	9/9/99	C					
-	ORIGINAL ISSUE	FJP	GV	WPH	8/1/97	B					
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

SDGE	TRANSMISSION ENGINEERING	SCALE: NONE	
	PROTECTED CROSSPLATE ANCHORS 20" & 24" INSTALLATION	DWG. NO.	SHT. NO.
		15310	2 of 3

15310A02

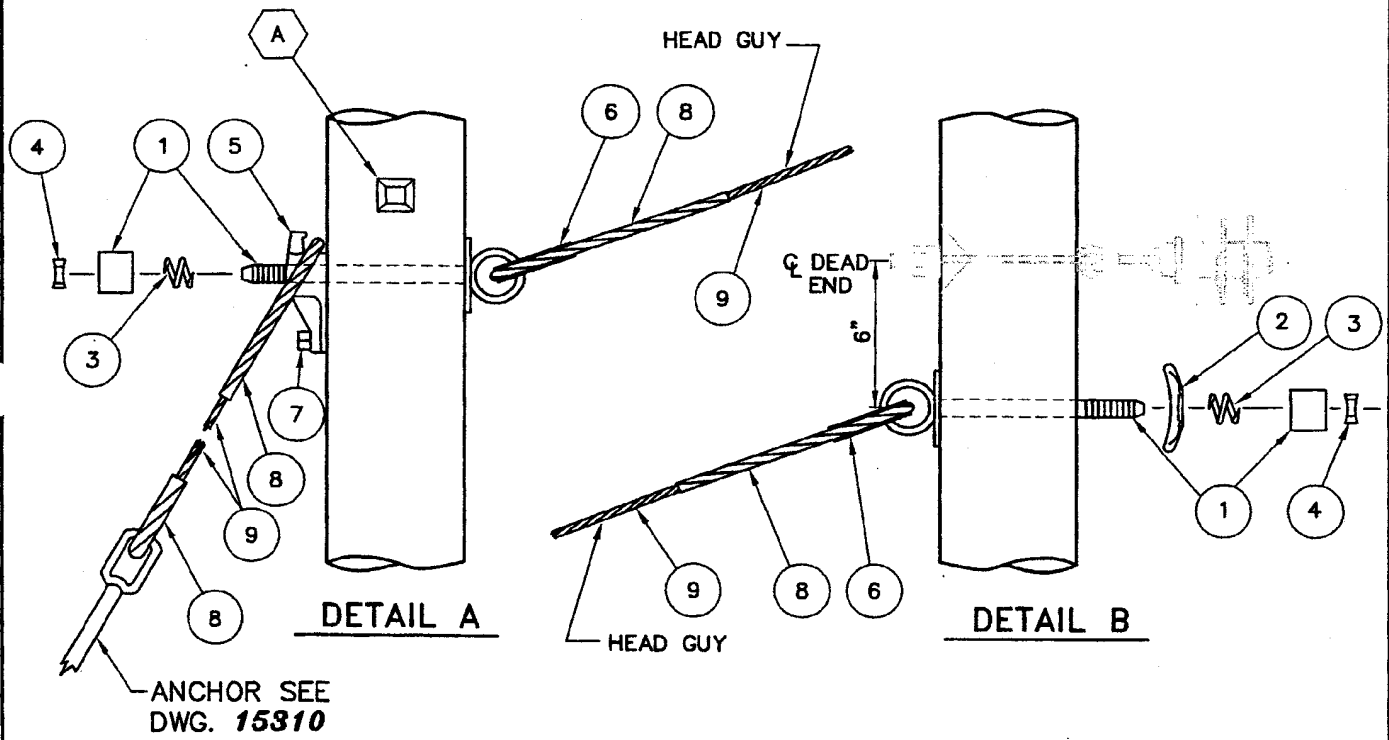
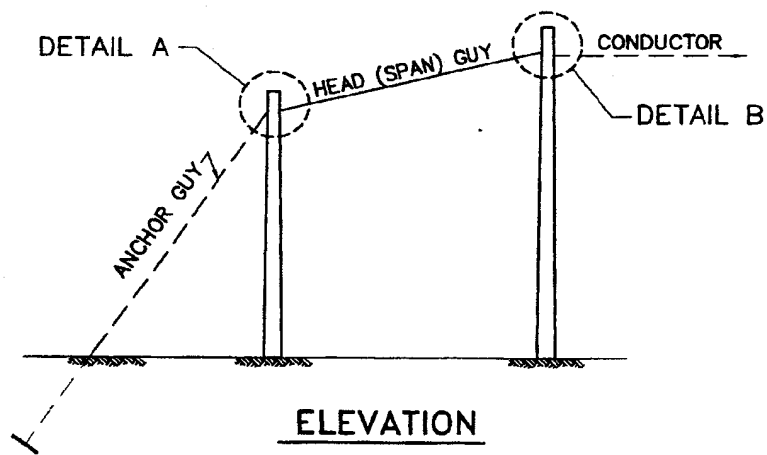
BILL OF MATERIAL

ITEM	QTY		STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
	20"	24"			
1	1	—	604480	ANCHOR, TREATED, 20" ANCHOR ROD — 1" X 10'	355.630
2	—	1	604512	ANCHOR, TREATED, 24" ANCHOR ROD — 1" X 10'	355.630
3	AS REQ	AS REQ	557696	PRIMER, TYPE 1170	355.630
4	AS REQ	AS REQ	720064	TAPE, PROTECTO WRAP 4"	355.630
5	1	1	603072	ROD, COPPERCLAD GROUND 5/8" X 8'	355.630
6	1	1	230016	CLAMP, GROUND ROD 5/8"	355.630
7	1	1	813056	WIRE, SOLID COPPERWELD #2 (LBS)	355.630
8	1	1	257752	CONNECTOR, COMPRESSION	355.630
9	1	1	476316	MARKER, GUY (NOTE 1)	355.630

NOTE:

1. ITEM 9 GUY MARKER MAY BE OMITTED ALONG FENCES, IN MARSHY GROUND, HEAVY BRUSH OR ISOLATED AREAS WHICH ARE INACCESSIBLE TO MOTOR VEHICLES, INCLUDING ALL OFF ROAD VEHICLES.

A	REV. SH. 1 & 2	WDF	DRB	WPH	9/9/99	C						15310A03
—	ORIGINAL ISSUE	FJP	GV	WPH	8/1/97	B						
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	
		TRANSMISSION ENGINEERING					SCALE: NONE					
		PROTECTED CROSSPLATE ANCHORS 20" & 24" INSTALLATION					DWG. NO.			SHT. NO.		
							15310			3of3		



NOTES:

1. FOR APPLICATION WITH RESULTANT CONDUCTOR TENSION OF 3,000 LBS. OR LESS.
2. HEAD GUY AND ANCHOR GUY MAY BE DIFFERENT SIZES.
3. STRAIN INSULATOR(S) OR FIBERGLASS LINK(S) SHALL BE INSTALLED TO MEET G.O. 95 REQUIREMENTS FOR SECTIONALIZATION OF GUYS IN PROXIMITY TO CONDUCTORS.

A						C						
-	ORIGINAL ISSUE	FJP	DRB	WPH	9/9/99	B						
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	

SDGE	TRANSMISSION ENGINEERING						SCALE: NONE	
	HEAD GUY AND ANCHOR GUY WITH GUY HOOK						DWG. NO.	SHT. NO.
							15312	1 of 2

15312001

BILL OF MATERIAL

ITEM	QTY	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
1	2	150720	BOLT, SHOULDER EYE 3/4" x 14" W/NUT	355.630
2	1	797760	WASHER, 4" SQ. CURVED RIB	355.630
3	2	798496	WASHER, 3/4" DBL COIL SPRING	355.630
4	2	504576	LOCKNUT, MF 3/4"	355.630
5	1	415084	HOOK, GUY, 3/4" BOLT HOLE WITH LAG HOLE	355.630
6	2	736600	THIMBLE	355.630
7	1	621568	SCREW, LAG, 1/2" x 4"	355.630
8		USE TABLE A	GRIP, GALV, GUY	355.630
9		USE TABLE A	WIRE, GUY GALV.	355.630
A	1	19001	ASSEMBLY, BOLT, 5/8" SPLIT	355.630

TABLE A GUY WIRE & GRIP BILL OF MATERIAL

ITEM	QTY*	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
8	4	393216	GRIP, GUY 1/4"	355.630
9	AS REQ'D	811360	WIRE, GUY 1/4"	355.630
8	4	393280	GRIP, GUY 5/16"	355.630
9	AS REQ'D	811328	WIRE, GUY 5/16"	355.630
8	4	393248	GRIP, GUY 3/8"	355.630
9	AS REQ'D	811296	WIRE, GUY 3/8"	355.630
8	4	393312	GRIP, GUY 7/16"	355.630
9	AS REQ'D	811264	WIRE, GUY 7/16"	355.630
8	4	393184	GRIP, GUY 1/2"	355.630
9	AS REQ'D	811232**	WIRE, GUY 1/2"	355.630

*HEAD GUY AND ANCHOR GUY MAY BE DIFFERENT SIZES

** SPECIAL ORDER ITEM.

A					C					
-	ORIGINAL ISSUE	WDF	WPH	wy	4/25/02	B				
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV

15312002



TRANSMISSION ENGINEERING

SCALE: NONE

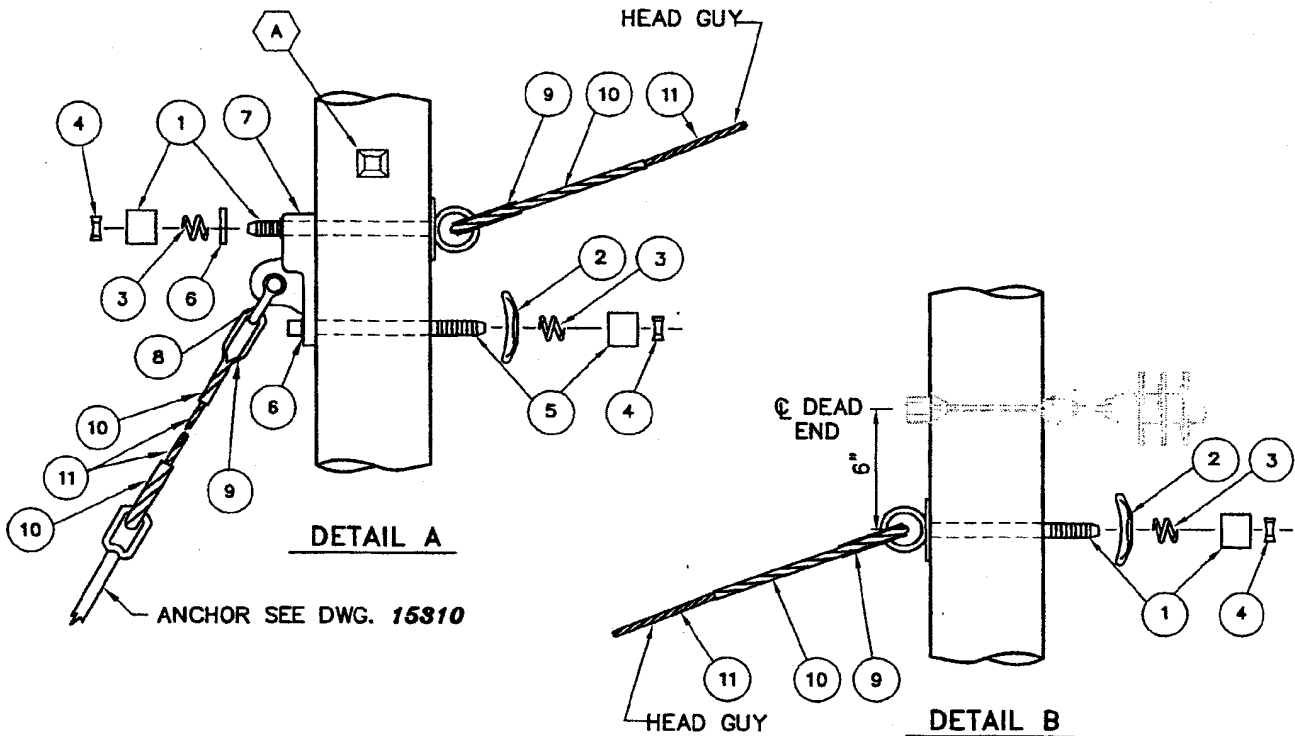
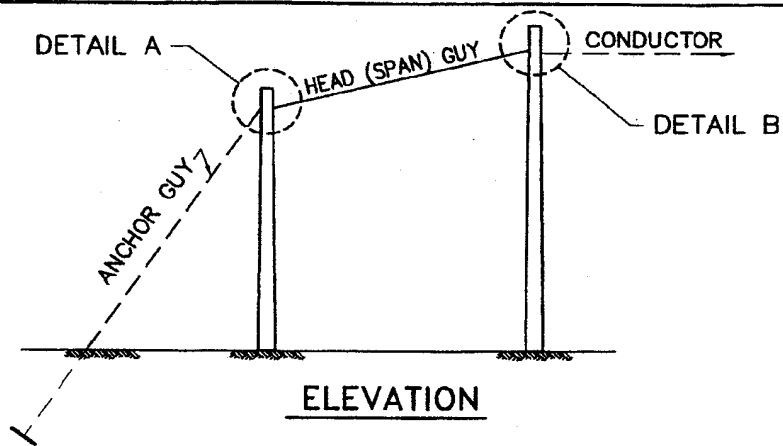
HEAD GUY & ANCHOR GUY WITH HOOK

DWG. NO.

SHT. NO.

15312

2of2



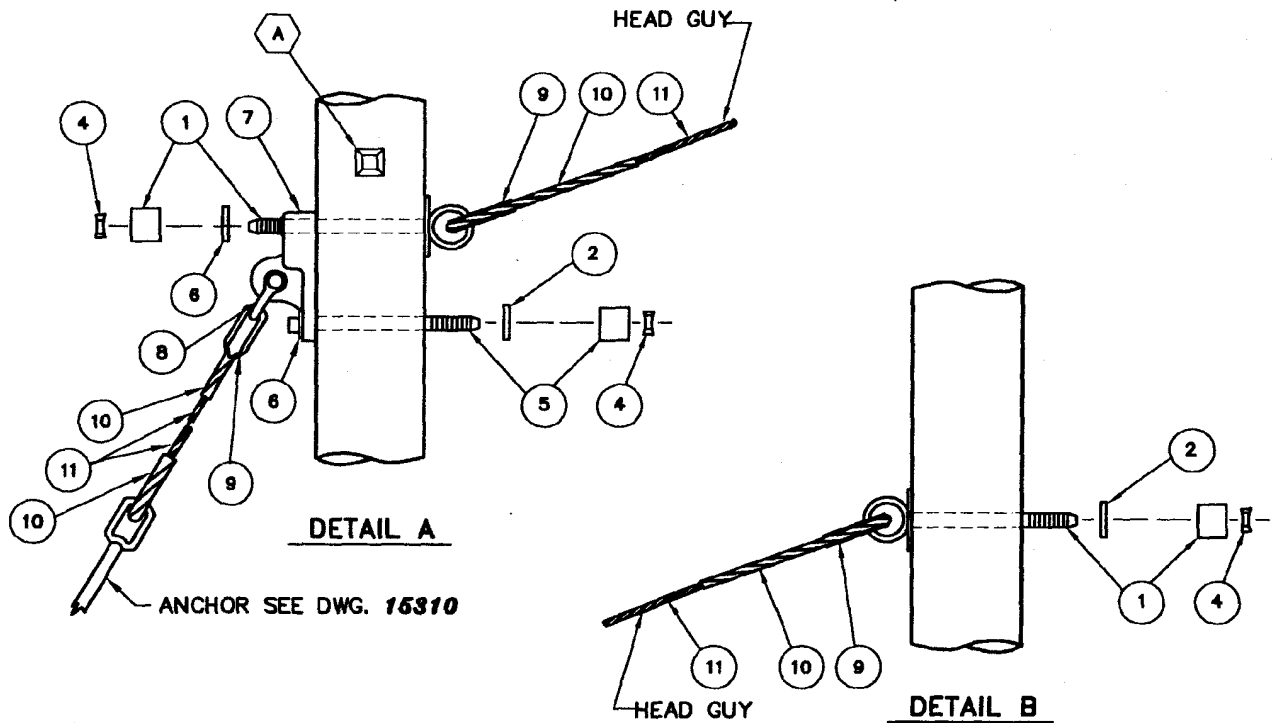
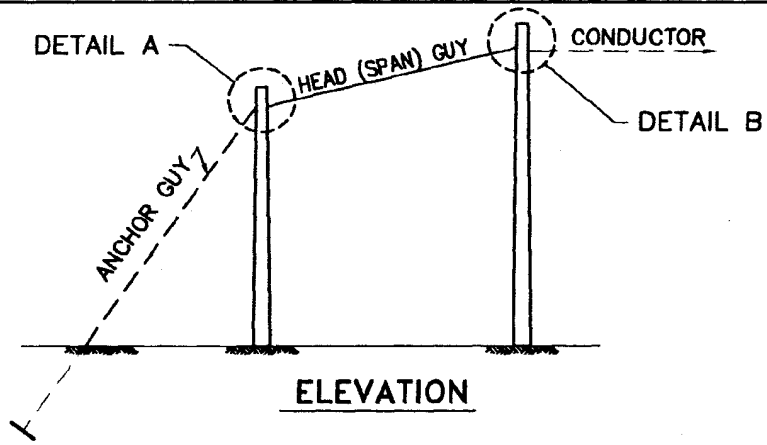
NOTES:

1. FOR APPLICATION WITH RESULTANT CONDUCTOR TENSION OF 5,000 LBS. OR LESS.
2. HEAD GUY AND ANCHOR GUY MAY BE DIFFERENT SIZE.
3. STRAIN INSULATOR(S) OR FIBERGLASS LINK(S) SHALL BE INSTALLED TO MEET G.O. 95 REQUIREMENTS FOR SECTIONALIZATION OF GUYS IN PROXIMITY TO CONDUCTORS.

A						C						
-	ORIGINAL ISSUE	FJP	DRB	WPH	9/9/99	B						
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	

SDGE	TRANSMISSION ENGINEERING						SCALE: NONE					
	HEAD GUY AND ANCHOR GUY WITH GUY PLATE						DWG. NO.		SHT. NO.			
							15313		1 of 2			

15313001




NOTES:

1. FOR APPLICATION WITH RESULTANT CONDUCTOR TENSION OF 5,000 LBS. OR LESS.
2. HEAD GUY AND ANCHOR GUY MAY BE DIFFERENT SIZE.
3. STRAIN INSULATOR(S) OR FIBERGLASS LINK(S) SHALL BE INSTALLED TO MEET G.O. 95 REQUIREMENTS FOR SECTIONALIZATION OF GUYS IN PROXIMITY TO CONDUCTORS.


A						C							
-	ORIGINAL ISSUE	LLD	WPH	<i>297</i>	4/23/08	B							
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE		
SDGE		TRANSMISSION ENGINEERING						SCALE: NONE					
		HEAD GUY AND ANCHOR GUY WITH GUY PLATE						DWG. NO.		SHT. NO.			
								15313SW		1 of 2			

Steel Poles

<u>DWG. NO.</u>	<u>REV.</u>	<u>TITLE</u>	<u>NO. OF SHEETS</u>
17000	G	SECTION TABLE OF CONTENTS	7
		<u>STEEL POLES - GENERAL</u>	
17100	O	STEEL POLE GENERAL NOTES	1
17101	B	STEEL POLE SHAFT	1
17105	B	STEEL POLE, CLIMBING AND WORKING STEPS	2
17110	A	STEEL POLE, INSULATOR, GUY AND TELEPHONE ATTACHMENTS	1
17125	O	STEEL POLE, FIBER OPTIC ATTACHMENT	1
17130	A	STEEL POLE, YELLOW WARNING	1
17135	O	STEEL POLE, GROUNDING DETAILS	1
17136	O	DIRECT EMBEDDED STEEL POLE, GROUNDING DETAILS	1
17140	A	STEEL POLE, TYPE "S" SUSPENSION CROSSARM FOR I-STRING	1
17141	O	STEEL POLE, TYPE "T" DEAD-END CROSSARM	1
17142	O	STEEL POLE, TYPE "TJ" DEAD-END CROSSARM WITH JUMPER POST INSULATOR ATTACHMENT	1
17150	O	STEEL POLE, TYPE "A, B, C, D & E" DISTRIBUTION CROSSARM	1
17160	O	230kV STEEL POLE, CROSSARM, TANGENT STRUCTURE	1


G	UPDATED LIST	RLR	WPH	<i>ACM</i>	9/18/08	F	UPDATED LIST	RLR	WPH	WVT	4/3/08
--	ORIGINAL ISSUE	RLR	WPH	WVT	04/25/02	E	UPDATED LIST	RLR	WPH	WVT	08/29/05
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE
TRANSMISSION ENGINEERING						SCALE:					
	POLES AND POLE TOP ARRANGEMENTS - STEEL SECTION TABLE OF CONTENTS					DWG. NO			SHEET NO.		
						17000			1 OF 7		

<u>DWG. NO.</u>	<u>REV.</u>	<u>TITLE</u>	<u>NO. OF SHEETS</u>
17165	O	230kV STEEL POLE, OUTSIDE CROSSARM, LIGHT ANGLE STRUCTURE	1
17170	O	230kV STEEL POLE, INSIDE CROSSARM, LIGHT ANGLE STRUCTURE	1
17175	A	230kV STEEL POLE, CROSSARM, D.E./STRAIN STRUCTURE	1
17180	O	230kV STEEL POLE, POLE CAP AND VANG DETAILS	1


G	UPDATED LIST	RLR	WPH	<i>WVT</i>	9/18/08	F	UPDATED LIST	RLR	WPH	WVT	4/3/08
--	ORIGINAL ISSUE	RLR	WPH	WVT	04/25/02	E	UPDATED LIST	RLR	WPH	WVT	08/29/05
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE
TRANSMISSION ENGINEERING						SCALE:					
	POLES AND POLE TOP ARRANGEMENTS - STEEL SECTION TABLE OF CONTENTS					DWG. NO			SHEET NO.		
						17000			2 OF 7		

<u>DWG. NO.</u>	<u>REV.</u>	<u>TITLE</u>	<u>NO. OF SHEETS</u>
17201	O	POLE TOP INDEX 69KV STEEL POLE	4
17203	O	COMMENTARY ON POLE-TOP INDEX FOR 69KV STEEL POLE	4
17205	O	POLE TOP ARRANGEMENT, TYPE 2/1 WPI, SINGLE CIRCUIT, 69KV STEEL POLE	1
17210	O	POLE TOP ARRANGEMENT, TYPE 2/1 W, SINGLE CIRCUIT, 69KV STEEL POLE	1
17225	A	POLE-TOP ARRANGEMENT, TYPE YPI, SINGLE CIRCUIT, 69KV STEEL POLE	1
17230	A	POLE TOP ARRANGEMENT, TYPE Y, SINGLE CIRCUIT, 69KV STEEL POLE	1
17245	O	POLE TOP ARRANGEMENT, TYPE 2/1 WPI (DC), SGL. CKT. CONVERTIBLE TO DBL. CKT., 69KV STEEL POLE	1
17250	O	POLE TOP ARRANGEMENT, TYPE HALF WPI (DC), SGL. CKT. CONVERTIBLE TO DBL. CKT., 69KV STEEL POLE	1
17255	O	POLE TYPE ARRANGEMENT, TYPE 2/1 W (DC), SGL. CKT. CONVERTIBLE TO DBL. CKT., 69KV STEEL POLE	1


G	UPDATED LIST	RLR	WPH	<i>RLR</i>	9/18/08	F	UPDATED LIST	RLR	WPH	WWT	4/3/08
--	ORIGINAL ISSUE	RLR	WPH	WWT	04/25/02	E	UPDATED LIST	RLR	WPH	WWT	08/29/05
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

TRANSMISSION ENGINEERING						SCALE:					
	POLES AND POLE TOP ARRANGEMENTS - STEEL SECTION TABLE OF CONTENTS					DWG. NO			SHEET NO.		
						17000			3 OF 7		


<u>DWG. NO.</u>	<u>REV.</u>	<u>TITLE</u>	<u>NO. OF SHEETS</u>
17260	O	POLE TOP ARRANGEMENT, TYPE HALF W (DC), SGL. CKT. CONVERTIBLE TO DBL. CKT., 69kV STEEL POLE	1
17265	A	POLE TOP ARRANGEMENT, TYPE 2/1 X30,60,90 (DC-R), SGL. CKT. CONVERTIBLE TO DBL. CKT., 69kV STEEL POLE	1
17266	A	POLE TOP ARRANGEMENT, TYPE 2/1 X30,60,90 (DC-L), SGL. CKT. CONVERTIBLE TO DBL. CKT., 69kV STEEL POLE	1
17270	A	POLE TOP ARRANGEMENT, TYPE HALF X30,60,90 (DC), SGL. CKT. CONVERTIBLE TO DBL. CKT., 69kV STEEL POLE	1
17280	O	POLE TOP ARRANGEMENT, TYPE DC - WPI, DOUBLE CIRCUIT, 69kV STEEL POLE	1
17285	O	POLE TOP ARRANGEMENT, TYPE DC - W, DOUBLE CIRCUIT, 69kV STEEL POLE	1
17290	A	POLE TOP ARRANGEMENT, TYPE DC - X30,60,90, DOUBLE CIRCUIT, 69kV STEEL POLE	1

G	UPDATED LIST	RLR	WPH	<i>Alh</i>	9/18/08	F	UPDATED LIST	RLR	WPH	WVT	4/3/08
--	ORIGINAL ISSUE	RLR	WPH	WVT	04/25/02	E	UPDATED LIST	RLR	WPH	WVT	08/29/05
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE
TRANSMISSION ENGINEERING						SCALE:					
	POLES AND POLE TOP ARRANGEMENTS - STEEL SECTION TABLE OF CONTENTS					DWG. NO			SHEET NO.		
						17000			4 OF 7		


<u>DWG. NO.</u>	<u>REV.</u>	<u>TITLE</u>	<u>NO. OF SHEETS</u>
17301	A	POLE TOP INDEX 138KV STEEL POLE	4
17305	O	POLE TOP ARRANGEMENT, TYPE 2/1 WPI, SINGLE CIRCUIT, 138KV STEEL POLE	1
17310	A	POLE TOP ARRANGEMENT, TYPE 2/1 WPI, SINGLE CIRCUIT, 138KV STEEL POLE	1
17325	B	POLE TOP ARRANGEMENT, TYPE YPI, SINGLE CIRCUIT, 138KV STEEL POLE	1
17330	B	POLE TOP ARRANGEMENT, TYPE Y, SINGLE CIRCUIT, 138KV STEEL POLE	1
17345	O	POLE TOP ARRANGEMENT, TYPE 2/1 WPI (DC), SGL. CKT. CONVERTIBLE TO DBL. CKT., 138KV STEEL POLE	1
17350	O	POLE TYPE ARRANGEMENT, TYPE HALF WPI (DC), SGL. CKT. CONVERTIBLE TO DBL. CKT., 138KV STEEL POLE	1
17355	A	POLE TOP ARRANGEMENT, TYPE 2/1 W (DC), SGL. CKT. CONVERTIBLE TO DBL. CKT., 138KV STEEL POLE	1

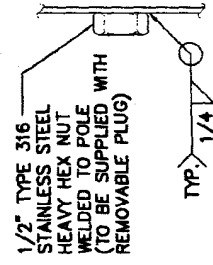
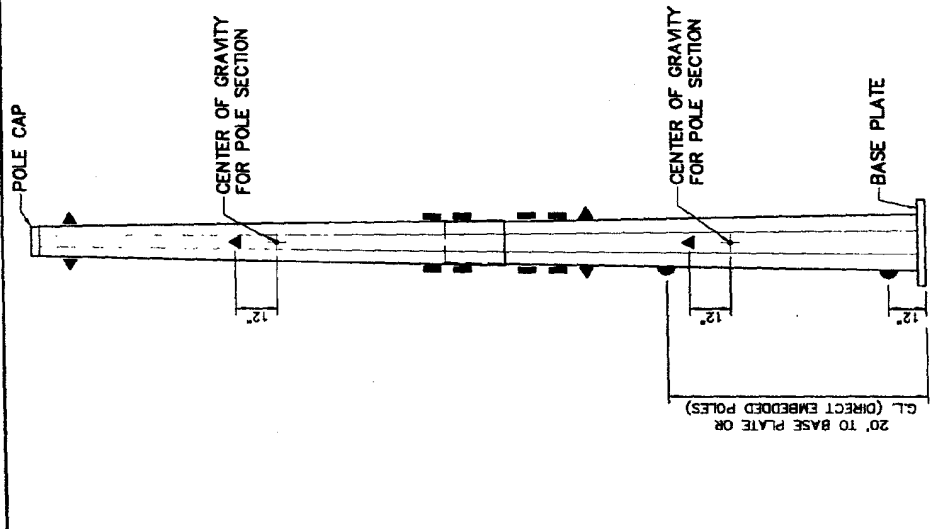
G	UPDATED LIST	RLR	WPH	<i>WWT</i>	9/18/08	F	UPDATED LIST	RLR	WPH	WWT	4/3/08
--	ORIGINAL ISSUE	RLR	WPH	WWT	04/25/02	E	UPDATED LIST	RLR	WPH	WWT	08/29/05
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE
TRANSMISSION ENGINEERING						SCALE:					
	POLES AND POLE TOP ARRANGEMENTS - STEEL SECTION TABLE OF CONTENTS					DWG. NO			SHEET NO.		
						17000			5 OF 7		

<u>DWG. NO.</u>	<u>REV.</u>	<u>TITLE</u>	<u>NO. OF SHEETS</u>
17360	A	POLE TOP ARRANGEMENT, TYPE HALF W (DC), SGL. CKT. CONVERTIBLE TO DBL. CKT. 138kV STEEL POLE	1
17365	B	POLE TOP ARRANGEMENT, TYPE 2/1 X30,60,90 (DC-R) SGL. CKT. CONVERTIBLE TO DBL. CKT. 138kV STEEL POLE	1
17366	A	POLE TOP ARRANGEMENT, TYPE 2/1 X30,60,90 (DC-L), SGL. CKT. CONVERTIBLE TO DBL. CKT. 138kV STEEL POLE	1
17370	B	POLE TOP ARRANGEMENT, TYPE HALF X30,60,90, SGL. CKT. CONVERTIBLE TO DBL. CKT. 138kV STEEL POLE	1
17380	O	POLE TOP ARRANGEMENT, TYPE DC – WPI, DOUBLE CIRCUIT, 138kV STEEL POLE	1
17385	A	POLE TOP ARRANGEMENT, TYPE DC - W, DOUBLE CIRCUIT, 138kV STEEL POLE	1
17390	B	POLE TYPE ARRANGEMENT, TYPE DC – X30,60,90, DOUBLE CIRCUIT, 138kV STEEL POLE	1

G	UPDATED LIST	RLR	WPH	<i>WWT</i>	9/18/08	F	UPDATED LIST	RLR	WPH	WWT	4/3/08
--	ORIGINAL ISSUE	RLR	WPH	WWT	04/25/02	E	UPDATED LIST	RLR	WPH	WWT	08/29/05
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE
TRANSMISSION ENGINEERING						SCALE:					
		POLES AND POLE TOP ARRANGEMENTS - STEEL SECTION TABLE OF CONTENTS				DWG. NO			SHEET NO.		
						17000			6 OF 7		

<u>DWG. NO.</u>	<u>REV.</u>	<u>TITLE</u>	<u>NO. OF SHEETS</u>
17405	O	POLE TOP ARRANGEMENT, TANGENT STRUCTURE, DOUBLE CIRCUIT, 230kV STEEL POLE	1
17410	O	POLE TOP ARRANGEMENT, LIGHT ANGLE STRUCTURE, DOUBLE CIRCUIT, 230kV STEEL POLE	1
17415	O	POLE TOP ARRANGEMENT, D.E./STRAIN STRUCTURE, DOUBLE CIRCUIT, 230kV STEEL POLE	1

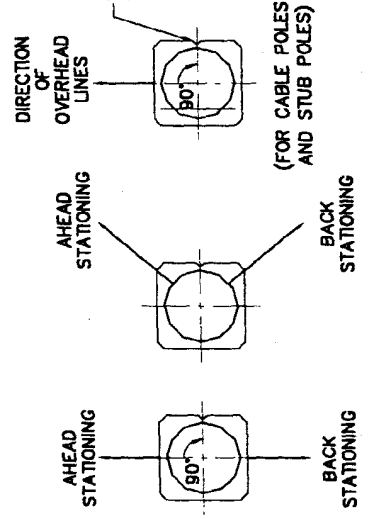
G	UPDATED LIST	RLR	WPH	<i>RLR</i>	9/18/08	F	UPDATED LIST	RLR	WPH	WVT	4/3/08
--	ORIGINAL ISSUE	RLR	WPH	WVT	04/25/02	E	UPDATED LIST	RLR	WPH	WVT	08/29/05
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE
TRANSMISSION ENGINEERING						SCALE:					
	POLES AND POLE TOP ARRANGEMENTS - STEEL SECTION TABLE OF CONTENTS					DWG. NO			SHEET NO.		
						17000			7 OF 7		



LEGEND:
 ▲ LIFTING EYE
 ■ JACKING LUG
 ● GROUNDING ATTACHMENT

DETAIL A
(SEE NOTE 9)

GROUNDING ATTACHMENT
(SEE NOTE 9)



POLE ORIENTATION MARK

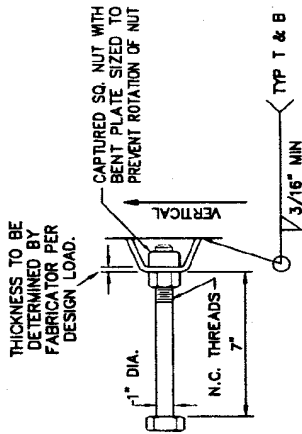
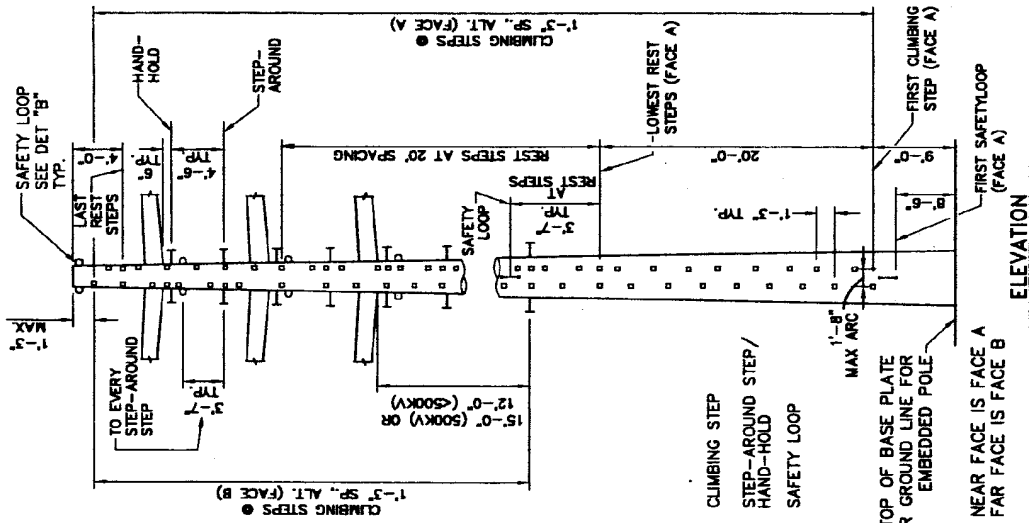
NOTES:

1. PLACE A V-NOTCH IN THE BASEPLATE. USE A WELD BEAD ON THE POLE SHAFT ABOVE THE GROUND LINE FOR DIRECT BURIED POLES.
2. FOR POLES SUPPORTING TWO OR MULTIPLE CIRCUITS RUNNING IN DIFFERENT DIRECTIONS, ONE OF THE CIRCUITS SHALL BE DESIGNATED ON THE PROJECT DRAWING AS THE GOVERNING CIRCUIT FOR POLE ORIENTATION MARKING PURPOSE.
3. POLE SECTIONS SHALL BE MATCH-MARKED AT JOINTS.
4. PROJECT SPECIFIC DRAWING IF PROVIDED WILL TAKE PRECEDENCE.
5. THE STEEL POLE SHAFT SHALL SATISFY SPECIFICATION TE0042.
6. CLIMBING ATTACHMENTS ARE SHOWN ON DWG. 17105.
7. INSULATOR ATTACHMENTS IS SHOWN ON DWG. 17110.
8. HIGH VOLTAGE MARKERS ARE SHOWN ON DWG. 17150.
9. GROUNDING NUTS FOR DIRECT BURIED POLES SHALL BE WELDED ON THE SAME FLAT AS THE POLE I.D. TAG

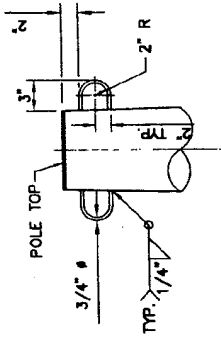
SEE DET. A FOR GROUNDING ATT. LOCATION FOR DIRECT EMBEDDED POLES

ELEVATION

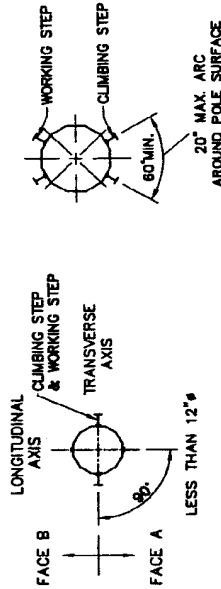
TRANSMISSION ENGINEERING									
SCALE: NONE					DWG. NO.		SBT. NO.		
					17101		1 of 1		
STEEL POLE SHAFT					SDGE				
					CHANGE				
B	UPDATED GROUNDING NUT & COVER	LLD	WPH / 2/1/04	09/18/08	E				
A	REVISED POLE ORIENT. MARKING	PM	WPH / 07/15/05	06/15/05	D				
-	ORIGINAL ISSUE	AUS	DRB	WPH / 08/18/99	C				
REV	CHANGE	BY	CHD/APPY	DATE	REV	BY	CHD/APPY	DATE	REV



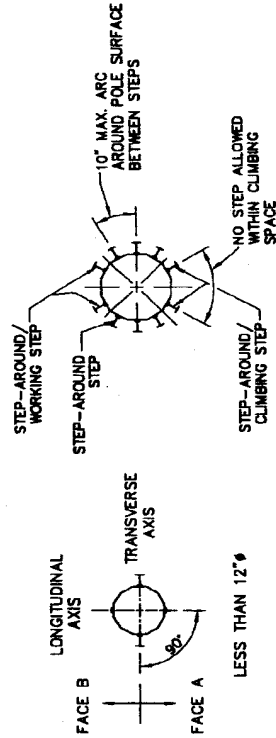
DETAIL A
STEPS AND HAND-HOLDS



DETAIL B
SAFETY LOOP



CLIMBING AND WORKING STEPS ARRANGEMENT



STEP-AROUND STEP ARRANGEMENT

NOTES FOR STEPS & LOOPS ARE
ON DRAWING 17105 SHEET 2.

TRANSMISSION ENGINEERING		SCALE: NONE				
STEEL POLE CLIMBING AND WORKING STEPS		DWG. NO.	SRT. NO.			
		17105	1 of 2			
		17105801				
REF	CHANGE	BY	DATE	APPY	DATE	
B	ADDED STEP MIN. ANGLE	PM	WPH	8/29/05	E	
A	GENERAL REVISION	PM	WPH	8/1/03	D	
-	ORIGINAL ISSUE	AJS	DRB	8/16/99	C	
	CHANGE				REF	

NOTES:

THESE NOTES ARE TO BE USED WITH DRAWING 17105 SHEET 1. ADDITIONAL STEPS AND SAFETY LOOPS MAY BE CALLED FOR ON THE DRAWINGS FOR SPECIFIC POLES.

STEPS:

1. CLIMBING STEPS ARE TO BE LOCATED TO ALLOW A PERSON TO CLIMB ONE SIDE OF THE STRUCTURE (FACE "A" OR OTHER INDICATED FACE) FROM A POINT 9 FEET ABOVE THE BASE PLATE (GROUND LINE FOR DIRECT EMBEDDED POLE) TO THE TOP OF THE POLE. WORKING STEPS SHALL BE LOCATED ON THE OPPOSITE SIDE (WORKING SIDE OR FACE "B") FROM THE LOWEST STEP-AROUND LEVEL BELOW THE BOTTOM PHASE TO THE TOP OF THE POLE.
2. UNLESS OTHERWISE NOTED, STEP AROUND STEPS AND HAND-HOLDS SHALL BE PROVIDED TO ALLOW A PERSON TO TRANSFER AROUND THE POLE FROM FACE "A" TO FACE "B". UNLESS OTHERWISE INDICATED THE FIRST STEP-AROUND SHALL BE 15 FEET FOR 500KV AND 12 FEET FOR LOWER VOLTAGES BELOW THE BOTTOM CROSSARM OR INSULATOR BRACKET. STEP-AROUND SHALL ALSO BE PROVIDED AT 5 FEET BELOW EACH ARM OR INSULATOR BRACKET. A SECOND IDENTICAL SET OF STEPS ARE REQUIRED 4 FEET 6 INCHES ABOVE EACH STEP-AROUND AND ARE TO BE USED AS HAND HOLDS.
3. REST STEPS (TWO STEPS ON THE SAME HORIZONTAL LEVEL) SHALL BE PROVIDED ON BOTH FACE "A" AND FACE "B". ON FACE "A" THE FIRST REST STEPS SHALL BE NOT MORE THAN 20 FEET ABOVE THE FIRST CLIMBING STEP AND AT LEAST EVERY 20 FEET THEREAFTER TO THE TOP OF THE POLE. ON FACE "B" THE FIRST REST STEPS SHALL BE NOT MORE THAN 20 FEET ABOVE THE LOWEST STEP-AROUND AND AT LEAST EVERY 20 FEET THEREAFTER TO THE TOP OF THE POLE. STEP-AROUNDS MAY BE USED AS REST STEPS. THE LAST REST STEPS ON BOTH FACE "A" AND "B" SHALL BE APPROXIMATELY 4 FEET FROM THE TOP OF THE POLE.
4. CLIMBING AND WORKING STEPS SHALL BE EQUALLY SPACED ALTERNATELY 15 INCHES VERTICALLY. IF THE STEP SPACING CONFLICTS WITH A CROSSARM OR INSULATOR BRACKET, THE SUPPLIER MAY (ONLY IN THE VICINITY OF THE CONFLICT) EXTEND THE STEP SPACING TO A MAXIMUM OF 18 INCHES. STEPS INSTALLED DIRECTLY UNDER A CROSSARM OR BRACKET MUST HAVE A MINIMUM OF 4 INCHES CLEARANCE FOR THE CLIMBER'S FOOT. ARC DISTANCE AROUND THE POLE SURFACE BETWEEN STEPS SHALL BE 20 INCHES AND UP TO A MAXIMUM OF 180 DEGREES SEPARATION. STEPS FOR STEP-AROUNDS SHALL HAVE A MAXIMUM 10-INCH ARC AROUND THE POLE SURFACE.

SAFETY LOOPS

1. ONE SAFETY LOOP SHALL BE LOCATED ON FACE "A" ON THE CENTERLINE OF STEP SPACING 8 FEET 6 INCHES ABOVE THE BASE PLATE (TOP OF GROUND LINE OF EMBEDDED POLE).
2. ONE SAFETY LOOP SHALL BE LOCATED ON EACH FACE 3 FEET 7 INCHES ABOVE THE STEP-AROUND STEPS AT A POINT APPROXIMATELY HALFWAY AROUND THE POLE (MIDPOINT BETWEEN FACE "A" AND FACE "B").
3. ONE SAFETY LOOP SHALL BE LOCATED ON FACE "A" AND FACE "B" 3 FEET 7 INCHES ABOVE EVERY REST STEP LOCATION.

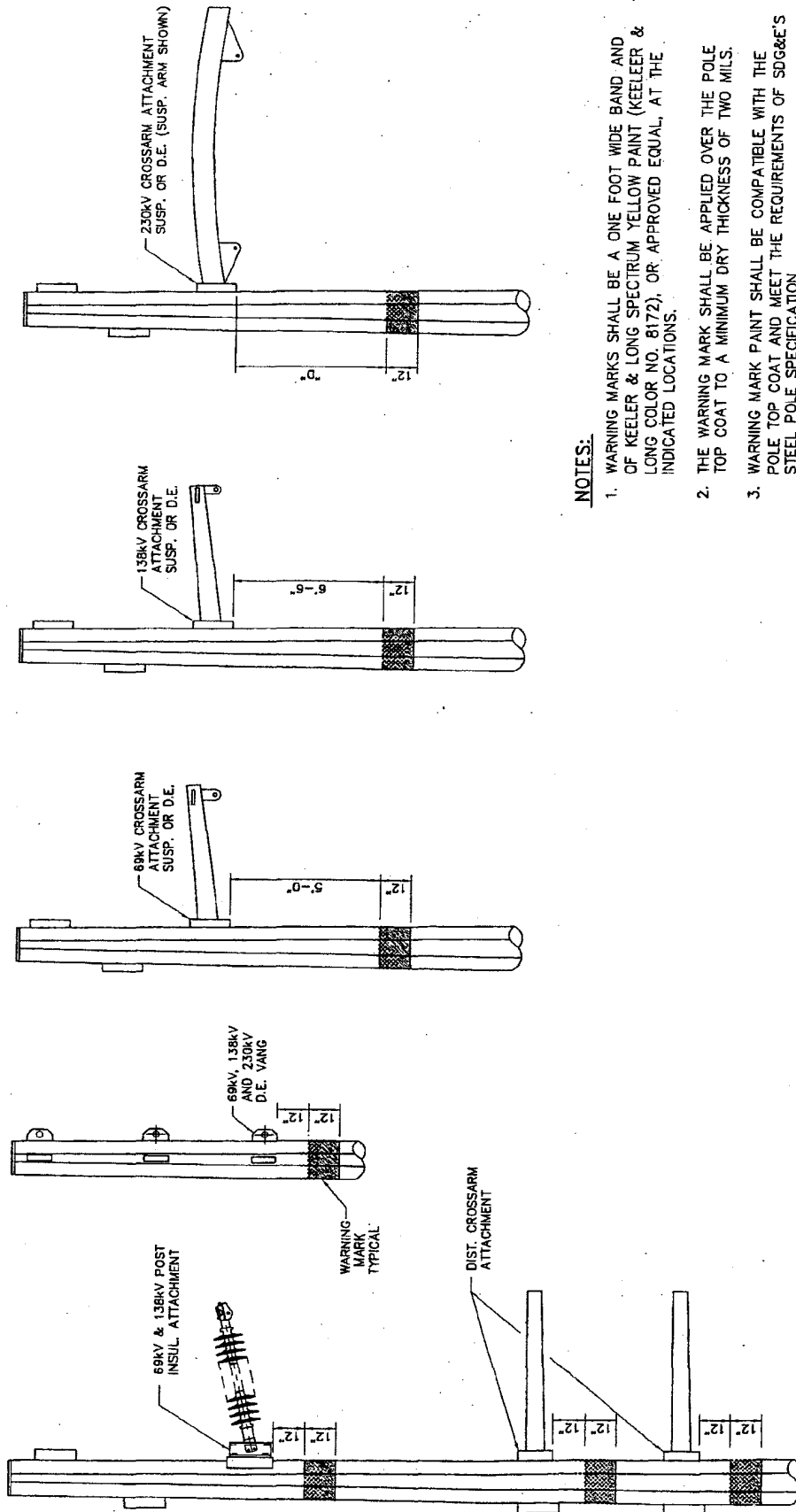
DESIGN LOADS

1. STEPS: 250 LB. VERTICAL WORKING LOAD PLUS A SAFETY FACTOR OF 2.5 MINIMUM.
2. SAFETY LOOPS: 400 LB. VERTICAL WORKING LOAD PLUS A SAFETY FACTOR OF 2.5 MINIMUM.

CLIMBING AND WORKING STEPS

4. IF THE POLE DIAMETER IS LESS THAN 24 INCHES, NO SAFETY LOOPS ARE REQUIRED AT THAT LOCATION BUT A SAFETY LOOP IS ALWAYS REQUIRED ON EACH TRANSVERSE FACE AT THE TOP OF THE POLE.
5. ONE SAFETY LOOP IS REQUIRED NEAR THE END OF CROSS ARMS AS SHOWN ON THE POLE DRAWINGS.
6. SAFETY LOOPS SHALL BE A MINIMUM 3/4 INCH IN DIAMETER AND SHALL BE SUITABLE TO SUPPORT THE LOADS SPECIFIED. THE SAFETY LOOPS SHALL BE WELDED TO THE POLE WITH A 1/4-INCH CONTINUOUS FILLET WELD.

TRANSMISSION ENGINEERING		SCALE: NONE	
STEEL POLE		DWG. NO.	SET. NO.
CLIMBING AND WORKING STEPS		17105	2 of 2
BY	DATE	BY	DATE
CRG	10/16/99	CRG	10/16/99
CHK	10/16/99	CHK	10/16/99
APP	10/16/99	APP	10/16/99
REV		REV	



NOTES:

1. WARNING MARKS SHALL BE A ONE FOOT WIDE BAND AND OF KEELER & LONG SPECTRUM YELLOW PAINT (KEELEER & LONG COLOR NO. 8172), OR APPROVED EQUAL, AT THE INDICATED LOCATIONS.
2. THE WARNING MARK SHALL BE APPLIED OVER THE POLE TOP COAT TO A MINIMUM DRY THICKNESS OF TWO MILS.
3. WARNING MARK PAINT SHALL BE COMPATIBLE WITH THE POLE TOP COAT AND MEET THE REQUIREMENTS OF SDG&E'S STEEL POLE SPECIFICATION.
4. A WARNING MARK IS REQUIRED BELOW EACH CIRCUIT.
5. D=9'-0" FOR V-STRING OR D.E. W/O JUMPER INSULATOR.
D=12'-6" FOR D.E. WITH JUMPER INSULATOR.

TRANSMISSION ENGINEERING



STEEL POLE
YELLOW WARNING MARK

SCALE: NONE

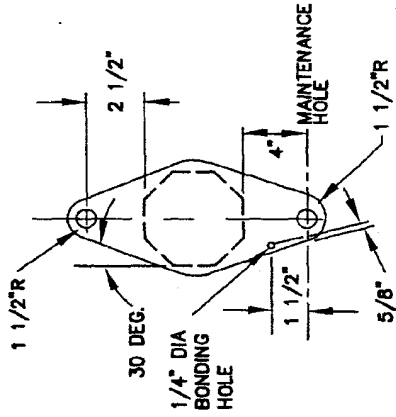
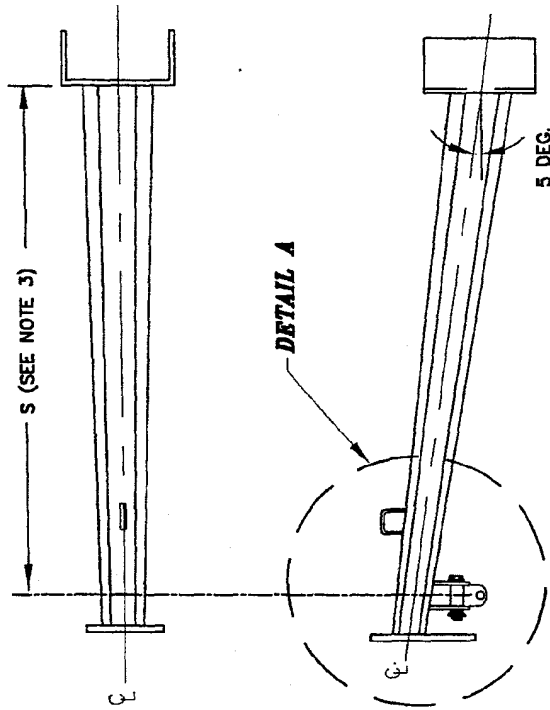
DTG. NO.

17130

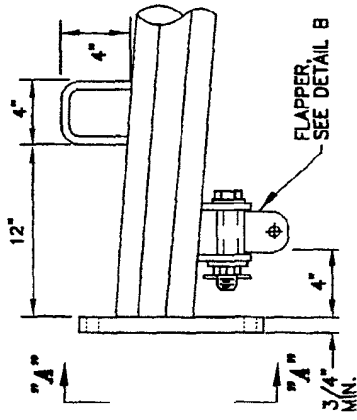
SBT. NO.

1 of 1

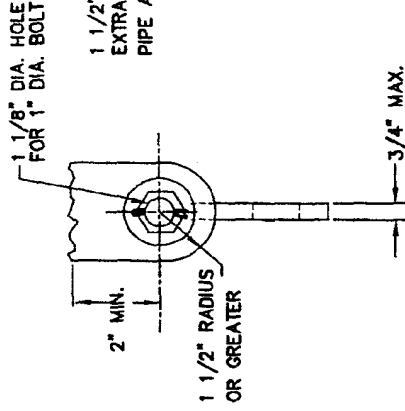
REV	CHANGE	BY	CHKD	APPV	DATE	REV	APPV	DATE	REV
B						E			
A	REVISED DIMENSIONS	PM	WJH	WJH	8/1/04	D			
-	ORIGINAL ISSUE	AJS	DRB	WPH	8/16/99	C			



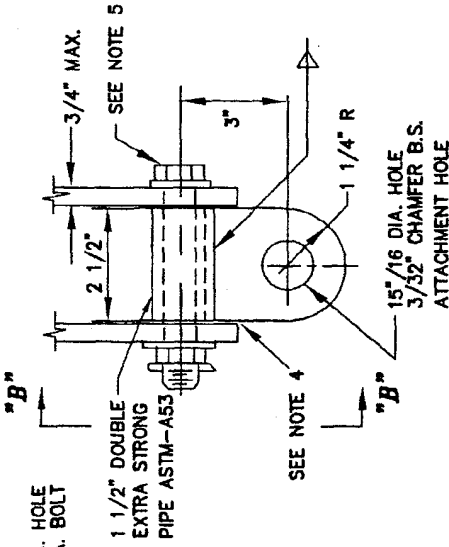
ELEV. A-A



DETAIL A



ELEV. B-B



DETAIL B

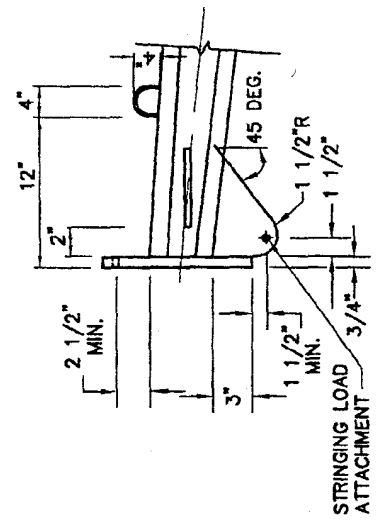
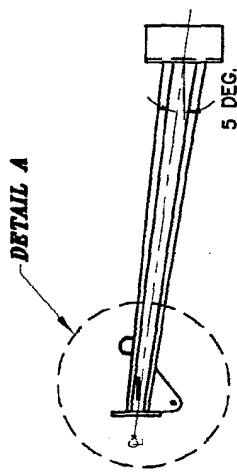
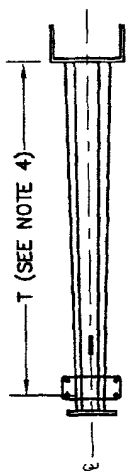
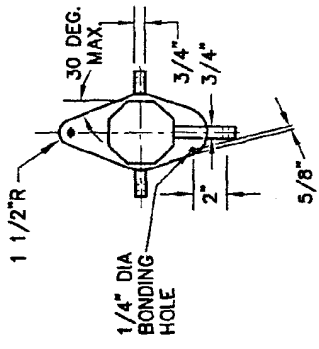
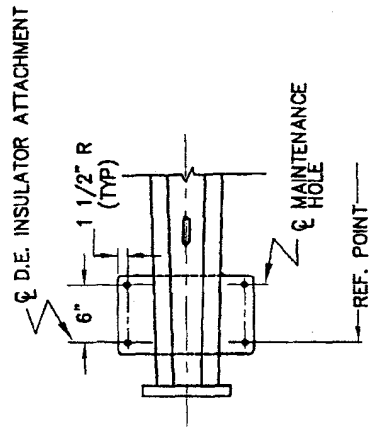
NOTES:

1. ALL HOLES SHALL BE 15/16" DIAMETER AND SHALL HAVE 1/8" CHAMFER ON BOTH SIDES UNLESS OTHERWISE NOTED.
2. DESIGN LOADS FOR THE ATTACHMENT HOLE AND MAINTENANCE HOLE ARE IDENTICAL, BUT NOT SIMULTANEOUS.
3. ARM LENGTH DESIGNATION EXAMPLES.
 $S6-6$ --- $S=6'$
 $S6-6$ --- $S=6'-6"$
4. FLAPPER SHALL BE FREE SWINGING UNDER LOAD WITH 1/8" MIN. CLEARANCE TO BRACKET.
5. 1-HEX BOLT, 2-LOCK WASHERS, 1-HEX NUT, 1-COTTER PIN.
6. ALL DESIGN SHALL CONFORM TO SDG&E SPECIFICATION. TE-0042 AND ASCE MANUAL NO. 72, LATEST EDITION.
7. GALVANIZE ALL PARTS PER ASTM SPECIFICATION A-385.

REVISIONS		BY		CHECKED		APPROVED		DATE	
REV	CHANGE	BY	CHANGE	BY	CHECK	APPT	DATE	DATE	DATE
B									
A	DWG ON NEW FORM	KSM	DRB	WPH	6/16/99	D			
-	ORIGINAL ISSUE	KSM	DRB	WPH	6/25/99	C			
REV	CHANGE	BY	CHANGE	BY	CHECK	APPT	DATE	DATE	DATE

TRANSMISSION ENGINEERING
SDGE
 STEEL POLE
 TYPE S SUSPENSION
 CROSSARM
 FOR 1-STRING

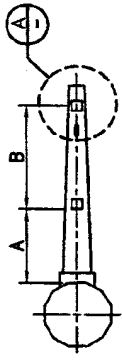
SCALE: NONE
 DWG. NO. 17140
 SET. NO. 10F1
 17140A001



DETAIL A

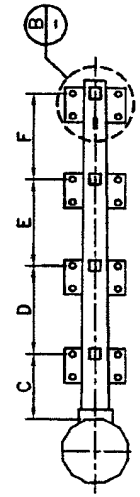
- NOTES:**
1. WORK THIS DRAWING WITH ATTACHED STRUCTURAL LOADING DRAWINGS.
 2. ALL HOLES SHALL BE 15/16" DIAMETER AND SHALL HAVE 1/8" CHAMFER ON EDGES UNLESS NOTED OTHERWISE.
 3. DESIGN LOADS FOR THE D.E. ATTACHMENT HOLE AND MAINTENANCE HOLE ARE IDENTICAL BUT NOT SIMULTANEOUS.
 4. ARM LENGTH DESIGNATION EXAMPLES.
T6---T=6'
T6-6---T=6'-6"
 5. ALL DESIGNS SHALL CONFORM TO SDG&E CO. SPECIFICATIONS TE-0042 AND ASCE MANUAL 72, LATEST EDITION.
 6. GALVANIZE ALL PARTS PER ASTM SPECIFICATION A-385.

SDGE		TRANSMISSION ENGINEERING		SCALE: NONE	
TYPE T DEAD-END CROSSARM		DWG. NO. 17141		SHEET NO. 1 of 1	
BY	CHKD	DATE	BY	CHKD	DATE
CHANGE	CHANGE		CHANGE		
ORIGINAL ISSUE	MSM	DRB	WPH	8/16/99	C
BY	CHKD	DATE	BY	CHKD	DATE
CHANGE			CHANGE		
B			E		
A			D		
-			C		
REV					



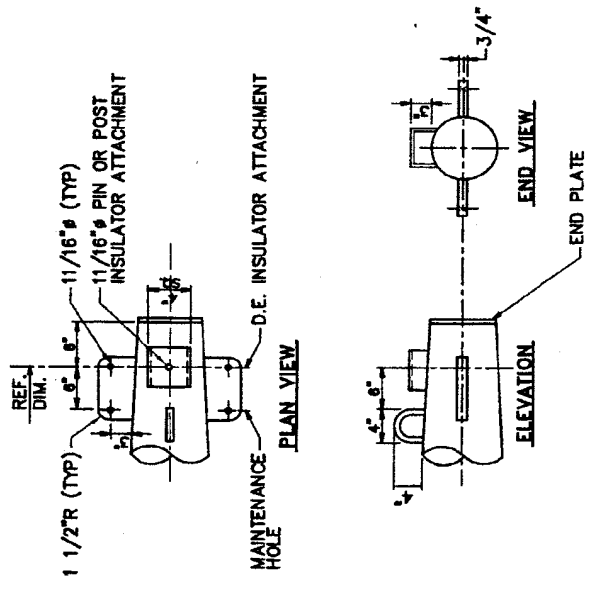
ARM	A	B	A + B
A4	21"	25"	46"
A5	21"	39"	60"
A6	21"	51"	72"
A8	28"	68"	96"
A9	33"	75"	108"

TANGENT ARM

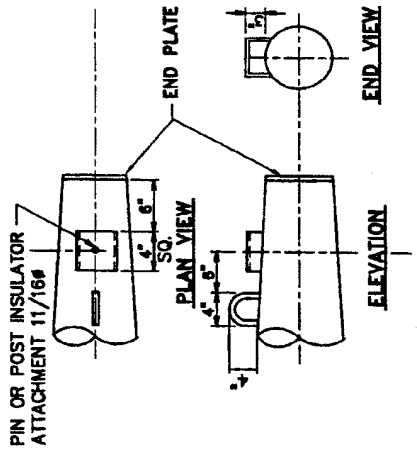


ARM	C	D	E	F	C+D+E+F
B3	36"	0"	0"	0"	36"
B4	48"	0"	0"	0"	48"
B5	60"	0"	0"	0"	60"
C5	21"	39"	0"	0"	60"
C6	21"	51"	0"	0"	72"
C8	28"	68"	0"	0"	96"
C9	33"	75"	0"	0"	108"
D6	21"	26"	26"	0"	73"
D8	21"	38"	38"	0"	97"
D10	22"	49"	49"	0"	120"
E8	21"	25"	25"	25"	96"
E10	21"	33"	33"	33"	120"
E11	33"	33"	33"	33"	132"

ANGLE/DEAD END ARM



DETAIL B

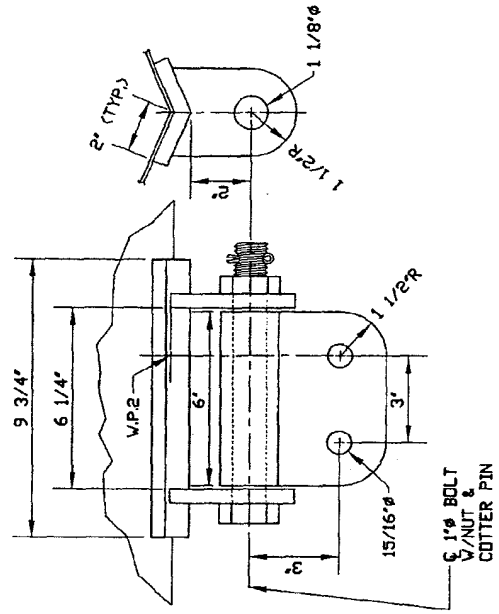
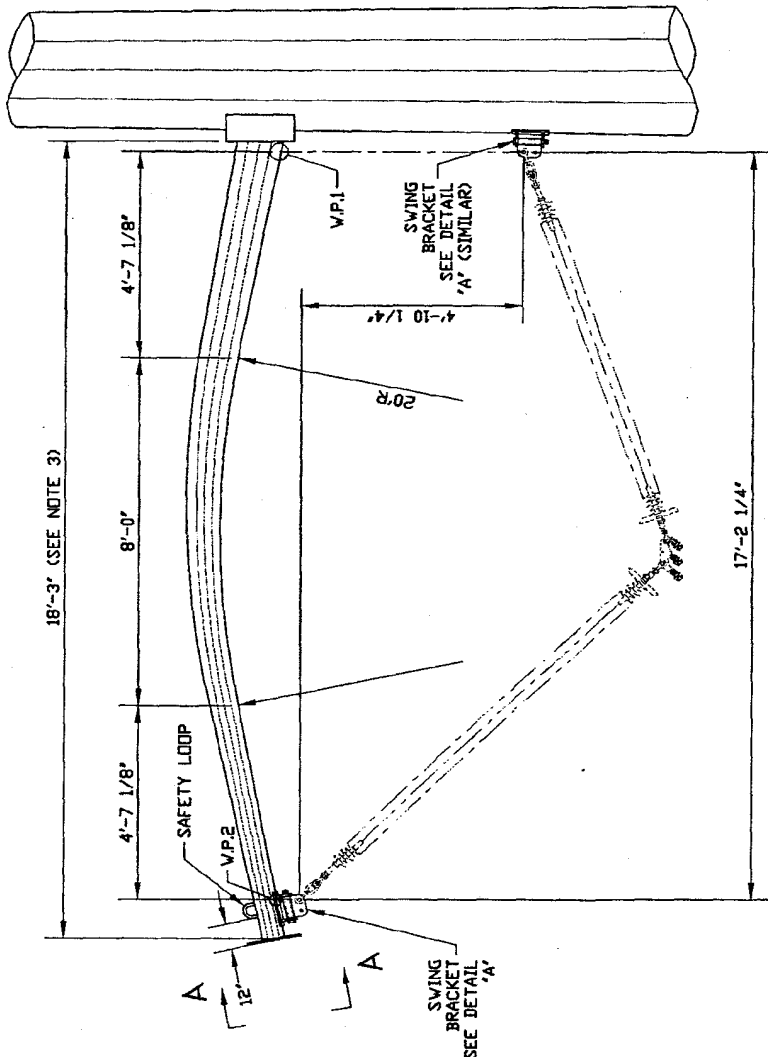


DETAIL A

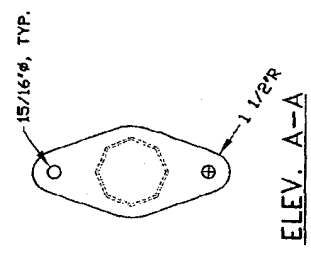
NOTES

1. WORK THIS DRAWING WITH ATTACHED STRUCTURAL LOADING DRAWINGS.
2. ALL DESIGN SHALL CONFORM TO SDG&E CO. SPECIFICATION TE-0042 AND ASCE MANUAL NO. 72 LATEST EDITION.
3. CHAMFER ALL HOLES 1/8" BOTH SIDES.
4. DESIGN LOADS FOR INSULATOR ATTACHMENT HOLE AND MAINTENANCE HOLE ARE IDENTICAL BUT NOT SIMULTANEOUS.
5. GALVANIZE ALL PARTS PER ASTM SPECIFICATION A-385.

SDGE		TRANSMISSION ENGINEERING		SCALE: NONE	
REV	CHANGE	BY	CHKD	APPY	DATE
B					
A					
-	ORIGINAL ISSUE	AJS	DRB	WPH	10/16/99
	CHANGE				
STEEL POLE TYPE A, B, C, D & E DISTRIBUTION CROSSARM					
				DWG. NO.	17150
				SHEET NO.	1 of 1



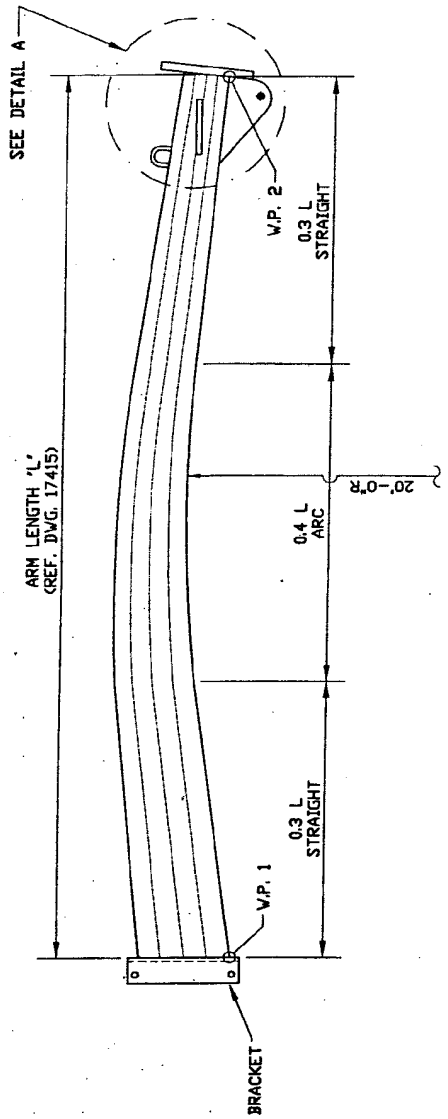
DETAIL A



ELEV. A-A

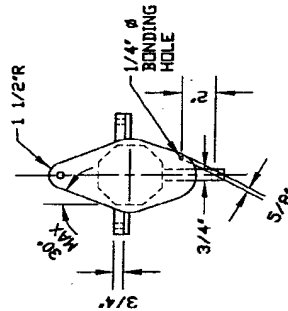
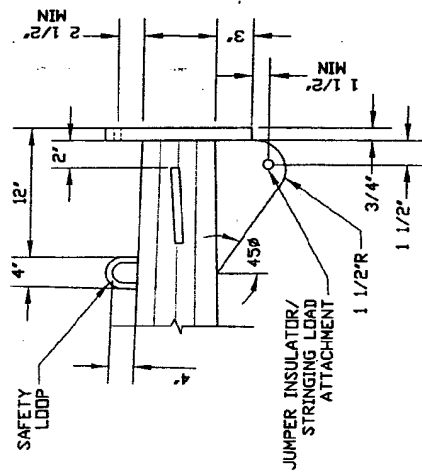
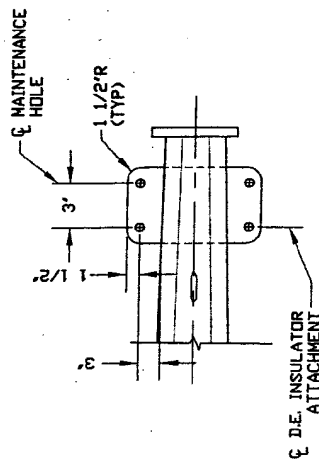
- NOTES:**
1. WORK THIS DRAWING WITH ATTACHED STRUCTURAL LOADING DRAWINGS.
 2. ALL HOLES SHALL BE 15/16" DIAMETER AND SHALL HAVE 1/8" CHAMFER ON BOTH SIDES UNLESS OTHERWISE NOTED.
 3. DIMENSIONS SHOWN FOR THE SWING BRACKETS ARE CONCEPTUAL. FABRICATOR SHALL PROVIDE DETAILED DESIGN AND FINAL DIMENSIONS.
 4. ARM LENGTH SHOWN IS APPROXIMATE AND IS TO BE FINALIZED BY THE FABRICATOR UPON COMPLETION OF THE SHOP DRAWINGS.
 5. WORK POINTS 1 AND 2 ARE LEVEL.
 6. REFER TO DWG. 17000 FOR STEEL POLE GENERAL NOTES.

SDGE		TRANSMISSION ENGINEERING		SCALE: NONE	DWG. NO. 17170	SBT. NO. 1 of 1
230KV STEEL POLE LIGHT ANGLE STRUCTURE INSIDE CROSSARM						
REV	CHANGE	BY	CHKD/APPY	DATE	REV	DATE
A	ORIGINAL ISSUE	PM	7/1/04	C		
B				E		



NOTES:

1. WORK THIS DRAWING WITH ATTACHED STRUCTURAL LOADING DRAWINGS.
2. ALL HOLES SHALL BE 15/16" DIAMETER AND SHALL HAVE 1/8" CHAMFER ON BOTH SIDES UNLESS OTHERWISE NOTED.
3. DESIGN LOADS ON D. E. ATTACHMENT HOLE AND MAINTENANCE HOLE ARE IDENTICAL BUT NOT SIMULTANEOUS.
4. REFER TO DWG. 17100 FOR STEEL POLE GENERAL NOTES.
5. ALL ARM AND WELDING DETAILS ARE TO BE PROVIDED BY THE FABRICATOR.
6. V. P. 1 AND V. P. 2 ARE LEVEL.



TRANSMISSION ENGINEERING



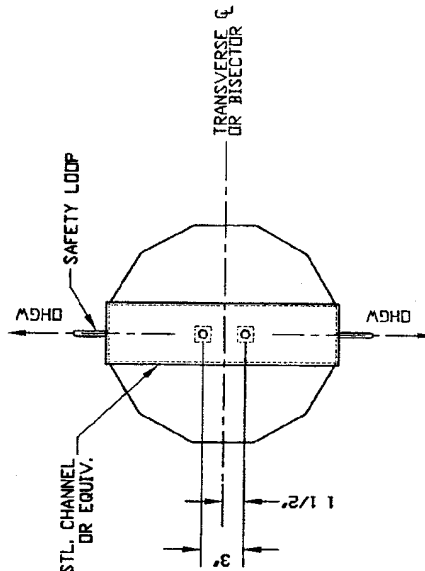
**230KV STEEL POLE
CROSSARM
DEAD END/STRAIN POLE**

SCALE: NONE

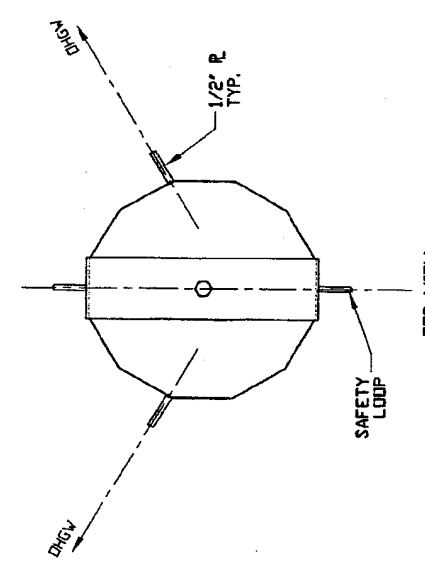
DWG. NO. 17175

SHEET NO. 1 of 1

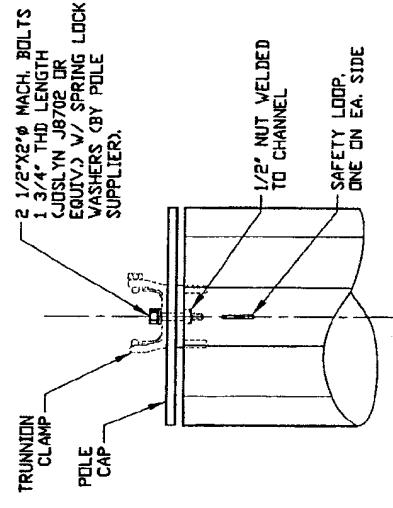
REV	BY	CHKD	APPY	DATE	REBY	CHANGE	BY	CHKD	APPY	DATE
A	PH	SV	WVT	7/1/04	C					
	PH	SV	WVT	7/1/04	C					
	PH	SV	WVT	7/1/04	C					
	PH	SV	WVT	7/1/04	C					



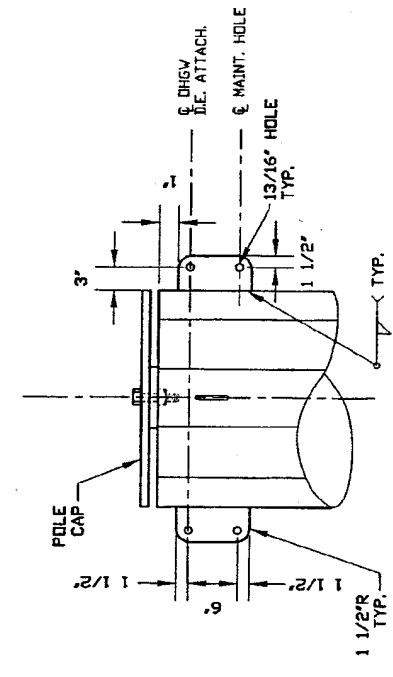
TOP VIEW
(POLE CAP NOT SHOWN)



TOP VIEW
(POLE CAP NOT SHOWN)



ELEVATION

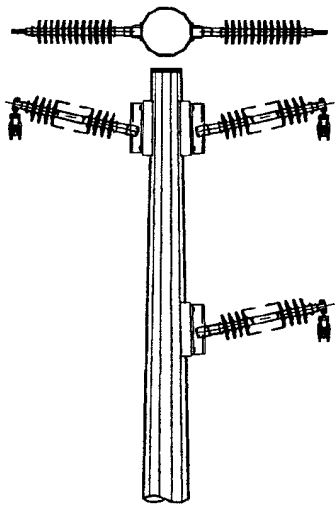


ELEVATION

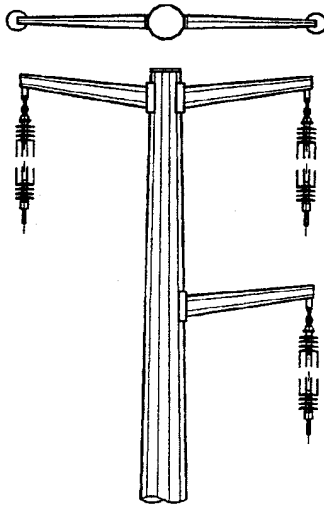
POLE CAP DETAILS AT OHGW TRUNNION CLAMP
LINE ANGLE 0°-20° U.N.

POLE CAP AND VANG DETAILS AT OHGW DEADENDS
LINE ANGLE 0°-90° U.N.

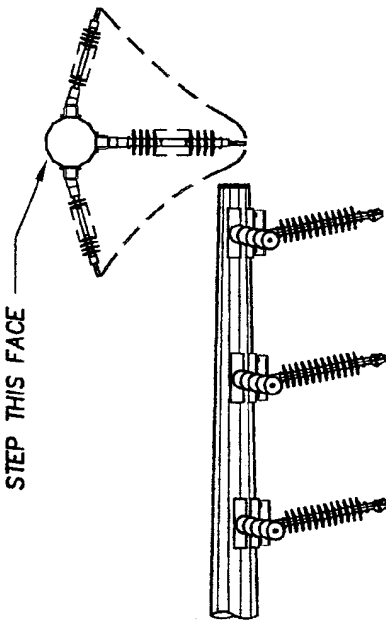
TRANSMISSION ENGINEERING		SCALE: NONE		DWG. NO. 17180		SHT. NO. 1 of 1	
SDGE		DATE		BY		CHKD	
		DATE		BY		CHKD	
B		E					
A		D					
-	ORIGINAL ISSUE	PH	7/1/04	BY			
REV	CHANGE	BY	CHKD	DATE	REV	DATE	CHKD
	CHANGE						



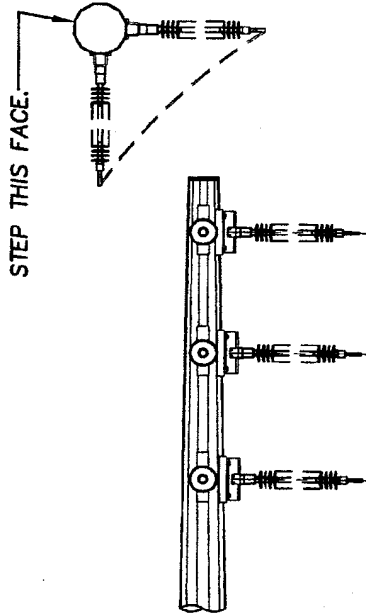
69kV STEEL POLE
TYPE 2/1 WPI
DWG. NO. 17205
LINE ANGLE 3° MAX.



69kV STEEL POLE
TYPE 2/1 W
DWG. NO. 17210



69kV STEEL POLE
TYPE YPI
DWG. NO. 17225
LINE ANGLE 0° TO 75°



69kV STEEL POLE
TYPE Y
DWG. NO. 17230
LINE ANGLE 75°-90°

A						C							
-	ORIGINAL ISSUE	FJP	DRB	WPH	3/1/00	B							
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE		



TRANSMISSION ENGINEERING

POLE TOP INDEX
SINGLE CIRCUIT
69kV STEEL POLE

SCALE: NONE

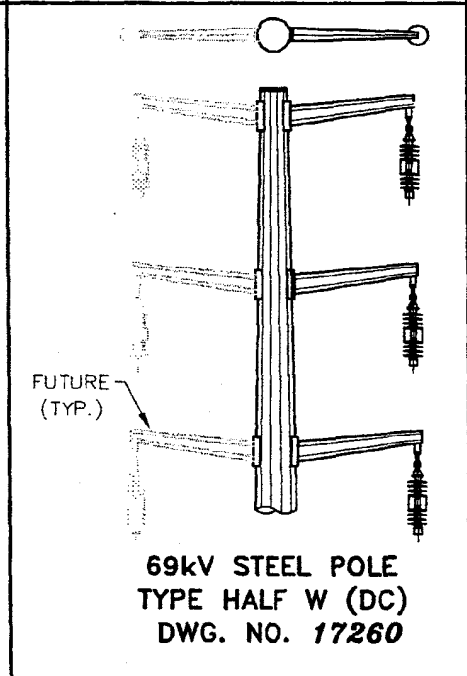
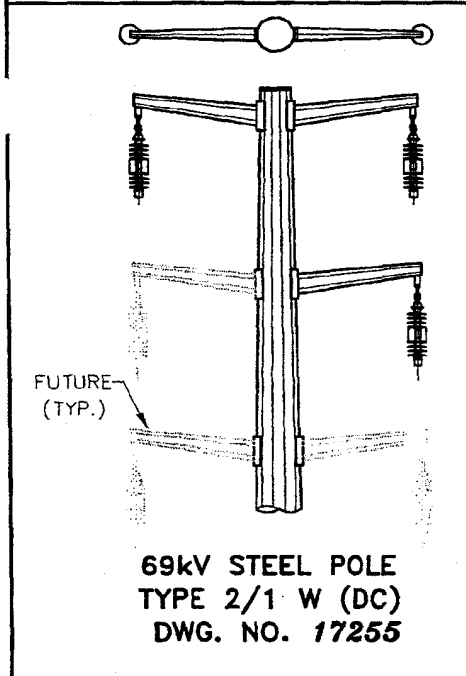
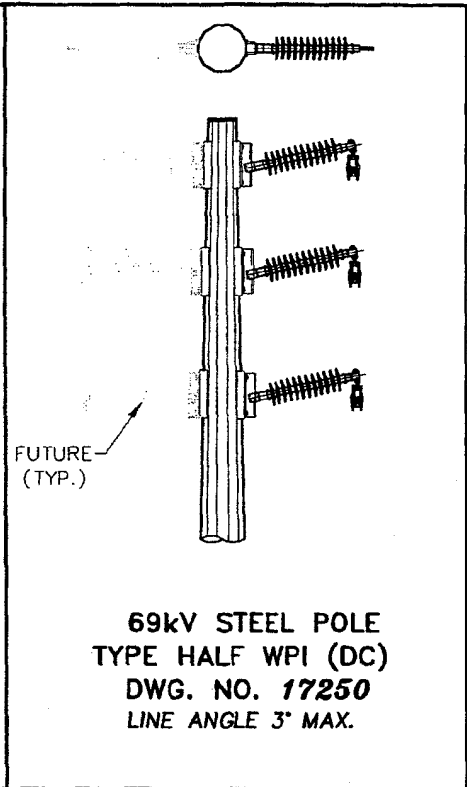
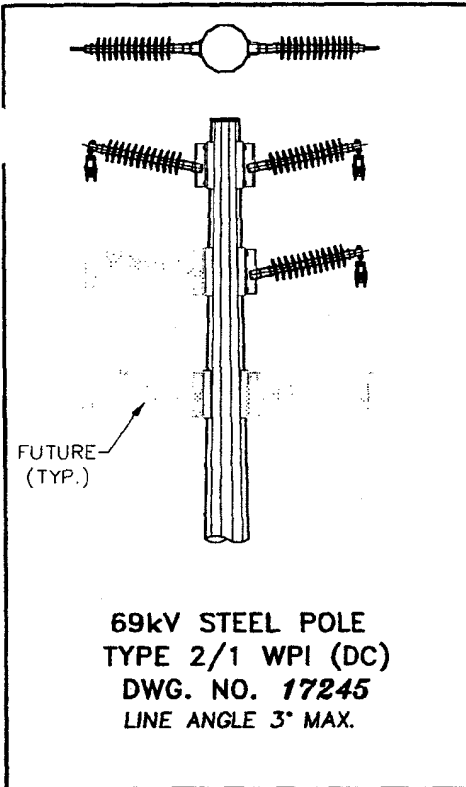
DWG. NO.

SHT. NO.

17201

1 of 4

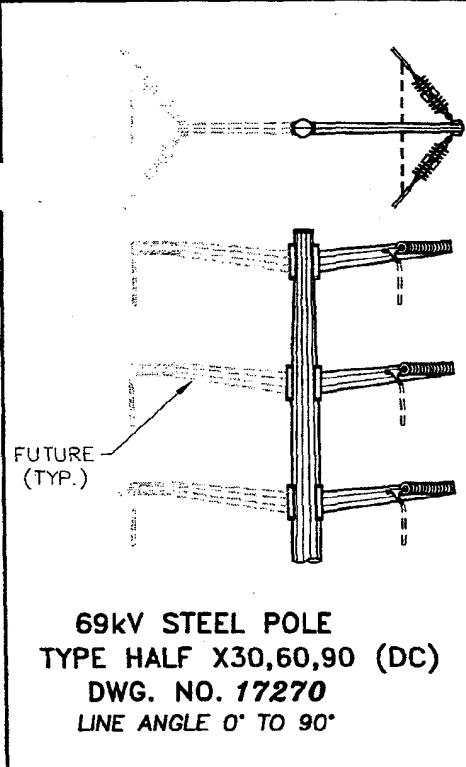
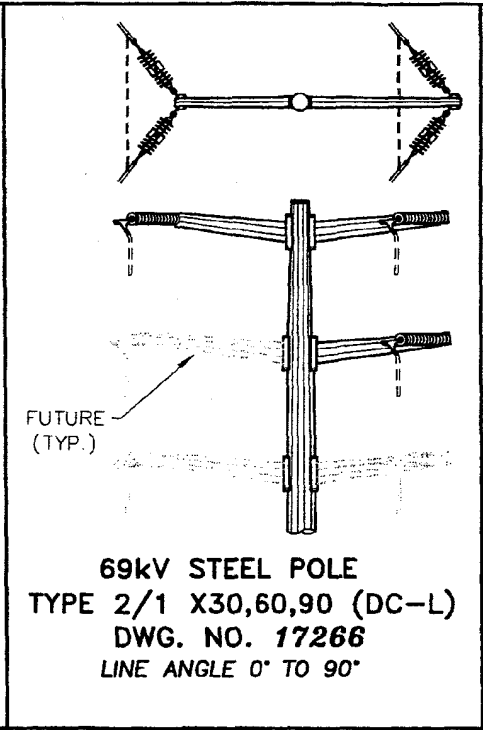
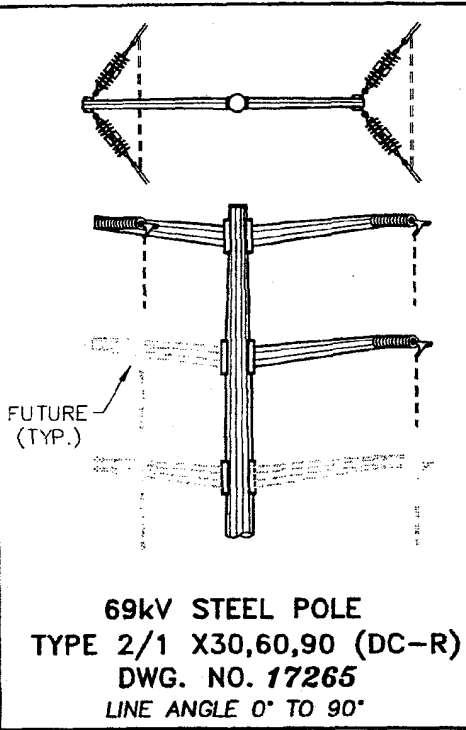
17201001



A						C						
-	ORIGINAL ISSUE	FJP	DRB	WPH	3/1/00	B						
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	

SDGE	TRANSMISSION ENGINEERING				SCALE: NONE	
	POLE TOP INDEX SGL. CKT. CONVERTIBLE TO DBL. CKT. 69kV STEEL POLE				DWG. NO.	SHT. NO.
					17201	2 of 4

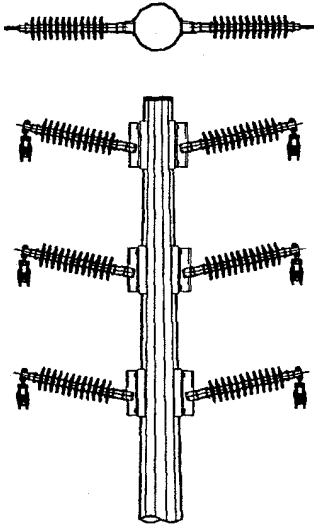
17201002



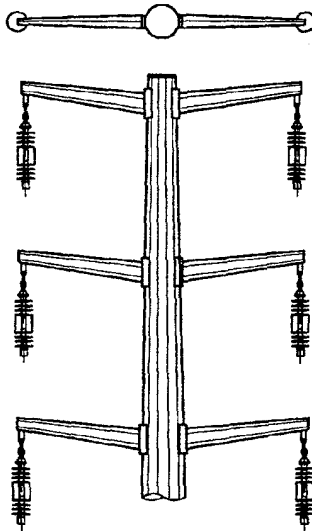
A						C						
-	ORIGINAL ISSUE	FJP	DRB	WPH	3/1/00	B						
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	

SDGE	TRANSMISSION ENGINEERING						SCALE: NONE					
	POLE TOP INDEX						DWG. NO.		SHT. NO.			
	SGL. CKT. CONVERTIBLE TO DBL. CKT. 69kV STEEL POLE						17201		3of4			

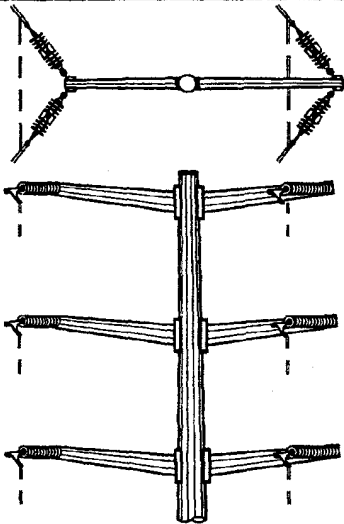
17201003



69kV STEEL POLE
TYPE DC-WPI
DWG. NO. 17280
LINE ANGLE 3° MAX.



69kV STEEL POLE
TYPE DC-W
DWG. NO. 17285



69kV STEEL POLE
TYPE DC-X30,60,90
DWG. NO. 17290
LINE ANGLE 0°-90°

A						C						
-	ORIGINAL ISSUE	FJP	DRB	WPH	3/1/00	B						
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	

SDGE	TRANSMISSION ENGINEERING						SCALE: NONE		17201004
	POLE TOP INDEX DOUBLE CIRCUIT 69kV STEEL POLE						DWG. NO.	SHT. NO.	
							17201	4 of 4	

COMMENTARY ON POLE-TOP INDEX FOR 69kV STEEL POLES

SINGLE CIRCUIT

17205 – 2/1 WPI – Single Circuit Polymer Post Blade Suspension 0-3 Degrees

This standard is used for single circuit design. The suspension links limit the line angle to 3 degrees; they are used to allow longitudinal movement and reduce differential tension.

17210 – 2/1 W – Single Circuit Polymer Suspension I-String


This standard is to be used in place of **17205** when the vertical load exceeds the capacity of the post insulator. Check swing angle for conductor clearance to steel. Allowable swing angle without wind is 25 degrees. The allowable swing angle with wind is 8 PSF wind is 50 degrees. The horizontal conductor spacing is wider than those with horizontal post insulators and may dictate right-of-way width and separation of parallel lines.

17225 – YPI – Single Circuit Polymer Dead-End 0-75 Degrees

This standard is used when a suspension structure would be in uplift, and for in-line dead-ends and line angles up to 75 degrees.

17230 – Y – Single Circuit Polymer Dead-End 75-90 Degrees

This standard is used for line angles from 75 to 90 degrees.

A							C					
--	ORIGINAL ISSUE	RLR	WPH	<i>wrt</i>	04/25/02		B					
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	
TRANSMISSION ENGINEERING							SCALE:					
		COMMENTARY ON POLE-TOP INDEX STEEL POLES					DWG. NO			SHEET NO.		
							17203			1 of 4		

SINGLE CIRCUIT CONVERTIBLE TO DOUBLE CIRCUIT

17245 – 2/1 WPI (DC) – Single Circuit Polymer Post Blade Suspension, One Circuit Initial, Two Circuit Ultimate, 0-3 Degrees

This standard is used when the second circuit will be needed in the future. Allow additional clearance for future conductors at the lower level. Suspension links limit the line angle to 3 degrees.


17250 – HALF WPI (DC) – Single Circuit Polymer Post Blade Suspension, One Circuit Initial, Two Circuit Ultimate, 0-3 Degrees

This standard is used when the second circuit will be needed in the future. This standard is an alternate to Standard **17245**. This configuration allows an easier installation for the second circuit but has a higher EMF reading. Suspension links limit the line angle to 3 degrees.

17255 – 2/1 W (DC) – Single Circuit Polymer Suspension I-String, One Circuit Initial, Two Circuits Ultimate.

This standard is used in place of **17245** when the vertical load exceeds the capacity of the post insulator. Check swing angle for conductor clearance to steel. The allowable swing without wind is 25 degrees. The allowable swing angle with wind is 50 degrees. This standard is to be used when the second circuit will be added in the future. Allow additional clearance for future conductors at the lower level. The horizontal conductor spacing is wider than those horizontal post insulators and may dictate right-of-way width and separation of parallel lines.

This configuration allows an easier installation for the second circuit but has a higher EMF reading.

A						C					
--	ORIGINAL ISSUE	RLR	WPH	WYT	04/25/02	B					
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE
TRANSMISSION ENGINEERING						SCALE:					
	COMMENTARY ON POLE-TOP INDEX STEEL POLES					DWG. NO			SHEET NO.		
						17203			2 of 4		

17260 – HALF W (DC) – Single Circuit Polymer Suspension I-String, One Circuit

Initial, Two Circuits Ultimate

This standard is used in place of **17250** when the vertical load exceeds the capacity of the post insulator. Check swing angle for conductor clearance to steel. The allowable swing without wind is 25 degrees. The allowable swing angle with wind is 50 degrees. This standard is to be used when the second circuit will be added soon. The horizontal conductor spacing is wider than those with polymer post insulators and may dictate right-of-way width and separation of parallel lines.

17265 – 2/1 X30,60,90 (DC) – Single Circuit Polymer Dead-End, One Circuit Initial, Two Circuits


Ultimate, 0-30,30-60, & 60-90 Degrees

This standard consists of three configurations for a range of line angles (**2/1 X30 (DC), 2/1 X60 (DC) and 2/1 X90 (DC)**). The allowable line angle is dictated by the arm length on the outside side of the line angle. A 6' arm is used for 0-30 degrees. A 7' arm is used for 30-60 degrees. An 8' arm is used for 60-90 degrees. This standard is used when a suspension pole would be in uplift, and for in-line dead-ends and angles up to 90 degrees. Allow additional clearance for future conductors at the lower level. Consider arm lengths when determining right-of-way width and separation between parallel lines.

17266 – 2/1 X30,60,90 (DC) – Single Circuit Polymer Dead-End, One Circuit Initial, Two Circuits

Ultimate, 0-30,30-60, & 60-90 Degrees

This standard is similar to **17265**. The difference is the number of long arms required in the initial single circuit installation because of left or right angles. Consider arm lengths when determining right-of-way widths and separation between parallel lines.

A						C					
--	ORIGINAL ISSUE	RLR	WPH	WYT	04/25/02	B					
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE
TRANSMISSION ENGINEERING						SCALE:					
		COMMENTARY ON POLE-TOP INDEX STEEL POLES				DWG. NO			SHEET NO.		
						17203			3 of 4		

17270-HALF X30,60,90 (DC) – Single Circuit Polymer Dead-End, One Circuit Initial, Two Circuits Ultimate, 0-30,30-60, & 60-90 Degrees

This standard is an alternate to **17265** and **17266**. The initial configuration allows similar installation of the second circuit in the future but has a higher EMF reading.

DOUBLE CIRCUIT

17280 – DC-WPI – Double Circuit Polymer Post Blade Suspension 0-3 Degrees

This standard is used for a double circuit suspension. The suspension links limit the line angle to 3 degrees.

17285 – DC-W – Double Circuit Polymer Suspension I-String


This standard is used in place of **17280** when the vertical load exceeds the capacity of the post insulator. Check the swing angle for clearance from conductor to steel. The allowable swing angle without wind is 25 degrees. The allowable swing angle with wind is 50 degrees. Horizontal separation of conductors is wider than those with polymer post insulators and may dictate Right of way width and separation between parallel lines.

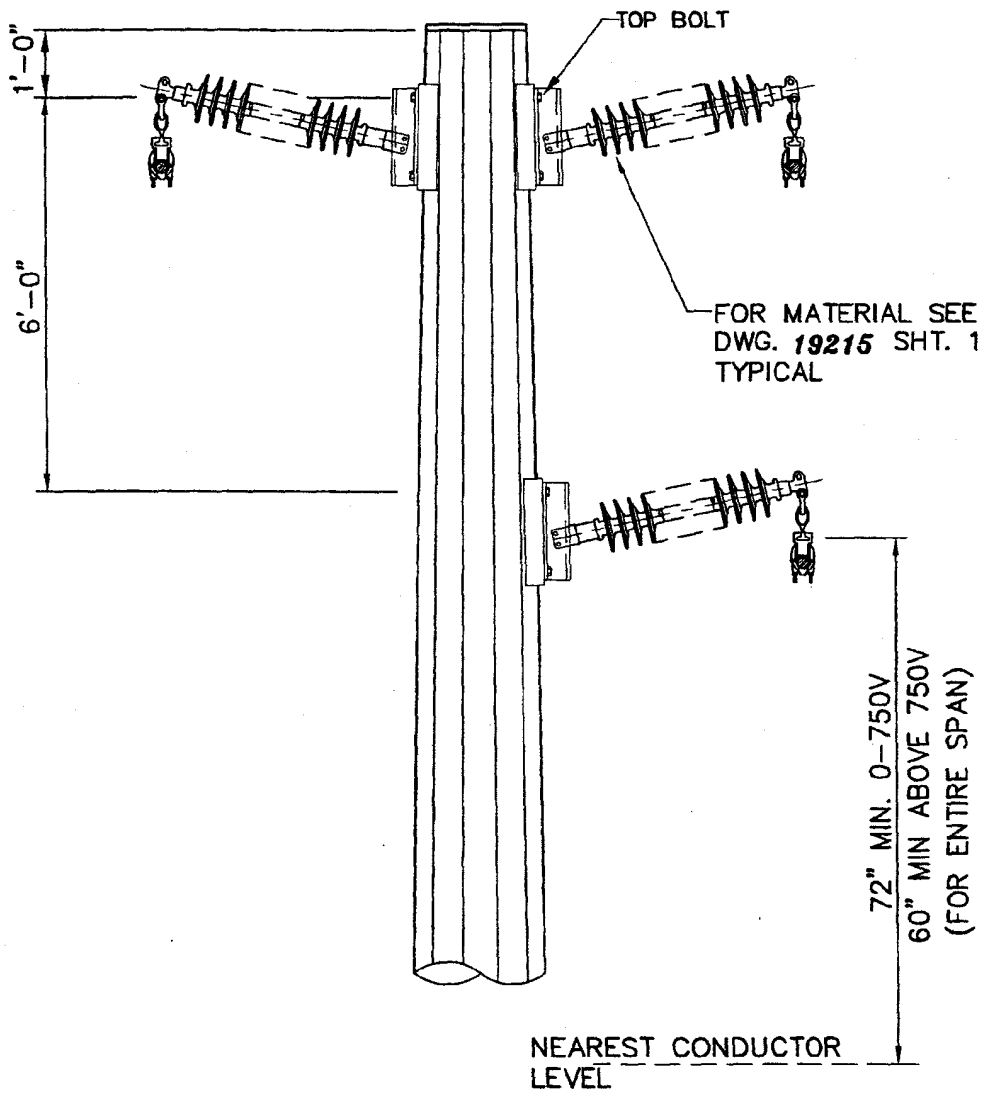
17290 – DC X30,60,90 - Double Circuit Polymer Dead-End 0-30,30-60 & 60-90 Degrees

The allowable line angle for this standard is dictated by the arm length on the outside side of the line angle. A 6' arm is used for 0-30 degrees. A 7' arm is used for 30-60 degrees. An 8' arm is used for 60-90 degrees. This standard is used when a suspension would be in uplift and for in-line dead-ends and line angles from 0 to 90 degrees. Consider arm lengths when determining right-of-way widths and separation between parallel lines.

NOTE:

Applications of the 138kV steel pole-tops are similar.

A						C					
--	ORIGINAL ISSUE	RLR	WPH	<i>WYT</i>	04/25/02	B					
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE
TRANSMISSION ENGINEERING						SCALE:					
	COMMENTARY ON POLE-TOP INDEX 69kV STEEL POLES					DWG. NO			SHEET NO.		
						17203			4 of 4		



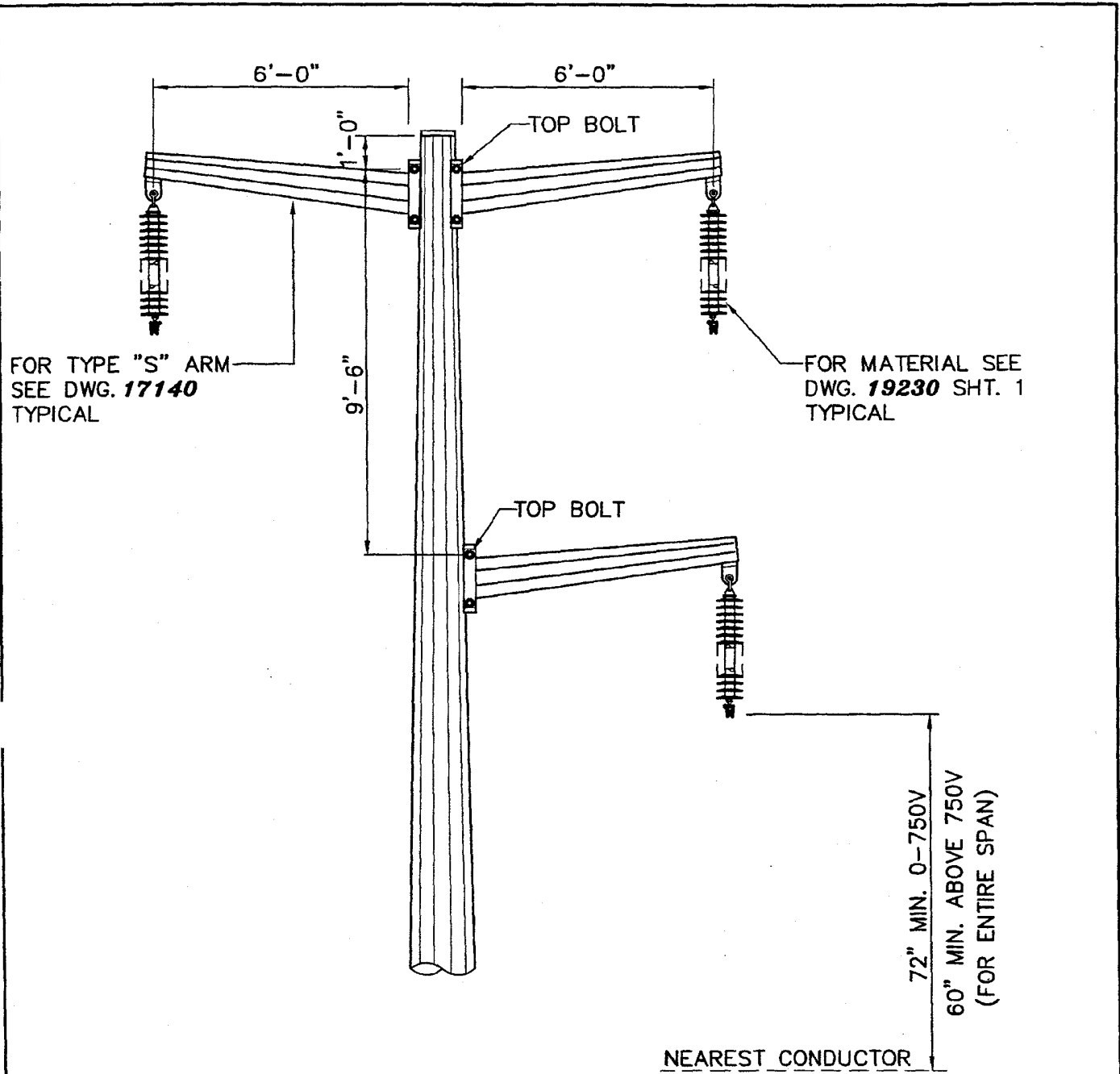
NOTES:

1. LINE ANGLE NOT TO EXCEED 3 DEGREES.
2. VERTICAL WORKING LOAD ON POST INSULATOR NOT TO EXCEED 1,250 LBS. WITHOUT PRIOR APPROVAL.

A						C						
-	ORIGINAL ISSUE	FJP	DRB	WPH	3/1/00	B						
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	

SDGE	TRANSMISSION ENGINEERING				SCALE: NONE	
	POLE TOP ARRANGEMENT TYPE 2/1 WPI SINGLE CIRCUIT 69KV STEEL POLE				DWG. NO.	SHT. NO.
					17205	1 of 1

17205001



- NOTES:**
1. FOR LONG SPAN AND RUNNING ANGLE APPLICATIONS
 2. MAXIMUM INSULATOR SWING ANGLE 25° NO WIND, 50° WITH WIND

A						C					
-	ORIGINAL ISSUE	FJP	DRB	WPH	3/1/00	B					
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

SDGE	TRANSMISSION ENGINEERING				SCALE: NONE	
	POLE TOP ARRANGEMENT TYPE 2/1 WPI SINGLE CIRCUIT 69kV STEEL POLE				DWG. NO.	SHT. NO.
					17210	1 of 1

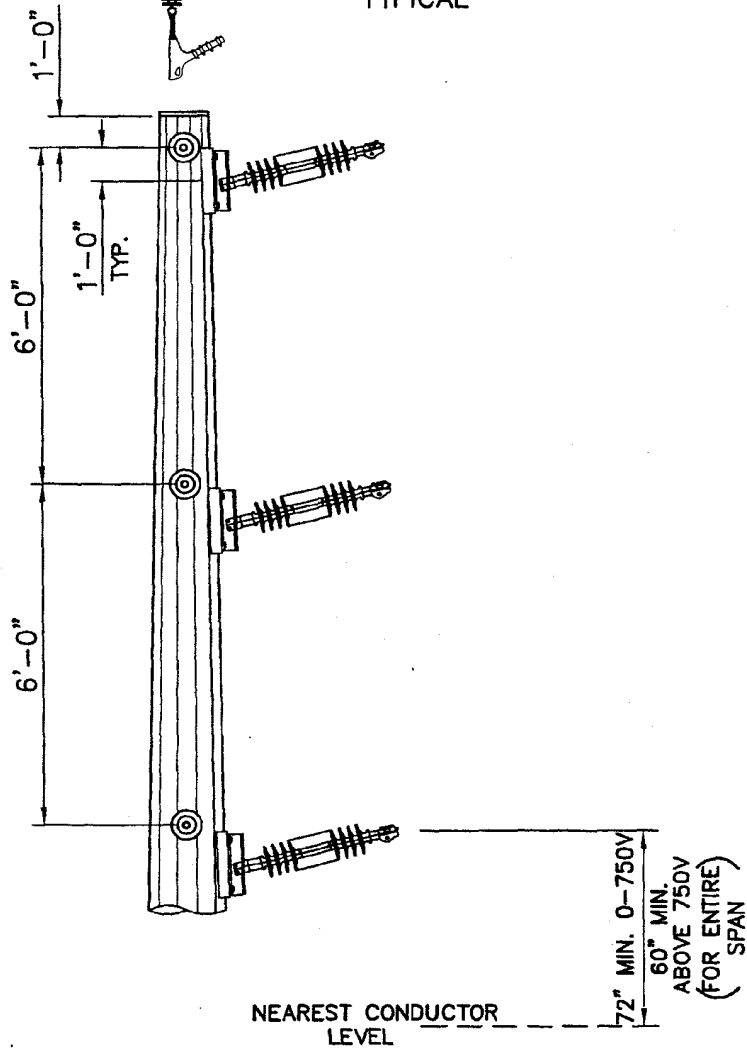
17210001

STEP AND CLIMB THIS FACE.

FOR ASSEMBLY
DETAILS, SEE DWGS.
19240 (ACSR) &
19242 (ACSS)

SEE NOTE 3

FOR MATERIAL SEE
DWG. 19265 SHT. 1
TYPICAL



NOTES:

1. DO NOT ALIGN STRAIN CLAMPS OR COMP. DEADEND WITH CONDUCTOR UNDER TENSION - INSULATOR DAMAGE MAY OCCUR.
2. USE ON LINE ANGLES FROM 0° TO 75°
3. STRAIN CLAMP SHOWN, USE COMP. DEADEND FOR ACSS CONDUCTOR. SEE DWG. 19242

NEAREST CONDUCTOR
LEVEL

72" MIN. 0-750V
60" MIN.
ABOVE 750V
(FOR ENTIRE
SPAN)

A	ADD ACSS CONDUCTORS	WDF	SP WPH	WPH	2/20/03	C						
-	ORIGINAL ISSUE	FJP	DRB	WPH	3/1/00	B						
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	



TRANSMISSION ENGINEERING

**POLE TOP ARRANGEMENT
TYPE YPI SINGLE CIRCUIT
69kV STEEL POLE**

SCALE: NONE

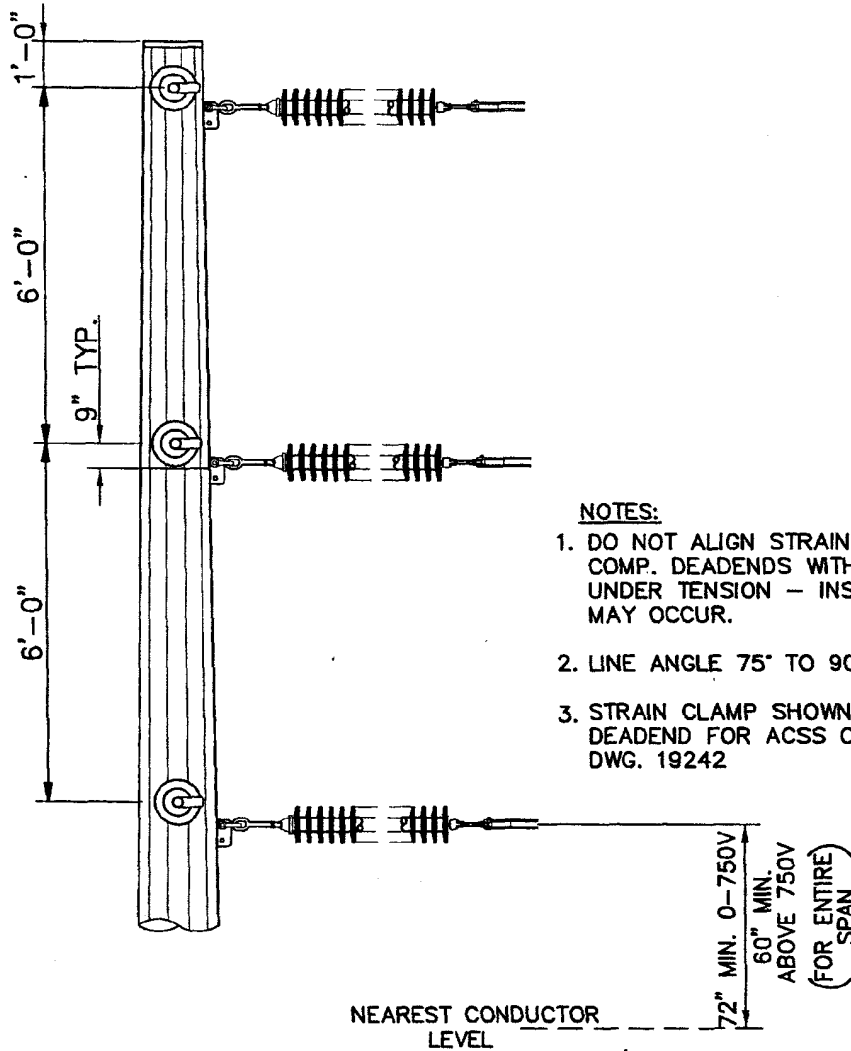
DWG. NO.	SHT. NO.
17225	1 of 1

17225A01

STEP AND CLIMB THIS FACE.

SEE NOTE 3

FOR ASSEMBLY DETAILS, SEE DWGS. 19240 (ACSR) & 19242 (ACSS)



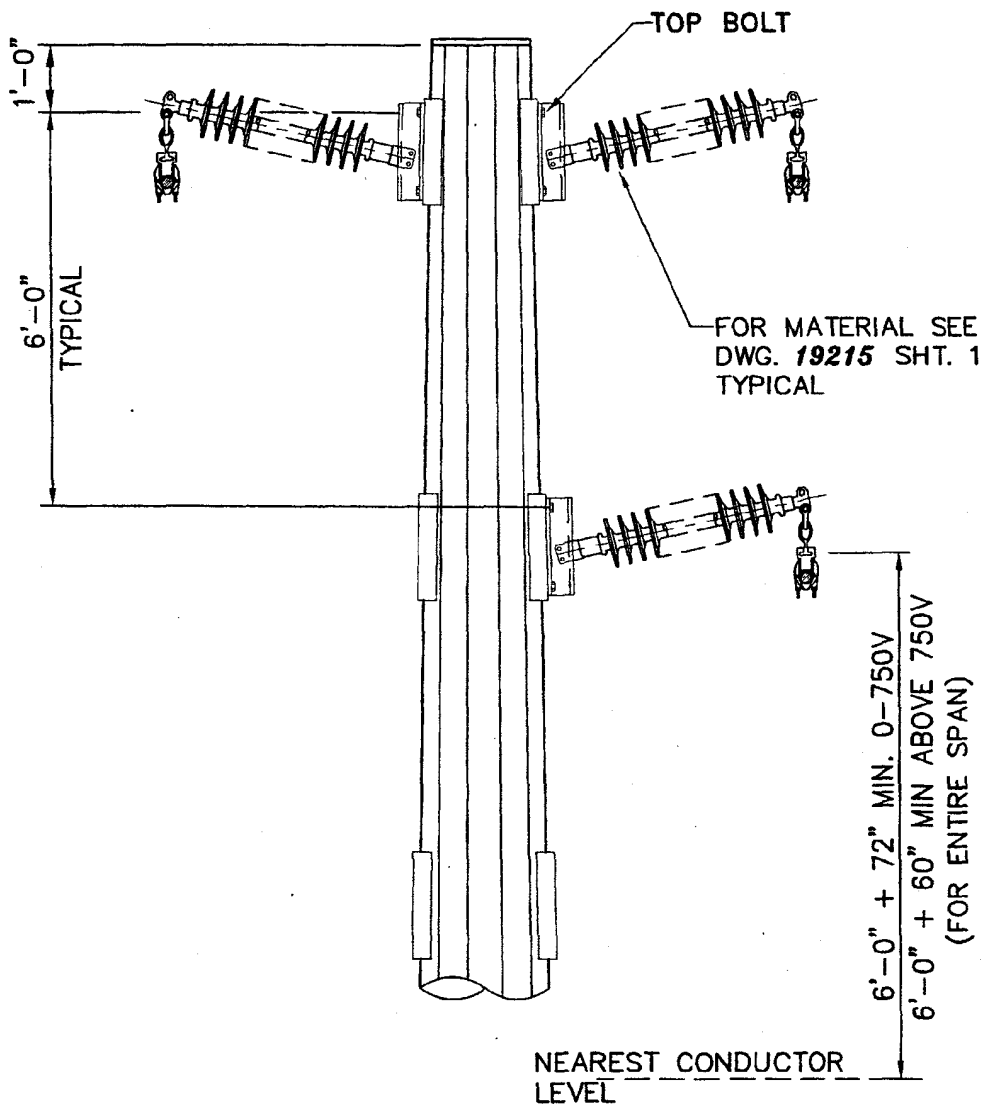
NOTES:

1. DO NOT ALIGN STRAIN CLAMPS OR COMP. DEADENDS WITH CONDUCTOR UNDER TENSION - INSULATOR DAMAGE MAY OCCUR.
2. LINE ANGLE 75° TO 90°
3. STRAIN CLAMP SHOWN, USE COMP. DEADEND FOR ACSS CONDUCTOR. SEE DWG. 19242

REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE
A	ADD ACSS CONDUCTORS	WDF	SFO	WPH	2/20/03	C					
-	ORIGINAL ISSUE	FJP	DRB	WPH	3/1/00	B					

SDGE	TRANSMISSION ENGINEERING				SCALE: NONE	
	POLE TOP ARRANGEMENT TYPE Y SINGLE CIRCUIT 69kV STEEL POLE				DWG. NO.	SHT. NO.
					17230	1 of 1

17230A1

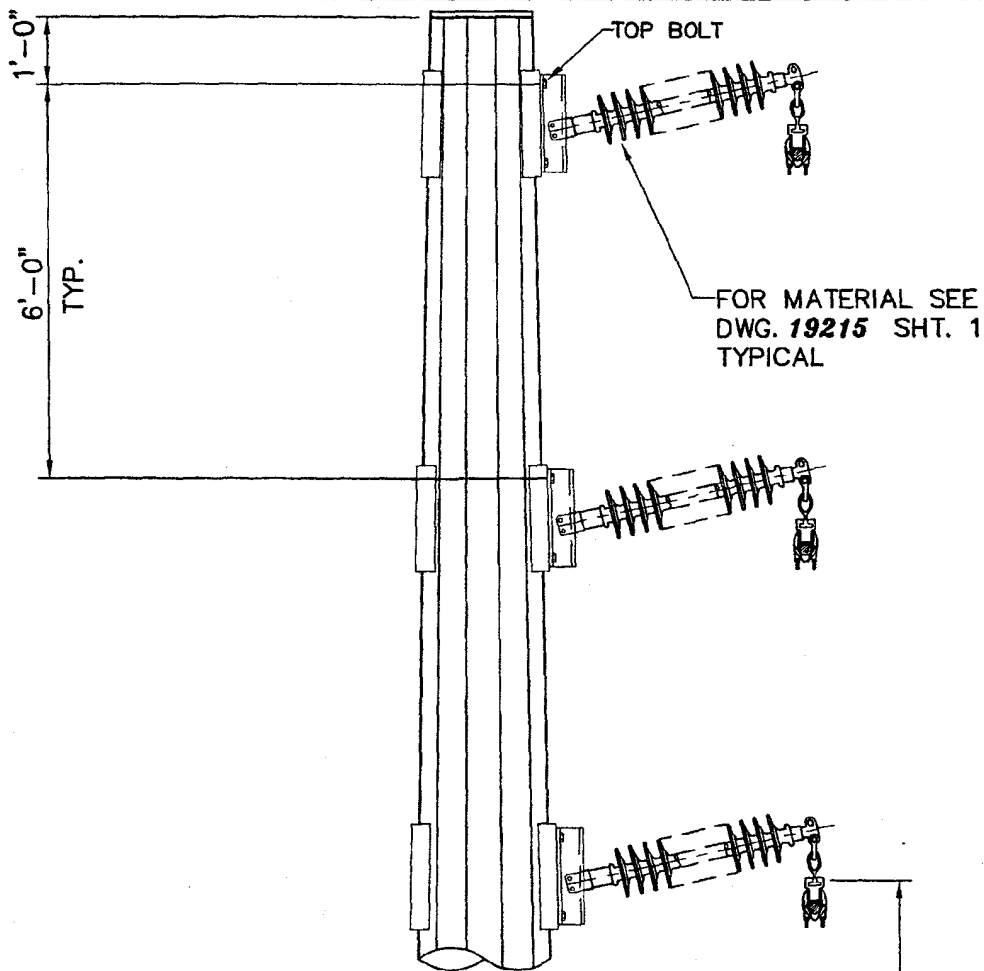


NOTES:

1. LINE ANGLE NOT TO EXCEED 3 DEGREES.
2. VERTICAL WORKING LOAD ON POST INSULATOR NOT TO EXCEED 1,250 LBS. WITHOUT PRIOR APPROVAL.

A						C					
-	ORIGINAL ISSUE	FJP	DRB	WPH	3/1/00	B					
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

SDGE	TRANSMISSION ENGINEERING						SCALE: NONE				17245001
	POLE TOP ARRANGEMENT						DWG. NO.		SHT. NO.		
	TYPE 2/1 WPI (DC)						17245		1 of 1		
SGL. CKT. CONVERTABLE TO DBL. CKT.											
69kV STEEL POLE											



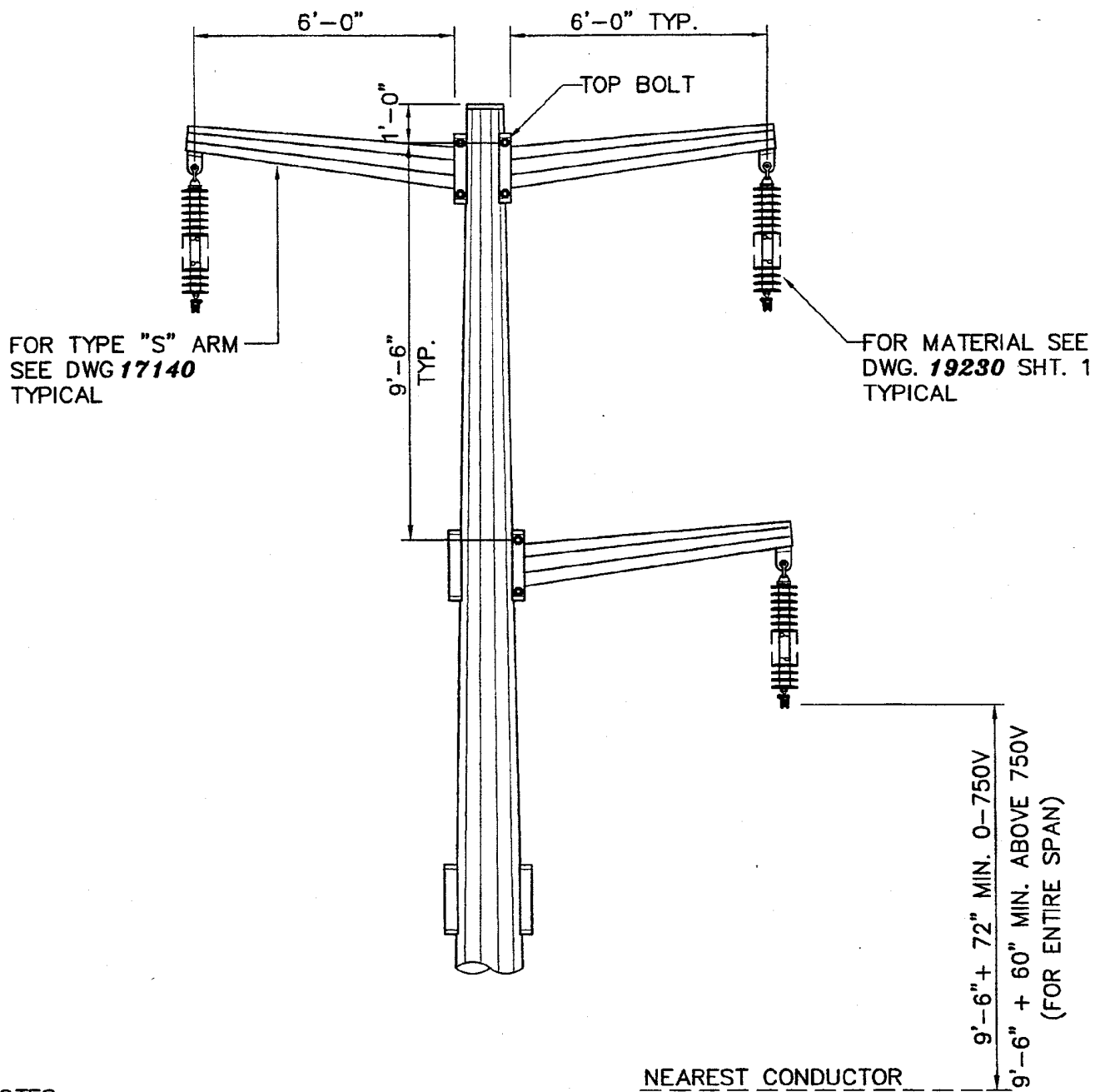
NOTES:

1. LINE ANGLE NOT TO EXCEED 3 DEGREES.
2. VERTICAL WORKING LOAD ON POST INSULATOR NOT TO EXCEED 1,250 LBS. WITHOUT PRIOR APPROVAL.

NEAREST CONDUCTOR LEVEL

A						C						
-	ORIGINAL ISSUE	FJP	DRB	WPH	3/1/00	B						
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	

SDGE	TRANSMISSION ENGINEERING						SCALE: NONE		17250001
	POLE TOP ARRANGEMENT TYPE HALF WPI (DC)						DWG. NO.	SHT. NO.	
	SGL. CKT. CONVERTABLE TO DBL. CKT. 69KV STEEL POLE						17250	1 of 1	



NOTES:

1. FOR LONG SPAN AND RUNNING ANGLE APPLICATIONS
2. MAXIMUM INSULATOR SWING ANGLE 25° NO WIND, 50° WITH WIND

NEAREST CONDUCTOR LEVEL

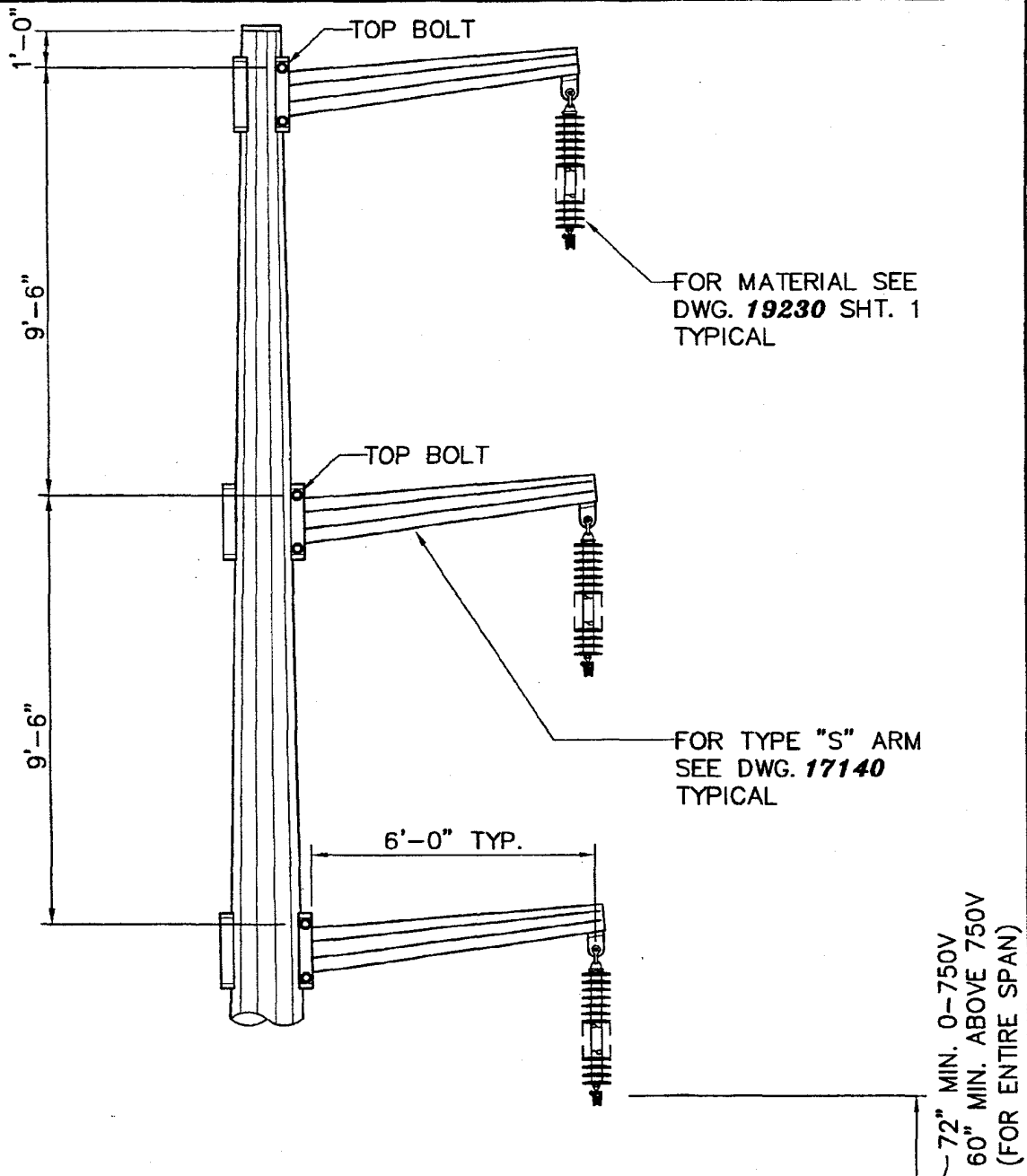
A						C						
-	ORIGINAL ISSUE	FJP	DRB	WPH	3/1/00	B						
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	



TRANSMISSION ENGINEERING
POLE TOP ARRANGEMENT
TYPE 2/1 W (DC)
SGL. CKT. CONVERTABLE TO DBL. CKT.
69KV STEEL POLE

SCALE: NONE	
DWG. NO.	SHT. NO.
17255	1 of 1

17255001

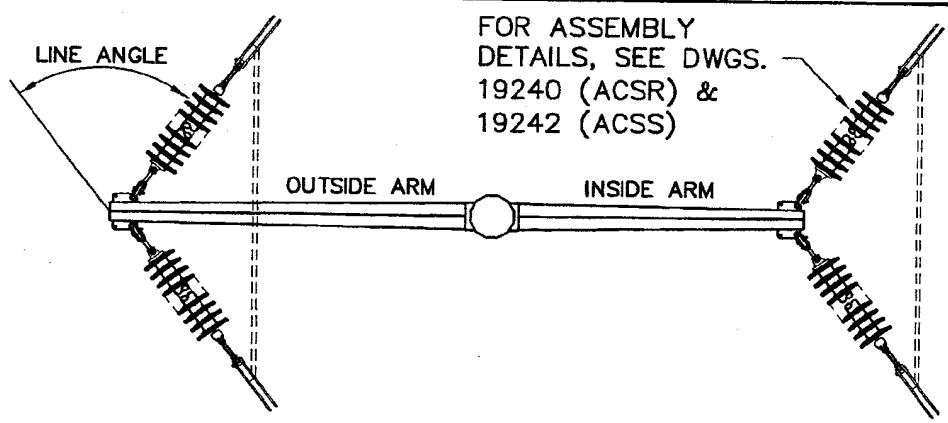


- NOTES:**
1. FOR LONG SPAN AND RUNNING ANGLE APPLICATIONS.
 2. MAXIMUM INSULATOR SWING ANGLE 25° NO WIND, 50° WITH WIND.

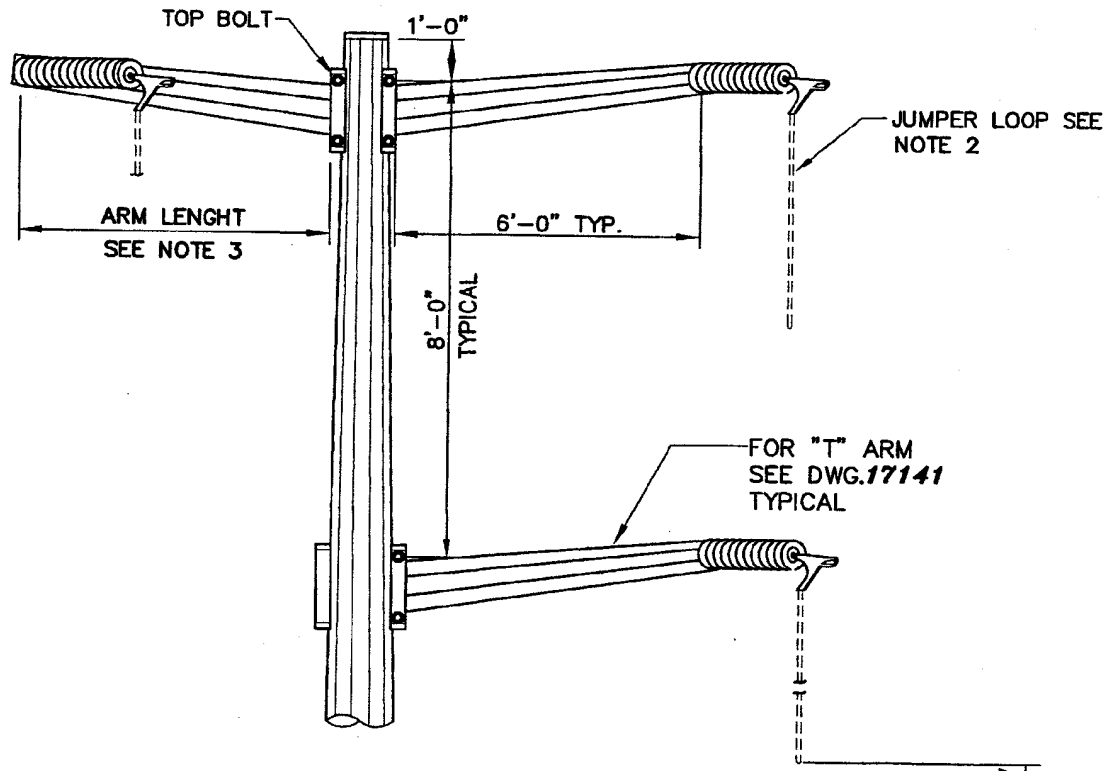
NEAREST CONDUCTOR
LEVEL

A						C						
-	ORIGINAL ISSUE	FJP	DRB	WPH	3/1/00	B						
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	

SDGE	TRANSMISSION ENGINEERING						SCALE: NONE	
	POLE TOP ARRANGEMENT						DWG. NO.	SHT. NO.
	TYPE HALF W (DC)						17260	1 of 1
SGL. CKT. CONVERTABLE TO DBL. CKT.								
69KV STEEL POLE								
						17260001		



NOTE:
 STRAIN CLAMP SHOWN, USE COMP. DEADEND FOR ACSS CONDUCTOR. SEE DWG. 19242



NOTES:

- DO NOT ALIGN STRAIN CLAMPS OR COMP. DEADENDS WITH CONDUCTOR UNDER TENSION - INSULATOR DAMAGE MAY OCCUR.
- MAINTAIN A 3'-0" MINIMUM CLEARANCE FROM JUMPER LOOPS TO CROSSARMS AND POLE SHAFT.

3. OUTSIDE ARM	LINE ANGLE	INSIDE ARM	TYPE
6'-0"	0°-30°	6'-0"	2/1 X30 (DC-R)
7'-0"	30°-60°	6'-0"	2/1 X60 (DC-R)
8'-0"	60°-90°	6'-0"	2/1 X90 (DC-R)

NEAREST CONDUCTOR LEVEL
 8'-0" +72" MIN. 0-750V
 8'-0" +60" MIN. ABOVE 750V
 (FOR ENTIRE SPAN)

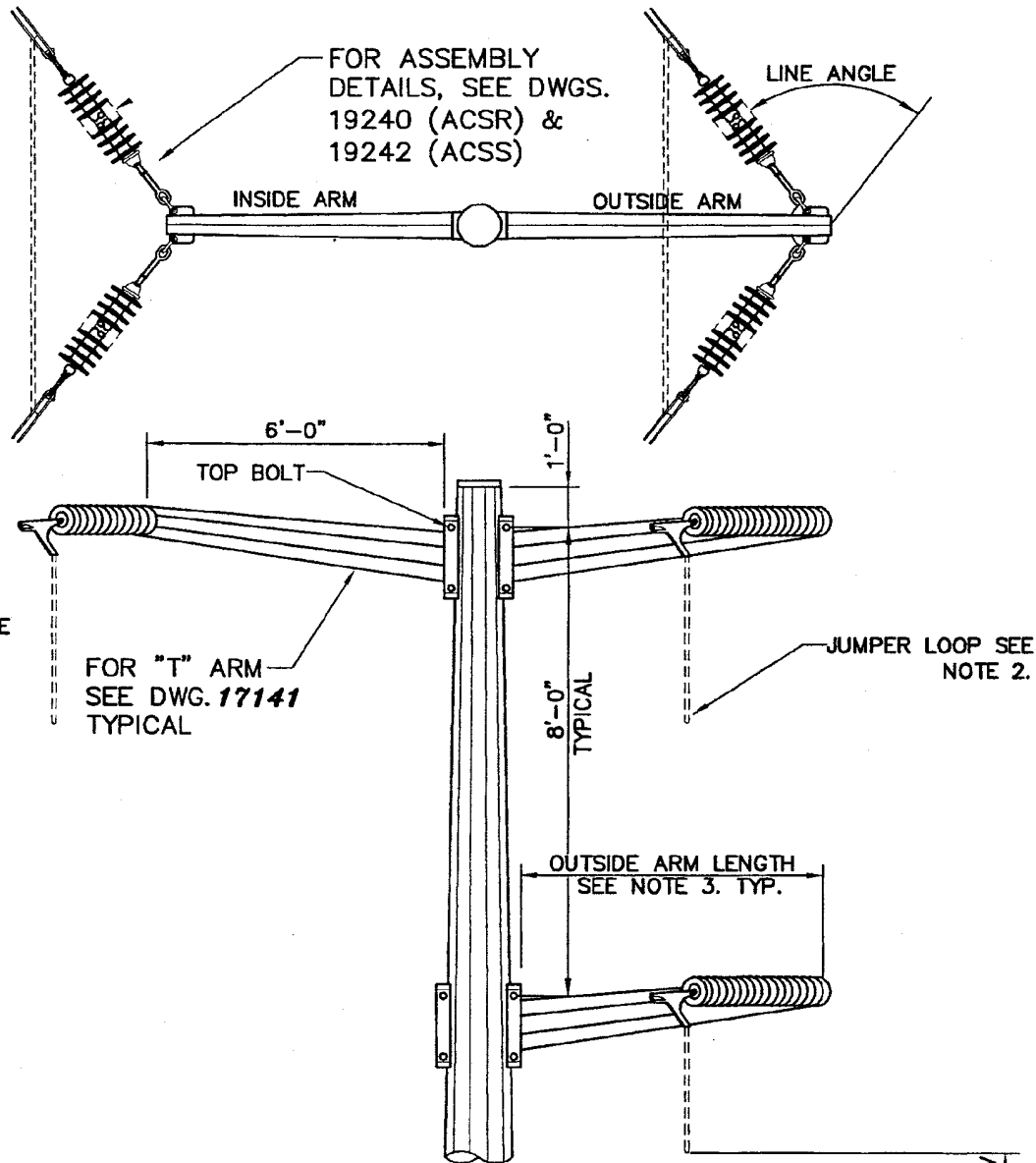
A	ADD ACSS CONDUCTORS	WDF	WDF WY	2/20/03	C						
-	ORIGINAL ISSUE	FJP	DRB	WPH	3/1/00	B					
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE



TRANSMISSION ENGINEERING
POLE TOP ARRANGEMENT
 TYPE 2/1 X 30 60 90 (DC-R)
 SGL. CKT. CONVERTABLE TO DBL. CKT.
 69KV STEEL POLE

SCALE: NONE	
DWG. NO.	SHT. NO.
17265	1 of 1

17265A01



NOTE:
 STRAIN CLAMP
 SHOWN, USE
 COMP. DEADEND
 FOR ACSS
 CONDUCTOR. SEE
 DWG. 19242

FOR "T" ARM
 SEE DWG. 17141
 TYPICAL

JUMPER LOOP SEE
 NOTE 2.

NOTES:

- DO NOT ALIGN STRAIN CLAMPS OR COMP. DEADENDS WITH CONDUCTOR UNDER TENSION - INSULATOR DAMAGE MAY OCCUR.
- MAINTAIN A 3'-0" MINIMUM CLEARANCE FROM JUMPER LOOPS TO CROSSARMS AND POLE SHAFT.
- INSIDE ARM LINE ANGLE OUTSIDE ARM TYPE

INSIDE ARM	LINE ANGLE	OUTSIDE ARM	TYPE
6'-0"	0°-30°	6'-0"	2/1 X30 (DC-L)
6'-0"	30°-60°	7'-0"	2/1 X60 (DC-L)
6'-0"	60°-90°	8'-0"	2/1 X90 (DC-L)

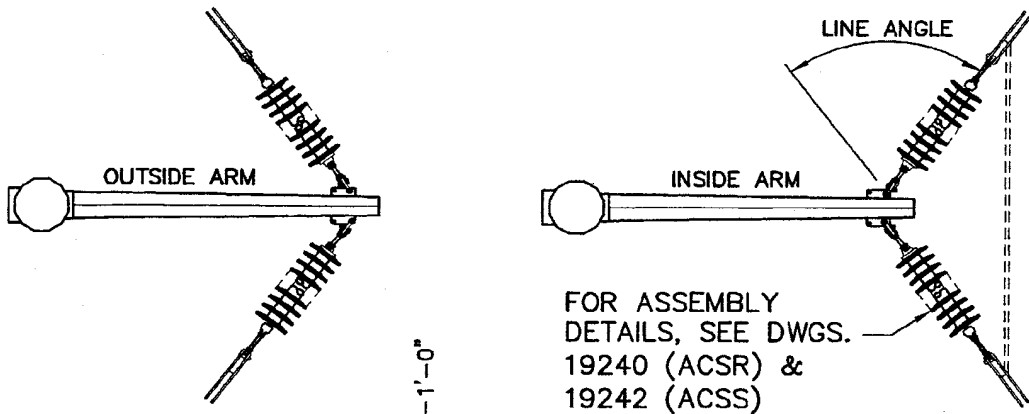
NEAREST CONDUCTOR
 LEVEL

9'-0" +72" MIN. 0-750V
 9'-0" +60" MIN.
 ABOVE 750V
 (FOR ENTIRE SPAN)

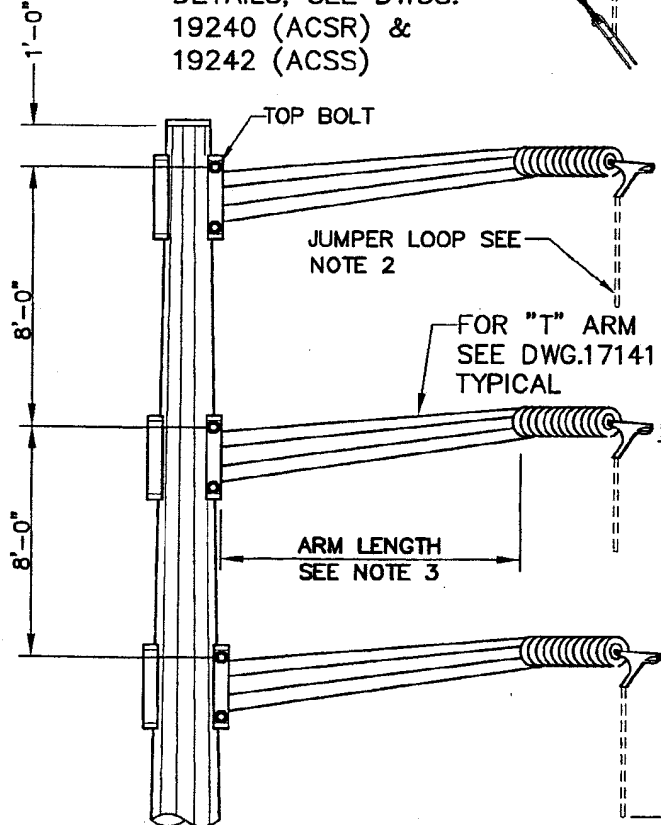
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE
A	ADD ACSS CONDUCTORS	WDF	STW	WYT	2/20/03	C					
-	ORIGINAL ISSUE	FJP	DRB	WPH	3/1/00	B					

SDGE	TRANSMISSION ENGINEERING				SCALE: NONE	
	POLE TOP ARRANGEMENT TYPE 2/1 X 30 60 90 (DC-L) SGL. CKT. CONVERTABLE TO DBL. CKT. 69kV STEEL POLE				DWG. NO.	SHT. NO.
					17266	1 of 1

17266A01



FOR ASSEMBLY
DETAILS, SEE DWGS.
19240 (ACSR) &
19242 (ACSS)



NOTE:
STRAIN CLAMP
SHOWN, USE
COMP. DEADEND
FOR ACSS
CONDUCTOR. SEE
DWG. 19242

NOTES:

- DO NOT ALIGN STRAIN CLAMPS OR COMP. DEADENDS WITH CONDUCTOR UNDER TENSION - INSULATOR DAMAGE MAY OCCUR.
- MAINTAIN A 3'-0" MINIMUM CLEARANCE FROM JUMPER LOOPS TO CROSSARMS AND POLE SHAFT.

3. OUTSIDE ARM	LINE ANGLE	INSIDE ARM	TYPE
6'-0"	0°-30°	6'-0"	HALF X30 (DC)
7'-0"	30°-60°	6'-0"	HALF X60 (DC)
8'-0"	60°-90°	6'-0"	HALF X90 (DC)

NEAREST CONDUCTOR LEVEL

72" MIN. 0-750V
60" MIN.
ABOVE 750V
(FOR ENTIRE SPAN)

A	ADD ACSS CONDUCTORS	WDF	SFO	WPH	WVT	2/20/03	C						
-	ORIGINAL ISSUE	FJP	DRB	WPH		3/1/00	B						
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE		

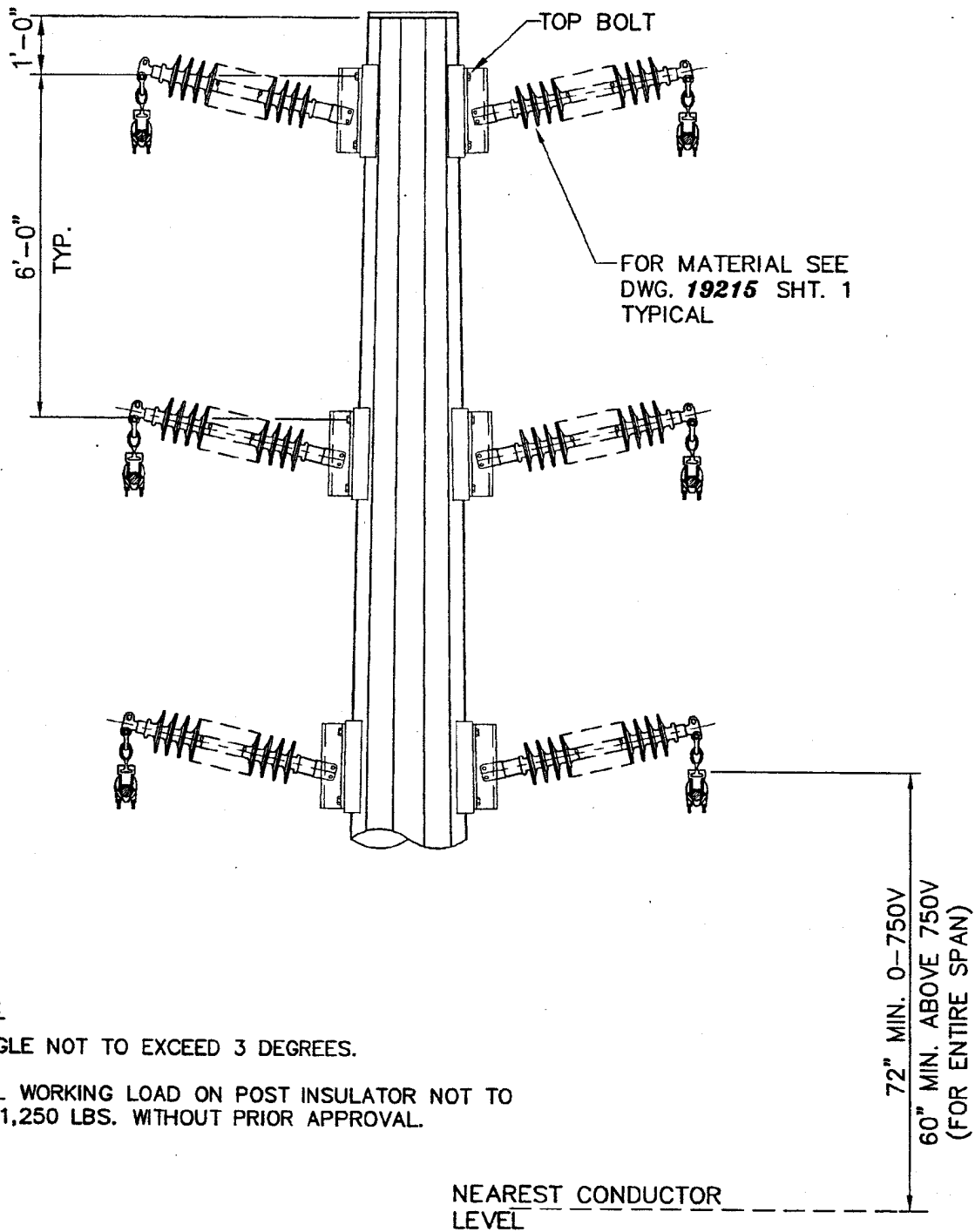


TRANSMISSION ENGINEERING

POLE TOP ARRANGEMENT
TYPE HALF X 30 60 90 (DC)
SGL. CKT. CONVERTABLE TO DBL. CKT.
69KV STEEL POLE

SCALE: NONE	
DWG. NO.	SHT. NO.
17270	1 of 1

17270A01

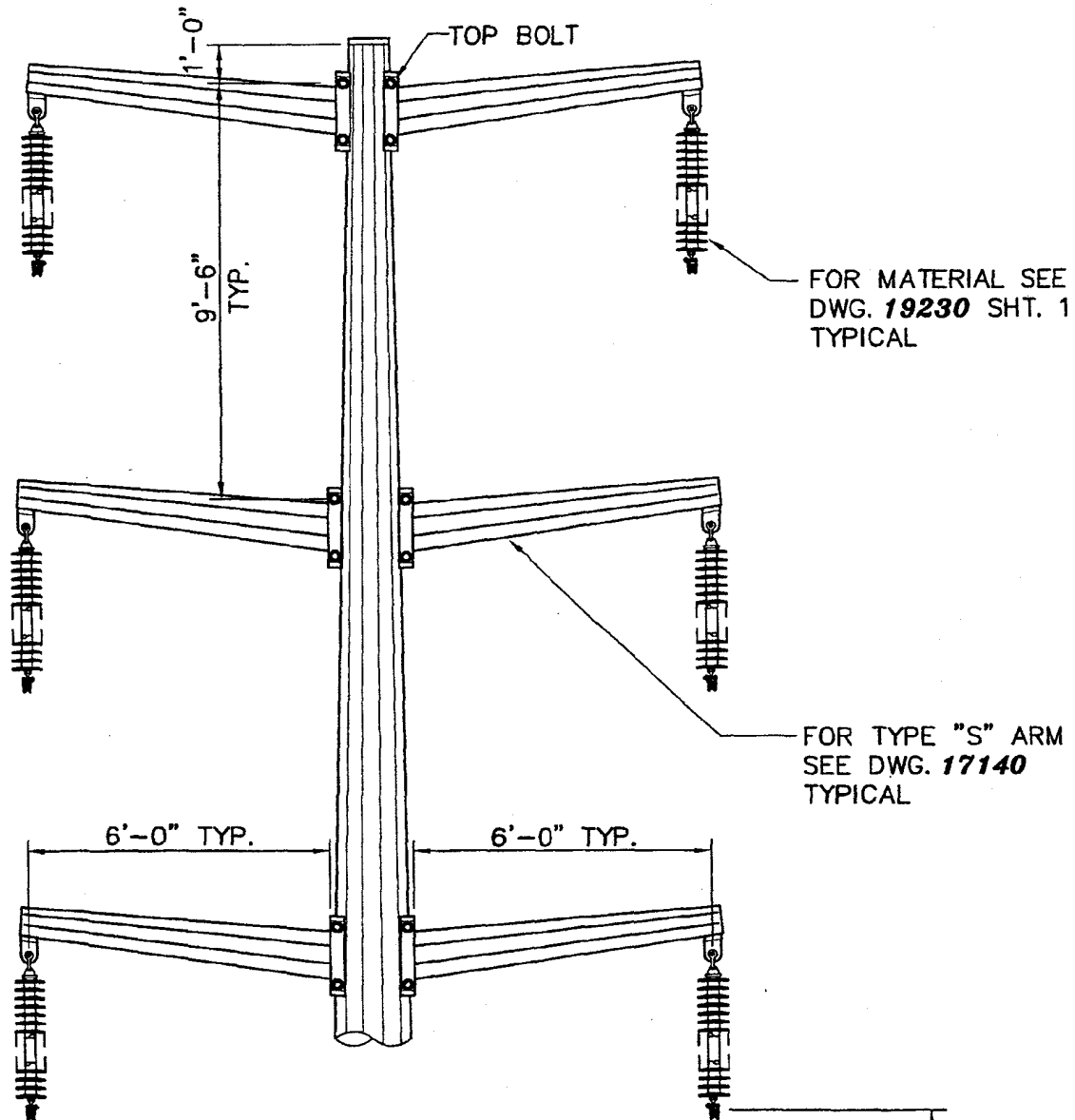


NOTES:

1. LINE ANGLE NOT TO EXCEED 3 DEGREES.
2. VERTICAL WORKING LOAD ON POST INSULATOR NOT TO EXCEED 1,250 LBS. WITHOUT PRIOR APPROVAL.

A						C						
-	ORIGINAL ISSUE	FJP	DRB	WPH	3/1/00	B						
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	

SDGE	TRANSMISSION ENGINEERING							SCALE: NONE		17280001
	POLE TOP ARRANGEMENT TYPE DC-WPI DOUBLE CIRCUIT 69KV STEEL POLE							DWG. NO.	SHT. NO.	
								17280	1 of 1	



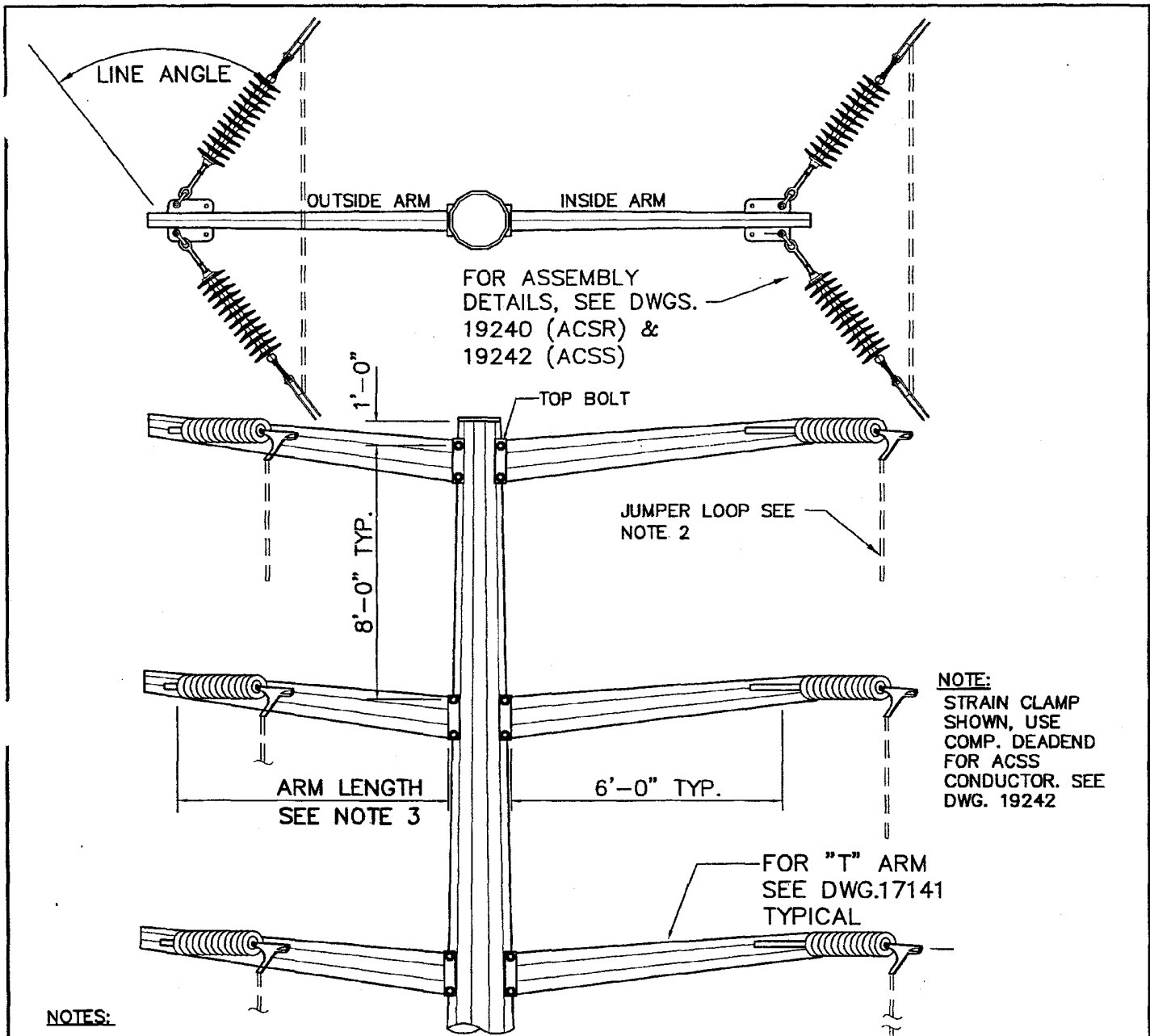
NOTES:

1. FOR LONG SPAN AND RUNNING ANGLE APPLICATIONS.
2. MAXIMUM INSULATOR SWING ANGLE
25° NO WIND, 50° WITH WIND.

NEAREST CONDUCTOR LEVEL

A						C					
-	ORIGINAL ISSUE	FJP	DRB	WPH	3/1/00	B					
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

SDGE	TRANSMISSION ENGINEERING						SCALE: NONE		17285001
	POLE TOP ARRANGEMENT						DWG. NO.	SHT. NO.	
	DOUBLE CIRCUIT I-STRING SUSPENSION						17285	1 of 1	
69KV STEEL POLE									



FOR ASSEMBLY
DETAILS, SEE DWGS.
19240 (ACSR) &
19242 (ACSS)

NOTE:
STRAIN CLAMP
SHOWN, USE
COMP. DEADEND
FOR ACSS
CONDUCTOR. SEE
DWG. 19242

NOTES:

- DO NOT ALIGN STRAIN CLAMPS OR COMP. DEADENDS WITH CONDUCTOR UNDER TENSION - INSULATOR DAMAGE MAY OCCUR.
- MAINTAIN A 3'-0" MINIMUM CLEARANCE FROM JUMPER LOOPS TO CROSSARMS AND POLE SHAFT.
- OUTSIDE ARM LINE ANGLE INSIDE ARM TYPE

OUTSIDE ARM	LINE ANGLE	INSIDE ARM	TYPE
6'-0"	0°-30°	6'-0"	DC-X30
7'-0"	30°-60°	6'-0"	DC-X60
8'-0"	60°-90°	6'-0"	DC-X90

NEAREST CONDUCTOR
LEVEL _____

72" MIN. 0-750V
60" MIN.
ABOVE 750V
(FOR ENTIRE SPAN)

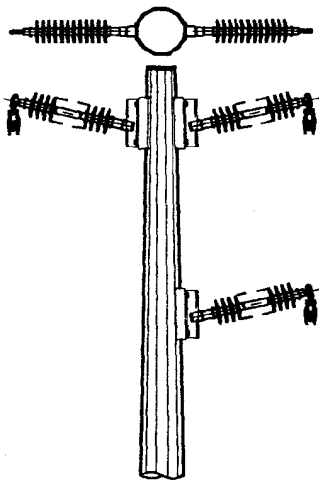
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE
A	ADD ACSS CONDUCTORS	WDF	SW	WVT	2/20/03	C					
-	ORIGINAL ISSUE	FJP	DRB	WPH	3/1/00	B					



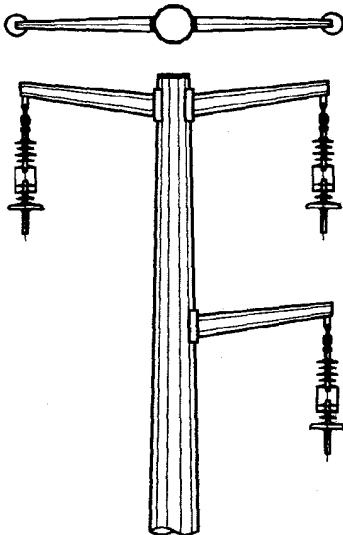
TRANSMISSION ENGINEERING
POLE TOP ARRANGEMENT
TYPE DC-X30, 60, 90
DOUBLE CIRCUIT
69KV STEEL POLE

SCALE: NONE	
DWG. NO.	SHT. NO.
17290	1 of 1

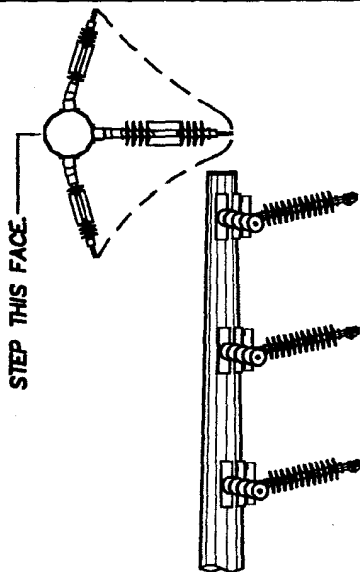
17290A01



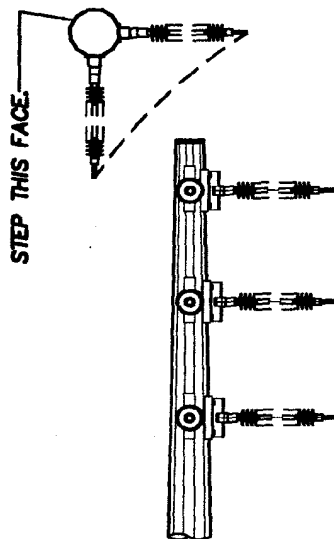
138kV STEEL POLE
TYPE 2/1 WPI
DWG. NO. 17305
LINE ANGLE 3° MAX.



138kV STEEL POLE
TYPE 2/1 W
DWG. NO. 17310



138kV STEEL POLE
TYPE YPI
DWG. NO. 17325
LINE ANGLE 0° TO 75°



138kV STEEL POLE
TYPE Y
DWG. NO. 17330
LINE ANGLE 75°-90°

REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE
A	ADDED CORONA RING	LLD	WPH	<i>WPH</i>	4/3/08						
-	ORIGINAL ISSUE	FJP	DRB	WPH	3/1/00						

TRANSMISSION ENGINEERING

SCALE: NONE

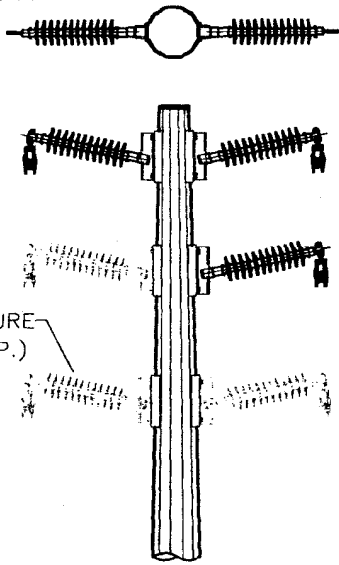


**POLE TOP INDEX
SINGLE CIRCUIT
138kV STEEL POLE**

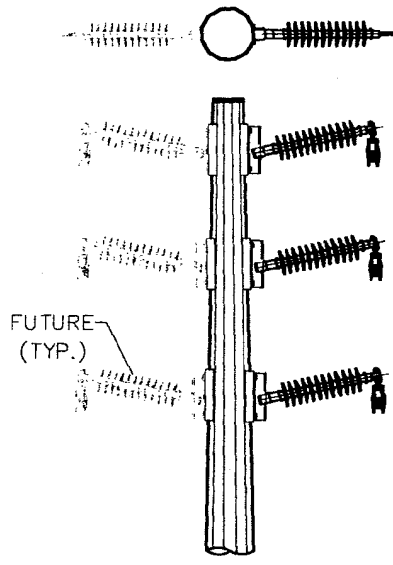
DWG. NO.
17301

SHT. NO.
1 of 4

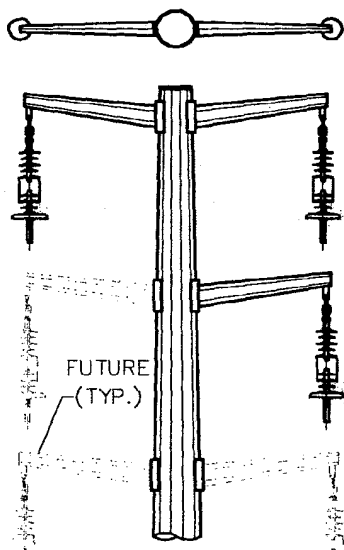
17301-1



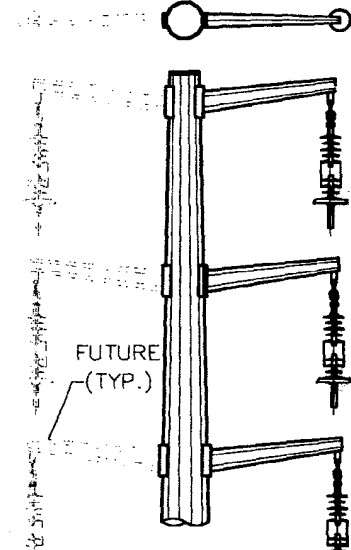
**138kV STEEL POLE
TYPE 2/1 WPI (DC)
DWG. NO. 17345**



**138kV STEEL POLE
TYPE HALF WPI (DC)
DWG. NO. 17350**



**138kV STEEL POLE
TYPE 2/1 W (DC)
DWG. NO. 17355**



**138kV STEEL POLE
TYPE HALF W (DC)
DWG. NO. 17360**

A	ADDED CORONA RING	LLD	WPH	WPH	4/3/08						
-	ORIGINAL ISSUE	FJP	DRB	WPH	3/1/00						
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

TRANSMISSION ENGINEERING

SCALE: NONE

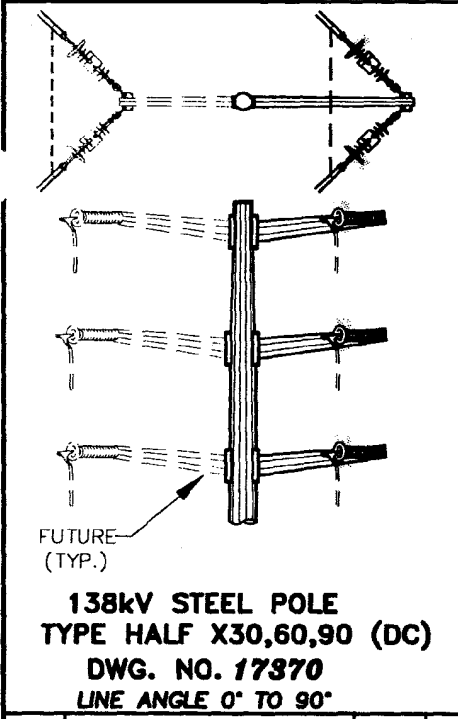
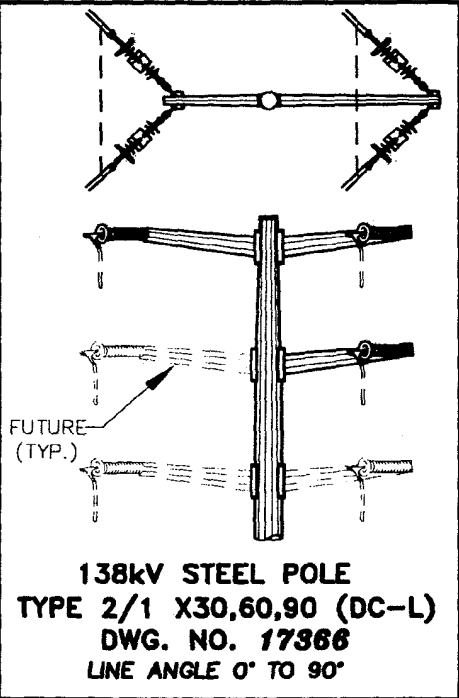
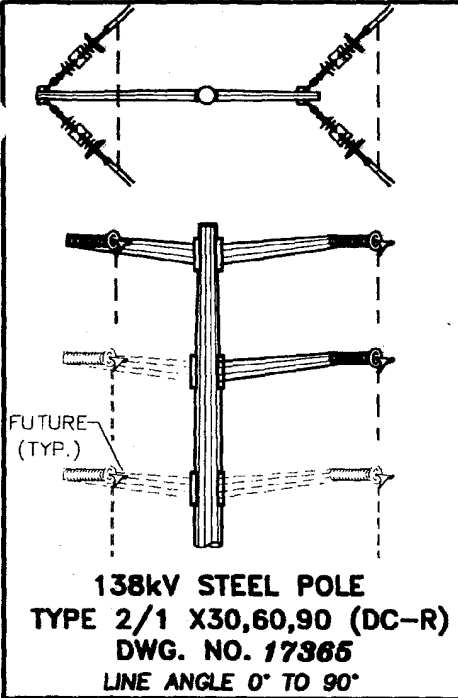


**POLE TOP INDEX
SINGLE CIRCUIT CONVERTIBLE TO DOUBLE CIRCUIT
138kV STEEL POLE**

DWG. NO.
17301

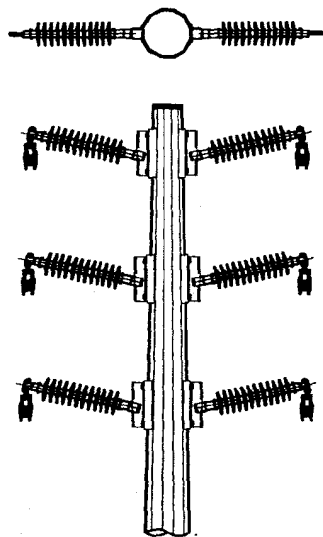
SHT. NO.
2 of 4

17301-2

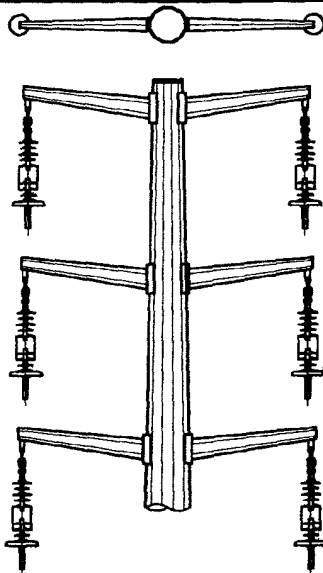


A	ADDED CORONA RING	LLD	WPH	<i>WPH</i>	4/3/08						
-	ORIGINAL ISSUE	FJP	DRB	WPH	3/1/00						
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

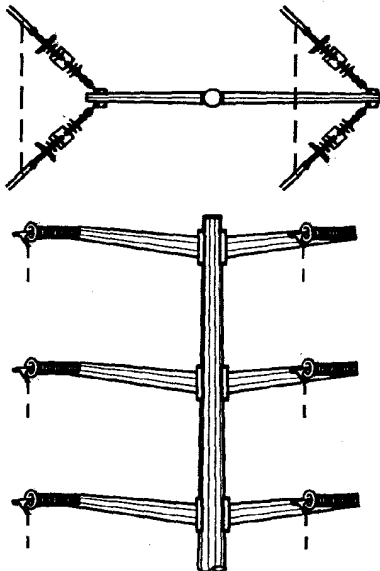
TRANSMISSION ENGINEERING		SCALE: NONE	
SDGE	POLE TOP INDEX		DWG. NO.
	SINGLE CIRCUIT CONVERTIBLE TO DOUBLE CIRCUIT		17301
138kV STEEL POLE		SHT. NO.	3 of 4
			17301-3



138kV STEEL POLE
TYPE DC-WPI
DWG. NO. 17380



138kV STEEL POLE
TYPE DC-W
DWG. NO. 17385



138kV STEEL POLE
TYPE DC-X30,60,90
DWG. NO. 17390
LINE ANGLE 0° TO 90°

REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE
A	ADDED CORONA RING	LLD	WPH	<i>WPH</i>	4/3/08						
-	ORIGINAL ISSUE	FJP	DRB	WPH	3/1/00						

TRANSMISSION ENGINEERING

SCALE: NONE



POLE TOP INDEX
SINGLE CIRCUIT CONVERTIBLE TO DOUBLE CIRCUIT
138kV STEEL POLE

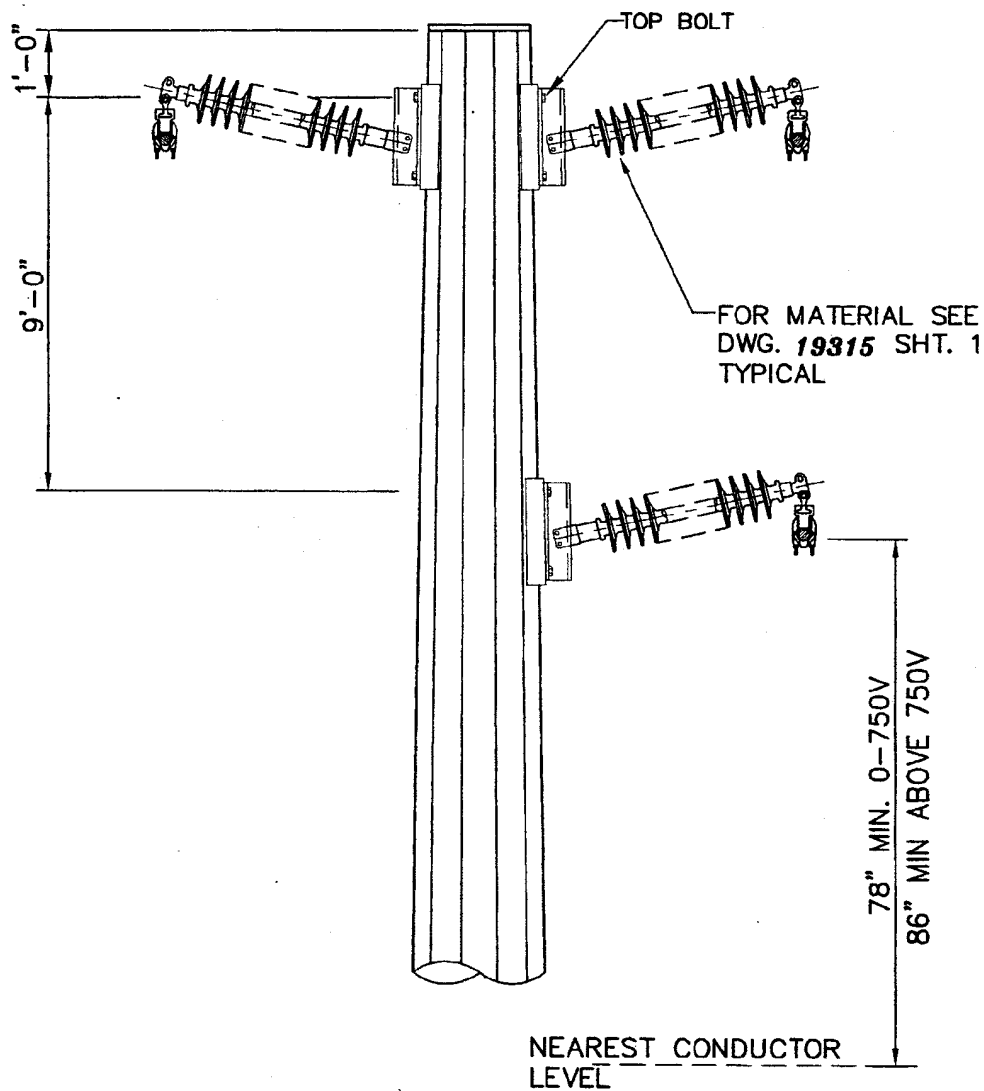
DWG. NO.

SHT. NO.

17301

4 of 4

17301-4

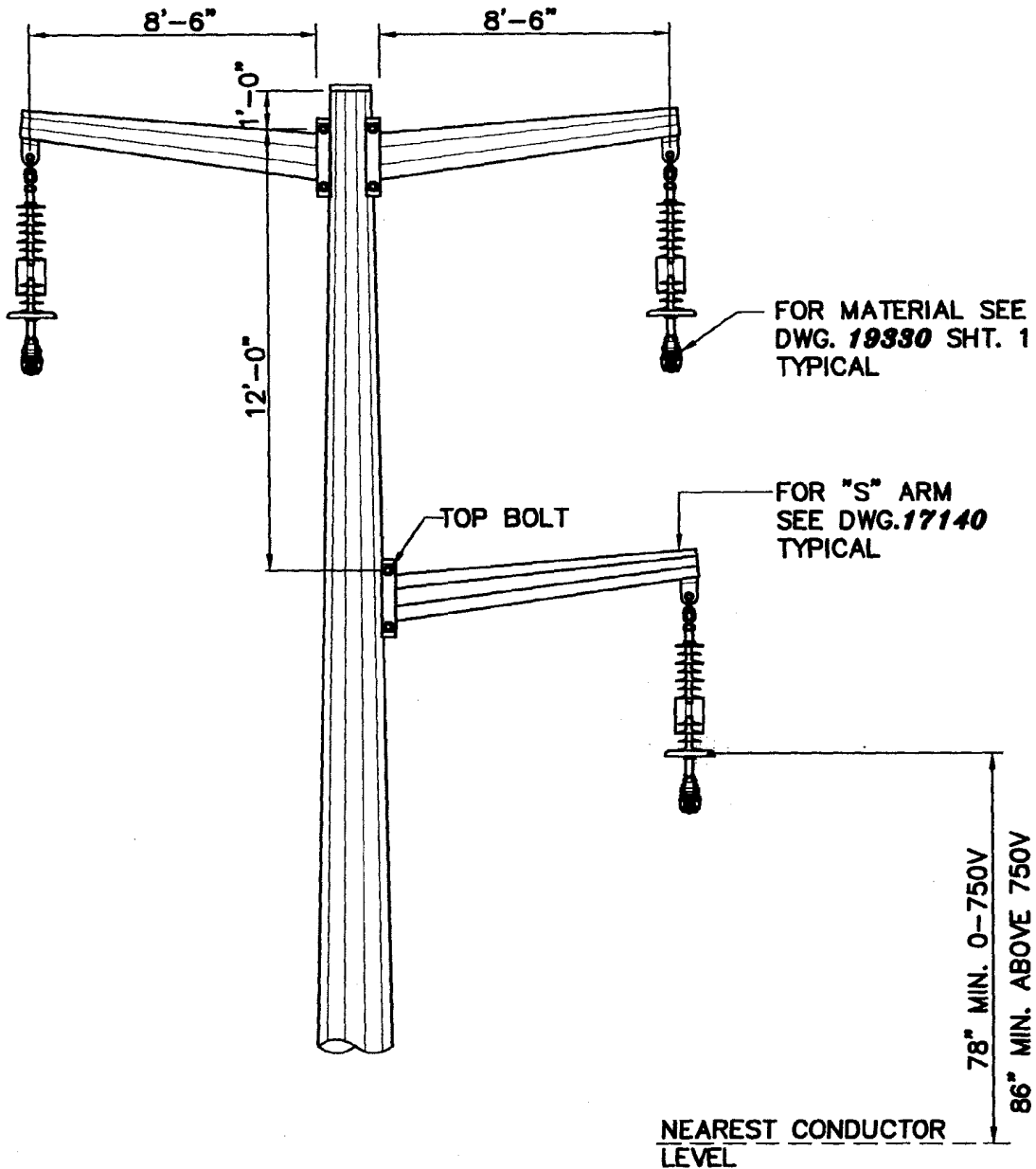


NOTES:

1. LINE ANGLE NOT TO EXCEED 3 DEGREES.
2. VERTICAL WORKING LOAD ON POST INSULATOR NOT TO EXCEED 1,000 LBS. FOR GRADE "B" AND 800 LBS. FOR GRADE "A" CONSTRUCTION, WITHOUT PRIOR APPROVAL.

A						C						
-	ORIGINAL ISSUE	FJP	DRB	WPH	3/1/00	B						
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	
SDGE	TRANSMISSION ENGINEERING							SCALE: NONE				
	POLE TOP ARRANGEMENT TYPE 2/1 WPI SINGLE CIRCUIT 138 kV STEEL POLE							DWG. NO.		SHT. NO.		
								17305		1 of 1		

17305001



NOTE

1. FOR LONG SPAN AND RUNNING ANGLE APPLICATIONS.
2. MAXIMUM INSULATOR SWING ANGLE 35° NO WIND, 55° WITH WIND.

A	ADDED CORONA RING	LLD	WPH	WPH	4/3/08						
-	ORIGINAL ISSUE	FJP	DRB	WPH	3/1/00						
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

TRANSMISSION ENGINEERING

SCALE: NONE



**POLE TOP ARRANGEMENT
TYPE 2/1 WPI SINGLE CIRCUIT
138kV STEEL POLE**

DWG. NO.

SHT. NO.

17310

1 of 1

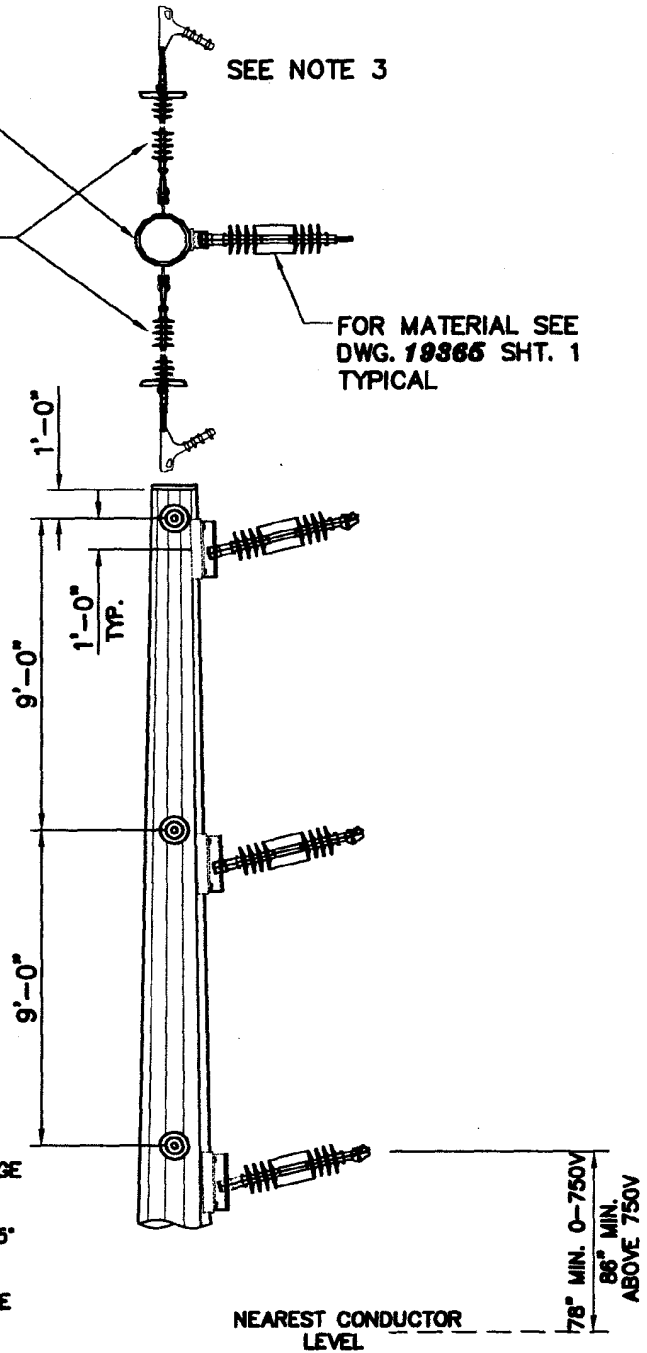
17310

STEP AND CLIMB THIS FACE.

SEE NOTE 3

FOR ASSEMBLY
DETAILS, SEE DWGS.
19340 (ACSR) &
19342 (ACSS)

FOR MATERIAL SEE
DWG. 19365 SHT. 1
TYPICAL



NOTES:

1. DO NOT ALIGN STRAIN CLAMPS OR COMP. DEADEND WITH CONDUCTOR UNDER TENSION - INSULATOR DAMAGE MAY OCCUR.
2. USE ON LINE ANGLES FROM 0° TO 75°
3. STRAIN CLAMP SHOWN, USE COMP. DEADEND FOR ACSS CONDUCTOR. SEE DWG. 19342

NEAREST CONDUCTOR
LEVEL

78" MIN. 0-750V
86" MIN.
ABOVE 750V

B	ADDED CORONA RING	LLD	WPH	<i>WPH</i>	4/3/08						
A	ADD ACSS CONDUCTORS	WDF	WPH	<i>WPH</i>	2/20/03						
-	ORIGINAL ISSUE	FJP	WPH	<i>WPH</i>	3/1/00						
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

TRANSMISSION ENGINEERING

SCALE: NONE



**POLE TOP ARRANGEMENT
TYPE YPI SINGLE CIRCUIT
138kV STEEL POLE**

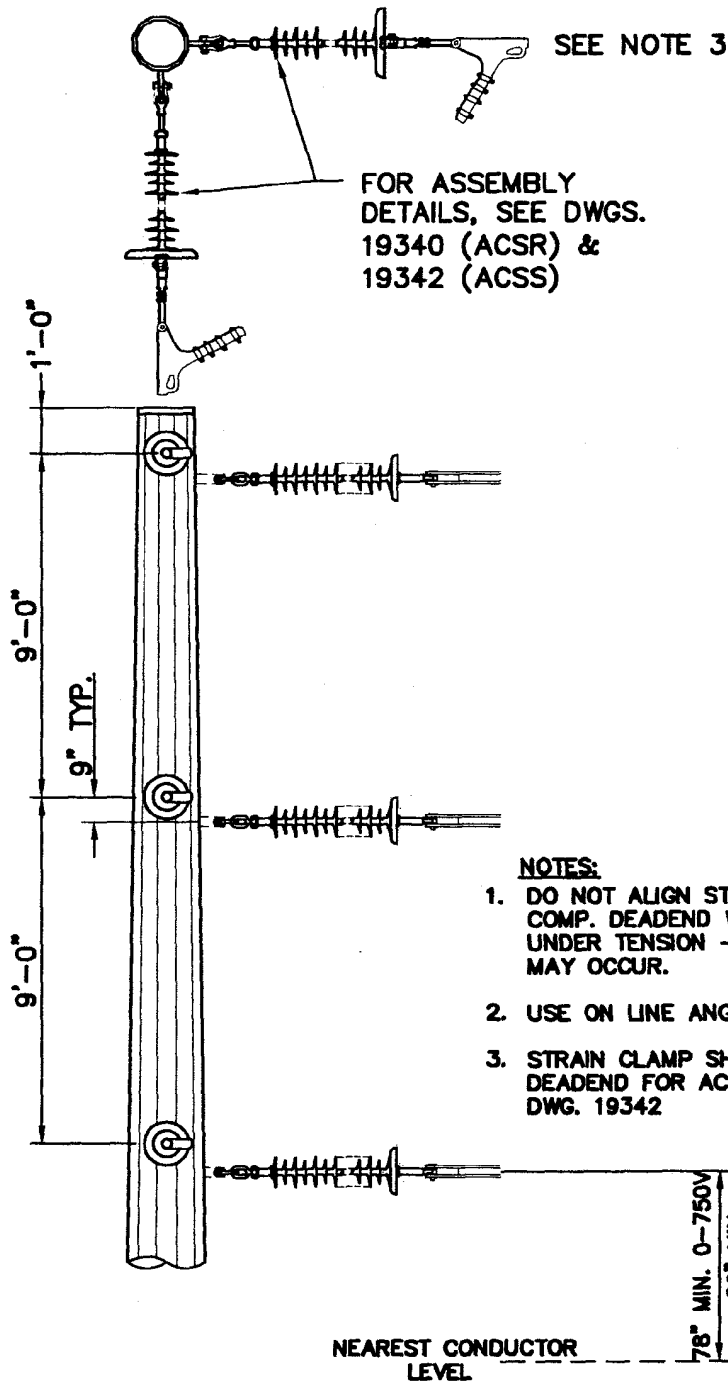
DWG. NO.

SHT. NO.

17325

1 of 1

17325

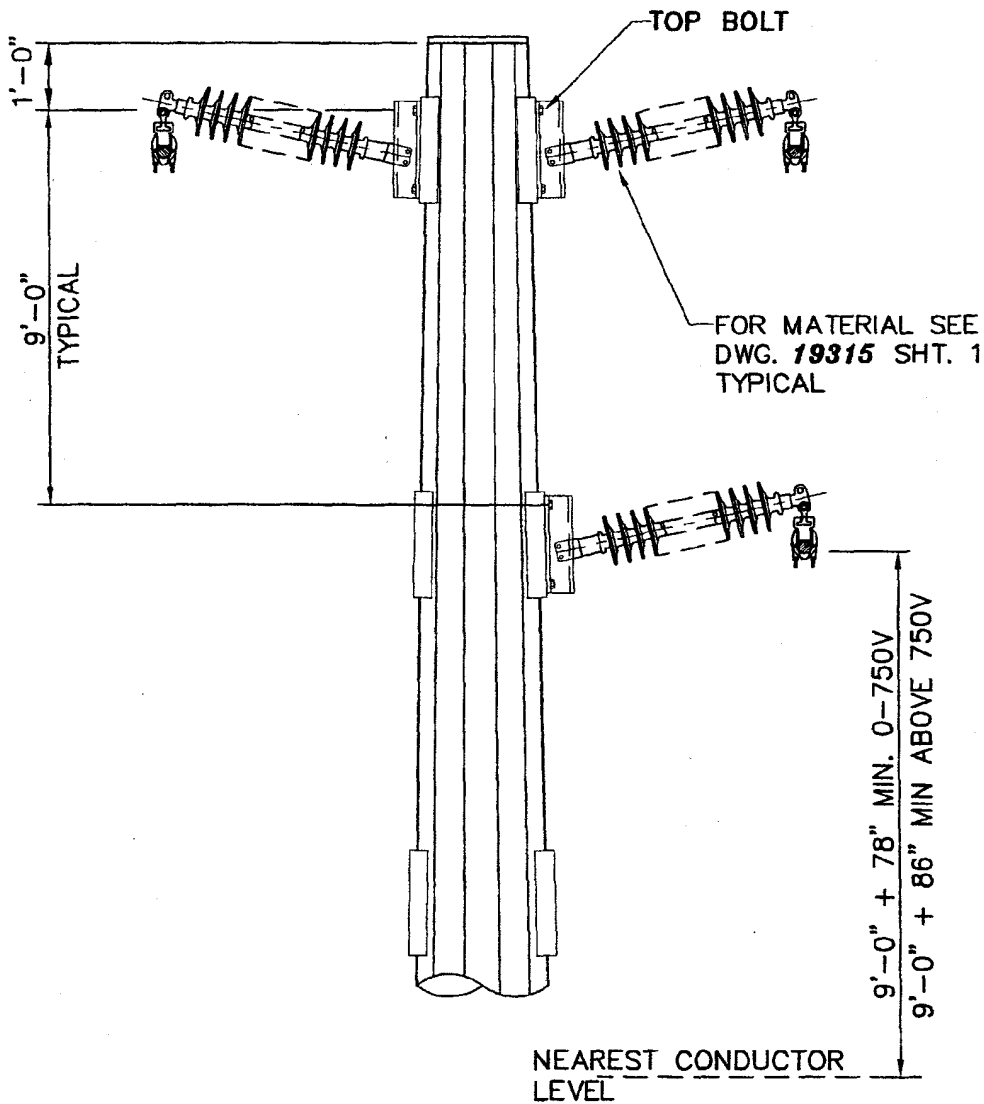


NOTES:

1. DO NOT ALIGN STRAIN CLAMPS OR COMP. DEADEND WITH CONDUCTOR UNDER TENSION - INSULATOR DAMAGE MAY OCCUR.
2. USE ON LINE ANGLES FROM 0° TO 75°
3. STRAIN CLAMP SHOWN, USE COMP. DEADEND FOR ACSS CONDUCTOR. SEE DWG. 19342

REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE
B	ADDED CORONA RING	LLD	WPH	<i>iw</i>	4/3/08						
A	ADD ACSS CONDUCTORS	WDF	WPH SFD	<i>iw</i>	2/20/03						
-	ORIGINAL ISSUE	FJP	DRB	WPH	3/1/00						

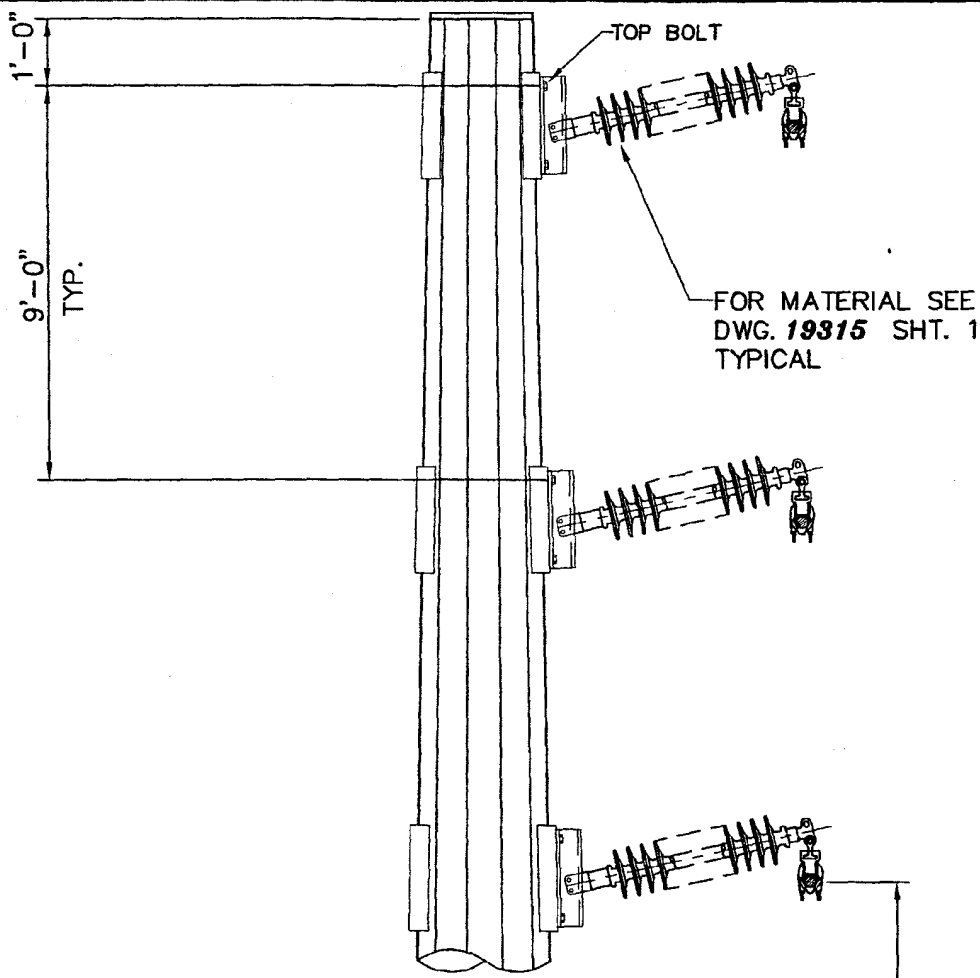
SDGE	TRANSMISSION ENGINEERING	SCALE: NONE		17330
	POLE TOP ARRANGEMENT	DWG. NO.	SHT. NO.	
	TYPE Y SINGLE CIRCUIT	17330	1 of 1	
	138kV STEEL POLE			



NOTES:

1. LINE ANGLE NOT TO EXCEED 3 DEGREES.
2. VERTICAL WORKING LOAD ON POST INSULATOR NOT TO EXCEED 1,000 LBS. FOR GRADE "B" AND 800 LBS FOR GRADE "A" CONSTRUCTION, WITHOUT PRIOR APPROVAL.

A						C							
-	ORIGINAL ISSUE	FJP	DRB	WPH	3/1/00	B							
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE		
SDGE		TRANSMISSION ENGINEERING					SCALE: NONE						
		POLE TOP ARRANGEMENT					DWG. NO.		SHT. NO.				
		TYPE 2/1 WPI (DC)					17345		1 of 1				
SGL. CKT. CONVERTIBLE TO DBL. CKT.													17345001
138KV STEEL POLE													



NOTES:

1. LINE ANGLE NOT TO EXCEED 3 DEGREES.
2. VERTICAL WORKING LOAD ON POST INSULATOR NOT TO EXCEED 1,000 LBS. FOR GRADE "B" AND 800 LBS. FOR GRADE "A" CONSTRUCTION, WITHOUT PRIOR APPROVAL.

78" MIN. 0-750V
86" MIN ABOVE 750V

NEAREST CONDUCTOR
LEVEL

A						C						
-	ORIGINAL ISSUE	FJP	DRB	WPH	3/1/00	B						
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	



TRANSMISSION ENGINEERING

POLE TOP ARRANGEMENT
TYPE HALF WPI (DC) SINGLE CIRCUIT
138kV STEEL POLE

SCALE: NONE

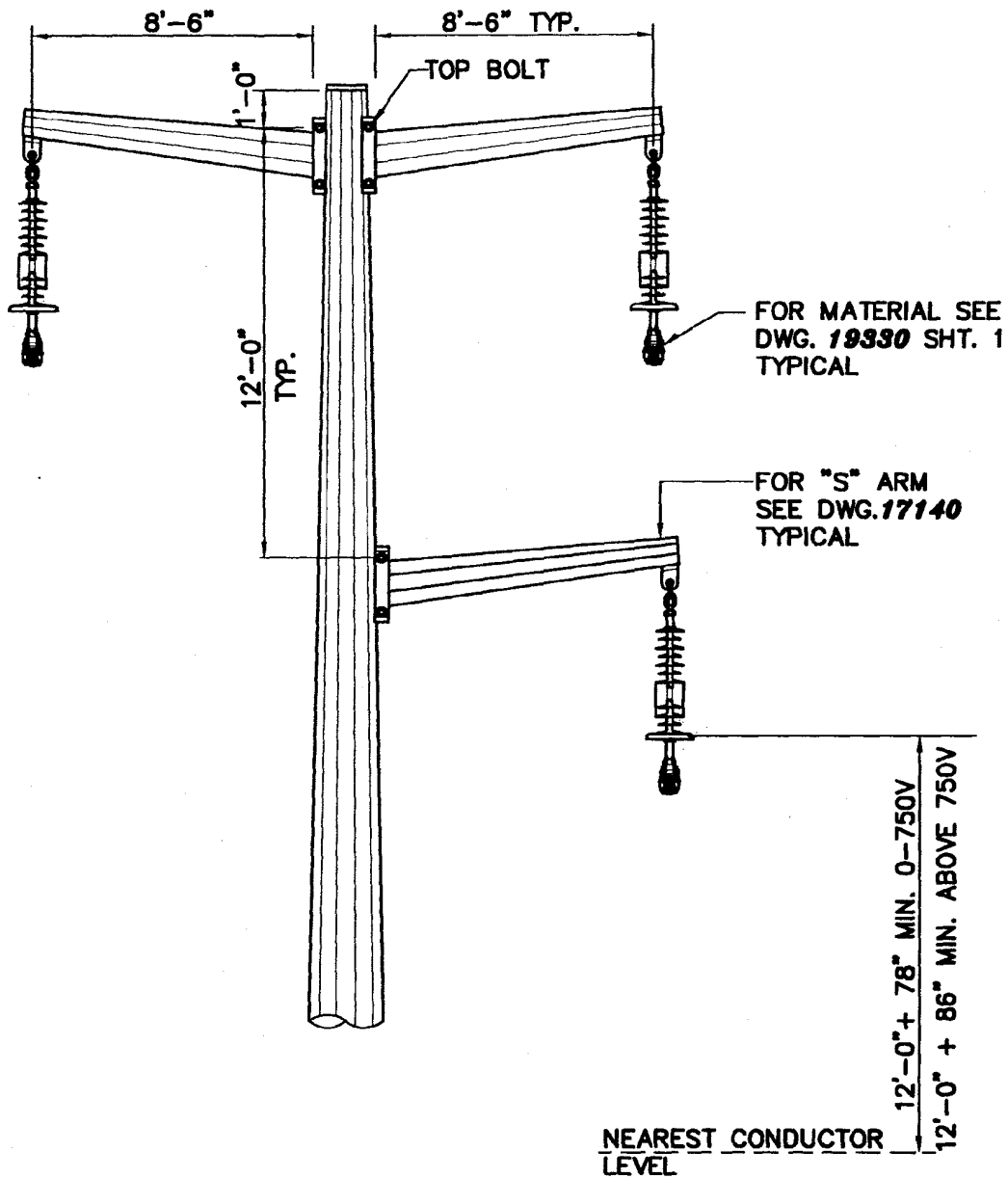
DWG. NO.

SHT. NO.

17350

1 of 1

17350001



NOTE

1. FOR LONG SPAN AND RUNNING ANGLE APPLICATIONS.
2. MAXIMUM INSULATOR SWING ANGLE 35° NO WIND, 55° WITH WIND.

A	ADDED CORONA RING	LLD	WPH	<i>WPH</i>	4/3/08						
-	ORIGINAL ISSUE	FJP	DRB	WPH	3/1/00						
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

TRANSMISSION ENGINEERING

SCALE: NONE



**POLE TOP ARRANGEMENT TYPE 2/1 W (DC)
SINGLE CIRCUIT ON DOUBLE CIRCUIT POLE
138kV STEEL POLE**

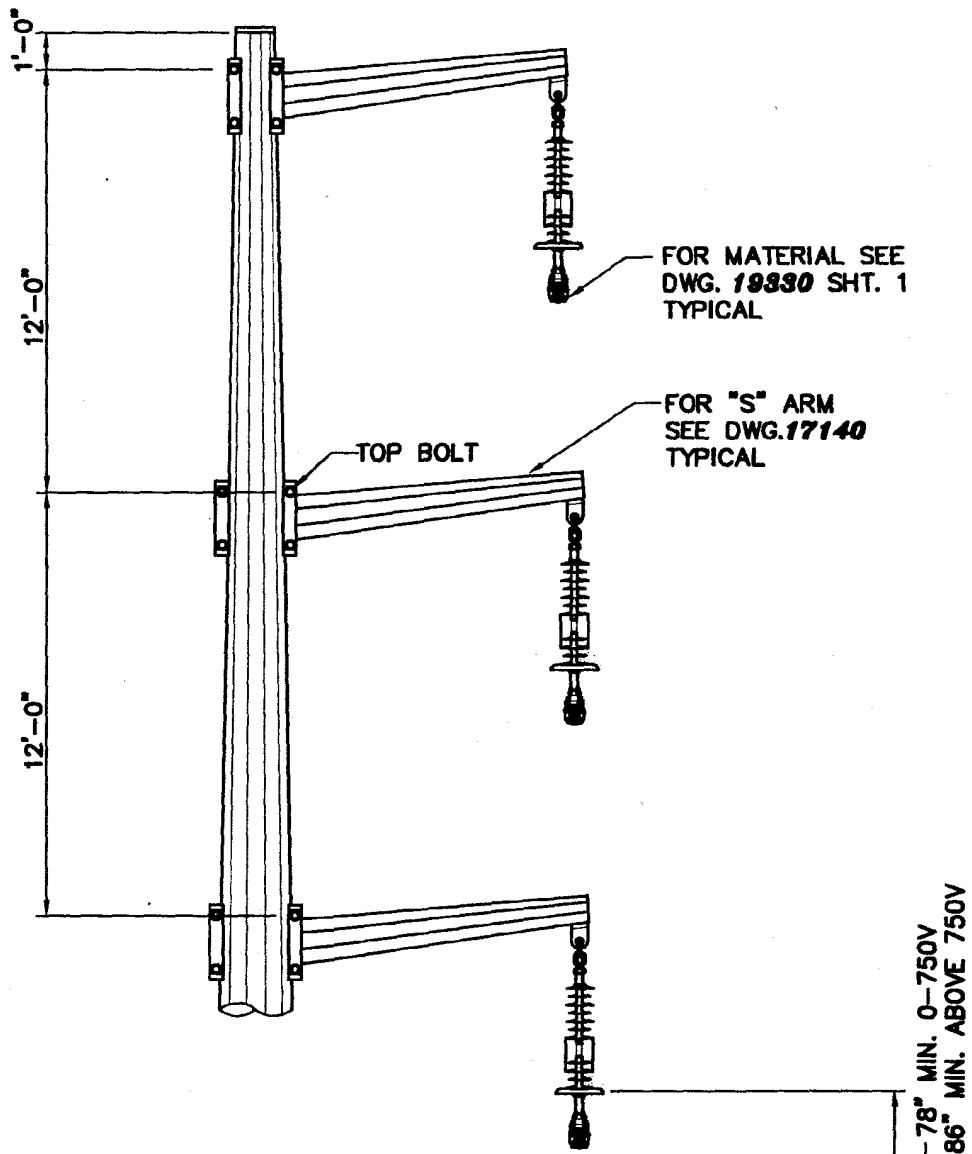
DWG. NO.

SHT. NO.

17355

1 of 1

17355



NOTES

1. FOR LONG SPAN AND RUNNING ANGLE APPLICATIONS.
2. MAXIMUM INSULATOR SWING ANGLE 35° NO WIND, 55° WITH WIND.

NEAREST CONDUCTOR
LEVEL

A	ADDED CORONA RING	LLD	WPH	lvw	4/3/08						
	ORIGINAL ISSUE	FJP	DRB	WPH	3/1/00						
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

TRANSMISSION ENGINEERING

SCALE: NONE



**POLE TOP ARRANGEMENT, TYPE HALF W (DC)
SINGLE CIRCUIT ON DOUBLE CIRCUIT POLE
138kV STEEL POLE**

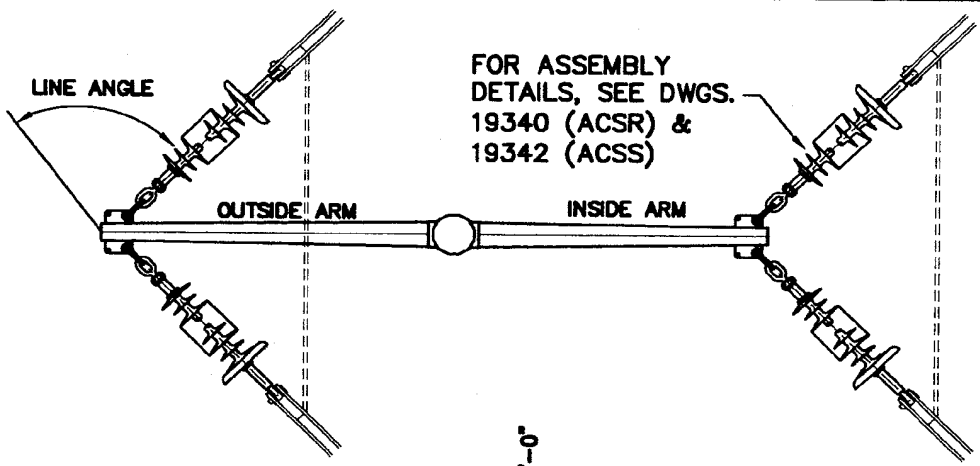
DWG. NO.

SHT. NO.

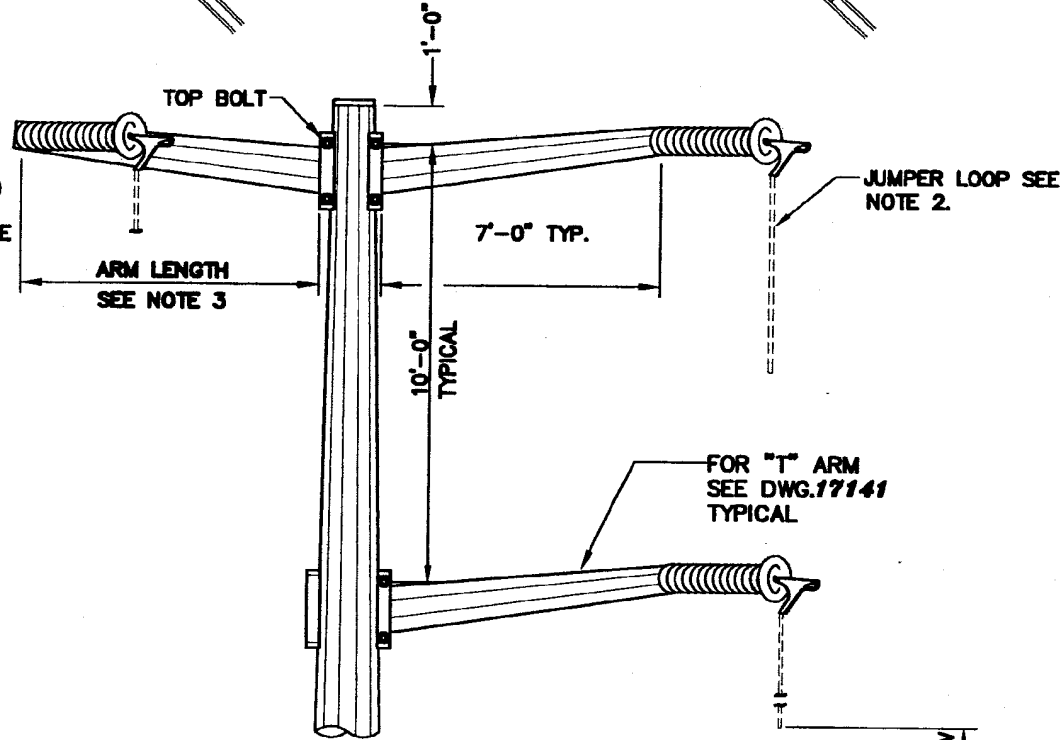
17360

1 of 1

17360



NOTE:
STRAIN CLAMP SHOWN, USE COMP. DEADEND FOR ACSS CONDUCTOR, SEE DWG. 19342



NOTES:

1. DO NOT ALIGN STRAIN CLAMPS OR COMP. DEADEND WITH CONDUCTOR UNDER TENSION -INSULATOR DAMAGE MAY OCCUR.
2. MAINTAIN A 3'-7" MINIMUM CLEARANCE FROM JUMPER LOOPS TO CROSSARMS AND POLE SHAFT.

3. OUTSIDE ARM	LINE ANGLE	INSIDE ARM	TYPE
7'-0"	0°-30°	7'-0"	2/1 X30 (DC-R)
8'-6"	0°-60°	7'-0"	2/1 X80 (DC-R)
10'-0"	0°-90°	7'-0"	2/1 X90 (DC-R)

NEAREST CONDUCTOR LEVEL
10'-0" +78" MIN. 0-750V
10'-0" +86" MIN. ABOVE 750V

REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE
B	ADDED CORONA RING	LLD	WPH	mit	4/3/08						
A	ADD ACSS CONDUCTORS	WDF	SFO WPH	mit	2/20/03						
-	ORIGINAL ISSUE	FJP	DRB	WPH	3/1/00						

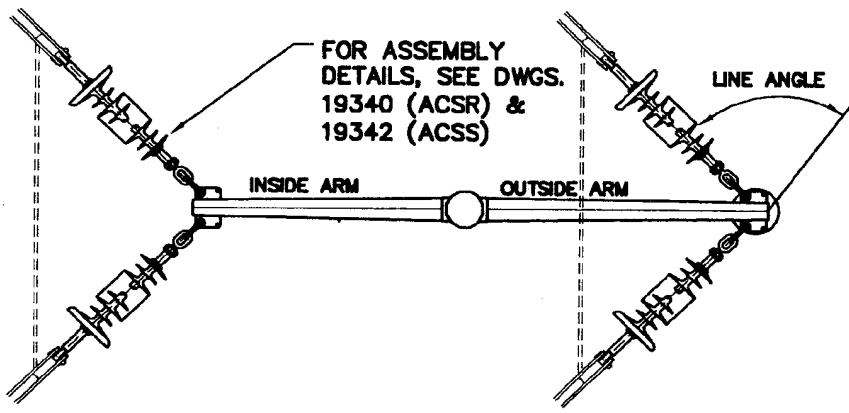
TRANSMISSION ENGINEERING

SCALE: NONE

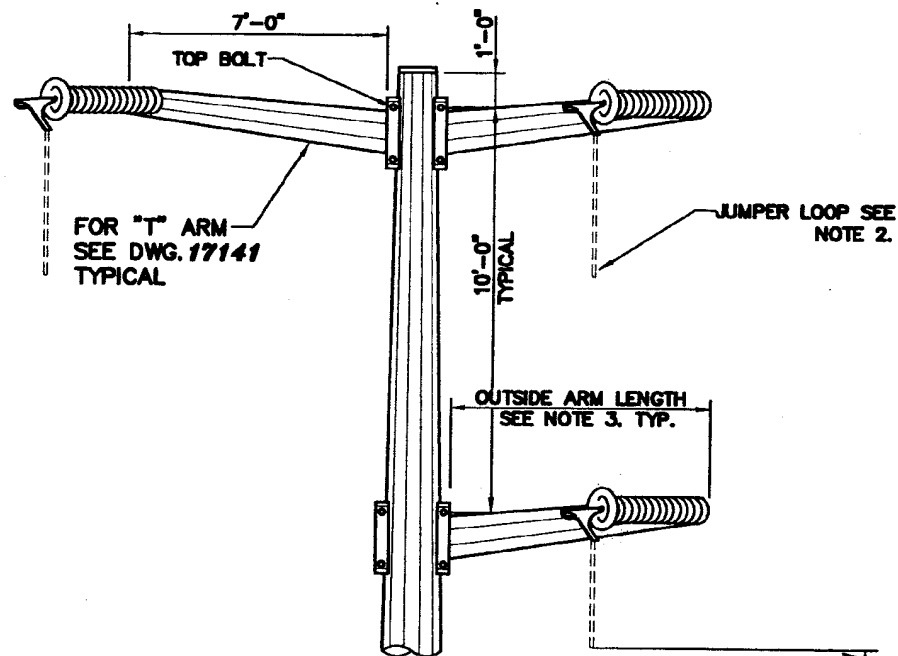
SDGE POLE TOP ARRANGEMENT, TYPE 2/1 X 30 60 90 (DCR) SINGLE CIRCUIT ON DOUBLE CIRCUIT POLE 138kV STEEL POLE

DWG. NO.	SHT. NO.
17365	1 of 1

17365



NOTE:
STRAIN CLAMP
SHOWN, USE
COMP. DEADEND
FOR ACSS
CONDUCTOR, SEE
DWG. 19342



NOTES:

- DO NOT ALIGN STRAIN CLAMPS OR COMP. DEADEND WITH CONDUCTOR UNDER TENSION - INSULATOR DAMAGE MAY OCCUR. MAINTAIN A 3'-7" MINIMUM CLEARANCE FROM JUMPER LOOPS TO CROSSARMS AND POLE SHAFT.

INSIDE ARM	LINE ANGLE	OUTSIDE ARM	TYPE
7'-0"	0°-30°	7'-0"	2/1 X30 (DC-L)
7'-0"	30°-60°	8'-6"	2/1 X60 (DC-L)
7'-0"	60°-90°	10'-0"	2/1 X90 (DC-L)

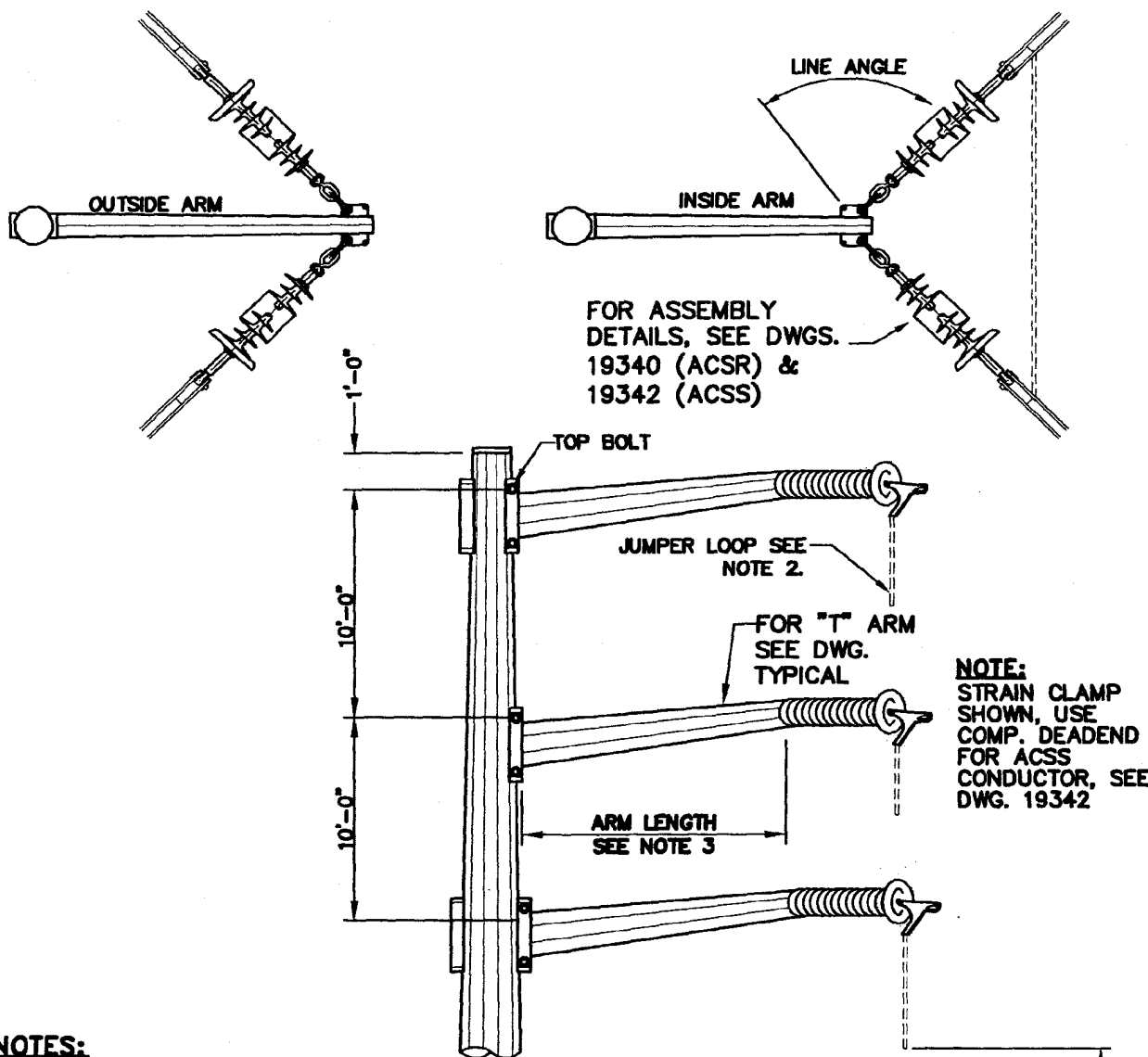
NEAREST CONDUCTOR LEVEL
10'-0" + 78" MIN. 0-750V
10'-0" + 80" MIN. ABOVE 750V (FOR ENTIRE SPAN)

REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE
A	ADDED CORONA RING	LLD	WPH	✓	4/3/08						
-	ORIGINAL ISSUE	FJP	DRB	WPH	3/1/00						

TRANSMISSION ENGINEERING

SCALE: NONE

	POLE TOP ARRANGEMENT, TYPE 2/1 X 30 60 90 (DC-L) SINGLE CIRCUIT ON DOUBLE CIRCUIT POLE 138KV STEEL POLE	DWG. NO. 17366	SHT. NO. 1 of 1	17366



NOTES:

1. DO NOT ALIGN STRAIN CLAMPS OR COMP. DEADEND WITH CONDUCTOR UNDER TENSION -INSULATOR DAMAGE MAY OCCUR.
2. MAINTAIN A 3'-7" MINIMUM CLEARANCE FROM JUMPER LOOPS TO CROSSARMS AND POLE SHAFT.
3. **INSIDE ARM LINE ANGLE** **OUTSIDE ARM** **TYPE**

7'-0"	0°-30°	7'-0"	HALF X30 (DC)
8'-6"	0°-60°	7'-0"	HALF X60 (DC)
10'-0"	0°-90°	7'-0"	HALF X90 (DC)

NEAREST CONDUCTOR LEVEL

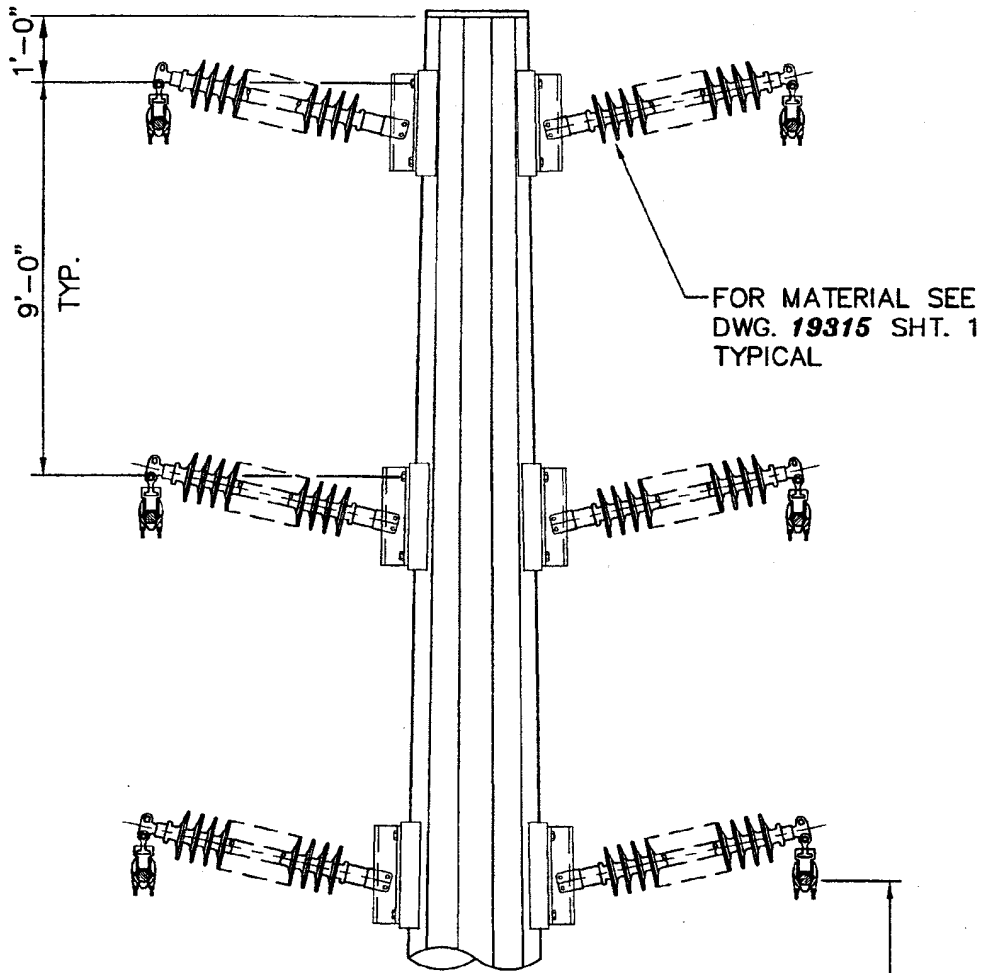
B	ADDED CORONA RING	LLD	WPH	kwj	4/3/08						
A	ADD ACSS CONDUCTORS	WDF	SFO	WPH	kwj	2/20/03					
-	ORIGINAL ISSUE	FJP	DRB	WPH	3/1/00						
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

TRANSMISSION ENGINEERING

SCALE: NONE

SDGE	POLE TOP ARRANGEMENT, TYPE 2/1 X 30 60 90 SINGLE CIRCUIT ON DOUBLE CIRCUIT POLE 138KV STEEL POLE	DWG. NO.	SHT. NO.	17370
		17370	1 of 1	

17370



NOTES:

1. LINE ANGLE NOT TO EXCEED 3 DEGREES.
2. VERTICAL WORKING LOAD ON POST INSULATOR NOT TO EXCEED 1,000 LBS. FOR GRADE "B" AND 800 LBS. FOR GRADE "A" CONSTRUCTION, WITHOUT PRIOR APPROVAL.

NEAREST CONDUCTOR LEVEL

78" MIN. 0-750V
86" MIN ABOVE 750V

A						C						
-	ORIGINAL ISSUE	WDF	WPH	WYT	4/25/02	B						
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	



TRANSMISSION ENGINEERING

POLE TOP ARRANGEMENT
TYPE DC-WPI DOUBLE CIRCUIT
138kV STEEL POLE

SCALE: NONE

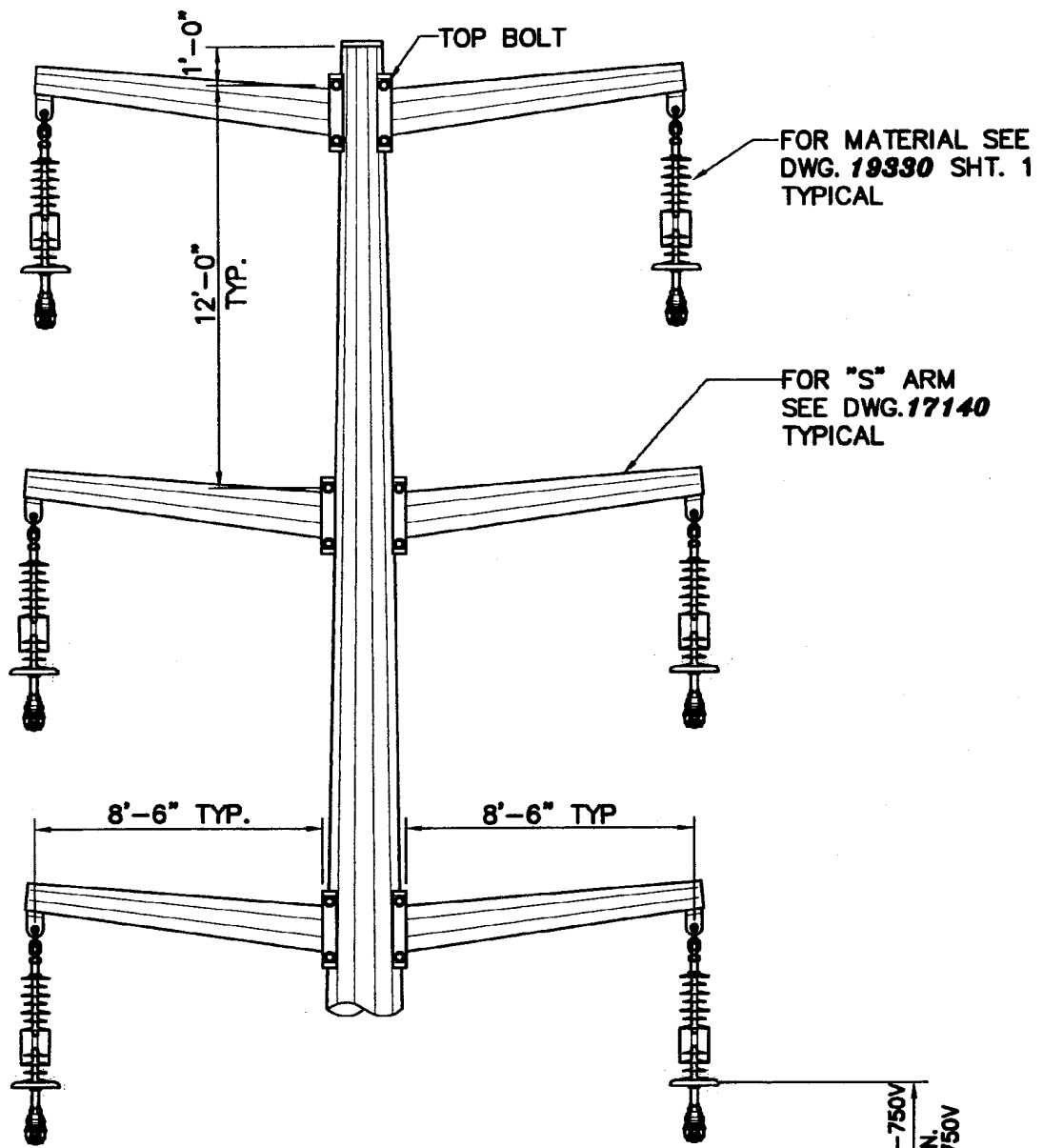
DWG. NO.

SHT. NO.

17380

1 of 1

17380001



NOTES

1. FOR LONG SPAN AND RUNNING ANGLE APPLICATIONS.
2. MAXIMUM INSULATOR SWING ANGLE
35° NO WIND, 55° WITH WIND.

NEAREST CONDUCTOR LEVEL
78" MIN. 0-750V
86" MIN. ABOVE 750V

A	ADDED CORONA RING	LLD	WPH	WPH	4/3/08								
-	ORIGINAL ISSUE	FJP	DRB	WPH	3/1/00								
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE		

TRANSMISSION ENGINEERING

SCALE: NONE

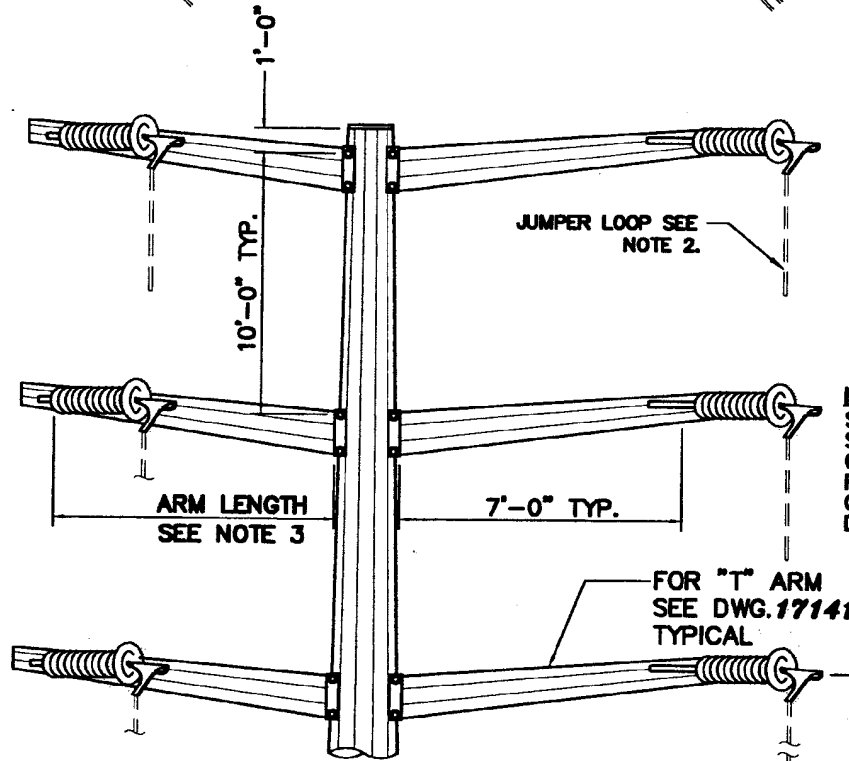
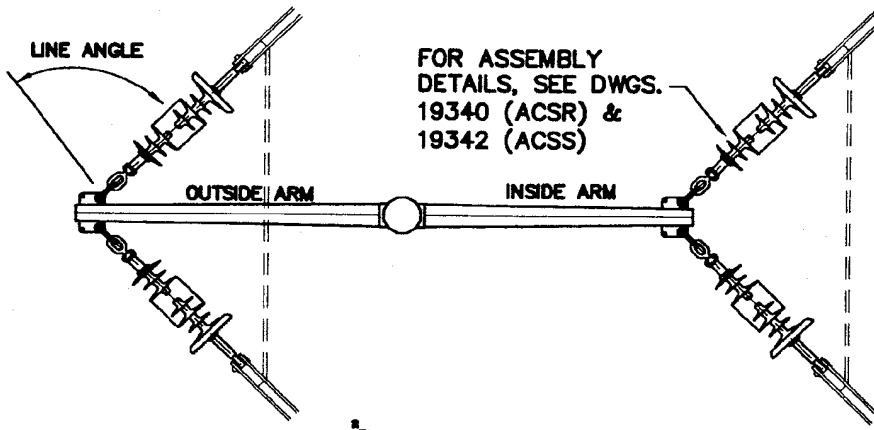


**POLE TOP ARRANGEMENT
TYPE DC-W DOUBLE CIRCUIT
138kV STEEL POLE**

DWG. NO.
17385

SHT. NO.
1 of 1

17385



NOTES:

- DO NOT ALIGN STRAIN CLAMPS OR COMP. DEADEND WITH CONDUCTOR UNDER TENSION - INSULATOR DAMAGE MAY OCCUR.
- MAINTAIN A 3'-7" MINIMUM CLEARANCE FROM JUMPER LOOPS TO CROSSARMS AND POLE SHAFT.
- OUTSIDE ARM** **LINE ANGLE** **INSIDE ARM** **TYPE**

7'-0"	0°-30°	7'-0"	DC-X30
8'-6"	0°-60°	7'-0"	DC-X80
10'-0"	0°-90°	7'-0"	DC-X90

NEAREST CONDUCTOR LEVEL

7'8" MIN. 0-750V
8'6" MIN.
ABOVE 750V

B	ADDED CORONA RING	LLD	WPH	lev	4/3/08						
A	ADD ACSS CONDUCTORS	WDF	SFO WPH	dv	2/20/03						
-	ORIGINAL ISSUE	FJP	DRB	WPH	3/1/00						
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

TRANSMISSION ENGINEERING

SCALE: NONE



POLE TOP ARRANGEMENT
TYPE DC-X 30 60 90 DOUBLE CIRCUIT
138KV STEEL POLE

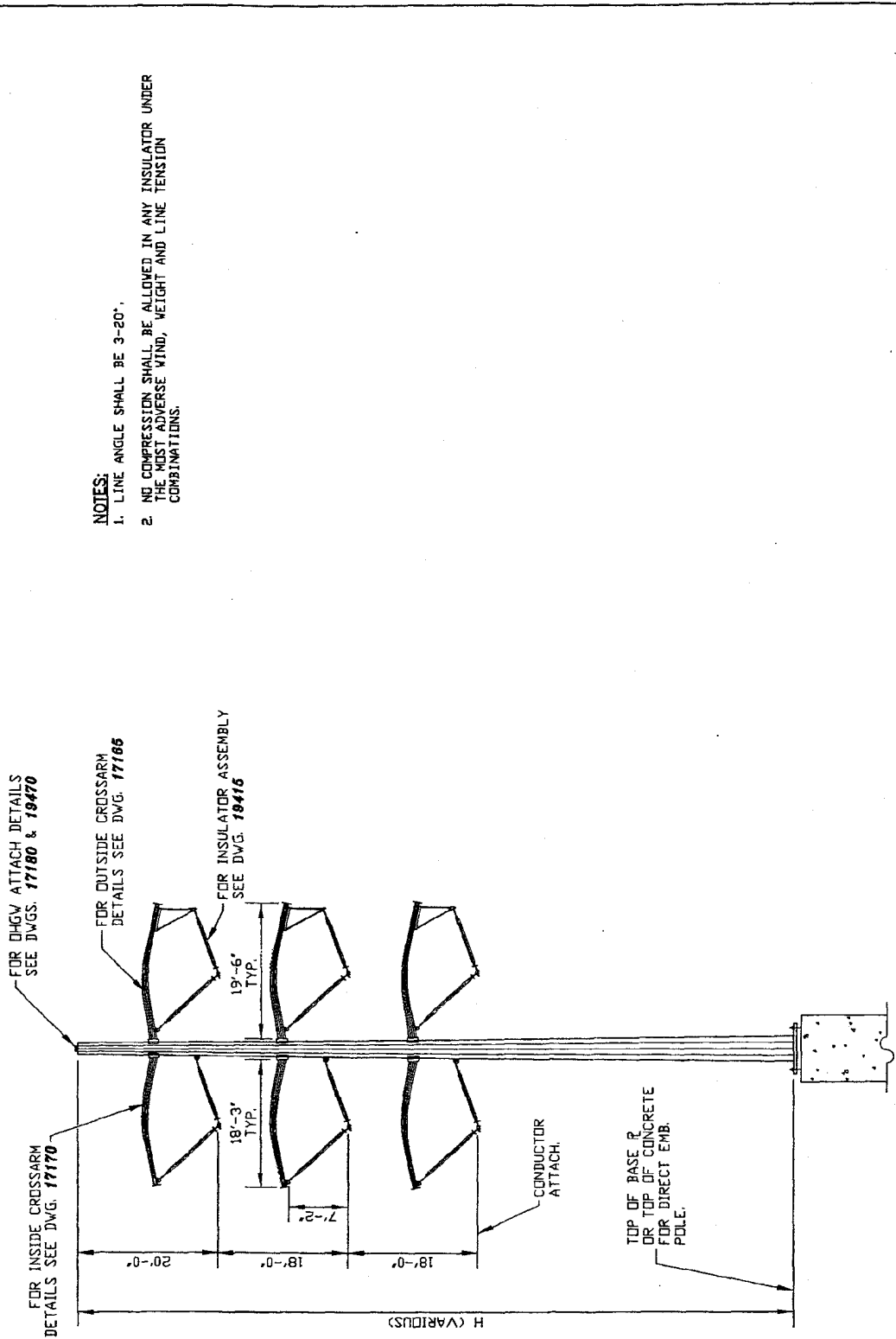
DWG. NO.

SHT. NO.

17390

1 of 1

17390



NOTES:
 1. LINE ANGLE SHALL BE 3-20°.
 2. NO COMPRESSION SHALL BE ALLOWED IN ANY INSULATOR UNDER THE MOST ADVERSE WIND, WEIGHT AND LINE TENSION COMBINATIONS.

A		E		D		C		BY CHKD/APPV		DATE		REV		DATE		REV	
B		PM		7/1/04		7/1/04		BY CHKD/APPV		DATE		REV		DATE		REV	
-		PM		7/1/04		7/1/04		BY CHKD/APPV		DATE		REV		DATE		REV	
REV		CHANGE		CHANGE		CHANGE		BY CHKD/APPV		DATE		REV		DATE		REV	
TRANSMISSION ENGINEERING POLE TOP ARRANGEMENT LIGHT ANGLE STRUCTURE, DOUBLE CIRCUIT 230KV STEEL POLE																	
SCALE: NONE DWG. NO. 17410 SHT. NO. 1 of 1																	



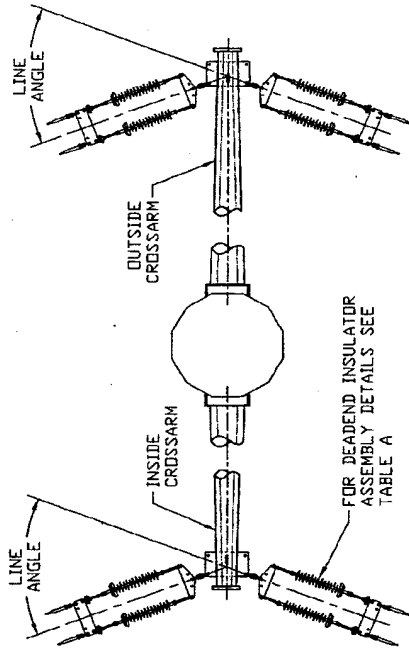
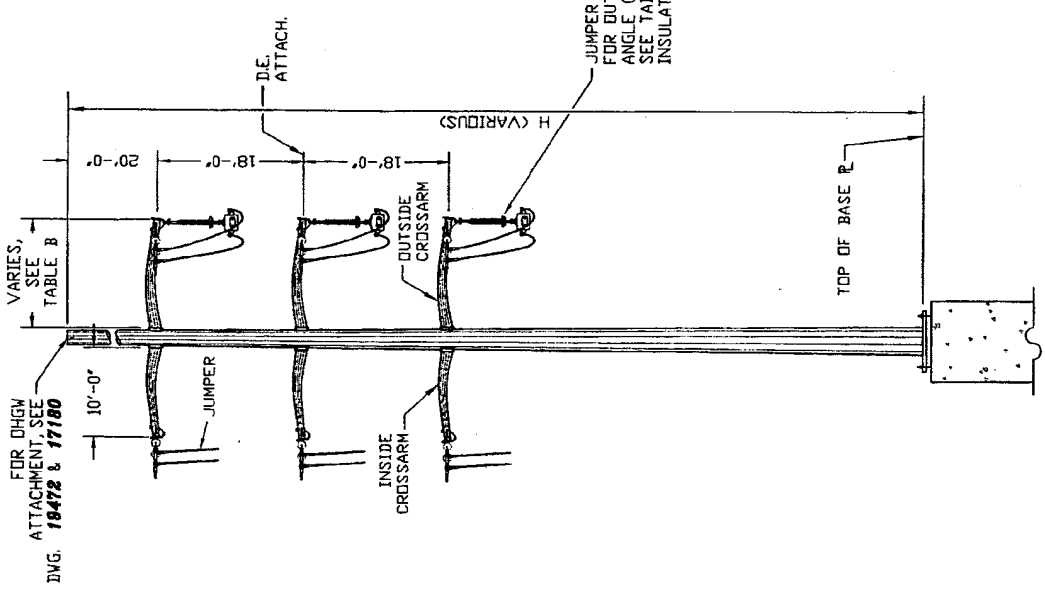
17410-01

TABLE B
OUTSIDE CROSSARM LENGTH

LINE ANGLE	ARM LENGTH
0°-30°	10'
30°-60°	12'
60°-90°	14'

TABLE A- INSULATOR ASSEMBLIES

ITEM	STD. NO.	DESCRIPTION
1	19440	POLYMER 1-STRING JUMPER INSULATOR, SINGLE CONDUCTOR
2	19445	POLYMER 1-STRING JUMPER INSULATOR, 2-BUNDLE CONDUCTORS
3	19452	POLYMER DEADEND INSULATOR SINGLE CONDUCTOR - ACSR
4	19454	POLYMER DEADEND INSULATOR SINGLE CONDUCTOR - ACSS
5	19456	POLYMER DEADEND INSULATOR 2-BUNDLE CONDUCTORS - ACSR
6	19458	POLYMER DEADEND INSULATOR 2-BUNDLE CONDUCTORS - ACSS




NOTES:

1. MAX. LINE ANGLE SHALL BE LESS THAN 90°, UNLESS OTHERWISE APPROVED.
2. REFER TO DWG. NO. 17178 FOR CROSSARM DETAILS.
3. REFER TO JOB PACKAGE FOR CONDUCTOR TYPE AND CONFIGURATION.

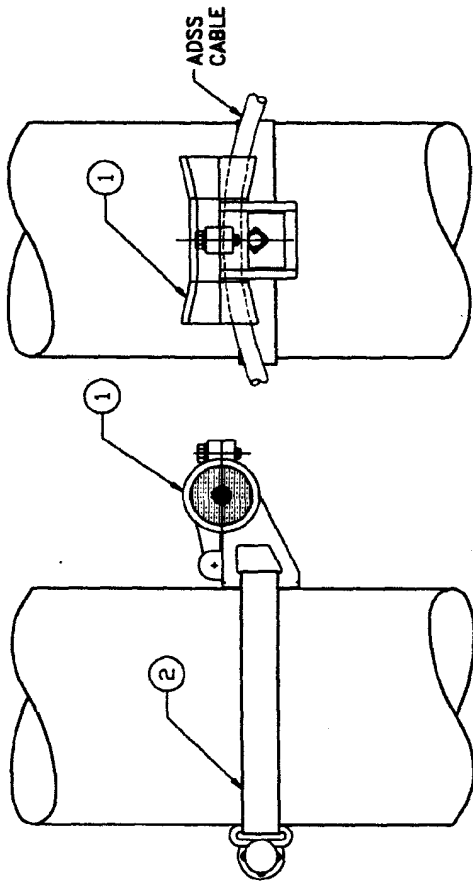
SDGE		TRANSMISSION ENGINEERING		SCALE: NONE	DWG. NO. 17415	SHT. NO. 1 of 1
POLE TOP ARRANGEMENT		D.E./STRAIN STRUCTURE, DOUBLE CIRCUIT		230KV STEEL POLE		
REV	BY	CHKD	APPV	DATE	CHANGE	
A	PM	SM		7/1/04		
B						

Communications

<u>DWG. NO.</u>	<u>REV.</u>	<u>TITLE</u>	<u>NO. OF SHEETS</u>
18000	O	COMMUNICATIONS SECTION TABLE OF CONTENTS	1
18010	A	FIBER OPTIC – ADSS TRUNNION SUSPENSION STRAP – MOUNTED	1
18020	A	FIBER OPTIC – ADSS WEDGE DEAD-END	1
18022	A	FIBER OPTIC – ADSS WEDGE DEAD-END STRAP – MOUNTED	1
18026	O	FIBER OPTIC – ADSS SPLICE BOX – WOOD POLE	1
18028	A	FIBER OPTIC – ADSS SPLICE BOX – STEEL POLE	1

						C					
--	ORIGINAL ISSUE	RLR	WPH	<i>WVT</i>	11/20/07	B					
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE
TRANSMISSION ENGINEERING						SCALE:					
		COMMUNICATIONS SECTION TABLE OF CONTENTS				DWG. NO		SHEET NO.			
						18000		1 OF 1			

BILL OF MATERIAL				
ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
1	SEE TABLE A	SEE TABLE A	TRUNNION, STRAP-MOUNTED	356
2	1	AFL BK03-1016 (SEE NOTE 6)	BAND KIT, USABAND 812432, 1-1/4" X 0.044", S.S., W/ALUM. BUCKLES & 9/16" DIA. HOT-DIP GALV. STEEL BOLT, DIA. RANGE 10"-16"	356
TABLE A				
ADSS CABLE, 0.575" DIA., 9,000# RBS (STOCK #196760)				
1	1	AFL ATGN 526/575	TRUNNION, STRAP MOUNTED, CABLE RANGE 0.526"-0.575"	356
ADSS CABLE, 0.685" DIA., 16,000# RBS (STOCK #196742)				
1	1	AFL ATGN 675/725	TRUNNION, STRAP-MOUNTED, CABLE RANGE 0.675"-0.725"	356



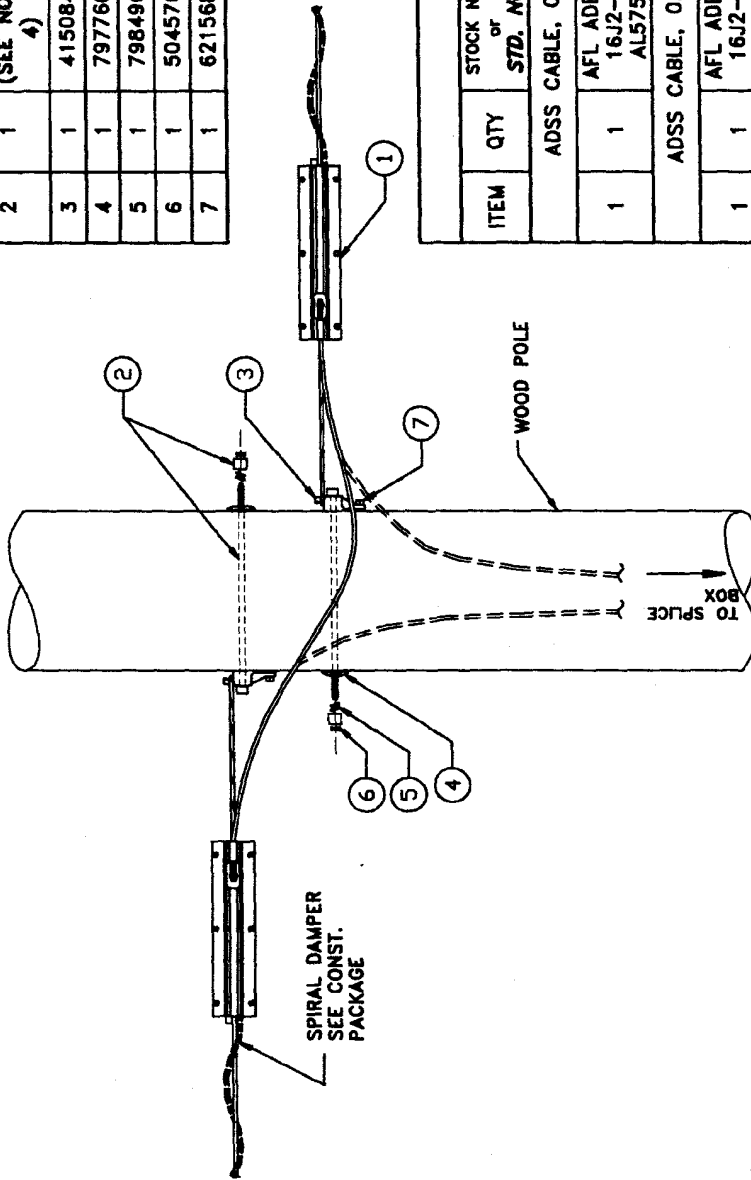
- NOTES:**
1. MAX. SPAN SHALL NOT EXCEED 600' UNLESS OTHERWISE APPROVED.
 2. MAX. LINE ANGLE - 22°.
 3. GUY, WHERE REQUIRED, SHALL BE INSTALLED 6" BELOW POLE BAND AS PER DWG 16300.
 4. REFER TO DWG 12660 FOR CLEARANCE REQUIREMENTS.
 5. SEE CONSTRUCTION PACKAGE FOR VIBRATION DAMPER REQUIREMENTS. FOR STEEL POLES WITH LARGER DIAMETERS, USE THE LAST 4 DIGITS IN THE PART NUMBER TO SPECIFY DIAMETER RANGE OF THE BAND KIT. EXAMPLE: AFL BK03-1624 DENOTES A DIAMETER RANGE OF 16"-24".

REV	BY	CHKD	DATE	DATE	REV	CHANCE	BY	CHKD	DATE	DATE	SCALE	SCALE
B					E						NONE	NONE
A	PM	PM	04/07	04/07	D						DWG. NO.	SMT. NO.
	ORIGINAL	PM	04/07	04/07	C						18010	1 of 1
	CHANCE	BY	CHKD	DATE	DATE	REV	CHANCE	BY	CHKD	DATE		



TRANSMISSION ENGINEERING
 FIBER OPTIC - ADSS
 TRUNNION SUSPENSION
 STRAP-MOUNTED

- NOTES:**
1. MAX ALLOWABLE CABLE TENSION SHALL NOT EXCEED 2400#.
 2. REFER TO *DWG 12660* FOR CLEARANCE REQUIREMENTS.
 3. QUANTITIES SHOWN ARE FOR ONE DEAD-END ASSEMBLY ON ONE SIDE.
 4. ORDER LONGER BOLT FOR LARGER STEEL POLE.



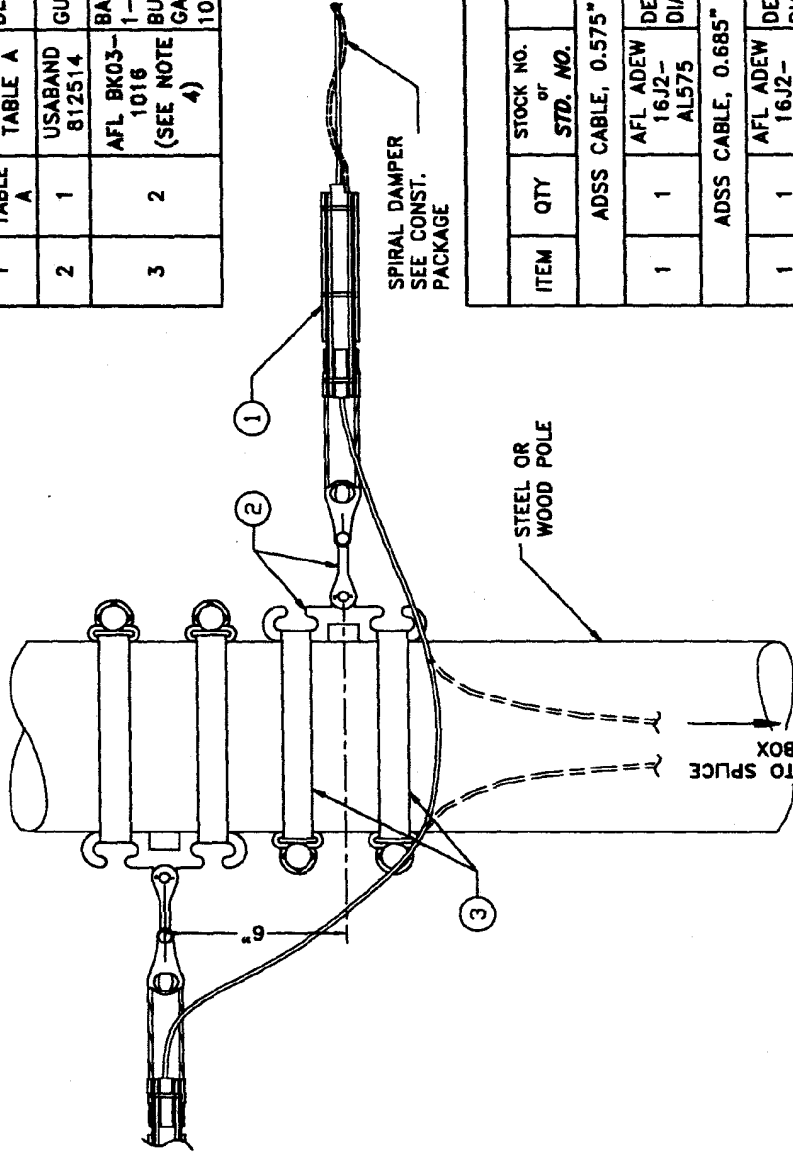
BILL OF MATERIAL				
ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
1	SEE TABLE A	SEE TABLE A	DEAD-END, WEDGE, 16"	356
2	1	153440 (SEE NOTE 4)	BOLT, MACHINE, 3/4" X 14", W/SQUARE NUT	356
3	1	415084	HOOK, GUY, 3/4" W/LAG HOLE	356
4	1	797760	WASHER, 4" SQ., CURVED, RIB	356
5	1	798496	WASHER, 3/4", DOUBLE COIL SPRING	356
6	1	504576	M NUT, LOCK, MF, 3/4"	356
7	1	621568	SCREW, LAG, 1/2" X 4"	356

TABLE A				
ITEM	QTY	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
ADSS CABLE, 0.575" DIA., 9,000# RBS (STOCK #196760)				
1	1	AFL ADEW 16J2-AL575	DEAD-END, WEDGE, 16", FOR CABLE DIA. 0.575"	356
ADSS CABLE, 0.685" DIA., 16,000# RBS (STOCK #196742)				
1	1	AFL ADEW 16J2-AL685	DEAD-END, WEDGE, 16", FOR CABLE DIA. 0.685"	356

B		E		SCALE: NONE	
A		D		DWG. NO. 18020	
REV		C		SHEET NO. 1 of 1	
DESCRIPTION		DATE		BY	
ORIGINAL		12/4/07		CEG/APPY	
UPDATE ITEM 2		12/4/07		CEG/APPY	
DATE		DATE		DATE	
BY		BY		BY	
CEG		APPY		APPY	
DATE		DATE		DATE	
12/4/07		12/4/07		12/4/07	
BY		BY		BY	
CEG		APPY		APPY	
DATE		DATE		DATE	
12/4/07		12/4/07		12/4/07	
BY		BY		BY	
CEG		APPY		APPY	
DATE		DATE		DATE	
12/4/07		12/4/07		12/4/07	
BY		BY		BY	
CEG		APPY		APPY	
DATE		DATE		DATE	
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BY		BY		BY	
CEG		APPY		APPY	
DATE		DATE		DATE	
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BY		BY		BY	
CEG		APPY		APPY	
DATE		DATE		DATE	
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BY		BY		BY	
CEG		APPY		APPY	
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BY		BY		BY	
CEG		APPY		APPY	
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BY		BY		BY	
CEG		APPY		APPY	
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BY		BY		BY	
CEG		APPY		APPY	
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BY		BY		BY	
CEG		APPY		APPY	
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CEG		APPY		APPY	
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CEG		APPY		APPY	
DATE		DATE		DATE	
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CEG		APPY		APPY	
DATE		DATE		DATE	
12/4/07		12/4/0			

NOTE:

1. MAX ALLOWABLE CABLE TENSION SHALL NOT EXCEED 2400#.
2. REFER TO *DWG 12660* FOR CLEARANCE REQUIREMENTS.
3. QUANTITIES SHOWN ARE FOR ONE DEAD-END ASSEMBLY ON ONE SIDE.
4. FOR STEEL POLES WITH LARGER DIAMETERS, USE THE LAST 4 DIGITS IN THE PART NUMBER TO SPECIFY DIAMETER RANGE OF THE BAND KIT.
EXAMPLE: AFL BK03-1624 DENOTES A DIAMETER RANGE OF 16"-24".



BILL OF MATERIAL				
ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
1	SEE TABLE A	SEE TABLE A	DEAD-END, WEDGE, 16"	356
2	1	USABAND 812514	GUY, DEAD-END, ASSEMBLY	356
3	2	AFL BK03-1016 (SEE NOTE 4)	BAND KIT, USABAND 812432, 1-1/4" X 0.044", S.S. W/ALUM. BUCKLES & 9/16" DIA. HOT-DIP GALV. STEEL BOLE, DIA. RANGE 10"-16"	356

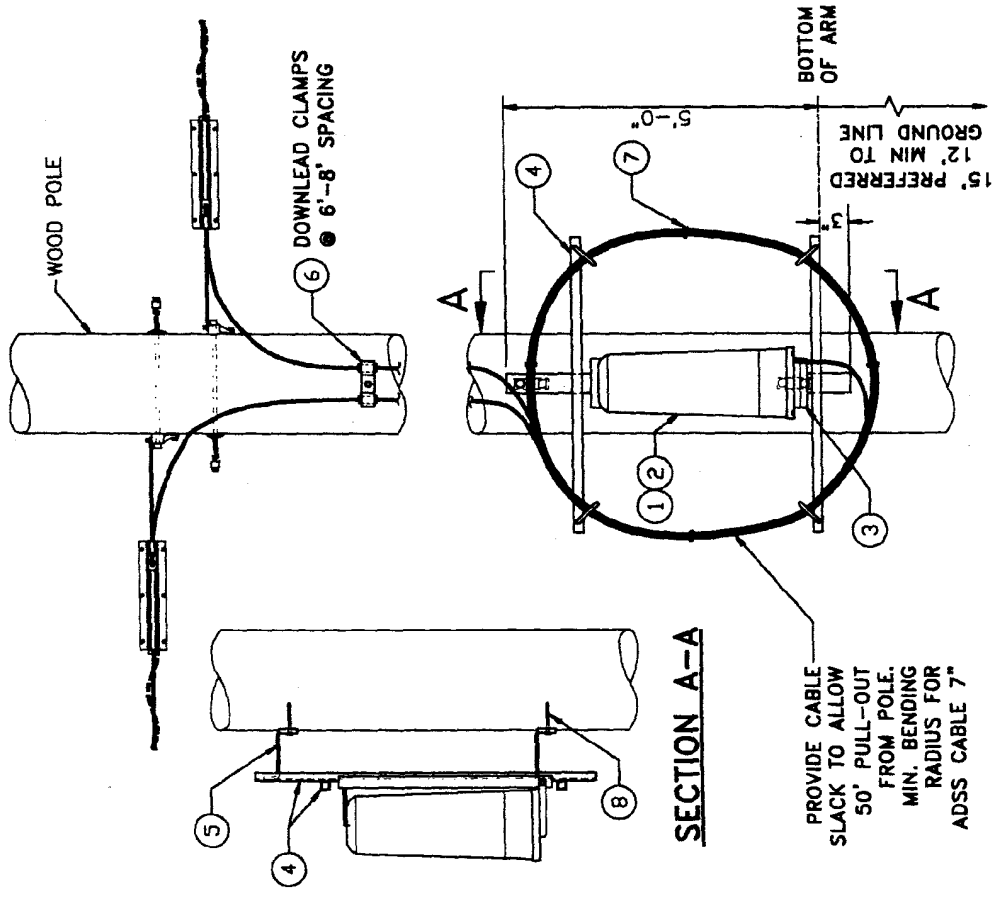
SPIRAL DAMPER
SEE CONST.
PACKAGE

TABLE A				
ITEM	QTY	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
ADSS CABLE, 0.575" DIA., 9,000# RBS (STOCK #196760)				
1	1	AFL ADEW 16J2-AL575	DEAD-END, WEDGE, 16", FOR CABLE DIA. 0.575"	356
ADSS CABLE, 0.685" DIA., 16,000# RBS (STOCK #196742)				
1	1	AFL ADEW 16J2-AL685	DEAD-END, WEDGE, 16", FOR CABLE DIA. 0.685"	356

REV	BY	CHKD	DATE	APP	DATE	APP	DATE	APP	DATE	SCALE	None
B											
A	PM	WT	12/11/11	D							
	PM	WT	3/04/07	C							
	BY	CEG									
TRANSMISSION ENGINEERING											
FIBER OPTIC - ADSS											
WEDGE DEAD-END											
STRAP-MOUNTED											
18022											
1 of 1											

BILL OF MATERIAL				
ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
1	1	AFL LG250	CLOSURE, SPLICE	356
2	2	AFL 91710-06	TRAY, SPLICE, 24 FIBERS, MODEL #LL-2400	356
3	1	AFL 911969-00	ADAPTER, MOUNTING, CABLE ENCLOSER, HOT-DIP GALV.	356
4	1	AFL CB-44	BRACKET, CABLE COIL, HOT-DIP GALV.	356
5	2	INWESCO 51D73	BRACKET, STAND-OFF, W/1/2" X 1 1/2" A307 BOLT, HOT-DIP GALV.	356
6	SEE TABLE A	SEE TABLE A	CLAMP, DOWNLEAD, WOOD POLE, W/ BUSHINGS & LAG SCREW	356
7	1	AFL 911115-00	TIE, ZIP, BAG OF 10	356
8	2	621600	SCREW, LAG, 5/8" X 5", HOT-DIP GALV.	356
TABLE A				
ADSS CABLE, 0.575" DIA., 9,000# RBS (STOCK #196760)				
6	5	AFL AGW 562/655	CLAMP, DOWNLEAD, W/BUSHINGS AND LAG SCREW, DIA. RANGE 0.562"-0.655"	356
ADSS CABLE, 0.685" DIA., 16,000# RBS (STOCK #196742)				
6	5	AFL AGW 656/750	CLAMP, DOWNLEAD, W/BUSHINGS AND LAG SCREW, DIA. RANGE 0.656"-0.750"	356

NOTE:
1. REFER TO DWG. 12560 FOR CLEARANCE REQUIREMENTS.




TRANSMISSION ENGINEERING		SCALE:	NONE
FIBER OPTIC - ADSS		DWG. NO.	18026
SDGE		1 of 1	
SPICE BOX			
WOOD POLE			
BY	DATE	BY	DATE
CE	04/07	CE	
BY	DATE	BY	DATE
CE		CE	


Assemblies

<u>DWG. NO.</u>	<u>REV.</u>	<u>TITLE</u>	<u>NO. OF SHEETS</u>
19000	J	SECTION TABLE OF CONTENTS	6
		<u>BOLT AND MISCELLANEOUS ASSEMBLIES</u>	
19001	B	ASSEMBLY, 5/8" SPLIT BOLT	1
19002	A	ASSEMBLY, 5/8" X-ARM BOLT	1
19004	O	ASSEMBLY, 5/8" BONDED X-ARM BOLT	1
19005	B	ASSEMBLY, 5/8" POST INSULATOR MOUNTING BOLT	1
19006	A	ASSEMBLY, 5/8" THRU BOLT	1
19008	O	ASSEMBLY, 5/8" BONDED SHOULDER EYE BOLT	1
19009	O	ASSEMBLY, 3/4" BONDED SHOULDER EYE-THRU BOLT	1
19009SW	O	ASSEMBLY, 3/4" SHOULDER EYE-THRU BOLT SW POLE	1
19010	A	ASSEMBLY, 3/4" SPACE BOLT, BONDED	1
19012	A	ASSEMBLY, 3/4" THRU BOLT (DOUBLE X-ARM)	1
19014	O	ASSEMBLY, 3/4" BONDED THRU BOLT (X-ARM)	1
19016	A	ASSEMBLY, 1/2" AND 5/8" CROSSARM BRACE BOLTS	2
19018	B	ASSEMBLY, 5/8" THRU BOLT (POLE)	1


J	UPDATED LIST	RLR	WPH	<i>WPH</i>	4/17/09	I	UPDATED LIST	RLR	WPH	GAA	9/18/08
--	ORIGINAL ISSUE	KSM	GV	WPH	9/1/97	H	UPDATED LIST	RLR	WPH	WVT	4/3/08
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

TRANSMISSION ENGINEERING						SCALE:					
	OVERHEAD ASSEMBLIES SECTION TABLE OF CONTENTS					DWG. NO			SHEET NO.		
						19000			1 OF 6		


<u>DWG. NO.</u>	<u>REV.</u>	<u>TITLE</u>	<u>NO. OF SHEETS</u>
19019	O	ASSEMBLY, 3/4" X 12" BONDED THRU BOLT (POLE) ELEVATION AND BILL OF MATERIAL	1
19020	O	ASSEMBLY; 3/4" BONDED THRU BOLT (POLE)	1
19022	B	ASSEMBLY, 3/4" POST INSULATOR MOUNTING BOLTS	2
19022SW	O	ASSEMBLY, 3/4" POST INSULATOR MOUNTING BOLTS, SW POLE	1
19024	B	ASSEMBLY, 3/4" POST INSULATOR MOUNTING BOLTS, WOOD POLE, DC WPI	2
19024SW	O	ASSMEBLY, 3/4" POST INSULATOR MOUNTING BOLTS, SW POLE	1
19026	B	ASSEMBLY, 3/4" BONDED THRU BOLT	1
19026SW	O	ASSEMBLY, 3/4" SW POLE THRU BOLT	1
19027	O	ASSEMBLY, 3/4" BONDED THRU BOLT	1
19028	O	ASSEMBLY, 3/4" DEAD END ANGLE PLATE X-ARM BOLT	1
19029	O	ASSEMBLY, 3/4" THRU BOLT	1
19030	A	ASSEMBLY, 7/8" THRU BOLT	1
19033	A	ASSEMBLY, CROSS ARM TEE DEAD-END	1
19033SW	O	CROSSARM TEE DEAD END ASSEMBLY SW POLE	1

J	UPDATED LIST	RLR	WPH	<i>299</i>	4/17/09	I	UPDATED LIST	RLR	WPH	GAA	9/18/08
--	ORIGINAL ISSUE	KSM	GV	WPH	9/1/97	H	UPDATED LIST	RLR	WPH	WVT	4/3/08
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE
TRANSMISSION ENGINEERING						SCALE:					
	OVERHEAD ASSEMBLIES SECTION TABLE OF CONTENTS					DWG. NO			SHEET NO.		
						19000			2 OF 6		

<u>DWG. NO.</u>	<u>REV.</u>	<u>TITLE</u>	<u>NO. OF SHEETS</u>
19036	A	ASSEMBLY, SWINGING ANGLE BRACKET	1
19040	A	ASSEMBLY, CROSSARM TO POLE THRUST PLATE	1
19040SW	O	CROSSARM TO POLE THRUST PLATE SW POLE	1
<u>69kV STEEL POLE INSULATOR ASSEMBLIES</u>			
19215	C	POLYMER POST (BLADE) INSULATOR, 69kV STEEL POLE	2
19230	C	POLYMER SUSPENSION INSULATOR, 69kV STEEL POLE	1
19240	E	POLYMER DEAD-END INSULATOR, 69kV STEEL POLE	1
19242	C	POLYMER DEAD-END INSULATOR-ACSS, 69kV STEEL POLE	2
19260	B	POLYMER LINE POST JUMPER INSULATOR, 69kV STEEL POLE	1
19265	C	POLYMER POST JUMPER INSULATOR, HORIZ. CLAMP, 69kV STEEL POLE	1

J	UPDATED LIST	RLR	WPH	<i>2009</i>	4/17/09	I	UPDATED LIST	RLR	WPH	GAA	9/18/08
-	ORIGINAL ISSUE	KSM	GV	WPH	9/1/97	H	UPDATED LIST	RLR	WPH	WVT	4/3/08
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE
TRANSMISSION ENGINEERING						SCALE:					
	OVERHEAD ASSEMBLIES SECTION TABLE OF CONTENTS					DWG. NO			SHEET NO.		
						19000			3 OF 6		

<u>DWG. NO.</u>	<u>REV.</u>	<u>TITLE</u>	<u>NO. OF SHEETS</u>
<u>230KV INSULATOR ASSEMBLIES</u>			
19410	E	POLYMER V-STRING INSULATOR 230KV STEEL STRUCTURE	1
19415	D	POLYMER RESTRAINED V-STRING INSULATOR, 230KV STEEL POLE	1
19425	C	POLYMER RESTRAINED V-STRING INSULATOR, OUTSIDE ANGLE, 230KV STEEL TOWER	1
19430	C	POLYMER RESTRAINED V-STRING INSULATOR, INSIDE ANGLE, TOP & MDL. X-ARMS, 230KV STEEL TOWER	1
19435	C	POLYMER RESTRAINED V-STRING INSULATOR, INSIDE ANGLE, BOTTOM X-ARM, 230KV STEEL TOWER	1
19440	B	POLYMER I-STRING JUMPER INSULATOR, SINGLE CONDUCTOR, 230KV STRUCTURE	1
19445	B	POLYMER I-STRING JUMPER INSULATOR, 2-BUNDLE CONDUCTORS, 230KV STRUCTURE	1
19452	C	POLYMER DEAD-END INSULATOR, SINGLE CONDUCTOR - ACSR, 230KV STRUCTURE	1
19454	A	POLYMER DEAD-END INSULATOR, SINGLE CONDUCTOR - ACSS, 230KV STRUCTURE	1

J	UPDATED LIST	RLR	WPH	<i>WPH</i>	4/17/09	I	UPDATED LIST	RLR	WPH	GAA	9/18/08
--	ORIGINAL ISSUE	KSM	GV	WPH	9/1/97	H	UPDATED LIST	RLR	WPH	WVT	4/3/08
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE
TRANSMISSION ENGINEERING						SCALE:					
 OVERHEAD ASSEMBLIES SECTION TABLE OF CONTENTS						DWG. NO			SHEET NO.		
						19000			5 OF 6		


<u>DWG. NO.</u>	<u>REV.</u>	<u>TITLE</u>	<u>NO. OF SHEETS</u>
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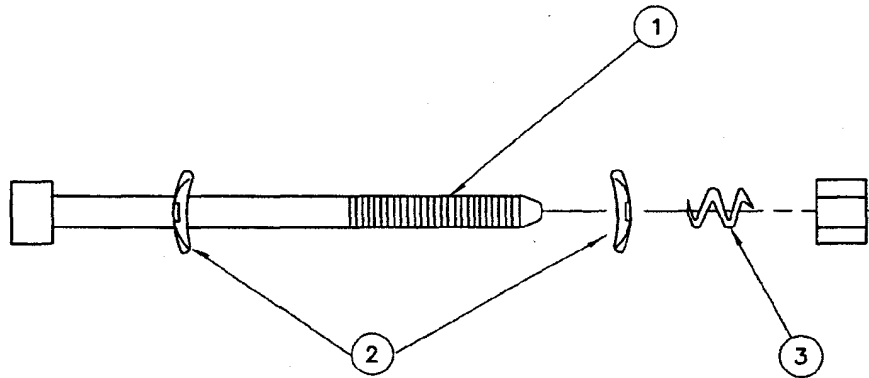
230kV INSULATOR ASSEMBLIES

19456	A	POLYMER DEAD-END INSULATOR, 2-BUNDLE CONDUCTORS – ACSR, 230kV STEEL STRUCTURE	1
19458	C	POLYMER DEAD-END INSULATOR, 2-BUNDLE CONDUCTORS – ACSS, 230kV STEEL STRUCTURE	1

230kV OHGW ASSEMBLIES

19470	A	OHGW SUSPENSION CLAMP ASSEMBLY, 230kV STEEL POLE	1
19472	A	OHGW DEAD-END ASSEMBLY, 230kV STEEL POLE	1

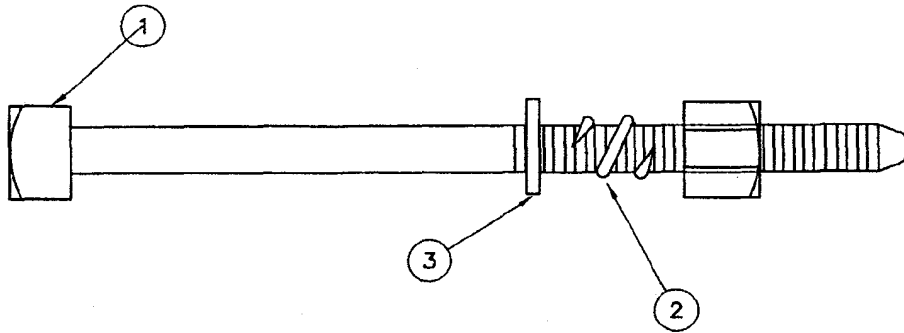
J	UPDATED LIST	RLR	WPH	<i>299</i>	4/17/09	I	UPDATED LIST	RLR	WPH	GAA	9/18/08
--	ORIGINAL ISSUE	KSM	GV	WPH	9/1/97	H	UPDATED LIST	RLR	WPH	WVT	4/3/08
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE
TRANSMISSION ENGINEERING						SCALE:					
	OVERHEAD ASSEMBLIES SECTON TABLE OF CONTENTS					DWG. NO			SHEET NO.		
						19000			6 OF 6		



BILL OF MATERIAL				
ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
1	1	154848	BOLT, 5/8" X 12" MACHINE, WITH NUT	355.630
2	2	797792	WASHER CURVED RIB 3X3 11/16" HOLE	355.630
3	1	798560	WASHER, SPRING, DBL. COIL, 5/8" BOLT	355.630


A	RE-NUMBERED FROM 19000 TO 19001	KSM	GV	WPH	8/1/97	C						
-	ORIGINAL ISSUE	KSM	GV	WPH	6/14/95	B	REMOVED LOCK NUT	WDF	WPH	WV	4/25/02	
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	

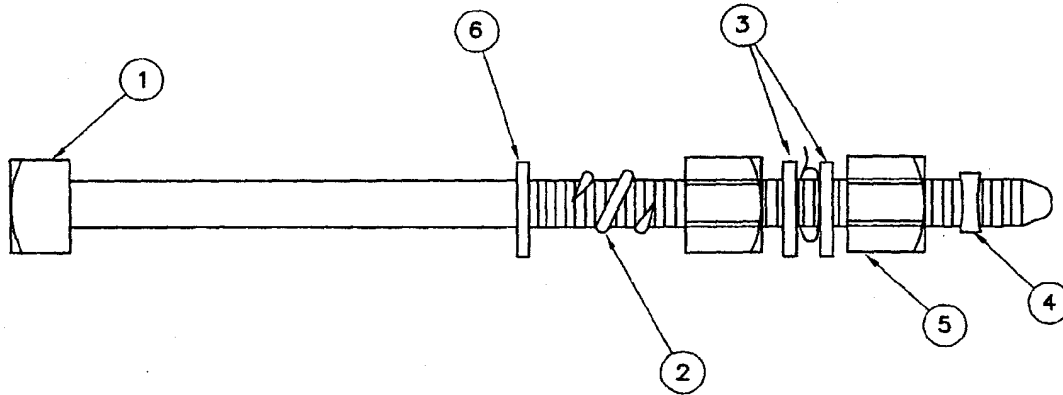
	TRANSMISSION ENGINEERING						SCALE: NONE					
	ASSEMBLY 5/8" SPLIT BOLT						DWG. NO.		SHT. NO.		19001B01	
							19001		1 of 1			



BILL OF MATERIAL				
ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
1	1	155584	BOLT, 5/8" X 8" MACHINE, WITH NUT	355.630
2	1	798560	WASHER, SPRING, DBL. COIL, 5/8" BOLT	355.630
3	1	799040	WASHER, SQ. FLAT 5/8" BOLT	355.630

A	REMOVED LOCKNUT	WDF	WPH	WPH	4/25/02	C					
-	ORIGINAL ISSUE	KSM	GV	WPH	8/01/97	B					
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

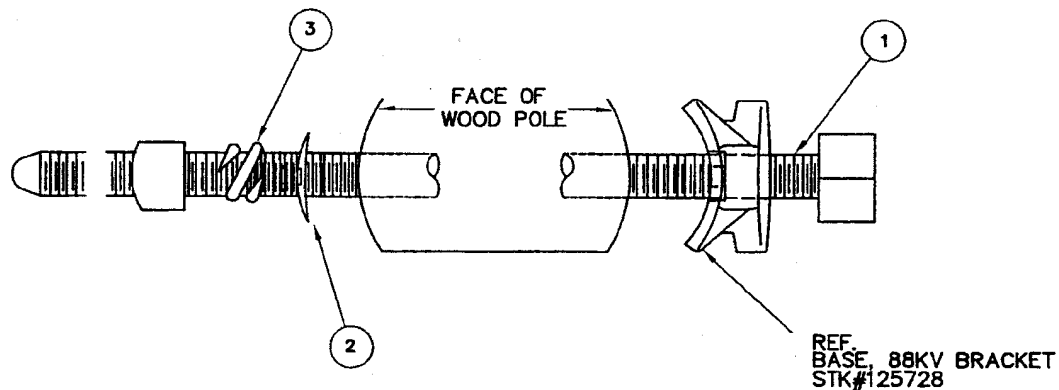
	TRANSMISSION ENGINEERING						SCALE: NONE				
	ASSEMBLY						DWG. NO.		SHT. NO.		19002A01
	5/8" X-ARM BOLT						19002		1 of 1		



BILL OF MATERIAL				
ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
1	1	155584	BOLT, 5/8" X 8" MACHINE, WITH NUT	355.630
2	1	798560	WASHER, SPRING, DBL. COIL, 5/8" BOLT	355.630
3	2	800320	WASHER, ROUND, FLAT 5/8" BOLT	355.630
4	1	504608	NUT, M-F LOCK, 5/8" BOLT	355.630
5	1	506880	NUT, 5/8"	355.630
6	1	799040	WASHER, SQ. FLAT, 5/8" BOLT	355.630

A						C						
-	ORIGINAL ISSUE	KSM	GV	WPH	8/01/97	B						
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	

SDGE	TRANSMISSION ENGINEERING						SCALE: NONE		19004001
	ASSEMBLY						DWG. NO.	SHT. NO.	
	5/8" BONDED X-ARM BOLT						19004	1 of 1	



BILL OF MATERIAL				
ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
1	1	NOTE 1	BOLT, MACHINE, WITH NUT, 5/8"	355.630
2	1	797792	WASHER, SQ., CURVED RIB 3X3, 11/16" HOLE	355.630
3	1	798560	WASHER, SPRING, DBL COIL 5/8"	355.630

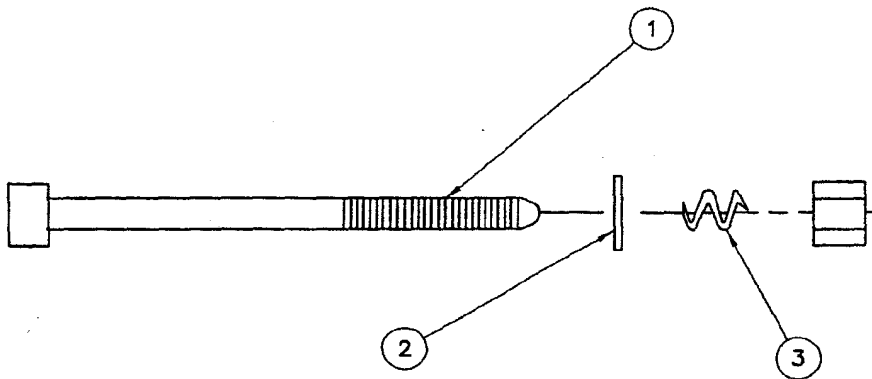
NOTE:

- 1. TOP INSULATOR - 155072 - 20"
- MID INSULATOR - 155104 - 22"
- BOT INSULATOR - 155136 - 24"
- NON-BONDED

A	UPDATED FORM	KSM	DRB	WPH	5/15/00	C						
-	ORIGINAL ISSUE	KSM	GV	WPH	10/30/97	B	REMOVED LOCKNUT	WDF	WPH	WV	4/25/02	
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	

19005B01


SDGE	TRANSMISSION ENGINEERING							SCALE: NONE				
	ASSEMBLY							DWG. NO.		SHT. NO.		
	5/8" POST INSULATOR MOUNTING BOLT (FOR LOWER HOLE) SHORT POLY							19005		10F1		



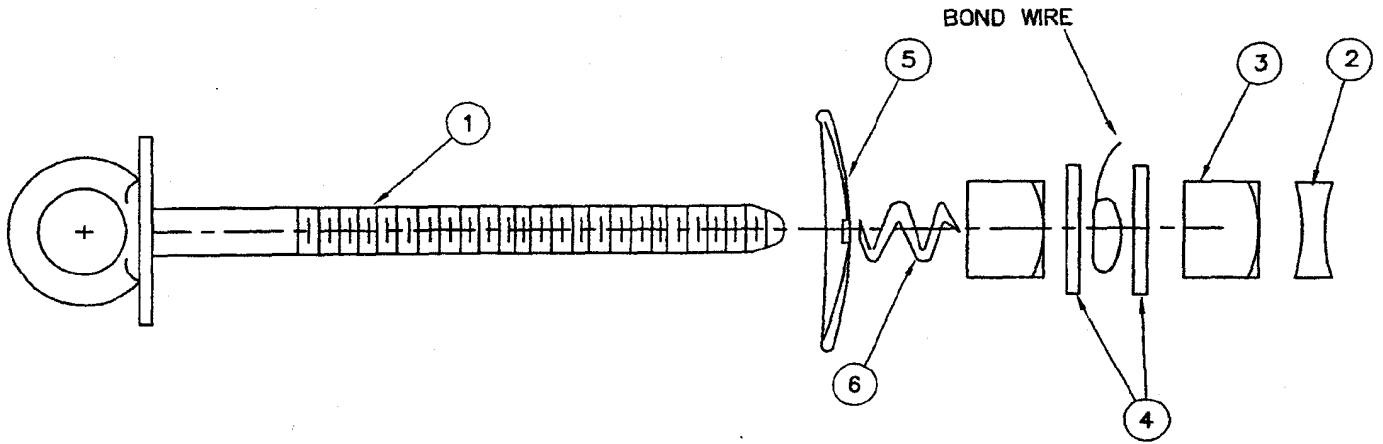
BILL OF MATERIAL				
ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
1	1	SEE NOTE	BOLT, 5/8" MACHINE, WITH NUT	355.630
2	1	799040	WASHER, ROUND FLAT, 5/8" BOLT	355.630
3	1	798560	WASHER, SPRING, DBL. COIL, 5/8" BOLT	355.630

NOTE:

1.TOP - 154880 - 14"
 MID - 154912 - 16"
 BOT - 154944 - 18"

A	REMOVED LOCKNUT	WDF	WPH	WPH	4/25/02	C						
-	ORIGINAL ISSUE	KSM	GV	WPH	6/14/95	B						
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	
TRANSMISSION ENGINEERING							SCALE: NONE					
 ASSEMBLY 5/8" THRU BOLT							DWC. NO.		SHT. NO.			
							19006		1 of 1			

19006A01



ELEVATION

BILL OF MATERIAL

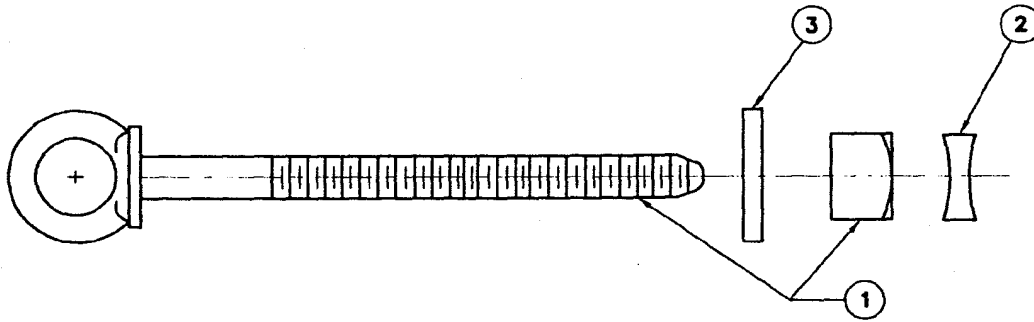
ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
1	1	SEE BELOW	BOLT, SHOULDER EYE, 3/4", W/NUT 18.3K	355.630
2	1	504576	NUT, M-F LOCK NUT, 3/4"	355.630
3	1	504768	NUT, SQUARE, 3/4", BOLT	355.630
4	2	800256	WASHER, ROUND FLAT, 3/4", 2" O.D.	355.630
5	1	797760	WASHER, RIB 4" SQ. CURVED FOR 3/4" BOLT	355.630
6	1	798496	WASHER, SPRING DBL COIL 3/4"	355.630

- 150718-3/4" X 12"
- 150720-3/4" X 14"
- 150722-3/4" X 16"
- 150724-3/4" X 18"
- 150726-3/4" X 20"
- 150728-3/4" X 22"
- 150730-3/4" X 24"

A						C					
-	ORIGINAL	KSM	WPH	lv	5/15/00	B					
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

SDGE	TRANSMISSION ENGINEERING						SCALE: NONE			
	ASSEMBLY						DWG. NO.	SHT. NO.		
	3/4" BONDED SHOULDER EYE-THRU BOLT						19009	1 of 1		

19009001



ELEVATION

BILL OF MATERIAL

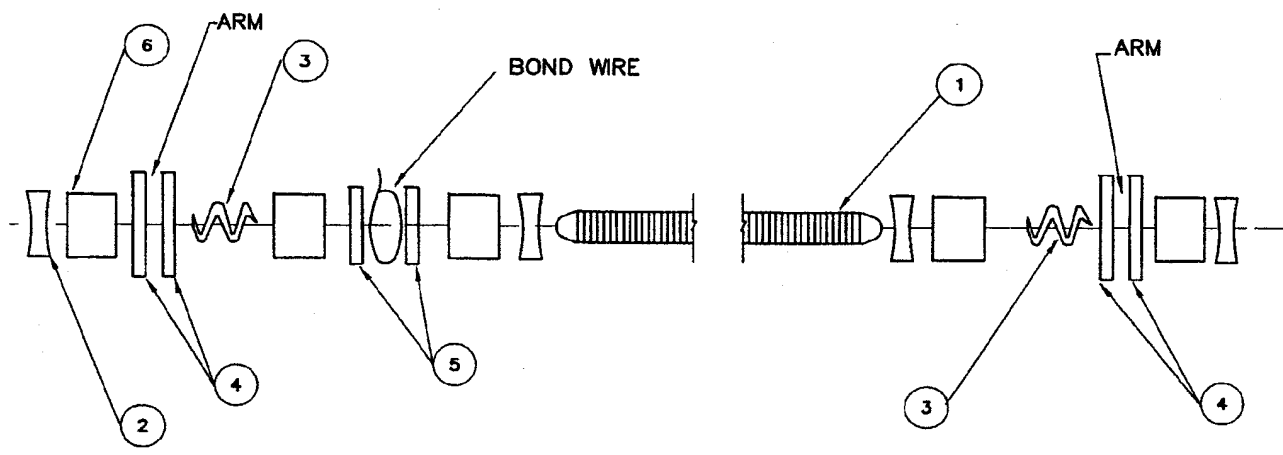
ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
1	1	SEE BELOW	BOLT, SHOULDER EYE, 3/4" W/ NUT 18.3K	355.630
2	1	504576	NUT, M-F LOCK NUT, 3/4"	355.630
3	1	799048	WASHER, SQUARE, FLAT, 2-1/4"x 2-1/4"x 3/16", 13/16" HOLE	355.630

- 150718-3/4" X 12"
- 150720-3/4" X 14"
- 150722-3/4" X 16"
- 150724-3/4" X 18"
- 150726-3/4" X 20"
- 150728-3/4" X 22"
- 150730-3/4" X 24"

	ORIGINAL	LLD	WPH	ORC	4/17/08						
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

TRANSMISSION ENGINEERING						SCALE: NONE	
SDGE	ASSEMBLY					DWG. NO.	SHT. NO.
	3/4" SHOULDER EYE-THRU BOLT SW POLE					19009SW	1 of 1

19009SW



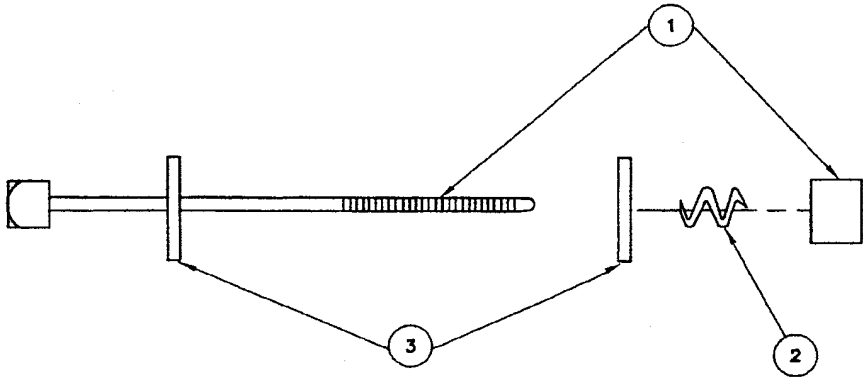
BILL OF MATERIAL				
ITEM	QTY.	STOCK NO or STD. NO	DESCRIPTION	ACCT. NO.
1	1	SEE NOTE	BOLT, SPACE, WITH 4 NUTS	355.630
2	4	504576	NUT, M-F LOCK, 3/4" BOLT	355.630
3	2	798496	WASHER, SPRING, DBL. COIL, 3/4"	355.630
4	4	799104	WASHER, SQUARE FLAT, 3/4"	355.630
5	2	800256	WASHER, ROUND FLAT, 3/4"	355.630
6	1	504768	NUT 3/4"	355.630

NOTE:
 156288 - 3/4" X 26" - FOR 5 3/4" ARM
 156224 - 3/4" X 22" - FOR 3 3/4" ARM

A	ADDED 22" BOLT	WDF	WPH	<i>WPH</i>	4/25/02	C					
-	ORIGINAL ISSUE	KSM	GV	WPH	8/01/97	B					
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

SDGE	TRANSMISSION ENGINEERING				SCALE: NONE	
	ASSEMBLY				DWG. NO.	SHT. NO.
	3/4" SPACE BOLT, BONDED				19010	1 of 1

19010A01



BILL OF MATERIAL

ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
1	1	SEE NOTE	BOLT, MACHINE, WITH NUT, 3/4"	355.630
2	1	798496	WASHER, SPRING, DBL. COIL, 3/4" BOLT	355.630
3	2	799104	WASHER, SQUARE, FLAT, 3X3, 3/4" BOLT	355.630

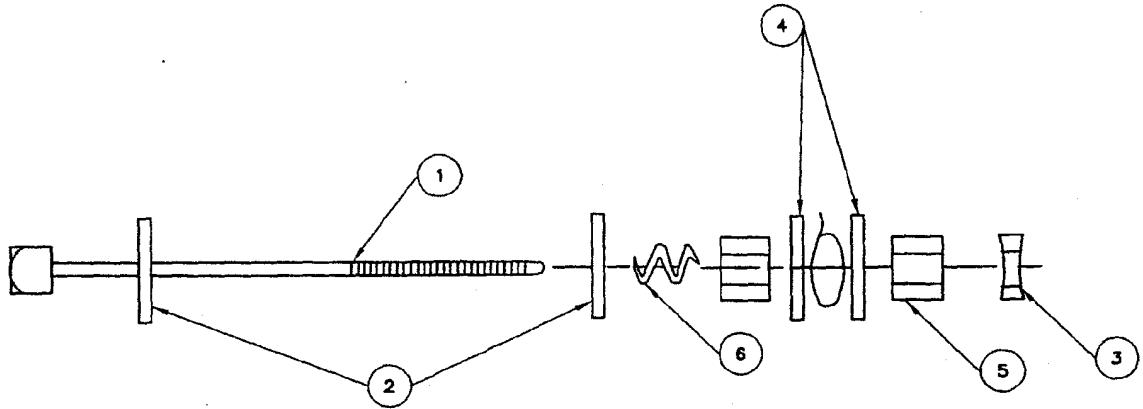
NOTE:

TOP ARM - 153696-24"
 MID ARM - 153728-26"
 BOT ARM - 153760-28" } 5 3/4" ARM

TOP ARM - 153632-20"
 MID ARM - 153664-22"
 BOT ARM - 153696-24" } 3 3/4" ARM

A	REMOVED LOCKNUT	WDF	WPH	WY	4/25/02	C					
-	ORIGINAL ISSUE	KSM	GV	WPH	8/01/97	B					
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

SDGE	TRANSMISSION ENGINEERING							SCALE: NONE				
	ASSEMBLY							DWG. NO.		SHT. NO.		19012A01
	3/4" THRU BOLT [DBL X-ARM]							19012		1 of 1		



BILL OF MATERIAL				
ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
1	1	NOTE 1	BOLT, 3/4", MACHINE, WITH NUT	355.630
2	2	799104	WASHER, SQ. FLAT 3 X 3	355.630
3	1	504576	NUT, M-F LOCK, 3/4" BOLT	355.630
4	2	800256	WASHER, ROUND, FLAT 3/4" BOLT	355.630
5	1	504768	NUT, SQUARE, 3/4" BOLT	355.630
6	1	798496	WASHER, SPRING DBL. COIL, 3/4" BOLT	355.630

NOTE:

- 1.TOP X-ARM - 153440 - 14"
- MID X-ARM - 153472 - 16"
- BOT X-ARM - 153504 - 18"

A						C						
-	ORIGINAL ISSUE	KSM	GV	WPH	8/01/97	B						
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	


SDGE	TRANSMISSION ENGINEERING						SCALE: NONE					
	ASSEMBLY						DWG. NO.			SHT. NO.		
	3/4" BONDED THRU BOLT(X-ARM)						19014			1 of 1		

19014001

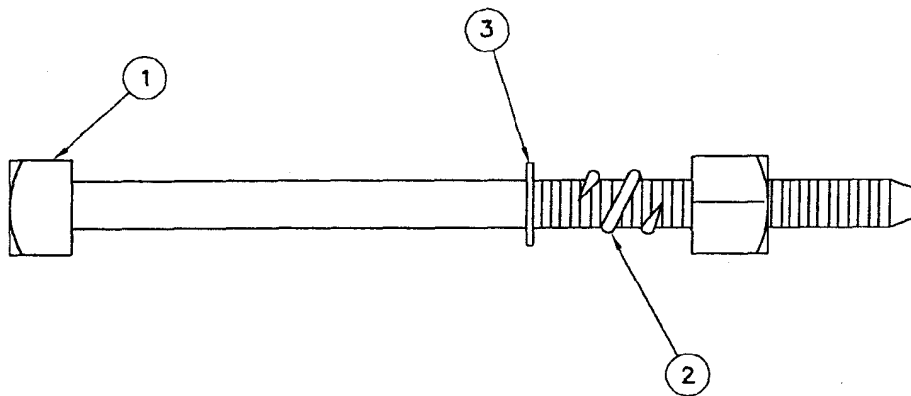
BILL OF MATERIAL				
1/2" X-ARM BRACE BOLT ASSEMBLY				
ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
1	1	153120	BOLT, 1/2" X 7", MACHINE, WITH NUT	355.630
2	1	798464	WASHER, SPRING, DBL.COIL,1/2" BOLT	355.630
3	1	800192	WASHER, SQUARE, FLAT 1/2" BOLT	355.630

BILL OF MATERIAL				
5/8" X-ARM BRACE BOLT ASSEMBLY				
ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
1	1	154880	BOLT, 5/8" X 14", MACHINE, WITH NUT	355.630
2	1	798560	WASHER, SPRING, DBL.COIL,5/8" BOLT	355.630

A	REMOVED LOCKNUT	WDF	WPH	WPH	4/25/02	C					
-	ORIGINAL ISSUE	KSM	GV	WPH	8/01/97	B					
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

	TRANSMISSION ENGINEERING							SCALE: NONE			
	ASSEMBLY 1/2" AND 5/8" CROSSARM BRACE BOLTS							DWG. NO.		SHT. NO.	
								19016		20F2	

19016A02

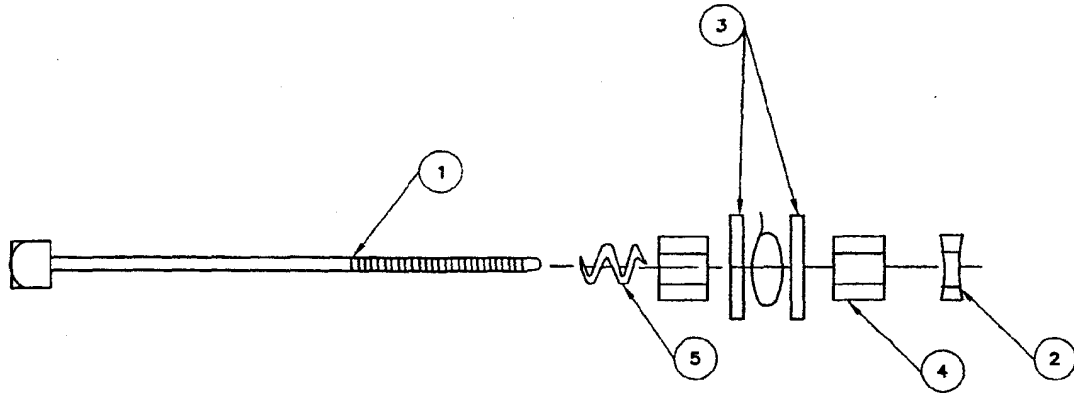


BILL OF MATERIAL				
ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
1	1	SEE BELOW	BOLT, 5/8", MACHINE, WITH NUT	355.630
2	1	798560	WASHER, DOUBLE COIL SPRING, 5/8" BOLT	355.630
3	1	797792	WASHER, CURVED RIB, 3X3 11/16" HOLE	355.630

154848 - 5/8" X 12"
 155072 - 5/8" X 20"
 155104 - 5/8" X 22"
 155136 - 5/8" X 24"

A	REMOVED LOCKNUT	WDF	WPH	<i>wj</i>	4/25/02	C					
-	ORIGINAL ISSUE	KSM	GV	WPH	8/01/97	B	ADDED BOLT LENGTHS	PM	WPH		2/22/05
RFV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

SDGE	TRANSMISSION ENGINEERING						SCALE: NONE		19018B01
	5/8" THRU BOLT (POLE) ASSEMBLY						DWG. NO.	SHT. NO.	
							19018	1 of 1	

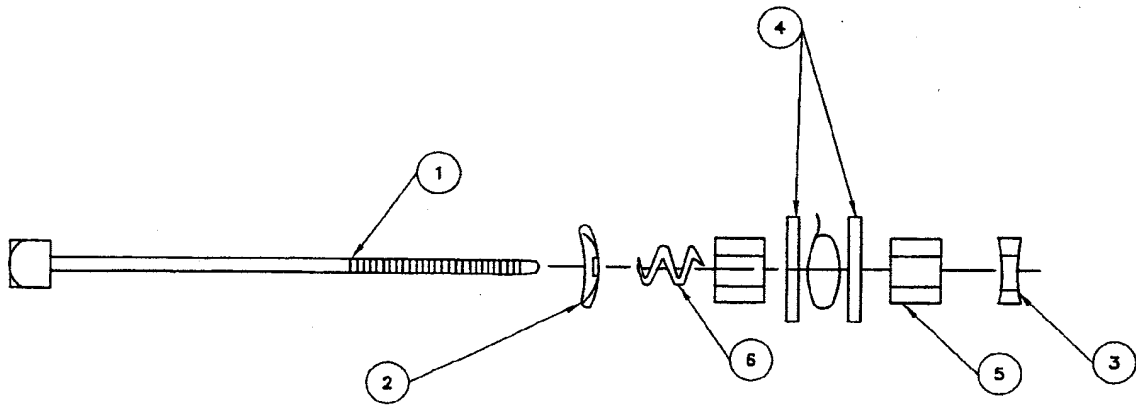


BILL OF MATERIAL				
ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
1	1	153408	BOLT, 3/4" x 12", MACHINE, WITH NUT	355.630
2	1	504576	NUT, M-F LOCK, 3/4" BOLT	355.630
3	2	800256	WASHER, ROUND, FLAT 3/4" BOLT	355.630
4	1	504768	NUT, SQUARE, 3/4" BOLT	355.630
5	1	798496	WASHER, SPRING DBL. COIL, 3/4" BOLT	355.630

A						C					
-	ORIGINAL ISSUE	WDF	WPH	WY	4/25/02	B					
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

SDGE	TRANSMISSION ENGINEERING						SCALE: NONE	
	ASSEMBLY						DWC. NO.	SHT. NO.
	3/4" X 12" BONDED THRU BOLT(POLE)						19019	1 of 1

19019001



BILL OF MATERIAL

ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
1	1	NOTE 1	BOLT, 3/4", MACHINE, WITH NUT	355.630
2	1	797760	WASHER, RIB, SQ. CURVED 3/4" BOLT	355.630
3	1	504576	NUT, M-F LOCK, 3/4" BOLT	355.630
4	2	800256	WASHER, ROUND, FLAT 3/4" BOLT	355.630
5	1	504768	NUT, SQUARE, 3/4" BOLT	355.630
6	1	798496	WASHER, SPRING DBL. COIL, 3/4" BOLT	355.630

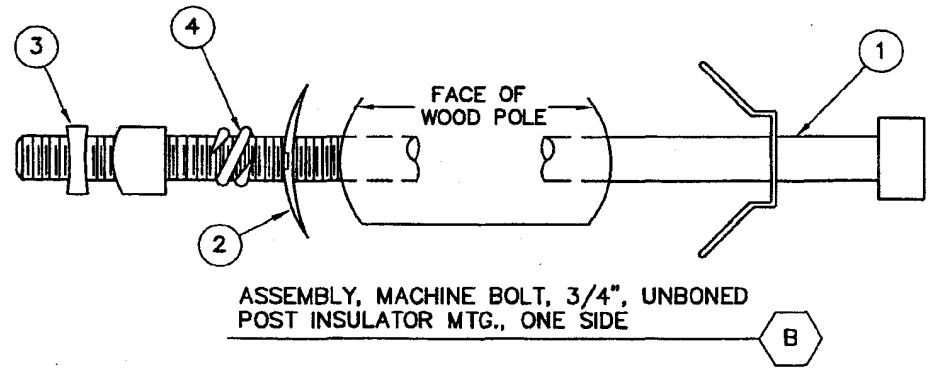
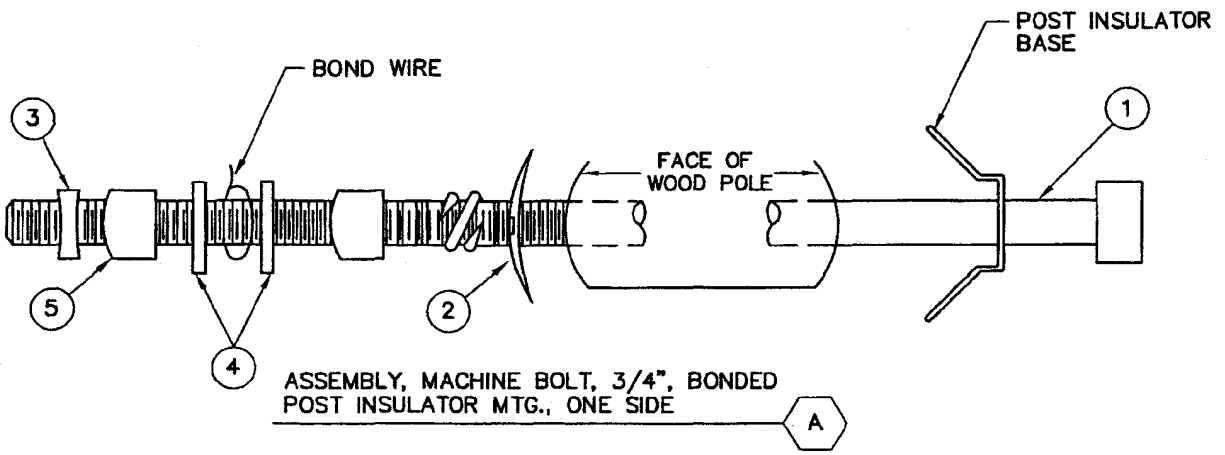
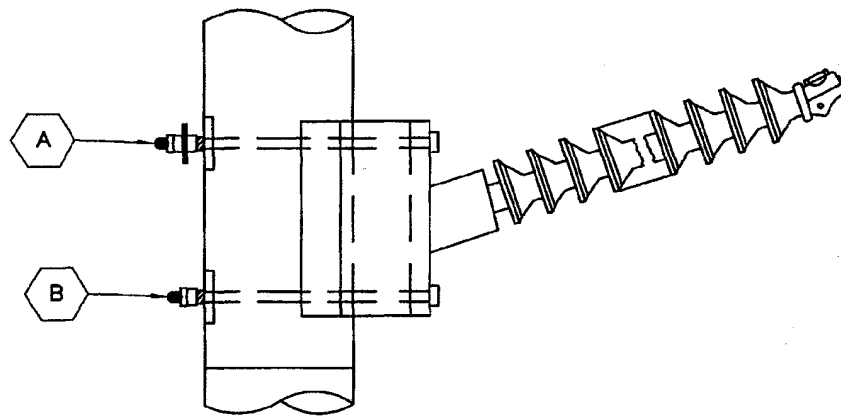
NOTE:

- 1.TOP - 153440 -14"
- MID - 153472 -16"
- BOT - 153504 -18"

A						C						
-	ORIGINAL ISSUE	KSM	GV	WPH	11/6/97	B						
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	

SDGE	TRANSMISSION ENGINEERING						SCALE: NONE	
	ASSEMBLY 3/4" BONDED THRU BOLT (POLE)						DWG. NO.	SHT. NO.
							19020	1 of 1

19020001



A	REMOVED ITEM 6	WDF	WPH		4/25/02	C					
-	ORIGINAL ISSUE	KSM	GV	WPH	9/1/97	B	REVISED BOLT LENGTHS	WDF	SFO	WPH	3/25/03
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE



TRANSMISSION ENGINEERING

ASSEMBLY

3/4" POST INSULATOR MOUNTING BOLTS

WOOD POLE WPI, ZPI

SCALE: NONE

DWG. NO. 19022

SHT. NO. 1 of 2

19022B01

BILL OF MATERIAL "A"

ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
1	1	NOTE 1	BOLT, 3/4" MACHINE, WITH NUT	355
2	1	797760	WASHER, RIB SQ. CURVED, 3/4" BOLT	355
3	1	504576	NUT, M-F LOCK, 3/4" BOLT	355
4	2	800256	WASHER, ROUND, FLAT 3/4" BOLT	355
5	1	504768	NUT, SQUARE, 3/4" BOLT	355

NOTE:

TOP INSULATOR: STOCK NO.# 153632 - 20"
 MID INSULATOR: STOCK NO.# 153664 - 22"
 BOT INSULATOR: STOCK NO.# 153664 - 22"

BONDED

BILL OF MATERIAL "B"


ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
1	1	NOTE 1	BOLT, 3/4" MACHINE, WITH NUT	355
2	1	797760	WASHER, RIB SQ. CURVED, 3/4" BOLT	355
3	1	504576	NUT, M-F LOCK, 3/4" BOLT	355
4	2	800256	WASHER, SPRING, DBL. COIL, 3/4" BOLT	355

NOTE:

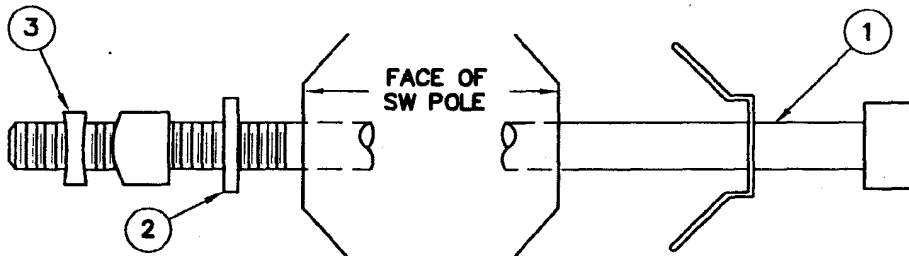
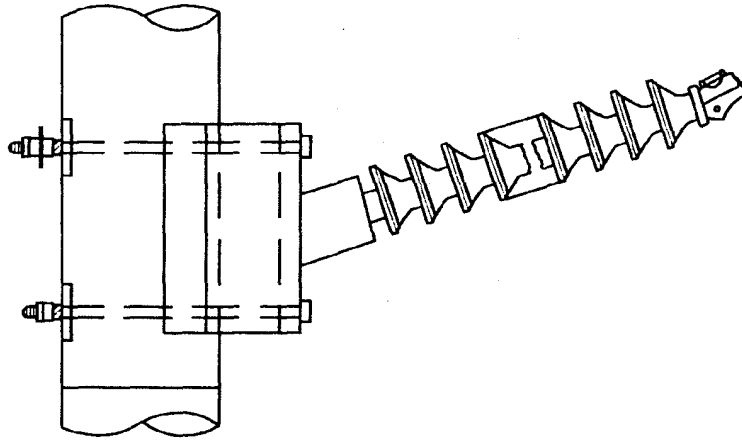
TOP INSULATOR: STOCK NO.# 153632 - 20"
 MID INSULATOR: STOCK NO.# 153632 - 20"
 BOT INSULATOR: STOCK NO.# 153632 - 20"

UN-BONDED

A	REMOVED ITEM 6	WDF	WPH		4/25/02	C					
-	ORIGINAL ISSUE	KSM	GV	WPH	8/1/97	B	REVISED BOLT LENGTHS	WDF	SFO WPH	WYT	3/25/03
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

	TRANSMISSION ENGINEERING	SCALE: NONE	
	ASSEMBLY	DWG. NO.	SHT. NO.
	3/4" POST INSULATOR MOUNTING BOLTS, WOOD POLE WPI, ZPI	19022	2 of 2

19022B02



ASSEMBLY, MACHINE BOLT, 3/4",
POST INSULATOR MOUNTING, ONE SIDE

BILL OF MATERIAL

ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
1	1	NOTE 1	BOLT, 3/4" MACHINE, WITH NUT	355
2	1	799048	WASHER, SQUARE, FLAT, 2-1/4"X 2-1/4"X 3/16", 13/16" HOLE	355
3	1	504576	NUT, M-F LOCK, 3/4" BOLT	355

NOTE:

TOP INSULATOR: STOCK NO.# 153632 - 20"
 MID INSULATOR: STOCK NO.# 153632 - 20"
 BOT INSULATOR: STOCK NO.# 153664 - 22"

	ORIGINAL	LLD	WPH	4/17/08							
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

TRANSMISSION ENGINEERING

SCALE: NONE



ASSEMBLY
3/4" POST INSULATOR MOUNTING BOLTS
SW POLE

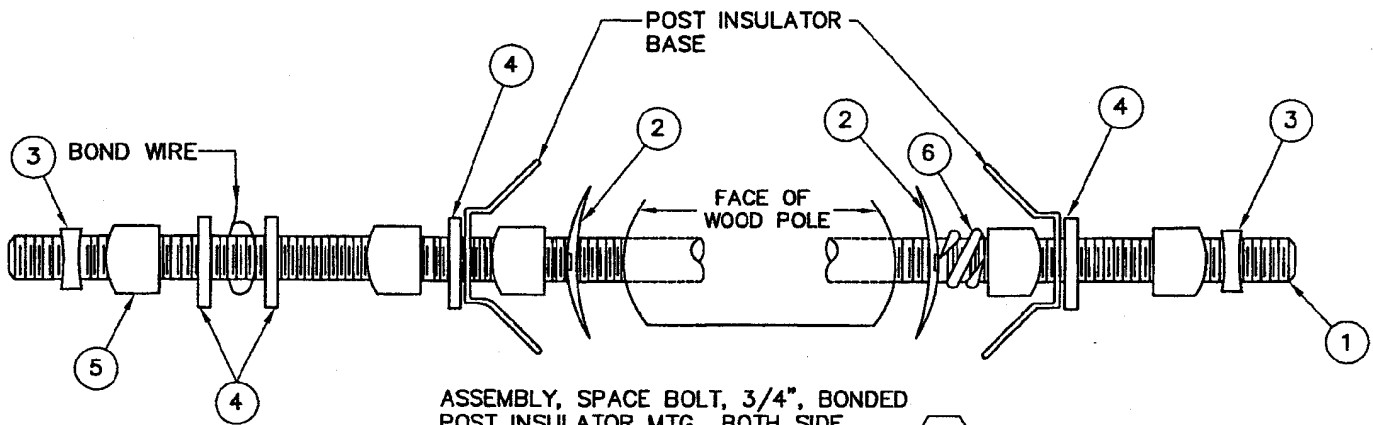
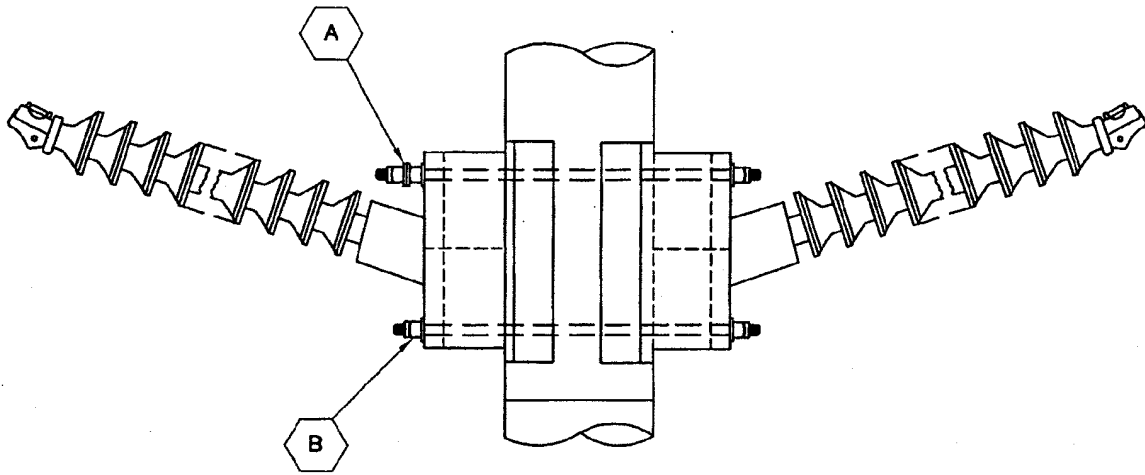
DWG. NO.

SHT. NO.

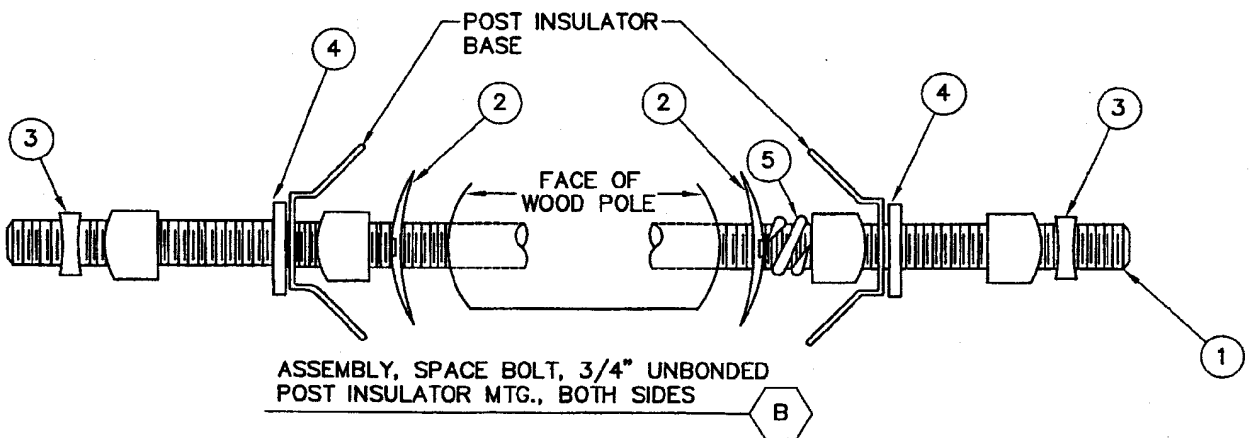
19022SW

1 of 1

19022SW



ASSEMBLY, SPACE BOLT, 3/4", BONDED
POST INSULATOR MTG., BOTH SIDE



ASSEMBLY, SPACE BOLT, 3/4" UNBONDED
POST INSULATOR MTG., BOTH SIDES

A	REVISED SPRING WASHERS	SDF	WPH		6/3/02	C					
-	ORIGINAL ISSUE	KSM	GV	WPH	9/1/97	B	REVISED BOLT MATERIAL	WDF	WPH	WV	3/25/03
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

SDGE	TRANSMISSION ENGINEERING							SCALE: NONE				
	ASSEMBLY							DWG. NO.		SHT. NO.		19024B01
	3/4" POST INSULATOR MOUNTING BOLTS WOOD POLE DC WPI ELEVATION							19024		1 of 2		

BILL OF MATERIAL "A"

ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
1	1	NOTE 1	BOLT, 3/4" SPACE, WITH 4 NUTS	355
2	2	797760	WASHER, RIB SQ. CURVED, 3/4" BOLT	355
3	2	504576	NUT, M-F LOCK, 3/4" BOLT	355
4	4	800256	WASHER, ROUND, FLAT 3/4" BOLT	355
5	1	504768	NUT, SQUARE, 3/4" BOLT	355
6	1	798496	WASHER, SPRING, DBL. COIL, 3/4" BOLT	355

NOTE:

TOP INSULATOR: STOCK NO. 156288 - 26"

MID INSULATOR: STOCK NO. 156288 - 26"

BOT INSULATOR: STOCK NO. 156320 - 28"

BONDED

BILL OF MATERIAL "B"

ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
1	1	NOTE 1	BOLT, 3/4" SPACE, WITH 4 NUTS	355
2	2	797760	WASHER, RIB SQ. CURVED, 3/4" BOLT	355
3	2	504576	NUT, M-F LOCK, 3/4" BOLT	355
4	2	800256	WASHER, ROUND, FLAT, 3/4" BOLT	355
5	1	798496	WASHER, SPRING, DBL. COIL, 3/4" BOLT	355

NOTE:


TOP INSULATOR: STOCK NO.# 156256 - 24"

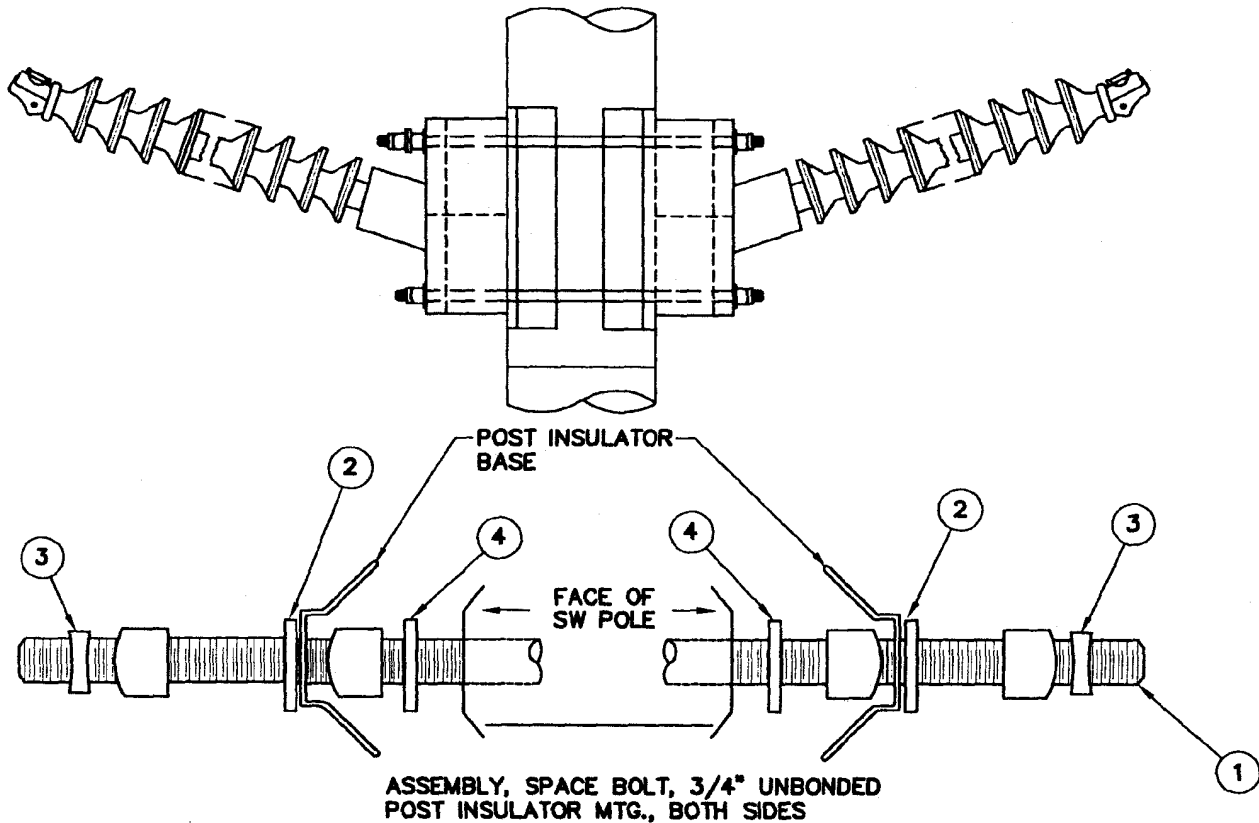
MID INSULATOR: STOCK NO.# 156288 - 26"

BOT INSULATOR: STOCK NO.# 156288 - 26"

UNBONDED

A	REVISED SPRING WASHERS	SDF	WPH		6/3/02	C					
-	ORIGINAL ISSUE	KSM	GV	WPH	8/1/97	B	REVISED BOLT MATERIAL	WDF	<i>SFO</i>	<i>WVT</i>	3/25/03
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

	TRANSMISSION ENGINEERING						SCALE: NONE		19024B02
	ASSEMBLY						DWG. NO.	SHT. NO.	
	3/4" POST INSULATOR MOUNTING BOLTS, WOOD POLE (DC WPI) BILL OF MATERIAL						19024	2of2	



BILL OF MATERIAL

ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
1	1	NOTE 1	BOLT, 3/4" MACHINE, WITH 4 NUTS	355
2	2	800256	WASHER, ROUND, FLAT, 3/4" BOLT	355
3	2	504576	NUT, M-F LOCK, 3/4" BOLT	355
4	2	799048	WASHER, SQUARE, FLAT, 2-1/4" X 2-1/4" X 3/16", 13/16" HOLE	355

NOTE:

TOP INSULATOR: STOCK NO.# 156256 - 24"

MID INSULATOR: STOCK NO.# 156288 - 26"

BOT INSULATOR: STOCK NO.# 156288 - 26"

NON - BONDED

ORIGINAL	LLD	WPH	<i>WPH</i>	4/17/08							
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

TRANSMISSION ENGINEERING

SCALE: NONE



ASSEMBLY
3/4" POST INSULATOR MOUNTING BOLTS
SW POLE

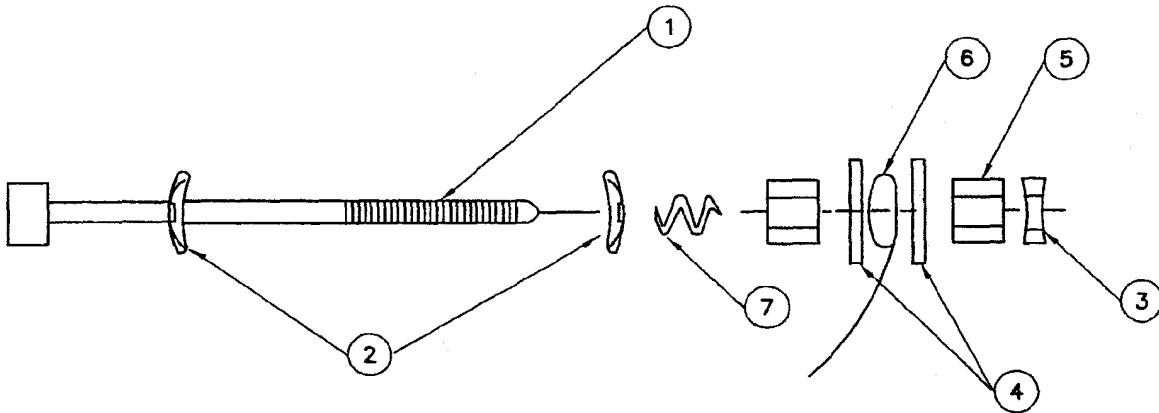
DWG. NO.

SHT. NO.

19024SW

1 of 1

19024SW



BILL OF MATERIAL

ITEM	QTY.	STOCK NO. or <i>STD. NO.</i>	DESCRIPTION	ACCT. NO.
1	1	NOTE 1	BOLT, 3/4" MACHINE, WITH NUT	355.630
2	2	797760	WASHER RIB, SQ. CURVED, 3/4" BOLT	355.630
3	1	504576	NUT, M-F LOCK, 3/4" BOLT	355.630
4	2	800256	WASHER, ROUND, FLAT, 3/4" BOLT	355.630
5	1	504768	NUT, SQUARE, 3/4" BOLT	355.630
6	-	812928	WIRE, CU. SOFT, #8 AWG	355.630
7	1	798496	WASHER, SPRING, DBL COIL, 3/4"	355.630

NOTE:

1. TOP INSULATOR: STOCK NO. 153440 - 14"
- MIDDLE INSULATOR: STOCK NO. 153472 - 16"
- BOTTOM INSULATOR: STOCK NO. 153504 - 18"

A	UPDATED FORM	KSM	GV	WPH	8/01/97	C					
-	ORIGINAL ISSUE	KSM	GV	WPH	6/14/95	B	ADDED SPRING WASHER	WDF	WPH	10/7	4/25/02
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE



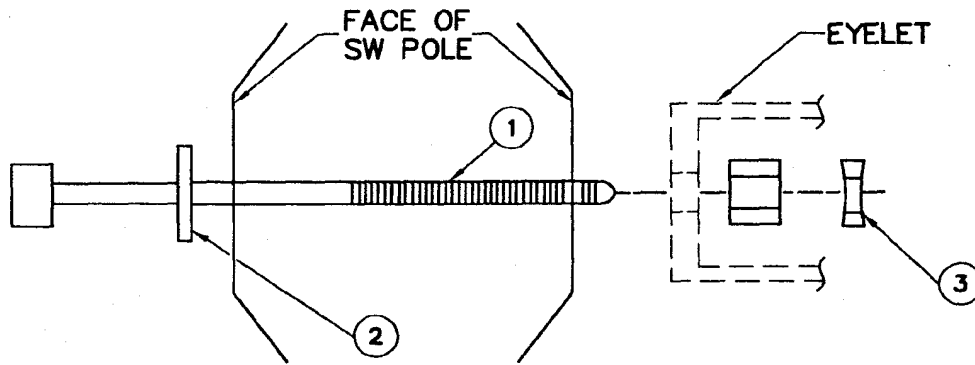
TRANSMISSION ENGINEERING

**3/4" ASSEMBLY
BONDED THRU BOLT**

SCALE: NONE

DWG. NO.	SHT. NO.	REV
19026	1 of 1	-

19026B01



BILL OF MATERIAL				
ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
1	1	NOTE 1	BOLT, 3/4" MACHINE, WITH NUT	355
2	1	799048	WASHER, SQUARE, 2-1/4"X 2-1/4"X 3/16", 13/16" HOLE	355
3	1	504576	NUT, M-F LOCK, 3/4" BOLT	355

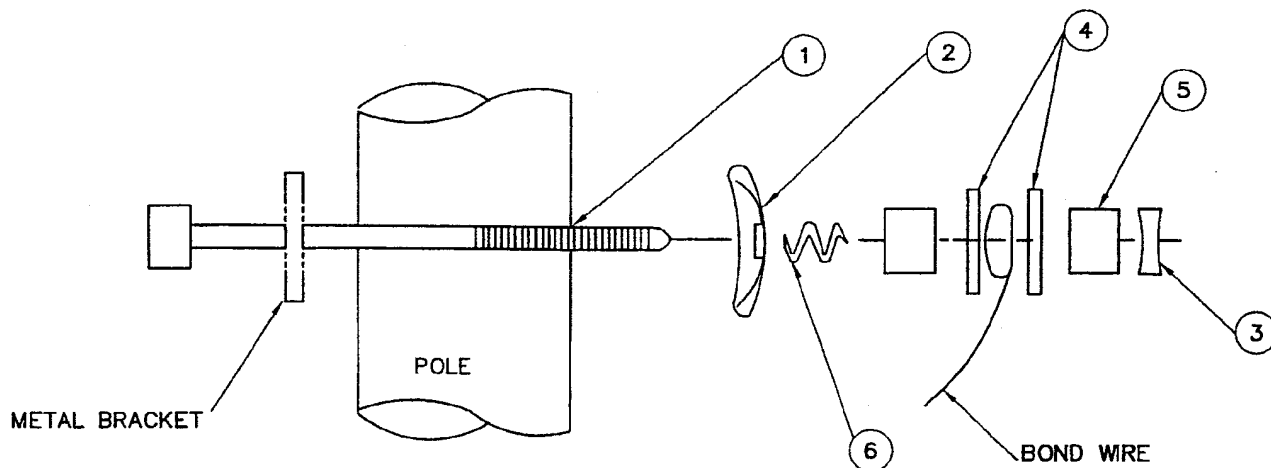
NOTE:

TOP INSULATOR: STOCK NO. 153440 - 14"
 MIDDLE INSULATOR: STOCK NO. 153472 - 16"
 BOTTOM INSULATOR: STOCK NO. 153472 - 16"

	ORIGINAL	PM	WPH	<i>dhg</i>	4/17/08						
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

TRANSMISSION ENGINEERING						SCALE: NONE			
SDGE	ASSEMBLY					DWG. NO.		SHT. NO.	
	3/4" SW POLE THRU BOLT					19026SW		1 of 1	

19026SW



BILL OF MATERIAL				
ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
1	1	NOTE 1	BOLT, 3/4" MACHINE, WITH NUT	355.630
2	1	797760	WASHER RIB, 4", SQ. CURVED, 3/4" BOLT	355.630
3	1	504576	NUT, M-F LOCK, 3/4" BOLT	355.630
4	2	800256	WASHER, ROUND, FLAT, 3/4" BOLT	355.630
5	1	504768	NUT, SQUARE, 3/4" BOLT	355.630
6	1	798496	WASHER, SPRING, DBL COIL, 3/4"	355.630

NOTE:

1. TOP INSULATOR: STOCK NO. 153440 - 14"
 MIDDLE INSULATOR: STOCK NO. 153472 - 16"
 BOTTOM INSULATOR: STOCK NO. 153504 - 18"

2. METAL-WOOD CONNECTION

A						C						
-	ORIGINAL ISSUE	KSM	GV	WPH	3/1/00	B						
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	



TRANSMISSION ENGINEERING

ASSEMBLY
3/4" BONDED THRU BOLT

SCALE: NONE

DWG. NO.

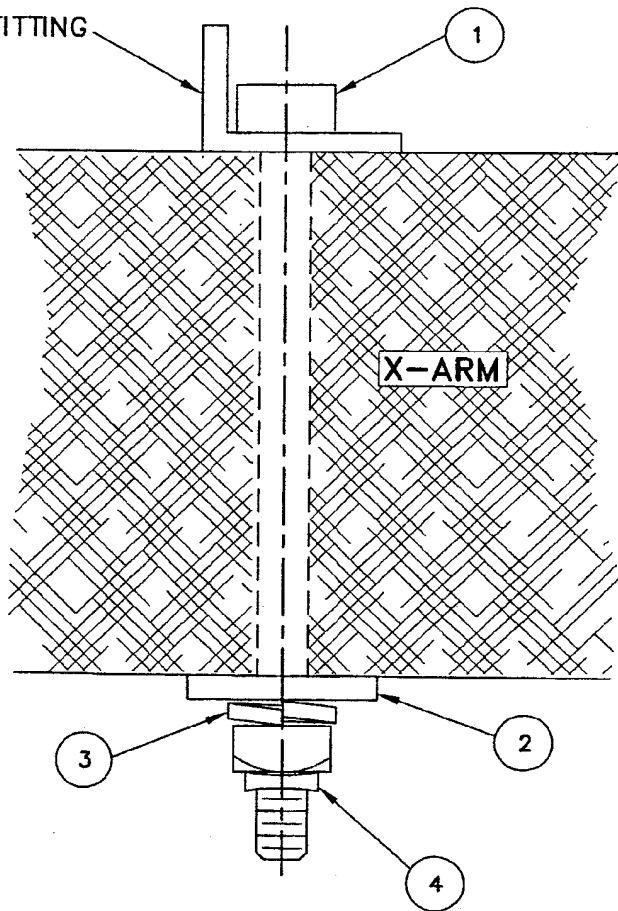
SHT. NO.

19027

1 of 1

19027001

AS2419 SPACER FITTING
(FOR REF.)



BILL OF MATERIAL

ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
1	1	153408	BOLT, 3/4" X 12" W/NUT	355.630
2	1	799104	WASHER, SQ. FLAT, 3 X 3 - 3/4" BOLT	355.630
3	1	798496	DBL COIL SPRING WASHER	355.630
4	1	504576	NUT M/F LOCK 3/4"	355.630

A						C					
-	ORIGINAL ISSUE	KSM	GV	WPH	10/1/97	B					
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE



TRANSMISSION ENGINEERING

ASSEMBLY
3/4" DEAD END ANGLE PLATE
X-ARM BOLT

SCALE: NONE

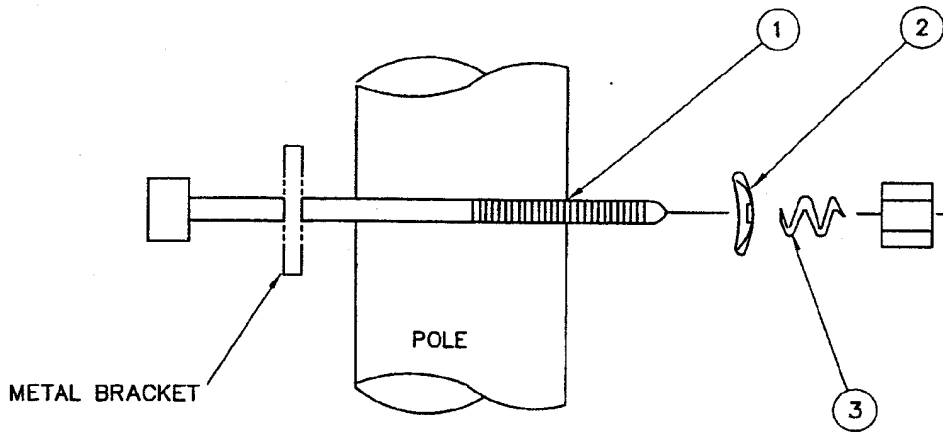
DWG. NO.

SHT. NO.

19028

1 of 1

19028001



BILL OF MATERIAL				
ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
1	1	NOTE 1	BOLT, 3/4" MACHINE, WITH NUT	355.630
2	1	797760	WASHER RIB, SQ. CURVED, 3/4" BOLT	355.630
3	1	798496	WASHER, SPRING, DBL COIL, 3/4"	355.630

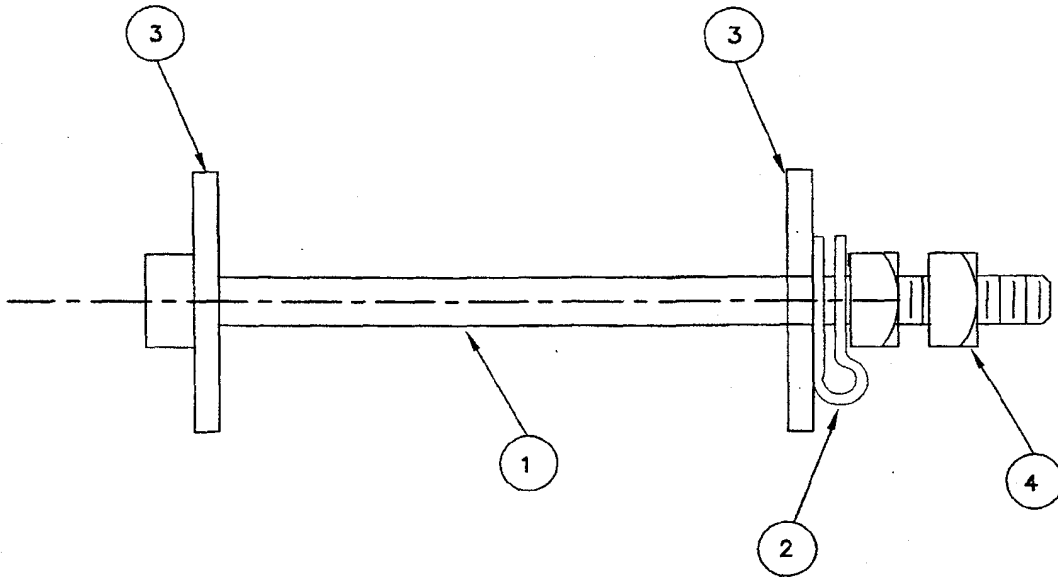
NOTE:

1. TOP INSULATOR: STOCK NO. 153440 - 14"
 MIDDLE INSULATOR: STOCK NO. 153472 - 16"
 BOTTOM INSULATOR: STOCK NO. 153504 - 18"
2. METAL-WOOD CONNECTION

A						C						
-	ORIGINAL ISSUE	WDF	WDF	WV7	4/25/02	B						
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	


SDGE	TRANSMISSION ENGINEERING						SCALE: NONE		
	ASSEMBLY						DWC. NO.	SHT. NO.	REV
	3/4" THRU BOLT						19029	1 of 1	-

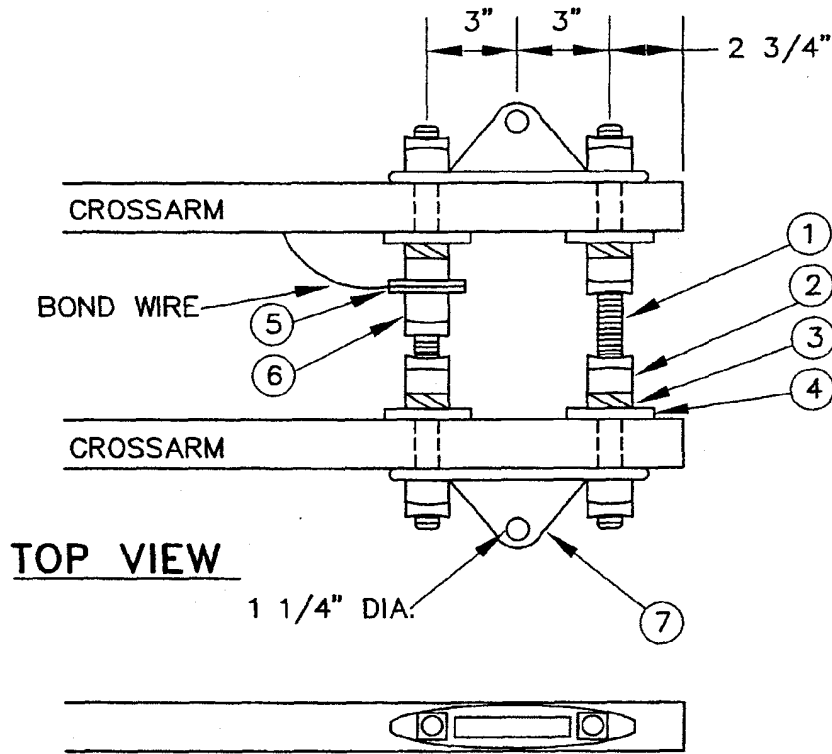
19029001



BILL OF MATERIAL				
ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
1	1	155840	BOLT, 7/8" X 22" W/NUT	355.630
2	1	798720	WASHER, SPRING 7/8"	355.630
3	2	799136	WASHER 31/2" X 31/2" SQ. FLAT	355.630
4	1	506912	7/8" NUT	355.630

A	CHANGED ITEM #4	WDF	WPH	WPH	4/25/02	C					
-	ORIGINAL ISSUE	KSM	GV	WPH	10/1/97	B					
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

	TRANSMISSION ENGINEERING						SCALE: NONE		190300A01
	ASSEMBLY						DWG. NO.	SHT. NO.	
	7/8" THRU BOLT						19030	1 of 1	



TOP VIEW

ELEVATION

BILL OF MATERIAL

ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
1	2	156288	BOLT, SPACE, 3/4"x26", W/ 4 NUTS	355.630
2	8	504576	NUT, M-F LOCK NUT, 3/4"	355.630
3	4	798496	WASHER, SPRING, DBL. COIL, 3/4"	355.630
4	4	799104	WASHER, SQUARE FLAT, 3/4"	355.630
5	2	800256	WASHER, ROUND FLAT, 3/4"	355.630
6	1	504768	NUT 3/4"	355.630
7	2	723968	TEE, DEAD END, GALV., 30K	355.630

A	ADDED DIA. DIMENSION	WDF	WPH	WYT	4/25/02	C					
-	ORIGINAL ISSUE	SDF	DRB	WPH	3/1/00	B					
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE



CROSSARM TEE DEAD END ASSEMBLY

TRANSMISSION ENGINEERING

SCALE: NONE

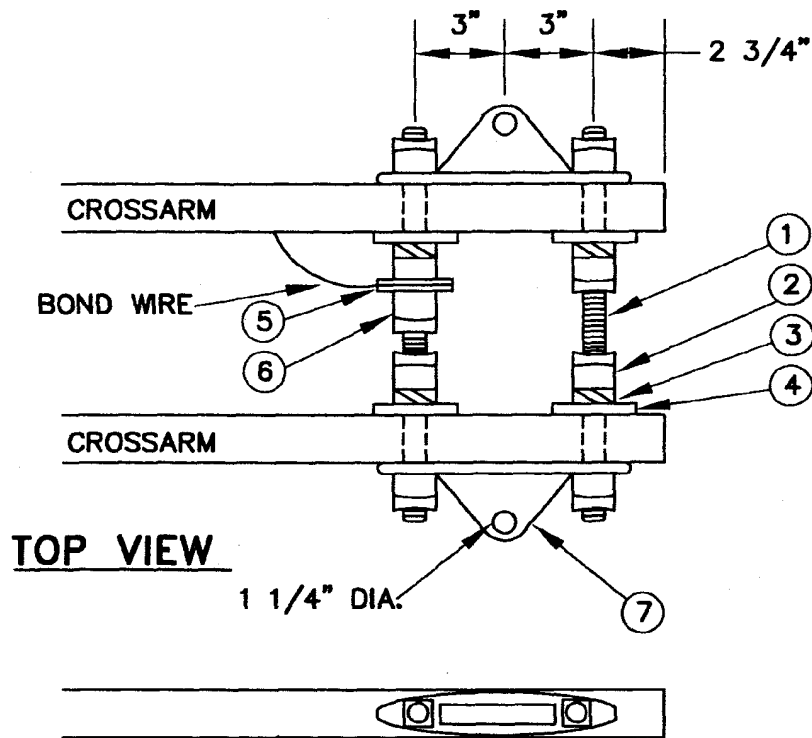
DWG. NO.

SHT. NO.

19033

1 of 1

19033A01

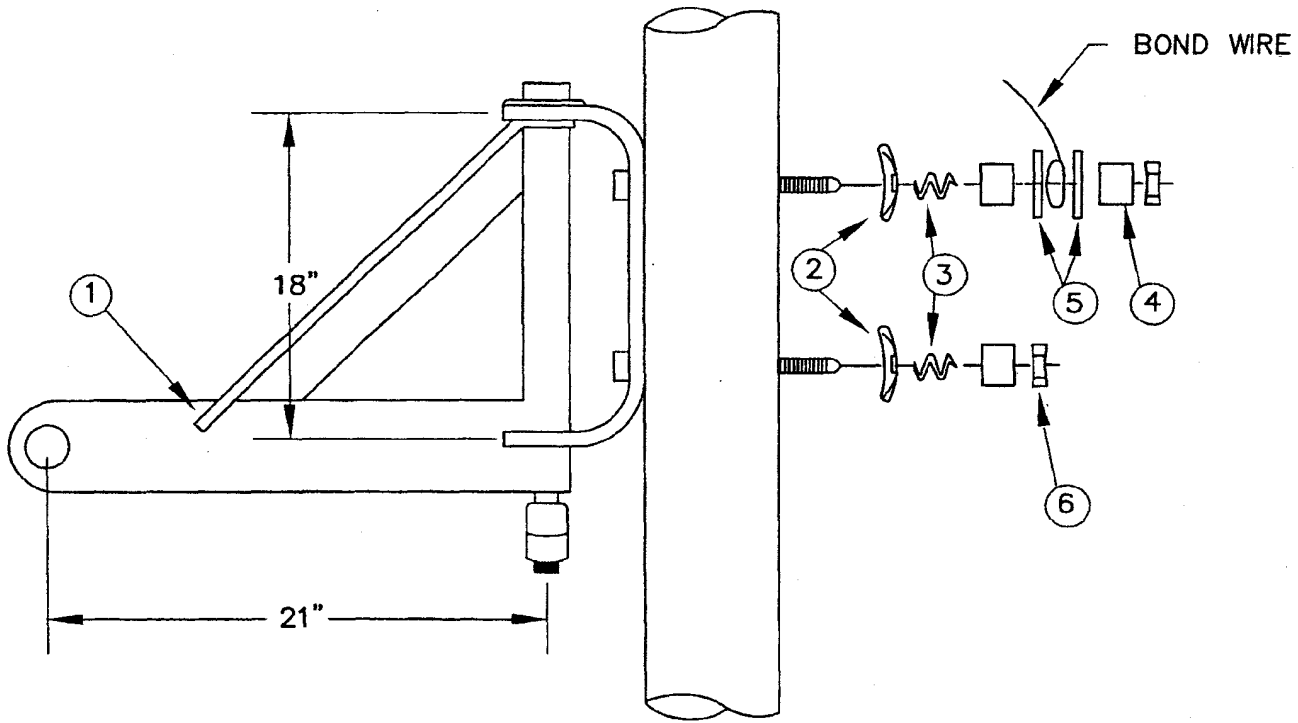


BILL OF MATERIAL				
ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
1	2	156320	BOLT, SPACE, 3/4"x28", W/ 4 NUTS	355.630
2	8	504576	NUT, M-F LOCK NUT, 3/4"	355.630
3	4	798496	WASHER, SPRING, DBL. COIL, 3/4"	355.630
4	4	799104	WASHER, SQUARE FLAT, 3/4"	355.630
5	2	800256	WASHER, ROUND FLAT, 3/4"	355.630
6	1	504768	NUT 3/4"	355.630
7	2	723968	TEE, DEAD END, GALV., 30K	355.630

	ORIGINAL	LLD	WPH	2008	5/20/08						
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

TRANSMISSION ENGINEERING						SCALE: NONE			
SDGE	CROSSARM TEE DEAD END ASSEMBLY SW POLE					DWG. NO.		SHT. NO.	
						19033SW		1 of 1	

19033SW



ELEVATION

BILL OF MATERIAL

ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
1	1	167190	BRACKET SWING ANGLE, WITH TWO BOLTS (3/4"x14") TWO NUTS AND TWO LOCK NUTS	355.630
2	2	797760	WASHER RIB, SQ. CURVED, 3/4" BOLT	355.630
3	2	798496	WASHER, SPRING, DBL. COIL, 3/4"	355.630
4	1	504768	NUT, 3/4"	355.630
5	2	800256	WASHER, ROUND, FLAT, 3/4"	355.630
6	2	504576	NUT, M/F LOCKNUT, 3/4"	355.630

153472 BOLT, 3/4"x16" WITH NUT

153504 BOLT 3/4"x18" WTH NUT

A	ADDED ITEM 6	WDF	WPH	WWT	4/25/02	C					
-	ORIGINAL ISSUE	SDF	DRB	WPH	3/1/00	B					
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE



TRANSMISSION ENGINEERING

SCALE: NONE

SWINGING ANGLE BRACKET ASSEMBLY

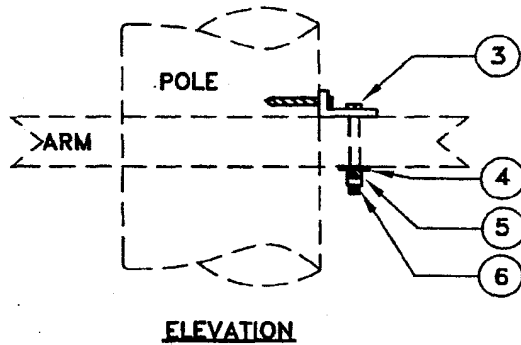
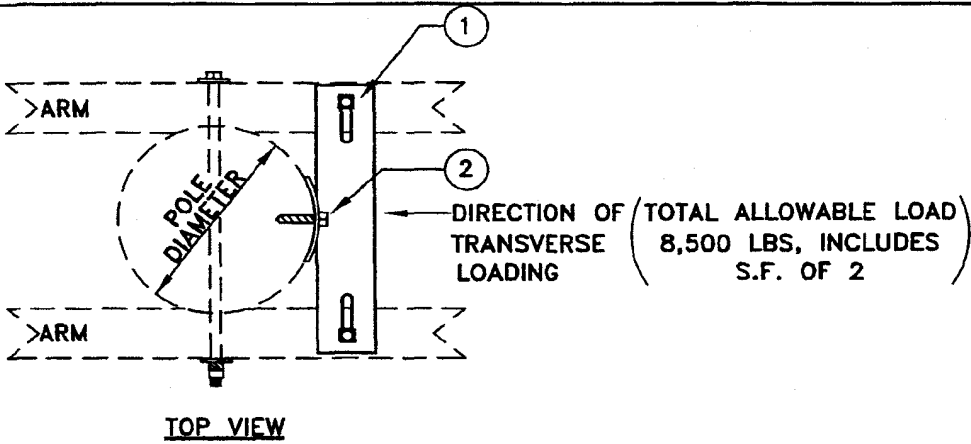
DWG. NO.

SHT. NO.

19036

1 of 1

19036A01



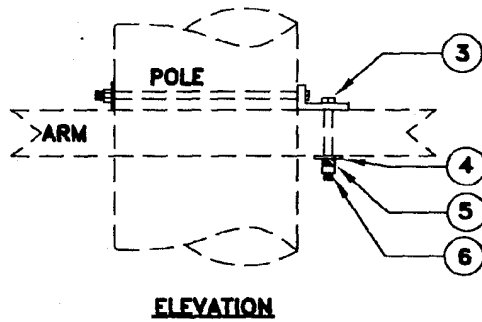
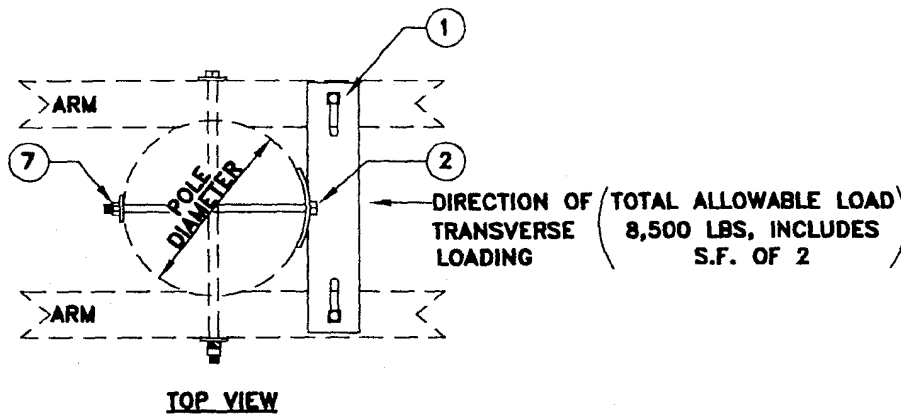
THRUST PLATE APPLICATION		
DIAMETER OF POLE AT CROSSARM THRU-BOLT		
THRUST PLATE SIZE	HEAVY CROSSARMS	
	MIN. DIA.	MAX. DIA.
18"	5 3/4"	9 3/4"
22"	9 3/4"	13 3/4"

BILL OF MATERIAL				
ITEM	QTY.	STOCK NO. OR STD. NO.	DESCRIPTION	ACCT. NO.
1	1	541210 OR 541208	PLATE, THRUST, GALV. 18"x4"x3/8" OR 22"x5"x3/8"	355.630
2	1	621600	SCREW, LAG, GALV. 5/8"x5"	355.630
3	2	154112	BOLT, MACHINE, GALV. WITH NUT, 3/4"x10"	355.630
4	2	799104	WASHER, SQUARE, FLAT, 3"x3" FOR 3/4" BOLT	355.630
5	2	798496	WASHER, SPRING, DBL COIL, 3/4" BOLT	355.630
6	2	504576	NUT, M-F LOCK, 3/4" BOLT	355.630

- NOTES: 1. BEFORE DRILLING CROSSARMS FOR BOLTING THRUST PLATE TO CROSSARMS, ENSURE THAT PLATE IS DRIVEN TIGHT AGAINST POLE WITH LAG SCREW.
 2. DRILL THRUST PLATE MOUNTING BOLT HOLES ON CROSSARMS CENTERLINE.
 3. DO NOT BOND STEEL THRUST PLATE OR HARDWARE.

A	CHANGED TITLE	WDF	WPH	WYT	4/25/02	C					
-	ORIGINAL ISSUE	SDF	DRB	WPH	3/1/00	B					
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

	TRANSMISSION ENGINEERING						SCALE: NONE				19040A01
	CROSSARM TO POLE THRUST PLATE						DWG. NO.		SHT. NO.		
							19040		1 of 1		



THRUST PLATE APPLICATION		
DIAMETER OF POLE AT CROSSARM THRU-BOLT		
THRUST PLATE SIZE	HEAVY CROSSARMS	
	MIN. DIA.	MAX. DIA.
18"	5 3/4"	9 3/4"
22"	9 3/4"	13 3/4"

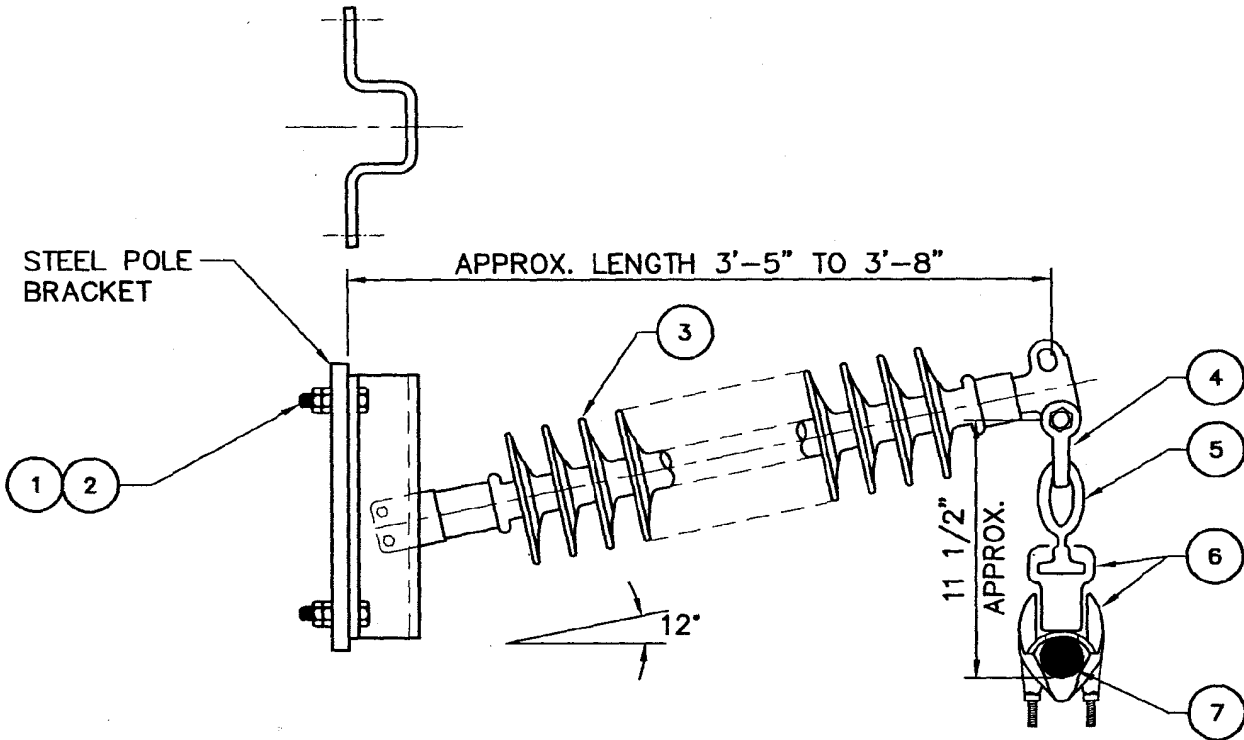
BILL OF MATERIAL				
ITEM	QTY.	STOCK NO. OR STD. NO.	DESCRIPTION	ACCT. NO.
1	1	541210 OR 541208	PLATE, THRUST, GALV. 18"x4"x3/8" OR 22"x5"x3/8"	355.630
2	1	154880	BOLT, THRU, 5/8" X 14"	355.630
3	2	154112	BOLT, MACHINE, GALV. WITH NUT, 3/4"x10"	355.630
4	2	799104	WASHER, SQUARE, FLAT, 3"x3" FOR 3/4" BOLT	355.630
5	2	798496	WASHER, SPRING, DBL. COIL, 3/4" BOLT	355.630
6	2	504576	NUT, M-F LOCK, 3/4" BOLT	355.630
7	1	800320	WASHER, 5/8" ROUND, FLAT	355

- NOTES:**
- BEFORE DRILLING CROSSARMS FOR BOLTING THRUST PLATE TO CROSSARMS, ENSURE THAT PLATE IS DRIVEN TIGHT AGAINST POLE WITH LAG SCREW.
 - DRILL THRUST PLATE MOUNTING BOLT HOLES ON CROSSARMS CENTERLINE.
 - DO NOT BOND STEEL THRUST PLATE OR HARDWARE.

	ORIGINAL	LLD	WPH	<i>WPH</i>	5/20/08						
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

TRANSMISSION ENGINEERING						SCALE: NONE			
SDGE	CROSSARM TO POLE THRUST PLATE SW POLE					DWG. NO.		SHT. NO.	
						19040SW		1 of 1	

19040SW



ELEVATION

A	ADDED ITEMS 4 & 5	SDF	DRB	WPH	2/1/00	C	REVISED LINE GUARD STOCK NO. FOR CANARY	PM	WPH	WVT	5/3/05
-	ORIGINAL ISSUE	AJS	DRB	WPH	7/15/99	B	ADD ACSS CONDUCTORS	WDF	SFO WPH	WVT	2/20/03
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE



TRANSMISSION ENGINEERING

**POLYMER POST (BLADE) INSULATOR
69KV STEEL POLE**

SCALE: NONE

DWG. NO. 19215 SHT. NO. 1 of 2

19215C01

BILL OF MATERIAL (FOR ONE ASSEMBLY)


ITEM	QTY.	STOCK NO. OR STD. NO.	DESCRIPTION	ACCT NO.
1	4	153792	BOLT , 3/4" x 3" WITH NUT	356
2	4	504576	LOCK NUT, 3/4"	356
3	1	429330	INSULATOR, POST, POLYMER, 41-44" LONG, BENDABLE BASE AND BLADE TOP, 4,000 LBS. CANTILEVER BREAKING LOAD.	356
4	1	636436	SHACKLE, ANCHOR, 30K	356
5	1	337542	EYE OVAL BALL, 30K	356
6	1	232192	CLAMP, SUSPENSION, ALUM. ALLOY, WITH SOCKET EYE, RANGE 1.25" TO 1.82", 25K	356
7		SEE TABLE A	GUARD, LINE	356

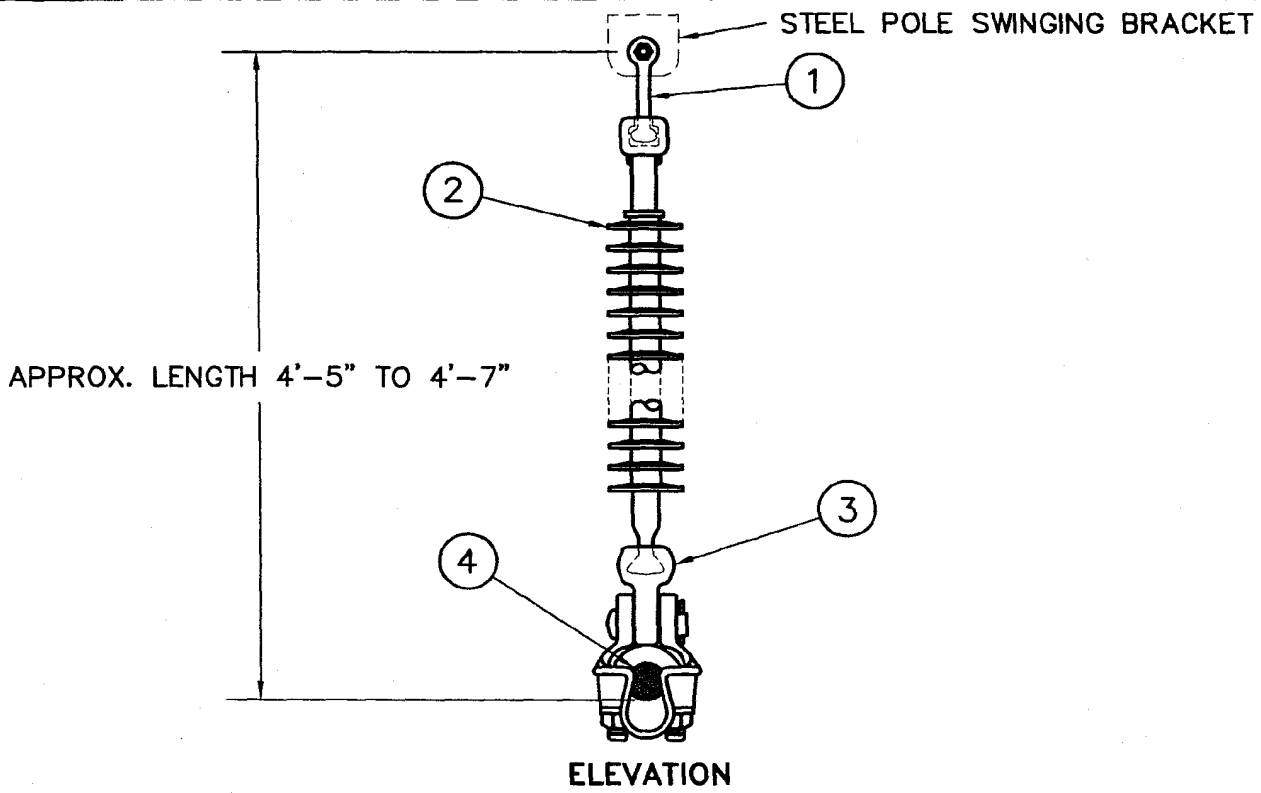
TABLE A

636 ACSR/AW OR ACSS/AW 24/7 (ROOK/AW)

7	1 SET	397728	GUARD, LINE, LENGTH 45", O.D. 1.342"	356
			900 ACSS/AW 54/7 (CANARY/AW)	
7	1 SET	397740	GUARD, LINE, LENGTH 53", O.D. 1.662"	356
			1033.5 ACSR/AW OR ACSS/AW 45/7 (ORTOLAN/AW)	
7	1 SET	397760	GUARD, LINE, LENGTH 53", O.D. 1.712"	356

A	ADDED ITEMS 4 & 5	SDF	DRB	WPH	2/1/00	C	REVISED LINE GUARD STOCK NO. FOR CANARY	PM	WPH	WWT	5/3/05
-	ORIGINAL ISSUE	AJS	DRB	WPH	7/15/99	B	ADD ACSS CONDUCTORS	WDF	SFO WPH	WWT	2/20/03
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

	TRANSMISSION ENGINEERING						SCALE: NONE		19215C01
	POLYMER POST (BLADE) INSULATOR 69kV STEEL POLE						DWG. NO.	SHT. NO.	
							19215	2 of 2	



BILL OF MATERIAL (FOR ONE ASSEMBLY)

ITEM	QTY.	STOCK NO. OR STD. NO.	DESCRIPTION	ACCT NO.
1	1	235424	Y-CLEVIS BALL, 30K	356
2	1	431200	INSULATOR, SUSPENSION, POLYMER, 45"-47" LONG, BALL (HOT END) & SOCKET, 25K SPECIFIED MECH. LOAD	356
3	1	232192	CLAMP, SUSPENSION, ALUM. ALLOY WITH SOCKET EYE RANGE 1.25" TO 1.82", 25K	356
4		SEE TABLE A	GUARD, LINE	356

TABLE A

636 ACSR/AW 24/7 (ROOK/AW) OR 636 ACSS/AW 24/7 (ROOK/AW)				
4	1 SET	397728	GUARD, LINE, LENGTH 45", O.D. 1.342"	356
900 ACSS/AW 54/7 (CANARY/AW)				
4	1 SET	397740	GUARD, LINE, LENGTH 51", O.D. 1.662"	356
1033.5 ACSR/AW 45/7 (ORTOLAN/AW) OR 1033.5 ACSS/AW 45/7 (ORTOLAN/AW)				
4	1 SET	397760	GUARD, LINE, LENGTH 53", O.D. 1.712"	356

A	TITLE CHANGE	FJP	DRB	WPH	3/21/00	C	REVISED LINE GUARD STOCK NO. FOR CANARY	PM	WPH	WV	5/03/05
-	ORIGINAL ISSUE	FJP	DRB	WPH	7/15/99	B	ADD ACSS	WDF	SFO WPH	WWT	2/20/03
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE



TRANSMISSION ENGINEERING

**POLYMER SUSPENSION INSULATOR
69KV STEEL POLE**

SCALE: NONE

DWG. NO.

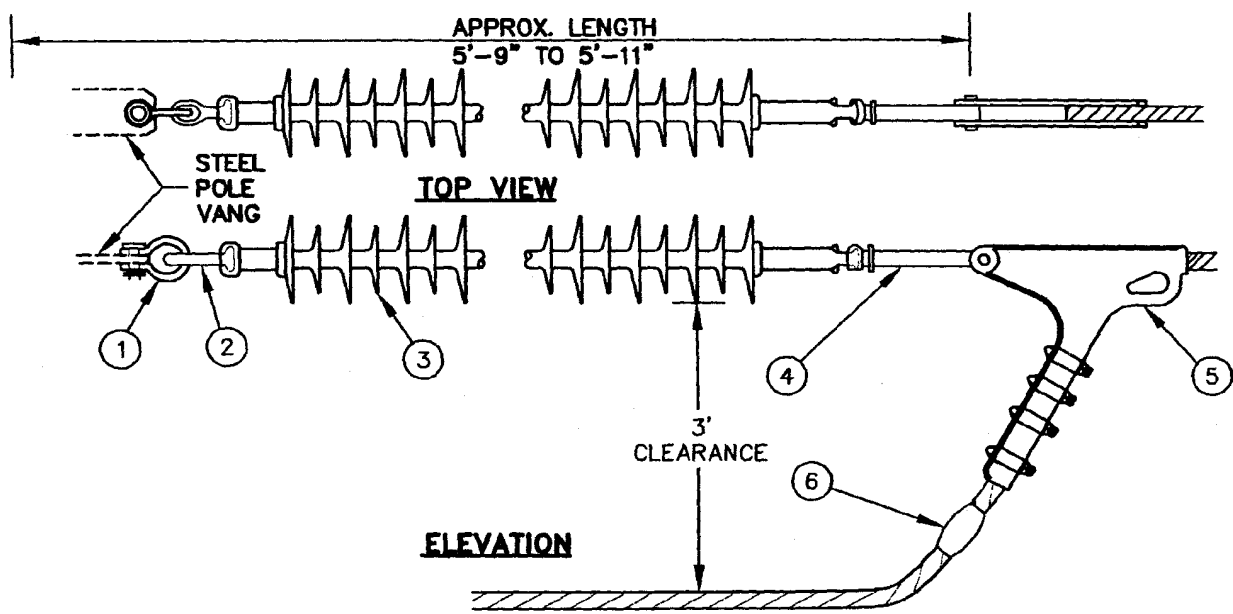
19230

SHT. NO.

1 of 1

19230C01

D:\VAC\FILES\TRANS STANDARDS\ELECTRIC TRANSMISSION STANDAR .19000 OVERHEAD ASSEMBLIES\19240\19240DER

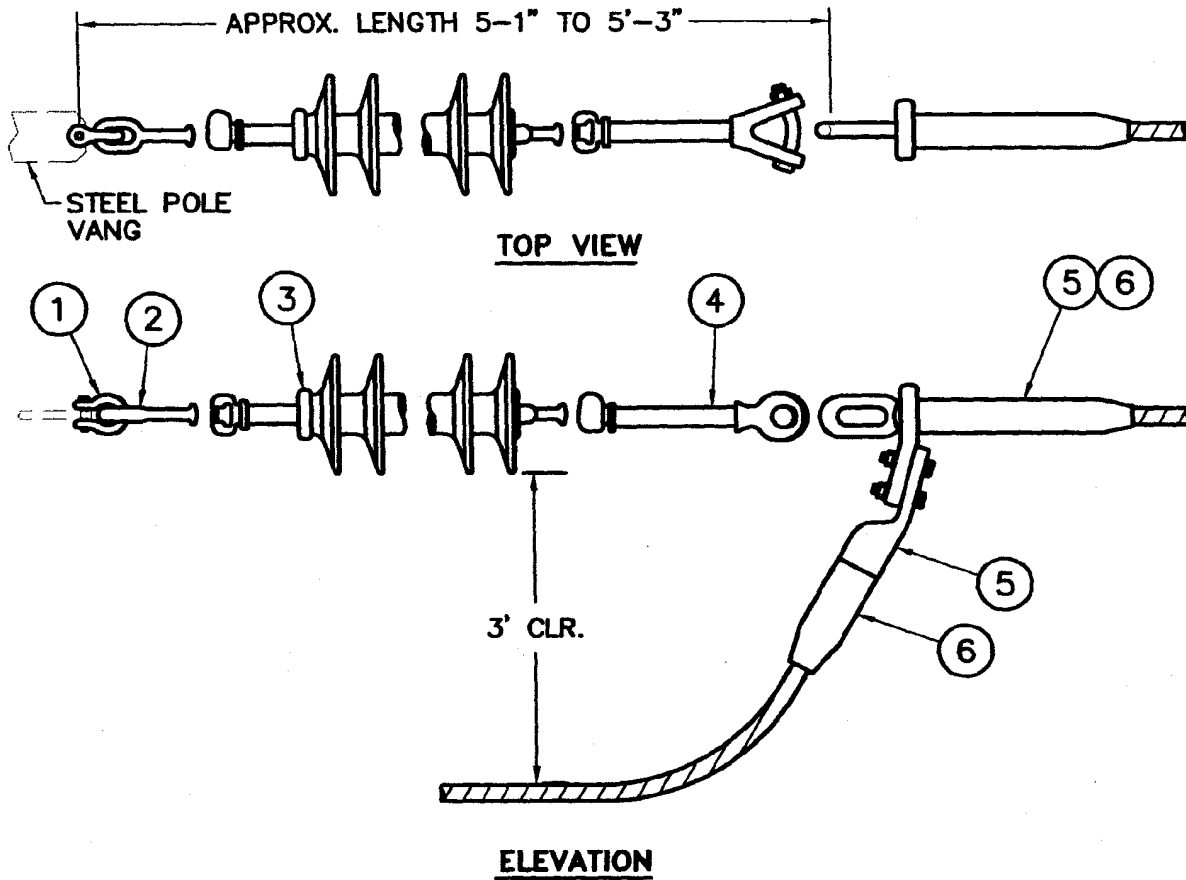


BILL OF MATERIAL (FOR ONE ASSEMBLY)				
ITEM	QTY.	STOCK NO. OR STD. NO.	DESCRIPTION	ACCT NO.
1	1	636436	SHACKLE, ANCHOR, 30K	356.655
2	1	337542	EYE, OVAL BALL, 30K	356.655
3	1	431200	INSULATOR, SUSPENSION, POLYMER, 45-47" LONG, BALL (HOT END) & SOCKET, 25,000 LBS. UTIL. TENSILE STRENGTH	356.655
4		SEE TABLE A	EYE, SOCKET, HOTLINE, 30K	356.655
5		SEE TABLE A	CLAMP, STRAIN, DEADEND, ALUM. ALLOY,	356.655
6		SEE TABLE A	SLEEVE ALUM, JUMPER	

TABLE A				
		811904	336.4 ACSR/AW 28/7 (LINNET/AW)	
4	1	337604	EYE, SOCKET HOTLINE, WIDTH 3/4"	356.655
5	1	231700	CLAMP, STRAIN, DEADEND, ALUM. ALLOY W/O SOCKET EYE, RANGE 0.47" TO 0.86" 25K	356.655
6	1/2	650264	SLEEVE, ALUM. JUMPER	356.655
		811888	636 ACSR/AW 24/7 (ROOK/AW)	
4	1	337622	EYE, SOCKET HOTLINE, WIDTH 1 3/8"	356.655
5	1	230688	CLAMP, STRAIN, DEADEND, ALUM. ALLOY RANGE 0.71" TO 1.138" 30K	356.655
6	1/2	650656	SLEEVE, ALUM. JUMPER	356.655
		811808	1,033.5 ACSR/AW 45/7 (ORTOLAN/AW)	
4	1	337622	EYE, SOCKET HOTLINE, WIDTH 1 3/8"	356.655
5	1	230688	CLAMP, STRAIN, DEADEND, ALUM. ALLOY RANGE 0.71" TO 1.318" 30K	356.655
6	1/2	650336	SLEEVE, ALUM. JUMPER	356.655

C	REVISED STOCK NO., ITEM 2	PM	WPH	WVT	2/22/05	F					
B	SHORTEN OVAL EYE	WDF	WPH	WVT	7/25/02	E	REDRAWN	PM	WPH	WVT	4/4/06
	ORIGINAL	FJP	DRB	WPH	7/15/99	D	REVISED TITLE	PM	WPH	WVT	5/3/05
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

SDGE	TRANSMISSION ENGINEERING		SCALE: NONE	
	POLYMER SUSPENSION DEADEND INSULATOR-ACSR 69kV STEEL POLE		DWG. NO. 19240	SHT. NO. 1 of 1
			19240E01	



CONDUCTOR	STEEL DIE	ALUMINUM DIE
ROOK	12SH	27AH
CANARY	14SH	30AH
ORTOLAN	10SH	34AH
TEAL	14SH	27AH

NOTE:

INSTALLATION OF THE COMPRESSION DEAD ENDS & COMPRESSION SPLICES, INCLUDING THE PROPER DIRECTION OF COMPRESSION, SHALL STRICTLY FOLLOW MANUFACTURER'S INSTRUCTIONS.

B	REVISED ITEM 1	PM	WPH	WVT	2/22/05	E					
A	ADD 605 TEAL	PM	GV DW	WVT	4/1/04	D					
	ORIGINAL	WDF	SFO WPH	WVT	2/20/03	C	UPDATED DIE TABLE & ITEM 6	PM	WPH	WVT 4/4/06	
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

TRANSMISSION ENGINEERING

SCALE: NONE



**POLYMER
DEADEND INSULATOR-ACSS
69KV STEEL POLE**

DWG. NO.

SHT. NO.

19242

1 of 2

19242C01

BILL OF MATERIAL (FOR ONE ASSEMBLY)

ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	ACCT NO.
1	1	636436	SHACKLE, ANCHOR, 30K	356
2	1	337542	BALL, OVALEYE, 30K	356
3	1	431200	INSULATOR, SUSPENSION, POLYMER, 45"-47" LONG, BALL (HOT END) & SOCKET, 25K SPECIFIED MECH. LOAD	356
4	1	236048	Y-CLEVIS, SOCKET, HOTLINE, 30K	356
5	1	SEE TABLE A	DEAD END, COMPRESSION, FOR ACSS CONDUCTOR, FULL TENSION WITH VERTICAL EYE, SINGLE TONGUE & 4-HOLE NEMA PAD	356
6	1/2	246950	COMPOUND, FILLER	356

TABLE A

ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	ACCT NO.
			636 ACSS/AW 24/7 (ROOK/AW)	
5	1	652678	DEAD END, COMPRESSION, FOR 636 ROOK/ACSS/AW 24/7 CONDUCTOR, FULL TENSION WITH VERTICAL EYE, SINGLE TONGUE & 4-HOLE NEMA PAD	356
			900 ACSS/AW 54/7 (CANARY/AW)	
5	1	652682	DEAD END, COMPRESSION, FOR 900 CANARY/ACSS/AW CONDUCTOR, FULL TENSION WITH VERTICAL EYE, SINGLE TONGUE & 4-HOLE NEMA PAD	356
			1033.5 ACSS/AW 45/7 (ORTOLAN/AW)	
5	1	652674	DEAD END, COMPRESSION, FOR 1033.5 ORTOLAN/ACSS /AW CONDUCTOR, FULL TENSION WITH VERTICAL EYE, SINGLE TONGUE & 4-HOLE NEMA PAD	356
			605 ACSS/AW 30/19 (TEAL/AW)	
5	1	ALCOA COMP DE E33129SSAC	DEAD END, COMPRESSION, FOR 605 TEAL/ACSS/AW CONDUCTOR, FULL TENSION WITH VERTICAL EYE, SINGLE TONGUE & 4-HOLE NEMA PAD	356

B	REVISED ITEM 1	PM	WPH	WWT	2/22/05	E					
A	ADD 605 TEAL	PM	GV DW	WWT	4/1/04	D					
	ORIGINAL	WDF	SFO WPH	WWT	2/20/03	C	UPDATED DIE TABLE & ITEM 6	PM	WPH	WWT	4/4/06
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

TRANSMISSION ENGINEERING

SCALE: NONE



**POLYMER
DEADEND INSULATOR-ACSS
69KV STEEL POLE**

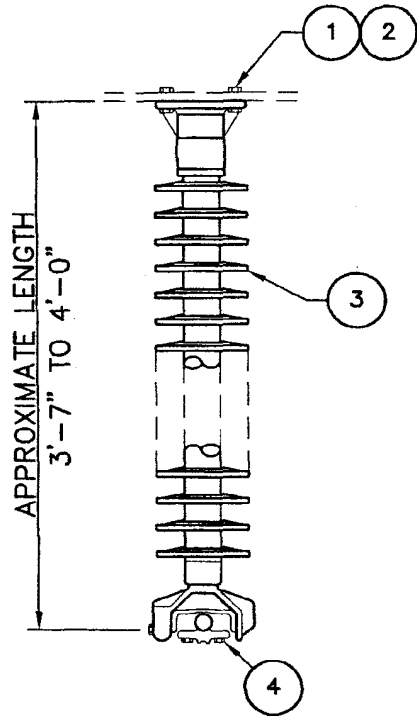
DWG. NO.

SHT. NO.

19242

2 of 2

19242C02



ELEVATION

BILL OF MATERIAL (FOR ONE ASSEMBLY)				
ITEM	QTY.	STOCK NO. OR STD. NO.	DESCRIPTION	ACCT NO.
1	4	155296	BOLT, WITH NUT, 5/8" x 3"	355
2	4	504608	LOCK NUT, 5/8"	355
3	1	428964	INSULATOR, POLYMER LINE POST WITH INVERTED SKIRTS, 43-48" LONG, 4 BOLT BASE AND CLAMP TOP, 3,400 LBS CANTILEVER BREAKING LOAD	356
4	1	SEE TABLE A	CLAMP, POST INSULATOR	

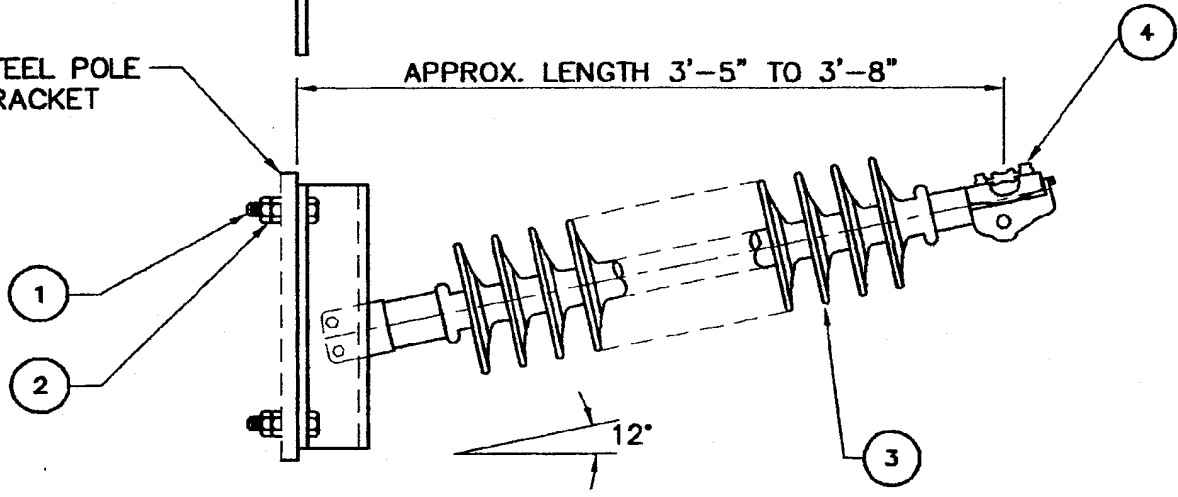
TABLE A				
636 ACSR/AW OR ACSS/AW 24/7 (ROOK/AW)				
4	1	229728	CLAMP, POST INSULATOR, RANGE 0.70" TO 1.06"	356
900 ACSS/AW 54/7 (CANARY/AW)				
4	1	229760	CLAMP, POST INSULATOR, RANGE 1" TO 1.5"	356
1033.5 ACSR/AW OR ACSS/AW 45/7 (ORTOLAN/AW)				
4	1	229760	CLAMP, POST INSULATOR, RANGE 1" TO 1.5"	356

A	TITLE CHANGE	WDF	WPH	WVT	4/25/02	C					
-	ORIGINAL ISSUE	FJP	DRB	WPH	3/23/00	B	ADD ACSS CONDUCTORS	WDF	5/0	WVT	2/20/03
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

	TRANSMISSION ENGINEERING						SCALE: NONE	
	POLYMER LINE POST JUMPER INSULATOR 69KV STEEL POLE						DWG. NO.	SHT. NO.
							19260	1 of 1

1926B01

STEEL POLE BRACKET



ELEVATION

BILL OF MATERIAL (FOR ONE ASSEMBLY)

ITEM	QTY.	STOCK NO. OR STD. NO.	DESCRIPTION	ACCT NO.
1	4	153792	BOLT WITH NUT, 3/4" x 3"	355
2	4	504576	NUT, M/F, LOCK, 3/4"	355
3	1	428970	INSULATOR, POST, POLYMER, 41-44" LONG, BENDABLE BASE AND CLAMPTOP, 4,000 LBS. CANTILEVER BREAKING LOAD.	356
4		SEE TABLE A	CLAMP, POST INSULATOR, ALUM.	

TABLE A

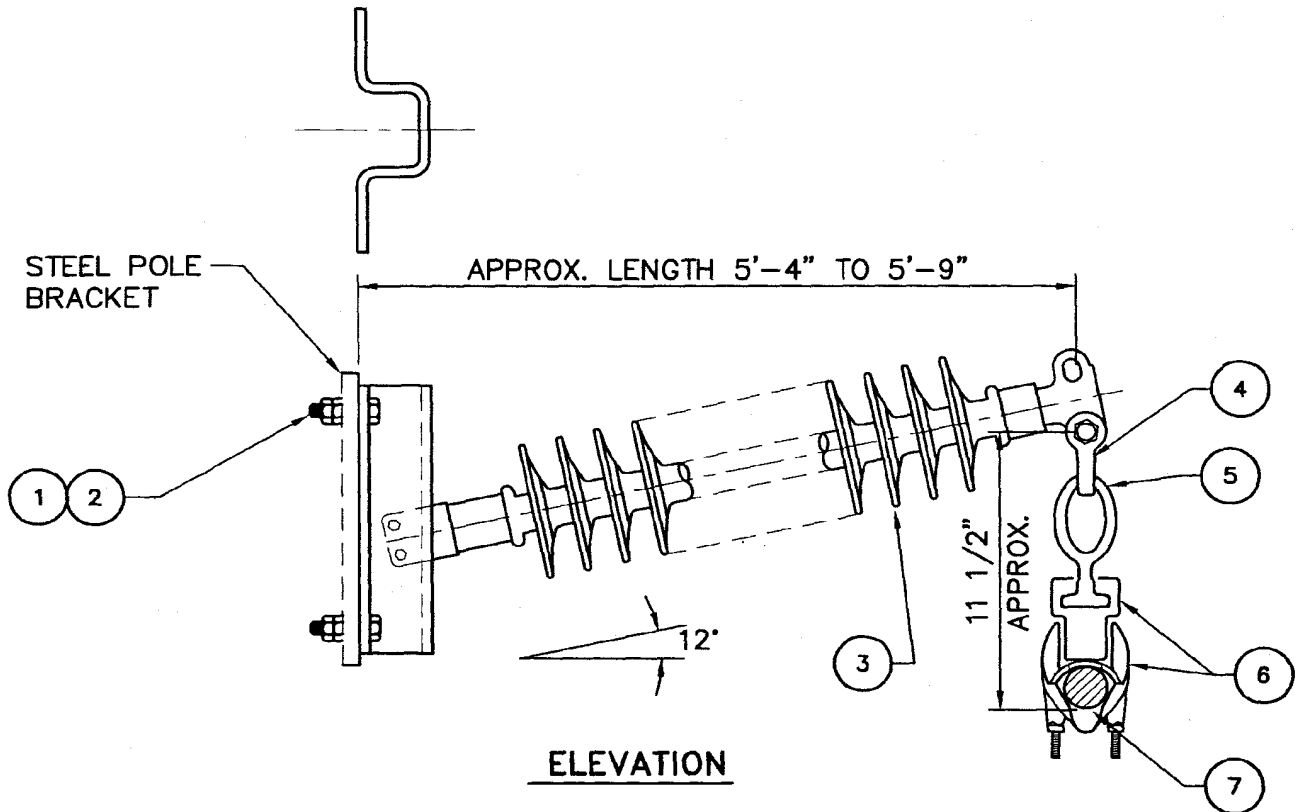
			636 ACSR/AW OR ACSS/AW 24/7 (ROOK/AW)	
4	1	229728	CLAMP, POST INSULATOR, RANGE 0.70" TO 1.06"	356
			605 ACSS/AW 30/19 (TEAL/AW)	
4	1	229728	CLAMP, POST INSULATOR, RANGE 0.70" TO 1.06"	356
			900 ACSS/AW 54/7 (CANARY/AW)	
4	1	229760	CLAMP, POST INSULATOR, RANGE 1" TO 1.5"	356
			1033.5 ACSR/AW OR ACSS/AW 45/7 (ORTOLAN/AW)	
4	1	229760	CLAMP, POST INSULATOR, RANGE 1" TO 1.5"	356

NOTE: NO LINE GUARDS WHEN USED AS JUMPER SUPPORT

A	CHANGED NOTE	WDF	WPH		4/25/02	C	ADD 605 ACSS/AW	PM	GV DW	WVT	4/1/07
-	ORIGINAL ISSUE	FJP	DRB	WPH	3/23/00	B	ADD ACSS CONDUCTORS	WDF	SFO WPH	WVT	2/20/03
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

SDGE	TRANSMISSION ENGINEERING							SCALE: NONE			
	POLYMER POST JUMPER INSULATOR HORIZONTAL CLAMP 69KV STEEL POLE							DWC. NO.	SHT. NO.		
								19265	1 of 1		

19265C01



ELEVATION

BILL OF MATERIAL (FOR ONE ASSEMBLY)

ITEM	QTY.	STOCK NO. OR STD. NO.	DESCRIPTION	ACCT NO.
1	4	153792	BOLT, 3/4" x 3" WITH NUT	356
2	4	504576	NUT, M/F, LOCK, 3/4"	356
3	1	429334	INSULATOR, POST, POLYMER, 64-69" LONG, BENDABLE, BASE AND BLADE TOP, 2,600 LBS. CANTILEVER BREAKING LOAD.	356
4	1	636436	SHACLE, ANCHOR, 30K	356
5	1	337542	EYE OVAL BALL, 30K	356
6	1	232192	CLAMP, SUSPENSION, ALUM. ALLOY, WITH SOCKET EYE RANGE 1.25" TO 1.82", 25K	356
7		SEE TABLE A	GUARD, LINE	

TABLE A

636 ACSR/AW OR ACSS/AW 24/7 (ROOK/AW)				
7	1 SET	397728	GUARD, LINE, LENGTH 45", O.D. 1.342"	356
900 ACSS/AW 54/7 (CANARY/AW)				
7	1 SET	397740	GUARD, LINE, LENGTH 53", O.D. 1.662"	356
1033.5 ACSR/AW OR ACSS/AW 45/7 (ORTOLAN/AW)				
7	1 SET	397760	GUARD, LINE, LENGTH 53", O.D. 1.712"	356

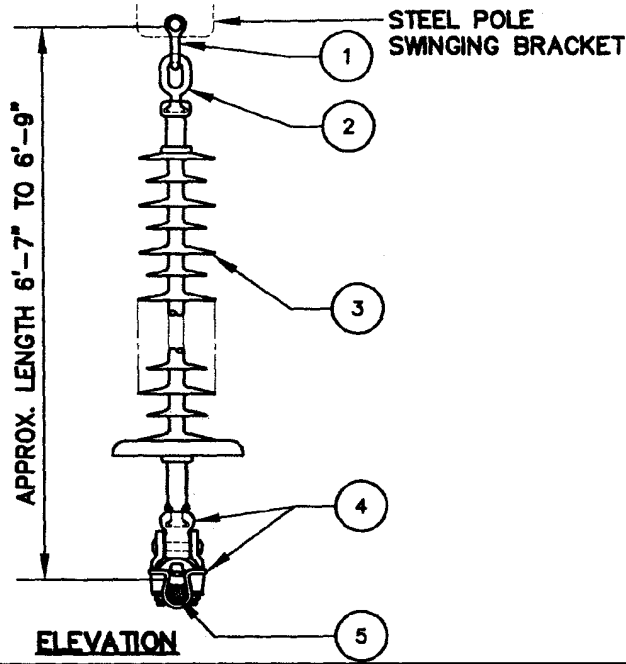
A	CHANGED NOTE	WDF	WPH	WPH	4/25/02	C	REVISED LINE GUARD STOCK NO. FOR CANARY	PM	WDH	WVT	5/03/05
-	ORIGINAL ISSUE	FJP	DRB	WPH	3/23/00	B	ADD ACSS CONDUCTORS	WDF	SFO	WVT	2/20/03
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE



TRANSMISSION ENGINEERING
**POLYMER POST (BLADE) INSULATOR
 138KV STEEL POLE**

SCALE: NONE
 DWG. NO. 19315
 SHT. NO. 1 of 1

19315C01



BILL OF MATERIALS (FOR ONE ASSEMBLY)

ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
1	1	636436	SHACKLE, ANCHOR, 30K	356
2	1	337542	EYE, OVAL, BALL, 30K	356
3	1	431396	INSULATOR, SUSPENSION, 138KV, W/ CORONA RING, SILICONE RUBBER, 25K SPECIFIED MECHANICAL LOAD, SECTION LENGTH 66"-68", BALL (HOT END) AND SOCKET END FITTINGS	356
4	1	232192	CLAMP, SUSPENSION, ALUM. ALLOY, W/ SOCKET EYE, RANGE 1.25" TO 1.82", 25K	356
5		SEE TABLE A	GUARD, LINE	

TABLE A

			636 ACSR/AW OR ACSS/AW 24/7 (ROOK/AW)	
5	1 SET	397728	GUARD, LINE, O.D. 1.342", LENGTH 45"	356
			1033.5 ACSR/AW OR ACSS/AW 45/7 (ORTOLAN/AW)	
5	1 SET	397760	GUARD, LINE, O.D. 1.712", LENGTH 53"	356
			900 ACSS/AW 54/7 (CANARY/AW)	
5	1 SET	397740	GUARD, LINE, O.D. 1.662", LENGTH 51"	356
			605 ACSS/AW 30/19 (TEAL/AW)	
5	1 SET	397730	GUARD, LINE, O.D. 1.358", LENGTH 45"	356

D	REVISED LENGTH	PM	WPH	WVT	2/22/05	G	ADDED CORONA RING	LLD	WPH	WVT	4/3/08
C	ADD TEAL CONDUCTOR	WDF	GV	WVT	4/01/04	F	UPDT. STOCK NO. ITEM 6	PM	WPH	WVT	8/15/06
	ORIGINAL	FJP	DRB	WPH	3/23/00	E	REV. LINE GUARD STOCK NOS.	PM	WPH	WVT	5/3/05
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

TRANSMISSION ENGINEERING

SCALE: NONE

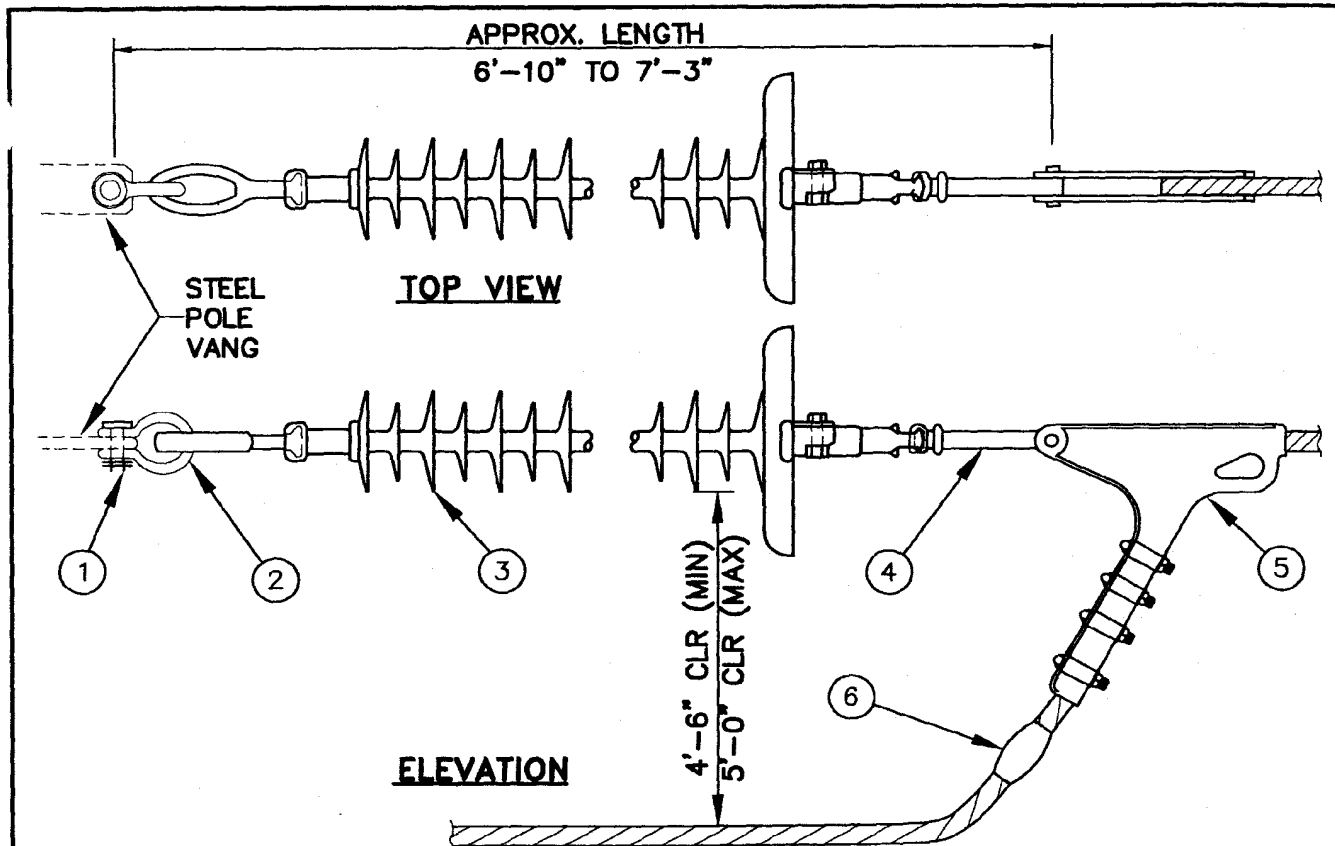


**POLYMER
SUSPENSION INSULATOR
138kV STEEL POLE**

DWG. NO.
19330

SHT. NO.
1 of 1

19330



BILL OF MATERIALS (FOR ONE ASSEMBLY)

ITEM	QTY.	STOCK NO. OR STD. NO.	DESCRIPTION	ACCT. NO.
1	1	636436	SHACKLE, ANCHOR, 30K	356
2	1	337542	EYE, OVAL, BALL, 30K	356
3	1	431396	INSULATOR, SUSPENSION, 138KV, W/ CORONA RING, SILICONE RUBBER, 25K SPECIFIED MECHANICAL LOAD, SECTION LENGTH 66"-68", BALL (HOT END) AND SOCKET END FITTINGS	356
4	1	337622	EYE, SOCKET, HOTLINE, EYE, 1-3/8" WIDE, 30K	356
5	1	230686	CLAMP, STRAIN, DEADEND, ALUM. ALLOY, RANGE 0.71"-1.318", 30K	356
6		SEE TABLE A	SLEEVE, ALUM. JUMPER	

TABLE A

638 ACSR/AW 24/7 (ROOK/AW)				
6	1/2	650656	SLEEVE, ALUM., JUMPER	356
1033.5 ACSR/AW 45/7 (ORTOLAN/AW)				
6	1/2	650336	SLEEVE, ALUM., JUMPER	356

REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE
B	REVISED TITLE	PM	WPH	WVT	5/3/05						
A	CHANGED TITLE	WDF	WPH	WVT	4/25/02	D	UPDATE DESCRIPTION, ITEM 3	LLD	WPH	AW	4/3/08
	ORIGINAL	FJP	DRB	WPH	3/23/02	C	ADDED CORONA RING	PM	WPH	AW	8/15/08

TRANSMISSION ENGINEERING

SCALE: NONE



**POLYMER SUSPENSION
DEADEND INSULATOR-ACSR
138KV STEEL POLE**

DWG. NO.

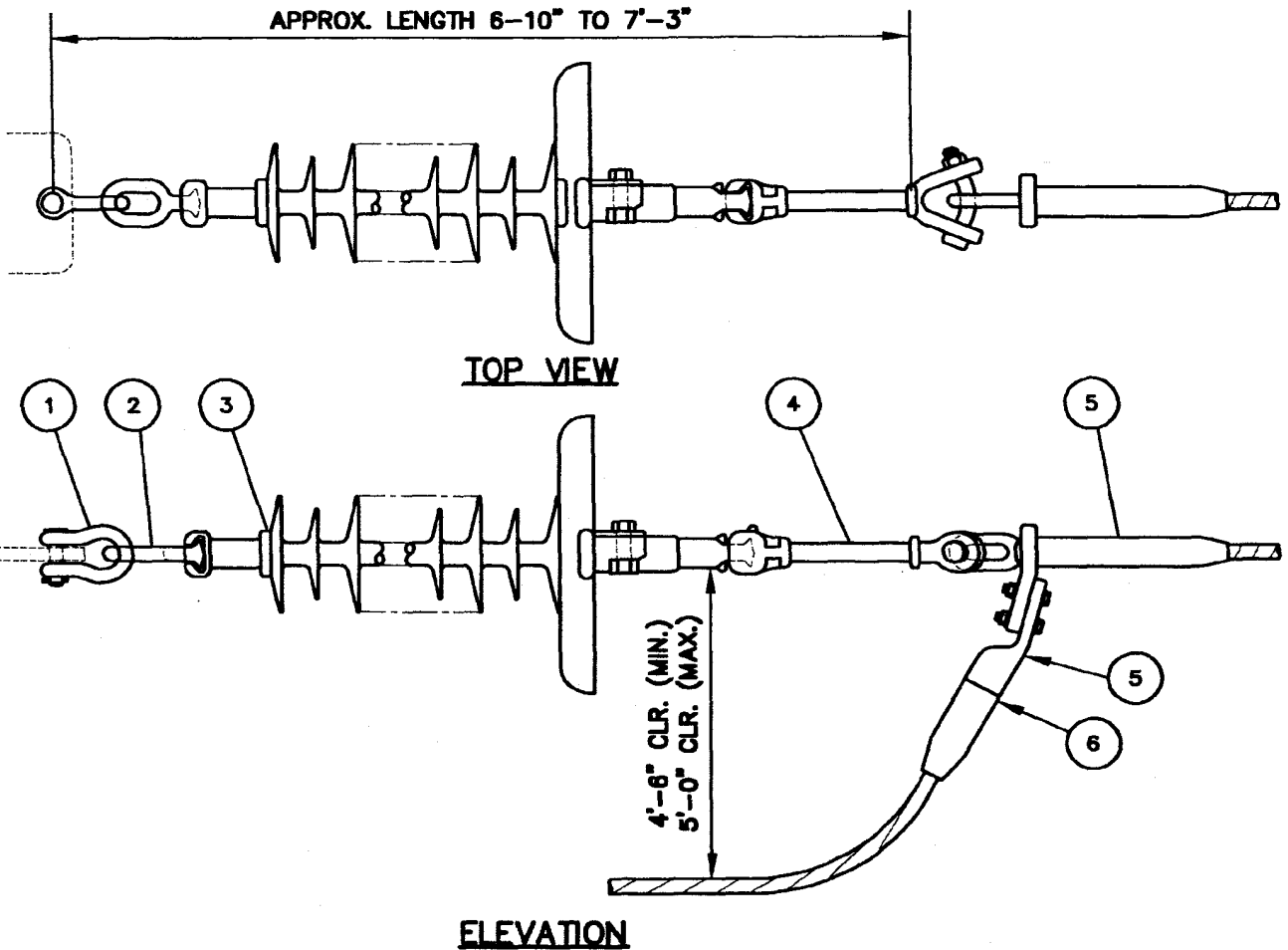
SHT. NO.

19340

1 of 1

19340

LES\TRANS STANDARDS\ELECTRIC TRANSMISSION STANDAR. 9000 OVERHEAD ASSEMBLIES\19342\19342CR
 DI VACA



CONDUCTOR	STEEL DIE	ALUMINUM DIE
ROOK	12SH	27SH
CANARY	14SH	30SH
ORTOLAN	10SH	34SH
TEAL	14SH	27SH

NOTE:
 INSTALLATION OF THE COMPRESSION DEAD ENDS &
 COMPRESSION SPLICES, INCLUDING THE PROPER
 DIRECTION OF COMPRESSION, SHALL STRICTLY FOLLOW
 MANUFACTURER'S INSTRUCTIONS.

B	REVISED ITEM 1	PM	WPH	WWT	2/22/05	E				
A	REVISED BOM	PM	GV DW	WWT	4/1/04	D				
	ORIGINAL	WDF	SFO WPH	WWT	2/20/03	C	ADDED CORONA RING	PM	WPH	wy 6/15/06
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV DATE

TRANSMISSION ENGINEERING

SCALE: NONE



**POLYMER
 DEADEND INSULATOR-ACSS
 138KV STEEL POLE**

DWG. NO.
 19342

SHT. NO.
 1 of 2

19342C01

LES\TRANS STANDARDS\ELECTRIC TRANSMISSION STANDAR 9000 OVERHEAD ASSEMBLIES\19342\19342CCR

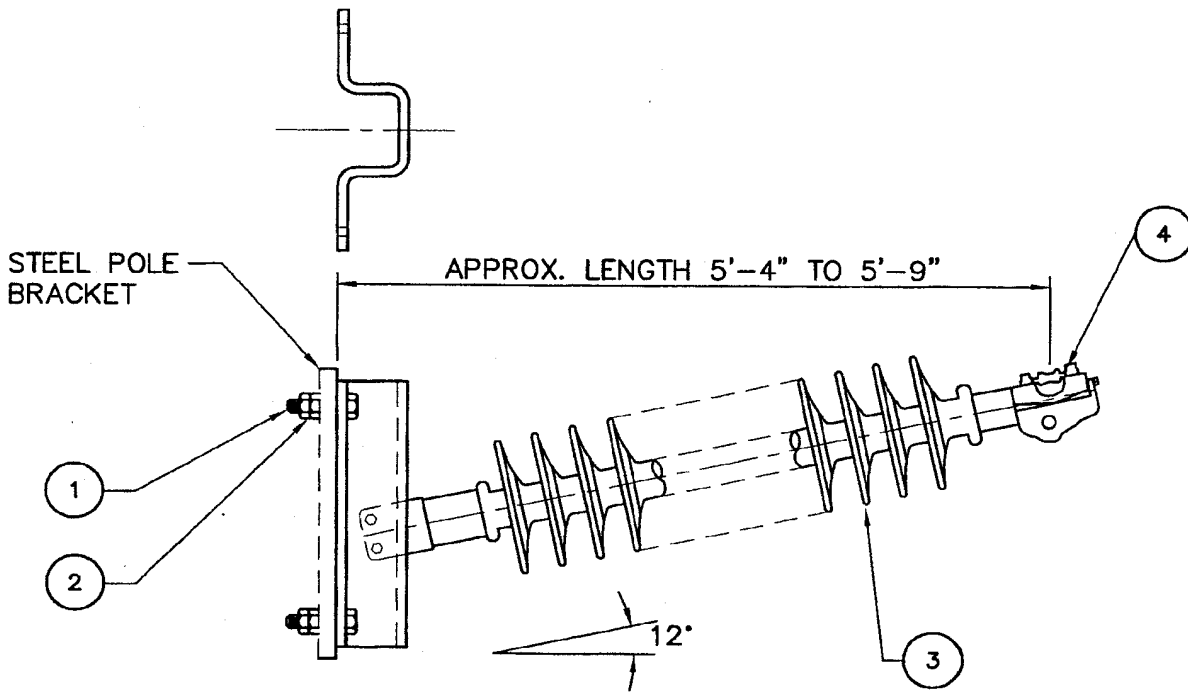
BILL OF MATERIALS				
ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
1	1	636436	SHACKLE, ANCHOR, 30K	356
2	1	337542	BALL, OVALEYE, 30K	356
3	1	431396	INSULATOR, SUSPENSION FOR DEAD-END APPLICATION, 138kV, W/CORONA RING, SILICONE RUBBER, 25K SPECIFIED MECHANICAL LOAD, SECTION LENGTH 66"-68", BALL (HOT END) AND SOCKET END FITTINGS	356
4	1	236048	Y-CLEVIS, SOCKET, HOTLINE, 30K	356
5	1	SEE TABLE A	DEAD END, COMPRESSION, FOR ACSS CONDUCTOR, FULL TENSION WITH VERTICAL EYE, SINGLE TONGUE & 4-HOLE NEMA PAD	356
6	1/2	246950	FILLER, COMPOUND	356

TABLE A				
636 ACSS/AW 24/7 (ROOK/AW)				
5	1	652678	DEAD END, COMPRESSION, FOR ROOK/ACSS/AW CONDUCTOR, FULL TENSION WITH VERTICAL EYE, SINGLE TONGUE & 4-HOLE NEMA PAD	356
900 ACSS/AW 54/7 (CANARY/AW)				
5	1	652682	DEAD END, COMPRESSION, FOR CANARY/ACSS/AW CONDUCTOR, FULL TENSION WITH VERTICAL EYE, SINGLE TONGUE & 4-HOLE NEMA PAD	356
1033.5 ACSS/AW 45/7 (ORTOLAN/AW)				
5	1	652674	DEAD END, COMPRESSION, FOR ORTOLAN/ACSS/AW CONDUCTOR, FULL TENSION WITH VERTICAL EYE, SINGLE TONGUE & 4-HOLE NEMA PAD	356
605 ACSS/AW 30/19 (TEAL/AW)				
5	1	ALCOA COMP DE E33129SSAC	DEAD END, COMPRESSION, FOR TEAL/ACSS/AW CONDUCTOR, FULL TENSION WITH VERTICAL EYE, SINGLE TONGUE & 4-HOLE NEMA PAD	356

B	REVISED ITEM 1	PM	WPH	WWT	2/22/05		ORIGINAL				
A	REVISED BOM	PM	GV	WWT	4/1/04		ORIGINAL				
	ORIGINAL	WDF	SFO	WWT	2/20/03	C	ADDED CORONA RING	PM	WPH	6/15/06	
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

TRANSMISSION ENGINEERING							SCALE: NONE			
	POLYMER DEADEND INSULATOR-ACSS 138kV STEEL POLE						DWG. NO.		SHT. NO.	
							19342		2 of 2	

19342C02



ELEVATION

BILL OF MATERIAL (FOR ONE ASSEMBLY)

ITEM	QTY.	STOCK NO. OR STD. NO.	DESCRIPTION	ACCT NO.
1	4	153792	BOLT WITH NUT, 3/4" x 3"	355.630
2	4	504576	NUT M/F LOCK, 3/4"	355.630
3	1	428974	INSULATOR, POLYMER POST, 64-69" LONG, BENDABLE BASE AND CLAMPTOP, 2,600 LBS. CANTILEVER BREAKING LOAD.	356.655
4		SEE TABLE A	CLAMP, POST INSULATOR, ALUM.	

TABLE A

636 ACSR/AW OR ACSS/AW 24/7 (ROOK/AW)				
4	1	229728	CLAMP, POST INSULATOR, RANGE 0.7" TO 1.06"	356.655
900 ACSS/AW 54/7 (CANARY/AW)				
4	1	229760	CLAMP, POST INSULATOR, RANGE 1" TO 1.5"	356.655
1033.5 ACSR/AW OR ACSS/AW 45/7 (ORTOLAN/AW)				
4	1	229760	CLAMP, POST INSULATOR, RANGE 1" TO 1.5"	356.655

NO LINE GUARDS - WHEN USED AS JUMPER SUPPORT

A	UPDATED NOTES	WDF	WPH	WVT	4/25/02	C					
-	ORIGINAL ISSUE	FJP	DRB	WPH	3/1/00	B	ADD ACSS CONDUCTORS	WDF	<i>5/20/03</i>	<i>WVT</i>	2/20/03
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE



TRANSMISSION ENGINEERING
POLYMER POST JUMPER INSULATOR
HORIZONTAL CLAMP
138kV STEEL POLE

SCALE: NONE

DWG. NO.

SHT. NO.

19365

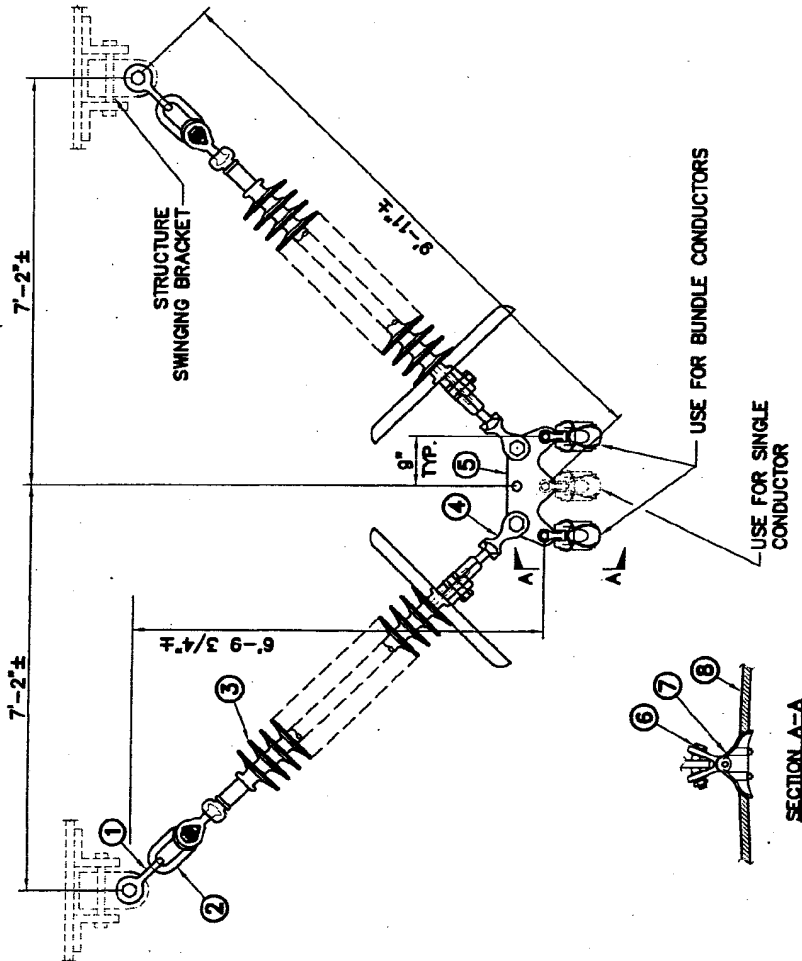
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19365B01

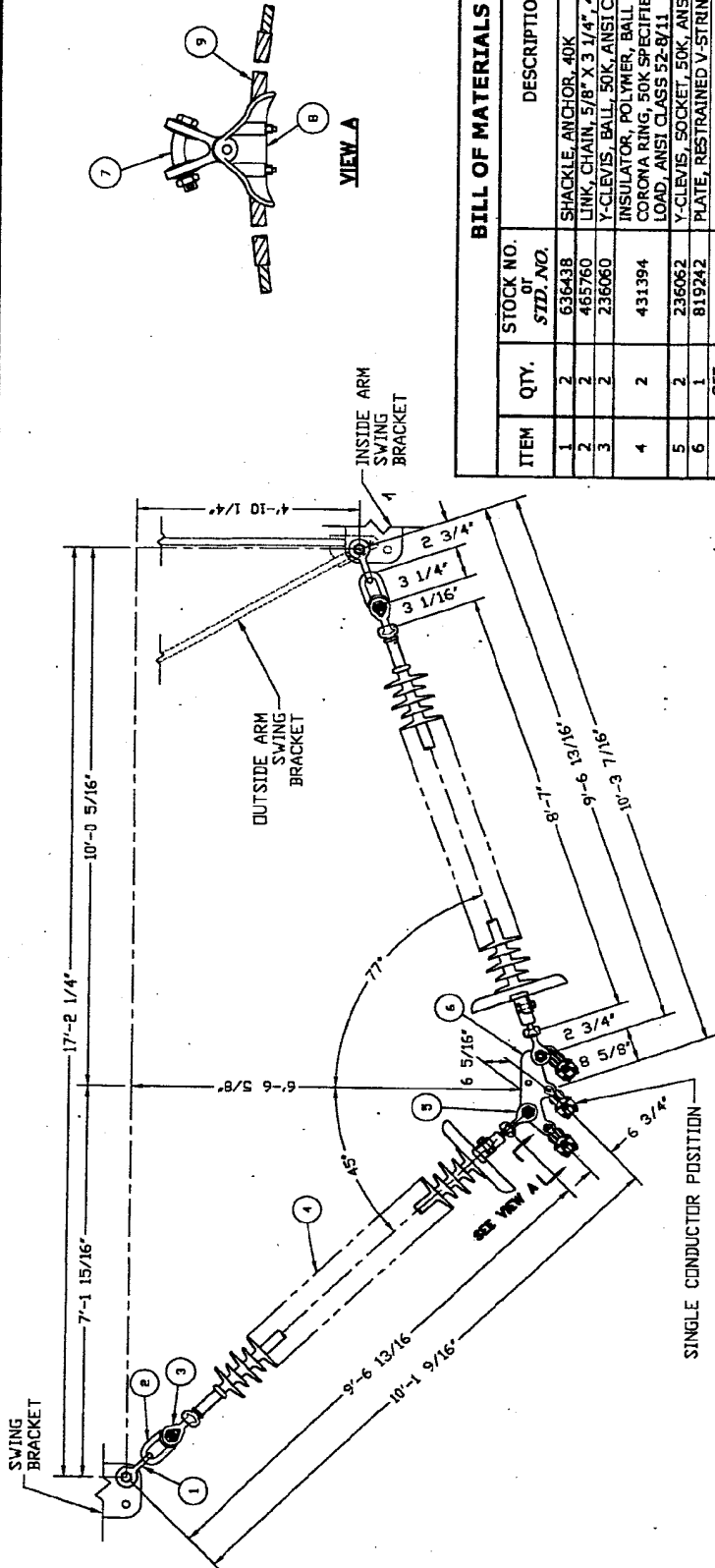
BILL OF MATERIAL (FOR ONE ASSEMBLY)				
ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	ACCT NO.
1	2	636436	SHACKLE, ANCHOR, 30K	356
2	2	186748	LINK, CHAIN, 1/2" - 30K	356
3	2	431392	INSULATOR, POLYMER, Y-CLEVIS BALL WITH CORONA RING, 30K SPECIFIED MECHANICAL LOAD	356
4	2	236018	Y-CLEVIS, SOCKET, 30K	356
5	1	819248	PLATE, V-STRING YOKE, 40K	356
6	SEE NOTE	337810	EYE, Y-CLEVIS, 30K	356
7	SEE NOTE	232352	CLAMP, SUSPENSION, ALUM ALLOY, RANGE 1.25" - 1.82", 25K	356
8		SEE TABLE A	GUARD, LINE	

TABLE A				
ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	ACCT NO.
8	SEE NOTE	397728	638 ACSR/AW OR ACSS/AW 24/7 (ROCK/AW) GUARD, LINE, LENGTH 45", OD. 1.342"	356
8	SEE NOTE	397740	900 ACS/AW 54/7 (CANARY/AW) GUARD, LINE, LENGTH 53", OD. 1.662"	356
8	SEE NOTE	397760	1033.5 ACSR/AW OR ACSS/AW 45/7 (ORTOLAN/AW) GUARD, LINE, LENGTH 53", OD. 1.712"	356

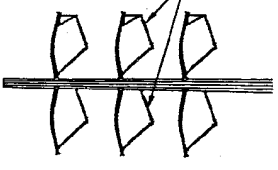
NOTE: ONE REQUIRED FOR EACH CONDUCTOR.



TRANSMISSION ENGINEERING											
POLYMER V-STRING INSULATOR 230KV STEEL STRUCTURE											
SCALE: NONE											
DTC. NO. 19410											
SRT. NO. 1 of 1											
B	ADD ACSR CONDUCTORS	WDF	WPH	WYT	4/18/03	E	ADDED CHAIN LINK	LLD	WPH	WYT	4/18/03
A	TITLE CHANGE	WDF	WPH	WYT	4/25/02	D	REVISED LINE GUARD STOCK NO. FOR CANARY	PM	WPH	WYT	5/03/06
-	ORIGINAL ISSUE	AJS	DRB	WPH	6/21/99	C	REDRAW TO 11X17	PM	DRB	WPH	7/1/04
REV	CHANGE	BY	CEED	APPT	DATE	REV	CHANGE	BY	CEED	APPT	DATE



- NOTES:**
1. MAX. LINE ANGLE SHALL BE LESS THAN 20°. IN ADDITION, NO COMPRESSION SHALL BE ALLOWED IN ANY INSULATOR UNDER THE MOST ADVERSE WIND, WEIGHT & LINE TENSION COMBINATION. THE HEADS OF ALL CUTTER KEYS WILL BE FACED TOWARD UPPER TOWER CROSSARM.
 2. LINE GUARDS WILL BE CENTERED IN EACH SUSPENSION CLAMP SUCH THAT VARIATION BETWEEN MIDDLE OF LINE GUARD & CENTER LINE SUSPENSION CLAMP IS NOT MORE THAN 2 INCHES. VARIATION BETWEEN ENDS OF ANY TWO RODS WILL NOT BE MORE THAN 1/4 INCH.
 3. DIMENSIONS SHOWN FOR THE INSULATOR ASSEMBLIES ARE APPROX. PENDING ACTUAL LENGTH OF POLYMER INSULATOR SUPPLIED BY MANUFACTURER.



KEY DIAGRAM

BILL OF MATERIALS

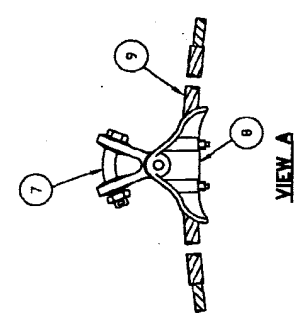
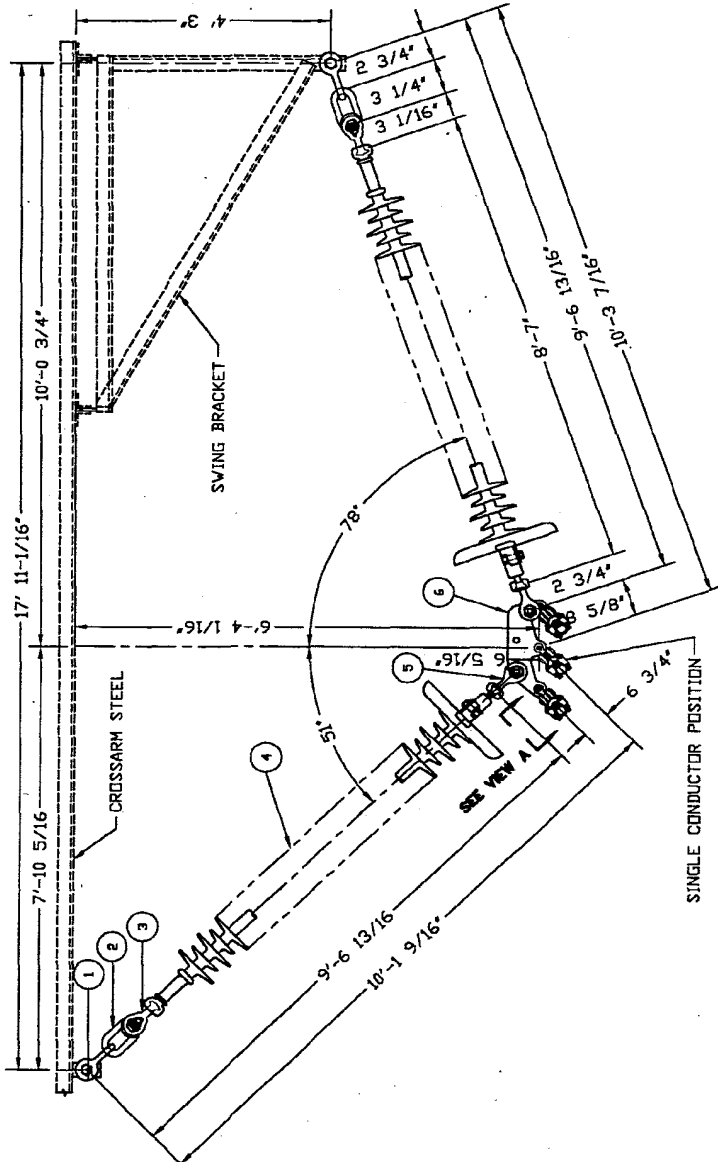
ITEM	QTY.	STOCK NO. OF STD. NO.	DESCRIPTION	ACCT. NO.
1	2	636438	SHACKLE ANCHOR, 40K	356
2	2	465760	LINK, CHAIN, 5/8" X 3 1/4", 40K	356
3	2	236080	Y-CLEVIS, BALL, 50K, ANSI CLASS 52-B/11	356
4	2	431394	INSULATOR, POLYMER, BALL & SOCKET WITH CORONA RING, 50K SPECIFIED MECHANICAL LOAD, ANSI CLASS 52-B/11	356
5	2	236062	Y-CLEVIS, SOCKET, 50K, ANSI CLASS 52-B/11	356
6	1	819242	PLATE, RESTRAINED V-STRING YOKE, 40K	356
7	SEE NOTE	337810	EYE, Y-CLEVIS, 30K	356
8	SEE NOTE	232352	CLAMP SUSPENSION, AL ALLOY, RANGE 1.25"-1.82", 25K	356
9	SEE TABLE A		GUARD, LINE	356

TABLE A

ITEM	QTY.	DESCRIPTION	ACCT. NO.
9	SEE NOTE	636 ACSR/AW OR ACSS/AW 24/7 (ROOK/AW)	356
9	SEE NOTE	GUARD, LINE, LENGTH 45", O.D. 1.342"	356
9	SEE NOTE	900 ACSR/AW 54/7 (CANARY/AW)	356
9	SEE NOTE	GUARD, LINE, LENGTH 53", O.D. 1.662"	356
9	SEE NOTE	1033.5 ACSR/AW OR ACSS/AW 45/7 (ORTOLAN/AW)	356
9	SEE NOTE	GUARD, LINE, LENGTH 53", O.D. 1.712"	356

NOTE: ONE REQUIRED FOR EACH CONDUCTOR.

TRANSMISSION ENGINEERING				SCALE:	NONE
POLYMER RESTRAINED V-STRING INSULATOR				DWG. NO.	19415
LIGHT ANGLE STEEL POLE				SFT. NO.	1 of 1
230KV STEEL POLE					
REVISED LINE GUARD STOCK	PM	WHT	5/3/05	E	
REVISED ANCHOR SHACKLE	PM	WHT	2/22/06	D	
ORIGINAL	PM	WHT	7/1/04	C	
BY	CHG	APPLY	DATE	REV	
LD	WPH	2/2/09	3/26/09		
PM	WPH	4/4/06			
BY	CHG	APPLY	DATE	REV	
CHANGED ITEM 1	LD	WPH	2/2/09		
ADDED STOCK NOS.	PM	WPH	4/4/06		
CHANGE					



BILL OF MATERIALS

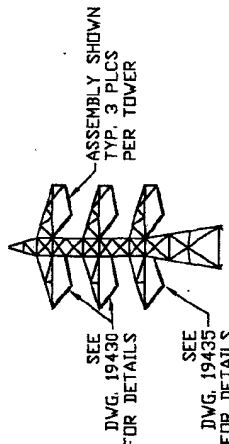
ITEM	QTY.	STOCK NO. OR STD. NO.	DESCRIPTION	ACCT. NO.
1	2	636438	SHACKLE, ANGLIOR, 40K	356
2	2	465760	LINK, CHAIN, 5/8" X 3 1/4", 40K	356
3	2	236060	Y-CLEVIS, BALL, 50K ANSI CLASS 52-8/11	356
4	2	431394	INSULATOR, POLYMER, BALL & SOCKET WITH CORONA RING, 50K SPECIFIED MECHANICAL LOAD, ANSI CLASS 52-8/11	356
5	2	236062	Y-CLEVIS, SOCKET, 50K, ANSI CLASS 52-8/11	356
6	1	819242	PLATE, RESTRAINED V-STRING YOKE, 40K	356
7	SEE NOTE	337810	EYE, Y-CLEVIS, 30K	356
8	SEE NOTE	232352	CLAMP, SUSPENSION, AL. ALLOY, RANGE 1.25-1.82, 25K	356
9	SEE NOTE	SEE TABLE A	GUARD, LINE	356

TABLE A

ITEM	QTY.	STOCK NO. OR STD. NO.	DESCRIPTION	ACCT. NO.
9	SEE NOTE	636 ACSS/AW OR ACSS/AW 24/7	GUARD, LINE, LENGTH 45", O.D. 1.342"	356
9	SEE NOTE	900 ACSS/AW 54/7	GUARD, LINE, LENGTH 53", O.D. 1.662"	356
9	SEE NOTE	1033.5 ACSS/AW OR ACSS/AW 45/7	GUARD, LINE, LENGTH 53", O.D. 1.712"	356

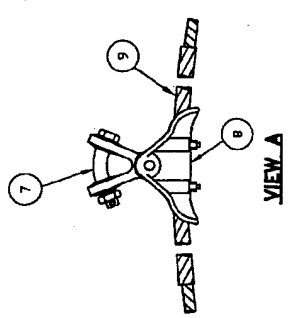
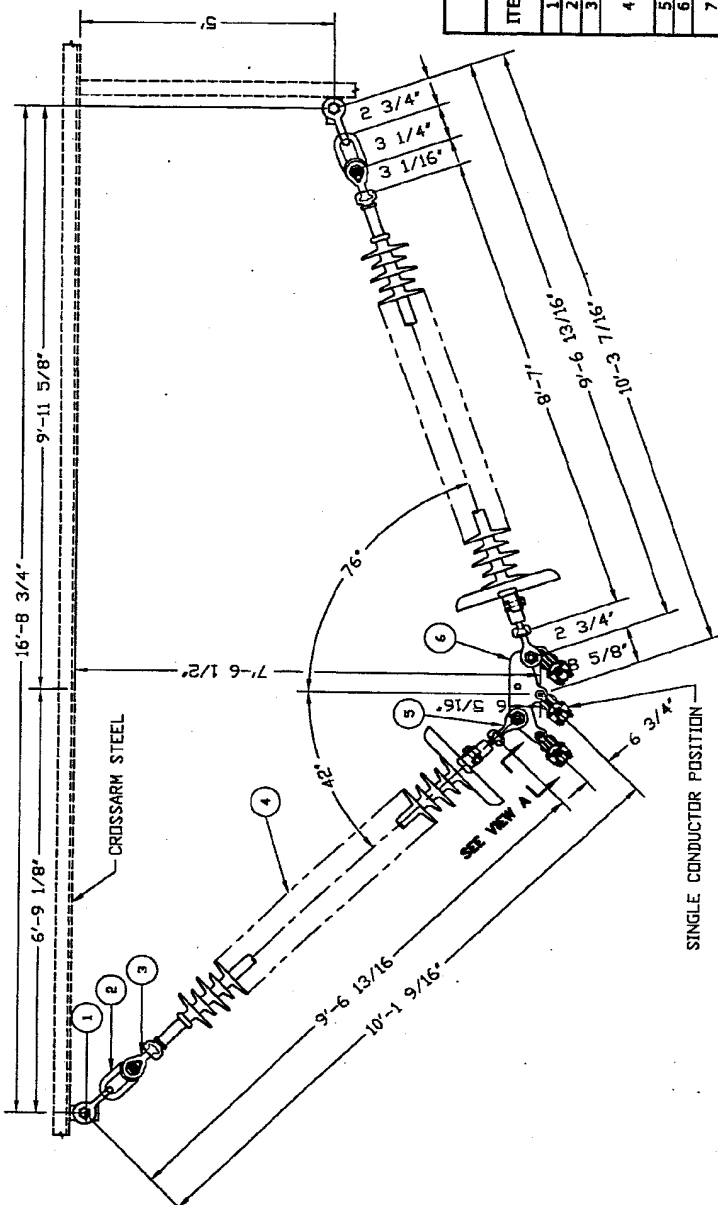
NOTE: ONE REQUIRED FOR EACH CONDUCTOR.

- NOTES:**
- MAX. LINE ANGLE SHALL BE LESS THAN 20°. IN ADDITION, NO COMPRESSION SHALL BE ALLOWED IN ANY INSULATOR UNDER THE MOST ADVERSE WIND, WEIGHT & LINE TENSION COMBINATION. THE HEADS OF ALL COTTER KEYS WILL BE FACED TOWARD UPPER TOWER CROSSARM.
 - LINE GUARDS WILL BE CENTERED IN EACH SUSPENSION CLAMP & SUCH THAT VARIATION BETWEEN MIDPOINT OF LINE GUARD & CENTER LINE SUSPENSION CLAMP IS NOT MORE THAN 2 INCHES. VARIATION BETWEEN ENDS OF ANY TWO RODS WILL NOT BE MORE THAN 1/4 INCH.
 - DIMENSIONS SHOWN FOR THE INSULATOR ASSEMBLIES ARE APPROX. PENDING ACTUAL LENGTH OF POLYMER INSULATOR SUPPLIED BY MANUFACTURER.



KEY DIAGRAM

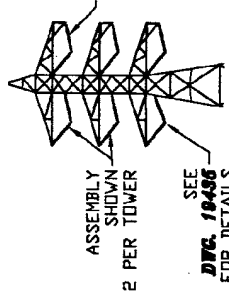
REV	BY	CHKD	APPR	DATE	REV	DATE	CHANGED ITEM	BY	CHKD	APPR	DATE	SCALE	
B	PM	WT		4/4/05	B							NONE	
A	PM	WT		5/3/05	D								
	PM	WT		2/22/05	C								
	BY	CHKD	APPR	DATE	REV	DATE	CHANGED ITEM	BY	CHKD	APPR	DATE		
<p>TRANSMISSION ENGINEERING</p> <p>POLYMER RESTRAINED V-STRING INSULATOR</p> <p>OUTSIDE ANGLE, ALL LEVELS</p> <p>230KV CTA20 TOWER</p>												DWG. NO.	19425
												SHEET NO.	1 of 1



BILL OF MATERIALS

ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
1	2	636438	SHACKLE ANCHOR, 40K	356
2	2	465760	LINK, CHAIN, 5/8" X 3 1/4", 40K	356
3	2	236060	Y-CLEVIS, BALL, 50K, ANSI CLASS 52-8/11	356
4	2	431394	INSULATOR, POLYMER, BALL & SOCKET WITH CORONA RING, 50K SPECIFIED MECHANICAL LOAD, ANSI CLASS 52-8/11	356
5	2	236062	Y-CLEVIS, SOCKET, 50K, ANSI CLASS 52-8/11	356
6	1	819242	PLATE, RESTRAINED V-STRING YOKE, 40K	356
7	SEE NOTE	337810	EYE, Y-CLEVIS, 30K	356
8	SEE NOTE	232352	CLAMP, SUSPENSION, AL ALLOY, RANGE 1.25"-1.82", 25K	356
9	SEE TABLE A		GUARD, LINE	356

- NOTES:**
- MAX. LINE ANGLE SHALL BE LESS THAN 20°. IN ADDITION, NO COMPRESSION SHALL BE ALLOWED IN ANY INSULATOR UNDER THE MOST ADVERSE WIND, WEIGHT & LINE TENSION COMBINATION. THE HEADS OF ALL COTTER KEYS WILL BE FACED TOWARD UPPER TOWER CROSSARM.
 - LINE GUARDS WILL BE CENTERED IN EACH SUSPENSION CLAMP SUCH THAT VARIATION BETWEEN MIDPOINT OF LINE GUARD & CENTER LINE SUSPENSION CLAMP IS NOT MORE THAN 2 INCHES. VARIATION BETWEEN ENDS OF ANY TWO RODS WILL NOT BE MORE THAN 1/4 INCH.
 - DIMENSIONS SHOWN FOR THE INSULATOR ASSEMBLIES ARE APPROX. PENDING ACTUAL LENGTH OF POLYMER INSULATOR SUPPLIED BY MANUFACTURER.



NOTE: ONE REQUIRED FOR EACH CONDUCTOR.

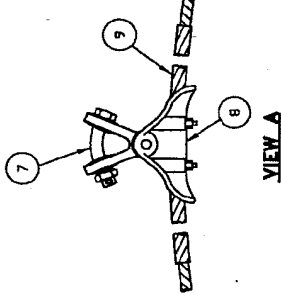
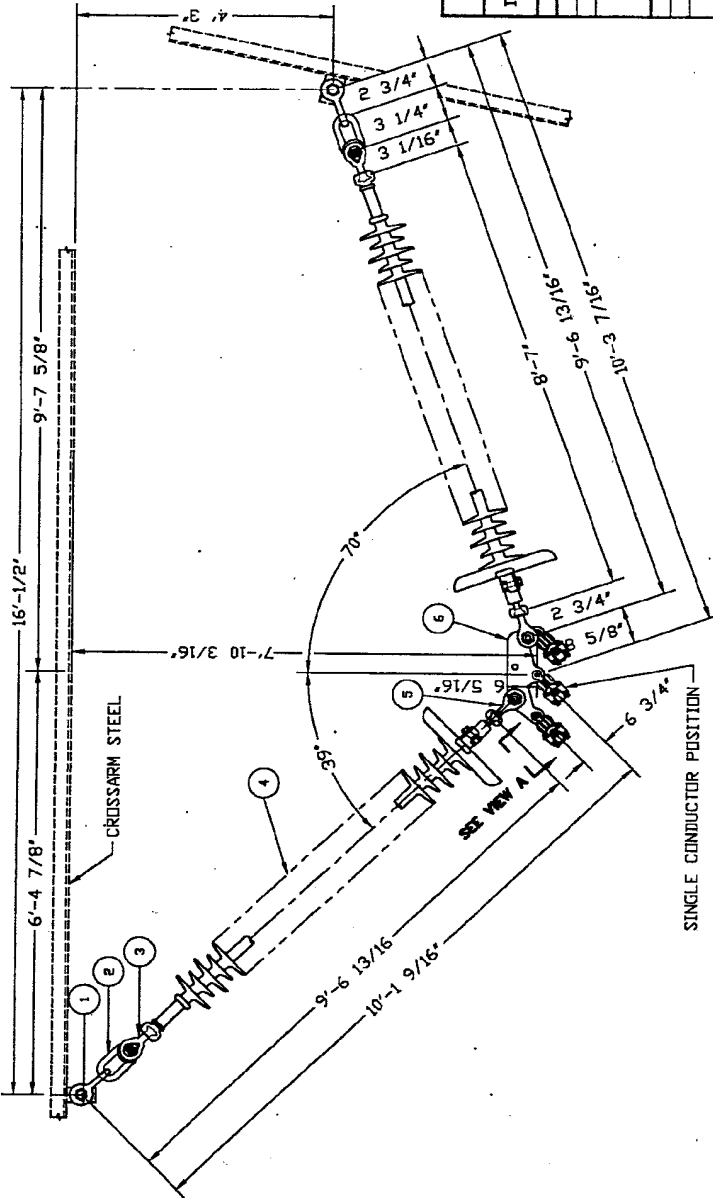
TABLE A

636 ACSR/AW OR ACSS/AW 24/7 (ROCK/AW)	
9	SEE NOTE
9	SEE NOTE

900 ACSR/AW 54/7 (CANARY/AW)	
9	SEE NOTE
9	SEE NOTE

ADDED STOCK NOS.		PM	WT	DATE	BY		DATE	DATE	SCALE:	NONE
B	REVISOR	PM	WT	DATE	BY	DATE	DATE			
A	ORIGINAL	PM	WT	DATE	BY	DATE	DATE			
REV	CHANGE	PM	WT	DATE	BY	DATE	DATE			

TRANSMISSION ENGINEERING		SCALE:	NONE
POLYMER RESTRAINED V-STRING INSULATOR		DRG. NO.	19430
OUTSIDE ANGLE, TOP & MDL. XARMS			
230KV CTA20 TOWER		SHT. NO.	1 of 1



BILL OF MATERIALS

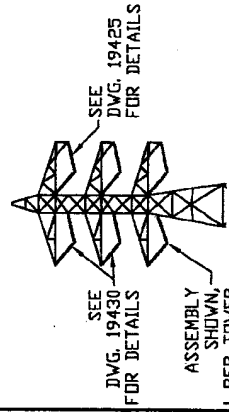
ITEM	QTY.	STOCK NO. OR STD. NO.	DESCRIPTION	ACCT. NO.
1	2	636438	SHACKLE ANCHOR, 40K	356
2	2	465760	LINK CHAIN, 5/8" X 3 1/4", 40K	356
3	2	236060	Y-CLEVIS BALL, 50K, ANSI CLASS 52-B/11	356
4	2	431394	INSULATOR, POLYMER, BALL & SOCKET WITH CORONA RING, 50K SPECIFIED MECHANICAL LOAD, ANSI CLASS 52-B/11	356
5	2	236062	Y-CLEVIS, SOCKET, 50K, ANSI CLASS 52-8/11	356
6	1	819242	PLATE, RESTRAINED V-STRING YOKE, 40K	356
7	SEE NOTE	337810	EYE, Y-CLEVIS, 30K	356
8	SEE NOTE	232352	CLAMP, SUSPENSION, AL. ALLOY, RANGE 1.25-1.82, 25K	356
9	SEE NOTE	SEE TABLE A	GUARD, LINE	356

TABLE A

ITEM	DESCRIPTION	ACCT. NO.
9	636 ACSS/AW OR ACSS/AW 24/7 (ROOK/AW)	356
9	SEE NOTE	
	GUARD, LINE, LENGTH 45", O.D. 1.342"	
	900 ACSS/AW 54/7 (CANARY/AW)	
9	SEE NOTE	
	GUARD, LINE, LENGTH 53", O.D. 1.662"	
	1033.5 ACSR/AW OR ACSS/AW 45/7 (ORTOLAN/AW)	
9	SEE NOTE	
	GUARD, LINE, LENGTH 53", O.D. 1.712"	

NOTE: ONE REQUIRED FOR EACH CONDUCTOR.

- NOTES:**
- MAX. LINE ANGLE SHALL BE LESS THAN 20°. IN ADDITION, NO COMPRESSION SHALL BE ALLOWED IN ANY INSULATOR UNDER THE MOST ADVERSE WIND, WEIGHT & LINE TENSION COMBINATION. THE HEADS OF ALL CUTTER KEYS WILL BE FACED TOWARD UPPER TOWER CROSSARM.
 - LINE GUARDS WILL BE CENTERED IN EACH SUSPENSION CLAMP SUCH THAT VARIATION BETWEEN MIDPOINT OF LINE GUARD & CENTER LINE SUSPENSION CLAMP IS NOT MORE THAN 2 INCHES. VARIATION BETWEEN ENDS OF ANY TWO RODS WILL NOT BE MORE THAN 1/4 INCH.
 - DIMENSIONS SHOWN FOR THE INSULATOR ASSEMBLIES ARE APPROX. PENDING ACTUAL LENGTH OF POLYMER INSULATOR SUPPLIED BY MANUFACTURER.



KEY DIAGRAM

ADDED STOCK NOS.		DATE	BY	CHKD	APPLY	DATE	REV	CHANGED ITEM 1	LD	WFT	DATE	DATE
B		4/4/06	E									
A		9/3/05	D									
	ORIGINAL											
	CHANGE											

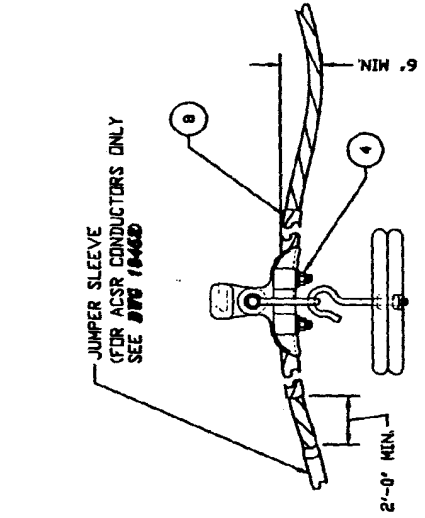
TRANSMISSION ENGINEERING		SCALE:	NONE
POLYMER RESTRAINED V-STRING INSULATOR		DWG. NO.	19435
INSIDE ANGLE, BOTTOM CROSSARM		SHT. NO.	1 of 1
230KV CTA20 TOWER			

BILL OF MATERIALS

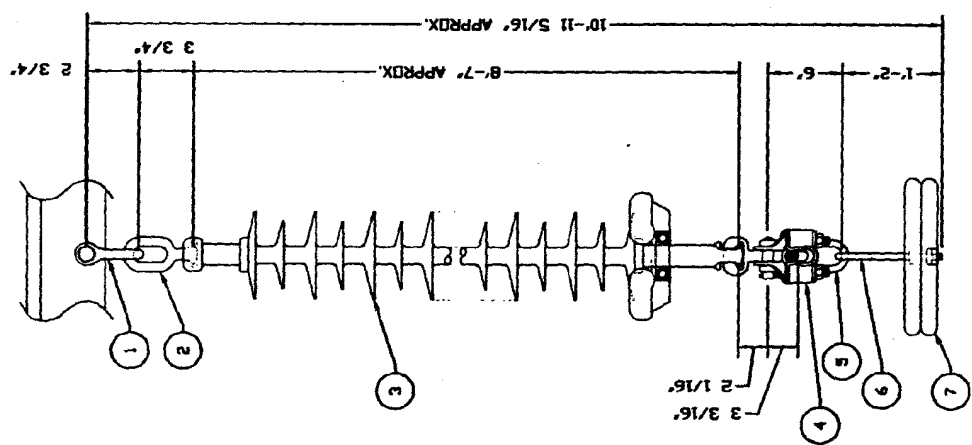
ITEM	QTY.	STOCK NO. STD. NO.	DESCRIPTION	ACCT. NO.
1	1	636436	SHACKLE, ANCHOR, 30K	356
2	1	337542	EYE, OVAL BALL, 30K	356
3	1	431204	INSULATOR, SUSPENSION, POLYMER, 102.5-104" LONG, BALL (HOT END) AND SOCKET, WITH CORONA RING, 30K SPECIFIED MECHANICAL LOAD	356
4	1	232192	CLAMP, SUSPENSION, ALUMINUM ALLOY W/SOCKET EYE RANGE 1.25" TO 1.82", 25K	356
5	1	636340	HOLD-DOWN SHACKLE	356
6	1	156100	BOLT, HOOK, 3/4"	356
7	2	801660	WEIGHT, HOLD-DOWN, 12" X 2", 50 LBS	356
8		SEE TABLE A	GUARD, LINE	356

TABLE A

8	1	397728	636 ACSS/AW 24/7 (ROOK/AW) GUARD, LINE, LENGTH 45", O.D. 1.342"	356
8	-		636 ACSR/AW 24/7 (ROOK/AW) (LINE GUARD NOT REQUIRED)	
8	1	397740	900 ACSS/AW 34/7 (CANARY/AW) GUARD, LINE, LENGTH 53", O.D. 1.662"	
8	1	397760	1033.5 ACSS/AW 45/7 (ORTOLAN/AW) GUARD, LINE, LENGTH 53", O.D. 1.712"	
8	-		1033.5 ACSR/AW 45/7 (ORTOLAN/AW) (LINE GUARD NOT REQUIRED)	
8	1	397730	605 ACSS/AW 30/19 (TEAL/AW) GUARD, LINE, LENGTH 45", O.D. 1.358"	356



SECTION A-A



NOTES:

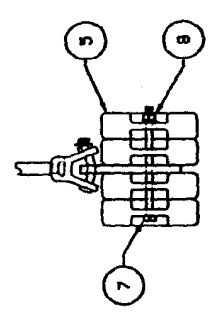
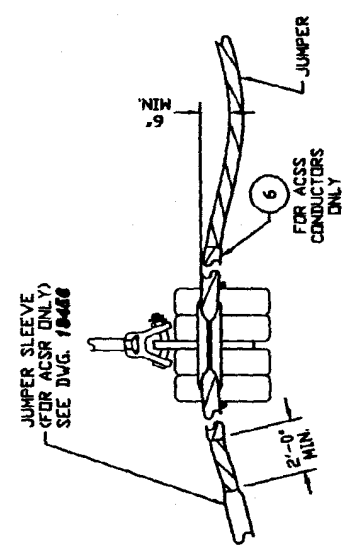
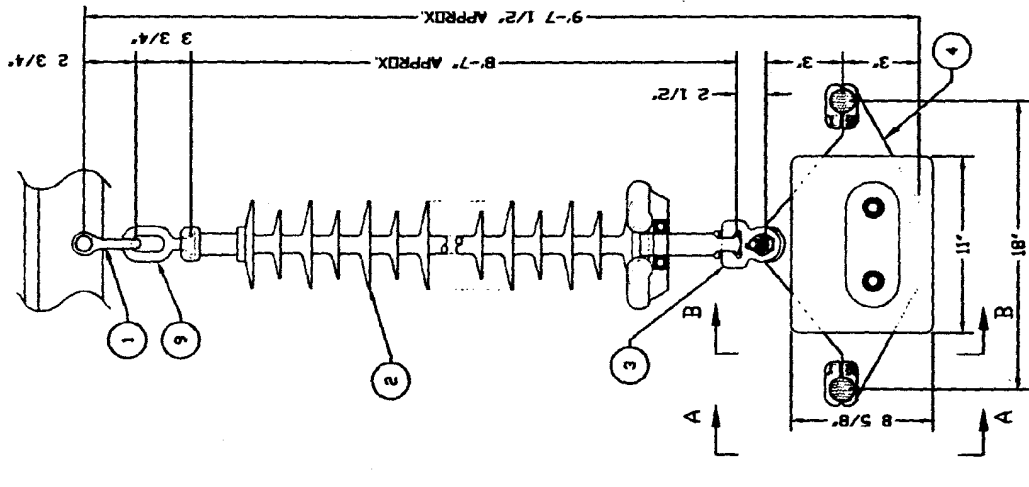
1. CONDUCTOR MUST HAVE A MINIMUM SAG OF 6' BELOW THE TOP OF THE LINE GUARD.
2. MINIMUM OF 2'-0" BETWEEN LINE GUARD AND JUMPER SLEEVE.
3. THE HEADS OF ALL COTTER KEYS WILL BE FACED TOWARDS THE BODY OF THE TOWER.
4. LINE GUARDS WILL BE CENTERED IN EACH SUSPENSION CLAMP SUCH THAT VARIATION BETWEEN MIDPOINT OF LINE GUARD AND CENTER LINE OF SUSPENSION CLAMP IS NOT MORE THAN 2 INCHES. VARIATION BETWEEN ENDS OF ANY TOW RODS WILL NOT BE MORE THAN 1/4 INCH.

BY	DATE	BY	DATE	BY	DATE	BY	DATE
B	4/4/08	B					
A	5/3/08	D					
	2/22/08	C					

ADDED STOCK NOS.	PM	DATE	BY	DATE	BY	DATE	BY	DATE
REVISED B.O.M.	PM	4/4/08	WT	5/3/08	WT	2/22/08	WT	
ORIGINAL	PM		WT		WT		WT	
CHANGE	BY		WT		WT		WT	

SCALE:	NONE
DWG. NO.	19440
SRT. NO.	1 of 1

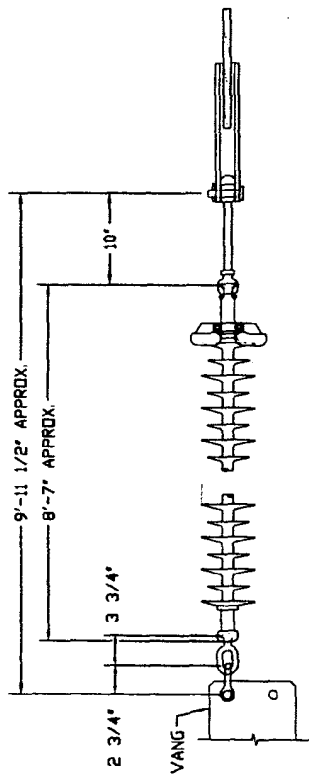
TRANSMISSION ENGINEERING	
POLYMER I-STRING JUMPER INSULATOR	
SINGLE CONDUCTOR	
230KV STEEL STRUCTURE	



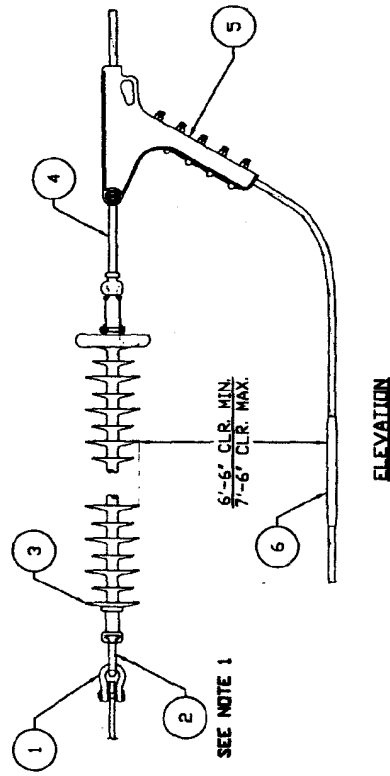
- NOTES**
1. CONDUCTOR MUST HAVE A MINIMUM SAG OF 6' BELOW THE TOP OF THE LINE GUARD.
 2. MINIMUM OF 2'-0" BETWEEN LINE GUARD AND JUMPER SLEEVE.
 3. THE HEADS OF ALL COTTER KEYS WILL BE FACED TOWARDS THE BODY OF THE TOWER.
 4. LINE GUARDS WILL BE CENTERED IN EACH SUSPENSION CLAMP SUCH THAT VARIATION BETWEEN MIDPOINT OF LINE GUARD AND CENTER LINE OF SUSPENSION CLAMP IS NOT MORE THAN 2 INCHES. VARIATION BETWEEN ENDS OF ANY TOWER RODS WILL NOT BE MORE THAN 1/4 INCH.
 5. ALL SUPPORT AND/OR WINGS ARE PART OF THE STRUCTURE.

BILL OF MATERIALS				
ITEM	QTY.	STOCK NO. OF 5721. NO.	DESCRIPTION	ACCT. NO.
1	1	636436	SHACKLE, ANCHOR, 30K	356
2	1	431204	INSULATOR, SUSPENSION, POLYMER, 102.5-104" LONG, BALL (HOT END) AND SOCKET, WITH CORONA RING, 30K SPECIFIED MECHANICAL LOAD	356
3	1	236016	Y-CLEVIS, SOCKET, 30K	356
4	1	SEE TABLE A	PLATE, YOKE, JUMPER	356
5	4	801888	WEIGHT, HOLD-DOWN, 50 LBS	356
6	4	SEE TABLE A	GUARD, LINE	356
7	2	154916	BOLT, 5/8" X 10", MACHINE	356
8	2	504608	NUT, 5/8" M-F LOCK	356
9	1	337542	EYE, OVAL BALL, 30K	356
TABLE A				
636 ACSS/AW 24/7 (ROCK/AW)				
4	1	818694	PLATE, YOKE, JUMPER, ALUM., RANGE 1.333"-1.602", 10K	356
6	2	397728	GUARD, LINE, LENGTH 45", O.D. 1.342"	356
636 ACSR/AW 24/7 (ROCK/AW)				
4	1	818692	PLATE, YOKE, JUMPER, ALUM., RANGE 0.974"-1.259", 10K (LINE GUARD NOT REQUIRED)	356
5	-	-	(LINE GUARD NOT REQUIRED)	
900 ACSS/AW 54/7 (CANARY/AW)				
4	1	818696	PLATE, YOKE, JUMPER, ALUM., RANGE 1.63"-1.824", 10K	356
6	-	397740	GUARD, LINE, LENGTH 53", O.D. 1.662"	
1033.5 ACSS/AW 45/7 (ORTOLAN/AW)				
4	1	818696	PLATE, YOKE, JUMPER, ALUM., RANGE 1.63"-1.824", 10K	356
6	2	397760	GUARD, LINE, LENGTH 53", O.D. 1.712"	
1033.5 ACSR/AW 45/7 (ORTOLAN/AW)				
4	1	818692	PLATE, YOKE, JUMPER, ALUM., RANGE 0.974"-1.259", 10K (LINE GUARD NOT REQUIRED)	356
6	-	-	(LINE GUARD NOT REQUIRED)	
605 ACSS/AW 30/19 (TEAL/AW)				
4	1	818694	PLATE, YOKE, JUMPER, ALUM., RANGE 1.333"-1.602", 10K	356
6	2	397730	GUARD, LINE, 45" LENGTH, O.D. 1.388"	356

BY	CHKD	APPY	DATE	REV	DESCRIPTION	SCALE	SHEET NO.
B			4/4/04	E		NONE	
A			2/22/06	D			
			7/1/04	C			
REV	CHANGE						
TRANSMISSION ENGINEERING							
POLYMER 1-STRING JUMPER INSULATOR							
2-BUNDLE CONDUCTORS							
230KV STEEL STRUCTURE							
						19445	1 of 1



TOP VIEW



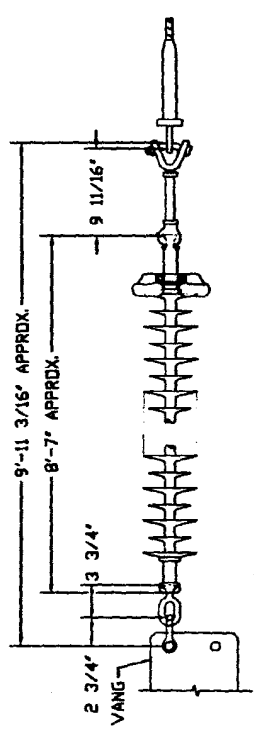
ELEVATION

BILL OF MATERIALS				
ITEM	QTY.	STOCK NO. OF STD. NO.	DESCRIPTION	ACCT. NO.
1	1	636438	SHACKLE, ANCHOR, 40K	356
2	1	337542	OVAL-EYE, BALL, 30K	356
3	1	431204	INSULATOR, SUSPENSION, POLYMER, 102.5-104\"/>	
4	1	337622	EYE, SOCKET, HOTLINE, 30K	356
5	1	230686	CLAMP, STRAIN, DEADEND, ALUM. ALLOY, 71\"/>	
6	1/2	SEE TABLE A	SLEEVE, ALUM. JUMPER (3)	356
TABLE A				
6	1/2	650656	SLEEVE, ALUM., JUMPER	356
6	1/2	650336	SLEEVE, ALUM., JUMPER	356

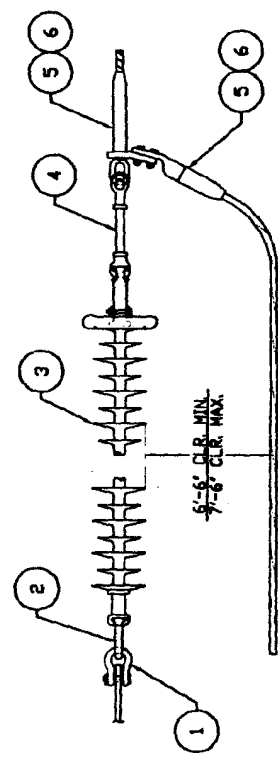
- NOTES:**
- WHEN REPLACING EXISTING PORCELAIN INSULATOR ASSEMBLY WITH POLYMER ASSEMBLY OF UNEQUAL LENGTH, CONDUCTOR AND JUMPER LENGTHS MUST BE ADJUSTED AS REQUIRED TO MAINTAIN SAG AND CLEARANCE. USE OVAL-EYE BALL HOTLINE (11' LONG, STOCK NO. 337550) IN LIEU OF ITEM 2 IF LONGER ASSEMBLY LENGTH IS NEEDED FOR REPLACEMENT. CONTACT TRANSMISSION ENGINEERING FOR DETAILED REQUIREMENTS.
 - THE SAME ASSEMBLY MATERIALS ARE APPLICABLE FOR 1109 24/13 ACAR CONDUCTOR.
 - ONE SLEEVE PER JUMPER.

TRANSMISSION ENGINEERING					SCALE:	NONE
SDGE					DWG. NO.	19452
POLYMER DEADEND INSULATOR SINGLE CONDUCTOR-ACSR 230KV STEEL STRUCTURE					SET. NO.	1 of 1
B	ADDED NOTES	PH	VPH	VVT	2/22/05	E
A	TITLE CHANGE	WDF	VPH	VVT	4/25/02	D
-	ORIGINAL ISSUE	SDF	DRB	VPH	3/1/00	C
REV	CHANGE	BY	CHKD	APPY	DATE	REV
			PH	VPH	9/03/05	
	ADDED NOTE	BY	CHKD	APPY	DATE	
	CHANGE					

BILL OF MATERIALS					
ITEM	QTY.	STOCK NO. OR STD. NO.	DESCRIPTION	ACCT. NO.	
1	1	636438	SHACKLE, ANCHOR, 40K	356	
2	1	337542	BALL, OVAL-EYE, 30K	356	
3	1	431204	INSULATOR, SUSPENSION, POLYMER, 102.5-104" LONG, BALL (HOT END) AND SOCKET, WITH CORONA RING, 30K SPECIFIED MECHANICAL LOAD	356	
4	1	236048	Y-CLEVIS, SOCKET, HOTLINE, 30K	356	
5	1	SEE TABLE A	DEAD END, COMPRESSION	356	
6	1/2	246950	FILLER COMPOUND (LB)	356	
TABLE A					
636 ACSS/AW 24/7 (ROOK/AW)					
5	1	652678	DEAD END, COMPRESSION, FOR 636 ROOK/ACSS/AW 24/7 CONDUCTOR, FULL TENSION, WITH EYE, SINGLE TONGUE, 4-HOLE NEMA PAD & TERMINAL CONNECTOR	356	
900 ACSS/AW 54/7 (CANARY/AW)					
5	1	652682	DEAD END, COMPRESSION, FOR 900 CANARY/ACSS/AW CONDUCTOR, FULL TENSION, WITH EYE, SINGLE TONGUE, 4-HOLE NEMA PAD & TERMINAL CONNECTOR	356	
1033.5 ACSS/AW 45/7 (ORTOLAN/AW)					
5	1	652674	DEAD END, COMPRESSION, FOR 1033.5 ORTOLAN/ACSS/AW CONDUCTOR, FULL TENSION, WITH EYE, SINGLE TONGUE, 4-HOLE NEMA PAD & TERMINAL CONNECTOR	356	
605 ACSS/AW 30/19 (TEAL/AW)					
5	1	649860	DEAD END, COMPRESSION, FOR 605 TEAL/ACSS/AW CONDUCTOR, FULL TENSION, WITH EYE, SINGLE TONGUE, 4-HOLE NEMA PAD & TERMINAL CONNECTOR	356	



TOP VIEW



ELEVATION

CONDUCTOR	STEEL DIE	ALUMINUM DIE
ROOK	12SH	27AH
CANARY	14SH	30AH
ORTOLAN	10SH	34AH
TEAL	14SH	27AH

NOTE:
 INSTALLATION OF THE COMPRESSION DEAD ENDS & COMPRESSION SPLICES, INCLUDING THE PROPER DIRECTION OF COMPRESSION, SHALL STRICTLY FOLLOW MANUFACTURER'S INSTRUCTION.

B		DATE 10/15/06		BY		DATE		BY		DATE		BY		DATE	
A		DATE 2/22/06		BY		DATE		BY		DATE		BY		DATE	
REV		ORIGINAL		BY		DATE		BY		DATE		BY		DATE	
ADDED STOCK NOS.		PN		BY		DATE		BY		DATE		BY		DATE	
CHANGED		PN		BY		DATE		BY		DATE		BY		DATE	
SCALE: NONE		DWG. NO. 19454		SERT. NO.		1 OF 1		19454		19454		19454		19454	
TRANSMISSION ENGINEERING POLYMER DEADEND INSULATOR SINGLE CONDUCTOR-ACSS 230KV STEEL STRUCTURE															

BILL OF MATERIALS

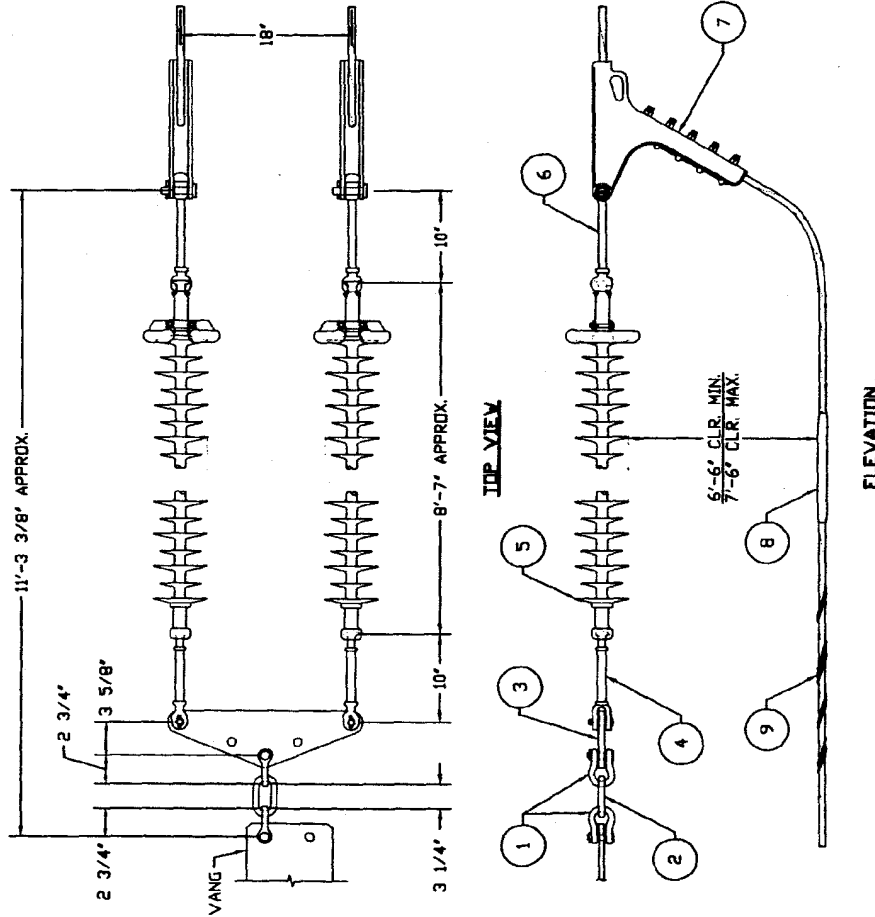
ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
1	2	636438	SHACKLE, ANCHOR, 40K	356
2	1	465760	LINK, CHAIN, 5/8" X 3 1/2", 40K	356
3	1	819296	PLATE, STRAIN YOKE, 40K	356
4	2	235402	CLEVIS BALL, HOT-LINE, 30K	356
5	2	431204	INSULATOR, SUSPENSION, POLYMAR, 102.5:104" LONG, BALL (HOT END) AND SOCKET, WITH CORONA RING, 30K SPECIFIED MECHANICAL LOAD	356
6	2	337622	EYE, SOCKET, HOTLINE, 30K	356
7	2	230686	CLAMP, STRAIN, DEADEND, ALUM. ALLOY, 71° TO 1.318", 30K	356
8	<small>ONE FOR EACH JUMPER</small>	SEE TABLE A	SLEEVE, ALUM. JUMPER (3)	356
9	1/2	SEE TABLE A	SPACER, HELICAL (3)	356

TABLE A				
636 ACSR/AW 24/7 (ROOK/AW)				
8	1	650656	SLEEVE, ALUM., JUMPER	356
9	1/2	663682	SPACER, HELICAL, 18" PREFORMED	356

1033.5 ACSR/AW 45/7 (ORTOLAN/AW) (SEE NOTE 2)				
8	1	650336	SLEEVE, ALUM., JUMPER	356
9	1/2	663264	SPACER, HELICAL, 18" PREFORMED	356

NOTES:

- WHEN REPLACING EXISTING PORCELAIN INSULATOR ASSEMBLY WITH POLYMER ASSEMBLY OF UNEQUAL LENGTH, CONDUCTOR AND JUMPER LENGTHS MUST BE ADJUSTED AS REQUIRED TO MAINTAIN SAG AND CLEARANCE. CONTACT TRANSMISSION ENGINEERING FOR DETAILED REQUIREMENTS.
- THE SAME ASSEMBLY MATERIALS ARE APPLICABLE FOR 1109 24/13 ACSR CONDUCTOR.
- ONE SLEEVE PER EACH JUMPER; ONE SPACER PER JUMPER ASSEMBLY.

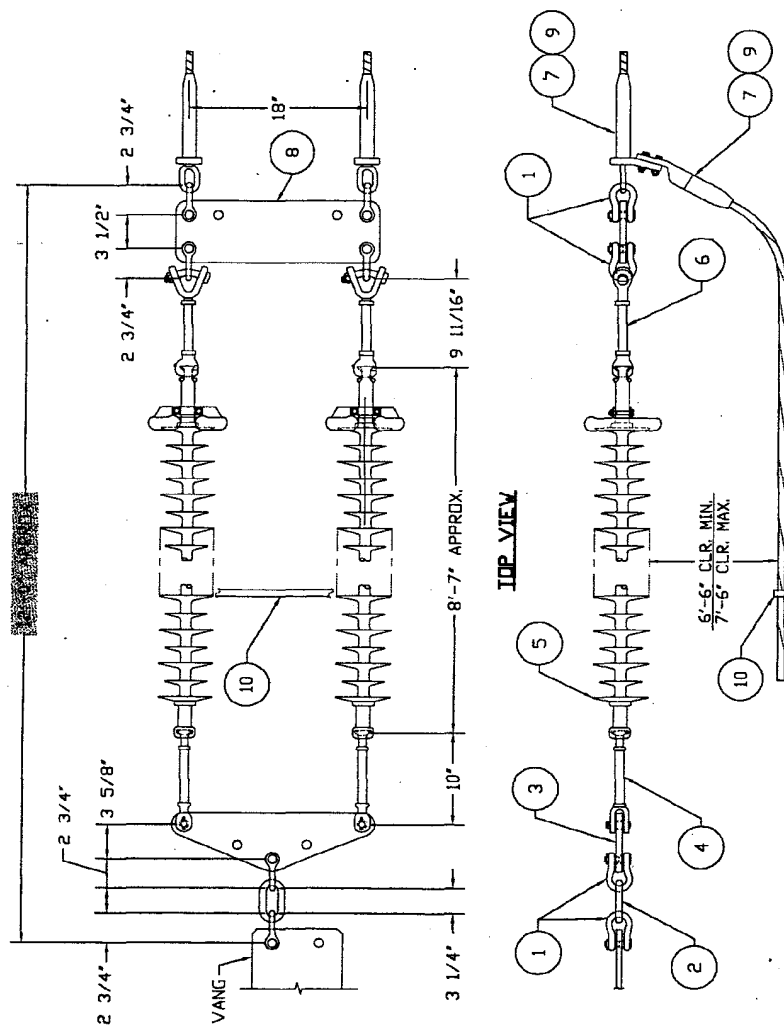


B		E							
A	REVISED B.O.M.	BY VPH h.v.v./	DATE 5/03/05	D					
-	ORIGINAL ISSUE	BY VPH WVT	DATE 7/1/04	C					
REF	CHANGE	BY	CHKD APPY	DATE	REF	CHANGE	BY	CHKD APPY	DATE

BILL OF MATERIALS

ITEM	QTY.	STOCK NO. OF STZ, NO.	DESCRIPTION	ACCT. NO.
1	6	636438	SHACKLE, ANCHOR, 40K	356
2	1	465760	LINK, CHAIN, 40K	356
3	1	819296	PLATE, STRAIN YOKE, 40K	356
4	2	235402	CLEVIS BALL, HOT-LINE, 30K	356
5	2	431204	INSULATOR, SUSPENSION, POLYMAR, 102.5-104" LONG, BALL (HOT END) AND SOCKET, WITH CORONA RING, 30K SPECIFIED MECHANICAL LOAD	356
6	2	236048	Y-CLEVIS, SOCKET, HOTLINE, 30K	356
7	2	SEE TABLE A	DEAD END, COMPRESSION	356
8	1	818690	PLATE, YOKE, RECTANGULAR, 12"x6" W/ 15/16" HOLES, 30K	356
9	1	246950	FILLER COMPOUND (LBS)	356
10	1/2	SEE TABLE A	SPACER, CLAMP-TYPE, 18" SP., HI-TEMP. (2)	356

TABLE A				
636 ACSS/AW 24/7 (ROOK/AW)				
7	2	652678	DEAD END, COMPRESSION, FOR 636 ROOK/ACSS/AW 24/7 CONDUCTOR, FULL TENSION, WITH EYE, SINGLE TONGUE, 4-HOLE NEMA PAD & TERMINAL CONNECTOR	356
10	1/2	663682	SPACER, CLAMP-TYPE, 18" SP., HI-TEMP	356
900 ACSS/AW 54/7 (CANARY/AW)				
7	2	652682	DEAD END, COMPRESSION, FOR 900 CANARY/ACSS/AW CONDUCTOR, FULL TENSION, WITH EYE, SINGLE TONGUE, 4-HOLE NEMA PAD & TERMINAL CONNECTOR	356
10	1/2	663684	SPACER, CLAMP-TYPE, 18" SP., HI-TEMP	356
1033.5 ACSS/AW 45/7 (ORTOLAN/AW)				
7	2	652674	DEAD END, COMPRESSION, FOR 1033.5 ORTOLAN/ACSS/AW CONDUCTOR, FULL TENSION, WITH EYE, SINGLE TONGUE, 4-HOLE NEMA PAD & TERMINAL CONNECTOR	356
10	1/2	ALCOA 3314 HT	SPACER, CLAMP-TYPE, 18" SP., HI-TEMP	356
605 ACSS/AW 30/19 (TEAL/AW)				
7	2	649860	DEAD END, COMPRESSION, FOR 605 TEAL/ACSS/AW CONDUCTOR, FULL TENSION, WITH EYE, SINGLE TONGUE, 4-HOLE NEMA PAD & TERMINAL CONNECTOR	356
10	1/2	663682	SPACER, CLAMP-TYPE, 18" SP., HI-TEMP	356

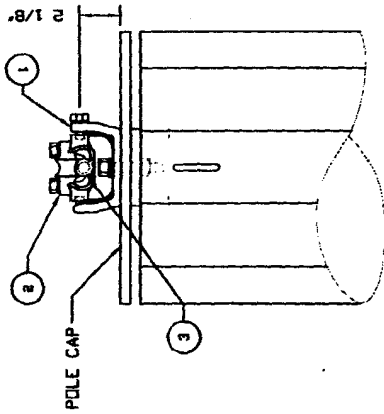


NOTES:
 1. INSTALLATION OF THE COMPRESSION DEAD ENDS & COMPRESSION SPLICES, INCLUDING THE PROPER DIRECTION OF COMPRESSION, SHALL STRICTLY FOLLOW MANUFACTURER'S INSTRUCTION.
 2. ONE PER JUMPER ASSEMBLY.

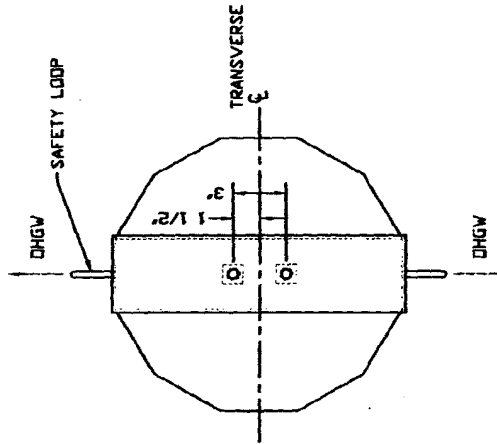
ELEVATION

CONDUCTOR	STEEL DIE	ALUMINUM DIE
ROOK	125H	27AH
CANARY	145H	30AH
ORTOLAN	105H	34AH
TEAL	145H	27AH

B		ADDED STOCK NOS.	PM	WPH	WYT	4/4/08	E	SCALE: NONE	
A		REVISED B.O.M.	PM	WPH	WYT	5/3/05	D	TRANSMISSION ENGINEERING	
		ORIGINAL	PM	WPH	WYT	7/1/04	C	POLYMER DEADEND INSULATOR	
REV		CHANGE	BY	CHKD/APPY	DATE	REF	DATE	2-BUNDLE CONDUCTORS-ACSS	
								230KV STEEL STRUCTURE	
								SDGE	
								DRC. NO. 19458	
								SECT. NO. 1 of 1	



ELEVATION



TOP VIEW

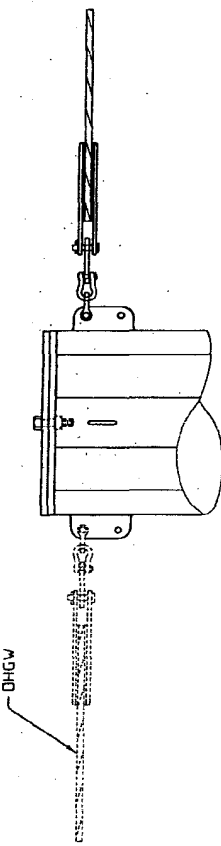
(POLE CAP NOT SHOWN FOR CLARITY)

BILL OF MATERIALS				
ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION	ACCT. NO.
1	1	167192	BRACKET, TRUNNION	356
2	1	229230	CLAMP TRUNNION, RANGE 0.25"-0.56", DUCTILE IRON, HOT DIP GALV., 2.BK	356
3	1	601810	ROD, ANKOR, DIA. RANGE 0.296"-0.314", 46" LG., FOR 7#10 AW	356

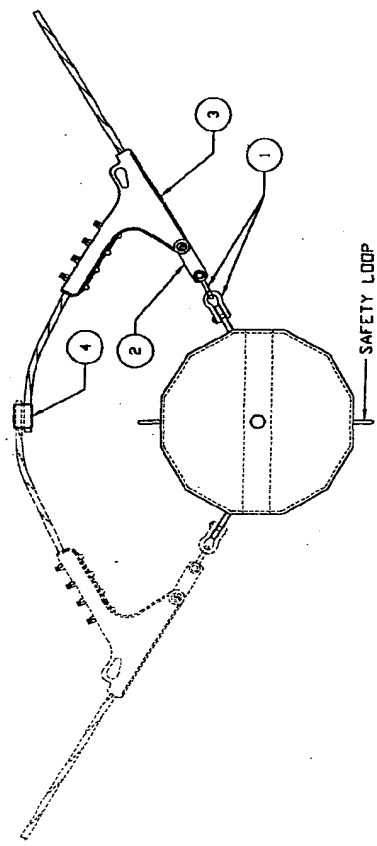
NOTES:

1. LINE ANGLE SHALL NOT EXCEED 20°.
2. REFER TO DWG. NO. 17180 FOR STEEL POLE DETAILS.

B	REV	CHANGE	DATE	BY	CHKD/APPT	DATE	SDGE	OHGW SUSPENSION CLAMP ASSEMBLY 230KV STEEL POLE	TRANSMISSION ENGINEERING	SCALE:	NONE
	A	ADDED ANKOR ROD & STOCK NOS.	7/1/04	WT	DATE	REV				DWG. NO.	19470
REV	CHANGE	DATE	BY	CHKD/APPT	DATE	REV					



ELEVATION



TOP VIEW

BILL OF MATERIALS (PER POLE)				
ITEM	QTY.	STOCK NO. OF STD. NO.	DESCRIPTION	ACCT. NO.
1	2	636436	SHACKLE, ANCHOR, 30K	356
2	1	466292	EXTENSION STRAP, 2 1/2" X 5/8" X 4" LG., GALV. STEEL, 40K	356
3	1	999325	CLAMP, QUADRANT STRAIN, DUCTILE IRON, RANGE 0.22-0.55", 19K	356
4	1	256432	CONNECTOR, COMPRESSION	356


NOTES

1. REFER TO DWG. NO. **17180** FOR STEEL POLE DETAILS.


REV	BY	CHKD	APPV	DATE	IRV	CHANGE	TRANSMISSION ENGINEERING		SCALE: NONE		
							DATE	BY	CHKD	APPV	DWG. NO.
B										19472	1 of 1
A	WPH	WVT	WVT	2/22/05	D						
-	PH	PH	WVT	7/1/04	C						
	BY	CHKD	APPV	DATE	IRV	CHANGE	BY	CHKD	APPV	DATE	
SDGE											
OHGW DEAD-END ASSEMBLY											
250KV STEEL POLE											
19472A01											

Underground


<u>DWG. NO.</u>	<u>REV.</u>	<u>TITLE</u>	<u>NO. OF SHEETS</u>
31000	E	UNDERGROUND SECTION TABLE OF CONTENTS	4
31001	O	UNDERGROUND TRANSMISSION GENERAL NOTES	2
33001	A	UNDERGROUND TRENCH DETAIL SINGLE CIRCUIT IN CONDUIT (HORZ.) WITH TELECOMMUNICATIONS	2
33002	A	UNDERGROUND TRENCH DETAIL DOUBLE CIRCUIT IN 6' VERTICAL CONDUIT WITH TELECOMMUNICATIONS	2
33003	A	UNDERGROUND TRENCH DETAIL SINGLE CIRCUIT IN CONDUIT (VERTICAL) WITH TELECOMMUNICATIONS	2
33004	A	UNDERGROUND TRENCH DETAIL DOUBLE CIRCUIT IN CONDUIT (HORZ.) WITH TELECOMMUNICATIONS	2
33005	A	UNDERGROUND TRENCH DETAIL SINGLE CIRCUIT DIRECT BURY WITH TELECOMMUNICATION	2

D	UPDATE	RLR	WPH	WVT	8/29/05	F	UPDATE	RLR	WPH	WVT	7/3/07
--	ORIGINAL ISSUE	RLR	WPH	WVT	4/25/02	E	UPDATE	RLR	WPH	WVT	3/1/07
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE
TRANSMISSION ENGINEERING						SCALE:					
	UNDERGROUND STANDARDS SECTION TABLE OF CONTENTS					DWG. NO			SHEET NO.		
						31000			1 OF 4		


<u>DWG. NO.</u>	<u>REV.</u>	<u>TITLE</u>	<u>NO. OF SHEETS</u>
33007	A	UNDERGROUND TRENCH DETAIL DOUBLE CIRCUIT IN 6" CONDUIT (HORZ.)	2
33008	A	UNDERGROUND TRENCH DETAIL SINGLE CIRCUIT IN 6" CONDUIT (HORZ.)	2
33009	A	UNDERGROUND TRENCH DETAIL SINGLE CIRCUIT IN CONDUIT (VERTICAL)	2
33010	A	UNDERGROUND TRENCH DETAIL DOUBLE CIRCUIT IN 6" CONDUIT (VERTICAL)	2
33011	C	UNDERGROUND TRENCH DETAIL FUTURE EXTENSION IN 6" CONDUIT WITH TELECOMMUNICATIONS (VERTICAL)	2
33015	A	GENERAL ARRANGEMENT UNDERGROUND TRENCH DETAIL TELECOMMUNICATION MULTI CONDUIT	2
33017	A	UNDERGROUND BORING DETAIL DOUBLE CIRCUIT IN CASING	2

D	UPDATE.	RLR	WPH	WVT	8/29/05	F	UPDATE	RLR	WPH	<i>WVT</i>	7/3/07
--	ORIGINAL ISSUE	RLR	WPH	WVT	4/25/02	E	UPDATE	RLR	WPH	WVT	3/1/07
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE
TRANSMISSION ENGINEERING						SCALE:					
	UNDERGROUND STANDARDS SECTION TABLE OF CONTENTS					DWG. NO			SHEET NO.		
						31000			2 OF 4		

<u>DWG. NO.</u>	<u>REV.</u>	<u>TITLE</u>	<u>NO. OF SHEETS</u>
34001	O	TELECOMMUNICATION 3313 HANDHOLE	2
34002	A	UNDERGROUND MANHOLE 8' X 16' X 9' - 6"	1
34003	A	UNDERGROUND MANHOLE 8' X 20' X 9' - 6"	1
34004	O	GENERAL ARRANGEMENT 69KV SPLICING PIT FOR DIRECT BURIED SYSTEM	1
34005	B	69KV VAULT LAYOUT	1
34015	A	CABLE RACK - 69KV & 138KV	2
35001	B	GENERAL ARRANGEMENT STEEL CABLE POLE RISER (6") DUAL CIRCUIT W/TELECOM	3
35002	B	GENERAL ARRANGEMENT AT SUBSTATION CONDUIT BELOW GROUND	3
35003	B	GENERAL ARRANGEMENT CABLE POLE RISER CONDUIT BELOW GROUND	3
35004	C	GENERAL ARRANGEMENT CABLE POLE RISER W/TELECOM. CONDUIT BELOW GROUND	3
35205	A	69KV STEEL CABLE POLE	6
35210	B	138KV STEEL CABLE POLE	6
36005	E	69KV WOOD CABLE POLE	4

D	UPDATE	RLR	WPH	WVT	8/29/05	F	UPDATE	RLR	WPH	WVT	7/3/07
--	ORIGINAL ISSUE	RLR	WPH	WVT	4/25/02	E	UPDATE	RLR	WPH	WVT	3/1/07
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE
TRANSMISSION ENGINEERING						SCALE:					
	UNDERGROUND STANDARDS SECTION TABLE OF CONTENTS					DWG. NO			SHEET NO.		
						31000			3 OF 4		

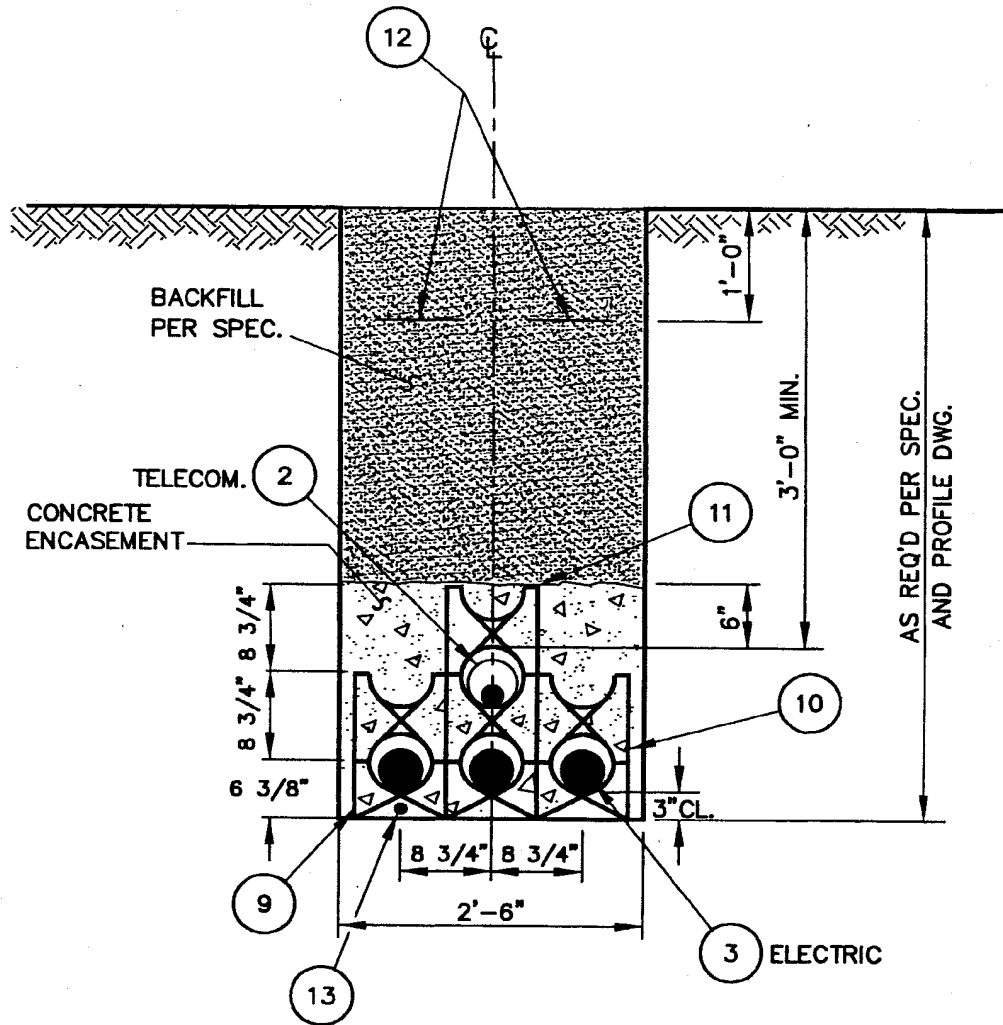
<u>DWG. NO.</u>	<u>REV.</u>	<u>TITLE</u>	<u>NO. OF SHEETS</u>
36020	A	69KV UNDERGROUND CABLE GROUNDING AND SPLICE SCHEMATIC, CABLE POLE TO SUBSTATION RACK	1
36025	B	69KV UNDERGROUND CABLE GROUNDING AND SPLICE SCHEMATIC, CABLE POLE TO CABLE POLE	1
36040	A	69KV WOOD CABLE POLE GROUNDING DETAILS	1
36045	O	STEEL CABLE POLE GROUNDING DETAILS	1
36050	O	UNDERGROUND TRENCH GROUNDING DETAILS AT SUBSTATION	1
39001	O	UNDERGROUND WARNING SIGN	2
39005	C	69KV RAYCHEM TERMINATOR AT STEEL CABLE POLE	1
39010	B	69KV LIGHTNING ARRESTOR AT STEEL CABLE POLE	1
39015	A	69KV JOSLYN TERMINATOR AT SUBSTATION RACK	1
39020	B	69KV RAYCHEM TERMINATOR AT WOOD CABLE POLE	1
39025	B	69KV LIGHTNING ARRESTOR AT WOOD CABLE POLE	1

D	UPDATE	RLR	WPH	WVT	8/29/05	F	UPDATE	RLR	WPH	<i>WVT</i>	7/3/07
--	ORIGINAL ISSUE	RLR	WPH	WVT	4/25/02	E	UPDATE	RLR	WPH	WVT	3/1/07
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE
TRANSMISSION ENGINEERING						SCALE:					
	UNDERGROUND STANDARDS SECTION TABLE OF CONTENTS					DWG. NO			SHEET NO.		
						31000			4 OF 4		

GENERAL NOTES

1. LOCATION OF ALL UNDERGROUND FACILITIES ARE TAKEN FROM AVAILABLE MAPS AND RECORDS. ACTUAL FIELD LOCATIONS OF ALL FOREIGN UTILITIES MUST BE VERIFIED BY CONTRACTOR PRIOR TO TRENCHING. CONTACT USA DIGALERT 1-800-227-2600 PRIOR TO DIGGING.
2. ALL WORK SHALL COMPLY WITH ENGINEERING DRAWINGS, SPECIFICATION NO. TE-0107, CONTRACT DOCUMENT AND ALL APPLICABLE PROVISIONS OF THE SDG&E UNDERGROUND STANDARDS HANDBOOK, LATEST REVISION.
3. ALL WORK SHALL CONFORM TO THE REQUIREMENTS OF G.O. 128.
5. ALL WORK SHALL COMPLY WITH ALL STATE AND LOCAL TRAFFIC CONTROL REGULATIONS.
6. ANY DEVIATION FROM ENGINEERING DRAWINGS MUST BE APPROVED BY SDG&E PRIOR TO CONSTRUCTION. MAINTAIN & UPDATE THE AS-BUILT RECORDS TO DOCUMENT ALL FIELD CHANGES.
7. PROVIDE NECESSARY ANCHORING TO PREVENT CONDUITS FROM FLOATING WHILE THEY ARE BEING ENCASED IN CONCRETE.
8. WHEN REQUIRED, USE ONLY PLASTIC STRAPS TO SECURE CONDUITS UNLESS OTHERWISE APPROVED. NO FERROUS METAL SHALL ENCIRCLE AN INDIVIDUAL DUCT.
9. UNLESS OTHERWISE SPECIFIED OR APPROVED, THE CONDUIT SPACERS SHALL BE INSTALLED AT AN INTERVAL NOT TO EXCEED 6'.
10. MINIMUM DEPTH OF BACKFILL ABOVE TOP OF CONDUIT SHALL BE 36" UNLESS NOTED OTHERWISE.
11. THE TOP OF CONDUIT SHALL BE A MINIMUM OF 42" BELOW FINISHED GRADE FOR ALL STATE HIGHWAY ENCROACHMENT.
12. AT RAILROAD CROSSING, THE TOP OF CASING PIPE SHALL NOT BE LESS THAN 66" BELOW THE THE BASE OF RAIL.
13. ALTERNATE THE GROUND WIRE FROM ONE SIDE OF THE TRENCH TO THE OTHER IN EVERY THIRD SEGMENT OF THE TRENCH BETWEEN SPLICE POINTS.

A							C				
-	ORIGINAL ISSUE	WDF	SAG WPH	WDT	11/12/01	B					
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE
SDGE	TRANSMISSION ENGINEERING							SCALE: NONE			
	UNDERGROUND TRANSMISSION							DWC. NO.	SHT. NO.		
GENERAL NOTES							31001	1 of 1			
											31001001



NOTE:

1. ALL WORK SHALL CONFORM TO SPECIFICATION TE-107 & DWG. 31001.

A	UPDATED MATERIALS	PM	WPH	<i>WPH</i>	8/29/05	C					
-	ORIGINAL ISSUE	WDF	SAG	WVT	11/12/01	B					
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE



TRANSMISSION ENGINEERING

**UNDERGROUND TRENCH
SINGLE CIRCUIT IN CONDUIT (HORZ.)
WITH TELECOMMUNICATIONS**

SCALE: NONE

DWG. NO.

SHT. NO.

33001

1 of 2

33001A01

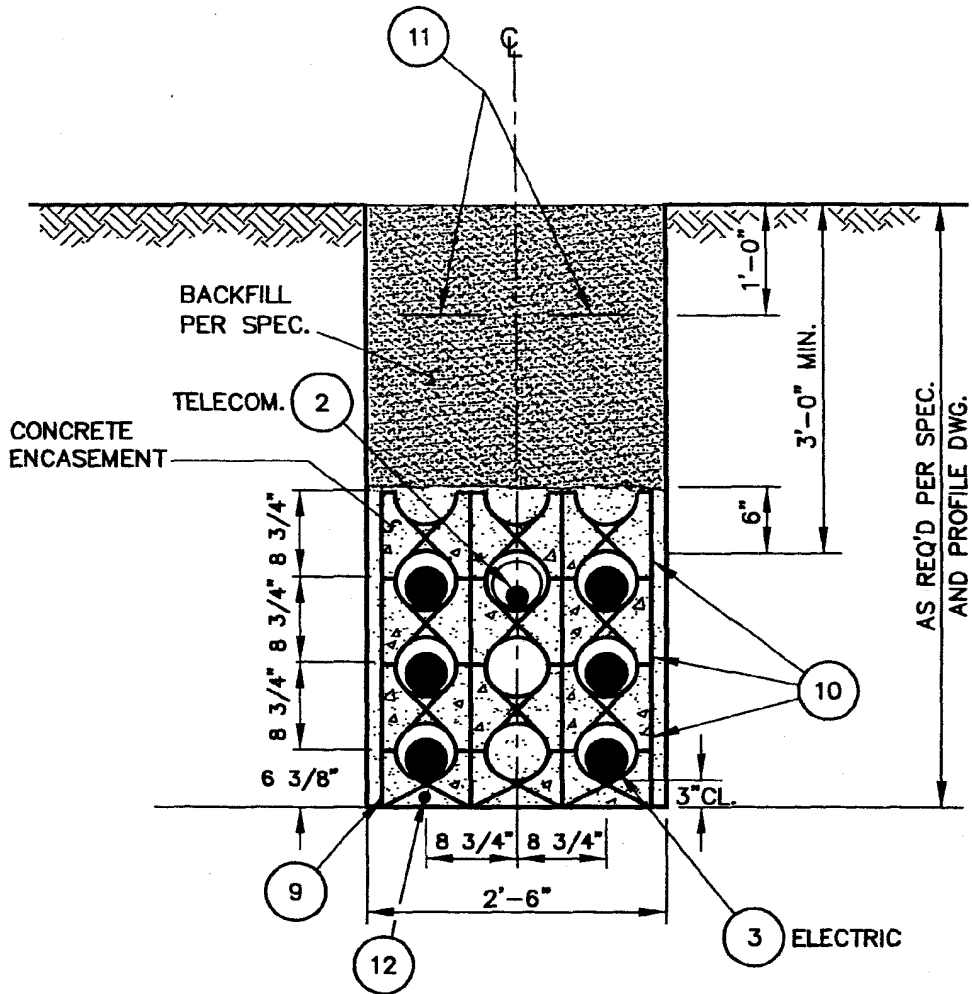
BILL OF MATERIAL

ITEM	QTY.	STOCK NO. OR STD. NO.	DESCRIPTION
1*	AS REQ'D.	213232	CEMENT, CLEAR, FOR PVC CONDUIT
2	1'	249710	CONDUIT, DB-100, 4" PVC
3	3'	249930	CONDUIT, DB-100, 6" PVC
4*	AS REQ'D.	279936	COUPLING, 4" DB/EB, PVC
5*	AS REQ'D.	280070	COUPLING, 6" DB/EB, PVC
6*	AS REQ'D.	321826	SWEEP, 4", DB-100, PVC, 22 1/2°, 25' R
7*	AS REQ'D.	321872	SWEEP, 6", DB-100, PVC, 22 1/2°, 25' R
8*	AS REQ'D.	721700	TAPE, MULE, CABLE PULLING
9	6' SP.	663658	SPACER, BASE, FOR 6" CONDUIT, 3 UNITS, PRE-ASSEMBLED
10	6' SP.	663660	SPACER, INTERMEDIATE, FOR 6" CONDUIT, 3 UNITS, PRE-ASSEMBLED
11	6' SP.	663664	SPACER, INTERMEDIATE, FOR 6" CONDUIT, 1 UNIT
12	2'	721750	TAPE-WARNING U/G CABLE TX 2417
13*	1'	812764	WIRE, 4/0 BARE COPPER

NOTES:

1. QUANTITIES ARE BASED ON ONE FOOT OF TRENCH.
2. ITEMS IDENTIFIED WITH "*" MARK ARE INCIDENTAL MATERIALS REQUIRED FOR CONSTRUCTION BUT NOT SHOWN ON SHT. 1.

A	UPDATED MATERIALS	PM	WPH	<i>WPH</i>	8/29/05	C					33001A02
-	ORIGINAL ISSUE	WDF	SAG WPH	WVT	11/12/01	B					
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	
TRANSMISSION ENGINEERING							SCALE: NONE				
UNDERGROUND TRENCH SINGLE CIRCUIT IN CONDUIT (HORZ.) WITH TELECOMMUNICATIONS							<i>DWG. NO.</i>	<i>SHT. NO.</i>			
							33001	2 of 2			



NOTE:

1. ALL WORK SHALL CONFORM TO SPECIFICATION TE-107 & DWG. NO. 31001.

A	UPDATED MATERIALS	PM	WPH	WVT	8/29/05	C					
-	ORIGINAL ISSUE	WDF	SAG WPH	WVT	11/21/09	B					
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

SDGE	TRANSMISSION ENGINEERING						SCALE: NONE			
	UNDERGROUND TRENCH DOUBLE CIRCUIT IN CONDUIT (VERTICAL) WITH TELECOMMUNICATIONS						DWG. NO.		SHT. NO.	
							33002		1 of 2	

33002A01

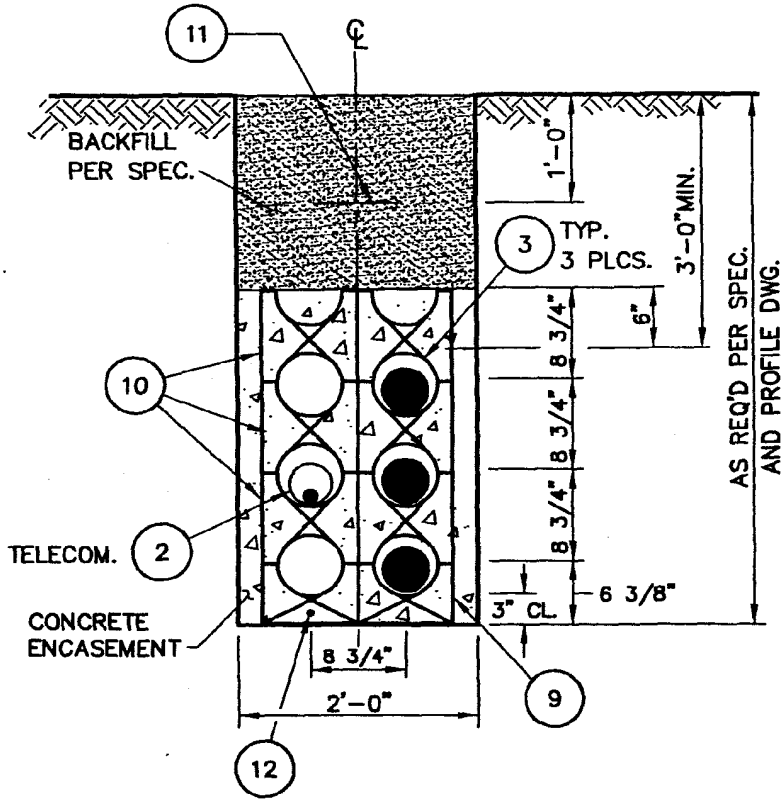
BILL OF MATERIAL

ITEM	QTY.	STOCK NO. OR STD. NO.	DESCRIPTION
1*	AS REQ'D.	213232	CEMENT, CLEAR, FOR PVC CONDUIT
2	1'	249710	CONDUIT, DB-100, 4" PVC
3	6'	249930	CONDUIT, DB-100, 6" PVC
4*	AS REQ'D.	279936	COUPLING, 4", DB/EB, PVC
5*	AS REQ'D.	280070	COUPLING, 6", DB/EB, PVC
6*	AS REQ'D.	321826	SWEEP, 4", DB-100, PVC, 22 1/2°, 25' R
7*	AS REQ'D.	321872	SWEEP, 6", DB-100, PVC, 22 1/2°, 25' R
8*	AS REQ'D.	721700	TAPE, MULE, CABLE PULLING
9	6' SP.	663658	SPACER, BASE, FOR 6" CONDUIT, 3 UNITS, PRE-ASSEMBLED
10	6' SP.	663660	SPACER, INTERMEDIATE, FOR 6" CONDUIT, 3 UNITS, PRE-ASSEMBLED
11	2'	721750	TAPE-WARNING U/G CABLE TX 2417
12	1'	812764	WIRE, 4/0 BARE COPPER

NOTES:

1. QUANTITIES ARE BASED ON ONE FOOT OF TRENCH.
2. ITEMS IDENTIFIED WITH "*" MARK ARE INCIDENTAL MATERIALS REQUIRED FOR CONSTRUCTION BUT NOT SHOWN ON SHT. 1.

A	UPDATED MATERIALS	PM	WPH	<i>WPH</i>	8/29/05	C					33002A02
-	ORIGINAL ISSUE	WDF	SAG WPH	WVT	11/21/09	B					
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	
TRANSMISSION ENGINEERING							SCALE: NONE				
UNDERGROUND TRENCH DOUBLE CIRCUIT IN CONDUIT (VERTICAL) WITH TELECOMMUNICATIONS							DWG. NO.	SHT. NO.			
							33002	2 of 2			



NOTE:

1. ALL WORK SHALL CONFORM TO SPECIFICATION TE-107 & DWG. NO. 31001.

A	UPDATED MATERIALS	PM	WPH	WVT	8/29/05	C						
-	ORIGINAL ISSUE	WDF	SAG WPH	WVT	11/29/01	B						
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	

	TRANSMISSION ENGINEERING				SCALE: NONE			
	UNDERGROUND TRENCH DETAIL SINGLE CIRCUIT IN CONDUIT (VERTICAL) WITH TELECOMMUNICATIONS				DWG. NO.		SHT. NO.	
					33003		1 of 2	

33003A01

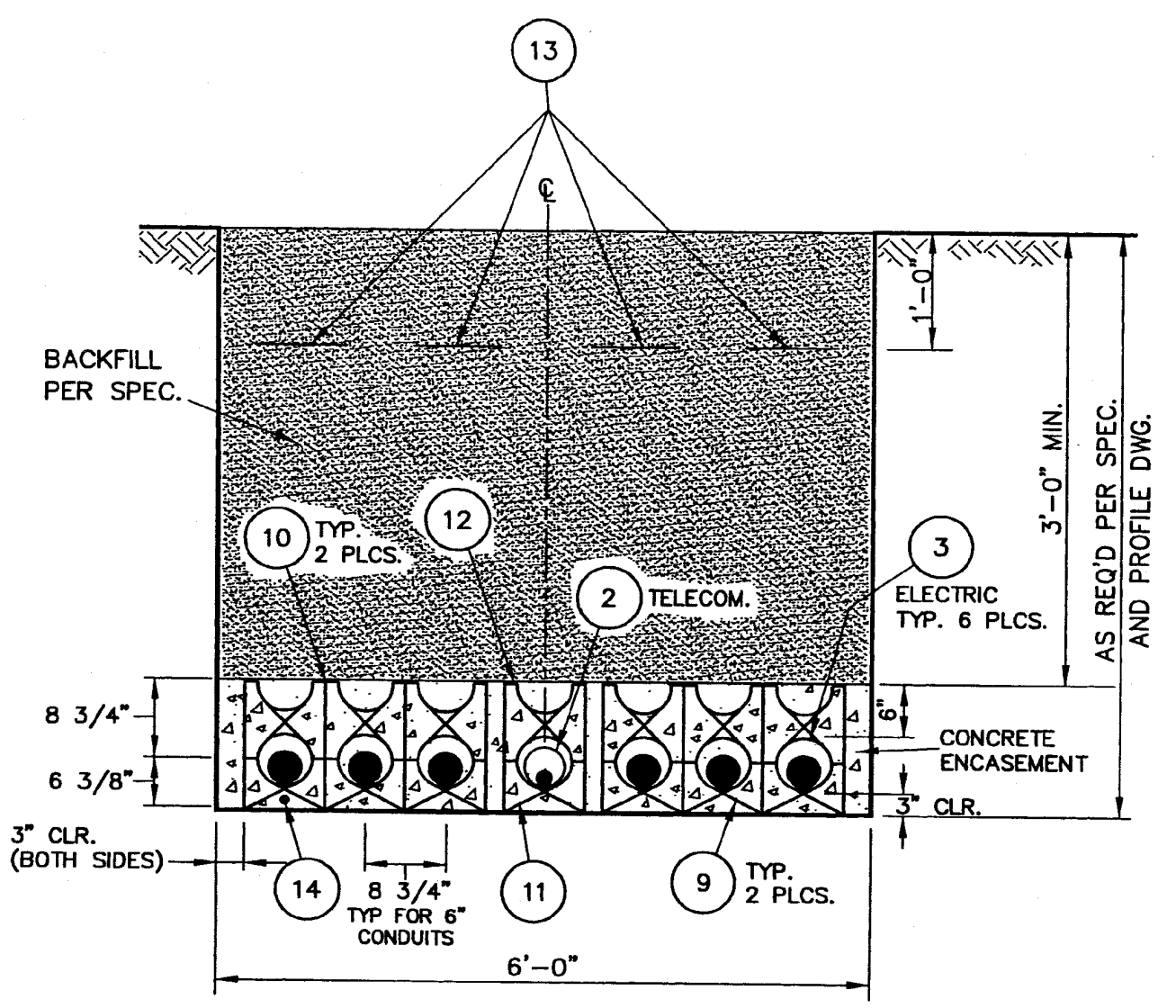
BILL OF MATERIAL

ITEM	QTY.	STOCK NO. OR STD. NO.	DESCRIPTION
1*	AS REQ.D.	213232	CEMENT, CLEAR, FOR PVC CONDUIT
2	1'	249710	CONDUIT, DB-100, 4" PVC
3	3'	249930	CONDUIT, DB-100, 6" PVC
4*	AS REQ.D.	279936	COUPLING, 4", DB/EB, PVC
5*	AS REQ.D.	280070	COUPLING, 6", DB/EB, PVC
6*	AS REQ.D.	321826	SWEEP, 4", DB-100, PVC, 22 1/2°, 25' R
7*	AS REQ.D.	321872	SWEEP, 6", DB-100, PVC, 22 1/2°, 25' R
8*	AS REQ.D.	721700	TAPE, MULE, CABLE PULLING
9	6' SP.	663016	SPACER, BASE, FOR 6" CONDUIT, 2 UNITS, PRE-ASSEM.
10	6' SP.	663666	SPACER, INTMD., FOR 6" CONDUIT, 2 UNITS, PRE-ASSEM.
11	2'	721750	TAPE-WARNING U/G CABLE TX 2417
12	1'	812764	WIRE, 4/0 BARE COPPER

NOTES:

1. QUANTITIES ARE BASED ON ONE FOOT OF TRENCH.
2. ITEMS IDENTIFIED WITH "*" MARK ARE INCIDENTAL MATERIALS REQUIRED FOR CONSTRUCTION BUT NOT SHOWN ON SHT. 1.

A	UPDATED MATERIALS	PM	WPH	WY	8/29/05	C					33003A02
-	ORIGINAL ISSUE	WDF	SAG WPH	WVT	11/29/01	B					
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	
		TRANSMISSION ENGINEERING					SCALE: NONE				
		UNDERGROUND TRENCH SINGLE CIRCUIT IN CONDUIT (VERTICAL) WITH TELECOMMUNICATIONS					DWG. NO.		SHT. NO.		
							33003		2 of 2		



NOTE:

1. ALL WORK SHALL CONFORM TO SPECIFICATION TE-107 & DWG. NO. 31001.

A	UPDATED MATERIALS	PM	WPH	<i>[Signature]</i>	8/29/05	C					
-	ORIGINAL ISSUE	WDF	SAG WPH	WVT	11/29/01	B					
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

SDGE	TRANSMISSION ENGINEERING				SCALE: NONE	
	UNDERGROUND TRENCH DOUBLE CIRCUIT IN CONDUIT (HORZ.) WITH TELECOMMUNICATIONS				DWG. NO.	SHT. NO.
					33004	1 of 2
33004401						

BILL OF MATERIAL


ITEM	QTY.	STOCK NO. OR STD. NO.	DESCRIPTION
1*	AS REQ'D.	213232	CEMENT, CLEAR, FOR PVC CONDUIT
2	1'	249710	CONDUIT, DB-100, 4" PVC
3	6'	249930	CONDUIT, DB-100, 6" PVC
4*	AS REQ'D.	279936	COUPLING, 4", DB/EB, PVC
5*	AS REQ'D.	280070	COUPLING, 6", DB/EB, PVC
6*	AS REQ'D.	321826	SWEEP, 4", DB-100, PVC, 22 1/2°, 25' R
7*	AS REQ'D.	321872	SWEEP, 6", DB-100, PVC, 22 1/2°, 25' R
8*	AS REQ'D.	721700	TAPE, MULE, CABLE PULLING
9	6' SP.	663658	SPACER, BASE, FOR 6" CONDUIT, 3 UNITS, PRE-ASSEM.
10	6' SP.	663660	SPACER, INTMD., FOR 6" CONDUIT, 3 UNITS, PRE-ASSEM.
11	6' SP.	663014	SPACER, BASE, FOR 6" CONDUIT, 1 UNIT
12	6' SP.	663664	SPACER, INTERMEDIATE, FOR 6" CONDUIT, 1 UNIT
13	4'	721750	TAPE-WARNING U/G CABLE TX 2417
14	1'	812764	WIRE, 4/0 BARE COPPER

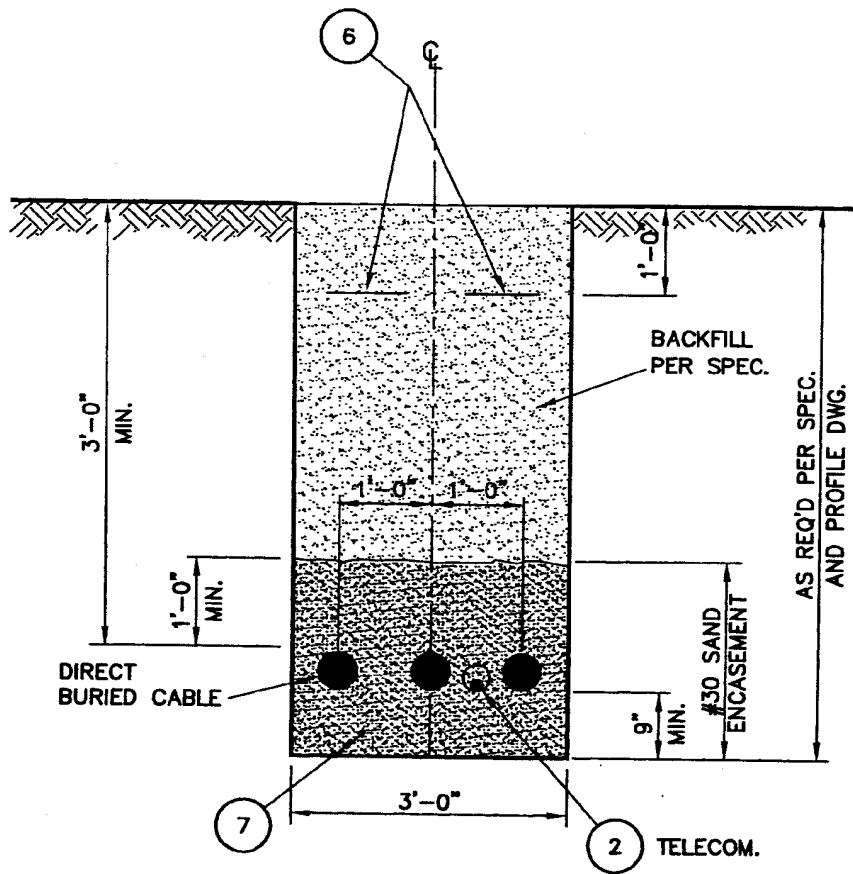
NOTES:

1. QUANTITIES ARE BASED ON ONE FOOT OF TRENCH.
2. ITEMS IDENTIFIED WITH "*" MARK ARE INCIDENTAL MATERIALS REQUIRED FOR CONSTRUCTION BUT NOT SHOWN ON SHT. 1.

A	UPDATED MATERIALS	PM	WPH	WVT	8/29/05	C					
-	ORIGINAL ISSUE	WDF	SAG WPH	WVT	11/29/01	B					
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

33004A02

	TRANSMISSION ENGINEERING	SCALE: NONE	
	UNDERGROUND TRENCH DOUBLE CIRCUIT IN CONDUIT (HORZ.) WITH TELECOMMUNICATIONS	DWG. NO.	SHT. NO.
		33004	2 of 2



NOTE:

1. ALL WORK SHALL CONFORM TO SPECIFICATION TE-107 & DWG. NO. 31001.

A	UPDATED MATERIALS	PM	WPH	WWT	8/29/05	C						
-	ORIGINAL ISSUE	WDF	SAG WPH	WWT	11/24/01	B						
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	
TRANSMISSION ENGINEERING							SCALE: NONE					
UNDERGROUND TRENCH SINGLE CIRCUIT DIRECT BURY WITH TELECOMMUNICATIONS							DWG. NO.	SHT. NO.				
							33005	1 of 2				
												33005A01

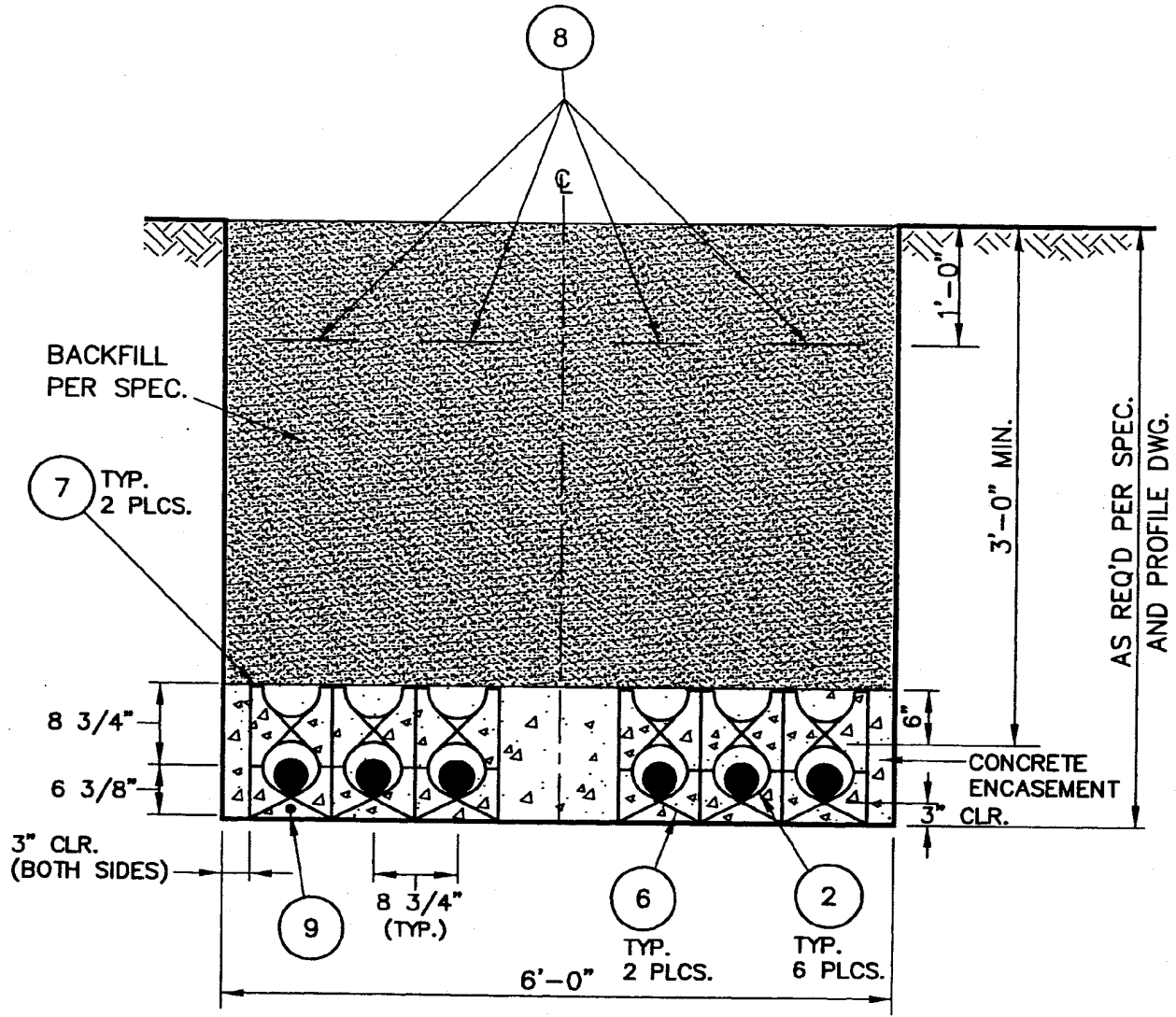
BILL OF MATERIAL

ITEM	QTY.	STOCK NO. OR STD. NO.	DESCRIPTION
1*	AS REQ'D.	213232	CEMENT, CLEAR, FOR PVC CONDUIT
2	1'	249710	CONDUIT, DB-100, 4" PVC
3*	AS REQ'D.	279936	COUPLING, 4", DB, PVC
4*	AS REQ'D.	321824	SWEEP, 4", DB-100, PVC, 22 1/2°, 25' R
5*	AS REQ'D.	721700	TAPE, MULE, CABLE PULLING
6	2'	721750	TAPE-WARNING U/G CABLE TX 2417
7	1'	812764	4/0 BARE COPPER WIRE

NOTES:

1. QUANTITIES ARE BASED ON ONE FOOT OF TRENCH.
2. ITEMS IDENTIFIED WITH "*" MARK ARE INCIDENTAL MATERIALS REQUIRED FOR CONSTRUCTION BUT NOT SHOWN ON SHT. 1.

A	UPDATED MATERIALS	PM	WPH	<i>[Signature]</i>	8/29/05	C					33005A02
-	ORIGINAL ISSUE	WDF	SAG WPH	WVT	11/24/01	B					
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	
TRANSMISSION ENGINEERING							SCALE: NONE				
UNDERGROUND TRENCH SINGLE CIRCUIT DIRECT BURY WITH TELECOMMUNICATIONS							DWG. NO.	SHT. NO.			
							33005	2 of 2			



NOTE:

1. ALL WORK SHALL CONFORM TO SPECIFICATION TE-107 & DWG. NO. 31001.

A	UPDATED MATERIALS	PM	WPH	WV	8/29/05	C					
-	ORIGINAL ISSUE	WDF	SAG WPH	WVT	11/29/01	B					
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

SDGE	TRANSMISSION ENGINEERING						SCALE: NONE				33007A01
	UNDERGROUND TRENCH DOUBLE CIRCUIT IN CONDUIT (HORZ.)						DWG. NO.	SHT. NO.			
							33007	1 of 2			

BILL OF MATERIAL

ITEM	QTY.	STOCK NO. OR STD. NO.	DESCRIPTION
1*	AS REQ'D.	213232	CEMENT, CLEAR, FOR PVC CONDUIT
2	6'	249930	CONDUIT, DB-100, 6" PVC
3*	AS REQ'D.	280070	COUPLING, 6", DB/EB, PVC
4*	AS REQ'D.	321872	SWEEP, 6", DB-100, PVC, 22 1/2°, 25' R
5*	AS REQ'D.	721700	TAPE, MULE, CABLE PULLING
6	6' SP.	663658	SPACER, BASE, FOR 6" CONDUIT, 3 UNITS, PRE-ASSEM.
7	6' SP.	663660	SPACER, INTMD., FOR 6" CONDUIT, 3 UNITS, PRE-ASSEM.
8	4'	721750	TAPE-WARNING U/G CABLE TX 2417
9	1'	812764	WIRE, 4/0 BARE COPPER

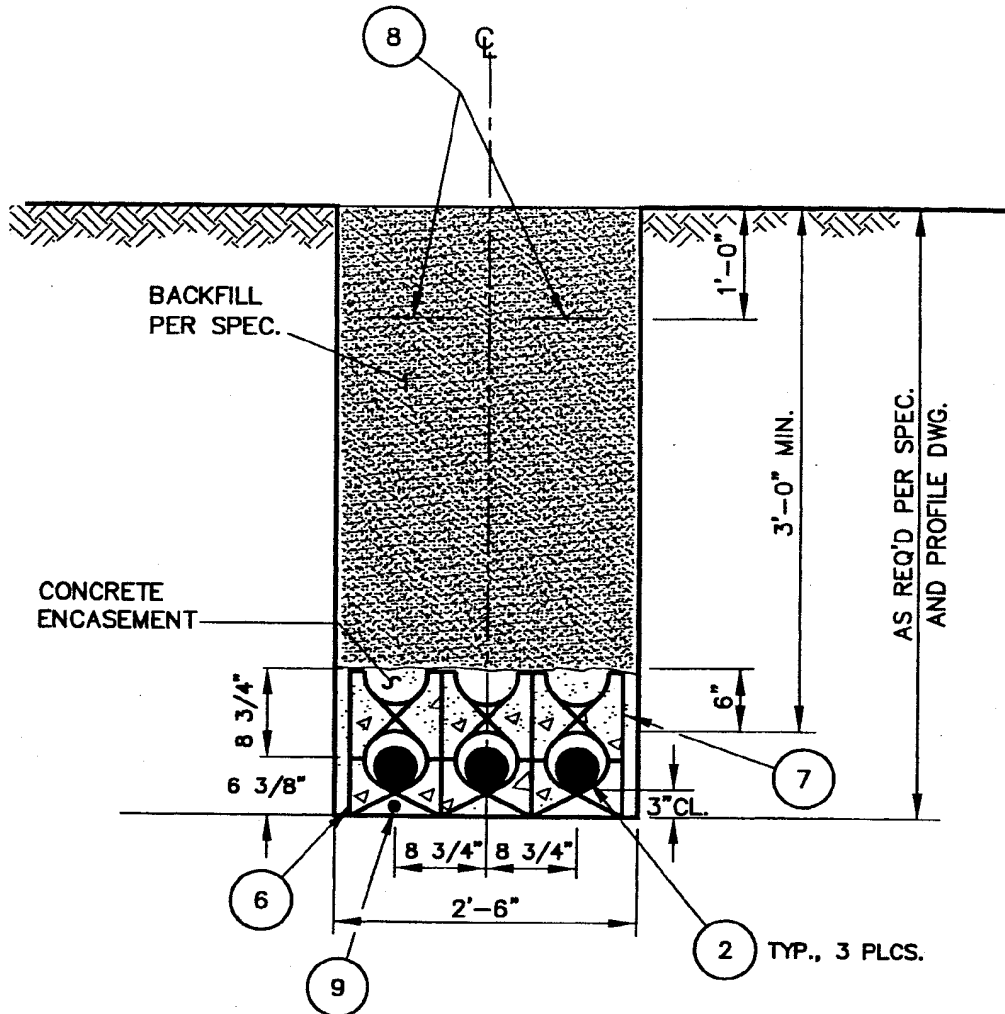
NOTES:

1. QUANTITIES ARE BASED ON ONE FOOT OF TRENCH.
2. ITEMS IDENTIFIED WITH "*" MARK ARE INCIDENTAL MATERIALS REQUIRED FOR CONSTRUCTION BUT NOT SHOWN ON SHT. 1.

A	UPDATED MATERIALS	PM	WPH	WV	8/29/05	C					
-	ORIGINAL ISSUE	WDF	SAG WPH	WVT	11/29/01	B					
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

33007A02

	TRANSMISSION ENGINEERING	SCALE: NONE	
	UNDERGROUND TRENCH DOUBLE CIRCUIT IN CONDUIT (HORZ.)	DWG. NO.	SHT. NO.
		33007	2 of 2



NOTE:

1. ALL WORK SHALL CONFORM TO SPECIFICATION TE-107 & DWG. NO. 31001.

A	UPDATED MATERIALS	PM	WPH	WVT	8/29/05	C						
-	ORIGINAL ISSUE	WDF	SAG WPH	WVT	11/12/01	B						
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	

	TRANSMISSION ENGINEERING	SCALE: NONE	
	UNDERGROUND TRENCH SINGLE CIRCUIT IN CONDUIT (HORZ.)	DWG. NO. 33008	SHT. NO. 1 of 2
	33008A01		

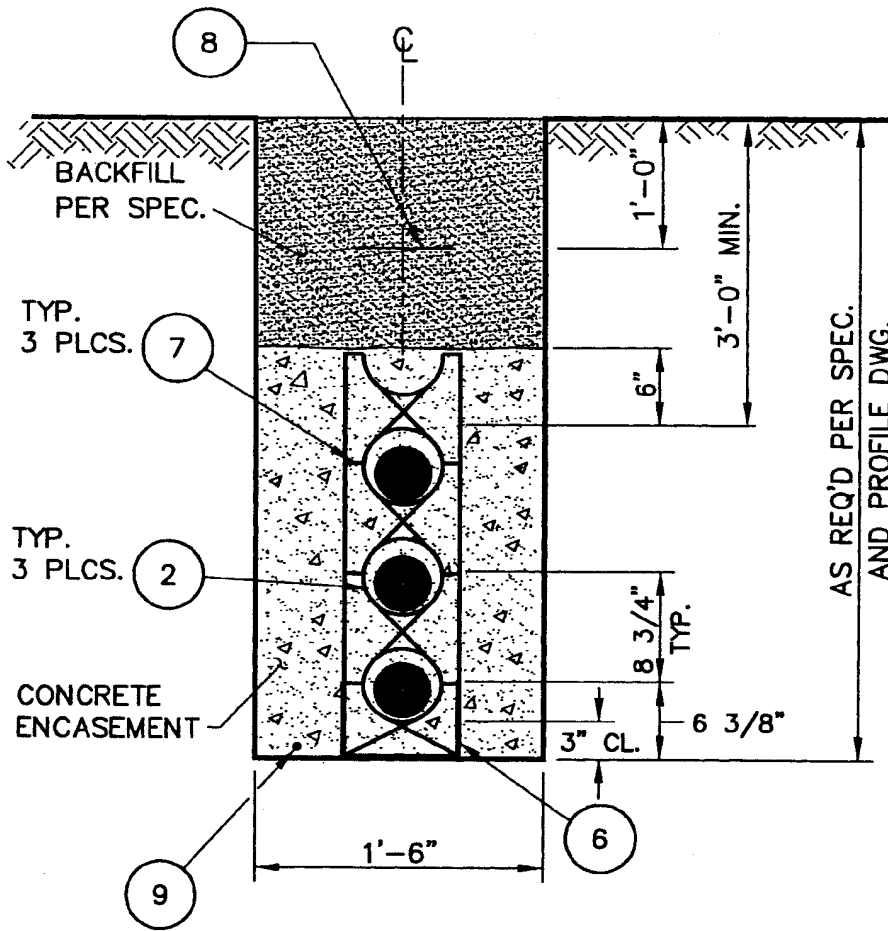
BILL OF MATERIAL

ITEM	QTY.	STOCK NO. OR STD. NO.	DESCRIPTION
1*	AS REQ.D.	213232	CEMENT, CLEAR, FOR PVC CONDUIT
2	3'	249930	CONDUIT, DB-100, 6" PVC
3*	AS REQ.D.	280070	COUPLING, 6", DB/EB, PVC
4*	AS REQ.D.	321872	SWEEP, 6", DB-100, PVC, 22 1/2°, 25' R
5*	AS REQ.D.	721700	TAPE, MULE, CABLE PULLING
6	6' SP.	663658	SPACER, BASE, FOR 6" CONDUIT, 3 UNITS, PRE-ASSEM.
7	6' SP.	663660	SPACER, INTMD., FOR 6" CONDUIT, 3 UNITS, PRE-ASSEM.
8	2'	721750	TAPE-WARNING U/G CABLE TX 2417
9	1'	812764	WRE, 4/0 BARE COPPER

NOTES:

1. QUANTITIES BASED ON ONE FOOT OF TRENCH.
2. ITEMS IDENTIFIED WITH "*" MARK ARE INCIDENTAL MATERIALS REQUIRED FOR CONSTRUCTION BUT NOT SHOWN ON SHT. 1.

A	UPDATED MATERIALS	PM	WPH	<i>WVT</i>	8/29/05	C					3300BA02
-	ORIGINAL ISSUE	WDF	SAG WPH	WVT	11/12/01	B					
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	
TRANSMISSION ENGINEERING							SCALE: NONE				
UNDERGROUND TRENCH SINGLE CIRCUIT IN CONDUIT (HORZ.)							DWG. NO.		SHT. NO.		
							33008		2 of 2		



NOTES:

1. ALL WORK SHALL CONFORM TO SPECIFICATION TE-107 & DWG. NO. 31001.

A	ORIGINAL ISSUE	PM	WPH	WVT	8/29/05	C					
-	ORIGINAL ISSUE	WDF	SAG WPH	WVT	11/12/01	B					
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

SDGE	TRANSMISSION ENGINEERING						SCALE: NONE				
	UNDERGROUND TRENCH SINGLE CIRCUIT IN CONDUIT (VERTICAL)						DWG. NO.		SHT. NO.		33009A01
							33009		1 of 2		

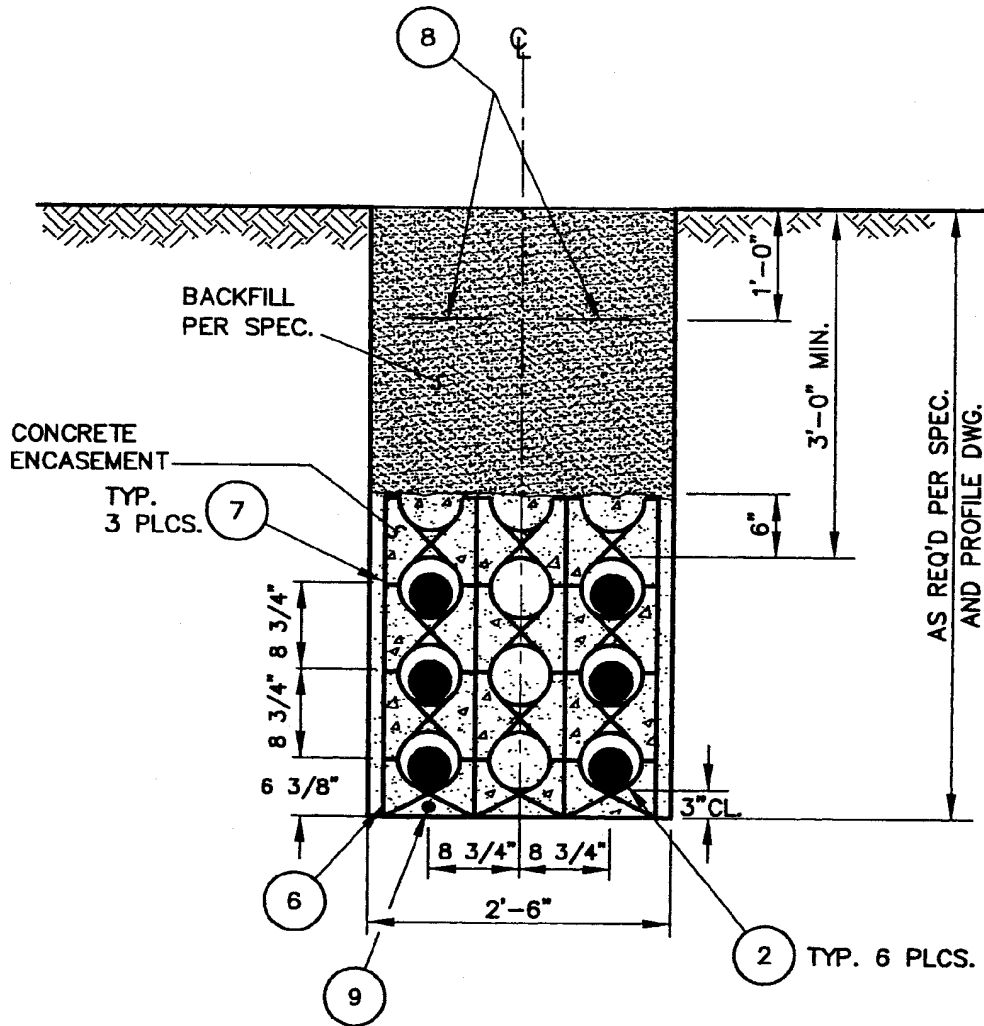
BILL OF MATERIAL

ITEM	QTY.	STOCK NO. OR STD. NO.	DESCRIPTION
1*	AS REQ.D.	213232	CEMENT, CLEAR, FOR PVC CONDUIT
2	3'	249930	CONDUIT, DB-100, 6" PVC
3*	AS REQ.D.	280070	COUPLING, 6", DB/EB, PVC
4*	AS REQ.D.	321872	SWEEP, 6", DB-100, PVC, 22 1/2°, 25' R
5*	AS REQ.D.	721700	TAPE, MULE, CABLE PULLING
6	6' SP.	663014	SPACER, BASE, FOR 6" CONDUIT
7	6' SP.	663664	SPACER, INTERMEDIATE, FOR 6" CONDUIT
8	1'	721750	TAPE-WARNING U/G CABLE TX 2417
9	1'	812764	WIRE, 4/0 BARE COPPER

NOTES:

1. QUANTITIES BASED ON ONE FOOT OF TRENCH.
2. ITEMS IDENTIFIED WITH "*" MARK ARE INCIDENTAL MATERIALS REQUIRED FOR CONSTRUCTION BUT NOT SHOWN ON SHT. 1.

A		PM	WPH	<i>WPH</i>	8/29/05	C					33009A02
-	ORIGINAL ISSUE	WDF	SAG WPH	WVT	11/12/01	B					
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	
		TRANSMISSION ENGINEERING					SCALE: NONE				
		UNDERGROUND TRENCH SINGLE CIRCUIT IN CONDUIT (VERTICAL)					DWG. NO.		SHT. NO.		
							33009		2 of 2		



NOTE:

1. ALL WORK SHALL CONFORM TO SPECIFICATIONS TE-107 & DWG. NO. 31001.

A	UPDATED MATERIALS	PM	WPH	WYT	8/29/05	C					
-	ORIGINAL ISSUE	WDF	SAG	WVT	11/12/01	B					
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE



TRANSMISSION ENGINEERING

**UNDERGROUND TRENCH
DOUBLE CIRCUIT IN CONDUIT (VERTICAL)**

SCALE: NONE

DWG. NO.

SHT. NO.

33010

1 of 2

33010A01

BILL OF MATERIAL

ITEM	QTY.	STOCK NO. OR STD. NO.	DESCRIPTION
1*	AS REQ.D.	213232	CEMENT, CLEAR, FOR PVC CONDUIT
2	6'	249930	CONDUIT, DB-100, 6" PVC
3*	AS REQ.D.	280070	COUPLING, 6", DB/EB, PVC
4*	AS REQ.D.	321872	SWEEP, 6", DB-100, PVC, 22 1/2°, 25' R
5*	AS REQ.D.	721700	TAPE, MULE, CABLE PULLING
6	6' SP.	663658	SPACER, BASE, FOR 6" CONDUIT, 3 UNITS, PRE-ASSEM.
7	6' SP.	663660	SPACER, INTMD., FOR 6" CONDUIT, 3 UNITS, PRE-ASSEM.
8	2'	721750	TAPE-WARNING U/G CABLE TX 2417
9	1'	812764	WIRE, 4/0 BARE COPPER

NOTES:

1. QUANTITIES BASED ON ONE FOOT OF TRENCH.
2. ITEMS IDENTIFIED WITH "*" MARK ARE INCIDENTAL MATERIALS REQUIRED FOR CONSTRUCTION BUT NOT SHOWN ON SHT. 1.

A	UPDATED MATERIALS	PM	WPH	WVT	8/29/05	C					
-	ORIGINAL ISSUE	WDF	SAG WPH	WVT	11/12/01	B					
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

33010A02

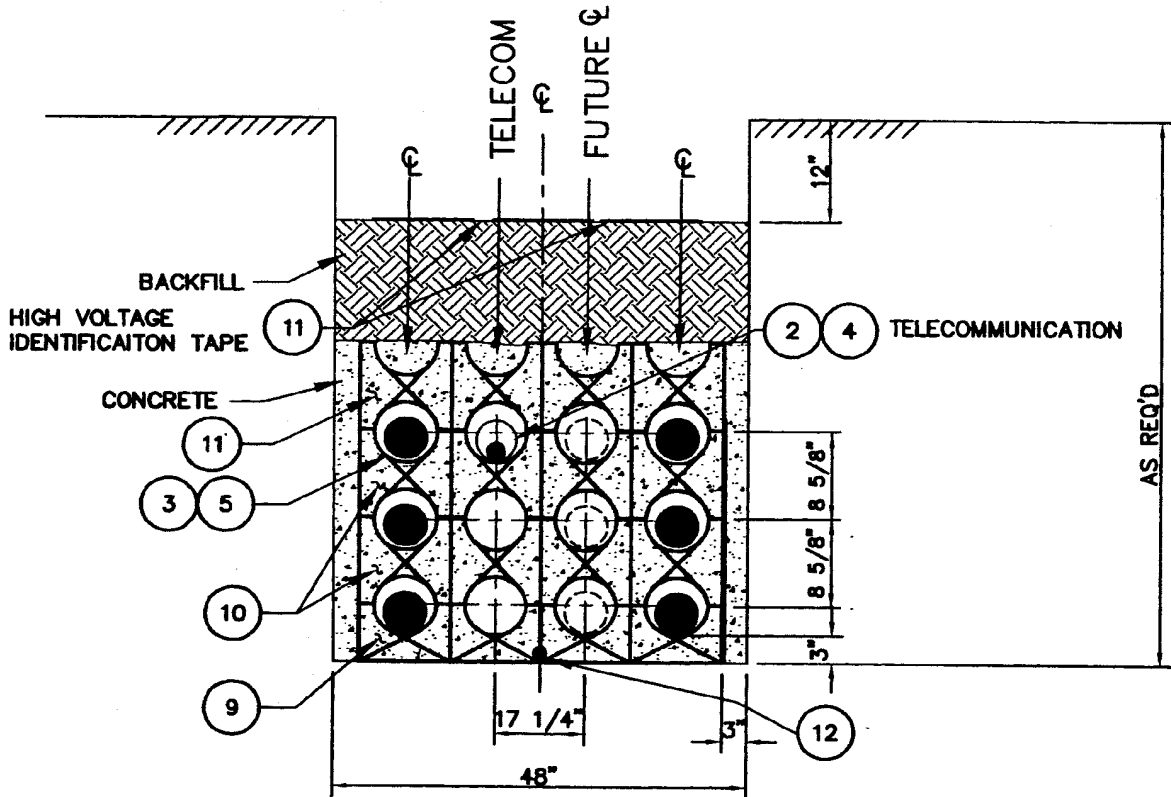


TRANSMISSION ENGINEERING

SCALE: NONE

**UNDERGROUND TRENCH
DOUBLE CIRCUIT IN CONDUIT (VERTICAL)**

DWG. NO.	SHT. NO.
33010	2 of 2



NOTES:

- BACKFILL TRENCH AND LOCATE SPACERS PER SPECIFICATION 31001 AND TE 0107.

B	UPDATED MATERIALS	PM	WPH	WVT	8/29/05	E					
A	CHANGED DWG. NO	WDF	SAG	WVT	8/21/02	D					
	ORIGINAL	KSM	SAG	WPH	12/18/00	C	CORRECTED STOCK NOS. 9,10	PM	WPH	WVT	3/1/07
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

TRANSMISSION ENGINEERING

SCALE: NONE



**UNDERGROUND TRENCH DETAIL FOR
FUTURE EXTENSION IN 6" VERTICAL
CONDUIT WITH TELECOMMUNICATIONS**

DWG. NO.
33011

SHT. NO.
1 of 2

33011C01

BILL OF MATERIAL

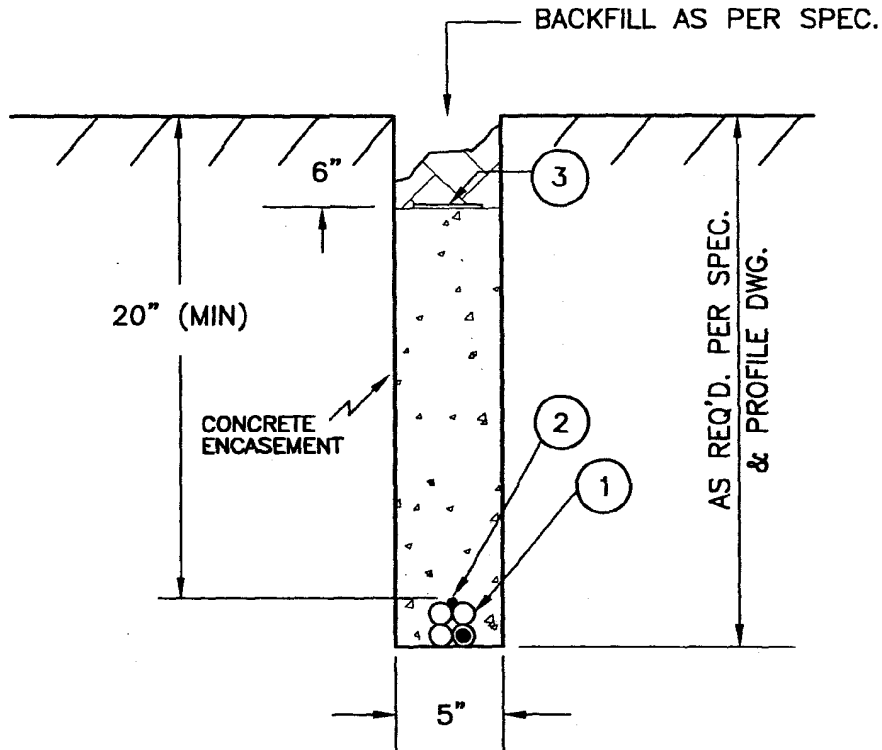
ITEM	QTY.	STOCK NO. or STD. NO.	DESCRIPTION
1	AS REQ'D	213232	CEMENT, CLEAR, FOR PVC AND ABS CONDUIT
2	1'	249710	CONDUIT, DB-100, 4" PVC
3	9'	249930	CONDUIT, DB-100, 6" PVC
4*	AS REQ'D	279936	COUPLING, 4" DB/EB PVC
5*	AS REQ'D	280070	COUPLING, 6" DB/EB PVC
6*	AS REQ'D	321824	SWEEP, 4" DB-100, PVC, 22-1/2 DEGREES, 25' R.
7*	AS REQ'D	321872	SWEEP, 6" DB-100, PVC, 22-1/2 , 25' R.
8*	AS REQ'D	721700	TAPE, MULE, CABLE PULLING
9	6' SP	663016	SPACER, BASE, FOR 6" CONDUIT, 2 UNITS, PRE-ASSEM.
10	6' SP	663666	SPACER, INTERMEDIATE, FOR 6" CONDUIT, 2 UNITS, PRE-ASSEM.
11	2'	721750	TAPE-WARNING U/G CABLE TX 2417
12	1'	812764	4/0 BARE COPPER WIRE

NOTES:

1. QUANTITIES BASED ON ONE FOOT OF TRENCH.
2. ITEMS IDENTIFIED WITH "*" ARE INCIDENTAL MATERIALS REQUIRED FOR CONSTRUCTION BU NOT SHOWN ON SHT. 1.

B	UPDATED MATERIALS	PM	WPH	WVT	8/29/05	E					
A	CHANGED DWG. NO	WDF	SAG	WVT	8/21/02	D					
	ORIGINAL	KSM	SAG	WPH	12/18/00	C	CORRECTED STOCK NOS. 9,10	PM	WPH	3/1/07	
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

TRANSMISSION ENGINEERING							SCALE: NONE				33011C02
	UNDERGROUND TRENCH DETAIL FOR FUTURE EXTENSION IN 6" VERTICAL CONDUIT WITH TELECOMMUNICATIONS						DWG. NO.		SHT. NO.		
							33011		2 of 2		



NOTES:

1. ALL WORK SHALL CONFORM TO SPECIFICATION TE 0107 & DWG. 31001
2. REFER TO GAS STANDARD PRACTICE PAGES 7243, 7257.1 AND 7257.2 FOR TRACER WIRE INSTALLATION AND ACCESSORIES.
3. BRING TRACER WIRE INTO HANDHOLES, CUT AT 2' INSIDE HANDHOLE AND SEAL TIP WITH AQUASEAL AND ELECTRICAL TAPE TO PREVENT GROUNDING.
4. REFER TO UNDERGROUND STANDARDS PAGES 4620.5, 4620.6, 4620.7, 4620.8 & 4720.9.

A	UPDATED MATERIALS	PM	WVT	WVT	8/29/05	C					
-	ORIGINAL ISSUE	WDF	SAG WPH	WVT	11/29/01	B					
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

SDGE	TRANSMISSION ENGINEERING	SCALE: NONE	
	UNDERGROUND TRENCH TELECOMMUNICATION 4-WAY CONDUIT	DWG. NO.	SHT. NO.
		33015	1 of 2

33015A01


BILL OF MATERIAL

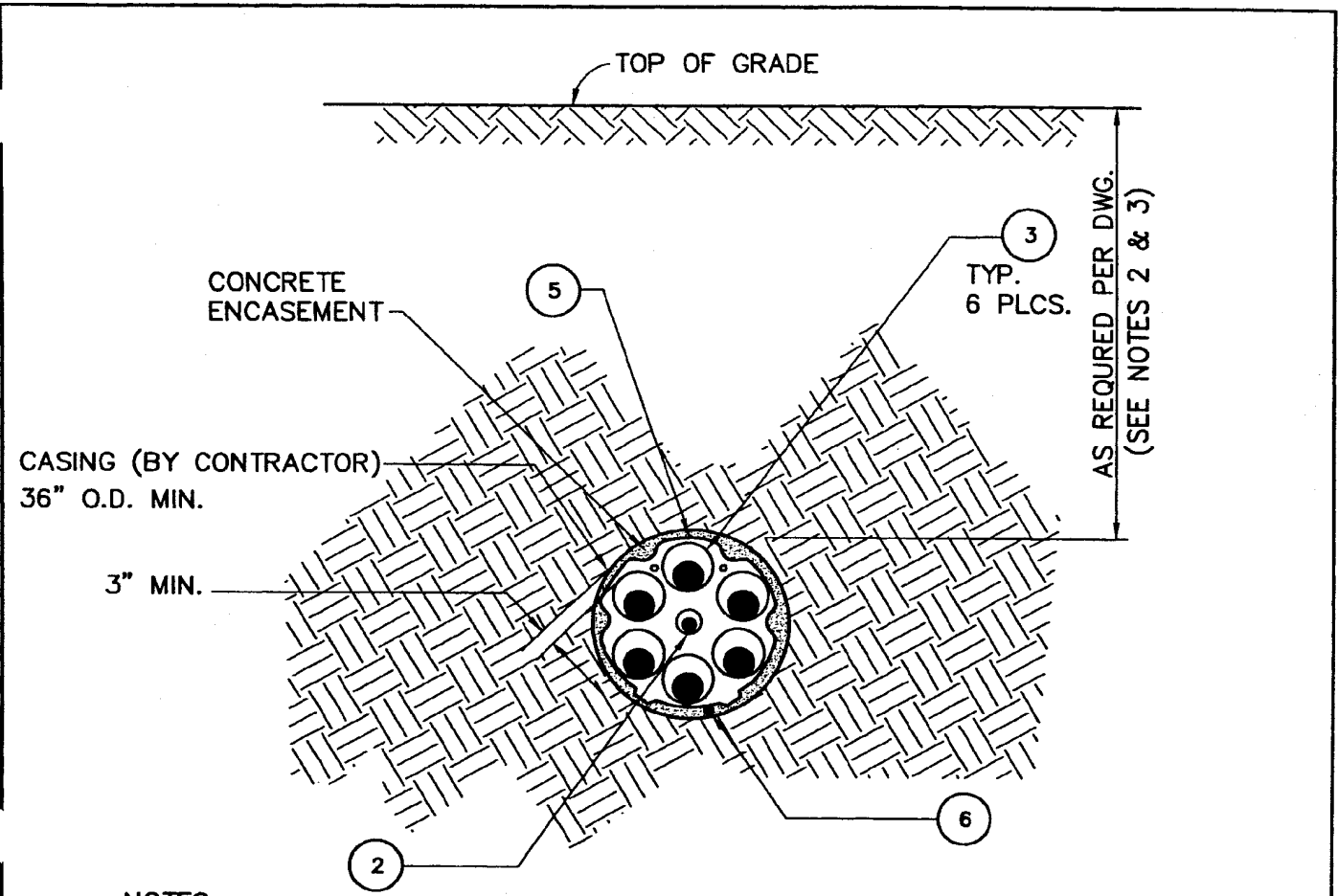
ITEM	QTY.	STOCK NO. OR STD. NO.	DESCRIPTION
1	1'	250150	CONDUIT, SCH. 40 PVC, 4-1.25" MULTIPLE CONDUITS
2	1'	809200	WIRE, TRACER, #14 AWG SOL. CU, HMWPE INSULATED
3	1'	721750	TAPE - WARNING U/G CABLE TX 2417
4*	AS REQ'D.	213232	CEMENT, CLEAR, FOR PVC CONDUIT
5*	AS REQ'D.	721700	TAPE, MULE, CABLE PULLING

NOTES:

1. QUANTITIES ARE BASED ON ONE FOOT OF TRENCH.
2. ITEMS IDENTIFIED WITH "*" MARK ARE INCIDENTAL MATERIALS REQUIRED FOR CONSTRUCTION BUT NOT SHOWN ON SHT. 1.

A	UPDATED MATERIALS	PM	WVT	WYT	8/29/05	C						33015A02
-	ORIGINAL ISSUE	WDF	SAG WPH	WVT	11/29/01	B						
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	

	TRANSMISSION ENGINEERING	SCALE: NONE	
	UNDERGROUND TRENCH TELECOMMUNICATION 4-WAY CONDUIT	DWC. NO.	SHT. NO.
		33015	2 of 2



NOTES:

1. CABLE CONSTRUCTION CREWS MUST VERIFY AND TEST FOR CABLE POSITION AND PHASING BEFORE AND AFTER MAKING CONNECTIONS.
2. THE TOP OF CASING SHALL BE A MINIMUM OF 42" BELOW FINISHED GRADE.
3. AT RAILROAD CROSSING, THE DEPTH OF CASING BELOW GRADE SHALL BE IN ACCORDANCE WITH THE PLAN & PROFILE DWG. & SHALL NOT BE LESS THAN 5'-6" BELOW THE BASE OF RAIL.
4. CASING INSTALLED ACROSS RAILWAY RIGHTS-OF-WAY SHALL EXTEND TO THE GREATER OF THE TWO DISTANCES MEASURED AT RIGHT ANGLES TO CENTERLINE OF TRACK: MINIMUM 25' EACH SIDE FROM CENTERLINE OF OUTSIDE TRACK, OR 3' BEYOND DITCH LINE & 2' BEYOND TOE OF SLOPE.
5. ALL WORK SHALL CONFORM TO SPECIFICATIONS TE 0107 & DWG. 31001.

A	UPDATED MATERIALS	PM	WPH	WY	8/29/05	C					
-	ORIGINAL ISSUE	WDF	SAG WPH	WVT	11/29/01	B					
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

SDGE	TRANSMISSION ENGINEERING						SCALE: NONE				
	UNDERGROUND BORING DOUBLE CIRCUIT IN CASING WITH TELECOMMUNICATIONS						DWG. NO.		SHT. NO.		33017A01
							33017		1 of 2		

BILL OF MATERIAL


ITEM	QTY.	STOCK NO. OR STD. NO.	DESCRIPTION
1*	AS REQ'D.	213232	CEMENT, CLEAR, FOR PVC CONDUIT
2	1'	251584	CONDUIT, PVC, SCH. 80, 4" x 10'
3	6'	251596	CONDUIT, PVC, SCH. 80, 6" x 10'
4*	AS REQ'D.	721700	TAPE, MULE, CABLE PULLING
5	3' SP.	PER JOB PACKAGE	SPACER, 6" CONDUIT BORE
6	1'	808224	4/0 COVERED COPPER WIRE

NOTES:

1. QUANTITIES ARE BASED ON ONE FOOT OF TRENCH.
2. ITEMS IDENTIFIED WITH "*" MARK ARE INCIDENTAL MATERIALS REQUIRED FOR CONSTRUCTION BUT NOT SHOWN ON SHT. 1.

A	UPDATED MATERIALS	PM	WPH	<i>WPH</i>	8/29/05	C						
-	ORIGINAL ISSUE	WDF	SAG WPH	WVT	11/29/01	B						
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	

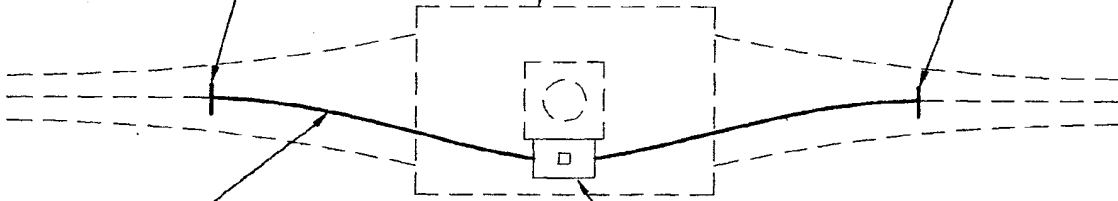
33017A02

	TRANSMISSION ENGINEERING				SCALE: NONE	
	UNDERGROUND BORING DOUBLE CIRCUIT IN CASING WITH TELECOMMUNICATIONS				DWG. NO.	SHT. NO.
					33017	2 of 2

INTERCEPT EXISTING 4" TELECOMMUNICATIONS DUCT. (W/O TRACER WIRE)

SDG&E 69kV VAULT

INTERCEPT EXISTING 4" TELECOMMUNICATIONS DUCT. (W/O TRACER WIRE)



6 5 4 1 4" CONDUIT

2 3 HBS #3313 HANDHOLE FOR TELECOMMUNICATIONS USE (USE KNOCKOUTS AT EACH END)

A						C						
-	ORIGINAL ISSUE	WDF	SAG WPH	WVT	11/29/01	B						
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	

SDGE	TRANSMISSION ENGINEERING						SCALE: NONE	
	TELECOMMUNICATION 3313 HANDHOLE						DWG. NO.	SHT. NO.
							34001	1 of 2


34001001

BILL OF MATERIAL

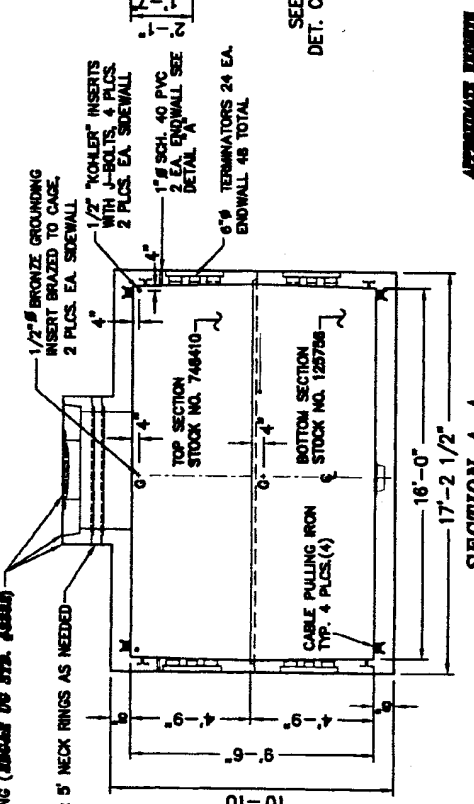
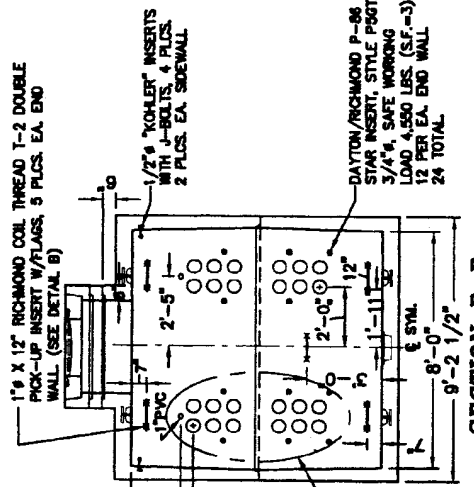
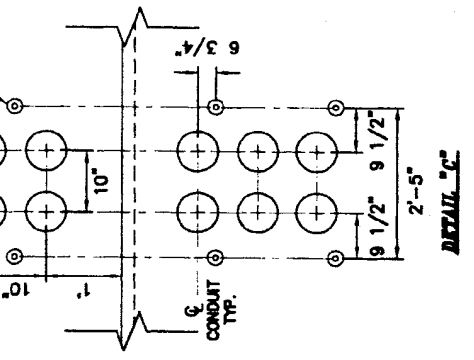
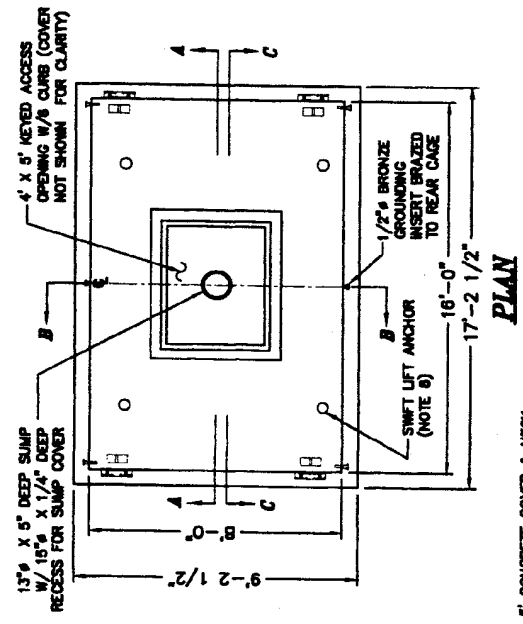
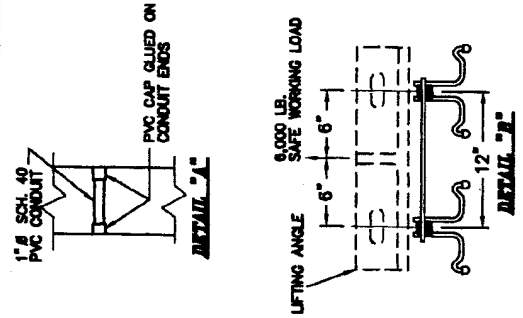
ITEM	QTY.	STOCK NO. OR STD. NO.	DESCRIPTION
1	100'	249888	CONDUIT, DB-100, 4" PVC
2	1	336368	EXTENSION SECTION, 2' x 3' x 6" HIGH
3	1	400302	HANDHOLE, W/TRAFFIC COVER, 2' x 3' x 2' HIGH
4*	AS REQ'D.	213232	CEMENT, CLEAR, FOR PVC CONDUIT
5*	AS REQ'D.	721750	TAPE-WARNING U/G CABLE TX 2417
6	100'	809200	WIRE, TRACER, 14 AWG SOL. CU, HMWPE INSULATED

NOTES:

1. QUANTITIES ARE BASED ON ONE FOOT OF TRENCH.
2. ITEMS IDENTIFIED WITH "*" MARK ARE INCIDENTAL MATERIALS REQUIRED FOR CONSTRUCTION BUT NOT SHOWN ON SHT. 1.

A												34001002
-	ORIGINAL ISSUE	WDF	SAG	WPH	WPT	11/29/01	B					
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	
		TRANSMISSION ENGINEERING							SCALE: NONE			
		TELECOMMUNICATON 3313 HANDHOLE							DWG. NO.		SHT. NO.	
									34001		2 of 2	

- STRUCTURAL NOTES:**
1. CONCRETE - 28 DAY COMPRESSIVE STRENGTH 16,000 PSI, UNLESS OTHERWISE APPROVED.
 2. REBAR - ASTM A-709 GRADE 60
 3. LOADS - HEAD-44 WHEEL LOAD W/IMPACT PER ASSHTO AND SOGMA SPEC. TE-0086.
 4. ENRM COVER 1"-8" MINIMUM TO 4"-0" MAXIMUM
- GENERAL NOTES:**
1. ALL WORK SHALL CONFORM TO SOGMA SPEC. TE-0086, SPEC. FOR PRECAST REINFORCED CONCRETE MANHOLES.
 2. VAULT CONTRACTOR TO GROUT ALL JOINTS AS REQUIRED.
 3. WALLS AND CEILING TO BE PAINTED WHITE AND COAT EXTERIOR WITH SEALER.
 4. USE FELT BETWEEN CONCRETE COVER & NECK RING.
 5. VAULT CONTRACTOR TO SUPPLY CRANE & CREW TO SET STRUCTURE.
 6. SOGMA APPROVED EQUIVALENT MAY BE USED FOR INSERTS SHOWN ON THIS DRAWING.
 7. THICKNESSES OF CONCRETE VAULTS AND SLABS ARE SHOWN FOR REFERENCE ONLY.
 8. ACTUAL THICKNESSES ARE TO BE DETERMINED BY MANHOLE SUPPLIER.
 9. LOCATIONS AND CAPACITIES OF SWIFT LIFT ANCHORS FOR THE TOP & BASE SECTIONS ARE TO BE DETERMINED BY VAULT SUPPLIER.
 10. CABLE PULLING IRONS SHALL HAVE A SAFE WORKING LOAD OF 20,000 LBS. APPLIED IN ANY DIRECTION BETWEEN 30° AND 60° FROM HORIZONTAL.



REV	BY	CHKD	DATE	APPY	DATE	CHG
B	PH	WT	6/19/07	E		
A	PH	WT	3/1/07	D		
	WDF	WT	11/29/01	C		
REV	BY	CHKD	DATE	APPY	DATE	CHG

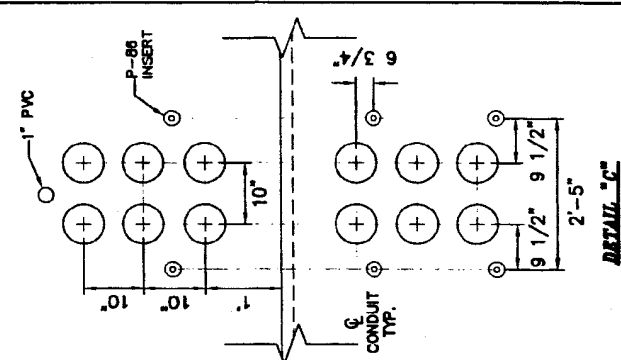
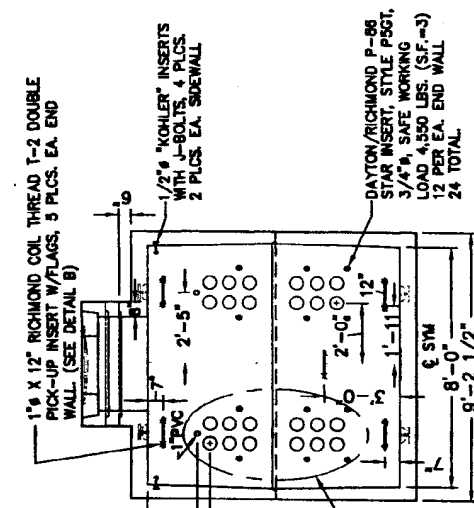
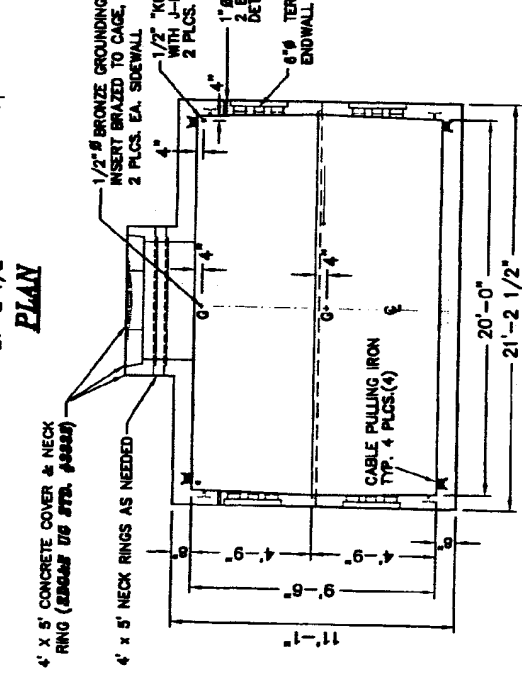
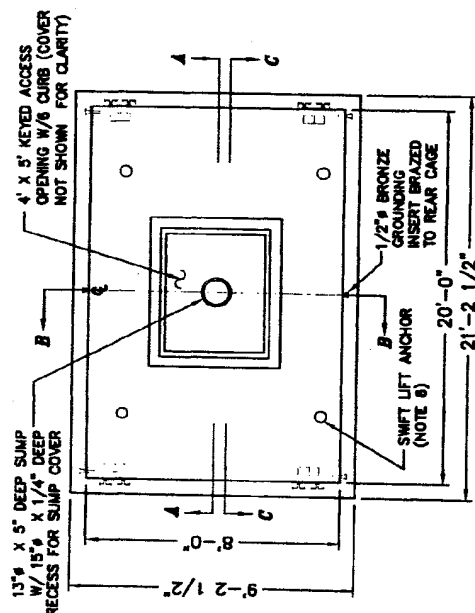
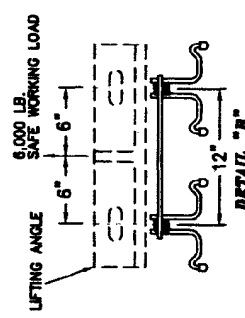
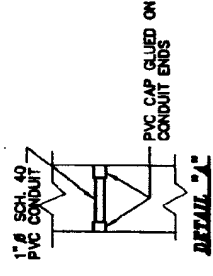
ADDED STOCK NOS., UPDATED WT.	SCALE:	NONE
UPDATED INSERTS & NOTES	DWG. NO.	34002
ORIGINAL	SHEET NO.	1 of 1
CHG	TRANSMISSION ENGINEERING	
	69KV UNDERGROUND MANHOLE	
	8' X 16' X 9'-6"	
	54022801	

STRUCTURAL NOTES:

1. CONCRETE - 28 DAY COMPRESSIVE STRENGTH $f_c = 6000$ psi
2. REBAR - ASTM A-706 GRADE 60
3. LOADS - H20 WHEEL LOAD W/IMPACT PER ASSHTO
4. EARTH COVER 1'-8" MINIMUM TO 4'-0" MAXIMUM

GENERAL NOTES:

1. ALL WORK SHALL CONFORM TO SDG&E SPEC. TE-0089, SPEC. FOR PRECAST REINFORCED CONCRETE MANHOLES.
2. VALU CONTRACTOR TO GROUT ALL JOINTS AS REQUIRED.
3. WALLS AND CEILING TO BE PAINTED WHITE AND COAT EXTERIOR WITH SEALER.
4. USE FELT BETWEEN CONCRETE COVER & NECK RING.
5. VALU CONTRACTOR TO SUPPLY CRANE & CREW TO SET STRUCTURE.
6. SDG&E APPROVED EQUIVALENT MAY BE USED FOR INSERTS SHOWN ON THIS DRAWING.
7. THICKNESSES OF CONCRETE VALUITS AND SLABS ARE SHOWN FOR REFERENCE ONLY.
8. ACTUAL THICKNESSES ARE TO BE DETERMINED BY MANHOLE SUPPLIER.
9. LOCATIONS AND CAPACITIES OF SWIFT LIFT ANCHORS FOR THE TOP & BASE SECTIONS ARE TO BE DETERMINED BY VALU SUPPLIER.
10. CABLE PULLING RINGS SHALL HAVE A SAFE WORKING LOAD OF 20,000 LBS. APPLIED IN ANY DIRECTION BETWEEN 30° AND 60° FROM HORIZONTAL.



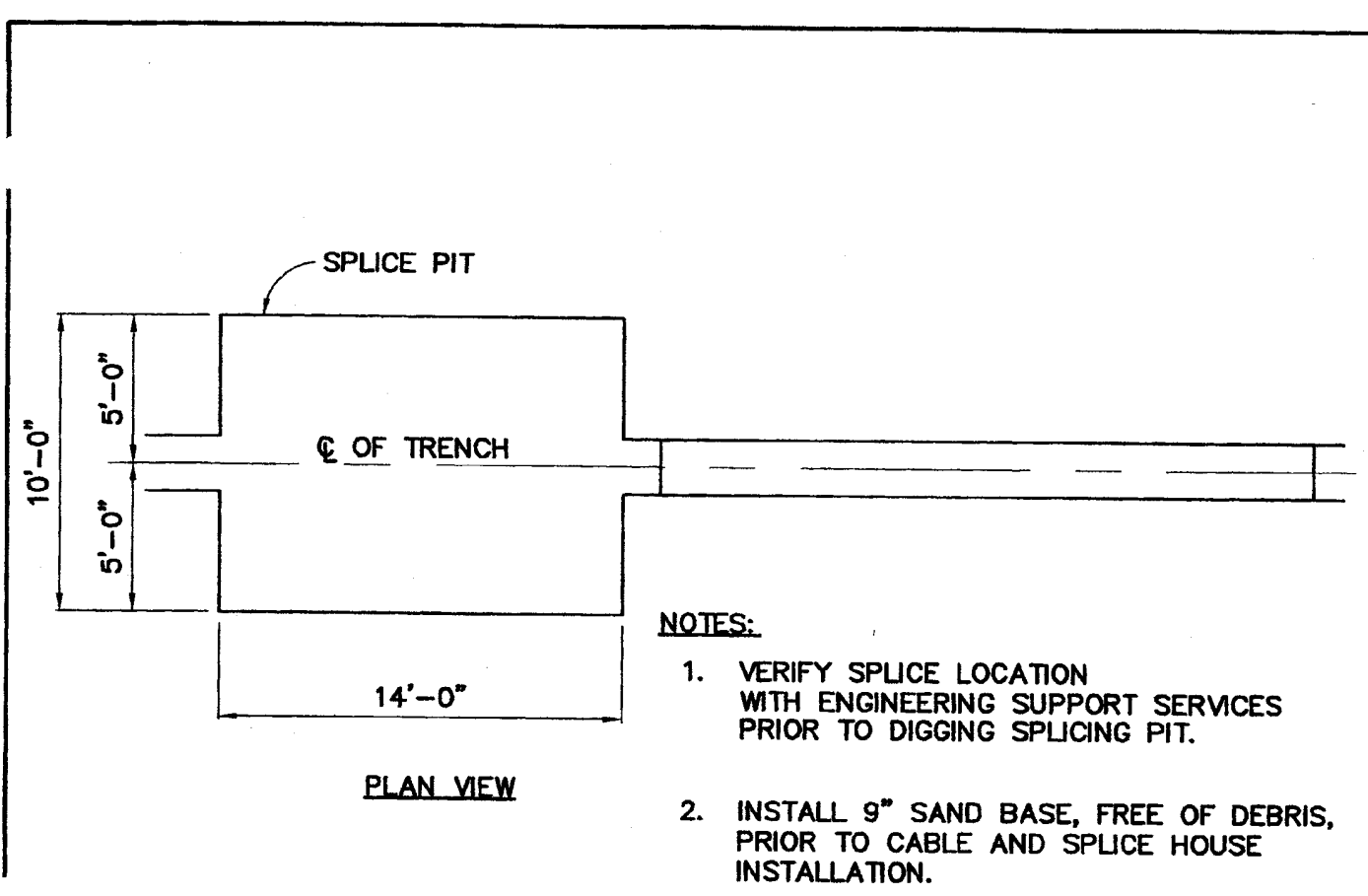
APPROXIMATE WEIGHTS
BASE - 14,850 LBS.
TOP - 42,850 LBS.

REV	BY	CHKD	APPY	DATE	REV	BY	CHKD	APPY	DATE
B					E				
A	PM	WOF	WOF	3/1/07	D				
	ORIGINAL			1/29/01	C				
	CHANGE								

SCALE:	NONE
DRG. NO.	34003
SHT. NO.	1 of 1

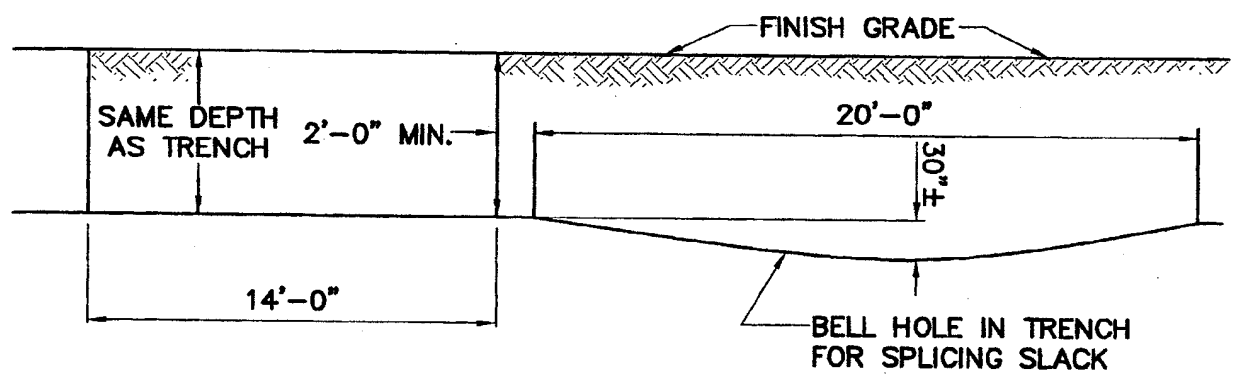
TRANSMISSION ENGINEERING
138KV UNDERGROUND MANHOLE
8' X 20' X 9'-6"

SDGE



NOTES:

1. VERIFY SPLICE LOCATION WITH ENGINEERING SUPPORT SERVICES PRIOR TO DIGGING SPLICING PIT.
2. INSTALL 9" SAND BASE, FREE OF DEBRIS, PRIOR TO CABLE AND SPLICE HOUSE INSTALLATION.

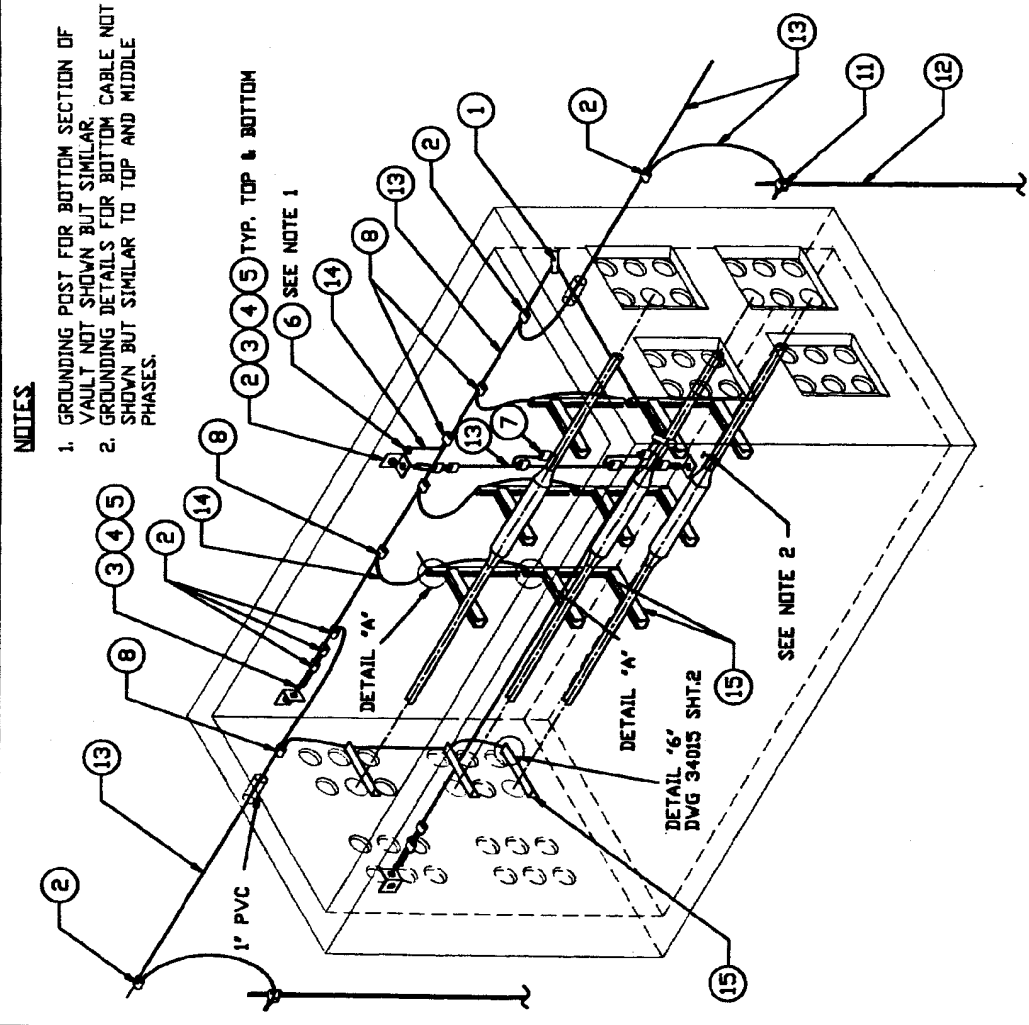


A						C						
-	ORIGINAL ISSUE	WDF	SAG WDF	DWF	1/29/01	B						
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	

SDGE	TRANSMISSION ENGINEERING						SCALE: NONE		34004001
	GENERAL ARRANGEMENT 69KV SPLICING PIT DIRECT BURIED CABLE						DWC. NO.	SHT. NO.	
							34004	1 of 1	

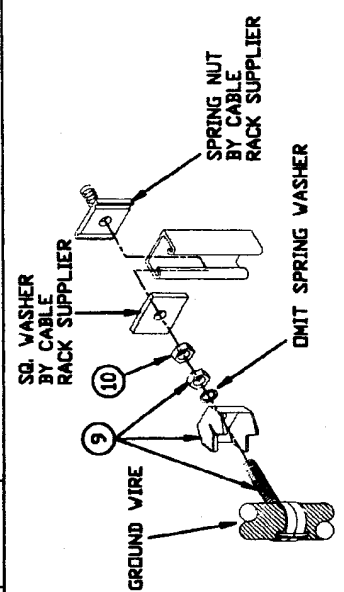
BILL OF MATERIAL

ITEM	QTY.	STOCK NO. S728 #2	DESCRIPTION
1	2	338176	EYELET, THIMBLE, 5/8", HOT-DIP GALV.
2	15	257824	CONNECTOR, COMPRESSION, COPPER, 4/0-4/0
3	4	166208	BRACKET 1/4" X 2-1/2" X 2-1/2" ANGLE
4	4	150528	BOLT, 1/2" X 6" DROP FORGED EYE BOLT, GALV.
5	4	107654	BOLT, CONCRETE ANCHOR, KB3 304 S.S., 1/2"
6	2	261222	CONNECTOR GROUNDING POST, RANGE #2-4/0, 1/2"
7	3	254176	CONNECTOR, DAM, CU, 4/0
8	7	257856	CONNECTOR, COMPRESSION, COPPER, 4/0-#2
9	6	730464	TERMINAL, GROUND, SINGLE BOLT, 1/2" CLAMP
10	6	505536	NUT, 1/2", HEX, 304 S.S.
11	2	230016	CLAMP, 5/8" GROUND ROD, COPPER
12	2	603072	ROD, 5/8" X 8FT, COPPERWELD, GROUND
13	52#	812764	WIRE, 4/0 AWG, 19 STRAND, BARE, SOFT DRAWN, CU
14	9#	812816	WIRE, #2 AWG, 7 STRAND, BARE, SOFT DRAWN, CU
15	1	34016	RACK, CABLE
16	6	204310	CAP, END SEALING, FOR CABLE

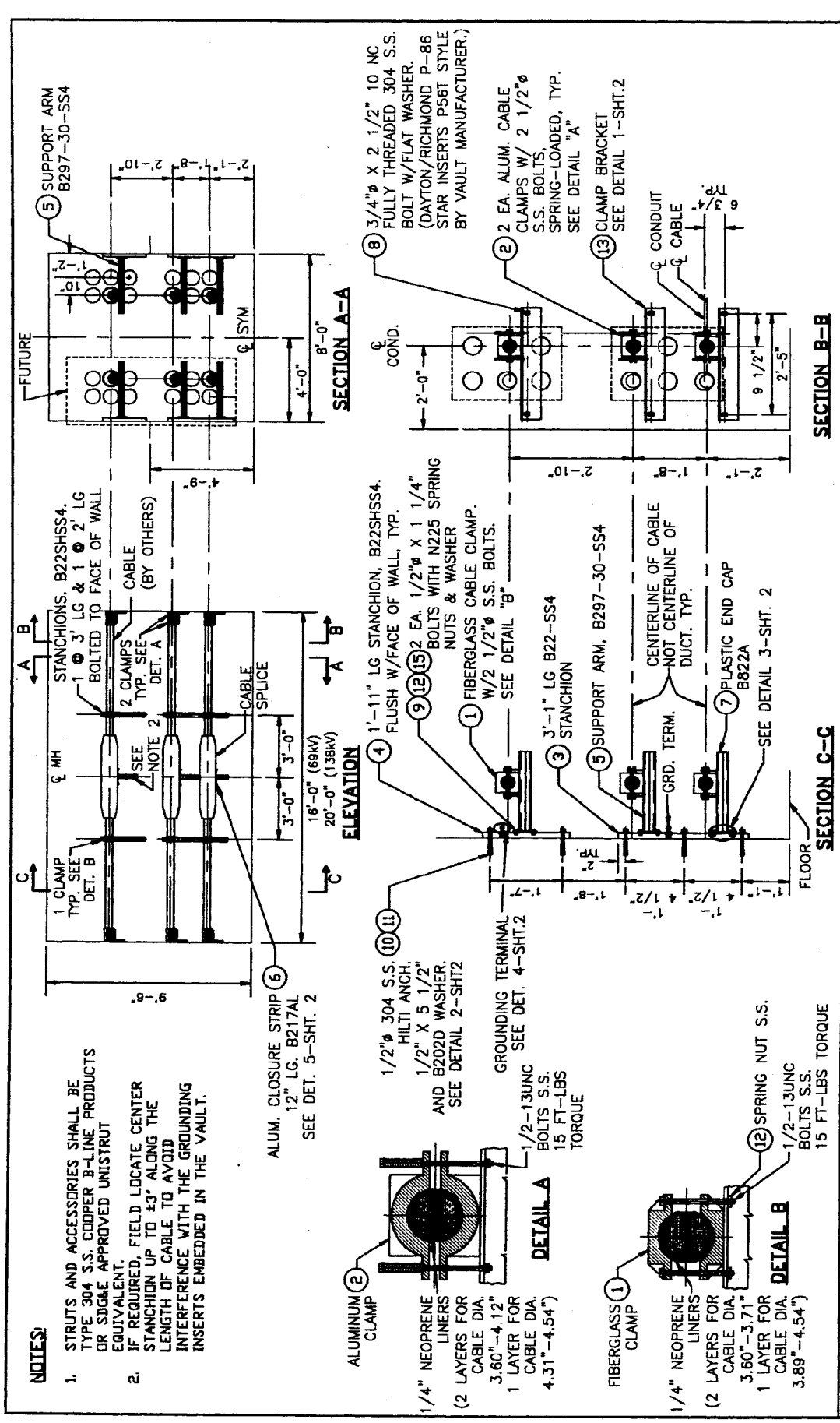


- NOTES**
- GROUNDING POST FOR BOTTOM SECTION OF VAULT NOT SHOWN BUT SIMILAR.
 - GROUNDING DETAILS FOR BOTTOM CABLE NOT SHOWN BUT SIMILAR TO TOP AND MIDDLE PHASES.

DETAIL "A"
GROUNDING TERMINAL
TYP. 12 PLCS. EA. WALL



TRANSMISSION ENGINEERING		SCALE: NONE	
69KV VAULT LAYOUT		DWG. NO. 34005	
SDGE		SHEET NO. 1 of 1	
REV	BY	DATE	APP
B	PM	3/1/07	E
A	WT	8/26/06	D
ORIGINAL	WDF	8/22/06	C
CHANGE	BY	DATE	APP



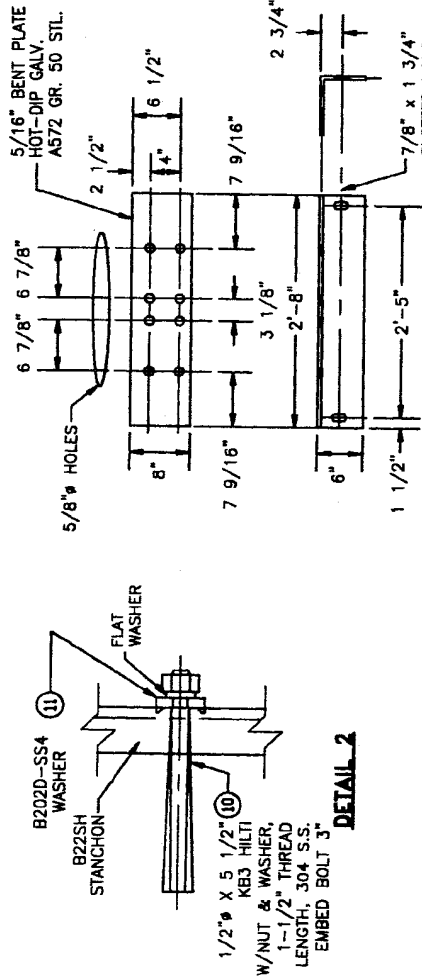
TRANSMISSION ENGINEERING		SCALE:	NONE
CABLE RACK		DWG. NO.	34015
69 KV & 138 KV		SHEET NO.	1 of 2
BY	DATE	BY	DATE
CM	7/3/07	CM	3/1/07
UPDATED ITEMS 3, 4, 13 & ADDED BOLT TORQUE		ORIGINAL	
CHANGE		CHANGE	
BY	DATE	BY	DATE
CM	7/3/07	CM	3/1/07
UPDATED ITEMS 3, 4, 13 & ADDED BOLT TORQUE		ORIGINAL	
CHANGE		CHANGE	

BILL OF MATERIAL

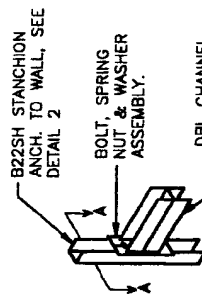
ITEM	QTY.	STOCK NO. or PART NO.	DESCRIPTION
1	6	BOLT POWER C7-000- 1076A-3	CLAMP, CABLE, FIBERGLASS W/TWO 1/2" DIA. BOLTS, 2 WASHERS, 304 S.S. AND FOUR 1/4" NEOPRENE LINERS, CABLE DIA. RANGE 3.60"-4.54"
2	12	BOLT POWER B27-1276A-3	CLAMP, CABLE, ALUMINUM, SPRING-LOADED, W/ TWO 1/2" DIA. BOLTS, 2 NUTS, 4 WASHERS, 304 S. S. AND 4 1/4" NEOPRENE LINERS, CABLE DIA. RANGE 3.60" - 4.54"
3	3	B-LINE B22SH-334	STANCHION, 3'-1" LG. 304 S.S.
4	3	B-LINE B22SH-334	STANCHION, 1'-11" LG. 304 S.S.
5	9	B-LINE B227-30- 334	ARM, DOUBLE CHANNEL, 30" LG.
6	3	B-LINE B217AL	CLOSURE STRIP, ALUM.
7	9	B-LINE B227AL	END CAP, PLASTIC
8	12	N. A.	BOLT, FULLY THREADED, 10 NC 3/4" DIA. X 2-1/2" LG W/ FLAT WASHER, 304 S. S.
9	18	N. A.	BOLT, 1/2" DIA. X 1-1/4" LG. W/ NUT AND WASHER, 304 S. S.
10	15	WELT XPS	ANCHOR, HILT KB3, 1/2" DIA. X 5-1/2" LG. W/ FLAT WASHER & NUT, 1-3/8" THREAD LENGTH, 304 S. S.
11	15	B-LINE B200B-334	WASHER, SQ., NO TWIST, 304 S. S.
12	30	B-LINE B200B-334	NUT, SPRING, 304 S. S.
13	6	N. A.	BRACKET, CLAMP, 8" X 6" X 5/16" X 2'-8" LG. BENT PLATE, A572 GR. 50 STEEL, HOT-DIP GALV., HOLE PATTERN PER DWG.
14	6	PC/STAINLESS EX-081-87	CONNECTOR, GROUNDING POST, COPPER, TIN-PLATED, 1/2" DIA.
15	18	N. A.	WASHER, FLAT, FOR 1/2" BOLT, 304 S. S.
16	6	N. A.	NUT, HEX, 1/2" 304 S. S.

NOTES:

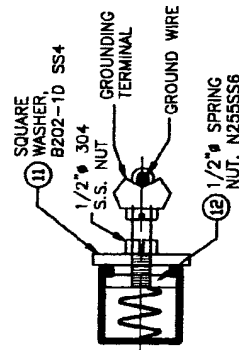
- ALL ITEMS IN THE BILL OF MATERIAL, EXCEPT CABLE CLAMPS (ITEMS 1 & 2) ARE TO BE SUPPLIED BY THE CABLE RACK SUPPLIER.
- ALL STRUTS AND ACCESSORIES SHALL BE TYPE 304 STAINLESS STEEL, UNLESS OTHERWISE NOTED.
- PART NOS LISTED IN THE BILL OF MATERIAL FOR STRUTS AND ACCESSORIES ARE BASED ON COPPER B-LINE PRODUCTS. EQUIVALENT PRODUCTS BY UNISTRUT MAY BE USED AS SUBSTITUTES.
- OBTAIN CONCURRENCE FROM CABLE SUPPLIER PRIOR TO ALL 138kV APPLICATIONS.



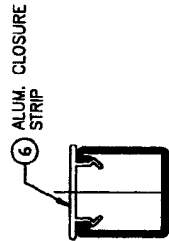
DETAIL 1



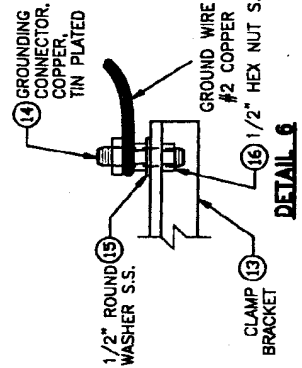
DETAIL 2



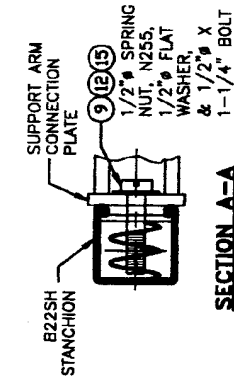
DETAIL 3



DETAIL 4



DETAIL 5



DETAIL 6

REV	DATE	BY	CHKD	APP'D	DATE	REV
B						B
A	7/3/07	PM	4cv			D
	3/1/07	PM	4cv			C

UPDATED ITEMS 3, 4, 13 & ADDED BOLT TORQUE ORIGINAL

SCALE: NONE

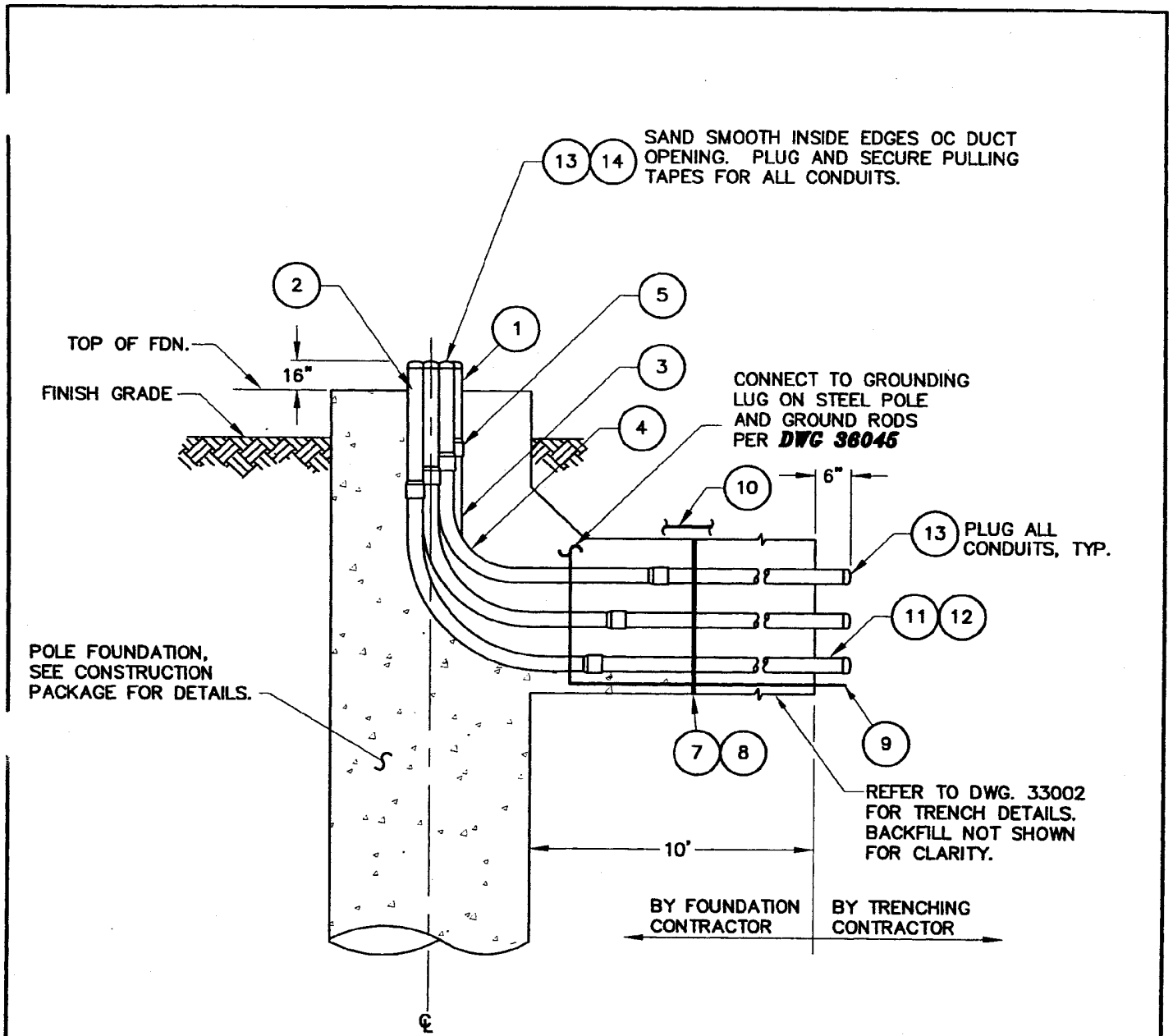
TRANSMISSION ENGINEERING

CABLE RACK

69 kV & 138 kV

DWG. NO. 34015

SERT. NO. 2 of 2

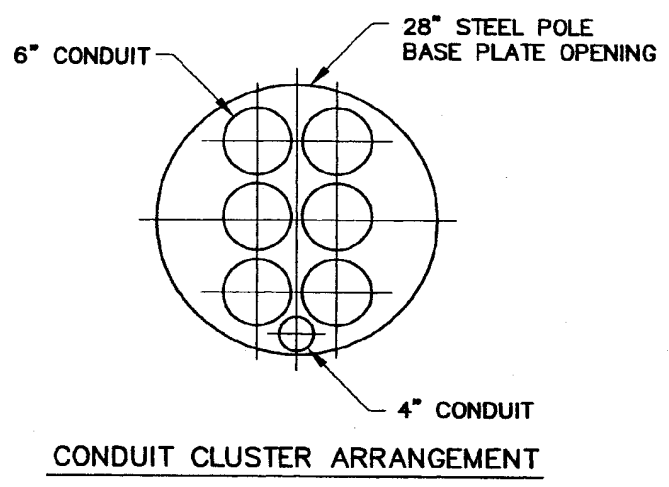
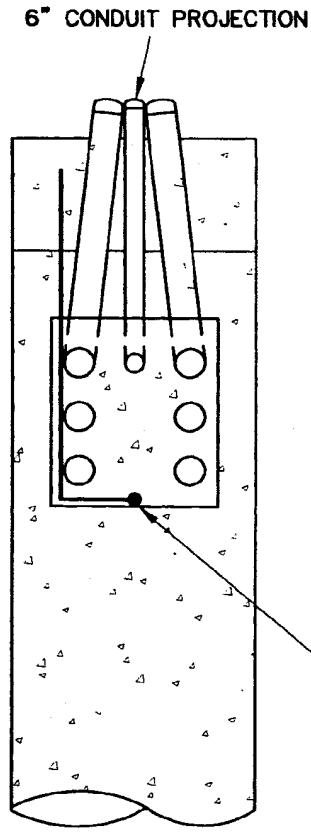


NOTE:

ALL WORK SHALL CONFORM TO SPEC. TE-107 & DWG. 31001.

A	ADDED REFERENCE	PM	WPH	WWT	2/22/05	C					
-	ORIGINAL ISSUE	WDF	SAG WPH	WWT	12/17/01	B	UPDATED MATERIALS	PM	WPH	WWT	8/29/05
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

SDGE	TRANSMISSION ENGINEERING						SCALE: NONE		35001B01
	GENERAL ARRANGEMENT STEEL CABLE POLE RISER DOUBLE CIRCUIT W/TELECOM						DWG. NO.	SHT. NO.	
							35001	1 of 3	



NOTE:
 REFERENCE JOB PACKAGE FOR PHASING DETAILS.

A	ADDED REFERENCE	PM	WPH	WVT	2/22/05	C						
-	ORIGINAL ISSUE	WDF	SAG WPH	WVT	12/17/01	B	UPDATED MATERIALS	PM	WPH	WVT	8/29/05	
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	

35001B02

SDGE	TRANSMISSION ENGINEERING	SCALE: NONE	
	GENERAL ARRANGEMENT STEEL CABLE POLE RISER DOUBLE CIRCUIT W/TELECOM	DWG. NO.	SHT. NO.
		35001	2 of 3

BILL OF MATERIAL

ITEM	QTY.	STOCK NO. OR STD. NO.	DESCRIPTION
1	10'	251584	CONDUIT, 4" X 10' SCH. 80 PVC
2	60'	251596	CONDUIT, 6" X 10' SCH. 80 PVC
3	1	322480	ELBOW, 90°, 4" SCH. 80 PVC, 36"R
4	6	366478	ELBOW, 90°, 6" SCH. 80 PVC, 72"R
5*	AS REQ'D.	280576	COUPLING, 4" SCH. 80 PVC, SWEDGED
6*	AS REQ'D.	280500	COUPLING, 6" SCH. 80 PVC, SWEDGED
7	2	663658	SPACER, BASE, FOR 6" CONDUIT, 3 UNITS, PRE-ASSEMBLED
8	4	663660	SPACER, INTERMEDIATE, FOR 6" CONDUIT, 3 UNITS, PRE-ASSEMBLED
9	30'	812764	WIRE, 4/0 BARE COPPER
10	30'	721750	TAPE-WARNING U/G CABLE TX 2417
11	10'	249710	CONDUIT, 4", PVC, DB100
12	60'	249930	CONDUIT, 6", PVC, DB100
13	12	544819	PLUG, 6"
14	2	544704	PLUG, 4"

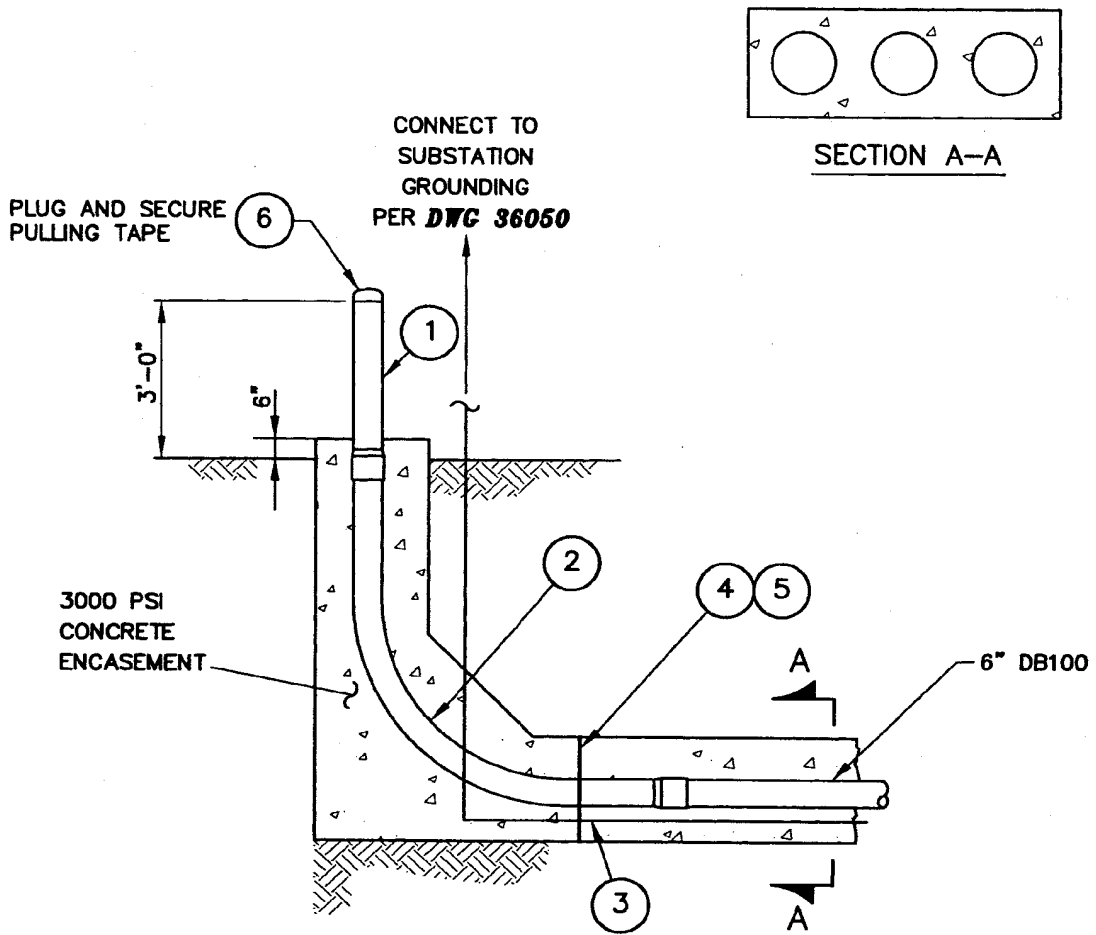
NOTES:

1. QUANTITIES ARE BASED ON ONE FOOT OF TRENCH.
2. ITEMS IDENTIFIED WITH "*" MARK ARE INCIDENTAL MATERIALS REQUIRED FOR CONSTRUCTION BUT NOT SHOWN ON SHT. 1.

A	ADDED REFERENCE	PM	WPH	WVT	2/22/05	C					
-	ORIGINAL ISSUE	WDF	SAG WPH	WVT	12/17/01	B	UPDATED MATERIALS	PM	WPH	WVT	8/29/05
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

	TRANSMISSION ENGINEERING	SCALE: NONE	
	GENERAL ARRANGEMENT STEEL CABLE POLE RISER DOUBLE CIRCUIT W/TELECOM	DWG. NO.	SHT. NO.
		35001	3 of 3

35001B03



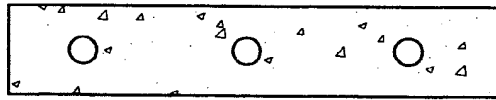
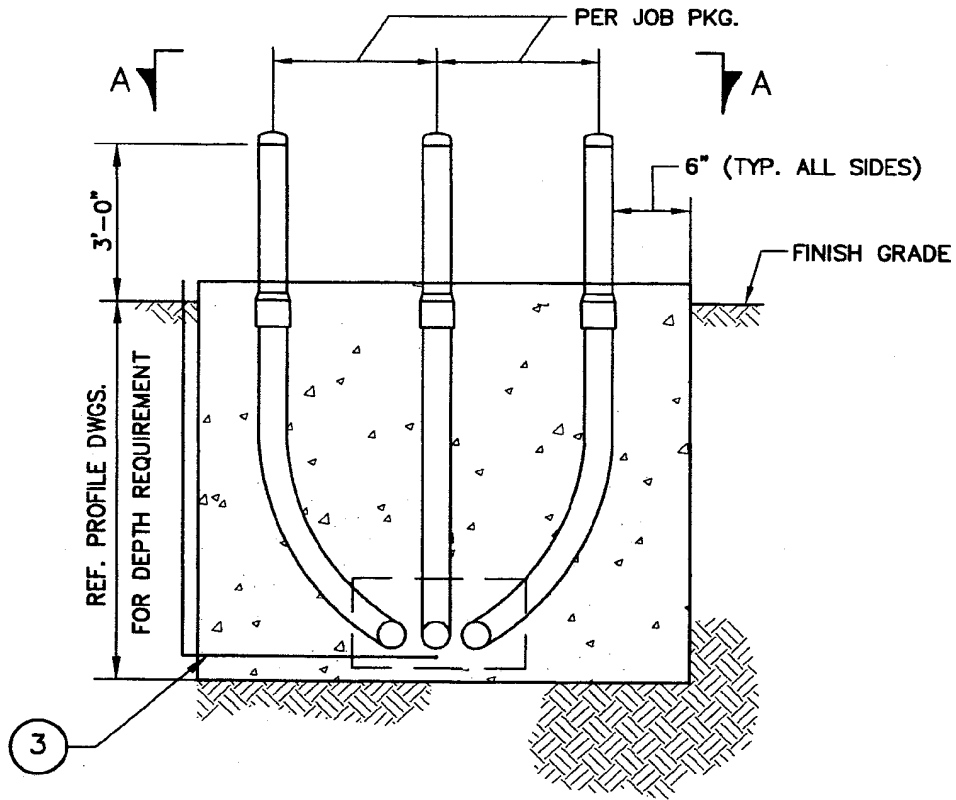
NOTES:

1. PROVIDE 6" MINIMUM ENCASEMENT FROM FACES OF CONDUIT AT RISER.
2. SEE JOB PACKAGE FOR TRENCH DETAILS.
3. ALL WORK SHALL CONFORM TO SPEC. TE-107 & DWG. 31001.

A	ADDED REFERENCE	PM	WPH	WVT	2/22/05	C					
-	ORIGINAL ISSUE	WDF	SAG WPH	WVT	12/17/01	B	UPDATED MATERIALS	PM	WPH	WVT	8/29/05
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

SDGE	TRANSMISSION ENGINEERING						SCALE: NONE	
	GENERAL ARRANGEMENT RISER AT SUBSTATION SINGLE CIRCUIT						DWG. NO.	SHT. NO.
							35002	1 of 3

35002B01



SECTION A-A

A	ADDED REFERENCE	PM	WPH	WWT	2/22/05	C					
-	ORIGINAL ISSUE	WDF	SAG WPH	WWT	12/17/01	B	UPDATED MATERIALS	PM	WPH	WWT	8/29/05
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

35002B02



TRANSMISSION ENGINEERING

GENERAL ARRANGEMENT
RISER AT SUBSTATION
SINGLE CIRCUIT

SCALE: NONE

DWG. NO.

SHT. NO.


35002

2 of 3

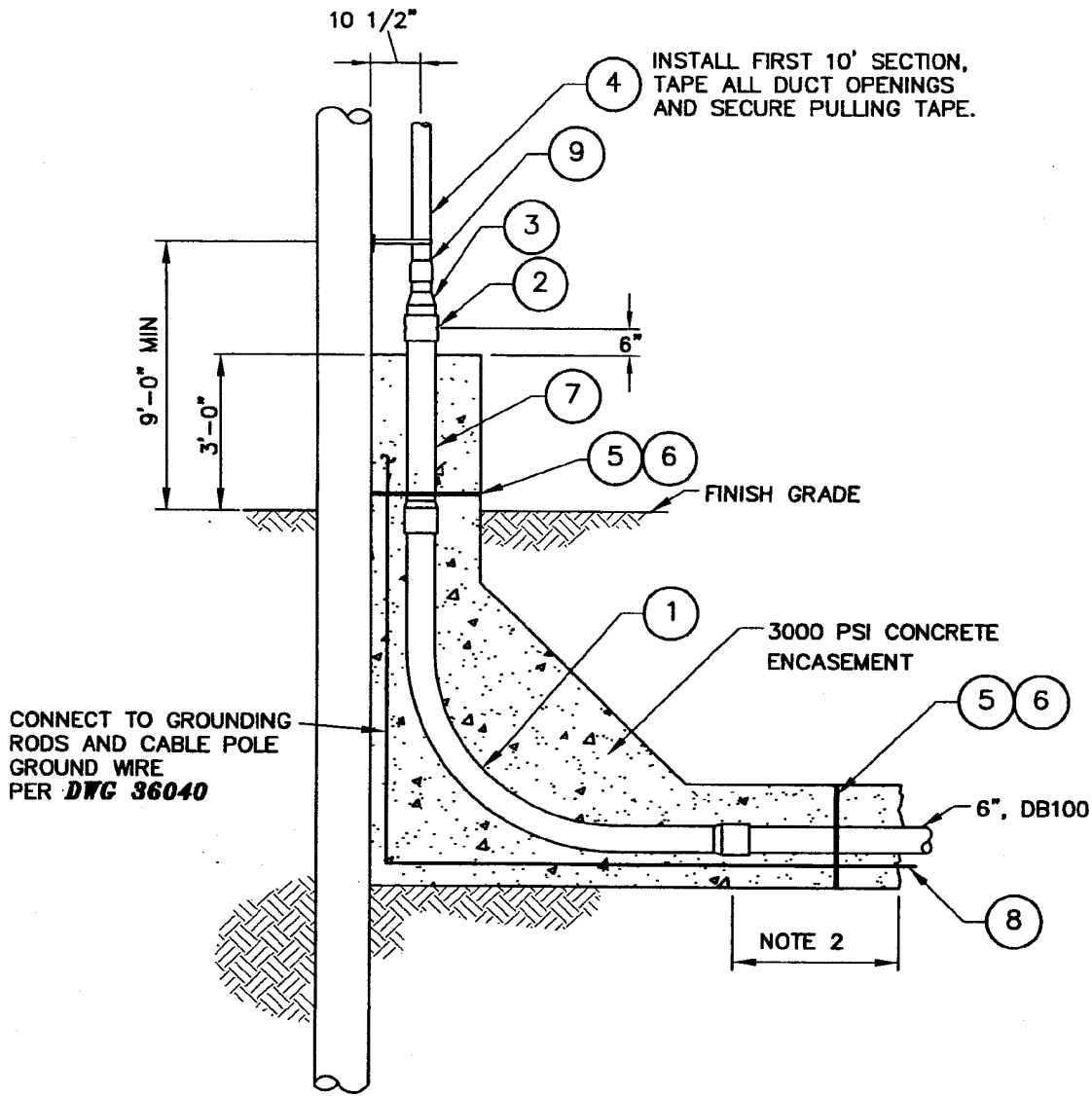
BILL OF MATERIAL

ITEM	QTY.	STOCK NO. OR STD. NO.	DESCRIPTION
1	30'	251596	CONDUIT, 6" X 10' SCH. 80 PVC
2	3	366478	ELBOW, 90°, 6" SCH. 80 PVC, 72"R
3	20'	812764	WIRE, 4/0 BARE COPPER
4	1	663658	SPACER, BASE, 3 UNITS, PRE-ASSEM.
5	1	663660	SPACER, INTERM., 3 UNITS, PRE-ASSEM.
6	3	544816	PLUG, 6"

A	ADDED REFERENCE	PM	WPH	WVT	2/22/05	C					
-	ORIGINAL ISSUE	WDF	SAG WPH	WVT	12/17/01	B	UPDATED MATERIALS	PM	WPH	<i>WVT</i>	8/29/05
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

	TRANSMISSION ENGINEERING	SCALE: NONE	
	GENERAL ARRANGEMENT RISER AT SUBSTATION SINGLE CIRCUIT	DWG. NO.	SHT. NO.
		35002	3 of 3

35002B03



NOTES:

1. PROVIDE 6 IN. MINIMUM ENCASEMENT FROM FACE OF CONDUIT IN RISER.
2. FOR DIRECT BURIED CABLES, EXTEND CONDUIT & ENCASEMENT 5' BEYOND END OF ELBOW.
3. REFER TO JOB PACKAGE FOR TRENCH DETAILS.
4. ALL WORK SHALL CONFORM TO SPEC. TE-107 & DWG. 31001.

A	ADDED REFERENCE	PM	WPH	WVT	2/22/05	C					
-	ORIGINAL ISSUE	WDF	SAG WPH	WVT	12/12/01	B	UPDATED MATERIALS	PM	WPH	WVT	8/29/05
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE



TRANSMISSION ENGINEERING

**GENERAL ARRANGEMENT
WOOD CABLE POLE RISER
SINGLE CIRCUIT**

SCALE: NONE

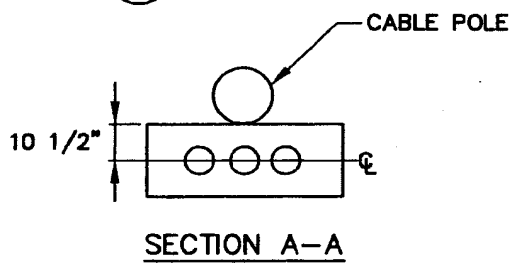
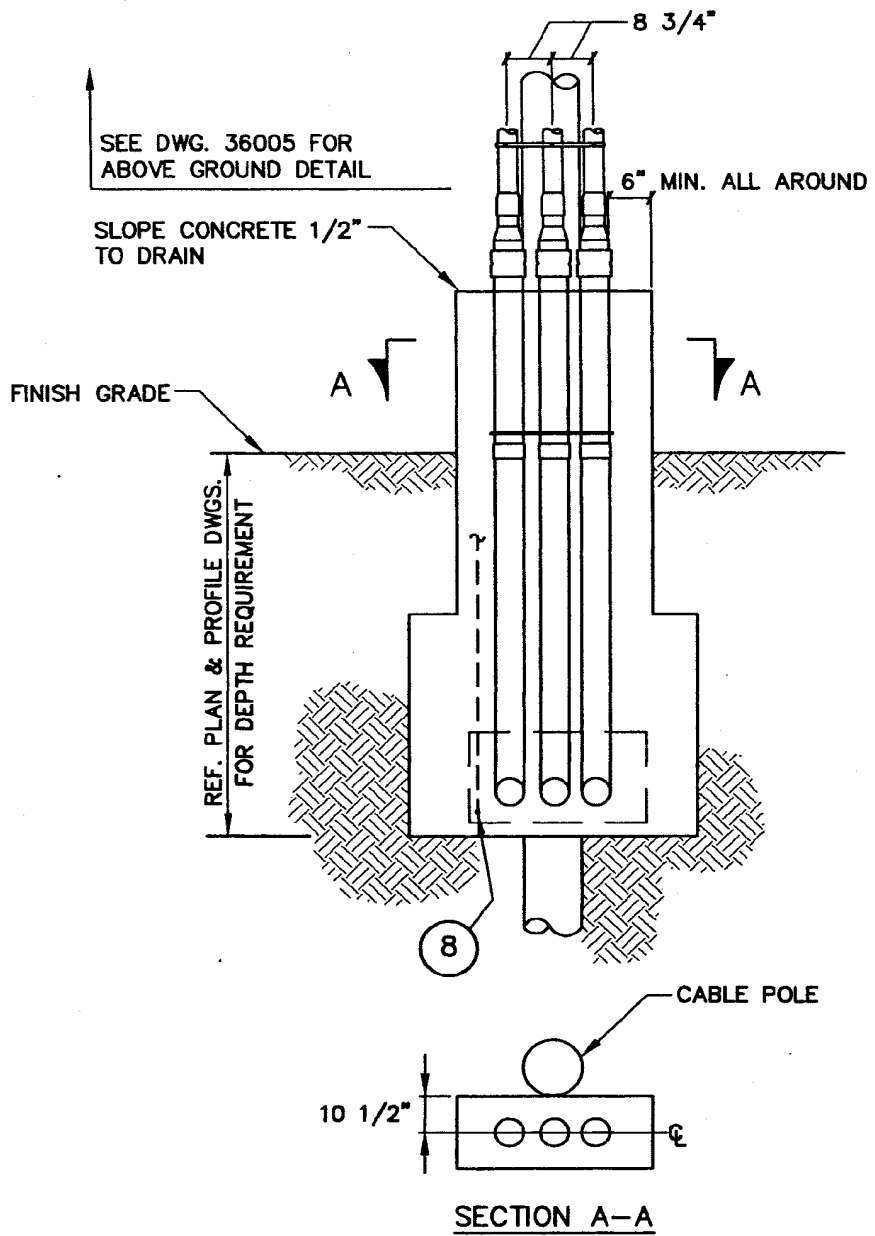
DWG. NO.

SHT. NO.

35003

1 of 3

35003B01



A	ADDED REFERENCE	PM	WPH	WWT	2/22/05	C						
-	ORIGINAL ISSUE	WDF	SAG WPH	WWT	12/12/01	B	UPDATED MATERIALS	PM	WPH	WWT	8/29/05	
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	

35003B02



TRANSMISSION ENGINEERING
GENERAL ARRANGEMENT
WOOD CABLE POLE RISER
SINGLE CIRCUIT

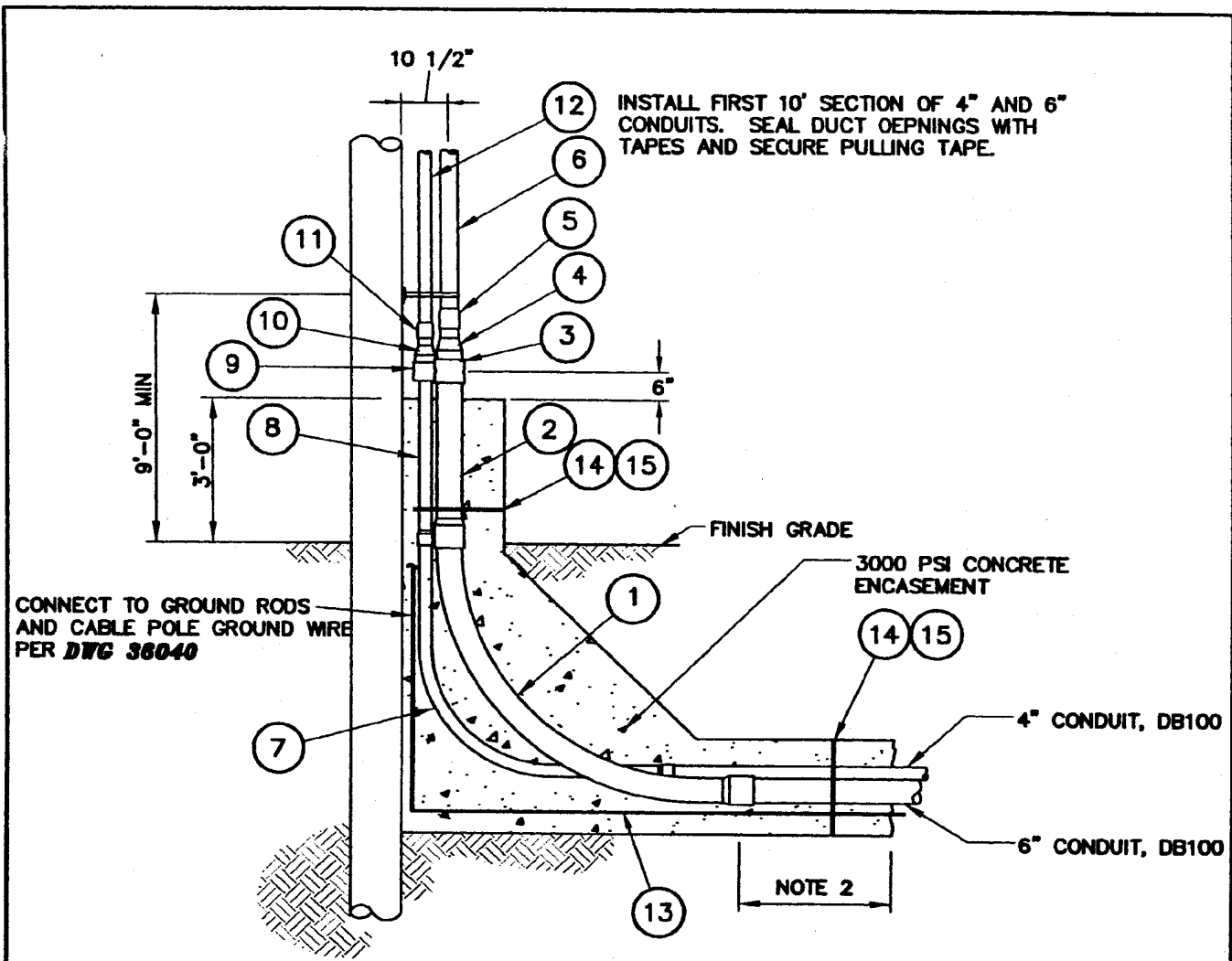
SCALE: NONE	
DWG. NO.	SHT. NO.
35003	2 of 3

BILL OF MATERIAL

ITEM	QTY	STOCK NO. OR STD. NO.	DESCRIPTION
1	3	366478	ELBOW, 90°, 6" SCH. 80 PVC, 72"R
2	3	280070	COUPLING, 6" SCH. 80 PVC, SWEDGED
3	3	573388	REDUCER, 6" x 5" SCH. 80 PVC, SPIGOT TO SPIGOT
4	30'	251592	CONDUIT, 5" X 10' SCH. 80 PVC
5	2	663662	SPACER, INTERMEDIATE, FOR 6" CONDUIT, 3 UNITS, PRE-ASSEMBLED
6	2	663658	SPACER, BASE, FOR 6" CONDUIT, 3 UNITS, PRE-ASSEMBLED
7	30'	251596	CONDUIT, 6" X 10' SCH. 80 PVC
8	20'	812764	WIRE, 4/O BARE COPPER
9	3	280592	COUPLING, 5", SCH. 80, PVC, SWEDGED

A	ADDED REFERENCE	PM	WPH	WVT	2/22/05	C					
-	ORIGINAL ISSUE	WDF	SAG WPH	WVT	12/12/01	B	UPDATED MATERIALS	PM	WPH	WVT	8/29/05
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

	TRANSMISSION ENGINEERING	SCALE: NONE		35003B03
	GENERAL ARRANGEMENT WOOD CABLE POLE RISER SINGLE CIRCUIT	DWG. NO.	SHT. NO.	
		35003	3 of 3	

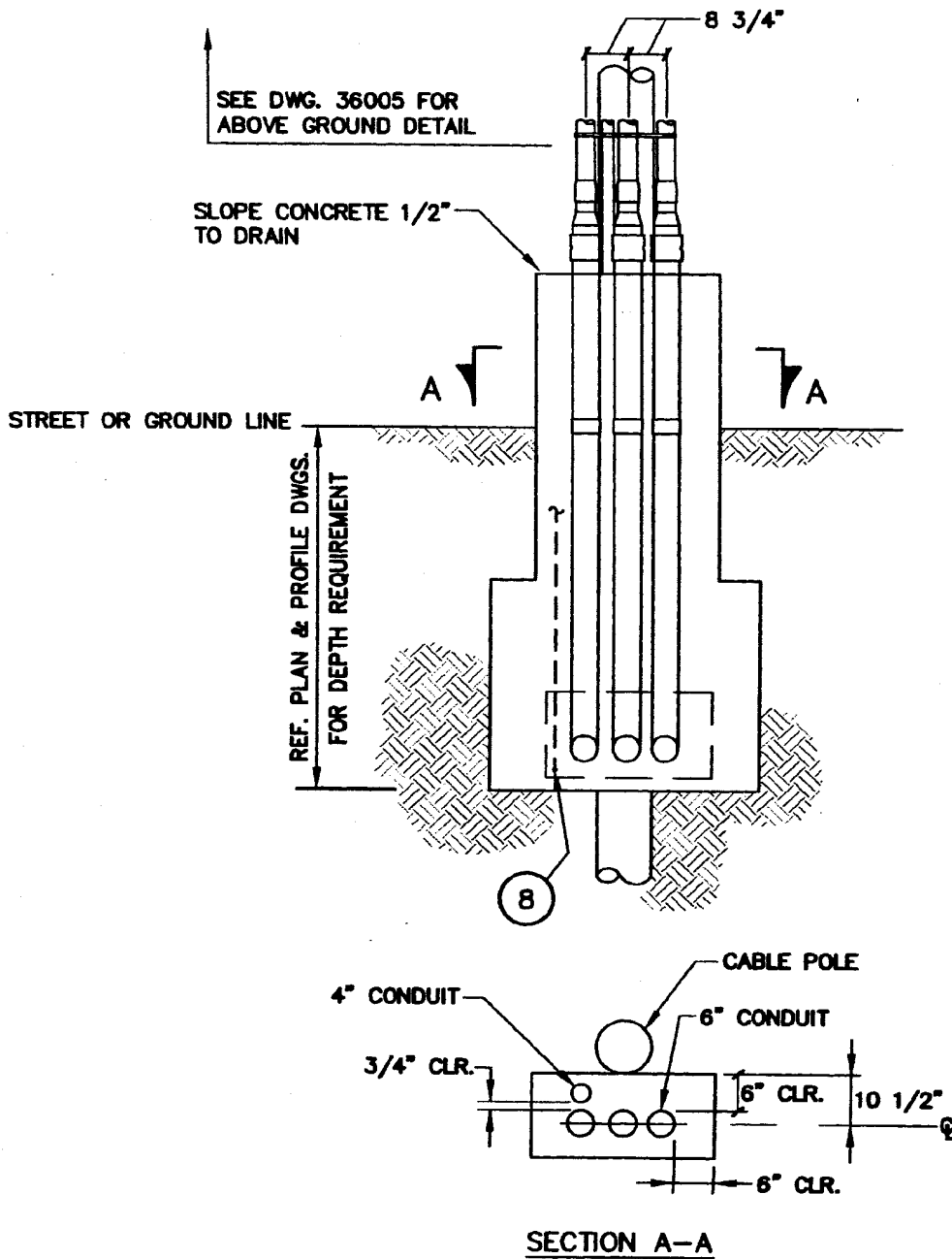


NOTES:

1. PROVIDE 6 IN. MINIMUM ENCASEMENT AROUND 6" CONDUITS IN RISER.
2. FOR DIRECT BURIED CABLES, EXTEND CONDUIT & ENCASEMENT 5' BEYOND END OF ELBOW.
3. REFER TO JOB PACKAGE FOR TRENCH DETAILS.
4. ALL WORK SHALL CONFORM TO SPEC. TE-107 & DWG. 31001.

B	UPDATED MATERIALS	PM	WPH	WVT	8/29/05	E					
A	ADDED REFERENCE	PM	WPH	WVT	2/22/05	D					
	ORIGINAL	WDF	SAC WPH	WVT	12/12/01	C	UPDATED QTY ITEM 12	PM	WPH	3/1/07	
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

TRANSMISSION ENGINEERING		SCALE: NONE	
	GENERAL ARRANGEMENT		35004C01
	WOOD CABLE POLE RISER		
SINGLE CIRCUIT W/TELECOM		DWG. NO.	SHT. NO.
		35004	1 of 3




B	UPDATED MATERIALS	PM	WPH	WWT	8/29/05	E					
A	ADDED REFERENCE	PM	WPH	WWT	2/22/05	D					
	ORIGINAL	WDF	SAG WPH	WWT	12/12/01	C	UPDATED QTY ITEM 12	PM	WPH	<i>WPH</i>	3/1/07
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

TRANSMISSION ENGINEERING							SCALE: NONE		35004C02
SDGE	GENERAL ARRANGEMENT WOOD CABLE POLE RISER SINGLE CIRCUIT W/TELECOM						DWG. NO.	SHT. NO.	
							35004	2 of 3	

BILL OF MATERIAL

ITEM	QTY	STOCK NO. OR STD. NO.	DESCRIPTION
1	3	366478	ELBOW, 90°, 6" SCH. 80 PVC, 72"R
2	30'	251596	CONDUIT, 6" X 10' SCH. 80 PVC
3	3	280070	COUPLING, 6" SCH. 80 PVC, SWEDGED
4	3	573388	REDUCER, 6" x 5" SCH. 80 PVC, SPIGOT TO SPIGOT
5	3	280592	COUPLING, 5", SCH. 80, PVC, SWEDGED
6	30'	251592	CONDUIT, 5" X 10' SCH. 80 PVC
7	1	322480	ELBOW, 90°, 4" SCH. 80 PVC, 36"R
8	1	251584	CONDUIT, 4" X 10' SCH. 80 PVC
9	1	280576	COUPLING, 4" SCH. 80 PVC, SWEDGED
10	1	573408	REDUCER, 4" x 3" SCH. 80 PVC, SPIGOT TO SPIGOT
11	1	280448	COUPLING, 3", SCH. 40, PVC, SWEDGED
12	30'	249858	CONDUIT, 3" X 10' SCH. 80 PVC
13	20'	812764	WIRE, 4/0 BARE COPPER
14	3	663660	SPACER, INTERMEDIATE, FOR 6" CONDUIT, 3 UNITS, PRE-ASSEMBLED
15	2	663658	SPACER, BASE, FOR 6" CONDUIT, 3 UNITS, PRE-ASSEMBLED

B	UPDATED MATERIALS	PM	WPH	WVT	8/29/05	E					
A	ADDED REFERENCE	PM	WPH	WVT	2/22/05	D					
	ORIGINAL	WDF	SAG WPH	WVT	12/12/01	C	UPDATED QTY ITEM 12	PM	WPH	3/1/07	
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE

TRANSMISSION ENGINEERING							SCALE: NONE		35004C03
	GENERAL ARRANGEMENT WOOD CABLE POLE RISER SINGLE CIRCUIT W/TELECOM						DWG. NO.	SHT. NO.	
							35004	3 of 3	

BILL OF MATERIAL

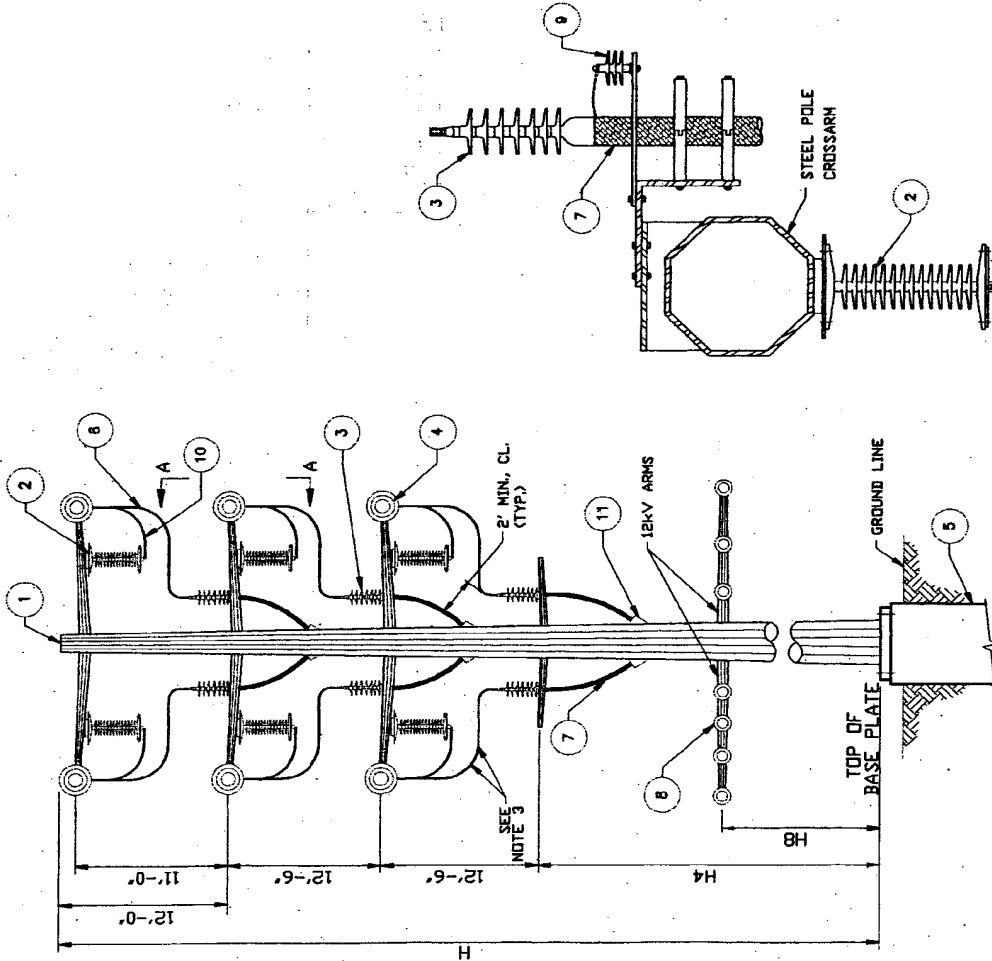
ITEM	QTY.	STOCK NO. OR STD. NO.	DESCRIPTION
1	1	96205, SHT. 2	STEEL CABLE POLE
2	3 PER CIRCUIT	99010	ARRESTER, 69KV LIGHTNING
3	3 PER CIRCUIT	99005	TERMINATOR, 69KV
4	AS REQ'D	19240	69KV DEADEND INSULATOR ASSEMBLY
5	1	REF. JOB. PACKAGE	FOUNDATION
6	AS REQ'D	99005	WIRE, 750 MCM B.S. CU., B.S.
7	AS REQ'D	REF. JOB PACKAGE	CABLE, 69KV UNDERGROUND
8	AS REQ'D	REF. JOB PACKAGE	12KV DEADEND INSULATOR ASSEMBLY
9	3 PER CIRCUIT	99006	3KV SURGE VOLTAGE LIMITER
10	AS REQ'D	99010	WIRE, 4/0 CU., B.S.
11	3 PER CIRCUIT	392414	GRIP, CABLE SUPPORT, HOOKED ENDS

STEEL CABLE POLE DESIGNATIONS

POLE DESIGNATION	VOLTAGE	POLE HEIGHT (H)	TERMINATOR ARM ATTACH. HT. (H4)	12KV ATTACH. HT. (H8)	FIBER OPTIC ATTACH. HT. (H7)
69SCP-X-83	69KV	83'	46'	31'	25'
69SCP-X-103	69KV	103'	66'	51'	35'

- X - N - NO 12KV ARMS
 A - WITH 12KV ARMS
 V - WITH VANGS ONLY FOR 12KV ARMS
 EXAMPLE: 69SCP-A-83 DENOTES AN 83' 69KV STEEL CABLE POLE WITH 12KV ARMS.

- NOTES:**
1. THE CABLE POLE IS DESIGNED TO ACCOMMODATE DOUBLE CIRCUIT INSTALLATION. REFER TO THE SPECIFIC JOB PACKAGE FOR THE NUMBER OF CIRCUITS TO BE INSTALLED.
 2. REFER TO SHEET 2 FOR H7.
 3. THE PATH FROM OH CONDUCTOR TO ARRESTOR MUST BE SHORTER THAN THE PATH FROM OH CONDUCTOR TO TERMINATOR.



ELEVATION A-A

ELEVATION

REV	CHANGE	BY	CHKD	APPT	DATE	REV	CHANGE	BY	CHKD	APPT	DATE
B						E					
A	ADDED NOTE 3 ON SHEET 1	PH	WPH	10/1/18/05	D						
-	ORIGINAL ISSUE	VDF	SAC	WVT	3/20/02	C					

TRANSMISSION ENGINEERING



**69KV STEEL CABLE POLE
GENERAL ARRANGEMENT**

SCALE: NONE

DWG. NO.

35205

SHT. NO.

1 of 6

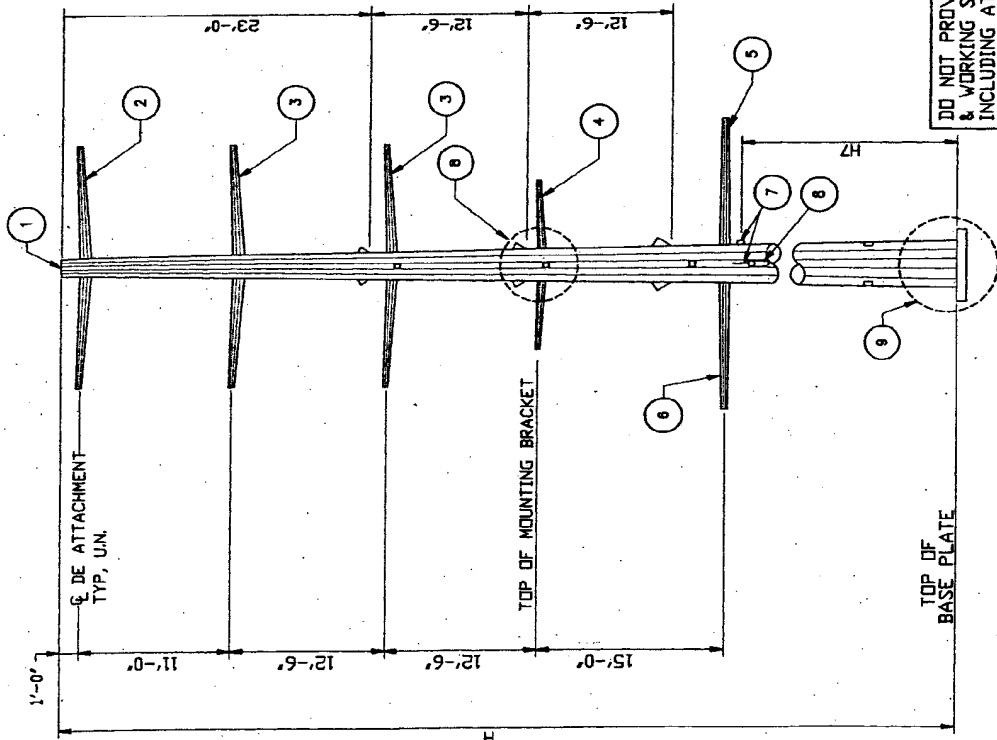
BILL OF MATERIAL

ITEM	QTY.	STOCK NO. OR STD. NO.	DESCRIPTION
1	1	SEE NOTES	POLE SHAFT
2	2	36206, SHT. 3	LIGHTING ARRESTOR MOUNTING ARM
3	4	36206, SHT. 4	LIGHTING ARRESTOR & TERMINATOR MOUNTING ARM
4	2	36206, SHT. 5	TERMINATOR MOUNTING ARM
5	1	17160, SHT. 1	D10 12KV STEEL ARM (SEE NOTE 5)
6	1	17150, SHT. 1	E10 12KV STEEL ARM (SEE NOTE 5)
7	3	36206, SHT. 6	FIBER OPTIC ATTACHMENT VANG (3 @ 90°)
8	---	36206, SHT. 8	HANDHOLE/RISE DETAIL
9	---	36206, SHT. 6	BASE PLATE/HANDHOLE DETAIL

NOTES:

- ALL WORK SHALL CONFORM TO THE LATEST REVISION OF SDGE SPECIFICATION TE-0042.
- THE FOLLOWING ARE THE BASIC DESIGN PARAMETERS. REFER TO LOAD TREE DWGS. IN JOB PACKAGE FOR DESIGN LOAD REQUIREMENTS.
 - WIND SPAN: LA = 750' LB = 0'
 - WEIGHT SPAN: LA = 1000' LB = 0'
 - DESIGN LINE ANGLE: TERMINAL DEADEND, 90° ±5° U. N.
 - 69KV CONDUCTOR: 1-1033.5 ACSR/AV PER PHASE
 - 69KV LINE TENSION: 4,000 LBS/CONDUCTOR MAX.
 - 12KV CONDUCTOR: 1-636 ACSR/AV PER PHASE
 - 12KV LINE TENSION: 3,000 LBS/CONDUCTOR MAX.
 - CABLE PULLING TENSION: 3,000 LBS MAX.
- REFERENCE THE FOLLOWING DRAWINGS FOR STEEL POLE DETAILS

DRAWING NO.	TITLE
17100	STEEL POLE GENERAL NOTES
17101	STEEL POLE SHAFT
17105	STEEL POLE CLIMBING & WORKING STEPS & SAFETY LOOP ORIENTATION
17130	STEEL POLE YELLOW WARNING MARK



DO NOT PROVIDE CLIMBING & WORKING STEPS, INCLUDING ATTACHMENT LUGS, FOR 69KV STEEL CABLE POLES.

ELEVATION

REV	BY	CHECK	APPY	DATE	REV	BY	CHECK	APPY	DATE
A	WDF	WPH		2/18/05	D				
-	WDF	WPH		3/20/02	C				

TRANSMISSION ENGINEERING

**69KV STEEL CABLE POLE
STEEL POLE ARRANGEMENT**



SCALE: NONE

DWG. NO.

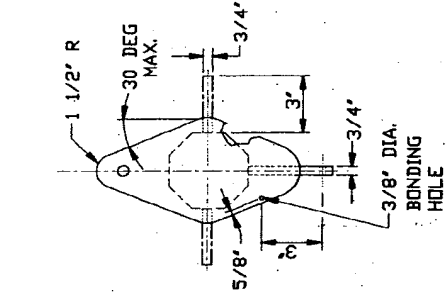
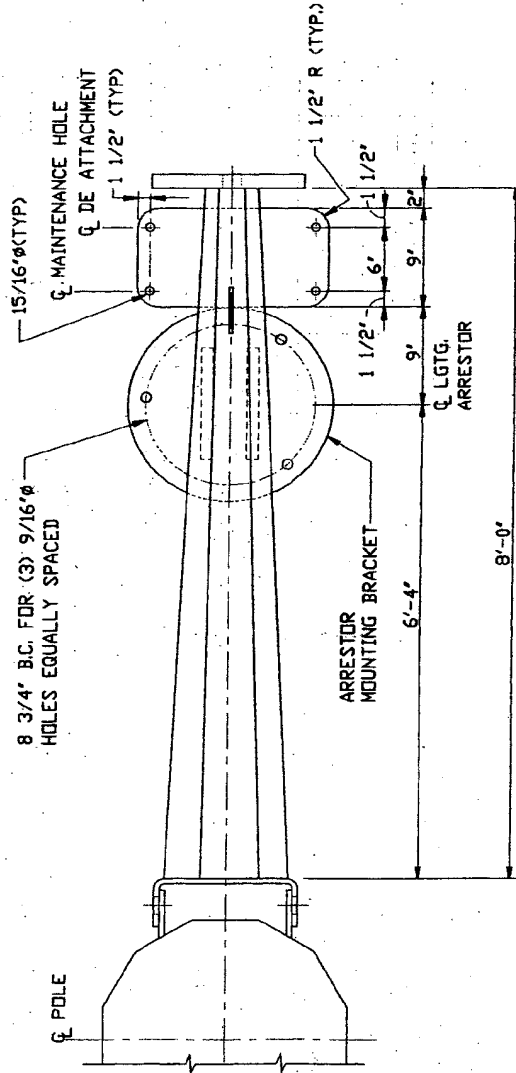
35205

SHT. NO.

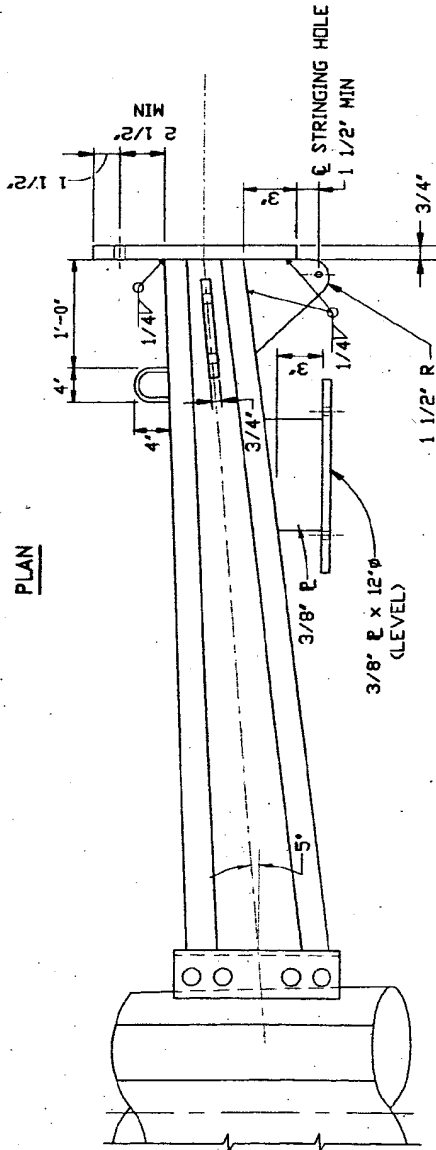
2 of 6

NOTES:

1. ALL HOLES SHALL BE 15/16" DIAMETER AND SHALL HAVE 1/8" CHAMFER ON EDGES UNLESS NOTED OTHERWISE.
2. PLATE THICKNESS SHOWN ARE MINIMUM REQUIREMENTS. POLE SUPPLIER IS RESPONSIBLE FOR FINAL DESIGN AND SIZING OF ALL DETAILS.
3. OPPOSITE ARM IS SYMMETRICAL TO Q OF POLE.
4. DESIGN LOADS FOR THE D.E. ATTACHMENT HOLE AND MAINTENANCE HOLE ARE IDENTICAL BUT ONLY ONE SET OF DESIGN LOADS IS APPLICABLE AT A GIVEN TIME.

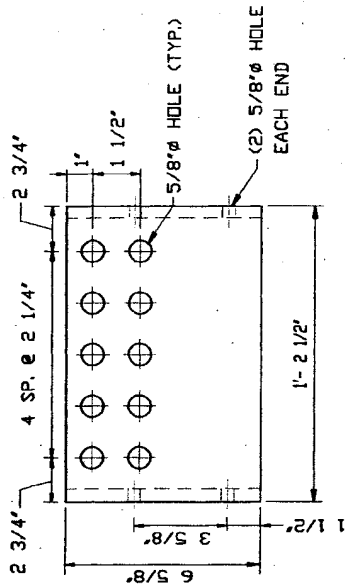


FRONT VIEW



ELEVATION

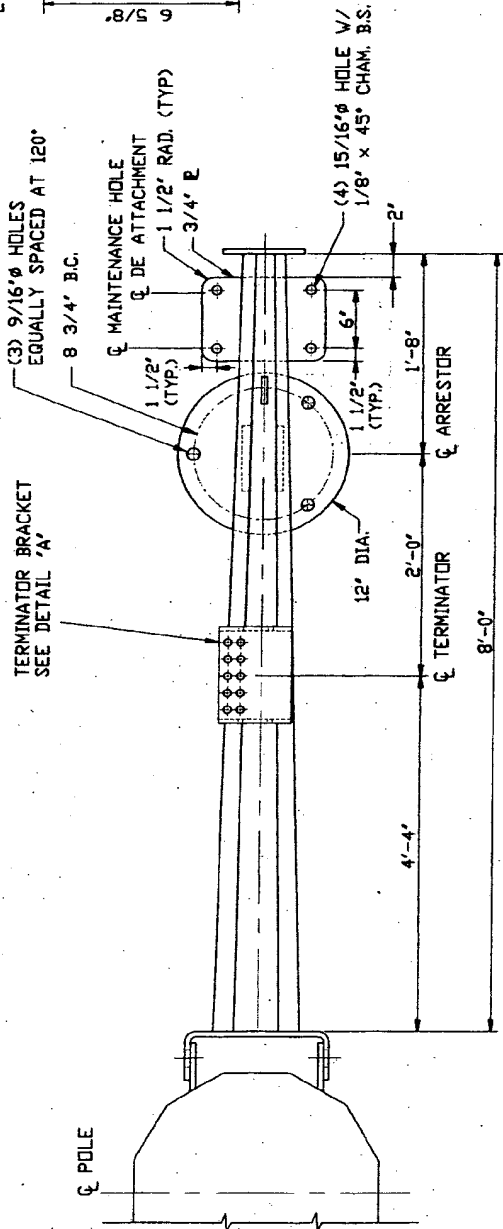
SDGE		TRANSMISSION ENGINEERING		SCALE: NONE	DWG. NO. 35205	SHT. NO. 3 of 6
69KV STEEL CABLE POLE LIGHTNING ARRESTOR MOUNTING ARM						
REV	BY	CHKD	APPY	DATE	CHANGE	
A	WPH	AV		1/18/05	D	
	VDF	VVT		3/20/02	C	
B	ADDED NOTE 3 ON SHEET 1					
	ORIGINAL ISSUE					
	CHANGE					



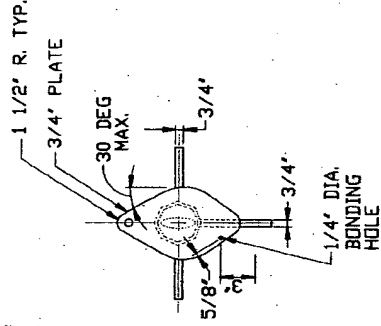
DETAIL "A"

NOTES:

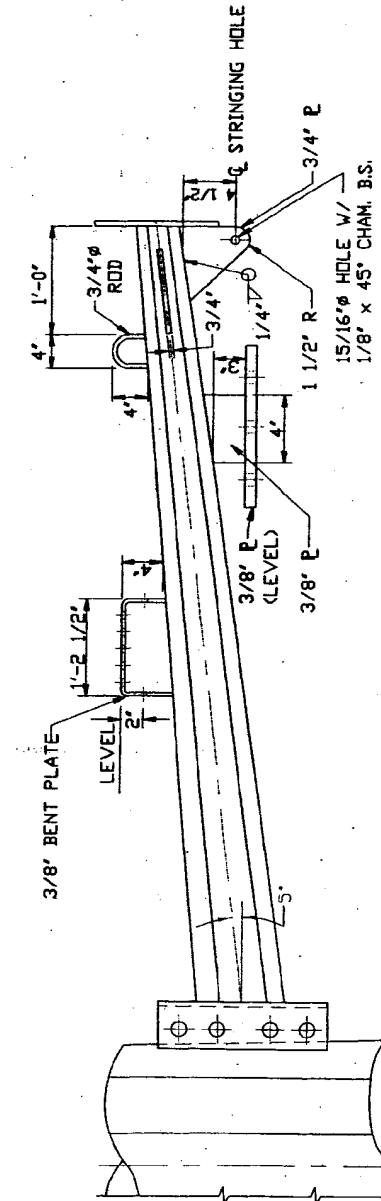
1. ALL HOLES SHALL BE 15/16" DIAMETER AND SHALL HAVE 1/8" CHAMFER ON EDGES UNLESS NOTED OTHERWISE.
2. PLATE THICKNESS SHOWN ARE MINIMUM REQUIREMENTS. POLE SUPPLIER IS RESPONSIBLE FOR FINAL DESIGN AND SIZING OF ALL DETAILS.
3. OPPOSITE ARM IS SYMMETRICAL ABOUT C OF POLE.



PLAN

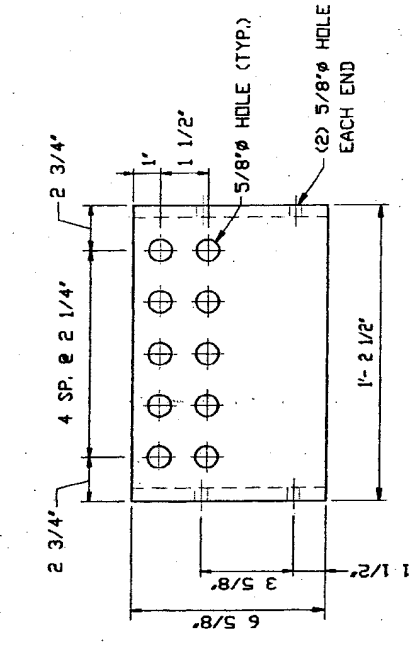


FRONT VIEW

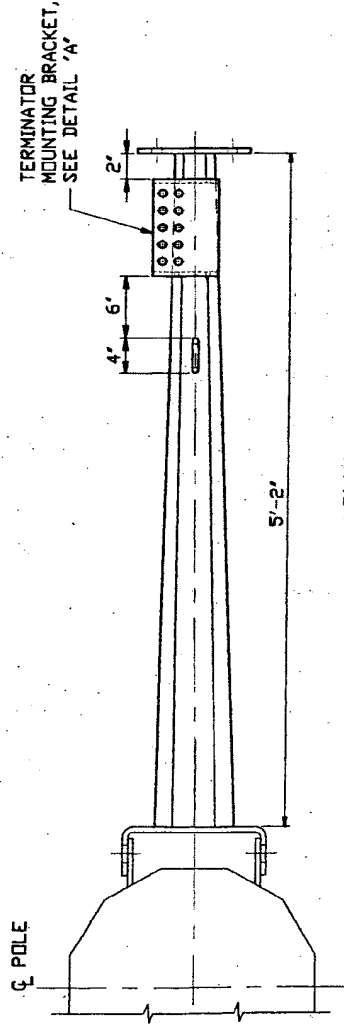
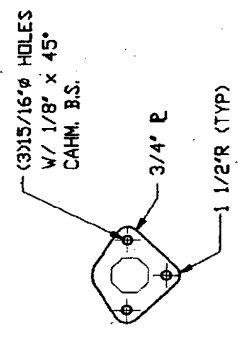


ELEVATION

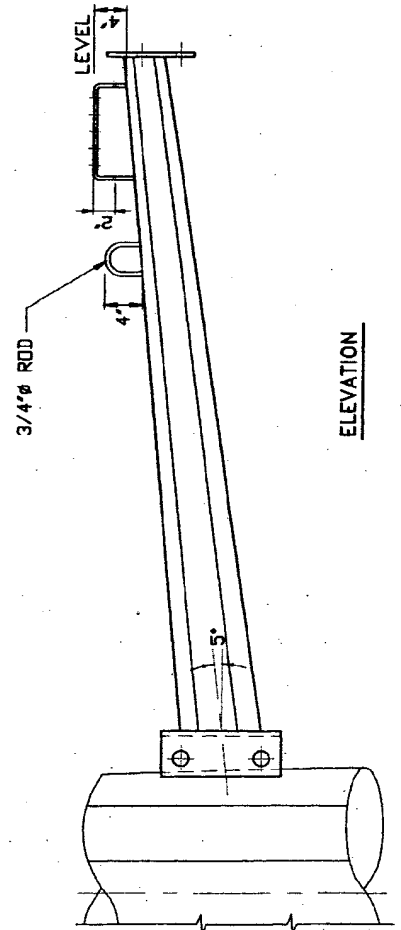
TRANSMISSION ENGINEERING		SCALE: NONE	
69KV STEEL CABLE POLE		DWG. NO.	35205
LIGHTNING ARRESTOR/TERMINATOR		SHT. NO.	4016
MOUNTING ARM			
REV	BY	CHECKED	APPLY
	DATE	DATE	REV
B			
A	WPH	1/18/05	D
	VDF	3/20/02	C
	BT		
ADDED NOTE 3 ON SHEET 1			
ORIGINAL ISSUE			
CHANGE			



DETAIL "A"



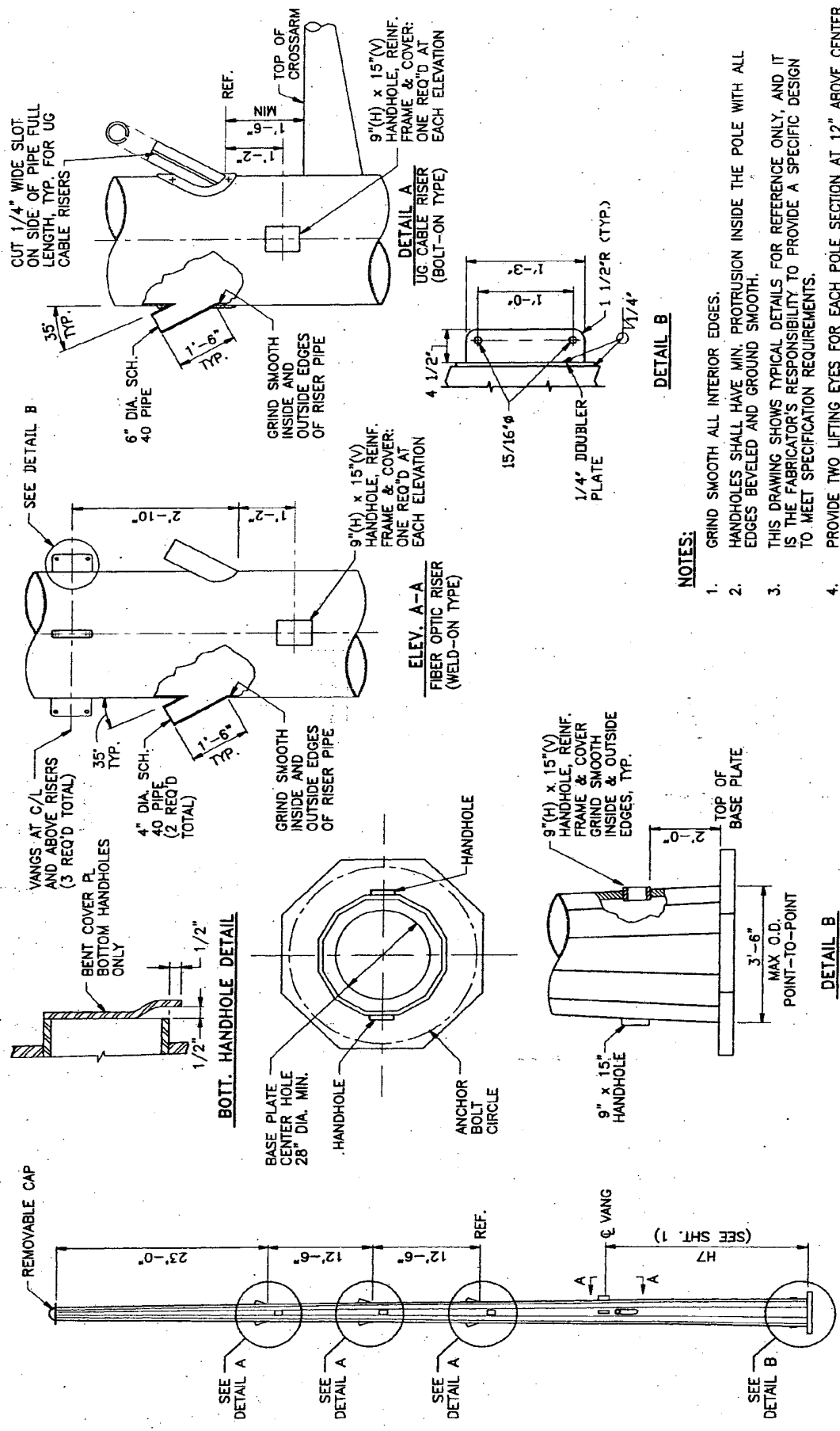
PLAN



ELEVATION

- NOTES:
1. ALL HOLES SHALL BE 15/16" DIAMETER AND SHALL HAVE 1/8" CHAMFER ON EDGES UNLESS NOTED OTHERWISE.
 2. PLATE THICKNESSES SHOWN ARE MINIMUM REQUIREMENTS. POLE SUPPLIER IS RESPONSIBLE FOR FINAL DESIGN AND SIZING OF ALL DETAILS.
 3. OPPOSITE ARM IS SYMMETRICAL ABOUT Q OF POLE.

TRANSMISSION ENGINEERING		SCALE: NONE	
69KV STEEL CABLE POLE TERMINATOR MOUNTING ARM		DWG. NO.	35205
SDGE		SHT. NO.	5 of 6
B	ADDED NOTE 3 ON SHEET 1	PM	WPH
A	ORIGINAL ISSUE	WDF	WVT
REV	CHANGE	BY	CHKD APPY DATE
	CHANGE	BY	CHKD APPY DATE



- NOTES:**
1. GRIND SMOOTH ALL INTERIOR EDGES.
 2. HANDHOLES SHALL HAVE MIN. PROTRUSION INSIDE THE POLE WITH ALL EDGES BEVELED AND GROUND SMOOTH.
 3. THIS DRAWING SHOWS TYPICAL DETAILS FOR REFERENCE ONLY, AND IT IS THE FABRICATOR'S RESPONSIBILITY TO PROVIDE A SPECIFIC DESIGN TO MEET SPECIFICATION REQUIREMENTS.
 4. PROVIDE TWO LIFTING EYES FOR EACH POLE SECTION AT 12" ABOVE CENTER OF GRAVITY PERPENDICULAR TO CROSSARM PLANE, 180" TO EACH OTHER.

TRANSMISSION ENGINEERING				SCALE: NONE	
69KV STEEL CABLE POLE				DRG. NO.	SHT. NO.
POLE SHAFT DETAILS				35205	6016
B					
A	ADDED NOTE 3 ON SHEET 1	PM	WPH	1/18/05	D
	ORIGINAL ISSUE	WDF	BMS	3/20/02	C
REV	CHANGE	BY	CHEK/APPY	DATE	REV
				CHANGE	
				BY	CHEK/APPY
				DATE	

BILL OF MATERIAL

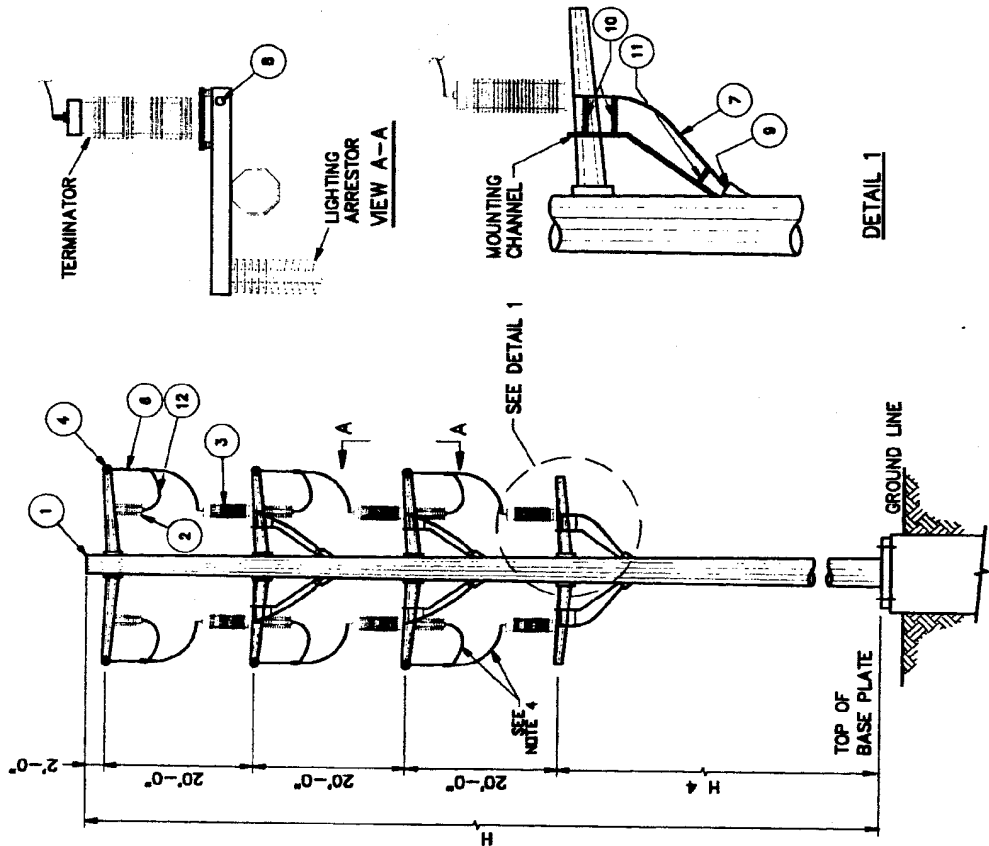
ITEM	QTY.	STOCK NO. OR STD. NO.	DESCRIPTION
1	1	36R10, SFT. #	STEEL CABLE POLE
2	3 PER CIRCUIT	REF. JOB. PACKAGE	ARRESTER, LIGHTNING, 138KV
3	3 PER CIRCUIT	REF. JOB. PACKAGE	TERMINATOR, 138KV
4	3 PER CIRCUIT	REF. JOB. PACKAGE	INSULATOR ASSEMBLY, DEADEND, 138KV
5	1	REF. JOB. PACKAGE	FOUNDATION
6	AS REQ'D	813824	WIRE, 750 MCM B.S. CU., B.S.
7	AS REQ'D	REF. JOB PACKAGE	CABLE, UNDERGROUND, 138KV
8	3 PER CIRCUIT	REF. JOB PACKAGE	ARRESTOR. CABLE SHIELD
9	3 PER CIRCUIT	392414	GRIP, CABLE, HOOKED ENDS
10	2 PER CABLE	SEE NOTE 5	CLAMP, STANDOFF, CABLE, FIXED BASE
11	1 PER CABLE	SEE NOTE 5	CLAMP, STANDOFF, CABLE, SWIVEL BASE
12	AS REQ'D	REF. JOB PACKAGE	WIRE, 4/0 CU., B.S.

STEEL CABLE POLE DESIGNATIONS

POLE DESIGNATION	VOLTAGE	POLE HEIGHT (H)	TERMINATOR ARM ATTACH. HT. (H4)
138SCP-95	138KV	95'	33'
138SCP-110	138KV	110'	48'

NOTES:

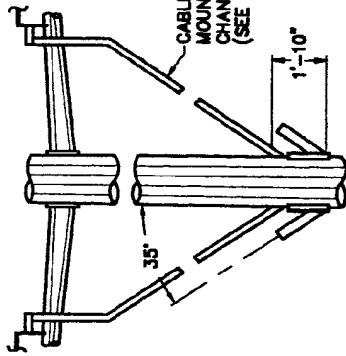
1. REFER TO STEEL POLE PURCHASE ORDER OR JOB PACKAGE FOR APPLICABLE POLE HEIGHT.
2. THE CABLE POLE IS DESIGNED TO ACCOMMODATE DOUBLE CIRCUIT INSTALLATION. REFER TO THE SPECIFIC JOB PACKAGE FOR THE NUMBER OF CIRCUITS TO BE INSTALLED.
3. REFER TO JOB PACKAGE FOR GROUNDING DETAILS.
4. THE PATH FROM OH CONDUCTOR TO ARRESTOR MUST BE SHORTER THAN THE PATH FROM OH CONDUCTOR TO TERMINATOR.
5. USE SAGEM STANDOFF CLAMP OR APPROVED EQUIV. REFER TO SAGEM DWGS: 671-4 (FIXED BASE), 681-4 (SWIVEL BASE) AND 651-4 (CLAMP) FOR DETAILS. FIELD CUT STANDOFF ROD AS NEEDED TO FIT.



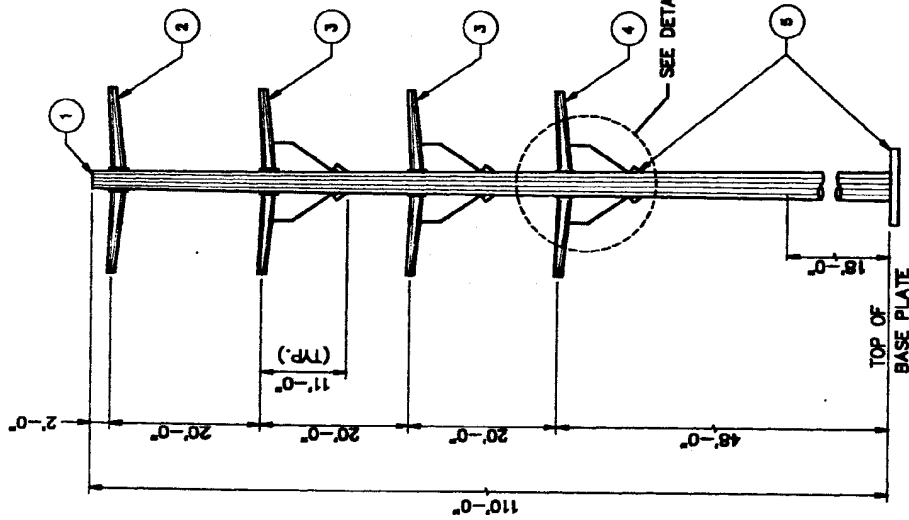
REV	DATE	BY	CHKD	APPR	DATE	REV	DATE	BY	CHKD	APPR	DATE
B	3/1/07	PM				E					
A	1/19/05	PM				D					
	9/8/02	WOF				C					

SDGE		TRANSMISSION ENGINEERING		SCALE: NONE
138KV STEEL CABLE POLE		35210		SFT. NO.
GENERAL ARRANGEMENT		1 of 6		

BILL OF MATERIAL			
ITEM	QTY	STOCK NO. OR STD. NO.	DESCRIPTION
1	1	SEE NOTES	POLE SHAFT
2	2	36210, SBT.3	LIGHTNING ARRESTOR MOUNTING ARM
3	4	36210, SBT.4	LIGHTNING ARRESTOR & TERMINATOR MOUNTING ARM
4	2	36210, SBT.5	TERMINATOR MOUNTING ARM
5	1	36210, SBT.6	BASE PLATE, HANDHOLE & RISER DETAILS



DETAIL A



ELEVATION

NOTES:

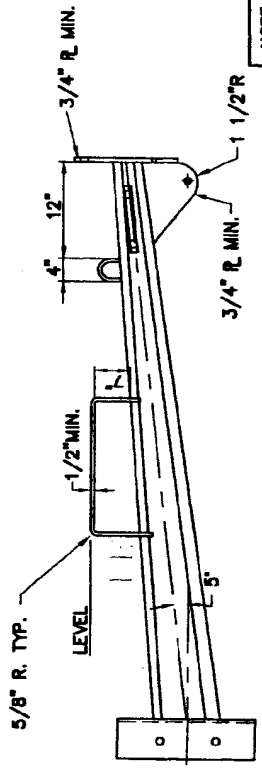
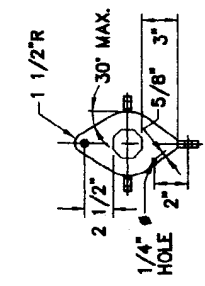
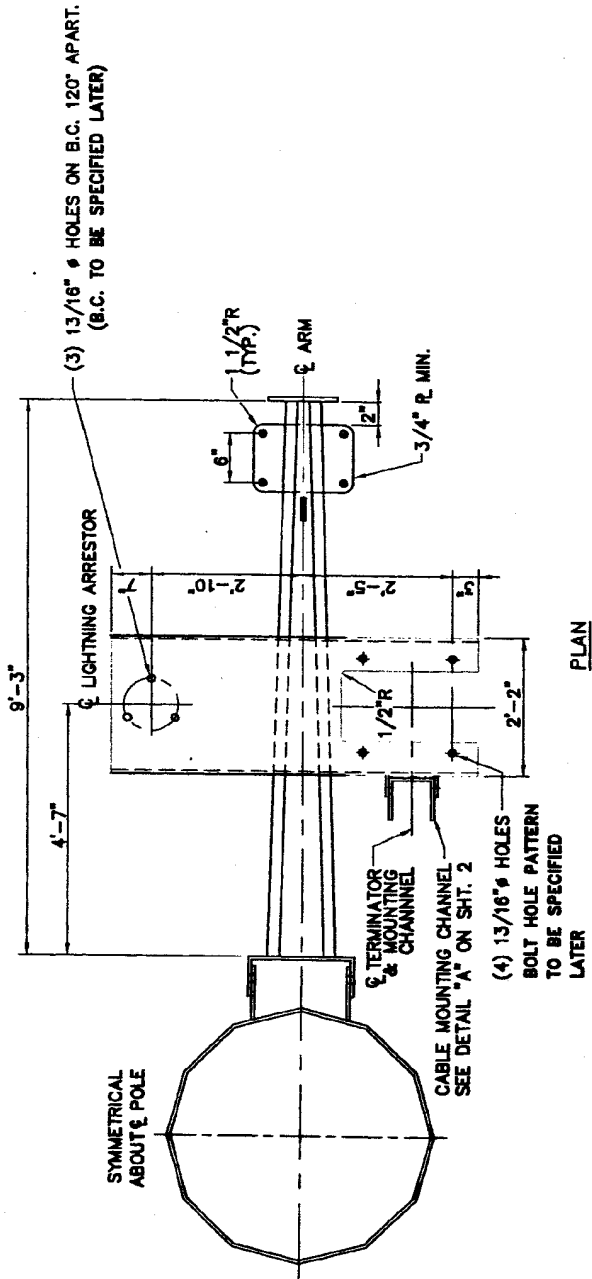
- ALL WORK SHALL CONFORM TO SPECIFICATION TE0042.
- THE FOLLOWING ARE THE BASIC DESIGN DATA. REFER TO DRAWING NO. 11095-03 FOR DESIGN LOAD REQUIREMENTS.
 - WIND SPAN: AH = 1000' BK = 0'
 - WEIGHT SPAN: AH = 1250' BK = 0'
 - DESIGN LINE ANGLE: TERMINAL DEADEND, 90°±5' TO CROSSARM U.N.
 - CONDUCTOR: 2-836 ACSRR/AW PER PHASE
 - LINE TENSION: 5,000 LBS/CONDUCTOR MAX.
 - CABLE PULLING TENSION: 4000 LBS. MAX.

- REFERENCE THE FOLLOWING DRAWINGS FOR STEEL POLE DETAILS

DRAWING NO.	TITLE
17100	STEEL POLE GENERAL NOTES
17101	STEEL POLE SHAFT
17130	STEEL POLE YELLOW WARNING MARK

- POLE SHAFT, MOUNTING ARM & ALL OTHER APPURTENANCES TO BE HOT DIP GALVANIZED & PAINT DULLED.
- THE INTERIOR OF POLE SHALL BE CLEAR OF ANY OBSTRUCTIONS. NO THROUGH VANGS SHALL BE ALLOWED.
- MOUNTING DETAILS FOR CABLE GRIPS TO BE PROVIDED PRIOR TO FABRICATION.

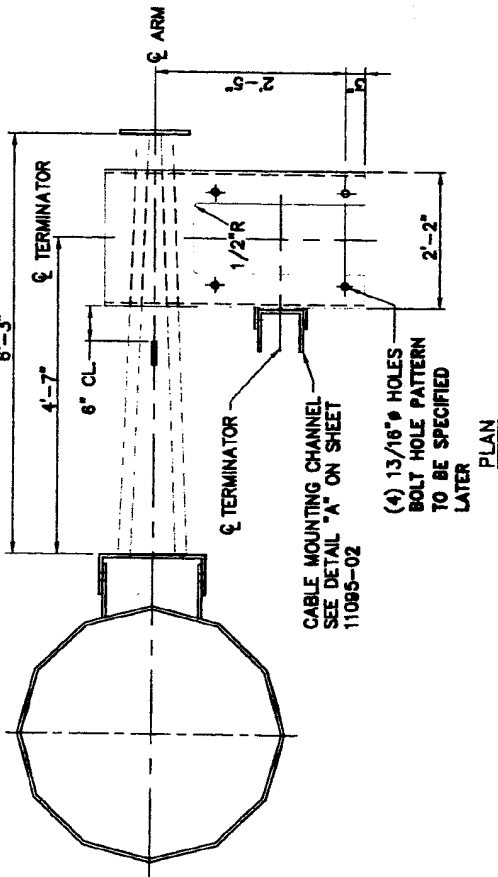
TRANSMISSION ENGINEERING		SCALE:	NONE
138KV STEEL CABLE POLE GENERAL ARRANGEMENT		DTG. NO.	35210
BY: [Signature]		SBT. NO.	2 of 6
REV	DATE	BY	CHKD/APP
B	3/1/07	PM	
A	1/16/08	PM	
	8/9/02	WOF	
ORIGINAL			
CHARGE			



NOTE:
DIMENSIONS FOR THE LIGHTNING ARRESTOR & TERMINATOR BRACKETS ARE PRELIMINARY. FINAL DIMENSIONS ARE TO BE PROVIDED PRIOR TO FABRICATION.

REV	BY	CHKD	DATE	DATE	REV	BY	CHKD	DATE	DATE	SCALE	SHEET NO.
B	WT	WT	3/1/07	E						TRANSMISSION ENGINEERING	4 of 6
A	WT	WT	1/18/05	D						138KV STEEL CABLE POLE	
	WDF	WDF	8/9/02	C						GENERAL ARRANGEMENT	
REV	BY	CHKD	APPLY	DATE	REV	BY	CHKD	APPLY	DATE	35210	

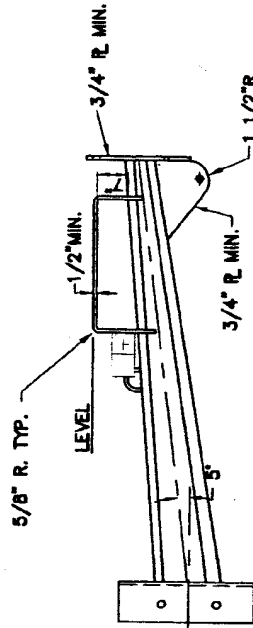
SYMMETRICAL ABOUT ϕ POLE



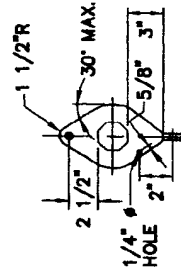
CABLE MOUNTING CHANNEL
SEE DETAIL "A" ON SHEET
11085-02

(4) 13/16" ϕ HOLES
BOLT HOLE PATTERN
TO BE SPECIFIED
LATER

PLAN



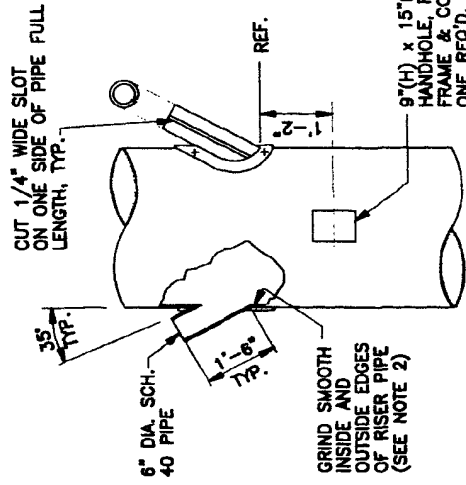
ELEVATION



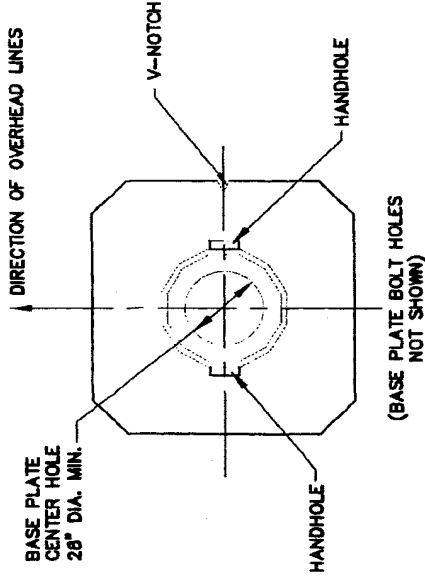
NOTE:
DIMENSIONS FOR THE LIGHTNING ARRESTOR & TERMINATOR
BRACKETS ARE PRELIMINARY. FINAL DIMENSIONS ARE TO BE
PROVIDED PRIOR TO FABRICATION.

REV	BY	CHKD	APPY	DATE	REV	DATE	APPY	DATE	SCALE	NONE
B	WDF	WIT	WIT	3/1/07	E				TRANSMISSION ENGINEERING	
A	WDF	WIT	WIT	1/18/05	D				138KV STEEL CABLE POLE	
				5/8/02	C				GENERAL ARRANGEMENT	
									35210	
										5 of 6

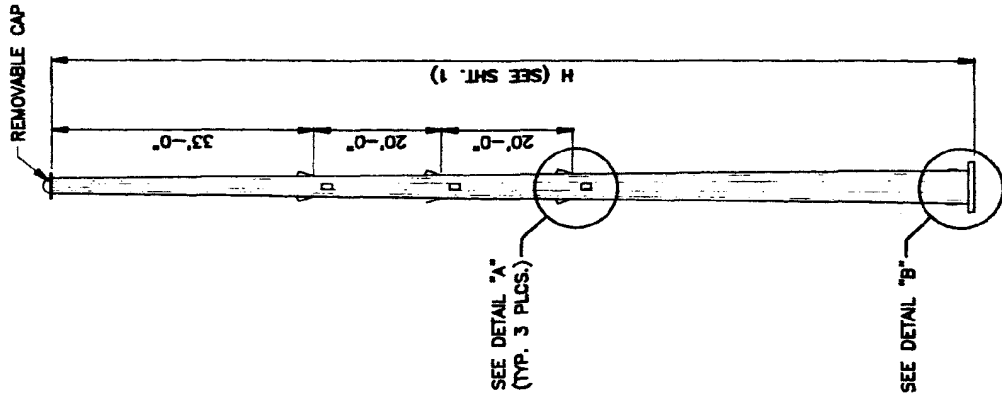
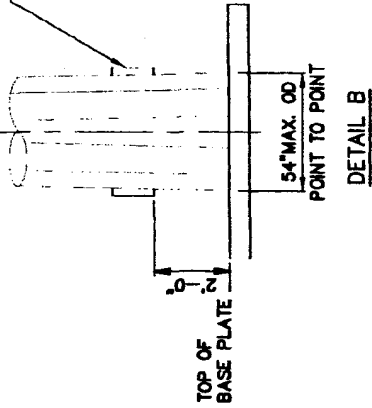




DETAIL A
UG CABLE RISER
(BOLT-ON TYPE)



12" (W) x 15" (H) INSIDE HANDHOLE,
REFINE. FRAME & COVER; GRINDE
SMOOTH INSIDE & OUTSIDE EDGES, TYP.
(SEE NOTE 3)



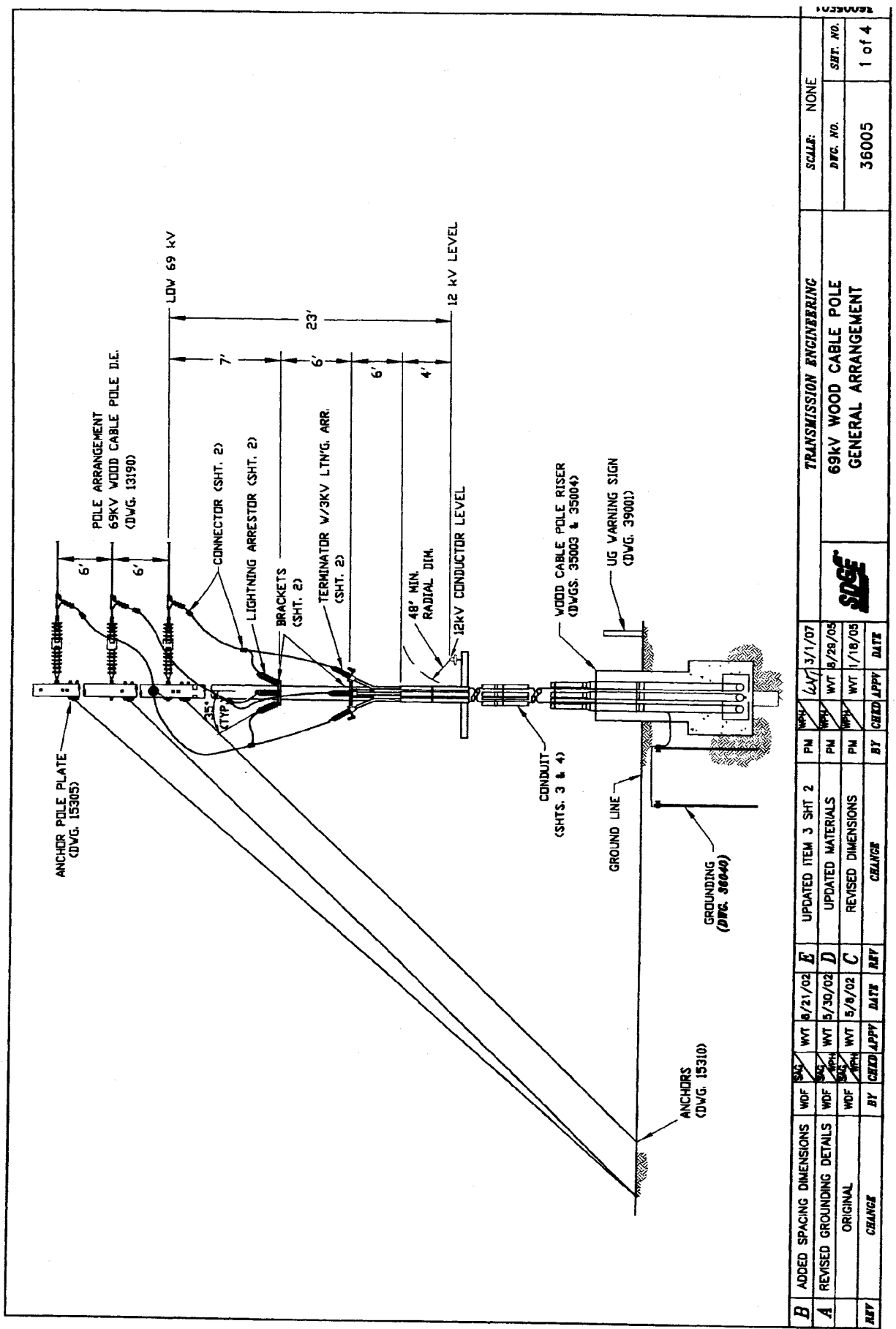
NOTES:

1. FOR ASSEMBLY AND ERECTION DETAILS SEE MANUFACTURER GUIDELINES.
2. ALL PIPES TO BE MOUNTED FLUSH WITH INSIDE OF SHAFT. BEVEL AND GRIND SMOOTH ALL INTERIOR FACES.
3. HANDHOLES SHALL PROTRUDE INSIDE THE POLE A BARE MINIMUM WITH THE EDGES BEVELED AND GROUND SMOOTH.
4. THIS DRAWING SHOWS TYPICAL DETAILS FOR REFERENCE ONLY. IT IS THE FABRICATOR'S RESPONSIBILITY TO PROVIDE A SPECIFIC DESIGN TO MEET SPECIFICATION REQUIREMENTS.
5. POLE SHALL INCLUDE TWO LIFTING VINGS LOCATED 12" ABOVE CENTER OF GRAVITY AND PERPENDICULAR TO CROSSARM PLANE, 180° APART.

REV	BY	CHKD/APPLY	DATE	REV	DATE	BY	CHKD/APPLY	DATE	CHANGE
B	WT	WT	3/1/07	E					
A	WT	WT	1/18/05	D					
	WDF	WT	9/9/02	C					

TRANSMISSION ENGINEERING		SCALE:	NONE
138KV STEEL CABLE POLE		DWG. NO.	35210
GENERAL ARRANGEMENT		SBT. NO.	6 of 6

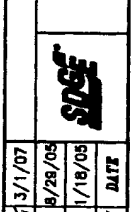




ADDED SPACING DIMENSIONS		WDF	DATE	BY	CHKD	APPLY	DATE	REV	DESCRIPTION	DATE	BY	CHKD	APPLY	DATE	REV	DESCRIPTION
B	ADDED SPACING DIMENSIONS	WDF	8/21/02	E	WT	8/21/02	PM	3/1/07	UPDATED ITEM 3 SHT 2	3/1/07	WT	8/21/02	PM	3/1/07	PM	UPDATED MATERIALS
A	REVISED GROUNDING DETAILS	WDF	5/30/02	D	WT	5/30/02	PM	8/28/05	UPDATED MATERIALS	8/28/05	WT	8/28/05	PM	8/28/05	PM	UPDATED MATERIALS
	ORIGINAL	WDF	5/8/02	C	WT	5/8/02	PM	1/18/05	REVISED DIMENSIONS	1/18/05	WT	1/18/05	PM	1/18/05	PM	REVISED DIMENSIONS
REV	CHANGE	BY	CHKD	APPLY	DATE	REV	DESCRIPTION	DATE	REV	DESCRIPTION	DATE	REV	DESCRIPTION	DATE	REV	DESCRIPTION

SCALE:	NONE
DWG. NO.	36005
SET. NO.	1 of 4

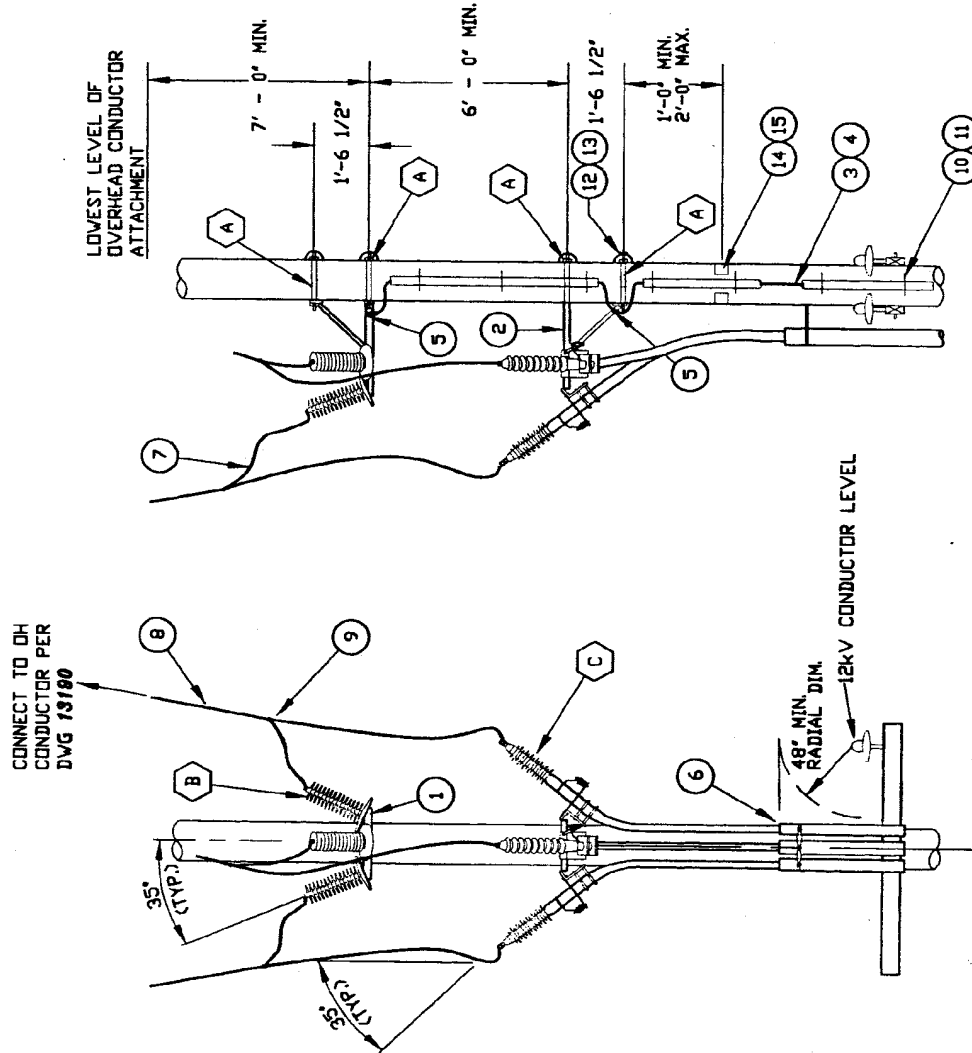
TRANSMISSION ENGINEERING
 69KV WOOD CABLE POLE
 GENERAL ARRANGEMENT



BILL OF MATERIAL

ITEM	QTY	STOCK NO. OR DWG. NO.	DESCRIPTION
1	1	165440	BRACKET, LIGHTING ARRESTOR, 69KV
2	1	166872	TERMINATOR BRACKET, 69KV
3	90'	812816	WIRE, #2, 7 STR, CU, SOFT DRAWN
4	60'	678528	STAPLES, FENCE, GALV.
5	2	471296	GROUNDING LUG, BRONZE, #6 SOL - 250 MCM
6	3	392414	GRIP, CABLE SUPPORT, HOOKED ENDS
7	30'	813728	WIRE, 4/0 B.S. CU.
8	60'	813824	WIRE, 750 B.S. CU.
9	3	262464	CONNECTOR, 2 BOLT, BRONZE, 4/0-750 CU.
10	8	487200	MOULDING, DAK, 1" x 8'
11	800	678560	STAPLES, MOULDING, GALV.
12	4	285696	BOLT COVER
13	1/4#	491392	NAIL, 10D, COMMON, GALVANIZED
14	2	647648	SIGN, HIGH VOLTAGE
15	1/8#	492192	NAIL, ROOFING, GALVANIZED
A	4	180210	BOLT, ASSEMBLY, 3/4" (SEE NOTE 1)
B	3	390225	ARRESTOR, ASSEMBLY 69KV, POLYMER
C	3	390220	TERMINATOR ASSEMBLY, 69KV, RAYCHEM

- NOTES:**
1. PLACE THE CURVED & SPRING WASHERS UNDER THE BOLT HEAD.
 2. SEE DWG. 360040 FOR ADDITIONAL GROUNDING DETAILS.
 3. ITEMS 1, 2, 3, 4, 7, 8, 14, 15, A, B, AND THE CONNECTION BETWEEN TERMINATOR C AND JUMPER 8 ARE TO BE INSTALLED BY THE OVERHEAD CREW. ALL OTHERS ARE TO BE INSTALLED BY THE UG CABLE CREW.



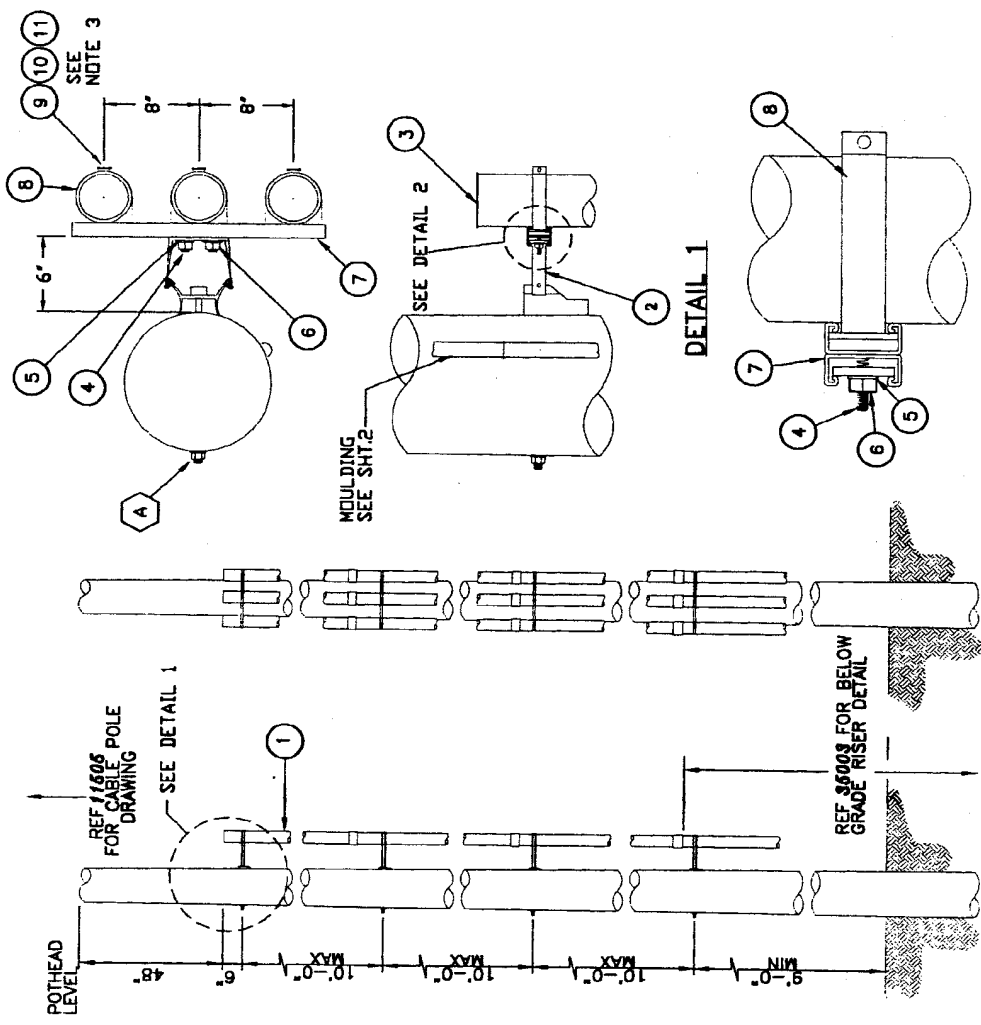
ADDED SPACING DIMENSIONS		WDF	WT	9/21/02	E	3/1/07	DATE
B	ADDED SPACING DIMENSIONS	WDF	WT	9/21/02	E	3/1/07	DATE
A	REVISED GROUNDING DETAILS	WDF	WT	5/30/02	D	9/28/05	DATE
REF	ORIGINAL	WDF	WT	5/8/02	C	1/18/05	DATE
REF	CHANGE	BY	CHKD	APPR	DATE	BY	CHKD
					CHANGE		
UPDATED ITEM 3 SHT 2		PM	WT	3/1/07			
UPDATED MATERIALS		PM	WT	9/28/05			
REVISED DIMENSIONS		PM	WT	1/18/05			
BY		CHKD	APPR	DATE			

TRANSMISSION ENGINEERING		SCALE:	NONE
69KV WOOD CABLE POLE		DWG. NO.	36005
GENERAL ARRANGEMENT		SET. NO.	2 of 4



BILL OF MATERIAL			DESCRIPTION
ITEM	QTY	STOCK NO. STD. NO.	
1	90'	251592	CONDUIT, SCHEDULE 80 PVC, 5' x 10'
2	4	167184	BRACKET, CONDUIT STAND OFF
3	3	558720	PROTECTOR, NYLON CABLE
4	8	507000	NUT, STUD, 1/2" x 1 3/8"
5	8	796768	WASHER, SPRING, LOCK, 1/2"
6	8	505824	NUT, SQUARE STEEL GALV. 1/2"
7	4	216700	CHANNEL, "DOUBLE" GALV. 2 x 1 5/8" x 1 5/8"
8	12	229668	5' GALV. PIPE CLAMP
9	12	616832	SCREW, 3/8" x 1 1/4", BRONZE
10	12	506208	NUT, 3/8", LOCK, BRONZE
11	12	796544	WASHER, 3/8", LOCK, BRONZE
A	4	180718	ASSEMBLY, BOLT, 5/8"

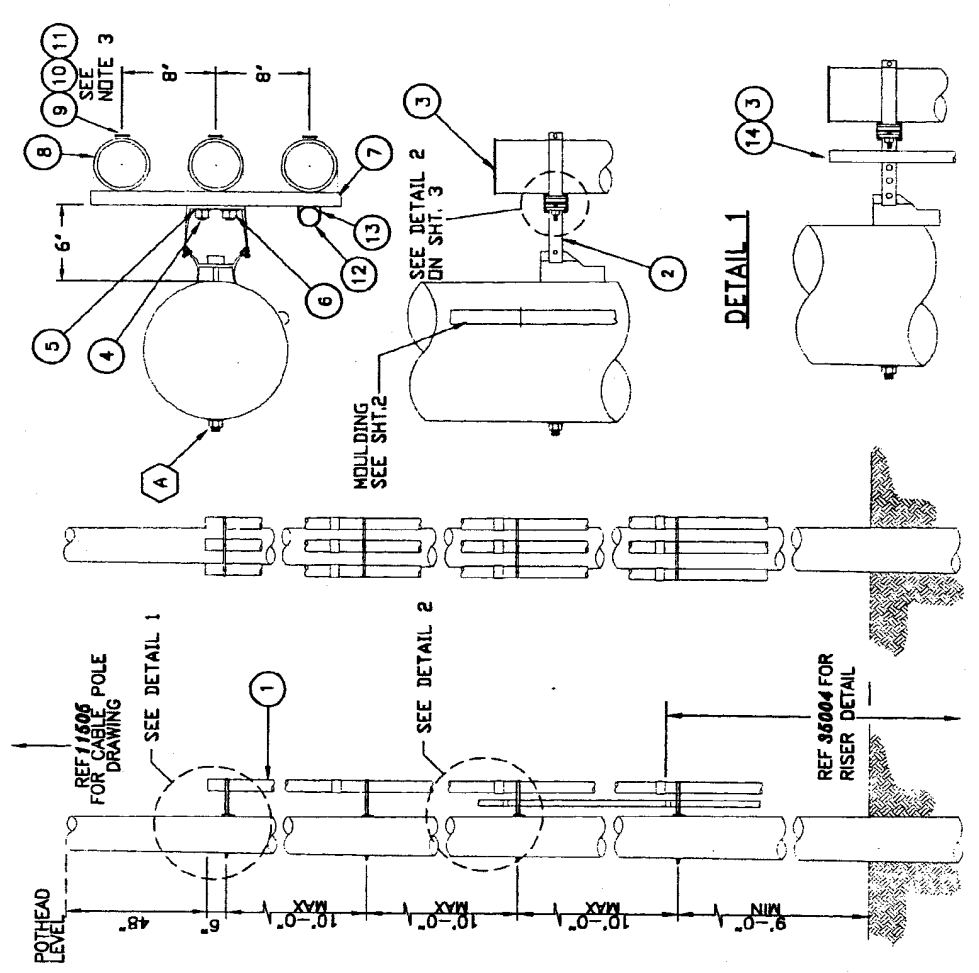
- NOTES:**
1. WHENEVER POSSIBLE, RISERS SHOULD BE INSTALLED ON THE SIDE OF THE POLE OPPOSITE TRAFFIC FLOW.
 2. QUANTITIES ARE BASED ON 70' POLE.
 3. MAINTAIN A GAP BETWEEN THE TWO HALVES OF THE CLAMP AND BOLT SHALL BE NON-MAGNETIC.
 4. AT LEAST ONE BRACKET MUST BE INSTALLED NEAR EACH JOINT OF CONDUIT.
 5. ITEMS 2 AND A ARE TO BE INSTALLED BY THE OVERHEAD CREW. ALL OTHERS ARE TO BE INSTALLED BY THE UG CABLE CREW.



DETAIL 2

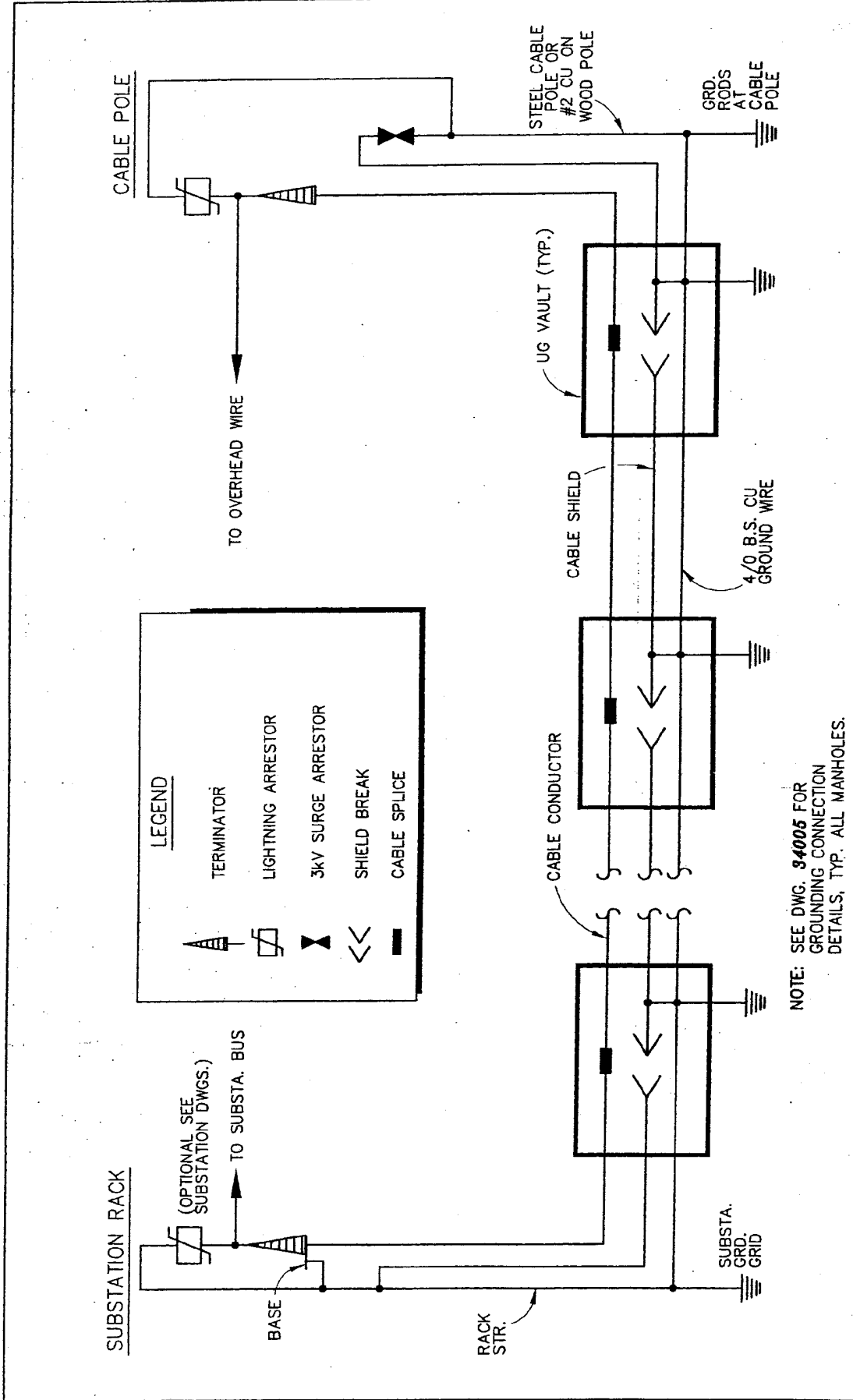
TRANSMISSION ENGINEERING				SCALE:	NONE
69KV WOOD CABLE POLE GENERAL ARRANGEMENT				DFG. NO.	36005
SDGE				SET. NO.	3 of 4
B	ADDED SPACING DIMENSIONS	WDF	WT 8/21/02	3/1/07	
A	REVISED GROUNDING DETAILS	WDF	WT 5/30/02	8/29/05	
	ORIGINAL	WDF	WT 5/8/02	1/18/05	
BY	CHANGE	BY	CEED	APPY	DATE

BILL OF MATERIAL			DESCRIPTION
ITEM	QTY	STOCK NO. OR STD. NO.	
1	120'	251592	CONDUIT, SCHEDULE 80 PVC, 5' x 10'
2	4	167184	BRACKET, LADDER ARM
3	4	558720	PROTECTOR, NYLON CABLE
4	8	507000	NUT, STUD 1/2" x 1 3/8" (FOR UNISTRUT)
5	8	796768	WASHER, SPRING, LOCK, 1/2"
6	8	505824	NUT, SQUARE STEEL GALV. 1/2"
7	4	216700	CHANNEL, DOUBLE, GALV.
8	12	229668	CLAMP, PIPE, STEEL, GALV. UNISTRUT, 5'
9	12	616832	SCREW, 3/8" x 1 1/4", BRONZE
10	12	506208	NUT, 3/8", LOCK, BRONZE
11	12	796544	WASHER, 3/8", LOCK, BRONZE
12	30'	251552	CONDUIT, SCHEDULE 80 PVC 3' x 10'
13	2	229632	3' GALV. PIE CLAMP
14	1	393984	GRIP, CABLE 3'
A	4	19018	ASSEMBLY, BOLT, 5/8"



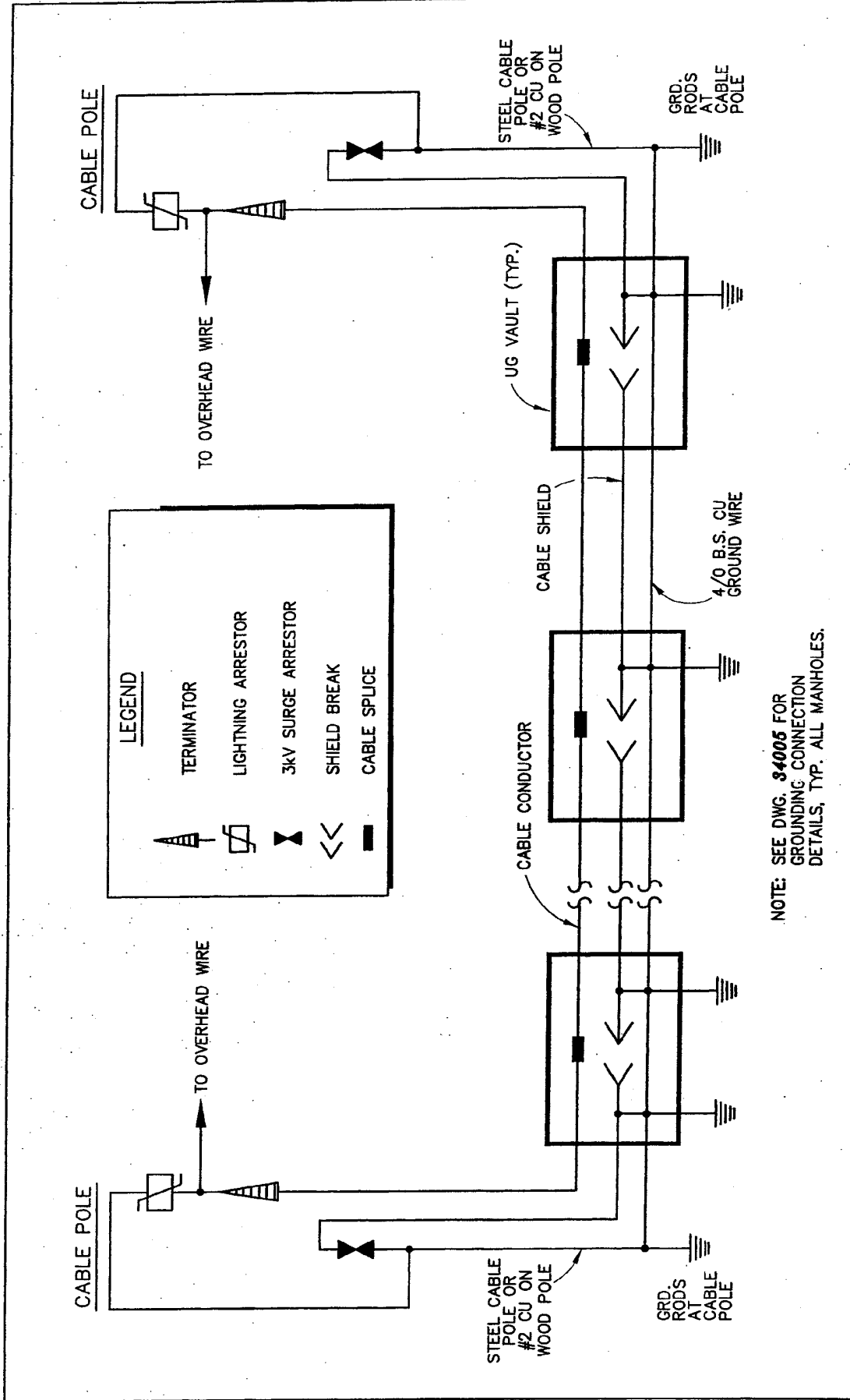
- NOTES:**
- WHENEVER POSSIBLE, RISERS SHOULD BE INSTALLED ON THE SIDE OF THE POLE OPPOSITE TRAFFIC FLOW.
 - QUANTITIES ARE BASED ON 70' POLE.
 - MAINTAIN A GAP BETWEEN THE TWO HALVES OF THE CLAMP AND BOLT SHALL BE NON-MAGNETIC.
 - AT LEAST ONE BRACKET MUST BE INSTALLED NEAR EACH JOINT OF CONDUIT.
 - ITEMS 2 AND A ARE TO BE INSTALLED BY THE OVERHEAD CREW. ALL OTHERS ARE TO BE INSTALLED BY THE UG CABLE CREW.

TRANSMISSION ENGINEERING		SCALE: NONE	
69KV WOOD CABLE POLE GENERAL ARRANGEMENT		DWG. NO.	36005
SDGE		SHEET NO.	4 of 4
DATE	BY	CREW/APPV	DATE
3/1/07	PM	WT	8/28/05
3/1/07	PM	WT	1/18/05
8/21/02	E	WT	5/30/02
5/30/02	D	WT	5/8/02
5/8/02	C	BY	CEW/APPV
DATE	REV	DATE	REV
ADDED SPACING DIMENSIONS	WDF		
REVISED GROUNDING DETAILS	WDF		
ORIGINAL	WDF		
CHANGE	BY	CEW/APPV	DATE
UPDATED ITEM 3 SHT 2	PM	WT	8/28/05
UPDATED MATERIALS	PM	WT	1/18/05
REVISED DIMENSIONS	PM	WT	1/18/05
CHANGE	BY	CEW/APPV	DATE



NOTE: SEE DWG. 34005 FOR GROUNDING CONNECTION DETAILS, TYP. ALL MANHOLES.

REV	DESCRIPTION	BY	CHKD	APPY	DATE	REV	DATE	REV	DATE	BY	CHKD	APPY	DATE	CHANGE	SCALE: NONE	DWG. NO. 36020	SHT. NO. 1 of 1	36020A01
-	ORIGINAL ISSUE	VDF	JMK	WVT	5/30/02	C												
	CHANGE	BY	CHKD	APPY	DATE	REV	DATE	REV	DATE	BY	CHKD	APPY	DATE	CHANGE				



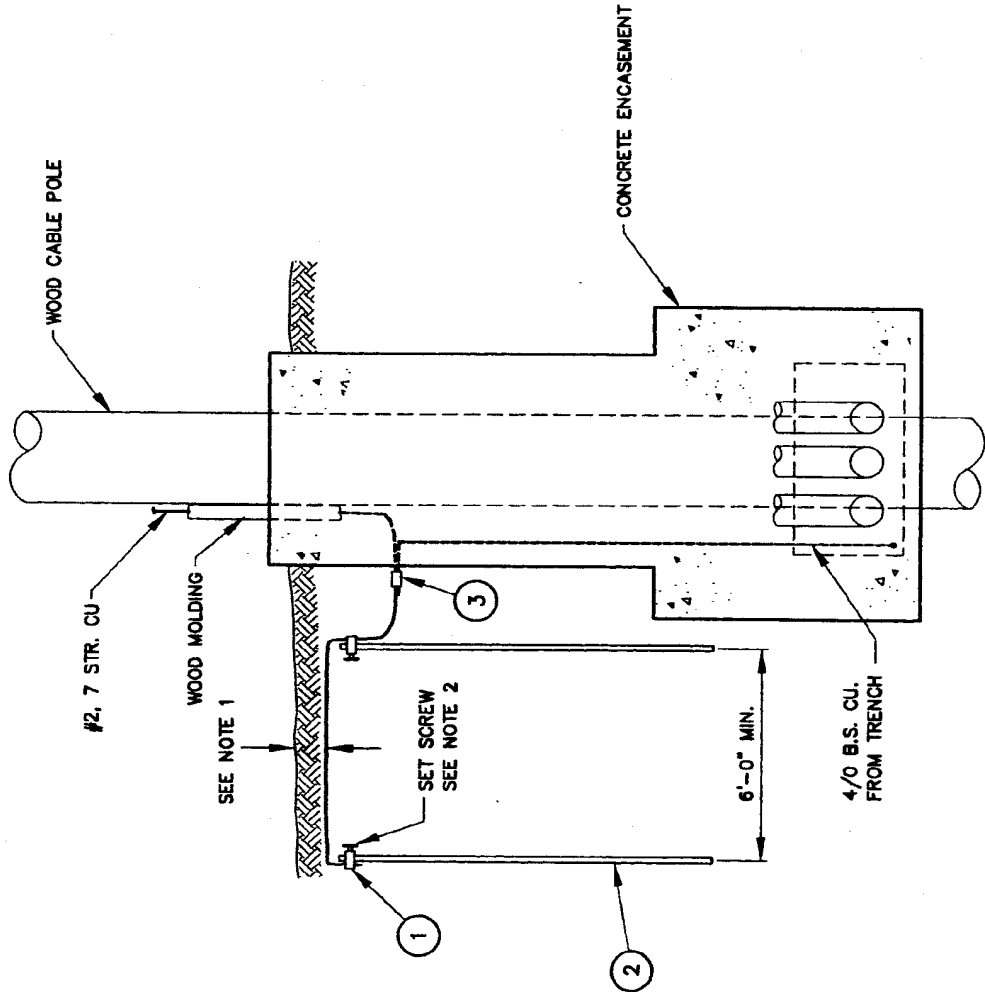
CORRECTED GROUNDING		PH	VPH	LVT	2/22/05	E	TRANSMISSION ENGINEERING		SCALE: NONE	DWG. NO.	36025	SHT. NO.	1 of 1
REVISED GROUND WIRE & ADDED NOTE		PH	VPH	VVT	1/16/05	D	69kV UNDERGROUND CABLE GROUNDING & SPLICE SCHEMATIC CABLE POLE TO CABLE POLE						
ORIGINAL ISSUE		VDF	VPH	VVT	5/30/02	C	SDGE						
CHANGE		BY	CHKD	APPY	DATE	REV	CHANGE		BY	CHKD	APPY	DATE	

BILL OF MATERIAL

ITEM	QTY	STOCK NO. OR DWG. NO.	DESCRIPTION
1	2	230016	GROUND ROD CLAMPS
2	2	603072	GROUNDING ROD, COPPERWELD, 5/8" x 8'
3	1	257856	CONNECTOR, COMPRESSION

NOTES:

- ROD & WIRE DEPTH SHALL BE 6" MIN. UNDER CONCRETE OR FINISHED GRADE, 18" FOR OPEN GROUND & 4' MIN. IN AREAS SUBJECT TO PLOWING.
- SET SCREWS SHALL TIGHTEN AGAINST GROUND ROD & NOT AGAINST THE GROUND WIRE.



REV	BY	CHKD	APPY	DATE	REV	BY	CHKD	APPY	DATE	SCALE	10040492	
											DWG. NO.	SHEET NO.
B					E					NONE	36040	1 of 1
A	UPDATED DESCRIPTION FOR #2 C.U.	PM		3/1/07	D							
	ORIGINAL	WDF		5/30/03	C							
	CHANGE	WDF										

TRANSMISSION ENGINEERING
69KV WOOD CABLE POLE
GROUNDING DETAILS

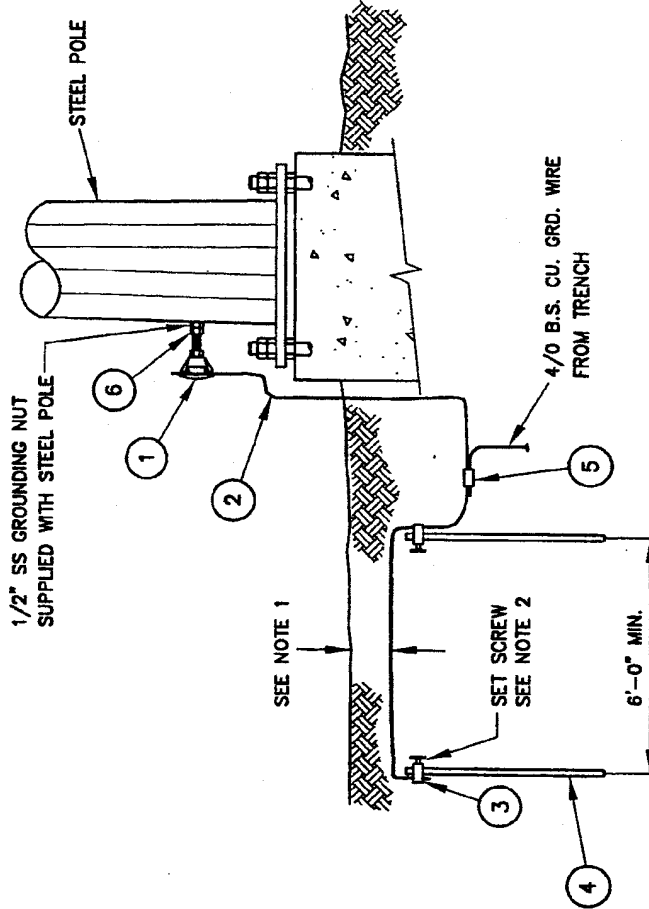


BILL OF MATERIAL

ITEM QTY	STOCK NO. OR SPEC. NO.	DESCRIPTION	
1	2	730464	GROUNDING LUG, BRONZE, LONG STUD
2	20'	813056	WIRE, #2 SOL, COPPERWELD
3	2	230016	GROUND ROD CLAMP
4	2	603072	GROUNDING ROD, COPPERWELD, 5/8" x 8'
5	1	257888	CONNECTOR, COMPRESSION
6	1	505536	NUT, 1/2", SS

NOTES:

1. ROD & WIRE DEPTH SHALL BE 6" MIN. UNDER CONCRETE OR FINISHED GRADE, 18" FOR OPEN GROUND & 4' MIN. IN AREAS SUBJECT TO FLOWING.
2. SET SCREWS SHALL TIGHTEN AGAINST GROUND ROD & NOT AGAINST THE GROUND WIRE.



1/2" SS GROUNDING NUT
SUPPLIED WITH STEEL POLE

SEE NOTE 1

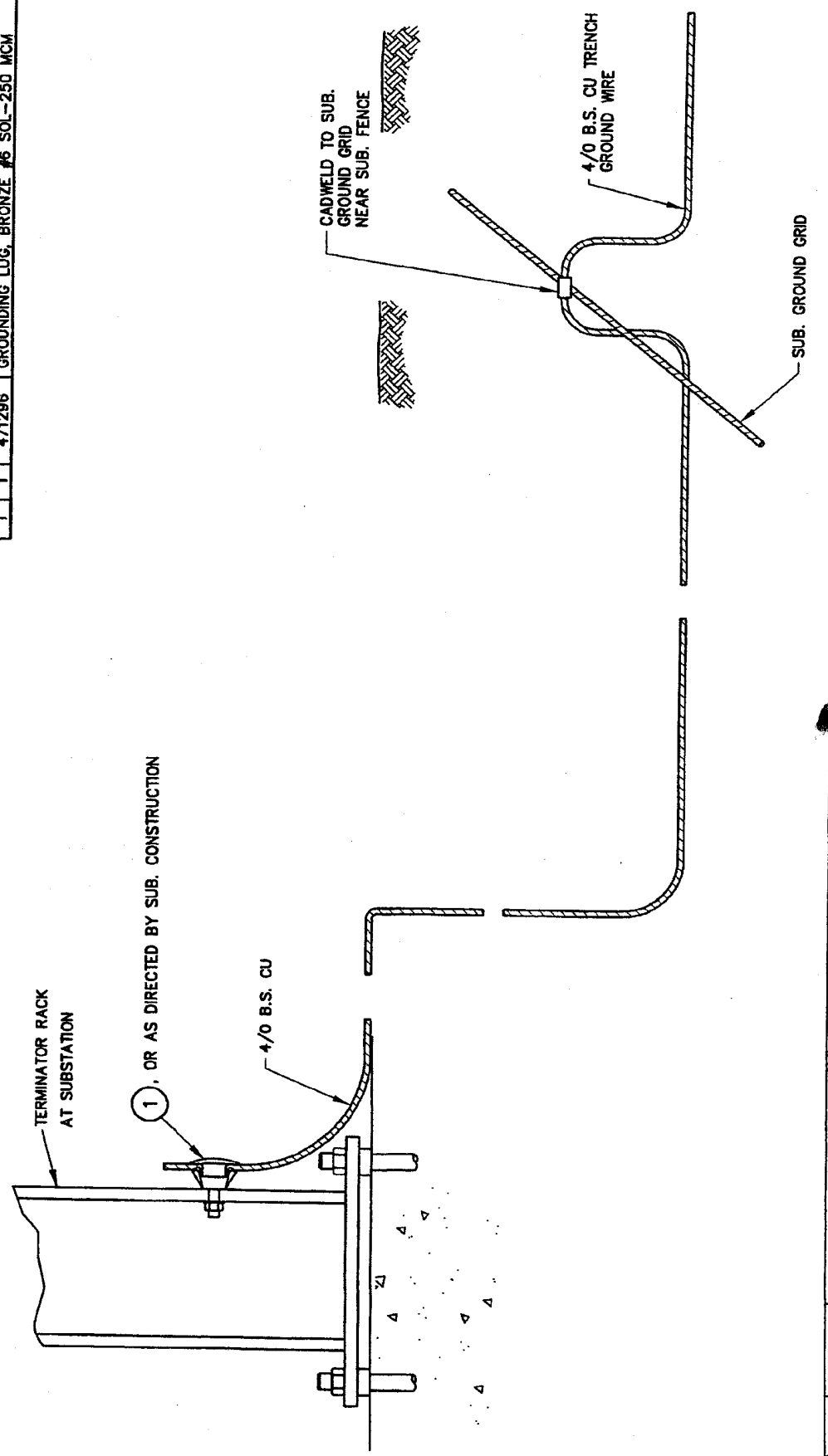
SEE NOTE 2

6'-0" MIN.

C	SDGE SAN DIEGO GAS & ELECTRIC		STEEL CABLE POLE GROUNDING DETAILS	
B	TRANSMISSION ENGINEERING			
A	DATE	BY	DATE	
	WDF	WV	5/30/02	
	DATE CHG'D APPL'D	DATE		
REV	BUDGET	CONST	ORDER	
				36045
				36045

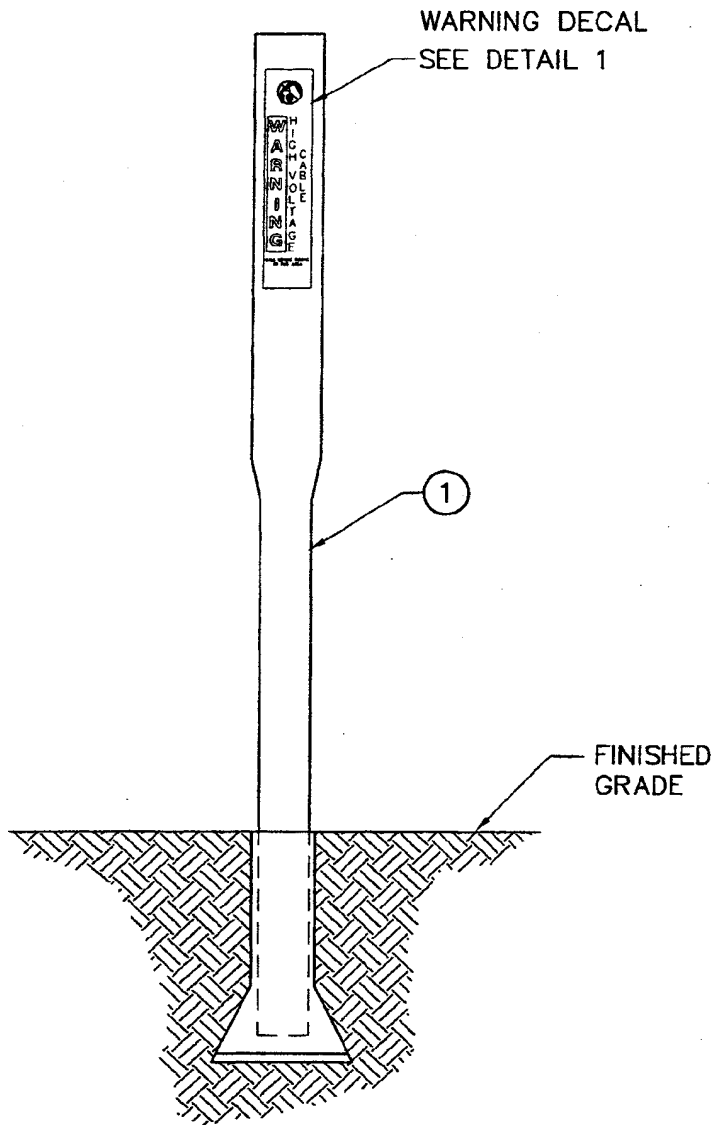
BILL OF MATERIAL

ITEM QTY	STOCK NO. OR D.P.C. NO.	DESCRIPTION
1	471296	GROUNDING LUG, BRONZE, #6 SOL.-250 MCM

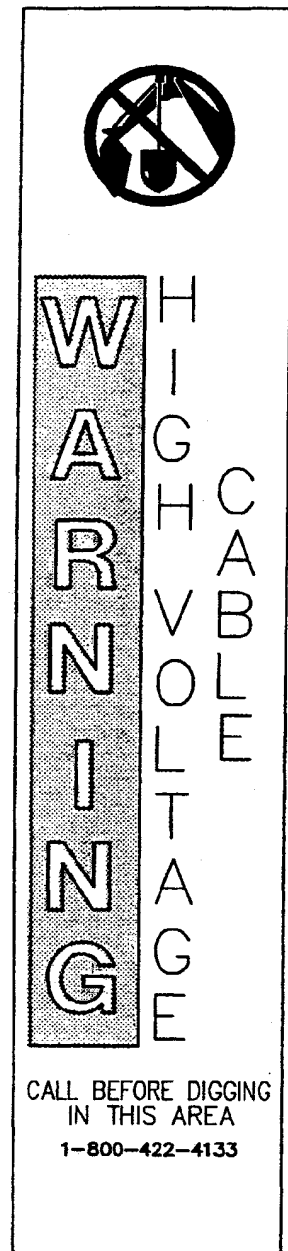


1, OR AS DIRECTED BY SUB. CONSTRUCTION

REV	BUDGET	CONST	ORDER	NO.	DATE	BY	CHK'D	DATE	DATE	SCALE	SHEET	OF	NO.
C									5/30/02				
B													
A													
<p>SDGE SAN DIEGO GAS & ELECTRIC TRANSMISSION ENGINEERING</p>										<p>UNDERGROUND TRENCH GROUNDING DETAILS AT SUBSTATION</p>		<p>36050</p>	
										<p>SCALE: NONE</p>		<p>SHEET 1 OF 1</p>	



ELEVATION



DETAIL 1

A	CHANGE NOTES	WDF	WPH	WPH	4/25/02	C						
-	ORIGINAL ISSUE	SDF	SAG	WPH	10/19/00	B						
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE	


39001A01

	TRANSMISSION ENGINEERING						SCALE: NONE		
	GENERAL ARRANGEMENT UNDERGROUND WARNING SIGN						DWG. NO.	SHT. NO.	REV
							39001	1 of 2	A

BILL OF MATERIALS			
ITEM	QTY	STOCK NO. or STD. NO.	DESCRIPTION
1	1	647465	POST (RED) & ANCHOR SOCKET WITH WARNING DECAL

NOTES:

1. EXACT LOCATIONS TO BE STAKED BY SDGE'S PROPERTY INSPECTOR.
2. MAXIMUM SPACING 200'
3. INSTALL AT ALL FENCE LINE CROSSINGS.
4. MARK WITHIN 20' OF EDGE OF TRAVELED WAY (BOTH SIDES) AT TRENCH CROSSINGS.
5. MARK ALL B.C. , E.C. & P.I. POINTS OF TRENCH.
6. CALL DIG ALERT AT, (800) 422-4133 BEFORE DIGGING.

A	UPDATE NOTES & MAT'L	WDF	WPH	WPH	4/25/02	C							
-	ORIGINAL ISSUE	SDF	SAG	WPH	10/19/00	B							
REV	CHANGE	BY	CHKD	APPV	DATE	REV	CHANGE	BY	CHKD	APPV	DATE		
	TRANSMISSION ENGINEERING							SCALE: NONE					
	GENERAL ARRANGEMENT UNDERGROUND WARNING SIGN							DWG. NO.	SHT. NO.	REV			
								39001	2of2	A			

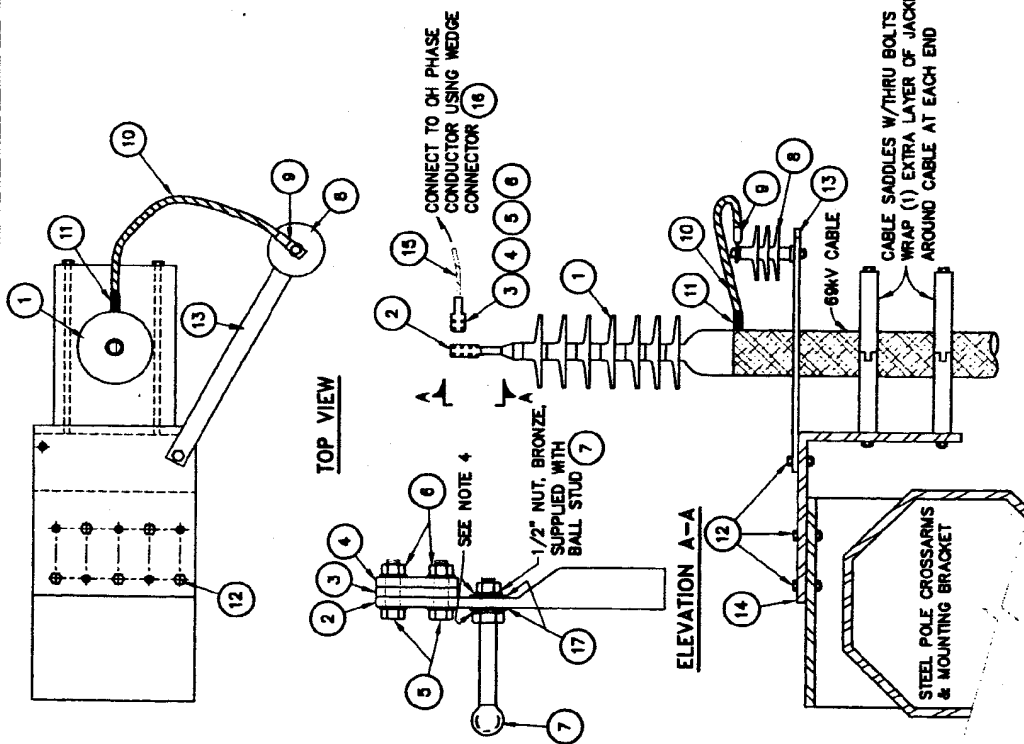
39001A02

BILL OF MATERIAL

ITEM	QTY.	STOCK NO. OR STD. NO.	DESCRIPTION
1	1	723924	TERMINATOR, RAYCHEM, POLYMER, 69KV
2	1	(NOTE 2)	TERMINAL, AL., COMPRESSION OR SHEAR BOLT TYPE, WITH 6-HOLE NEMA PAD
3	1	543216	PLATE, TRANSITION, AL TO CU., 4-HOLE
4	1	728924	TERMINAL, CU., COMPRESSION, 4-HOLE NEPA PAD, FOR 750 MCM CU.
5	4	152634	BOLT, 1/2" x 2-3/4", MACHINE, HOT-DIP GALVANIZED
6	4	796768	WASHER, SPRING, 1/2", HOT-DIP GALVANIZED
7	1	700100	GROUNDING BALL STUD, 5/8" x 3"
8	1	113800	ARRESTOR, 3KV, TYPE "ZSP", POLYMER
9	1	259136	CONNECTOR, COMPRESSION, PURPLE, FOR 4/0 CU.
10	6'	808224	WIRE, 4/0 CU., B.S.
11	1	254176	4/0 CU. DAM CONNECTOR
12	6	152608	BOLT, 1/2" x 1-1/2", MACHINE, HOT-DIP GALVANIZED
13	1	698864	STRAP, 1/2" x 1-1/2" x 20", A-36 STEEL, HOT DIP GALVANIZED
14	1	166970	BRACKET FOR 69KV RAYCHEM TERMINATOR, W/2 NON- CONDUCTIVE SADDLES
15	20'	813824	WIRE, 750 MCM CU., B.S.
16	1	(NOTE 3)	CONNECTOR, WEDGE
17	6	800182	WASHER, 1/2", HOT-DIP GALVANIZED

NOTES:

- QUANTITIES SHOWN ARE FOR ONE PHASE.
- TERMINAL IS SUPPLIED WITH RAYCHEM TERMINATOR.
- FOR ITEM (9) USE S. N. 289769 FOR 1033 ACSR TO 750 MCM CU. & S. N. 289791 FOR 636 ACSR TO 750 MCM CU..
- BRONZE SPRING WASHER SUPPLIED W/ BALL STUD.
- ITEMS 3, 4, 5, 6, 7, 15, 16 AND 17 ARE TO BE INSTALLED BY THE OVERHEAD CREW. ALL OTHERS ARE TO BE INSTALLED BY THE UG CABLE CREW.



ELEVATION

REV	DESCRIPTION	BY	CHKD	APPLY	DATE	DATE	DATE	DATE
B	REVISED NOTE 2	PM	WPH	WYT	2/22/05	E		
A	REVISED DESCRIPTION FOR ITEM 2	PM	WPH	WYT	1/19/05	D		
-	ORIGINAL ISSUE	WDF	SAG	WYT	3/20/02	C		
REF	CHANGE	BY	CHKD	APPLY	DATE	DATE	DATE	DATE
	CHANGE							
	UPDATE MATERIAL	PM	WPH	WYT	10/16/29/05			
	BY	CHKD	APPLY	DATE				

SCALE: NONE	
DWG. NO.	39005
SET. NO.	1 of 1

TRANSMISSION ENGINEERING

69KV RAYCHEM TERMINATOR AT STEEL CABLE POLE

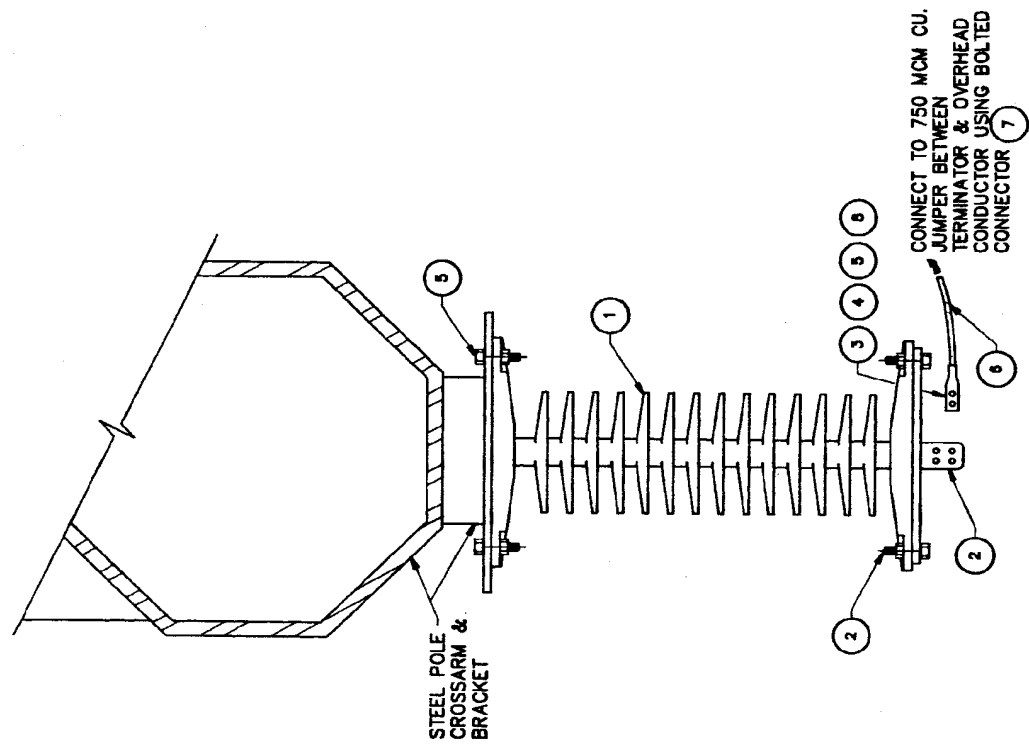


BILL OF MATERIAL

ITEM	QTY.	STOCK NO. OR STZ. NO.	DESCRIPTION
1	1	113804	ARRESTOR, 69KV, POLYMER, INTERMEDIATE
2	1	(SEE NOTE 2)	LUG, AERIAL, AL, 4-HOLE
3	1	728792	TERMINAL, COMPRESSION, 2-HOLE, CU.
4	1	543208	PLATE, TRANSMISSION, AL. TO CU., 2-HOLE
5	10	152832	BOLT, 1/2" x 2", MACHINE, HOT-DIP GALVANIZED
6	10'	808224	WIRE, 4/0 CU., B. S.
7	1	252464	CONNECTOR, BRONZE, BOLTED
8	2	796768	WASHER, SPRING, 1/2" HOT-DIP GALVANIZED

NOTE:

1. QUANTITIES SHOWN ARE FOR ONE PHASE.
2. AERIAL LUG IS SUPPLIED AS PART OF THE ARRESTOR.
3. ALL WORK SHOWN IS TO BE INSTALLED BY THE OVERHEAD CREW.



REV	QTY.	ITEM	DATE	BY	CHKD	APPV	DATE	REV	CHANGE
B		UPDATED	3/1/07	E					
A		UPDATED MATERIALS	9/26/05	D					
		ORIGINAL	3/20/02	C					
		CHANGE							

SDGE

TRANSMISSION ENGINEERING

69KV LIGHTNING ARRESTOR
AT STEEL CABLE POLE

SCALE: NONE
DWC. NO. 39010
SHT. NO. 1 of 1

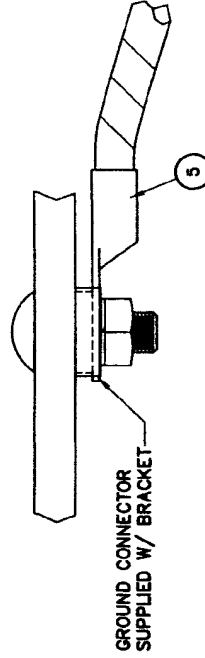
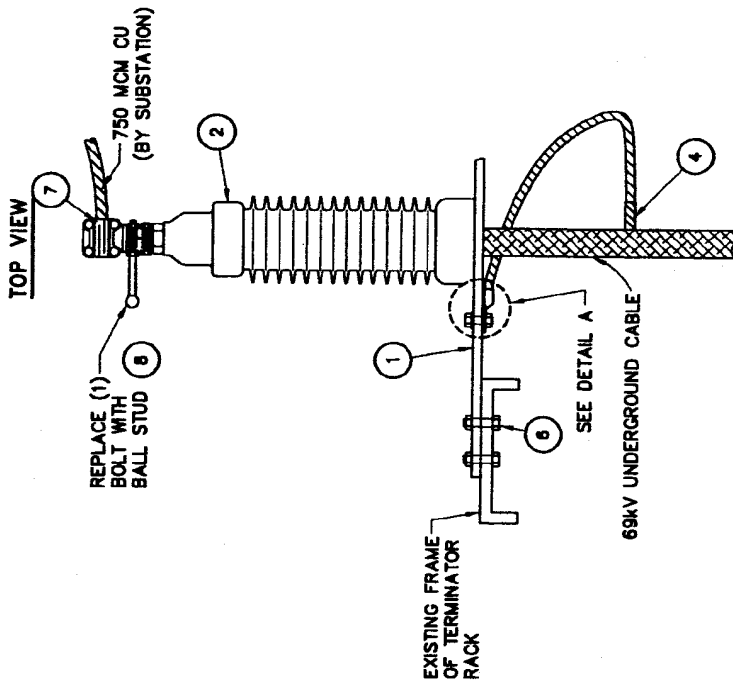
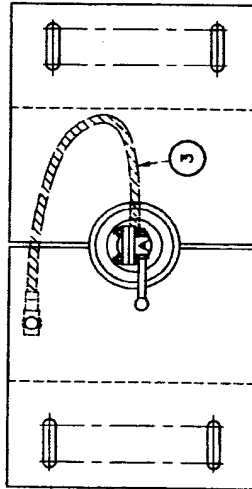
39010801

BILL OF MATERIAL

ITEM	QTY.	STOCK NO. OR STD. NO.	DESCRIPTION
1	1	166666	BRACKET, MOUNTING, FOR JOSLYN TERMINATOR, 2-PIECE
2	1	727000	TERMINATOR, 69KV, JOSLYN
3	6'	808224	WIRE, COPPER, 600V, INSULATED
4	1	254176	DAM CONNECTOR, 4/0 CU.
5	1	259136	CONNECTOR, COMPRESSION WIRE FOR 4/0 CU.
6	5	152832	1/2" x 2" GALV. BOLT
7	1	470460	AERIAL LUG, FLAT BUS CONNECTION, CU., 4/0 -2000 MCM, 4-HOLE, W/BOLTS
8	1	700100	GROUNDING BALL STUD 5/8" x 3"

NOTE:

- QUANTITIES SHOWN ARE FOR ONE PHASE.
- REFER TO DWG. NO. 35002 FOR RISER DETAILS.
- ALL WORK IS TO BE INSTALLED BY THE UG CABLE CREW, U.N.



DETAIL A

SIDE VIEW

REV	DATE	BY	CHKD	APPY	DATE	BY	CHKD	APPY	DATE	CHANGE
B										
A	8/28/05	PM	WPH	WT	3/20/02					
-										
REF										

TRANSMISSION ENGINEERING
SDGE
 69KV JOSLYN TERMINATOR
 AT SUBSTATION RACK

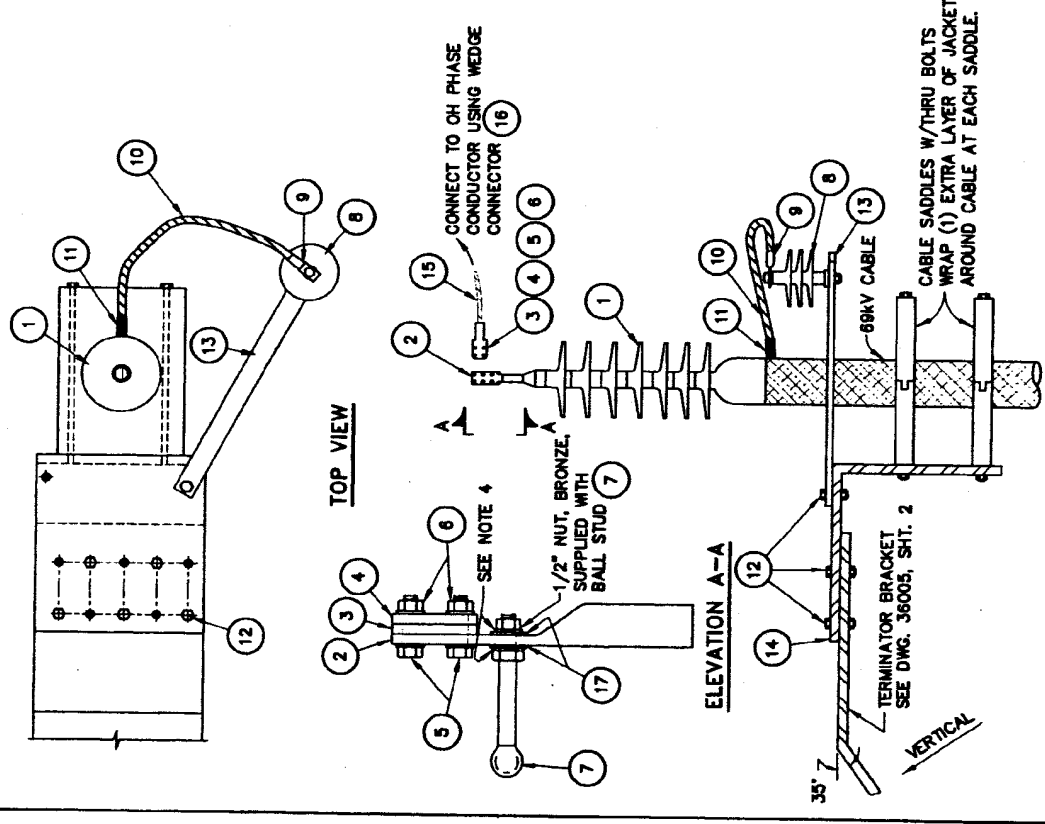
SCALE: NONE
 DFG. NO. 39015
 SFT. NO. 1 of 1

10451086

BILL OF MATERIAL

ITEM	QTY.	STOCK NO. OR STD. NO.	DESCRIPTION
1	1	723924	TERMINATOR, RAYCHEM, POLYMER, 69KV
2	1	(NOTE 2)	TERMINAL, AL., COMPRESSION OR SHEAR BOLT TYPE, WITH 6-HOLE NEMA PAD
3	1	543216	PLATE, TRANSITION, AL TO CU., 4-HOLE
4	1	729924	TERMINAL, CU., COMPRESSION, 4-HOLE NEMA PAD, FOR 750 MCM CU.
5	4	192634	BOLT, 1/2" x 2-3/4", MACHINE, HOT-DIP GALVANIZED
6	4	796768	WASHER, SPRING, 1/2", HOT-DIP GALVANIZED
7	1	700100	GROUNDING BALL STUD, 5/8" x 3"
8	1	113900	ARRESTOR, 3KV, TYPE "ZSP", POLYMER
9	1	259136	CONNECTOR, COMPRESSION, PURPLE, FOR 4/0 CU.
10	6'	808224	WIRE, 4/0 CU., B.S.
11	1	254176	4/0 CU. DAM CONNECTOR
12	6	152808	BOLT, 1/2" x 1-1/2", MACHINE, HOT-DIP GALVANIZED
13	1	696964	STRAP, 1/2" x 1-1/2" x 20", A-36 STEEL, HOT DIP GALVANIZED
14	1	166870	BRACKET FOR 69KV RAYCHEM TERMINATOR, W/2 NON- CONDUCTIVE SADDLES
15	20'	813924	WIRE, 750 MCM CU., B.S. (INCLUDED IN DWG. 36005)
16	1	(NOTE 3)	CONNECTOR, WEDGE (INCLUDED IN DWG. 19190)
17	6	800192	WASHER, 1/2". HOT-DIP GALVANIZED

NOTES:
 1. QUANTITIES SHOWN ARE FOR ONE PHASE.
 2. COMPRESSION TERMINAL IS SUPPLIED WITH RAYCHEM TERMINATOR.
 3. FOR ITEM (8) USE S. N. 269789 FOR 1033 ACSR TO 750 MCM CU. & S. N. 269791 FOR 636 ACSR TO 750 MCM CU..
 4. BRONZE SPRING WASHER SUPPLIED W/ BALL STUD.
 5. ITEMS 3, 4, 5, 6, 7, 15, 16 AND 17 ARE TO BE INSTALLED BY THE OVERHEAD CREW. ALL OTHERS ARE TO BE INSTALLED BY THE UG CABLE CREW.

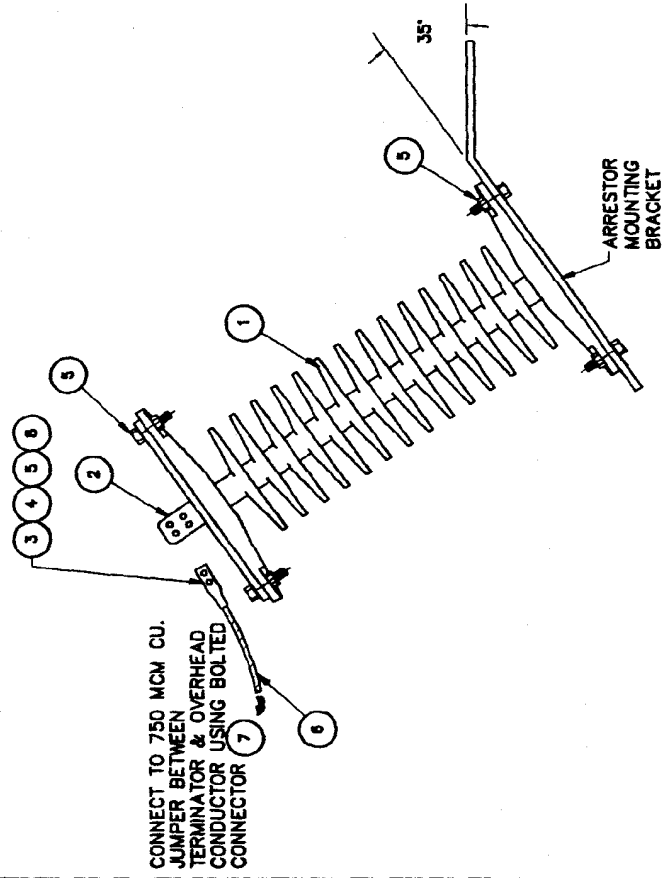


TRANSMISSION ENGINEERING				SCALE:	NONE
69KV RAYCHEM TERMINATOR AT WOOD CABLE POLE				DWG. NO.	39020
SDGE				SET. NO.	1 of 1
B	UPDATED MATERIALS	PM	WPH	11/8/29/05	E
A	REVISED DESCRIPTION FOR ITEM 2	PM	WPH	1/18/05	D
-	ORIGINAL ISSUE	WOF	WPH	5/8/02	C
REV	CHANGE	BY	CHD	APPY	DATE
				REV	
				CHANGE	

BILL OF MATERIAL			
ITEM	QTY.	STOCK NO. OR SYZY. NO.	DESCRIPTION
1	1	113804	ARRESTOR, 69KV, POLYMER, INTERMEDIATE
2	1	(SEE NOTE 2)	LUG, AERIAL, AL, 4-HOLE
3	1	728782	TERMINAL, COMPRESSION, 2-HOLE, CU.
4	1	543208	PLATE, TRANSITION, AL TO CU., 2-HOLE
5	10	152832	BOLT, 1/2" x 2", MACHINE, HOT-DIP GALVANIZED
6	8'	808224	WIRE, 4/0 CU., B. S. (INCLUDED IN DWG. 36006)
7	1	262464	CONNECTOR, BRONZE, BOLTED (INCLUDED IN DWG. 36006)
8	2	788788	WASHER, SPRING, 1/2" HOT-DIP GALVANIZED

NOTE:

- QUANTITIES SHOWN ARE FOR ONE PHASE.
- AERIAL LUG IS SUPPLIED AS PART OF THE ARRESTOR
- ALL WORK SHOWN IS TO BE INSTALLED BY THE OVERHEAD CREW.



REV	DATE	BY	CHKD	APPY	DATE	REV
B	3/1/07	PM			E	
A	8/28/05	PM			D	
	5/8/02	WDF			C	
REV	DATE	BY	CHKD	APPY	DATE	REV

SCALE:	NONE
DWG. NO.	39025
SGE	1 of 1

TRANSMISSION ENGINEERING
69KV LIGHTNING ARRESTOR
AT WOOD CABLE POLE

DATE	BY	CHKD	APPY