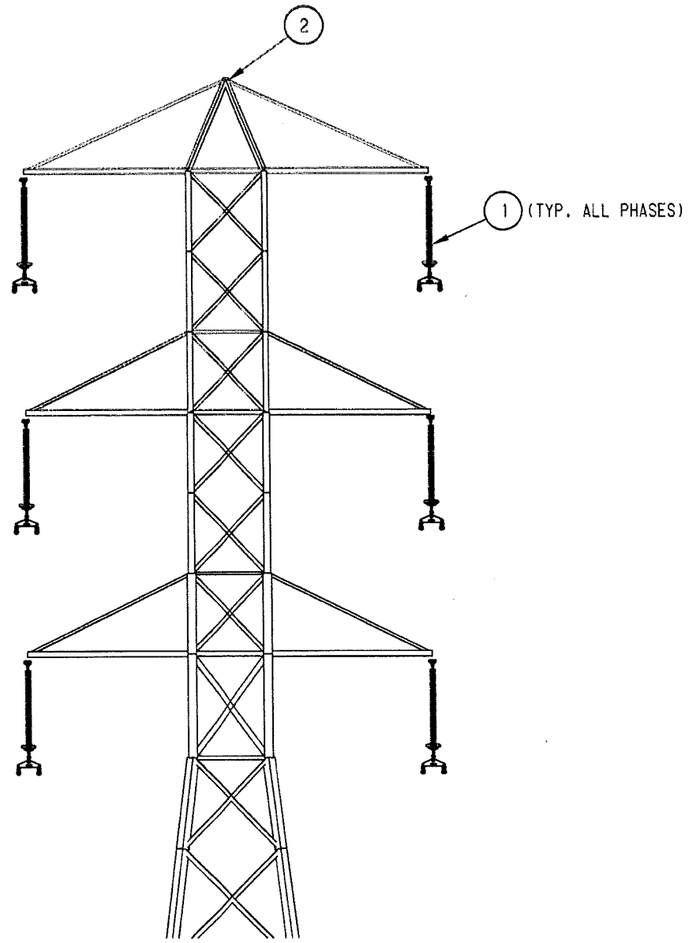


ELEVATION

BILL OF MATERIAL			
ITEM	QUAN.	DESCRIPTION	DWG. NO.
1	6	SUSPENSION INSULATOR ASSY, 2B-1590 45/7 ACSR "LAPWING"	N-4593 SH1*
2	1	TRUNNION SUSP. CLAMP ASSY, OPGW	N-4595 SH1

* SEE NOTE 1

REGISTERED PROFESSIONAL ENGINEER STEVEN HARRISON C 048314 CIVIL ENGINEER STATE OF CALIFORNIA 5/17/12

PROFESSIONAL ENGINEER STATE OF NEVADA STEVEN HARRISON Exp: 6/30/13 CIVIL No. 10316 5/17/12

NOTES:

1. IF TIE DOWN WEIGHTS ARE SPECIFIED ITEM 1 WILL BE REPLACED BY N-4593 SH.2, SUSPENSION INSULATOR ASSEMBLY WITH WEIGHTS.
2. UNLESS OTHERWISE NOTED, EACH VERTICAL BOLT OR PIN SHALL HAVE THE NUT OR COTTER FACE DOWN. EACH HORIZONTAL BOLT OR PIN SHALL HAVE THE NUT OR COTTER FACE TOWARD THE STEP LEG OF THE TOWER.

* REVISE ON AUTOCAD SYSTEM ONLY *

SAP WO	LOCATION
900344621	CALIFORNIA
900344623	NEVADA

POWER ENGINEERS

PEI SUBMITTAL DATE: 05-20-2012

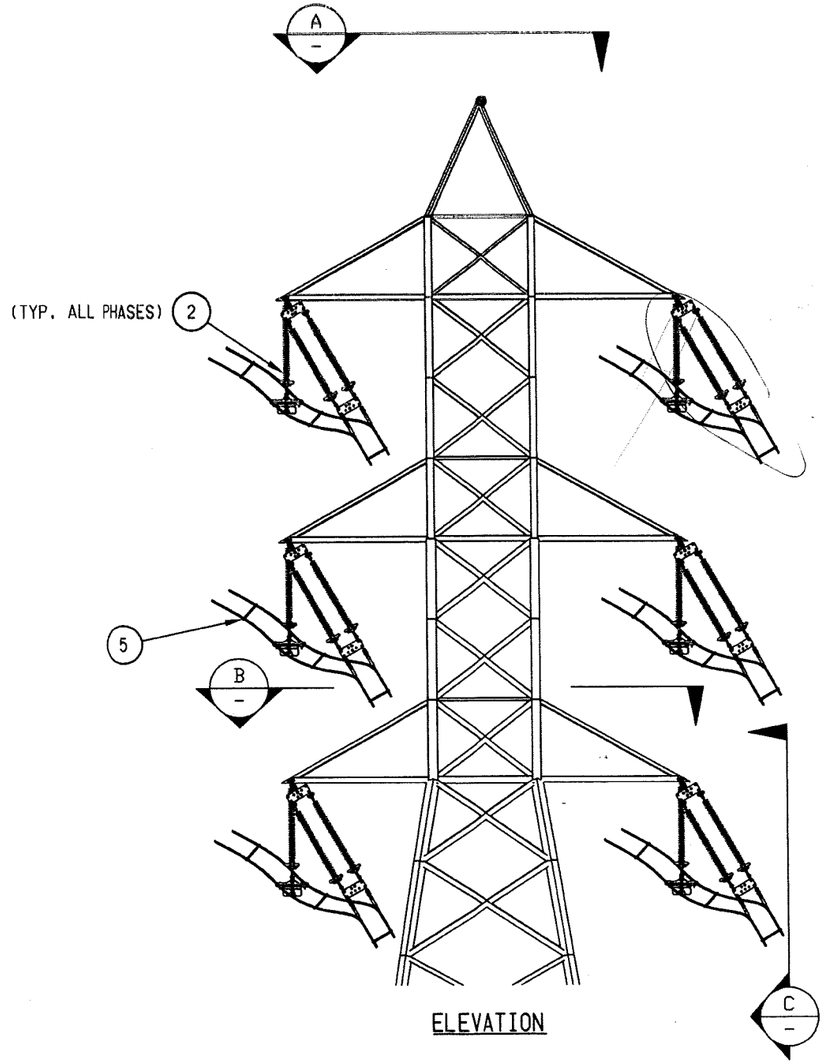
REFERENCE DRAWINGS		NO	REVISIONS	DATE	SAP WO	SUPV	APPROVED	ENGR	CK'D	MADE	P.E.
M-60221	DATA SHEETS, CKT #2										
M-60220	MASTER DWG LIST, CKT #2										
5453019	TOWER DRAWINGS										
M-60204	MASTER DWG LIST, CKT #1										
725645	GENERAL ARRANGEMENT										
725646	PLAN AND PROFILES										
M-60205	DATA SHEETS, CKT #1	0	ISSUED FOR CONSTRUCTION	6/1/12	SEE TABLE			BH POWER	OR	HG POWER	SH POWER

LOCATION ELDORADO - IVANPAH NO.1 & NO.2 220kV T/L

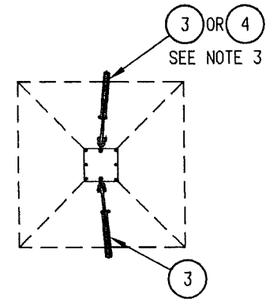
HARDWARE FRAMING ASSEMBLY
TOWER TYPE WB (C X-ARM)

SOUTHERN CALIFORNIA EDISON An EDISON INTERNATIONAL Company

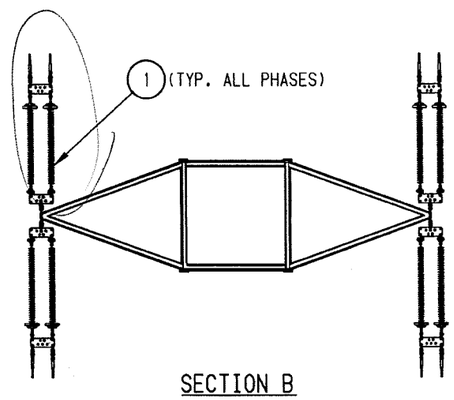
D/L N4592SH01.DWG | N-4592-0 | SH.1



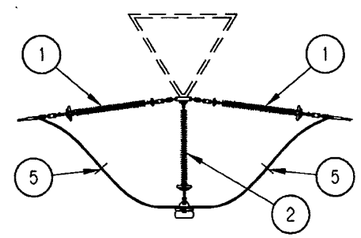
ELEVATION



SECTION A



SECTION B



SECTION C

BILL OF MATERIAL			
ITEM	QUAN.	DESCRIPTION	DWG. NO.
1	12	DEADEND INSULATOR ASSY, 2B-1590 45/7 ACSR "LAPWING"	N-4593 SH3
2	6	JUMPER LOOP INSULATOR ASSY, 2B-1590 45/7 ACSR "LAPWING"	N-4593 SH5
3	AS REQ *	OPGW DEADEND ASSY, GROUNDED	N-4595 SH2
4	AS REQ *	OPGW DEADEND ASSY, UNGROUNDED	N-4595 SH3
5	12	CONDUCTOR SPACER FOR JUMPER (PART NO. 10068374)	---
6	AS REQ	OUTRIGGER, SEE NOTE 2	---

* SEE NOTE 3

REGISTERED PROFESSIONAL ENGINEER STEVEN HARRISON C 048314 CIVIL ENGINEER STATE OF CALIFORNIA 5/17/12

PROFESSIONAL ENGINEER STATE OF NEVADA STEVEN J. HARRISON Exp: 6/30/12 CIVIL No. 10316 5/17/12

NOTES:

1. EACH JUMPER LOOP SHALL BE DIVIDED INTO FOUR EQUAL SEGMENTS BY INSTALLING TWO (2) CONDUCTOR SPACER CLAMPS (ITEM 5) AND A JUMPER LOOP INSULATOR (ITEM 2).
2. WHEN OUTRIGGERS ARE SPECIFIED (NOT SHOWN) THEY WILL BE INSTALLED ON THE ARMS THAT ARE ON THE OUTSIDE OF THE LINE ANGLE. THE PURPOSE OF THE OUTRIGGER IS TO SUPPORT THE JUMPER ASSEMBLY/ASSEMBLIES.
3. IF AN OPGW SPLICE IS REQUIRED, BOTH THE AHEAD AND BACK OPGW DEADENDS ARE TO BE GROUNDED (2 X ITEM 3). DEADEND TOWERS WITHOUT AN OPGW SPLICE REQUIRE ONLY ONE GROUNDED ASSEMBLY (ITEM 3) THE OTHER ASSEMBLY WILL BE UNGROUNDED (ITEM 4). REFER TO DRAWING N-4599 SH.1, FOR A MORE COMPREHENSIVE LIST OF MATERIAL NEEDED FOR THE OPGW SPLICE.
4. UNLESS OTHERWISE NOTED, EACH VERTICAL BOLT OR PIN SHALL HAVE THE NUT OR COTTER FACE DOWN. EACH HORIZONTAL BOLT OR PIN SHALL HAVE THE NUT OR COTTER FACE TOWARD THE STEP LEG OF THE TOWER.
5. A CLEARANCE OF 8 FEET SHALL BE MAINTAINED FROM CONDUCTOR, AND ALL ENERGIZED HARDWARE, TO STRUCTURE STEEL DURING NORMAL INSTALLATION CONDITIONS.

* REVISE ON AUTOCAD SYSTEM ONLY *

SAP WO	LOCATION
900344621	CALIFORNIA
900344623	NEVADA

POWER ENGINEERS

PEI SUBMITTAL DATE: 05-20-2012

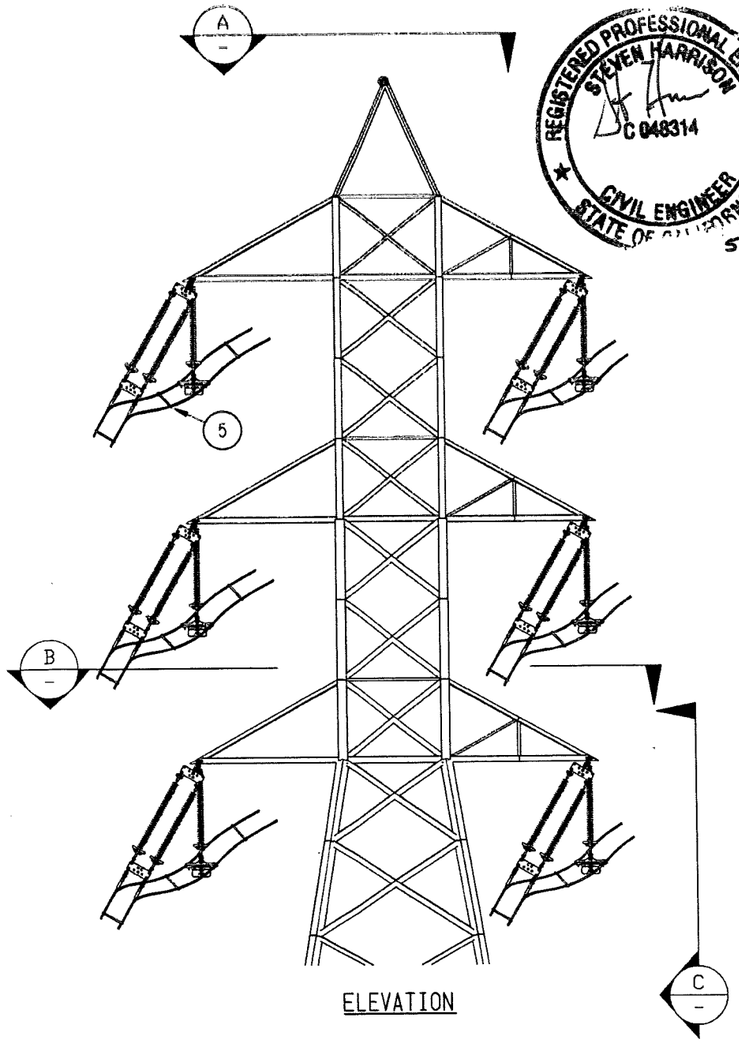
REFERENCE DRAWINGS		NO	REVISIONS	DATE	SAP WO	SUPV	APPROVED	ENGR (BH POWER)	CK'D (OK)	MADE (MG POWER)	P.E. (SH POWER)
M-60221	DATA SHEETS, CKT #2										
M-60220	MASTER DWG LIST, CKT #2										
5453019	TOWER DRAWINGS										
M-60204	MASTER DWG LIST, CKT #1										
725645	GENERAL ARRANGEMENT										
725646	PLAN AND PROFILES										
M-60205	DATA SHEETS, CKT #1	0	ISSUED FOR CONSTRUCTION	6/1/12	SEE TABLE						

LOCATION ELDORADO - IVANPAH NO.1 & NO.2 220kV T/L

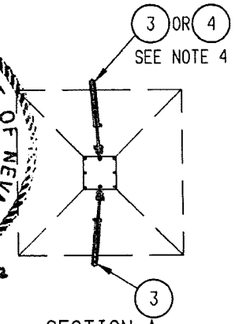
HARDWARE FRAMING ASSEMBLY
TOWER TYPE WY (A X-ARM)

SOUTHERN CALIFORNIA EDISON An EDISON INTERNATIONAL Company

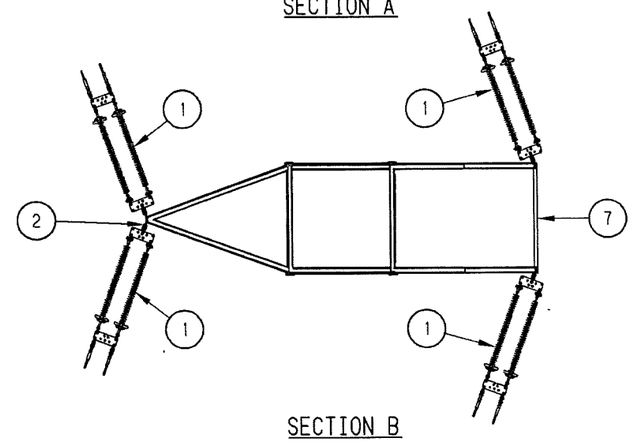
D/L N4592SH02.DWG | N-4592-0 | SH.2



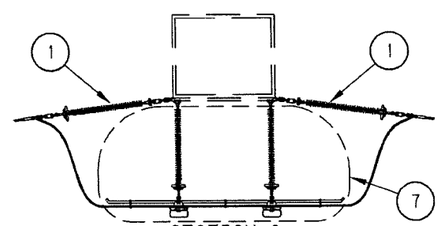
ELEVATION



SECTION A



SECTION B



SECTION C

REGISTERED PROFESSIONAL ENGINEER STEVEN HARRISON C 048314 CIVIL ENGINEER STATE OF CALIFORNIA 5/17/12

PROFESSIONAL ENGINEER STATE OF NEVADA STEVEN HARRISON Exp: 6/30/13 CIVIL No. 10316 5/17/12

BILL OF MATERIAL

ITEM	QUAN.	DESCRIPTION	DWG. NO.
1	12	DEADEND INSULATOR ASSY, 2B-1590 45/7 ACSR "LAPWING"	N-4593 SH3
2	3	JUMPER LOOP INSULATOR ASSY, 2B-1590 45/7 ACSR "LAPWING"	N-4593 SH5
3	AS REQ *	OPGW DEADEND ASSY, GROUNDED	N-4595 SH2
4	AS REQ *	OPGW DEADEND ASSY, UNGROUNDED	N-4595 SH3
5	6	CONDUCTOR SPACER FOR JUMPER (PART NO. 10068374)	---
6	AS REQ	OUTRIGGER, SEE NOTE 3	---
7	3	JUMPER STIFFENER, 2-STRING, 2B-1590 45/7 ACSR "LAPWING"	N-4593 SH6

* SEE NOTE 4

NOTES:

1. THE POINTED ARM JUMPER LOOP SHALL BE DIVIDED INTO FOUR EQUAL SEGMENTS BY INSTALLING TWO (2) CONDUCTOR SPACER CLAMPS (ITEM 5) AND A JUMPER LOOP INSULATOR (ITEM 2).
2. THE BOX ARM JUMPER LOOP WILL BE DIVIDED INTO FIVE (5) SEGMENTS BY INSTALLING THE JUMPER STIFFENER (ITEM 7).
3. WHEN OUTRIGGERS ARE SPECIFIED (NOT SHOWN) THEY WILL BE INSTALLED ON THE BOX ARMS. THE PURPOSE OF THE OUTRIGGER IS TO SUPPORT THE JUMPER ASSEMBLY/ASSEMBLIES. ADDITIONALLY, ITEM 7 WILL BE REPLACED BY DWG. NO. N-4593 SH.8.
4. IF AN OPGW SPLICE IS REQUIRED, BOTH THE AHEAD AND BACK OPGW DEADENDS ARE TO BE GROUNDED (2 X ITEM 3). DEADEND TOWERS WITHOUT AN OPGW SPLICE REQUIRE ONLY ONE GROUNDED ASSEMBLY (ITEM 3) THE OTHER ASSEMBLY WILL BE UNGROUNDED (ITEM 4). REFER TO DRAWING N-4599 SH.1, FOR A MORE COMPREHENSIVE LIST OF MATERIAL NEEDED FOR THE OPGW SPLICE.
5. UNLESS OTHERWISE NOTED, EACH VERTICAL BOLT OR PIN SHALL HAVE THE NUT OR COTTER FACE DOWN. EACH HORIZONTAL BOLT OR PIN SHALL HAVE THE NUT OR COTTER FACE TOWARD THE STEP LEG OF THE TOWER.
6. A CLEARANCE OF 8 FEET SHALL BE MAINTAINED FROM CONDUCTOR, AND ALL ENERGIZED HARDWARE, TO STRUCTURE STEEL DURING NORMAL INSTALLATION CONDITIONS.

* REVISE ON AUTOCAD SYSTEM ONLY *

SAP WO	LOCATION
900344621	CALIFORNIA
900344623	NEVADA

POWER ENGINEERS

PEI SUBMITTAL DATE: 05-20-2012

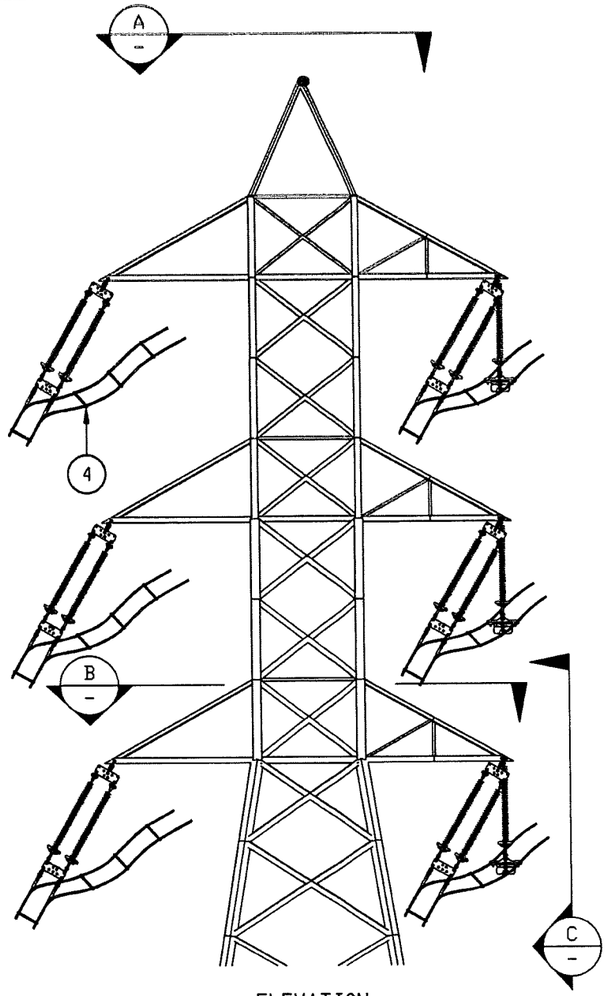
REFERENCE DRAWINGS		NO	REVISIONS	DATE	SAP WO	SUPV	APPROVED	ENGR	CK'D	MADE	P.E.
M-60221	DATA SHEETS, CKT #2										
M-60220	MASTER DWG LIST, CKT #2										
5453019	TOWER DRAWINGS										
M-60204	MASTER DWG LIST, CKT #1										
725645	GENERAL ARRANGEMENT										
725646	PLAN AND PROFILES										
M-60205	DATA SHEETS, CKT #1	0	ISSUED FOR CONSTRUCTION	6/1/12	SEE TABLE			BH POWER		MG POWER	SH POWER

LOCATION ELDORADO - IVANPAH NO.1 & NO.2 220kV T/L

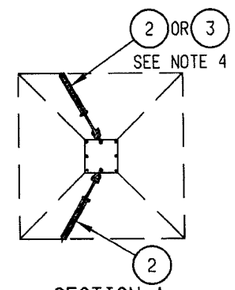
HARDWARE FRAMING ASSEMBLY
TOWER TYPE WY (B X-ARM)

SOUTHERN CALIFORNIA EDISON An EDISON INTERNATIONAL Company

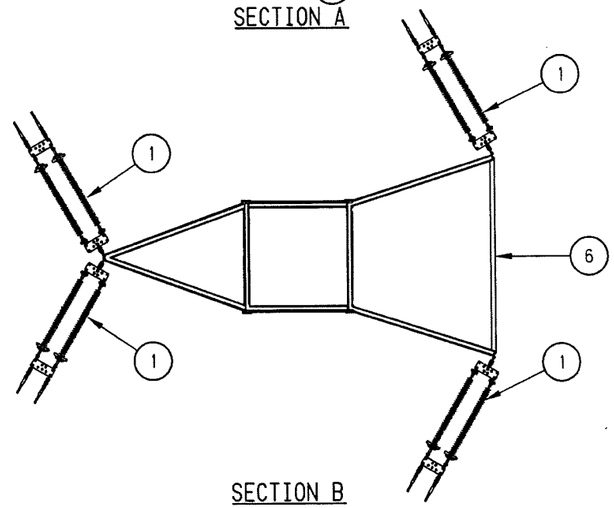
D/L N4592SH03.DWG | N-4592-0 | SH.3



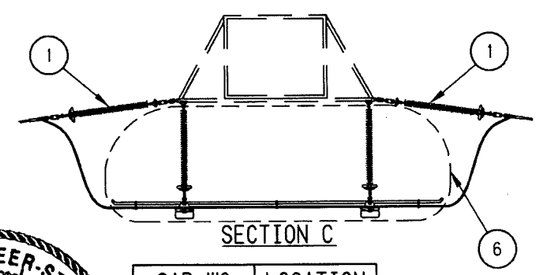
ELEVATION



SECTION A



SECTION B



SECTION C

BILL OF MATERIAL

ITEM	QUAN.	DESCRIPTION	DWG. NO.
1	12	DEADEND INSULATOR ASSY, 2B-1590 45/7 ACSR "LAPWING"	N-4593 SH3
2	AS REQ *	OPGW DEADEND ASSY, GROUNDED	N-4595 SH2
3	AS REQ *	OPGW DEADEND ASSY, UNGROUNDED	N-4595 SH3
4	9	CONDUCTOR SPACER FOR JUMPER (PART NO. 10068374)	---
5	AS REQ	OUTRIGGER, SEE NOTE 3	---
6	3	JUMPER STIFFENER, 2-STRING, 2B-1590 45/7 ACSR "LAPWING"	N-4593 SH8

* SEE NOTE 4

NOTES:

1. THE POINTED ARM JUMPER LOOP SHALL BE DIVIDED INTO FOUR EQUAL SEGMENTS BY INSTALLING THREE (3) CONDUCTOR SPACER CLAMPS (ITEM 4). A JUMPER LOOP INSULATOR WILL NOT BE INSTALLED ON THE POINTED ARM.
2. THE BUTTERFLY ARM JUMPER LOOP WILL BE DIVIDED INTO SIX (6) SEGMENTS BY INSTALLING THE JUMPER STIFFENER (ITEM 6).
3. WHEN OUTRIGGERS ARE SPECIFIED (NOT SHOWN) THEY WILL BE INSTALLED ON THE BUTTERFLY ARMS. THE PURPOSE OF THE OUTRIGGER IS TO SUPPORT THE JUMPER ASSEMBLY/ASSEMBLIES. ADDITIONALLY, ITEM 6 WILL BE REPLACED BY DWG. NO. N-4593 SH.7.
4. IF AN OPGW SLICE IS REQUIRED, BOTH THE AHEAD AND BACK OPGW DEADENDS ARE TO BE GROUNDED (2 X ITEM 2). DEADEND TOWERS WITHOUT AN OPGW SPLICE REQUIRE ONLY ONE GROUNDED ASSEMBLY (ITEM 2); THE OTHER ASSEMBLY WILL BE UNGROUNDED (ITEM 3). REFER TO DRAWING N-4599 SH.1, FOR A MORE COMPREHENSIVE LIST OF MATERIAL NEEDED FOR THE OPGW SPLICE.
5. UNLESS OTHERWISE NOTED, EACH VERTICAL BOLT OR PIN SHALL HAVE THE NUT OR COTTER FACE DOWN. EACH HORIZONTAL BOLT OR PIN SHALL HAVE THE NUT OR COTTER FACE TOWARD THE STEP LEG OF THE TOWER.
6. A CLEARANCE OF 8 FEET SHALL BE MAINTAINED FROM CONDUCTOR, AND ALL ENERGIZED HARDWARE, TO STRUCTURE STEEL DURING NORMAL INSTALLATION CONDITIONS.
7. JUMPER LOOPS NOT SUPPORTED BY A JUMPER INSULATOR MUST BE CONSTRUCTED TO THE MEET THE FOLLOWING CRITERIA. JUMPER LOOPS MUST MAINTAIN 8 FEET OF CLEARANCE BETWEEN THE CONDUCTOR AND ANY PORTION OF THE TOWER STEEL. JUMPER LOOP SAG MUST BE LIMITED TO 10 FEET OR LESS. JUMPER LOOPS MUST BE BUILT WITH SUFFICIENT SLACK TO ALLOW THE DEADEND ASSEMBLIES TO MOVE DURING WEATHER EVENTS WITHOUT INDUCING STRESS ON THE JUMPER LOOPS.

* REVISE ON AUTOCAD SYSTEM ONLY *

SAP WO	LOCATION
900344621	CALIFORNIA
900344623	NEVADA

POWER ENGINEERS

REGISTERED PROFESSIONAL ENGINEER STEVEN HARRISON C 66314 CIVIL ENGINEER STATE OF CALIFORNIA 5/17/12

PROFESSIONAL ENGINEER - STATE OF NEVADA STEVEN J. HARRISON Exp: 6/30/12 CIVIL No. 10316 5/17/12

PEI SUBMITTAL DATE: 05-20-2012

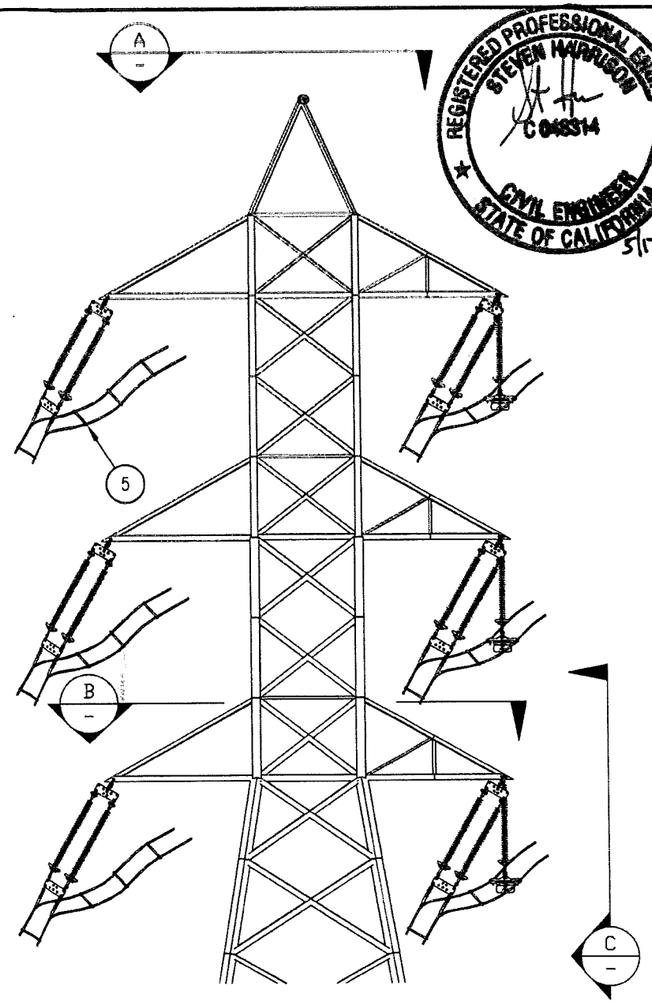
REFERENCE DRAWINGS		NO	REVISIONS	DATE	SAP WO	SUPV	APPROVED	ENGR	CK'D	MADE	P.E.
M-60221	DATA SHEETS, CKT #2										
M-60220	MASTER DWG LIST, CKT #2										
5453019	TOWER DRAWINGS										
M-60204	MASTER DWG LIST, CKT #1										
725645	GENERAL ARRANGEMENT										
725646	PLAN AND PROFILES										
M-60205	DATA SHEETS, CKT #1	0	ISSUED FOR CONSTRUCTION	6/1/12	SEE TABLE		C L Dorn	SH POWER	OR	HG POWER	SH POWER

LOCATION ELDORADO - IVANPAH NO.1 & NO.2 220kV T/L

HARDWARE FRAMING ASSEMBLY
TOWER TYPE WY (C X-ARM)

SOUTHERN CALIFORNIA EDISON An EDISON INTERNATIONAL Company

D/L N4592SH04.DWG | N-4592-0 | SH.4



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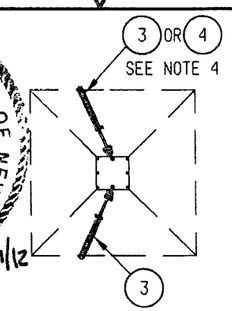
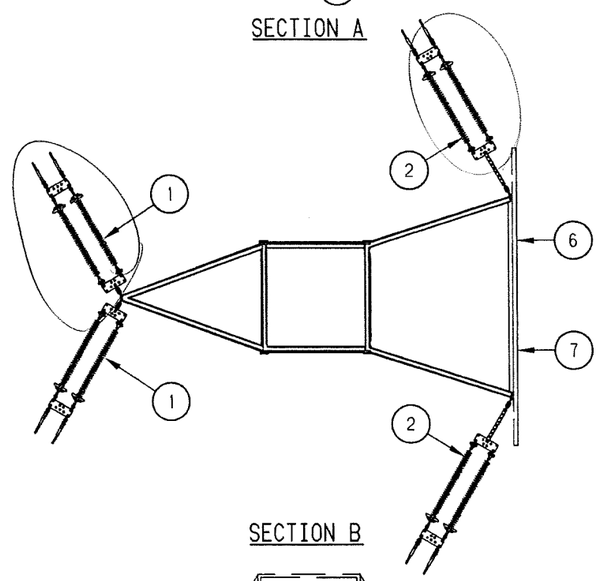


SECTION A



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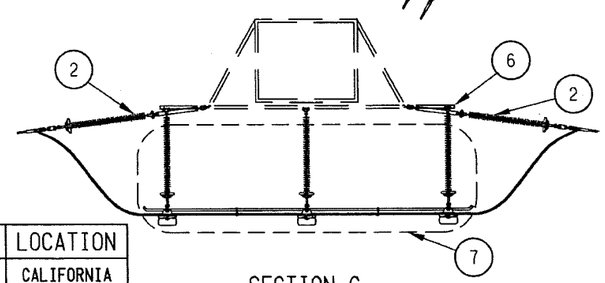


SECTION C

REGISTERED PROFESSIONAL ENGINEER STEVEN HARRISON C 048314 CIVIL ENGINEER STATE OF CALIFORNIA 5/17/12

PROFESSIONAL ENGINEER STATE OF NEVADA STEVEN J. HARRISON Exp: 6/30/13 CIVIL No. 10316 5/17/12

BILL OF MATERIAL

ITEM	QUAN.	DESCRIPTION	DWG. NO.
1	6	DEADEND INSULATOR, 2B-1590 45/7 ACSR "LAPWING"	N-4593 SH3
2	6	DE INSUL ASSY W/EXT STRAP, 2B-1590 45/7 ACSR "LAPWING"	N-4593 SH4
3	AS REQ *	OPGW DEADEND ASSY, GROUNDED	N-4595 SH2
4	AS REQ *	OPGW DEADEND ASSY, UNGROUNDED	N-4595 SH3
5	9	CONDUCTOR SPACER FOR JUMPER (PART NO. 10068374)	---
6	3	OUTRIGGER, SEE NOTE 3	---
7	3	JUMPER STIFFENER, 3-STRING, 2B-1590 45/7 ACSR "LAPWING"	N-4593 SH7

* SEE NOTE 4

NOTES:

1. THE POINTED ARM JUMPER LOOP SHALL BE DIVIDED INTO FOUR EQUAL SEGMENTS BY INSTALLING THREE (3) CONDUCTOR SPACER CLAMPS (ITEM 5). A JUMPER LOOP INSULATOR WILL NOT BE INSTALLED ON THE POINTED ARM.
2. THE BUTTERFLY ARM JUMPER LOOP WILL BE DIVIDED INTO SIX (6) SEGMENTS BY INSTALLING THE JUMPER STIFFENER (ITEM 7).
3. OUTRIGGERS ARE TO BE INSTALLED ON THE BUTTERFLY ARMS. THE PURPOSE OF THE OUTRIGGER IS TO SUPPORT THE JUMPER LOOP INSULATOR ASSEMBLY/ASSEMBLIES.
4. IF AN OPGW SLICE IS REQUIRED, BOTH THE AHEAD AND BACK OPGW DEADENDS ARE TO BE GROUNDED (2 X ITEM 3). DEADEND TOWERS WITHOUT AN OPGW SPLICE REQUIRE ONLY ONE GROUNDED ASSEMBLY (ITEM 3); THE OTHER ASSEMBLY WILL BE UNGROUNDED (ITEM 4). REFER TO DRAWING N-4599 SH.1, FOR A MORE COMPREHENSIVE LIST OF MATERIAL NEEDED FOR THE OPGW SPLICE.
5. UNLESS OTHERWISE NOTED, EACH VERTICAL BOLT OR PIN SHALL HAVE THE NUT OR COTTER FACE DOWN. EACH HORIZONTAL BOLT OR PIN SHALL HAVE THE NUT OR COTTER FACE TOWARD THE STEP LEG OF THE TOWER.
6. A CLEARANCE OF 8 FEET SHALL BE MAINTAINED FROM CONDUCTOR, AND ALL ENERGIZED HARDWARE, TO STRUCTURE STEEL DURING NORMAL INSTALLATION CONDITIONS.
7. JUMPER LOOPS NOT SUPPORTED BY A JUMPER INSULATOR MUST BE CONSTRUCTED TO THE MEET THE FOLLOWING CRITERIA. JUMPER LOOPS MUST MAINTAIN 8 FEET OF CLEARANCE BETWEEN THE CONDUCTOR AND ANY PORTION OF THE TOWER STEEL. JUMPER LOOP SAG MUST BE LIMITED TO 10 FEET OR LESS. JUMPER LOOPS MUST BE BUILT WITH SUFFICIENT SLACK TO ALLOW THE DEADEND ASSEMBLIES TO MOVE DURING WEATHER EVENTS WITHOUT INDUCING STRESS ON THE JUMPER LOOPS.

* REVISE ON AUTOCAD SYSTEM ONLY *

SAP WO	LOCATION
900344621	CALIFORNIA
900344623	NEVADA

POWER ENGINEERS

PEI SUBMITTAL DATE: 05-20-2012

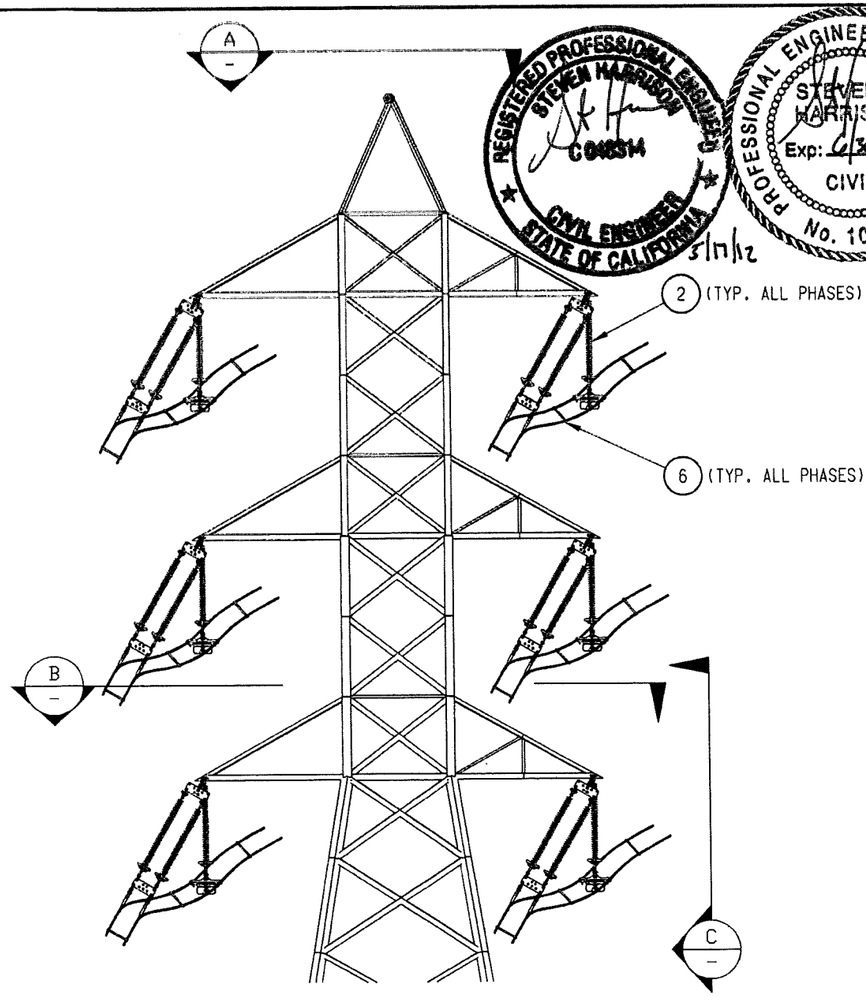
REFERENCE DRAWINGS		NO	REVISIONS	DATE	SAP WO	SUPV	APPROVED	ENGR	CK'D	MADE	P.E.
M-60221	DATA SHEETS, CKT #2										
M-60220	MASTER DWG LIST, CKT #2										
5453019	TOWER DRAWINGS										
M-60204	MASTER DWG LIST, CKT #1										
725645	GENERAL ARRANGEMENT										
725646	PLAN AND PROFILES										
M-60205	DATA SHEETS, CKT #1	0	ISSUED FOR CONSTRUCTION	6/1/12	SEE TABLE		C J Dom	BH POWER	OK	MG POWER	SH POWER

LOCATION ELDORADO - IVANPAH NO.1 & NO.2 220kV T/L

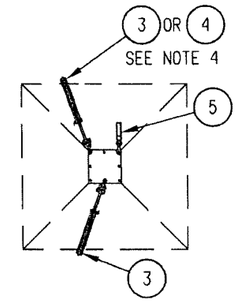
HARDWARE FRAMING ASSEMBLY
TOWER TYPE WZ W/ OTR (C X-ARM)

SOUTHERN CALIFORNIA EDISON An EDISON INTERNATIONAL Company

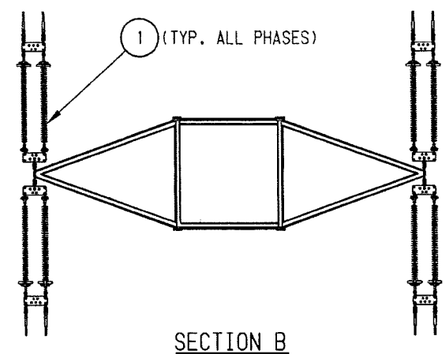
D/L N4592SH05.DWG | N-4592-0 | SH.5



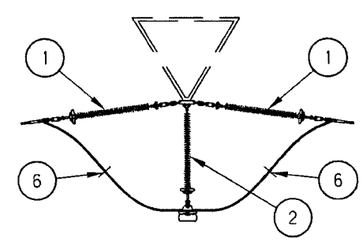
ELEVATION



SECTION A



SECTION B



SECTION C

BILL OF MATERIAL			
ITEM	QUAN.	DESCRIPTION	DWG. NO.
1	12	DEADEND INSULATOR ASSY, 2B-1590 45/7 ACSR "LAPWING"	N-4593 SH3
2	6	JUMPER LOOP INSULATOR ASSY, 2B-1590 45/7 ACSR "LAPWING"	N-4593 SH5
3	AS REQ *	OPGW DEADEND ASSY, GROUNDED	N-4595 SH2
4	AS REQ *	OPGW DEADEND ASSY, UNGROUNDED	N-4595 SH3
5	1	OHGW DEADEND ASSY, 1/2" EHS STEEL WIRE	N-4594 SH1
6	12	CONDUCTOR SPACER FOR JUMPER (PART NO. 10068374)	---
7	AS REQ	OUTRIGGER, SEE NOTE 3	---

* SEE NOTE 4

NOTES:

1. AN OHGW WILL BE ADDED AS A SECOND SHIELD WIRE TO PROTECT THE CONDUCTOR AS IT ROLLS FROM A VERTICAL CONFIGURATION TO HORIZONTAL.
2. EACH JUMPER LOOP SHALL BE DIVIDED INTO FOUR EQUAL SEGMENTS BY INSTALLING TWO (2) CONDUCTOR SPACER CLAMPS (ITEM 6) AND A JUMPER LOOP INSULATOR (ITEM 2).
3. WHEN OUTRIGGERS ARE SPECIFIED (NOT SHOWN) THEY WILL BE INSTALLED ON THE ARMS ON THE EXTERIOR OF THE LINE ANGLE. THE PURPOSE OF THE OUTRIGGER IS TO SUPPORT THE JUMPER ASSEMBLY/ASSEMBLIES.
4. IF AN OPGW SPLICE IS REQUIRED, BOTH THE AHEAD AND BACK OPGW DEADENDS ARE TO BE GROUNDED (2 X ITEM 3). DEADEND TOWERS WITHOUT AN OPGW SPLICE REQUIRE ONLY ONE GROUNDED ASSEMBLY (ITEM 3) THE OTHER ASSEMBLY WILL BE UNGROUNDED (ITEM 4). REFER TO DRAWING N-4599 SH.1, FOR A MORE COMPREHENSIVE LIST OF MATERIAL NEEDED FOR THE OPGW SPLICE.
5. UNLESS OTHERWISE NOTED, EACH VERTICAL BOLT OR PIN SHALL HAVE THE NUT OR COTTER FACE DOWN. EACH HORIZONTAL BOLT OR PIN SHALL HAVE THE NUT OR COTTER FACE TOWARD THE STEP LEG OF THE TOWER.
6. A CLEARANCE OF 8 FEET SHALL BE MAINTAINED FROM CONDUCTOR, AND ALL ENERGIZED HARDWARE, TO STRUCTURE STEEL DURING NORMAL INSTALLATION CONDITIONS.

* REVISE ON AUTOCAD SYSTEM ONLY *

REGISTERED PROFESSIONAL ENGINEER STEVEN HARRISON C048514 CIVIL ENGINEER STATE OF CALIFORNIA 5/17/12

PROFESSIONAL ENGINEER-STATE OF NEVADA STEVEN C. HARRISON Exp: 6/30/13 CIVIL No. 10316 5/17/12

SAP WO	LOCATION
900344621	CALIFORNIA
900344623	NEVADA

POWER ENGINEERS

PEI SUBMITTAL DATE: 05-20-2012

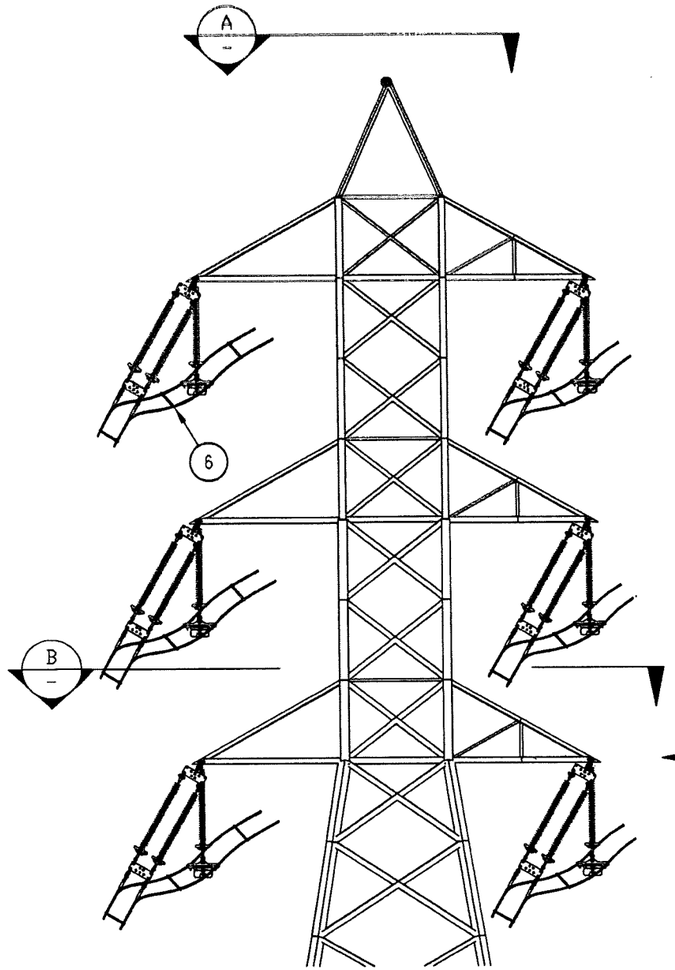
REFERENCE DRAWINGS		NO	REVISIONS	DATE	SAP WO	SUPV	APPROVED	ENGR	CK'D	MADE	P.E.
M-60221	DATA SHEETS, CKT #2										
M-60220	MASTER DWG LIST, CKT #2										
5453019	TOWER DRAWINGS										
M-60204	MASTER DWG LIST, CKT #1										
725645	GENERAL ARRANGEMENT										
725646	PLAN AND PROFILES										
M-60205	DATA SHEETS, CKT #1	0	ISSUED FOR CONSTRUCTION	6/1/12	SEE TABLE			BH POWER		MG POWER	SH POWER

LOCATION ELDORADO - IVANPAH NO.1 & NO.2 220kV T/L

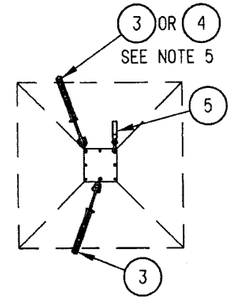
HARDWARE FRAMING ASSEMBLY
TOWER TYPE WY (A X-ARM) W/ 2 SW

SOUTHERN CALIFORNIA EDISON An EDISON INTERNATIONAL Company

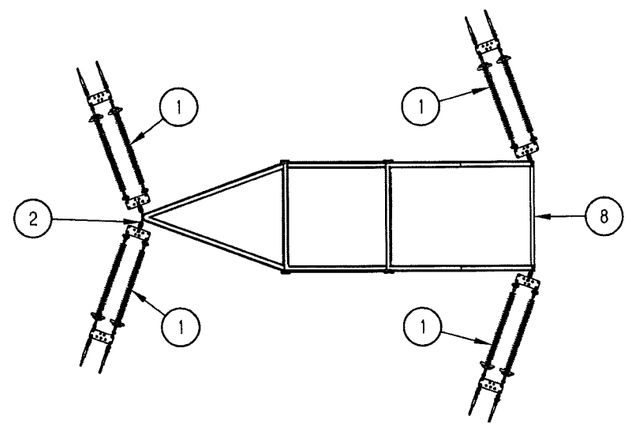
D/L N4592SH06.DWG | N-4592-0 | SH.6



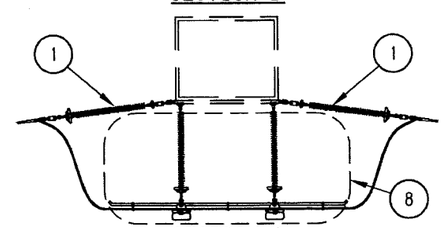
ELEVATION



SECTION A



SECTION B



SECTION C

BILL OF MATERIAL			
ITEM	QUAN.	DESCRIPTION	DWG. NO.
1	12	DEADEND INSULATOR ASSY, 2B-1590 45/7 ACSR "LAPWING"	N-4593 SH3
2	3	JUMPER LOOP INSULATOR ASSY, 2B-1590 45/7 ACSR "LAPWING"	N-4593 SH5
3	AS REQ *	OPGW DEADEND ASSY, GROUNDED	N-4595 SH2
4	AS REQ *	OPGW DEADEND ASSY, UNGROUNDED	N-4595 SH3
5	1	OHGW DEADEND ASSY, 1/2" EHS STEEL WIRE	N-4594 SH1
6	6	CONDUCTOR SPACER FOR JUMPER (PART NO. 10068374)	---
7	AS REQ	OUTRIGGER, SEE NOTE 4	---
8	3	JUMPER STIFFENER, 2-STRING, 2B-1590 45/7 ACSR "LAPWING"	N-4593 SH6

* SEE NOTE 5

NOTES:

1. AN OHGW WILL BE ADDED AS A SECOND SHIELD WIRE TO PROTECT THE CONDUCTOR AS IT ROLLS FROM A VERTICAL CONFIGURATION TO HORIZONTAL.
2. THE POINTED ARM JUMPER LOOP SHALL BE DIVIDED INTO FOUR EQUAL SEGMENTS BY INSTALLING TWO (2) CONDUCTOR SPACER CLAMPS (ITEM 6) AND A JUMPER LOOP INSULATOR (ITEM 2).
3. THE BOX ARM JUMPER LOOP WILL BE DIVIDED INTO FIVE (5) SEGMENTS BY INSTALLING THE JUMPER STIFFENER (ITEM 8).
4. WHEN OUTRIGGERS ARE SPECIFIED (NOT SHOWN) THEY WILL BE INSTALLED ON THE BOX ARMS. THE PURPOSE OF THE OUTRIGGER IS TO SUPPORT THE JUMPER ASSEMBLY/ASSEMBLIES. ADDITIONALLY, ITEM 8 WILL BE REPLACED BY DWG. NO. N-4595 SH.8.
5. IF AN OPGW SPLICE IS REQUIRED, BOTH THE AHEAD AND BACK OPGW DEADENDS ARE TO BE GROUNDED (2 X ITEM 3). DEADEND TOWERS WITHOUT AN OPGW SPLICE REQUIRE ONLY ONE GROUNDED ASSEMBLY (ITEM 3) THE OTHER ASSEMBLY WILL BE UNGROUNDED (ITEM 4). REFER TO DRAWING N-4599 SH.1, FOR A MORE COMPREHENSIVE LIST OF MATERIAL NEEDED FOR THE OPGW SPLICE.
6. UNLESS OTHERWISE NOTED, EACH VERTICAL BOLT OR PIN SHALL HAVE THE NUT OR COTTER FACE DOWN. EACH HORIZONTAL BOLT OR PIN SHALL HAVE THE NUT OR COTTER FACE TOWARD THE STEP LEG OF THE TOWER.
7. A CLEARANCE OF 8 FEET SHALL BE MAINTAINED FROM CONDUCTOR, AND ALL ENERGIZED HARDWARE, TO STRUCTURE STEEL DURING NORMAL INSTALLATION CONDITIONS.

* REVISE ON AUTOCAD SYSTEM ONLY *

SAP WO	LOCATION
900344621	CALIFORNIA
900344623	NEVADA

POWER ENGINEERS

REGISTERED PROFESSIONAL ENGINEER STEVEN HARRISON C068314 CIVIL ENGINEER STATE OF CALIFORNIA 5/17/12

PROFESSIONAL ENGINEER STATE OF NEVADA STEVEN J. HARRISON Exp: 6/30/13 CIVIL No. 10316 5/17/12

PEI SUBMITTAL DATE: 05-20-2012

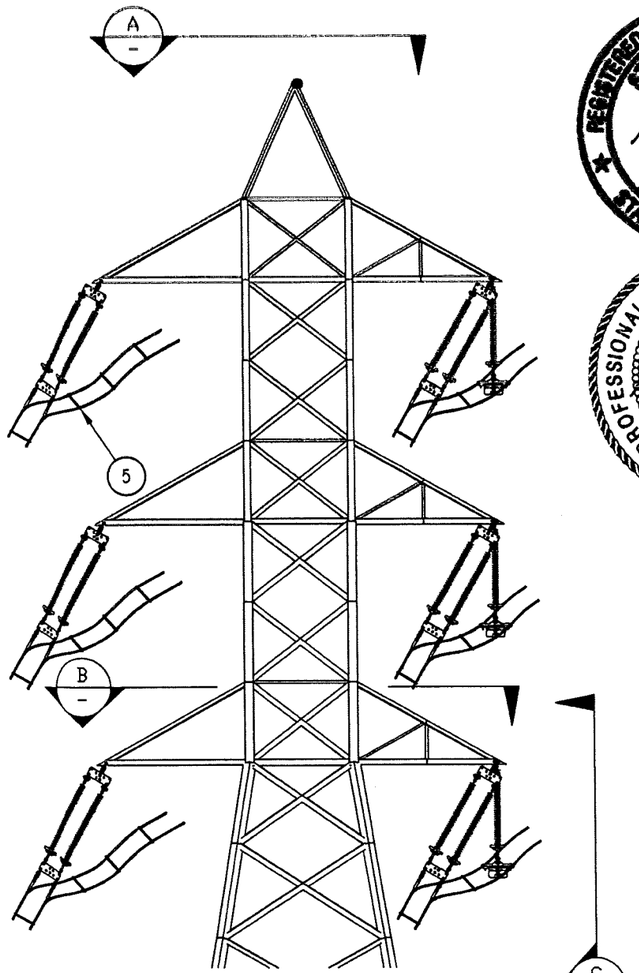
REFERENCE DRAWINGS		NO	REVISIONS	DATE	SAP WO	SUPV	APPROVED	ENGR	CK'D	MADE	P.E.
M-60221	DATA SHEETS, CKT #2										
M-60220	MASTER DWG LIST, CKT #2										
5453019	TOWER DRAWINGS										
M-60204	MASTER DWG LIST, CKT #1										
725645	GENERAL ARRANGEMENT										
725646	PLAN AND PROFILES										
M-60205	DATA SHEETS, CKT #1	0	ISSUED FOR CONSTRUCTION	6/1/12	SEE TABLE			BH POWER	OK	HG POWER	SH POWER

LOCATION ELDORADO - IVANPAH NO.1 & NO.2 220kV T/L

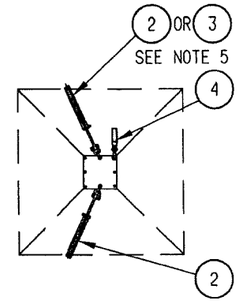
HARDWARE FRAMING ASSEMBLY
TOWER TYPE WY (B X-ARM) W/ 2 SW

SOUTHERN CALIFORNIA EDISON An EDISON INTERNATIONAL Company

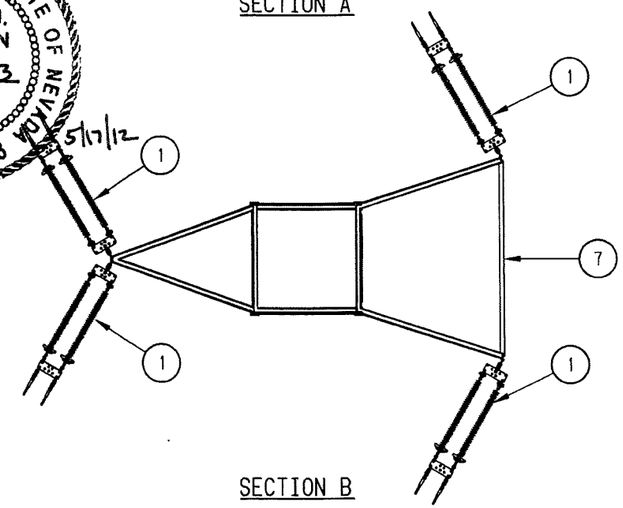
D/L N4592SH07.DWG | N-4592-0 | SH.7



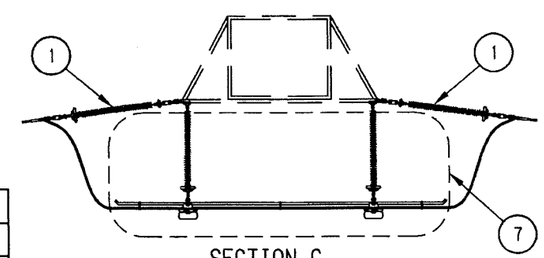
ELEVATION



SECTION A



SECTION B



SECTION C

REGISTERED PROFESSIONAL ENGINEER STEVEN HARRISON C 063514 CIVIL ENGINEER STATE OF CALIFORNIA 5/17/12

PROFESSIONAL ENGINEER-STATE OF NEVADA STEVEN J. HARRISON Exp: 12/31/13 CIVIL No. 10316 5/17/12

BILL OF MATERIAL			
ITEM	QUAN.	DESCRIPTION	DWG. NO.
1	12	DEADEND INSULATOR ASSY, 2B-1590 45/7 ACSR "LAPWING"	N-4593 SH3
2	AS REQ *	OPGW DEADEND ASSY, GROUNDED	N-4595 SH2
3	AS REQ *	OPGW DEADEND ASSY, UNGROUNDED	N-4595 SH3
4	1	OHGW DEADEND ASSY, 1/2" EHS STEEL WIRE	N-4594 SH1
5	9	CONDUCTOR SPACER FOR JUMPER (PART NO. 10068374)	---
6	AS REQ	OUTRIGGER, SEE NOTE 4	---
7	3	JUMPER STIFFENER, 2-STRING, 2B-1590 45/7 ACSR "LAPWING"	N-4593 SH8

* SEE NOTE 5

NOTES:

1. AN OHGW WILL BE ADDED AS A SECOND SHIELD WIRE TO PROTECT THE CONDUCTOR AS IT ROLLS FROM A VERTICAL CONFIGURATION TO HORIZONTAL.
2. THE POINTED ARM JUMPER LOOP SHALL BE DIVIDED INTO FOUR EQUAL SEGMENTS BY INSTALLING THREE (3) CONDUCTOR SPACER CLAMPS (ITEM 5). A JUMPER LOOP INSULATOR WILL NOT BE INSTALLED ON THE POINTED ARM.
3. THE BUTTERFLY ARM JUMPER LOOP WILL BE DIVIDED INTO SIX (6) SEGMENTS BY INSTALLING THE JUMPER STIFFENER (ITEM 7).
4. WHEN OUTRIGGERS ARE SPECIFIED (NOT SHOWN) THEY WILL BE INSTALLED ON THE BUTTERFLY ARMS. THE PURPOSE OF THE OUTRIGGER IS TO SUPPORT THE JUMPER ASSEMBLY/ASSEMBLIES. ADDITIONALLY, ITEM 6 WILL BE REPLACED BY DWG. NO. N-4593 SH.7.
5. IF AN OPGW SLICE IS REQUIRED, BOTH THE AHEAD AND BACK OPGW DEADENDS ARE TO BE GROUNDED (2 X ITEM 2). DEADEND TOWERS WITHOUT AN OPGW SPLICE REQUIRE ONLY ONE GROUNDED ASSEMBLY (ITEM 2); THE OTHER ASSEMBLY WILL BE UNGROUNDED (ITEM 3). REFER TO DRAWING N-4599 SH.1, FOR A MORE COMPREHENSIVE LIST OF MATERIAL NEEDED FOR THE OPGW SPLICE.
6. UNLESS OTHERWISE NOTED, EACH VERTICAL BOLT OR PIN SHALL HAVE THE NUT OR COTTER FACE DOWN. EACH HORIZONTAL BOLT OR PIN SHALL HAVE THE NUT OR COTTER FACE TOWARD THE STEP LEG OF THE TOWER.
7. A CLEARANCE OF 8 FEET SHALL BE MAINTAINED FROM CONDUCTOR, AND ALL ENERGIZED HARDWARE, TO STRUCTURE STEEL DURING NORMAL INSTALLATION CONDITIONS.
8. JUMPER LOOPS NOT SUPPORTED BY A JUMPER INSULATOR MUST BE CONSTRUCTED TO THE MEET THE FOLLOWING CRITERIA. JUMPER LOOPS MUST MAINTAIN 8 FEET OF CLEARANCE BETWEEN THE CONDUCTOR AND ANY PORTION OF THE TOWER STEEL. JUMPER LOOP SAG MUST BE LIMITED TO 10 FEET OR LESS. JUMPER LOOPS MUST BE BUILT WITH SUFFICIENT SLACK TO ALLOW THE DEADEND ASSEMBLIES TO MOVE DURING WEATHER EVENTS WITHOUT INDUCING STRESS ON THE JUMPER LOOPS.

* REVISE ON AUTOCAD SYSTEM ONLY *

SAP WO	LOCATION
900344621	CALIFORNIA
900344623	NEVADA

POWER ENGINEERS

PEI SUBMITTAL DATE: 05-20-2012

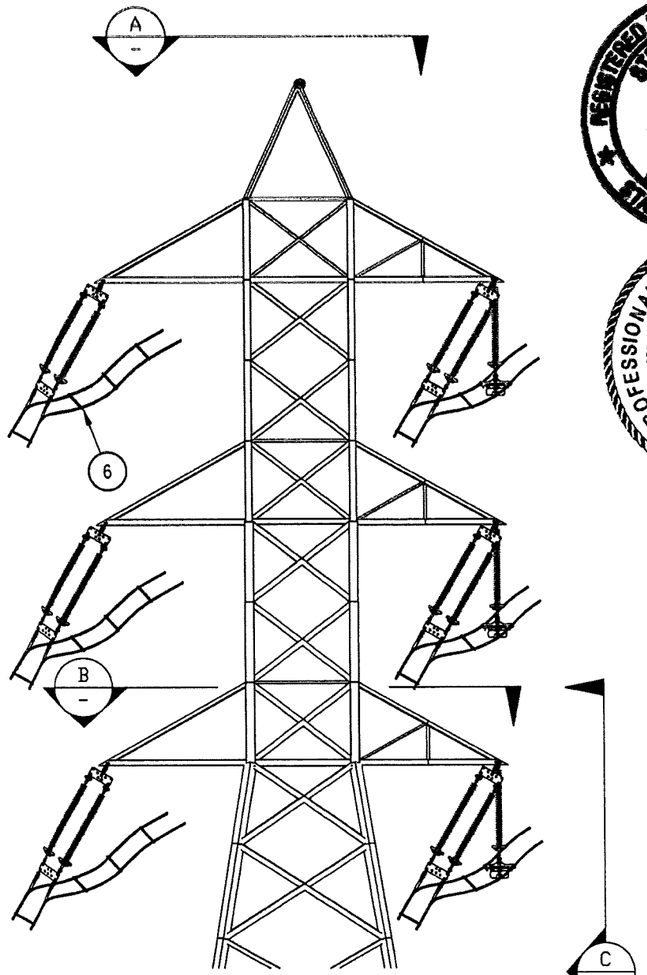
REFERENCE DRAWINGS		NO	REVISIONS	DATE	SAP WO	SUPV	APPROVED	ENGR	CK'D	MADE	P.E.
M-60221	DATA SHEETS, CKT #2										
M-60220	MASTER DWG LIST, CKT #2										
5453019	TOWER DRAWINGS										
M-60204	MASTER DWG LIST, CKT #1										
725645	GENERAL ARRANGEMENT										
725646	PLAN AND PROFILES										
M-60205	DATA SHEETS, CKT #1	0	ISSUED FOR CONSTRUCTION	6/1/12	SEE TABLE			BH POWER		MG POWER	SH POWER

LOCATION ELDORADO - IVANPAH NO.1 & NO.2 220kV T/L

HARDWARE FRAMING ASSEMBLY
TOWER TYPE WY (C X-ARM) W/ 2 SW

SOUTHERN CALIFORNIA EDISON An EDISON INTERNATIONAL Company

D/L	N4592SH08.DWG	N-4592-0	SH.8



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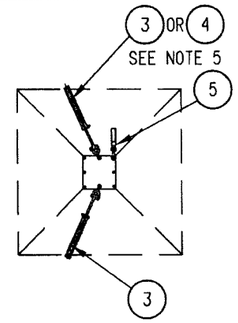
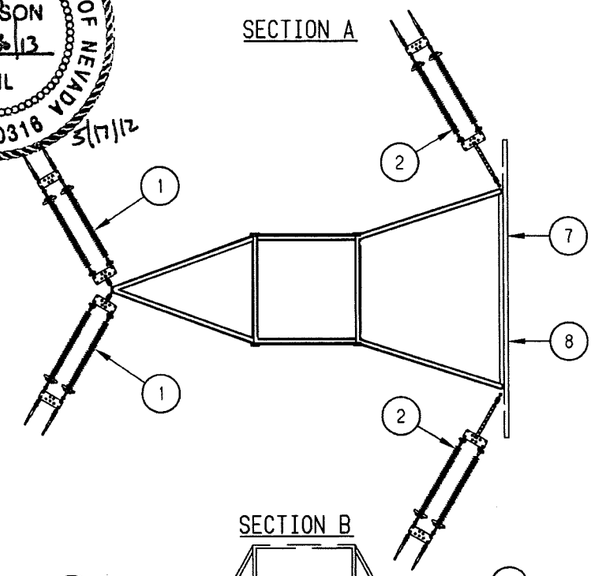
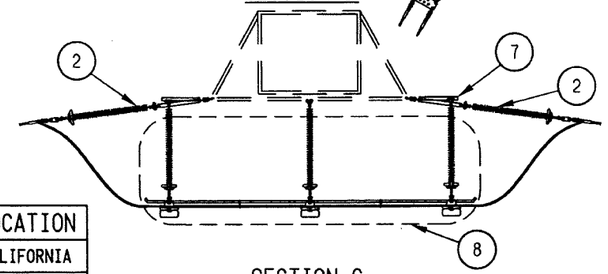


SECTION A



SECTION B



SECTION C

REGISTERED PROFESSIONAL ENGINEER STEVEN HARRISON C048314 CIVIL ENGINEER STATE OF CALIFORNIA 5/17/12

PROFESSIONAL ENGINEER STATE OF NEVADA STEVEN J. HARRISON Exp: 6/30/13 CIVIL No. 10316 5/17/12

BILL OF MATERIAL			
ITEM	QUAN.	DESCRIPTION	DWG. NO.
1	6	DEADEND INSULATOR, 2B-1590 45/7 ACSR "LAPWING"	N-4593 SH3
2	6	DE INSUL ASSY W/EXT STRAP, 2B-1590 45/7 ACSR "LAPWING"	N-4593 SH4
3	AS REQ *	OPGW DEADEND ASSY, GROUNDED	N-4595 SH2
4	AS REQ *	OPGW DEADEND ASSY, UNGROUNDED	N-4595 SH3
5	1	OHGW DEADEND ASSY, 1/2" EHS STEEL WIRE	N-4594 SH1
6	9	CONDUCTOR SPACER FOR JUMPER (PART NO. 10068374)	---
7	3	OUTRIGGER, SEE NOTE 4	---
8	3	JUMPER STIFFENER, 3-STRING, 2B-1590 45/7 ACSR "LAPWING"	N-4593 SH7

* SEE NOTE 5

NOTES:

1. AN OHGW WILL BE ADDED AS A SECOND SHIELD WIRE TO PROTECT THE CONDUCTOR AS IT ROLLS FROM A VERTICAL CONFIGURATION TO HORIZONTAL.
2. THE POINTED ARM JUMPER LOOP SHALL BE DIVIDED INTO FOUR EQUAL SEGMENTS BY INSTALLING THREE (3) CONDUCTOR SPACER CLAMPS (ITEM 6). A JUMPER LOOP INSULATOR WILL NOT BE INSTALLED ON THE POINTED ARM.
3. THE BUTTERFLY ARM JUMPER LOOP WILL BE DIVIDED INTO SIX (6) SEGMENTS BY INSTALLING THE JUMPER STIFFENER (ITEM 8).
4. OUTRIGGERS ARE TO BE INSTALLED ON THE BUTTERFLY ARMS. THE PURPOSE OF THE OUTRIGGER IS TO SUPPORT THE JUMPER LOOP INSULATOR ASSEMBLY/ASSEMBLIES.
5. IF AN OPGW SLICE IS REQUIRED, BOTH THE AHEAD AND BACK OPGW DEADENDS ARE TO BE GROUNDED (2 X ITEM 3). DEADEND TOWERS WITHOUT AN OPGW SPLICE REQUIRE ONLY ONE GROUNDED ASSEMBLY (ITEM 3); THE OTHER ASSEMBLY WILL BE UNGROUNDED (ITEM 4). REFER TO DRAWING N-4599 SH.1, FOR A MORE COMPREHENSIVE LIST OF MATERIAL NEEDED FOR THE OPGW SPLICE.
6. UNLESS OTHERWISE NOTED, EACH VERTICAL BOLT OR PIN SHALL HAVE THE NUT OR COTTER FACE DOWN. EACH HORIZONTAL BOLT OR PIN SHALL HAVE THE NUT OR COTTER FACE TOWARD THE STEP LEG OF THE TOWER.
7. A CLEARANCE OF 8 FEET SHALL BE MAINTAINED FROM CONDUCTOR, AND ALL ENERGIZED HARDWARE, TO STRUCTURE STEEL DURING NORMAL INSTALLATION CONDITIONS.
8. JUMPER LOOPS NOT SUPPORTED BY A JUMPER INSULATOR MUST BE CONSTRUCTED TO THE MEET THE FOLLOWING CRITERIA. JUMPER LOOPS MUST MAINTAIN 8 FEET OF CLEARANCE BETWEEN THE CONDUCTOR AND ANY PORTION OF THE TOWER STEEL. JUMPER LOOP SAG MUST BE LIMITED TO 10 FEET OR LESS. JUMPER LOOPS MUST BE BUILT WITH SUFFICIENT SLACK TO ALLOW THE DEADEND ASSEMBLIES TO MOVE DURING WEATHER EVENTS WITHOUT INDUCING STRESS ON THE JUMPER LOOPS.

* REVISE ON AUTOCAD SYSTEM ONLY *

SAP WO	LOCATION
900344621	CALIFORNIA
900344623	NEVADA

POWER ENGINEERS

PEI SUBMITTAL DATE: 05-20-2012

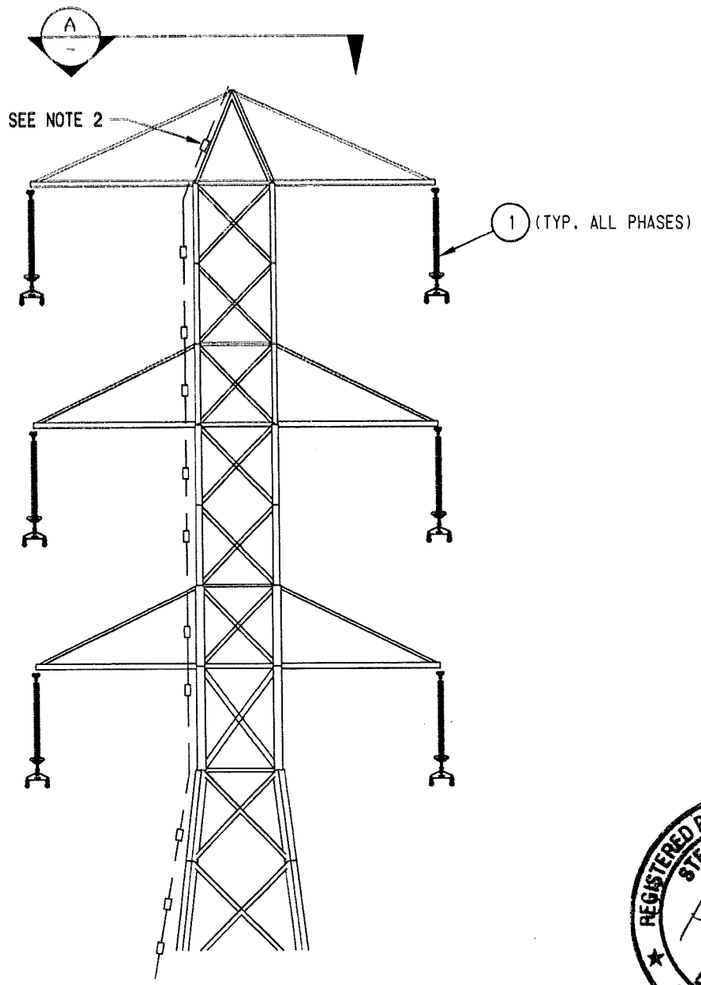
REFERENCE DRAWINGS		NO	REVISIONS	DATE	SAP WO	SUPV	APPROVED	ENGR	CK'D	MADE	P.E.
M-60221	DATA SHEETS, CKT #2										
M-60220	MASTER DWG LIST, CKT #2										
5453019	TOWER DRAWINGS										
M-60204	MASTER DWG LIST, CKT #1										
725645	GENERAL ARRANGEMENT										
725646	PLAN AND PROFILES										
M-60205	DATA SHEETS, CKT #1	0	ISSUED FOR CONSTRUCTION	6/1/12	SEE TABLE			BH POWER		MG POWER	SH POWER

LOCATION ELDORADO - IVANPAH NO.1 & NO.2 220kV T/L

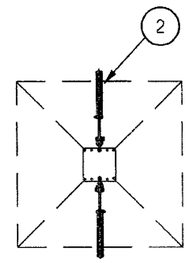
HARDWARE FRAMING ASSEMBLY
TWR TYPE WZ W/OTR (C X-ARM) W/2 SW

SOUTHERN CALIFORNIA EDISON An EDISON INTERNATIONAL Company

D/L N4592SH09.DWG | N-4592-0 | SH.9



ELEVATION



SECTION A

BILL OF MATERIAL			
ITEM	QUAN.	DESCRIPTION	DWG. NO.
1	6	SUSPENSION INSULATOR ASSY, 2B-1590 45/7 ACSR "LAPWING"	N-4593 SH1*
2	2	OPGW DEADEND ASSY, GROUNDED	N-4595 SH2

* SEE NOTE 1

NOTES:

1. IF TIE DOWN WEIGHTS ARE SPECIFIED ITEM 1 WILL BE REPLACED BY N-4593 SH.2, SUSPENSION INSULATOR ASSEMBLY WITH WEIGHTS.
2. THE OPGW DEADENDS ARE ON THIS TOWER TO FACILITATE AN OPGW SPLICE. REFER TO DRAWING N-4599 SH1, FOR A MORE COMPREHENSIVE LIST OF MATERIAL NEEDED FOR THE OPGW SPLICE.
3. UNLESS OTHERWISE NOTED, EACH VERTICAL BOLT OR PIN SHALL HAVE THE NUT OR COTTER FACE DOWN. EACH HORIZONTAL BOLT OR PIN SHALL HAVE THE NUT OR COTTER FACE TOWARD THE STEP LEG OF THE TOWER.

REGISTERED PROFESSIONAL ENGINEER STEVEN HARRISON C048314 CIVIL ENGINEER STATE OF CALIFORNIA 5/17/12

PROFESSIONAL ENGINEER STATE OF NEVADA STEVEN HARRISON Exp: 6/30/12 CIVIL No. 10316 5/17/12

SAP WO	LOCATION
900344621	CALIFORNIA
900344623	NEVADA

POWER ENGINEERS

PEI SUBMITTAL DATE: 05-20-2012

REFERENCE DRAWINGS		NO	REVISIONS	DATE	SAP WO	SUPV	APPROVED	ENGR	CK'D	MADE	P.E.
M-60221	DATA SHEETS, CKT #2										
M-60220	MASTER DWG LIST, CKT #2										
5453019	TOWER DRAWINGS										
M-60204	MASTER DWG LIST, CKT #1										
725645	GENERAL ARRANGEMENT										
725646	PLAN AND PROFILES										
M-60205	DATA SHEETS, CKT #1	0	ISSUED FOR CONSTRUCTION	6/1/12	SEE TABLE		C.L. Dhom	BH POWER	CK	MG POWER	SH POWER

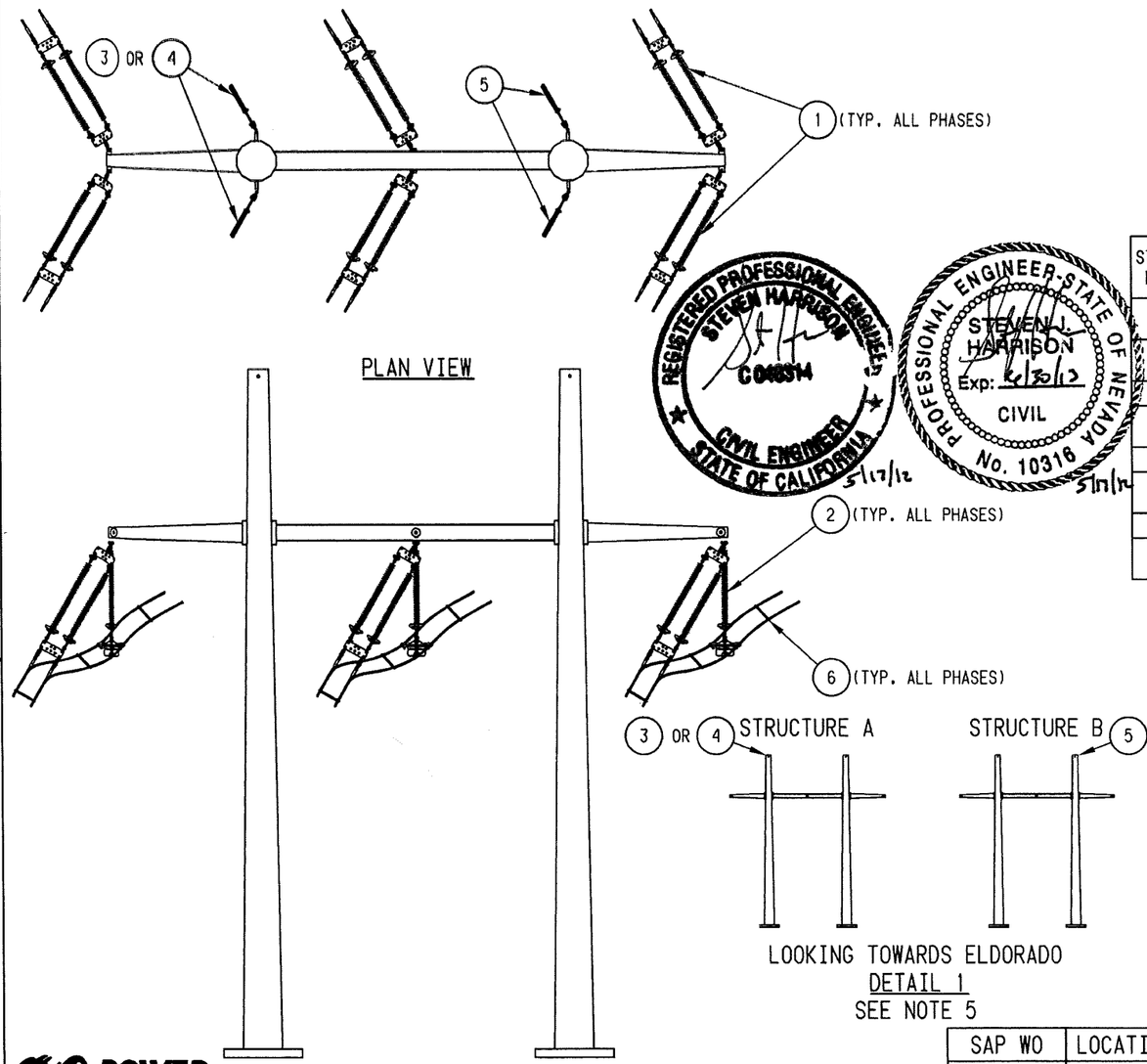
LOCATION ELDORADO - IVANPAH NO.1 & NO.2 220kV T/L

HARDWARE FRAMING ASSEMBLY
TOWER TYPE WB (OPGW SPLICE)

SOUTHERN CALIFORNIA EDISON An EDISON INTERNATIONAL Company

D/L N4592SH10.DWG | N-4592-0 | SH.10

* REVISE ON AUTOCAD SYSTEM ONLY *



REGISTERED PROFESSIONAL ENGINEER STEVEN HARRISON C046314 CIVIL ENGINEER STATE OF CALIFORNIA 5/17/12

PROFESSIONAL ENGINEER STATE OF NEVADA STEVEN J. HARRISON Exp: 6/30/12 CIVIL No. 10316 5/17/12

BILL OF MATERIAL

ITEM	QUAN.	DESCRIPTION	DWG. NO.
1	6	DEADEND INSULATOR ASSY, 2B-1590 45/7 ACSR "LAPWING"	N-4593 SH3
2	3	JUMPER LOOP INSULATOR ASSY, 2B-1590 45/7 ACSR "LAPWING"	N-4593 SH5
3	A/R*	OPGW DEADEND ASSY, GROUNDED	N-4595 SH2
4	A/R*	OPGW DEADEND ASSY, UNGROUNDED	N-4593 SH3
5	A/R*	OHGW DEADEND ASSY, 1/2" EHS STEEL WIRE (7 STRAND)	N-4594 SH1
6	6	CONDUCTOR SPACER FOR JUMPER (PART NO. 10068374)	---

* SEE TABLES FOR QUANTITIES AND NOTE 1

STUCTURE NUMBER	QUANTITIES		
	ITEM 3	ITEM 4	ITEM 5
167A	1 AHEAD 1 BACK	-	-
167B	-	-	1 AHEAD 1 BACK
166A	1 AHEAD	1 BACK	-
166B	-	-	1 AHEAD 1 BACK
160A	1 AHEAD	1 BACK	-
160B	-	-	1 AHEAD 1 BACK
159A	1 AHEAD	1 BACK	-
159B	-	-	1 AHEAD 1 BACK

STUCTURE NUMBER	QUANTITIES		
	ITEM 3	ITEM 4	ITEM 5
158A	1 BACK	-	-
158B	-	-	1 BACK
81A	1 AHEAD 1 BACK	-	-
81B	-	-	1 AHEAD 1 BACK
80A	1 AHEAD 1 BACK	-	-
80B	-	-	1 AHEAD 1 BACK
47A	1 BACK	-	-
47B	-	-	1 BACK

STUCTURE NUMBER	QUANTITIES		
	ITEM 3	ITEM 4	ITEM 5
46A	1 AHEAD	-	-
46B	-	-	1 AHEAD
18A	1 AHEAD	1 BACK	-
18B	-	-	1 AHEAD 1 BACK
17A	1 AHEAD	1 BACK	-
17B	-	-	1 AHEAD 1 BACK
9A	-	-	-
9B	-	-	-
8A	-	-	-
8B	-	-	-

NOTES:

1. THE PROVIDED TABLES DESCRIBE THE QUANTITIES OF ITEMS 3,4, AND 5 FOR EACH INSTANCE OF THIS STRUCTURE TYPE. THESE TABLES ALSO DESCRIBE THE DIRECTION OF THE SPAN SUPPORTED BY THESE ITEMS AS "AHEAD" (SPANS TOWARDS ELDORADO SUBSTATION) AND "BACK" (SPANS TOWARDS IVANPAH SUBSTATION). WHEN THESE ITEMS ARE CALLED FOR, THE OPGW DEADEND ASSEMBLY (ITEMS 3 AND 4) WILL BE INSTALLED ON THE LEFT POLE AND THE OHGW DEADEND ASSEMBLY (ITEM 5) WILL BE INSTALLED ON THE RIGHT POLE LOOKING TOWARDS ELDORADO SUBSTATION.
2. EACH JUMPER LOOP SHALL BE DIVIDED INTO FOUR EQUAL SEGMENTS BY INSTALLING TWO (2) CONDUCTOR SPACER CLAMPS (ITEM 6) AND A JUMPER LOOP INSULATOR (ITEM 2). IF A JUMPER LOOP INSULATOR IS NOT INSTALLED A THIRD CONDUCTOR SPACER WILL NEED TO BE INSTALLED IN ITS PLACE.
3. UNLESS OTHERWISE NOTED, EACH VERTICAL BOLT OR PIN SHALL HAVE THE NUT OR COTTER FACE DOWN. EACH HORIZONTAL BOLT OR PIN SHALL HAVE THE NUT OR COTTER FACE TOWARD THE STEP BOLTS OF THE STRUCTURE.
4. A CLEARANCE OF 8 FEET SHALL BE MAINTAINED FROM CONDUCTOR, AND ALL ENERGIZED HARDWARE, TO STRUCTURE STEEL DURING NORMAL INSTALLATION CONDITIONS.
5. AT LOCATIONS WITH H-FRAMES, TWO (2) SINGLE CIRCUIT STRUCTURES WILL BE INSTALLED (SEE DETAIL 1). IN ORDER TO BE CONSISTENT, THE MATERIAL PROVIDED IN THE BILL OF MATERIAL (BOM) IS FOR ONE (1) OF THE H-FRAMES.
6. IF AN OPGW SLICE IS REQUIRED, REFER TO DRAWING N-4599 SH.1 FOR A COMPREHENSIVE LIST OF MATERIAL NEEDED. IF THE FIBER IS TO BE PLACED UNDERGROUND, REFER TO EDISON CARRIER SOLUTIONS (ECS) OPGW CONDUIT DRAWING 8007-85241 SHEETS 1B, 1T, 2B, 2T, 3B, AND 3T.

REVISE ON AUTOCAD SYSTEM ONLY *

SAP WO	LOCATION
900344621	CALIFORNIA
900344623	NEVADA

POWER ENGINEERS

PEI SUBMITTAL DATE: 05-20-2012

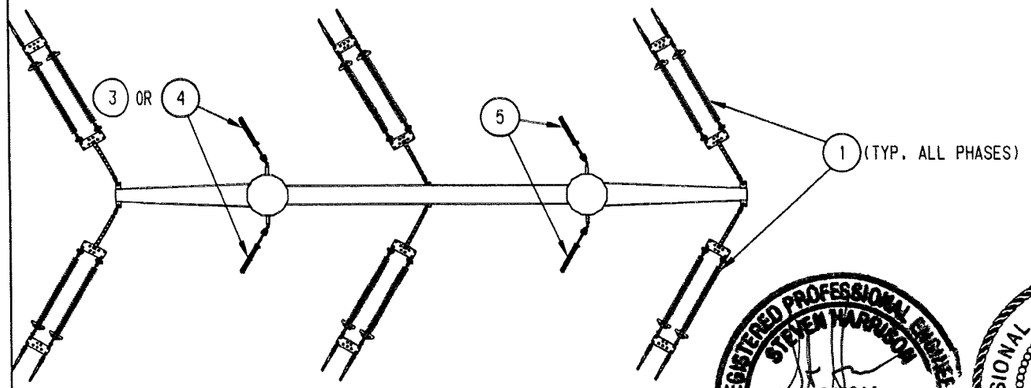
REFERENCE DRAWINGS		NO	REVISIONS	DATE	SAP WO	SUPV	APPROVED	ENGR	CK'D	MADE	P.E.
M-60221	DATA SHEETS, CKT #2										
M-60220	MASTER DWG LIST, CKT #2										
M-60204	MASTER DWG LIST, CKT #1										
725645	GENERAL ARRANGEMENT										
725646	PLAN AND PROFILES										
M-60205	DATA SHEETS, CKT #1	0	ISSUED FOR CONSTRUCTION	6/1/12	SEE TABLE		CLDon	BH POWER	DL	MG POWER	SH POWER

LOCATION ELDORADO - IVANPAH NO.1 & NO.2 220kV T/L

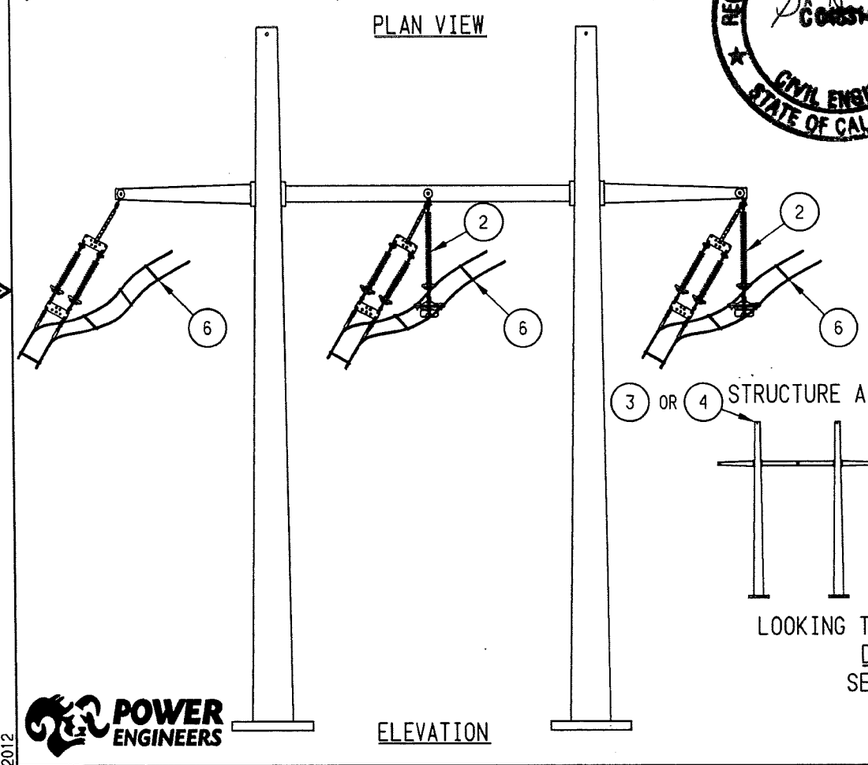
HARDWARE FRAMING ASSEMBLY
TSP, H-FRAME

SOUTHERN CALIFORNIA EDISON An EDISON INTERNATIONAL Company

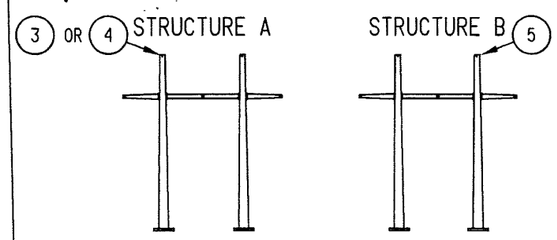
D/L N4592SH11.DWG | N-4592-0 | SH.11



PLAN VIEW



ELEVATION



LOOKING TOWARDS ELDORADO

DETAIL 1

SEE NOTE 5

SAP WO	LOCATION
900344621	CALIFORNIA
900344623	NEVADA

REGISTERED PROFESSIONAL ENGINEER STEVEN HARRISON C 045314 CIVIL ENGINEER STATE OF CALIFORNIA 5/17/12

PROFESSIONAL ENGINEER STATE OF NEVADA STEVEN J. HARRISON Exp: 6/30/13 CIVIL No. 10316 5/17/12

BILL OF MATERIAL

ITEM	QUAN.	DESCRIPTION	DWG. NO.
1	6	DE INSUL. ASSY W/ EXT. STRAP, 2B-1590 45/7 ACSR "LAPWING"	N-4593 SH4
2	2	JUMPER LOOP INSULATOR ASSY, 2B-1590 45/7 ACSR "LAPWING"	N-4593 SH5
3	A/R*	OPGW DEADEND ASSY, GROUNDED	N-4595 SH2
4	A/R*	OPGW DEADEND ASSY, UNGROUNDED	N-4593 SH3
5	A/R*	OHGW DEADEND ASSY, 1/2" EHS STEEL WIRE (7 STRAND)	N-4594 SH1
6	7	CONDUCTOR SPACER FOR JUMPER (PART NO. 10068374)	---

* SEE TABLES FOR QUANTITIES AND NOTE 1

STUCTURE NUMBER	QUANTITIES		
	ITEM 3	ITEM 4	ITEM 5
165A	1 AHEAD	1 BACK	-
165B	-	-	1 AHEAD 1 BACK
164A	1 AHEAD 1 BACK	-	-

STUCTURE NUMBER	QUANTITIES		
	ITEM 3	ITEM 4	ITEM 5
164B	-	-	1 AHEAD 1 BACK
157A	1 AHEAD	-	-
157B	-	-	1 AHEAD
10A	1 BACK	-	-

STUCTURE NUMBER	QUANTITIES		
	ITEM 3	ITEM 4	ITEM 5
10B	-	-	1 BACK
7A	1 AHEAD	-	-
7B	-	-	1 AHEAD

NOTES:

1. THE PROVIDED TABLES DESCRIBE THE QUANTITIES OF ITEMS 3,4, AND 5 FOR EACH INSTANCE OF THIS STRUCTURE TYPE. THESE TABLES ALSO DESCRIBE THE DIRECTION OF THE SPAN SUPPORTED BY THESE ITEMS AS "AHEAD" (SPANS TOWARDS ELDORADO SUBSTATION) AND "BACK" (SPANS TOWARDS IVANPAH SUBSTATION). WHEN THESE ITEMS ARE CALLED FOR, THE OPGW DEADEND ASSEMBLY (ITEMS 3 AND 4) WILL BE INSTALLED ON THE LEFT POLE AND THE OHGW DEADEND ASSEMBLY (ITEM 5) WILL BE INSTALLED ON THE RIGHT POLE LOOKING TOWARDS ELDORADO SUBSTATION.
2. EACH JUMPER LOOP SHALL BE DIVIDED INTO FOUR EQUAL SEGMENTS BY INSTALLING TWO (2) CONDUCTOR SPACER CLAMPS (ITEM 6) AND A JUMPER LOOP INSULATOR (ITEM 2). WHEN A JUMPER LOOP INSULATOR IS NOT INSTALLED A THIRD CONDUCTOR SPACER WILL NEED TO BE INSTALLED IN ITS PLACE.
3. UNLESS OTHERWISE NOTED, EACH VERTICAL BOLT OR PIN SHALL HAVE THE NUT OR COTTER FACE DOWN. EACH HORIZONTAL BOLT OR PIN SHALL HAVE THE NUT OR COTTER FACE TOWARD THE STEP BOLTS OF THE STRUCTURE.
4. A CLEARANCE OF 8 FEET SHALL BE MAINTAINED FROM CONDUCTOR, AND ALL ENERGIZED HARDWARE, TO STRUCTURE STEEL DURING NORMAL INSTALLATION CONDITIONS.
5. AT LOCATIONS WITH H-FRAMES, TWO (2) SINGLE CIRCUIT STRUCTURES WILL BE INSTALLED (SEE DETAIL 1). IN ORDER TO BE CONSISTENT, THE MATERIAL PROVIDED IN THE BILL OF MATERIAL (BOM) IS FOR ONE (1) OF THE H-FRAMES.
6. JUMPER LOOPS NOT SUPPORTED BY A JUMPER INSULATOR MUST BE CONSTRUCTED TO THE MEET THE FOLLOWING CRITERIA. JUMPER LOOPS MUST MAINTAIN 8 FEET OF CLEARANCE BETWEEN THE CONDUCTOR AND ANY PORTION OF THE TOWER STEEL. JUMPER LOOP SAG MUST BE LIMITED TO 10 FEET OR LESS. JUMPER LOOPS MUST BE BUILT WITH SUFFICIENT SLACK TO ALLOW THE DEADEND ASSEMBLIES TO MOVE DURING WEATHER EVENTS WITHOUT INDUCING STRESS ON THE JUMPER LOOPS.
7. IF AN OPGW SLICE IS REQUIRED, REFER TO DRAWING N-4599 SH.1 FOR A COMPREHENSIVE LIST OF MATERIAL NEEDED. IF THE FIBER IS TO BE PLACED UNDERGROUND, REFER TO EDISON CARRIER SOLUTIONS (ECS) OPGW CONDUIT DRAWING 8007-85241 SHEETS 1B, 1T, 2B, 2T, 3B, AND 3T.

* REVISE ON AUTOCAD SYSTEM ONLY *

POWER ENGINEERS

PEI SUBMITTAL DATE: 05-20-2012

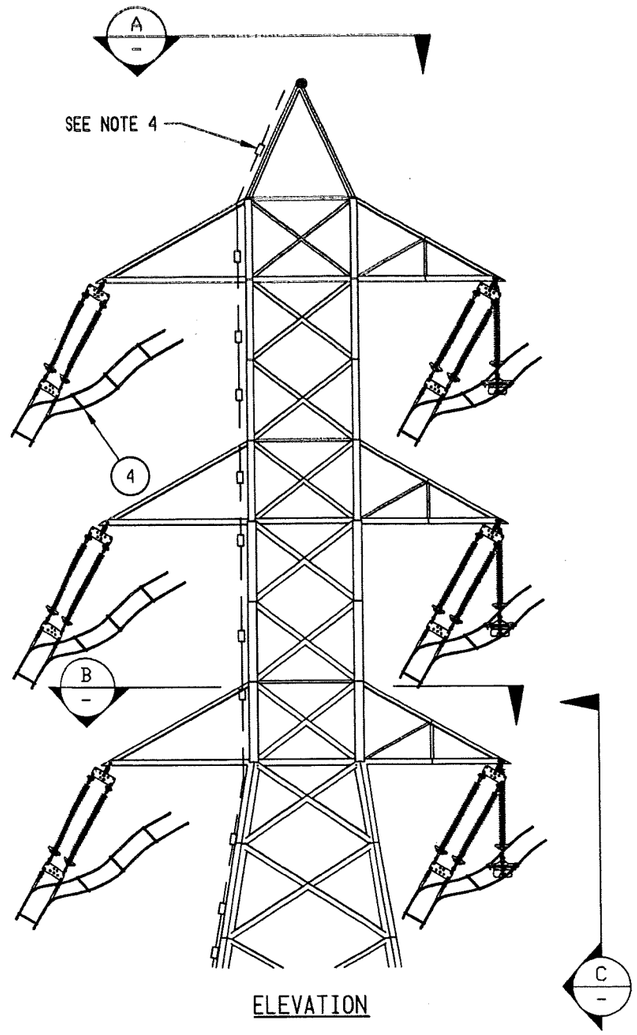
REFERENCE DRAWINGS		NO	REVISIONS	DATE	SAP WO	SUPV	APPROVED	ENGR (BH POWER)	CK'D	MADE (MG POWER)	P.E. (SH POWER)
M-60221	DATA SHEETS, CKT #2										
M-60220	MASTER DWG LIST, CKT #2										
M-60204	MASTER DWG LIST, CKT #1										
725645	GENERAL ARRANGEMENT										
725646	PLAN AND PROFILES										
M-60205	DATA SHEETS, CKT #1	0	ISSUED FOR CONSTRUCTION	6/1/12	SEE TABLE		C. Edson		ok		

LOCATION ELDORADO - IVANPAH NO.1 & NO.2 220kV T/L

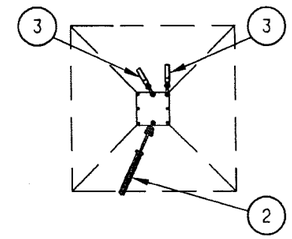
HARDWARE FRAMING ASSEMBLY
TSP, H-FRAME W/ INSUL. EXT. STRAPS

SOUTHERN CALIFORNIA EDISON An EDISON INTERNATIONAL Company

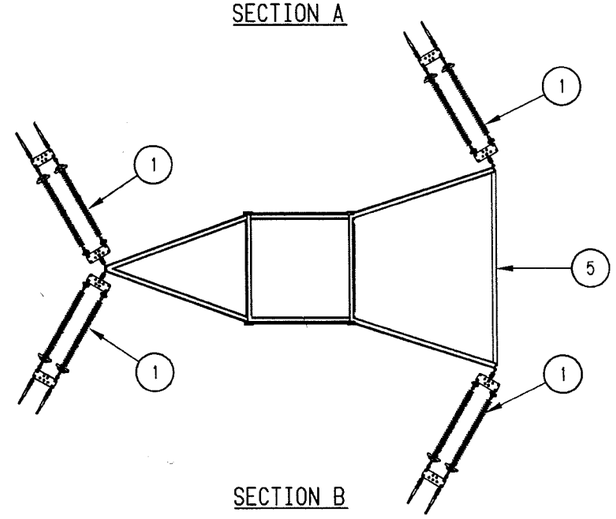
D/L N4592SH12.DWG | N-4592-0 | SH.12



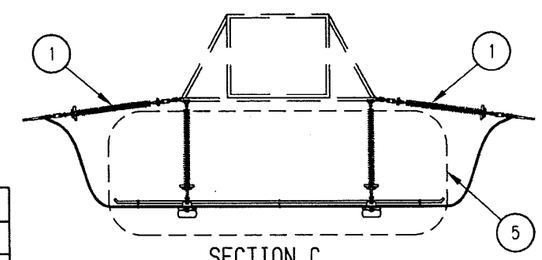
ELEVATION



SECTION A



SECTION B



SECTION C

BILL OF MATERIAL			
ITEM	QUAN.	DESCRIPTION	DWG. NO.
1	12	DEADEND INSULATOR ASSY, 2B-1590 45/7 ACSR "LAPWING"	N-4593 SH3
2	1	OPGW DEADEND ASSY, GROUNDED	N-4595 SH2
3	2	OHGW DEADEND ASSY, 1/2" EHS STEEL WIRE	N-4594 SH1
4	9	CONDUCTOR SPACER FOR JUMPER (PART NO. 10068374)	---
5	3	JUMPER STIFFENER, 2-STRING, 2B-1590 45/7 ACSR "LAPWING"	N-4593 SH8

REGISTERED PROFESSIONAL ENGINEER STEVEN HARRISON C068314 CIVIL ENGINEER STATE OF CALIFORNIA 5/17/12

PROFESSIONAL ENGINEER STATE OF NEVADA STEVEN HARRISON Exp: 6/30/13 CIVIL No. 10316 5/17/12

NOTES:

1. TWO (2) OHGW WILL BE ADDED AS A SECOND SHIELD WIRE TO PROTECT THE CONDUCTOR AS IT ROLLS FROM A VERTICAL CONFIGURATION TO HORIZONTAL (SUB RACKS).
2. THE POINTED ARM JUMPER LOOP SHALL BE DIVIDED INTO FOUR EQUAL SEGMENTS BY INSTALLING THREE (3) CONDUCTOR SPACER CLAMPS (ITEM 4). A JUMPER LOOP INSULATOR WILL NOT BE INSTALLED ON THE POINTED ARM.
3. THE BUTTERFLY ARM JUMPER LOOP WILL BE DIVIDED INTO SIX (6) SEGMENTS BY INSTALLING THE JUMPER STIFFENER (ITEM 5).
4. AN OPGW SLICE IS REQUIRED. REFER TO DRAWING N-4599 SH.1, FOR A MORE COMPREHENSIVE LIST OF MATERIAL NEEDED FOR THE OPGW SPLICE.
5. UNLESS OTHERWISE NOTED, EACH VERTICAL BOLT OR PIN SHALL HAVE THE NUT OR COTTER FACE DOWN. EACH HORIZONTAL BOLT OR PIN SHALL HAVE THE NUT OR COTTER FACE TOWARD THE STEP LEG OF THE TOWER.
6. A CLEARANCE OF 8 FEET SHALL BE MAINTAINED FROM CONDUCTOR, AND ALL ENERGIZED HARDWARE, TO STRUCTURE STEEL DURING NORMAL INSTALLATION CONDITIONS.
7. JUMPER LOOPS NOT SUPPORTED BY A JUMPER INSULATOR MUST BE CONSTRUCTED TO THE MEET THE FOLLOWING CRITERIA. JUMPER LOOPS MUST MAINTAIN 8 FEET OF CLEARANCE BETWEEN THE CONDUCTOR AND ANY PORTION OF THE TOWER STEEL. JUMPER LOOP SAG MUST BE LIMITED TO 10 FEET OR LESS. JUMPER LOOPS MUST BE BUILT WITH SUFFICIENT SLACK TO ALLOW THE DEADEND ASSEMBLIES TO MOVE DURING WEATHER EVENTS WITHOUT INDUCING STRESS ON THE JUMPER LOOPS.

✳ REVISE ON AUTOCAD SYSTEM ONLY ✳

POWER ENGINEERS

SAP WO	LOCATION
900344621	CALIFORNIA
900344623	NEVADA

PEI SUBMITTAL DATE: 05-20-2012

REFERENCE DRAWINGS		NO	REVISIONS	DATE	SAP WO	SUPV	APPROVED	ENGR	CK'D	MADE	P.E.
M-60221	DATA SHEETS, CKT #2										
M-60220	MASTER DWG LIST, CKT #2										
5453019	TOWER DRAWINGS										
M-60204	MASTER DWG LIST, CKT #1										
725645	GENERAL ARRANGEMENT										
725646	PLAN AND PROFILES										
M-60205	DATA SHEETS, CKT #1	0	ISSUED FOR CONSTRUCTION	6/1/12	SEE TABLE		CL Dom	BH POWER	CK	MG POWER	SH POWER

LOCATION ELDORADO - IVANPAH NO.1 & NO.2 220kV T/L

HARDWARE FRAMING ASSEMBLY
STR 213 (WY-C W/ 2 SW)

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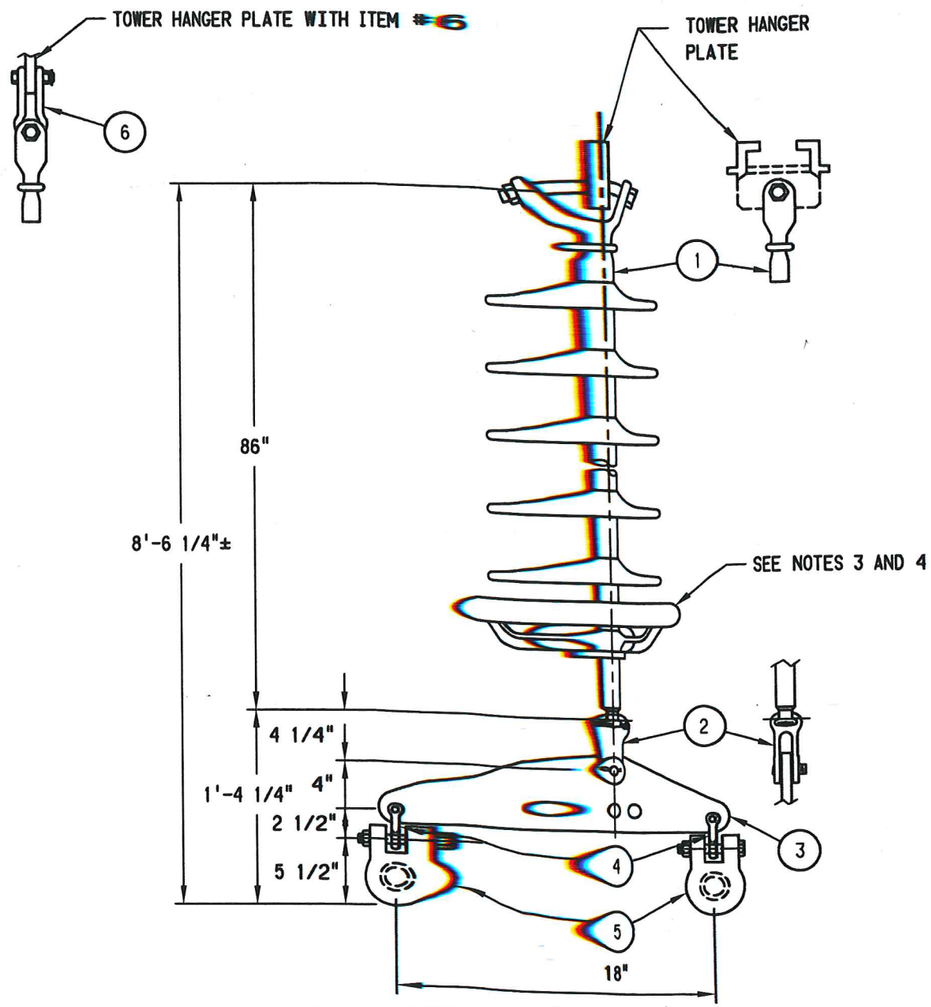
D/L N4592SH15.DWG | N-4592-0 | SH.15



2-BUNDLE CONDUCTOR: 1590 KCMIL ACSR 45X7 "LAPWING"

BILL OF MATERIAL

ITEM	QTY	DESCRIPTION	OLD MAT. CODE	NEW MAT. CODE
1	1	POLYMER INSULATOR, 50 KIP		10171938
2	1	SOCKET-CLEVIS, 50 KIP		10175421
3	1	YOKE PLATE, 60 KIP	078-91807	10068073
4	2	CLEVIS-EYE, "Y", 90°, 30 KIP	077-77410	10067648
5	2	CLAMP, ARMOR GRIP SUSP., 30 KIP, 1590 KCMIL ACSR 45/7	077-72726	10067632
6	1*	ANCHOR SHACKLE, 50 KIP	078-92201	10068083

* SEE NOTE 1

NOTES:

1. ITEM #6 MAY NOT BE NEEDED DEPENDING ON STRUCTURE HANGER PLATE.
2. BOLTS AND PINS SHALL HAVE NUTS AND COTTER FACED DOWN OR TOWARDS STEP LEG OF TOWER.
3. CORONA RINGS SHALL BE INSTALLED PER MANUFACTURER RECOMMENDATION. CORONA RINGS THAT ALLOW INSTALLATION IN EITHER DIRECTION SHALL BE INSTALLED IN THE CORRECT DIRECTION AS DESCRIBED IN THE MAUNFACTURERS INSTALLATION SPECIFICATION.
4. FOR HORSE-SHOE CORONA RINGS THE ORIENTATION OF THE OPENING OF THE CORONA RING SHALL BE FACED IN THE DIRECTION OF THE STRUCTURE.

* REVISE ON AUTOCAD SYSTEM ONLY *

POWER ENGINEERS

SAP WO	LOCATION
900344621	CALIFORNIA
900344623	NEVADA

PEI SUBMITTAL DATE: 06-01-2012

REFERENCE DRAWINGS		NO
M-60221	DATA SHEETS, CKT #2	
M-60220	MASTER DWG LIST, CKT #2	
M-60204	MASTER DWG LIST, CKT #1	
N-4592	HARDWARE FRAMING	
M-60205	DATA SHEETS, CKT #1	0

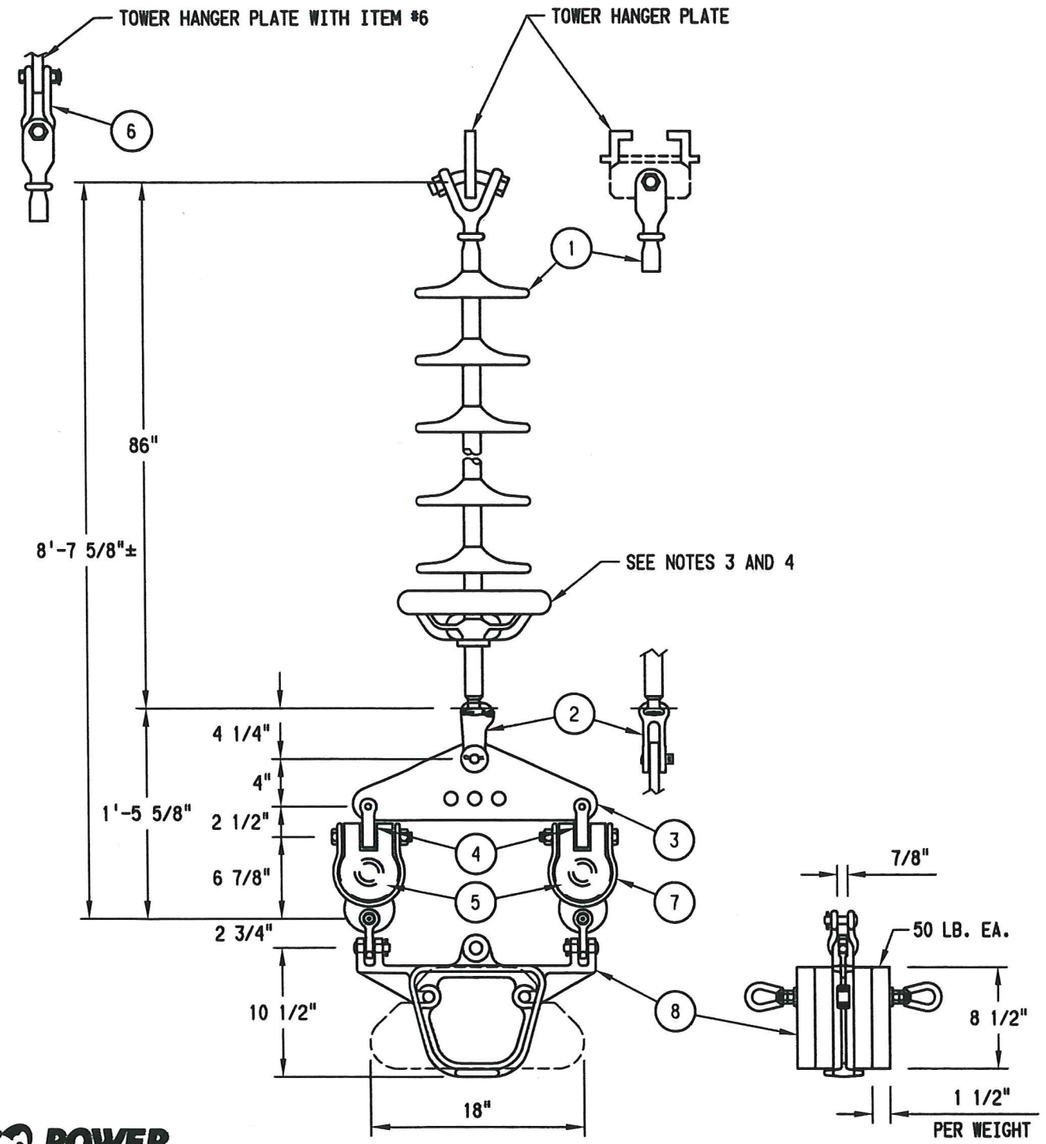
REVISIONS	DATE	SAP WO	SUPV	APPROVED	ENGR	CK'D	MADE	P.E.
ISSUED FOR CONSTRUCTION	6-7-12	SEE TABLE			BH POWER		NG POWER	

LOCATION ELDORADO - IVANPAH NO.1 & NO.2 220kV T/L

SUSPENSION INSULATOR ASSEMBLY
2-CONDUCTOR HORIZ. BUNDLE

SOUTHERN CALIFORNIA EDISON An EDISON INTERNATIONAL Company

D/L N4593SH01.DWG | N-4593-0 | SH.1



2-BUNDLED CONDUCTOR: 1590 KCMIL ACSR 45 x 7 "LAPWING"

BILL OF MATERIAL

ITEM	QTY	DESCRIPTION	OLD MAT. CODE	NEW MAT. CODE
1	1	POLYMER INSULATOR, 50 KIP		10171938
2	1	SOCKET-CLEVIS , 50 KIP		10175421
3	1	YOKE PLATE, 60 KIP	078-91807	10068073
4	2	CLEVIS-EYE, "Y", 90°, 30 KIP	077-77410	10067648
5	2	CLAMP, ARMOR GRIP SUSP., 30 KIP, 1590 KCMIL ACSR 45/7	077-72726	10067632
6	1*	ANCHOR SHACKLE, 50 KIP	078-92201	10068083
7	1	STRAP FOR TIE DOWN WEIGHTS	082-62024	10068475
8	1	WEIGHTS (SEE TABLE)		

* SEE NOTE 1

CATALOG NUMBER	SCE MAT. CODE	WEIGHT
C-8650-100	10181444	100 LBS.
C-8650-200	10181445	200 LBS.
C-8650-300	10181446	300 LBS.
C-8650-400	10181447	400 LBS.
C-8650-500	10181448	500 LBS.
C-8650-600	10181449	600 LBS.
C-8650-700	10181450	700 LBS.
C-8650-800	10181451	800 LBS.

CATALOG NUMBER	SCE MAT. CODE	WEIGHT
C-8650-900	10181452	900 LBS.
C-8650-1000	10181453	1000 LBS.
C-8650-1100	10181402	1100 LBS.
C-8650-1200	10181403	1200 LBS.
C-8650-1300	10181404	1300 LBS.
C-8650-1400	10181405	1400 LBS.
C-8650-1500	10181406	1500 LBS.

NOTES:

1. ITEM #6 MAY NOT BE NEEDED DEPENDING ON STRUCTURE HANGER PLATE.
2. BOLTS AND PINS SHALL HAVE NUTS AND COTTERS FACED DOWN OR TOWARDS STEP LEG OF TOWER.
3. CORONA RINGS SHALL BE INSTALLED PER MANUFACTURER RECOMMENDATION. CORONA RINGS THAT ALLOW INSTALLATION IN EITHER DIRECTION SHALL BE INSTALLED IN THE CORRECT DIRECTION AS DESCRIBED IN THE MAUNFACTURERS INSTALLATION SPECIFICATION.
4. FOR HORSE-SHOE CORONA RINGS THE ORIENTATION OF THE OPENING OF THE CORONA RING SHALL BE FACED IN THE DIRECTION OF THE STRUCTURE.

* REVISE ON AUTOCAD SYSTEM ONLY *

SAP WO	LOCATION
900344621	CALIFORNIA
900344623	NEVADA

POWER ENGINEERS

PEI SUBMITTAL DATE: 06-01-2012

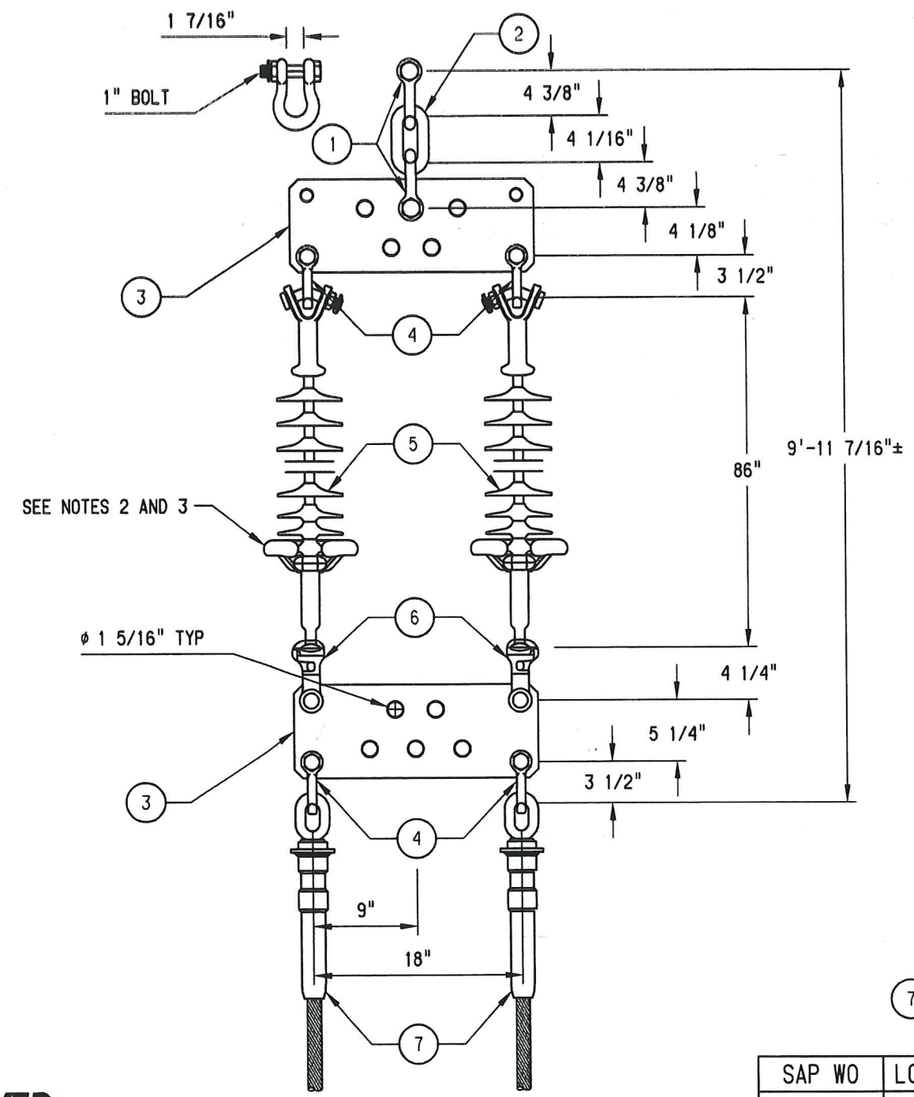
REFERENCE DRAWINGS		NO	REVISIONS	DATE	SAP WO	SUPV	APPROVED	ENGR	CK'D	MADE	P.E.
M-60221	DATA SHEETS, CKT #2										
M-60220	MASTER DWG LIST, CKT #2										
M-60204	MASTER DWG LIST, CKT #1										
N-4592	HARDWARE FRAMING										
M-60205	DATA SHEETS, CKT #1	0	ISSUED FOR CONSTRUCTION	6-7-12	SEE TABLE			BH POWER		NG POWER	

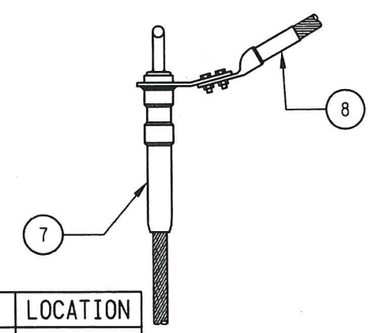
LOCATION ELDORADO - IVANPAH NO.1 & NO.2 220kV T/L

SUSP. INSULATOR ASSEMBLY W/WEIGHTS
2-CONDUCTOR HORIZ. BUNDLE

SOUTHERN CALIFORNIA EDISON An EDISON INTERNATIONAL Company

D/L N4593SH02.DWG | N-4593-0 | SH.2





BILL OF MATERIAL

ITEM	QTY	DESCRIPTION	OLD MAT. CODE	NEW MAT. CODE
1	2	ANCHOR SHACKLE, GALV., 80 KIP	082-53601	10068441
2	1	CHAIN LINK, GALV., 85 KIP	080-63604	10068259
3	2	YOKE PLATE, GALV., 80 KIP	081-00083	10068280
4	4	ANCHOR SHACKLE, GALV., 60 KIP	082-53809	10068443
5	2	POLYMER INSULATOR, 50 KIP		10171938
6	2	SOCKET CLEVIS, 50 KIP		10175421
7	2	COMPR. DEAD END, NON ADJUST., W/ EYE, 1590 KCMIL ACSR 45/7	077-98721	10067705
8	2	COMPR. JUMPER TERMINAL, 1590 KCMIL ACSR 45/7	609-73104	10112071

CLIP

AFL 5140.162P ?

NOTES:

1. BOLTS AND PINS SHALL HAVE NUTS AND COTTER FACED DOWN OR TOWARDS STEP LEG OF TOWER.
2. CORONA RINGS SHALL BE INSTALLED PER MANUFACTURER RECOMMENDATION. CORONA RINGS THAT ALLOW INSTALLATION IN EITHER DIRECTION SHALL BE INSTALLED IN THE CORRECT DIRECTION AS DESCRIBED IN THE MAUNFACTURERS INSTALLATION SPECIFICATION.
3. FOR HORSE-SHOE CORONA RINGS THE ORIENTATION OF THE OPENING OF THE CORONA RING SHALL BE FACED IN THE UPWARD POSITION.

✳ REVISE ON AUTOCAD SYSTEM ONLY ✳

POWER ENGINEERS

2-BUNDLE CONDUCTOR: 1590 KCMIL ACSR 45X7 "LAPWING"

SAP WO	LOCATION
900344621	CALIFORNIA
900344623	NEVADA

PEI SUBMITTAL DATE: 05-20-2012

REFERENCE DRAWINGS		NO	REVISIONS	DATE	SAP WO	SUPV	APPROVED	ENGR	CK'D	MADE	P.E.
M-60221	DATA SHEETS, CKT #2										
M-60220	MASTER DWG LIST, CKT #2										
M-60204	MASTER DWG LIST, CKT #1										
N-4592	HARDWARE FRAMING										
M-60205	DATA SHEETS, CKT #1	0	ISSUED FOR CONSTRUCTION	6/1/12	SEE TABLE			BH POWER	OR	MG POWER	

LOCATION ELDORADO - IVANPAH NO.1 & NO.2 220kV T/L

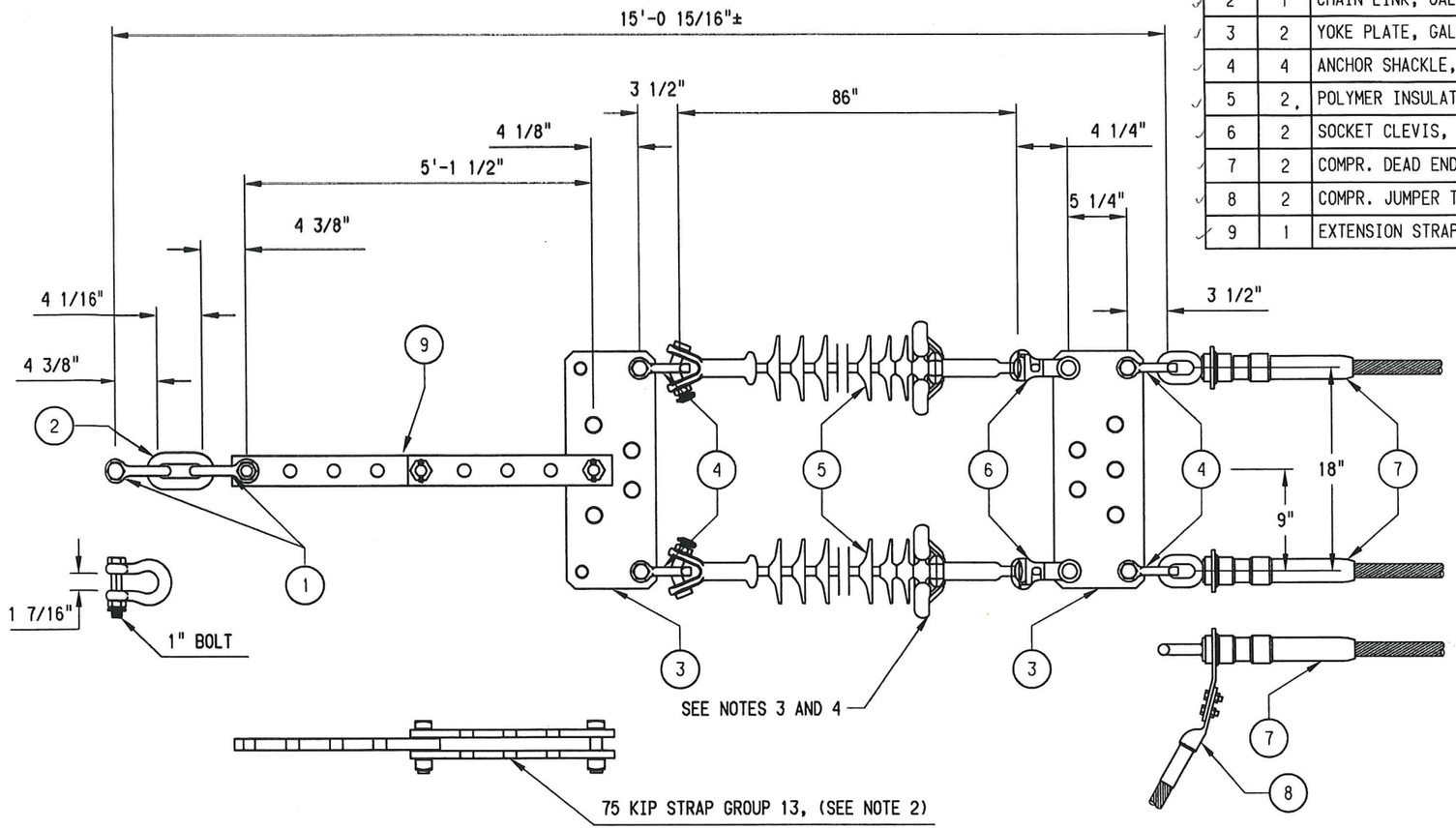
DEADEND INSULATOR ASSEMBLY
2-CONDUCTOR HORIZ. ASSEMBLY

SOUTHERN CALIFORNIA EDISON
An EDISON INTERNATIONAL Company

D/L N4593SH03.DWG | N-4593-0 | SH.3

BILL OF MATERIAL

ITEM	QTY	DESCRIPTION	OLD MAT. CODE	NEW MAT. CODE
1	2	ANCHOR SHACKLE, GALV., 80 KIP	082-53601	10068441
2	1	CHAIN LINK, GALV., 85 KIP	080-63604	10068259
3	2	YOKE PLATE, GALV., 80 KIP	081-00083	10068280
4	4	ANCHOR SHACKLE, GALV., 60 KIP	082-53809	10068443
5	2	POLYMER INSULATOR, 50 KIP		10171938
6	2	SOCKET CLEVIS, 50 KIP		10175421
7	2	COMPR. DEAD END, NON ADJUST., W/ EYE, 1590 KCMIL ACSR 45/7	077-98721	10067705
8	2	COMPR. JUMPER TERMINAL, 1590 KCMIL ACSR 45/7	609-73104	10112071
9	1	EXTENSION STRAP, ADJUSTABLE, 75 KIP, GROUP 13	078-97150	10068124



CLIP

2-BUNDLE CONDUCTOR: 1590 KCMIL ACSR 45X7 "LAPWING"

NOTES:

1. BOLTS AND PINS SHALL HAVE NUTS AND COTTER FACED DOWN OR TOWARDS STEP LEG OF TOWER.
2. SEE SCE DRAWING 235302 FOR DETAILS ON EXTENSION STRAP. STRAP WILL USE HOLES 13-D TO OBTAIN A LENGTH OF 61 1/2".
3. CORONA RINGS SHALL BE INSTALLED PER MANUFACTURER RECOMMENDATION. CORONA RINGS THAT ALLOW INSTALLATION IN EITHER DIRECTION SHALL BE INSTALLED IN THE CORRECT DIRECTION AS DESCRIBED IN THE MAUNFACTURERS INSTALLATION SPECIFICATION.
4. FOR HORSE-SHOE CORONA RINGS THE ORIENTATION OF THE OPENING OF THE CORONA RING SHALL BE FACED IN THE UPWARD POSITION.

* REVISE ON AUTOCAD SYSTEM ONLY *

SAP WO	LOCATION
900344621	CALIFORNIA
900344623	NEVADA

POWER ENGINEERS

PEI SUBMITTAL DATE: 05-20-2012

REFERENCE DRAWINGS		NO	REVISIONS	DATE	SAP WO	SUPV	APPROVED	ENGR	CK'D	MADE	P.E.
M-60221	DATA SHEETS, CKT #2										
M-60220	MASTER DWG LIST, CKT #2										
M-60204	MASTER DWG LIST, CKT #1										
N-4592	HARDWARE FRAMING										
M-60205	DATA SHEETS, CKT #1	0	ISSUED FOR CONSTRUCTION	6/1/12	SEE TABLE			BH POWER	OR	MG POWER	

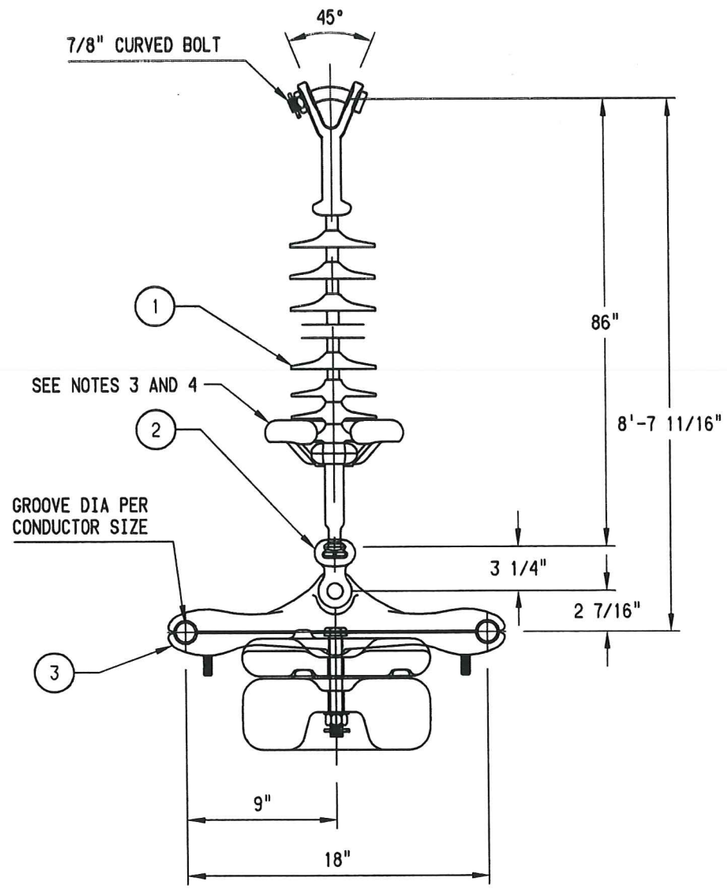
LOCATION ELDORADO - IVANPAH NO.1 & NO.2 220kV T/L

DEADEND INSULATOR ASSEMBLY W/ EXT.
2-CONDUCTOR HORIZ. ASSEMBLY

SOUTHERN CALIFORNIA EDISON An EDISON INTERNATIONAL Company

D/L N4593SH04.DWG | N-4593-0 | SH.4

BILL OF MATERIAL				
ITEM	QTY	DESCRIPTION	OLD MAT. CODE	NEW MAT. CODE
1	1	POLYMER INSULATOR, 50 KIPS		10171938
2	1	SOCKET CLEVIS, 45 KIPS		10171899
3	1	YOKE ASSY W/ 300 LBS WT & SIDE CLAMPS, 1590 KCMIL ACSR 45/7		



2-BUNDLE CONDUCTOR: 1590 KCMIL ACSR 45X7 "LAPWING"

CLIP

NOTES:

1. BOLTS AND PINS SHALL HAVE NUTS AND COTTER FACED DOWN OR TOWARDS STEP LEG OF TOWER.
2. ITEM 3 (YOKE ASSEMBLY W/ 300 LBS WEIGHTS AND SIDE CLAMPS) WILL BE, OR AN EQUIVALENT TO, MACLEAN PART NO. SBJ 1502-18-W300-6.
3. CORONA RINGS SHALL BE INSTALLED PER MANUFACTURER RECOMMENDATION. CORONA RINGS THAT ALLOW INSTALLATION IN EITHER DIRECTION SHALL BE INSTALLED IN THE CORRECT DIRECTION AS DESCRIBED IN THE MAUNFACTURERS INSTALLATION SPECIFICATION.
4. FOR HORSE-SHOE CORONA RINGS THE ORIENTATION OF THE OPENING OF THE CORONA RING SHALL BE FACED IN THE DIRECTION OF THE STRUCTURE.

* REVISE ON AUTOCAD SYSTEM ONLY *

SAP WO	LOCATION
900344621	CALIFORNIA
900344623	NEVADA

POWER ENGINEERS

REFERENCE DRAWINGS		NO	REVISIONS	DATE	SAP WO	SUPV	APPROVED	ENGR	CK'D	MADE	P.E.
M-60221	DATA SHEETS, CKT #2										
M-60220	MASTER DWG LIST, CKT #2										
M-60204	MASTER DWG LIST, CKT #1										
N-4592	HARDWARE FRAMING										
M-60205	DATA SHEETS, CKT #1	0	ISSUED FOR CONSTRUCTION	6/1/12	SEE TABLE		C.L. Storm	BH POWER	OR	MG POWER	

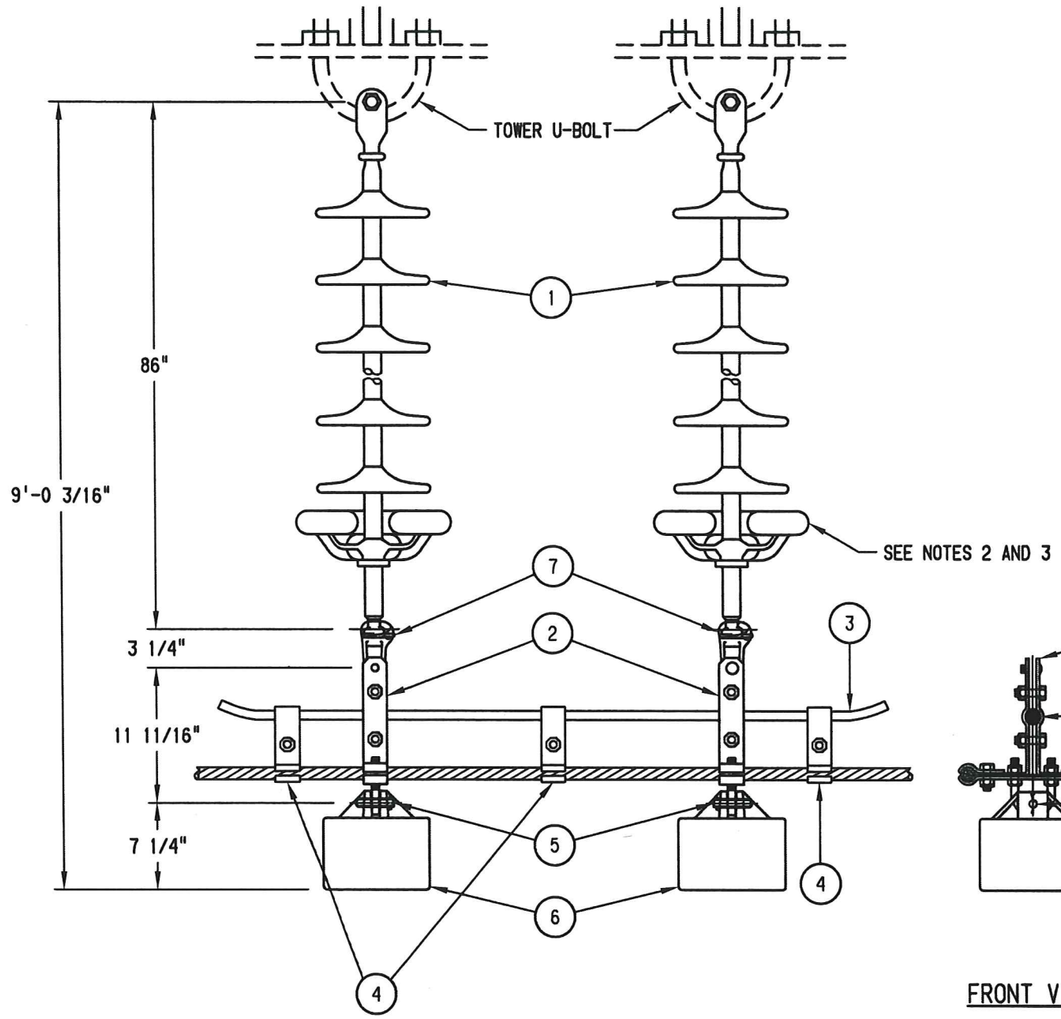
LOCATION ELDORADO - IVANPAH NO.1 & NO.2 220kV T/L

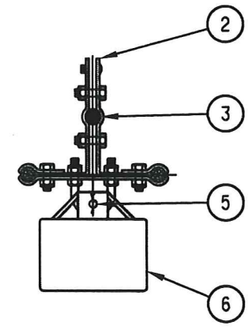
JUMPER LOOP INSULATOR ASSEMBLY
2-CONDUCTOR HORIZ. BUNDLE

SOUTHERN CALIFORNIA EDISON An EDISON INTERNATIONAL Company

D/L N4593SH05.DWG | N-4593-0 | SH.5

PEI SUBMITTAL DATE: 05-20-2012





FRONT VIEW

2-BUNDLE CONDUCTOR: 1590 KCMIL ACSR 45X7 "LAPWING"

SAP WO	LOCATION
900344621	CALIFORNIA
900344623	NEVADA

BILL OF MATERIAL

ITEM	QTY	DESCRIPTION	OLD MAT. CODE	NEW MAT. CODE
1	2	POLYMER INSULATOR, 50 KIP		10171938
2	2	CLAMP, J.L. STIFFENER, 2-BUNDLE FOR 3/4" I.D. PIPE.	077-59418	10067595
3	1	PIPE, ARCHING GALV., 3/4" X 14'.	081-52407	10068337
4	3	CLAMP, JUMPER LOOP SUPPORT 2-BUNDLE FOR 3/4" I.D. PIPE	077-59004	10067590
5	2	PIN, 5/8" DIA. x 3", W/COTTER	081-31500	10068323
6	2	STIFFENER STRING WEIGHT, 100 LB. EA.	084-20507	10068570
7	2	SOCKET-EYE, 50 KIP SOCKET, 30 KIP EYE		10175419

CLIP

NOTES:

1. BOLTS AND PINS SHALL HAVE NUTS AND COTTERS FACED DOWN OR TOWARDS STEP LEG OF TOWER.
2. CORONA RINGS SHALL BE INSTALLED PER MANUFACTURER RECOMMENDATION. CORONA RINGS THAT ALLOW INSTALLATION IN EITHER DIRECTION SHALL BE INSTALLED IN THE CORRECT DIRECTION AS DESCRIBED IN THE MAUNFACTURERS INSTALLATION SPECIFICATION.
3. FOR HORSE-SHOE CORONA RINGS THE ORIENTATION OF the OPENING OF THE CORONA RING SHALL BE FACED IN THE DIRECTION OF THE STRUCTURE.

✳ REVISE ON AUTOCAD SYSTEM ONLY ✳

POWER ENGINEERS

PEI SUBMITTAL DATE: 06-01-2012

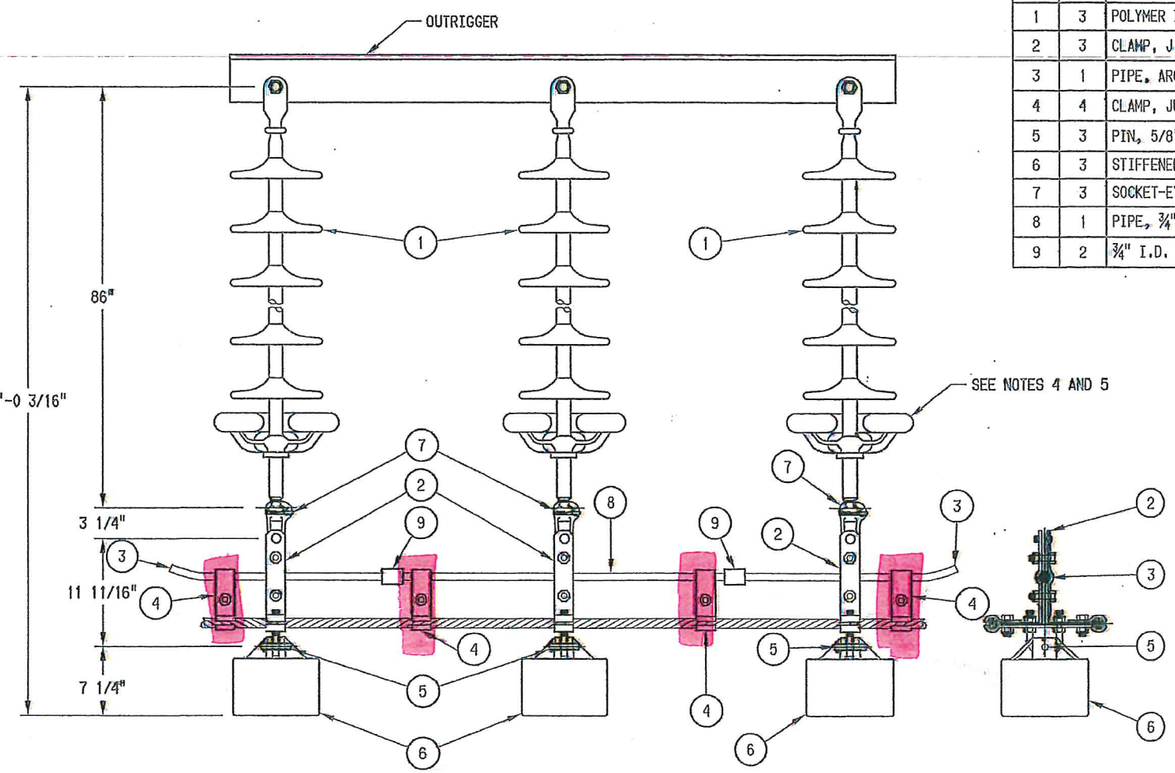
REFERENCE DRAWINGS		NO	REVISIONS	DATE	SAP WO	SUPV	APPROVED	ENGR	CK'D	MADE	P.E.
M-60221	DATA SHEETS, CKT #2										
M-60220	MASTER DWG LIST, CKT #2										
M-60204	MASTER DWG LIST, CKT #1										
N-4592	HARDWARE FRAMING										
M-60205	DATA SHEETS, CKT #1	0	ISSUED FOR CONSTRUCTION	6-7-12	SEE TABLE		C Edison	BH POWER	CK	HG POWER	

LOCATION ELDORADO - IVANPAH NO.1 & NO.2 220kV T/L

JUMPER STIFFENER FOR B-ARM, 2-STRING 2-CONDUCTOR HORIZ. BUNDLE

SOUTHERN CALIFORNIA EDISON An EDISON INTERNATIONAL Company

D/L N4593SH06.DWG | N-4593-0 | SH.6



FRONT VIEW

BILL OF MATERIAL

ITEM	QTY	DESCRIPTION	OLD MAT. CODE	NEW MAT. CODE
1	3	POLYMER INSULATOR, 50 KIP		10171938
2	3	CLAMP, J.L. STIFFENER, 2-BUNDLE FOR 3/4" I.D. PIPE	077-59418	10067595
3	1	PIPE, ARCHING GALV., 3/4" O.D. X 14'	081-52407	10068337
4	4	CLAMP, JUMPER LOOP SUPPORT 2-BUNDLE FOR 3/4" I.D. PIPE	077-59004	10067590
5	3	PIN, 5/8" DIA. x 3", W/COTTER	081-31500	10068323
6	3	STIFFENER STRING WEIGHT, 100 LB. EA.	084-20507	10068570
7	3	SOCKET-EYE, 50 KIP SOCKET, 30 KIP EYE		10175419
8	1	PIPE, ¾" I.D. x 16' STRAIGHT, GALV.		0
9	2	¾" I.D. PIPE COUPLINGS, THREADED		0

NEW

NOTES:

1. BOLTS AND PINS SHALL HAVE NUTS AND COTTERS FACED DOWN OR TOWARDS STEP LEG OF TOWER.
2. ITEM 4 TO BE CENTERED BETWEEN INSULATORS AND OUT 12"-18" NEAR PIPE ARCH AS SHOWN.
3. ITEM 3, PRIOR TO INSTALL, TO BE CUT IN HALF AND THREADED TO JOIN COUPLINGS.
4. CORONA RINGS SHALL BE INSTALLED PER MANUFACTURER RECOMMENDATION. CORONA RINGS THAT ALLOW INSTALLATION IN EITHER DIRECTION SHALL BE INSTALLED IN THE CORRECT DIRECTION AS DESCRIBED IN THE MAUNFACTURERS INSTALLATION SPECIFICATION.
5. FOR HORSE-SHOE CORONA RINGS THE ORIENTATION OF THE OPENING OF THE CORONA RING SHALL BE FACED IN THE DIRECTION OF THE STRUCTURE.

* REVISE ON AUTOCAD SYSTEM ONLY *

2-BUNDLE CONDUCTOR: 1590 KCMIL ACSR 45X7 "LAPWING"

SAP WO	LOCATION
900344621	CALIFORNIA
900344623	NEVADA

POWER ENGINEERS

PEI SUBMITTAL DATE: 07-05-2012

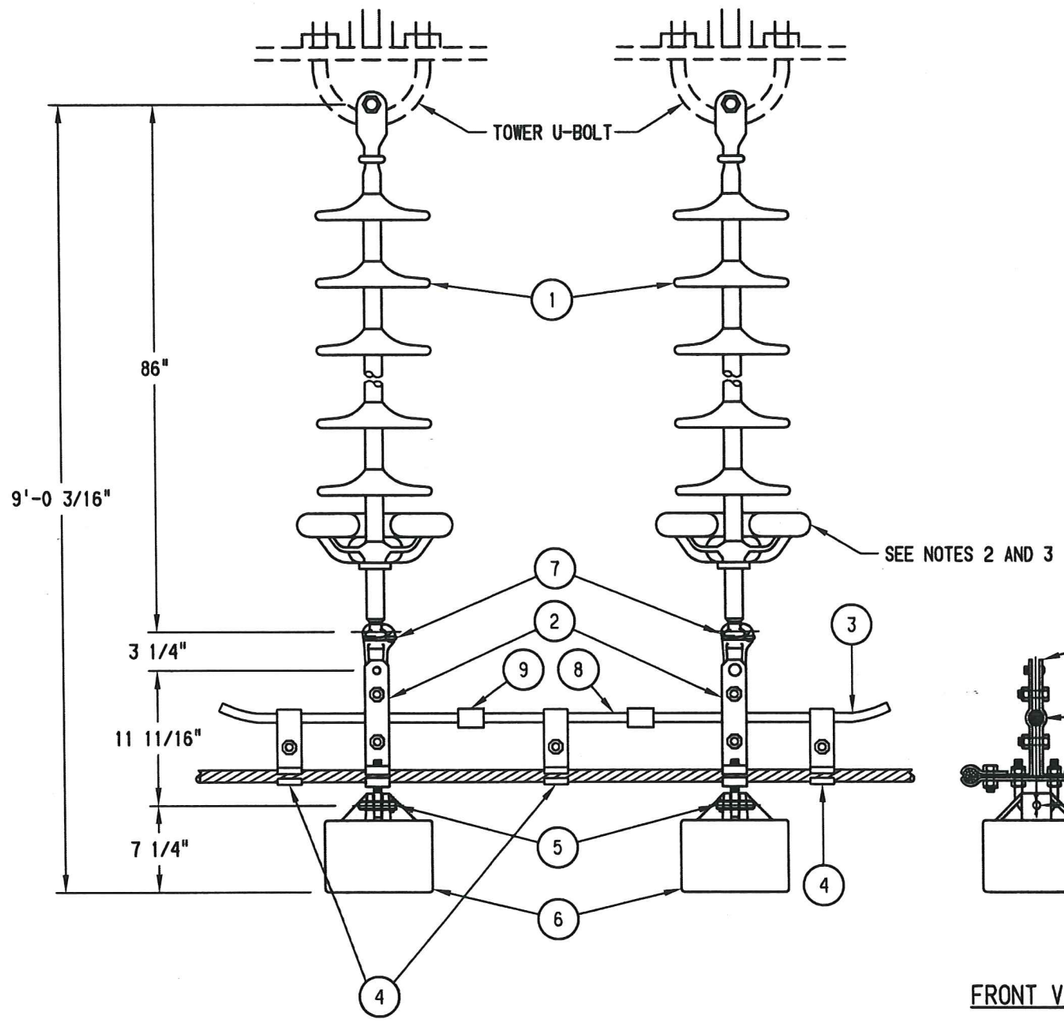
REFERENCE DRAWINGS		NO	REVISIONS	DATE	SAP WO	SUPV	APPROVED	ENGR	CK'D	MADE	P.E.
M-60221	DATA SHEETS, CKT #2										
M-60220	MASTER DWG LIST, CKT #2										
M-60204	MASTER DWG LIST, CKT #1										
N-4592	HARDWARE FRAMING	1	ADDED TWO ITEM 4 CLAMPS	9-13-12	SEE TABLE			BH POWER		NG POWER	
M-60205	DATA SHEETS, CKT #1	0	ISSUED FOR CONSTRUCTION		SEE TABLE			BH POWER		NG POWER	

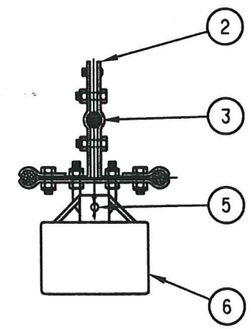
LOCATION ELDORADO - IVANPAH NO.1 & NO.2 220kV T/L

JUMPER STIFFENER, 3-STRING
2-CONDUCTOR HORIZ. BUNDLE

SOUTHERN CALIFORNIA EDISON An EDISON INTERNATIONAL Company

D/L N4593SH06.DWG | N-4593-1 | SH.7





FRONT VIEW

BILL OF MATERIAL

ITEM	QTY	DESCRIPTION	OLD MAT. CODE	NEW MAT. CODE
1	2	POLYMER INSULATOR, 50 KIP		10171938
2	2	CLAMP, J.L. STIFFENER, 2-BUNDLE FOR 3/4" I.D. PIPE.	077-59418	10067595
3	1	PIPE, ARCHING GALV., 3/4" X 14'.	081-52407	10068337
4	3	CLAMP, JUMPER LOOP SUPPORT 2-BUNDLE FOR 3/4" I.D. PIPE	077-59004	10067590
5	2	PIN, 5/8" DIA. x 3", W/COTTER	081-31500	10068323
6	2	STIFFENER STRING WEIGHT, 100 LB. EA.	084-20507	10068570
7	2	SOCKET-EYE, 50 KIP SOCKET, 30 KIP EYE		10175419
8	1	PIPE, 3/4" I.D. x 8' STRAIGHT, GALV		
9	2	3/4" I.D. PIPE COUPLINGS, THREADED		

CLIP

NOTES:

1. BOLTS AND PINS SHALL HAVE NUTS AND COTTERS FACED DOWN OR TOWARDS STEP LEG OF TOWER.
2. CORONA RINGS SHALL BE INSTALLED PER MANUFACTURER RECOMMENDATION. CORONA RINGS THAT ALLOW INSTALLATION IN EITHER DIRECTION SHALL BE INSTALLED IN THE CORRECT DIRECTION AS DESCRIBED IN THE MAUNFACTURERS INSTALLATION SPECIFICATION.
3. FOR HORSE-SHOE CORONA RINGS THE ORIENTATION OF THE OPENING OF THE CORONA RING SHALL BE FACED IN THE DIRECTION OF THE STRUCTURE.

2-BUNDLE CONDUCTOR: 1590 KCMIL ACSR 45X7 "LAPWING"

SAP WO	LOCATION
900344621	CALIFORNIA
900344623	NEVADA

POWER ENGINEERS

* REVISE ON AUTOCAD SYSTEM ONLY *

PEI SUBMITTAL DATE: 06-01-2012

REFERENCE DRAWINGS		NO	REVISIONS	DATE	SAP WO	SUPV	APPROVED	ENGR	CK'D	MADE	P.E.
M-60221	DATA SHEETS, CKT #2										
M-60220	MASTER DWG LIST, CKT #2										
M-60204	MASTER DWG LIST, CKT #1										
N-4592	HARDWARE FRAMING										
M-60205	DATA SHEETS, CKT #1	0	ISSUED FOR CONSTRUCTION	6-7-12	SEE TABLE			BH POWER		NG POWER	

LOCATION ELDORADO - IVANPAH NO.1 & NO.2 220kV T/L

JUMPER STIFFENER FOR C-ARM, 2-STRING 2-CONDUCTOR HORIZ. BUNDLE

SOUTHERN CALIFORNIA EDISON An EDISON INTERNATIONAL Company

D/L N4593SH08.DWG | N-4593-0 | SH.8