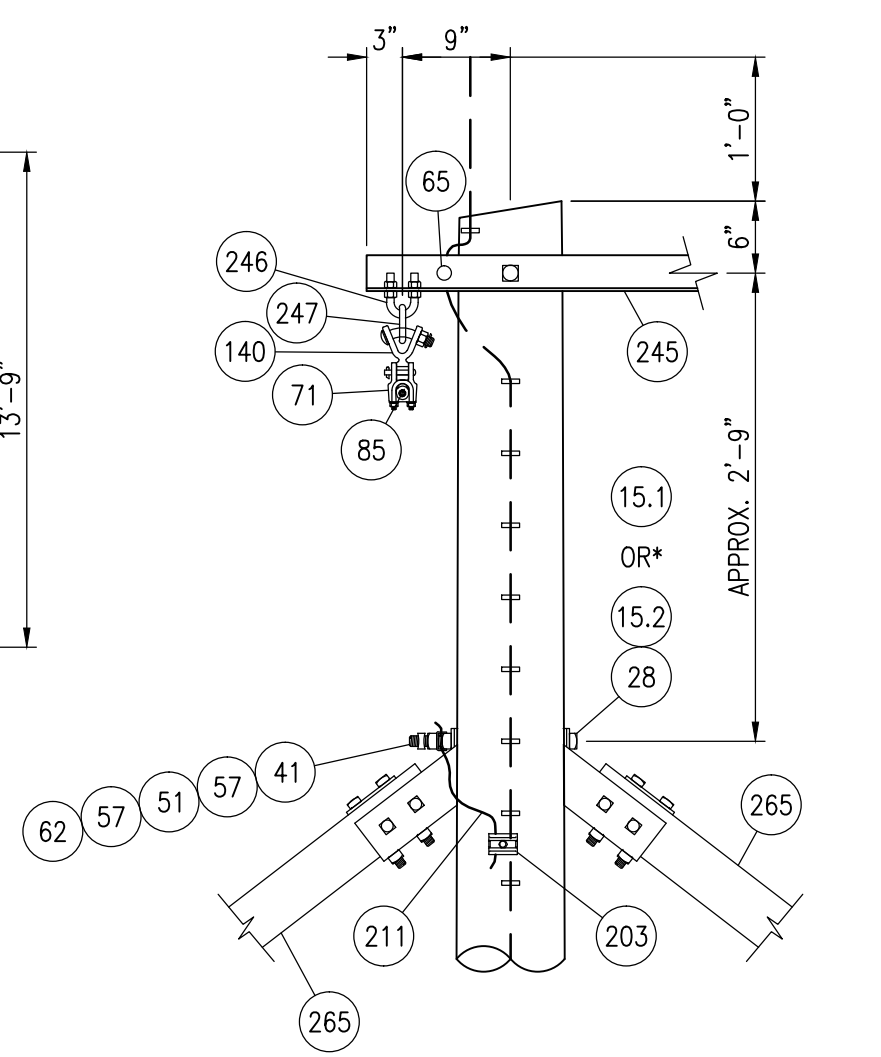
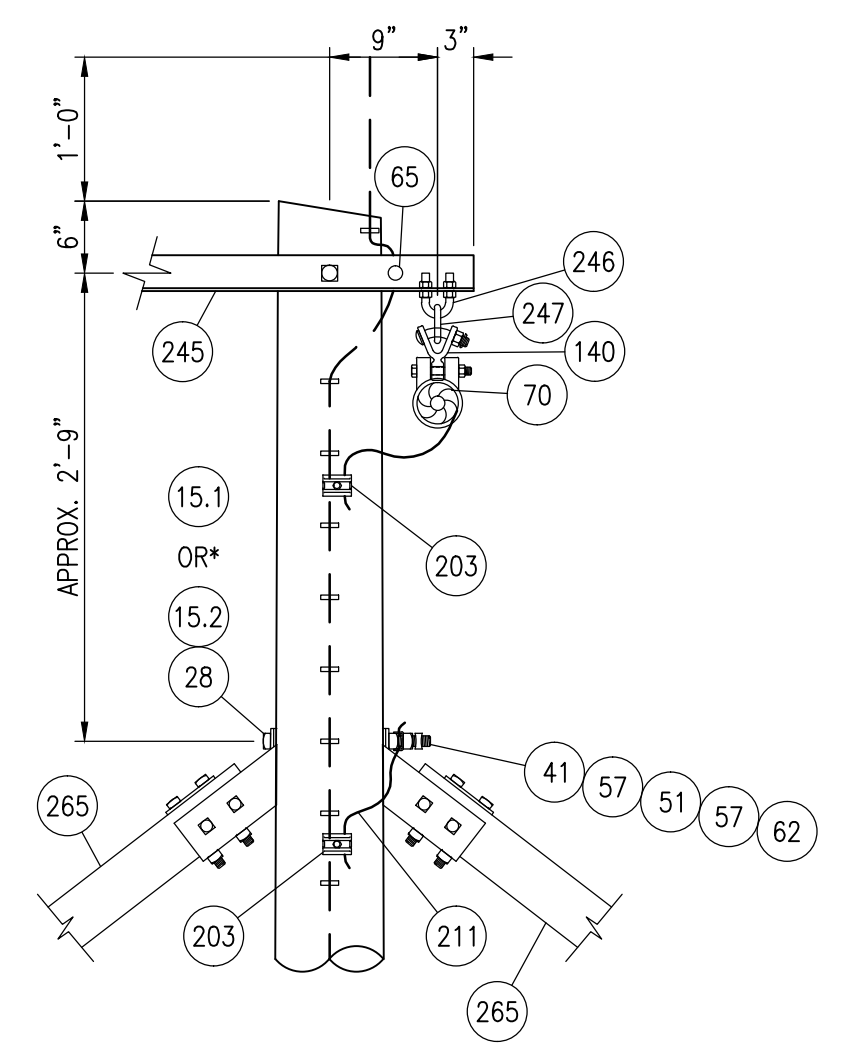


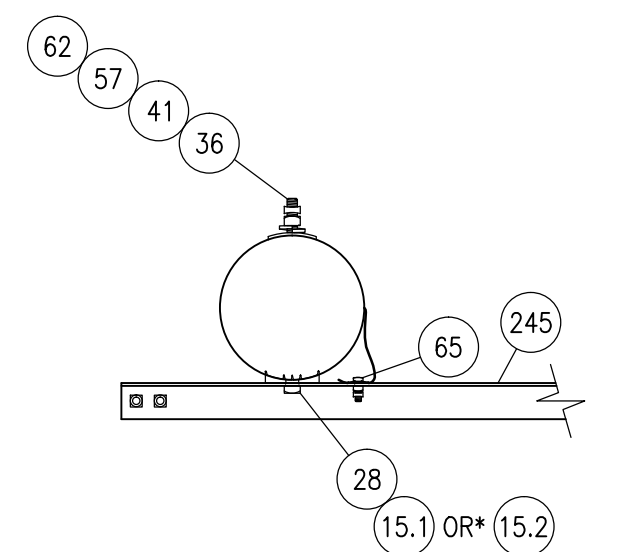
H-FRAME TANGENT  
ELEVATION  
LOOKING AHEAD



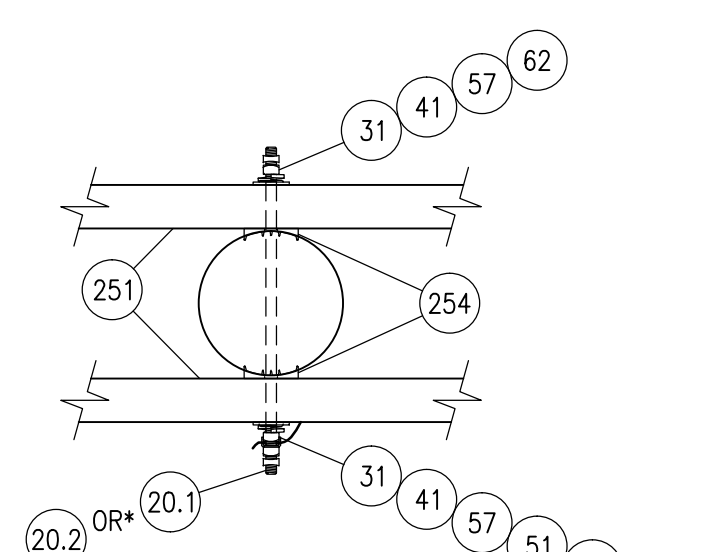
DETAIL 1  
3/8" SHIELD WIRE WITH VEE BRACE ATTACHMENT  
SCALE: N.T.S.



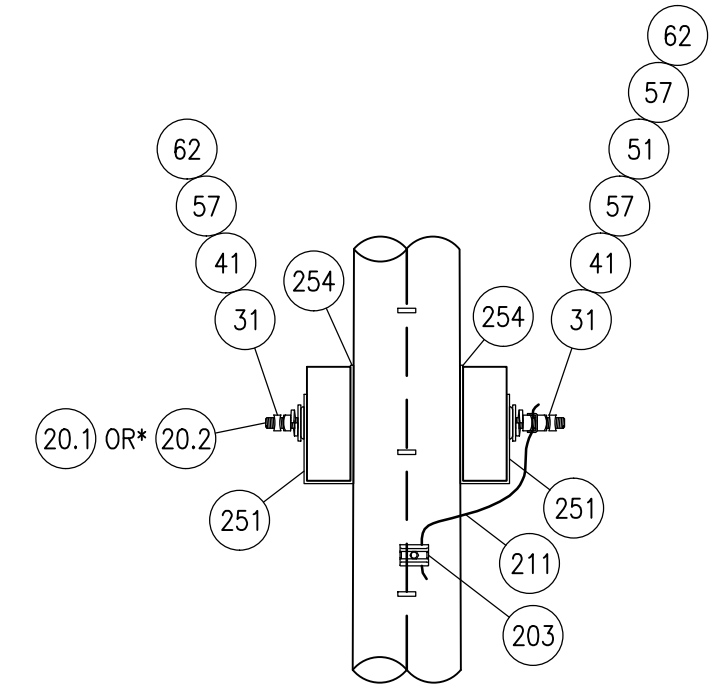
DETAIL 2  
OPGW WITH VEE BRACE ATTACHMENT  
SCALE: N.T.S.



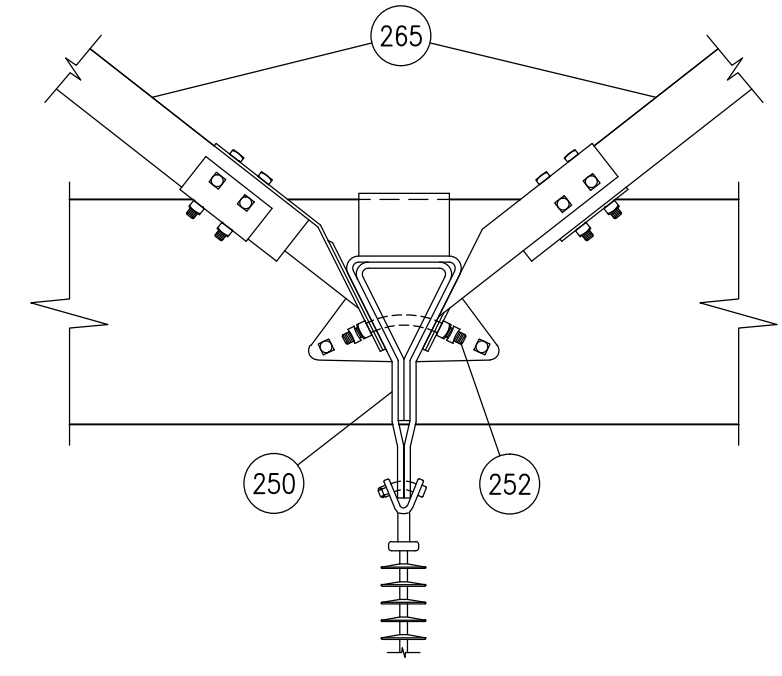
VIEW A  
SHIELD WIRE CROSSARM ATTACHMENT  
SCALE: N.T.S.



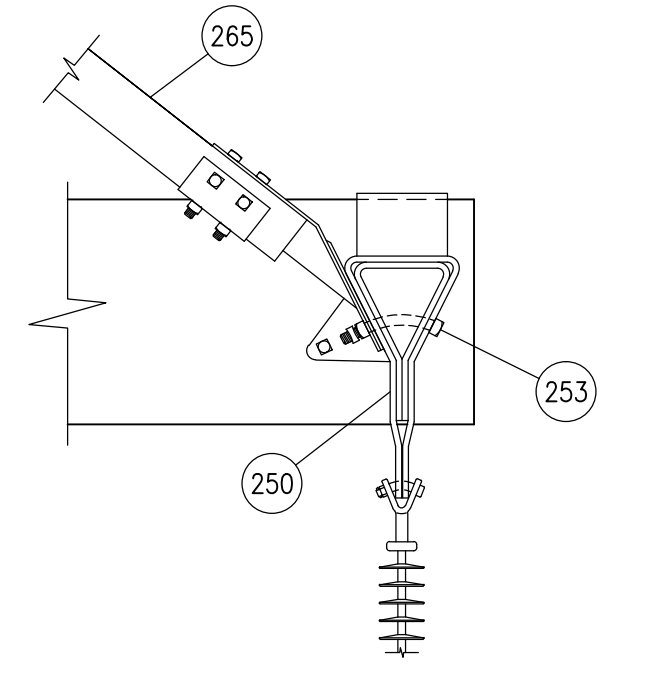
SECTION B  
PHASE CROSSARM ATTACHMENT  
SCALE: N.T.S.



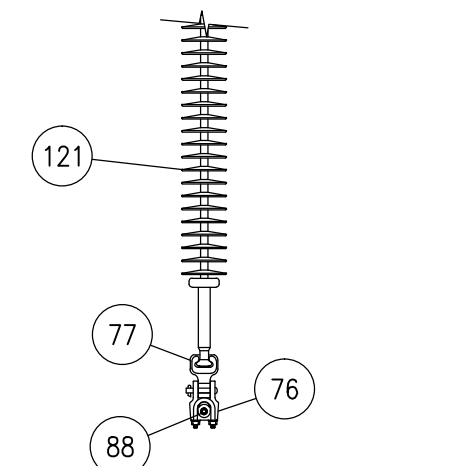
SECTION C  
PHASE CROSSARM ATTACHMENT  
SCALE: N.T.S.



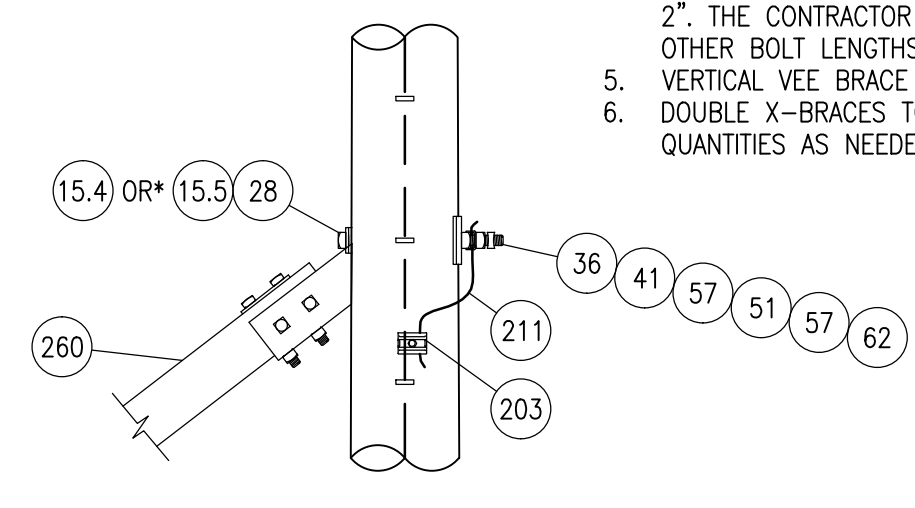
DETAIL 3  
ADJUSTABLE SPACER - MIDDLE PHASE  
SCALE: N.T.S.



DETAIL 4  
ADJUSTABLE SPACER - END PHASE  
SCALE: N.T.S.



DETAIL 5  
PHASE ATTACHMENT  
SCALE: N.T.S.



DETAIL 6  
X-BRACE CONNECTION AND GROUNDING  
(4 PLACES)  
SCALE: N.T.S.

LIST OF MATERIALS				
ITEM	QTY	DESCRIPTION	MANUFACTURER	CATALOG NO.
15.1	2*	BOLT, MACHINE, W/ NUT, 7/8" X 12"	CHANCE	DF5B12
15.2	2*	BOLT, MACHINE, W/ NUT, 7/8" X 14"	CHANCE	C2050254
15.3	*	BOLT, MACHINE, W/ NUT, 7/8" X 16"	CHANCE	C2050255
15.4	2*	BOLT, MACHINE, W/ NUT, 7/8" X 18"	CHANCE	C2050556
15.5	2*	BOLT, MACHINE, W/ NUT, 7/8" X 20"	CHANCE	C2050257
15.6	*	BOLT, MACHINE, W/ NUT, 7/8" X 22"	CHANCE	C2050258
20.1	*	BOLT, DOUBLE ARMING, FULL THREAD, W/ 4 SQ. NUTS, 7/8" X 22"	CHANCE	PSDA782200
20.2	2*	BOLT, DOUBLE ARMING, FULL THREAD, W/ 4 SQ. NUTS, 7/8" X 24"	CHANCE	PSDA782400
20.3	*	BOLT, DOUBLE ARMING, FULL THREAD, W/ 4 SQ. NUTS, 7/8" X 26"	CHANCE	PSDA782600
28	8	WASHER, ROUND, FLAT, 7/8", 2" X 1/4"	HUGHES	RW2-80
31	4	WASHER, SQUARE, FLAT, 7/8", 3" X 3" X 1/4"	HUGHES	SW3-80
36	6	WASHER, SQUARE, CURVED, 7/8", 4" X 4" X 1/4"	CHANCE	680912
41	12	WASHER, DOUBLE COIL SPRING LOCK, 7/8", EXTRA HEAVY	HUGHES	SLW2-80EM
51	8	CLIP, BONDING, 7/8"	HUGHES	2727.8
55	-	NUT, SQUARE, 1/2"	HUGHES	N50
57	8	NUT, SQUARE, 7/8"	HUGHES	N80
60	-	LOCKNUT, SQUARE, 1/2"	HUGHES	MF50
62	12	LOCKNUT, SQUARE, 7/8"	HUGHES	MF80
65	2	GROUND WIRE BONDING BOLT, 1/2" X 1-1/2" MAX WIRE DIA=7/16" (COMES WITH ITEMS 55 & 60)	HUGHES	GWBS1-1/2
70	1	CLAMP, ARMOR-GRIP SUSPENSION, 0.440"-0.458", FOR 0.443" OPGW, W/ #4 CU GW	PLP	4300104G
71	1	CLAMP, SUSPENSION, 0.20"-0.60", FOR 3/8" HS OR EHS STEEL SW	ANDERSON	MS-60-N
76	3	CLAMP, SUSPENSION, 1.25"-1.82", FOR 795 ACSR "DRAKE"	ANDERSON	HAS-182-N
77	3	SOCKET EYE, ANSI 52-8	MACLEAN	SE8-1750-6
85	1	ARMOR ROD, FOR 3/8" HS & EHS STEEL SW, L=48", ROD DIAM=0.10"	PLP	AR-1130
88	3	ARMOR ROD, FOR 795 ACSR "DRAKE", L=100", ROD DIAM=0.310"	PLP	AR-0141
121	3	INSULATOR, SUSPENSION, 115KV, 25K, Y-CLEVIS/BALL, POLY L=55.2"	OHIO BRASS	S050040S2010
140	2	CLEVIS-Y, EYE, 20K, L=2-13/16", W=5/8", PD=3/4", HOLE DIA.=11/16"	ANDERSON	YCS-05
203	9	CLAMP, PARALLEL, 1-BOLT, #2 CU TO #4 CU & #4 CU TO #4 CU	BURNDY	UCK-3UL
211	AS REQ'D	WIRE, COPPER, #4 SOLID, SD, 0.2043" DIA., FT		
245	1	CROSSARM, SHIELD WIRE SUPPORT FOR 14'-6" CENTER	HUGHES	C3016.1
246	2	U-BOLT, 5/8" DIAMETER (COMES W/ 4 NUTS AND 2 LOCK NUTS)	HUGHES	1329-A-CPT
247	2	5/8" CHAIN LINK, 1" X 3"	HUGHES	1329-B
250	***	ADJUSTABLE SPACER FITTINGS W/ HARDWARE	HUGHES	3414
251	1	CROSSARM, DOUBLE WOOD, 3-5/8" X 9-1/2" X 30'-0" W/ (3) 3414 ADJUSTABLE SPACERS (ITEM #250)	HUGHES	C4430.1B
252	1	BENT BOLT (COMES WITH 2 NUTS AND 2 LOCKNUTS)	HUGHES	2722
253	2	BENT STUD (COMES WITH NUT AND LOCKNUT)	HUGHES	2722.1D-B
254	4	GAIN FITTING, FOR 3-5/8" X 9-1/2" XARM	HUGHES	A783.1Q-15
260**	1	BRACE, X-TYPE, WOOD, 14'-6" POLE SPACING, 3-3/8" X 5-3/8" & CENTER CLAMP	HUGHES	1042-14-6-CCO
265	4	BRACE, VEE, WOOD, 8'-0" CENTER TO CENTER HOLE SPACING, 8'-4" LENGTH	HUGHES	2025BDV100
2	2	ASSEMBLY: GND-POLE-2		

\* SEE NOTE 4  
\*\* SEE NOTE 6  
\*\*\* SEE ITEM 251

NOTES:

- REFER TO THE STAKING SHEETS FOR COORDINATES OF POLES & LINE C HUB.
- SEE P&P'S OR STRUCTURE LIST FOR STRUCTURE HEIGHT AND EMBEDMENT DEPTH.
- DRILLED HOLES SHALL BE 1/16" GREATER THAN THE SPECIFIED BOLT DIAMETER.
- BOLT LENGTHS ARE ESTIMATED BASED ON 60' CLASS 3 DOUGLAS FIR POLE, OVERSIZED 2". THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING EXTRA QUANTITIES OF OTHER BOLT LENGTHS TO ACCOMMODATE OTHER POLE DIAMETERS.
- VERTICAL VEE BRACE DIMENSION IS APPROXIMATE. FIELD DRILL WHERE NECESSARY.
- DOUBLE X-BRACES TO BE ASSEMBLED ON STRUCTURES 36 & 37. ADJUST MATERIAL QUANTITIES AS NEEDED.



ISSUE	DATE	DESCRIPTION
0	03/20/2014	ISSUED FOR RECORD

PROJECT MANAGER	J. ELLSWORTH
PROJECT ENGINEER	T. BROWN
DESIGN ENGINEER	T. MYERS
CADD TECHNICIAN	M. RODRIGUEZ
PROJECT NUMBER	207673

**BLACK HILLS ENERGY**  
PUEBLO, COLORADO

**PUEBLO PLANT - HYDE PARK - WEST STATION**  
115KV TRANSMISSION LINE

**STRUCTURE ASSEMBLY DRAWING**  
115KV SINGLE CIRCUIT  
TANGENT H-FRAME

0 1" 2"

FILENAME: PHW-04.DWG  
SCALE: 3/16"=1'-0"

SHEET  
**PHW-04**