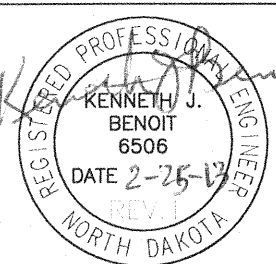


Images in Drawing

A	BNK	RJG	CSF	8/16/11	85% DELIVERABLE
B	BNK	CSF	CSF	9/20/11	90% DELIVERABLE
O	BNK	CSF	JLM	10/4/11	ISSUED FOR CONSTRUCTION
1	NJG	CSF	CSF	2/22/13	CONSTRUCTION REVISIONS
NO.	BY	CHK	APP.	DATE	REVISION DESCRIPTION



CLIENT	8/16/10/20/11	10/4/11					
BID							
CONSTRUCTION PERMITTING							
RELEASED TO/FOR	A	B	C	0	1	2	3
	DATE RELEASED						



Project Office:
BARR ENGINEERING CO.
4700 WEST 77TH STREET
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Scale	N.T.S
Date	08/16/11
Drawn	BNK
Checked	CSF
Designed	RJG
Approved	JLM



BISON 3 WIND PROJECT
MORTON & OLIVER COUNTIES, NORTH DAKOTA

COLLECTOR SYSTEM
BISON 3 BILL OF MATERIALS

BARR PROJECT No. 34/33-1006	
CLIENT PROJECT No.	
DWG. No. E-BM-32	REV. No. 1



BISON 3 BILL OF MATERIALS

ITEM	DESCRIPTION	MANUFACTURER	CATALOG	UNIT	TOTAL QUANTITY
1A	GSU PADMOUNT TRANSFORMER 34500 Δ - 690 Y/398, 3300/3696 MVA 55°/65°C RISE, Z=6%	CG POWER SYSTEMS		EA	35
1B	SWITCHGEAR, PADMOUNT, 38kV PUFFER GAS, 3-WAY W/ 20" CABLE COMPARTMENT	G&W ELECTRIC	SPRAM-33-396F-40P1	EA	15
1C	SWITCHGEAR, PADMOUNT, 38kV PUFFER GAS, 4-WAY W/ 20" CABLE COMPARTMENT	G&W ELECTRIC	SPRAM-44-396F-40P1	EA	10
1E	ZIG ZAG PADMOUNT GND TRANSFORMER 3Ø, 830A@10 SEC. 60A CONT NEUT I, 20A CONT PHASE I, 70Q/Ø	PACIFIC CREST		EA	5
1F	BOLLARD 5 1/2" O.D. X 6'-0", CONCRETE FILLED, PAINTED YELLOW OR PROVIDE YELLOW COVERS	OLD CASTLE PRECAST	DWG# 7.5 DIA-84-BOLLARD, ITEM:1658900	EA	250
1G	TRANSFORMER PAD, 8'X12'X6" VAULT	OLD CASTLE PRECAST	DWG# 110-106125-8X14 TOP REV. C	EA	35
1H	TRANSFORMER PAD, SIZED TO FIT GROUNDING TRANSFORMER	NORDIC	GS-72-62-3ØRT-MG-58X18, ITEM:D1691.00	EA	5
4	ARRESTER, SURGE, 22.0kV MCOV, ELBOW	COOPER	3238020C27M	EA	120
5	WIRE, 1000 KCMIL AL 2KV RHH/RHW XLPE (10 CONDUCTORS / PHASE, 30' / CABLE, INC. 15% ADD)	SOUTHWIRE	1000-58 3E AL RHH-RHW-2 2KV PARALLELED	FT	36400
6	WIRE, 4/0 COPPER BARE, STR			FT	13125
7	LUG, COMPRESSION, ALUMINUM, 2 HOLE, 1000 kcmil str	BURNDY	HYLUG YA44A9	EA	2100
8	LUG, COMPRESSION, COPPER, 2 HOLE, 4/0 AWG FOR NEUTRAL CONNECTION	BURNDY	YGHA28-2N	EA	315
9A	BOLT, 302 OR 316 STAINLESS, 1/2"-13 x 2-1/2"			EA	2450
9B	BOLT, 302 OR 316 STAINLESS, 1/2"-13 x 1-1/2"			EA	315
10	CONNECTOR, COPPER COMPRESSION 2/0-4/0 TO 2/0-4/0			EA	5
11	WASHER, STAINLESS, FLAT, ROUND, 1/2", 1.25" OD, 0.125" TK			EA	5215
12	WASHER, BELLEVILLE, STAINLESS, 1/2", 1.25", 4700 LB			EA	2765
13	NUT, 1/2" ALLOY 650 SILICONE BRONZE			EA	2765
14A	ELBOW ASSEMBLY KIT, 600 AMP, 35kV, 1/0 AWG AL, 345 MILS	COOPER	TP635G13CCS1	EA	240
14B	ELBOW ASSEMBLY KIT, 600 AMP, 35kV, 350kcmil AL, 345 MILS	COOPER	TP635M19CCS2	EA	30
15	ELBOW ASSEMBLY KIT, 600 AMP, 35kV, 4/0 AWG AL, 345 MILS	COOPER	TP635K16CCS1	EA	42
16	ELBOW ASSEMBLY KIT, 600 AMP, 35kV, 750 kcmil AL, 345 MILS	COOPER	TP635R25CCS1	EA	48
17	ELBOW ASSEMBLY KIT, 600 AMP, 35kV, 1000 kcmil AL, 345 MILS	COOPER	TP635T27CCS1	EA	15
18	LUG, COMPRESSION, COPPER, 2 HOLE, 2/0 AWG FOR GROUND CONNECTION	BURNDY	YGHA26-2N	EA	85
19	WIRE, 2/0 COPPER BARE, STR			FT	22415
20	CONNECTOR, COPPER COMPRESSION #6-1/0 TO #6-1/0			EA	355
25A	PAD/VAULT, 3-WAY SWITCH			EA	15
25B	PAD/VAULT, 4-WAY SWITCH			EA	10
26	FLT IND, 3 PH, TST PT MTD, 600 AMP, W/ RMT IND, 800 A TRIP	POWER DELIVERY PRODUCTS	40-3115-000-08	EA	180
30	LUG, TRANSFORMER GROUNDING, 250 KCMIL MAX			EA	5
31	GROUND ROD, 5/8" x 8'	BLACKBURN - OE	6258	EA	252
32	CONNECTOR, COPPER, 1/2"-5/8" ROD TO 1/0-2/0	HUBBELL/ ANDERSON	GC103-02	EA	110
32A	CONNECTOR, COPPER, 1/2"-5/8" ROD TO #6-1/0	HUBBELL/ ANDERSON	GC103-01	EA	1
33	LUG, COMPRESSION, COPPER 1 HOLE, 2/0 STR	BURNDY	YAZV26TC12FX	EA	110
34	WASHER, BELLVILLE, STAINLESS, 5/8"-11x1"			EA	5
35	BOLT, 302 OR 316 STAINLESS, 5/8"-11x1"			EA	5
36	CONNECTOR, COPPER CRIMPIT #2-1/0 TO 2/0-4/0			EA	120
38	WIRE, #6 COPPER BARE, SOLID			FT	Note 3
39	CONNECTOR, COPPER COMPRESSION, #2-2/0 TO #2-#4			EA	Note 3
43	1/0-500 kcmil, NEUTRAL GROUNDING KIT (KIT OF 3)	RAYCHEM	JGK-MS-2	EA	Note 3
44	750-1500kcmil, NEUTRAL GROUNDING KIT (KIT OF 3)	RAYCHEM	JGK-MS-3	EA	Note 3
45	SPLICE ASSEMBLY, 35 kV, 1/0 AWG AL, COLD SHRINK	3M	5467A-1/0-AL	EA	Note 3
46	SPLICE ASSEMBLY, 35 kV, 4/0 AWG AL, COLD SHRINK	3M	5467A-4/0-AL	EA	Note 3
47	SPLICE ASSEMBLY, 35 kV, 350 kcmil AL, COLD SHRINK	3M	5467A-350-AL	EA	Note 3
48	SPLICE ASSEMBLY, 35 kV, 750 kcmil AL, COLD SHRINK	3M	5468A-750-AL	EA	Note 3
49	SPLICE ASSEMBLY, 35 kV, 1000 kcmil AL, COLD SHRINK	3M	5468A-1000-AL	EA	Note 3
51	LUG, COMPRESSION, COPPER, 1 HOLE, 2/0 AWG			EA	105

NOTES:

- INCLUDES QUANTITIES FROM FIBER OPTIC PANEL (FD-31), FIBER OPTIC SPLICE (FS-31, FS-32), FIBER OPTIC HAND HOLE (FS-33), GROUNDING TRANSFORMER (GT-31), MET TOWER (MT-31), PAD MOUNT TRANSFORMER (PM-31), SWITCH CABINET (SD-30, SD-31), AND CONDUIT AND GROUNDING (TD-31).
- DOES NOT INCLUDE SPLICE AND GROUNDING KIT MATERIALS (CA-32) OR BURIED CONDUITS FOR CROSSINGS. ACTUAL QUANTITIES TO BE DETERMINED BY CONTRACTOR DURING REEL MANAGEMENT.
- CONTRACTOR TO VERIFY QUANTITIES AND MATERIAL.

BISON 3 BILL OF MATERIALS (CON'T)

ITEM	DESCRIPTION	MANUFACTURER	CATALOG	UNIT	TOTAL QUANTITY
63	2" HDPE CONDUIT 90 DEGREE ELBOW, 24" RADIUS			FT	138
64	8" SCH 40 PVC 90 DEGREE ELBOW, 48" RADIUS			EA	95
65	4" PVC CONDUIT, 10' SCHEDULE 40 RIGID NONMETALLIC CONDUIT (RNC)	CARLON	49015-010	EA.	210
66	4" PVC END BELLS	CARLON	E997N	EA.	420
67	4" PVC CONDUIT, 45 DEGREE ELBOW, 36" RADIUS	CARLON	UB9FN	EA.	210
69	4" PVC CONDUIT 90 DEGREE ELBOW, 36" RADIUS, ID-TYPE	CARLON		EA.	420
70	4" PVC CONDUIT, ID-TYPE	CARLON		FT	1400
71	4" PVC END BELLS	CARLON		EA.	420
72	4" PVC COUPLING	CARLON		EA.	420
74	1" PVC CONDUIT, 10' SCHEDULE 40 RIGID NONMETALLIC CONDUIT (RNC)	CARLON	49008-020	EA.	70
75	1" PVC END BELLS	CARLON	E997F	EA.	210
76	1" PVC CONDUIT, 90 DEGREE ELBOW, 36" RADIUS	CARLON	UB9FF	EA.	105
77	1" PVC COUPLING	CARLON		EA.	210
81	2/0 COPPER RUN TO 2/0 COPPER TAP, TYPE TA CONNECTION, DARK BLUE CONTAINER	CADWELD	TA	EA.	595
82	2/0 COPPER RUN TO GROUND ROD, TYPE GY CONNECTION, GRAY CONTAINER	CADWELD	GY	EA.	140
83	2/0 COPPER TO 2/0 COPPER, TYPE SS CONNECTION, ORANGE CONTAINER	CADWELD	SS	EA.	70
85	MOLD WITH BAFFLE FOR 2/0 COPPER RUN TO 2/0 COPPER TAP, TYPE TA CONNECTION	CADWELD	TAC-2G2G	EA.	Note 3
86	MOLD WITH BAFFLE FOR 2/0 COPPER TO GROUND ROD, TYPE GY CONNECTION	CADWELD	GYE-182G	EA.	Note 3
87	MOLD WITH BAFFLE FOR 2/0 COPPER TO 2/0 COPPER, TYPE SS CONNECTION	CADWELD	SSC-2G	EA.	Note 3
90	GROUND CONNECTOR, TWO CABLE TO FLAT, FOR MET TOWER SERVICE PANEL	SEFCOR	GF2-08B	EA.	2
91	LUG, COMPRESSION, COPPER, 1 HOLE 4/0 AWG FOR T-BAR CONNECTION	BURNDY	YAZV28TC12FX	EA.	315
94	HILTI HST M16X140/25 (ANCHOR BOLTS FOR POWER UNIT, 2 PER FOOTER)	-	-	EA.	280
95	HANDLE CLAMP (AS NEEDED)	CADWELD PLUS	L160	EA	Note 3
96	CRUSHED STONE #57			CU YD	315
110	ENCLOSURE, PRECAST POLYMER CONCRETE ENCLOSURE 24"x36" GASKETED, HEAVY DUTY w/ 2 BOLTS	QUAZITE	PG246HG00	EA	26
111	COVER, PRECAST POLYMER CONCRETE ENCLOSURE 24"x36" GASKETED, HEAVY DUTY w/ 2 BOLTS	QUAZITE	PG246HG00	EA	26
112	SPLICE CLOSURE, FIBER OPTIC, 8" I.D. x 25"	TYCO	FOSC-450-B6-4-24-0-BOV	EA	25
114	LOCATOR BALL (AS NEEDED, SEE NOTES)	3M	EMS1422-XR/ID POWER	FT	Note 3
116	CONDUIT BODY, TYPE LR, 1" PVC	CARLON	E985F-CAR	EA	2
117	2"x24"x90 DEGREE SWEEP RGS	CARION - OE		EA	1
118	2#6 AWG CU MC CABLE W/PVC JACKET FOR DIRECT BURIAL W/GROUND	SOUTHWIRE		FT	Note 3
122	SURGE ARRESTER, 1 OR 3 PHASE, 650VAC PHASE TO GROUND MAX	SQUARE D	SDSA1175	EA	2
123	QO LOAD CENTER W/ FACTORY INSTALLED GROUND BAR	SQUARE D	QO1816M200FTRB	EA	1
124	200 AMP MAIN BREAKER, 2 POLE	SQUARE D	QO2200	EA	1
125	110 AMP CIRCUIT BREAKER, 2 POLE	SQUARE D	QO2110	EA	1
126	10 AMP CIRCUIT BREAKER, 2 POLE	SQUARE D	QO210	EA	1
126A	15A CIRCUIT BREAKER, SINGLE POLE	SQUARE D	QO115	EA	1
126B	20A CIRCUIT BREAKER, SINGLE POLE	SQUARE D	QO120	EA	1
127	2" RGS CONDUIT			FT	Note 3
128	3" SCH 40 PVC			FT	6
131	OUTDOOR WALLBOX ASSEMBLY, TYPE FDS 24	CLEARFIELD	WDZ-024-A1F-ZZZ	EA	36
132	UNISTRUT X 15"	POWERSTRUT	PS-500	EA	70
133	BEAM CLAMP, TYPE 501	WESTCO	78599150954	EA	140
134	UNISTRUT CLAMPING NUT	POWERSTRUT	PS SS	EA	140
135	5/16" X 3/4" ROUND HEAD MACHINE SCREW, TYPE 31161504	FASTENAL	27737	EA	140
136	5/16" X 1/2" HEX HEAD BOLT, TYPE 31161561	FASTENAL	13051	EA	140
137	5/16" LOCK WASHERS, TYPE 31161801	FASTENAL	33620	EA	280
138	1/16" FLAT WASHER, TYPE 31161800	FASTENAL	33216	EA	140
139	5/16" X 1-3/4" X 1/8" FENDER WASHER, TYPE 31161807	FASTENAL	33086	EA	140
140	SURFACE MOUNTING KIT W/ 2 BRACKETS	EMERSON	OPFOBD7	EA	25
141	BURIED PADMOUNT SPLICE CABINET, 2 STAKES (MS1342), 2 RECESSED PADMOUNT BRACKETS, (BA12)	EMERSON	PADMT200300	EA	25
142	SINGLE PHASE GROUND SLEEVE	NORDIC	GS-30-18-30-MG-21X10	EA	25
143	ISOLATION BUS BAR	HARGER	GBIS1416CGB	EA	25
144	POST GROUND CONNECTOR	SEFCOR	GUI-6009	EA	2