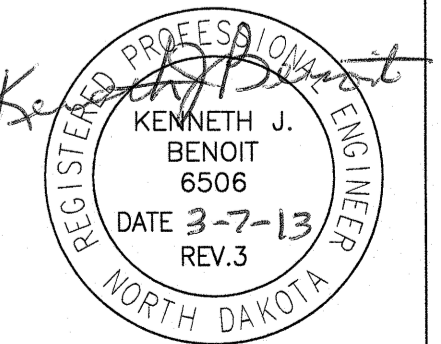


ITEM #	MP STORES#	DESCRIPTION	ITEM #	MP STORES# / PO#	DESCRIPTION
A - ELECTRICAL APARATUS			C - POWER WIRING		
A1		CIRCUIT BREAKER, MITSUBISHI TYPE 200 SFMT-63HF, DEAD TANK, SF6, OUTDOOR - 245KV, 900KV BIL, 60HZ, 2000 A CONTINUOUS - 63KA MAX, 2 CYCLES INTERRUPTING	C15		TERMINAL, CABLE TO FLAT - #1/0 TO 500 CU 2 HOLE BOLTED
A2		AIR BREAK DISC SW, PASCOR, TYPE TTR-8, HORIZONTAL MOUNTED VERTICAL BREAK, UPRIGHT/TPST/MANUAL 230KV, 900KV BIL, 60HZ, 2000A CONT., 61KA MOMENTARY, W/ COMMON BASE	C17		TERMINAL, 3" TUBE TO FLAT, 4-HOLE PAD, AL, WELD
A3		CCVT, AREVA TYPE 'OTCF_245.IM', 2000/1200:1 RATIO, 245KV, 900KV BIL, 60HZ, 1000VA	C75		TERMINAL, CABLE TO FLAT, 1590-1700 MCM, 4-HOLE PAD, AL, WELD
A4		SURGE ARRESTOR, 152KV MCOV, GAPLESS, METAL OXIDE, STATION CLASS, W/ MOUNTING BRACKETS-10" B.C.	C76		TERMINAL, CABLE TO FLAT, 1590-1700 MCM, 4-HOLE PAD, 90°, AL, WELD
A5		WAVE TRAP, TRENCH, 230KV, 60HZ, 0.265MH, 2000A, 63KA THERMAL FOR 2 SEC, 100-300KHZ @ 400 Ω Zo, SINGLE FREQUENCY	C78		TERMINAL, 3" TUBE TO FLAT, 4-HOLE PAD, 90 DEGREE, ALUMINUM, WELD
A6		POWER TRANSFORMER, GE PROLEC, 230/34.5/13.2KV, THREE PHASE, WYE-WYE-DELTA, 90/120/150 MVA, ONAN/ONAF/ONAF, 8.5% IMPEDENCE, 65° C TEMP RISE, 60HZ, 900KV/200KV BIL	C82		TERMINAL, 4" TUBE TO FLAT, CENTER FORMED, 4 HOLE PAD, ALUMINUM, WELD
A7		METERING CT, 34.5KV, 60HZ, 200KV BIL, KULHMAN TYPE CXM-200, 800:5, RF4, 0.15 ACCURACY W/ 1.8 BURDEN, 120KA THERMAL FOR 1 SEC	C83		TERMINAL, EXPANSION, 4" TUBE TO 4 HOLE PAD, ALUMINUM, WELD
A8		AIR BREAK DISC SW, PASCOR TYPE TTT-7 VERTICAL MOUNTED, DOUBLE-SIDE BREAK, TPST/MANUAL, 230KV, 900KV BIL, 60HZ, 3000A CONT., 100KA MOMENTARY, W/ COMMON BASE	C84		TERMINAL TWO CABLES TO FLAT, 1590-1700 MCM AAC TO 4-HOLE PAD, ALUMINUM, WELD
A9		OUTDOOR CEILING MOUNTED LIGHTING FIXTURE W/ 85 W 120V INDUCTION LAMP	C85		TERMINAL, TWO CABLES TO FLAT, 90 DEG, 1590 - 1700 MCM AAC; TO 4-HOLE PAD, AL, WELD
A10		STATION SERVICE TRANSFORMER, PAD MOUNTED, RTE CORP., 60HZ, 167KVA, 34,500 GRD Y, 19,920-240/120V, 2.5% IMP @ 85° C	C87		TERMINAL, TUBE TO FLAT, 5" TUBE TO 4-HOLE PAD, CENTER FORMED, ALUMINUM, WELD
A11		LINE TUNER	C90		TERMINAL, TWO CABLES TO FLAT, 2250 MCM TO 4-HOLE PAD, ALUMINUM, WELD
A12		MPP METER PLASTIC PEDESTAL, NORDIC FIBERGLASS # MPP-141480-MG-X	C157		TEE, TUBE TO FLAT, 3"-6" TUBE TO 4-HOLE PAD, IN LINE WITH TUBE, ALUMINUM, WELD
A13		POWER TRANSFORMER, 230/34.5/13KV, THREE PHASE, WYE-WYE-DELTA, 90/120 MVA, ONANONAF, 65° C TEMP RISE, 60 Hz	C158		TEE, TUBE TO FLAT, 5" TUBE TO 4-HOLE PAD, 3000A RATED, PAD 90° WITH TUBE, ALUMINUM, WELD
A14		CAP BANK, 230KV, 40 MVAR	C209		BUS SUPPORT 5" AL SLIP-RIGID WELDED CUP, 3" B.C.
A15		METERING CT, 34.5KV, 60HZ, 200KV BIL, ABB TYPE LGX-34-879, 800:5, RF4	C251		BUS SUPPORT 4" AL SLIP-RIGID WELDED CUP, 5" B.C.
A16		CCVT, ALSTOM TYPE 'OTCF_245.EM', 2000/1200:1 RATIO, 245KV, 900KV BIL, 60HZ	C254		BUS SUPPORT, 2 CABLE TO 3" B.C., 1272-1780 MCM ACSR
			X1		COMPRESSION COUPLING 4" TO 4" IPS AI TUBE
			X2		COMPRESSION COUPLING 45 DEGREE 4" TO 4" IPS AI TUBE
			C374		STUD CONNECTOR, 2-12 STUD TO 3/4" THICK 4-HOLE PAD, AL, BOLTED
			C375		STUD CONNECTOR, 1.5-12 STUD TO 1/2" THICK 4-HOLE PAD, AL, BOLTED
D - STRUCTURAL STEEL					
D8		34.5KV 3 PHASE CT SUPPORT (DWG ME-32815-14 SH.7)	C401		END CAP 4" AL
D9		34.5KV 3 PHASE CT SUPPORT (DWG ME-32815-14 SH. 15)	C402		END CAP 5" AL
D40		34.5KV 3 PHASE STRAIGHT BUS SUPPORT (DWG. ME-32815-14 SH. 16)	C433		SPACER, 1250-1600 MCM AAC, 4" SPACING
D41		34.5KV SKEWED BUS SUPPORT (DWG ME-32815-13 SH. 17)	C434		SPACER TERMINAL, 1250-1600 MCM AAC, 8" SPACING, 90° TERMINAL
D42		34.5KV SKEWED BUS SUPPORT (DWG ME-32815-13 SH. 18)	C435		SPACER, 1272-1590 MCM ACSR, 4" SPACING
D110		230KV LOW MANUAL SWITCH SUPPORT (DWG ME-32815-14 SH. 1)	C436		SPACER, 2000-2500 MCM AAC, 4" SPACING
D120		230KV HIGH MANUAL SWITCH SUPPORT (DWG ME-32815-14 SH. 2)	C457		A FRAME BASE, 15", 4" MAIN TO 2" TAP AL WELDED
D149		230KV LOW SINGLE PHASE BUS SUPPORT (DWG ME-32815-14 SH.6)	C460		A FRAME TOP, 15", 4" MAIN TO (2) 2" TAP, AL WELDED
D150		230KV LOW THREE PHASE STRAIGHT BUS SUPPORT (DWG. ME-32815-14 SH. 13)	C462		A FRAME TEE, 15", 2" MAIN TO 2" TAP, AL WELDED
D160		230KV HIGH THREE PHASE STRAIGHT BUS SUPPORT (DWG ME-32815-14 SH. 14)	C500		4/0 AWG BARE COPPER SOFT DRAWN
D170		230KV LOW SKEWED BUS SUPPORT (DWG ME-32815-14 SH. 3)	C511		336 LINNET 26/7 ACSR 0.721" DIA.
D189		230KV LOW SINGLE PHASE CCVT SUPPORT (DWG ME-32815-14 SH. 5)	C523		2" IPS AL BUS
D190		230KV LOW THREE PHASE CCVT SUPPORT (DWG ME-32815-14 SH. 4)	C524		3" IPS AL BUS
D600		STATIC MAST(DWG ME-32815-13 SH. 3)	C525		4" IPS AL BUS
D700		230KV SWITCHED H-FRAME (DWG ME-32815-13 SH. 2)	C526		5" IPS AL BUS
			C537		1590 AAC, 61 STRAND
			C542		CONDUCTOR, 1590 MCM ACSR (LAPWING)
F21		SINGLE GROOVE TOWER CLAMP, BRONZE, ONE CABLE TO FLAT, #2/0 TO 250 KCMIL	C543		CONDUCTOR, 2250 MCM AAC (SAGEBRUSH)
			C552		STATION POST INSULATOR, 34.5KV TR210, PORCELAIN
			C558		STATION POST INSULATOR, 230KV TR304, PORCELAIN
M - MISCELLANEOUS					
M2		ENCLOSURE, ALUMINUM, 24" x 24" x 8", CONTINUOUS HINGE, NEMA 4X	C702		TERMINAL, CABLE TO FLAT, 336 KCMIL TO 4-HOLE PAD, AL, COMPRESSION
M3		MOUNTING PANEL, STEEL, 21" x 21" (USE WITH 24" x 24" x 8" ENCLOSURE)	C810		PARALLEL GROOVE CONNECTOR, 2-BOLT, AL W/ CU LINER, #1/0-400 KCMIL MAIN TO #4-#4/0 TAP
M4		HEIGHT ADAPTOR, GALVANIZED STEEL, 5" B.C., 5" HEIGHT			



NO.	DATE	REVISION DESCRIPTION	BY	APPROVED	NO.	DATE	REVISION DESCRIPTION	BY	APPROVED
2	03-08-12	ISSUED FOR CONSTRUCTION	NTC/B&V	CLN/B&V	2	03-08-12	ISSUED FOR CONSTRUCTION	NTC/B&V	CLN/B&V
1	6-8-11	CONSTRUCTION REVISION, NO CHANGES WO-17400	AJW	RPS	1	6-8-11	CONSTRUCTION REVISION, NO CHANGES WO-17400	AJW	RPS
3	3-4-13	CONSTRUCTION REVISIONS	NJG	KJB	0	05-03-10	ISSUED FOR CONSTRUCTION	CLN/B&V	CLN/B&V

BLACK & VEATCH
CORPORATION

I HEREBY CERTIFY THAT THIS DOCUMENT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF NORTH DAKOTA.

SIGNED: KENNETH J. BENOIT (REV. 0)
DATE: 05-03-10 REG. NO. 6506

MINNESOTA POWER

BISON WIND GENERATING FACILITY
NEW SALEM, ND

BISON 230KV SUBSTATION
ELECTRICAL PLAN & ELEVATIONS
BILL OF MATERIALS

SHEET **2** REV. **3**

ME-32815-17

SCALE: 1/16" = 1'-0"

MICROFILMED / /

BIS 3500