CONSULTING ENGINEERS GROUP **21210 EATON AVENUE, SUITE C** **FARMINGTON, MN 55024**	**TO:** PUBLIC SERVICE COMMISSION STATE CAPITOL DEPT 408 600 EAST BOULEVARD AVENUE BISMARCK, ND 58505-0480 **ATTN:** JERRY LEIM	**Date: MAY 20, 2009** ENCLOSED FOR FILING OF **CASE NO. PU-08-34** DESIGN DRAWINGS FOR LUVERNE WIND FARM

WE ARE TRANSMITTING TO YOU:

- [X] Transmittal
- [X] Prints (11 x 17)
- [ ] Prints (D Size)
- [ ] Originals
- [ ] Electronic files
- [ ] Diskette
- [X] Compact Disk (CD)

THESE ARE TRANSMITTED AS CHECKED:

- [ ] Preliminary
- [ ] For Approval
- [ ] For Construction
- [ ] As Built
- [X] As Requested
- [ ] Obtaining Bids
- [ ] For Comments
- [ ] Archived

DRAWING	DESCRIPTION	REV.
MPOW-INDEX	PRINT INDEX	1
MPOW-PR-01	SUBSTATION SKETCH PROPERTY DESCRIPTION	0
MPOW-EQ-01	ELECTRICAL LAYOUT	0
MPOW-2-3	COLLECTION SYSTEM ONE LINE	0
MPOW-PL-02	COLLECTION SYSTEM NORTH OVERALL LAYOUT	0
MPOW-PL-03	COLLECTION SYSTEM SECTIONS 22 & 23	0
MPOW-PL-04	COLLECTION SYSTEM SECTIONS 26 & 27	0
MPOW-PL-05	COLLECTION SYSTEM SECTIONS 28 & 29	0
MPOW-PL-06	COLLECTION SYSTEM SECTIONS 31 & 32	0
MPOW-PL-07	COLLECTION SYSTEM SECTIONS 33 & 34	0
MPOW-PL-08	COLLECTION SYSTEM SECTIONS 35 & 36	0
MPOW-TR-01	TRENCH AND PLOW DETAILS FOR DIRECT BURIAL CABLE	0
MPOW-TR-04	WETLAND BORING DETAIL	0
MPOW-TR-05	ROAD BORING DETAIL	0
MPOW-INDEX-02	230KV TRANSMISSION LINE INDEX	1
P&P_1	PLAN & PROFILE	0
P&P_2	PLAN & PROFILE	0
P&P_3	PLAN & PROFILE	0
P&P_4	PLAN & PROFILE	0
P&P_5	PLAN & PROFILE	0
P&P_6	PLAN & PROFILE	0
P&P_7	PLAN & PROFILE	0
P&P_8	PLAN & PROFILE	0
P&P_9	PLAN & PROFILE	0
MPOW-PH-01	PHASING DIAGRAM PILLSBURY/MPOWER 230KV LINE	0
MPOW-TLR-01	TRANSMISSION LINE ROUTE	0
MPOW-TLR-02	TRANSMISSION LINE STRUCTURE COORDINATES	1
MPOW-TLR-03	TRANSMISSION LINE CORNER POLE ANCHOR COORDINATES	0

DRAWING		ISSUE	REV	DESCRIPTION
MPOW-INDEX-02	→	FC	1	230KV TRANSMISSION LINE INDEX
P&P_1		FC	0	PLAN & PROFILE
P&P_2		FC	0	PLAN & PROFILE
P&P_3		FC	0	PLAN & PROFILE
P&P_4		FC	0	PLAN & PROFILE
P&P_5		FC	0	PLAN & PROFILE
P&P_6		FC	0	PLAN & PROFILE
P&P_7		FC	0	PLAN & PROFILE
P&P_8		FC	0	PLAN & PROFILE
P&P_9	→	FC	1	PLAN & PROFILE
MPOW-DP-01		FC	0	TRANSMISSION LINE DAMPER PLACEMENT
MPOW-FO-01		FC	0	FIBER OPTIC CABLE INSTALLATION PILLSBURY SUBSTATION TO MPOWER SUBSTATION
MPOW-FD-05	→	OBSOLETE		
MPOW-MAT-01		FC	0	TRANSMISSION LINE MATERIAL LIST
MPOW-PF-01		FC	0	POLE FRAMING SH 1; POWER SCREW ANCHOR, MISCELLANEOUS
MPOW-PF-02		FC	0	POLE FRAMING SH 2; TRANSMISSION CROSSARMS
MPOW-PF-03		FC	0	POLE FRAMING SH 3; CROSSARM DETAILS
MPOW-PF-04		FC	0	POLE FRAMING SH 4; CROSSARM DETAILS
MPOW-PF-05		FC	0	POLE FRAMING SH 5; CROSSARM BRACE DETAILS, GUYING ASSEMBLIES
MPOW-PF-06		FC	0	POLE FRAMING SH 6; GUY ATTACHMENTS, POLE TIE ASSEMBLIES
MPOW-PF-07		FC	0	POLE FRAMING SH 7; INSULATOR ASSEMBLIES
MPOW-PF-08		FC	0	POLE FRAMING SH 8; O.H.G.W. ASSEMBLIES, O.H.G.W. SUPPORT ASSEMBLY
MPOW-PF-09		FC	0	POLE FRAMING SH 9; GROUNDING ASSEMBLIES
MPOW-PF-10		FC	0	POLE FRAMING SH 10; TRANSMISSION ROW CLEARING, MISCELLANEOUS FENCE GATES
MPOW-PF-11		FC	0	POLE FRAMING SH 11; FOUNDATION UNITS, MISCELLANEOUS X-BRACE ASSEMBLIES
MPOW-PF-12		FC	0	POLE FRAMING SH 12; MISCELLANEOUS X-ARM ASSEMBLIES
MPOW-PF-13		FC	0	POLE FRAMING SH 13; TRANMISSION LINE STRUCTURE
MPOW-PF-14		FC	0	POLE FRAMING SH 14; TRANSMISSION LINE STRUCTURE, 230KV WOOD STRUCTURE
MPOW-PF-15		FC	0	POLE FRAMING SH 15; FIBER OPTIC SPLICE GUIDE
MPOW-PH-01		FC	0	PHASING DIAGRAM PILLSBURY/MPOWER 230KV LINE
MPOW-S&T-01		FC	0	DRAKE CONDUCTOR & 3/8" EHS STEEL SAG & TENSION
MPOW-S&T-02		FC	0	FO-DNO-3825 OHGW FIBER OPTIC SAG & TENSION
MPOW-S&T-03		FC	0	795kcmil DRAKE CONDUCTOR STRINGING CHART
MPOW-S&T-04		FC	0	3/8" EHS STEEL OHGW STRINGING CHART
MPOW-S&T-05		FC	0	FO-DNO-3825 STRINGING CHART
MPOW-STR-88	→	FC	1	STEEL STRUCTURE #88
MPOW-TLR-01		FC	0	TRANSMISSION LINE ROUTE
MPOW-TLR-02	→	FC	1	TRANSMISSION LINE STRUCTURE COORDINATES
MPOW-TLR-03	→	FC	0	TRANSMISSION LINE CORNER POLE ANCHOR COORDINATES

LEGEND

→ – REVISED THIS ISSUE
AB – AS BUILT
FC – DRAWING HAS BEEN RELEASED FOR CONSTRUCTION
FB – DRAWING HAS BEEN RELEASED FOR BID & PROCUREMENT
FF – DRAWING HAS BEEN RELEASED FOR FABRICATION
PR – DRAWING IS PRELIMINARY & MAY CHANGE DURING DESIGN
IF NO LETTER OR NUMBER IS SHOWN, THE DRAWING HAS NOT BEEN ISSUED

REV.	DATE	DRAWN	DESCRIPTION	WORK ORDER	CHKD	APPD	DATE
1	05/14/09	MAK	CHANGE STEEL POLE TO LAMINATE				
0	04/28/08	MAK	ISSUE FOR CONSTRUCTION				

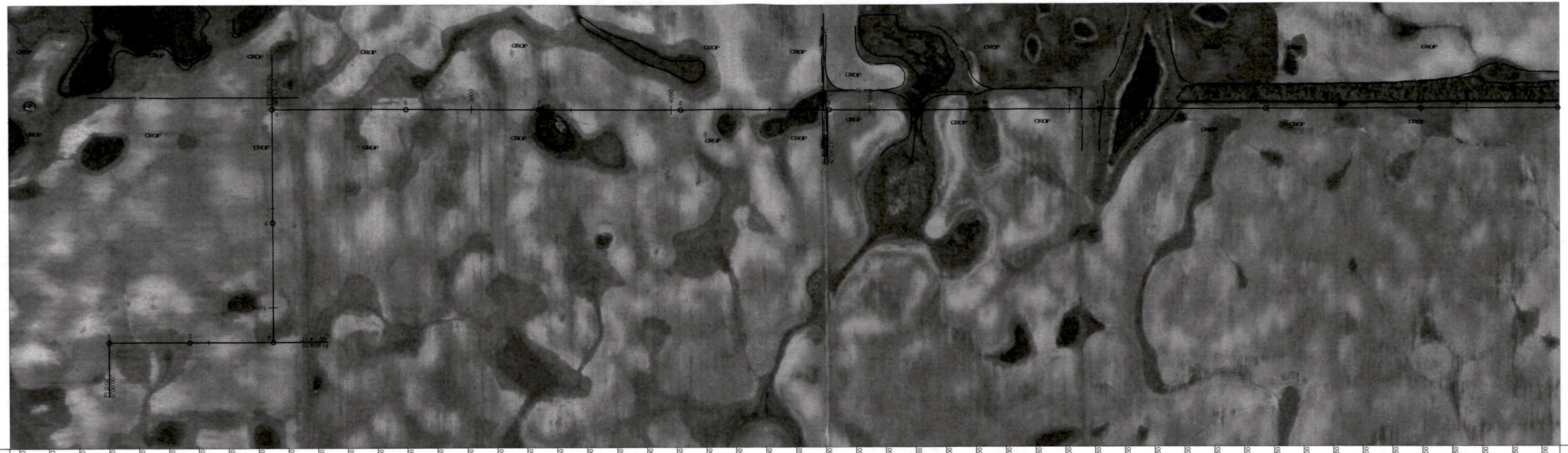
CEG CONSULTING ENGINEERS GROUP
FARMINGTON MINNESOTA

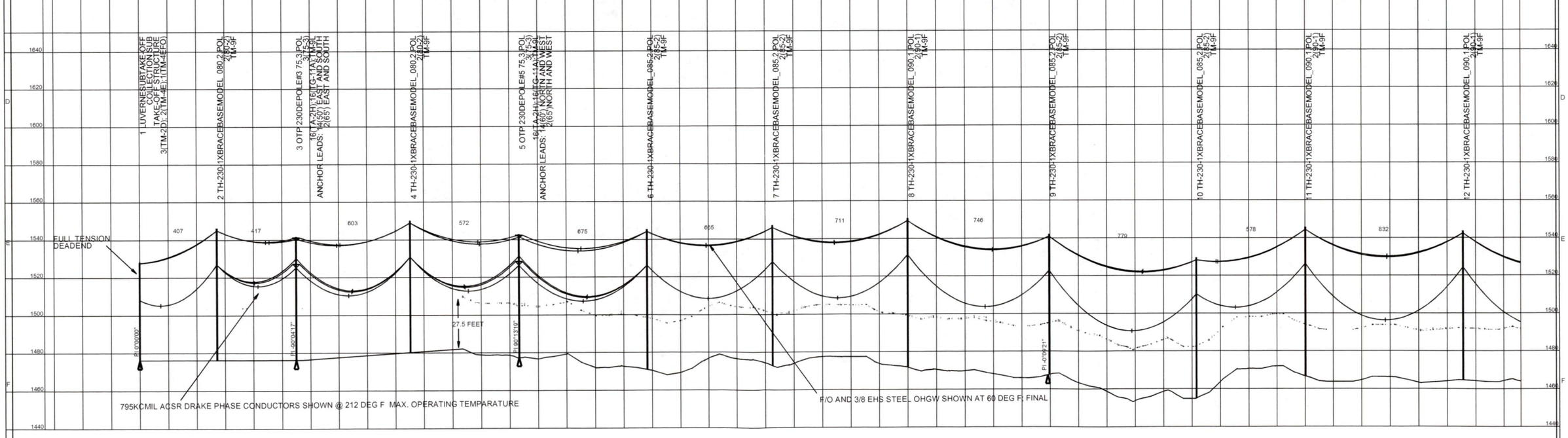
I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF NORTH DAKOTA
NAME JAMES C. HANSON
DATE _____ REGISTER NO. 5413

MPOWER / LUVERNE
230KV TRANSMISSION LINE
INDEX

CHECKED _____ DATE _____
DRAWN MAK DATE 08/25/08
SCALE NONE
W.O. NO.
MAP NO.
DWG. NO. MPOW-INDEX-02

PLS-CADD DRAWING





NOTE: FOR CONDUCTOR DESIGN CRITERIA AND TENSION LIMITS SEE PAGE#9.

NO.	DATE	REVISIONS AND RECORD OF ISSUE
0	04-23-09	ISSUE FOR CONSTRUCTION AND CHANGES PER OTP (NEW DEADEND STRUCTURES AND FIBER OPTIC DNO-3825)
C	03-02-09	ISSUE FOR REVIEW
B	01-13-09	ISSUE FOR REVIEW

M-POWER, ND

230KV T-LINE FROM PILLSBURRY SUB TO COLLECTION SUB

CEG

ENGINEER PM | DRAWN DB | CHECKED | DATE 5/14/2009

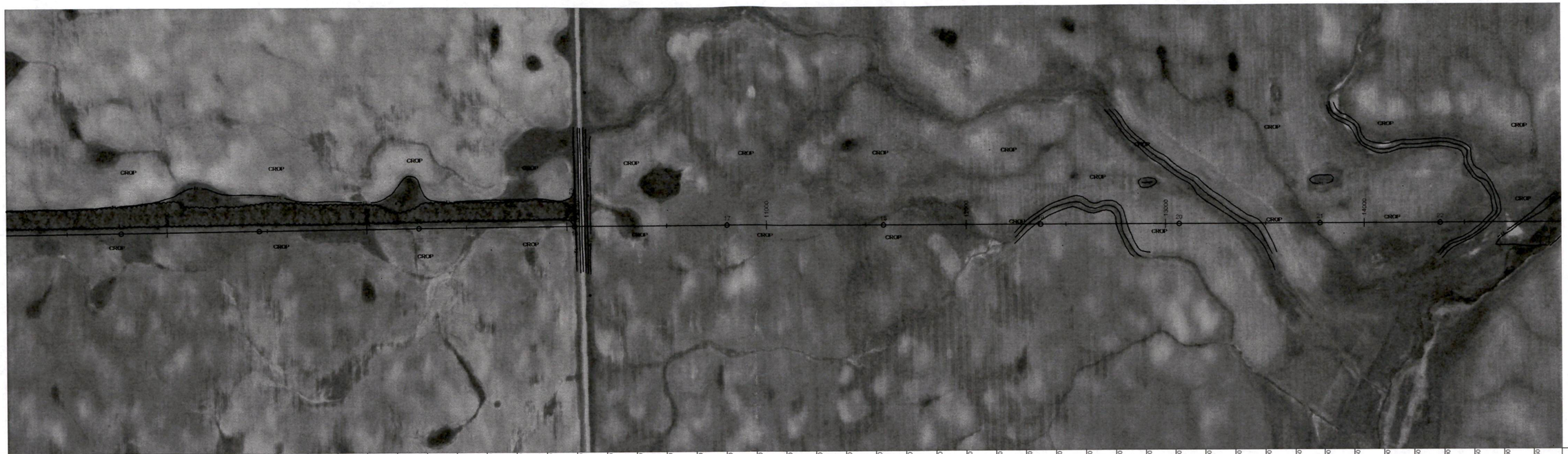
500.0 FT. HORIZ. SCALE
50.0 FT. VERT. SCALE
NORTH

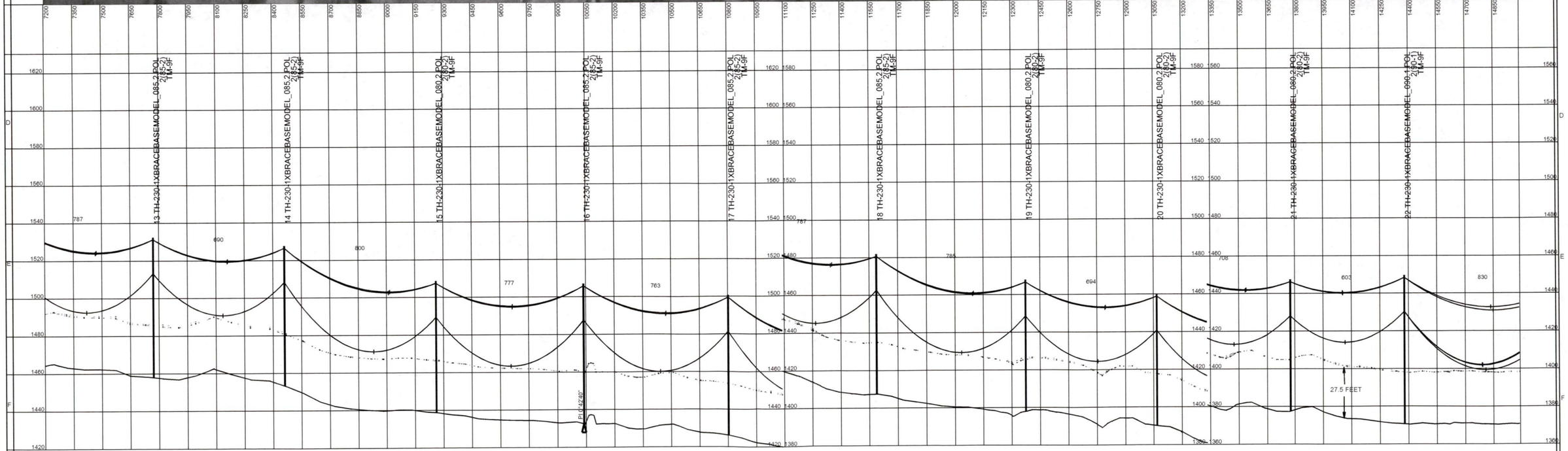
PROJECT | DRAWING NUMBER | REV. 0

CODE | AREA

1 OF 9

PLS-CADD DRAWING





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C	03-02-09	ISSUE FOR REVIEW
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M-POWER, ND

230KV T-LINE FROM PILLSBURRY SUB TO COLLECTION SUB

CEG

ENGINEER PM | DRAWN DB | CHECKED | DATE 5/14/2009

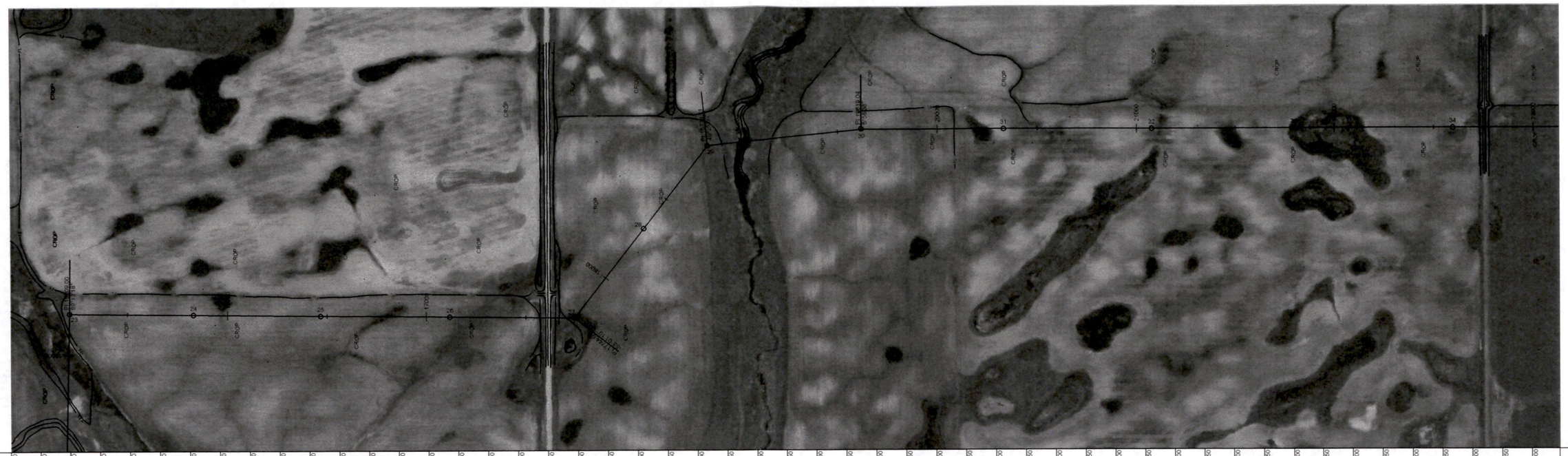
500.0 FT. HORIZ. SCALE
50.0 FT. VERT. SCALE
NORTH

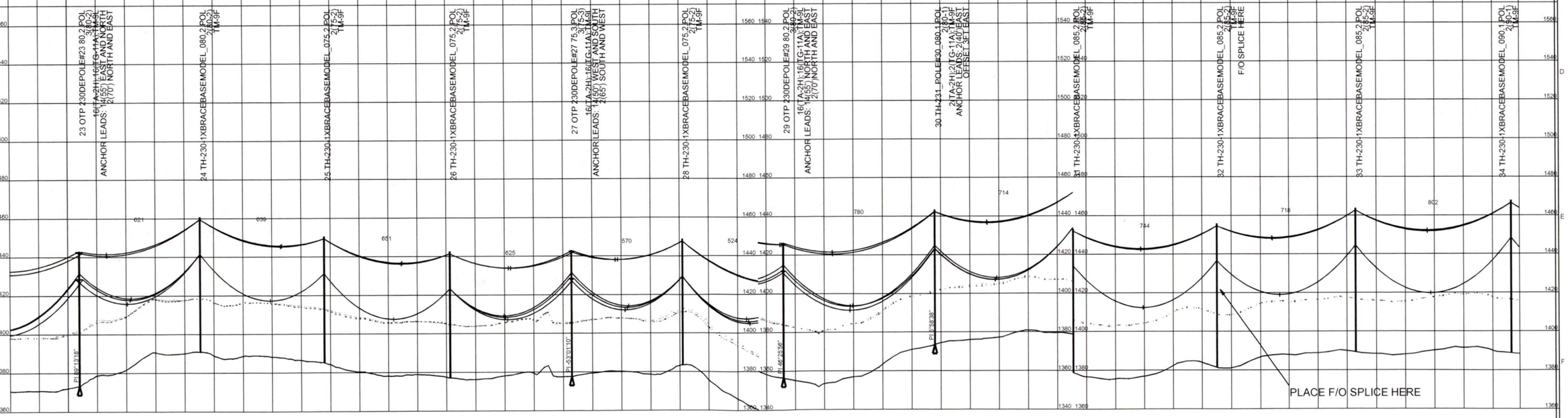
PROJECT | DRAWING NUMBER | REV 0

CODE | AREA

2 OF 9

PLS-CADD DRAWING





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M-POWER, ND

230KV T-LINE FROM PILLSBURRY SUB TO COLLECTION SUB

CEG

ENGINEER PM | DRAWN DB | CHECKED | DATE 5/14/2009

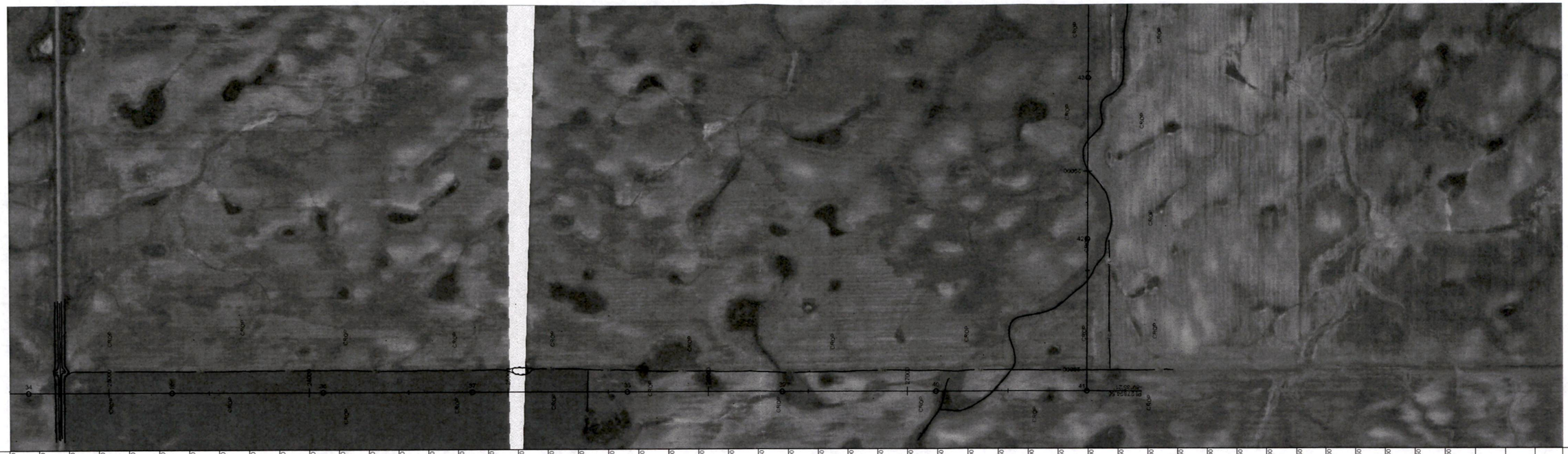
500.0 FT. HORIZ. SCALE
50.0 FT. VERT. SCALE
NORTH

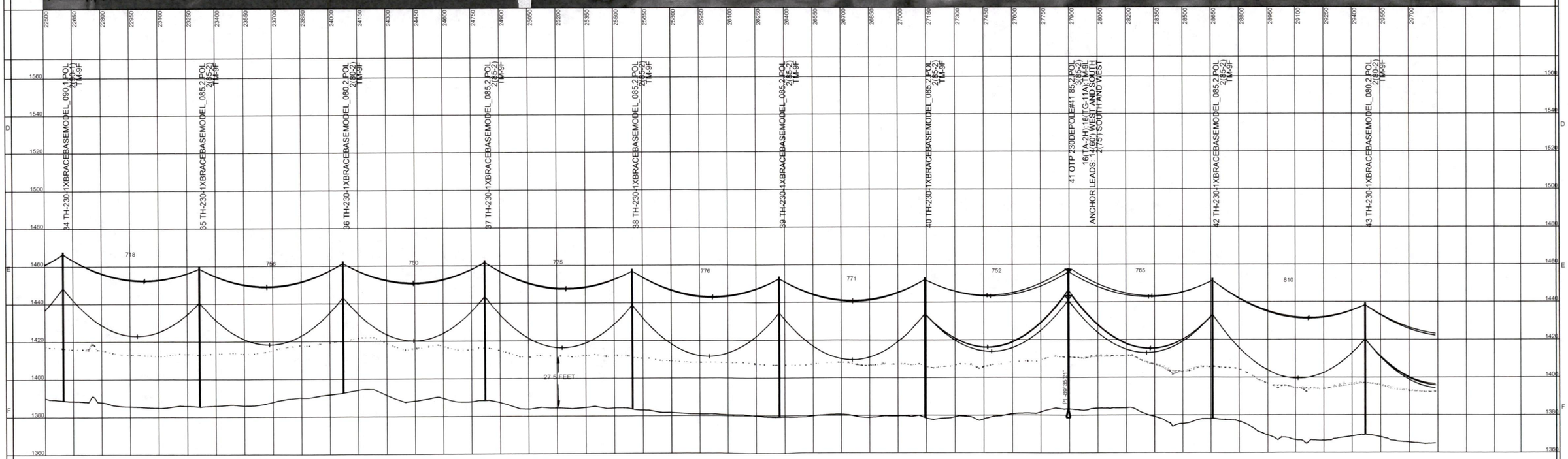
PROJECT | DRAWING NUMBER | REV 0

CODE | AREA

3 OF 9

PLS-CADD DRAWING





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B	01-13-09	ISSUE FOR REVIEW

M-POWER, ND

230KV T-LINE FROM PILLSBURRY SUB TO COLLECTION SUB

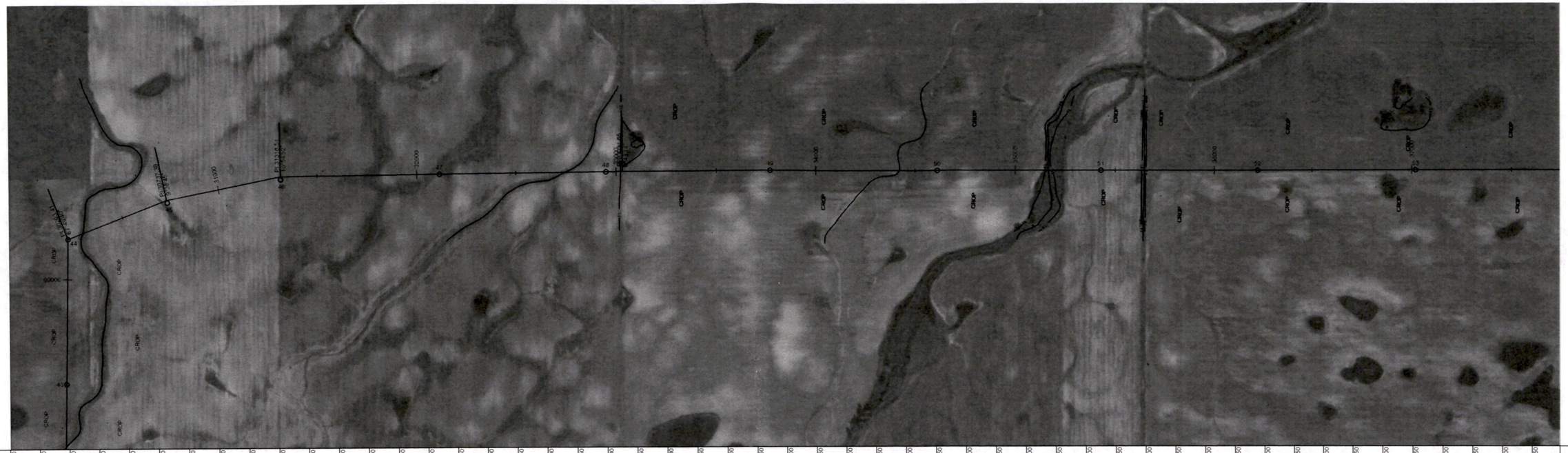
CEG

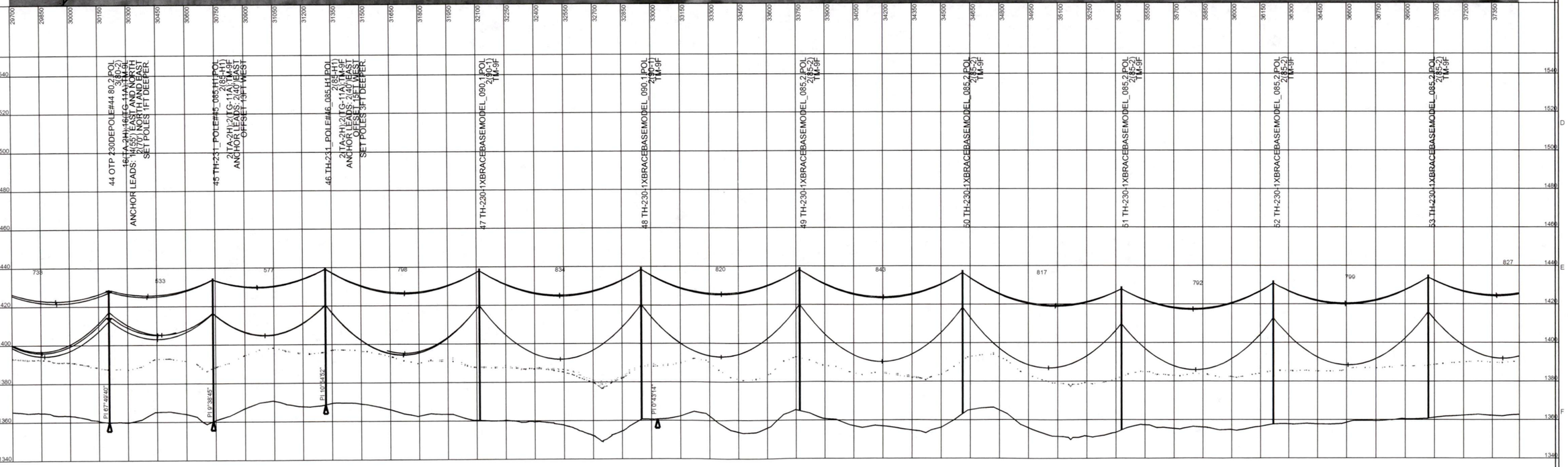
ENGINEER	PM	DRAWN	DB
CHECKED		DATE	5/14/2009

500.0 FT. HORIZ. SCALE
50.0 FT. VERT. SCALE
NORTH

PROJECT	DRAWING NUMBER	REV
		0
CODE		
AREA		4 OF 9

PLS-CADD DRAWING





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M-POWER, ND

230KV T-LINE FROM PILLSBURRY SUB TO COLLECTION SUB

CEG

ENGINEER PM | DRAWN DB

CHECKED | DATE 5/14/2009

500.0 FT. HORIZ. SCALE

50.0 FT. VERT. SCALE

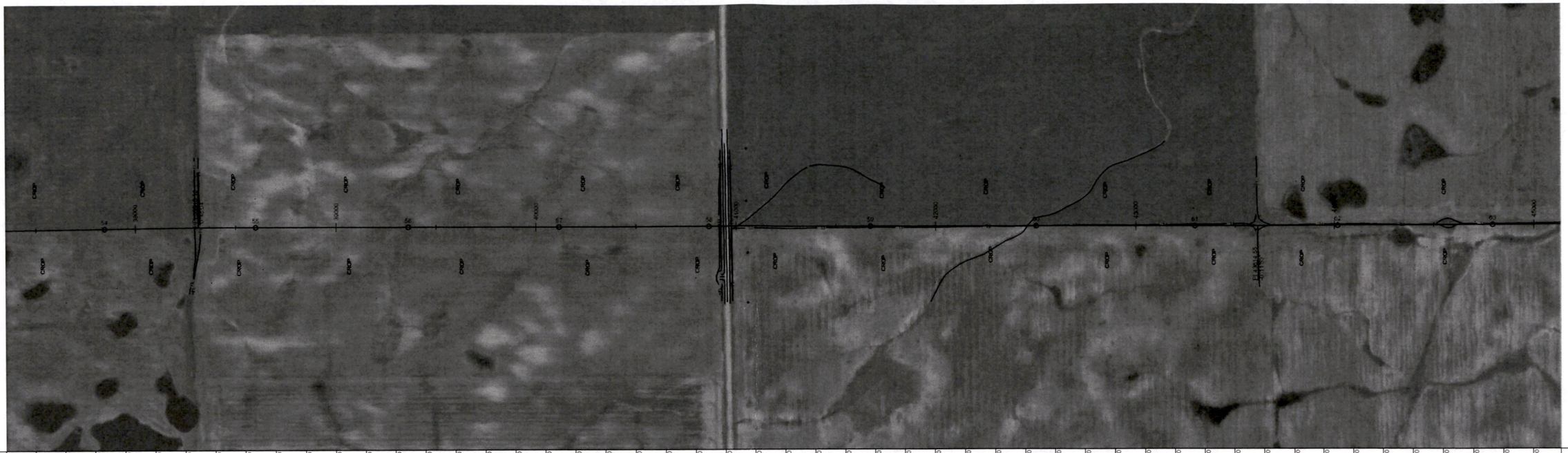
NORTH

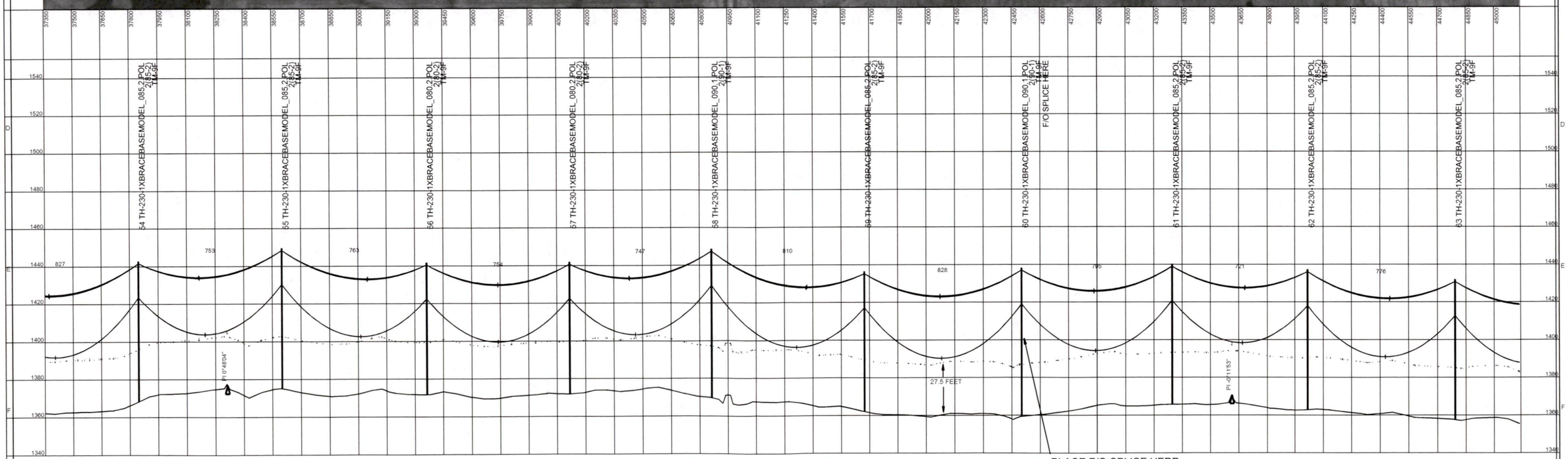
PROJECT | DRAWING NUMBER | REV 0

CODE | AREA

5 OF 9

PLS-CADD DRAWING





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B	01-13-09	ISSUE FOR REVIEW

M-POWER, ND

230KV T-LINE FROM PILLSBURRY SUB TO COLLECTION SUB

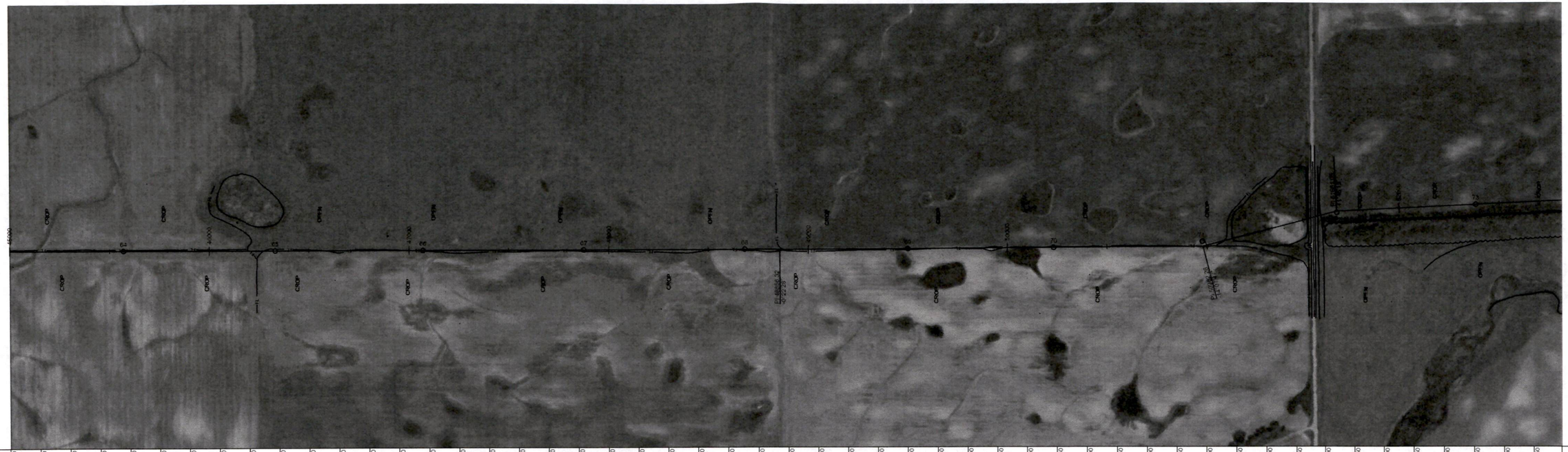
CEG

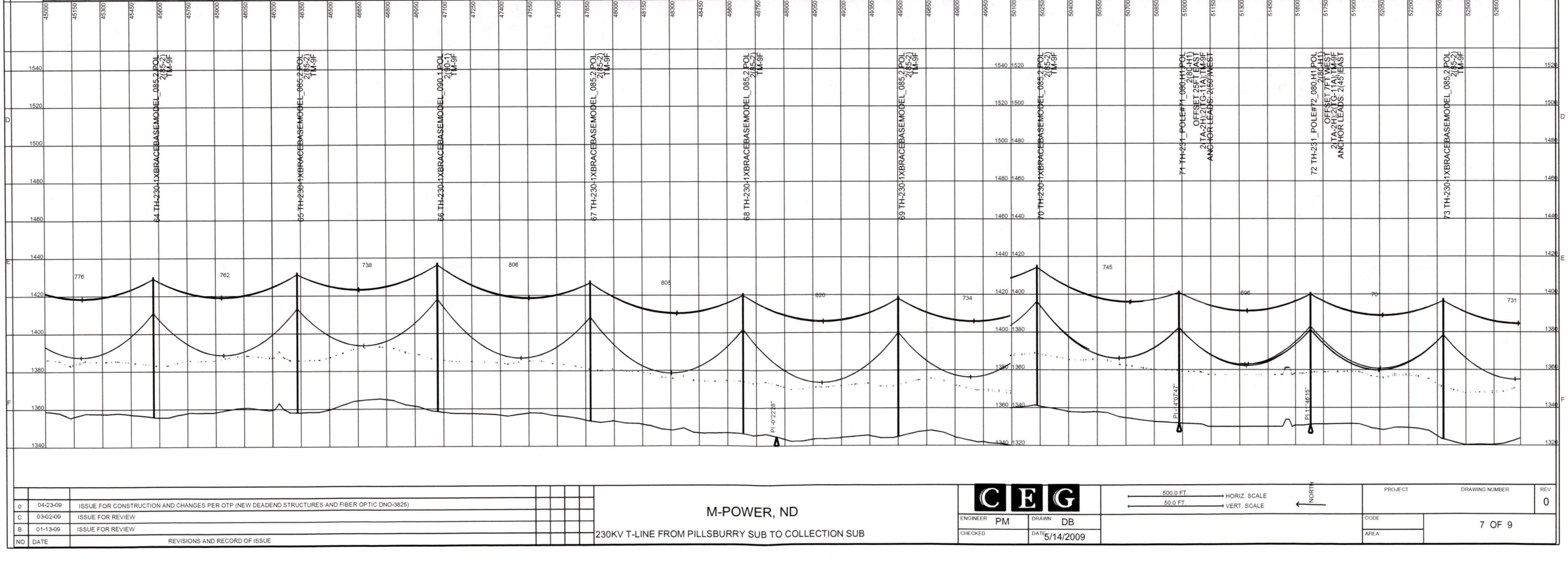
ENGINEER	PM	DRAWN	DB
CHECKED		DATE	5/14/2009

500.0 FT. HORIZ. SCALE
50.0 FT. VERT. SCALE
NORTH

PROJECT	DRAWING NUMBER	REV
		0
CODE	6 OF 9	
AREA		

PLS-CADD DRAWING





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M-POWER, ND

230KV T-LINE FROM PILLSBURRY SUB TO COLLECTION SUB

CEG

ENGINEER: PM | DRAWN: DB | CHECKED | DATE: 5/14/2009

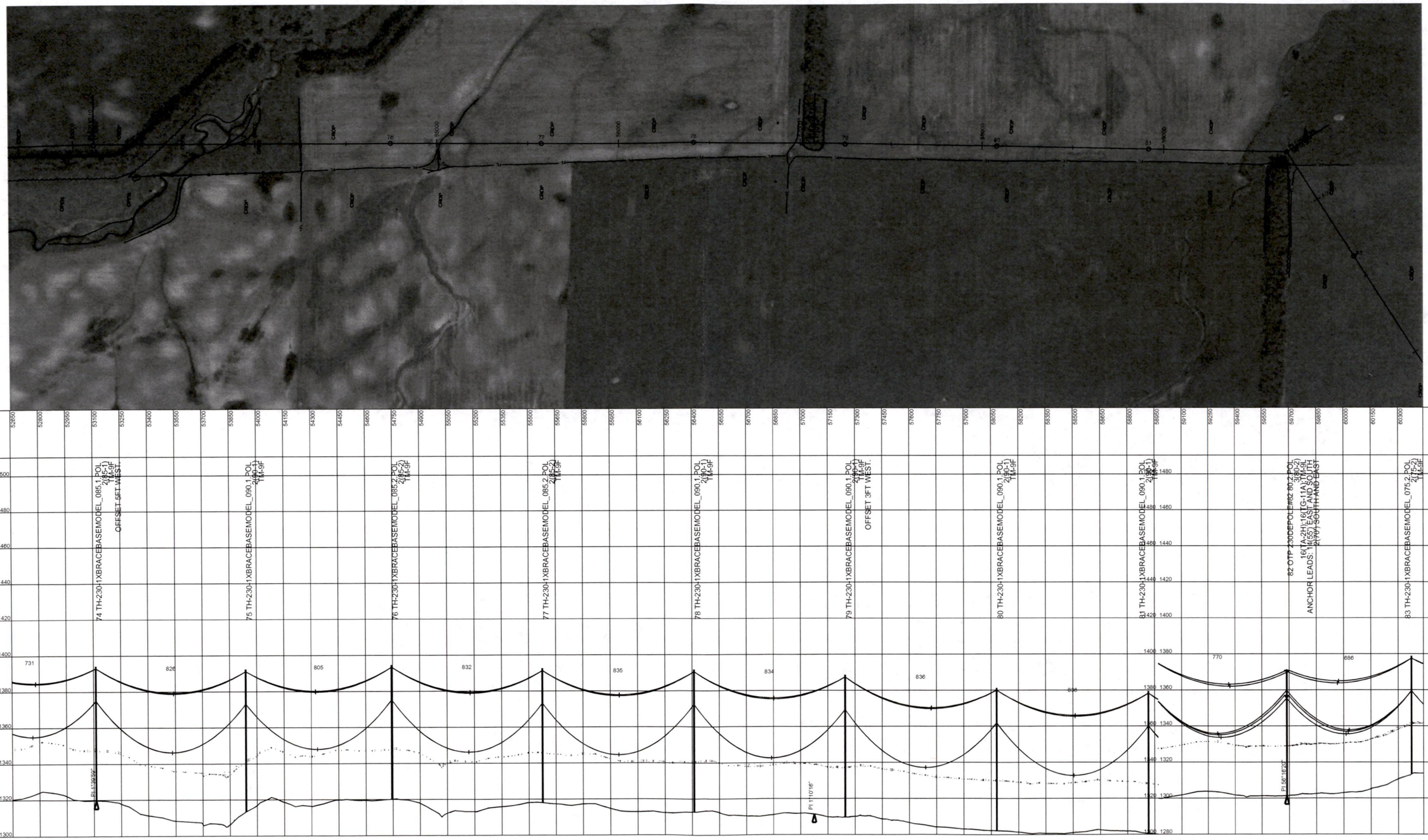
500.0 FT. HORIZ. SCALE
50.0 FT. VERT. SCALE
NORTH

PROJECT | DRAWING NUMBER | REV: 0

CODE | AREA

7 OF 9

PLS-CADD DRAWING



NO	DATE	REVISIONS AND RECORD OF ISSUE
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C	03-02-09	ISSUE FOR REVIEW
B	01-13-09	ISSUE FOR REVIEW

M-POWER, ND

230KV T-LINE FROM PILLSBURRY SUB TO COLLECTION SUB

CEG

ENGINEER PM | DRAWN DB | CHECKED | DATE 5/14/2009

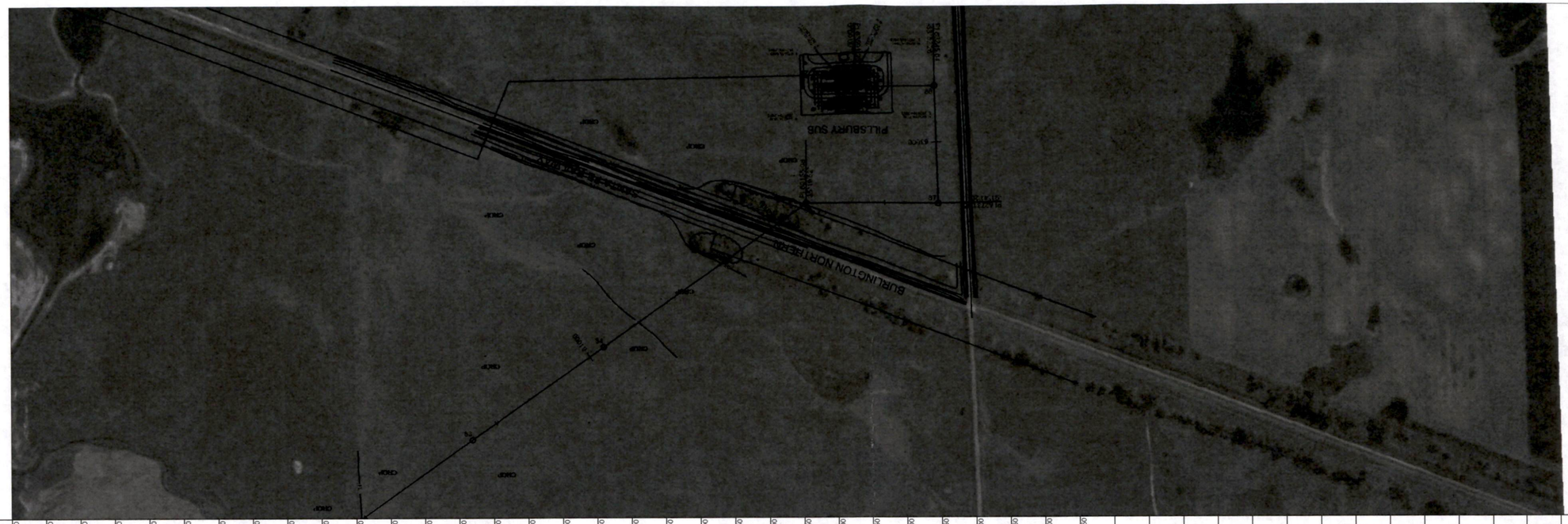
500.0 FT. HORIZ. SCALE
50.0 FT. VERT. SCALE
NORTH

PROJECT | DRAWING NUMBER | REV 0

CODE | AREA

8 OF 9

PLS-CADD DRAWING



83 TH-230-1XBRACEBASEMODEL_075.2 POL 2(180-2) TM-9F

84 TH-230-1XBRACEBASEMODEL_080.2 POL 2(180-2) TM-9F

85 TH-230-1XBRACEBASEMODEL_080.2 POL 2(180-2) TM-9F

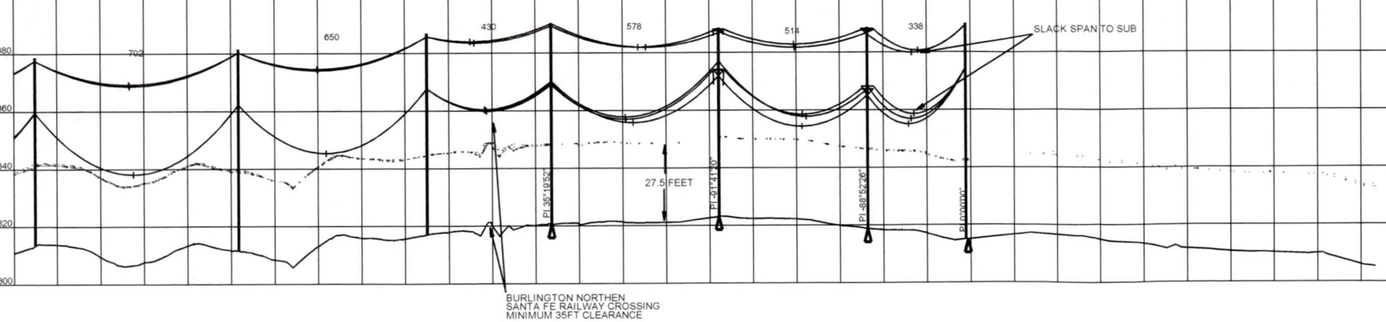
86 TH-234-80-2 POL 2(180-2) 4-(TA-2H); 4-(TG-11A) ANCHOR LEADS: 3(60) SOUTH-EAST 1(65) OSW SOUTH-EAST OFFSET 3FT SOUTH.

87 OTP 230DEPOLE#87 75.3 POL 2(180-2) 16-(TA-2H); 16-(TG-11A) ANCHOR LEADS: 1(50) NORTH AND WEST 2(65) NORTH AND WEST

88 POLE#88 LAMINATED POL 3(LAMINATED POLES) SEE DWG MPOW-STR-88 (3)TM-9X

"1"

89 POL-SBURY SUBTAKE-OFF PILLSBURY SUB TAKE-OFF STRUCTURE 3(TM-2D); 2(TM-4E); (TM-4EPO)



CONDUCTOR DESIGN CRITERIA

	FINAL, 0 DEG F	INITIAL, -35 DEG F	HEAVY LOAD	MAX. TENSION
795, ACSR	25%	20%	50%	9700#
FO-OPGW	20%	20%	50%	5600#
3/8EHS STEEL	20%	17%	50%	4800#

NO	DATE	REVISIONS AND RECORD OF ISSUE
1	05-14-09	STRUCTURE #88 CHANGED FROM STEEL TO LAMINATED WOOD POLES PER OTP
0	04-23-09	ISSUE FOR CONSTRUCTION AND CHANGES PER OTP (NEW DEADEND STRUCTURES AND FIBER OPTIC DNO-3825)
C	03-02-09	ISSUE FOR REVIEW
B	01-13-09	ISSUE FOR REVIEW

M-POWER, ND

230KV T-LINE FROM PILLSBURY SUB TO COLLECTION SUB

CEG

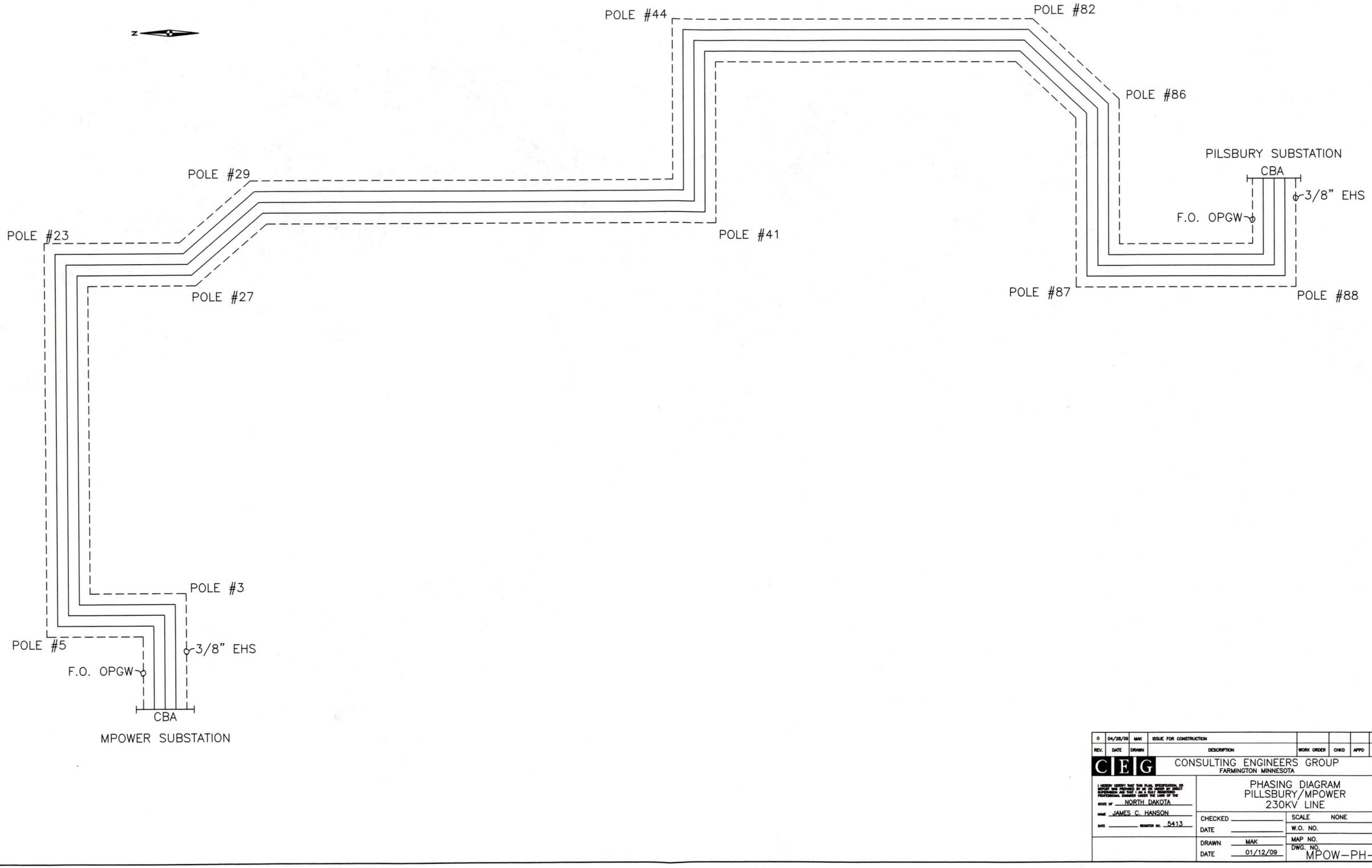
ENGINEER PM | DRAWN DB | CHECKED | DATE 5/14/2009

500.0 FT. HORIZ. SCALE
50.0 FT. VERT. SCALE
NORTH

PROJECT | DRAWING NUMBER | REV 1

CODE | AREA

9 OF 9



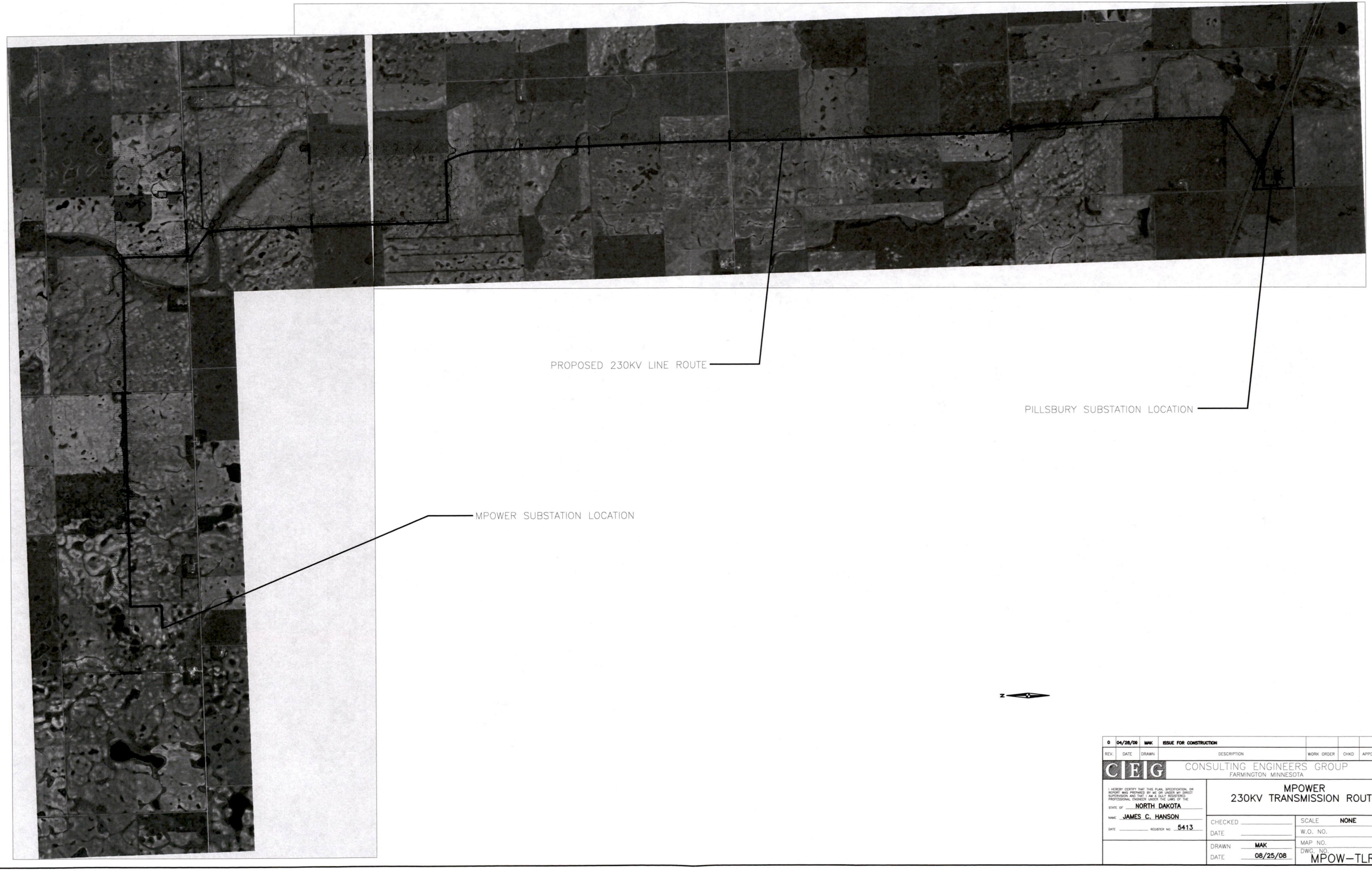
REV.	DATE	DRAWN	DESCRIPTION	WORK ORDER	CHKD	APPD	DATE
0	04/28/09	MAK	ISSUE FOR CONSTRUCTION				

CEG CONSULTING ENGINEERS GROUP
FARMINGTON MINNESOTA

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT 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
NAME JAMES C. HANSON
DATE _____ REGISTER NO. 5413

PHASING DIAGRAM PILLSBURY/MPOWER 230KV LINE

CHECKED _____
DATE _____
DRAWN MAK
DATE 01/12/09
SCALE NONE
W.O. NO.
MAP NO.
DWG. NO. MPOW-PH-01



REV.	DATE	DRAWN	DESCRIPTION	WORK ORDER	CHKD	APPD	DATE
0	04/28/09	MAK	ISSUE FOR CONSTRUCTION				

CEG CONSULTING ENGINEERS GROUP
FARMINGTON MINNESOTA

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NAME JAMES C. HANSON
DATE _____ REGISTER NO. 5413

MPOWER
230KV TRANSMISSION ROUTE

CHECKED _____
DATE _____
DRAWN MAK
DATE 08/25/08

SCALE NONE
W.O. NO.
MAP NO.
DWG. NO. MPOW-TLR-01

Structure Number	Station #	X - Easting (ft)	Y - Northing (ft)	Span Ahead (ft)	Structure Description	Pole Type
1	**0.1**	**2614582.90**	**617248.70**	**406.737**	**Sub P.O. (take-off structure)**	**Collection Sub**
2	406.9	2614989.56	617256.63	417.489	TH-230 Tangent H-Frame	2(75-2)
3	824.3	2615406.97	617264.77	603.214	OTP-230kV D.E. - Large Angle Deadend	3(75-3)
4	1427.6	2615394.45	617867.85	571.834	TH-230 Tangent H-Frame	2(80-2)
5	1999.4	2615382.59	618439.57	674.516	OTP-230kV D.E. - Large Angle Deadend	3(75-3)
6	2673.9	2616057.01	618450.95	664.66	TH-230 Tangent H-Frame	2(85-2)
7	3338.6	2616721.57	618462.17	710.9	TH-230 Tangent H-Frame	2(85-2)
8	4049.5	2617432.37	618474.16	745.61	TH-230 Tangent H-Frame	2(90-1)
9	4795.1	2618177.87	618486.77	778.84	TH-230 Tangent H-Frame	2(85-2)
10	5573.9	2618956.56	618502.03	578	TH-230 Tangent H-Frame	2(85-2)
11	6151.9	2619534.45	618513.35	832.24	TH-230 Tangent H-Frame	2(90-1)
12	6984.2	2620366.53	618529.66	786.74	TH-230 Tangent H-Frame	2(90-1)
13	7770.9	2621153.12	618545.07	689.91	TH-230 Tangent H-Frame	2(85-2)
14	8460.8	2621842.90	618558.59	800.47	TH-230 Tangent H-Frame	2(85-2)
15	9261.3	2622643.22	618574.27	777.452	TH-230 Tangent H-Frame	2(80-2)
16	10038.7	2623420.52	618589.51	763.128	TH-230 Tangent H-Frame	2(85-2)
17	10801.9	2624183.63	618594.99	786.88	TH-230 Tangent H-Frame	2(85-2)
18	11588.7	2624970.49	618600.64	785.33	TH-230 Tangent H-Frame	2(85-2)
19	12374.1	2625755.80	618606.28	693.89	TH-230 Tangent H-Frame	2(80-2)
20	13068.0	2626449.67	618611.26	707.88	TH-230 Tangent H-Frame	2(80-2)
21	13775.8	2627157.53	618616.35	603.26	TH-230 Tangent H-Frame	2(80-2)
22	14379.1	2627760.78	618620.68	829.902	TH-230 Tangent H-Frame	2(90-1)
23	15209.0	2628590.66	618626.64	620.528	OTP-230kV D.E. - Large Angle Deadend	3(80-2)
24	15829.5	2628603.54	618006.25	638.81	TH-230 Tangent H-Frame	2(80-2)
25	16468.3	2628616.80	617367.57	651.11	TH-230 Tangent H-Frame	2(75-2)
26	17119.5	2628630.32	616716.60	625.236	TH-230 Tangent H-Frame	2(75-2)
27	17744.7	2628643.30	616091.50	570.164	OTP-230kV D.E. - Large Angle Deadend	3(75-3)
28	18314.9	2629105.80	615758.06	524.257	TH-230 Tangent H-Frame	2(75-2)
29	18839.1	2629531.05	615451.46	780.093	OTP-230kV D.E. - Large Angle Deadend	3(80-2)
30	19619.0	2629639.58	614678.95	713.845	TH-231 Tangent H-Frame	2(80-1)
31	20332.7	2629659.00	613965.37	743.77	TH-230 Tangent H-Frame	2(85-2)
32	21076.5	2629682.36	613221.97	717.96	TH-230 Tangent H-Frame	2(85-2)
33	21794.5	2629704.90	612504.36	802.14	TH-230 Tangent H-Frame	2(85-2)
34	22596.6	2629730.09	611702.61	718.17	TH-230 Tangent H-Frame	2(90-1)
35	23314.8	2629752.64	610984.80	755.75	TH-230 Tangent H-Frame	2(85-2)
36	24070.5	2629776.38	610229.42	750.12	TH-230 Tangent H-Frame	2(80-2)
37	24820.6	2629799.93	609479.67	775.03	TH-230 Tangent H-Frame	2(85-2)
38	25595.7	2629824.27	608705.02	775.98	TH-230 Tangent H-Frame	2(85-2)
39	26371.6	2629848.64	607929.43	771	TH-230 Tangent H-Frame	2(85-2)
40	27142.6	2629872.85	607158.81	751.92	TH-230 Tangent H-Frame	2(85-2)
41	27894.6	2629896.46	606407.26	765.084	OTP-230kV D.E. - Large Angle Deadend	3(85-2)
42	28659.6	2630661.32	606425.80	810.363	TH-230 Tangent H-Frame	2(85-2)
43	29470.0	2631471.45	606445.44	733.403	TH-230 Tangent H-Frame	2(80-2)
44	30203.4	2632204.63	606463.21	532.952	OTP-230kV D.E. - Large Angle Deadend	3(80-2)
45	30737.3	2632405.73	605969.65	576.695	TH-231 Tangent H-Frame	2(85-H1)
46	31316.5	2632542.49	605409.41	797.556	TH-231 Tangent H-Frame	2(85-H1)
47	32115.4	2632599.14	604613.87	834.07	TH-230 Tangent H-Frame	2(90-1)
48	32949.4	2632642.80	603780.94	819.734	TH-230 Tangent H-Frame	2(90-1)
49	33769.2	2632676.45	602961.90	842.58	TH-230 Tangent H-Frame	2(85-2)
50	34611.7	2632709.97	602119.99	817.02	TH-230 Tangent H-Frame	2(85-2)
51	35428.8	2632742.47	601303.61	791.52	TH-230 Tangent H-Frame	2(85-2)
52	36220.3	2632773.95	600512.72	798.97	TH-230 Tangent H-Frame	2(85-2)
53	37019.3	2632805.74	599714.38	827.5	TH-230 Tangent H-Frame	2(85-2)
54	37846.8	2632838.66	598887.54	753.493	TH-230 Tangent H-Frame	2(85-2)
55	38600.3	2632864.62	598134.49	763.01	TH-230 Tangent H-Frame	2(85-2)
56	39363.3	2632884.31	597371.74	753.51	TH-230 Tangent H-Frame	2(80-2)
57	40116.8	2632903.76	596618.48	746.72	TH-230 Tangent H-Frame	2(80-2)
58	40863.5	2632923.03	595872.01	810.16	TH-230 Tangent H-Frame	2(90-1)
59	41673.7	2632943.94	595062.12	828.09	TH-230 Tangent H-Frame	2(85-2)
60	42501.8	2632965.31	594234.30	795.12	TH-230 Tangent H-Frame	2(90-1)
61	43296.9	2632985.83	593439.45	720.829	TH-230 Tangent H-Frame	2(85-2)
62	44017.7	2633005.83	592718.89	776.01	TH-230 Tangent H-Frame	2(85-2)
63	44793.7	2633028.54	591943.22	776.07	TH-230 Tangent H-Frame	2(85-2)
64	45569.8	2633051.25	591167.48	761.84	TH-230 Tangent H-Frame	2(85-2)
65	46331.6	2633073.55	590405.97	738.45	TH-230 Tangent H-Frame	2(85-2)
66	47070.1	2633095.16	589667.83	805.66	TH-230 Tangent H-Frame	2(90-1)
67	47875.7	2633118.73	588862.52	805.33	TH-230 Tangent H-Frame	2(85-2)
68	48681.1	2633142.30	588057.53	819.627	TH-230 Tangent H-Frame	2(85-2)
69	49500.7	2633170.50	587238.39	733.95	TH-230 Tangent H-Frame	2(85-2)
70	50234.6	2633196.77	586504.91	744.954	TH-230 Tangent H-Frame	2(85-2)
71	50982.3	2633248.22	585761.73	695.724	TH-231 Tangent H-Frame	2(80-H1)
72	51681.0	2633411.39	585085.41	700.57	TH-231 Tangent H-Frame	2(80-H1)
73	52382.3	2633472.20	584387.49	730.744	TH-230 Tangent H-Frame	2(85-2)
74	53113.1	2633523.41	583658.54	826.323	TH-230 Tangent H-Frame	2(85-1)
75	53939.5	2633567.96	582833.42	804.92	TH-230 Tangent H-Frame	2(90-1)
76	54744.4	2633606.50	582029.42	831.63	TH-230 Tangent H-Frame	2(85-2)
77	55576.0	2633646.32	581198.75	834.85	TH-230 Tangent H-Frame	2(85-2)
78	56410.9	2633686.28	580364.85	834.018	TH-230 Tangent H-Frame	2(90-1)
79	57245.0	2633719.74	579531.51	835.595	TH-230 Tangent H-Frame	2(90-1)
80	58080.6	2633745.68	578696.31	835.9	TH-230 Tangent H-Frame	2(90-1)
81	58916.5	2633768.63	577860.73	770.427	TH-230 Tangent H-Frame	2(90-1)
82	59686.9	2633789.78	577090.59	686.383	OTP-230kV D.E. - Large Angle Deadend	3(80-2)
83	60373.3	2633229.60	576693.95	702.17	TH-230 Tangent H-Frame	2(75-2)
84	61075.4	2632656.54	576288.19	650.12	TH-230 Tangent H-Frame	2(80-2)
85	61725.6	2632125.96	575912.51	430.441	TH-230 Tangent H-Frame	2(80-2)
86	62155.1	2631776.32	575661.44	577.788	Th-234 Large Angle	3(80-2)
87	62732.0	2631198.54	575664.60	513.684	OTP-230kV D.E. - Large Angle Deadend	3(75-3)
88	63245.6	2631213.41	575151.13	337.704	Laminate Structure Large Angle Deadend	3(LAMINATE POLES)
89	**63583.3**	**2631551.10**	**575154.27**	**0**	**Sub P.O. (take-off structure)**	**PILLSBURY Sub**
4/23/2009						

"1" "1"

NOTES:

1. GIVEN COORDINATES ARE IN FEET.
2. X AND Y COORDINATE FOR 2-POLE STRUCTURE IS GIVEN TO BE POINT BETWEEN TWO POLES IN THE MIDDLE OF THE STRUCTURE.
3. X AND Y COORDINATE FOR 3-POLE STRUCTURE IS POSITION OF THE MIDDLE POLE.
4. OFFSETS ARE INCLUDED IN GIVEN COORDINATES.

REV.	DATE	DRAWN	DESCRIPTION	WORK ORDER	CHKD	APPD	DATE
1	05/14/09	JKC	REVISED STEEL POLE TO LAMINATE POLE PER OTP				
0	04/28/09	MAK	ISSUE FOR CONSTRUCTION				

CEG CONSULTING ENGINEERS GROUP
FARMINGTON MINNESOTA

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT 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
NAME JAMES C. HANSON
DATE _____ REGISTER NO. 5413

MPOWER TRANMISSION LINE
STRUCTURE COORDINATES

CHECKED _____
DATE _____
DRAWN MAK
DATE 02/03/09

SCALE NONE
W.O. NO.
MAP NO.
DWG. NO. MPOW-TLR-02

5/14/2009

M-Power X and Y coordinates for angle structure anchor positions

CEG

Structure #	Attachment	X - Easting (ft)	Y - Northing (ft)
3			
	OHGW	2615426.3	617182.2
	OHGW	2615489.8	617248.8
	PHASE	2615395.3	617231.1
	PHASE	2615384.6	617230.9
	PHASE	2615410.9	617210.6
	PHASE	2615405.2	617210.4
	PHASE	2615431.4	617196.5
	PHASE	2615420.7	617196.3
	PHASE	2615439.7	617288.5
	PHASE	2615439.9	617277.8
	PHASE	2615461.0	617268.7
	PHASE	2615461.1	617263.0
	PHASE	2615475.8	617253.8
	PHASE	2615476.0	617243.1
	OHGW	2615390.0	617231.0
	OHGW	2615439.6	617283.1
5			
	OHGW	2615363.4	618522.2
	OHGW	2615299.8	618455.7
	PHASE	2615394.3	618473.2
	PHASE	2615405.0	618473.4
	PHASE	2615378.7	618493.8
	PHASE	2615384.4	618493.9
	PHASE	2615358.2	618507.9
	PHASE	2615369.0	618508.1
	PHASE	2615349.8	618415.9
	PHASE	2615349.6	618426.6
	PHASE	2615328.6	618435.7
	PHASE	2615328.5	618441.4
	PHASE	2615313.8	618450.6
	PHASE	2615313.6	618461.3
	OHGW	2615399.6	618473.3
	OHGW	2615349.9	618421.3
23			
	OHGW	2628677.9	618645.5
	OHGW	2628607.1	618713.9
	PHASE	2628628.7	618615.3
	PHASE	2628628.9	618603.7
	PHASE	2628649.4	618630.5
	PHASE	2628649.5	618624.4
	PHASE	2628663.6	618651.2
	PHASE	2628663.8	618639.5
	PHASE	2628566.6	618664.0
	PHASE	2628578.3	618664.2
	PHASE	2628586.8	618685.2
	PHASE	2628592.9	618685.3
	PHASE	2628601.5	618699.9
	PHASE	2628613.1	618700.0
	OHGW	2628627.9	618609.5
	OHGW	2628572.5	618663.0

27			
	OHGW	2628568.0	616117.9
	OHGW	2628621.4	616015.1
	PHASE	2628621.0	616128.9
	PHASE	2628627.3	616137.5
	PHASE	2628597.6	616121.0
	PHASE	2628600.9	616125.6
	PHASE	2628576.5	616105.2
	PHASE	2628582.7	616114.0
	PHASE	2628661.4	616052.1
	PHASE	2628672.1	616052.4
	PHASE	2628641.6	616037.4
	PHASE	2628647.3	616037.5
	PHASE	2628616.7	616028.9
	PHASE	2628626.5	616029.0
	OHGW	2628624.1	616133.2
	OHGW	2628666.7	616052.4
29			
	OHGW	2629610.0	615424.8
	OHGW	2629543.9	615533.1
	PHASE	2629557.9	615410.5
	PHASE	2629551.0	615401.0
	PHASE	2629580.5	615419.5
	PHASE	2629576.9	615414.5
	PHASE	2629595.0	615428.0
	PHASE	2629601.6	615437.6
	PHASE	2629507.5	615494.2
	PHASE	2629496.0	615492.6
	PHASE	2629526.0	615509.9
	PHASE	2629519.9	615509.1
	PHASE	2629551.4	615520.0
	PHASE	2629539.9	615518.6
	OHGW	2629553.2	615405.6
	OHGW	2629501.3	615492.2
30			
	PHASE	2629689.6	614683.1
	PHASE	2629670.2	614681.5
41			
	OHGW	2629805.0	606387.0
	OHGW	2629881.3	606315.3
	PHASE	2629853.8	606417.4
	PHASE	2629853.4	606430.1
	PHASE	2629833.3	606402.2
	PHASE	2629833.1	606408.8
	PHASE	2629819.4	606381.1
	PHASE	2629819.1	606393.7
	PHASE	2629921.6	606365.8
	PHASE	2629909.0	606365.4
	PHASE	2629901.5	606344.3
	PHASE	2629894.9	606344.1
	PHASE	2629887.2	606329.4
	PHASE	2629874.7	606329.1
	OHGW	2629855.5	606423.8
	OHGW	2629915.2	606367.7

44			
	OHGW	2632287.9	606486.9
	OHGW	2632193.1	606549.0
	PHASE	2632246.7	606448.4
	PHASE	2632246.8	606436.9
	PHASE	2632263.3	606467.7
	PHASE	2632263.5	606461.5
	PHASE	2632273.5	606491.6
	PHASE	2632273.8	606479.9
	PHASE	2632174.5	606495.3
	PHASE	2632163.8	606490.6
	PHASE	2632185.6	606518.7
	PHASE	2632179.9	606516.4
	PHASE	2632203.7	606538.1
	PHASE	2632192.8	606533.9
	OHGW	2632245.8	606442.7
	OHGW	2632169.9	606492.0
45			
	PHASE	2632453.3	605985.8
	PHASE	2632434.9	605979.5
46			
	PHASE	2632592.2	605416.8
	PHASE	2632572.9	605413.9
71			
	PHASE	2633208.0	585755.3
	PHASE	2633188.7	585752.2
72			
	PHASE	2633465.8	585095.3
	PHASE	2633446.6	585091.8
82			
	OHGW	2633815.0	577009.6
	OHGW	2633869.3	577118.6
	PHASE	2633762.5	577046.1
	PHASE	2633774.2	577046.3
	PHASE	2633788.3	577031.7
	PHASE	2633794.4	577031.9
	PHASE	2633808.7	577023.6
	PHASE	2633820.3	577024.1
	PHASE	2633808.8	577139.0
	PHASE	2633815.7	577129.6
	PHASE	2633835.8	577127.0
	PHASE	2633839.4	577122.0
	PHASE	2633854.5	577115.5
	PHASE	2633861.1	577105.9
	OHGW	2633768.1	577047.1
	OHGW	2633811.2	577133.8
86			
	OHGW	2631804.0	575574.4
	PHASE	2631783.7	575627.8
	PHASE	2631797.6	575604.9
	PHASE	2631802.5	575579.1

87			
	OHGW	2631179.7	575747.3
	OHGW	2631115.8	575681.1
	PHASE	2631210.4	575698.2
	PHASE	2631221.1	575698.3
	PHASE	2631194.9	575718.8
	PHASE	2631200.6	575718.9
	PHASE	2631174.5	575733.0
	PHASE	2631185.3	575733.2
	PHASE	2631165.7	575641.1
	PHASE	2631165.5	575651.8
	PHASE	2631144.5	575661.0
	PHASE	2631144.4	575666.7
	PHASE	2631129.8	575676.0
	PHASE	2631129.7	575686.7
	OHGW	2631215.7	575698.3
	OHGW	2631165.8	575646.5
88			
	Laminated Wood Structure		

NOTES:

1. GIVEN COORDINATES ARE IN FEET.
2. X AND Y COORDINATES ARE FOR EXACT ANCHOR LOCATIONS.
3. REFER TO PLAN AND PROFILE SHEETS FOR MORE DESCRIPTIONS ON ANCHOR LEADS AND ORIENTATIONS.
4. OFFSETS ARE INCLUDED IN GIVEN COORDINATES.

REV.	DATE	DRAWN	DESCRIPTION	WORK ORDER	CHKD	APPD	DATE
0	05/15/09	JKC	ISSUE FOR CONSTRUCTION				

CEG CONSULTING ENGINEERS GROUP
FARMINGTON MINNESOTA

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NAME JAMES C. HANSON
DATE ____ REGISTER NO. 5413

MPOWER / LUVERNE
TRANSMISSION LINE CORNER POLE
ANCHOR COORDINATES

CHECKED ____ DATE ____
SCALE NONE
W.O. NO.
MAP NO.
DRAWN JKC
DATE 05/15/09
DWG. NO. MPOW-TLR-03