1. STRONGBACK

— STRONGBACK IS DELIVERED ON JAN. 5, 2000. FIELD INSPECTION FOUND THERE ARE 8 GUSSET PLATES & 18 WELDS MISSING.

— FLATNESS SURVEY:

IT WAS NOT QUITE TO THE TOLERANCE THAT I EXPECTED TO BE AROUND THE EAR AREAS: ONE SIDE IS 1/2" lower and the other side is 3/8" lower.

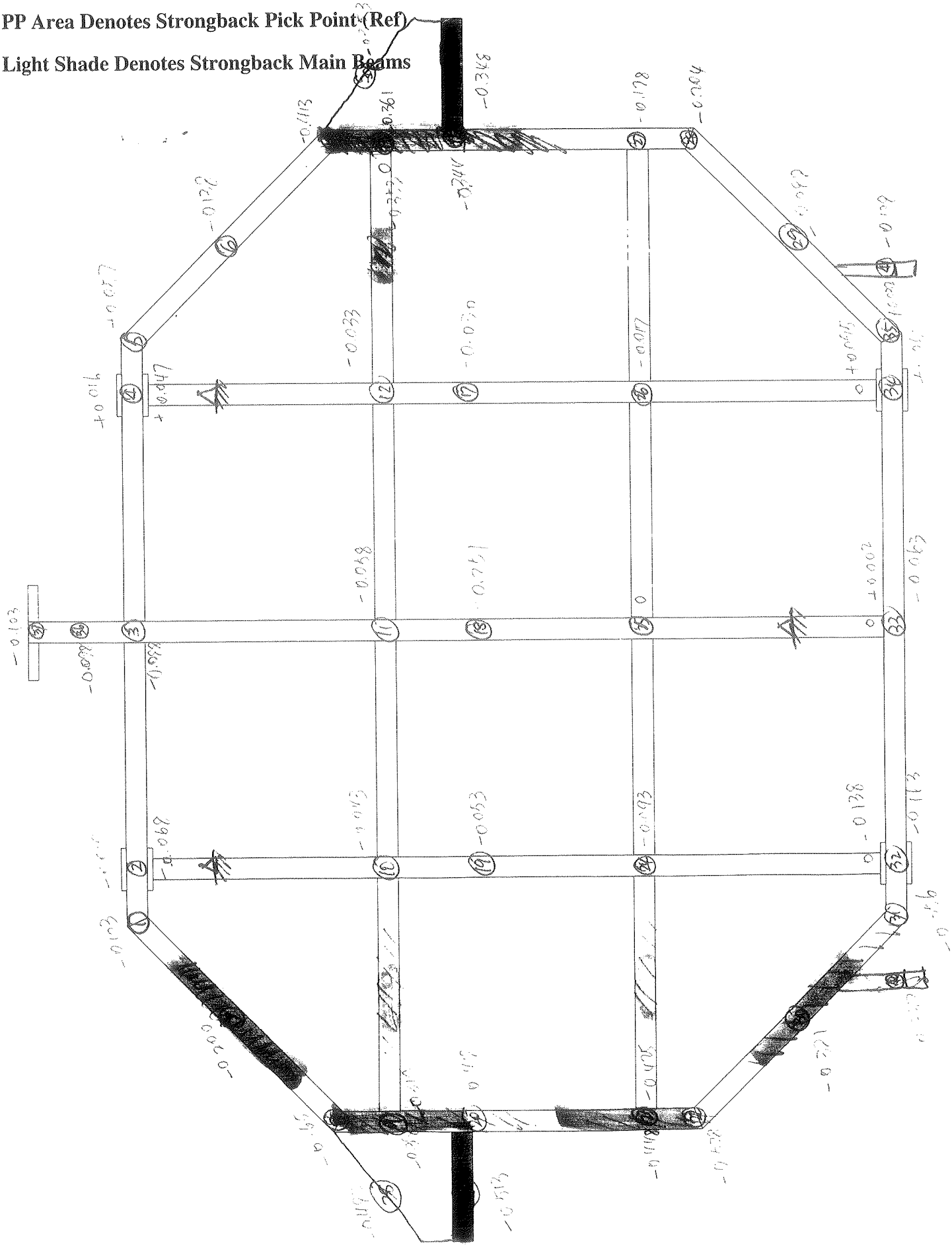
— IT WAS ASSUMED TO BE BUILT TO NORMAL CONSTRUCTION TOLERANCE of ±1/8" in 10-feet.

— DESIGN THE SCHEME TO BRING THE FLATNESS WITHIN 1/8" which require welding the shim plate on top of the strongback. HOWEVER, AFTER TALKING TO KILMER, HE FELT THE EXISTING FLATNESS ON THE NEAR STRONGBACK IS ADEQUATE FOR THE PLATES DUE TO HIS EXPERIENCE ON THE FAR STRONGBACK. THEREFORE, NO SHIM PLATES WILL BE ADDED AT THIS TIME.

Scale: 1" = 2' **Illustration 1**

PP Area Denotes Strongback Pick Point (Ref)

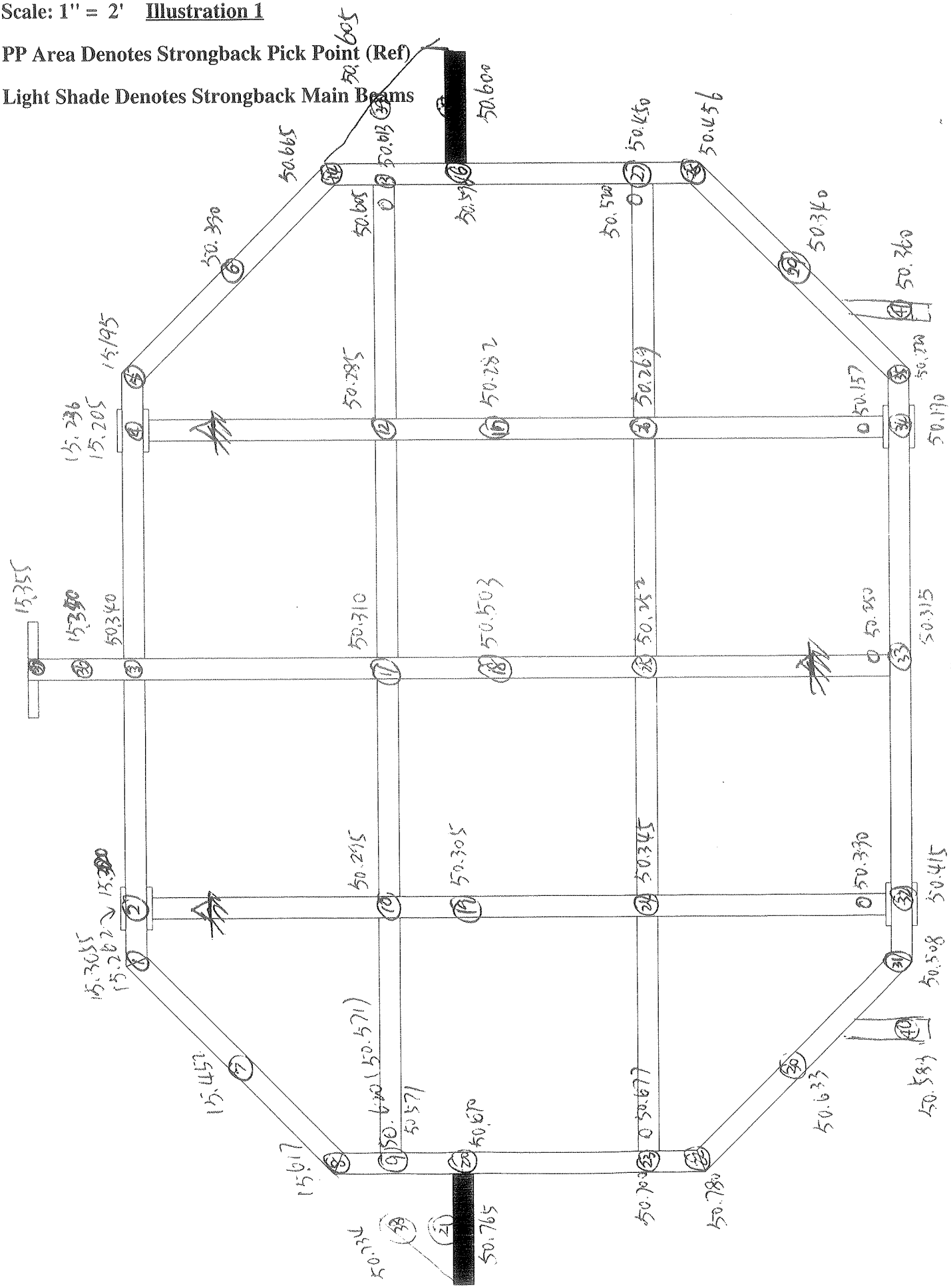
Light Shade Denotes Strongback Main Beams



Scale: 1" = 2' **Illustration 1**

PP Area Denotes Strongback Pick Point (Ref)

Light Shade Denotes Strongback Main Beams



CREW #3: O'Boyle, Rodriguez.

*

Request # : 3094 Requisition Date : 06-AUG-99
Project # : 3423
Task Manager : STU LAKANEN
Starting Date : 16-AUG-99 Completion Date : 30-OCT-99
Requested By : JAMES KILMER
Expt/Beamline : MINOS
Description :

Alignment support is sought for the assembly and hanging of the four planes of detector for the Minos prototype. This will include photogrametry and possibly flatness measurements of each plane as it is assembled. A final alignment of the entire array will be needed.

Contact for the job

Fermi ID #	: N 1641	Name	: JAMES R. KILMER
Extension	: 2637	E-Mail	: KILMER@FNAL.GOV
Mail Stop	: 219	Page #	: 6307721209

Hazard assessor's name : JAMES KILMER

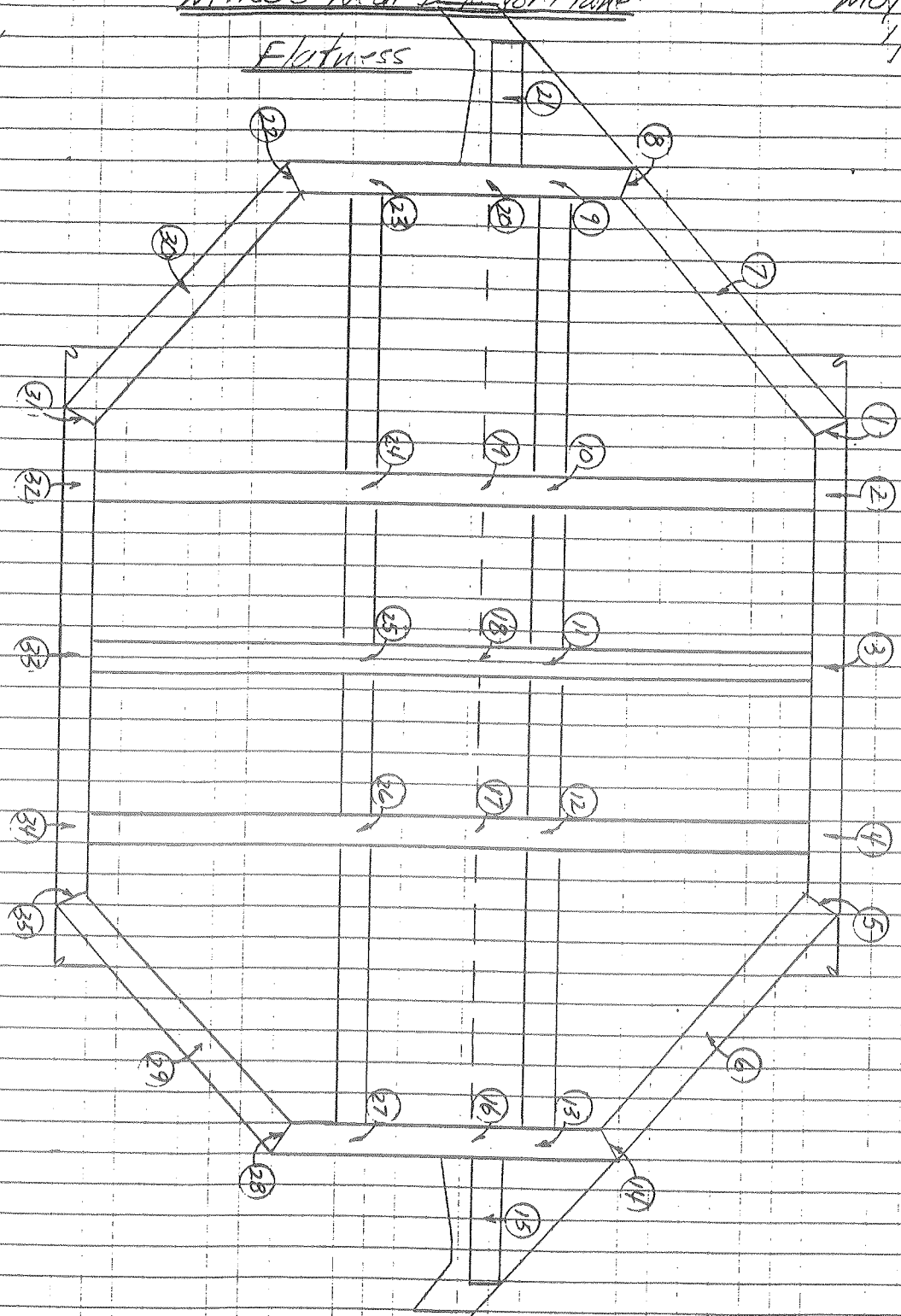
S.AL
10 Jan 00

BK 130-1
Reg # 3094
Proj # 3423

MINOS Near Detector Plane

Flatness

MO/JK
1/6/00



MC
1
STA
TB
TBM

JK
1/6/00

MO/JK
1/6/00

MINOS Near Detector Plane

Flatness

BK 130-
Reg # 309
Proj # 342

STA	BS(+) STK	BS(+) SCL	BS(+) MIC	HI	FS(-) STK	FS(-) SCL	FS(-) MIC	FS(-) CORR	ELEV	DESIGN	REMARK
TBM	—	15.9	.009	115.909						100.000	RANDOM
1					27.0	12.3	.024		76.585		
2					"	12.3	.055		76.554		
3					"	12.4	.014		76.495		
4					"	12.4	.082		76.427		
5					"	12.5	.018		76.391		
6					"	12.5	.029		76.380		
7					"	12.2	.047		76.662		
8					"	12.1	.039		76.770		
9					"	12.1	.066		76.743		
10					"	12.3	.050		76.559		
11					"	12.3	.077		76.532		
12					"	12.4	.021		76.488		
13					"	12.6	.014		76.295		
14					"	12.6	.006		76.303		
15					"	12.7	.046		76.163		
16					"	12.6	.052		76.257		
17					"	12.4	.023		76.486		
18					"	12.3	.082		76.527		
19					"	12.3	.009		76.540		
20					"	12.2	.028		76.681		
21					"	12.2	.005		76.704		
22					"	12.3	.024		76.585		
23					"	12.3	.015		76.594		
24					"	12.3	.071		76.538		
25					"	12.3	.080		76.529		
26					"	12.4	.059		76.450		
27					"	12.6	.094		76.215		
28					"	12.6	.070		76.239		
29					"	12.5	.077		76.332		
30					"	12.4	.000		76.509		
31					"	12.4	.023		76.486		
32					"	12.4	.023		76.486		
33					"	12.4	.042		76.467		
34					"	12.5	.064		76.345		
35					"	12.5	.095		76.314		
TBM					—	15.9	.010		99.499	100.000	E = .000

SAL

BK 130-1
Reg # 3094
Proj # 3423

MINOS Near Detector Stromboli

Flatness

MO/AR
1/10/00

STA	BS(+) STK	BS(+) SCL	BS(+) MIC	HI	FS(-) STK	FS(-) SCL	FS(-) MIC	FS(-) CCPR	ELEV	DESIGN	REMARKS
TBM	–	(2.1)	.037	97.937						100.000	RANDOM
											Δ
1					15.0	15.3	.055		67.582	67.622	-.040
2					"	15.3	.020		67.617		-.005
2A					"	15.2	.062		67.675		.053
3					"	15.3	.040		67.597		-.025
3A											N/A
4					"	15.2	.005		67.732		.110
4A					"	15.2	.036		67.701		.079
5					"	15.1	.095		67.742		.120
6					"	15.3	.090		67.547		-.075
7					"	15.4	.052		67.485		-.137
8					"	15.6	.017		67.320		-.302
9					"	15.6	.020		67.317		-.305
9A					"	15.5	.071		67.366		-.256
10					"	15.2	.095		67.642		.020
11					"	15.3	.010		67.627		.005
12					"	15.2	.085		67.652		.030
13					"	15.6	.013		67.324		-.298
13A					"	15.6	.005		67.332		-.290
14					"	15.6	.065		67.272		-.350
15					"	15.6	.000		67.337		-.285
16					"	15.5	.090		67.347		-.275
17					"	15.2	.082		67.665		.043 .033
18					"	15.3	.003		67.634		.012
19					"	15.3	.005		67.632		.010
20					"	15.6	.070		67.267		-.355
21					"	15.7	.065		67.172		-.450
22					"	15.7	.080		67.157		-.465
23					"	15.7	.000		67.237		-.385
23A					"	15.6	.077		67.260		-.362
24					"	15.3	.045		67.592		-.030
25					"	15.2	.052		67.685		.063
26					"	15.2	.069		67.668		.046
27					"	15.4	.050		67.487		-.135
27A					"	15.5	.020		67.417		-.205
28					"	15.4	.056		67.481		-.141
29					"	15.3	.040		67.597		-.025

MO/AR
1/10/00

MINOS Near Detector Strongback

Flatness

BK 130-1
Req. #3094
Proj. #3423

STA	BS(+) STK	BS(+) SCL	BS(+) MIC	HI	FS(-) STK	FS(-) SCL	FS(-) MIC	FS(-) CORR	ELEV	DESIGN	REMARKS
											Δ
30					"	15.6	.033		67.304	67.622	-.318
31					"	15.5	.008		67.429		-.193
32					"	15.4	.015		67.522		-.100
32A					"	15.3	.090		67.547		-.075
33					"	15.3	.015		67.622		.000
33A					"	15.2	.050		67.687		.065
34					"	15.1	.090		67.747		.125
34A					"	15.1	.057		67.780		.158
35					"	15.2	.020		67.717		.095
36					"	15.3	.050		67.587		-.035
37					"	15.3	.055		67.582		-.040
38					"	15.7	.034		67.203		-.419
39					"	15.6	.005		67.332		-.290
40					"	15.5	.059		67.348		-.274
41					"	15.3	.016		67.621		-.001
					—	(2.1)	.035		100.002	100.000	F.C.=.002

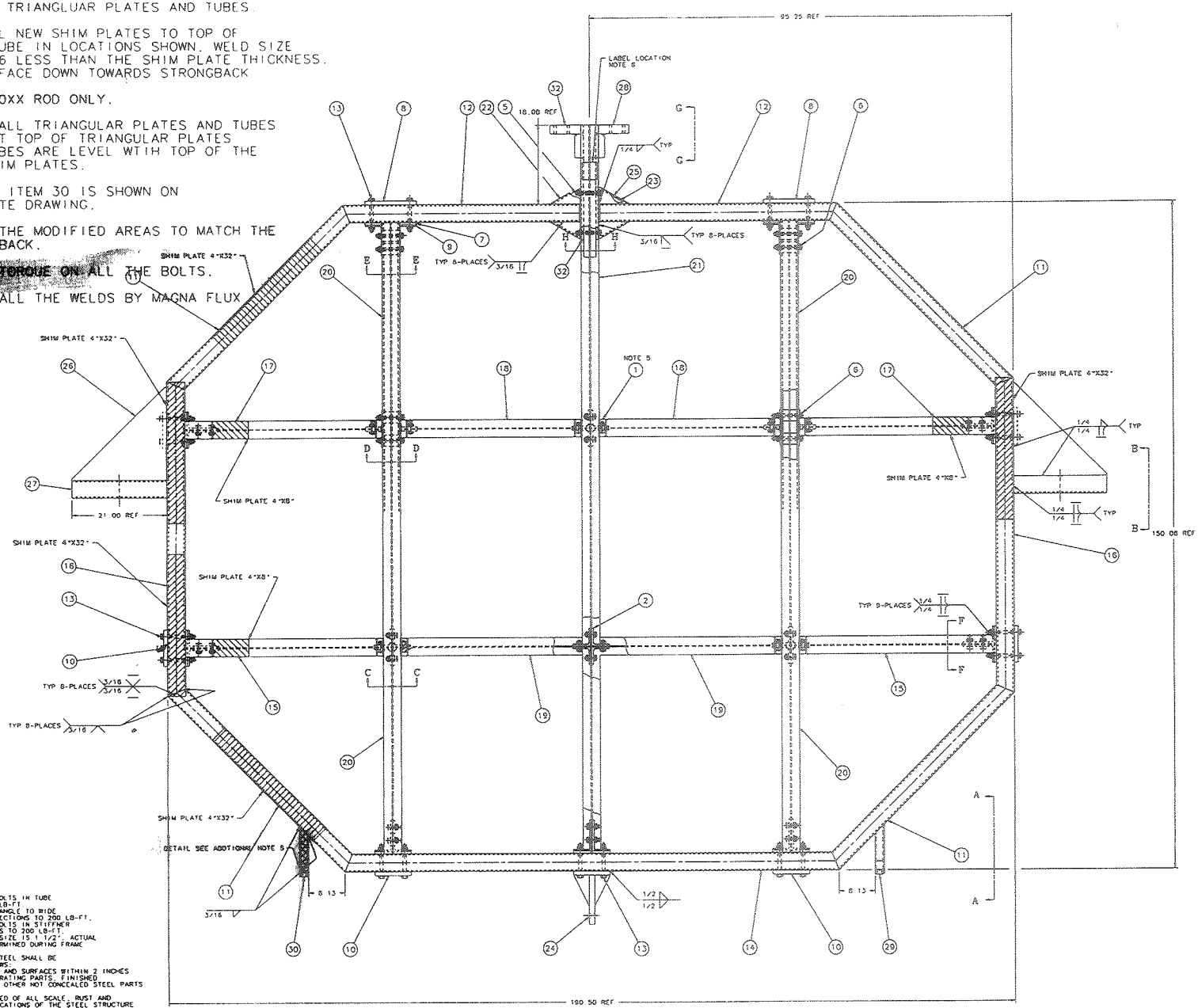
* Note: Use pt. 33 as 0 point as per Ingrid Fang

* Note: notes are not checked.

REV	DESCRIPTION	DRAWN / APPROVED	DATE / DATE

ADDITONAL NOTES:

1. REMOVE TRIANGLUAR PLATES AND TUBES.
2. INSTALL NEW SHIM PLATES TO TOP OF 4X12 TUBE IN LOCATIONS SHOWN. WELD SIZE IS 1/16 LESS THAN THE SHIM PLATE THICKNESS. WELDS FACE DOWN TOWARDS STRONGBACK
3. USE E70XX ROD ONLY.
4. REINSTALL TRIANGULAR PLATES AND TUBES SO THAT TOP OF TRIANGULAR PLATES AND TUBES ARE LEVEL WTIH TOP OF THE NEW SHIM PLATES.
5. MODIFY ITEM 30 IS SHOWN ON SEPERATE DRAWING.
6. PAINT THE MODIFIED AREAS TO MATCH THE STRONGBACK.
7. CHECK TORQUE ON ALL THE BOLTS.
8. CHECK ALL THE WELDS BY MAGNA FLUX



ITEM NO	PART NO.	DESCRIPTION OR SIZE	QTY. REQ.
32	MC-384197	WELDMENT, L.H.	1
31	COML	WASHER, FLAT, 3/4" BOLT ASTM F436 HARDENED	124
30	MC-384163-2	WELDMENT SUPPORTING LIP L.H.	1
29	MC-384163-1	WELDMENT SUPPORTING LIP R.H.	1
28	MC-384156	WELDMENT, R.H.	1
27	MB-384135	TUBE-CLAMPING DEVICE	2
26	MC-384134	GUSSET PLATE-CLAMPING DEVICE SUPPT	2
25	MB-384133	GUSSET PLATE-UPPER AND LOWER	4
24	MC-384130	LIFTING LUG WELDMENT	1
23	MC-384129	GUSSET PLATE-MIDDLE	4
22	MB-384127	GUSSET PLATE-UPPER AND LOWER	4
21	MC-384116	BEAM & SPACER WELDMENT CENTER VERTICAL	1
20	MC-384115	BEAM & SPACER WELDMENT VERTICAL	2
19	MC-384114	BEAM-HORIZONTAL CENTER LOWER	2
18	MC-384113	BEAM-HORIZONTAL CENTER UPPER	2
17	MC-384112	BEAM-HORIZONTAL UPPER	2
16	MC-384111	TUBE-SIDE	2
15	MC-384110	BEAM-HORIZONTAL LOWER	2
14	MC-384109	TUBE-BOTTOM	1
13	COML	BOLT, 3/4-10UNC x 7 LG. HX HD ASTM A325 TYPE 1	36
12	MC-384195	TUBE-TOP WELDMENT	2
11	MC-384106	TUBE-DIAGONAL	4
10	MC-384105	PLATE-OUTSIDE SMALL	7
9	MB-384104	ANGLE-BRACKET	18
8	MC-384103	PLATE-OUTSIDE LARGE	2
7	MB-384102	PLATE-SPACER	18
6	COML	BOLT, 3/4-10UNC x 5-1/2 LG. HX HD ASTM A325 TYPE 1	18
5	COML	BOLT, 3/4-10UNC x 5 LG. HX HD ASTM A325 TYPE 1	4
4	COML	NUT, 3/4-10UNC-2B HX HD ASTM A194 GRADE 2	124
3	COML	BOLT, 3/4-10UNC x 2-1/4 LG. HX HD ASTM A325 TYPE 1	68
2	MB-384098	ANGLE-BRACKET	24
1	MB-384097	PLATE	24

PARTS LIST

UNLESS OTHERWISE SPECIFIED			ORIGINATOR	T. FANG	AUG99
.XX	.XXX	ANGLES	DRAWN	VIC MAJDANSKI	17AUG99
±	±	±	CHECKED		
1. BREAK ALL SHARP EDGES .01 REF			APPROVED		
2. DO NOT SCALE DRWG.			USED ON		
3. DIMENSIONING IS ACCORD WITH ANSI Y14.5M-1982					
4. ALL DIMENSIONS ARE IN INCHES			MATERIAL	SEE PARTS LIST	
USE ALL MACHINED SURFACE					

FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

PPD/MECHANICAL SUPPORT
MINOS NEAR DETECTOR
STRONGBACK STRUCTURE WELDMENT

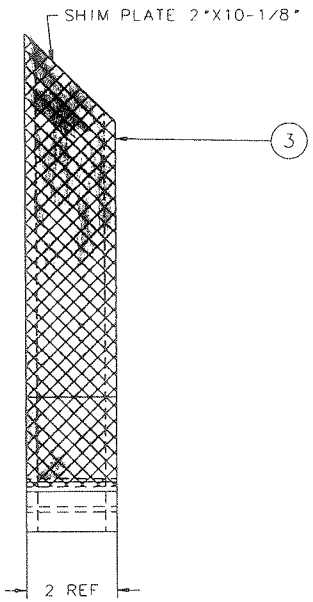
SCALE	DRAWING NUMBER		SHEET NO	REV
1/8 & NOTED	9213.30	384094	1 OF 2	

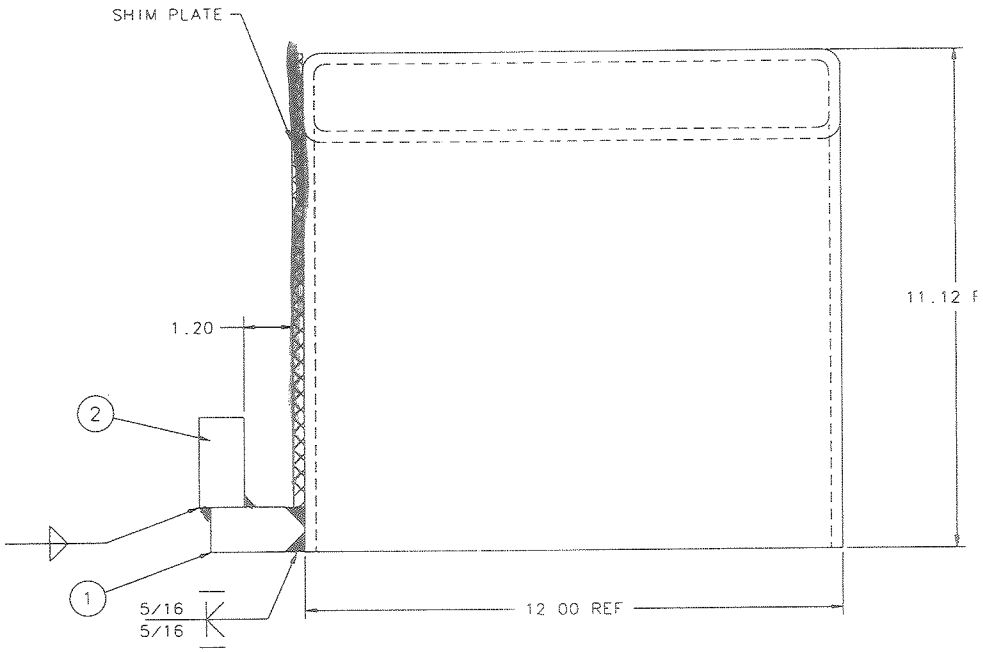
APPROXIMATE WEIGHT = 4800 LBS.

NOTES:

1- TORQUE THROUGH BOLTS IN TUBE CONNECTIONS 110 LB-FT
2- TORQUE BOLTS IN ANGLE TO WIDE FLANGE BEAM CONNECTIONS TO 200 LB-FT.
3- TORQUE THROUGH BOLTS IN STIFFNER PLATE CONNECTIONS TO 200 LB-FT.
4- ITEM #1 NOMINAL SIZE IS 1 1/2". ACTUAL SIZES TO BE DETERMINED DURING FRAME FABRICATION.
5- ALL STRUCTURAL STEEL SHALL BE PAINTED AS FOLLOWS: EXCEPT FOR LABEL AND SURFACES WITHIN 2 INCHES OF ANY WELD, OPERATING PARTS, FINISHED SURFACES AND ALL OTHER NOT CONCEALED STEEL PARTS SHALL BE THOROUGHLY CLEANED OF ALL SCALE, RUST AND DIRT PER SPECIFICATIONS OF THE STEEL STRUCTURE PAINTING COUNCIL (SSPC) "SURFACE PREPARATION SPECIFICATION NO 3 (SP-3) POWER TOOL CLEANING". PRIMED WITH SYNTHETIC, QUICK-DRYING, RUST-INHIBITING FERROUS METAL PRIMER GLIDDEN 5203 GLID-GUARD TANK AND STRUCTURAL PRIMER, PAINTED WITH TWO COATS OF INTERIOR SEMI-GLOSS, ODORLESS, ALKYD ENAMEL GLIDDEN 4200 SPREAD ULTRA SEMI-GLOSS ENAMEL. COLOR SHALL BE "MASSEY FERGUSON RED". INCLUDE 1 GALLON OF FINAL PAINT WITH SHIPMENT (FOR TOUCH-UP)
6- LABEL FURNISHED BY FERMILAB.

REV	DESCRIPTION	DRAWN	DATE
		APPROVED	DATE





NOTES:

1. REMOVE ITEM 2.
2. INSTALL SHIM PLATE ON TOP OF ITEM 3. WELD SIZE IS 1/16" LESS THAN THE SHIM PLATE THICKNESS. USE E70XX ROD ONLY.
3. REINSTALL ITEM 2 ON TOP OF THE SHIM PLATE.

PART #	DESCRIPTION
MC-384163-1	AS SHOWN R.H.
MC-384163-2	OPPOSITE L.H.

ITEM NO.	PART NO.	DESCRIPTION OR SIZE	QTY. REQ.
3	MB-384162	TUBE	1
2	MB-384161	PLATE	1
1	MB-384160	PLATE	1

PARTS LIST

UNLESS OTHERWISE SPECIFIED			ORIGINATOR	I. FANG	AUG99
XX	.XXX	ANGLES	DRAWN	VIC MAJDANSKI	17AUG99
± .03	± ——	± ——	CHECKED		
			APPROVED		

1. BREAK ALL SHARP EDGES .015 MAX.
2. DO NOT SCALE DRWG.
3. DIMENSIONING IN ACCORD WITH ANSI Y14.5M-1982 STD'S.
4. ALL DIMENSIONS ARE IN INCHES.

125 MAX. ALL MACHINED SURFACES

USED ON ME-384094

MATERIAL SEE PARTS LIST

FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

PPD/MECHANICAL SUPPORT
MINOS STRONGBACK FIXTURE
SUPPORTING LIP WELDMENT

SCALE	DRAWING NUMBER	SHEET NO	REV
HALF	9213.300-MC-384163	1 OF 1	

- SURVEY THE STRONGBACK FLATNESS AFTER ADDING THE MISSING PLATES AND WELDS.

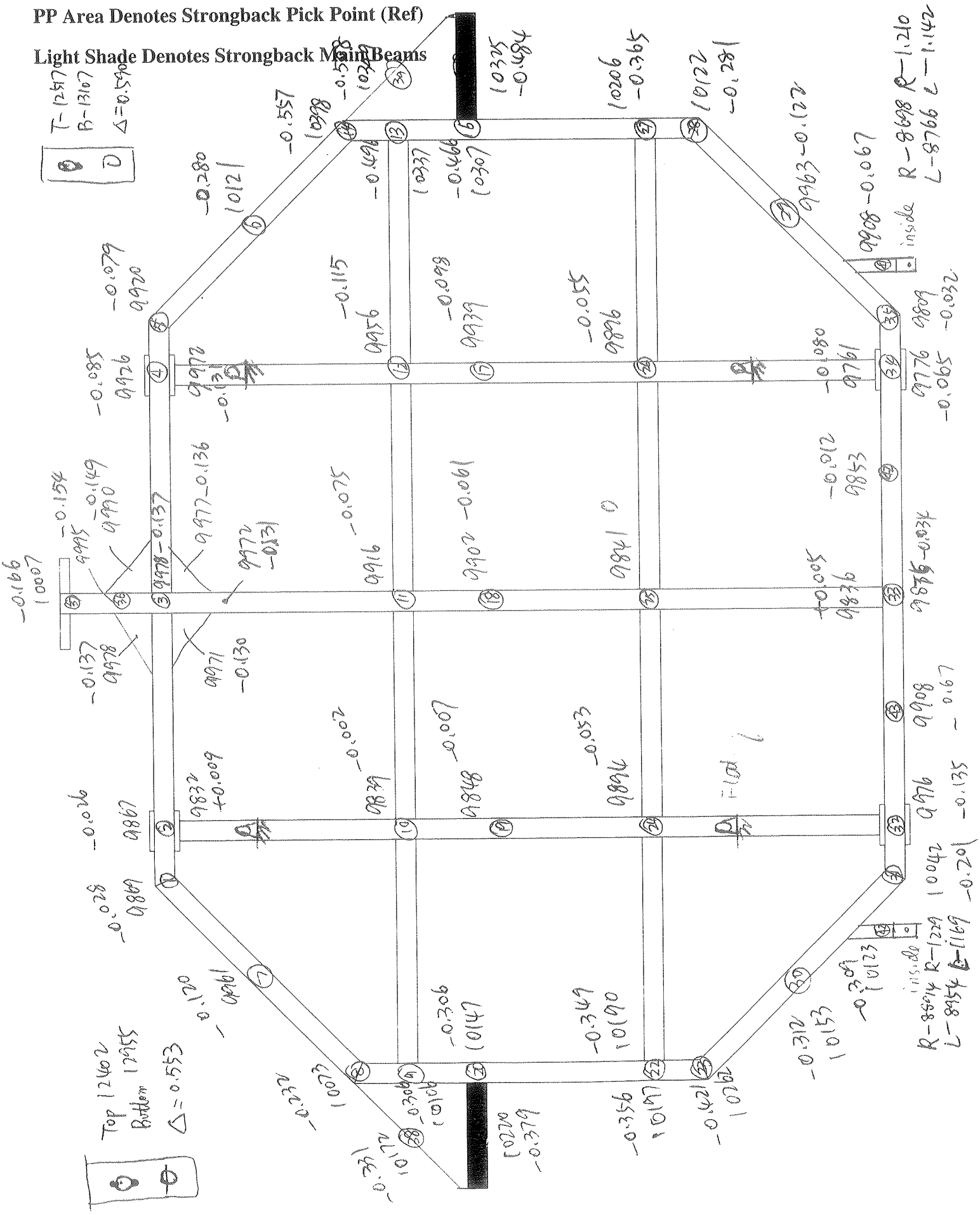
- RESULTS SHOW THAT BOTH EAR AREAS ARE STILL LOWER THAN THE CENTER OF THE PLATE.

- PROPOSE TO SET AN ACTUAL PLATE ON THE STRONGBACK AND PERFORM ANOTHER FLATNESS TEST ON THE PLATE.

Scale: 1" = 2' **Illustration 1**

PP Area Denotes Strongback Pick Point (Ref)

Light Shade Denotes Strongback Main Beams



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Request # : 3219 Requisition Date : 30-NOV-99
Project # : 3423
Task Manager : STU LAKANEN
Starting Date : 01-DEC-99 Completion Date : 30-JUN-00
Requested By : JAMES KILMER
Expt/Beamline : MINOS
Description :

Alignment support is requested for the Near Detector 4 plane prototype. This includes initial survey of the support structure and bookend, measure flatness of strongback, and measure flatness of each plane haning vertically. If Scintillator detectors are available use V-Star to measure positions of scintillator on steel and then tie planes together after hanging (just like far 4PP).

Contact for the job

Fermi ID #	: N 1641	Name	: JAMES R. KILMER
Extension	: 2637	E-Mail	: KILMER@FNAL.GOV
Mail Stop	: 219	Page #	: 6307721209

Hazard assessor's name : JAMES KILMER

STU 6298

✓ SAL
19 Jan 00

REQUEST 3219
PROJECT 3423

MINOS NEAR TARGET
STRONGBACK SURVEYED
18 JAN 00

PRINTED ON1/19/00

POINT	FORWARD	BACK	DIFF	MEAN		
1	100.936	100.935	0.001	100.936		
2	100.938	100.931	0.007	100.935		
2A	100.973	100.973	0.000	100.973		
3	100.827	100.826	0.001	100.827		
3A	100.833	100.820	0.013	100.827		
3B	100.827	100.822	0.005	100.825		
3C	100.815	100.810	0.005	100.813		
3D	100.828	100.826	0.002	100.827		
4	100.879	100.879	0.000	100.879		
4A	100.833	100.841	-0.008	100.837		
5	100.885	100.883	0.002	100.884		
6	100.685	100.683	0.002	100.684		
7	100.844	100.848	-0.004	100.846		
8	100.732	100.732	0.000	100.732		
9	100.705	100.712	-0.007	100.709		
9A	100.745	100.752	-0.007	100.749		
10	100.966	100.972	-0.006	100.969		
11	100.889	100.891	-0.002	100.890		
12	100.849	100.846	0.003	100.848		
13	100.460	100.462	-0.002	100.461		
13A	100.468	100.463	0.005	100.466		
14	100.407	100.405	0.002	100.406		
15	100.480	100.480	0.000	100.480		
16	100.498	100.497	0.001	100.498		
17	100.866	100.866	0.000	100.866		
18	100.903	100.904	-0.001	100.904		
19	100.957	100.959	-0.002	100.958		
20	100.658	100.659	-0.001	100.659		
21	100.585	100.589	-0.004	100.587		
22	100.543	100.550	-0.007	100.547		
23	100.608	100.611	-0.003	100.610		
23A	100.615	100.618	-0.003	100.617		
24	100.911	100.912	-0.001	100.912		
25	100.964	100.969	-0.005	100.967		
26	100.909	100.910	-0.001	100.910		
27	100.674	100.673	0.001	100.674		
27A	100.599	100.598	0.001	100.599		
28	100.683	100.687	-0.004	100.685		
29	100.842	100.846	-0.004	100.844		
30	100.652	100.656	-0.004	100.654		
31	100.763	100.765	-0.002	100.764		
32	100.829	100.836	-0.007	100.833		
32A	100.854	100.865	-0.011	100.860		
33	100.932	100.939	-0.007	100.936		
33A	100.969	100.976	-0.007	100.973		
34	101.029	101.035	-0.006	101.032		
34A	101.044	101.045	-0.001	101.045	HI POINT	
35	100.996	100.996	0.000	100.996		
36	100.810	100.810	0.000	100.810		
37	100.798	100.794	0.004	100.796		
38	100.633	100.638	-0.005	100.636		
39	100.456	100.459	-0.003	100.458		
40	100.682	100.688	-0.006	100.685		
40A	101.911	101.919	-0.008	101.915	BRACKET	
40A.1	101.852	101.856	-0.004	101.854	BRACKET	
41	100.897	100.899	-0.002	100.898		
41A	102.107	102.109	-0.002	102.108	BRACKET	
41A.1	102.039	102.038	0.001	102.039	BRACKET	
42	100.952	100.956	-0.004	100.954		
43	100.857	100.862	-0.005	100.860		
@15T	98.413	98.420	-0.007	98.417	HOLE TOP	DIAM
@15B	97.573	97.576	-0.003	97.575	HOLE BOT	0.842
@21T	98.528	98.522	0.006	98.525	HOLE TOP	
@21B	97.685	97.681	0.004	97.683	HOLE BOT	0.842
44	**99.890**	**99.904**	**-0.014**	**99.897**	**LO POINT**	
45	100.152	100.143	0.009	100.148		
46	100.394	100.398	-0.004	100.396		
47	100.036	100.036	0.000	100.036		
MAX	101.044	101.045	0.013	101.045		
MIN	99.890	99.904	-0.014	99.897		
SPREAD	1.154	1.141	0.027	1.148		
ST DEV	0.210	0.210	0.004	0.210		

STU LAKANEN
EXT 6298 MS 334

84

BK130-1
Req # 3094
Proj # 3423

MINOS Near Detector Strongback

MO/JK
1/18/0

Post Weld Flatness

STA	BS(+) STK	BS(+) SCL	BS(+) MIC	HI	FS(-) STK	FS(-) SCL	FS(-) MIC	FS(-) CORR	ELEV	DESIGN	REMAR
TBM	–	13.8	.005	113.805						100.000	RANDO
1					3.0	9.8	.069		100.936		
2						9.8	.067		100.938		
2A						9.8	.032		100.973		
3						9.9	.078		100.827		
3A						9.9	.072		100.833		
3B						9.9	.078		100.827		
3C						9.9	.090		100.815		
3D						9.9	.077		100.828		
4						9.9	.026		100.879		
4A						9.9	.072		100.833		
5						9.9	.020		100.885		
6						10.1	.020		100.685		
7						9.9	.061		100.844		
8						10.0	.073		100.732		
9						10.1	.000		100.705		
9A						10.0	.060		100.745		
10						9.8	.039		100.966		
11						9.9	.016		100.889		
12						9.9	.056		100.849		
13						10.3	.045		100.460		
13A						10.3	.037		100.468		
14						10.3	.098		100.407		
15						10.3	.025		100.480		
16						10.3	.007		100.498		
17						9.9	.039		100.866		
18						9.9	.002		100.903		
19						9.8	.048		100.957		
20						10.1	.047		100.658		
21						10.2	.020		100.585		
22						10.2	.062		100.543		
23						10.1	.097		100.608		
23A						10.1	.090		100.615		
24						9.8	.094		100.911		
25						9.8	.041		100.964		
26						9.8	.096		100.909		
27						10.1	.031		100.674		
27A						10.2	.006		100.599		
28						10.1	.022		100.683		
29						9.9	.063		100.842		

√ SAL
9 Jan 00

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Hole@15
Hole@21
Hole@21
Hole@15

/JK
/18/00

MC/JK
1/18/00

MINOS Near Detector Stronghack

Bk 130-1
Req #3094
Proj #3423

Post Weld Flatness

STA	BS(+) STK	BS(+) SCL	BS(+) MIC	HI	FS(-) STK	FS(-) SCL	FS(-) MIC	FS(-) CORR	ELEV	DESIGN	REMARKS
30					3.0	10.1	.053		100.~~654~~ 652		
31						10.0	.042		100.763		
32						9.9	.076		100.829		
32 A						9.9	.051		100.854		
33						9.8	.073		100.932		
33 A						9.8	.036		100.969		
34						9.7	.076		101.029		
34 A						9.7	.061		101.044		
35						9.8	.009		100.996		
36						9.9	.095		100.810		
37						10.0	.007		100.798		
38						10.1	.072		100.633		
39						10.3	.049		100.456		
40						10.1	.023		100.682		
40 A						8.8 8.9	.094 .053		101.911 101.852		
41						9.9	.008		100.897		
41 A						8.6 8.7	.098 .066		102.107 102.039		
42						9.8	.053		100.952		
43						9.9	.048		100.857		
[illegible]@15 T					2.875	12.5	.017		98.413		
B					3.125	13.1	.007		97.573		
[illegible]@21 T					2.875	12.4	.002		98.528		
B					3.125	12.9	.095		97.685		
44					3.0	10.9	.015		99.890		
45					"	10.6	.053		100.152		
46					"	10.4	.011		100.394		
47					"	10.7	.069		100.036		
	3.0	10.6	.060	113.696							
46					3.0	10.2	.098		100.398		
45					"	10.5	.053		100.143		
44					"	10.7	.092		99.904		
[illegible]@21 B					3.125	12.8	.090		97.681		
T					2.875	12.2	.099		98.522		
[illegible]@15 B					3.125	12.9	.095		97.576		
T					2.875	[illegible].4	.001		98.420		
43					3.0	9.8	.034		100.862		
42						9.7	.040		100.956		
41A						8.5 8.6	.087 .058		102.109 102.038		
41						9.7	.097		100.899		
40A						8.7 8.8	.077 .040		101.919 101.856		
40						10.0	.008		100.688		

✓ SAL 19 Jan 00

BK 130-1
Rep #2094
Proj #3423

MINOS Near Detector Stromback

MC/JK
1/18/[illegible]

Post Weld Flatness

STA	BS(+) STK	BS(+) SCL	BS(+) MIC	HI	FS(-) STK	FS(-) SCL	FS(-) MIC	FS(-) CORR	ELEV	DESIGN	REMA
39					3.0	10.2	.037		100.459		
38						10.0	.058		100.638		
37						9.9	.002		100.794		
36						9.8	.086		100.810		
35						9.7	.000		100.996		
34 A						9.6	.051		101.045		
34						9.6	.061		101.035		
33 A						9.7	.020		100.976		
33						9.7	.057		100.939		
32 A						9.8	.031		100.865		
32						9.8	.060		100.836		
31						9.9	.031		100.765		
30						10.0	.040		100.656		
29						9.8	.050		100.846		
28						10.0	.009		100.687		
27A						10.0	.098		100.598		
27						10.0	.023		100.673		
26						9.7	.086		100.910		
25						9.7	.027		100.969		
24						9.7	.084		100.912		
23A						10.0	.078		100.618		
23						10.0	.085		100.611		
22						10.1	.046		100.550		
21						10.1	.007		100.589		
20						10.0	.037		100.659		
19						9.7	.037		100.959		
18						9.7	.092		100.904		
17						9.8	.030		100.866		
16						10.1	.099		100.497		
15						10.2	.016		100.480		
14						10.2	.091		100.405		
13A						10.2	.033		100.463		
13						10.2	.034		100.462		
12						9.8	.050		100.846		
11						9.8	.005		100.891		
10						9.7	.024		100.972		
9A						9.9	.044		100.752		
9						9.9	.084		100.712		
8						9.9	.064		100.732		

✓ SAL
19 Jan 00

JK
18/05

MC/JK
1/18/00

MINOS Near Detector Stromback

BK 130-1
Reg # 3094
Pg # 3423

Post Weld Flatness

MARKS	STA	BC(+) STK	BC(+) SCL	BC(+) MIC	HI	FC(-) STK	FC(-) SCL	FC(-) MIC	FC(-) CORR	ELEV	DESIGN	REMARKS
	7					3.0	9.8	.048		100.848		
	6						10.0	.013		100.683		
	5						9.8	.013		100.883		
	4A						9.8	.055		100.841		
	4						9.8	.017		100.879		
	3D						9.8	.070		100.826		
	3C						9.8	.086		100.810		
	3B						9.8	.074		100.822		
	3A						9.8	.076		100.820		
	3						9.8	.070		100.826		
	2A						9.7	.023		100.973		
	2						9.7	.065		100.931		
	1						9.7	.061		100.935		
	TBM					→	13.6	.095		100.001	100.000	FC = .001

✓ SAL
19 Jan 00

0 PUT THE ACTUAL PLATE ON THE STRONGBACK TO SEE HOW THE CLAMPING DEVICES WORK.

OBSERVATION:

1). GAP BETWEEN THE PLATE AND THE STRONGBACK.

RIGHT SIDE EAR: ~0.5"
LEFT SIDE EAR: ~0.3"

BOTTOM RIGHT SIDE LIP: FIT
BOTTOM LEFT SIDE LIP: FIT TIGHT.

2) INSTALL CLAMPING DEVICES TO SEE IF THEY ARE WORING PROPERLY.

Both sides worked fine on tightening & releasing. However, ear deflects when tightening to clamp.

Propose to install extra support to reduce the ear deflection.

Crew #3: O'Boyle, Crutcher, Ziegler.

*

Request # : 3219 Requisition Date : 30-NOV-99
Project # : 3423
Task Manager : STU LAKANEN
Starting Date : 01-DEC-99 Completion Date : 30-JUN-00
Requested By : JAMES KILMER
Expt/Beamline : MINOS
Description :

Alignment support is requested for the Near Detector 4 plane prototype. This includes initial survey of the support structure and bookend, measure flatness of strongback, and measure flatness of each plane haning vertically. If Scintillator detectors are available use V-Star to measure positions of scintillator on steel and then tie planes together after hanging (just like far 4PP).

Contact for the job

Fermi ID #	: N 1641	Name	: JAMES R. KILMER
Extension	: 2637	E-Mail	: KILMER@FNAL.GOV
Mail Stop	: 219	Page #	: 6307721209

Hazard assessor's name : JAMES KILMER

GWC/RZ
1/19/00

UPSTREAM FACE
MINOS Near Detector Plane 2

BK 130-1
Req. #3219
Proj. #3423

Flatness on Floor See Prev. Pg. 80

TA	BS(+) STR	BS(+) SCL	BS(+) MIC	HI	FS(-) STK	FS(-) SCL	FS(-) MIC	FS(-) CORR	ELEV	DESIGN	REMARKS
BM	3.0	8.9	053	111.953						100.000	RANDOM
1					27.0	16.2	.062		68.691		
2						16.2	.082		68.671		
3						16.3	.062		68.591		
4						16.4	.079		68.474		
5						16.5	.027		68.426		
6						16.4	.074		68.479		
7						16.2	.012		68.741		
8						16.1	.012		68.841		
9						16.1	.054		68.799		
10						16.3	.050		68.603		
11						16.3	.087		68.566		
12						16.4	.035		68.518		
13						16.6	.000		68.353		
14						16.5	.039		68.414		
15						16.7	.078		68.175		
16						16.6	.065		68.288		
17						16.4	.049		68.504		
18						16.3	.096		68.557		
19						16.3	.092		68.561		
20						16.2	.029		68.724		
21						16.2	.000		68.753		
22						16.4	.021		68.532		
23						16.3	.080		68.573		
24						16.4	.014		68.539		
25						16.3	.075		68.578		
26						16.4	.066		68.487		
27						16.7	.053		68.200		
28						16.7	.053		68.200		
29						16.6	.076		68.277		
30						16.4	.067		68.486		
31						16.5	.049		68.404		
32						16.5	.029		68.424		
33						16.4	.058		68.495		
34						16.6	.002		68.351		
35						16.6	.076		68.277		
[illegible]						16.1	.046		68.807		
[illegible]						16.7	.018		68.235		
42						16.5	.014		68.439		
43						16.4	.072		68.481		
TBM					3.0	8.9	.062		99.991	100.000	EC = .009

√ SAL 20 Jan 00

Crew #3: O'Boyle, Crutcher, Ziegler.

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Request # : 3219 Requisition Date : 30-NOV-99
Project # : 3423
Task Manager : STU LAKANEN
Starting Date : 01-DEC-99 Completion Date : 30-JUN-00
Requested By : JAMES KILMER
Expt/Beamline : MINOS
Description :

Alignment support is requested for the Near Detector 4 plane prototype. This includes initial survey of the support structure and bookend, measure flatness of strongback, and measure flatness of each plane haning vertically. If Scintillator detectors are available use V-Star to measure positions of scintillator on steel and then tie planes together after hanging (just like far 4PP).

Contact for the job

Fermi ID #	N 1641	Name	JAMES R. KILMER
Extension	2637	E-Mail	KILMER@FNAL.GOV
Mail Stop	219	Page #	6307721209

Hazard assessor's name : JAMES KILMER

DS FACE

MINOS Near Detector Plane 1

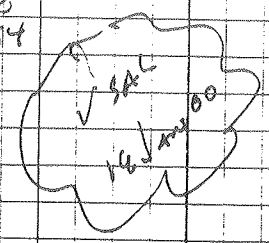
MO/GW
1/1

BK 130-1
Reg #3219
Proj #3423

on Strongback See Dwg Pg. 80

Measurements taken at strongback locations

STA	BS(+) STR	BS(+) SCL	BS(+) MIC	HI	FS(-) STR	FS(-) SCL	FS(-) MIC	FS(-) CORR	ELEV	DESIGN	REM
TBM	—	16.3	.020	116.320						100.000	RAN
1					3.0	11.2	.045		102.075		
2						11.2	.090		102.030		
3						11.4	.031		101.889		
4						11.4	.028		101.892		
5						11.4	.034		101.886		
6						11.4	.089		101.831		
7						11.2	.025		102.095		
8						11.1	.089		102.131		
9						11.2	.021		102.099		
10						11.3	.020		102.000		
11						11.3	.098		101.922		
12						11.4	.054		101.866		
13						11.4	.083		101.837		
14						11.5	.011		101.809		
15						11.3	.077		101.943		
16						11.4	.032		101.888		
17						11.4	.018		101.902		
18						11.3	.068		101.952		
19						11.3	.045		101.975		
20						11.2	.061		102.059		
21						11.1	.081		102.139		
22						11.5	.000		101.820		
23						11.4	.021		101.899		
24						11.4	.014		101.906		
25						11.3	.021		101.999		
26						11.3	.063		101.957		
27						11.4	.005		101.915		
28						11.4	.011		101.909		
29						11.3	.083		101.937		
30						11.5	.085		101.735		
31						11.4	.098		101.822		
32						11.4	.056		101.864		
33						11.3	.026		101.994		
34						11.2	.062		102.058		
35						11.2	.066		102.054		



✓ SAL
16 Jan 00

DS FACE

MC/GWC/RZ
1/19/00

MINOS Near Detector Plane 1

on Strongback

BK 130-1
Req #3219
Proj #3423

STA	BS(+) STK	BS(+) SCL	BS(+) MIC	HI	FS(-) STK	FS(-) SCL	FS(-) MIC	FS(-) COPR	ELEV	DESIGN	REMARKS
				116.320							Pg. 88
38						11.1	.038		102.054		
39						11.4	.018		101.902		
40						11.5	.031		101.789		
41						11.2	.072		102.048		
42						11.2	.085		102.035		
43						11.3	.082		101.938		
44						13.4	.053		99.867		
45						13.2	.011		100.109		
46						12.9	.029		100.391		
47						13.3	.000		100.020		
	3.0	13.4	.064	116.484							
46					3.0	13.0	.097		100.387		
45						13.4	.001		100.083		
44						13.5	.089		99.895		
43						11.5	.047		101.937		
42						11.4	.049		102.035		
41						11.4	.034		102.050		
40						11.6	.098		101.786		
39						11.5	.080		101.904		
38						11.3	.004		102.180		
35						11.4	.030		102.054		
34						11.4	.024		102.060		
33						11.4	.089		101.995		
32						11.6	.021		101.863		
31						11.6	.067		101.817		
30						11.7	.040		101.744		
29						11.5	.048		101.936		
28						11.5	.075		101.909		
27						11.5	.069		101.915		
26						11.5	.026		101.958		
25						11.4	.088		101.996		
24						11.5	.079		101.905		
23						11.5	.089		101.895		
22						11.6	.004		101.820		
21						11.3	.047		102.137		
20						11.4	.028		102.056		

JSAL
19 Jan 00

DS FACE

MINOS Near Detector Plane 1

on Strongback

BK 130-1
Reg # 3219
Proj # 3423

MO/Bu
1/1

STA	BS(+) STK	BS(+) SCL	BS(+) MIC	HI	FS(-) STK	FS(-) SCL	FS(-) MIC	FS(-) CORR	ELEV	DESIGN	REMA
				116.484							Pg. 8
19						11.5	.009		101.975		
18						11.5	.038		101.946		
17						11.5	.088		101.896		
16						11.5	.097		101.887		
15						11.5	.051		101.933		
14						11.6	.078		101.806		
13						11.6	.048		101.836		
12						11.6	.023		101.861		
11						11.5	.064		101.920		
10						11.4	.088		101.996		
9						11.3	.086		102.098		
8						11.3	.056		102.128		
7						11.3	.077		102.107		
6						11.6	.060		101.824		
5						11.5	.097		101.887		
4						11.5	.094		101.890		
3						11.5	.098		101.886		
2						11.4	.062		102.022		
1						11.4	.011		102.073		
TBM					—	16.4	.089		99.995	100.000	E.C. =
	—	(0.5)	.041	98.669						99.128	Bottom
Hole@15 T					—	—	.239		98.430		
	—	—	.125	98.555							
TBM					—	(0.6)	.021		99.134	99.128	E.C. =
	—	(0.5)	.017	98.645							
Hole@21 T					—	—	.106		98.539		
	—	—	.194	98.733							
TBM					—	(0.4)	.004		99.129	99.128	E.C. =
	—	12.3	.057	112.357						100.000	
44					3.0	9.4	.086		99.871		
45					"	9.2	.062		100.095		
46					"	8.9	.069		100.388		
47					"	9.3	.058		99.999		
	3.0	9.4	.060	112.459							
46					"	9.0	.071		100.388		
45					"	9.3	.065		100.094		
44					"	9.5	.092		99.867		
TBM					—	12.4	.058		100.001	100.000	E.C. = 00

REQUEST 3219
PROJECT 3423
COMPS ON 20 JAN 00

MINOS PLATE 1
DIFFERENCES FROM TRANSFORMED 19 JAN
SURVEY TO 18 JAN STRONGBACK

PRINTED ON :1/20/00
UNITS ARE INCHES

TRANSFORMED PLATE ONE NEAR DETECTOR				STRONGBACK			STRONGBACK		
POINT	X	Y	Z	POINT	X	Y	MN ELEV	DIFF	DIFF-1
1	-54.0	63.5	102.043	1	-54.0	63.5	100.936	1.107	0.107
2	-45.0	63.5	101.995	2	-45.0	63.5	100.935	1.060	0.060
3	0.0	63.5	101.856	3	0.0	63.5	100.827	1.029	0.029
4	45.0	63.5	101.858	4	45.0	63.5	100.879	0.979	-0.021
5	54.0	63.5	101.853	5	54.0	63.5	100.884	0.969	-0.031
6	73.5	44.0	101.803	6	73.5	44.0	100.684	1.119	0.119
7	-73.5	44.0	102.080	7	-73.5	44.0	100.846	1.234	0.234
8	-93.0	24.5	102.119	8	-93.0	24.5	100.732	1.387	0.386
9	-93.0	15.5	102.092	9	-93.0	15.5	100.709	1.383	0.383
10	-45.0	15.5	101.990	10	-45.0	15.5	100.969	1.021	0.021
11	0.0	15.5	101.912	11	0.0	15.5	100.890	1.022	0.022
12	45.0	15.5	101.853	12	45.0	15.5	100.848	1.005	0.005
13	93.0	15.5	101.825	13	93.0	15.5	100.461	1.364	0.364
14	93.0	24.5	101.792	14	93.0	24.5	100.406	1.386	0.386
15	102.0	2.0	101.935	15	102.0	2.0	100.480	1.455	0.455
16	93.0	0.0	101.884	16	93.0	0.0	100.498	1.386	0.386
17	45.0	0.0	101.896	17	45.0	0.0	100.866	1.030	0.030
18	0.0	0.0	101.947	18	0.0	0.0	100.904	1.043	0.043
19	-45.0	0.0	101.974	19	-45.0	0.0	100.958	1.016	0.016
20	93.0	0.0	102.054	20	93.0	0.0	100.659	1.395	0.395
21	102.0	2.0	102.132	21	102.0	2.0	100.587	1.545	0.545
22	-93.0	-42.5	101.840	22	-93.0	-42.5	100.547	1.293	0.293
23	-93.0	-33.5	101.913	23	-93.0	-33.5	100.610	1.303	0.303
24	-45.0	-33.5	101.921	24	-45.0	-33.5	100.912	1.009	0.009
25	0.0	-33.5	102.012	25	0.0	-33.5	100.967	1.045	0.045
26	45.0	-33.5	101.971	26	45.0	-33.5	100.910	1.061	0.061
27	93.0	-33.5	101.927	27	93.0	-33.5	100.674	1.253	0.252
28	93.0	-42.5	101.925	28	93.0	-42.5	100.685	1.240	0.240
29	73.5	-62.0	101.963	29	73.5	-62.0	100.844	1.119	0.119
30	-73.5	-62.0	101.769	30	-73.5	-62.0	100.654	1.115	0.115
31	-54.0	-81.5	101.858	31	-54.0	-81.5	100.764	1.094	0.094
32	-45.0	-81.5	101.902	32	-45.0	-81.5	100.833	1.069	0.069
33	0.0	-81.5	102.032	33	0.0	-81.5	100.936	1.095	0.095
34	45.0	-81.5	102.094	34	45.0	-81.5	101.032	1.062	0.062
35	54.0	-81.5	102.089	35	54.0	-81.5	100.996	1.093	0.093
38	-101.0	11.0	102.176	38	-101.0	11.0	100.636	1.540	0.540
39	101.0	11.0	101.893	39	101.0	11.0	100.458	1.435	0.435
40	-65.0	-81.5	101.826	40	-65.0	-81.5	100.685	1.141	0.141
41	65.0	-81.5	102.084	41	65.0	-81.5	100.898	1.186	0.186
42	22.5	-81.5	102.071	42	22.5	-81.5	100.954	1.117	0.117
43	-22.5	-81.5	101.975	43	-22.5	-81.5	100.860	1.115	0.115
44	-96.0	-33.5	99.885	44	-96.0	-33.5	99.897	-0.012	
45	-45.0	-84.5	100.134	45	-45.0	-84.5	100.148	-0.014	
46	45.0	-84.5	100.425	46	45.0	-84.5	100.396	0.029	
47	96.0	-33.5	100.010	47	96.0	-33.5	100.036	-0.026	
15T	102.0	0.0	98.425	@15T	102.0	0.0	98.417	0.008	
21T	-102.0	0.0	98.539	@21T	-102.0	0.0	98.525	0.014	

```
*
* Standard Transformation
*
* Primary:      C:\MINOS Detector Prototype\3219 3423 NEAR TARGETS TRANSFORMATION\STRONGBACK 18 JAN.prn
* Secondary:    C:\MINOS Detector Prototype\3219 3423 NEAR TARGETS TRANSFORMATION\PLATE 1 19 JAN.prn
* Transformed:  C:\MINOS Detector Prototype\3219 3423 NEAR TARGETS RESULTS
*
*    Shift:     0.002427     0.047238     0.002174
*
* Rotation:     0.000474    -0.100024     0.000000
*
     Scale:     1.000000

*   Cutoff:     0.500000
*
```

INCHES

DIFFERENCES w/ STND TRANS

* Label	DX	DY	DZ	
44	-0.0000	-0.0002	0.0119	
45	-0.0000	-0.0003	0.0140	
46	-0.0000	-0.0004	-0.0288	
47	-0.0000	-0.0002	0.0256	
15T	0.0000	0.0006	-0.0083	
21T	0.0000	0.0005	-0.0143	
*				
* RMS:	0.0000	0.0004	0.0187	0.0187
*				
* Average:	-0.0000	0.0000	0.0000	0.0000

[illegible]	[illegible]	0	98.525
44	-96	-33.5	99.897
45	-45	-84.5	100.148
46	45	-84.5	100.396
47	96	-33.5	100.036

STRONG BACK VERTICAL FIZ

INCHES

SECONDARY FILE

PLATE 1 DATA

INCHES

3	0	63.5	101.888
4	45	63.5	101.891
5	54	63.5	101.887
6	73.5	44	101.828
7	-73.5	44	102.101
8	-93	24.5	102.130
9	-93	15.5	102.099
10	-45	15.5	101.998
11	0	15.5	101.921
12	45	15.5	101.864
13	93	15.5	101.837
14	93	24.5	101.808
15	102	2	101.941
16	93	0	101.888
17	45	0	101.899
18	0	0	101.949
19	-45	0	101.975
20	93	0	102.058
21	102	2	102.138
22	-93	-42.5	101.820
23	-93	-33.5	101.897
24	-45	-33.5	101.906
25	0	-33.5	101.998
26	45	-33.5	101.958
27	93	-33.5	101.915
28	93	-42.5	101.909
29	73.5	-62	101.937
30	-73.5	-62	101.740
31	-54	-81.5	101.820
32	-45	-81.5	101.864
33	0	-81.5	101.995
34	45	-81.5	102.059
35	54	-81.5	102.054
38	-101	11	102.181
39	101	11	101.903
40	-65	-81.5	101.788
41	65	-81.5	102.049
42	22.5	-81.5	102.035
43	-22.5	-81.5	101.938
15T	102	0	98.430
21T	-102	0	98.539
44	-96	-33.5	99.869
45	-45	-84.5	100.095
46	45	-84.5	100.388
47	96	-33.5	99.999

Standard Transformation

Primary: C:\MINOS Detector Prototype\3219 3423 NEAR TARGETS\TRANSFORMATION\STRONGBACK 18 JAN.prn
Secondary: C:\MINOS Detector Prototype\3219 3423 NEAR TARGETS\TRANSFORMATION\PLATE 1 19 JAN.prn
Transformed: C:\MINOS Detector Prototype\3219 3423 NEAR TARGETS\RESULTS

Shift: 0.002427 0.047238 0.002174

Rotation: 0.000474 -0.000024 0.000000

Scale: 1.000000

Cutoff: 0.500000

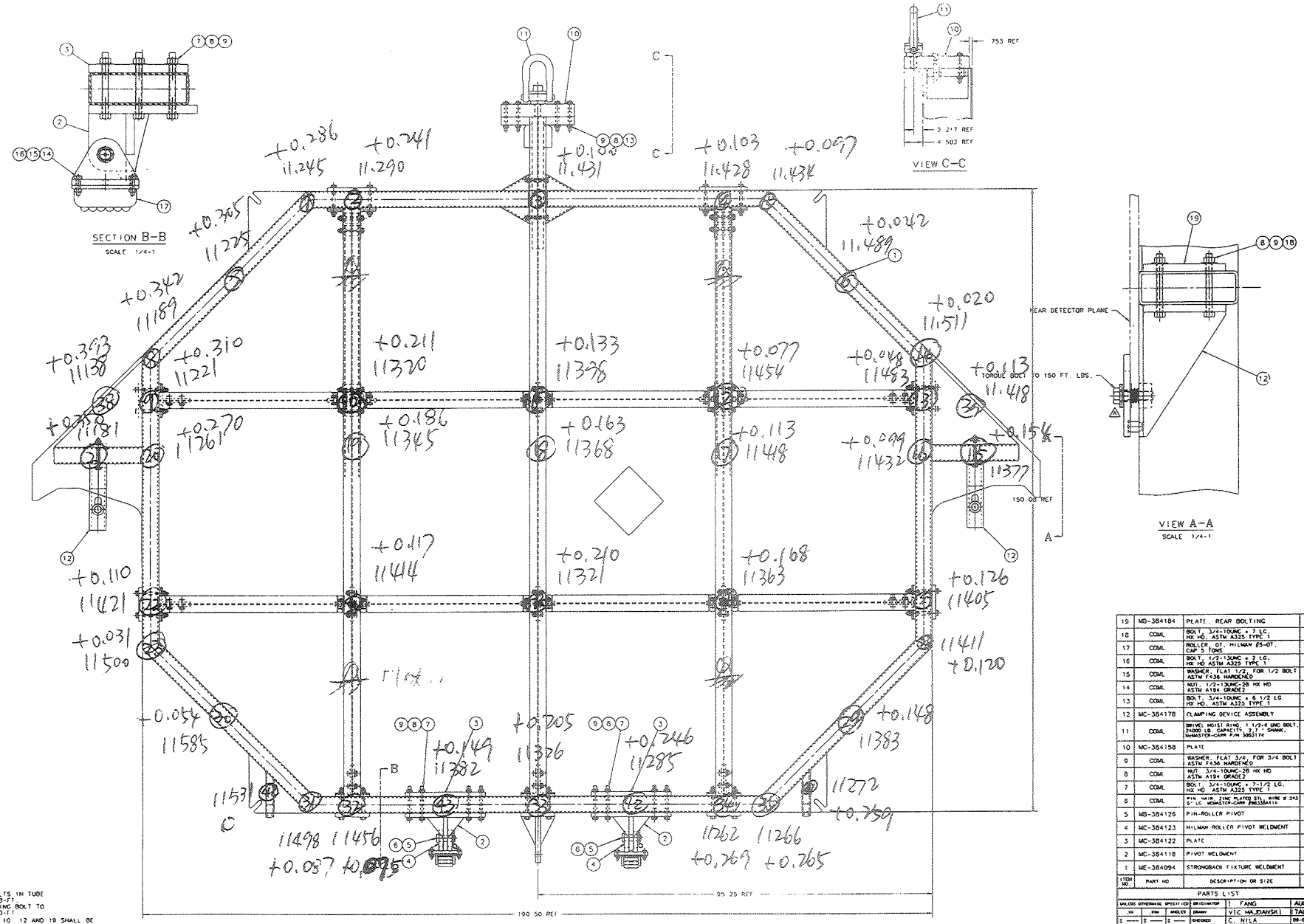
PLATE 1 D.S. FACE

TRANSFORMED

INCHES

Label	X	Y	Z
1	-53.9999	63.5012	102.0430
2	-44.9999	63.5012	101.9948
3	0.0001	63.5011	101.8557
4	45.0001	63.5011	101.8576
5	54.0001	63.5011	101.8534
6	73.5001	44.0011	101.8032
7	-73.4999	44.0012	102.0798
8	-92.9999	24.5012	102.1185
9	-92.9999	15.5012	102.0918
10	-44.9999	15.5012	101.9896
11	0.0001	15.5011	101.9115
12	45.0001	15.5011	101.8534
13	93.0001	15.5011	101.8252
14	93.0001	24.5010	101.7919
15	102.0001	2.0011	101.9354
16	93.0001	0.0011	101.8836
17	45.0001	0.0011	101.8957
18	0.0001	0.0011	101.9468
19	-44.9999	0.0012	101.9739
20	93.0001	0.0012	102.0536
21	102.0001	2.0012	102.1324
22	-92.9999	-42.4989	101.8403
23	-92.9999	-33.4989	101.9130
24	-44.9999	-33.4989	101.9208
25	0.0001	-33.4988	102.0117
26	45.0001	-33.4989	101.9706
27	93.0001	-33.4989	101.9265
28	93.0001	-42.4989	101.9247
29	73.5001	-61.9989	101.9625
30	-73.5000	-61.9989	101.7691
31	-54.0000	-81.4989	101.8578
32	-45.0000	-81.4989	101.9016
33	0.0001	-81.4988	102.0315
34	45.0001	-81.4988	102.0944
35	54.0001	-81.4988	102.0892
38	-100.9999	11.0013	102.1761
39	101.0001	11.0011	101.3931
40	-65.0000	-81.4989	101.8261
	65.0001	-81.4988	102.0839
	22.5001	-81.4988	102.0710
5	-22.4999	-81.4989	101.9751
44	-96.0000	-33.4998	99.8851
45	-45.0000	-84.4997	100.1340
46	45.0000	-84.4996	100.4248
47	96.0000	-33.4998	100.0104
15T	102.0000	-0.0006	98.4253
21T	-102.0000	-0.0005	98.5393

REV	DESCRIPTION	DRAWN / APPROVED	INITIAL / DATE
A	REVISED CLAMPING DEVICE ASSEMBLY IN VIEW A-A TO SHOW STANDARD BOLT W/SLEEVE INSTEAD OF SHOULDER BOLT.	B. CYKO	09-28-99



ITEM NO.	PART NO	DESCRIPTION OR SIZE	QTY. REQ.
19	MB-384184	PLATE, REAR BOLTING	2
18	COML	BOLT, 3/4-10UNC x 7 LG. HX HD. ASTM A325 TYPE 1	4
17	COML	ROLLER, OT. HILMAN #5-OT. CAP 5 TONS	2
16	COML	BOLT, 1/2-13UNC x 2 LG. HX HD ASTM A325 TYPE 1	12
15	COML	WASHER, FLAT 1/2, FOR 1/2 BOLT ASTM F436 HARDENED	12
14	COML	NUT, 1/2-13UNC-2B HX HD ASTM A194 GRADE2	12
13	COML	BOLT, 3/4-10UNC x 6 1/2 LG. HX HD. ASTM A325 TYPE 1	8
12	MC-384178	CLAMPING DEVICE ASSEMBLY	2
11	COML	DRIVEN HOIST RING, 1 1/2-6 UNC BOLT, 2-4000 LB. CAPACITY, 2.7" SHANK, McMASTER-CARR P/N 3052T74	1
10	MC-384158	PLATE	1
9	COML	WASHER, FLAT 3/4, FOR 3/4 BOLT ASTM F436 HARDENED	36
8	COML	NUT, 3/4-10UNC-2B HX HD ASTM A194 GRADE2	36
7	COML	BOLT, 3/4-10UNC x 7-1/2 LG. HX HD. ASTM A325 TYPE 1	24
6	COML	PIN, HAIR, ZINC PLATED STL, WIRE # 243 5" LG. McMASTER-CARR P/N 3884A14	2
5	MB-384126	PIN-ROLLER PIVOT	2
4	MC-384123	HILMAN ROLLER PIVOT WELDMENT	2
3	MC-384122	PLATE	2
2	MC-384118	PIVOT WELDMENT	2
1	ME-384094	STRONGBACK FIXTURE WELDMENT	1

PARTS LIST

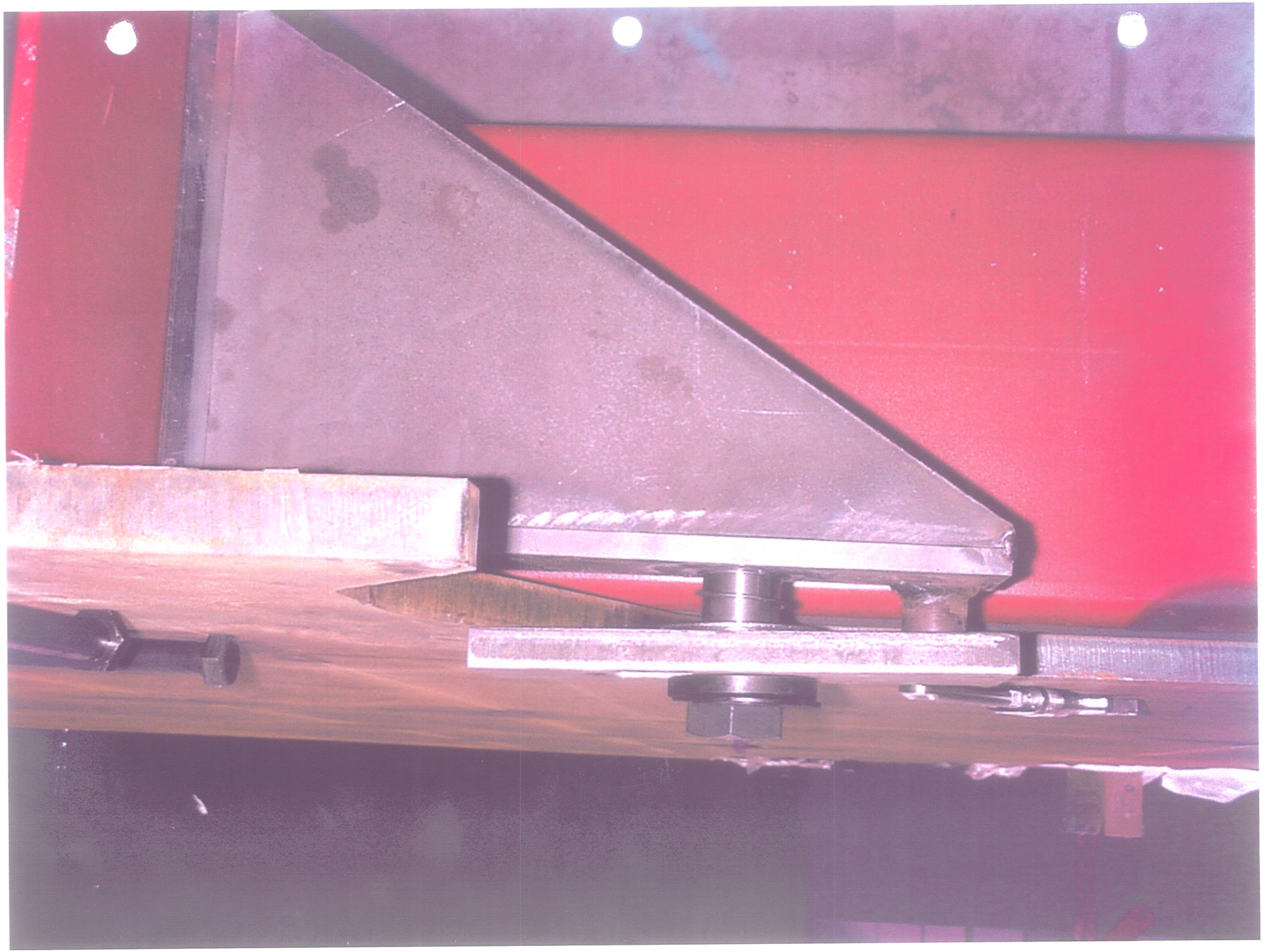
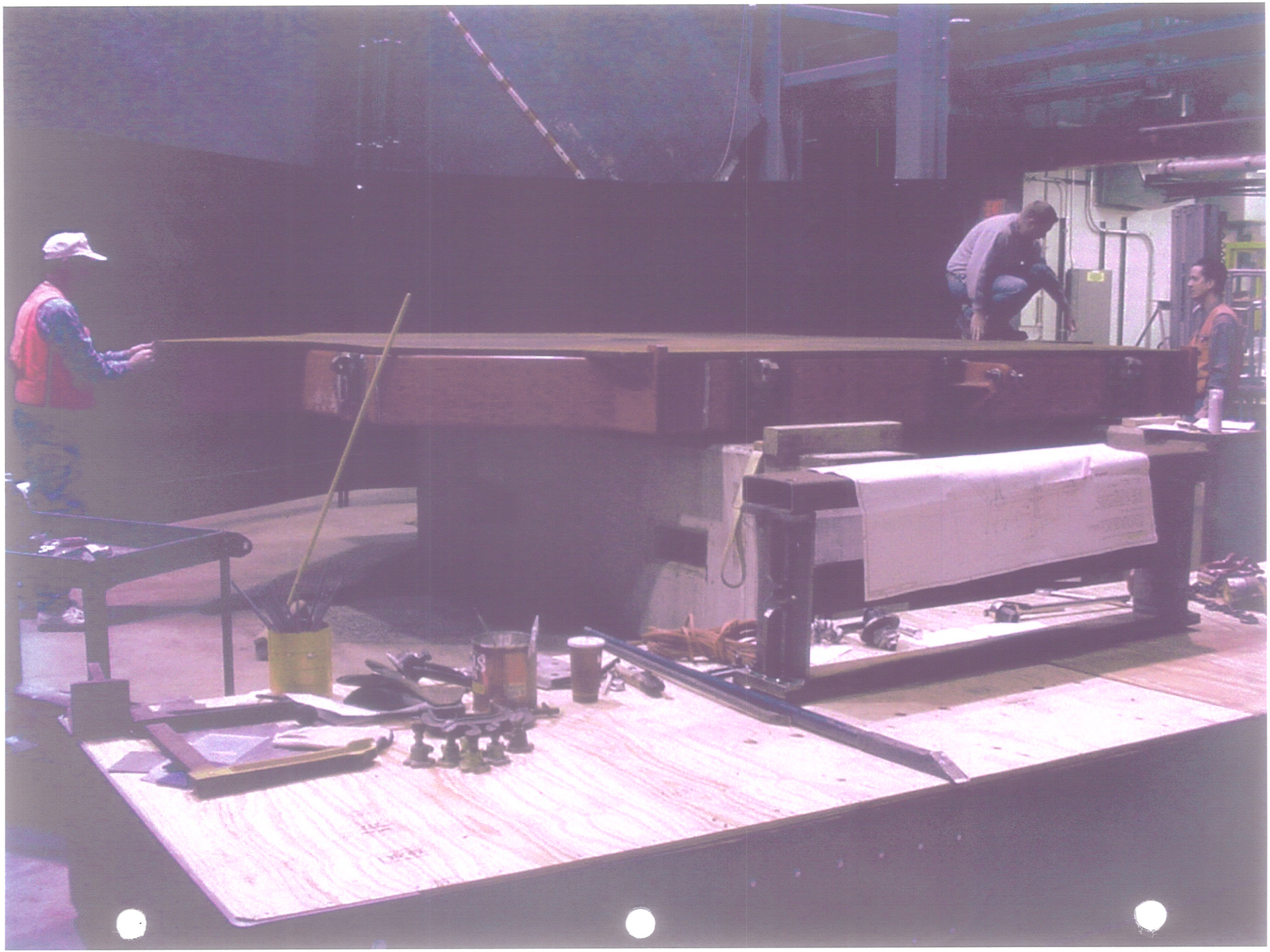
UNLESS OTHERWISE SPECIFIED	ORIGINATOR	I. FANG	AUG99
X.XX / X.XXX / ANGLES	DRAWN	VIC MAJDANSKI	7AUG99
± — / ± — / ± —	CHECKED	C. NILA	09-08-99
1. BREAK ALL SHARP EDGES 010 MAX.	APPROVED	INGRID FANG	09-09-99
2. DO NOT SCALE DWG.	USED ON		
3. DIMENSIONING IN ACCORD WITH ANSI Y14.5M-1982			
4. ALL DIMENSIONS ARE IN INCHES.			
✓ MAX. ALL MACHINED SURFACE	MATERIAL	SEE PARTS LIST	

FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

PPD/MECHANICAL SUPPORT
MINOS-NEAR DETECTOR
STRONGBACK FIXTURE ASSEMBLY

SCALE	DRAWING NUMBER		SHEET NO	REV
1/8	9213.3C	384185	1 OF 1	A

APPROX WT - 5400 LBS.

NOTES

1. TORQUE THROUGH BOLTS IN TUBE CONNECTIONS 110 LB-FT.
2. TIGHTENEN HOIST RING BOLT TO A TORQUE OF 800 LB-FT.
3. ITEMS 2, 3, 4, 5, 10, 12 AND 19 SHALL BE PAINTED AS FOLLOWS:
   EXCEPT FOR LABEL AND SURFACES WITHIN 2 INCHES OF ANY WELD, OPERATING PARTS, FINISHED SURFACES AND ALL OTHER NOT CONCEALED STEEL PARTS SHALL BE
   THOROUGHLY CLEANED OF ALL SCALE, RUST AND DIRT PER SPECIFICATIONS OF THE STEEL STRUCTURE PAINTING COUNCIL (SSPC) "SURFACE PREPARATION SPECIFICATION NO. 3.(SP-3) POWER TOOL CLEANING"
   PRIMED WITH SYNTHETIC, QUICK-DRYING RUST INHIBITING FERROUS METAL PRIMER GLIDDEN 5205 GLID-GUARD TANK AND STRUCTURAL PRIMER.
   PAINTED WITH TWO COATS OF INTERIOR, SEMI-GLOSS, ODORLESS, ALKYD ENAMEL GLIDDEN 4200 SPREAD ULTRA SEMI-GLOSS ENAMEL. COLOR SHALL BE "MASSEY FERGUSON RED". INCLUDE 1 GALLON OF FINAL PAINT WITH SHIPMENT FOR TOUCH-UP.