

Studies of the Injection Line for AGR RHIC Lattice

J. Xu

August 1991

Collider Accelerator Department
Brookhaven National Laboratory

U.S. Department of Energy

USDOE Office of Science (SC)

Notice: This technical note has been authored by employees of Brookhaven Science Associates, LLC under Contract No. DE-AC02-76CH00016 with the U.S. Department of Energy. The publisher by accepting the technical note for publication acknowledges that the United States Government retains a non-exclusive, paid-up, irrevocable, world-wide license to publish or reproduce the published form of this technical note, or allow others to do so, for United States Government purposes.

DISCLAIMER

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, nor any of their contractors, subcontractors, or their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or any third party's use or the results of such use of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof or its contractors or subcontractors. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

AD/RHIC/AP-94

RHIC PROJECT
Brookhaven National Laboratory

Studies of the Injection Line for AGR RHIC Lattice

Jianming Xu

August 1991

STUDIES OF THE INJECTION LINE FOR AGR RHIC LATTICE

Jianming Xu

Accelerator Development Department

Brookhaven National Laboratory

August 1991

The injection line which matches the AGR RHIC lattice has been studied and the results are summarized in this note.

The major difference between this injection line and the original one¹ is that the beam will be injected first by horizontal bending magnet SI1 and then by vertical bending kicker. So that, the septum is an iron septum (Lamberson magnet) but not a current septum as used in reference 1. The small vertical bending magnet SI0 is used to match the beam injection coordinates vertically. The parameters of the main injection elements are shown in Table 1.

The elevation view of the beam centerline at the injection area is shown in Figure 1. Figure 2 is the plan view of RHIC and injection beam center lines at the injection area. Y axis is the line directing from entrance of SWM to the center of RHIC. From these figures and the coordinates of beam center line shown in Table 3, one can find that the separation between the injection line and the nearest RHIC upstream magnet Q6 is about 45 cm which is enough for missing. The injection beam height relative to the RHIC axis is 53 mm at the exit of SI1 and 45 mm at the center of SI1 where the distance between the injection beam and circulating beam is 4 cm already. The 45 mm height includes 30 mm circulating beam half height, 10 mm injection beam half height and 5 mm for iron septum and some clearance. The maximum height of the injection beam center is 56 mm at the center of Q7. So, the maximum half-aperture requirement including the injection beam envelop is about 68.6 mm at Q7 and 42 mm at the entrance of B_2 .

The output of MAD program including the element parameters and Twiss parameters of the injection line are shown in Table 2. The coordinates of this line from SWM to its

¹ Beam Transfer from AGS to RHIC, J. Claus and H. Foelsche, AD/RHIC-47, 1987.

Table 1:

	Length(m)	Bending Angle (mrad)	Field Strength (T)
SI0	0.5	2.635	0.52
SI1	6.5	45	0.68
KI	5.3	1.333	0.025

end are shown in Table 3 which is the output of the subroutine SURVEY of the MAD program.

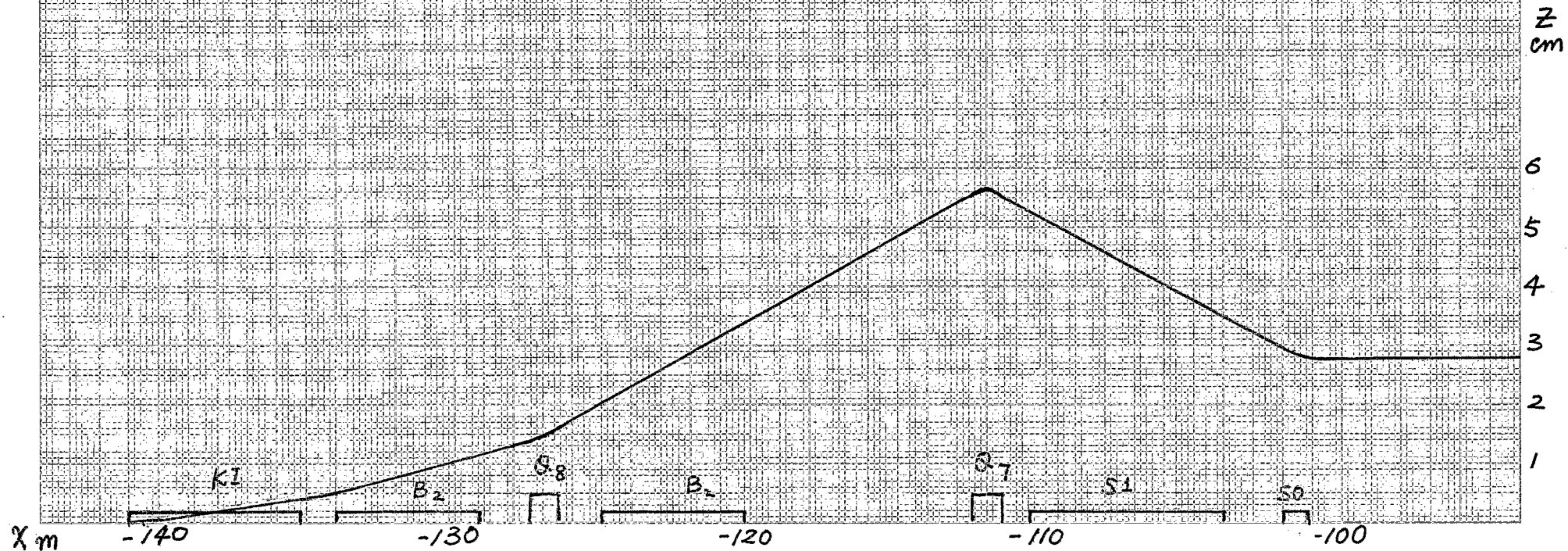
The above parameters are corresponding to the case in which the circulating beam emittance is about $20 \pi \text{mm}\cdot\text{mrad}$. So, the maximum injection beam height at Q7 and B_2 is large. If we assume a circulating beam emittance to be $6 \pi \text{mm}\cdot\text{mrad}$, then the circulating beam radius at the exist of S21 is about 16 mm, and injection beam radius 11.6 mm (where $\beta_y = 42 \text{ m}$). We select the injection beam center height at that location to be 39.4 mm (including 12.2 mm separation between beams for septum thickness and some clearance), which is corresponding to a maximum beam height 51 mm. In this case, the height of the injection beam center and its the maximum half aperture requirement at some locations are shown in Table 4.

Table 4:

	SI1 Center	SI1 Exit	Q7	B_2 Entrance
$y_{cen}(\text{mm})$	34.6	39.4	44.5	26.9
$y_{max}(\text{mm})$	44.6	51.0	57	35
half-aperture				

The elevation view of the beam centerline in this case is shown in Figure 3. The Twiss parameters, parameters of the elements and the coordinates of the elements of this case from SWM to its end are shown in Table 5, which is the output of MAD program.

Figure 1
 Vertical displacement of injected beam from median plane
 Circulating beam emittance = 20π mm-mrad



y
(m)

Figure 2

The plan view of RHIC and injected beam center lines at 6 o'clock

114

113

112

111

110

θ_9

K1

B_2

θ_8

B_2

θ_7

S1

θ_6

-140

-130

-120

-110

-100

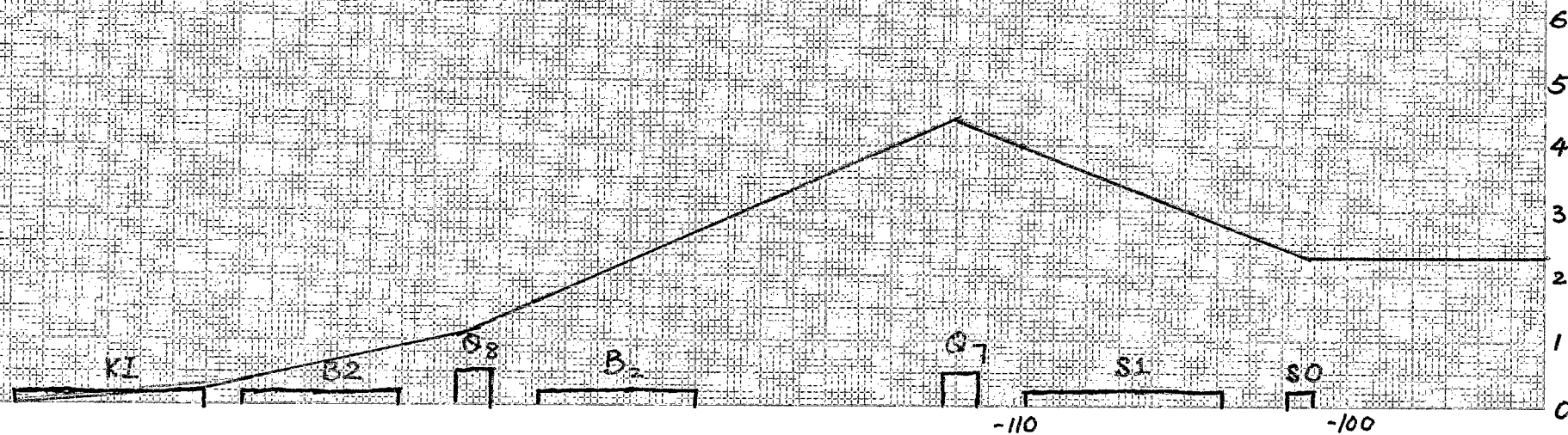
x (m)



Figure 3.

Vertical displacement of injected beam from median plane

Circulating beam emittance = $6\pi \text{ mm} \cdot \text{mrad}$



TITLE,rhic

LUKS:DRIFT,L=5.00000
 LU01:DRIFT,L=0.374005
 LU12:DRIFT,L=0.495300
 LU231:DRIFT,L=0.477256
 LU232:DRIFT,L=0.459994
 LU233:DRIFT,L=0.459994
 LU234:DRIFT,L=0.255379
 LU34:DRIFT,L=15.139416
 LU45:DRIFT,L=4.65048
 LU56:DRIFT,L=5.659624
 LU67:DRIFT,L=9.867062
 LU78:DRIFT,L=5.72644
 LU891:DRIFT,L=12.087263
 LU892:DRIFT,L=0.609600
 LU193:DRIFT,L=0.609600
 LU293:DRIFT,L=0.609600
 LU894:DRIFT,L=0.609600
 LU895:DRIFT,L=5.090476
 LU910:DRIFT,L=4.695957
 LU011:DRIFT,L=15.606874
 LU112:DRIFT,L=17.700615
 LU100:DRIFT,L=1.00
 LU150:DRIFT,L=1.50

LW01:DRIFT,L=17.524174
 LW12:DRIFT,L=14.051700
 LW231:DRIFT,L=6.111450
 LW232:DRIFT,L=6.111450
 LW34:DRIFT,L=14.0517
 LW45:DRIFT,L=14.0517
 LW56:DRIFT,L=14.0517
 LW67:DRIFT,L=14.0517
 LW78:DRIFT,L=14.0517

LV01:DRIFT,L=13.972064
 LV12:DRIFT,L=14.457299
 LV231:DRIFT,L=8.214856
 LV232:DRIFT,L=5.991919
 LV34:DRIFT,L=14.072442
 LV45:DRIFT,L=19.581019
 LV56:DRIFT,L=18.138067
 LV60:DRIFT,L=0.532168

L112:DRIFT,L=9.955836
 L113:DRIFT,L=4.624169
 L114:DRIFT,L=1.284570
 LH0L:DRIFT,L=0.715
 LOS:DRIFT,L=0.45000
 LHALL:DRIFT,L=0.504

LM121:DRIFT,L=.75
 LM122:DRIFT,L=.59
 LM231:DRIFT,L=.59
 LM232:DRIFT,L=.55
 LM341:DRIFT,L=.55
 LM342:DRIFT,L=.517
 LM451:DRIFT,L=.517
 LM452:DRIFT,L=1.07

LM150:DRIFT,L=1.5
LM561:DRIFT,L=1.47
LM562:DRIFT,L=2.718
LM782:DRIFT,L=.564
L0782:DRIFT,L=1.04
L0891:DRIFT,L=1.0
L0893:DRIFT,L=0.50
LM22:DRIFT,L=1.0
LM10:DRIFT,L=.564
LM1:DRIFT,L=.10
OL2:DRIFT,L=2.036
OL1:DRIFT,L=1.379
OB1:DRIFT,L=7.462
SA:MONITOR,L=0.00

UQ1:QUADRUPOLE,TYPE=MQ,L=0.9525,K1=0.3311532
UQ2:QUADRUPOLE,TYPE=MQ,L=0.9525,K1=-0.3796831
UQ3:QUADRUPOLE,TYPE=MQ,L=0.4572,K1=0.1751061
UQ4:QUADRUPOLE,TYPE=MQ,L=1.00,K1=-0.1488568
UQ5:QUADRUPOLE,TYPE=MQ,L=1.00,K1=0.1343706
UQ6:QUADRUPOLE,TYPE=MQ,L=.72644,K1=-.1115799
UQ7:QUADRUPOLE,TYPE=MQ,L=1.0,K1=.1202912
UQ8:QUADRUPOLE,TYPE=MQ,L=1.00,K1=-.1142795
UQ9:QUADRUPOLE,TYPE=MQ,L=0.72644,K1=.1062386
UQ10:QUADRUPOLE,TYPE=MQ,L=.726440,K1=-.09033853
UQ11:QUADRUPOLE,TYPE=MQ,L=.74,K1=-.09813880
UQ12:QUAD,TYPE=MQ,L=0.74,K1=.1159954

VQ1D:QUAD,TYPE=VQ,L=0.740000,K1=-0.1116851
VQ2F:QUAD,TYPE=VQ,L=0.740000,K1=.1178700
VQ3D:QUAD,TYPE=VQ,L=0.740000,K1=-.1266809
VQ4F:QUAD,TYPE=VQ,L=0.740000,K1=.1224162
VQ5D:QUAD,TYPE=VQ,L=0.740000,K1=-.1139264
VQ6F:QUAD,TYPE=VQ,L=0.740000,K1=.1347396

QMI1:QUAD,TYPE=Q,L=0.726,K1=.02465463
QMI2:QUAD,TYPE=Q,L=1.000,K1=.1011825
QMI3:QUAD,TYPE=Q,L=0.726,K1=-.1583411
QMI4:QUAD,TYPE=Q,L=0.726,K1=.1053285
QMI5:QUAD,TYPE=Q,L=0.726,k1=.08982922
QMI6:QUAD,TYPE=Q,L=.726,K1=-.1415044
QMI7:QUAD,TYPE=Q,L=0.726,K1=.1488638

Q80:RBEND,L=0.565,ANGLE=-.754E-3,K1=-0.087007,TILT
Q90:QUAD,L=0.565,K1=-0.0866054
Q70:RBEND,L=.565,K1=0.0866054,ANGLE=2.74E-3,TILT
UD1:RBEND,TYPE=UD,L=2.080006,ANGLE=24.725E-3
UD2:RBEND,TYPE=UD,L=2.080006,ANGLE=24.725E-3
UD3:RBEND,TYPE=UD,L=2.080006,ANGLE=24.725E-3

U4F:RBEND,TYPE=UD8F,L=3.657600,ANGLE=34.906E-3,K1=0.018823143
U5D:RBEND,TYPE=UD8D,L=3.657600,ANGLE=34.906E-3,K1=-0.018823143
U6D:RBEND,TYPE=UD8D,L=3.657600,ANGLE=34.906E-3,K1=-0.018823143
U7F:RBEND,TYPE=UD8F,L=3.657600,ANGLE=34.906E-3,K1=0.018823143

W1D:RBEND,TYPE=WDD,L=3.657600,ANGLE=43.633E-3,K1=-0.023528529
W2F:RBEND,TYPE=WDF,L=3.657600,ANGLE=43.633E-3,K1=0.023528529
W3D:RBEND,TYPE=WDD,L=3.657600,ANGLE=43.633E-3,K1=-0.023528529

W4F:RBEND,TYPE=WDF,L=3.657600,ANGLE=43.633E-3,K1=0.023528529
W5D:RBEND,TYPE=WDD,L=3.657600,ANGLE=43.633E-3,K1=-0.023528529
W6F:RBEND,TYPE=WDF,L=3.657600,ANGLE=43.633E-3,K1=0.023528529
W7D:RBEND,TYPE=WDD,L=3.657600,ANGLE=43.633E-3,K1=-0.023528529
W8F:RBEND,TYPE=WDF,L=3.657600,ANGLE=43.633E-3,K1=0.023528529
WP1:RBEND,TYPE=WD,L=1.828800,ANGLE=12.858E-3,TILT
WP2:RBEND,TYPE=WD,L=1.828800,ANGLE=-12.858E-3,TILT

SWM:RBEND,TYPE=WD,L=3.65726099,ANGLE=47.165E-3

G1D:RBEND,TYPE=GDD,L=3.65726099,ANGLE=47.419E-3,K1=-0.0380886
G2F:RBEND,TYPE=GDF2,L=2.946220867,ANGLE=38.199E-3,K1=0.0380886
GD:RBEND,TYPE=GDD,L=3.65726099,ANGLE=47.719E-3,K1=-0.0380886
GF:RBEND,TYPE=GDF,L=3.65726099,ANGLE=47.719E-3,K1=0.0380886

BMI:RBEND,TYPE=MD,L=2.946111148,ANGLE=42.084464E-3
SI0:RBEND,TYPE=SD,L=0.5,ANGLE=-2.635E-3,TILT
SI1:RBEND,TYPE=SD,L=6.5,ANGLE=45E-3
SI2:RBEND,TYPE=SD,L=0.5,ANGLE=2.8E-3,TILT
KI:RBEND,L=5.305,ANGLE=-1.3330E-3,TILT
B2:RBEND,L=4.84,ANGLE=-19.121842E-3

U1:LINE=(LUKS,LU01,UQ1,LU12,UQ2,LU231,UD1,LU232,UD2,LU233,UD3,&
LU234,UQ3,LU34,UQ4,LU45,UQ5,LU56,3*LU100,SA,LU100,LU150,&
UQ6,LU67,UQ7,LU78,UQ8,LU891)
U2:LINE=(U4F,LU892,U5D,LU193,LU293,U6D,LU894,U7F,LU895,&
UQ9,LU910,UQ10,LU011,UQ11,LU112,UQ12)

U:LINE=(U1,U2)

W:LINE=(LW01,W1D,LW12,W2F,LW231,WP1,LW232,W3D,LW34,W4F,LW45,&
W5D,LW56,W6F,LW67,W7D,LW78,W8F)

V1:LINE=(LV01,VQ1D,LV12,VQ2F,LV231,WP2)
V2:LINE=(LV232,VQ3D,LV34,VQ4F,LV45,VQ5D,LV56,VQ6F,LV60)
PF:LINE=(LH0L,GF,LOS,GD,LH0L)
PD:LINE=(LH0L,GD,LOS,GF,LH0L)
PERIOD:LINE=(PF,PD)
Q:LINE=(SWM,L112,G1D,L113,G2F,L114,5*PERIOD,PF,LH0L,GD,LOS,GF,LHALL)

M1:LINE=(QMI1,LM121,BMI,LM122,QMI2,LM231,BMI,LM232,QMI3,LM1,QMI3,LM341,BMI,&
LM342,QMI4,LM1,QMI4,LM451,BMI)
M2:LINE=(LM452,QMI5,LM561,BMI,LM562,QMI6,LM1,QMI6,LM22,SI0,LM10,QMI7,LM1,QMI7,&
LM782,SI1,L0782,Q70,Q70,OB1,B2,OL1,Q80,Q80,OL2,B2,L0891,KI,L0893,Q90)
QM:LINE=(Q,M1,M2)
UWV:LINE=(U,W,V1,V2)
RHIC:LINE=(U,W,V1,V2,Q,M1,M2)

TWISS,DELTAP=0E-3,BETX=37.59,BETY=8.05,ALFX=-4.778,ALFY=1.053,DX=-2.96,&
dPX=-0.295,DY=0,DPY=0,X=0E-4,Y=0E-4,PX=0E-4,PY=0E-4

"MAD" VERSION: 7.2/VAX RUN: 5-AUG-9 15:24:56

LINEAR LATTICE PARAMETERS FOR BEAM LINE: "RHIC", RANGE = "#S / #E"

DELTA(P)/P = 0.000000

SYMM = F

PAGE 1

ELEMENT SEQUENCE			H O R I Z O N T A L										V E R T I C A L					
POS.	ELEMENT	OCC.	DIST I	BETAX	ALFAX	MUX	X(CO)	PX(CO)	DX	DPX	I	BETAY	ALFAY	MUY	Y(CO)	PY(CO)	DY	DPY
NO.	NAME	NO.	[M]	[M]	[1]	[2PI]	[MM]	[.001]	[M]	[1]	I	[M]	[1]	[2PI]	[MM]	[.001]	[M]	[1]
BEGIN	RHIC	1	0.000	37.590	-4.778	0.000	0.000	0.000	-2.960	-0.295	8.050	1.053	0.000	0.000	0.000	0.000	0.000	0.000
BEGIN	U	1	0.000	37.590	-4.778	0.000	0.000	0.000	-2.960	-0.295	8.050	1.053	0.000	0.000	0.000	0.000	0.000	0.000

BEGIN	U1	1	0.000	37.590	-4.778	0.000	0.000	0.000	-2.960	-0.295	8.050	1.053	0.000	0.000	0.000	0.000	0.000
	1 LUKS	1	5.000	101.218	-7.948	0.013	0.000	0.000	-4.435	-0.295	4.069	-0.257	0.169	0.000	0.000	0.000	0.000
	2 LU01	1	5.374	107.252	-8.185	0.013	0.000	0.000	-4.545	-0.295	4.298	-0.355	0.183	0.000	0.000	0.000	0.000
	3 UQ1	1	6.327	91.301	23.220	0.015	0.000	0.000	-4.147	1.111	6.806	-2.537	0.213	0.000	0.000	0.000	0.000
	4 LU12	1	6.822	69.750	20.289	0.016	0.000	0.000	-3.593	1.111	9.587	-3.078	0.223	0.000	0.000	0.000	0.000
	5 UQ2	1	7.774	54.520	-2.504	0.019	0.000	0.000	-3.113	-0.068	12.136	0.716	0.236	0.000	0.000	0.000	0.000
	6 LU231	1	8.252	56.940	-2.567	0.020	0.000	0.000	-3.146	-0.068	11.480	0.657	0.242	0.000	0.000	0.000	0.000
	7 UD1	1	10.332	68.196	-2.845	0.025	0.000	0.000	-3.262	-0.044	9.281	0.400	0.275	0.000	0.000	0.000	0.000
	8 LU232	1	10.792	70.841	-2.906	0.026	0.000	0.000	-3.283	-0.044	8.939	0.343	0.283	0.000	0.000	0.000	0.000
	9 UD2	1	12.872	83.505	-3.183	0.031	0.000	0.000	-3.348	-0.019	8.049	0.085	0.322	0.000	0.000	0.000	0.000
	10 LU233	1	13.332	86.462	-3.245	0.031	0.000	0.000	-3.356	-0.019	7.998	0.027	0.331	0.000	0.000	0.000	0.000
	11 UD3	1	15.412	100.535	-3.522	0.035	0.000	0.000	-3.370	0.006	8.420	-0.230	0.372	0.000	0.000	0.000	0.000
	12 LU234	1	15.667	102.343	-3.556	0.035	0.000	0.000	-3.369	0.006	8.546	-0.262	0.377	0.000	0.000	0.000	0.000
	13 UQ3	1	16.124	101.842	4.637	0.036	0.000	0.000	-3.304	0.274	9.135	-1.041	0.385	0.000	0.000	0.000	0.000
	14 LU34	1	31.264	12.084	1.292	0.107	0.000	0.000	0.840	0.274	92.974	-4.496	0.472	0.000	0.000	0.000	0.000
	15 UQ4	1	32.264	11.358	-0.530	0.121	0.000	0.000	1.184	0.422	88.151	9.078	0.474	0.000	0.000	0.000	0.000
	16 LU45	1	36.914	18.725	-1.054	0.173	0.000	0.000	3.148	0.422	24.182	4.678	0.490	0.000	0.000	0.000	0.000
	17 UQ5	1	37.914	18.353	1.410	0.181	0.000	0.000	3.352	-0.019	18.353	1.410	0.498	0.000	0.000	0.000	0.000
	18 LU56	1	43.574	7.606	0.489	0.261	0.000	0.000	3.243	-0.019	7.606	0.489	0.577	0.000	0.000	0.000	0.000
	19 LU100	1	44.574	6.792	0.326	0.283	0.000	0.000	3.224	-0.019	6.791	0.326	0.599	0.000	0.000	0.000	0.000
	20 LU100	2	45.574	6.303	0.163	0.307	0.000	0.000	3.205	-0.019	6.303	0.163	0.624	0.000	0.000	0.000	0.000
	21 LU100	3	46.574	6.140	0.000	0.333	0.000	0.000	3.186	-0.019	6.140	0.000	0.650	0.000	0.000	0.000	0.000
	22 SA	1	46.574	6.140	0.000	0.333	0.000	0.000	3.186	-0.019	6.140	0.000	0.650	0.000	0.000	0.000	0.000
	23 LU100	4	47.574	6.303	-0.163	0.359	0.000	0.000	3.167	-0.019	6.303	-0.163	0.675	0.000	0.000	0.000	0.000
	24 LU150	1	49.074	7.158	-0.407	0.394	0.000	0.000	3.138	-0.019	7.158	-0.407	0.711	0.000	0.000	0.000	0.000
	25 UQ6	1	49.800	8.291	-1.182	0.410	0.000	0.000	3.216	0.237	7.398	0.084	0.727	0.000	0.000	0.000	0.000
	26 LU67	1	59.667	59.783	-4.036	0.483	0.000	0.000	5.555	0.237	18.998	-1.259	0.883	0.000	0.000	0.000	0.000
	27 UQ7	1	60.667	60.593	3.258	0.485	0.000	0.000	5.457	-0.432	24.243	-4.195	0.891	0.000	0.000	0.000	0.000
	28 LU78	1	66.394	29.563	2.160	0.507	0.000	0.000	2.983	-0.432	97.445	-8.588	0.910	0.000	0.000	0.000	0.000
	29 UQ8	1	67.394	28.614	-1.175	0.513	0.000	0.000	2.715	-0.110	103.363	2.898	0.911	0.000	0.000	0.000	0.000
	30 LU891	1	79.481	69.180	-2.181	0.556	0.000	0.000	1.391	-0.110	46.591	1.799	0.939	0.000	0.000	0.000	0.000
END	U1	1	79.481	69.180	-2.181	0.556	0.000	0.000	1.391	-0.110	46.591	1.799	0.939	0.000	0.000	0.000	0.000
BEGIN	U2	1	79.481	69.180	-2.181	0.556	0.000	0.000	1.391	-0.110	46.591	1.799	0.939	0.000	0.000	0.000	0.000
	31 U4F	1	83.138	67.600	2.576	0.564	0.000	0.000	0.898	-0.154	45.123	-1.365	0.952	0.000	0.000	0.000	0.000
	32 LU892	1	83.748	64.501	2.507	0.566	0.000	0.000	0.804	-0.154	46.811	-1.403	0.954	0.000	0.000	0.000	0.000
	33 U5D	1	87.406	62.222	-1.832	0.576	0.000	0.000	0.384	-0.080	45.333	1.773	0.967	0.000	0.000	0.000	0.000
	34 LU193	1	88.015	64.482	-1.875	0.577	0.000	0.000	0.335	-0.080	43.206	1.717	0.969	0.000	0.000	0.000	0.000
	35 LU293	1	88.625	66.794	-1.918	0.579	0.000	0.000	0.287	-0.080	41.147	1.661	0.971	0.000	0.000	0.000	0.000
	36 U6D	1	92.282	102.593	-8.680	0.586	0.000	0.000	0.083	-0.033	22.502	2.998	0.989	0.000	0.000	0.000	0.000
	37 LU894	1	92.892	113.452	-9.134	0.587	0.000	0.000	0.063	-0.033	19.012	2.727	0.994	0.000	0.000	0.000	0.000
	38 U7F	1	96.550	152.484	-0.628	0.591	0.000	0.000	0.000	0.000	7.181	0.772	1.047	0.000	0.000	0.000	0.000
	39 LU895	1	101.640	159.120	-0.675	0.596	0.000	0.000	0.000	0.000	5.079	-0.359	1.207	0.000	0.000	0.000	0.000
	40 UQ9	1	102.367	151.314	11.219	0.597	0.000	0.000	0.000	0.000	6.030	-0.975	1.228	0.000	0.000	0.000	0.000
	41 LU910	1	107.063	64.434	7.282	0.605	0.000	0.000	0.000	0.000	22.319	-2.494	1.294	0.000	0.000	0.000	0.000
	42 UQ10	1	107.789	57.085	2.994	0.606	0.000	0.000	0.000	0.000	24.949	-1.069	1.299	0.000	0.000	0.000	0.000
	43 LU011	1	123.396	6.144	0.270	0.763	0.000	0.000	0.000	0.000	79.222	-2.409	1.356	0.000	0.000	0.000	0.000
	44 UQ11	1	124.136	6.164	-0.297	0.783	0.000	0.000	0.000	0.000	78.525	3.334	1.358	0.000	0.000	0.000	0.000
	45 LU112	1	141.836	71.999	-3.422	0.941	0.000	0.000	0.000	0.000	8.841	0.603	1.475	0.000	0.000	0.000	0.000
	46 UQ12	1	142.576	72.470	2.800	0.943	0.000	0.000	0.000	0.000	8.570	-0.229	1.488	0.000	0.000	0.000	0.000
END	U2	1	142.576	72.470	2.800	0.943	0.000	0.000	0.000	0.000	8.570	-0.229	1.488	0.000	0.000	0.000	0.000
END	U	1	142.576	72.470	2.800	0.943	0.000	0.000	0.000	0.000	8.570	-0.229	1.488	0.000	0.000	0.000	0.000
BEGIN	W	1	142.576	72.470	2.800	0.943	0.000	0.000	0.000	0.000	8.570	-0.229	1.488	0.000	0.000	0.000	0.000
	47 LW01	1	160.101	11.795	0.662	1.045	0.000	0.000	0.000	0.000	54.312	-2.381	1.639	0.000	0.000	0.000	0.000
	48 W1D	1	163.758	11.797	-0.663	1.098	0.000	0.000	0.082	0.046	54.303	2.383	1.650	0.000	0.000	0.000	0.000
	49 LW12	1	177.810	54.521	-2.378	1.192	0.000	0.000	0.727	0.046	11.613	0.655	1.744	0.000	0.000	0.000	0.000
	50 W2F	1	181.468	54.515	2.379	1.202	0.000	0.000	0.853	0.021	11.613	-0.655	1.798	0.000	0.000	0.000	0.000
	51 LW231	1	187.579	29.998	1.632	1.226	0.000	0.000	0.981	0.021	24.209	-1.406	1.857	0.000	0.000	0.000	0.000
	52 WP1	1	189.408	24.432	1.411	1.237	0.000	0.000	1.019	0.021	29.764	-1.631	1.868	0.000	0.000	0.012	0.013
	53 LW232	1	195.519	11.756	0.663	1.295	0.000	0.000	1.146	0.021	54.299	-2.383	1.892	0.000	0.000	0.090	0.013
	54 W3D	1	199.177	11.746	-0.660	1.349	0.000	0.000	1.493	0.174	54.308	2.381	1.903	0.000	0.000	0.121	0.003

55	LW34	1	213.229	54.427	-2.377	1.442	0.000	0.000	3.939	0.174	11.641	0.655	1.997	0.000	0.000	0.170	0.003
56	W4F	1	216.886	54.448	2.372	1.452	0.000	0.000	4.017	-0.133	11.641	-0.655	2.051	0.000	0.000	0.210	0.019
57	LW45	1	230.938	11.816	0.662	1.546	0.000	0.000	2.150	-0.133	54.307	-2.381	2.145	0.000	0.000	0.481	0.019
58	W5D	1	234.595	11.826	-0.665	1.599	0.000	0.000	2.068	0.087	54.298	2.383	2.155	0.000	0.000	0.474	-0.023
59	LW56	1	248.647	54.584	-2.378	1.692	0.000	0.000	3.285	0.087	11.613	0.655	2.250	0.000	0.000	0.148	-0.023
60	W6F	1	252.305	54.562	2.383	1.702	0.000	0.000	3.160	-0.153	11.613	-0.655	2.304	0.000	0.000	0.083	-0.014
61	LW67	1	266.356	11.756	0.663	1.796	0.000	0.000	1.003	-0.153	54.304	-2.383	2.398	0.000	0.000	-0.107	-0.014
62	W7D	1	270.014	11.746	-0.660	1.849	0.000	0.000	0.656	-0.041	54.313	2.381	2.408	0.000	0.000	-0.138	-0.003
63	LW78	1	284.066	54.427	-2.377	1.943	0.000	0.000	0.076	-0.041	11.642	0.656	2.503	0.000	0.000	-0.175	-0.003
64	W8F	1	287.723	54.449	2.372	1.953	0.000	0.000	-0.002	0.000	11.641	-0.655	2.556	0.000	0.000	-0.213	-0.019
END	W	1	287.723	54.449	2.372	1.953	0.000	0.000	-0.002	0.000	11.641	-0.655	2.556	0.000	0.000	-0.213	-0.019
BEGIN	V1	1	287.723	54.449	2.372	1.953	0.000	0.000	-0.002	0.000	11.641	-0.655	2.556	0.000	0.000	-0.213	-0.019
65	LV01	1	301.695	11.922	0.672	2.045	0.000	0.000	0.002	0.000	53.924	-2.371	2.650	0.000	0.000	-0.476	-0.019
66	VQ1D	1	302.435	11.700	-0.364	2.055	0.000	0.000	0.002	0.000	54.126	2.103	2.653	0.000	0.000	-0.475	0.021
67	LV12	1	316.893	42.472	-1.764	2.168	0.000	0.000	0.007	0.000	14.257	0.655	2.740	0.000	0.000	-0.176	0.021
68	VQ2F	1	317.633	42.341	1.937	2.170	0.000	0.000	0.007	0.000	14.242	-0.634	2.748	0.000	0.000	-0.166	0.006
69	LV231	1	325.848	18.087	1.015	2.218	0.000	0.000	0.005	0.000	31.306	-1.443	2.812	0.000	0.000	-0.118	0.006
70	WP2	1	327.676	14.747	0.811	2.236	0.000	0.000	0.005	0.000	36.914	-1.623	2.820	0.000	0.000	-0.119	-0.007
END	V1	1	327.676	14.747	0.811	2.236	0.000	0.000	0.005	0.000	36.914	-1.623	2.820	0.000	0.000	-0.119	-0.007
BEGIN	V2	1	327.676	14.747	0.811	2.236	0.000	0.000	0.005	0.000	36.914	-1.623	2.820	0.000	0.000	-0.119	-0.007
71	LV232	1	333.668	9.063	0.137	2.323	0.000	0.000	0.003	0.000	59.899	-2.213	2.841	0.000	0.000	-0.161	-0.007
72	VQ3D	1	334.408	9.556	-0.820	2.336	0.000	0.000	0.003	0.000	59.017	3.377	2.842	0.000	0.000	-0.161	0.008
73	LV34	1	348.481	67.262	-3.281	2.429	0.000	0.000	0.003	0.000	5.597	0.420	2.983	0.000	0.000	-0.046	0.008
74	VQ4F	1	349.221	67.589	2.850	2.431	0.000	0.000	0.003	0.000	5.449	-0.215	3.005	0.000	0.000	-0.041	0.004
75	LV45	1	368.802	7.729	0.207	2.595	0.000	0.000	-0.002	0.000	87.512	-3.976	3.182	0.000	0.000	0.042	0.004
76	VQ5D	1	369.542	7.977	-0.549	2.610	0.000	0.000	-0.002	0.000	87.910	3.449	3.183	0.000	0.000	0.044	0.001
77	LV56	1	387.680	81.598	-3.510	2.736	0.000	0.000	-0.011	0.000	11.056	0.788	3.282	0.000	0.000	0.055	0.001
78	VQ6F	1	388.420	80.753	4.622	2.737	0.000	0.000	-0.011	0.001	10.750	-0.364	3.293	0.000	0.000	0.058	0.006
79	LV60	1	388.952	75.912	4.475	2.738	0.000	0.000	-0.011	0.001	11.167	-0.420	3.301	0.000	0.000	0.061	0.006
END	V2	1	388.952	75.912	4.475	2.738	0.000	0.000	-0.011	0.001	11.167	-0.420	3.301	0.000	0.000	0.061	0.006
BEGIN	Q	1	388.952	75.912	4.475	2.738	0.000	0.000	-0.011	0.001	11.167	-0.420	3.301	0.000	0.000	0.061	0.006
80	SWM	1	392.609	46.894	3.462	2.748	0.000	0.000	0.078	0.048	15.618	-0.796	3.346	0.000	0.000	0.083	0.006
81	L112	1	402.565	5.405	0.705	2.856	0.000	0.000	0.554	0.048	41.833	-1.837	3.409	0.000	0.000	0.144	0.006
82	G1D	1	406.222	5.941	-0.876	2.979	0.000	0.000	0.982	0.196	34.320	3.528	3.423	0.000	0.000	0.130	-0.014
83	L113	1	410.847	20.401	-2.251	3.048	0.000	0.000	1.888	0.196	10.069	1.716	3.463	0.000	0.000	0.065	-0.014
84	G2F	1	413.793	27.202	0.203	3.067	0.000	0.000	2.185	0.000	5.071	0.162	3.535	0.000	0.000	0.033	-0.009
85	L114	1	415.077	26.744	0.153	3.075	0.000	0.000	2.185	0.000	4.989	-0.098	3.576	0.000	0.000	0.022	-0.009
BEGIN	PERIOD	1	415.077	26.744	0.153	3.075	0.000	0.000	2.185	0.000	4.989	-0.098	3.576	0.000	0.000	0.022	-0.009
BEGIN	PF	1	415.077	26.744	0.153	3.075	0.000	0.000	2.185	0.000	4.989	-0.098	3.576	0.000	0.000	0.022	-0.009
86	LHOL	1	415.792	26.544	0.126	3.079	0.000	0.000	2.185	0.000	5.232	-0.243	3.598	0.000	0.000	0.016	-0.009
87	GF	1	419.450	14.958	2.486	3.106	0.000	0.000	1.736	-0.235	14.005	-2.547	3.675	0.000	0.000	-0.013	-0.008
88	LOS	1	419.900	12.818	2.270	3.111	0.000	0.000	1.630	-0.235	16.406	-2.788	3.680	0.000	0.000	-0.017	-0.008
89	GD	1	423.557	5.281	0.131	3.191	0.000	0.000	1.219	0.001	29.485	-0.155	3.704	0.000	0.000	-0.041	-0.004
90	LHOL	2	424.272	5.192	-0.007	3.213	0.000	0.000	1.219	0.001	29.725	-0.180	3.708	0.000	0.000	-0.044	-0.004
END	PF	1	424.272	5.192	-0.007	3.213	0.000	0.000	1.219	0.001	29.725	-0.180	3.708	0.000	0.000	-0.044	-0.004
BEGIN	PD	1	424.272	5.192	-0.007	3.213	0.000	0.000	1.219	0.001	29.725	-0.180	3.708	0.000	0.000	-0.044	-0.004
91	LHOL	3	424.987	5.301	-0.145	3.235	0.000	0.000	1.220	0.001	30.000	-0.205	3.712	0.000	0.000	-0.047	-0.004
92	GD	2	428.644	12.989	-2.304	3.314	0.000	0.000	1.639	0.238	18.523	2.788	3.735	0.000	0.000	-0.049	0.003
93	LOS	2	429.094	15.161	-2.523	3.320	0.000	0.000	1.746	0.238	16.110	2.574	3.739	0.000	0.000	-0.048	0.003
94	GF	2	432.751	26.912	-0.126	3.346	0.000	0.000	2.201	0.000	7.358	0.209	3.798	0.000	0.000	-0.049	-0.004
95	LHOL	4	433.466	27.112	-0.153	3.350	0.000	0.000	2.201	0.000	7.131	0.108	3.814	0.000	0.000	-0.051	-0.004
END	PD	1	433.466	27.112	-0.153	3.350	0.000	0.000	2.201	0.000	7.131	0.108	3.814	0.000	0.000	-0.051	-0.004
END	PERIOD	1	433.466	27.112	-0.153	3.350	0.000	0.000	2.201	0.000	7.131	0.108	3.814	0.000	0.000	-0.051	-0.004
BEGIN	PERIOD	2	433.466	27.112	-0.153	3.350	0.000	0.000	2.201	0.000	7.131	0.108	3.814	0.000	0.000	-0.051	-0.004
BEGIN	PF	2	433.466	27.112	-0.153	3.350	0.000	0.000	2.201	0.000	7.131	0.108	3.814	0.000	0.000	-0.051	-0.004
96	LHOL	5	434.181	27.350	-0.180	3.355	0.000	0.000	2.201	0.000	7.050	0.006	3.830	0.000	0.000	-0.054	-0.004
97	GF	3	437.839	16.966	2.521	3.379	0.000	0.000	1.749	-0.237	13.451	-2.042	3.897	0.000	0.000	-0.082	-0.013
98	LOS	3	438.289	14.785	2.326	3.384	0.000	0.000	1.642	-0.237	15.367	-2.215	3.902	0.000	0.000	-0.088	-0.013
99	GD	3	441.946	7.133	0.111	3.447	0.000	0.000	1.226	0.000	24.300	0.205	3.930	0.000	0.000	-0.108	0.002
100	LHOL	6	442.661	7.047	0.009	3.463	0.000	0.000	1.227	0.000	24.029	0.174	3.935	0.000	0.000	-0.107	0.002

END	PF	2	442.661	7.047	0.009	3.463	0.000	0.000	1.227	0.000	24.029	0.174	3.935	0.000	0.000	-0.107	0.002
BEGIN	PD	2	442.661	7.047	0.009	3.463	0.000	0.000	1.227	0.000	24.029	0.174	3.935	0.000	0.000	-0.107	0.002
	101 LHOL	7	443.376	7.106	-0.092	3.479	0.000	0.000	1.227	0.000	23.802	0.144	3.939	0.000	0.000	-0.106	0.002
	102 GD	4	447.033	14.552	-2.279	3.543	0.000	0.000	1.645	0.238	13.318	2.216	3.970	0.000	0.000	-0.074	0.015
	103 LOS	4	447.483	16.690	-2.471	3.548	0.000	0.000	1.752	0.238	11.414	2.016	3.975	0.000	0.000	-0.067	0.015
	104 GF	4	451.140	26.850	0.181	3.573	0.000	0.000	2.207	0.000	4.994	0.026	4.064	0.000	0.000	-0.026	0.009
	105 LHOL	8	451.855	26.611	0.153	3.577	0.000	0.000	2.207	0.000	5.059	-0.117	4.086	0.000	0.000	-0.019	0.009
END	PD	2	451.855	26.611	0.153	3.577	0.000	0.000	2.207	0.000	5.059	-0.117	4.086	0.000	0.000	-0.019	0.009
END	PERIOD	2	451.855	26.611	0.153	3.577	0.000	0.000	2.207	0.000	5.059	-0.117	4.086	0.000	0.000	-0.019	0.009
BEGIN	PERIOD	3	451.855	26.611	0.153	3.577	0.000	0.000	2.207	0.000	5.059	-0.117	4.086	0.000	0.000	-0.019	0.009
BEGIN	PF	3	451.855	26.611	0.153	3.577	0.000	0.000	2.207	0.000	5.059	-0.117	4.086	0.000	0.000	-0.019	0.009
	106 LHOL	9	452.570	26.412	0.126	3.582	0.000	0.000	2.207	0.000	5.329	-0.261	4.108	0.000	0.000	-0.013	0.009
	107 GF	5	456.228	14.887	2.472	3.609	0.000	0.000	1.751	-0.238	14.308	-2.595	4.184	0.000	0.000	0.018	0.009
	108 LOS	5	456.678	12.758	2.257	3.614	0.000	0.000	1.644	-0.238	16.753	-2.838	4.188	0.000	0.000	0.022	0.009
	109 GD	5	460.335	5.276	0.126	3.694	0.000	0.000	1.224	-0.001	30.004	-0.144	4.212	0.000	0.000	0.047	0.004
	110 LHOL	10	461.050	5.194	-0.012	3.716	0.000	0.000	1.223	-0.001	30.227	-0.168	4.216	0.000	0.000	0.050	0.004
END	PF	3	461.050	5.194	-0.012	3.716	0.000	0.000	1.223	-0.001	30.227	-0.168	4.216	0.000	0.000	0.050	0.004
BEGIN	PD	3	461.050	5.194	-0.012	3.716	0.000	0.000	1.223	-0.001	30.227	-0.168	4.216	0.000	0.000	0.050	0.004
	111 LHOL	11	461.765	5.310	-0.150	3.738	0.000	0.000	1.223	-0.001	30.484	-0.192	4.220	0.000	0.000	0.053	0.004
	112 GD	6	465.422	13.053	-2.316	3.817	0.000	0.000	1.635	0.236	18.726	2.838	4.242	0.000	0.000	0.053	-0.004
	113 LOS	6	465.872	15.236	-2.536	3.822	0.000	0.000	1.741	0.236	16.270	2.620	4.246	0.000	0.000	0.051	-0.004
	114 GF	6	469.529	27.045	-0.126	3.849	0.000	0.000	2.191	0.000	7.310	0.229	4.306	0.000	0.000	0.050	0.003
	115 LHOL	12	470.244	27.245	-0.153	3.853	0.000	0.000	2.191	0.000	7.055	0.126	4.321	0.000	0.000	0.052	0.003
END	PD	3	470.244	27.245	-0.153	3.853	0.000	0.000	2.191	0.000	7.055	0.126	4.321	0.000	0.000	0.052	0.003
END	PERIOD	3	470.244	27.245	-0.153	3.853	0.000	0.000	2.191	0.000	7.055	0.126	4.321	0.000	0.000	0.052	0.003
BEGIN	PERIOD	4	470.244	27.245	-0.153	3.853	0.000	0.000	2.191	0.000	7.055	0.126	4.321	0.000	0.000	0.052	0.003
BEGIN	PF	4	470.244	27.245	-0.153	3.853	0.000	0.000	2.191	0.000	7.055	0.126	4.321	0.000	0.000	0.052	0.003
	116 LHOL	13	470.959	27.483	-0.180	3.857	0.000	0.000	2.190	0.000	6.948	0.023	4.338	0.000	0.000	0.055	0.003
	117 GF	7	474.617	17.037	2.534	3.882	0.000	0.000	1.738	-0.236	13.151	-1.996	4.406	0.000	0.000	0.081	0.012
	118 LOS	7	475.067	14.845	2.338	3.886	0.000	0.000	1.632	-0.236	15.024	-2.167	4.411	0.000	0.000	0.086	0.012
	119 GD	7	478.724	7.138	0.116	3.949	0.000	0.000	1.216	0.000	23.798	0.192	4.440	0.000	0.000	0.106	-0.002
	120 LHOL	14	479.439	7.045	0.014	3.965	0.000	0.000	1.216	0.000	23.546	0.161	4.444	0.000	0.000	0.104	-0.002
END	PF	4	479.439	7.045	0.014	3.965	0.000	0.000	1.216	0.000	23.546	0.161	4.444	0.000	0.000	0.104	-0.002
BEGIN	PD	4	479.439	7.045	0.014	3.965	0.000	0.000	1.216	0.000	23.546	0.161	4.444	0.000	0.000	0.104	-0.002
	121 LHOL	15	480.154	7.097	-0.087	3.982	0.000	0.000	1.216	0.000	23.338	0.130	4.449	0.000	0.000	0.103	-0.002
	122 GD	8	483.811	14.489	-2.267	4.046	0.000	0.000	1.629	0.236	13.131	2.167	4.480	0.000	0.000	0.071	-0.015
	123 LOS	8	484.261	16.615	-2.458	4.050	0.000	0.000	1.735	0.236	11.269	1.972	4.486	0.000	0.000	0.064	-0.015
	124 GF	8	487.918	26.717	0.180	4.076	0.000	0.000	2.185	0.000	5.049	0.006	4.574	0.000	0.000	0.023	-0.009
	125 LHOL	16	488.633	26.478	0.153	4.080	0.000	0.000	2.185	0.000	5.141	-0.135	4.597	0.000	0.000	0.017	-0.009
END	PD	4	488.633	26.478	0.153	4.080	0.000	0.000	2.185	0.000	5.141	-0.135	4.597	0.000	0.000	0.017	-0.009
END	PERIOD	4	488.633	26.478	0.153	4.080	0.000	0.000	2.185	0.000	5.141	-0.135	4.597	0.000	0.000	0.017	-0.009
BEGIN	PERIOD	5	488.633	26.478	0.153	4.080	0.000	0.000	2.185	0.000	5.141	-0.135	4.597	0.000	0.000	0.017	-0.009
BEGIN	PF	5	488.633	26.478	0.153	4.080	0.000	0.000	2.185	0.000	5.141	-0.135	4.597	0.000	0.000	0.017	-0.009
	126 LHOL	17	489.348	26.280	0.125	4.084	0.000	0.000	2.185	0.000	5.435	-0.277	4.618	0.000	0.000	0.010	-0.009
	127 GF	9	493.006	14.816	2.459	4.112	0.000	0.000	1.736	-0.235	14.604	-2.639	4.692	0.000	0.000	-0.022	-0.010
	128 LOS	9	493.456	12.700	2.245	4.117	0.000	0.000	1.630	-0.235	17.090	-2.885	4.696	0.000	0.000	-0.027	-0.010
	129 GD	9	497.113	5.271	0.121	4.197	0.000	0.000	1.219	0.001	30.488	-0.130	4.720	0.000	0.000	-0.053	-0.004
	130 LHOL	18	497.828	5.197	-0.017	4.219	0.000	0.000	1.220	0.001	30.690	-0.154	4.723	0.000	0.000	-0.055	-0.004
END	PF	5	497.828	5.197	-0.017	4.219	0.000	0.000	1.220	0.001	30.690	-0.154	4.723	0.000	0.000	-0.055	-0.004
BEGIN	PD	5	497.828	5.197	-0.017	4.219	0.000	0.000	1.220	0.001	30.690	-0.154	4.723	0.000	0.000	-0.055	-0.004
	131 LHOL	19	498.543	5.320	-0.155	4.241	0.000	0.000	1.220	0.001	30.927	-0.177	4.727	0.000	0.000	-0.058	-0.004
	132 GD	10	502.200	13.117	-2.329	4.320	0.000	0.000	1.639	0.238	18.897	2.885	4.749	0.000	0.000	-0.057	0.005
	133 LOS	10	502.650	15.312	-2.549	4.325	0.000	0.000	1.746	0.238	16.400	2.663	4.753	0.000	0.000	-0.055	0.005
	134 GF	10	506.308	27.178	-0.126	4.351	0.000	0.000	2.201	0.000	7.248	0.248	4.813	0.000	0.000	-0.051	-0.003
	135 LHOL	20	507.023	27.377	-0.152	4.355	0.000	0.000	2.201	0.000	6.968	0.144	4.829	0.000	0.000	-0.053	-0.003
END	PD	5	507.023	27.377	-0.152	4.355	0.000	0.000	2.201	0.000	6.968	0.144	4.829	0.000	0.000	-0.053	-0.003
END	PERIOD	5	507.023	27.377	-0.152	4.355	0.000	0.000	2.201	0.000	6.968	0.144	4.829	0.000	0.000	-0.053	-0.003
BEGIN	PF	6	507.023	27.377	-0.152	4.355	0.000	0.000	2.201	0.000	6.968	0.144	4.829	0.000	0.000	-0.053	-0.003
	136 LHOL	21	507.738	27.614	-0.179	4.360	0.000	0.000	2.202	0.000	6.837	0.039	4.845	0.000	0.000	-0.055	-0.003
	137 GF	11	511.395	17.107	2.548	4.384	0.000	0.000	1.749	-0.237	12.858	-1.954	4.915	0.000	0.000	-0.080	-0.012

138	LOS	11	511.845	14.903	2.351	4.389	0.000	0.000	1.642-0.237	14.692	-2.122	4.920	0.000	0.000	-0.085-0.012
139	GD	11	515.502	7.142	0.121	4.452	0.000	0.000	1.227 0.000	23.334	0.177	4.949	0.000	0.000	-0.103 0.002
140	LHOL	22	516.217	7.042	0.019	4.468	0.000	0.000	1.227 0.000	23.103	0.146	4.954	0.000	0.000	-0.101 0.002
END	PF	6	516.217	7.042	0.019	4.468	0.000	0.000	1.227 0.000	23.103	0.146	4.954	0.000	0.000	-0.101 0.002
141	LHOL	23	516.932	7.086	-0.082	4.484	0.000	0.000	1.227 0.000	22.918	0.114	4.959	0.000	0.000	-0.100 0.002
142	GD	12	520.589	14.424	-2.255	4.548	0.000	0.000	1.645 0.238	12.978	2.123	4.990	0.000	0.000	-0.068 0.014
143	LOS	12	521.039	16.538	-2.444	4.553	0.000	0.000	1.752 0.238	11.154	1.932	4.996	0.000	0.000	-0.061 0.014
144	GF	12	524.697	26.584	0.180	4.578	0.000	0.000	2.207 0.000	5.117	-0.012	5.084	0.000	0.000	-0.020 0.009
145	LHALL	1	525.201	26.412	0.160	4.581	0.000	0.000	2.207 0.000	5.178	-0.110	5.100	0.000	0.000	-0.016 0.009
END	Q	1	525.201	26.412	0.160	4.581	0.000	0.000	2.207 0.000	5.178	-0.110	5.100	0.000	0.000	-0.016 0.009
BEGIN	M1	1	525.201	26.412	0.160	4.581	0.000	0.000	2.207 0.000	5.178	-0.110	5.100	0.000	0.000	-0.016 0.009
146	QMI1	1	525.927	25.860	0.597	4.586	0.000	0.000	2.192-0.040	5.511	-0.350	5.122	0.000	0.000	-0.009 0.009
147	LM121	1	526.677	24.994	0.558	4.590	0.000	0.000	2.162-0.040	6.150	-0.502	5.142	0.000	0.000	-0.003 0.009
148	BMI	1	529.623	22.165	0.403	4.610	0.000	0.000	2.108 0.002	10.865	-1.096	5.201	0.000	0.000	0.023 0.009
149	LM122	1	530.213	21.707	0.372	4.615	0.000	0.000	2.109 0.002	12.229	-1.216	5.209	0.000	0.000	0.029 0.009
150	QMI2	1	531.213	18.939	2.302	4.622	0.000	0.000	2.006-0.207	16.318	-3.010	5.221	0.000	0.000	0.039 0.012
151	LM231	1	531.803	16.339	2.105	4.628	0.000	0.000	1.883-0.207	20.084	-3.373	5.226	0.000	0.000	0.046 0.012
152	BMI	2	534.749	6.822	1.126	4.673	0.000	0.000	1.334-0.165	45.257	-5.164	5.241	0.000	0.000	0.082 0.012
153	LM232	1	535.299	5.684	0.943	4.687	0.000	0.000	1.243-0.165	51.122	-5.500	5.243	0.000	0.000	0.089 0.012
154	QMI3	1	536.025	4.904	0.160	4.709	0.000	0.000	1.174-0.027	54.836	0.529	5.245	0.000	0.000	0.094 0.002
155	LM1	1	536.125	4.874	0.139	4.712	0.000	0.000	1.171-0.027	54.730	0.526	5.246	0.000	0.000	0.094 0.002
156	QMI3	2	536.851	5.193	-0.590	4.736	0.000	0.000	1.200 0.108	49.578	6.372	5.248	0.000	0.000	0.091-0.009
157	LM341	1	537.401	5.920	-0.733	4.752	0.000	0.000	1.259 0.108	42.822	5.911	5.250	0.000	0.000	0.086-0.009
158	BMI	3	540.347	12.486	-1.497	4.807	0.000	0.000	1.639 0.150	15.235	3.445	5.268	0.000	0.000	0.059-0.009
159	LM342	1	540.864	14.104	-1.631	4.813	0.000	0.000	1.717 0.150	11.898	3.009	5.274	0.000	0.000	0.054-0.009
160	QMI4	1	541.590	15.751	-0.596	4.821	0.000	0.000	1.777 0.016	8.492	1.769	5.286	0.000	0.000	0.049-0.005
161	LM1	2	541.690	15.871	-0.604	4.822	0.000	0.000	1.779 0.016	8.144	1.720	5.288	0.000	0.000	0.049-0.005
162	QMI4	2	542.416	15.896	-0.570	4.829	0.000	0.000	1.741-0.119	6.274	0.902	5.304	0.000	0.000	0.046-0.002
163	LM451	1	542.933	15.329	0.527	4.835	0.000	0.000	1.679-0.119	5.418	0.753	5.318	0.000	0.000	0.045-0.002
164	BMI	4	545.879	12.946	0.282	4.868	0.000	0.000	1.390-0.077	3.486	-0.098	5.437	0.000	0.000	0.041-0.002
END	M1	1	545.879	12.946	0.282	4.868	0.000	0.000	1.390-0.077	3.486	-0.098	5.437	0.000	0.000	0.041-0.002
BEGIN	M2	1	545.879	12.946	0.282	4.868	0.000	0.000	1.390-0.077	3.486	-0.098	5.437	0.000	0.000	0.041-0.002
165	LM452	1	546.949	12.438	0.193	4.882	0.000	0.000	1.307-0.077	4.027	-0.408	5.483	0.000	0.000	0.039-0.002
166	QMI5	1	547.675	11.631	0.902	4.891	0.000	0.000	1.220-0.160	4.986	-0.935	5.509	0.000	0.000	0.039 0.001
167	LM561	1	549.145	9.316	0.673	4.914	0.000	0.000	0.985-0.160	8.546	-1.487	5.545	0.000	0.000	0.040 0.001
168	BMI	5	552.091	6.707	0.213	4.974	0.000	0.000	0.576-0.118	20.547	-2.583	5.581	0.000	0.000	0.042 0.001
169	LM562	1	554.809	6.698	-0.210	5.041	0.000	0.000	0.255-0.118	37.344	-3.597	5.596	0.000	0.000	0.045 0.001
170	QMI6	1	555.535	7.615	-1.084	5.057	0.000	0.000	0.178-0.096	39.787	0.317	5.599	0.000	0.000	0.044-0.004
171	LM1	3	555.635	7.835	-1.113	5.059	0.000	0.000	0.168-0.096	39.724	0.314	5.600	0.000	0.000	0.043-0.004
172	QMI6	2	556.361	10.285	-2.346	5.072	0.000	0.000	0.104-0.082	36.415	4.130	5.603	0.000	0.000	0.039-0.008
173	LM22	1	557.361	15.610	-2.979	5.085	0.000	0.000	0.022-0.082	28.650	3.634	5.608	0.000	0.000	0.031-0.008
174	SI0	1	557.861	18.747	-3.295	5.090	0.000	0.000	-0.019-0.082	25.140	3.386	5.611	0.000	0.000	0.026-0.011
175	LM10	1	558.425	22.665	-3.651	5.094	0.000	0.000	-0.065-0.082	21.478	3.107	5.615	0.000	0.000	0.020-0.011
176	QMI7	1	559.151	26.286	-1.205	5.099	0.000	0.000	-0.121-0.072	18.725	0.783	5.620	0.000	0.000	0.013-0.009
177	LM1	4	559.251	26.528	-1.215	5.099	0.000	0.000	-0.128-0.072	18.569	0.775	5.621	0.000	0.000	0.013-0.009
178	QMI7	2	559.977	26.221	1.626	5.104	0.000	0.000	-0.175-0.055	18.927	-1.280	5.628	0.000	0.000	0.007-0.008
179	LM782	1	560.541	24.431	1.548	5.107	0.000	0.000	-0.206-0.055	20.415	-1.358	5.632	0.000	0.000	0.002-0.008
180	SI1	1	567.041	10.185	0.645	5.175	0.000	0.000	-0.419-0.010	43.905	-2.252	5.667	0.000	0.000	-0.048-0.008
181	L0782	1	568.081	8.994	0.500	5.192	0.000	0.000	-0.430-0.010	48.738	-2.396	5.671	0.000	0.000	-0.056-0.008
182	Q70	1	568.646	8.714	0.000	5.202	0.000	0.000	-0.442-0.032	50.104	0.000	5.672	0.000	0.000	-0.059-0.002
183	Q70	2	569.211	8.994	-0.500	5.212	0.000	0.000	-0.466-0.054	48.738	2.396	5.674	0.000	0.000	-0.059 0.003
184	OB1	1	576.673	24.202	-1.538	5.297	0.000	0.000	-0.867-0.054	20.682	1.364	5.712	0.000	0.000	-0.033 0.003
185	B2	1	581.513	42.342	-2.210	5.321	0.000	0.000	-1.174-0.073	10.714	0.695	5.765	0.000	0.000	-0.016 0.003
186	OL1	1	582.892	48.703	-2.402	5.326	0.000	0.000	-1.274-0.073	9.060	0.504	5.787	0.000	0.000	-0.011 0.003
187	Q80	1	583.457	50.071	0.003	5.328	0.000	0.000	-1.298-0.010	8.778	-0.001	5.797	0.000	0.000	-0.010 0.002
188	Q80	2	584.022	48.696	2.408	5.329	0.000	0.000	-1.285 0.054	9.062	-0.506	5.807	0.000	0.000	-0.009 0.001
189	OL2	1	586.058	39.469	2.124	5.337	0.000	0.000	-1.175 0.054	11.696	-0.788	5.839	0.000	0.000	-0.007 0.001
190	B2	2	590.898	22.183	1.448	5.363	0.000	0.000	-0.959 0.035	22.566	-1.457	5.887	0.000	0.000	-0.002 0.001
191	L0891	1	591.898	19.426	1.308	5.371	0.000	0.000	-0.924 0.035	25.619	-1.596	5.894	0.000	0.000	-0.001 0.001
192	KI	1	597.203	9.472	0.568	5.435	0.000	0.000	-0.739 0.035	46.446	-2.330	5.918	0.000	0.000	0.000 0.000

193 L0893	1	597.703	8.939	0.498	5.443	0.000	0.000	-0.721	0.035	48.811	-2.399	5.920	0.000	0.000	0.000	0.000
194 Q90	1	598.268	8.661	0.000	5.454	0.000	0.000	-0.711	0.000	50.179	0.000	5.922	0.000	0.000	0.000	0.000
END M2	1	598.268	8.661	0.000	5.454	0.000	0.000	-0.711	0.000	50.179	0.000	5.922	0.000	0.000	0.000	0.000
END RHIC	1	598.268	8.661	0.000	5.454	0.000	0.000	-0.711	0.000	50.179	0.000	5.922	0.000	0.000	0.000	0.000

TOTAL LENGTH =	598.268097	MUX	=	5.453524	MUY	=	5.921744
DELTA(S) =	0.000000 mm	DMUX	=	-7.345957	DMUY	=	-8.177673
		BETAX(MAX)	=	159.119611	BETAY(MAX)	=	103.362771
		DX(MAX)	=	5.555500	DY(MAX)	=	0.481382

Table 3.

50 L112:DRIFT,L=9.955836
 L113:DRIFT,L=4.624169
 L114:DRIFT,L=1.284570
 LH0L:DRIFT,L=0.715
 LOS:DRIFT,L=0.450000
 LHALL:DRIFT,L=0.504

 55 LM121:DRIFT,L=.75
 LM122:DRIFT,L=.59
 LM231:DRIFT,L=.59
 LM232:DRIFT,L=.55
 LM341:DRIFT,L=.55
 60 LM342:DRIFT,L=.517
 LM451:DRIFT,L=.517
 LM452:DRIFT,L=1.07
 LM150:DRIFT,L=1.5
 LM561:DRIFT,L=1.47
 65 LM562:DRIFT,L=2.718
 LM782:DRIFT,L=.564
 L0782:DRIFT,L=1.04
 L0891:DRIFT,L=1.0
 L0893:DRIFT,L=0.500000
 70 LM22:DRIFT,L=1.
 LM10:DRIFT,L=.564
 LM1:DRIFT,L=.10
 OL2:DRIFT,L=2.036
 OL1:DRIFT,L=1.379
 75 OB1:DRIFT,L=7.462
 SA:MONITOR,L=0.00

 100 QMI1:QUAD,TYPE=Q,L=0.726,K1=-.01835744
 QMI2:QUAD,TYPE=Q,L=1.000,K1=.1307753
 QMI3:QUAD,TYPE=Q,L=0.726,K1=-.1691722
 QMI4:QUAD,TYPE=Q,L=0.726,K1=.1409831
 QMI5:QUAD,TYPE=Q,L=0.726,k1=-.022958050
 105 QMI6:QUAD,TYPE=Q,L=.726,K1=-.1305827
 QMI7:QUAD,TYPE=Q,L=0.726,K1=.1420930

 Q80:RBEND,L=0.565,ANGLE=-.754E-3,K1=-0.087007,TILT
 110 Q90:QUAD,L=0.565,K1=-0.0866054
 Q70:RBEND,L=.565,K1=0.0866054,ANGLE=2.74E-3,TILT

 SWM:RBEND,TYPE=WD,L=3.65726099,ANGLE=47.165E-3

 135 G1D:RBEND,TYPE=GDD,L=3.65726099,ANGLE=47.419E-3,K1=-0.0380886
 G2F:RBEND,TYPE=GDF2,L=2.946220867,ANGLE=38.199E-3,K1=0.0380886
 GD:RBEND,TYPE=GDD,L=3.65726009,ANGLE=47.719E-3,K1=-0.0380886
 GF:RBEND,TYPE=GDF,L=3.65726009,ANGLE=47.719E-3,K1=0.0380886

 140 BMI:RBEND,TYPE=MD,L=2.946111148,ANGLE=42.084464E-3
 SI0:RBEND,TYPE=SD,L=0.5,ANGLE=-2.635E-3,TILT
 SI1:RBEND,TYPE=SD,L=6.5,ANGLE=45E-3
 SI2:RBEND,TYPE=SD,L=0.5,ANGLE=2.8E-3,TILT
 KI:RBEND,L=5.305,ANGLE=-1.3330E-3,TILT
 145 B2:RBEND,L=4.84,ANGLE=-19.121842E-3

165 PF:LINE=(LHOL,GF,LOS,GD,LHOL)
 PD:LINE=(LHOL,GD,LOS,GF,LHOL)
 PERIOD:LINE=(PF,PD)
 Q:LINE=(SWM,L112,G1D,L113,G2F,L114,5*PERIOD,PF,LHOL,GD,LOS,GF,LHALL)

M1:LINE=(QMI1,LM121,BMI,LM122,QMI2,LM231,BMI,LM232,QMI3,LM1,QMI3,LM341,BMI,&
 LM342,QMI4,LM1,QMI4,LM451,BMI)
 170 M2:LINE=(LM452,QMI5,LM561,BMI,LM562,QMI6,LM1,QMI6,LM22,SI0,LM10,QMI7,LM1,QMI7,&
 LM782,SI1,L0782,Q70,Q70,OB1,B2,OL1,Q80,Q80,OL2,B2,L0891,KI,L0893,Q90)
 QM:LINE=(Q,M1,M2)
 SURVEY,Z0=0,Y0=.0281

1RHIC "MAD" VERSION: 7.2/VAX RUN: 5-AUG-9 13:09:06
 SURVEY OF BEAM LINE "QM", RANGE = #S / #E" PAGE 1

POS. NO.	ELEMENT NAME	OCC. NO.	SEQUENCE SUM(L) M	ARC M	I I I	X M	Y M	Z M	I I I	THETA RAD	ANGLES PHI RAD	PSI RAD
BEGIN	QM	1	0.000000	0.000000		0.000000	0.028100	0.000000		0.000000	0.000000	0.000000
BEGIN	Q	1	0.000000	0.000000		0.000000	0.028100	0.000000		0.000000	0.000000	0.000000
1	SWM	1	3.657261	3.657600		-0.086239	0.028100	3.656244		-0.047165	0.000000	0.000000
2	L112	1	13.613097	13.613436		-0.555632	0.028100	13.601009		-0.047165	0.000000	0.000000
3	G1D	1	17.270358	17.271040		-0.814622	0.028100	17.249088		-0.094584	0.000000	0.000000
4	L113	1	21.894527	21.895209		-1.251342	0.028100	21.852588		-0.094584	0.000000	0.000000
5	G2F	1	24.840748	24.841609		-1.585558	0.028100	24.779791		-0.132783	0.000000	0.000000
6	L114	1	26.125318	26.126179		-1.755626	0.028100	26.053053		-0.132783	0.000000	0.000000
BEGIN	PERIOD	1	26.125318	26.126179		-1.755626	0.028100	26.053053		-0.132783	0.000000	0.000000
BEGIN	PF	1	26.125318	26.126179		-1.755626	0.028100	26.053053		-0.132783	0.000000	0.000000
7	LHOL	1	26.840318	26.841179		-1.850288	0.028100	26.761759		-0.132783	0.000000	0.000000
8	GF	1	30.497578	30.498786		-2.420830	0.028100	30.374242		-0.180502	0.000000	0.000000
9	LOS	1	30.947578	30.948786		-2.501616	0.028100	30.816931		-0.180502	0.000000	0.000000
10	GD	1	34.604838	34.606393		-3.243827	0.028100	34.398087		-0.228221	0.000000	0.000000
11	LHOL	2	35.319838	35.321393		-3.405592	0.028100	35.094547		-0.228221	0.000000	0.000000
END	PF	1	35.319838	35.321393		-3.405592	0.028100	35.094547		-0.228221	0.000000	0.000000
BEGIN	PD	1	35.319838	35.321393		-3.405592	0.028100	35.094547		-0.228221	0.000000	0.000000
12	LHOL	3	36.034838	36.036393		-3.567358	0.028100	35.791007		-0.228221	0.000000	0.000000
13	GD	2	39.692098	39.694000		-4.479549	0.028100	39.332682		-0.275940	0.000000	0.000000
14	LOS	2	40.142098	40.144000		-4.602152	0.028100	39.765658		-0.275940	0.000000	0.000000
15	GF	2	43.799358	43.801607		-5.682245	0.028100	43.259789		-0.323659	0.000000	0.000000
16	LHOL	4	44.514358	44.516607		-5.909642	0.028100	43.937665		-0.323659	0.000000	0.000000
END	PD	1	44.514358	44.516607		-5.909642	0.028100	43.937665		-0.323659	0.000000	0.000000
END	PERIOD	1	44.514358	44.516607		-5.909642	0.028100	43.937665		-0.323659	0.000000	0.000000
BEGIN	PERIOD	2	44.514358	44.516607		-5.909642	0.028100	43.937665		-0.323659	0.000000	0.000000
BEGIN	PF	2	44.514358	44.516607		-5.909642	0.028100	43.937665		-0.323659	0.000000	0.000000
17	LHOL	5	45.229358	45.231607		-6.137039	0.028100	44.615541		-0.323659	0.000000	0.000000
18	GF	3	48.886618	48.889214		-7.382577	0.028100	48.054172		-0.371378	0.000000	0.000000
19	LOS	3	49.336618	49.339214		-7.545882	0.028100	48.473495		-0.371378	0.000000	0.000000
20	GD	3	52.993878	52.996821		-8.954027	0.028100	51.848799		-0.419097	0.000000	0.000000
21	LHOL	6	53.708878	53.711821		-9.244986	0.028100	52.501921		-0.419097	0.000000	0.000000
END	PF	2	53.708878	53.711821		-9.244986	0.028100	52.501921		-0.419097	0.000000	0.000000
BEGIN	PD	2	53.708878	53.711821		-9.244986	0.028100	52.501921		-0.419097	0.000000	0.000000
22	LHOL	7	54.423878	54.426821		-9.535945	0.028100	53.155042		-0.419097	0.000000	0.000000
23	GD	4	58.081138	58.084428		-11.103492	0.028100	56.459334		-0.466816	0.000000	0.000000
24	LOS	4	58.531138	58.534428		-11.306013	0.028100	56.861187		-0.466816	0.000000	0.000000
25	GF	4	62.188399	62.192036		-13.029394	0.028100	60.086944		-0.514535	0.000000	0.000000
26	LHOL	8	62.903399	62.907036		-13.381267	0.028100	60.709367		-0.514535	0.000000	0.000000
END	PD	2	62.903399	62.907036		-13.381267	0.028100	60.709367		-0.514535	0.000000	0.000000
END	PERIOD	2	62.903399	62.907036		-13.381267	0.028100	60.709367		-0.514535	0.000000	0.000000
BEGIN	PERIOD	3	62.903399	62.907036		-13.381267	0.028100	60.709367		-0.514535	0.000000	0.000000
BEGIN	PF	3	62.903399	62.907036		-13.381267	0.028100	60.709367		-0.514535	0.000000	0.000000

27	LHOL	9	63.618399	63.622036	-13.733140	0.028100	61.331790	-0.514535	0.000000	0.000000
28	GF	5	67.275659	67.279643	-15.608430	0.028100	64.471669	-0.562254	0.000000	0.000000
29	LOS	5	67.725659	67.729643	-15.848323	0.028100	64.852394	-0.562254	0.000000	0.000000
30	GD	5	71.382919	71.387250	-17.871253	0.028100	67.899245	-0.609973	0.000000	0.000000
31	LHOL	10	72.097919	72.102250	-18.280838	0.028100	68.485305	-0.609973	0.000000	0.000000
END	PF	3	72.097919	72.102250	-18.280838	0.028100	68.485305	-0.609973	0.000000	0.000000
BEGIN	PD	3	72.097919	72.102250	-18.280838	0.028100	68.485305	-0.609973	0.000000	0.000000

1RHIC "MAD" VERSION: 7.2/VAX RUN: 5-AUG-9 13:09:06
 SURVEY OF BEAM LINE "QM", RANGE = #S / #E" PAGE 2

POS. NO.	ELEMENT NAME	OCC. NO.	SEQUENCE SUM(L) M	ARC M	I I I	X M	POSITIONS Y M	Z M	I I I	THETA RAD	ANGLES PHI RAD	PSI RAD
32	LHOL	11	72.812919	72.817250	-18.690422	0.028100	69.071364	-0.609973	0.000000	0.000000	0.000000	
33	GD	6	76.470179	76.474857	-20.856387	0.028100	72.018251	-0.657692	0.000000	0.000000	0.000000	
34	LOS	6	76.920179	76.924857	-21.131469	0.028100	72.374384	-0.657692	0.000000	0.000000	0.000000	
35	GF	6	80.577439	80.582464	-23.435538	0.028100	75.214598	-0.705411	0.000000	0.000000	0.000000	
36	LHOL	12	81.292439	81.297464	-23.899106	0.028100	75.758960	-0.705411	0.000000	0.000000	0.000000	
END	PD	3	81.292439	81.297464	-23.899106	0.028100	75.758960	-0.705411	0.000000	0.000000	0.000000	
END	PERIOD	3	81.292439	81.297464	-23.899106	0.028100	75.758960	-0.705411	0.000000	0.000000	0.000000	
BEGIN	PERIOD	4	81.292439	81.297464	-23.899106	0.028100	75.758960	-0.705411	0.000000	0.000000	0.000000	
BEGIN	PF	4	81.292439	81.297464	-23.899106	0.028100	75.758960	-0.705411	0.000000	0.000000	0.000000	
37	LHOL	13	82.007439	82.012464	-24.362674	0.028100	76.303322	-0.705411	0.000000	0.000000	0.000000	
38	GF	7	85.664699	85.670071	-26.799601	0.028100	79.030397	-0.753130	0.000000	0.000000	0.000000	
39	LOS	7	86.114699	86.120071	-27.107367	0.028100	79.358695	-0.753130	0.000000	0.000000	0.000000	
40	GD	7	89.771959	89.777678	-29.671604	0.028100	81.966422	-0.800849	0.000000	0.000000	0.000000	
41	LHOL	14	90.486959	90.492678	-30.184936	0.028100	82.464132	-0.800849	0.000000	0.000000	0.000000	
END	PF	4	90.486959	90.492678	-30.184936	0.028100	82.464132	-0.800849	0.000000	0.000000	0.000000	
BEGIN	PD	4	90.486959	90.492678	-30.184936	0.028100	82.464132	-0.800849	0.000000	0.000000	0.000000	
42	LHOL	15	91.201959	91.207678	-30.698269	0.028100	82.961841	-0.800849	0.000000	0.000000	0.000000	
43	GD	8	94.859219	94.865285	-33.383977	0.028100	85.444284	-0.848568	0.000000	0.000000	0.000000	
44	LOS	8	95.309219	95.315285	-33.721628	0.028100	85.741760	-0.848568	0.000000	0.000000	0.000000	
45	GF	8	98.966479	98.972892	-36.522694	0.028100	88.093266	-0.896287	0.000000	0.000000	0.000000	
46	LHOL	16	99.681479	99.687892	-37.081119	0.028100	88.539793	-0.896287	0.000000	0.000000	0.000000	
END	PD	4	99.681479	99.687892	-37.081119	0.028100	88.539793	-0.896287	0.000000	0.000000	0.000000	
END	PERIOD	4	99.681479	99.687892	-37.081119	0.028100	88.539793	-0.896287	0.000000	0.000000	0.000000	
BEGIN	PERIOD	5	99.681479	99.687892	-37.081119	0.028100	88.539793	-0.896287	0.000000	0.000000	0.000000	
BEGIN	PF	5	99.681479	99.687892	-37.081119	0.028100	88.539793	-0.896287	0.000000	0.000000	0.000000	
47	LHOL	17	100.396479	100.402892	-37.639544	0.028100	88.986321	-0.896287	0.000000	0.000000	0.000000	
48	GF	9	104.053739	104.060500	-40.549590	0.028100	91.201537	-0.944006	0.000000	0.000000	0.000000	
49	LOS	9	104.503739	104.510500	-40.914052	0.028100	91.465483	-0.944006	0.000000	0.000000	0.000000	
50	GD	9	108.160999	108.168107	-43.926453	0.028100	93.539365	-0.991725	0.000000	0.000000	0.000000	
51	LHOL	18	108.875999	108.883107	-44.524888	0.028100	93.930647	-0.991725	0.000000	0.000000	0.000000	
END	PF	5	108.875999	108.883107	-44.524888	0.028100	93.930647	-0.991725	0.000000	0.000000	0.000000	
BEGIN	PD	5	108.875999	108.883107	-44.524888	0.028100	93.930647	-0.991725	0.000000	0.000000	0.000000	
52	LHOL	19	109.590999	109.598107	-45.123322	0.028100	94.321928	-0.991725	0.000000	0.000000	0.000000	
53	GD	10	113.248260	113.255714	-48.231221	0.028100	96.249756	-1.039444	0.000000	0.000000	0.000000	
54	LOS	10	113.698260	113.705714	-48.619176	0.028100	96.477770	-1.039444	0.000000	0.000000	0.000000	
55	GF	10	117.355520	117.363321	-51.815496	0.028100	98.255153	-1.087163	0.000000	0.000000	0.000000	
56	LHOL	20	118.070520	118.078321	-52.448494	0.028100	98.587628	-1.087163	0.000000	0.000000	0.000000	
END	PD	5	118.070520	118.078321	-52.448494	0.028100	98.587628	-1.087163	0.000000	0.000000	0.000000	
END	PERIOD	5	118.070520	118.078321	-52.448494	0.028100	98.587628	-1.087163	0.000000	0.000000	0.000000	
BEGIN	PF	6	118.070520	118.078321	-52.448494	0.028100	98.587628	-1.087163	0.000000	0.000000	0.000000	
57	LHOL	21	118.785520	118.793321	-53.081491	0.028100	98.920102	-1.087163	0.000000	0.000000	0.000000	
58	GF	11	122.442780	122.450928	-56.358955	0.028100	100.542994	-1.134882	0.000000	0.000000	0.000000	
59	LOS	11	122.892780	122.900928	-56.766873	0.028100	100.733002	-1.134882	0.000000	0.000000	0.000000	
60	GD	11	126.550040	126.558535	-60.118020	0.028100	102.197709	-1.182601	0.000000	0.000000	0.000000	
61	LHOL	22	127.265040	127.273535	-60.779819	0.028100	102.468350	-1.182601	0.000000	0.000000	0.000000	
END	PF	6	127.265040	127.273535	-60.779819	0.028100	102.468350	-1.182601	0.000000	0.000000	0.000000	

62 LHOL	23	127.980040	127.988535	-61.441619	0.028100	102.738991	-1.182601	0.000000	0.000000
63 GD	12	131.637300	131.646142	-64.858819	0.028100	104.042178	-1.230320	0.000000	0.000000
64 LOS	12	132.087300	132.096142	-65.282987	0.028100	104.192449	-1.230320	0.000000	0.000000

1RHC

"MAD" VERSION: 7.2/VAX RUN: 5-AUG-9 13:09:06

SURVEY OF BEAM LINE "QM", RANGE = #S / #E"

PAGE 3

POS. NO.	ELEMENT		SEQUENCE		POSITIONS				ANGLES		
	NAME	OCC. NO.	SUM(L) M	ARC M	I I	X M	Y M	Z M	THETA RAD	PHI RAD	PSI RAD
65	GF	12	135.744560	135.753749		-68.758460	0.028100	105.331149	-1.278039	0.000000	0.000000
66	LHALL	1	136.248560	136.257749		-69.241016	0.028100	105.476600	-1.278039	0.000000	0.000000
END	Q	1	136.248560	136.257749		-69.241016	0.028100	105.476600	-1.278039	0.000000	0.000000
BEGIN	M1	1	136.248560	136.257749		-69.241016	0.028100	105.476600	-1.278039	0.000000	0.000000
67	QMI1	1	136.974560	136.983749		-69.936126	0.028100	105.686119	-1.278039	0.000000	0.000000
68	LM121	1	137.724560	137.733749		-70.654214	0.028100	105.902564	-1.278039	0.000000	0.000000
69	BMI	1	140.670671	140.680078		-73.492239	0.028100	106.693253	-1.320123	0.000000	0.000000
70	LM122	1	141.260671	141.270078		-74.063799	0.028100	106.839606	-1.320123	0.000000	0.000000
71	QMI2	1	142.260671	142.270078		-75.032544	0.028100	107.087662	-1.320123	0.000000	0.000000
72	LM231	1	142.850671	142.860078		-75.604104	0.028100	107.234015	-1.320123	0.000000	0.000000
73	BMI	2	145.796782	145.806406		-78.472882	0.028100	107.904602	-1.362208	0.000000	0.000000
74	LM232	1	146.346782	146.356406		-79.010960	0.028100	108.018496	-1.362208	0.000000	0.000000
75	QMI3	1	147.072782	147.082406		-79.721223	0.028100	108.168835	-1.362208	0.000000	0.000000
76	LM1	1	147.172782	147.182406		-79.819056	0.028100	108.189543	-1.362208	0.000000	0.000000
77	QMI3	2	147.898782	147.908406		-80.529319	0.028100	108.339883	-1.362208	0.000000	0.000000
78	LM341	1	148.448782	148.458406		-81.067397	0.028100	108.453776	-1.362208	0.000000	0.000000
79	BMI	3	151.394893	151.404735		-83.961848	0.028100	109.003075	-1.404292	0.000000	0.000000
80	LM342	1	151.911893	151.921735		-84.471698	0.028100	109.088760	-1.404292	0.000000	0.000000
81	QMI4	1	152.637893	152.647735		-85.187657	0.028100	109.209084	-1.404292	0.000000	0.000000
82	LM1	2	152.737893	152.747735		-85.286274	0.028100	109.225658	-1.404292	0.000000	0.000000
83	QMI4	2	153.463893	153.473735		-86.002234	0.028100	109.345982	-1.404292	0.000000	0.000000
84	LM451	1	153.980893	153.990735		-86.512084	0.028100	109.431667	-1.404292	0.000000	0.000000
85	BMI	4	156.927005	156.937064		-89.427081	0.028100	109.858704	-1.446377	0.000000	0.000000
END	M1	1	156.927005	156.937064		-89.427081	0.028100	109.858704	-1.446377	0.000000	0.000000
BEGIN	M2	1	156.927005	156.937064		-89.427081	0.028100	109.858704	-1.446377	0.000000	0.000000
86	LM452	1	157.997005	158.007064		-90.488810	0.028100	109.991489	-1.446377	0.000000	0.000000
87	QMI5	1	158.723005	158.733064		-91.209198	0.028100	110.081585	-1.446377	0.000000	0.000000
88	LM561	1	160.193005	160.203064		-92.667835	0.028100	110.264010	-1.446377	0.000000	0.000000
89	BMI	5	163.139116	163.149392		-95.598218	0.028100	110.568029	-1.488461	0.000000	0.000000
90	LM562	1	165.857116	165.867392		-98.307010	0.028100	110.791563	-1.488461	0.000000	0.000000
91	QMI6	1	166.583116	166.593392		-99.030551	0.028100	110.851270	-1.488461	0.000000	0.000000
92	LM1	3	166.683116	166.693392		-99.130212	0.028100	110.859494	-1.488461	0.000000	0.000000
93	QMI6	2	167.409116	167.419392		-99.853753	0.028100	110.919202	-1.488461	0.000000	0.000000
94	LM22	1	168.409116	168.419392		-100.850365	0.028100	111.001444	-1.488461	0.000000	0.000000
95	SI0	1	168.909116	168.919392		-101.348671	0.028759	111.042565	-1.488461	0.002635	0.000000
96	LM10	1	169.473116	169.483392		-101.910758	0.030245	111.088949	-1.488461	0.002635	0.000000
97	QMI7	1	170.199116	170.209392		-102.634296	0.032158	111.148657	-1.488461	0.002635	0.000000
98	LM1	4	170.299116	170.309392		-102.733957	0.032421	111.156881	-1.488461	0.002635	0.000000
99	QMI7	2	171.025116	171.035392		-103.457495	0.034334	111.216589	-1.488461	0.002635	0.000000
100	LM782	1	171.589116	171.599392		-104.019583	0.035821	111.262973	-1.488461	0.002635	0.000000
101	SI1	1	178.089116	178.099941		-110.507928	0.052944	111.651667	-1.533461	0.002632	0.000119
102	L0782	1	179.129116	179.139941		-111.547200	0.055681	111.690486	-1.533461	0.002632	0.000119
103	Q70	1	179.694116	179.704941		-112.111805	0.056395	111.711575	-1.533461	-0.000108	0.000119
104	Q70	2	180.259116	180.269941		-112.676411	0.055560	111.732665	-1.533461	-0.002848	0.000119
105	OB1	1	187.721116	187.731941		-120.133181	0.034310	112.011196	-1.533461	-0.002848	0.000119
106	B2	1	192.561116	192.572015		-124.967840	0.020534	112.238091	-1.514339	-0.002845	0.000173
107	OL1	1	193.940116	193.951015		-126.344637	0.016611	112.315904	-1.514339	-0.002845	0.000173
108	Q80	1	194.505116	194.516015		-126.908735	0.015216	112.347785	-1.514339	-0.002091	0.000173
109	Q80	2	195.070116	195.081015		-127.472834	0.014248	112.379667	-1.514339	-0.001337	0.000173

1RHC

"MAD" VERSION: 7.2/VAX RUN: 5-AUG-9 13:09:06

E L E M E N T			S E Q U E N C E		P O S I T I O N S			I		A N G L E S		
POS. NO.	ELEMENT NAME	OCC. NO.	SUM(L) M	ARC M	I I	X M	Y M	Z M	I I	THETA RAD	PHI RAD	PSI RAD
110	OL2	1	197.106116	197.117015		-129.505588	0.011526	112.494552		-1.514339	-0.001337	0.000173
111	B2	2	201.946116	201.957089		-134.335041	0.005064	112.813848		-1.495217	-0.001333	0.000198
112	L0891	1	202.946116	202.957089		-135.332185	0.003731	112.889355		-1.495217	-0.001333	0.000198
113	KI	1	208.251116	208.262089		-140.622039	0.000193	113.289919		-1.495218	0.000000	0.000198
114	L0893	1	208.751116	208.762089		-141.120612	0.000193	113.327672		-1.495218	0.000000	0.000198
115	Q90	1	209.316116	209.327089		-141.683999	0.000193	113.370334		-1.495218	0.000000	0.000198
END	M2	1	209.316116	209.327089		-141.683999	0.000193	113.370334		-1.495218	0.000000	0.000198
END	QM	1	209.316116	209.327089		-141.683999	0.000193	113.370334		-1.495218	0.000000	0.000198
TOTAL LENGTH =			209.316116	ARC LENGTH =		209.327089						
ERROR (X) =			-0.141684E+03	ERROR (Y) =		-0.279073E-01		ERROR (Z) =		0.113370E+03		
ERROR (THETA) =			-0.149522E+01	ERROR (PHI) =		-0.328859E-06		ERROR (PSI) =		0.198493E-03		

TITLE,rhic

Table 5.

	LUKS:DRIFT,L=5.00000
	LU01:DRIFT,L=0.374005
5	LU12:DRIFT,L=0.495300
	LU231:DRIFT,L=0.477256
	LU232:DRIFT,L=0.459994
	LU233:DRIFT,L=0.459994
	LU234:DRIFT,L=0.255379
10	LU34:DRIFT,L=15.139416
	LU45:DRIFT,L=4.65048
	LU56:DRIFT,L=5.659624
	LU67:DRIFT,L=9.867062
	LU78:DRIFT,L=5.72644
15	LU891:DRIFT,L=12.087263
	LU892:DRIFT,L=0.609600
	LU193:DRIFT,L=0.609600
	LU293:DRIFT,L=0.609600
	LU894:DRIFT,L=0.609600
20	LU895:DRIFT,L=5.090476
	LU910:DRIFT,L=4.695957
	LU011:DRIFT,L=15.606874
	LU112:DRIFT,L=17.700615
25	LU100:DRIFT,L=1.00
	LU150:DRIFT,L=1.50
	LW01:DRIFT,L=17.524174
30	LW12:DRIFT,L=14.051700
	LW231:DRIFT,L=6.111450
	LW232:DRIFT,L=6.111450
	LW34:DRIFT,L=14.0517
	LW45:DRIFT,L=14.0517
35	LW56:DRIFT,L=14.0517
	LW67:DRIFT,L=14.0517
	LW78:DRIFT,L=14.0517
	LV01:DRIFT,L=13.972064
40	LV12:DRIFT,L=14.457299
	LV231:DRIFT,L=8.214856
	LV232:DRIFT,L=5.991919
	LV34:DRIFT,L=14.072442
	LV45:DRIFT,L=19.581019
45	LV56:DRIFT,L=18.138067
	LV60:DRIFT,L=0.532168
	L112:DRIFT,L=9.955836
	L113:DRIFT,L=4.624169
50	L114:DRIFT,L=1.284570
	LH0L:DRIFT,L=0.715
	LOS:DRIFT,L=0.45000
	LHALL:DRIFT,L=0.56
55	LM121:DRIFT,L=.75
	LM122:DRIFT,L=.59
	LM231:DRIFT,L=.59
	LM232:DRIFT,L=.55
	LM341:DRIFT,L=.55
60	LM342:DRIFT,L=.517

LM451:DRIFT,L=.517
 LM452:DRIFT,L=1.0750
 LM150:DRIFT,L=1.5
 LM561:DRIFT,L=1.47
 65 LM562:DRIFT,L=2.718
 LM782:DRIFT,L=1.045
 L0782:DRIFT,L=2
 L0891:DRIFT,L=1.0
 L0893:DRIFT,L=1.0
 70 LM22:DRIFT,L=1.
 LM10:DRIFT,L=.564
 LM1:DRIFT,L=.10
 OL2:DRIFT,L=2.036
 OL1:DRIFT,L=1.379
 75 OB1:DRIFT,L=7.462
 SA:MONITOR,L=0.00

UQ1:QUADRUPOLE,TYPE=MQ,L=0.9525,K1=0.3311532
 80 UQ2:QUADRUPOLE,TYPE=MQ,L=0.9525,K1=-0.3796831
 UQ3:QUADRUPOLE,TYPE=MQ,L=0.4572,K1=0.1751061
 UQ4:QUADRUPOLE,TYPE=MQ,L=1.00,K1=-0.1488568
 UQ5:QUADRUPOLE,TYPE=MQ,L=1.00,K1=0.1343706
 UQ6:QUADRUPOLE,TYPE=MQ,L=.72644,K1=-.1115799
 85 UQ7:QUADRUPOLE,TYPE=MQ,L=1.0,K1=.1202912
 UQ8:QUADRUPOLE,TYPE=MQ,L=1.00,K1=-.1142795
 UQ9:QUADRUPOLE,TYPE=MQ,L=0.72644,K1=.1062386
 UQ10:QUADRUPOLE,TYPE=MQ,L=.726440,K1=-.09033853
 UQ11:QUADRUPOLE,TYPE=MQ,L=.74,K1=-.09813880
 90 UQ12:QUAD,TYPE=MQ,L=0.74,K1=.1159954
 UQ13:QUAD,L=.74,K1=.07402850

VQ1D:QUAD,TYPE=VQ,L=0.740000,K1=-0.1132557
 VQ2F:QUAD,TYPE=VQ,L=0.740000,K1=.1159741
 95 VQ3D:QUAD,TYPE=VQ,L=0.740000,K1=-.1276003
 VQ4F:QUAD,TYPE=VQ,L=0.740000,K1=.1194976
 VQ5D:QUAD,TYPE=VQ,L=0.740000,K1=-.1121868
 VQ6F:QUAD,TYPE=VQ,L=0.740000,K1=.1344841

100 QMI1:QUAD,TYPE=Q,L=0.726,K1=.002627006
 QMI2:QUAD,TYPE=Q,L=1.000,K1=.1221955
 QMI3:QUAD,TYPE=Q,L=0.726,K1=-.1641456
 QMI4:QUAD,TYPE=Q,L=0.726,K1=.1224738
 QMI5:QUAD,TYPE=Q,L=0.726,k1=.05780293
 105 QMI6:QUAD,TYPE=Q,L=.726,K1=-.1376257
 QMI7:QUAD,TYPE=Q,L=0.726,K1=.1388608

Q80:RBEND,L=0.565,ANGLE=-.575E-3,K1=-0.0757,TILT
 110 Q90:QUAD,L=0.565,K1=-0.0866054
 Q70:RBEND,L=.565,K1=0.0866054,ANGLE=2.159E-3,TILT
 UD1:RBEND,TYPE=UD,L=2.080006,ANGLE=24.725E-3
 UD2:RBEND,TYPE=UD,L=2.080006,ANGLE=24.725E-3
 UD3:RBEND,TYPE=UD,L=2.080006,ANGLE=24.725E-3

115 U4F:RBEND,TYPE=UD8F,L=3.657600,ANGLE=34.906E-3,K1=0.018823143
 U5D:RBEND,TYPE=UD8D,L=3.657600,ANGLE=34.906E-3,K1=-0.018823143
 U6D:RBEND,TYPE=UD8D,L=3.657600,ANGLE=34.906E-3,K1=-0.018823143
 U7F:RBEND,TYPE=UD8F,L=3.657600,ANGLE=34.906E-3,K1=0.018823143

120

125 W1D:RBEND,TYPE=WDD,L=3.657600,ANGLE=43.633E-3,K1=-0.023528529
W2F:RBEND,TYPE=WDF,L=3.657600,ANGLE=43.633E-3,K1=0.023528529
W3D:RBEND,TYPE=WDD,L=3.657600,ANGLE=43.633E-3,K1=-0.023528529
W4F:RBEND,TYPE=WDF,L=3.657600,ANGLE=43.633E-3,K1=0.023528529
W5D:RBEND,TYPE=WDD,L=3.657600,ANGLE=43.633E-3,K1=-0.023528529
W6F:RBEND,TYPE=WDF,L=3.657600,ANGLE=43.633E-3,K1=0.023528529
W7D:RBEND,TYPE=WDD,L=3.657600,ANGLE=43.633E-3,K1=-0.023528529
W8F:RBEND,TYPE=WDF,L=3.657600,ANGLE=43.633E-3,K1=0.023528529
130 WP1:RBEND,TYPE=WD,L=1.828800,ANGLE=12.858E-3,TILT
WP2:RBEND,TYPE=WD,L=1.828800,ANGLE=-12.858E-3,TILT

SWM:RBEND,TYPE=WD,L=3.65726099,ANGLE=47.165E-3

135 G1D:RBEND,TYPE=GDD,L=3.65726099,ANGLE=47.419E-3,K1=-0.0380886
G2F:RBEND,TYPE=GDF,L=2.946220867,ANGLE=38.199E-3,K1=0.0380886
GD:RBEND,TYPE=GDD,L=3.65726099,ANGLE=47.719E-3,K1=-0.0380886
GF:RBEND,TYPE=GDF,L=3.65726099,ANGLE=47.719E-3,K1=0.0380886

140 BMI:RBEND,TYPE=MD,L=2.946111148,ANGLE=42.084464E-3
SI0:RBEND,TYPE=SD,L=0.5,ANGLE=-2.06E-3,TILT
SI1:RBEND,TYPE=SD,L=5,ANGLE=45E-3
SI2:RBEND,TYPE=SD,L=0.5,ANGLE=2.8E-3,TILT
KI:RBEND,L=4.805,ANGLE=-1.1080E-3,TILT
145 B2:RBEND,L=4.84,ANGLE=-19.121842E-3

U1:LINE=(LUKS,LU01,UQ1,LU12,UQ2,LU231,UD1,LU232,UD2,LU233,UD3,&
LU234,UQ3,LU34,UQ4,LU45,UQ5,LU56,3*LU100,SA,LU100,LU150,&
UQ6,LU67,UQ7,LU78,UQ8,LU891)
150 U2:LINE=(U4F,LU892,U5D,LU193,LU293,U6D,LU894,U7F,LU895,&
UQ9,LU910,UQ10,LU011,UQ11,LU112,UQ12)

U:LINE=(U1,U2)

155 W:LINE=(LW01,W1D,LW12,W2F,LW231,WP1,LW232,W3D,LW34,W4F,LW45,&
W5D,LW56,W6F,LW67,W7D,LW78,W8F)

V1:LINE=(LV01,VQ1D,LV12,VQ2F,LV231,WP2)
V2:LINE=(LV232,VQ3D,LV34,VQ4F,LV45,VQ5D,LV56,VQ6F,LV60)
160 PF:LINE=(LH0L,GF,LOS,GD,LH0L)
PD:LINE=(LH0L,GD,LOS,GF,LH0L)
PERIOD:LINE=(PF,PD)
Q:LINE=(SWM,L112,G1D,L113,G2F,L114,5*PERIOD,PF,LH0L,GD,LOS,GF,LHALL)

165 M1:LINE=(QMI1,LM121,BMI,LM122,QMI2,LM231,BMI,LM232,QMI3,LM1,QMI3,LM341,BMI,&
LM342,QMI4,LM1,QMI4,LM451,BMI)
M2:LINE=(LM452,QMI5,LM561,BMI,LM562,QMI6,LM1,QMI6,LM22,SI0,LM10,QMI7,LM1,QMI7,&
LM782,SI1,L0782,Q70,Q70,OB1,B2,OL1,Q80,Q80,OL2,B2,L0891,KI,L0893,Q90)
QM:LINE=(Q,M1,M2)

170 UWV:LINE=(U,W,V1,V2)
RHIC:LINE=(U,W,V1,V2,Q,M1,M2)
TWISS,DELTAP=0E-3,BETX=37.59,BETY=8.05,ALFX=-4.778,ALFY=1.053,DX=-2.96,&
dPX=-0.295,DY=0,DPY=0,X=0E-4,Y=0E-4,PX=0E-4,PY=0E-4

1RHIC

LINEAR LATTICE PARAMETERS FOR BEAM LINE: "RHIC", RANGE = "#S / #E"

DELTA(P)/P = 0.000000 SYMM = F

"MAD" VERSION: 7.2/VAX RUN: 16-AUG-9 11:44:08

PAGE 1

ELEMENT SEQUENCE			H O R I Z O N T A L								V E R T I C A L								
POS.	ELEMENT	OCC.	DIST	I	BETAX	ALFAX	MUX	X(CO)	PX(CO)	DX	DPX	I	BETAY	ALFAY	MUY	Y(CO)	PY(CO)	DY	DPY
NO.	NAME	NO.	[M]	I	[M]	[1]	[2PI]	[MM]	[.001]	[M]	[1]	I	[M]	[1]	[2PI]	[MM]	[.001]	[M]	[1]

BEGIN	RHIC	1	0.000	37.590	-4.778	0.000	0.000	0.000	-2.960-0.295	8.050	1.053	0.000	0.000	0.000	0.000	0.000
BEGIN	U	1	0.000	37.590	-4.778	0.000	0.000	0.000	-2.960-0.295	8.050	1.053	0.000	0.000	0.000	0.000	0.000
BEGIN	U1	1	0.000	37.590	-4.778	0.000	0.000	0.000	-2.960-0.295	8.050	1.053	0.000	0.000	0.000	0.000	0.000
1	LUKS	1	5.000	101.218	-7.948	0.013	0.000	0.000	-4.435-0.295	4.069	-0.257	0.169	0.000	0.000	0.000	0.000
2	LU01	1	5.374	107.252	-8.185	0.013	0.000	0.000	-4.545-0.295	4.298	-0.355	0.183	0.000	0.000	0.000	0.000
3	UQ1	1	6.327	91.301	23.220	0.015	0.000	0.000	-4.147 1.111	6.806	-2.537	0.213	0.000	0.000	0.000	0.000
4	LU12	1	6.822	69.750	20.289	0.016	0.000	0.000	-3.596 1.111	9.587	-3.078	0.223	0.000	0.000	0.000	0.000
5	UQ2	1	7.774	54.520	-2.504	0.019	0.000	0.000	-3.113-0.068	12.136	0.716	0.236	0.000	0.000	0.000	0.000
6	LU231	1	8.252	56.940	-2.567	0.020	0.000	0.000	-3.146-0.068	11.480	0.657	0.242	0.000	0.000	0.000	0.000
7	UD1	1	10.332	68.196	-2.845	0.025	0.000	0.000	-3.262-0.044	9.281	0.400	0.275	0.000	0.000	0.000	0.000
8	LU232	1	10.792	70.841	-2.906	0.026	0.000	0.000	-3.283-0.044	8.939	0.343	0.283	0.000	0.000	0.000	0.000
9	UD2	1	12.872	83.505	-3.183	0.031	0.000	0.000	-3.348-0.019	8.049	0.085	0.322	0.000	0.000	0.000	0.000
10	LU233	1	13.332	86.462	-3.245	0.031	0.000	0.000	-3.356-0.019	7.998	0.027	0.331	0.000	0.000	0.000	0.000
11	UD3	1	15.412	100.535	-3.522	0.035	0.000	0.000	-3.370 0.006	8.420	-0.230	0.372	0.000	0.000	0.000	0.000
12	LU234	1	15.667	102.343	-3.556	0.035	0.000	0.000	-3.369 0.006	8.546	-0.262	0.377	0.000	0.000	0.000	0.000
13	UQ3	1	16.124	101.842	4.637	0.036	0.000	0.000	-3.304 0.274	9.135	-1.041	0.385	0.000	0.000	0.000	0.000
14	LU34	1	31.264	12.084	1.292	0.107	0.000	0.000	0.840 0.274	92.974	-4.496	0.472	0.000	0.000	0.000	0.000
15	UQ4	1	32.264	11.358	-0.530	0.121	0.000	0.000	1.184 0.422	88.151	9.078	0.474	0.000	0.000	0.000	0.000
16	LU45	1	36.914	18.725	-1.054	0.173	0.000	0.000	3.148 0.422	24.182	4.678	0.490	0.000	0.000	0.000	0.000
17	UQ5	1	37.914	18.353	1.410	0.181	0.000	0.000	3.352-0.019	18.353	1.410	0.498	0.000	0.000	0.000	0.000
18	LU56	1	43.574	7.606	0.489	0.261	0.000	0.000	3.243-0.019	7.606	0.489	0.577	0.000	0.000	0.000	0.000
19	LU100	1	44.574	6.792	0.326	0.283	0.000	0.000	3.224-0.019	6.791	0.326	0.599	0.000	0.000	0.000	0.000
20	LU100	2	45.574	6.303	0.163	0.307	0.000	0.000	3.205-0.019	6.303	0.163	0.624	0.000	0.000	0.000	0.000
21	LU100	3	46.574	6.140	0.000	0.333	0.000	0.000	3.186-0.019	6.140	0.000	0.650	0.000	0.000	0.000	0.000
22	SA	1	46.574	6.140	0.000	0.333	0.000	0.000	3.186-0.019	6.140	0.000	0.650	0.000	0.000	0.000	0.000
23	LU100	4	47.574	6.303	-0.163	0.359	0.000	0.000	3.167-0.019	6.303	-0.163	0.675	0.000	0.000	0.000	0.000
24	LU150	1	49.074	7.158	-0.407	0.394	0.000	0.000	3.138-0.019	7.158	-0.407	0.711	0.000	0.000	0.000	0.000
25	UQ6	1	49.800	8.291	-1.182	0.410	0.000	0.000	3.216 0.237	7.398	0.084	0.727	0.000	0.000	0.000	0.000
26	LU67	1	59.667	59.783	-4.036	0.483	0.000	0.000	5.555 0.237	18.998	-1.259	0.883	0.000	0.000	0.000	0.000
27	UQ7	1	60.667	60.593	3.258	0.485	0.000	0.000	5.457-0.432	24.243	-4.195	0.891	0.000	0.000	0.000	0.000
28	LU78	1	66.394	29.563	2.160	0.507	0.000	0.000	2.983-0.432	97.445	-8.588	0.910	0.000	0.000	0.000	0.000
29	UQ8	1	67.394	28.614	-1.175	0.513	0.000	0.000	2.715-0.110	103.363	2.898	0.911	0.000	0.000	0.000	0.000
30	LU891	1	79.481	69.180	-2.181	0.556	0.000	0.000	1.391-0.110	46.591	1.799	0.939	0.000	0.000	0.000	0.000
END	U1	1	79.481	69.180	-2.181	0.556	0.000	0.000	1.391-0.110	46.591	1.799	0.939	0.000	0.000	0.000	0.000
BEGIN	U2	1	79.481	69.180	-2.181	0.556	0.000	0.000	1.391-0.110	46.591	1.799	0.939	0.000	0.000	0.000	0.000
31	U4F	1	83.138	67.600	2.576	0.564	0.000	0.000	0.898-0.154	45.123	-1.365	0.952	0.000	0.000	0.000	0.000
32	LU892	1	83.748	64.501	2.507	0.566	0.000	0.000	0.804-0.154	46.811	-1.403	0.954	0.000	0.000	0.000	0.000
33	U5D	1	87.406	62.222	-1.832	0.576	0.000	0.000	0.384-0.080	45.333	1.773	0.967	0.000	0.000	0.000	0.000
34	LU193	1	88.015	64.482	-1.875	0.577	0.000	0.000	0.335-0.080	43.206	1.717	0.969	0.000	0.000	0.000	0.000
35	LU293	1	88.625	66.794	-1.918	0.579	0.000	0.000	0.287-0.080	41.147	1.661	0.971	0.000	0.000	0.000	0.000
36	U6D	1	92.282	102.593	-8.680	0.586	0.000	0.000	0.083-0.033	22.502	2.998	0.989	0.000	0.000	0.000	0.000
37	LU894	1	92.892	113.452	-9.134	0.587	0.000	0.000	0.063-0.033	19.012	2.727	0.994	0.000	0.000	0.000	0.000
38	U7F	1	96.550	152.484	-0.628	0.591	0.000	0.000	0.000 0.000	7.181	0.772	1.047	0.000	0.000	0.000	0.000
39	LU895	1	101.640	159.120	-0.675	0.596	0.000	0.000	0.000 0.000	5.079	-0.359	1.207	0.000	0.000	0.000	0.000
40	UQ9	1	102.367	151.314	11.219	0.597	0.000	0.000	0.000 0.000	6.030	-0.975	1.228	0.000	0.000	0.000	0.000
41	LU910	1	107.063	64.434	7.282	0.605	0.000	0.000	0.000 0.000	22.319	-2.494	1.294	0.000	0.000	0.000	0.000
42	UQ10	1	107.789	57.085	2.994	0.606	0.000	0.000	0.000 0.000	24.949	-1.069	1.299	0.000	0.000	0.000	0.000
43	LU011	1	123.396	6.144	0.270	0.763	0.000	0.000	0.000 0.000	79.222	-2.409	1.356	0.000	0.000	0.000	0.000
44	UQ11	1	124.136	6.164	-0.297	0.783	0.000	0.000	0.000 0.000	78.525	3.334	1.358	0.000	0.000	0.000	0.000
45	LU112	1	141.836	71.999	-3.422	0.941	0.000	0.000	0.000 0.000	8.841	0.603	1.475	0.000	0.000	0.000	0.000
46	UQ12	1	142.576	72.470	2.800	0.943	0.000	0.000	0.000 0.000	8.570	-0.229	1.488	0.000	0.000	0.000	0.000
END	U2	1	142.576	72.470	2.800	0.943	0.000	0.000	0.000 0.000	8.570	-0.229	1.488	0.000	0.000	0.000	0.000
END	U	1	142.576	72.470	2.800	0.943	0.000	0.000	0.000 0.000	8.570	-0.229	1.488	0.000	0.000	0.000	0.000
BEGIN	W	1	142.576	72.470	2.800	0.943	0.000	0.000	0.000 0.000	8.570	-0.229	1.488	0.000	0.000	0.000	0.000
47	LW01	1	160.101	11.795	0.662	1.045	0.000	0.000	0.000 0.000	54.312	-2.381	1.639	0.000	0.000	0.000	0.000
48	W1D	1	163.758	11.797	-0.663	1.098	0.000	0.000	0.082 0.046	54.303	2.383	1.650	0.000	0.000	0.000	0.000
49	LW12	1	177.810	54.521	-2.378	1.192	0.000	0.000	0.727 0.046	11.613	0.655	1.744	0.000	0.000	0.000	0.000
50	W2F	1	181.468	54.515	2.379	1.202	0.000	0.000	0.853 0.021	11.613	-0.655	1.798	0.000	0.000	0.000	0.000
51	LW231	1	187.579	29.998	1.632	1.226	0.000	0.000	0.981 0.021	24.209	-1.406	1.857	0.000	0.000	0.000	0.000

52	WP1	1	189.408	24.432	1.411	1.237	0.000	0.000	1.019	0.021	29.764	-1.631	1.868	0.000	0.000	0.012	0.013
53	LW232	1	195.519	11.756	0.663	1.295	0.000	0.000	1.146	0.021	54.299	-2.383	1.892	0.000	0.000	0.090	0.013
54	W3D	1	199.177	11.746	-0.660	1.349	0.000	0.000	1.493	0.174	54.308	2.381	1.903	0.000	0.000	0.121	0.003
55	LW34	1	213.229	54.427	-2.377	1.442	0.000	0.000	3.939	0.174	11.641	0.655	1.997	0.000	0.000	0.170	0.003
56	W4F	1	216.886	54.448	2.372	1.452	0.000	0.000	4.017	-0.133	11.641	-0.655	2.051	0.000	0.000	0.210	0.019
57	LW45	1	230.938	11.816	0.662	1.546	0.000	0.000	2.150	-0.133	54.307	-2.381	2.145	0.000	0.000	0.481	0.019
58	W5D	1	234.595	11.826	-0.665	1.599	0.000	0.000	2.068	0.087	54.298	2.383	2.155	0.000	0.000	0.474	-0.023
59	LW56	1	248.647	54.584	-2.378	1.692	0.000	0.000	3.285	0.087	11.613	0.655	2.250	0.000	0.000	0.148	-0.023
60	W6F	1	252.305	54.562	2.383	1.702	0.000	0.000	3.160	-0.153	11.613	-0.655	2.304	0.000	0.000	0.083	-0.014
61	LW67	1	266.356	11.756	0.663	1.796	0.000	0.000	1.003	-0.153	54.304	-2.383	2.398	0.000	0.000	-0.107	-0.014
62	W7D	1	270.014	11.746	-0.660	1.849	0.000	0.000	0.656	-0.041	54.313	2.381	2.408	0.000	0.000	-0.138	-0.003
63	LW78	1	284.066	54.427	-2.377	1.943	0.000	0.000	0.076	-0.041	11.642	0.656	2.503	0.000	0.000	-0.175	-0.003
64	W8F	1	287.723	54.449	2.372	1.953	0.000	0.000	-0.002	0.000	11.641	-0.655	2.556	0.000	0.000	-0.213	-0.019
END	W	1	287.723	54.449	2.372	1.953	0.000	0.000	-0.002	0.000	11.641	-0.655	2.556	0.000	0.000	-0.213	-0.019
BEGIN	V1	1	287.723	54.449	2.372	1.953	0.000	0.000	-0.002	0.000	11.641	-0.655	2.556	0.000	0.000	-0.213	-0.019
65	LV01	1	301.695	11.922	0.672	2.045	0.000	0.000	0.002	0.000	53.924	-2.371	2.650	0.000	0.000	-0.476	-0.019
66	VQ1D	1	302.435	11.710	-0.378	2.055	0.000	0.000	0.002	0.000	54.080	2.165	2.653	0.000	0.000	-0.475	0.021
67	LV12	1	316.893	43.049	-1.790	2.167	0.000	0.000	0.007	0.000	13.464	0.645	2.743	0.000	0.000	-0.168	0.021
68	VQ2F	1	317.633	42.963	1.904	2.169	0.000	0.000	0.007	0.000	13.401	-0.558	2.751	0.000	0.000	-0.157	0.007
69	LW231	1	325.848	18.947	1.020	2.216	0.000	0.000	0.005	0.000	29.169	-1.362	2.820	0.000	0.000	-0.097	0.007
70	WP2	1	327.676	15.575	0.824	2.233	0.000	0.000	0.005	0.000	34.477	-1.541	2.829	0.000	0.000	-0.095	-0.005
END	V1	1	327.676	15.575	0.824	2.233	0.000	0.000	0.005	0.000	34.477	-1.541	2.829	0.000	0.000	-0.095	-0.005
BEGIN	V2	1	327.676	15.575	0.824	2.233	0.000	0.000	0.005	0.000	34.477	-1.541	2.829	0.000	0.000	-0.095	-0.005
71	LV232	1	333.668	9.570	0.178	2.314	0.000	0.000	0.003	0.000	56.452	-2.127	2.850	0.000	0.000	-0.128	-0.005
72	VQ3D	1	334.408	10.038	-0.826	2.327	0.000	0.000	0.003	0.000	55.654	3.180	2.853	0.000	0.000	-0.128	0.007
73	LV34	1	348.481	66.488	-3.185	2.418	0.000	0.000	0.004	0.000	5.695	0.370	2.998	0.000	0.000	-0.034	0.007
74	VQ4F	1	349.221	66.832	2.730	2.420	0.000	0.000	0.004	0.000	5.615	-0.260	3.019	0.000	0.000	-0.030	0.004
75	LV45	1	368.802	8.412	0.253	2.575	0.000	0.000	-0.002	0.000	88.728	-3.984	3.189	0.000	0.000	0.045	0.004
76	VQ5D	1	369.542	8.620	-0.540	2.589	0.000	0.000	-0.002	0.000	89.148	3.428	3.190	0.000	0.000	0.046	0.000
77	LV56	1	387.680	77.489	-3.257	2.712	0.000	0.000	-0.011	0.000	11.845	0.833	3.285	0.000	0.000	0.047	0.000
78	VQ6F	1	388.420	76.589	4.444	2.714	0.000	0.000	-0.011	0.001	11.524	-0.389	3.295	0.000	0.000	0.049	0.005
79	LV60	1	388.952	71.935	4.300	2.715	0.000	0.000	-0.010	0.001	11.967	-0.443	3.302	0.000	0.000	0.051	0.005
END	V2	1	388.952	71.935	4.300	2.715	0.000	0.000	-0.010	0.001	11.967	-0.443	3.302	0.000	0.000	0.051	0.005
BEGIN	Q	1	388.952	71.935	4.300	2.715	0.000	0.000	-0.010	0.001	11.967	-0.443	3.302	0.000	0.000	0.051	0.005
80	SWM	1	392.609	44.117	3.309	2.725	0.000	0.000	0.078	0.048	16.511	-0.798	3.344	0.000	0.000	0.068	0.005
81	L112	1	402.565	5.075	0.612	2.841	0.000	0.000	0.554	0.048	42.239	-1.786	3.405	0.000	0.000	0.115	0.005
82	G1D	1	406.222	6.250	-0.986	2.966	0.000	0.000	0.981	0.196	34.230	3.588	3.420	0.000	0.000	0.103	-0.011
83	L113	1	410.847	22.123	-2.446	3.030	0.000	0.000	1.887	0.196	9.712	1.714	3.460	0.000	0.000	0.051	-0.011
84	G2F	1	413.793	29.468	0.234	3.048	0.000	0.000	2.184	0.000	4.732	0.158	3.536	0.000	0.000	0.025	-0.007
85	L114	1	415.077	28.927	0.188	3.055	0.000	0.000	2.185	0.000	4.684	-0.120	3.580	0.000	0.000	0.015	-0.007
BEGIN	PERIOD	1	415.077	28.927	0.188	3.055	0.000	0.000	2.185	0.000	4.684	-0.120	3.580	0.000	0.000	0.015	-0.007
BEGIN	PF	1	415.077	28.927	0.188	3.055	0.000	0.000	2.185	0.000	4.684	-0.120	3.580	0.000	0.000	0.015	-0.007
86	LH0L	1	415.792	28.677	0.162	3.059	0.000	0.000	2.185	0.000	4.967	-0.275	3.604	0.000	0.000	0.010	-0.007
87	GF	1	419.450	15.967	2.703	3.084	0.000	0.000	1.736	-0.235	14.134	-2.640	3.683	0.000	0.000	-0.015	-0.007
88	L0S	1	419.900	13.639	2.469	3.089	0.000	0.000	1.630	-0.235	16.624	-2.894	3.687	0.000	0.000	-0.019	-0.007
89	GD	1	423.557	5.228	0.210	3.167	0.000	0.000	1.219	0.001	30.475	-0.223	3.711	0.000	0.000	-0.039	-0.003
90	LH0L	2	424.272	5.030	0.067	3.189	0.000	0.000	1.219	0.001	30.811	-0.247	3.715	0.000	0.000	-0.041	-0.003
END	PF	1	424.272	5.030	0.067	3.189	0.000	0.000	1.219	0.001	30.811	-0.247	3.715	0.000	0.000	-0.041	-0.003
BEGIN	PD	1	424.272	5.030	0.067	3.189	0.000	0.000	1.219	0.001	30.811	-0.247	3.715	0.000	0.000	-0.041	-0.003
91	LH0L	3	424.987	5.037	-0.076	3.212	0.000	0.000	1.220	0.001	31.182	-0.272	3.718	0.000	0.000	-0.044	-0.003
92	GD	2	428.644	11.987	-2.138	3.297	0.000	0.000	1.639	0.238	19.533	2.893	3.740	0.000	0.000	-0.044	0.003
93	L0S	2	429.094	14.005	-2.347	3.303	0.000	0.000	1.746	0.238	17.027	2.677	3.744	0.000	0.000	-0.042	0.003
94	GF	2	432.751	25.122	-0.160	3.331	0.000	0.000	2.201	0.000	7.887	0.229	3.800	0.000	0.000	-0.041	-0.002
95	LH0L	4	433.466	25.371	-0.189	3.336	0.000	0.000	2.201	0.000	7.627	0.134	3.814	0.000	0.000	-0.043	-0.002
END	PD	1	433.466	25.371	-0.189	3.336	0.000	0.000	2.201	0.000	7.627	0.134	3.814	0.000	0.000	-0.043	-0.002
END	PERIOD	1	433.466	25.371	-0.189	3.336	0.000	0.000	2.201	0.000	7.627	0.134	3.814	0.000	0.000	-0.043	-0.002
BEGIN	PERIOD	2	433.466	25.371	-0.189	3.336	0.000	0.000	2.201	0.000	7.627	0.134	3.814	0.000	0.000	-0.043	-0.002
BEGIN	PF	2	433.466	25.371	-0.189	3.336	0.000	0.000	2.201	0.000	7.627	0.134	3.814	0.000	0.000	-0.043	-0.002
96	LH0L	5	434.181	25.662	-0.218	3.340	0.000	0.000	2.202	0.000	7.504	0.039	3.830	0.000	0.000	-0.044	-0.002
97	GF	3	437.839	16.227	2.345	3.366	0.000	0.000	1.749	-0.237	13.720	-2.016	3.894	0.000	0.000	-0.066	-0.010

98	LOS	3	438.289	14.197	2.165	3.371	0.000	0.000	1.642-0.237	15.609	-2.182	3.899	0.000	0.000	-0.070-0.010
99	GD	3	441.946	7.293	0.034	3.435	0.000	0.000	1.227 0.000	24.096	0.272	3.926	0.000	0.000	-0.086 0.002
100	LHOL	6	442.661	7.314	-0.064	3.451	0.000	0.000	1.227 0.000	23.730	0.240	3.931	0.000	0.000	-0.084 0.002
END	PF	2	442.661	7.314	-0.064	3.451	0.000	0.000	1.227 0.000	23.730	0.240	3.931	0.000	0.000	-0.084 0.002
BEGIN	PD	2	442.661	7.314	-0.064	3.451	0.000	0.000	1.227 0.000	23.730	0.240	3.931	0.000	0.000	-0.084 0.002
101	LHOL	7	443.376	7.475	-0.162	3.466	0.000	0.000	1.227 0.000	23.409	0.208	3.936	0.000	0.000	-0.083 0.002
102	GD	4	447.033	15.774	-2.481	3.526	0.000	0.000	1.646 0.238	12.786	2.182	3.967	0.000	0.000	-0.057 0.012
103	LOS	4	447.483	18.098	-2.685	3.530	0.000	0.000	1.753 0.238	10.913	1.980	3.973	0.000	0.000	-0.052 0.012
104	GF	4	451.140	29.053	0.216	3.553	0.000	0.000	2.207 0.000	4.670	0.006	4.067	0.000	0.000	-0.018 0.007
105	LHOL	8	451.855	28.764	0.190	3.557	0.000	0.000	2.207 0.000	4.771	-0.147	4.091	0.000	0.000	-0.013 0.007
END	PD	2	451.855	28.764	0.190	3.557	0.000	0.000	2.207 0.000	4.771	-0.147	4.091	0.000	0.000	-0.013 0.007
END	PERIOD	2	451.855	28.764	0.190	3.557	0.000	0.000	2.207 0.000	4.771	-0.147	4.091	0.000	0.000	-0.013 0.007
BEGIN	PERIOD	3	451.855	28.764	0.190	3.557	0.000	0.000	2.207 0.000	4.771	-0.147	4.091	0.000	0.000	-0.013 0.007
BEGIN	PF	3	451.855	28.764	0.190	3.557	0.000	0.000	2.207 0.000	4.771	-0.147	4.091	0.000	0.000	-0.013 0.007
106	LHOL	9	452.570	28.511	0.164	3.561	0.000	0.000	2.207 0.000	5.091	-0.300	4.114	0.000	0.000	-0.008 0.007
107	GF	5	456.228	15.864	2.687	3.586	0.000	0.000	1.751-0.238	14.542	-2.706	4.191	0.000	0.000	0.019 0.008
108	LOS	5	456.678	13.551	2.454	3.591	0.000	0.000	1.644-0.238	17.093	-2.963	4.195	0.000	0.000	0.022 0.008
109	GD	5	460.335	5.207	0.204	3.670	0.000	0.000	1.224-0.001	31.188	-0.208	4.218	0.000	0.000	0.044 0.003
110	LHOL	10	461.050	5.018	0.061	3.692	0.000	0.000	1.223-0.001	31.502	-0.232	4.222	0.000	0.000	0.046 0.003
END	PF	3	461.050	5.018	0.061	3.692	0.000	0.000	1.223-0.001	31.502	-0.232	4.222	0.000	0.000	0.046 0.003
BEGIN	PD	3	461.050	5.018	0.061	3.692	0.000	0.000	1.223-0.001	31.502	-0.232	4.222	0.000	0.000	0.046 0.003
111	LHOL	11	461.765	5.033	-0.082	3.715	0.000	0.000	1.223-0.001	31.851	-0.256	4.226	0.000	0.000	0.048 0.003
112	GD	6	465.422	12.051	-2.153	3.800	0.000	0.000	1.635 0.236	19.822	2.963	4.247	0.000	0.000	0.047-0.004
113	LOS	6	465.872	14.083	-2.363	3.805	0.000	0.000	1.741 0.236	17.256	2.741	4.251	0.000	0.000	0.045-0.004
114	GF	6	469.529	25.283	-0.162	3.834	0.000	0.000	2.191 0.000	7.830	0.257	4.306	0.000	0.000	0.042 0.002
115	LHOL	12	470.244	25.535	-0.191	3.838	0.000	0.000	2.190 0.000	7.532	0.160	4.321	0.000	0.000	0.043 0.002
END	PD	3	470.244	25.535	-0.191	3.838	0.000	0.000	2.190 0.000	7.532	0.160	4.321	0.000	0.000	0.043 0.002
END	PERIOD	3	470.244	25.535	-0.191	3.838	0.000	0.000	2.190 0.000	7.532	0.160	4.321	0.000	0.000	0.043 0.002
BEGIN	PERIOD	4	470.244	25.535	-0.191	3.838	0.000	0.000	2.190 0.000	7.532	0.160	4.321	0.000	0.000	0.043 0.002
BEGIN	PF	4	470.244	25.535	-0.191	3.838	0.000	0.000	2.190 0.000	7.532	0.160	4.321	0.000	0.000	0.043 0.002
116	LHOL	13	470.959	25.829	-0.220	3.843	0.000	0.000	2.190 0.000	7.373	0.062	4.337	0.000	0.000	0.045 0.002
117	GF	7	474.617	16.329	2.361	3.869	0.000	0.000	1.738-0.236	13.315	-1.952	4.402	0.000	0.000	0.065 0.009
118	LOS	7	475.067	14.285	2.180	3.874	0.000	0.000	1.631-0.236	15.145	-2.115	4.407	0.000	0.000	0.069 0.009
119	GD	7	478.724	7.313	0.040	3.937	0.000	0.000	1.216 0.000	23.404	0.256	4.436	0.000	0.000	0.083-0.002
120	LHOL	14	479.439	7.326	-0.058	3.953	0.000	0.000	1.216 0.000	23.062	0.223	4.441	0.000	0.000	0.082-0.002
END	PF	4	479.439	7.326	-0.058	3.953	0.000	0.000	1.216 0.000	23.062	0.223	4.441	0.000	0.000	0.082-0.002
BEGIN	PD	4	479.439	7.326	-0.058	3.953	0.000	0.000	1.216 0.000	23.062	0.223	4.441	0.000	0.000	0.082-0.002
121	LHOL	15	480.154	7.478	-0.156	3.968	0.000	0.000	1.215 0.000	22.765	0.191	4.446	0.000	0.000	0.081-0.002
122	GD	8	483.811	15.708	-2.466	4.028	0.000	0.000	1.628 0.236	12.518	2.115	4.478	0.000	0.000	0.055-0.012
123	LOS	8	484.261	18.019	-2.668	4.032	0.000	0.000	1.734 0.236	10.703	1.918	4.484	0.000	0.000	0.049-0.012
124	GF	8	487.918	28.891	0.218	4.056	0.000	0.000	2.185 0.000	4.737	-0.021	4.578	0.000	0.000	0.016-0.007
125	LHOL	16	488.633	28.598	0.192	4.060	0.000	0.000	2.185 0.000	4.874	-0.172	4.602	0.000	0.000	0.011-0.007
END	PD	4	488.633	28.598	0.192	4.060	0.000	0.000	2.185 0.000	4.874	-0.172	4.602	0.000	0.000	0.011-0.007
END	PERIOD	4	488.633	28.598	0.192	4.060	0.000	0.000	2.185 0.000	4.874	-0.172	4.602	0.000	0.000	0.011-0.007
BEGIN	PERIOD	5	488.633	28.598	0.192	4.060	0.000	0.000	2.185 0.000	4.874	-0.172	4.602	0.000	0.000	0.011-0.007
BEGIN	PF	5	488.633	28.598	0.192	4.060	0.000	0.000	2.185 0.000	4.874	-0.172	4.602	0.000	0.000	0.011-0.007
126	LHOL	17	489.348	28.342	0.166	4.064	0.000	0.000	2.185 0.000	5.228	-0.323	4.624	0.000	0.000	0.005-0.007
127	GF	9	493.006	15.762	2.670	4.089	0.000	0.000	1.736-0.235	14.944	-2.767	4.699	0.000	0.000	-0.022-0.008
128	LOS	9	493.456	13.463	2.438	4.094	0.000	0.000	1.630-0.235	17.552	-3.028	4.703	0.000	0.000	-0.026-0.008
129	GD	9	497.113	5.187	0.198	4.173	0.000	0.000	1.219 0.001	31.856	-0.191	4.726	0.000	0.000	-0.048-0.003
130	LHOL	18	497.828	5.006	0.054	4.195	0.000	0.000	1.219 0.001	32.146	-0.214	4.729	0.000	0.000	-0.050-0.003
END	PF	5	497.828	5.006	0.054	4.195	0.000	0.000	1.219 0.001	32.146	-0.214	4.729	0.000	0.000	-0.050-0.003
BEGIN	PD	5	497.828	5.006	0.054	4.195	0.000	0.000	1.219 0.001	32.146	-0.214	4.729	0.000	0.000	-0.050-0.003
131	LHOL	19	498.543	5.031	-0.089	4.218	0.000	0.000	1.220 0.001	32.468	-0.237	4.733	0.000	0.000	-0.053-0.003
132	GD	10	502.200	12.117	-2.168	4.303	0.000	0.000	1.639 0.238	20.069	3.028	4.754	0.000	0.000	-0.050 0.004
133	LOS	10	502.650	14.164	-2.380	4.308	0.000	0.000	1.746 0.238	17.447	2.800	4.758	0.000	0.000	-0.048 0.004
134	GF	10	506.308	25.447	-0.164	4.337	0.000	0.000	2.201 0.000	7.754	0.283	4.813	0.000	0.000	-0.043-0.002
135	LHOL	20	507.023	25.702	-0.193	4.341	0.000	0.000	2.202 0.000	7.420	0.183	4.828	0.000	0.000	-0.044-0.002
END	PD	5	507.023	25.702	-0.193	4.341	0.000	0.000	2.202 0.000	7.420	0.183	4.828	0.000	0.000	-0.044-0.002
END	PERIOD	5	507.023	25.702	-0.193	4.341	0.000	0.000	2.202 0.000	7.420	0.183	4.828	0.000	0.000	-0.044-0.002

BEGIN PF	6	507.023	25.702	-0.193	4.341	0.000	0.000	2.202	0.000	7.420	0.183	4.828	0.000	0.000	-0.044-0.002
136 LHOL	21	507.738	25.998	-0.221	4.345	0.000	0.000	2.202	0.000	7.229	0.084	4.844	0.000	0.000	-0.045-0.002
137 GF	11	511.395	16.431	2.378	4.371	0.000	0.000	1.749-0.237		12.917	-1.893	4.911	0.000	0.000	-0.064-0.009
138 LOS	11	511.845	14.373	2.196	4.376	0.000	0.000	1.643-0.237		14.693	-2.053	4.916	0.000	0.000	-0.068-0.009
139 GD	11	515.502	7.333	0.046	4.439	0.000	0.000	1.227 0.000		22.761	0.237	4.946	0.000	0.000	-0.081 0.002
140 LHOL	22	516.217	7.336	-0.051	4.455	0.000	0.000	1.227 0.000		22.445	0.204	4.951	0.000	0.000	-0.079 0.002
END PF	6	516.217	7.336	-0.051	4.455	0.000	0.000	1.227 0.000		22.445	0.204	4.951	0.000	0.000	-0.079 0.002
141 LHOL	23	516.932	7.480	-0.149	4.470	0.000	0.000	1.227 0.000		22.177	0.171	4.956	0.000	0.000	-0.078 0.002
142 GD	12	520.589	15.641	-2.450	4.530	0.000	0.000	1.646 0.238		12.294	2.053	4.989	0.000	0.000	-0.052 0.011
143 LOS	12	521.039	17.937	-2.652	4.534	0.000	0.000	1.753 0.238		10.532	1.862	4.995	0.000	0.000	-0.047 0.011
144 GF	12	524.697	28.726	0.220	4.558	0.000	0.000	2.207 0.000		4.821	-0.046	5.089	0.000	0.000	-0.014 0.007
145 LHALL	1	525.257	28.492	0.199	4.561	0.000	0.000	2.207 0.000		4.938	-0.162	5.107	0.000	0.000	-0.009 0.007
END Q	1	525.257	28.492	0.199	4.561	0.000	0.000	2.207 0.000		4.938	-0.162	5.107	0.000	0.000	-0.009 0.007
BEGIN M1	1	525.257	28.492	0.199	4.561	0.000	0.000	2.207 0.000		4.938	-0.162	5.107	0.000	0.000	-0.009 0.007
146 QMI1	1	525.983	28.183	0.226	4.565	0.000	0.000	2.205-0.004		5.290	-0.323	5.130	0.000	0.000	-0.004 0.007
147 LM121	1	526.733	27.864	0.198	4.569	0.000	0.000	2.202-0.004		5.893	-0.480	5.151	0.000	0.000	0.001 0.007
148 BMI	1	529.679	27.019	0.089	4.587	0.000	0.000	2.251 0.038		10.520	-1.089	5.212	0.000	0.000	0.023 0.007
149 LM122	1	530.269	26.928	0.067	4.590	0.000	0.000	2.273 0.038		11.877	-1.212	5.221	0.000	0.000	0.028 0.007
150 QMI2	1	531.269	23.682	3.045	4.596	0.000	0.000	2.173-0.237		16.231	-3.318	5.233	0.000	0.000	0.037 0.011
151 LM231	1	531.859	20.240	2.789	4.601	0.000	0.000	2.033-0.237		20.404	-3.754	5.238	0.000	0.000	0.044 0.011
152 BMI	2	534.805	7.572	1.512	4.639	0.000	0.000	1.398-0.195		48.892	-5.907	5.253	0.000	0.000	0.077 0.011
153 LM232	1	535.355	6.040	1.273	4.652	0.000	0.000	1.291-0.195		55.612	-6.310	5.254	0.000	0.000	0.083 0.011
154 QMI3	1	536.081	4.857	0.404	4.673	0.000	0.000	1.203-0.047		59.957	0.499	5.256	0.000	0.000	0.088 0.001
155 LM1	1	536.181	4.778	0.380	4.677	0.000	0.000	1.199-0.047		59.857	0.497	5.257	0.000	0.000	0.088 0.001
156 QMI3	2	536.907	4.749	-0.339	4.701	0.000	0.000	1.216 0.096		54.156	7.128	5.259	0.000	0.000	0.085-0.009
157 LM341	1	537.457	5.193	-0.468	4.719	0.000	0.000	1.269 0.096		46.605	6.602	5.260	0.000	0.000	0.080-0.009
158 BMI	3	540.403	9.987	-1.160	4.786	0.000	0.000	1.613 0.138		15.960	3.791	5.278	0.000	0.000	0.052-0.009
159 LM342	1	540.920	11.248	-1.281	4.794	0.000	0.000	1.684 0.138		12.298	3.293	5.283	0.000	0.000	0.047-0.009
160 QMI4	1	541.646	12.440	-0.325	4.804	0.000	0.000	1.729-0.015		8.638	1.856	5.295	0.000	0.000	0.042-0.005
161 LM1	2	541.746	12.505	-0.333	4.805	0.000	0.000	1.727-0.015		8.272	1.805	5.297	0.000	0.000	0.041-0.005
162 QMI4	2	542.472	12.225	0.712	4.814	0.000	0.000	1.661-0.166		6.360	0.885	5.313	0.000	0.000	0.039-0.002
163 LM451	1	542.989	11.522	0.648	4.821	0.000	0.000	1.575-0.166		5.519	0.740	5.327	0.000	0.000	0.038-0.002
164 BMI	4	545.935	8.775	0.285	4.868	0.000	0.000	1.148-0.124		3.586	-0.085	5.442	0.000	0.000	0.032-0.002
END M1	1	545.935	8.775	0.285	4.868	0.000	0.000	1.148-0.124		3.586	-0.085	5.442	0.000	0.000	0.032-0.002
BEGIN M2	1	545.935	8.775	0.285	4.868	0.000	0.000	1.148-0.124		3.586	-0.085	5.442	0.000	0.000	0.032-0.002
165 LM452	1	547.010	8.304	0.153	4.888	0.000	0.000	1.014-0.124		4.092	-0.387	5.487	0.000	0.000	0.030-0.002
166 QMI5	1	547.736	7.901	0.397	4.903	0.000	0.000	0.909-0.165		4.940	-0.794	5.513	0.000	0.000	0.029-0.001
167 LM561	1	549.206	7.050	0.182	4.934	0.000	0.000	0.667-0.165		7.986	-1.279	5.551	0.000	0.000	0.028-0.001
168 BMI	5	552.152	7.251	-0.250	5.002	0.000	0.000	0.245-0.123		18.363	-2.240	5.590	0.000	0.000	0.026-0.001
169 LM562	1	554.870	9.691	-0.648	5.054	0.000	0.000	-0.088-0.123		32.963	-3.131	5.607	0.000	0.000	0.024-0.001
170 QMI6	1	555.596	11.478	-1.872	5.065	0.000	0.000	-0.182-0.136		35.128	0.222	5.611	0.000	0.000	0.023-0.003
171 LM1	3	555.696	11.856	-1.911	5.067	0.000	0.000	-0.195-0.136		35.084	0.219	5.611	0.000	0.000	0.023-0.003
172 QMI6	2	556.422	15.860	-3.737	5.075	0.000	0.000	-0.302-0.161		32.312	3.506	5.615	0.000	0.000	0.020-0.005
173 LM22	1	557.422	24.277	-4.680	5.083	0.000	0.000	-0.463-0.161		25.712	3.094	5.620	0.000	0.000	0.015-0.005
174 SI0	1	557.922	29.193	-5.152	5.086	0.000	0.000	-0.543-0.161		22.720	2.889	5.623	0.000	0.000	0.011-0.007
175 LM10	1	558.486	35.304	-5.684	5.089	0.000	0.000	-0.634-0.161		19.593	2.657	5.628	0.000	0.000	0.007-0.007
176 QMI7	1	559.212	41.123	-2.136	5.092	0.000	0.000	-0.726-0.092		17.236	0.669	5.634	0.000	0.000	0.002-0.007
177 LM1	4	559.312	41.552	-2.149	5.093	0.000	0.000	-0.735-0.092		17.103	0.660	5.635	0.000	0.000	0.002-0.007
178 QMI7	2	560.038	41.624	2.052	5.095	0.000	0.000	-0.774-0.015		17.424	-1.114	5.642	0.000	0.000	-0.003-0.007
179 LM782	1	561.083	37.473	1.921	5.100	0.000	0.000	-0.790-0.015		19.893	-1.248	5.651	0.000	0.000	-0.011-0.007
180 SI1	1	566.083	21.396	1.295	5.128	0.000	0.000	-0.753 0.030		35.539	-1.878	5.681	0.000	0.000	-0.045-0.007
181 L0782	1	568.083	16.715	1.045	5.145	0.000	0.000	-0.693 0.030		43.559	-2.132	5.689	0.000	0.000	-0.059-0.007
182 Q70	1	568.648	16.019	0.198	5.150	0.000	0.000	-0.686-0.004		44.772	0.006	5.691	0.000	0.000	-0.061-0.002
183 Q70	2	569.213	16.258	-0.626	5.156	0.000	0.000	-0.697-0.038		43.546	2.144	5.693	0.000	0.000	-0.061 0.003
184 OB1	1	576.675	30.369	-1.265	5.210	0.000	0.000	-0.977-0.038		18.704	1.185	5.735	0.000	0.000	-0.035 0.003
185 B2	1	581.515	44.618	-1.679	5.231	0.000	0.000	-1.205-0.057		10.240	0.564	5.792	0.000	0.000	-0.019 0.003
186 OL1	1	582.894	49.413	-1.797	5.236	0.000	0.000	-1.284-0.057		8.931	0.386	5.815	0.000	0.000	-0.014 0.003
187 Q80	1	583.459	50.254	0.321	5.238	0.000	0.000	-1.300-0.001		8.746	-0.057	5.825	0.000	0.000	-0.013 0.002
188 Q80	2	584.024	48.699	2.408	5.240	0.000	0.000	-1.285 0.054		9.062	-0.506	5.835	0.000	0.000	-0.012 0.001
189 OL2	1	586.060	39.472	2.124	5.247	0.000	0.000	-1.175 0.054		11.696	-0.788	5.867	0.000	0.000	-0.009 0.001

190	B2	2	590.900	22.184	1.448	5.273	0.000	0.000	-0.959	0.035	22.566	-1.457	5.915	0.000	0.000	-0.004	0.001
191	L0891	1	591.900	19.428	1.309	5.281	0.000	0.000	-0.924	0.035	25.619	-1.596	5.922	0.000	0.000	-0.003	0.001
192	KI	1	596.705	10.076	0.638	5.337	0.000	0.000	-0.756	0.035	44.150	-2.261	5.945	0.000	0.000	0.000	0.000
193	L0893	1	597.705	8.940	0.498	5.353	0.000	0.000	-0.721	0.035	48.810	-2.399	5.948	0.000	0.000	0.000	0.000
194	Q90	1	598.270	8.661	0.000	5.364	0.000	0.000	-0.711	0.000	50.179	0.000	5.950	0.000	0.000	0.000	0.000
END	M2	1	598.270	8.661	0.000	5.364	0.000	0.000	-0.711	0.000	50.179	0.000	5.950	0.000	0.000	0.000	0.000
END	RHIC	1	598.270	8.661	0.000	5.364	0.000	0.000	-0.711	0.000	50.179	0.000	5.950	0.000	0.000	0.000	0.000

TOTAL LENGTH =	598.270097	MUX	=	5.363656	MUY	=	5.949792
DELTA (S) =	0.000000 mm	DMUX	=	-10.152856	DMUY	=	-8.638940
		BETAX (MAX)	=	159.119611	BETAY (MAX)	=	103.362771
		DX (MAX)	=	5.555500	DY (MAX)	=	0.481382

SURVEY, Z0=0, Y0=.02247

1RHIC

"MAD" VERSION: 7.2/VAX RUN: 16-AUG-9 09:10:45

SURVEY OF BEAM LINE "QM", RANGE = #S / #E"

PAGE 1

POS. NO.	ELEMENT NAME	OCC. NO.	SUM(L) M	ARC M	I I I	X M	Y M	Z M	I I I	THETA RAD	PHI RAD	PSI RAD
BEGIN	QM	1	0.000000	0.000000		0.000000	0.022470	0.000000		0.000000	0.000000	0.000000
BEGIN	Q	1	0.000000	0.000000		0.000000	0.022470	0.000000		0.000000	0.000000	0.000000
1	SWM	1	3.657261	3.657600		-0.086239	0.022470	3.656244		-0.047165	0.000000	0.000000
2	L112	1	13.613097	13.613436		-0.555632	0.022470	13.601009		-0.047165	0.000000	0.000000
3	G1D	1	17.270358	17.271040		-0.814622	0.022470	17.249088		-0.094584	0.000000	0.000000
4	L113	1	21.894527	21.895209		-1.251342	0.022470	21.852588		-0.094584	0.000000	0.000000
5	G2F	1	24.840748	24.841609		-1.585558	0.022470	24.779791		-0.132783	0.000000	0.000000
6	L114	1	26.125318	26.126179		-1.755626	0.022470	26.053053		-0.132783	0.000000	0.000000
BEGIN	PERIOD	1	26.125318	26.126179		-1.755626	0.022470	26.053053		-0.132783	0.000000	0.000000
BEGIN	PF	1	26.125318	26.126179		-1.755626	0.022470	26.053053		-0.132783	0.000000	0.000000
7	LHOL	1	26.840318	26.841179		-1.850288	0.022470	26.761759		-0.132783	0.000000	0.000000
8	GF	1	30.497578	30.498786		-2.420830	0.022470	30.374242		-0.180502	0.000000	0.000000
9	LOS	1	30.947578	30.948786		-2.501616	0.022470	30.816931		-0.180502	0.000000	0.000000
10	GD	1	34.604838	34.606393		-3.243827	0.022470	34.398087		-0.228221	0.000000	0.000000
11	LHOL	2	35.319838	35.321393		-3.405592	0.022470	35.094547		-0.228221	0.000000	0.000000
END	PF	1	35.319838	35.321393		-3.405592	0.022470	35.094547		-0.228221	0.000000	0.000000
BEGIN	PD	1	35.319838	35.321393		-3.405592	0.022470	35.094547		-0.228221	0.000000	0.000000
12	LHOL	3	36.034838	36.036393		-3.567358	0.022470	35.791007		-0.228221	0.000000	0.000000
13	GD	2	39.692098	39.694000		-4.479549	0.022470	39.332682		-0.275940	0.000000	0.000000
14	LOS	2	40.142098	40.144000		-4.602152	0.022470	39.765658		-0.275940	0.000000	0.000000
15	GF	2	43.799358	43.801607		-5.682245	0.022470	43.259789		-0.323659	0.000000	0.000000
16	LHOL	4	44.514358	44.516607		-5.909642	0.022470	43.937665		-0.323659	0.000000	0.000000
END	PD	1	44.514358	44.516607		-5.909642	0.022470	43.937665		-0.323659	0.000000	0.000000
END	PERIOD	1	44.514358	44.516607		-5.909642	0.022470	43.937665		-0.323659	0.000000	0.000000
BEGIN	PERIOD	2	44.514358	44.516607		-5.909642	0.022470	43.937665		-0.323659	0.000000	0.000000
BEGIN	PF	2	44.514358	44.516607		-5.909642	0.022470	43.937665		-0.323659	0.000000	0.000000
17	LHOL	5	45.229358	45.231607		-6.137039	0.022470	44.615541		-0.323659	0.000000	0.000000
18	GF	3	48.886618	48.889214		-7.382577	0.022470	48.054172		-0.371378	0.000000	0.000000
19	LOS	3	49.336618	49.339214		-7.545882	0.022470	48.473495		-0.371378	0.000000	0.000000
20	GD	3	52.993878	52.996821		-8.954027	0.022470	51.848799		-0.419097	0.000000	0.000000
21	LHOL	6	53.708878	53.711821		-9.244986	0.022470	52.501921		-0.419097	0.000000	0.000000
END	PF	2	53.708878	53.711821		-9.244986	0.022470	52.501921		-0.419097	0.000000	0.000000
BEGIN	PD	2	53.708878	53.711821		-9.244986	0.022470	52.501921		-0.419097	0.000000	0.000000
22	LHOL	7	54.423878	54.426821		-9.535945	0.022470	53.155042		-0.419097	0.000000	0.000000
23	GD	4	58.081138	58.084428		-11.103492	0.022470	56.459334		-0.466816	0.000000	0.000000
24	LOS	4	58.531138	58.534428		-11.306013	0.022470	56.861187		-0.466816	0.000000	0.000000
25	GF	4	62.188399	62.192036		-13.029394	0.022470	60.086944		-0.514535	0.000000	0.000000
26	LHOL	8	62.903399	62.907036		-13.381267	0.022470	60.709367		-0.514535	0.000000	0.000000
END	PD	2	62.903399	62.907036		-13.381267	0.022470	60.709367		-0.514535	0.000000	0.000000

END PERIOD	2	62.903399	62.907036	-13.381267	0.022470	60.709367	-0.514535	0.000000	0.000000
BEGIN PERIOD	3	62.903399	62.907036	-13.381267	0.022470	60.709367	-0.514535	0.000000	0.000000
BEGIN PF	3	62.903399	62.907036	-13.381267	0.022470	60.709367	-0.514535	0.000000	0.000000
27 LHOL	9	63.618399	63.622036	-13.733140	0.022470	61.331790	-0.514535	0.000000	0.000000
28 GF	5	67.275659	67.279643	-15.608430	0.022470	64.471669	-0.562254	0.000000	0.000000
29 LOS	5	67.725659	67.729643	-15.848323	0.022470	64.852394	-0.562254	0.000000	0.000000
30 GD	5	71.382919	71.387250	-17.871253	0.022470	67.899245	-0.609973	0.000000	0.000000
31 LHOL	10	72.097919	72.102250	-18.280838	0.022470	68.485305	-0.609973	0.000000	0.000000
END PF	3	72.097919	72.102250	-18.280838	0.022470	68.485305	-0.609973	0.000000	0.000000
BEGIN PD	3	72.097919	72.102250	-18.280838	0.022470	68.485305	-0.609973	0.000000	0.000000

IRHIC "MAD" VERSION: 7.2/VAX RUN: 16-AUG-9 09:10:45
 SURVEY OF BEAM LINE "QM", RANGE = #S / #E" PAGE 2

POS. NO.	ELEMENT		SEQUENCE		POSITIONS				ANGLES		PSI RAD
	NAME	OCC. NO.	SUM(L) M	ARC M	I I	X M	Y M	Z M	THETA RAD	PHI RAD	
32	LHOL	11	72.812919	72.817250	-18.690422	0.022470	69.071364	-0.609973	0.000000	0.000000	0.000000
33	GD	6	76.470179	76.474857	-20.856387	0.022470	72.018251	-0.657692	0.000000	0.000000	0.000000
34	LOS	6	76.920179	76.924857	-21.131469	0.022470	72.374384	-0.657692	0.000000	0.000000	0.000000
35	GF	6	80.577439	80.582464	-23.435538	0.022470	75.214598	-0.705411	0.000000	0.000000	0.000000
36	LHOL	12	81.292439	81.297464	-23.899106	0.022470	75.758960	-0.705411	0.000000	0.000000	0.000000
END	PD	3	81.292439	81.297464	-23.899106	0.022470	75.758960	-0.705411	0.000000	0.000000	0.000000
END	PERIOD	3	81.292439	81.297464	-23.899106	0.022470	75.758960	-0.705411	0.000000	0.000000	0.000000
BEGIN	PERIOD	4	81.292439	81.297464	-23.899106	0.022470	75.758960	-0.705411	0.000000	0.000000	0.000000
BEGIN	PF	4	81.292439	81.297464	-23.899106	0.022470	75.758960	-0.705411	0.000000	0.000000	0.000000
37	LHOL	13	82.007439	82.012464	-24.362674	0.022470	76.303322	-0.705411	0.000000	0.000000	0.000000
38	GF	7	85.664699	85.670071	-26.799601	0.022470	79.030397	-0.753130	0.000000	0.000000	0.000000
39	LOS	7	86.114699	86.120071	-27.107367	0.022470	79.358695	-0.753130	0.000000	0.000000	0.000000
40	GD	7	89.771959	89.777678	-29.671604	0.022470	81.966422	-0.800849	0.000000	0.000000	0.000000
41	LHOL	14	90.486959	90.492678	-30.184936	0.022470	82.464132	-0.800849	0.000000	0.000000	0.000000
END	PF	4	90.486959	90.492678	-30.184936	0.022470	82.464132	-0.800849	0.000000	0.000000	0.000000
BEGIN	PD	4	90.486959	90.492678	-30.184936	0.022470	82.464132	-0.800849	0.000000	0.000000	0.000000
42	LHOL	15	91.201959	91.207678	-30.698269	0.022470	82.961841	-0.800849	0.000000	0.000000	0.000000
43	GD	8	94.859219	94.865285	-33.383977	0.022470	85.444284	-0.848568	0.000000	0.000000	0.000000
44	LOS	8	95.309219	95.315285	-33.721628	0.022470	85.741760	-0.848568	0.000000	0.000000	0.000000
45	GF	8	98.966479	98.972892	-36.522694	0.022470	88.093266	-0.896287	0.000000	0.000000	0.000000
46	LHOL	16	99.681479	99.687892	-37.081119	0.022470	88.539793	-0.896287	0.000000	0.000000	0.000000
END	PD	4	99.681479	99.687892	-37.081119	0.022470	88.539793	-0.896287	0.000000	0.000000	0.000000
END	PERIOD	4	99.681479	99.687892	-37.081119	0.022470	88.539793	-0.896287	0.000000	0.000000	0.000000
BEGIN	PERIOD	5	99.681479	99.687892	-37.081119	0.022470	88.539793	-0.896287	0.000000	0.000000	0.000000
BEGIN	PF	5	99.681479	99.687892	-37.081119	0.022470	88.539793	-0.896287	0.000000	0.000000	0.000000
47	LHOL	17	100.396479	100.402892	-37.639544	0.022470	88.986321	-0.896287	0.000000	0.000000	0.000000
48	GF	9	104.053739	104.060500	-40.549590	0.022470	91.201537	-0.944006	0.000000	0.000000	0.000000
49	LOS	9	104.503739	104.510500	-40.914052	0.022470	91.465483	-0.944006	0.000000	0.000000	0.000000
50	GD	9	108.160999	108.168107	-43.926453	0.022470	93.539365	-0.991725	0.000000	0.000000	0.000000
51	LHOL	18	108.875999	108.883107	-44.524888	0.022470	93.930647	-0.991725	0.000000	0.000000	0.000000
END	PF	5	108.875999	108.883107	-44.524888	0.022470	93.930647	-0.991725	0.000000	0.000000	0.000000
BEGIN	PD	5	108.875999	108.883107	-44.524888	0.022470	93.930647	-0.991725	0.000000	0.000000	0.000000
52	LHOL	19	109.590999	109.598107	-45.123322	0.022470	94.321928	-0.991725	0.000000	0.000000	0.000000
53	GD	10	113.248260	113.255714	-48.231221	0.022470	96.249756	-1.039444	0.000000	0.000000	0.000000
54	LOS	10	113.698260	113.705714	-48.619176	0.022470	96.477770	-1.039444	0.000000	0.000000	0.000000
55	GF	10	117.355520	117.363321	-51.815496	0.022470	98.255153	-1.087163	0.000000	0.000000	0.000000
56	LHOL	20	118.070520	118.078321	-52.448494	0.022470	98.587628	-1.087163	0.000000	0.000000	0.000000
END	PD	5	118.070520	118.078321	-52.448494	0.022470	98.587628	-1.087163	0.000000	0.000000	0.000000
END	PERIOD	5	118.070520	118.078321	-52.448494	0.022470	98.587628	-1.087163	0.000000	0.000000	0.000000
BEGIN	PF	6	118.070520	118.078321	-52.448494	0.022470	98.587628	-1.087163	0.000000	0.000000	0.000000
57	LHOL	21	118.785520	118.793321	-53.081491	0.022470	98.920102	-1.087163	0.000000	0.000000	0.000000
58	GF	11	122.442780	122.450928	-56.358955	0.022470	100.542994	-1.134882	0.000000	0.000000	0.000000
59	LOS	11	122.892780	122.900928	-56.766873	0.022470	100.733002	-1.134882	0.000000	0.000000	0.000000

60	GD	11	126.550040	126.558535	-60.118020	0.022470	102.197709	-1.182601	0.000000	0.000000
61	LHOL	22	127.265040	127.273535	-60.779819	0.022470	102.468350	-1.182601	0.000000	0.000000
END	PF	6	127.265040	127.273535	-60.779819	0.022470	102.468350	-1.182601	0.000000	0.000000
62	LHOL	23	127.980040	127.988535	-61.441619	0.022470	102.738991	-1.182601	0.000000	0.000000
63	GD	12	131.637300	131.646142	-64.858819	0.022470	104.042178	-1.230320	0.000000	0.000000
64	LOS	12	132.087300	132.096142	-65.282987	0.022470	104.192449	-1.230320	0.000000	0.000000
65	GF	12	135.744560	135.753749	-68.758460	0.022470	105.331149	-1.278039	0.000000	0.000000
66	LHALL	1	136.304560	136.313749	-69.294633	0.022470	105.492761	-1.278039	0.000000	0.000000
END	Q	1	136.304560	136.313749	-69.294633	0.022470	105.492761	-1.278039	0.000000	0.000000
BEGIN	M1	1	136.304560	136.313749	-69.294633	0.022470	105.492761	-1.278039	0.000000	0.000000
67	QMI1	1	137.030560	137.039749	-69.989743	0.022470	105.702280	-1.278039	0.000000	0.000000
68	LM121	1	137.780560	137.789749	-70.707832	0.022470	105.918725	-1.278039	0.000000	0.000000
69	BMI	1	140.726671	140.736078	-73.545856	0.022470	106.709414	-1.320123	0.000000	0.000000
70	LM122	1	141.316671	141.326078	-74.117416	0.022470	106.855767	-1.320123	0.000000	0.000000
71	QMI2	1	142.316671	142.326078	-75.086162	0.022470	107.103823	-1.320123	0.000000	0.000000
72	LM231	1	142.906671	142.916078	-75.657722	0.022470	107.250176	-1.320123	0.000000	0.000000
73	BMI	2	145.852782	145.862406	-78.526499	0.022470	107.920764	-1.362208	0.000000	0.000000
74	LM232	1	146.402782	146.412406	-79.064577	0.022470	108.034657	-1.362208	0.000000	0.000000
75	QMI3	1	147.128782	147.138406	-79.774841	0.022470	108.184997	-1.362208	0.000000	0.000000
76	LM1	1	147.228782	147.238406	-79.872673	0.022470	108.205704	-1.362208	0.000000	0.000000
77	QMI3	2	147.954782	147.964406	-80.582936	0.022470	108.356044	-1.362208	0.000000	0.000000
78	LM341	1	148.504782	148.514406	-81.121015	0.022470	108.469937	-1.362208	0.000000	0.000000
79	BMI	3	151.450893	151.460735	-84.015465	0.022470	109.019236	-1.404292	0.000000	0.000000
80	LM342	1	151.967893	151.977735	-84.525315	0.022470	109.104921	-1.404292	0.000000	0.000000
81	QMI4	1	152.693893	152.703735	-85.241275	0.022470	109.225245	-1.404292	0.000000	0.000000
82	LM1	2	152.793893	152.803735	-85.339892	0.022470	109.241819	-1.404292	0.000000	0.000000
83	QMI4	2	153.519893	153.529735	-86.055851	0.022470	109.362143	-1.404292	0.000000	0.000000
84	LM451	1	154.036893	154.046735	-86.565701	0.022470	109.447828	-1.404292	0.000000	0.000000
85	BMI	4	156.983005	156.993064	-89.480699	0.022470	109.874865	-1.446377	0.000000	0.000000
END	M1	1	156.983005	156.993064	-89.480699	0.022470	109.874865	-1.446377	0.000000	0.000000
BEGIN	M2	1	156.983005	156.993064	-89.480699	0.022470	109.874865	-1.446377	0.000000	0.000000
86	LM452	1	158.058005	158.068064	-90.547389	0.022470	110.008271	-1.446377	0.000000	0.000000
87	QMI5	1	158.784005	158.794064	-91.267777	0.022470	110.098367	-1.446377	0.000000	0.000000
88	LM561	1	160.254005	160.264064	-92.726413	0.022470	110.280792	-1.446377	0.000000	0.000000
89	BMI	5	163.200116	163.210392	-95.656796	0.022470	110.584810	-1.488461	0.000000	0.000000
90	LM562	1	165.918116	165.928392	-98.365589	0.022470	110.808344	-1.488461	0.000000	0.000000
91	QMI6	1	166.644116	166.654392	-99.089129	0.022470	110.868052	-1.488461	0.000000	0.000000
92	LM1	3	166.744116	166.754392	-99.188791	0.022470	110.876276	-1.488461	0.000000	0.000000
93	QMI6	2	167.470116	167.480392	-99.912331	0.022470	110.935984	-1.488461	0.000000	0.000000
94	LM22	1	168.470116	168.480392	-100.908944	0.022470	111.018226	-1.488461	0.000000	0.000000
95	SI0	1	168.970116	168.980392	-101.407250	0.022985	111.059347	-1.488461	0.002060	0.000000
96	LM10	1	169.534116	169.544392	-101.969338	0.024147	111.105731	-1.488461	0.002060	0.000000
97	QMI7	1	170.260116	170.270392	-102.692877	0.025642	111.165439	-1.488461	0.002060	0.000000
98	LM1	4	170.360116	170.370392	-102.792538	0.025848	111.173663	-1.488461	0.002060	0.000000
99	QMI7	2	171.086116	171.096392	-103.516077	0.027344	111.233371	-1.488461	0.002060	0.000000
100	LM782	1	172.131116	172.141392	-104.557535	0.029497	111.319313	-1.488461	0.002060	0.000000
101	SI1	1	177.131116	177.141814	-109.548576	0.039794	111.618309	-1.533461	0.002058	0.000093
102	L0782	1	179.131116	179.141814	-111.547178	0.043910	111.692961	-1.533461	0.002058	0.000093
103	Q70	1	179.696116	179.706814	-112.111784	0.044463	111.714051	-1.533461	-0.000101	0.000093
104	Q70	2	180.261116	180.271814	-112.676390	0.043796	111.735140	-1.533461	-0.002260	0.000093
105	OB1	1	187.723116	187.733814	-120.133171	0.026931	112.013671	-1.533461	-0.002260	0.000093
106	B2	1	192.563116	192.573888	-124.967837	0.015997	112.240565	-1.514339	-0.002258	0.000136
107	OL1	1	193.942116	193.952888	-126.344637	0.012883	112.318378	-1.514339	-0.002258	0.000136
108	Q80	1	194.507116	194.517888	-126.908735	0.011770	112.350259	-1.514339	-0.001683	0.000136
109	Q80	2	195.072116	195.082888	-127.472835	0.010982	112.382140	-1.514339	-0.001108	0.000136
110	OL2	1	197.108116	197.118888	-129.505589	0.008726	112.497026	-1.514339	-0.001108	0.000136
111	B2	2	201.948116	201.958962	-134.335043	0.003370	112.816321	-1.495217	-0.001105	0.000157
112	L0891	1	202.948116	202.958962	-135.332188	0.002265	112.891827	-1.495217	-0.001105	0.000157
113	KI	1	207.753116	207.763962	-140.123470	-0.000383	113.254638	-1.495218	0.000003	0.000157
114	L0893	1	208.753116	208.763962	-141.120615	-0.000380	113.330145	-1.495218	0.000003	0.000157

115 Q90	1	209.318116	209.328962	-141.684002	-0.000378	113.372806	-1.495218	0.000003	0.000157
END M2	1	209.318116	209.328962	-141.684002	-0.000378	113.372806	-1.495218	0.000003	0.000157
END QM	1	209.318116	209.328962	-141.684002	-0.000378	113.372806	-1.495218	0.000003	0.000157

TOTAL LENGTH =		209.318116		ARC LENGTH =	209.328962				
ERROR (X) =		-0.141684E+03		ERROR (Y) =	-0.228484E-01	ERROR (Z) =		0.113373E+03	
ERROR (THETA) =		-0.149522E+01		ERROR (PHI) =	0.290006E-05	ERROR (PSI) =		0.157025E-03	
