AD/RHIC/RD–78

RHIC PROJECT

Brookhaven National Laboratory

Calculated Volume for the RHIC Magnet Enclosure

D. P. Brown

November 1994

CALCULATED VOLUME FOR THE RHIC MAGNET ENCLOSURE

D. P. Brown

The study of the Oxygen Deficiency Hazard conditions in the RHIC Magnet Enclosure (RME) or Tunnel required that the volume of each sextant of the RME be calculated. The standard tunnel section is 16-feet in diameter and has its bottom truncated so that the floor-to-ceiling height is 11-feet. A series of elevation drawings of the RME, one per sextant, were prepared. See attached Drawings 01055057, 01055058, 01055061, 01055064, 01055065 and 01055066. These drawings show the various enlargements or "bumps" in the standard tunnel. None of the experimental area buildings are included in these volume calculations.

The information from these drawings was distilled down into a spreadsheet which calculates the volume of the tunnel. The dimensions of the "bumps" are listed in each table (Figures 1 through 6). The results of a calculation for the total tunnel volume of each sextant are shown in Figure 1. The areas of the segments and sectors of a circle are based on the standard formulas.[1] The cross-sectional area of the standard 16-foot tunnel is 147 square feet. An allowance or "deduct" was made in the volume calculation based on an estimated total of 10 square feet cross-sectional area for the magnets and other equipment in the tunnel. The line for "Total Arc Length" gives the arc length from the wall of one experimental area to the wall of its neighboring hall. At 8:00, only the main hall , not the smaller approach halls, is excluded from the tunnel volume. The injection tunnels will be separated by a partition from the main RHIC tunnel and, therefore, are not included in this calculation.

This spreadsheet can be used to calculate partial volumes for the tunnel. A "deduct" for the volume of equipment in the tunnel, linearly scaled with height, was made for each partial volume calculated. Three partial volumes are given in Figures 2, 3 and 4. Figure 2 calculates the volume of the "attics" of the tunnel, i.e., anything higher than the standard tunnel height, 11-feet above floor level. Although it is not shown in the bump dimension columns, added to the volume of the A and C alcoves is the calculated volume of the 7 x 7 x 6.5 foot extension above the main attic. Figure 3 calculates the volume of anything higher than 6.5 feet above the floor. This particular height is chosen because it results in a tunnel volume above it equal to 170,000 standard cubic feet in Sextant 5. 170,000 SCF is the volume of helium in the magnet circuit in one ring sextant which could, in the case of an uncontrolled release, displace air in the tunnel if the exhaust fans failed to operate. Figure 4 shows the calculation for the volume of anything eight feet above the floor. This is another volume (related to the height of the Sextant 5 exit tunnel to Building 1005) used in the safety analysis. Figures 5 and 6 show that for the sextants with the smallest volume (fewer and smaller "bumps") a release of 170,000 cubic feet would displace air down to about 4 feet above the floor if the exhaust fans failed to operate.

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[1] "Handbook of Mathematical Tables and Formulas," R. S. Burington, 3rd Edition, 1949

				SEXTANT VOLUMES						
		Linear dimensions are in feet, volumes in cubic feet								
					Sextant Number					
Type	**Length**	**Width**	**Height**	**Volume**	**1**	**3**	**5**	**7**	**9**	**11**
Calculation of Volume above			**0.0**	**feet from floor including Attics (for 0<height<11)**						
R =	8.00			R = radius of circle						
h =	11.00			h = sagitta of arc						
d =	-3.00			d = center to chord = R-h						
T =	3.910	rad		T = included angle of sector = 2*acos(d/R)						
=	224.05	deg								
l =	14.83			l = chord length across sector = 2*R*sin(T/2)						
Acir =	201.06			Acir = area of circle = Pi*R**2						
Asec =	125.13			Asec = area of whole sector = .5*T*R**2						
Aseg =	147.38			Aseg = area of segment outside of chord = 0.5*(T-sin(T)						
	Total Arc Length =				2046	1934	1976	2039	1918	1921
	Bump Volumes:									
1	97	20	14	27160			27160			
2	7	20	19	2660	2660	2660	2660	2660	2660	2660
3	78	23	12	21528			21528			
A	15	42	12	8111	8111	8111	8111	8111	8111	8111
B	22	42	19	16850	16850	16850	16850	16850	16850	16850
C	15	42	12	8111	8111	8111	8111	8111	8111	8111
4	465	20	14	137320			137320			
5	436	20	14	129080				129080		
6	161	20	16	51360				51360	51360	
2a	7	20	19	2660	2660				2660	2660
	16-ft Tunnel Volumes:									
16'	1980	147	*	291749	291749					
16'	1875	147	*	276348		276348				
16'	1276	147	*	188077			188077			
16'	1384	147	*	203910				203910		
16'	1692	147	*	249303					249303	
16'	1855	147	*	273400						273400
Subtotal					330141	312080	409817	420082	339055	311792
Deduct for Equipment**					20459	19344	19759	20394	19184	19214
Total					309682	292736	390058	399688	319871	292578
Total 16-ft Tunnel Cross-Sectional Area = 147 sq. ft.										
* Value shown in Width column is area (sq ft) of a segment (Aseg, as calculated above) in the tunnel above the given height.										
**Scaled value, linear with height										

				SEXTANT VOLUMES						
		Linear dimensions are in feet, volumes in cubic feet								
					Sextant Number					
Type	**Length**	**Width**	**Height**	**Volume**	**1**	**3**	**5**	**7**	**9**	**11**
Calculation of Volume above			**11.0**	**feet from floor including Attics (for 0<height<11)**						
R =	8.00			R = radius of circle						
h =	0.00			h = sagitta of arc						
d =	8.00			d = center to chord = R-h						
T =	0.000	rad		T = included angle of sector = 2*acos(d/R)						
=	0.00	deg								
l =	0.00			l = chord length across sector = 2*R*sin(T/2)						
Acir =	201.06			Acir = area of circle = Pi*R**2						
Asec =	0.00			Asec = area of whole sector = .5*T*R**2						
Aseg =	0.00			Aseg = area of segment outside of chord = 0.5*(T-sin(T)						
	Total Arc Length =				2046	1934	1976	2039	1918	1921
	Bump Volumes:									
1	97	20	3	5820			5820			
2	7	20	8	1120	1120	1120	1120	1120	1120	1120
3	78	23	1	1794			1794			
A	15	42	1	968	968	968	968	968	968	968
B	22	42	8	6831	6831	6831	6831	6831	6831	6831
C	15	42	1	968	968	968	968	968	968	968
4	465	20	3	29426			29426			
5	436	20	3	27660				27660		
6	161	20	5	16050				16050	16050	
2a	7	20	8	1120	1120				1120	1120
	16-ft Tunnel Volumes:									
16'	1980	0	*	0	0					
16'	1875	0	*	0		0				
16'	1276	0	*	0			0			
16'	1384	0	*	0				0		
16'	1692	0	*	0					0	
16'	1855	0	*	0						0
Subtotal					11007	9887	46926	53597	27057	11007
Deduct for Equipment**					0	0	0	0	0	0
Total					11007	9887	46926	53597	27057	11007
Total 16-ft Tunnel Cross-Sectional Area = 147 sq. ft.										
* Value shown in Width column is area (sq ft) of a segment (Aseg, as calculated above) in the tunnel above the given height.										
**Scaled value, linear with height										

				SEXTANT VOLUMES						
		Linear dimensions are in feet, volumes in cubic feet								
					Sextant Number					
Type	**Length**	**Width**	**Height**	**Volume**	**1**	**3**	**5**	**7**	**9**	**11**
Calculation of Volume above			**6.5**	**feet from floor including Attics (for 0<height<11)**						
R =	8.00			R = radius of circle						
h =	4.51			h = sagitta of arc						
d =	3.49			d = center to chord = R-h						
T =	2.240	rad		T = included angle of sector = 2*acos(d/R)						
=	128.34	deg								
l =	14.40			l = chord length across sector = 2*R*sin(T/2)						
Acir =	201.06			Acir = area of circle = Pi*R**2						
Asec =	71.68			Asec = area of whole sector = .5*T*R**2						
Aseg =	46.58			Aseg = area of segment outside of chord = 0.5*(T-sin(T)						
	Total Arc Length =				2046	1934	1976	2039	1918	1921
	Bump Volumes:									
1	97	20	8	14578			14578			
2	7	20	13	1752	1752	1752	1752	1752	1752	1752
3	78	23	6	9893			9893			
A	15	42	6	3899	3899	3899	3899	3899	3899	3899
B	22	42	12	10943	10943	10943	10943	10943	10943	10943
C	15	42	6	3899	3899	3899	3899	3899	3899	3899
4	465	20	8	73705			73705			
5	436	20	8	69282				69282		
6	161	20	10	30541				30541	30541	
2a	7	20	13	1752	1752				1752	1752
	16-ft Tunnel Volumes:									
16'	1980	47	*	92205	92205					
16'	1875	47	*	87338		87338				
16'	1276	47	*	59440			59440			
16'	1384	47	*	64444				64444		
16'	1692	47	*	78790					78790	
16'	1855	47	*	86406						86406
Subtotal					114450	107831	178109	184760	131577	108651
Deduct for Equipment**					8396	7939	8109	8369	7873	7885
Total					106054	99892	170000	176391	123704	100766
Total 16-ft Tunnel Cross-Sectional Area = 147 sq. ft.										
* Value shown in Width column is area (sq ft) of a segment (Aseg, as calculated above) in the tunnel above the given height.										
**Scaled value, linear with height										

				SEXTANT VOLUMES						
		Linear dimensions are in feet, volumes in cubic feet								
					Sextant Number					
Type	**Length**	**Width**	**Height**	**Volume**	**1**	**3**	**5**	**7**	**9**	**11**
Calculation of Volume above			**8.0**	**feet from floor including Attics (for 0<height<11)**						
R =	8.00			R = radius of circle						
h =	3.00			h = sagitta of arc						
d =	5.00			d = center to chord = R-h						
T =	1.791	rad		T = included angle of sector = 2*acos(d/R)						
=	102.64	deg								
l =	12.49			l = chord length across sector = 2*R*sin(T/2)						
Acir =	201.06			Acir = area of circle = Pi*R**2						
Asec =	57.32			Asec = area of whole sector = .5*T*R**2						
Aseg =	26.10			Aseg = area of segment outside of chord = 0.5*(T-sin(T)						
	Total Arc Length =				2046	1934	1976	2039	1918	1921
	Bump Volumes:									
1	97	20	6	11640			11640			
2	7	20	11	1540	1540	1540	1540	1540	1540	1540
3	78	23	4	7176			7176			
A	15	42	4	2916	2916	2916	2916	2916	2916	2916
B	22	42	11	9563	9563	9563	9563	9563	9563	9563
C	15	42	4	2916	2916	2916	2916	2916	2916	2916
4	465	20	6	58852			58852			
5	436	20	6	55320				55320		
6	161	20	8	25680				25680	25680	
2a	7	20	11	1540	1540				1540	1540
	16-ft Tunnel Volumes:									
16'	1980	26	*	51662	51662					
16'	1875	26	*	48934		48934				
16'	1276	26	*	33304			33304			
16'	1384	26	*	36107				36107		
16'	1692	26	*	44146					44146	
16'	1855	26	*	48412						48412
Subtotal					70137	65870	127907	134043	88301	66888
Deduct for Equipment**					5580	5276	5389	5562	5232	5240
Total					64557	60594	122518	128481	83069	61648
Total 16-ft Tunnel Cross-Sectional Area = 147 sq. ft.										
* Value shown in Width column is area (sq ft) of a segment (Aseg, as calculated above) in the tunnel above the given height.										
**Scaled value, linear with height										

				SEXTANT VOLUMES						
		Linear dimensions are in feet, volumes in cubic feet								
					Sextant Number					
Type	**Length**	**Width**	**Height**	**Volume**	**1**	**3**	**5**	**7**	**9**	**11**
Calculation of Volume above			**4.1**	**feet from floor including Attics (for 0<height<11)**						
R =	8.00			R = radius of circle						
h =	6.91			h = sagitta of arc						
d =	1.09			d = center to chord = R-h						
T =	2.869	rad		T = included angle of sector = 2*acos(d/R)						
=	164.40	deg								
l =	15.85			l = chord length across sector = 2*R*sin(T/2)						
Acir =	201.06			Acir = area of circle = Pi*R**2						
Asec =	91.82			Asec = area of whole sector = .5*T*R**2						
Aseg =	83.21			Aseg = area of segment outside of chord = 0.5*(T-sin(T)						
	Total Arc Length =				2046	1934	1976	2039	1918	1921
	Bump Volumes:									
1	97	20	10	19234			19234			
2	7	20	15	2088	2088	2088	2088	2088	2088	2088
3	78	23	8	14198			14198			
A	15	42	8	5458	5458	5458	5458	5458	5458	5458
B	22	42	14	13128	13128	13128	13128	13128	13128	13128
C	15	42	8	5458	5458	5458	5458	5458	5458	5458
4	465	20	10	97245			97245			
5	436	20	10	91409				91409		
6	161	20	12	38245				38245	38245	
2a	7	20	15	2088	2088				2088	2088
	16-ft Tunnel Volumes:									
16'	1980	83	*	164723	164723					
16'	1875	83	*	156027		156027				
16'	1276	83	*	106189			106189			
16'	1384	83	*	115128				115128		
16'	1692	83	*	140758					140758	
16'	1855	83	*	154363						154363
Subtotal					192942	182159	262997	270914	207222	182583
Deduct for Equipment**					12860	12159	12420	12819	12058	12077
Total					180083	170000	250577	258095	195164	170505
Total 16-ft Tunnel Cross-Sectional Area = 147 sq. ft.										
* Value shown in Width column is area (sq ft) of a segment (Aseg, as calculated above) in the tunnel above the given height.										
**Scaled value, linear with height										

SEXTANT VOLUMES

Linear dimensions are in feet, volumes in cubic feet

Type	Length	Width	Height	Volume	Sextant Number 1	3	5	7	9	11
Calculation of Volume above			4.1	feet from floor including Attics (for 0<height<11)						
R =	8.00			R = radius of circle						
h =	6.90			h = sagitta of arc						
d =	1.10			d = center to chord = R-h						
T =	2.865	rad		T = included angle of sector = 2*acos(d/R)						
=	164.16	deg								
l =	15.85			l = chord length across sector = 2*R*sin(T/2)						
Acir =	201.06			Acir = area of circle = Pi*R**2						
Asec =	91.68			Asec = area of whole sector = .5*T*R**2						
Aseg =	82.95			Aseg = area of segment outside of chord = 0.5*(T-sin(T)						
	Total Arc Length =				2046	1934	1976	2039	1918	1921
	Bump Volumes:									
1	97	20	10	19201			19201			
2	7	20	15	2086	2086	2086	2086	2086	2086	2086
3	78	23	8	14168			14168			
A	15	42	8	5447	5447	5447	5447	5447	5447	5447
B	22	42	14	13113	13113	13113	13113	13113	13113	13113
C	15	42	8	5447	5447	5447	5447	5447	5447	5447
4	465	20	10	97080			97080			
5	436	20	10	91254				91254		
6	161	20	12	38191				38191	38191	
2a	7	20	15	2086	2086				2086	2086
	16-ft Tunnel Volumes:									
16'	1980	83	*	164196	164196					
16'	1875	83	*	155529		155529				
16'	1276	83	*	105850			105850			
16'	1384	83	*	114761				114761		
16'	1692	83	*	140308					140308	
16'	1855	83	*	153870						153870
Subtotal					192375	181621	262391	270298	206677	182048
Deduct for Equipment**					12829	12129	12390	12788	12029	12048
Total					179546	169492	250002	257511	194648	170000

Total 16-ft Tunnel Cross-Sectional Area = 147 sq. ft.

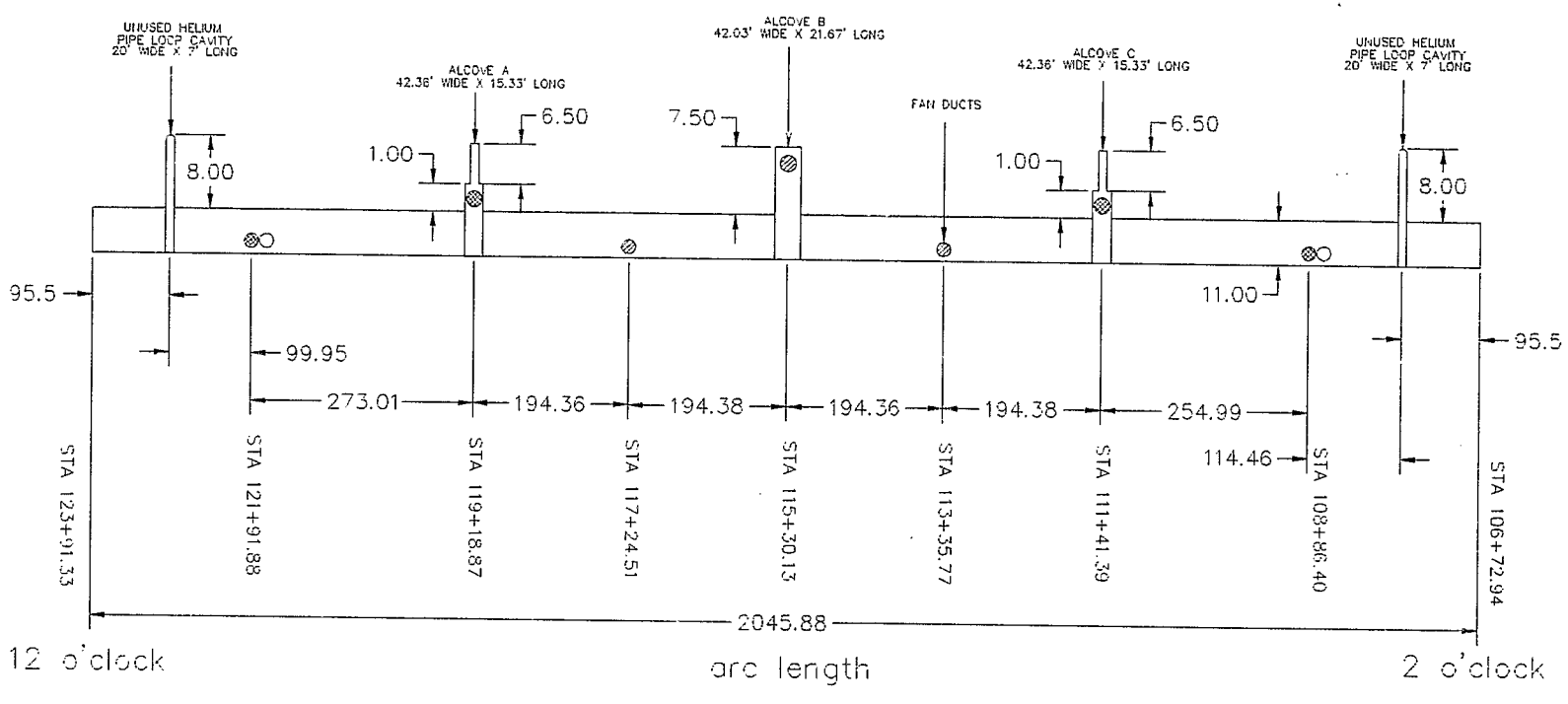
* Value shown in Width column is area (sq ft) of a segment (Aseg, as calculated above) in the tunnel above the given height.

**Scaled value, linear with height

NOTES:

REVISIONS							
REV	ZONE	ECN NO.	DESCRIPTION	BY	DATE	CKR	APP
A			INITIAL RELEASE	MJA	10/31/94	SN	DPB

- 4.0' DIAMETER DUCT
- 3.5' DIAMETER DUCT
- 2ND DUCT OF PAIR LOCATED OPPOSITE SIDE OF ENCLOSURE



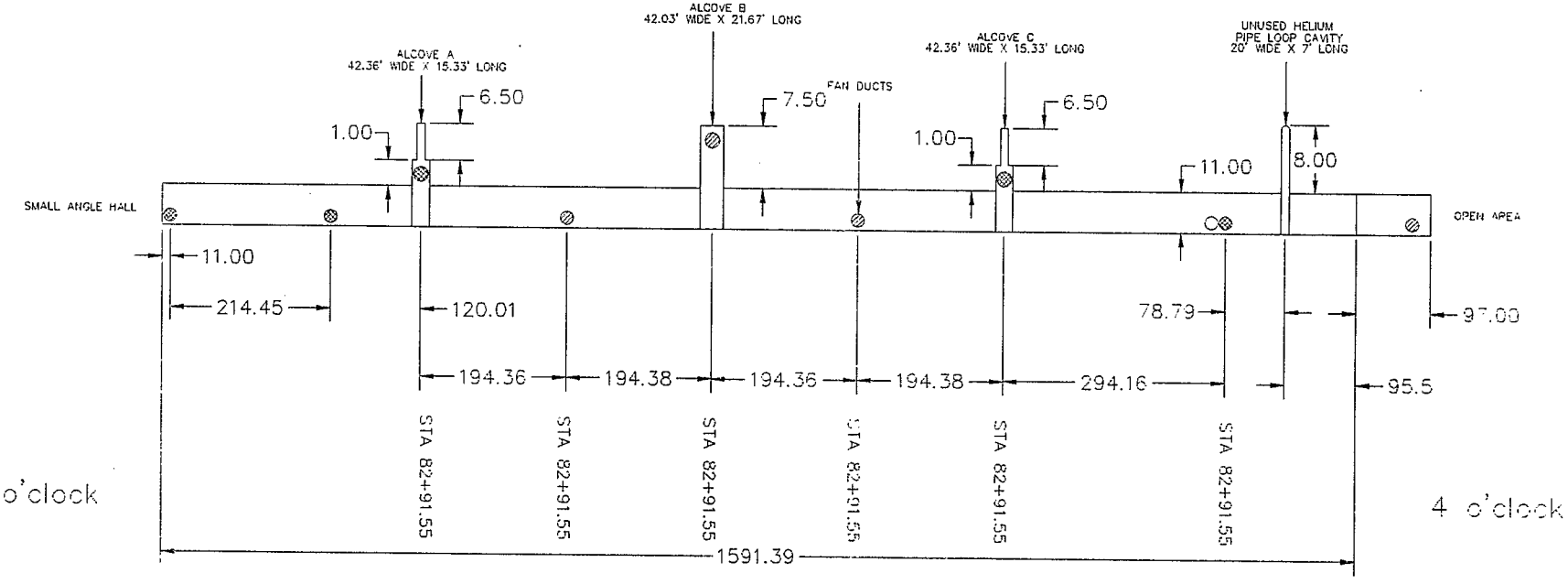
OUTSTANDING ECN NUMBERS	INTERPRET IN GENERAL ACCORDANCE WITH ASME Y14.24M-1989	RHIC			BROOKHAVEN NATIONAL LABORATORY ASSOCIATED UNIVERSITIES, INC. UPTON, N.Y. 11973			
	UNLESS OTHERWISE SPECIFIED	DRAWN BY	M.ALINGER	8/11/94	TITLE: MAGNET ENCLOSURE ELEV SEXTANT 1, FAN DUCTS			
	DIMENSIONS ARE IN INCHES DECIMAL TOLERANCES .X ± .06 .XX ± .02 .XXX ± .005 ANGULAR TOLERANCE ± 1°	DESIGN APPROVAL	D.P. Brown	10/28/94				
		CHECKED BY	S. Norton	10/31/94				
		ENGINEER APPROVAL	D.P. Brown	10/28/94				
		SUPERVISOR APPROVAL	D.P. Brown	10/28/94				
	NA FINISH	BREAK SHARP EDGES MAX. NA MIN. NA	Q.A. APPROVAL	T.R. Muller	10/31/94	SIZE C	DRAWING NUMBER: 01055065	REV. A
			SAFETY ENGINEERING	R. Alforque	10/31/94	Q.A. CATEGORY: NA	SCALE NONE	WEIGHT: NA	SHEET 1 OF 1

DWG NO 01055065 REV A SHT 1 OF 1

NOTES:

REVISIONS							
REV	ZONE	ECN NO.	DESCRIPTION	BY	DATE	CKR	APP
A			INITIAL RELEASE	MJA	10/31/94	SN	DPB

- 4.0' DIAMETER DUCT
- 3.5' DIAMETER DUCT
- 2ND DUCT OF PAIR LOCATED OPPOSITE SIDE OF ENCLOSURE



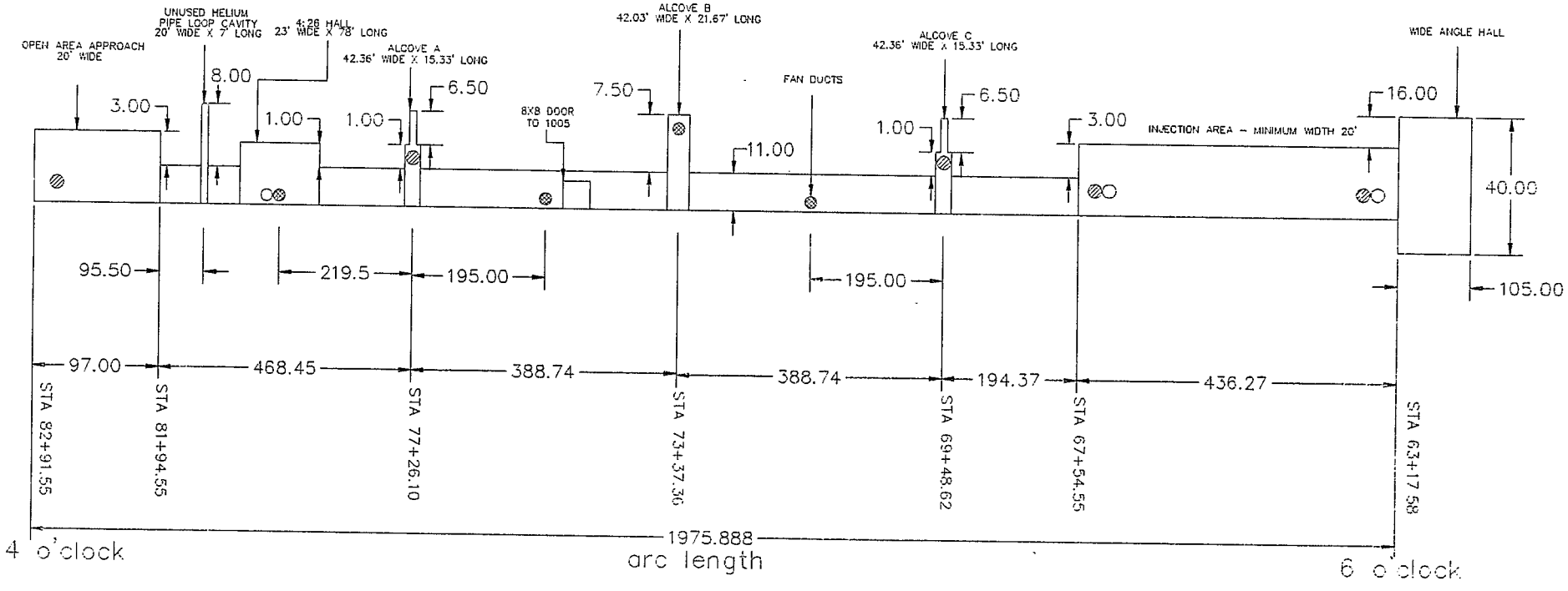
OUTSTANDING ECN NUMBERS	INTERPRET IN GENERAL ACCORDANCE WITH ASME Y14.24M-1989	RHIC			BROOKHAVEN NATIONAL LABORATORY ASSOCIATED UNIVERSITIES, INC. UPTON, N.Y. 11973			
	UNLESS OTHERWISE SPECIFIED	DRAWN BY	M.ALINGER	8/12/94	TITLE: MAGNET ENCLOSURE ELEV SEXTANT 3, FAN DUCTS			
	DIMENSIONS ARE IN INCHES DECIMAL TOLERANCES .X ± .03 .XX ± .02 .XXX ± .005 ANGULAR TOLERANCE ± 1°	DESIGN APPROVAL	D.P. Brown	10/28/94				
		CHECKED BY	S. Norton	10/31/94				
		ENGINEER APPROVAL	D.P. Brown	10/28/94				
		SUPERVISOR APPROVAL	D.P. Brown	10/28/94				
		Q.A. APPROVAL	T.R. Muller	10/31/94				
	NA ✓ FINISH	BREAK SHARP EDGES MAX. NA MIN. NA	SAFETY ENGINEERING	R. Alforque	10/31/94	SIZE C	DRAWING NUMBER: 01055066	REV. A
					Q.A. CATEGORY: NA	SCALE NONE	WEIGHT: NA	SHEET 1 OF 1

DWG NO 01055066 SHT 1 OF 1 REV A

NOTES:

REVISIONS							
REV	ZONE	ECN NO.	DESCRIPTION	BY	DATE	CKR	APP
A			INITIAL RELEASE	MJA	10/31/94	SN	DPB

- 4.0' DIAMETER DUCT
- 3.5' DIAMETER DUCT
- 2ND DUCT OF PAIR LOCATED OPPOSITE SIDE OF ENCLOSURE



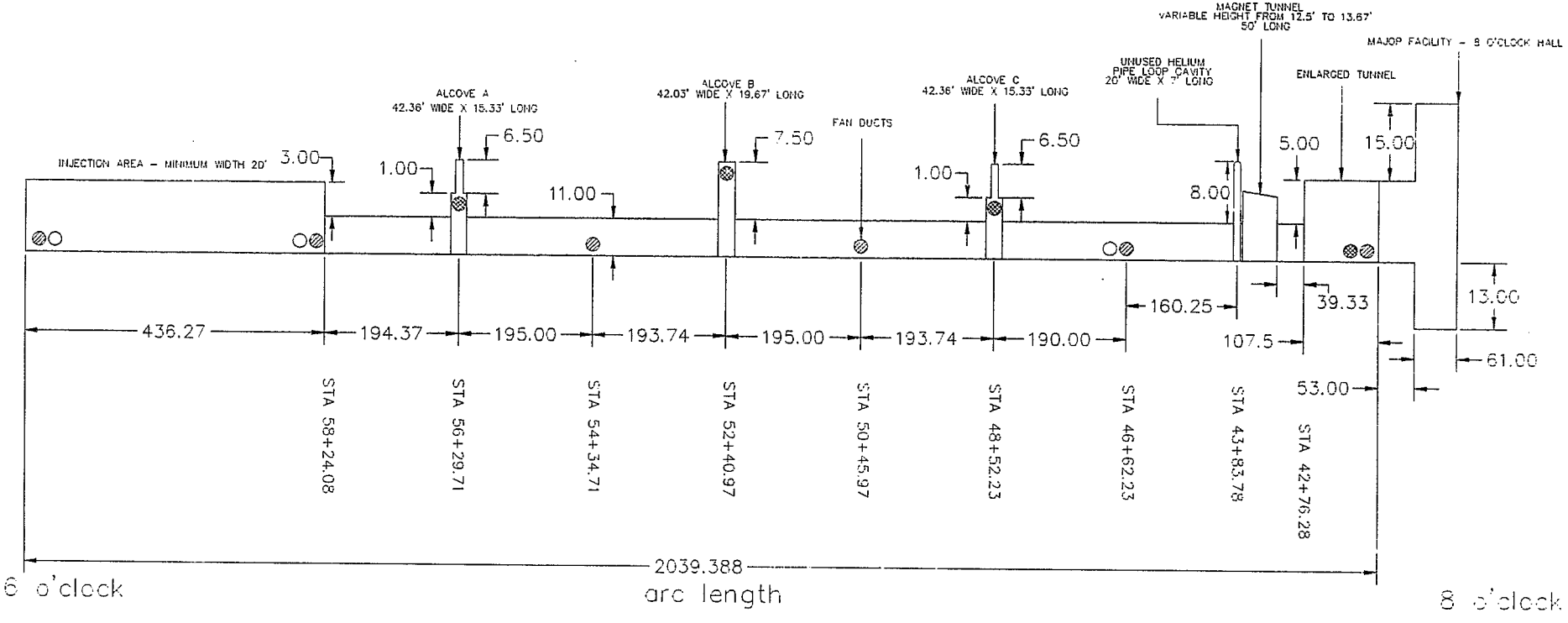
OUTSTANDING ECN NUMBERS	INTERPRET IN GENERAL ACCORDANCE WITH ASME Y14.24M–1989	RHIC			BROOKHAVEN NATIONAL LABORATORY ASSOCIATED UNIVERSITIES, INC. UPTON, N.Y. 11973
	UNLESS OTHERWISE SPECIFIED	DRAWN BY	M.ALINGER	7/25/94	TITLE: MAGNET ENCLOSURE ELEV. SEXTANT 5, FAN DUCTS
	DIMENSIONS ARE IN INCHES DECIMAL TOLERANCES .X ± .09 .XX ± .03 .XXX ± .005 ANGULAR TOLERANCE ± 1°	DESIGN APPROVAL	D.P. Brown	10/28/94	
		CHECKED BY	S. Norton	10/31/94	
		ENGINEER APPROVAL	D.P. Brown	10/28/94	
		SUPERVISOR APPROVAL	D.P. Brown	10/28/94	SIZE C — DRAWING NUMBER: 01055057 — REV. A
	NA FINISH — BREAK SHARP EDGES MAX. NA MIN. NA	Q.A. APPROVAL	T.R. Muller	10/31/94	
		SAFETY ENGINEERING	R. Alforque	10/31/94	Q.A. CATEGORY: NA — SCALE NONE — WEIGHT: NA — SHEET 1 OF 1

DWG NO 01055057 — SHT 1 OF 1 — REV B

REVISIONS							
REV	ZONE	ECN NO.	DESCRIPTION	BY	DATE	CKR	APP
A			INITIAL RELEASE	MJA	10/31/94	SN	DPB

NOTES:

- 4.0' DIAMETER DUCT
- 3.5' DIAMETER DUCT
- 2ND DUCT OF PAIR LOCATED OPPOSITE SIDE OF ENCLOSURE



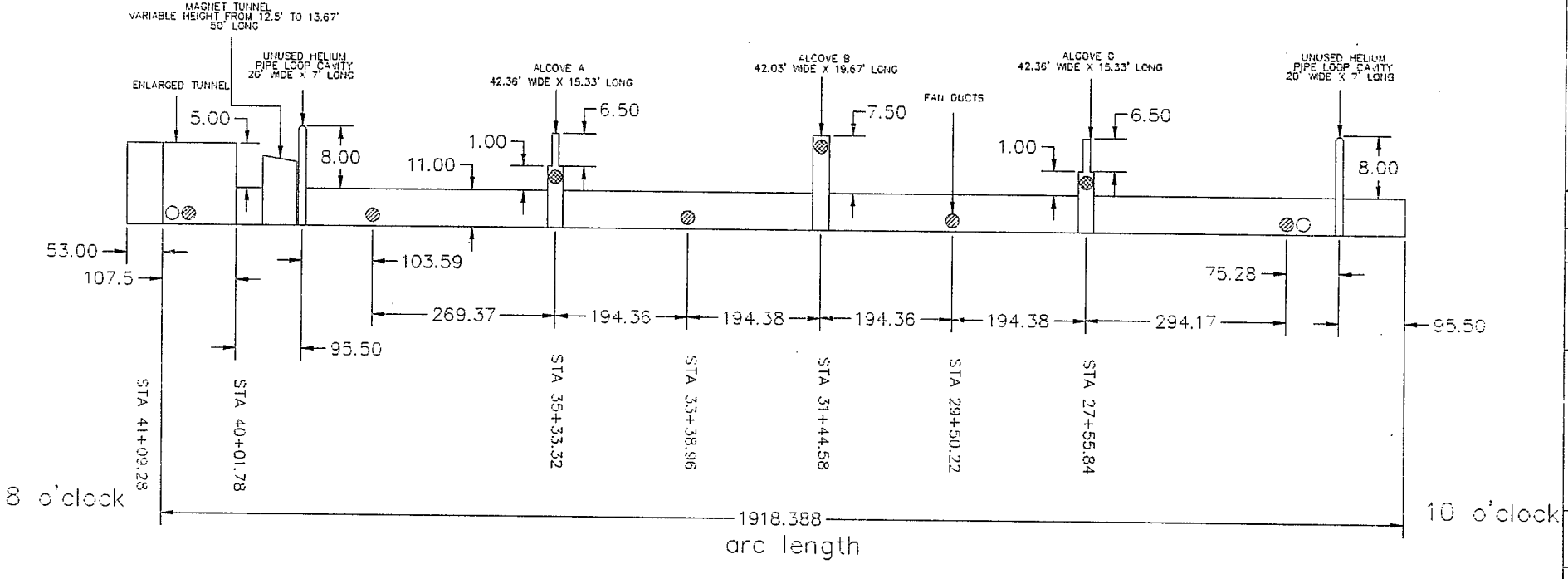
OUTSTANDING ECN NUMBERS	INTERPRET IN GENERAL ACCORDANCE WITH ASME Y14.24M–1989	RHIC			BROOKHAVEN NATIONAL LABORATORY ASSOCIATED UNIVERSITIES, INC. UPTON, N.Y. 11973
	UNLESS OTHERWISE SPECIFIED	DRAWN BY	M.ALINGER	8/1/94	TITLE: MAGNET ENCLOSURE ELEV SEXTANT 7, FAN DUCTS
	DIMENSIONS ARE IN INCHES DECIMAL TOLERANCES .X ± .08 .XX ± .02 .XXX ± .005 ANGULAR TOLERANCE ± 1°	DESIGN APPROVAL	D.P. Brown	10/28/94	
		CHECKED BY	S. Norton	10/31/94	
		ENGINEER APPROVAL	D.P Brown	10/28/94	
		SUPERVISOR APPROVAL	D.P. Brown	10/28/94	SIZE C — DRAWING NUMBER. 01055058 — REV. A
	NA ✓ FINISH — BREAK SHARP EDGES MAX. NA MIN. NA	Q.A. APPROVAL	T.R. Muller	10/31/94	
		SAFETY ENGINEERING	R. Alforque	10/31/94	Q.A. CATEGORY: NA — SCALE NONE — WEIGHT: NA — SHEET 1 OF 1

DWG NO 01055058 — SHT 1 OF 1 — REV A

REVISIONS							
REV	ZONE	ECN NO.	DESCRIPTION	BY	DATE	CKR	APP
A			INITIAL RELEASE	MJA	10/31/94	SN	DPB

NOTES:

- 4.0' DIAMETER DUCT
- 3.5' DIAMETER DUCT
- 2ND DUCT OF PAIR LOCATED OPPOSITE SIDE OF ENCLOSURE



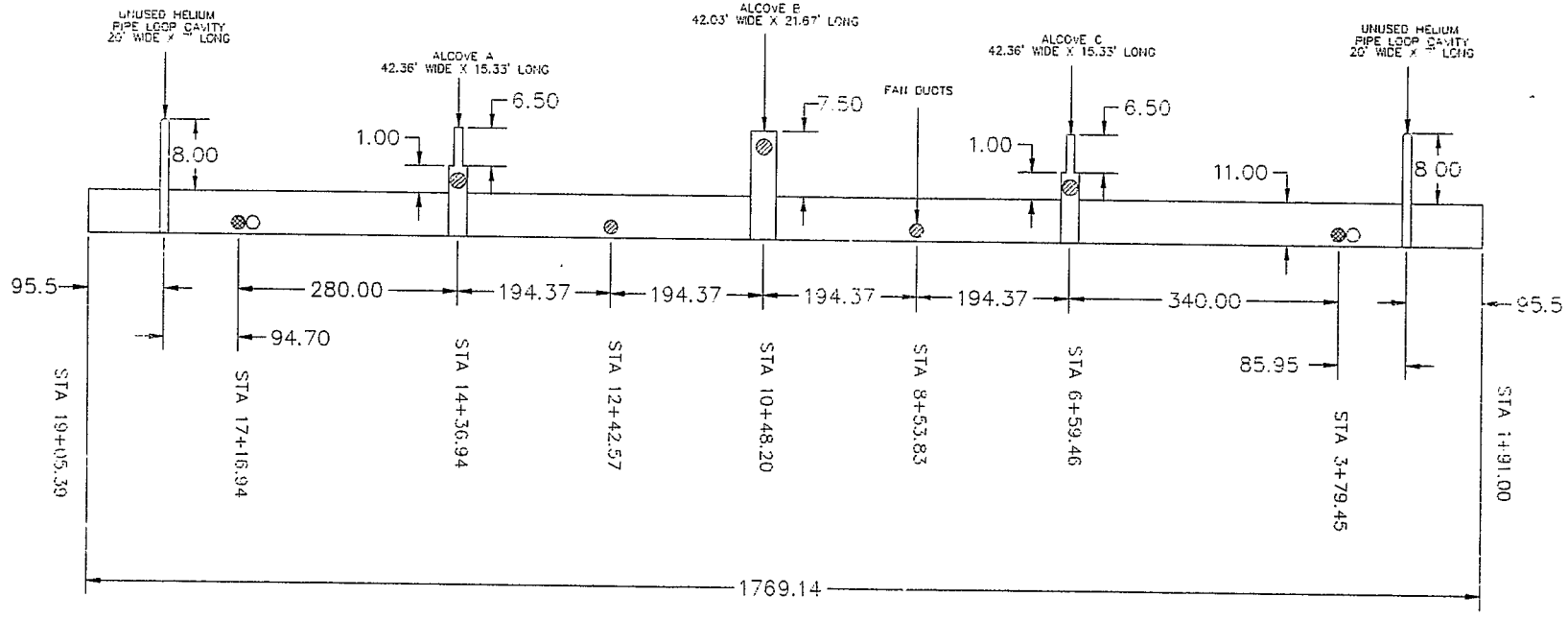
OUTSTANDING ECN NUMBERS	INTERPRET IN GENERAL ACCORDANCE WITH ASME Y14.24M-1989	RHIC			BROOKHAVEN NATIONAL LABORATORY ASSOCIATED UNIVERSITIES, INC. UPTON, N.Y. 11973
	UNLESS OTHERWISE SPECIFIED	DRAWN BY	M.ALINGER	8/3/94	TITLE: MAGNET ENCLOSURE ELEV SEXTANT 9, FAN DUCTS
	DIMENSIONS ARE IN INCHES DECIMAL TOLERANCES .X ± .06 .XX ± .02 .XXX ± .005 ANGULAR TOLERANCE ± 1°	DESIGN APPROVAL	D.P. Brown	10/28/94	
		CHECKED BY	S. Norton	10/31/94	
		ENGINEER APPROVAL	D.P. Brown	10/28/94	
		SUPERVISOR APPROVAL	D.P. Brown	10/28/94	SIZE C — DRAWING NUMBER: 01055061 — REV. A
	NA FINISH — BREAK SHARP EDGES MAX. NA MIN. NA	Q.A. APPROVAL	T.R. Muller	10/31/94	
		SAFETY ENGINEERING	R. Alforque	10/31/94	Q.A. CATEGORY: NA — SCALE NONE — WEIGHT: NA — SHEET 1 OF 1

DWG NO 01055061 — SHT 1 OF 1 — REV A

NOTES:

REVISIONS							
REV	ZONE	ECN NO.	DESCRIPTION	BY	DATE	CKR	APP
A			INITIAL RELEASE	MJA	10/31/94	SN	DPB

- 4.0' DIAMETER DUCT
- 3.5' DIAMETER DUCT
- 2ND DUCT OF PAIR LOCATED OPPOSITE SIDE OF ENCLOSURE



10 o'clock

arc length

12 o'clock

OUTSTANDING ECN NUMBERS	INTERPRET IN GENERAL ACCORDANCE WITH ASME Y14.24M-1989	RHIC	BROOKHAVEN NATIONAL LABORATORY ASSOCIATED UNIVERSITIES, INC. UPTON, N.Y. 11973
	UNLESS OTHERWISE SPECIFIED	DRAWN BY: M.ALINGER 8/10/94	TITLE: MAGNET ENCLOSURE ELEV SEXTANT 11. FAN DUCTS
	DIMENSIONS ARE IN INCHES DECIMAL TOLERANCES .X ± .06 .XX ± .02 .XXX ± .005 ANGULAR TOLERANCE ± 1°	DESIGN APPROVAL: D.P. Brown 10/28/94	
		CHECKED BY: S. Norton 10/31/94	
		ENGINEER APPROVAL: D.P. Brown 10/28/94	
		SUPERVISOR APPROVAL: D.P. Brown 10/28/94	SIZE C — DRAWING NUMBER: 01055064 — REV. A
	NA FINISH — BREAK SHARP EDGES MAX. NA MIN. NA	Q.A. APPROVAL: T.R. Muller 10/31/94	
		SAFETY ENGINEERING: R. Alforque 10/31/94	Q.A. CATEGORY: NA — SCALE NONE — WEIGHT: NA — SHEET 1 OF 1

DWG NO 01055064 SHT 1 OF 1 REV A