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PRELIMINARY REPORT ON BEAM 10,

THE 0° CHARGED PARTICLE BEAM FROM TARGET STATION A OF THE SEB

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The layout of Beam 10, utilizing charged particles produced at 0° from target station A of the SEB is shown in Figure 1. The characteristics, initial performance, and instrumentation of the SEB itself are given in references 1-3. The basic components of Beam 10, their positions and distances are given in Tables I, and Ia. At the moment, Collimators 1 and 2 are fixed collimators in air. They will be replaced in the Spring by remotely controlled variable collimators in vacuum. The jaws of the variable collimators will be stainless steel, 2 feet in length. Each collimator has a pair of such jaws for vertical aperture control and a pair for horizontal aperture control. The full aperture of the collimators in either dimension is 6 inches. The targets are typically one nuclear interaction length of Tungsten or Copper with a 0.100-inch x 0.200-inch cross-section. The targets are mounted on a six-position turret mount and are in air. Control of quadrupoles Q1-Q5 in the primary beam cave lies with the experimenter. Dipoles D1 and D2, which affect the residual primary proton beam dumping, are controlled by AGS Main Control only. Floor loading by the massive proton beam backstop has distorted the vacuum channel through the backstop for Beam 10. The distortion, as surveyed 11/5/69 when the loading of the floor was complete, is shown with an exaggerated vertical scale in Figure 2. The upstream half of this channel has a 4-inch square opening, the downstream half has a 6-inch square aperture. The limiting distortion is obviously that in the 4-inch channel.

TABLE I
Short Branch
Beam 10: Layout of Components

Element Label	Element Type	℄ Distance (inches)	Element Length	Bend (degrees)
Target		0		
DS1	Drift		154.625	
Q1	N8Q32-I	170.625	32.	
DS2	Drift		17.	
Q2	N8Q32-I	219.625	32.	
DS3	Drift		128.	
Q3	8Q48-II	387.625	48.	
DS4	Drift		16.	
Q4	8Q48-II	451.625	48.	
DS5	Drift		95.	
Q5	8Q48-II	594.625	48.	
DS6	Drift			
CIU*	Collimator (horizontal)			
DS7	Drift	666.625	"48"	
CID	Collimator (vertical)			
DS8	Drift		"57."	
D1	18D72-II	759.625	72.	-2.9
DS9	Drift		39.	
D2	30D72-I	111.000[x]		-2.46
DS10	Drift			
C2U**	Collimator (horizontal)		677.	
DS11	Drift	788.		
C2D	Collimator (vertical)		60.	
DS12	Drift			
Q6	8Q48-II	872.	48.	
DS13	Drift		166.	
Q7	8Q48-II	1086	48.	
DS14	Drift		17.	
Q8	8Q48-II	1151	48.	
DS15	Drift		108.	
Q9	8Q48-I	1307	48.	
DS16	Drift		19.	
Q10	8Q48-I	1374	48.	
DS18	Drift		74.	
Q11	8Q48-II	1496	48.	
DS19	Drift		151.	
H01	hodoscope	1671	0.	
DS20	Drift		348.	
D3	18D72-II	2055	72.	+2.9
DS21	Drift		24.	
D4	18D72-II	96	72.	+2.9
DS22	Drift		24.	
D5	18D72-II	96	72.	+2.9
DS23	Drift		48.	
H02	hodoscope	780	0.	
DS 24	Drift		696.	
H03	Hodoscope	780	0.	
DS25	Drift		255.	
T	LH2 Target	1035		

Table Ia

Long Branch

Element Label	Element Type	$\mathcal{C}_L$ Distance (inches)	Element Length (inches)	Bend (degrees)
(through D5, same as short branch except D3,D4,D5 bend - 2.9°)				
DS23	Drift		568.	
Q12	8Q48-II	592	48.	
DS24	Drift		114.	
Q13	8Q48-II	754	48.	
DS25	Drift		664.5	
T	LH2 target	1442.5		

*At present there is a collimator for "scraping" residual protons at this position. The planned centerline of the variable collimator is given as the centerline position here. The present collimator is equivalently a drift space from Q5 to D1 of length "48" + "57" = 105 inches.

**Same remarks as for above. The effective drift length at present is

677 + 60 = 737 inches

xDistances along the beam are measured from turning points. i.e. a new origin for the length is taken at the centerline of each bending magnet.

Reference drawings: AGS #D14-395-6 rev.A, D14-396-6 rev.A, D14-397-6 rev.A.

References:

1. Initial Performance of the AGS Slow External Beam, L. Blumberg et al., Proc. of the National Accelerator Conf. 1969, Washington, D.C.

2. Instrumentation and Control of the AGS Slow External Beam, J.D. Fox et al., ibid.

3. Emittance Measurements in the AGS Slow External Beam, L.N. Blumberg et al., BNL Internal Report AGS Div. 69-12.

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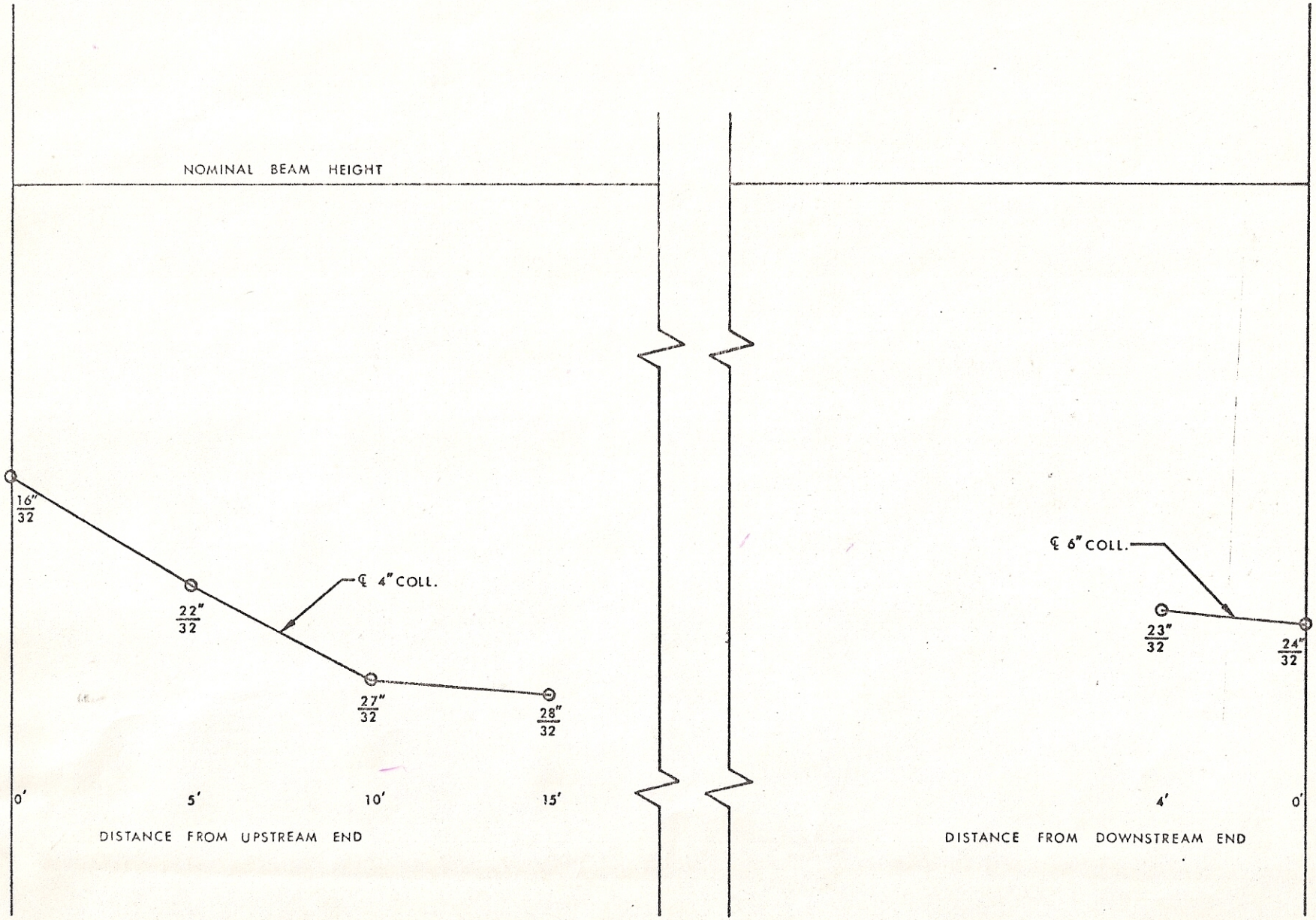
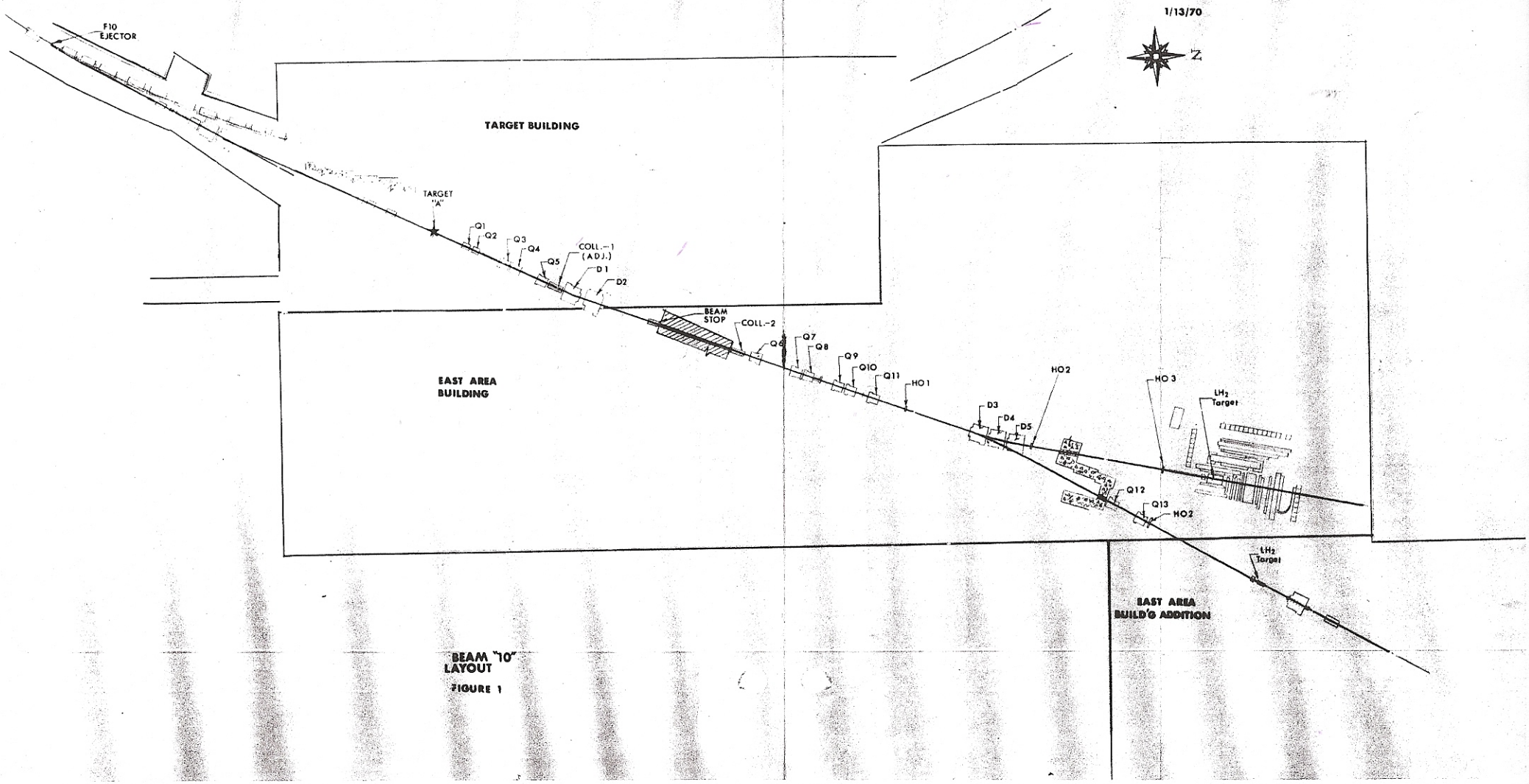
BEAM IO VACUUM CHANNEL DISTORTION





BEAM "10"
LAYOUT

FIGURE 1