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REPOSITIONING OF THE LINAC TO BOOSTER TRANSPORT LINE

F. X. Karl

November 1991

Collider Accelerator Department

Brookhaven National Laboratory

U.S. Department of Energy

USDOE Office of Science (SC)

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REPOSITIONING OF THE LINAC TO BOOSTER TRANSPORT LINE

BOOSTER TECHNICAL NOTE
NO. 203

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November 20, 1991

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REPOSITIONING OF THE LINAC TO BOOSTER TRANSPORT LINE

November 16, 1991

F.X. Karl , M.A. Goldman

The Linac to Booster transport line, used to inject protons from the Linac into the AGS Booster, was altered and resurveyed during October 1991 in order to provide more favorable proton injection orbits into the Booster.

Based upon calculations by E. Bleser and A. Luccio [1] of proton entry trajectories and initial proton orbits inside the Booster, the injection line was reconfigured by changing the deflection angle of each of the horizontal bending dipole magnets BLI.DH2 through BLI.DH5 to 31 degrees, 32 minutes, 18.0 seconds (0.55044782 radians). This change caused a displacement of 0.956 inches in the position of the vertical quadrupole magnet BLI.QV13, and changed the injection angle by 1.435 milliradians.

The revised injection line magnet apex coordinates are listed in Table 1; spacings between successive elements are given in Table 2; bend angles of successive sections appear in Table 3.

The present note is an update of Booster Technical Note No. 160 [2], and represents the current update of Table 4-1 of the Booster Design Manual [3]. The names of the line elements were modified, to correspond to the current nomenclature conventions [4] for Booster elements.

The survey was performed during the period October 24 through November 12, 1991. The survey was made by D. Gordon, D.L. Kazmark Jr., and J.C. Roecklein.

TABLE 1 Location Of The Proton Injection Line Elements.

Element		AGS Coordinates	
No.	Name	E [inches]	N [inches]
1	BLI.DH1	-658.9432	14516.9353
2	BLI.QH1	-502.3375	14417.9046
3	BLI.QV2	-459.0797	14390.5502
4	BLI.QH3	-415.8219	14363.1959
5	BLI.QV4	-372.5642	14335.8415
6	BLI.QH5	-329.3064	14308.4872
7	BLI.DH2	-262.1897	14266.0455
8	BLI.DH3	-197.8755	14265.1821
9	BLI.QH6	-160.0923	14287.6778
10	BLI.DH4	-122.3092	14310.1735
11	BLI.QH7	-101.8738	14349.1096
12	BLI.DH5	-18.8105	14507.3722
13	BLI.QH8	-27.0414	14629.8139
14	BLI.QV9	-30.4742	14680.8796
15	BLI.QH10	-36.5477	14771.2267
16	BLI.QV11	-39.9805	14822.2925
17	BLI.QH12	-46.0539	14912.6386
18	BLI.QV13	-51.5993	14995.1304

TABLE 2 Spacings Between Injection Line Elements.

From Element Number	To Element Number	Distance [Inches] Apex-To-Apex
End Of Linac Tank 9	1	723.125
1	2	185.290
2	3	51.181
3	4	51.181
4	5	51.181
5	6	51.181
6	7	79.410
7	8	64.320
8	9	43.973
9	10	43.973
10	11	43.973
11	12	178.736
12	13	122.718
13	14	51.181
14	15	90.551
15	16	51.181
16	17	90.550
17	18	82.678

TABLE 3

Bend Angles Of Successive Sections

Of The

Linac-To-Booster Transport Beam Line.

Linear Section Between Apexes	Deflection Deg/Min/Sec	From Linear Section
1 To 7	7 / 41 / 33.5	Linac Beam Exit
7 To 8	31 / 32 / 18.0	1 To 7
8 To 10	31 / 32 / 18.0	7 To 8
10 To 12	31 / 32 / 18.0	8 To 10
12 To 18	31 / 32 / 18.0	10 To 12

References

1. E. Bleser , Private Communication.

2. F.X. Karl and M.A. Goldman, The October 1989 Survey Of The Linac To Booster Transport Beam Line. BNL AD Technical Note No. 160, January 29, 1990.

3. Booster Design Manual, AGS Booster Project, Accelerator Development Department, Brookhaven National Laboratory, Upton NY, Revision 1, October 1988.

4. E.H. Auerbach, A Revised Convention For Naming Sections In The Booster And Naming Booster Elements. BNL AD Booster Technical Note No. 142, June 5 1989.