

Mn Inj Beam On Survey

Created Oct 23, 2020



location	Gamma cpm	Neutron mrem/min	location	Gamma cpm	Neutron mrem/min
1	1030	N/A	26	1221	N/A
2	1340		27	1217	
3	closed construction		28	1153	
4			29	1172	
5			30	1050	
6			31	1142	
7			32	1063	
8			33	1043	
9	1501		34	1049	
10	1465		35	1136	
11	1323		36	1145	
12	1350		37	1097	
13	1440		38	1212	
14	1331		39	1269	
15	1158		40	1157	
16	1208		41	1138	
17	1349		42	1268	
18	1251		43	1135	
19	1351		44	1146	
20	1299		45	911	
21	1270		46	1119	
22	1210		47	1298	
23	1019				
24	1218				
25	1207				

All Areas < N/A mR/hr@1foot (Unless otherwise indicated)

Highest Dose Rate Found: N/A mR/hr@1foot

Radiation Instruments Used

Inst Type: <u>Analyst</u>	<u>Analyst</u>
Inst No: <u>26</u>	<u>68</u>
Batt/Source Chk: <u>SAT</u>	<u>SAT</u>
Cal. Due Date: <u>5-21</u>	<u>5-21</u>
Background: <u>N/A</u>	<u>N/A</u>

Bkgd _____ cpm

Wipe #	Reading	Wipe #	Reading
_____	_____ ccpm	_____	_____ ccpm
_____	_____ ccpm	_____	_____ ccpm
_____	_____ ccpm	_____	_____ ccpm
_____	_____ ccpm	_____	_____ ccpm
_____	_____ ccpm	_____	_____ ccpm

Comments:

survey complete using 1 min integration on the Analyst scater
no neutron background taken due to no source from the beam

LEGEND

- Dose Rate in mR/hr @ 1 ft. * - Unlabeled Radioactive Material
 (#R) - Radioactive Material Wipe (#) - Wipe (#F) - Floor Wipe

Surveyed By: Fulgheri/Deloo

Reviewed By: Maddie Schoell, UID:maddiew Digitally signed by Maddie Schoell, UID:maddiew Date: 2021.01.25 14:25:38 -0600

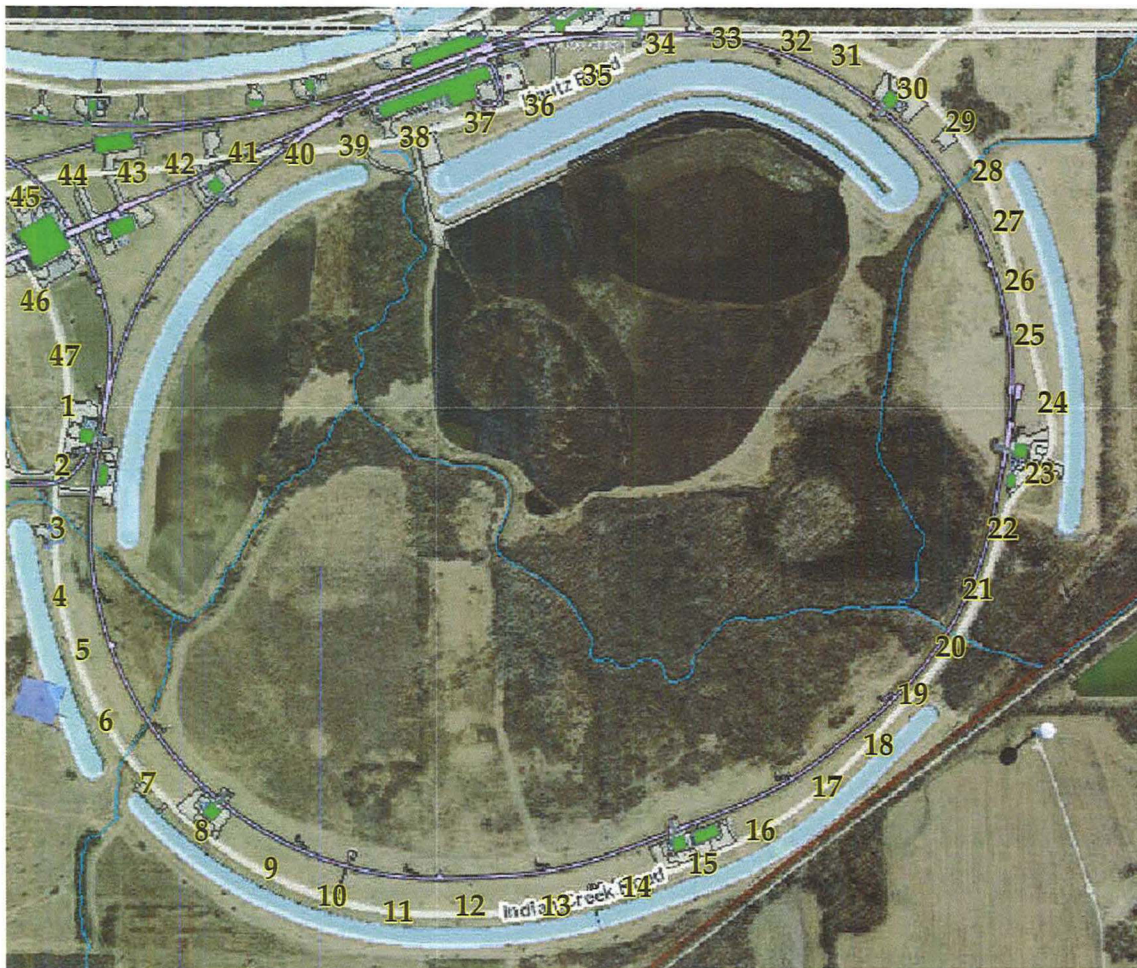
Thu 07-JAN-2021 15:13:25

12:00:30 12:53:05 13:45:41 14:38:17 15:30:53
T1 = 17-NOV-2020 12:00:30.000 T2 = 17-NOV-2020 15:30:53.000

R:TOR003
*BOLK E12
I:TOR003
*BOLK E12

Mn Inj Beam On Survey

Created Oct 23, 2020



location	Gamma cpm	Neutron mrem/min	location	Gamma cpm	Neutron mrem/min
1	1219	0	26	1091	0
2	1129	0	27	1108	0
3	1135	0	28	1120	0
4	1100	0	29	1071	0
5	1182	0	30	1006	0
6	1039	0	31	1088	0
7	1140	0	32	1028	0
8	1067	0	33	965	0
9	1117	0	34	982	0
10	1117	0	35	938	0
11	1093	0	36	1012	0
12	1106	0	37	908	0
13	972	0	38	1112	0
14	1004	0	39	1149	0
15	2150	0	40	1265	0
16	966	0	41	1469	0
17	979	0	42	1756	0
18	1059	0	43	4991	0
19	1009	0	44	4093	0
20	968	0	45	1306	0
21	1015	0	46	1203	0
22	1010	0	47	1230	0
23	1179	0			
24	1136	0			
25	1278	0			

All Areas < N/A mR/hr@1foot (Unless otherwise indicated)

Highest Dose Rate Found: N/A mR/hr@1foot

Radiation Instruments Used

Inst Type: <u>Analyst</u>	<u>Rem 500</u>
Inst No: <u>26</u>	<u>1</u>
Batt/Source Chk: <u>SAT</u>	<u>SAT</u>
Cal. Due Date: <u>5-21</u>	<u>10-21</u>
Background: <u>N/A</u>	<u>N/A</u>

Bkgd _____ cpm

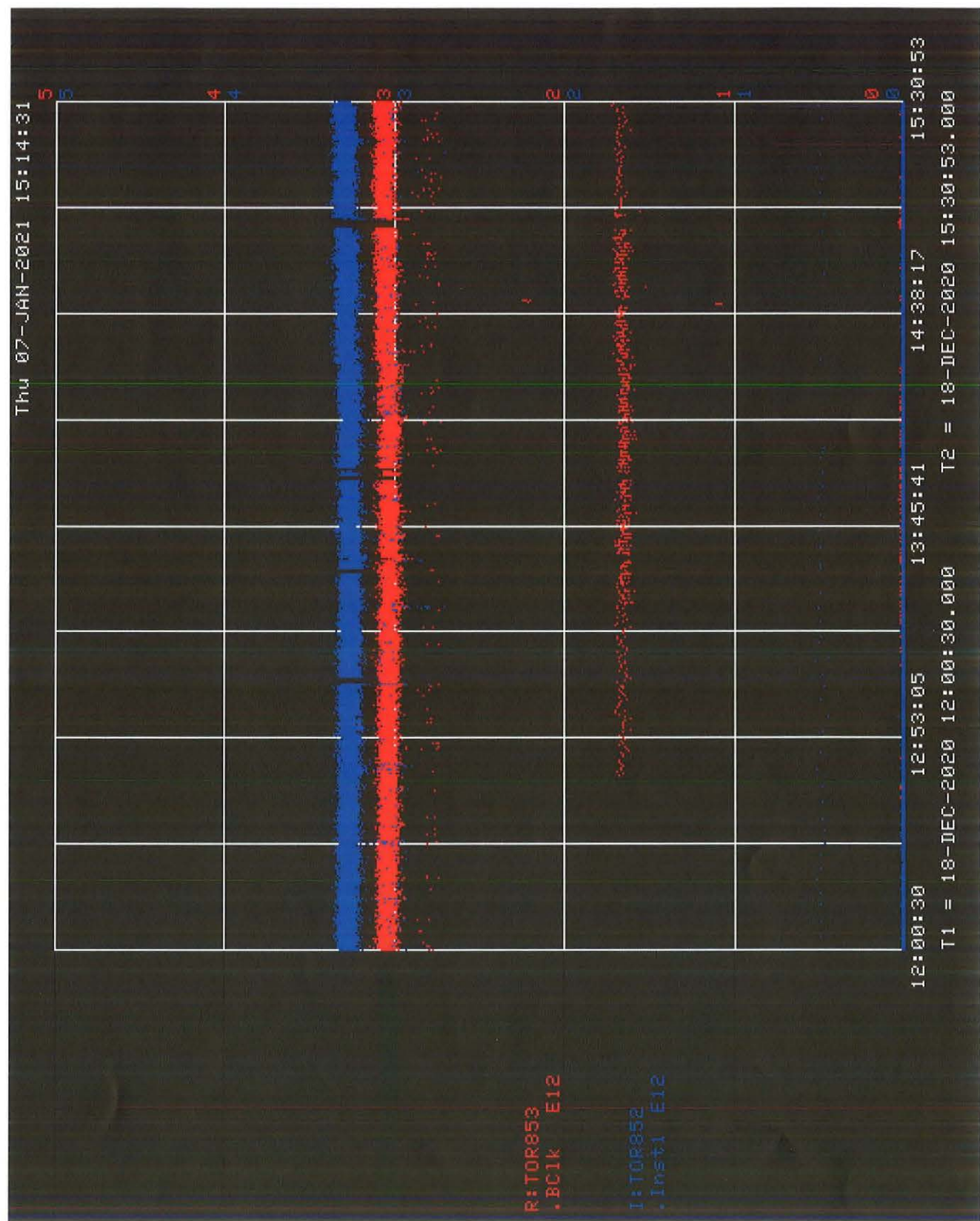
Wipe #	Reading	Wipe #	Reading
_____	_____ ccpm	_____	_____ ccpm
_____	_____ ccpm	_____	_____ ccpm
_____	_____ ccpm	_____	_____ ccpm
_____	_____ ccpm	_____	_____ ccpm
_____	_____ ccpm	_____	_____ ccpm

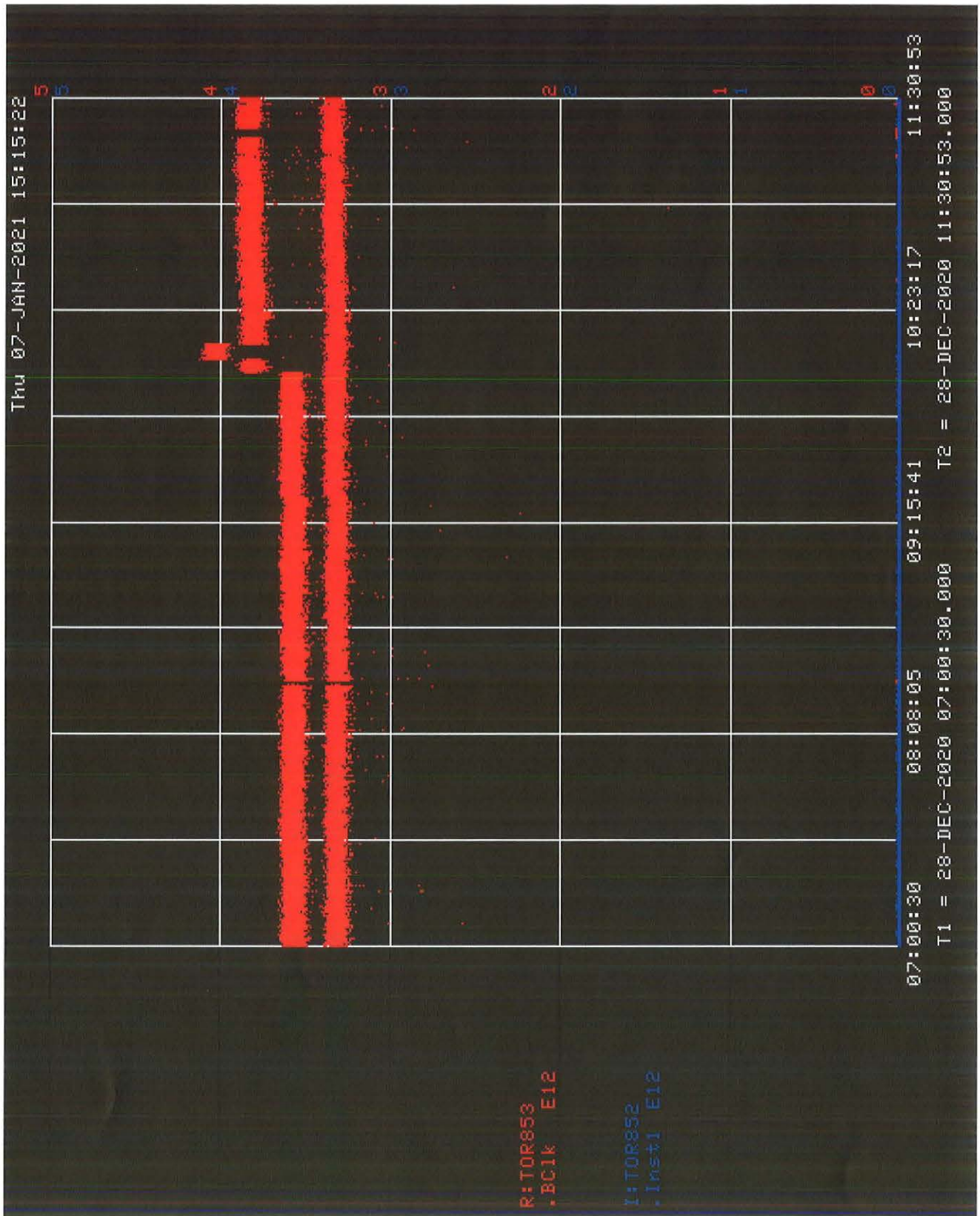
Comments:
1-23, 45-47 completed 12-18-20
24-44 completed 12-28-20
Readings are 1 minute integrations

LEGEND

- Dose Rate in mR/hr @ 1 ft. * - Unlabeled Radioactive Material
 (R) - Radioactive Material Wipe (W) - Wipe (F) - Floor Wipe

Surveyed By: Edgeman
 Reviewed By: Maddie Schoell, UID:maddiew
Digitally signed by Maddie Schoell, UID:maddiew Date: 2021.01.21 09:59:39 -0600





Main Injector (MI) / Recycler (RR)

Gamma Survey Results

Bicron Results

Location	Background (cpm)	Gross Beam-On (cpm)	Net Beam-On (cpm)	Standard Deviation	Net ± St. Dev.	L _c	N _D
1	1030	1219	189	47.42	189 ± 47.42	74.650 !	152.038
2	1340	1129	-211	49.69	-211 ± 49.69	85.146	173.034
3*	1181.09302	1135	-46.093023	48.13	-46.0930232558	79.938	162.616
4*	1181.09302	1100	-81.093023	47.76	-81.0930232558	79.938	162.616
5*	1181.09302	1182	0.9069767	48.61	0.906976744186	79.938	162.616
6*	1181.09302	1039	-142.09302	47.12	-142.093023255	79.938	162.616
7*	1181.09302	1140	-41.093023	48.18	-41.0930232558	79.938	162.616
8*	1181.09302	1067	-114.09302	47.41	-114.093023255	79.938	162.616
9	1501	1117	-384	51.17	-384 ± 51.17	90.116	182.976
10	1465	1117	-348	50.81	-348 ± 50.81	89.028	180.801
11	1324	1093	-231	49.16	-231 ± 49.16	84.636	172.014
12	1350	1106	-244	49.56	-244 ± 49.56	85.463	173.668
13	1440	972	-468	49.11	-468 ± 49.11	88.265	179.275
14	1331	1004	-327	48.32	-327 ± 48.32	84.859	172.461
15	1158	2150	992	57.52	992 ± 57.52	79.152 !	161.045
16	1208	966	-242	46.63	-242 ± 46.63	80.843	164.427
17	1349	979	-370	48.25	-370 ± 48.25	85.431	173.605
18	1251	1059	-192	48.06	-192 ± 48.06	82.269	167.280
19	1351	1009	-342	48.58	-342 ± 48.58	85.494	173.731
20	1299	968	-331	47.61	-331 ± 47.61	83.833	170.408
21	1270	1015	-255	47.80	-255 ± 47.8	82.892	168.525
22	1210	1010	-200	47.12	-200 ± 47.12	80.910	164.561
23	1019	1179	160	46.88	160 ± 46.88	74.250 !	151.238
24	1218	1136	-82	48.52	-82 ± 48.52	81.177	165.095
25	1207	1278	71	49.85	71 ± 49.85	80.810	164.360
26	1221	1091	-130	48.08	-130 ± 48.08	81.277	165.295
27	1217	1108	-109	48.22	-109 ± 48.22	81.144	165.028
28	1153	1120	-33	47.68	-33 ± 47.68	78.981	160.703

Converted to mR/hr

Background (mR/hr)	Gross Beam-On (mR/hr)	Net Beam-On (mR/hr)	Standard Deviation	Net ± St. Dev.	D _D
0.005	0.006	0.001	0.0002	0.001 ± 0.0002	0.001
0.007	0.006	0.000	0.0002	0 ± 0.0002	0.001
0.006	0.006	0.000	0.0002	0 ± 0.0002	0.001
0.006	0.006	0.000	0.0002	0 ± 0.0002	0.001
0.006	0.006	0.000	0.0002	0 ± 0.0002	0.001
0.006	0.005	0.000	0.0002	0 ± 0.0002	0.001
0.006	0.006	0.000	0.0002	0 ± 0.0002	0.001
0.006	0.005	0.000	0.0002	0 ± 0.0002	0.001
0.008	0.006	0.000	0.0003	0 ± 0.0003	0.001
0.007	0.006	0.000	0.0003	0 ± 0.0003	0.001
0.007	0.005	0.000	0.0002	0 ± 0.0002	0.001
0.007	0.006	0.000	0.0002	0 ± 0.0002	0.001
0.007	0.005	0.000	0.0002	0 ± 0.0002	0.001
0.007	0.005	0.000	0.0002	0 ± 0.0002	0.001
0.006	0.011	0.005	0.0003	0.005 ± 0.0003	0.001
0.006	0.005	0.000	0.0002	0 ± 0.0002	0.001
0.007	0.005	0.000	0.0002	0 ± 0.0002	0.001
0.006	0.005	0.000	0.0002	0 ± 0.0002	0.001
0.006	0.005	0.000	0.0002	0 ± 0.0002	0.001
0.006	0.005	0.000	0.0002	0 ± 0.0002	0.001
0.006	0.005	0.000	0.0002	0 ± 0.0002	0.001
0.006	0.005	0.000	0.0002	0 ± 0.0002	0.001
0.005	0.006	0.001	0.0002	0.001 ± 0.0002	0.001
0.006	0.006	0.000	0.0002	0 ± 0.0002	0.001
0.006	0.006	0.000	0.0002	0 ± 0.0002	0.001
0.006	0.005	0.000	0.0002	0 ± 0.0002	0.001
0.006	0.006	0.000	0.0002	0 ± 0.0002	0.001
0.006	0.006	0.000	0.0002	0 ± 0.0002	0.001

Main Injector (MI) / Recycler (RR)

Gamma Survey Results (continued)

Bicron Results

Location	Background (cpm)	Gross Beam-On (cpm)	Net Beam-On (cpm)	Standard Deviation	Net ± St. Dev.	L _c	N _D
29	1172	1071	-101	47.36	-101 ± 47.36	79.629	161.999
30	1050	1006	-44	45.34	-44 ± 45.34	75.371	153.480
31	1142	1088	-54	47.22	-54 ± 47.22	78.604	159.947
32	1063	1028	-35	45.73	-35 ± 45.73	75.836	154.411
33	1043	965	-78	44.81	-78 ± 44.81	75.119	152.977
34	1049	982	-67	45.07	-67 ± 45.07	75.335	153.409
35	1136	938	-198	45.54	-198 ± 45.54	78.397	159.533
36	1145	1012	-133	46.44	-133 ± 46.44	78.707	160.154
37	1097	908	-189	44.78	-189 ± 44.78	77.039	156.818
38	1212	1112	-100	48.21	-100 ± 48.21	80.977	164.695
39	1269	1149	-120	49.17	-120 ± 49.17	82.859	168.460
40	1157	1265	108	49.21	108 ± 49.21	79.118 !	160.976
41	1138	1469	331	51.06	331 ± 51.06	78.466 !	159.671
42	1268	1756	488	54.99	488 ± 54.99	82.827 !	168.395
43	1135	4991	3856	78.27	3856 ± 78.27	78.362 !	159.464
44	1146	4093	2947	72.38	2947 ± 72.38	78.741 !	160.222
45	911	1306	395	47.09	395 ± 47.09	70.205 !	143.146
46	119	1203	1084	36.36	1084 ± 36.36	25.374 !	53.464
47	1298	1230	-68	50.28	-68 ± 50.28	83.801	170.343

Converted to mR/hr

Background (mR/hr)	Gross Beam-On (mR/hr)	Net Beam-On (mR/hr)	Standard Deviation	Net ± St. Dev.	D _D
0.006	0.005	0.000	0.0002	0 ± 0.0002	0.001
0.005	0.005	0.000	0.0002	0 ± 0.0002	0.001
0.006	0.005	0.000	0.0002	0 ± 0.0002	0.001
0.005	0.005	0.000	0.0002	0 ± 0.0002	0.001
0.005	0.005	0.000	0.0002	0 ± 0.0002	0.001
0.005	0.005	0.000	0.0002	0 ± 0.0002	0.001
0.006	0.005	0.000	0.0002	0 ± 0.0002	0.001
0.006	0.005	0.000	0.0002	0 ± 0.0002	0.001
0.005	0.005	0.000	0.0002	0 ± 0.0002	0.001
0.006	0.006	0.000	0.0002	0 ± 0.0002	0.001
0.006	0.006	0.001	0.0002	0.001 ± 0.0002	0.001
0.006	0.007	0.002	0.0003	0.002 ± 0.0003	0.001
0.006	0.009	0.002	0.0003	0.002 ± 0.0003	0.001
0.006	0.025	0.019	0.0004	0.019 ± 0.0004	0.001
0.006	0.020	0.015	0.0004	0.015 ± 0.0004	0.001
0.005	0.007	0.002	0.0002	0.002 ± 0.0002	0.001
0.001	0.006	0.005	0.0002	0.005 ± 0.0002	0.000
0.006	0.006	0.000	0.0003	0 ± 0.0003	0.001

*The road for locations 3-8 was closed due to LBNF site-prep construction during the background survey. The road was open for beam-on survey, with readings being consistent with other near-background measurements. For these locations, the background readings were taken to be the average of the other 41 background measurements.

Main Injector (MI) / Recycler (RR)

Neutron Survey Results

Location	Average Background (mrem)	Average Background (mrem/hr)	Gross Beam-On (mrem/hr)	Net Beam-On (mrem/hr)	Sample Standard Deviation (mrem/hr)	Net ± St. Dev. (mrem/hr)	L _{C,N}	D _{D,N}
1	0.01933	0.01933	0.000	0.000	1.08E-04	0 ± 0.000108	2.52E-04	5.04E-04
2	0.01933	0.01933	0.000	0.000	1.08E-04	0 ± 0.000108	2.52E-04	5.04E-04
3	0.01933	0.01933	0.000	0.000	1.08E-04	0 ± 0.000108	2.52E-04	5.04E-04
4	0.01933	0.01933	0.000	0.000	1.08E-04	0 ± 0.000108	2.52E-04	5.04E-04
5	0.01933	0.01933	0.000	0.000	1.08E-04	0 ± 0.000108	2.52E-04	5.04E-04
6	0.01933	0.01933	0.000	0.000	1.08E-04	0 ± 0.000108	2.52E-04	5.04E-04
7	0.01933	0.01933	0.000	0.000	1.08E-04	0 ± 0.000108	2.52E-04	5.04E-04
8	0.01933	0.01933	0.000	0.000	1.08E-04	0 ± 0.000108	2.52E-04	5.04E-04
9	0.01933	0.01933	0.000	0.000	1.08E-04	0 ± 0.000108	2.52E-04	5.04E-04
10	0.01933	0.01933	0.000	0.000	1.08E-04	0 ± 0.000108	2.52E-04	5.04E-04
11	0.01933	0.01933	0.000	0.000	1.08E-04	0 ± 0.000108	2.52E-04	5.04E-04
12	0.01933	0.01933	0.000	0.000	1.08E-04	0 ± 0.000108	2.52E-04	5.04E-04
13	0.01933	0.01933	0.000	0.000	1.08E-04	0 ± 0.000108	2.52E-04	5.04E-04
14	0.01933	0.01933	0.000	0.000	1.08E-04	0 ± 0.000108	2.52E-04	5.04E-04
15	0.01933	0.01933	0.000	0.000	1.08E-04	0 ± 0.000108	2.52E-04	5.04E-04
16	0.01933	0.01933	0.000	0.000	1.08E-04	0 ± 0.000108	2.52E-04	5.04E-04
17	0.01933	0.01933	0.000	0.000	1.08E-04	0 ± 0.000108	2.52E-04	5.04E-04
18	0.01933	0.01933	0.000	0.000	1.08E-04	0 ± 0.000108	2.52E-04	5.04E-04
19	0.01933	0.01933	0.000	0.000	1.08E-04	0 ± 0.000108	2.52E-04	5.04E-04
20	0.01933	0.01933	0.000	0.000	1.08E-04	0 ± 0.000108	2.52E-04	5.04E-04
21	0.01933	0.01933	0.000	0.000	1.08E-04	0 ± 0.000108	2.52E-04	5.04E-04
22	0.01933	0.01933	0.000	0.000	1.08E-04	0 ± 0.000108	2.52E-04	5.04E-04
23	0.01933	0.01933	0.000	0.000	1.08E-04	0 ± 0.000108	2.52E-04	5.04E-04
24	0.01933	0.01933	0.000	0.000	1.08E-04	0 ± 0.000108	2.52E-04	5.04E-04
25	0.01933	0.01933	0.000	0.000	1.08E-04	0 ± 0.000108	2.52E-04	5.04E-04
26	0.01933	0.01933	0.000	0.000	1.08E-04	0 ± 0.000108	2.52E-04	5.04E-04
27	0.01933	0.01933	0.000	0.000	1.08E-04	0 ± 0.000108	2.52E-04	5.04E-04
28	0.01933	0.01933	0.000	0.000	1.08E-04	0 ± 0.000108	2.52E-04	5.04E-04
29	0.01933	0.01933	0.000	0.000	1.08E-04	0 ± 0.000108	2.52E-04	5.04E-04

Main Injector (MI) / Recycler (RR)

Neutron Survey Results (continued)

Location	Average Background (mrem)	Average Background (mrem/hr)	Gross Beam-On (mrem/hr)	Net Beam-On (mrem/hr)	Sample Standard Deviation (mrem/hr)	Net \pm St. Dev. (mrem/hr)	L _{C,N}	D _{D,N}
30	0.01933	0.01933	0.000	0.000	1.08E-04	0 \pm 0.000108	2.52E-04	5.04E-04
31	0.01933	0.01933	0.000	0.000	1.08E-04	0 \pm 0.000108	2.52E-04	5.04E-04
32	0.01933	0.01933	0.000	0.000	1.08E-04	0 \pm 0.000108	2.52E-04	5.04E-04
33	0.01933	0.01933	0.000	0.000	1.08E-04	0 \pm 0.000108	2.52E-04	5.04E-04
34	0.01933	0.01933	0.000	0.000	1.08E-04	0 \pm 0.000108	2.52E-04	5.04E-04
35	0.01933	0.01933	0.000	0.000	1.08E-04	0 \pm 0.000108	2.52E-04	5.04E-04
36	0.01933	0.01933	0.000	0.000	1.08E-04	0 \pm 0.000108	2.52E-04	5.04E-04
37	0.01933	0.01933	0.000	0.000	1.08E-04	0 \pm 0.000108	2.52E-04	5.04E-04
38	0.01933	0.01933	0.000	0.000	1.08E-04	0 \pm 0.000108	2.52E-04	5.04E-04
39	0.01933	0.01933	0.000	0.000	1.08E-04	0 \pm 0.000108	2.52E-04	5.04E-04
40	0.01933	0.01933	0.000	0.000	1.08E-04	0 \pm 0.000108	2.52E-04	5.04E-04
41	0.01933	0.01933	0.000	0.000	1.08E-04	0 \pm 0.000108	2.52E-04	5.04E-04
42	0.01933	0.01933	0.000	0.000	1.08E-04	0 \pm 0.000108	2.52E-04	5.04E-04
43	0.01933	0.01933	0.000	0.000	1.08E-04	0 \pm 0.000108	2.52E-04	5.04E-04
44	0.01933	0.01933	0.000	0.000	1.08E-04	0 \pm 0.000108	2.52E-04	5.04E-04
45	0.01933	0.01933	0.000	0.000	1.08E-04	0 \pm 0.000108	2.52E-04	5.04E-04
46	0.01933	0.01933	0.000	0.000	1.08E-04	0 \pm 0.000108	2.52E-04	5.04E-04
47	0.01933	0.01933	0.000	0.000	1.08E-04	0 \pm 0.000108	2.52E-04	5.04E-04

Main Injector (MI) / Recycler (RR)

Scaling Dose Rates to MI Operating Limit Intensity & Calculate Annual Dose

At Survey Intensity

Scaled to Operating Limit Intensity at Standard Beam Up-Time

Location	At Survey Intensity		Scaled to Operating Limit Intensity at Standard Beam Up-Time			Neutron		
	Gamma Net Beam- On (mR/hr)	Neutron Net Beam- On (mrem/hr)	Gamma Net Beam- On (mR/hr)	Gamma 2,000 hr Working Year (mrem)	Gamma 24/7/365 (mrem)	Net Beam- On (mrem/hr)	Neutron 2,000 hr Working Year (mrem)	Neutron 24/7/365 (mrem)
1	0.001	0.000	0.007	14.293	42.377	0	0	0
2	0.000	0.000	0.000	0.000	0.000	0	0	0
3	0.000	0.000	0.000	0.000	0.000	0	0	0
4	0.000	0.000	0.000	0.000	0.000	0	0	0
5	0.000	0.000	0.000	0.000	0.000	0	0	0
6	0.000	0.000	0.000	0.000	0.000	0	0	0
7	0.000	0.000	0.000	0.000	0.000	0	0	0
8	0.000	0.000	0.000	0.000	0.000	0	0	0
9	0.000	0.000	0.000	0.000	0.000	0	0	0
10	0.000	0.000	0.000	0.000	0.000	0	0	0
11	0.000	0.000	0.000	0.000	0.000	0	0	0
12	0.000	0.000	0.000	0.000	0.000	0	0	0
13	0.000	0.000	0.000	0.000	0.000	0	0	0
14	0.000	0.000	0.000	0.000	0.000	0	0	0
15	0.005	0.000	0.036	71.463	211.884	0	0	0
16	0.000	0.000	0.000	0.000	0.000	0	0	0
17	0.000	0.000	0.000	0.000	0.000	0	0	0
18	0.000	0.000	0.000	0.000	0.000	0	0	0
19	0.000	0.000	0.000	0.000	0.000	0	0	0
20	0.000	0.000	0.000	0.000	0.000	0	0	0
21	0.000	0.000	0.000	0.000	0.000	0	0	0
22	0.000	0.000	0.000	0.000	0.000	0	0	0
23	0.001	0.000	0.007	14.293	42.377	0	0	0
24	0.000	0.000	0.000	0.000	0.000	0	0	0
25	0.000	0.000	0.000	0.000	0.000	0	0	0
26	0.000	0.000	0.000	0.000	0.000	0	0	0
27	0.000	0.000	0.000	0.000	0.000	0	0	0

Intensities (protons/hr)	
Survey	Op. Limit
4.10E+16	2.93E+17

Beam Up-Time	
# Weeks	44
Efficiency	80%
67.7%	

Main Injector (MI) / Recycler (RR) (continued)

Scaling Dose Rates to MI Operating Limit Intensity & Calculate Annual Dose (continued)

At Survey Intensity

Scaled to Operating Limit Intensity at Standard Beam Up-Time

Location	At Survey Intensity		Scaled to Operating Limit Intensity at Standard Beam Up-Time					
	Gamma Net Beam- On (mR/hr)	Neutron Net Beam- On (mrem/hr)	Gamma Net Beam- On (mR/hr)	Gamma 2,000 hr Working Year (mrem)	Gamma 24/7/365 (mrem)	Neutron Net Beam- On (mrem/hr)	Neutron 2,000 hr Working Year (mrem)	Neutron 24/7/365 (mrem)
28	0.000	0.000	0.000	0.000	0.000	0	0	0
29	0.000	0.000	0.000	0.000	0.000	0	0	0
30	0.000	0.000	0.000	0.000	0.000	0	0	0
31	0.000	0.000	0.000	0.000	0.000	0	0	0
32	0.000	0.000	0.000	0.000	0.000	0	0	0
33	0.000	0.000	0.000	0.000	0.000	0	0	0
34	0.000	0.000	0.000	0.000	0.000	0	0	0
35	0.000	0.000	0.000	0.000	0.000	0	0	0
36	0.000	0.000	0.000	0.000	0.000	0	0	0
37	0.000	0.000	0.000	0.000	0.000	0	0	0
38	0.000	0.000	0.000	0.000	0.000	0	0	0
39	0.000	0.000	0.000	0.000	0.000	0	0	0
40	0.001	0.000	0.007	14.293	42.377	0	0	0
41	0.002	0.000	0.014	28.585	84.753	0	0	0
42	0.002	0.000	0.014	28.585	84.753	0	0	0
43	0.019	0.000	0.136	271.561	805.157	0	0	0
44	0.015	0.000	0.107	214.390	635.651	0	0	0
45	0.002	0.000	0.014	28.585	84.753	0	0	0
46	0.005	0.000	0.036	71.463	211.884	0	0	0
47	0.000	0.000	0.000	0.000	0.000	0	0	0

Intensities (protons/hr)	
Survey	Op. Limit
4.10E+16	2.93E+17

Beam Up-Time	
# Weeks	44
Efficiency	80%
67.7%	

Main Injector (MI) / Recycler (RR)

Scaling Dose Rates to RR Operating Limit Intensity & Calculate Annual Dose

At Survey Intensity

Scaled to Operating Limit Intensity at Standard Beam Up-Time

Location	At Survey Intensity		Scaled to Operating Limit Intensity at Standard Beam Up-Time			Scaled to Operating Limit Intensity at Standard Beam Up-Time		
	Gamma Net Beam- On (mR/hr)	Neutron Net Beam- On (mrem/hr)	Gamma Net Beam- On (mR/hr)	Gamma 2,000 hr Working Year (mrem)	Gamma 24/7/365 (mrem)	Neutron Net Beam- On (mrem/hr)	Neutron 2,000 hr Working Year (mrem)	Neutron 24/7/365 (mrem)
1	0.001	0.000	0.005	10.976	47.592	0	0	0
2	0.000	0.000	0.000	0.000	0.000	0	0	0
3	0.000	0.000	0.000	0.000	0.000	0	0	0
4	0.000	0.000	0.000	0.000	0.000	0	0	0
5	0.000	0.000	0.000	0.000	0.000	0	0	0
6	0.000	0.000	0.000	0.000	0.000	0	0	0
7	0.000	0.000	0.000	0.000	0.000	0	0	0
8	0.000	0.000	0.000	0.000	0.000	0	0	0
9	0.000	0.000	0.000	0.000	0.000	0	0	0
10	0.000	0.000	0.000	0.000	0.000	0	0	0
11	0.000	0.000	0.000	0.000	0.000	0	0	0
12	0.000	0.000	0.000	0.000	0.000	0	0	0
13	0.000	0.000	0.000	0.000	0.000	0	0	0
14	0.000	0.000	0.000	0.000	0.000	0	0	0
15	0.005	0.000	0.027	54.878	237.962	0	0	0
16	0.000	0.000	0.000	0.000	0.000	0	0	0
17	0.000	0.000	0.000	0.000	0.000	0	0	0
18	0.000	0.000	0.000	0.000	0.000	0	0	0
19	0.000	0.000	0.000	0.000	0.000	0	0	0
20	0.000	0.000	0.000	0.000	0.000	0	0	0
21	0.000	0.000	0.000	0.000	0.000	0	0	0
22	0.000	0.000	0.000	0.000	0.000	0	0	0
23	0.001	0.000	0.005	10.976	47.592	0	0	0
24	0.000	0.000	0.000	0.000	0.000	0	0	0
25	0.000	0.000	0.000	0.000	0.000	0	0	0
26	0.000	0.000	0.000	0.000	0.000	0	0	0
27	0.000	0.000	0.000	0.000	0.000	0	0	0

Intensities (protons/hr)	
Survey	Op. Limit
2.50E+16	2.25E+17

Beam Up-Time	
# Weeks	52
Efficiency	99%
99.0%	

Main Injector (MI) / Recycler (RR) (continued)

Scaling Dose Rates to RR Operating Limit Intensity & Calculate Annual Dose (continued)

Location	At Survey Intensity		Scaled to Operating Limit Intensity at Standard Beam Up-Time					
	Gamma	Neutron	Gamma			Neutron		
	Net Beam-On (mR/hr)	Net Beam-On (mrem/hr)	Net Beam-On (mR/hr)	2,000 hr Working Year (mrem)	24/7/365 (mrem)	Net Beam-On (mrem/hr)	2,000 hr Working Year (mrem)	24/7/365 (mrem)
28	0.000	0.000	0.000	0.000	0.000	0	0	0
29	0.000	0.000	0	0.000	0.000	0	0	0
30	0.000	0.000	0	0.000	0.000	0	0	0
31	0.000	0.000	0	0.000	0.000	0	0	0
32	0.000	0.000	0	0.000	0.000	0	0	0
33	0.000	0.000	0	0.000	0.000	0	0	0
34	0.000	0.000	0	0.000	0.000	0	0	0
35	0.000	0.000	0	0.000	0.000	0	0	0
36	0.000	0.000	0	0.000	0.000	0	0	0
37	0.000	0.000	0	0.000	0.000	0	0	0
38	0.000	0.000	0	0.000	0.000	0	0	0
39	0.000	0.000	0	0.000	0.000	0	0	0
40	0.001	0.000	0.009	18.000	78.052	0	0	0
41	0.002	0.000	0.018	36.000	156.103	0	0	0
42	0.002	0.000	0.018	36.000	156.103	0	0	0
43	0.019	0.000	0.171	342.000	1482.980	0	0	0
44	0.015	0.000	0.135	270.000	1170.774	0	0	0
45	0.002	0.000	0.018	36.000	156.103	0	0	0
46	0.005	0.000	0.045	90.000	390.258	0	0	0
47	0.000	0.000	0	0.000	0.000	0	0	0

Intensities (protons/hr)		Beam Up-Time	
Survey	Op. Limit	# Weeks Efficiency	52 99%
2.50E+16	2.25E+17	99.0%	