NSLS-II

NATIONAL SYNCHROTRON LIGHT SOURCE II

SST Lead Bremsstrahlung Shielding

Doc No. BL-SST-003 Rev: C
Page 1 of 2
Rev Date: 01/26/2017
Author: Cherno Jaye
Approved: 01/26/2018

Title	Name	Approval Date
NPB Project Manager	Howard Robinson	01/26/2018
ES&H Operations Manager	Lori Stiegler	01/26/2018
Quality Assurance Engineer	Joseph Zipper	01/26/2018

Serial No	Part No	Part Rev	ECN	Rev	ECN	Rev
	PD-SST-BL-SHLD-0200	A				

Deviation & Waiver: _____

OP	Description	Name/Life #	Date	DR
10	TRAVELER INFORMATION - This step is informational and does not require signoff. This traveler shall be used for the following assemblies/components: 1. PD-SST-BL-SHLD-0100 2. PD-SST-BL-SHLD-0200 3. PD-SST-BL-SHLD-0300	C-JAYE 0615-6	2/14/18	~~N-00089~~ CJ 2/14/18
20	In the space provided on this sheet for Part No. record the assembly number that this traveler will be used for.	Cherno Jaye 06156	1/26/18	
30	Follow the ESH and PPE requirements for the area. Wear safety glasses, safety shoes and gloves for physical installation as applicable	Cherno Jaye 06156	1/26/18	
40	Verify measuring and test equipment used for this procedure contains a valid calibration label in accordance with NSLS-II Calibration Procedure PS-QAP-0901, where applicable. The technician is responsible for notifying the technical supervisor and/or the cognizant engineer of any discrepancies occurring during the performance of this procedure. All discrepancies shall be identified and reported in accordance with NSLS-II Discrepancy Reporting Procedure PS-QAP-0002.	Cherno Jaye 06156 HUBBARD 20505	1/26/18 RAH 2/6/18	

OP	Description	Name/Life #	Date	DR
50	ASSEMBLY/INSTALLATION A. Per relevant assembly drawing in OP#10 verify the following: ✓ Shield has been assembled and installed per drawing requirements. ✓ Overall assembled shield dimensions are acceptable. B. Take digital photographs as needed to fully document shielding installation(s). Attach hard copies to traveler. Each photograph shall be at least 4" x 6", in color, and good quality with adequate contrast so it is still clearly viewable after scanning.	Cherno Jaye 06156	1/26/18	
60	SURVEY AND ALIGNMENT - Verify overall lead dimensions and final alignment as per PD-SST-BL-LAY-1030 - Attach survey report this traveler.	C. JAYE 06156	2/14/18	N-00089
70	Verify All Traveler Operations Complete	C. JAYE 06156	2/14/18	
80	REVISION HISTORY (This step is informational and does not require signoff) Rev - Description - Date C First Release			

Safety Critical Components Survey Result At ID-7-SST Beamline

Measurement Date: 02/14/2018
Measured By : R. Hubbard
Reported By: M. Ke

The reference control is updated in Feb 2017.

Leica AT401 was used to measure the control and the components for this beamline.

The reference data (presurvey data) is listed in the column2~column4 after the first name column, the actual data is listed in the next right three columns and the deviation is listed in the last three columns in the below tables.

PRACTICAL FRAME is created in the following manner:
Origin is the center of the cell 7 straight;
+Z is from Origin to the actual downstream aperture center of the front end fixed mask ;
+Y is up;
+X is outboard.

The deviation between the reference data and actual data for each component is reported in this frame.

PPS APERTURE & FM1 ASSEMBLY FIDUCIALS

Group to Group Relationship
Groups: FM1&PPS APERTURE ASSEMBLY to PPS APP&MASK (Reported in FRAME&CONTROL::07 ID SST PRACTICAL FRAME)

Name	FM1&PPS APERTURE ASSEMBLY			PPS APP&MASK			Delta		
	X1 (mm)	Y1 (mm)	Z1 (mm)	X2 (mm)	Y2 (mm)	Z2 (mm)	dX (mm)	dY (mm)	dZ (mm)
PD-COM-APERT-0090 SST F1	1.332	78.815	26393.628	1.437	78.878	26393.944	0.105	0.064	0.316
PD-COM-APERT-0090 SST F3	80.399	-0.494	26393.684	80.424	-0.592	26394.107	0.025	-0.098	0.423
PD-COM-APERT-0090 SST F2	57.286	55.525	26393.705	57.391	55.479	26394.034	0.105	-0.046	0.329
FM1_F1	62.443	107.733	26466.020	62.529	107.727	26466.329	0.086	-0.006	0.309
FM1_F4	-60.640	107.823	26466.753	-60.556	107.919	26467.017	0.084	0.096	0.264
FM1_F2	62.499	107.784	26628.221	62.526	107.740	26628.529	0.027	-0.044	0.308
FM1_F3	-60.531	107.913	26628.335	-60.497	107.982	26628.581	0.035	0.069	0.246

PPS APERTURE & FM1 ASSEMBLY APERTURE

Group to Group Relationship
Groups: FM1&PPS APERTURE ASSEMBLY to FM1&PPS aperture assembly (Reported in FRAME&CONTROL::07 ID SST PRACTICAL FRAME)

Name	FM1&PPS APERTURE ASSEMBLY			FM1&PPS APERTURE			Delta		
	X1 (mm)	Y1 (mm)	Z1 (mm)	X2 (mm)	Y2 (mm)	Z2 (mm)	dX (mm)	dY (mm)	dZ (mm)
M-APERT-0090 BR BOT BR	-37.624	-11.415	26393.457	-37.607	-11.355	26393.746	0.017	0.060	0.289
M-APERT-0090 BR TOP BR	-37.584	10.753	26393.483	-37.544	10.812	26393.770	0.040	0.060	0.287
-APERT-0090 BR APP CTR	-23.989	-0.344	26393.497	-23.961	-0.299	26393.792	0.028	0.045	0.295
M-APERT-0090 BR BOT BL	-10.389	-11.444	26393.502	-10.373	-11.413	26393.806	0.017	0.031	0.303
M-APERT-0090 BR TOP BL	-10.359	10.729	26393.545	-10.319	10.760	26393.847	0.040	0.031	0.302
M-APERT-0090 BL BOT BR	15.319	-10.178	26393.578	15.337	-10.174	26393.895	0.018	0.004	0.317
OM-APERT-0090 FLG CTR	1.238	-0.468	26393.583	1.267	-0.449	26393.892	0.028	0.019	0.309
M-APERT-0090 BL TOP BR	15.345	9.442	26393.584	15.384	9.446	26393.900	0.039	0.004	0.316
-APERT-0090 BL APP CTR	28.955	-0.381	26393.605	28.983	-0.391	26393.929	0.028	-0.010	0.324
M-APERT-0090 BL BOT BL	42.561	-10.207	26393.618	42.579	-10.232	26393.950	0.018	-0.024	0.331
M-APERT-0090 BL TOP BL	42.594	9.419	26393.640	42.632	9.394	26393.970	0.039	-0.024	0.330
FM1_US FLG CTR	1.088	-0.395	26403.911	1.111	-0.375	26404.220	0.023	0.020	0.309
FM1_US BR TOP BR	-38.803	12.116	26439.956	-38.786	12.181	26440.243	0.017	0.064	0.287
FM1_US BR BOT BR	-38.831	-12.093	26439.973	-38.840	-12.029	26440.261	-0.009	0.064	0.288
FM1_US BR CTR	-24.165	-0.005	26439.991	-24.161	0.044	26440.286	0.004	0.049	0.295
FM1_US BR TOP BL	-9.513	12.052	26440.009	-9.496	12.086	26440.311	0.017	0.033	0.302
FM1_US BR BOT BL	-9.512	-12.094	26440.026	-9.520	-12.060	26440.330	-0.009	0.033	0.304
FM1_US BL TOP BR	14.077	10.825	26440.053	14.092	10.833	26440.368	0.015	0.009	0.315
FM1_US BL BOT BR	14.040	-10.773	26440.068	14.033	-10.764	26440.384	-0.007	0.009	0.316
FM1_US BL CTR	28.696	0.005	26440.087	28.700	-0.002	26440.410	0.004	-0.007	0.323
FM1_US BL TOP BL	43.338	10.807	26440.106	43.353	10.785	26440.436	0.015	-0.022	0.330
FM1_US BL BOT BL	43.330	-10.840	26440.121	43.322	-10.862	26440.453	-0.007	-0.022	0.332
FM1_D BL TOP BL	33.217	2.439	26619.996	33.128	2.440	26620.322	-0.089	0.001	0.326
FM1_D BL TOP BR	25.708	2.434	26620.190	25.619	2.443	26620.512	-0.089	0.009	0.322
FM1_D BL BOT BR	25.694	-2.454	26620.562	25.599	-2.445	26620.884	-0.095	0.009	0.322
FM1_D BL BOT BL	33.174	-2.464	26620.728	33.079	-2.463	26621.053	-0.095	0.001	0.326
FM1_D BR BOT BL	-20.095	-3.658	26621.136	-20.191	-3.601	26621.434	-0.096	0.057	0.298
FM1_D BR BOT BR	-28.688	-3.651	26621.268	-28.785	-3.585	26621.561	-0.096	0.066	0.293
FM1_D BR TOP BL	-20.104	3.647	26621.289	-20.193	3.704	26621.586	-0.089	0.057	0.297
FM1_D BR TOP BR	-28.662	3.651	26621.589	-28.751	3.717	26621.881	-0.089	0.066	0.293
FM1_D BR BL BOT	-20.753	-3.842	26632.401	-20.855	-3.784	26632.699	-0.102	0.058	0.297
FM1_D BR BL TOP	-20.756	3.837	26632.447	-20.851	3.895	26632.744	-0.094	0.058	0.297
FM1_D BL BL BOT	32.505	-2.663	26632.626	32.403	-2.660	26632.952	-0.101	0.003	0.326
FM1_D BL BL TOP	32.507	2.651	26632.626	32.411	2.654	26632.952	-0.096	0.003	0.325
FM1_D BR BR TOP	-27.992	3.855	26633.569	-28.087	3.921	26633.862	-0.095	0.066	0.293
FM1_D BR BR BOT	-27.998	-3.855	26633.627	-28.101	-3.789	26633.921	-0.103	0.066	0.293
FM1_D BL BR TOP	25.248	2.667	26634.024	25.151	2.677	26634.345	-0.096	0.010	0.321
FM1_D BL BR BOT	25.243	-2.680	26634.106	25.141	-2.670	26634.427	-0.102	0.010	0.322
FM1_DS BL BOT BL	33.204	-2.987	26651.943	33.092	-2.984	26652.269	-0.112	0.003	0.326
FM1_DS BL BOT BR	24.649	-2.978	26651.947	24.537	-2.966	26652.269	-0.112	0.012	0.321
FM1_DS BL CTR	28.928	-0.005	26651.948	28.819	0.003	26652.271	-0.109	0.008	0.323
FM1_DS BL TOP BL	33.206	2.978	26651.948	33.100	2.981	26652.273	-0.106	0.003	0.326
FM1_DS BL TOP BR	24.651	2.969	26651.952	24.545	2.981	26652.273	-0.106	0.012	0.321
FM1_DS BR BOT BL	-20.098	-4.165	26651.969	-20.211	-4.106	26652.266	-0.113	0.059	0.298
FM1_DS BR BOT BR	-28.659	-4.156	26651.973	-28.773	-4.088	26652.266	-0.113	0.068	0.293
FM1_DS BR CTR	-24.379	0.005	26651.974	-24.488	0.068	26652.269	-0.109	0.064	0.295
FM1_DS BR TOP BL	-20.103	4.170	26651.976	-20.207	4.229	26652.273	-0.104	0.059	0.297
FM1_DS BR TOP BR	-28.656	4.169	26651.980	-28.760	4.237	26652.272	-0.104	0.068	0.292
FM1_DS FLG CTR	1.050	0.030	26686.359	0.923	0.070	26686.667	-0.127	0.039	0.309

SECONDARY SHIELD SBRS#1 HOLE

Point Group
REPORT::SECONDARY SHIELD SBRS#1 HOLE

Point Name	X (mm)	Y (mm)	Z (mm)
US BL	74.704	-0.894	27961.002
US BOT	-8.240	-83.838	27961.002
US TOP	-8.240	82.050	27961.002
US BR	-91.184	-0.894	27961.002
DS BR	-91.184	-0.894	28062.602
DS BL	74.704	-0.894	28062.602
DS BOT	-8.240	-83.838	28062.602
DS TOP	-8.240	82.050	28062.602

SECONDARY SHIELD SBRS#1 LEAD

Point Group
REPORT::SECONDARY SHIELD SBRS#1 LEAD

Point Name	X (mm)	Y (mm)	Z (mm)
TOP US BL	326.260	258.124	27958.427
TOP US BR	-298.740	258.124	27958.468
BOT US BL	326.260	-259.876	27958.334
BOT US BR	-298.740	-259.876	27958.375
TOP DS BL	326.267	258.106	28060.027
TOP DS BR	-298.733	258.106	28060.068
BOT DS BL	326.267	-259.894	28059.934
BOT DS BR	-298.733	-259.894	28059.975

Calculated points from measured cylinder/planes and measured dimension

WHITE BEAM STOP FIDUCIALS

Group to Group Relationship
Groups: WBS FIDS with 0.5" offset to WBS (Reported in FRAME&CONTROL::07 ID SST PRACTICAL FRAME)

Name	WBS FIDS with 0.5" offset			WBS			Delta		
	X1 (mm)	Y1 (mm)	Z1 (mm)	X2 (mm)	Y2 (mm)	Z2 (mm)	dX (mm)	dY (mm)	dZ (mm)
F-1	133.738	170.879	30284.473	134.307	170.801	30284.669	0.569	-0.077	0.196
F-2	-141.243	170.182	30283.492	-140.673	170.293	30283.812	0.570	0.111	0.320
F-4	-138.935	167.922	29604.138	-138.746	168.165	29604.447	0.189	0.244	0.309
F-5	52.343	152.651	29236.712	52.486	152.826	29236.815	0.143	0.176	0.103
F-7	53.802	152.461	29146.605	53.989	152.728	29146.832	0.187	0.267	0.228

WHITE BEAM STOP EDGES

Group to Group Relationship
Groups: WBS NOMINAL to WBS (Reported in FRAME&CONTROL::07 ID SST PRACTICAL FRAME)

Name	WBS FIDS with 0.5" offset			WBS EDGES			Delta		
	X1 (mm)	Y1 (mm)	Z1 (mm)	X2 (mm)	Y2 (mm)	Z2 (mm)	dX (mm)	dY (mm)	dZ (mm)
US BL	17.024	-6.561	29144.324	17.034	-6.306	29144.508	0.011	0.255	0.184
US BR	-13.976	-6.543	29144.356	-13.966	-6.268	29144.552	0.011	0.274	0.196
DS BL BOT	17.127	-6.564	29240.613	17.174	-6.331	29240.796	0.047	0.233	0.184
DS BL TOP	17.134	6.969	29240.612	17.190	7.202	29240.799	0.056	0.233	0.187
DS BR BOT	-13.873	-6.546	29240.645	-13.826	-6.293	29240.840	0.047	0.253	0.196
DS BR TOP	-13.866	6.987	29240.644	-13.810	7.240	29240.843	0.056	0.253	0.199

BRS EDGES

Point Group
REPORT`::BRS EDGES

Point Name	X (mm)	Y (mm)	Z (mm)
BOT BR US	-115.439	-75.368	29287.129
TOP BR US	-114.160	74.630	29287.230
BOT BL US	-27.439	-75.519	29287.697
TOP BL US	-26.160	74.479	29287.798
BOT BL DS	-28.847	-75.674	29587.983
BOT BR DS	-116.850	-75.522	29588.129
TOP BL DS	-27.568	74.324	29588.298
TOP BR DS	-115.572	74.475	29588.444

SECONDARY SHIELD SBRS#2 LEAD

Point Group
REPORT`::SECONDARY SHIELD SBRS#2 LEAD

Point Name	X (mm)	Y (mm)	Z (mm)
TOP US BL	467.646	483.686	30696.616
TOP US BR	-417.384	481.413	30697.177
TOP DS BL	467.492	483.162	30798.215
TOP DS BR	-417.514	480.890	30798.776
BOT US BL	470.114	-480.312	30694.264
BOT US BR	-414.916	-482.584	30694.825
BOT DS BL	469.960	-480.835	30795.864
BOT DS BR	-415.045	-483.107	30796.424

Calculated points from measured planes and measured dimension

SECONDARY SHIELD SBRS#2 BL HOLE

Point Group
REPORT`::SECONDARY SHIELD SBRS#2 BL HOLE

Point Name	X (mm)	Y (mm)	Z (mm)
US TOP	85.231	36.875	30695.683
US BOT	85.231	-35.487	30695.683
US BL	121.412	0.694	30695.683
US BR	49.050	0.694	30695.683
DS TOP	85.080	36.381	30797.282
DS BOT	85.080	-35.981	30797.282
DS BL	121.261	0.200	30797.282
DS BR	48.899	0.200	30797.282

SECONDARY SHIELD SBRS#2 BR HOLE

Point Group
REPORT`::SECONDARY SHIELD SBRS#2 BR HOLE

Point Name	X (mm)	Y (mm)	Z (mm)
US TOP	-37.501	36.586	30695.761
US BOT	-37.501	-35.798	30695.761
US BL	-1.309	0.394	30695.761
US BR	-73.693	0.394	30695.761
DS TOP	-37.627	36.061	30797.360
DS BOT	-37.627	-36.323	30797.360
DS BL	-1.435	-0.131	30797.360
DS BR	-73.819	-0.131	30797.360

Calculated points from measured planes and measured dimension

FM4 FIDUCIALS

Group to Group Relationship Groups: FM4 REF to FM4 FIDS (Reported in FRAME&CONTROL::07 ID SST PRACTICAL FRAME)									
Name	FM4 REF			FM4 FIDS			Delta		
	X1 (mm)	Y1 (mm)	Z1 (mm)	X2 (mm)	Y2 (mm)	Z2 (mm)	dX (mm)	dY (mm)	dZ (mm)
7IDSSTFM4 F1	203.518	152.290	31852.053	203.504	152.278	31852.087	-0.014	-0.012	0.034
7IDSSTFM4 F3	87.266	152.953	31928.170	87.270	152.998	31928.246	0.004	0.045	0.075
7IDSSTFM4 F4	83.768	152.303	31858.210	83.722	152.300	31858.269	-0.046	-0.003	0.059
7IDSSTFM4 F2	207.134	152.944	31921.988	207.165	152.952	31922.010	0.031	0.008	0.022

FM4 APERTURE

Group to Group Relationship Groups: FM4 REF to FM4 APP (Reported in FRAME&CONTROL::07 ID SST PRACTICAL FRAME)									
Name	FM4 REF			FM4 APP			Delta		
	X1 (mm)	Y1 (mm)	Z1 (mm)	X2 (mm)	Y2 (mm)	Z2 (mm)	dX (mm)	dY (mm)	dZ (mm)
US APP	145.080	0.003	31883.534	145.045	0.009	31883.657	-0.035	0.006	0.123
DS APP	146.364	-0.003	31908.491	146.339	0.015	31908.613	-0.025	0.018	0.123
ORIGIN	145.722	-0.000	31896.012	145.692	0.012	31896.135	-0.030	0.012	0.123
DS TOP BL	156.381	9.995	31907.974	156.358	10.011	31908.088	-0.023	0.016	0.114
DS TOP BR	136.359	9.995	31909.004	136.336	10.016	31909.126	-0.023	0.020	0.122
DS BOT BR	136.342	-10.003	31909.007	136.316	-9.983	31909.139	-0.026	0.020	0.132
DS BOT BL	156.375	-10.000	31907.977	156.349	-9.984	31908.100	-0.027	0.016	0.123

FM2 FIDUCIALS

Group to Group Relationship Groups: FM2 REF to FM2 FIDS (Reported in FRAME&CONTROL::07 ID SST PRACTICAL FRAME)									
Name	FM2 REF			FM2 FIDS			Delta		
	X1 (mm)	Y1 (mm)	Z1 (mm)	X2 (mm)	Y2 (mm)	Z2 (mm)	dX (mm)	dY (mm)	dZ (mm)
7IDSSTFM2 F1	-11.871	152.362	32905.259	-11.949	152.380	32905.175	-0.077	0.018	-0.084
7IDSSTFM2 F2	-13.347	152.861	32975.351	-13.314	152.829	32975.279	0.033	-0.033	-0.073
7IDSSTFM2 F3	-133.381	152.874	32972.894	-133.398	152.831	32972.901	-0.017	-0.044	0.007
7IDSSTFM2 F4	-131.930	152.374	32902.881	-131.972	152.392	32902.906	-0.043	0.019	0.025

FM2 APERTURE

Group to Group Relationship Groups: FM2 REF to FM2 APP (Reported in FRAME&CONTROL::07 ID SST PRACTICAL FRAME)									
Name	FM2 REF			FM2 APP			Delta		
	X1 (mm)	Y1 (mm)	Z1 (mm)	X2 (mm)	Y2 (mm)	Z2 (mm)	dX (mm)	dY (mm)	dZ (mm)
US APP CTR	-72.763	-0.036	32932.237	-72.786	-0.041	32932.083	-0.022	-0.004	-0.154
DS APP CTR	-73.242	-0.024	32957.191	-73.243	-0.048	32957.037	-0.002	-0.024	-0.154
DS TOP BL	-79.491	6.199	32957.076	-79.493	6.175	32956.932	-0.002	-0.025	-0.143
DS TOP BR	-67.019	6.206	32957.310	-67.021	6.181	32957.156	-0.002	-0.024	-0.154
DS BOT BR	-67.002	-6.241	32957.306	-67.003	-6.266	32957.142	-0.001	-0.024	-0.164
DS BOT BL	-79.455	-6.258	32957.072	-79.457	-6.283	32956.919	-0.001	-0.025	-0.153

COOLED FRAME FOR FS-L BRANCE FIDUCIALS

Group to Group Relationship Groups: FS BR REF to FS BL&FS BR USMN (Reported in FRAME&CONTROL::07 ID SST PRACTICAL FRAME)									
Name	FS BR REF			FS 02 FID			Delta		
	X1 (mm)	Y1 (mm)	Z1 (mm)	X2 (mm)	Y2 (mm)	Z2 (mm)	dX (mm)	dY (mm)	dZ (mm)
FS BR_F1	-93.733	284.449	35483.008	-93.447	284.254	35484.203	0.286	-0.195	1.195
FS BR_F4	-177.078	284.384	35503.310	-176.859	284.329	35504.423	0.219	-0.055	1.113
FS BR_F2	-35.711	283.931	35553.815	-35.472	283.940	35555.060	0.240	0.009	1.245

COOLED FRAME FOR FS-L BRANCE APERTURE

Group to Group Relationship Groups: FS BR REF to FS BR APP (Reported in FRAME&CONTROL::07 ID SST PRACTICAL FRAME)									
Name	FS BR REF			FS BR APP			Delta		
	X1 (mm)	Y1 (mm)	Z1 (mm)	X2 (mm)	Y2 (mm)	Z2 (mm)	dX (mm)	dY (mm)	dZ (mm)
US BOT BL	-97.530	-5.537	35528.198	-97.531	-5.567	35530.414	-0.001	-0.030	2.216
US TOP BL	-97.561	5.537	35528.220	-97.553	5.508	35530.397	0.008	-0.030	2.177
FS BR_US	-102.060	-0.000	35532.771	-102.060	-0.010	35534.964	-0.001	-0.010	2.193
M BR TOP	-106.580	5.523	35542.159	-106.584	5.550	35544.328	-0.004	0.027	2.169
M BR BOT	-106.556	-5.523	35542.171	-106.569	-5.496	35544.379	-0.013	0.027	2.209
US TOP BR	-111.373	5.511	35542.178	-111.377	5.542	35544.343	-0.004	0.031	2.166
US BOT BR	-111.376	-5.511	35542.190	-111.389	-5.479	35544.394	-0.013	0.031	2.205
DS TOP BL	-97.515	5.547	35545.052	-97.521	5.577	35547.229	-0.006	0.030	2.177
DS BOT BL	-97.484	-5.547	35545.063	-97.499	-5.517	35547.279	-0.015	0.030	2.216
FS BR_DS APP CTR	-102.020	-0.000	35549.619	-102.035	0.050	35551.812	-0.015	0.050	2.193
DS TOP BR	-106.557	5.530	35554.175	-106.570	5.600	35556.345	-0.014	0.070	2.169
DS BOT BR	-106.533	-5.530	35554.193	-106.555	-5.460	35556.402	-0.023	0.070	2.209

BRS (W) EDGES

Point Group REPORT`::BRS(W)			
Point Name	X (mm)	Y (mm)	Z (mm)
TOP US BR	-69.509	59.919	35666.442
BOT DS BR	-69.113	-60.010	35866.505
BOT US BR	-69.200	-60.081	35666.505
TOP DS BR	-69.423	59.990	35866.442
BOT DS BL	210.888	-59.958	35866.521
TOP DS BL	210.578	60.042	35866.459
BOT US BL	210.801	-60.029	35666.521
TOP US BL	210.492	59.971	35666.459

Calculated points from measured planes and measured dimension

COOLED FRAME FOR FL SCR-M BRANCE FIDUCIALS

Group to Group Relationship
Groups: FS BL REF to FS BL&FS BR USMN (Reported in FRAME&CONTROL::07 ID SST PRACTICAL FRAME)

Name	FS BL REF			FS 06 FID			Delta		
	X1 (mm)	Y1 (mm)	Z1 (mm)	X2 (mm)	Y2 (mm)	Z2 (mm)	dX (mm)	dY (mm)	dZ (mm)
FS BL_F1	390.442	284.678	35884.677	390.616	284.617	35884.622	0.174	-0.062	-0.055
FS BL_F2	395.185	283.815	36002.900	395.351	283.806	36002.895	0.167	-0.009	-0.005
FS BL_F3	312.504	283.152	36010.020	312.681	283.204	36010.072	0.177	0.053	0.052

COOLED FRAME FOR FL SCR-M BRANCE APERTURE

Group to Group Relationship
Groups: FS BL REF to FS BL APP (Reported in FRAME&CONTROL::07 ID SST PRACTICAL FRAME)

Name	FS BL REF			FS BL APP			Delta		
	X1 (mm)	Y1 (mm)	Z1 (mm)	X2 (mm)	Y2 (mm)	Z2 (mm)	dX (mm)	dY (mm)	dZ (mm)
US BOT BR	345.066	-5.557	35924.827	345.022	-5.568	35924.969	-0.044	-0.011	0.142
US TOP BR	345.077	5.557	35924.915	345.041	5.547	35925.052	-0.036	-0.011	0.137
FS BL_US	351.565	0.000	35930.712	351.527	-0.013	35930.850	-0.038	-0.013	0.138
US BOT BL	363.068	-5.523	35941.020	363.029	-5.538	35941.157	-0.039	-0.016	0.137
US TOP BL	362.998	5.522	35941.035	362.966	5.507	35941.166	-0.031	-0.016	0.132
M BL BOT	358.305	-5.521	35941.280	358.266	-5.534	35941.418	-0.039	-0.012	0.138
M BL TOP	358.320	5.521	35941.291	358.289	5.509	35941.424	-0.031	-0.012	0.133
DS BOT BR	345.914	-5.519	35941.511	345.875	-5.523	35941.653	-0.039	-0.003	0.142
DS TOP BR	345.926	5.519	35941.622	345.895	5.516	35941.759	-0.031	-0.003	0.137
FS BL_DS APP CTR	352.424	0.000	35947.415	352.391	-0.005	35947.553	-0.033	-0.005	0.138
DS BOT BL	358.926	-5.494	35953.211	358.890	-5.501	35953.349	-0.035	-0.007	0.138
DS TOP BL	358.946	5.494	35953.329	358.918	5.487	35953.462	-0.028	-0.007	0.133

SHIELDED BEAM PIPE M-BRANCH

Point Group
REPORT`::BL PIPE

Point Name	X (mm)	Y (mm)	Z (mm)
US BR	346.425	-0.359	36975.887
US BOT	405.139	-59.073	36975.884
US TOP	405.139	58.355	36975.884
US BL	463.853	-0.359	36975.882
DS BL	607.377	-0.322	39759.040
DS TOP	548.741	58.392	39762.062
DS BOT	548.741	-59.036	39762.063
DS BR	490.104	-0.322	39765.084

SHIELDED BEAM PIPE L-BRANCH

Point Group
REPORT`::BR PIPE

Point Name	X (mm)	Y (mm)	Z (mm)
US BOT	-99.132	-57.784	36978.211
US TOP	-99.132	59.612	36978.211
US BR	-157.830	0.914	36978.211
US BL	-40.434	0.914	36978.211
DS BL	-26.963	0.849	42473.452
DS BOT	-85.661	-57.849	42473.587
DS TOP	-85.661	59.547	42473.596
DS BR	-144.358	0.849	42473.732

SECONDARY SHIELD SBRS#3 EDGES

Point Group REPORT::SECONDARY SHIELD SBRS#3			
Point Name	X (mm)	Y (mm)	Z (mm)
TOP BR DS	-552.499	203.635	37225.780
TOP BL DS	-248.639	204.097	37232.289
BOT BR DS	-552.251	-203.364	37227.211
BOT BL DS	-248.391	-202.902	37233.720
TOP BR US	-550.336	203.612	37124.827
TOP BL US	-246.476	204.074	37131.336
BOT BR US	-550.088	-203.387	37126.257
BOT BL US	-246.228	-202.925	37132.766

PGM ZERO ORDER MASK&UNCOOLED APERTURE ASSEMBLY FIDUCIALS

Group to Group Relationship Groups: TRIPLE MSK ASSY to TRIPLE MSK ASSY FIDS (Reported in FRAME&CONTROL::07 ID SST PRACTICAL FRAME)									
Name	TRIPLE MSK ASSY			TRIPLE MSK ASSY FIDS			Delta		
	X1 (mm)	Y1 (mm)	Z1 (mm)	X2 (mm)	Y2 (mm)	Z2 (mm)	dX (mm)	dY (mm)	dZ (mm)
F2	673.263	198.585	41270.391	673.244	199.576	41270.752	-0.018	0.992	0.361
F1	695.333	198.214	41334.122	695.353	198.975	41334.497	0.020	0.762	0.375
VS15 RF4	630.429	75.198	41360.048	630.301	75.863	41360.013	-0.128	0.666	-0.035
VS15 F2	697.866	71.668	41558.807	697.847	71.609	41558.731	-0.019	-0.059	-0.076

PGM ZERO ORDER MASK&UNCOOLED APERTURE ASSEMBLY APERTURE

Group to Group Relationship Groups: TRIPLE MSK ASSY to TRIPLE MSK ASSY APP (Reported in FRAME&CONTROL::07 ID SST PRACTICAL FRAME)									
Name	TRIPLE MSK ASSY			TRIPLE MSK ASSY APP			Delta		
	X1 (mm)	Y1 (mm)	Z1 (mm)	X2 (mm)	Y2 (mm)	Z2 (mm)	dX (mm)	dY (mm)	dZ (mm)
US MASK US US1	631.980	31.488	41190.163	631.762	32.793	41189.970	-0.218	1.305	-0.193
US MASK US US4	631.971	-1.556	41190.338	631.721	-0.252	41190.028	-0.250	1.305	-0.310
US MSK US APP CTR	621.952	14.985	41190.769	621.719	16.297	41190.522	-0.233	1.313	-0.247
US MASK US US2	611.953	31.500	41191.199	611.736	32.821	41191.015	-0.217	1.321	-0.185
US MASK US US3	611.894	-1.530	41191.377	611.645	-0.209	41191.076	-0.249	1.320	-0.301
US MASK DS DS1	635.121	34.055	41201.976	634.911	35.316	41201.791	-0.210	1.260	-0.185
US MASK DS DS4	635.098	-4.057	41202.132	634.851	-2.797	41201.812	-0.247	1.260	-0.320
US MSK DS APP CTR	622.555	15.017	41202.701	622.327	16.287	41202.454	-0.228	1.270	-0.247
US MASK DS DS2	610.026	34.070	41203.270	609.816	35.350	41203.095	-0.210	1.280	-0.175
US MASK DS DS3	609.965	-4.022	41203.428	609.719	-2.743	41203.119	-0.247	1.280	-0.309
MID MSK US US1	640.503	18.755	41351.714	640.341	19.482	41351.472	-0.162	0.726	-0.243
MID MSK US US4	640.522	8.678	41351.788	640.351	9.404	41351.510	-0.172	0.726	-0.278
MID MSK US APP CTR	630.490	13.701	41352.259	630.323	14.435	41352.003	-0.166	0.734	-0.256
MID MSK US US2	620.457	18.726	41352.731	620.296	19.468	41352.497	-0.161	0.742	-0.234
MID MSK US US3	620.477	8.646	41352.804	620.306	9.388	41352.535	-0.171	0.742	-0.270
DS MSK DS DS1	651.485	20.069	41569.888	651.417	20.014	41569.644	-0.068	-0.055	-0.244
DS MSK DS DS4	651.505	9.962	41569.963	651.427	9.907	41569.683	-0.078	-0.055	-0.280
DS MSK DS APP CTR	641.462	15.000	41570.381	641.389	14.953	41570.123	-0.073	-0.047	-0.258
DS MSK DS DS2	631.418	20.039	41570.799	631.350	20.001	41570.563	-0.068	-0.039	-0.236
DS MSK DS DS3	631.438	9.930	41570.874	631.360	9.891	41570.602	-0.078	-0.039	-0.271

PBS FIDUCIALS

Group to Group Relationship
Groups: PBS to PBS FIDS (Reported in FRAME&CONTROL::07 ID SST PRACTICAL FRAME)

Name	PBS			PBS M FID			Delta		
	X1 (mm)	Y1 (mm)	Z1 (mm)	X2 (mm)	Y2 (mm)	Z2 (mm)	dX (mm)	dY (mm)	dZ (mm)
7ID PBS F1	636.050	196.266	42641.885	636.019	196.249	42641.809	-0.031	-0.016	-0.076
7ID PBS F2	759.537	196.354	42636.374	759.524	196.331	42636.328	-0.014	-0.022	-0.047
7ID PBS F3	765.173	196.196	42760.086	765.167	196.177	42759.988	-0.006	-0.019	-0.098
7ID PBS F4	641.317	196.171	42765.664	641.277	196.138	42765.550	-0.041	-0.032	-0.115

PBS EDGES

Group to Group Relationship
Groups: PBS to PBS EDGES (Reported in FRAME&CONTROL::07 ID SST PRACTICAL FRAME)

Name	PBS			PBS EDGES			Delta		
	X1 (mm)	Y1 (mm)	Z1 (mm)	X2 (mm)	Y2 (mm)	Z2 (mm)	dX (mm)	dY (mm)	dZ (mm)
US BL	721.758	-10.226	42671.114	721.743	-10.246	42671.021	-0.015	-0.020	-0.093
US BR	678.865	-10.197	42673.320	678.850	-10.219	42673.223	-0.015	-0.022	-0.097
DS BL	728.093	24.756	42730.811	728.072	24.732	42730.721	-0.021	-0.023	-0.091
DS BR	675.683	24.832	42733.578	675.662	24.807	42733.483	-0.021	-0.025	-0.095

PBS FLANGE CENTERS

Group to Group Relationship
Groups: PBS to PBS APP (Reported in FRAME&CONTROL::07 ID SST PRACTICAL FRAME)

Name	PBS			PBS FLG			Delta		
	X1 (mm)	Y1 (mm)	Z1 (mm)	X2 (mm)	Y2 (mm)	Z2 (mm)	dX (mm)	dY (mm)	dZ (mm)
US FLG	692.412	15.000	42561.540	692.407	14.985	42561.446	-0.005	-0.015	-0.094
DS BL FLG	755.382	15.000	42913.622	755.344	14.967	42913.533	-0.038	-0.033	-0.089
DS BR FLG	657.645	15.000	42996.363	657.600	14.960	42996.265	-0.045	-0.040	-0.098

FM3 FIDUCIALS

Group to Group Relationship
Groups: FM3 to FM3 FIDS (Reported in FRAME&CONTROL::07 ID SST PRACTICAL FRAME)

Name	FM3			FM3 FIDS			Delta		
	X1 (mm)	Y1 (mm)	Z1 (mm)	X2 (mm)	Y2 (mm)	Z2 (mm)	dX (mm)	dY (mm)	dZ (mm)
7IDSSTFM3 F1	-18.523	148.603	45916.912	-18.553	148.555	45916.905	-0.030	-0.048	-0.008
7IDSSTFM3 F2	-18.283	149.231	45986.949	-18.305	149.206	45986.900	-0.022	-0.025	-0.050
7IDSSTFM3 F3	-138.293	149.118	45987.374	-138.307	149.070	45987.363	-0.015	-0.049	-0.011
7IDSSTFM3 F4	-138.529	148.490	45917.352	-138.521	148.464	45917.317	0.008	-0.026	-0.035

FM3 APERTURE

Group to Group Relationship
Groups: FM3 to FM3 APP (Reported in FRAME&CONTROL::07 ID SST PRACTICAL FRAME)

Name	FM3			FM3 APP			Delta		
	X1 (mm)	Y1 (mm)	Z1 (mm)	X2 (mm)	Y2 (mm)	Z2 (mm)	dX (mm)	dY (mm)	dZ (mm)
US APP CTR	-78.205	-3.774	45945.290	-78.219	-3.811	45945.265	-0.014	-0.037	-0.025
DS APP CTR	-78.137	-3.784	45970.311	-78.151	-3.821	45970.286	-0.014	-0.037	-0.025
DS TOP BR	-82.187	4.236	45970.324	-82.201	4.199	45970.299	-0.014	-0.037	-0.025
DS TOP BL	-74.100	4.225	45970.291	-74.114	4.188	45970.265	-0.014	-0.037	-0.025
DS BOT BR	-82.164	-11.803	45970.332	-82.178	-11.840	45970.307	-0.014	-0.037	-0.025
DS BOT BL	-74.098	-11.793	45970.299	-74.111	-11.830	45970.274	-0.014	-0.037	-0.025

PBS L BRANCH FIDUCIALS

Group to Group Relationship
Groups: PBS L BRANCH to PBS L BRANCH FIDS (Reported in FRAME&CONTROL::07 ID SST PRACTICAL FRAME)

Name	PBS L BRANCH			PBS L FID			Delta		
	X1 (mm)	Y1 (mm)	Z1 (mm)	X2 (mm)	Y2 (mm)	Z2 (mm)	dX (mm)	dY (mm)	dZ (mm)
DM1 F1	-165.860	116.311	47904.719	-166.788	117.282	47903.099	-0.928	0.971	-1.619
DM1 F2	14.179	117.310	47901.287	13.221	116.493	47899.731	-0.958	-0.817	-1.556
DM1 F3	17.169	115.195	48317.342	16.095	115.296	48315.892	-1.075	0.101	-1.450
DM1 F4	-163.149	114.255	48319.845	-164.236	116.219	48318.262	-1.086	1.964	-1.583

PBS L BRANCH EDGES

Group to Group Relationship
Groups: PBS L BRANCH to PBS L BRANCH EDGES (Reported in FRAME&CONTROL::07 ID SST PRACTICAL FRAME)

Name	PBS L BRANCH			PBS L BRANCH EDGES			Delta		
	X1 (mm)	Y1 (mm)	Z1 (mm)	X2 (mm)	Y2 (mm)	Z2 (mm)	dX (mm)	dY (mm)	dZ (mm)
US BL	-39.266	-20.717	47676.866	-41.518	-21.537	47675.650	-2.252	-0.821	-1.216
US BR	-104.452	-21.432	47677.420	-106.708	-21.594	47676.183	-2.256	-0.162	-1.237
DS BL	-39.388	9.114	47705.077	-41.347	8.360	47703.790	-1.960	-0.754	-1.287
DS BR	-104.512	8.398	47705.629	-106.476	8.302	47704.322	-1.964	-0.096	-1.307

PBS L BRANCH FLANGE CENTERS

Group to Group Relationship
Groups: PBS L BRANCH to PBS L BRANCH APP (Reported in FRAME&CONTROL::07 ID SST PRACTICAL FRAME)

Name	PBS L BRANCH			PBS L BRANCH FLG			Delta		
	X1 (mm)	Y1 (mm)	Z1 (mm)	X2 (mm)	Y2 (mm)	Z2 (mm)	dX (mm)	dY (mm)	dZ (mm)
DS FLG CTR	-72.563	15.049	48344.936	-74.667	16.145	48343.622	-2.103	1.096	-1.314
US FLG CTR	-74.112	16.625	47849.916	-76.041	16.564	47848.599	-1.929	-0.061	-1.317
PBS US FLG CTR	-74.415	14.999	47611.239	-76.284	14.375	47609.926	-1.869	-0.623	-1.312

BRS2 DS TOP OUTB	210.600	60.000	35866.600
BRS2 DS BOT OUTB	210.600	-60.000	35866.600
BRS2 DS BOT INB	-67.400	-60.000	35866.600

PSH1 (mm)	x-coord.	y-coord.	z-coord.
PSH1 US TOP INB	-120.510	12.500	36326.714
PSH1 US TOP OUTB	-80.510	12.500	36326.622
PSH1 US BOT OUTB	-80.510	-12.500	36326.622
PSH1 US BOT INB	-120.510	-12.500	36326.714
PSH1 DS TOP INB	-120.146	12.500	36483.614
PSH1 DS TOP OUTB	-80.146	12.500	36483.521
PSH1 DS BOT OUTB	-80.146	-12.500	36483.521
PSH1 DS BOT INB	-120.146	-12.500	36483.614

SBT-L (mm)	x-coord.	y-coord.	z-coord.
SBT-L US TOP	-98.997	58.750	36978.212
SBT-L US BOT	-98.997	-58.850	36978.212
SBT-L US OUTB	-40.197	-0.050	36978.212
SBT-L US INB	-157.798	-0.050	36978.212
SBT-L DS TOP	-86.237	58.750	42476.563
SBT-L DS BOT	-86.237	-58.850	42476.563
SBT-L DS OUTB	-27.437	-0.050	42476.426
SBT-L DS INB	-145.037	-0.050	42476.699

FM3 (mm)	x-coord.	y-coord.	z-coord.
FM3 DS TOP INB	-82.129	4.240	45970.413
FM3 DS TOP OUTB	-74.129	4.240	45970.394
FM3 DS BOT OUTB	-74.129	-11.760	45970.394
FM3 DS BOT INB	-82.129	-11.760	45970.413

L PBS (mm)	x-coord.	y-coord.	z-coord.
L PBS DS INB	-106.600	7.500	47706.349
L PBS DS OUTB	-41.600	7.500	47706.198
L PBS US OUTB	-41.667	-21.500	47677.198
L PBS US INB	-106.667	-21.500	47677.349

PSH2 (mm)	x-coord.	y-coord.	z-coord.
PSH2 US TOP INB	-84.992	27.500	51630.814
PSH2 US TOP OUTB	-44.992	27.500	51630.721
PSH2 US BOT OUTB	-44.992	2.500	51630.721
PSH2 US BOT INB	-84.992	2.500	51630.814
PSH2 DS TOP INB	-84.628	27.500	51787.714
PSH2 DS TOP OUTB	-44.628	27.500	51787.621
PSH2 DS BOT OUTB	-44.628	2.500	51787.621
PSH2 DS BOT INB	-84.628	2.500	51787.714

PSH3 (mm)	x-coord.	y-coord.	z-coord.
PSH3 US TOP INB	-30.859	27.500	63500.831
PSH3 US TOP OUTB	9.129	27.500	63499.883
PSH3 US BOT OUTB	9.129	2.500	63499.883
PSH3 US BOT INB	-30.859	2.500	63500.831
PSH3 DS TOP INB	-27.139	27.500	63657.687
PSH3 DS TOP OUTB	12.850	27.500	63656.738
PSH3 DS BOT OUTB	12.850	2.500	63656.738
PSH3 DS BOT INB	-27.139	2.500	63657.687

BRS2 DS TOP OUTB	210.578	-0.022	1.440	0.000	60.042	0.042	0.410	0.000	35866.459	-0
BRS2 DS BOT OUTB	210.888	0.288	1.440	0.000	-59.958	0.042	0.000	0.410	35866.521	-0
BRS2 DS BOT INB	-69.113	-1.713	0.000	0.640	-60.010	-0.010	0.000	0.410	35866.505	-0

PSH1 (mm)	x-coord.	x-deviation	x-tol. (+/-)	y-coord.	y-deviation	y-tol. (+/-)	z-coord.	z-deviati
PSH1 US TOP INB	-120.872	-0.362	2.000	12.542	0.042	2.000	36322.689	-
PSH1 US TOP OUTB	-80.835	-0.325	2.000	12.524	0.024	2.000	36322.592	-
PSH1 US BOT OUTB	-80.851	-0.341	2.000	-12.513	-0.013	2.000	36322.577	-
PSH1 US BOT INB	-120.884	-0.374	2.000	-12.480	0.020	2.000	36322.673	-
PSH1 DS TOP INB	-120.731	-0.585	2.000	12.645	0.145	2.000	36479.812	-
PSH1 DS TOP OUTB	-80.669	-0.523	2.000	12.628	0.128	2.000	36479.687	-
PSH1 DS BOT OUTB	-80.684	-0.538	2.000	-12.414	0.086	2.000	36479.779	-
PSH1 DS BOT INB	-120.744	-0.598	2.000	-12.382	0.118	2.000	36479.904	-

SBT-L (mm)	x-coord.	x-deviation	x-tol. (+/-)	y-coord.	y-deviation	y-tol. (+/-)	z-coord.	z-deviati
SBT-L US TOP	-99.273	-0.276	2.000	59.616	0.866	2.000	36919.382	-5
SBT-L US BOT	-99.273	-0.276	2.000	-57.780	1.070	2.000	36919.373	-5
SBT-L US OUTB	-40.575	-0.378	2.000	0.918	0.968	2.000	36919.238	-5
SBT-L US INB	-157.970	-0.172	2.000	0.918	0.968	2.000	36919.518	-5
SBT-L DS TOP	-85.661	0.576	2.000	59.547	0.797	2.000	42473.596	-
SBT-L DS BOT	-85.661	0.576	2.000	-57.849	1.001	2.000	42473.587	-
SBT-L DS OUTB	-26.963	0.474	2.000	0.849	0.899	2.000	42473.587	-
SBT-L DS INB	-144.358	0.679	2.000	0.849	0.899	2.000	42473.732	-

FM3 (mm)	x-coord.	x-deviation	minus x-tol.	plus x-tol.	y-coord.	y-deviation	minus y-tol.	plus y-tol.	z-coord.	z-deviati
FM3 DS TOP INB	-82.201	-0.072	0.320	0.000	4.199	-0.041	0.000	0.120	45970.299	-
FM3 DS TOP OUTB	-74.114	0.015	0.000	0.320	4.188	-0.052	0.000	0.120	45970.265	-
FM3 DS BOT OUTB	-74.111	0.018	0.000	0.320	-11.830	-0.070	0.120	0.000	45970.274	-
FM3 DS BOT INB	-82.178	-0.049	0.320	0.000	-11.840	-0.080	0.120	0.000	45970.307	-

L PBS (mm)	x-coord.	x-deviation	minus x-tol.	plus x-tol.	y-coord.	y-deviation	minus y-tol.	plus y-tol.	z-coord.	z-deviat
L PBS DS INB	-104.714	1.886	0.320	0.000	8.463	0.963	0.000	0.320	47705.469	-
L PBS DS OUTB	-39.590	2.010	0.000	0.320	9.184	1.684	0.000	0.320	47704.907	-
L PBS US OUTB	-39.470	2.197	0.000	0.320	-20.651	0.849	0.320	0.000	47676.700	-
L PBS US INB	-104.656	2.011	0.320	0.000	-21.371	0.129	0.320	0.000	47677.264	-

PSH2 (mm)	x-coord.	x-deviation	x-tol. (+/-)	y-coord.	y-deviation	y-tol. (+/-)	z-coord.	z-deviat
PSH2 US TOP INB	-85.080	-0.088	2.000	27.604	0.104	2.000	51631.060	-
PSH2 US TOP OUTB	-44.878	0.114	2.000	27.609	0.109	2.000	51631.228	-
PSH2 US BOT OUTB	-44.906	0.086	2.000	2.346	-0.154	2.000	51631.208	-
PSH2 US BOT INB	-85.078	-0.086	2.000	2.350	-0.150	2.000	51631.041	-
PSH2 DS TOP INB	-84.805	-0.177	2.000	27.623	0.123	2.000	51787.740	-
PSH2 DS TOP OUTB	-44.517	0.111	2.000	27.627	0.127	2.000	51787.884	-
PSH2 DS BOT OUTB	-44.545	0.083	2.000	2.373	-0.127	2.000	51787.929	-
PSH2 DS BOT INB	-84.804	-0.176	2.000	2.378	-0.122	2.000	51787.785	-

PSH3 (mm)	x-coord.	x-deviation	x-tol. (+/-)	y-coord.	y-deviation	y-tol. (+/-)	z-coord.	z-deviat
PSH3 US TOP INB	-31.022	-0.163	2.000	27.538	0.038	2.000	63501.401	-
PSH3 US TOP OUTB	9.201	0.072	2.000	27.540	0.040	2.000	63500.491	-
PSH3 US BOT OUTB	9.196	0.067	2.000	2.309	-0.191	2.000	63500.486	-
PSH3 US BOT INB	-31.029	-0.170	2.000	2.326	-0.174	2.000	63501.396	-
PSH3 DS TOP INB	-27.206	-0.067	2.000	27.518	0.018	2.000	63657.963	-
PSH3 DS TOP OUTB	12.997	0.147	2.000	27.520	0.020	2.000	63657.090	-
PSH3 DS BOT OUTB	12.993	0.143	2.000	2.253	-0.247	2.000	63657.131	-
PSH3 DS BOT INB	-27.212	-0.073	2.000	2.270	-0.230	2.000	63658.003	-

M-BRANCH COMPONENTS

Beamline coordinate Data (mm)

FM4 (mm)	x-coord.	y-coord.	z-coord.
FM4 BOT INB	136.381	-10.000	31909.009
FM4 TOP INB	136.381	10.000	31909.009
FM4 TOP OUTB	156.355	10.000	31907.982
FM4 BOT OUTB	156.355	-10.000	31907.982

FS6 (mm)	x-coord.	y-coord.	z-coord.
FS6 US TOP INB	345.128	5.500	35924.904
FS6 US BOT INB	345.128	-5.500	35924.904
FS6 MIS APER TOP	358.259	5.500	35941.513
FS6 MIS APER BOT	358.259	-5.500	35941.513

PSH4 (mm)	x-coord.	y-coord.	z-coord.
PSH4 US TOP INB	351.930	12.500	36327.612
PSH4 US TOP OUTB	391.877	12.500	36325.559
PSH4 US BOT OUTB	391.877	-12.500	36325.559
PSH4 US BOT INB	351.930	-12.500	36327.612
PSH4 DS TOP INB	359.985	12.500	36484.305
PSH4 DS TOP OUTB	399.932	12.500	36482.252
PSH4 DS BOT OUTB	399.932	-12.500	36482.252
PSH4 DS BOT INB	359.985	-12.500	36484.305

SBT-M (mm)	x-coord.	y-coord.	z-coord.
SBT-M US TOP	405.281	58.800	36975.884
SBT-M US BOT	405.281	-58.800	36975.884
SBT-M US OUTB	464.159	0.000	36975.881
SBT-M US INB	346.404	0.000	36975.887
SBT-M DS TOP	548.506	58.800	39762.074
SBT-M DS BOT	548.506	-58.800	39762.074
SBT-M DS OUTB	607.228	0.000	39759.056
SBT-M DS INB	489.783	0.000	39765.093

PGM ZOM (mm)	x-coord.	y-coord.	z-coord.
PGM ZOM US TOP INB	611.960	33.000	41191.268
PGM ZOM US TOP OUTB	631.934	33.000	41190.242
PGM ZOM US BOT OUTB	631.934	-3.000	41190.242
PGM ZOM US BOT INB	611.960	-3.000	41191.268

PGM MIS (mm)	x-coord.	y-coord.	z-coord.
PGM MIS US TOP INB	620.238	20.000	41352.296
PGM MIS US TOP OUTB	640.211	20.000	41351.269
PGM MIS US BOT OUTB	640.211	10.000	41351.269
PGM MIS US BOT INB	620.238	10.000	41352.296
PGM MIS DS TOP INB	631.475	20.000	41570.894
PGM MIS DS TOP OUTB	651.448	20.000	41569.867
PGM MIS DS BOT OUTB	651.448	10.000	41569.867

Final Survey Data (mm) (with tolerances & deviation)

FM4 (mm)	x-coord.	x-deviation	minus x-tol.	plus x-tol.	y-coord.	y-deviation	minus y-tol.	plus y-tol.	z-coord.	z-deviat
FM4 BOT INB	136.342	-0.039	0.320	0.000	-10.003	-0.003	0.320	0.000	31909.007	-
FM4 TOP INB	136.359	-0.022	0.320	0.000	9.995	-0.005	0.000	0.320	31909.004	-
FM4 TOP OUTB	156.381	0.026	0.000	0.320	9.995	-0.005	0.000	0.320	31907.974	-
FM4 BOT OUTB	156.375	0.020	0.000	0.320	-10.000	0.000	0.320	0.000	31907.977	-

FS6 (mm)	x-coord.	x-deviation	minus x-tol.	plus x-tol.	y-coord.	y-deviation	minus y-tol.	plus y-tol.	z-coord.	z-deviat
FS6 US TOP INB	345.076690	-0.051	0.320	0.000	5.557230	0.057	0.000	0.320	35924.915218	-
FS6 US BOT INB	345.066318	-0.062	0.320	0.000	-5.557432	-0.057	0.320	0.000	35924.826872	-
FS6 MIS APER TOP	358.319798	0.060	0.320	0.000	5.521289	0.021	0.000	0.320	35941.290507	-
FS6 MIS APER BOT	358.305348	0.046	0.320	0.000	-5.521311	-0.021	0.320	0.000	35941.280069	-

PSH4 (mm)	x-coord.	x-deviation	x-tol. (+/-)	y-coord.	y-deviation	y-tol. (+/-)	z-coord.	z-deviat
PSH4 US TOP INB	351.689	-0.241	2.000	12.678	0.178	2.000	36332.426	-
PSH4 US TOP OUTB	391.865	-0.012	2.000	12.684	0.184	2.000	36330.215	-
PSH4 US BOT OUTB	391.851	-0.026	2.000	-12.586	-0.086	2.000	36330.180	-
PSH4 US BOT INB	351.682	-0.248	2.000	-12.579	-0.079	2.000	36332.391	-
PSH4 DS TOP INB	360.193	0.208	2.000	12.573	0.073	2.000	36488.938	-
PSH4 DS TOP OUTB	400.390	0.458	2.000	12.578	0.078	2.000	36486.881	-
PSH4 DS BOT OUTB	400.380	0.448	2.000	-12.679	-0.179	2.000	36486.930	-
PSH4 DS BOT INB	360.191	0.206	2.000	-12.672	-0.172	2.000	36488.986	-

SBT-M (mm)	x-coord.	x-deviation	x-tol. (+/-)	y-coord.	y-deviation	y-tol. (+/-)	z-coord.	z-deviat
SBT-M US TOP	405.139	-0.142	2.000	58.355	-0.445	2.000	36975.883	-
SBT-M US BOT	405.139	-0.142	2.000	-59.073	-0.273	2.000	36975.885	-
SBT-M US OUTB	463.775	-0.384	2.000	-0.359	-0.359	2.000	36972.862	-
SBT-M US INB	346.503	0.099	2.000	-0.359	-0.359	2.000	36978.906	-
SBT-M DS TOP	548.741	0.235	2.000	58.392	-0.408	2.000	39762.062	-
SBT-M DS BOT	548.741	0.235	2.000	-59.036	-0.236	2.000	39762.063	-
SBT-M DS OUTB	607.377	0.149	2.000	-0.322	-0.322	2.000	39759.040	-
SBT-M DS INB	490.104	0.321	2.000	-0.322	-0.322	2.000	39759.040	-

PGM ZOM (mm)	x-coord.	x-deviation	minus x-tol.	plus x-tol.	y-coord.	y-deviation	minus y-tol.	plus y-tol.	z-coord.	z-deviat
PGM ZOM US TOP INB	611.736	-0.224	0.320	0.000	32.821	-0.179	0.000	0.320	41191.015	-
PGM ZOM US TOP OUTB	631.762	-0.172	0.000	0.320	32.793	-0.207	0.000	0.320	41189.970	-
PGM ZOM US BOT OUTB	631.721	-0.213	0.000	0.320	-0.252	2.748	0.320	0.000	41190.028	-
PGM ZOM US BOT INB	611.645	-0.315	0.320	0.000	-0.209	2.791	0.320	0.000	41191.076	-

PGM MIS (mm)	x-coord.	x-deviation	minus x-tol.	plus x-tol.	y-coord.	y-deviation	minus y-tol.	plus y-tol.	z-coord.	z-deviat
PGM MIS US TOP INB	620.296	0.058	0.320	0.000	19.468	-0.532	0.000	0.320	41352.497	-
PGM MIS US TOP OUTB	640.341	0.130	0.000	0.320	19.482	-0.518	0.000	0.320	41351.472	-
PGM MIS US BOT OUTB	640.351	0.140	0.000	0.320	9.404	-0.596	0.320	0.000	41351.510	-
PGM MIS US BOT INB	620.306	0.068	0.320	0.000	9.388	-0.612	0.320	0.000	41352.535	-
PGM MIS DS TOP INB	631.350	-0.125	0.320	0.000	20.001	0.001	0.000	0.320	41570.563	-
PGM MIS DS TOP OUTB	651.417	-0.081	0.000	0.320	20.014	0.014	0.000	0.320	41569.644	-
PGM MIS DS BOT OUTB	651.427	-0.021	0.000	0.320	9.907	-0.093	0.320	0.000	41569.683	-

141	5.000
079	5.000
095	5.000

n	z-tol. (+/-)
025	5.000
030	5.000
045	5.000
041	5.000
802	5.000
834	5.000
742	5.000
710	5.000

n	z-tol. (+/-)
830	5.000
839	5.000
974	5.000
694	5.000
967	5.000
976	5.000
839	5.000
967	5.000

n	z-tol. (+/-)
.114	5.000
.129	5.000
.120	5.000
.106	5.000

n	z-tol. (+/-)
.880	5.000
.291	5.000
.498	5.000
.085	5.000

n	z-tol. (+/-)
.246	5.000
.507	5.000
.487	5.000
.227	5.000
.026	5.000
.263	5.000
.308	5.000
.071	5.000

n	z-tol. (+/-)
.570	5.000
.608	5.000
.603	5.000
.565	5.000
.276	5.000
.352	5.000
.393	5.000
.316	5.000

n	z-tol. (+/-)	
.002	5.000	Close enough
.005	5.000	
.008	5.000	
.005	5.000	

n	z-tol. (+/-)	
.011	5.000	Move outboard .24mm Move up .05mm
.078	5.000	
.222	5.000	
.233	5.000	

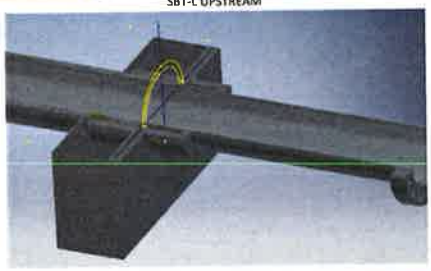
n	z-tol. (+/-)
.814	5.000
.656	5.000
.621	5.000
.779	5.000
[illegible]	5.000
.629	5.000
.678	5.000
.681	5.000

ion	z-tol. (+/-)	
0.001	5.000	Need correct data
0.001	5.000	
3.019	5.000	
3.019	5.000	
0.012	5.000	
0.011	5.000	
0.016	5.000	
6.053	5.000	

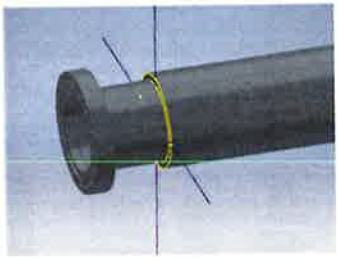
ion	z-tol. (+/-)	
0.253	5.000	Measured u/s aperture is 33mm high instead of 36. FMB's model is incorrect.
0.272	5.000	
0.214	5.000	
0.192	5.000	

ion	z-tol. (+/-)	
0.201	5.000	DR?
0.203	5.000	
0.241	5.000	
0.239	5.000	
0.331	5.000	
0.223	5.000	
0.184	5.000	

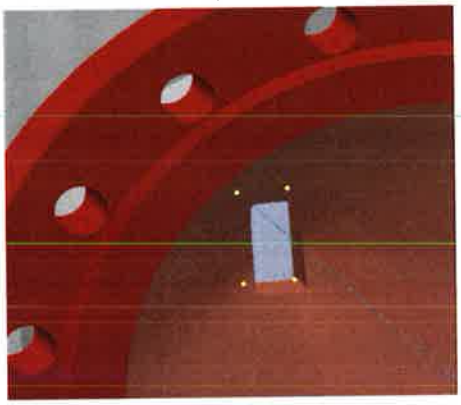
SBT-L UPSTREAM



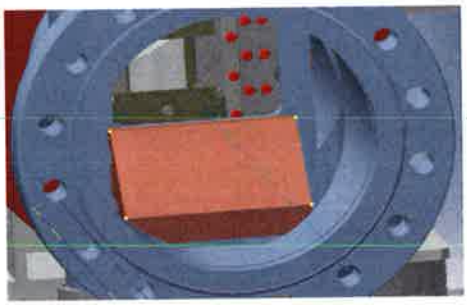
SBT-L DOWNSTREAM



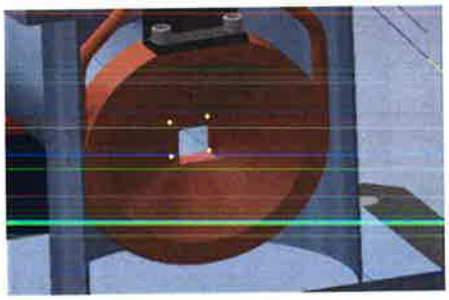
FM3



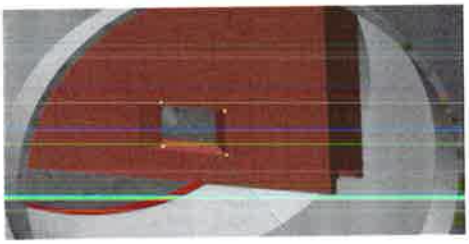
L-PBS



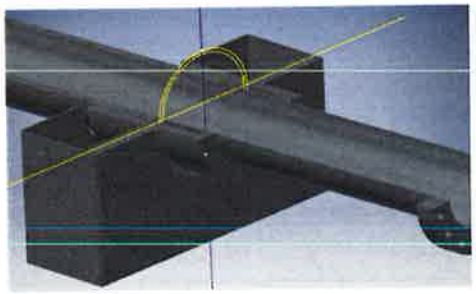
FM4



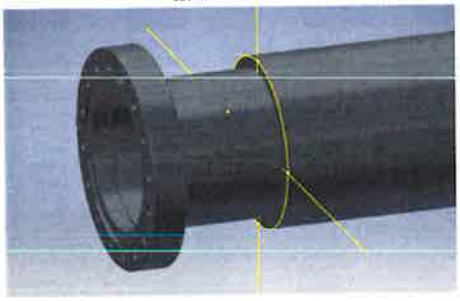
FS6



SBT-M UPSTREAM



SBT-M DOWNSTREAM



PGM ZOM & PGM MIS APER.

Nonconformance # N-00089 Created by Broadbent, Andrew on Feb 14, 2018 10:09:52 AM

Initiation | Disposition Recommendation | Quality Representative Concurrence | Final Disposition | Access Control | **All Tabs**

Initiation

Last Comment

Broadbent, Andrew [2569], Feb 15, 2018 5:20:08 PM, Final Disposition:

NC Number	Created by	Created on
N-00089	Broadbent, Andrew	Feb 15, 2018

GENERAL INFORMATION

Source of Nonconformance	Mode of Discovery	Receipt Type
Equipment	In-Process	BNL Production
Discovered by	**Phone Extension**	**Discovery Date**
Broadbent, Andrew	631/344-7103	Feb 14, 2018 10:10:00 AM

Affected Department
Photon Sciences Department

Dept Quality Representative
NSLS II QReps

Owner	Owner's Phone	Owner's Department
Broadbent, Andrew	631/344-7103	Photon Sciences Department

Type of Nonconformance
Out of Spec/Tolerance

General Item Description
Various small survey discrepancies on SST beamline radiation safety components

Description of Nonconformance
1. Mask 1: L-branch inboard aperture edge is 1mm wider than specified.
2. SBS#1: width is 5mm less than specified and height is ~5mm less than specified.
3. WBS: height of the back edge of the stop is greater than specified. This is good.
4. BSS: positioned further inboard than specified by 3mm, and this is 1mm low.
5. SBS#2: width is 5mm less than specified and height is ~5mm less than specified, and Z is 5mm upstream.
6. BRS: Width is 2mm greater than designed, primarily on the inboard side.
7. FM3: Installed 50 microns high.
8. PBS on L-branch: tope edge is 600 microns high.
9. FM4: Mis-positioned by 5 microns
10. PGM ZOM: Vertical aperture is smaller than designed.
11. PGM Mis-steer mask: Bottom edge is 600 microns low.

Quantity Delivered	Quantity with NC
1	1

ITEM INFORMATION

General Item Information

Supplier Name	Supplier Name 2	
Requisitioner	Item Type / Category	Vendor Item ID
Lot # / Serial #	Supplier Part #	BNL Part #
Manufacturer	Rev Level	
Attachments		

Quality Representative Concurrence

QUALITY REPRESENTATIVE INFO

Please review the information contained in the sections labeled "Initiation", and "Disposition Recommendation" by clicking on the tabs above. Return to this tab to record your concurrence.

Concurrence
- (•) Concur
- ( ) Recommend Adjustments

Comments

Final Disposition

FINAL DISPOSITION INFO

CAPA Link

SCAR Link

Date Closed

☑ Close Nonconformance

Comments

Attachment(s)

Access Control

Phase Tracking

Assigned To	Phase	Submitted Date	Due Date	Completed Date	Due Date Extension/Reassignment Link
Broadbent, Andrew	Initiation	Feb 14, 2018	Feb 22, 2018	Feb 14, 2018	
Broadbent, Andrew	Disposition Recommendation	Feb 14, 2018	Feb 22, 2018	Feb 14, 2018	
Cheswick, Edwar Zipper, Joseph	Quality Representative Concurrence	Feb 14, 2018	Feb 22, 2018	Feb 14, 2018	
Chitra, Sunil	Additional Approvals	Feb 14, 2018	Feb 22, 2018	Feb 15, 2018	
Cheswick, Edwar Zipper, Joseph	Quality Representative Concurrence	Feb 15, 2018	Feb 23, 2018	Feb 15, 2018	
Chitra, Sunil	Additional Approvals	Feb 15, 2018	Feb 23, 2018	Feb 15, 2018	
Broadbent, Andrew	Final Disposition	Feb 15, 2018	Feb 23, 2018	Feb 15, 2018	
	Closed	Feb 15, 2018		Feb 15, 2018	

☐ Additional Document Security

Quality Representative Concurrence

QUALITY REPRESENTATIVE INFO

Please review the information contained in the sections labeled "Initiation", and "Disposition Recommendation" by clicking on the tabs above. Return to this tab to record your concurrence.

Concurrence
- (•) Concur
- ( ) Recommend Adjustments

Comments

Final Disposition

FINAL DISPOSITION INFO

CAPA Link

SCAR Link

Date Closed

☑ Close Nonconformance

Comments

Attachment(s)

Access Control

Phase Tracking

Assigned To	Phase	Submitted Date	Due Date	Completed Date	Due Date Extension/Reassignment Link
Broadbent, Andrew	Initiation	Feb 14, 2018	Feb 22, 2018	Feb 14, 2018	
Broadbent, Andrew	Disposition Recommendation	Feb 14, 2018	Feb 22, 2018	Feb 14, 2018	
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Chitra, Sunil	Additional Approvals	Feb 14, 2018	Feb 22, 2018	Feb 15, 2018	
Cheswick, Edwar Zipper, Joseph	Quality Representative Concurrence	Feb 15, 2018	Feb 23, 2018	Feb 15, 2018	
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Broadbent, Andrew	Final Disposition	Feb 15, 2018	Feb 23, 2018	Feb 15, 2018	
	Closed	Feb 15, 2018		Feb 15, 2018	

☐ **Additional Document Security**