

<u>Title</u>	<u>Name</u>	<u>Approval Date</u>
NPB Portfolio Manager	Andrew Broadbent	10/02/2017
Deputy Director for Construction	Erik Johnson	10/02/2017
ESH Manager	Robert Lee	10/02/2017
Quality Assurance Engineer	Joseph Zipper	10/02/2017

Serial No	Part No	Part Rev	ECN	Rev	ECN	Rev
	PD-55T-ES-3000					
Deviation & Waiver: _____						

OP	Description	Name/Life #	Date	DR
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10 TRAVELER INFORMATION

This traveler shall be used for the installation and testing of end station equipment previously installed and operated at NLSII or another facility, that is now being installed at NLSII. This traveler goes beyond the typical installation/test traveler that instructs/documents installation qualification. It will also:

- 1) confirm that the re-purposing of this equipment was reviewed and approved for its intended use
- 2) collect upgrade information from subject matter experts (SME) that they deem necessary for the equipment's safe operation at NLSII, and
- 3) confirm that any new upgrades have been implemented.

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COMPLETE OP#20 THRU OP#130 BEFORE INSTALLATION

20 A. In the space provided at the top of this traveler write in the relevant beamline.

(Conan Wilap) 20498	11/21/18	
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B. In the space below record the name/description of the end station equipment, and its intended use.

NAME/DESCRIPTION: LARIAT-2 Endstation

INTENDED USE: UV experimental station for full-field XRF spectroscopy



OP	Description	Name/Life #	Date	DR
30	EQUIPMENT RE-PURPOSING REVIEW - This operation shall be signed off by the Lead Beamline Scientist when all concurrences have been obtained.	Conrad Wulke 20624	11/21/18	

The undersigned have inspected the end station equipment and agree to the following:

- It is fit for the intended purpose
- It will be used in a manner in which it was intended
- There is no additional radiation safety risk
- There are no additional vacuum/pressure vessel risks

Concurrence:

Lead Beamline Scientist: [Signature]

~~Program Manager:~~ [Signature]

Project Manager: [Signature]

Beamline Engineer: [Signature]

ESH Manager: [Signature]

40	EQUIPMENT UPGRADE INFORMATION - This operation shall be completed by the Electrical Engineering Group Leader	JR 20624	10/3/17	
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Inspect the equipment for electrical safety hazards, and complete the following:

The equipment is safe as is and there are no upgrades required.

The following upgrades are required:

ALL EQUIP REQUIRES EEI

ALL EQUIP NEEDS BONDING

MAGFIELD VS OPERATOR - SIGNS + PRECAUTIONS

FINISH BUILD + RE-INSPECT
MAGNET CABLES - NOT STARTED

done JR 11/19/18

Note: If there is not enough space provided here please write "See attachment" and reference 'OP#40' on the attachment.



OP	Description	Name/Life #	Date	DR
50	EQUIPMENT UPGRADE INFORMATION - This operation shall be completed by a Pressure Safety SME	Mitcoffney 22039 MB	3 Oct 2017	

Inspect the equipment for pressure safety hazards, and complete the following:

The equipment is safe as is and there are no upgrades required.

The following upgrades are required:

- verify compressor noise levels
are within OSHA dose safe limits or
if noise dampening required/recommended

Note: If there is not enough space provided here please write "See attachment" and reference 'OP#50' on the attachment.

60	EQUIPMENT UPGRADE INFORMATION - This operation shall be completed by a Vacuum Engineer	R. W. / 18710	10/3/17	
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Inspect the equipment for vacuum equipment performance, and complete the following:

The equipment is acceptable as is and there are no upgrades required.

The following upgrades are required:

VPI VALVES PROPERLY
WIRED TO EDWARDS
ROUGH PUMPS

Note: If there is not enough space provided here please write "See attachment" and reference 'OP#60' on the attachment.

REVIEW WORK INSTRUCTIONS
FOR VACUUM BY VACUUM ENGINEER



OP	Description	Name/Life #	Date	DR
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70 EQUIPMENT UPGRADE INFORMATION - This operation shall be completed by a Radiation Safety SME

2785 SUNIL CHILKA	10/3/17	
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Inspect the equipment for radiation safety hazards, and complete the following:

The equipment is safe as is and there are no upgrades required.

The following upgrades are required:

Note: If there is not enough space provided here please write "See attachment" and reference 'OP#70' on the attachment.

80 EQUIPMENT UPGRADE INFORMATION - This operation shall be completed by the Beamline Engineering Group Leader

Mary Carlucci-Daylor 21745	10/3/2017	
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Inspect the equipment for mechanical safety hazards, and complete the following:

The equipment is safe as is and there are no upgrades required.

The following upgrades are required:

signs to indicate magnetic fields to avoid
tool placement around location of magnets

Note: If there is not enough space provided here please write "See attachment" and reference 'OP#80' on the attachment.



OP	Description	Name/Life #	Date	DR
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90 EQUIPMENT UPGRADE INFORMATION - This operation shall be completed by ESH Staff

Loc Stg 19497	10/3/17	
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Inspect the equipment for safety hazards, and complete the following:

The equipment is safe as is and there are no upgrades required.

The following upgrades are required:

magnetic field survey required

Note: If there is not enough space provided here please write "See attachment" and reference 'OP#90' on the attachment.

100 EQUIPMENT UPGRADE INFORMATION - This operation shall be completed by an EPS Controls Engineer

H. Bassan 25077	10/3/17	
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Inspect the equipment for EPS upgrades, and complete the following:

The equipment is acceptable as is and there are no upgrades required.

The following upgrades are required:

Note: If there is not enough space provided here please write "See attachment" and reference 'OP#100' on the attachment.



OP	Description	Name/Life #	Date	DR
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110 EQUIPMENT UPGRADE INFORMATION - This operation shall be completed by a Mechanical Utilities Engineer

O'BRIEN 24021	10/4/17	
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Inspect the equipment for mechanical utility upgrades, and complete the following:

The equipment is acceptable as is and there are no upgrades required.

The following upgrades are required:

RE-INSTALL PCYW PIPING TO He

COMPRESSORS IAW SBMS AND

NYS MECHANICAL CODE

Note: If there is not enough space provided here please write "See attachment" and reference 'OP#110" on the attachment.

120 EQUIPMENT UPGRADE INFORMATION - This operation shall be completed by the Survey Group

HUBBARD 20563	11/16/18	
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Inspect the equipment for survey/alignment upgrades, and complete the following:

The equipment is acceptable as is and there are no upgrades required.

The following upgrades are required:

Note: If there is not enough space provided here please write "See attachment" and reference 'OP#120" on the attachment.



OP	Description	Name/Life #	Date	DR
130	END STATION DRAWING	Conan Weiland 26498	11/09/15	

A. On the space provided on page 1 for part number record the released drawing number for this end station equipment.

B. Verify that the drawing includes envelope dimensions, location from source, critical interfaces, performance specifications, and upgrade information from the SME's. For clarity purposes the drawing may also include a photo of the equipment but its not required.

COMPLETE OP#140 THRU OP#250 AFTER INSTALLATION & UPGRADE

140	Follow the ESH and PPE requirements for the area. Wear safety glasses, safety shoes and gloves for physical installation as applicable	Conan Weiland 26498	11/13/15	
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150	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.	Conan Weiland 26498	11/13/15	
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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.

160	Verify installation of the end station components per its released drawing.	Conan Weiland 26498	11/13/15	
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170	Verify windows and viewports (overpressure, Be) are installed and compliant with NSLSII requirements	Conan Weiland 26498	11/20/15	
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180	Verify access to the end station and adjacent equipment is acceptable and unimpeded.	Conan Weiland 26498	11/13/15	
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OP	Description	Name/Life #	Date	DR
190	MAGNETIC FIELD SAFETY VERIFICATION - This operation shall be completed by BNL Safety and Health Services Division Personnel A. Measure location of 5 Gauss Line. B. In the space provided below make recommendations on shielding, barricades, and/or signage. <u>Refer to survey of 11/29/17</u> C. Confirm recommendations have been installed and are acceptable.	<u>C. W. Anderson / 1724</u>	<u>11/29/17</u>	
200	FOR END STATION EQUIPMENT WITH CRYOGENICS A. Verify cyro lines are securely supported B. Veriy over pressure relief device is installed.	<u>Cora Weiland 02498</u>	<u>11/13/17</u>	
210	VACUUM TESTING A. Perform vacuum testing as per traveler BL-VA-001. B. Attach completed BL-VA-001 travelers to this traveler.	<u>Cora Weiland 02498</u>	<u>11/16/16</u>	



OP	Description	Name/Life #	Date	DR
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220 UPGRADE INSTALLATION VERIFICATION - This operation shall be signed off by the Lead Beamline Scientist once all signoffs are obtained from the SME's.

Cowan Weland Q6498	11/20/18			
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SME's shall sign-off below that requested upgrades have been installed and are acceptable. If no upgrades were requested then write "N/A".

Electrical Engineering Group Leader: JEE 11/19/18

Pressure Safety SME: MHoff 11/20/2018

Vacuum Engineer: PT... 11/7/18

Radiation Safety SME: _____

Beamline Engineering Group Leader: Ben... 14 Nov 2018

ESH Staff: Loi Steig 11/13/18

EPS Controls Engineer: _____

Mechanical Utilities Engineer: WLOS 11/20/18

Survey Group: _____

230 SURVEY GROUP

- A. Survey and align all components per released drawings.
- B. Attach survey report to this traveler.

HUBBARD 20103	11/10/18			
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240 Motion Testing with Motion Control System:

- A. Verify the motion of all motorized axes of the end station components listed above. Also verify the function of travel limits, over-travel limits, encoders, and home switches where applicable.
- B. Document results and attach test report.

Cowan Weland Q6498	11/16/18			
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250 Verify All Traveler Operations Complete

Cowan Weland Q6498	11/21/18			
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260 REVISION HISTORY (This step is informational and does not require signoff)

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Rev - Description - Date
C First Release



**BROOKHAVEN NATIONAL LABORATORY
DIRECT READING INSTRUMENT SURVEY FORM**

Date: 11/29/2017 Surveyor(s): C. Weilandics

I. AREA INFORMATION

Dept.: LT Bldg.: 740 Room: ID-7
Source: HTS-110 SRI 8.5/0.6T magnet system
Engineering Controls: None

II. EMPLOYEE INFORMATION

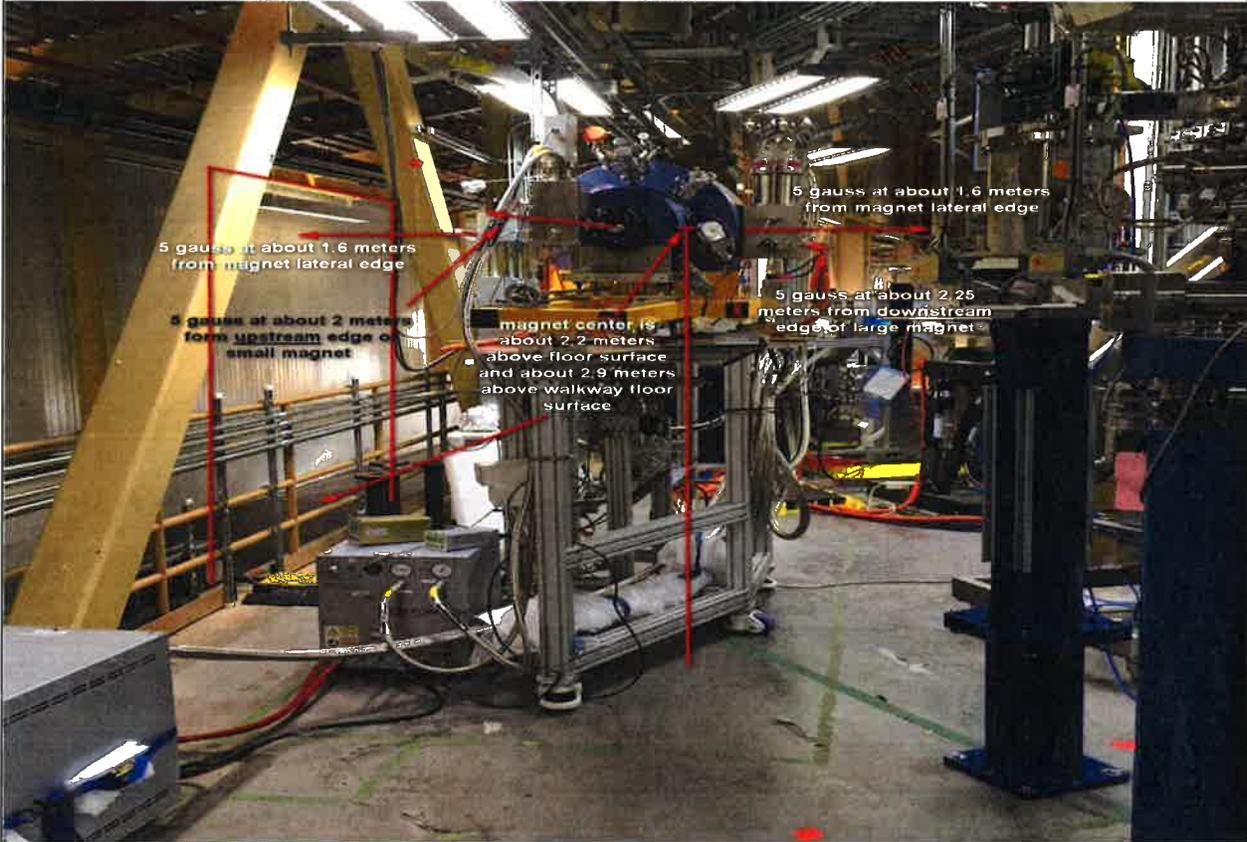
Name: N/A BNL / GUEST #: N/A
Dept.: N/A Bldg.: N/A Job Title: N/A
Exposure Duration (Hrs): N/A Times Per Day: N/A Times Per Year: N/A
Job / Task Performed: N/A
PPE Used: N/A

III. SURVEY INSTRUMENT INFORMATION

Instrument: Metrolab Cal Date: 9/26/2017 Calibrator: N/A
Model: THM 7025 Pre-Cal Comment: cal check
Serial #: TH-BO 855 Post-Cal Comment: cal check

IV. SAMPLING INFORMATION AND RESULTS

Hazard: Static Magnetic Field Magnet current: 187.5A(sample magnet) - 113A(detector magnet)
Units: gauss Correction Factor: None



V. Conclusion and Recommendation: The magnet actually consists of two magnets; a sample magnet which runs nominally at 8.5 tesla, and a smaller upstream Detector magnet which runs at 0.6 tesla. The five gauss readings taken with the meter were in fairly close agreement with the five gauss contour plot which may be found on sheet 2 of this survey. The maximum readings would be obtained at about the horizontal centerline of the magnet (~69 inches, or about 2.2 meters in height above the experimental floor and about 2.9 meters above the walkway floor surface). On the outboard side of the magnet, the 5 gauss line extends out to the vertical extent of the experimental floor slab. For someone to exceed this level they would have to be in an elevated platform (i.e. man lift) above the walkway, and leaning in toward the magnet while it is on.





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managed by Brookhaven Science Associates
for the U.S. Department of Energy

date: Sept. 12, 2018

to: C. Weiland

from: C. Weilandics 

subject: Bldg 740 ID7 Helium Compressors – IH Req. #4053

Memo

On Sep. 12, at the request of yourself, a noise survey was conducted on the two helium compressors (Chiller A: Cryomech CP800 series, LS B/C: 000029099; and Chiller B: Cryomech CP2800 series, LS B/C: 000029098).

The survey was performed using a Quest model 2100, type II (S/N: DAF030032, cal. date 04/07/18) sound level meter using a Quest QC-10 calibrator (S/N: QIF030115, cal. date 04/07/18). A simple measurement was made to determine sound pressure level in the environment. The levels of the two pumps were as follows:

Chiller A: 72 dBA @ 3 feet

Chiller B: 73.5 dBA @ 3 feet

This was a simple measurement and no effort was made to determine the level of the noise from the compressors themselves, just the noise level in the environment. Additional surveys may be requested as needed to account for changes in operations.

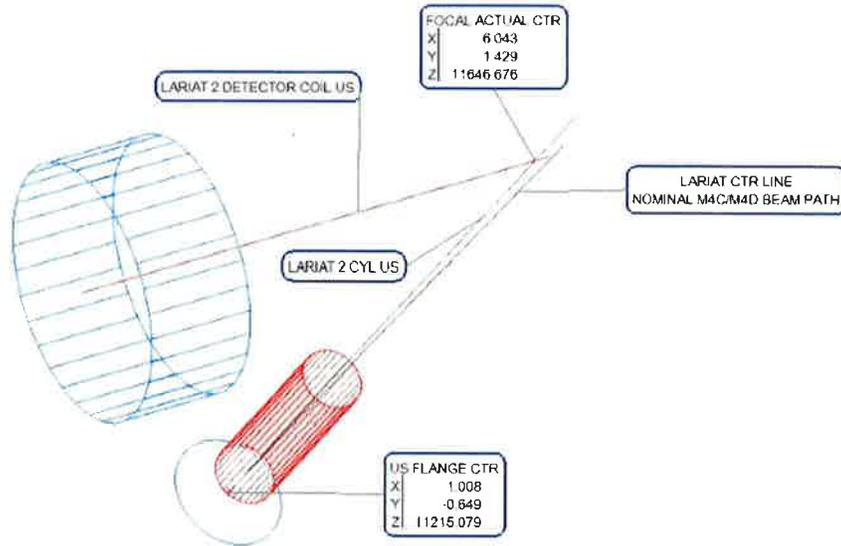
The reference noise standard which BNL uses is the American Conference of Governmental Industrial Hygiene (ACGIH - 2016) Threshold Limit Values for noise exposure. The allowable limit for eight hours is 85 dBA with a 3 dB doubling rate (i.e. 88 dBA for 4 hours, 82 dBA for 16 hours, etc.). The noise levels do not exceed any occupational exposure standards.

* * *

IH96.18

cc: A. Ackerman

L. Stiegler



Point Group			
7-ID LARIAT 2 ES FLANGES 11_9_2018::LARIAT 2 FLNG US			
Point Name	X	Y	Z
	(mm)	(mm)	(mm)
US FLANGE CTR	3017.913	601.308	64639.450

Cylinder			
7-ID LARIAT 2 ES FLANGES 11_9_2018::LARIAT 2 CYL US			
	X	Y	Z
Begin (mm)	3020.527	602.688	64662.633
End (mm)	3034.834	609.783	64785.857
Proj. Ang. (deg)	Rx from Y 86.7051	Ry from Z 6.6224	Rz from X 26.3758
Radius (mm)	19.026	Diameter (mm)	38.052
Length (mm)	124.254		

Cylinder			
7-ID LARIAT 2 ES FLANGES 11_9_2018::LARIAT 2 DETECTOR COIL US			
	X	Y	Z
Begin (mm)	3212.694	613.016	64798.299
End (mm)	3180.951	615.843	64857.169
Proj. Ang. (deg)	Rx from Y 87.2508	Ry from Z -28.3337	Rz from X 174.9109
Radius (mm)	79.149	Diameter (mm)	158.298
Length (mm)	66.942		

Point Group			
7-ID LARIAT 2 ES FLANGES 11_9_2018::FOCAL PT LARIAT 2			
Point Name	X	Y	Z
	(mm)	(mm)	(mm)
FOCAL ACTUAL CTR	3067.534	625.971	65067.509

LARIAT-2 Installation Survey

Position:	Design									Survey					
	x-pos	+x-tol	-x-tol	y-pos	+y-tol	-y-tol	z-pos	+z-tol	-z-tol	x-meas	x-dev	y-meas	y-dev	z-meas	z-dev
Upstream Flange	3019.65	10	-10	603.49	10	-10	64665.9	30	-30	3017.913	-1.737	601.308	-2.182	64639.45	-26.45
Focal Point (sample)	3064.11	10	-10	626	10	-10	65093	30	-30	3067.534	3.424	625.971	-0.029	65067.51	-25.491

DEPARTMENT/DIVISION/PROJECT LARIAT-II Sup

QA CLASSIFICATION: A1 (CRITICAL/HIGH) A2 (MAJOR/MODERATE) A3 (MINOR/LOW) A4 (NEGLIGIBLE)

PART NAME: <u>LARIAT-II Superconducting Magnet</u>	
PART NO.:	REV.:
PREPARED BY: <u>Caren Welton</u>	DATE: <u>11/14/2018</u>
VENDOR: <u>HTS-110</u>	P.O. NO.:
QTY. RECD.: <u>1</u>	DATE RECD.:

COMMENTS:

Inspection/Test Data Attached (Data Sheet To Include: Part Name, Part No., Date, & Sheet ___ of ___)

ITEM	CHARACTERISTIC/REQUIREMENT	INSP. / REJ.		INSPECTOR'S SIGNATURE/LIFE #	DATE
		INSP.	REJ.		
1	Dump circuit is connected to 8.6T (sample) magnet	✓	/	Caren Welton Q6498	11/13/18
2	Dump circuit is connected to 0.6T (detector) magnet	✓	/	Caren Welton Q6498	11/13/18
3	Magnet protection system (MPS) units are connected to magnet power supplies	✓	/	Caren Welton Q6498	11/13/18
4	All grounds are connected	✓	/	Caren Welton Q6498	11/13/18
5	Ensure that no current can be driven to magnet with magnet protection systems powered off.	✓	/	Caren Welton Q6498	11/13/18
6	Ensure that magnet power supply interlocks activate when magnet protection system detects fault or loses power	✓	/	Caren Welton Q6498	11/13/18
7		/	/		
8		/	/		
9		/	/		

Record all nonconformances for each item on page 2 of ITR.

Qty. Accepted _____ Serial (LOT) No. Accepted _____

LARIAT-II Motor Testing

Motor	Axis/Switch	Works?	Tested	Tested By
Linear (Z)	Drive	Yes	11/16/18	C. Weiland
Linear (Z)	Home	Yes	11/16/18	C. Weiland
Linear (Z)	Neg. Limit	Yes	11/16/18	C. Weiland
Linear (Z)	Ext. Pos. Limit	Yes	11/16/18	C. Weiland
Linear (Z)	Int. Pos. Limit	Yes	11/16/18	C. Weiland
Tilt	Drive	Yes	11/14/18	C. Weiland
Tilt	Neg. Limit	Yes	11/14/18	C. Weiland
Tilt	Pos. Limit	Yes	11/14/18	C. Weiland
Index	Drive	Yes	11/16/18	C. Weiland

<u>Title</u>	<u>Name</u>	<u>Approval Date</u>
Interface and Beamline Manager	Andrew Broadbent	06/10/2014
ES&H Operations Manager	Lori Stiegler	06/10/2014
CSX Beamline Scientist	Stuart Wilkins	06/10/2014
Quality Assurance Engineer	Joseph Zipper	06/10/2014

Serial No	Part No	Part Rev	ECN	Rev	ECN	Rev
7-ID	LARIAT - II ENDSTATION					
Deviation & Waiver: _____						

OP	Description	Name/Life #	Date	DR
10	Follow the ES&H and Personal Protective Equipment Requirements for the area.	R. Todd / 18710	11/7/18	
15	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.	R. Todd / 18710	11/7/18	
20	Vacuum Component/Section Information - This step shall be performed by the cognizant beamline engineer/scientist (CE/CS) A. Record the Beamline name (in the space provided) at the top of each page of this traveler. B. For a vacuum component, record the part number and description on this sheet in the box for "Part No". C. For a vacuum section, record the section number on this sheet in the box for "Part No" D. Record required base pressure for Vacuum Comp/Sec. <u>1.02-7</u> (Torr) E. Review this entire traveler and if a step (OP#) does not apply, write in that operation's sing-off box: "NA per OP#20"	Andrew Broadbent 20498	11/15/18	



OP	Description	Name/Life #	Date	DR
30	<p>Configuration- This step shall be performed by the CE/CS.</p> <p>A. Is component/section in its final configuration? (circle one)</p> <p style="text-align: center;"><u>YES</u> or NO</p> <p>B. If "NO" , provide a brief description of component/vacuum section</p> <hr/>	R. Todd / 18710	11/7/18	
40	<p>Visual Inspection</p> <p>Prior to pumping down, visually inspect that all flanges and vacuum connections to component/sector are tight and secure. Confirm the presence of burst disk (as required by the assembly drawing) and inspect for damage. Confirm all vacuum forces are restrained through the use of bolted stands/supports and appropriate bellows restraints. Any deviations from the assembly drawing shall be noted and the Cognizant Beamline Engineer shall be notified prior to proceeding.</p>	R. Todd / 18710	11/16/18	
50	<p>Leak check</p> <p>Leak check component/vacuum section using calibrated He MSLD. Confirm total leak rate < 2x10⁻¹⁰ mbar l/sec He.</p>	R. Todd / 18710	11/16/18	
60	<p>RGA scan</p> <p>Aquire RGA data. The CS/CE or Vacuum Engineer (VE) will aquire and interpret RGA and prescribe corrective action if necessary. Initial RGA scan shall include a baseline scan of RGA isolated from vacuum section/component to confirm RGA cleanliness.</p>	NA R. Todd / 18710	11/7/18	
70	<p>Bakeout</p> <p>Confirm that bakeout was performed according to procedure PS-C-XFD-PRC-013 (NSLS-II Beamline Vacuum Bake-Out Procedure) and the manufacturer's requirements with temperature ramp rate(s) soak time(s), soak temperature(s) and maximum temperature(s) all controlled within acceptable limits.</p>	NA R. Todd / 18710	11/7/18	
80	<p>Hot leak check</p> <p>With the component/sector at the soak temperature, perform leak check using calibrated He MSLD. Confirm total leak rate < 2x10⁻¹⁰ std cc/sec He (mbar l/sec He).</p>	NA R. Todd / 18710	11/7/18	
90	<p>Crossover to ion pumps</p> <p>Confirm with the Cognizant Beamline Engineer prior to switching from turbopump to ion pump(s). Record the date and time the ion pumps are turned on and the turbopump valved out.</p>	NA R. Todd / 18710	11/7/18	

Date _____ Time _____



OP	Description	Name/Life #	Date	DR
100	Final RGA scan When the component/section has reached room temperature, acquire RGA data. The CS/CE/VE will acquire and interpret the data to determine conformance to section 4.7.3 of spec LT-ENG-RSI-SR-VA-002 and prescribe corrective action if necessary. Attach RGA scan.	NA KIR/18710	11/7/18	
110	Base pressure measurement. Confirm the required base pressure in OP 20 is met. The CE/BE/VE shall make this determination. Record base pressure measurement. <u>4.9×10^{-9}</u> (Torr)	P. Todd / 18710	11/7/18	
120	Forward this traveler and all attachments to QA for archiving.	J. Zippor 24115	11/26/18	
130	REVISION HISTORY (This step is informational and does not require signoff)			

Rev - Description - Date

B INITIAL RELEASE



RADIATION SAFETY COMPONENTS ALIGNMENT

Doc No. BL-SRVY-001 Rev: B

Page 1 of 3

Rev Date: 02/23/2018

Author: Steven Hulbert

Approved: 03/02/2018

<u>Title</u>	<u>Name</u>	<u>Approval Date</u>
Beamline Engineering Group Leader	Steven Hulbert	03/02/2018
ES&H Operations Manager	Lori Stiegler	03/01/2018
Quality Assurance Engineer	Joseph Zipper	03/01/2018

Serial No	Part No	Part Rev	ECN	Rev	ECN	Rev
	PD-55T-ES-3000					
Deviation & Waiver: _____						

OP	Description	Name/Life #	Date	DR
10	Review the following for ES&H requirements: - PS-JRA-0001 Electrical and Electronic Shop Work; - PS-JRA-0006 Accelerator or Beam Line Components, Mechanical Assembly; - PS-JRA-0014 Hand Tool Use.	Conan Weiland QE498	11/27/18	
20	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.	Conan Weiland QE498	11/27/18	
30	BEAMLINE COMPONENT INFORMATION A. In the space provided on page 1 of this traveler, write the part number and serial number of the item that this traveler is being used for. B. Indicate if the item has aperture(s). Yes or <input checked="" type="radio"/> No C. Confirm the item is properly labeled.	Conan Weiland QE498	11/27/18	

OP	Description	Name/Life #	Date	DR
40	SURVEY GROUP	N/A Coran Weiland Q24946	11/27/18	

- A. Perform a bench survey per the following:
- Determine the center line of the item body defined by the centers of the flanges.
 - Measure each fiducial (tooling ball center) x.y.z coordinates with respect to the item centerline.
 - Measure the size of the item with respect to the item center line.

- B. If the item has aperture(s) per op#30, perform the additional following steps;
- Measure the size inlet and outlet aperture(s)
 - Determine the aperture(s) center location with respect to the item centerline.
 - Determine the location of the aperture(s) with respect to the part containing the aperture.
 - Measure the aperture(s) channel length, channel inclination and taper surface angle.
 - Determine the fiducial locations with respect to the aperture center(s).

- C. Attach survey report to this traveler.

Note:

The Survey report shall contain the following:

- Survey Data FileName
- Survey Data File Location
- Survey equipment used

50 COGNIZANT BEAMLIN ENGINEER/SCIENTIST

Coran Weiland Q24946	11/27/18	
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- A. Indicate the model/drawing number, which include fiducial information to be used to survey / align the item into the corresponding beamline location.

Model / Drawing number:

PD-SS1-LAY-1060

- B. Indicate the "positioning" tolerances (with measurement units) that the item fiducials shall be aligned to.

X: +/- 10mm Y: +/- 10mm Z: +/- 30mm



RADIATION SAFETY COMPONENTS ALIGNMENT

Doc No. BL-SRVY-001 Rev: B

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Rev Date: 02/23/2018

Author: Steven Hulbert

Approved: 03/02/2018

OP	Description	Name/Life #	Date	DR
60	<p>SURVEY GROUP</p> <p>A. Align the item (using OP#40 bench survey data) to the 3D model, within required tolerance (per OP#50)</p> <p>B. Attach survey report to this traveler.</p> <p>Note: The Survey report shall contain the following: -Installed location of Bench Survey center line in beamline coordinates (beamline origin = source point) -Measured fiducial locations (as installed) versus required positions (using corrected bench survey measurements) in accelerator/beamline coordinates -Apperture center in beamline coordinates -Survey Data FileName -Survey Data File Location -Survey equipment used</p>	D Davis 23067	11/27/18	
65	<p>SURVEY RESULTS ANALYSIS - This operation shall be completed by the Beamline Engineer</p> <p>Review final survey results and confirm they are satisfactory. (i.e. tolerance requirements met)</p>	Conrad W. Wilson 22498	11/27/18	
70	Verify All Traveler Operations Complete	Conrad W. Wilson 22498	11/27/18	
80	<p>REVISION HISTORY (This step is informational and does not require signoff)</p> <p>Rev - Description - Date A First Release 7/23/2014 B Steve Hulbert replaced Mary Carlucci-Dayton as author and approver OP#65 Added</p>			

