Approved

ORNL WORK PLAN

Operations, Maintenance and Services

59492

Work Plan Name / Rev: BL1B-VAC REPAIR 2ND / 0
Expiration Date: 2/27/2028

WORK SCOPE/DESCRIPTION	
Requester (Name/Badge/Division):	Sexton, Randall / 00712268 / X186
Location of work (Bldg/Rm/Other):	8700 / / Nomad
Work Plan Title:	BL1B-VAC REPAIR 2ND Shutter

Description of Service/Work Needed:
Remove shielding, t-zero chopper, rad check, disconnect secondary shutter wiring, survey check alignment, critical lift remove 2nd shutter, Drill holes and install vacuum caps, leak test, install repair shutter, Test and align 2nd shutter, install t-zero and shielding.

Charge Number, if required:	
Work Plan Grade/Worktype:	3 / 0
Author (Name/Badge):	Sexton, Randall / 00712268

File Attachments:

Badge	Name	Attachment Desc	File Name
00712268	Sexton, Randall	2nd shutter	BL 1B Secondary Shutter Drawing copy.pdf
00712268	Sexton, Randall	Shielding	Bl 1B shielding drawing.pdf
00712268	Sexton, Randall	Repair instruction	NOMAD Secondary Shutter Vacuum January 2023 v2.docx
00712268	Sexton, Randall	Slit package	Removing the Nomad #3 slit package.pdf
00712268	Sexton, Randall	Model of Beamline	section A 092710.pdf
00712268	Sexton, Randall	Repair instruction	NOMAD Secondary Shutter Vacuum January 2023 v2.docx
00712268	Sexton, Randall	Rework Vacuum Plate	2nd shutter plate.pdf
00712268	Sexton, Randall	oring	SING01B-20-M8U-8701-A167-R00.pdf
00712268	Sexton, Randall	plug	SING01B-20-M8U-8701-A170-R00 (1).pdf

INSTRUCTIONS

Prerequisites/Precautions:
This a PPS system. Make sure to have permission to work on system.

Directions:

1. PPS
2. Chopper turn off
3. Vacuum vented
4. Remove shielding
5. rad check
6. remove t-zero chopper
7. Remove shielding
8. disconnect secondary shutter wiring and slit package
9. survey check alignment
10. remove slit package
11. critical lift remove 2nd shutter,
12. Drill holes and install vacuum caps
13. leak test
14. install repair shutter
15. Test
16. align 2nd shutter
17. Install shielding for 2nd shutter
18. install t-zero
19. install shielding.

Post Work Testing:
Work with PPS staff to test successful operation secondary shutter

Closeout:

JOB HAZARD EVALUATION	
HAZARDS	PERMITS / CONTROLS
Hoisting and Rigging	ı Hard hats ı Safety shoes
Radiological Work	ı Radiological Work Permit (Enter RWP no.) ı Follow radiological posting, entry control & egress requirements
Electrical Work	ı Minimum level of electrical worker qualification for the task (i.e. EW, QEW 1, 2, 3, 4, or 5): Specify.
Elevated Work	ı Work at unprotected heights over 4 feet - Fall Protection: handrails system used
Manual Material Handling	ı Establish Controls (Guideline) [apply 30-50-30 criteria for a non-repetitive lifting task] ¡ Reduce weight ¡ Decrease load ¡ Design work area ¡ Facilitate access to material ¡ Optimum environment ¡ Reduce distance /Provide proper storage facilities ¡ Load storage ¡ Eliminate manual lifting/lowering ¡ Eliminate pushing/pulling – Use lifting aids ¡ Other instructions to staff ı Diversity of activities ı Exposure Assessment: Enter or attach justification to classify exposure scenario as low risk, qualitative exposure assessment (QEA), or requirement to conduct quantitative exposure monitoring (QEM)

DOCUMENTATION REVIEW AUTHORIZATION (Approvals are certification of hazards assessment)		
Reviewer / Approver Roles	Signature	Date
Accountable Management (Service Provider, Line, Equipment Owner, or Facility Management)	Cross Jr, Bobby Lee	2/27/2023
Task Leader	Sexton, Randall	2/16/2023
Work Package Concurrence		
Facility Manager		
Operations Supervisor		
Facility Manager Approval To Start Work		
Facility Manager		
Work Start Authorization		
Task Leader		
Work Acknowledged Complete		
Task Leader		

Worker Feedback:

FOR INFORMATION ONLY. WORK RELEASE AND SYSTEM HOLD POINTS			
TASK DESCRIPTION		RESOURCES	DUR
[Hold Point] - Rad Survery		ı Radiological Control Technician	1
[Hold Point] - Critical Lift -2nd Shutter *[Required Tools & Materials - Critical Lift plan]*		ı Rigger/Ironworker	1
[Hold Point] - Install secondary shutter *[Required Tools & Materials - Critical Lift plan]*		ı Rigger/Ironworker	1
WORK DETAILS - Prerequisites/Precautions			
Hazards	Permits/Controls	Resources	Dur
1) - This a PPS system. Make sure to have permission to work on system.			
		ı Technical Support	1
WORK DETAILS - Directions			
Hazards	Permits/Controls	Resources	Dur
2) - PPS			
		ı Technical Staff	1
3) - Chopper turn off			
		ı Technician	1
4) - Vacuum Vented			
		ı Technician	1
5) - Remove shielding - 1. remove door plate 2. Key blocks 3. A336 4. A327 5. A329			
Hoisting and Rigging	ı Hard hats ı Safety shoes	ı Rigger/Ironworker	1
[Hold Point] - 6) - Rad Survery			
Signature: _____		ı Radiological Control Technician	1
7) - Remove T-zero chopper			
Hoisting and Rigging	ı Instructions for Completion of Ordinary Lift Form (ORNL-544, Ordinary Lift Plan) ı Hard hats ı Safety shoes ı Qualified personnel	ı Technician	1
8) - Remove Shielding 1. a313 2. a315 3. a303 4. a293 5. a219			
Hoisting and Rigging	ı Hard hats ı Safety shoes	ı Rigger/Ironworker	1

9) - Disconnect wiring on slit package and 2nd shutter.			
Electrical Work	ı Minimum level of electrical worker qualification for the task (i.e. EW, QEW 1, 2, 3, 4, or 5): Specify.	ı SNS Research Mechanic - Electrical	1
10) - Survey and alignment			
		ı Technician	1
11) - Remove Slit package			
		ı SNS Instrument Support Technician	1
[Hold Point] - 12) - Critical Lift -2nd Shutter *[Required Tools & Materials - Critical Lift plan]*			
Signature: _____		ı Rigger/Ironworker	1
13) - Drill and install vacuum cover plate			
Radiological Work	ı Radiological Work Permit (Enter RWP no.) ı Follow radiological posting, entry control & egress requirements: RCT present during drilling.	ı Research Mech - Mechanical	1
Ergonomic Conditions (Contact Stress, Vibration, Posture, Force, Repetitive Motion)	ı Exposure Assessment: Enter or attach justification to classify exposure scenario as low risk, qualitative exposure assessment (QEA), or requirement to conduct quantitative exposure monitoring (QEM)		
Power Equipment	ı PPE: Specify. safety glasses		
14) - Leak Test *[Required Tools & Materials - Leak Detector]*			
		ı Technician	1
[Hold Point] - 15) - Install secondary shutter			
Signature: _____		ı Rigger/Ironworker	1
16) - Function test 2nd shutter and slit package- SA			
		ı Technical Staff	1
17) - Survey and alignment			
		ı Technician	1
18) - Install shielding 1. a219 2. a293 3. a303 4. a315 5. a313			
Hoisting and Rigging	ı Hard hats ı Safety shoes	ı Rigger/Ironworker	1

19) - Install T zero chopper			
		Technician	1

20) - Install shielding and key blocks 1. a329 2. a327 3. a336			
			1

EQUIPMENT AND MATERIALS PLAN

All equipment, materials and supplies - including Facility equipment/space, Operations processes, PPE

#	QTY	ITEM	COMMENTS	SPECIAL PURCHASE	DELIVER BY DATE	RESPONSIBILITY
1		Critical Lift plan				
2		Leak Detector				

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PRE-JOB SAFETY REVIEW GUIDE

ID: 59492

Scope of Work: Review work package/plan to ensure all participants understand the work activity.

Hazards: Review the hazards identified in Job Hazard Evaluation (JHE) / work plan (IOP).

- Since the work package / plan was written: 1) Have conditions changed? 2) Are there new hazards? Refer to Field Notes and Focus Areas.

Hazard Controls / Permits: Review:

- Written permits for the work activity.
- Precautions, step warnings, Hold Points ...
- Personal Protective Equipment (PPE)
- Work instructions for information - e.g., steps where hazards are introduced.
- ORNL subject area requirements - e.g., non-permit hazard controls.

Performing Work:

- Discuss group/individual responsibilities for safe & effective work.
- Follow work instructions & safety procedures.
- Availability/location of materials, tools, etc.
- Any previous experiences / lessons learned?
- Response if work cannot be performed as planned.
- What is the worst thing that could happen?
- Are there *Potential error traps* with the job? → →
- Take a minute before: work start & leaving work area.
- Work Hand-off / Turnover - workers & Task Leader

→ Potential Error Traps:

- Time pressures
- Distractive environment
- High workload
- First time evolution
- First day back
- Vague guidance
- Over confidence
- Imprecise communications
- Work stress

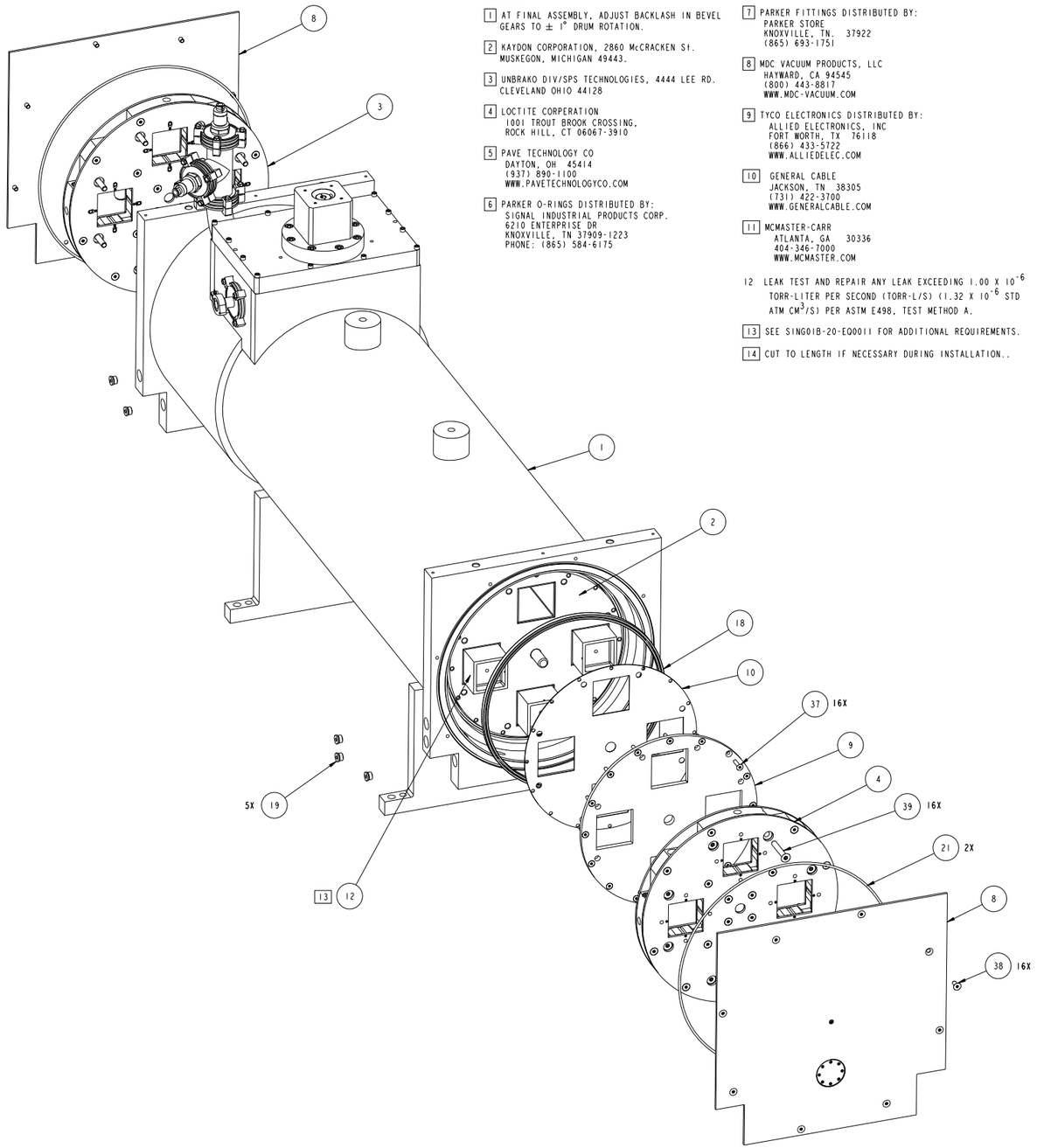
Abnormal Situation Response:

- *Stop Work*: Observe an unsafe act, activity or condition that creates an imminent danger.
- *Emergency Response*: Discuss egress paths or other responses if problems are encountered.

Field Notes and Focus Areas: (Use this area as a work space to record notes related to new hazards identified in the field or changed conditions. Record feedback in work package/plan information systems.)

By signing below, I am indicating that I have been briefed on the potential hazards associated with completing this job.

Signature / Badge	Date	Signature / Badge	Date



NOTES

1. AT FINAL ASSEMBLY, ADJUST BACKLASH IN BEVEL GEARS TO ± 1° DRUM ROTATION.
2. KAYDON CORPORATION, 2860 McCRACKEN St. MUSKEGON, MICHIGAN 49443.
3. UNBRAKO DIV/SPS TECHNOLOGIES, 4444 LEE RD. CLEVELAND OHIO 44128
4. LOCTITE CORPERATION 1001 TROUT BROOK CROSSING, ROCK HILL, CT 06067-3910
5. PAVE TECHNOLOGY CO DAYTON, OH 45414 (937) 890-1100 WWW.PAVETECHNOLOGYCO.COM
6. PARKER O-RINGS DISTRIBUTED BY: SIGNAL INDUSTRIAL PRODUCTS CORP. 6210 ENTERPRISE DR KNOXVILLE, TN 37909-1223 PHONE: (865) 584-6175
7. PARKER FITTINGS DISTRIBUTED BY: PARKER STORE KNOXVILLE, TN. 37922 (865) 693-1751
8. MDC VACUUM PRODUCTS, LLC HAYWARD, CA 94545 (800) 443-8817 WWW.MDC-VACUUM.COM
9. TYCO ELECTRONICS DISTRIBUTED BY: ALLIED ELECTRONICS, INC FORT WORTH, TX 76118 (866) 433-5722 WWW.ALLIEDELEC.COM
10. GENERAL CABLE JACKSON, TN 38305 (731) 422-3700 WWW.GENERALCABLE.COM
11. MCMASTER-CARR ATLANTA, GA 30336 404-346-7000 WWW.MCMASTER.COM
12. LEAK TEST AND REPAIR ANY LEAK EXCEEDING 1.00 X 10^{-6} TORR-LITER PER SECOND (TORR-L/S) (1.32 X 10^{-6} STD ATM CM^3/S) PER ASTM E498, TEST METHOD A.
13. SEE SING01B-20-E0001I FOR ADDITIONAL REQUIREMENTS.
14. CUT TO LENGTH IF NECESSARY DURING INSTALLATION..

REVISIONS

REV	TYPE	DESCRIPTION OF CHANGE	BY	CHK	APPR	DATE

	FIND NO.	QTY	CAGE CODE	PART OR IDENTIFYING NUMBER	DESCRIPTION OR NOMENCLATURE	MATERIAL / SPECIFICATION
4	43	1	04347	04347_242	THREADLOCKER, MEDIUM STRENGTH	ANAEROBIC METH-ACRYLATE ---
	42	6		92196A152	SHCS #6- 32" UNC x 0.875" LG	ALLOY STEEL AISI 4140
11	41	4		92196A153	SHCS NO.6-32 x 1.0 LG 18-8 SS	--- ---
	40	14		98032A436	#6 X 0.25 OD FLAT WASHER	STEEL MIL27183
	39	16		AES16R500C25DG5L7I	FHCS .500-13 UNRC X 3.25 MIL-DTL-13924 CLI BLK OXIDE CTG	ASTM F835 ALLOY STL ASME B18.3
	38	16		AES16R375875DG5L7I	FHCS .375-16 UNRC X .875 MIL-DTL-13924 CLI BLK OXIDE CTG	ASTM F835 ALLOY STL ASME B18.3
3	37	16		AES16R312A37DG5L7I	FHCS .312-18 UNRC X 1.37 MIL-DTL-13924 CLI BLK OXIDE CTG	ASTM F835 ALLOY STL ASME B18.3
	36	2		AES14R500A75BB3L7I	SHCS .500-13 UNRC X 1.75 MIL-DTL-13924 CLI BLK OXIDE CTG	ASTM A574 ALLOY STL ASME B18.3
	35	12		AES14R312B75BB3L7I	SHCS .312-18 UNRC X 2.75 MIL-DTL-13924 CLI BLK OXIDE CTG	ASTM A574 ALLOY STL ASME B18.3
	34	4		AES14R138500BB3L7I	SHCS #6-32 UNRC X .50 MIL-DTL-13924 CLI BLK OXIDE CTG	ASTM A574 ALLOY STL ASME B18.3
	33	4	---	AEP05X375A50GM7A11	PIN, DOWEL, HRND GRND MACH, STD, 0.375 X 1.50 NO FINISH	ANY CARBON STEEL ASME B18.8.2
	32	4		3A054_96278A007	HMSN W/ TOOTHED WSHR	STAINLESS STEEL TYPE 18-8
	31	8		NW63-S-CLAW	801000 SINGLE CLAW CLAMP	PURCHASED ---
	30	12		NW63-D-CLAW	802000 DOUBLE CLAW CLAMP	PURCHASED ---
	29	1		NW25-CLAMP	701001 HINGED CLAMP	PURCHASED ---
	28	1		NW25-BLANK	712001 BLANK FLANGE	PURCHASED ---
8	27	2		NW63-BLANK	L250-B BLANK FLANGE	PURCHASED ---
	26	1		NW25-CENTER-RING	710014 CENTERING RING	PURCHASED ---
	25	5		NW63-CENTER-RING	810000 CENTERING RING	PURCHASED ---
	24	1		NW63-NW25-NIPPLE	840005 NIPPLE	PURCHASED ---
	23	1		NW63-90ELL	824036 LARGE FLANGE TEE	PURCHASED ---
	22	1		NW63-TEE	824036 LARGE FLANGE TEE	PURCHASED ---
6	21	2	--	AS568-391_VITON	O-RING .210 WIDE X Ø 21.955 INSIDE	VITON SAE AS 568
6	20	1		AS568-385_VITON	O-RING .210 WIDE X 16.0 INSIDE	PURCHASED ---
7	19	5		30780_8_HP5ON-S	3/4 SAE HEX PLUG W/ORING	STEEL ---
2	18	1		ND180XP0	BALL BEARING	--- ---
9	17	10		31890	RING TONGUE	STUD SIZE 8 22-16 AWG
10	16	2		279700	600V TRAY CABLE	2 PR 18AWG IND & OVERALL SHIELDS
5	15	2		PAVE_1837_MS3476L16-8S	ATMOSPHERE PLUG - 8 SOCKETS	VSI8-E-150-8-16-3112PS M85049/52-1-16N
5	14	2		PAVE_1837_776L16-8P-460	VACUUM PLUG - 8 PINS	VSI8-E-150-8-16-3112PS M85049/52-1-16N
5	13	2		PAVE_1837	HERMETIC FEED THROUGH	STAINLESS STEEL VSI8-E-150-8-16-3112PS
	12	3	--	SING01B20M8U8701A161-01	CAROUSEL BEAM STOP TAIL	S30400 A666
	11	5		107030100M8U870DA012-01	ELECTRICAL SWITCH	--- ---
	10	1		SING01B20M8U8701A105-1	BEARING SHIM	S30400 STAINLESS STEEL ASTM A666
	9	1		SING01B20M8U8701A104-1	FRONT BEARING COVER	S30400 STAINLESS STEEL ASTM A666
	8	2	--	SING01B20M8U8701A167	HEAD WITH WINDOW	
	7	1	--	SING01B20M8U8701A171-01	PPS OPEN & HOME SWITCH BRACKET	S30400 A666
	6	1		SING01B20M8U8701A107-1	SHUTTER DETENT ASSEMBLY	--- ---
	5	1		SING01B20M8U8701A106-1	CAROUSEL DRIVE ASSEMBLY	--- ---
	4	1		SING01B20M8U8701A109-1	REAR GUIDE ALIGNMENT ASSEMBLY	--- ---
	3	1		SING01B20M8U8701A108-1	HEAD OPTICS POSITIONER	--- ---
	2	1	--	SING01B20M8U8701A112-01	CAROUSEL ASSEMBLY	
	1	1		SING01B20M8U8701A103-01	SECONDARY SHUTTER HOUSING	--- ---

PARTS LIST — TOTAL WEIGHT 6528 LBS

QUALITY VERIFICATION	
DOCUMENTS REQUIRED	APPLICABLE
MATERIAL MILL TEST REPORT	
LEAK TEST REPORT	X
CLEANING CERT	
WELD / BRAZE INSPECTION REPORT	
HEAT TREAT REPORT (MICHART)	
DIMENSIONAL REPORT	X
MATERIAL SELLER CERT	
FUNCTIONAL TEST REPORT	X
DEVIATION REQUEST	X
NONCONFORMANCE REPORT	X

SING01B20M8U8701A100
NEXT USED ASSEMBLIES

QA Mark L. Goldstein 2009.08.03 15:32:13 -04'00' DATE

DIMENSIONS ARE IN INCHES
DRAFTING STANDARD: ASME Y14.100
DIMENSIONING AND TOLERANCING IN ACCORDANCE WITH ASME Y14.5M,1994
DO NOT SCALE DRAWING
DEFAULT TOLERANCES
LINEAR: X.X ±0.1, X.XX ±0.01, X.XXX ±0.005 — ANGULAR: ±0.5°
REMOVE ALL BURRS AND BREAK SHARP EDGES: RMS MAX
SURFACE ROUGHNESS:
THIRD ANGLE PROJECTION

APPROVALS		DATE
DESIGNER	PR SUMMERS	06/2009
DRAFTER	K LOGAN	06/2009
CHECKER		DATE
ENGINEER		DATE
CDR	Darryl Williams	DATE
CHIEF ENGR		DATE
VERIFIER	Ken Chipley	DATE
VERIFIER		DATE
CONTROL SYSTEM	0	
RELEASE	Level 1	
SNS PROCEDURE		

SPALLATION NEUTRON SOURCE

SING NOMAD BL1b SECONDARY SHUTTER CAROUSEL NOMAD CAROUSEL ASSEMBLY

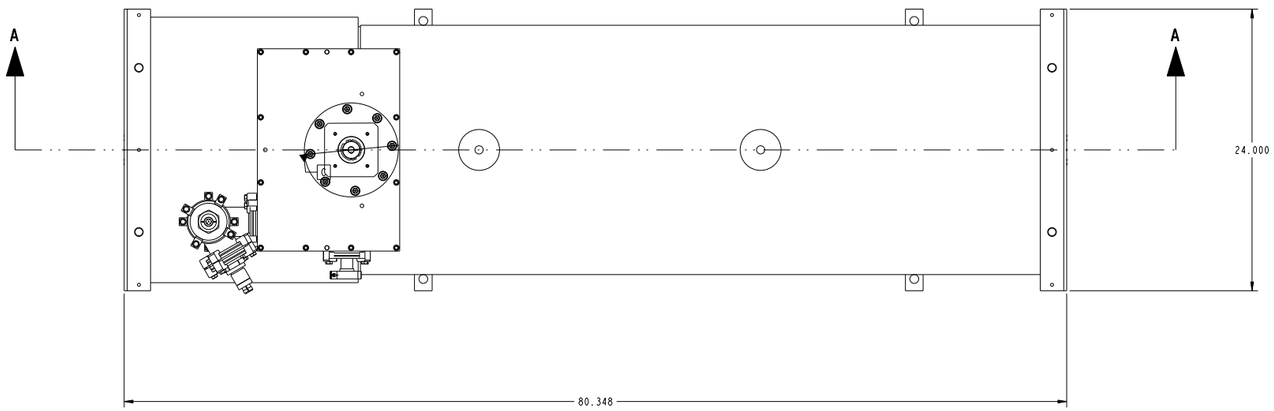
SIZE	DRAWING NUMBER	REV
E	SING01B20M8U8701A101	0

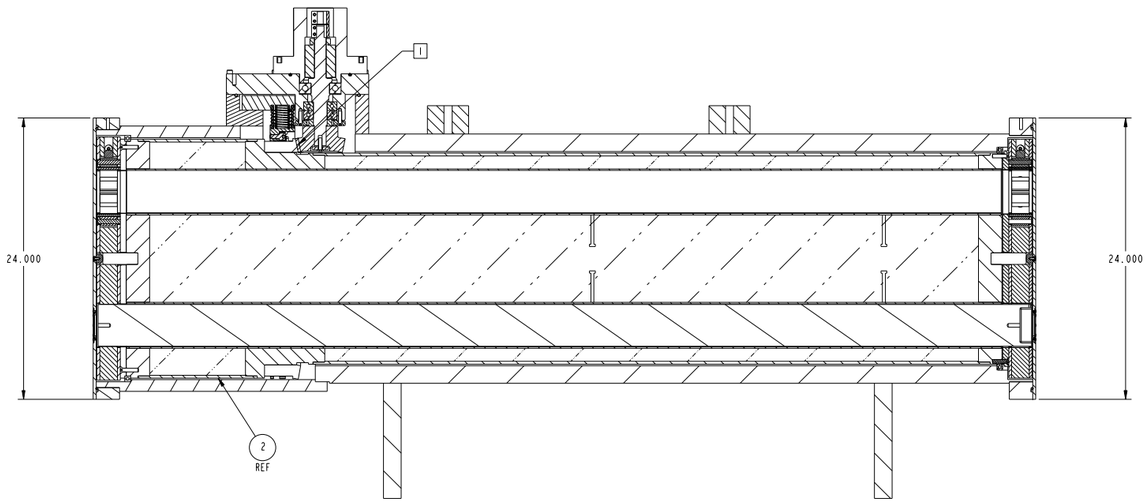
SCALE	CAD MODEL	SHEET
0.250	SING01B20M8U8701A101-1	1 of 4

THIS DRAWING PREPARED ON Pro/ENGINEER

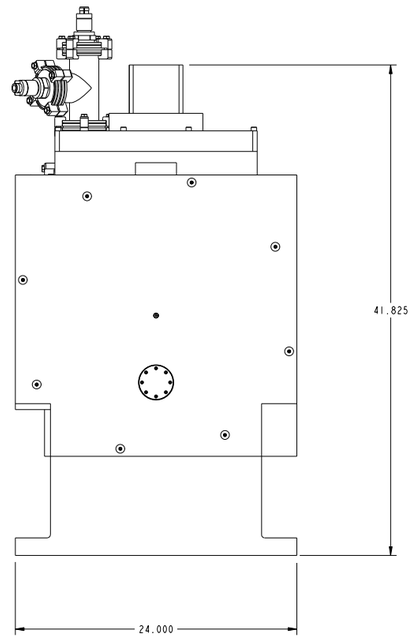
PARENT NO: SING01B20M8U8701A101 — 1st

ADDITIONAL APPROVALS	
NAME, TITLE	DATE
NAME, TITLE	DATE
NAME, TITLE	DATE
NAME, TITLE	DATE
NAME, TITLE	DATE
NAME, TITLE	DATE
NAME, TITLE	DATE
NAME, TITLE	DATE





SECTION A-A
SCALE .25



SIZE	DRAWING NUMBER	REV
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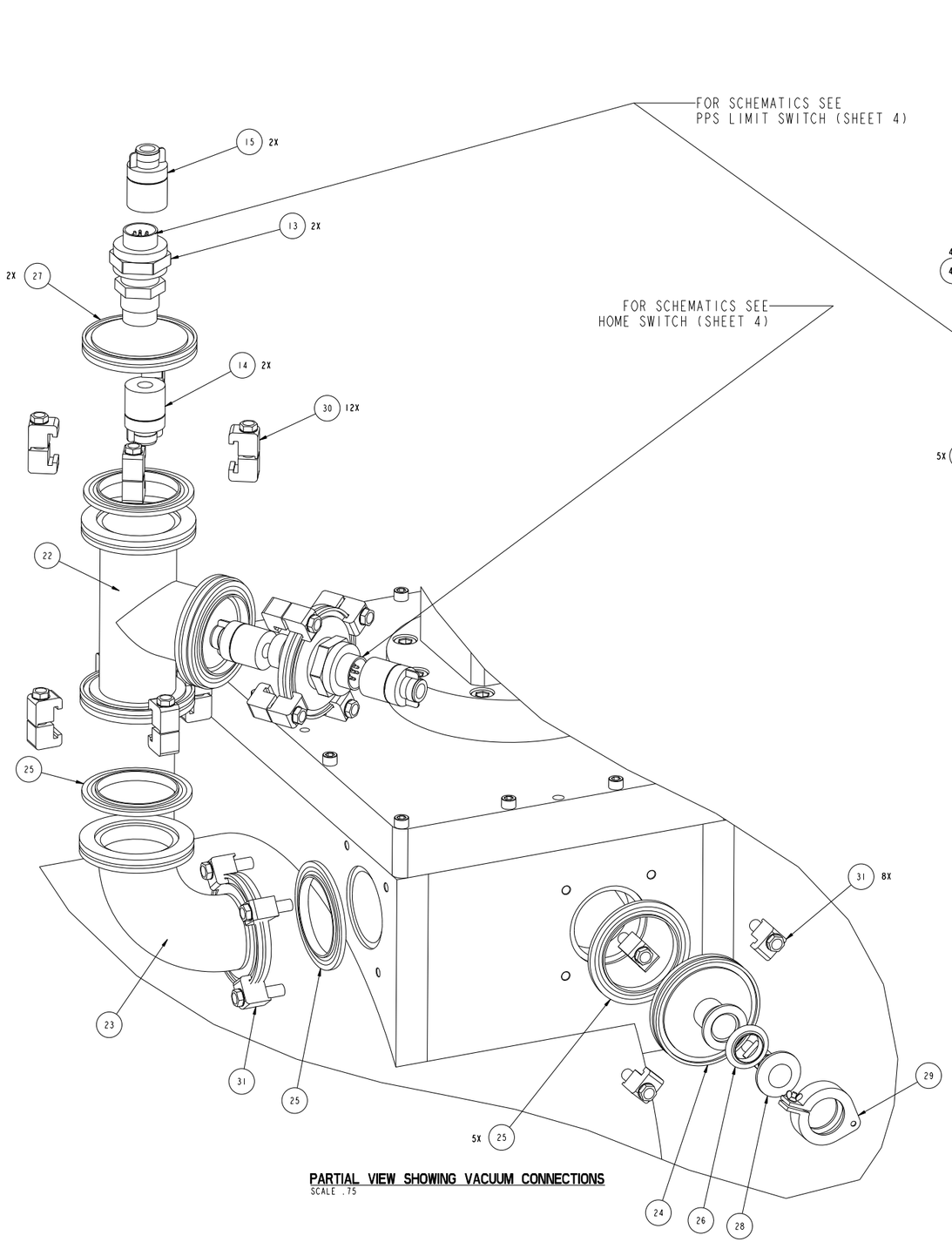
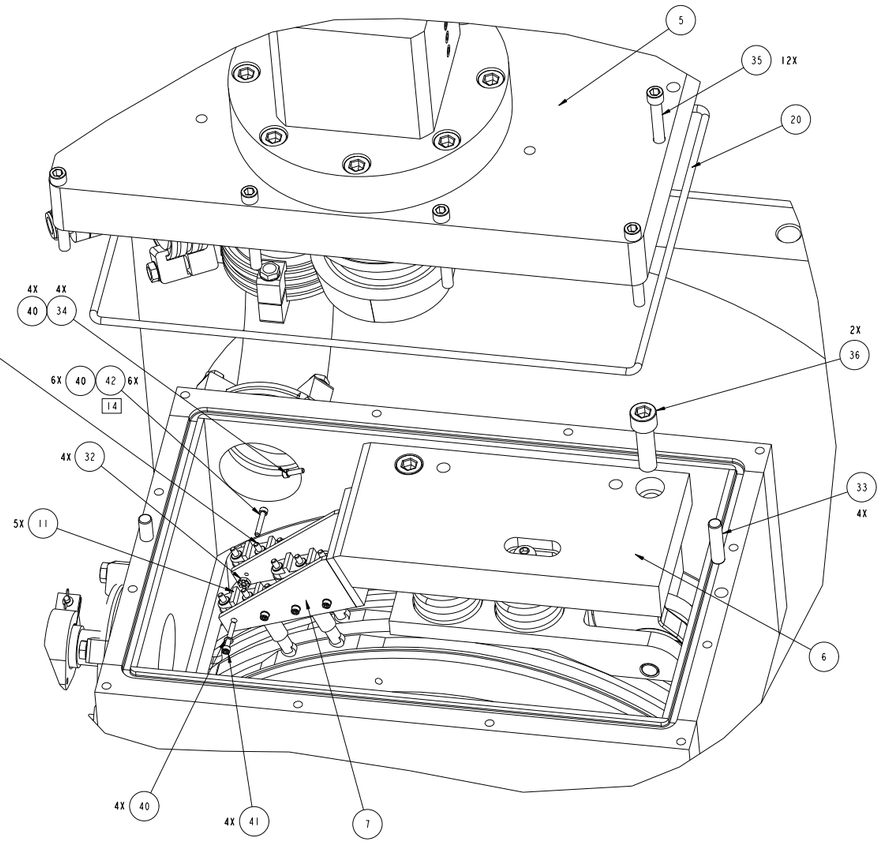
SCALE 0.190	CAD MODEL SING01B20M8U8701A101-1	SHEET 2 of 4
THIS DRAWING PREPARED ON Pro/ENGINEER		

DRAWING SING01B20M8U8701A101 [Pg 2]



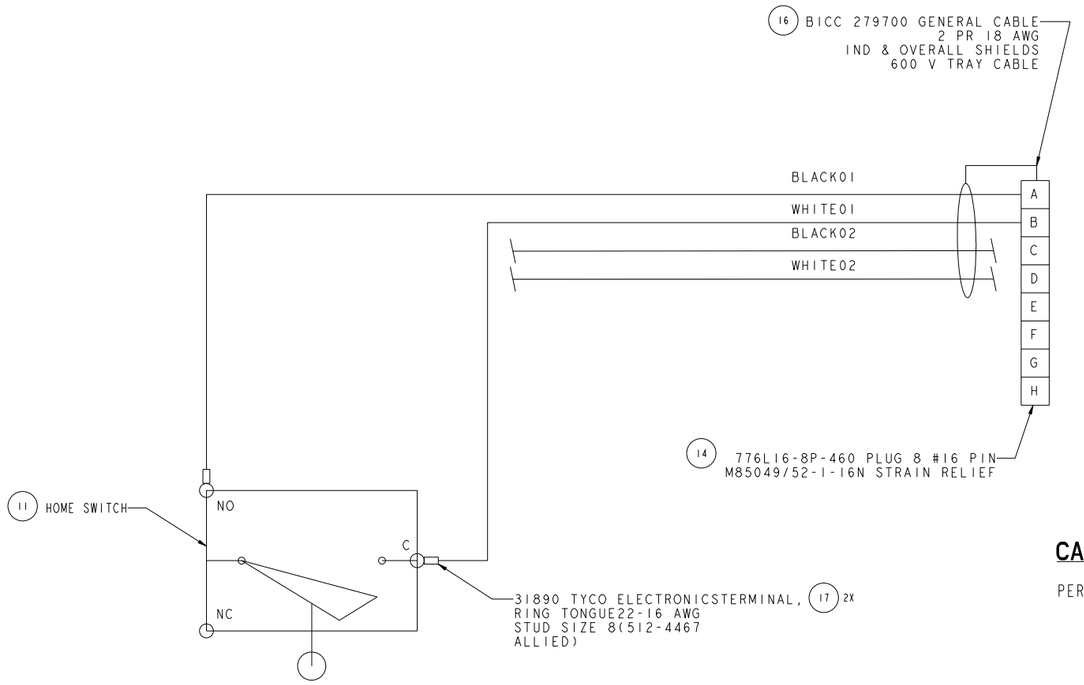
PARTIAL VIEW SHOWING VACUUM CONNECTIONS
SCALE .75



PARTIAL VIEW SHOWING ELECTRICAL SWITCH CONNECTIONS
SCALE .75

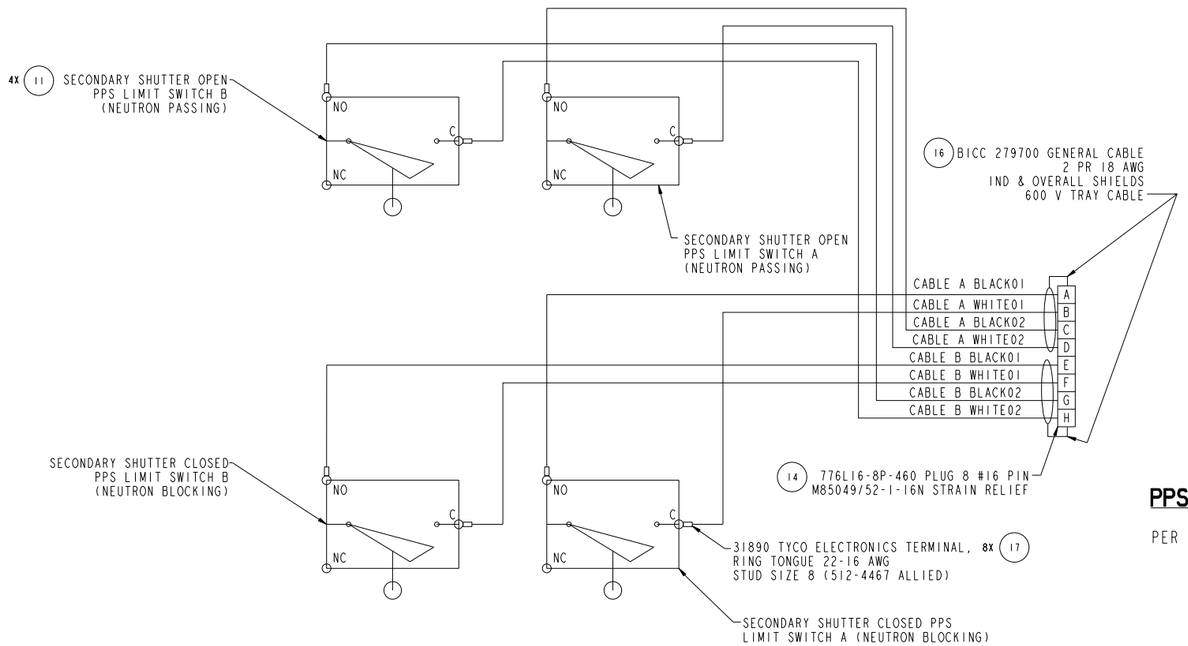
SIZE	DRAWING NUMBER	REV
E	SING01B20M8U8701A101	0
SCALE 0.750	CAD MODEL SING01B20M8U8701A101-1	SHEET 3 of 4
THIS DRAWING PREPARED ON Pro/ENGINEER		

DWG NO. SING01B20M8U8701A101 Pg 3



CAROUSEL HOME SWITCH

PER FILE: CAROUSELHOMESWITCHSCHEMATIC_V00.PDF



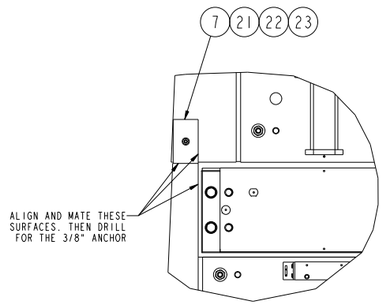
PPS LIMIT SWITCH

PER FILE: PPSLIMITSWITCHSCHEMATIC_V00.PDF

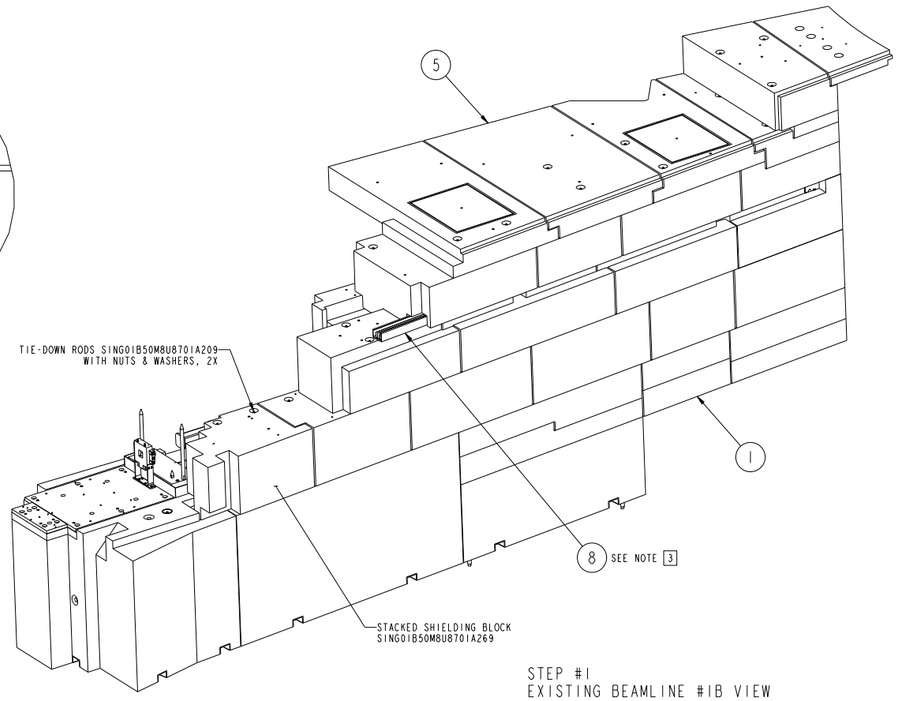
SIZE	DRAWING NUMBER	REV
E	SING01B20M8U8701A101	0
SCALE 0.250	CAD MODEL SING01B20M8U8701A101-1	SHEET 4 of 4

THIS DRAWING PREPARED ON Pro/ENGINEER

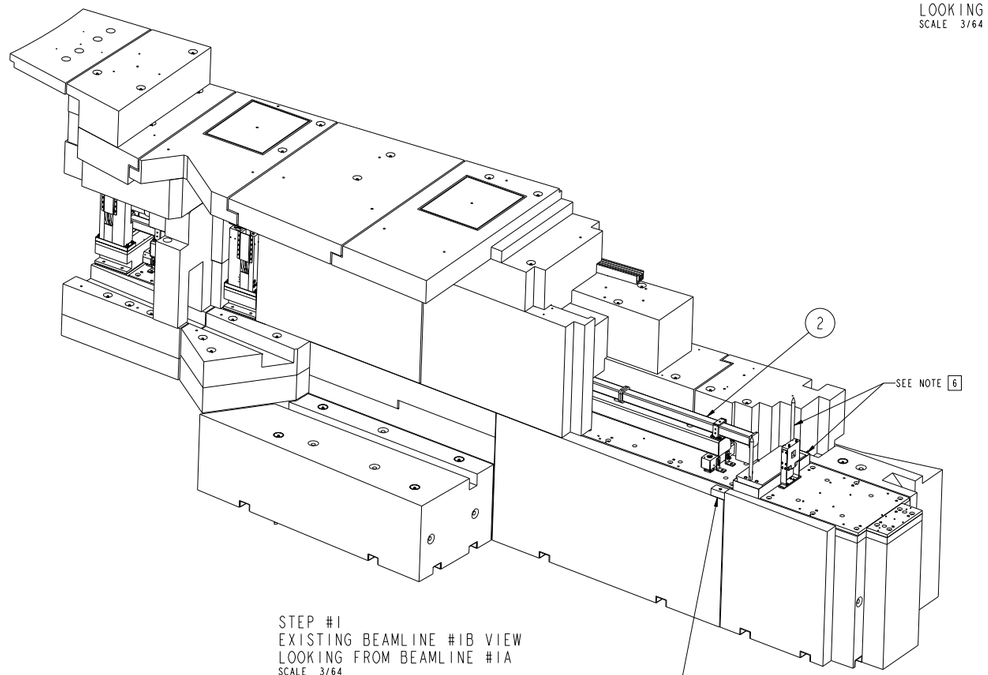
DWG NO SING01B20M8U8701A101 [illegible]



PARTIAL TOP PLAN VIEW
SCALE 1/8



STEP #1
EXISTING BEAMLINE #1B VIEW
LOOKING FROM BEAMLINE #2
SCALE 3/64



STEP #1
EXISTING BEAMLINE #1B VIEW
LOOKING FROM BEAMLINE #1A
SCALE 3/64

REVISIONS

REV	TYPE	DESCRIPTION OF CHANGE	BY	CHK	APPR	DATE
0		ISSUED APPROVED	MEP			03/10

NOTES:

1. THIS DRAWING SHOWS SEQUENTIAL VIEWS FOR THE COMPLETION OF THE STACKED SHIELDING BLOCKS. IT'S A CONTINUATION FROM THE APPROXIMATE 12M STACKED SHIELDING DRAWING SINGO1B50M8U8701A248.
2. SEE THE PARTS LIST AND VENDOR INFORMATION ON DRAWING SINGO1B50M8U8701A249 FOR ALL STACKED SHIELDING BLOCKS, TIE-DOWN RODS, NUTS, BOLTS AND WASHERS SHOWN ON THIS DRAWING.
3. [3] THE CHOPPERS, CAROUSEL, J-J SLITS & BEAM MONITORS CABLE TRAY SECTIONS SHOWN PORTRAYS HOW THEY ARE ROUTED. THESE CABLE TRAY SECTIONS WILL BE ASSEMBLED AND FIELD ANCHORED TO THE TOPS AND SIDES OF THE STACKED SHIELDING BLOCKS.
4. [4] MCMASTER-CARR SUPPLY CO, ELMHURST, IL 60126-2081 OR COMPANY APPROVED EQUIVALENT.
5. [5] VENDOR: FASTENAL OR COMPANY APPROVED EQUIVALENT.
6. [6] THE TO BASE WELDMENT AND GUIDE RODS ARE CURRENTLY INSTALLED. THE TO CHOPPER, THE 2ND NEUTRONIC SLIT MOUNT ASSEMBLY, THE INSTALLED SECONDARY SHUTTER (+OPTICS) AND APPROPRIATE FASTENERS WILL BE INSTALLED AT A LATER DATE.

PARTS LIST

FIND NO.	QTY	CAGE CODE	PART OR IDENTIFYING NUMBER	DESCRIPTION OR NOMENCLATURE	MATERIAL / SPECIFICATION
[5]	23	1	--	50207	3/8" X 5" ANKR-TITE STUD ANCHOR	ZINC-PLATED STEEL FF-S 325
[4]	22	1		98026A031	HIGH-STRENGTH WASHER, 3/8"	C1035 STEEL
[4]	21	1	3A054	94895A031	HEX NUT, 3/8"-16, GRADE 8	STEEL, ZINC PLATED ASME B18.2.2
[4 6]	20	4	0KVE6	98023A038	1" FLAT WASHER	HIGH-STRENGTH STEEL ANSI B18.22.1
[4 6]	19	4	0KVE6	91257A959	HHCS, 1"-8 X 3.5", PART THD	STEEL, ZINC PLATED GRADE 8
[4 6]	18	4		91257A724	HHCS, 1/2"-13 X 3.0", PRT THD	STEEL, ZINC PLATED GRADE 8
[4 6]	17	4		91104A049	1" SCR SIZE HVY DUTY SPLIT LOCK WSHR	ZINC-PLATED STEEL ASME B18.21.1
[4 6]	16	4	3A054	91102A770	1/2" ID SPRING LOCK WASHER	STEEL ZINC-PLATED
[4 6]	15	4		90108A033	FLAT WASHER .50 DIA	STEEL ---
[4 6]	14	4	3A054	91102A750	1/4 LOCK WASHER	ZINC-PLATED STEEL --
[4 6]	13	4	--	91090A106	1/4 FLAT WASHER	ZINC-PLATED STEEL ---
[4 6]	12	4		92620A542	HHCS, 1/4"-20 X 1.00, FULL THD, GR 8	STEEL ZINC-PLATED
[3]	11	1	--	SINGO1B50M8U8701A193	NOMAD ELECTRICAL TRAY, SECTION #4	
[3]	10	1	--	SINGO1B50M8U8701A192	NOMAD ELECTRICAL TRAY, SECTION #3	
[3]	9	1	--	SINGO1B50M8U8701A191	NOMAD ELECTRICAL TRAY, SECTION #2	
[3]	8	1	--	SINGO1B50M8U8701A190	NOMAD ELECTRICAL TRAY, SECTION #1	
	7	1	--	SINGO1B50M8U8701A186	SHINE PATH SHIELD BLOCK	ANY CARBON STEEL ---
[6]	6	1	--	SINGO1B20M8U8701A203	2ND NEUTRONIC SLIT MOUNT ASSEMBLY	
	5	1		SINGO1B50M8U8701A249	STACKED SHIELDING SEQUENCE ASSY	--- ---
	4	1	--	SINGO1B30M8U8701A020	NOMAD UTILITIES ASSEMBLY	--- ---
[6]	3	1	--	SINGO1B30M8U8701A001	NOMAD INSTRUMENTS ASSEMBLY	--- ---
	2	1	--	SINGO1B20M8U8701A070-1	GUIDE TUBE ASSEMBLY	--- ---
	1	1		SINGO1B50M8U8701A171-1	P-I-P SHLDNG & EMBED PLATES ASSY	--- ---

TOTAL WEIGHT 205693933746 LBS

QUALITY VERIFICATION	
DOCUMENTS REQUIRED	APPLICABLE
MATERIAL MILL TEST REPORT	
LEAK TEST REPORT	
CLEANING CERT	
WELD / BRAZE INSPECTION REPORT	
HEAT TREAT REPORT (WICHART)	
DIMENSIONAL REPORT	
MATERIAL SELLER CERT	
FUNCTIONAL TEST REPORT	
DEVIATION REQUEST	X
NONCONFORMANCE REPORT	
N/A	
QA REP	DATE
NEXT USED ASSEMBLIES	

DIMENSIONS ARE IN INCHES
DRAFTING STANDARD: ASME Y14.100
DIMENSIONING AND TOLERANCING IN ACCORDANCE WITH ASME Y14.5M,1994
DO NOT SCALE DRAWING
DEFAULT TOLERANCES
LINEAR: X.X ±0.1, X.XX ±0.01, X.XXX ±0.005
ANGULAR: ±0.5°
REMOVE ALL BURRS AND BREAK SHARP EDGES: 0.060
SURFACE ROUGHNESS: 125 RMS MAX
THIRD ANGLE PROJECTION

APPROVALS		
DESIGNER	KKC/MEP	DATE 03/10
DRAFTER	M.E. PHILLIPS	DATE 03/10
CHECKER		DATE
ENGINEER	K.K. CHIPLEY	DATE 03/10
GROUP LEAD		DATE
CHIEF ENGR		DATE
VERIFIER		DATE
VERIFIER		DATE
CONTROL SYSTEM	4	RELEASE WIP
SNS PROCEDURE	NFDD-ENG-001	

THIS DRAWING IS THE PROPERTY OF OAK RIDGE NATIONAL LABORATORY
DEPARTMENT OF ENERGY UNDER U.S. GOVERNMENT CONTRACT DE-AC05-00OR22725
OAK RIDGE, TENNESSEE
SPALLATION NEUTRON SOURCE

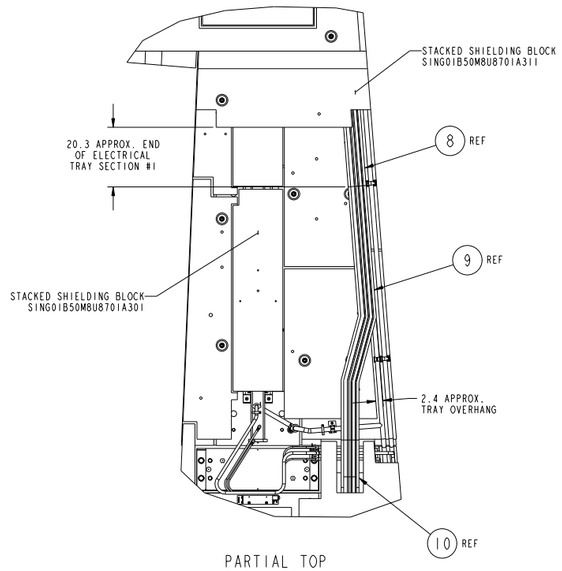
NOMAD BEAMLINE #1B SHIELDING
FINAL STACKED SHIELDING FROM 12M

SIZE	DRAWING NUMBER	REV
E	SING01B50M8U8701A247	0

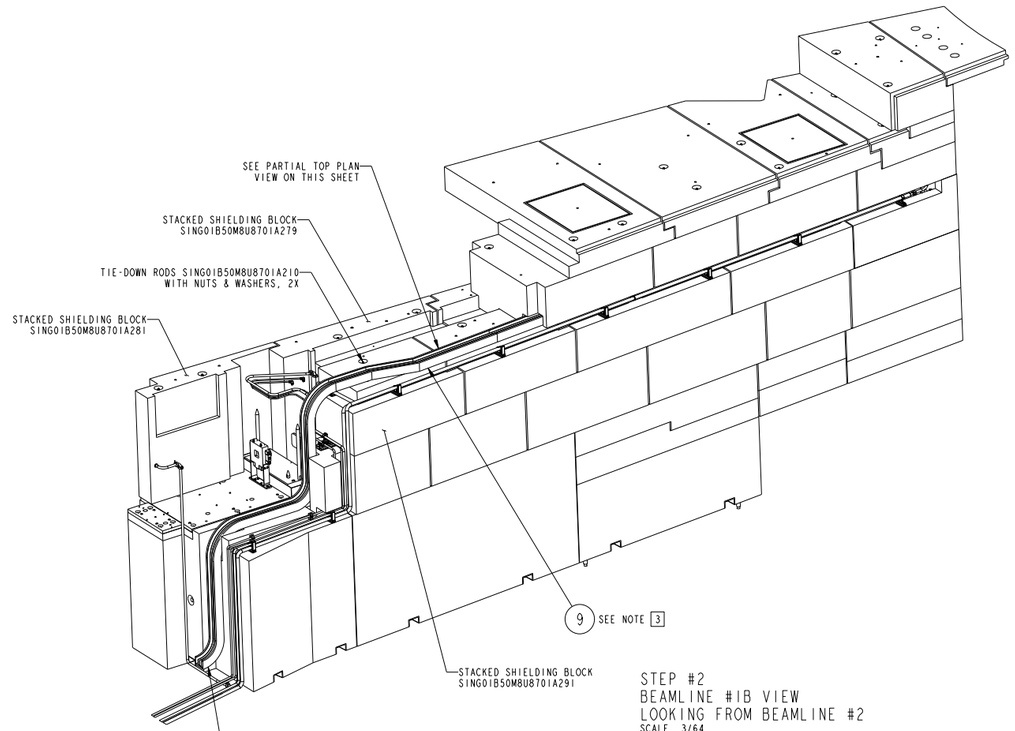
SCALE	CAD MODEL	SHEET
3/1600	SING01B50M8U8701A247	1 of 6

This DRAWING PREPARED ON Pro/ENGINEER

DWG NO. SING01B50M8U8701A247 R 1

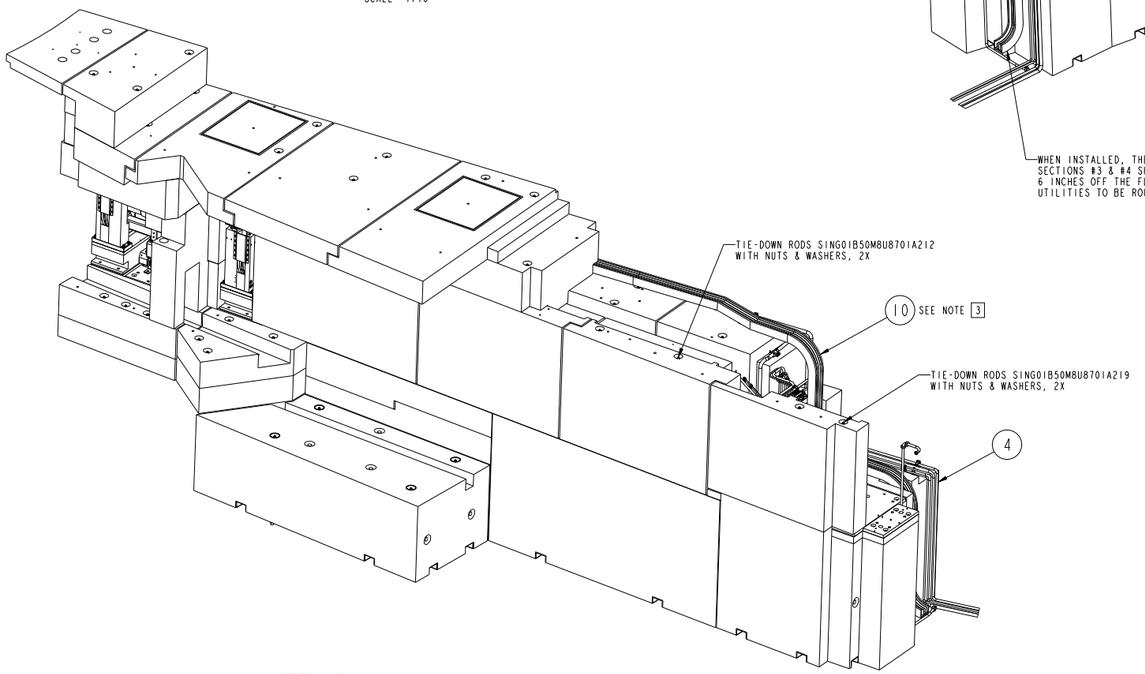


PARTIAL TOP
PLAN VIEW
SCALE 1/16



STEP #2
BEAMLINE #1B VIEW
LOOKING FROM BEAMLINE #2
SCALE 3/64

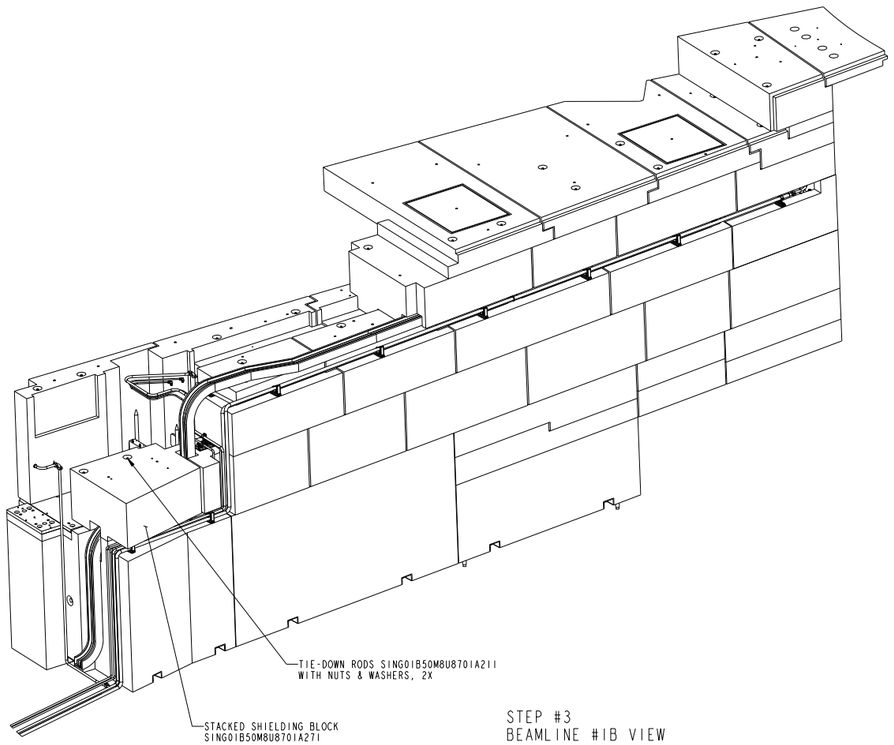
WHEN INSTALLED, THE NOMAD ELECTRICAL TRAYS,
SECTIONS #3 & #4 SHOULD BE APPROXIMATELY
6 INCHES OFF THE FLOOR TO ALLOW FOR THE
UTILITIES TO BE ROUTED UNDER THEM



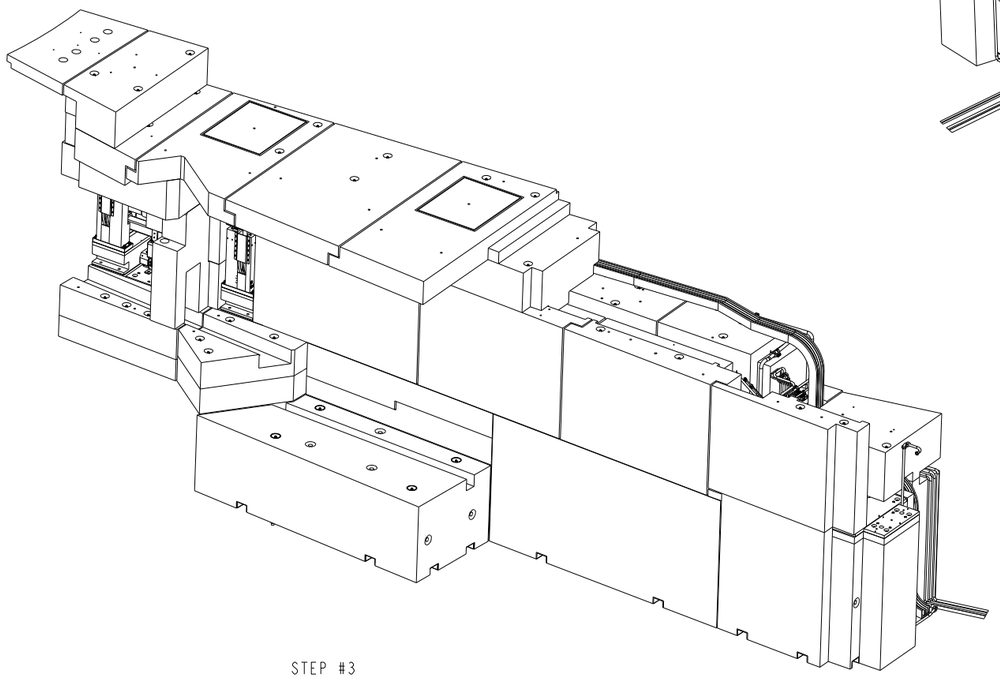
STEP #2
BEAMLINE #1B VIEW
LOOKING FROM BEAMLINE #1A
SCALE 3/64

SIZE	DRAWING NUMBER	REV
E	SING01B50M8U8701A247	0
SCALE 3/1600	CAD MODEL SING01B50M8U8701A247	SHEET 2 of 6
THIS DRAWING PREPARED ON Pro/ENGINEER		

DWG NO SING01B50M8U8701A247 [P.2]



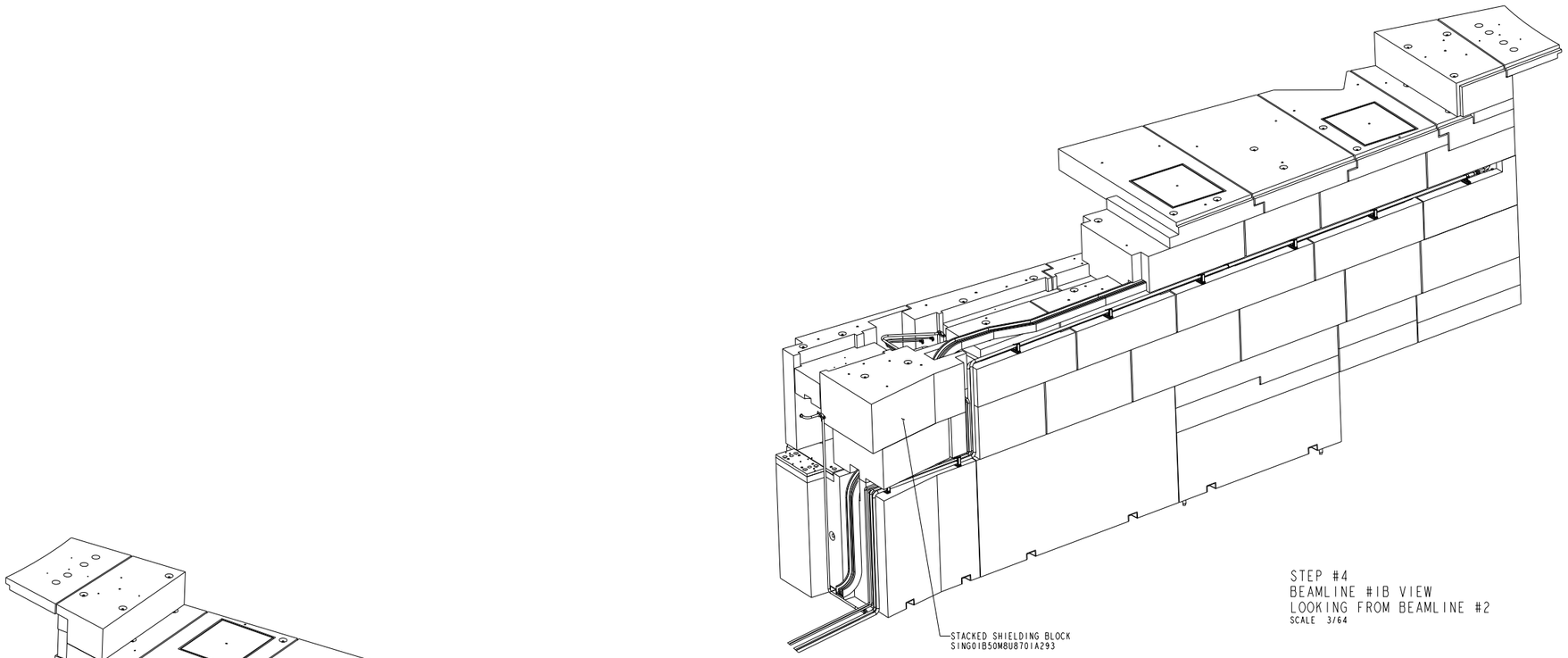
STEP #3
BEAMLINE #1B VIEW
LOOKING FROM BEAMLINE #2
SCALE 3/64



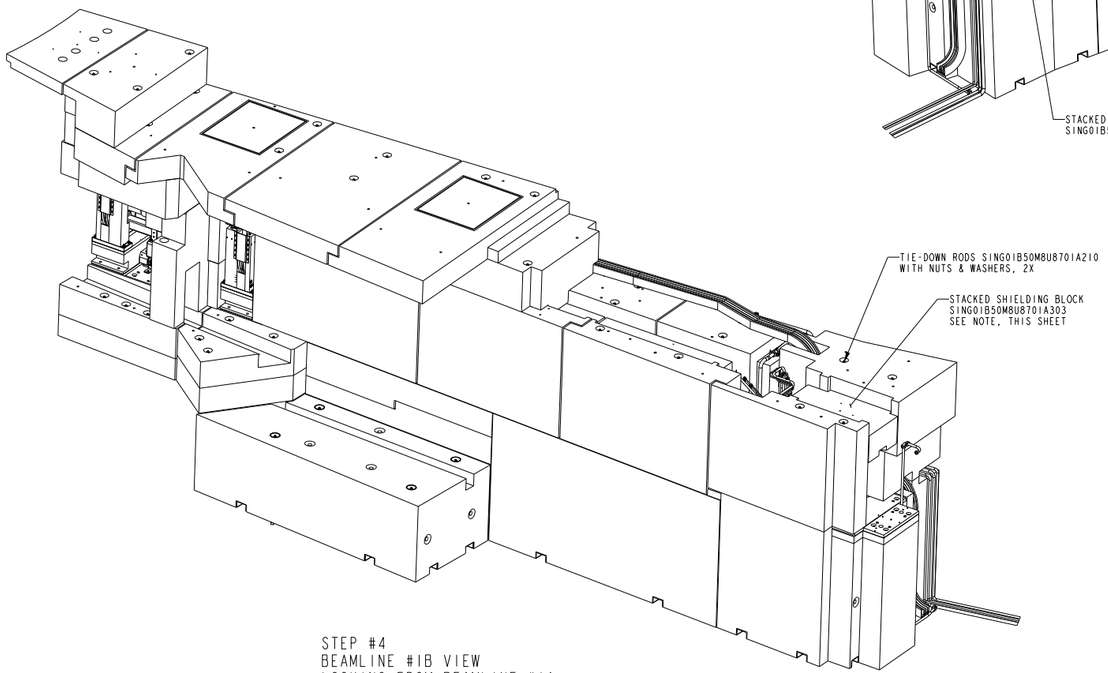
STEP #3
BEAMLINE #1B VIEW
LOOKING FROM BEAMLINE #1A
SCALE 3/64

SIZE	DRAWING NUMBER	REV
E	SING01B50M8U8701A247	0
SCALE 3/1600	CAD MODEL SING01B50M8U8701A247	SHEET 3 of 6
THIS DRAWING PREPARED ON Pro/ENGINEER		

DWG NO SING01B50M8U8701A247 | R 3



STEP #4
BEAMLINE #1B VIEW
LOOKING FROM BEAMLINE #2
SCALE 3/64



STEP #4
BEAMLINE #1B VIEW
LOOKING FROM BEAMLINE #1A
SCALE 3/64

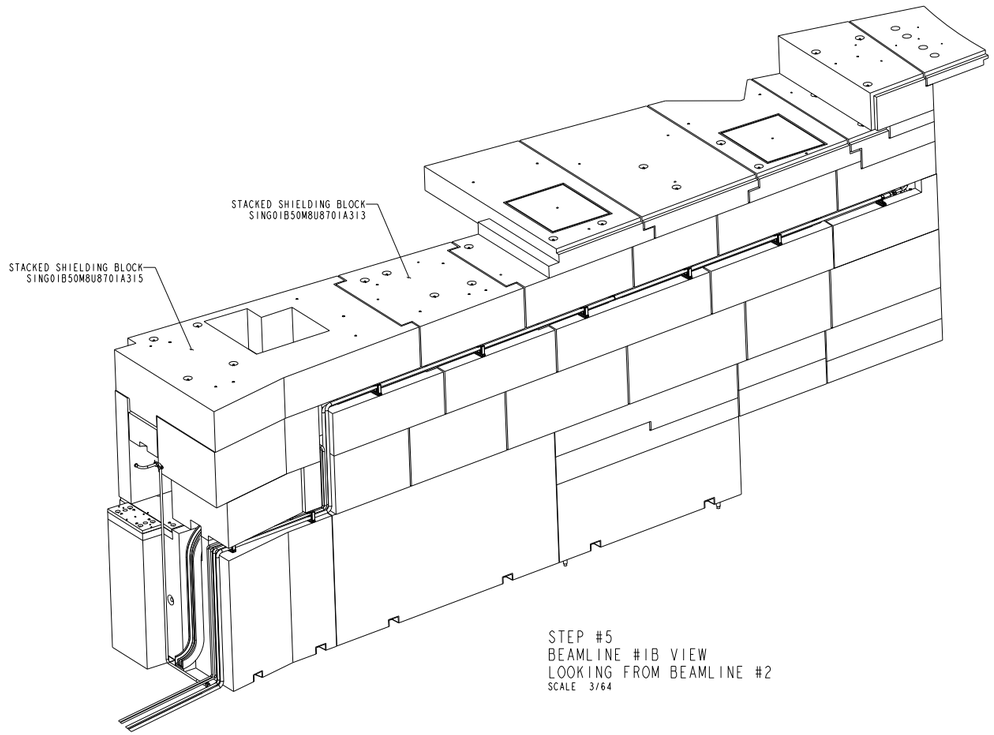
STOP STACKING SHIELDING

INSTALLATION OF STACKED SHIELDING BLOCK SING01B50M8U8701A303 IS TEMPORARY TO ASSURE SPACING. CONTINUING INSTALLATION OF SHIELD BLOCK REQUIRES INSTALLATION OF THE INSTALLED SECONDARY SHUTTER PER DRAWING SING01B30M8U8701A001 PRIOR TO PROCEEDING.

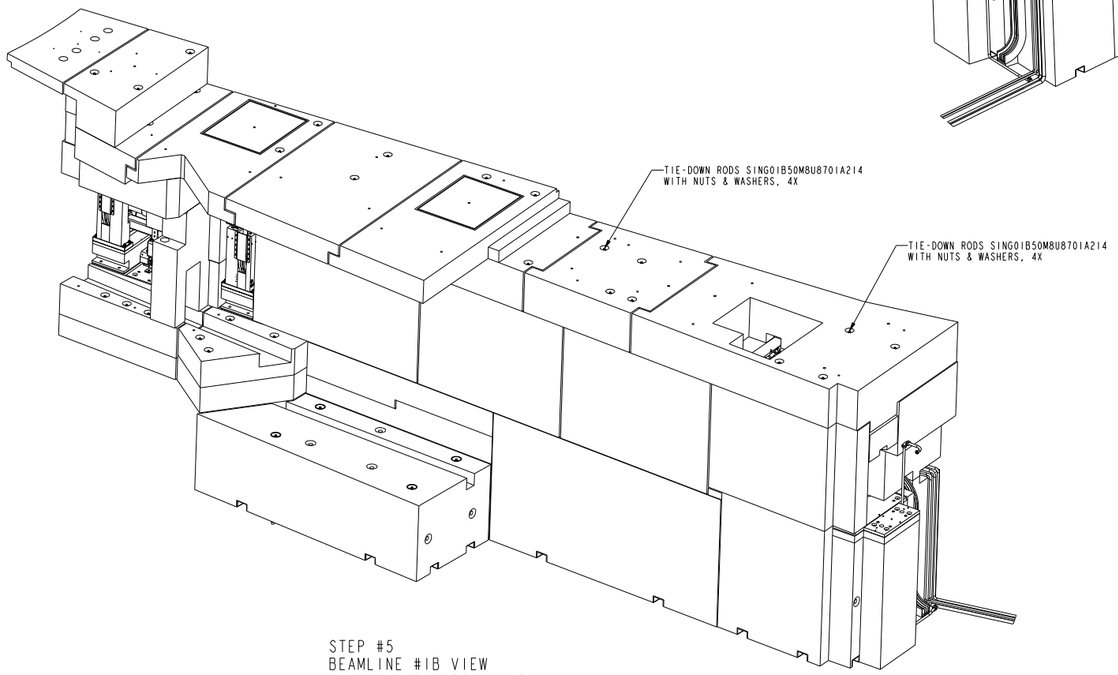
DWG NO: SING01B50M8U8701A247 | 0 | 4

SIZE	DRAWING NUMBER	REV
E	SING01B50M8U8701A247	0
SCALE 3/1600	CAD MODEL SING01B50M8U8701A247	SHEET 4 of 6

THIS DRAWING PREPARED ON Pro/ENGINEER



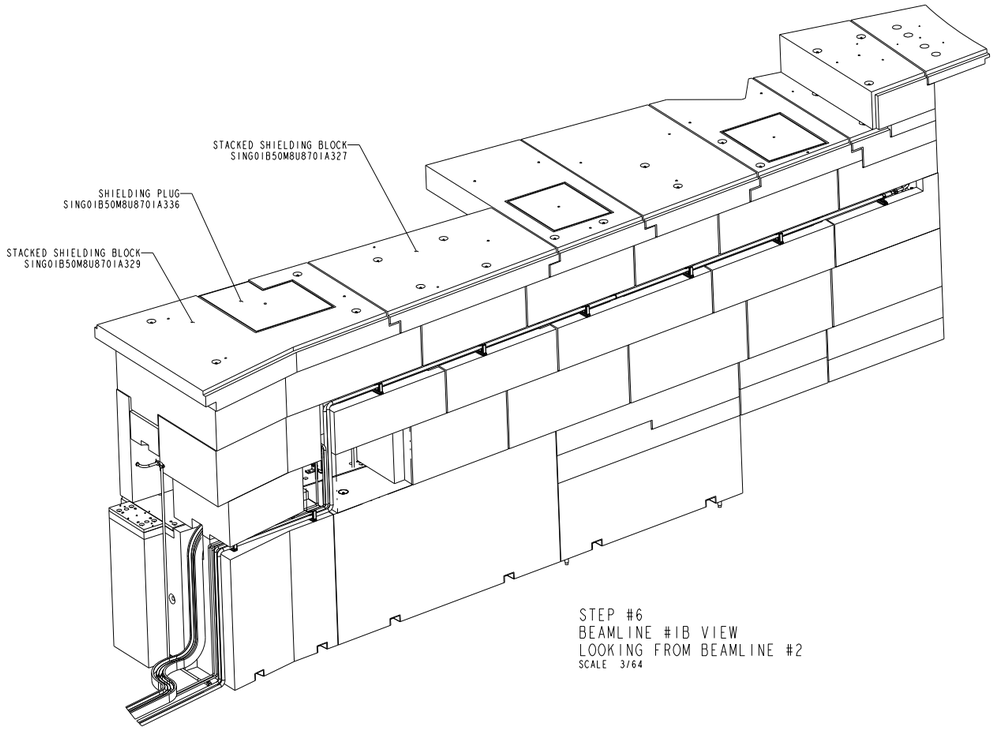
STEP #5
BEAMLINE #1B VIEW
LOOKING FROM BEAMLINE #2
SCALE 3/64



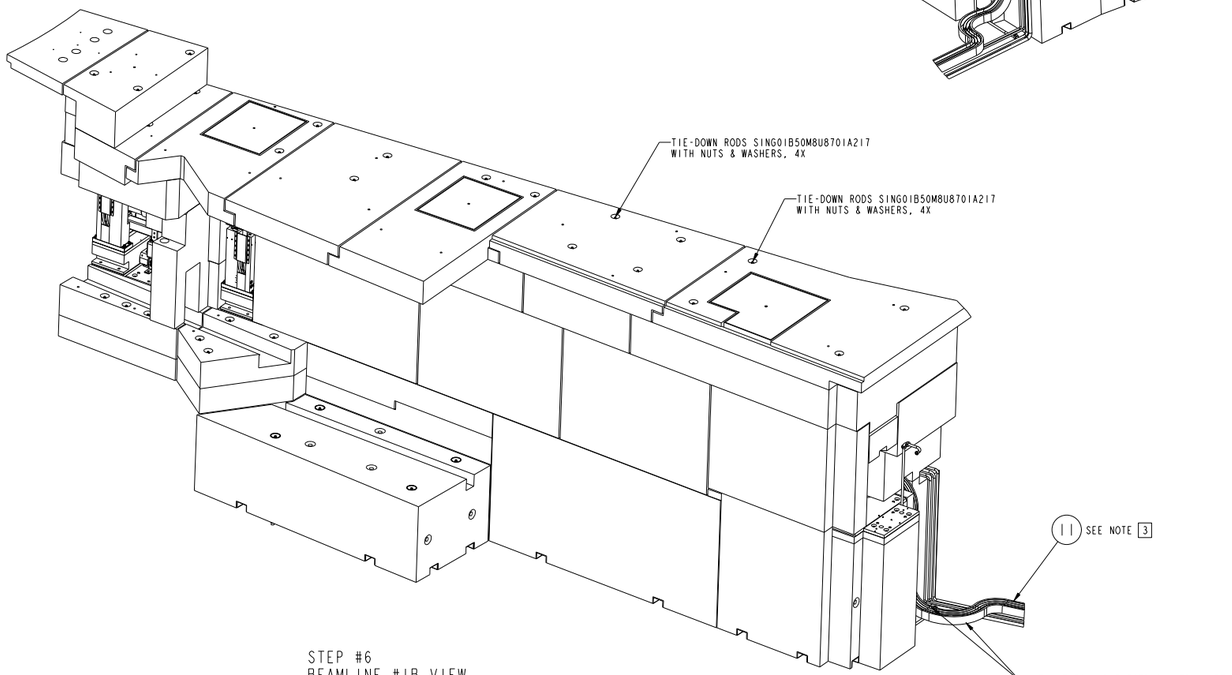
STEP #5
BEAMLINE #1B VIEW
LOOKING FROM BEAMLINE #1A
SCALE 3/64

SIZE	DRAWING NUMBER	REV
E	SINGO1B50M8U8701A247	0
SCALE 3/1600	CAD MODEL SINGO1B50M8U8701A247	SHEET 5 of 6
THIS DRAWING PREPARED ON Pro/ENGINEER		

DWG NO SINGO1B50M8U8701A247 M.S.



STEP #6
BEAMLINE #1B VIEW
LOOKING FROM BEAMLINE #2
SCALE 3/64



STEP #6
BEAMLINE #1B VIEW
LOOKING FROM BEAMLINE #1A
SCALE 3/64

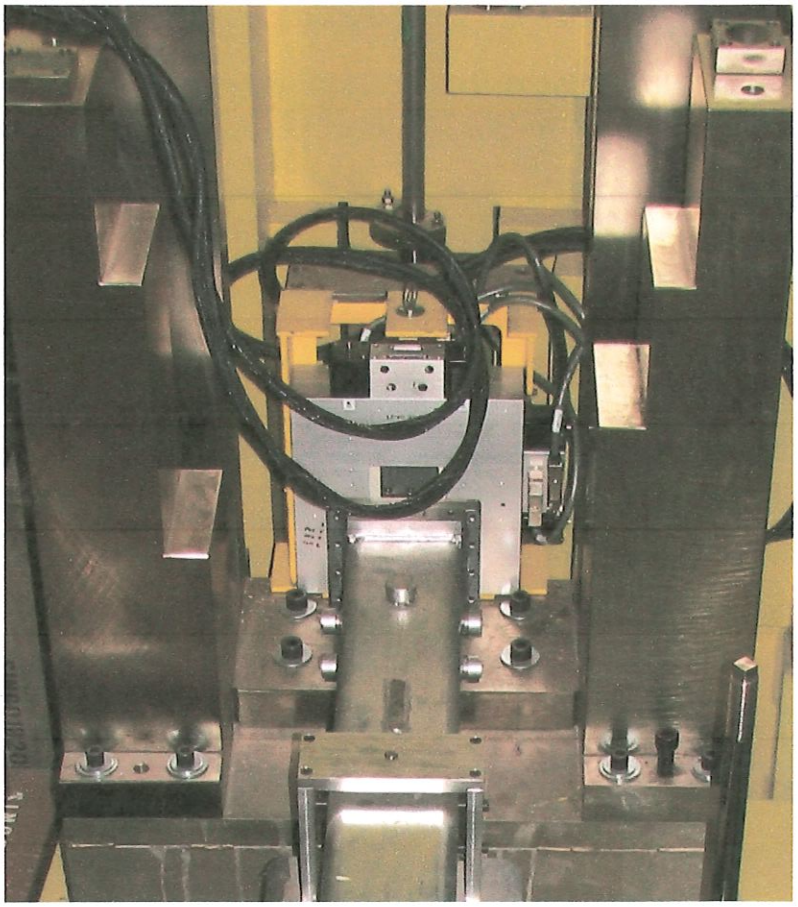
SIZE	DRAWING NUMBER	REV
E	SING01B50M8U8701A247	0
SCALE 3/1600	CAD MODEL SING01B50M8U8701A247	SHEET 6 of 6

THIS DRAWING PREPARED ON Pro/ENGINEER

DWG NO. SING01B50M8U8701A247 REV 0

Work Instructions

Removing the NOMAD Slit Package #3



1. Purpose

1.1 The purpose of this work instruction is to provide an overview and guidance for the safe and consistent removal of the NOMAD slit package #3 and the surrounding shielding.

2. Scope

2.1 The Instrument Support Team task leader is responsible for the performance of this work instruction.
2.2 This instruction only covers the removal of the #3 slit package at NOMAD and the surrounding shielding.

3. Prerequisites

3.1 Work order must be approved.
3.2 Write JHA for the work being performed and have a pre job briefing.
3.3 Removal of this slit package requires an administrative lock on the shutter of the beamline. Contact Operations manager and the Radiation Safety officer and get NOMAD key released to remove tamper locks on shielding.
3.4 Contact PPS team and make sure that chipmunk can be moved.
3.5 Contact Vacuum group and have vacuum lines on pump the front end shielding disconnected before removing any shielding.
3.6 Contact F&O craft supervisor and schedule riggers.
3.7 Contact Chopper group and have choppers shut down.
3.8 Contact NOMAD staff and have them turn off slit package motors.
3.9 Contact RCT and have RMA area set up on the south side floor for shielding stacking.

4. Precautions

4.1 Radiation Hazards – Significant radiation fields and removable contamination are expected from the activation of the slit package and surrounding components. RCT will make appropriate determinations for handling of any activated materials after survey is taken.
4.2 Hoisting and Rigging hazards associated with this work should be checked off in the ORNL work plan.
4.3 Fall protection is needed when a 4 ft. drop is present.

5. Procedure

5.1 Remove tamper locks shielding blocks

6. Documentation

6.1 Drawing SING01B-50-M8U-8701-A249-R01

7. References

7.1 SNS-OPM 9.D-1 Guidelines for post Maintenance testing.
7.2 SNS 108000000-PR0061, R08 SNS Work Control process

8. Attachments

8.1 NONE.

9. Tools

9.1 ½" socket
5/8" socket
3/4" socket
7/8" socket
1" deep well socket
1 ½" socket at least 6" deep.
½" drive Impact wrench
½" drive torque wrench
Channel locks
Grizzly pry bar

5.2 Remove shot bags and poly shielding from top cavities. Make sure to have RCT survey this area for any radiological hazards. (See figure 1.)

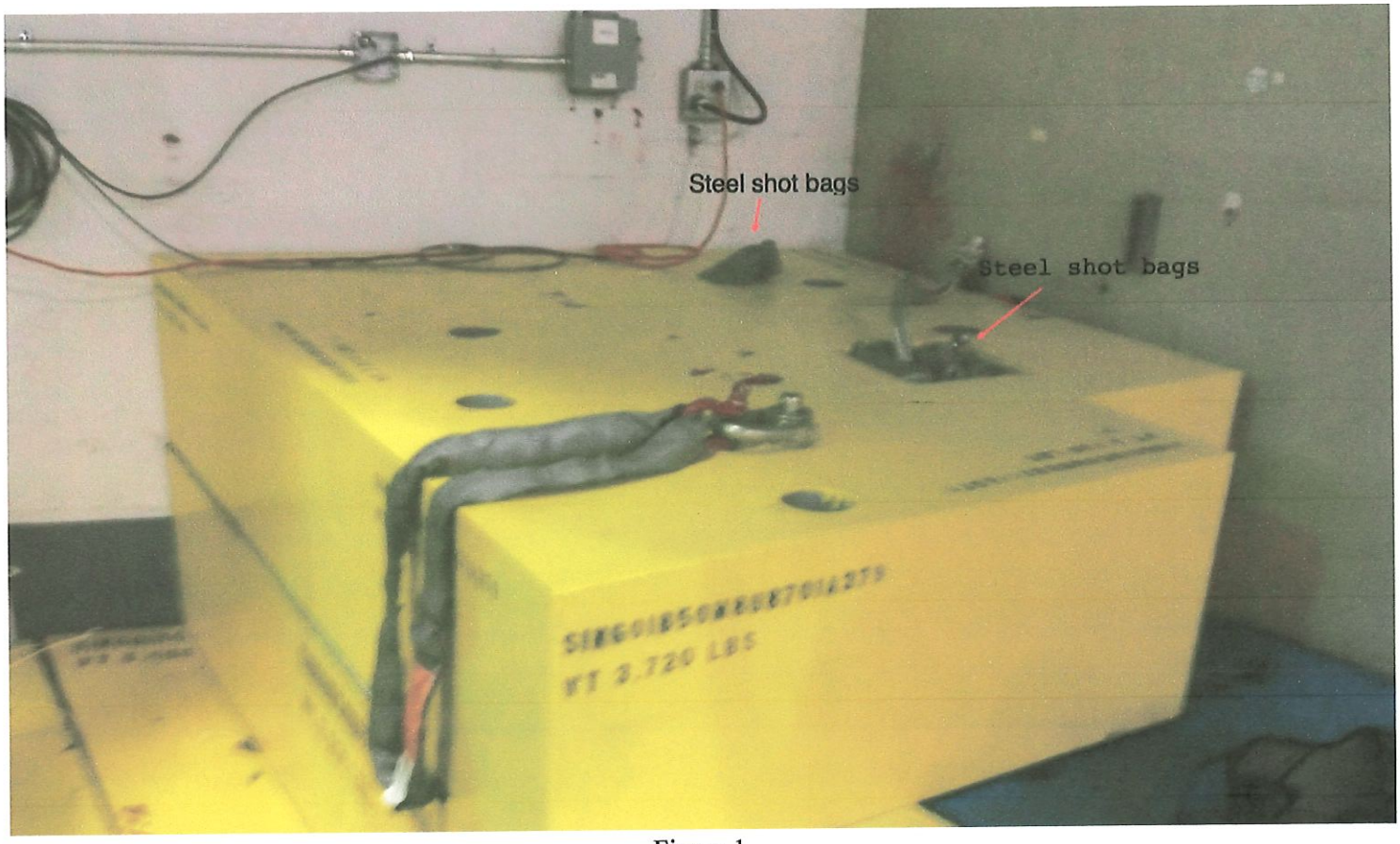


Figure 1.

5.3 Remove 3 nuts (3/4" socket) from A379 and remove block (1-1" swivel lifts).

5.4 Remove A376 (3-1" swivel lifts)

5.5 Remove small fill in block (40 lbs.)

5.6 Remove A378 (3-1" swivel lifts).

5.7 Remove nut (1 ½" deep well socket that must be at least six inches long) from A344 and remove block (3-3/4" swivel lifts).

5.8 Remove plate A373 (choke with 6" sling. See figure 2.)

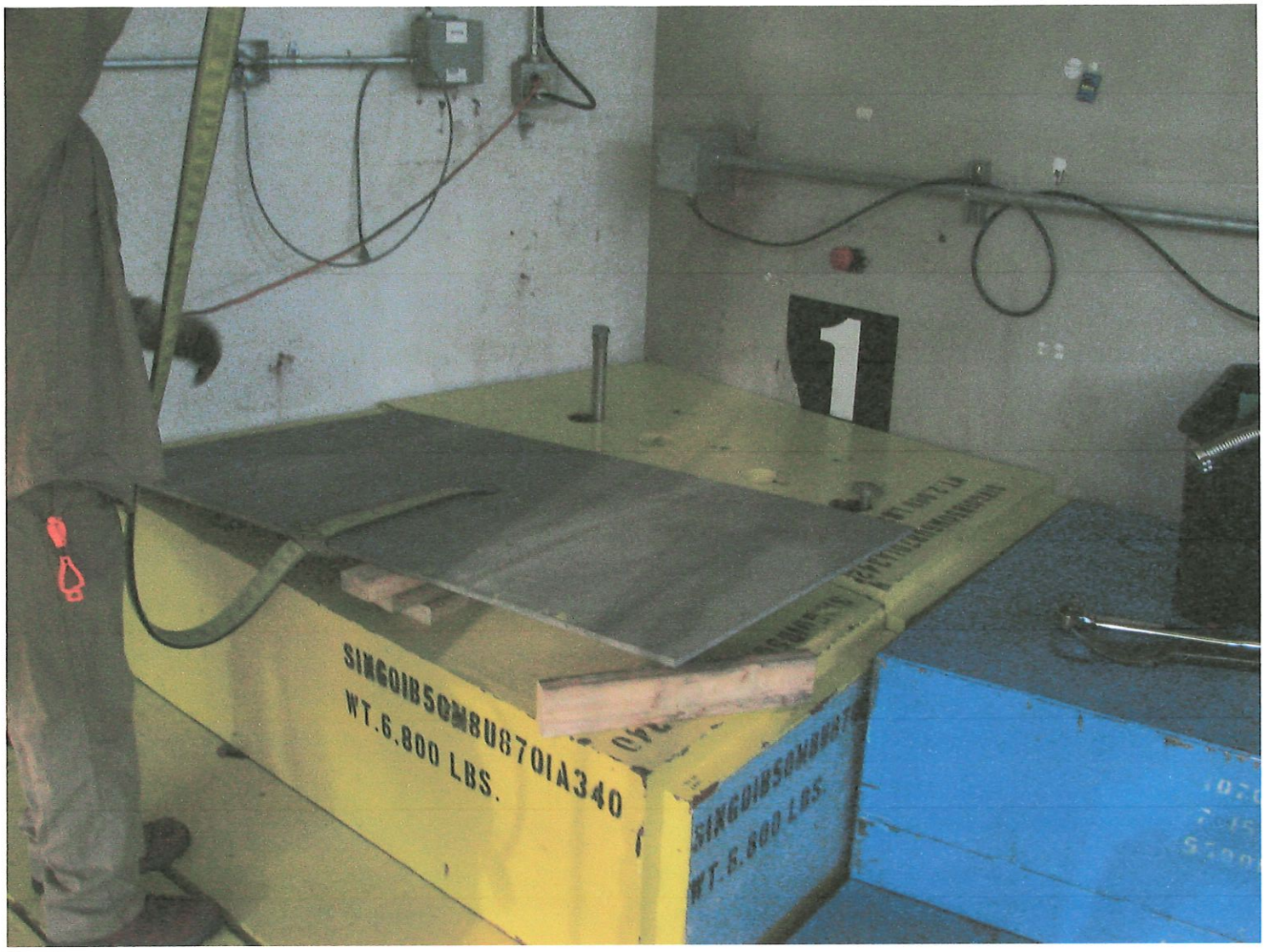
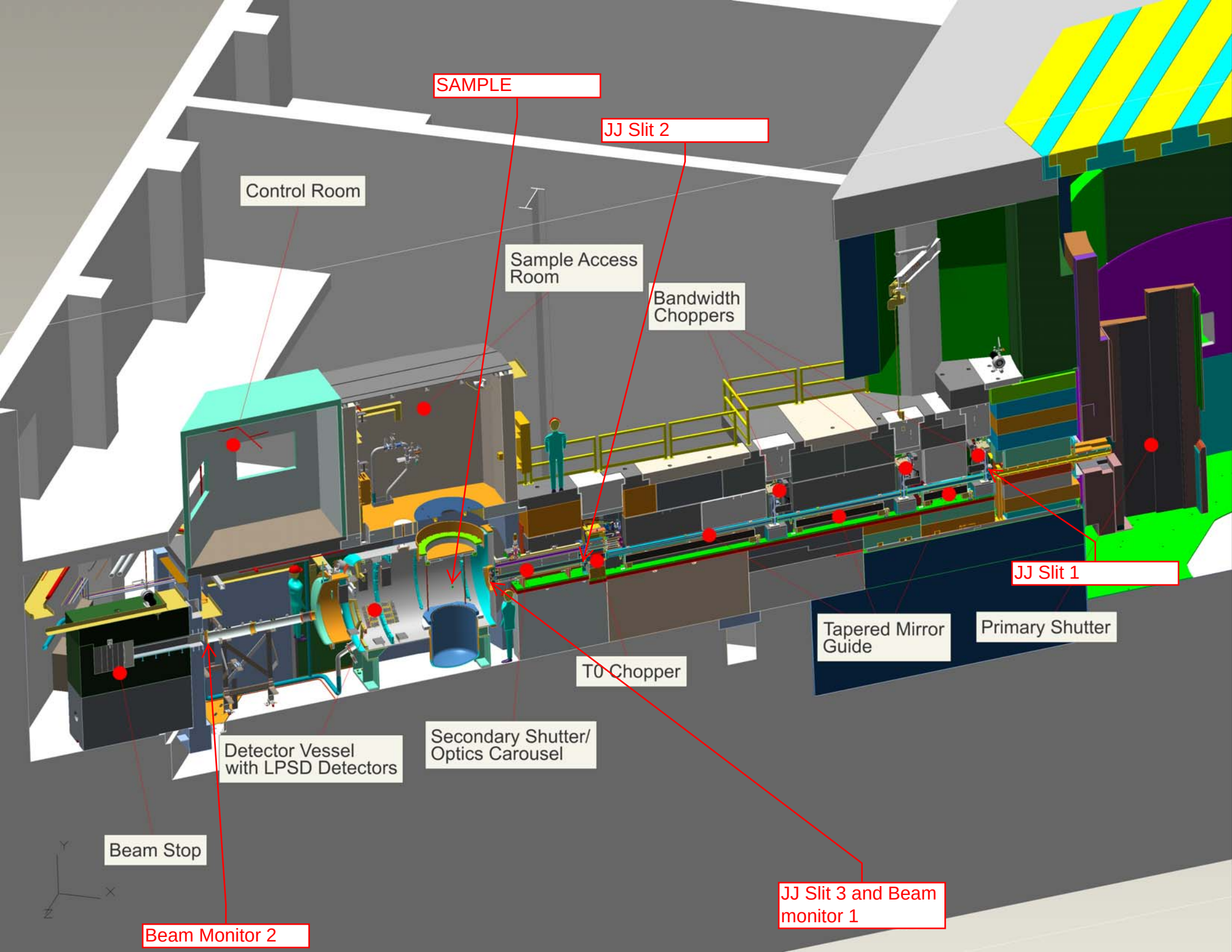


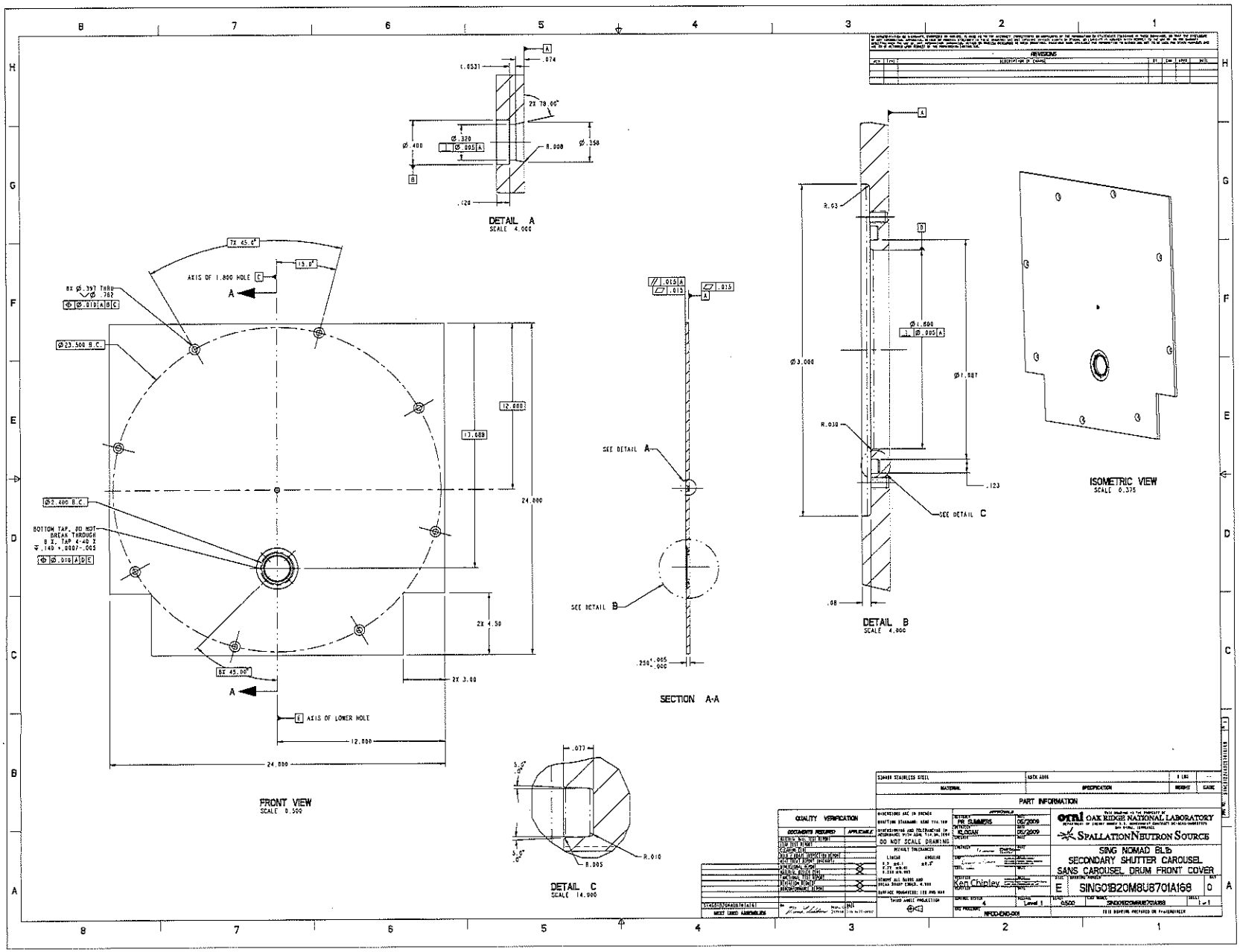
Figure 2.

5.9 Remove 2 nuts (7/8"socket) and then remove A377 (1-5/8" swivel lift).
5.10 Remove 40"X5" plate (choke with sling).
5.11 Remove nut (1½" socket) and then remove A342 (3-5/8" swivel lifts).
5.12 Remove wedge plate. (1/2" swivel lift.)
5.13 Remove 3 nuts (1½" socket) then remove A340. (3-3/4" swivel lifts).
5.14 Remove A333 (3-5/8" swivel lifts). Removing this block may create a fall hazard. If so, set up handrails around hole and put up fall protection sign.
5.15 Verify with NOMAD SA that motors to the slit package are de-energized.
5.16 The JJ x-ray slit package is on the upstream side of chopper and sits on 2 alignment pins. To remove the slit package, disconnect 2 labeled slit package connectors.
5.17 Pull slit package up off the alignment pins and pull out the cavity. The slit package weighs about 10 lbs. Be careful to not bump the beam guide. Chopper does not have to be removed.
5.18 Have RCT survey slit package for radiological hazards.
5.19 Place slit package in NOMAD sample cave and notify BL staff of its location.

Figure 3.

5.20 Make sure all cables and wires are replaced in an area where they wont get crushed by shielding.
5.21 Replace block A333.
5.22 Replace wedge plate. Make sure that plate is as far downstream as possible to allow the plate to fit correctly.
5.23 Replace A340 and torque nuts to 250 ft. lbs.
5.24 Torque nuts on A333 to 250 ft. lbs.
5.25 Replace 40"X5" plate.
5.26 Replace block A342 and torque nut to 250 ft. lbs.
5.27 Replace block A377 and torque nut to 50 ft. lbs.
5.28 Replace Plate A373.
5.29 Replace block A344 and torque nut to 50 ft. lbs.
5.30 Replace block A378 and torque nuts to 50 ft. lbs.
5.31 Replace block A376 torque nuts to 125 ft. lbs.
5.32 Replace A379 and torque nuts to 125 lbs.
5.33 Replace poly shield box and shot bags.
5.34 Replace tamper locks on beamline and return key to Operations manager.
5.35 Alert beamline staff, PPS, vacuum and chopper groups that work is complete so that components may be reconnected and/or restarted.


SAMPLE
JJ Slit 2
Control Room
Sample Access Room
Bandwidth Choppers
JJ Slit 1
Tapered Mirror Guide
Primary Shutter
T0 Chopper
Secondary Shutter/ Optics Carousel
Detector Vessel with LPSD Detectors
Beam Stop
JJ Slit 3 and Beam monitor 1
Beam Monitor 2

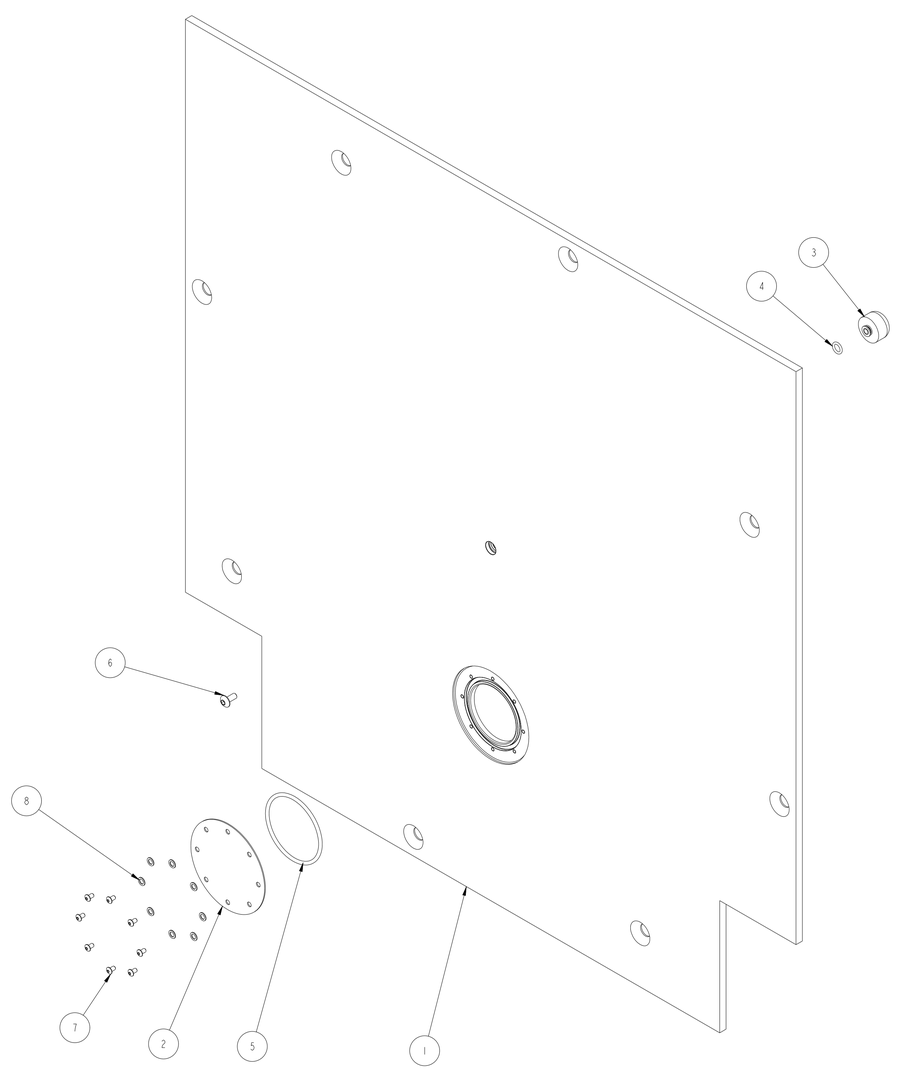

DETAIL A
SCALE 4.000
FRONT VIEW
SCALE 0.500
SECTION A-A
DETAIL B
SCALE 4.000
ISOMETRIC VIEW
SCALE 0.375
DETAIL C
SCALE 14.000
SPALLATION NEUTRON SOURCE
SING NOMAD BLIB
SECONDARY SHUTTER CAROUSEL
SANS CAROUSEL DRUM FRONT COVER
SINGO1B20M8U8701A168
DO NOT SCALE DRAWING

REVISIONS

REV	TYPE	DESCRIPTION OF CHANGE	BY	CHK	APPR	DATE

NOTES

1. UNBRAKO DIV/SPS TECHNOLOGIES, 4444 LEE RD. CLEVELAND, OHIO 44128
2. THE TORRINGTON COMPANY,59 FIELD STREET, TORRINGTON, CONNECTICUT 06790



EXPLODED ISOMETRIC VIEW
SCALE: .75

FIND NO.	-01 QTY	CAGE CODE	PART OR IDENTIFYING NUMBER	DESCRIPTION OR NOMENCLATURE	MATERIAL / SPECIFICATION
	8	8	98032A436	#6 X 0.25 OD FLAT WASHER	STEEL MIL27183
1	7	8	-- AES18R112188DG5L7I	BHCS #4-40UNC X .188, MIL-DTL-13924 CL1 BLK OXIDE CTG	ASTM F835 ALLOY STL ASME B18.3
1	6	1	-- AES18R190375DG5L7I	BHCS #10-24 UNRC X .380, MIL-DTL-13924 CL1 BLK OXIDE CTG	ASTM F835 ALLOY STL ASME B18.3
2	5	1	-- AS568-136_VITON	O-RING .103 WIDE X Ø 1.987 INSIDE	VITON SAE AS 568
2	4	1	-- AS568-902_VITON	O-RING .064 WIDE X Ø .239 INSIDE	VITON SAE AS 568
	3	1	-- SING01B20M8U8701A170	HEAD BOSS	S30400 A666
	2	1	-- SING01B20M8U8701A169	SANS CAROUSEL DRUM FRONT WINDOW	96061-T6 ALUMINUM ASTM B209
	1	1	-- SING01B20M8U8701A168	DRUM FRONT COVER	S30400 STAINLESS STEEL ASTM A666
				TOTAL WEIGHT	0 LBS

PARTS LIST

DWG NO. SING01B20M8U8701A167 REV 0

ADDITIONAL APPROVALS	
NAME,TITLE	DATE
NAME,TITLE	DATE
NAME,TITLE	DATE
NAME,TITLE	DATE
NAME,TITLE	DATE
NAME,TITLE	DATE
NAME,TITLE	DATE
NAME,TITLE	DATE

QUALITY VERIFICATION

DOCUMENTS REQUIRED	APPLICABLE
MATERIAL MILL TEST REPORT	
LEAK TEST REPORT	
CLEANING CERT	
WELD / BRAZE INSPECTION REPORT	
HEAT TREAT REPORT (W/CHART)	
DIMENSIONAL REPORT	
MATERIAL SELLER CERT	
FUNCTIONAL TEST REPORT	
DEVIATION REQUEST	
NONCONFORMANCE REPORT	X

SING01B20M8U8701A102
NEXT USED ASSEMBLIES

QA Max L. Gibbons DATE 2009.08.04 10:39:30 -04'00'

DIMENSIONS ARE IN inches
DRAFTING STANDARD: ASME Y14.100
DIMENSIONING AND TOLERANCING IN ACCORDANCE WITH ASME Y14.5M,1994
DO NOT SCALE DRAWING
DEFAULT TOLERANCES
LINEAR: X.X ±0.1, X.XX ±0.01, X.XXX ±0.005
ANGULAR: ±0.5°
REMOVE ALL BURRS AND BREAK SHARP EDGES: 0.060
SURFACE ROUGHNESS: 125 RMS MAX
THIRD ANGLE PROJECTION

APPROVALS

		DATE
DESIGNER	PR SUMMERS	05/2009
DRAFTER	KLOGAN	05/2009
CHECKER		
ENGINEER	PR Summers	
	Digitally signed by Danny Williams DN: cn=Danny Williams, o=ORNL, ou=NFDD, email=williamsdm@ornl.gov, c=US Date: 2009.08.04 13:19:38 -04'00'	
SPALLATION NEUTRON SOURCE	Ken Chipley	
VERIFIER		
CONTROL SYSTEM	4	
RELEASE	Level 1	
DNS PROCEDURE	NFDD-ENG-001	

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DEPARTMENT OF ENERGY UNDER U.S. GOVERNMENT CONTRACT DE-AC05-00OR22725
OAK RIDGE, TENNESSEE

SPALLATION NEUTRON SOURCE

SING NOMAD BL1b SECONDARY SHUTTER CAROUSEL HEAD WITH WINDOW

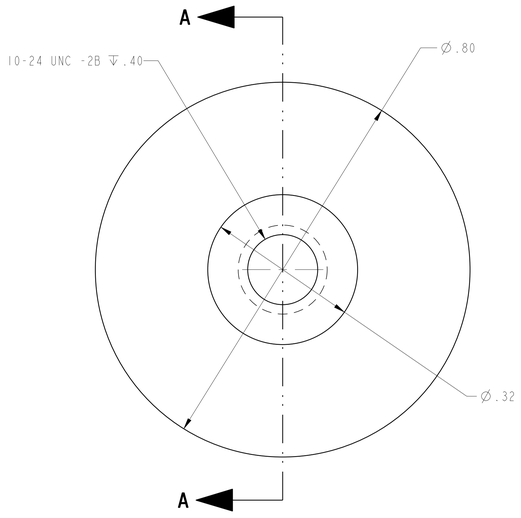
SIZE	DRAWING NUMBER	REV
E	SING01B20M8U8701A167	0

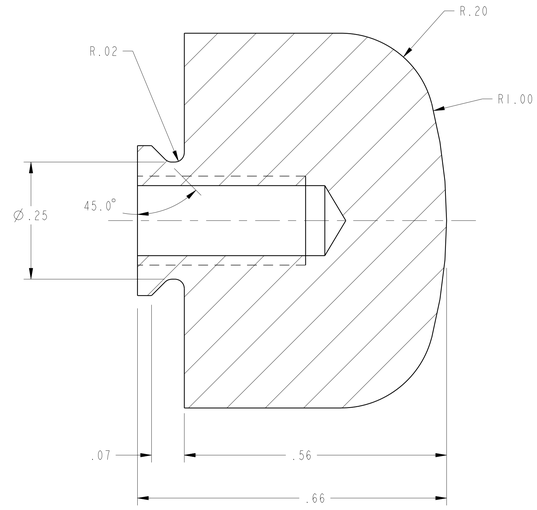
SCALE	CAD MODEL	SHEET
0.750	SING01B20M8U8701A167	1 of 1

THIS DRAWING PREPARED ON Pro/ENGINEER

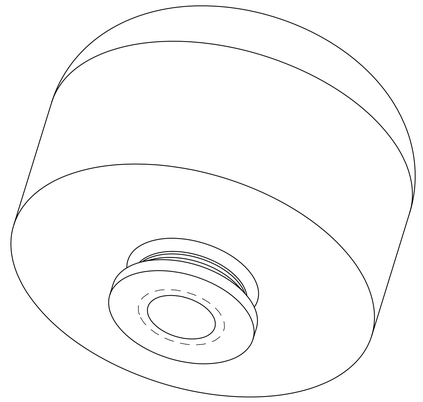
REVISIONS

REV	TYPE	DESCRIPTION OF CHANGE	BY	CHK	APPR	DATE





SECTION A-A



S30400	A666	0 LBS	--
MATERIAL	SPECIFICATION	WEIGHT	CAGE

PART INFORMATION

QUALITY VERIFICATION	
DOCUMENTS REQUIRED	APPLICABLE
MATERIAL MILL TEST REPORT	
LEAK TEST REPORT	
CLEANING CERT	
WELD / BRAZE INSPECTION REPORT	
HEAT TREAT REPORT (W/CHART)	
DIMENSIONAL REPORT	
MATERIAL SELLER CERT	X
FUNCTIONAL TEST REPORT	
DEVIATION REQUEST	X
NONCONFORMANCE REPORT	

SING01B20M8U8701A167
NEXT USED ASSEMBLIES

QA — Max L. Gardner 2009.08.03 16:18:31 -04'00'

DIMENSIONS ARE IN INCHES
DRAFTING STANDARD: ASME Y14.100
DIMENSIONING AND TOLERANCING IN ACCORDANCE WITH ASME Y14.5M,1994
DO NOT SCALE DRAWING

DEFAULT TOLERANCES

LINEAR	ANGULAR
X.X ±0.1 X.XX ±0.01 X.XXX ±0.005	±0.5°

REMOVE ALL BURRS AND BREAK SHARP EDGES: 0.060
SURFACE ROUGHNESS: 125 RMS MAX
THIRD ANGLE PROJECTION

APPROVALS		
DESIGNER	PR SUMMERS	05/2009
DETAILER	KLOGAN	05/2009
CHECKER		
ENGINEER	PR Summers	
GROUP LEAD		
CM	Cheryl Williams	
PROJECT ENGINEER	Ken Chipley	
VERIFIER		
CONTROL SYSTEM	4	
SNS PROCEDURE		

Digitally signed by Ken Chipley
DN: cn=Ken Chipley, o=Spallation Neutron Source, ou=SNS, email=chipleyk@ornl.gov, c=US
Date: 2009.08.03 16:18:03 -04'00'

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DEPARTMENT OF ENERGY UNDER U.S. GOVERNMENT CONTRACT DE-AC05-00OR22725
OAK RIDGE, TENNESSEE
SPALLATION NEUTRON SOURCE

SING NOMAD BL1b SECONDARY SHUTTER CAROUSEL HEAD BOSS

SIZE	DRAWING NUMBER	REV
E	SING01B20M8U8701A170	A

SCALE	CAD MODEL	SHEET
8.000	SING01B20M8U8701A170	1 of 1

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DWG NO: SING01B20M8U8701A170 REV A