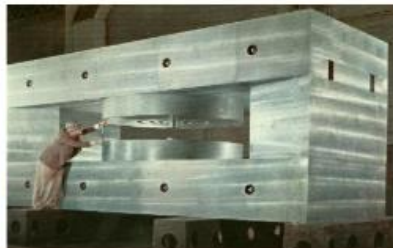
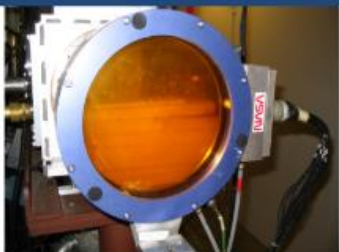
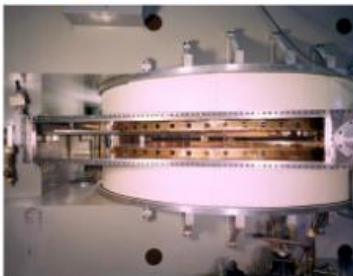


# Safety at B088



**BERKELEY LAB**

Jeff Bramble



# B088 Safety Drivers

DOE order 420.2C (Safety of Accelerator Facilities)

Radiation Protection Group (RPG) - Radiation Protection Program

EHS Procedure 703 - Institutional Assurance of Accelerator Safety

- Radiation Safety Committee (RSC) / Accelerator Radiation Safety Committee
- Triennial Self-Assessment / Review
  - Completed in 2019
  - 13 Recommendations

B088 Documents

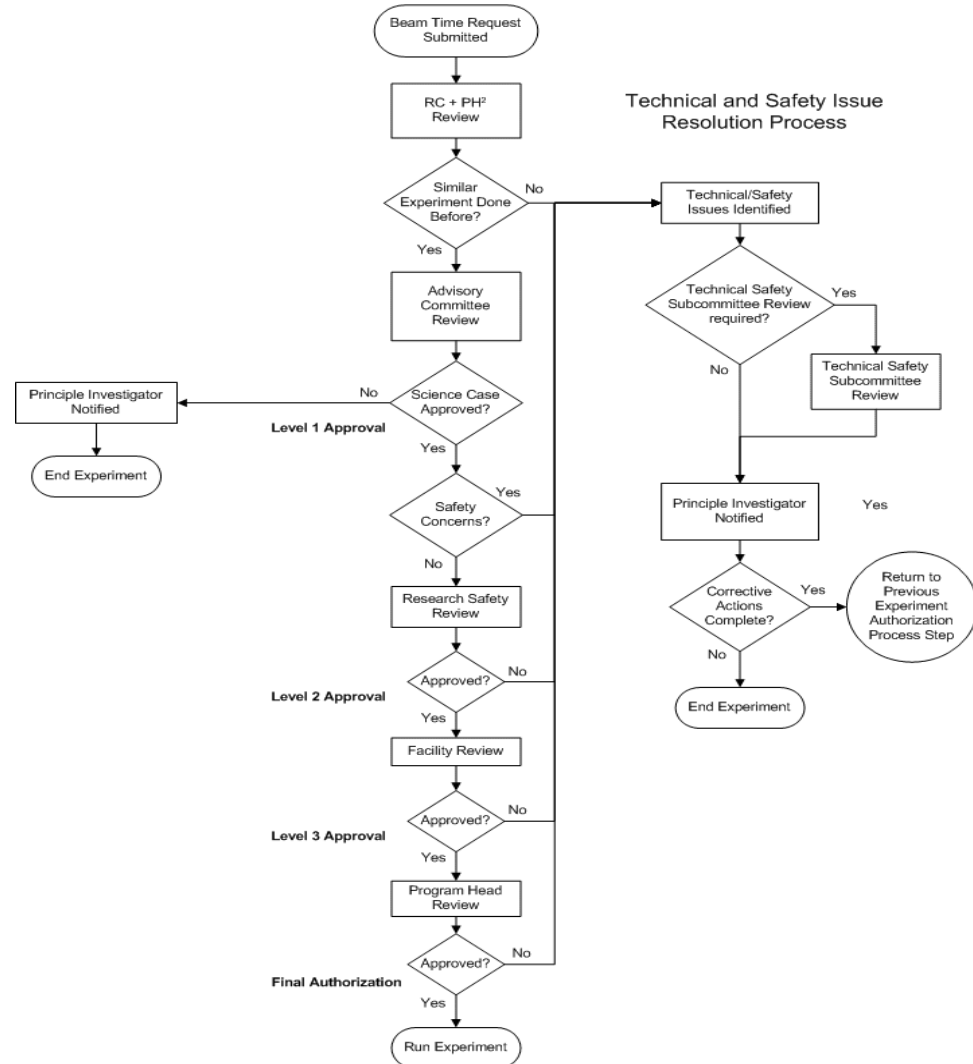
- SAD - Rev 4 (May 2018)
- ASE – Rev 3a (November 2009)
  - 6 Credited Controls
- Configuration Control Policy
- Procedures
- Experimental Tracking Form
- Beam Authorization Form

# B088 Safety Drivers

Beam time is authorized per the Experiment Approval & Conduct Procedure (88-OPS-PRO-034)

- All beam requests sent to Research Coordinator
  - Local nuclear science requests
  - BASE requests
  - Other miscellaneous requests
  - Beam development
- Experimental Tracking Form

Experiment Authorization Process



# B088 Safety Drivers

1. Level 1 Authorization - Cyclotron Advisory Committee approval.
2. Level 2 Authorization - Research Safety Reviewer approval.
3. Level 3 Authorization - Approvals from:
  - a. Research Coordinator
  - b. Operations Supervisor
  - c. Division Safety Coordinator
  - d. Experimental Cave Owner
  - e. Principal Investigator.
4. Authorization to Run - Cyclotron Program Head

**88-Inch Cyclotron Experiment Tracking Form**

Experiment Title: BASE Facility Testing Beam Req. No. 2014

Experiment Description: Standard BASE Facility testing. Exp. No. FY20 Q2 R6

Principal Investigator: Rivas / Johnson Exp. Type BASE

Institution: Blue Origin Funding Recharge

Start Date: 25-Feb-20    Start Day: Tue    Start Time: 1200    Shifts: 6

Cave:	Ion:	Mass:	Energy:	Req. Target Intensity:	Rad Ctrl Level:	Suggested Limit:	Beam Stop Max. Limit:
4B	Ar	40	20 AMeV	20 enA	1	100 enA	100 enA

Text Signature: \_\_\_\_\_    Badge No.: \_\_\_\_\_    Date: \_\_\_\_\_

Level 1 Approval \_\_\_\_\_

Advisory Committee: \_\_\_\_\_

Level 2 Approval \_\_\_\_\_

Research Safety: \_\_\_\_\_

Final Review Approvals

Scheduling: \_\_\_\_\_

Operations: \_\_\_\_\_

Bldg Safety: \_\_\_\_\_

Cave Owner: \_\_\_\_\_

Principal Investigator: \_\_\_\_\_

Authorization to Run:

Cyclotron Program Head: \_\_\_\_\_


Two Key Operation is authorized: \_\_\_\_\_ (4B Only)  
Initial



# B088 Safety Drivers

## Beam Authorization Form

- Required for RF and Beam Delivery
- Verify Current SAD and ASE
- Validate Credited Controls
- Reviewed and Initialed by OIC



**RF & BEAM OPERATION  
AUTHORIZATION FORM**


**Rev. 3**  
 BAF #: 0    DATE OF ISSUE: 2/26/17

Operators: Verify (by initialing) at the **beginning** of each shift of Cyclotron operation that the "Authorization to Operate Cyclotron RF System" is currently authorized **before** energizing the RF system. Also, verify that all caves needed are authorized for beam delivery **before** removing any beam plugs.

	S	M	T	W	T	F	S
	2/26/2017	2/27/2017	2/28/2017	3/1/2017	3/2/2017	3/3/2017	3/4/2017
7:20	RL	RL	RL	RL	RL	RL	RL
15:20	TLG	TLG	TLG	TLG	TLG	TLG	TLG
23:20	SG	SG	SG	SG	SG	SG	SG
	S	M	T	W	T	F	S
	3/5/2017	3/7/2017	3/8/2017	3/9/2017	3/10/2017	3/11/2017	
7:20	RL	RL	RL	RL	RL	RL	RL
15:20	TLG	TLG	TLG	TLG	TLG	TLG	TLG
23:20	SG	SG	SG	SG	SG	SG	SG
	S	M	T	W	T	F	S
	3/12/2017	3/13/2017	3/14/2017	3/15/2017	3/16/2017	3/17/2017	3/18/2017
7:20	RL	RL	RL	RL	RL	RL	RL
15:20	TLG	TLG	TLG	TLG	TLG	TLG	TLG
23:20	SG	SG	SG	SG	SG	SG	SG
	S	M	T	W	T	F	S
	3/19/2017	3/21/2017	3/22/2017	3/23/2017	3/24/2017	3/25/2017	
7:20	RL	RL	RL	RL	RL	RL	RL
15:20	TLG	TLG	TLG	TLG	TLG	TLG	TLG
23:20	SG	SG	SG	SG	SG	SG	SG
	S	M	T	W	T	F	S
	3/26/2017	3/27/2017	3/28/2017	3/29/2017	3/30/2017	3/31/2017	4/1/2017
7:20	RL	RL	RL	RL	RL	RL	RL
15:20	TLG	TLG	TLG	TLG	TLG	TLG	TLG
23:20	SG	SG	SG	SG	SG	SG	SG

	S	M	T	W	T	F	S
	4/23/2017	4/24/2017	4/25/2017	4/26/2017	4/27/2017	4/28/2017	4/29/2017
7:20	RL	RL	RL	RL	RL	RL	RL
15:20	TLG	TLG	TLG	TLG	TLG	TLG	TLG
23:20	SG	SG	SG	SG	SG	SG	SG
	S	M	T	W	T	F	S
	4/30/2017	5/1/2017	5/2/2017	5/3/2017	5/4/2017	5/5/2017	5/6/2017
7:20	RL	RL	RL	RL	RL	RL	RL
15:20	TLG	TLG	TLG	TLG	TLG	TLG	TLG
23:20	SG	SG	SG	SG	SG	SG	SG
	S	M	T	W	T	F	S
	5/7/2017	5/8/2017	5/9/2017	5/10/2017	5/11/2017	5/12/2017	5/13/2017
7:20	RL	RL	RL	RL	RL	RL	RL
15:20	TLG	TLG	TLG	TLG	TLG	TLG	TLG
23:20	SG	SG	SG	SG	SG	SG	SG
	S	M	T	W	T	F	S
	5/14/2017	5/15/2017	5/16/2017	5/17/2017	5/18/2017	5/19/2017	5/20/2017
7:20	RL	RL	RL	RL	RL	RL	RL
15:20	TLG	TLG	TLG	TLG	TLG	TLG	TLG
23:20	SG	SG	SG	SG	SG	SG	SG
	S	M	T	W	T	F	S
	5/21/2017	5/22/2017	5/23/2017	5/24/2017	5/25/2017	5/26/2017	5/27/2017
7:20	RL	RL	RL	RL	RL	RL	RL
15:20	TLG	TLG	TLG	TLG	TLG	TLG	TLG
23:20	SG	SG	SG	SG	SG	SG	SG

Continued on next page



**RF & BEAM OPERATION  
AUTHORIZATION FORM**

**Rev. 3**  
 BAF #: 0    DATE OF ISSUE: 2/26/17

**SAD & ASE Current**  
 Certified on 10/15/15  
 by the Program Head:  
Warry Khan  
 Badge # 419501  
 Expires on 10/15/18

**ASE Beam Limits Procedure Current**  
 Certified on 5/24/15  
 by the Program Head:  
Warry Khan  
 Badge # 419501  
 Expires on 5/24/18

**Vault SAS Procedure Current**  
 Certified on 5/30/15  
 by the Operations Supervisor:  
Paul  
 Badge # 010895  
 Expires on 5/30/18

**Pit SAS Procedures Current**  
 Certified on 6/26/15  
 by the Operations Supervisor:  
Paul  
 Badge # 010895  
 Expires on 1/1/18

**Trench SAS Procedure Current**  
 Certified on 6/2/15  
 by the Operations Supervisor:  
Paul  
 Badge # 010895  
 Expires on 6/2/18

**Vault Radiation Survey Procedure Current**  
 Certified on 6/1/14  
 by the Operations Supervisor:  
Paul  
 Badge # 010895  
 Expires on 6/1/17

**Permanent Shielding Inspection Current**  
 Certified on 1/13/16  
 by the Operations Supervisor:  
Paul  
 Badge # 010895  
 Expires on 1/13/17

**Vault Chain Check Current**  
 Certified on 8/5/16  
 by the Ops Sup or Elect Grp Lead:  
Paul  
 Badge # 010895  
 Expires on 8/5/17

**Pit Chain Check Current**  
 Certified on 9/9/16  
 by the Ops Sup or Elect Grp Lead:  
Paul  
 Badge # 010895  
 Expires on 9/9/17

**Trench Chain Check Current**  
 Certified on 8/8/16  
 by the Ops Sup or Elect Grp Lead:  
Paul  
 Badge # 010895  
 Expires on 8/8/17

**12kV & RF Chain Checks Current**  
 Certified on 8/5/16  
 by the Ops Sup or Elect Grp Lead:  
Paul  
 Badge # 010895  
 Expires on 8/5/17

**Authorized to Operate Cyclotron RF System (Screen Grid Energized) & Beam in Vault Only!**  
 Until 6/1/17

**Cave SAS Procedure Current**  
 Certified on 4/14/16  
 by the Operations Supervisor:  
Paul  
 Badge # 010895  
 Expires on 4/14/19

**Exp. Area Rad Survey Procedure Current**  
 Certified on 10/19/15  
 by the Operations Supervisor:  
Paul  
 Badge # 010895  
 Expires on 10/19/18

**Cave 0 Chain Check Current**  
 Certified on 2/21/17  
 by the Ops Sup or Elect Grp Lead:  
Paul  
 Badge # 010895  
 Expires on 2/21/18

**Cave 0 Beam Plug CC Current**  
 Certified on 8/8/16  
 by the Ops Sup or Elect Grp Lead:  
Paul  
 Badge # 010895  
 Expires on 8/8/17

**Authorized to Deliver Beam to Cave 0**  
 Until 8/8/17

**Cave 1 Chain Check Current**  
 Certified on 10/4/17  
 by the Ops Sup or Elect Grp Lead:  
Paul  
 Badge # 010895  
 Expires on 10/4/18

**Cave 1 Beam Plug CC Current**  
 Certified on 9/28/16  
 by the Ops Sup or Elect Grp Lead:  
Paul  
 Badge # 010895  
 Expires on 9/28/17

**Authorized to Deliver Beam to Cave 1**  
 Until 9/28/17

Continued on next page


Page # 1

# B088 Safety Drivers


## Work Authorizations

- Work Planning and Control (WPC)
  - Work Scope
  - Hazards
    - Risk Levels 1-2-3
    - Approvals
    - Renewal Frequency
  - Controls
  - Training
  - 34 Approved Activities
- Radiological Work Authorizations (RWA)
  - 8 Active RWAs
    - Class 1-2-3
    - Class 3 Require RSC Review/Approval

This is an unofficial reference copy. Refer to the Activity Manager system for the official version.



LAWRENCE BERKELEY NATIONAL LABORATORY  
WORK PLANNING & CONTROL



NS-0073

**NSD RESEARCHER OFFICE AND COMPUTATIONAL WORK**

Activity Lead: Jeffrey Bramble  
Status: Active

Division: Nuclear Science  
Approved Date: 12/10/2018 2:45:30 PM  
Renewal Date: 12/10/2021 12:00:00 AM

Parent Project: NSD researcher office and computational work  
Project Lead: Bramble, Jeffrey R  
Project ID: P-NS-050

Activity Lead Designees: Suzuki, Erika |

Activity Description: This activity covers office and computational work for researchers whose office work is not covered by another activity in WPC.

Locations: Offices throughout the site |

**STATEMENT OF WORK**

This activity covers general office activities including computational work and writing in an office. It should be used for researchers whose office work is not covered by another activity. This should not be used for admins in the division as they have their own activity which covers office work.

Equipment includes computers, telephones, printers, shredders.  
Primary hazard is ergonomics and travel hazards.

**HAZARDS & CONTROLS**

**ERGONOMICS**

HAZARD	ACTIVITY SPECIFIC INFORMATION	RISK LEVEL
Laptop computer as the primary device without an external monitor, keyboard and mouse 2 days or more per week		1
Computer use at secondary office on a regular basis		1
Computer use, 4 or more hours per day		1

CONTROL	ACTIVITY SPECIFIC INFORMATION	RELATED HAZARDS

**ADDITIONAL CONTROLS**

CONTROL	ACTIVITY SPECIFIC INFORMATION
ergo discussion	discuss ergo problems with supervisor or safety coordinator if any develop

**TRAINING COURSES**

CONTROL ID	TRAINING COURSE	ACTIVITY SPECIFIC INFORMATION
TRN011	EHS0059 Ergo Self Assessment For Computer Users	

**ASSIGNED WORKERS**

WORKER NAME	AUTHORIZATION	RESTRICTIONS
Chow, Chun Ho	Authorized to Work	
Ellin, Justin	Authorized to Work	
McManus, Keith David	Authorized to Work	

Page 1 of 3

# Safety at B088

## Focus Areas

### Triennial Self-Assessment

#### 13 Recommendations (7-B088, 4-RPG, 1-88/RPG, 1-NSD)

- 88-Inch develop a document that describes conditions and future plans that trigger a USI. This document would be valuable in training existing and future staff who may perform USIs.
- Perform a self-assessment during the next cycle of the critical safety systems at the 88-Inch to understand their life expectancy and develop plans to mitigate any noted degradation issues.
- 88-Inch prioritize resolving the movable shielding recommendations that remain open.
- RPG perform an oversight assessment to measure, and if necessary improve, the effectiveness of 88-Inch staff and their User community performing cave entry surveys. (Credited Control)
- 88-Inch staff and RPG evaluate the value of increasing the use of real time radiation monitors outside of the caves to provide information to the control room beyond the initial Operator survey and existing monitors.

# Safety at B088

## Focus Areas (cont.)

### Deflector Rails (Single Point of Failure)

- Cleaned and maintained during long shutdowns (twice a year)
  - Currently done about 4 weeks into the shutdown
- Increase Dose Rates
  - Highest Whole Body at LBNL
  - ~70% of activity is from Co-57 (271.8 day half-life)
- Second Set of Rails
  - Shielded Storage for 5 ½ months before cleaned
  - Aluminum Rails (Al-26, isotope of concern)

### Personnel Protection System (PPS) (Single Point of Failure)

- Credited Control
- Obsolete System
  - Received Spare Parts from ORNL
- First Use Two Weeks Ago



# Safety at B088

## Focus Areas (cont.)

### Cf-249 Targets (Scenario 2 & 3)

- Material Stored and Targets Made in B070A (Heavy Elements Research Lab)
  - WPC Activity / RWA
  - Dedicated Glove Box
- Loaded into Target Cassette inside Glove Box (~ 30 mg /130 mCi)
- Passed Out / Double Contained
- Transported to B088 by RPG
- Passed into Cave 1 Glove Box (attached to Beamline)
  - WPC Activity / RWA
- After run is completed, process reversed to return material to B070A
- Always done with RPG RCT coverage

NOTE: Work flow previously used for the Am-243 targets

# Safety at B088

Questions?