Work Planning and Control:

SSRL Implementation for User Experiments

Revision Record

Revision Number	Revision Date	Description of Change
R2	February 13, 2025	Updated language on SCL references
R1	March 14, 2018	General updates. Previous document number; ESRD-WPC-001.
R0	November 20, 2009	Initial Release.

Approved by:

Matthew Padilla (Feb 13, 2025 15:03 PST)

Matthew Padilla
SSRL Safety Officer

Date: 2/13/2025

Paul McIntyre (Feb 13, 2025 18:02 PST)

Paul McIntyre
SSRL Director

Date: 2/13/2025

All work at SLAC is planned, authorized and released. All workers are expected to perform work, including experiments, within established and documented controls. Stop work authority is understood by all workers. WPC authorization has two elements: affirmation that the worker is fully trained, qualified and licensed, if needed; and that the worker understands the hazards and controls of the work activity they will be carrying out.

SSRL executes the elements of WPC for experiments performed by Users as described below. Due to the often extended timeline between when a User's proposal is accepted and their arrival on site to perform experiments, SSRL has separated these two authorization elements and ensure they occur as follows.

- SSRL User Authorization includes:
  - ESH & access training compliance,
  - Hazard identification and analysis, development of mitigation and control strategy, as documented in the Safety Review Summary (as applicable) and on the SSRL Beam Line Safety Checklist, and
  - Documented procedure verification.

- SSRL User Release includes:
  - Verification of authorization,
  - Pre-job briefing (face-to-face discussion) to ensure the User understands the hazards and controls of the experiment they have been authorized to perform,
  - Completed SSRL Beam Line Safety Checklist, and
  - Coordination of the experiment within the physical boundaries of SSRL control.

SSRL User Authorization is granted by a SLAC knowledgeable employee (i.e. SSRL Safety Staff), who verifies the authorization elements listed above. SSRL User Release is a two-step process. A pre-job briefing is conducted by a SLAC knowledgeable employee (i.e. Staff Beam Line Scientist, Beam Line Engineer, SSRL Safety Staff or Beam Line Duty Operator), and the final release is granted by the Beam Line Duty Operator who verifies the release elements listed above.

Process: How are Users authorized and released to conduct experiments at SSRL?

At SLAC all work, which includes performing experiments, requires planning, analysis and review prior to authorization and release. Users are required to identify and disclose potential safety issues in their proposal and beam time request/user support forms before they arrive. These are reviewed by the SSRL Safety Officer to understand risk and consequences.

Once the User is on-site a knowledgeable SLAC employee, such as the SSRL Safety Staff, Beam Line Scientist or Engineer or Duty Operator will review the proposed experiment and engage with the user to ensure that hazards are understood, appropriate controls identified, that required procedures follow best known methods/practices and that the user can adequately explain the steps, hazards and controls of their process.

Experiments are evaluated through the appropriate process prior to starting. Completion of the evaluation, required ES&H training, site and facility access agreements, safety talks and the experimental Safety Checklist constitute line management authorization for work to proceed within the limits imposed by the facility. Furthermore, release is then granted to users by the Duty Operator after verification of completion of the Safety Checklist, including the pre-job briefing.

When in operation, SSRL provides 24/7 assistance to users. Whenever possible, the pre-job briefing will be conducted by the Beam Line Staff. SSRL Safety Staff may serve as back up. Outside normal hours, Duty Operators are authorized to perform the pre-job briefing. When this is the case, they will inform SSRL Safety Staff (via email or phone message) that they have done so.

As with any work activity at SLAC, should the experimental conditions change, new hazards be introduced or other conditions occur that have not been evaluated, then re-authorization is required to ensure that potential hazards that may have been introduced are understood and controlled. At this point re-release may also be required. For

confirmation or if any questions or problems arise during the course of a visit, the Duty Operator who is on duty 24/7 whenever experiments are scheduled should be contacted.

Documentation

Work Authorization is documented by the following:

- Approved proposal/initial safety review
- Approved beam time request/final safety review
- All users sign the User Acknowledgement
- Individual user initials part 1 of Safety Checklist*
- Safety Staff signs and dates part 2 of Safety Checklist in “initial safety review” area

*User initials indicate the following:
1 . "I am conducting the experiments as previously described and approved. I am not introducing any element that was not previously disclosed."
2. “ I agree that I will keep the beamline NEAT and ORDERLY and will CLEAN UP my work area – including REMOVAL OF ALL SAMPLES – before my experiment ends. Failure to do so will impact my teams ability to access SSRL facilities in the future.

User Pre-job Briefing and Release are documented by the following:

- Beam Line Engineer, Beam Line Scientist, Staff Scientist, SSRL Safety Staff or Duty Operator carry out meaningful pre-job briefing with users to confirm that all potential hazards have been disclosed, evaluated and mitigated. Any newly identified hazard is brought to the attention of SSRL Safety Staff and addressed before part 2 is signed.
- Person conducting the pre-job briefing then signs and dates part 2 of Safety Checklist in “user safety checkout”
- Duty Operator checks each box of part 3, including verifying that that elements identified in part 2 and SRS (when applicable) are implemented and the training has been logged
- Duty Operator signs and dates part 3.

Follow Up by SSRL Safety Office

- Safety officer follows up with users once running. The last signature confirms that between proposal screening and beam use all hazards have been addressed.

Training requirements

The user completes core training requirements (ESHO/GERT/Cyber) as a prerequisite to obtain SLAC site access permission and associated SLAC badge. The SSRL Safety Staff or Beam Line Staff may identify additional training requirements in the course of the proposal and experimental review process. These requirements are communicated to user. They are documented in the Safety Checklist (SCL) / Safety Review Summary (SRS). The additional training requirements must be met before work can be authorized.

Summary of Procedures

WPC Elements	SSRL Process	Responsible Parties	Comments
Define work scope	Proposal submission	User spokesperson; SSRL User Administration	http://www-ssrl.slac.stanford.edu/userresources/proposals.html
	Proposal review for science rating	SSRL User Administration; Review Panels	
Identify and analyze hazards	Proposal review for hazards	Initial review by SSRL Safety Staff	
Identify controls		SSRL Safety Staff communicate with Spokesperson	Result of initial safety review integrated in proposal
	Beam time request	Final safety review by SSRL Safety Staff	Changes from original proposal are analyzed for new hazards and new controls are put in place
Prepare SOPs or equivalent if needed	User Acknowledgment	All users sign User Acknowledgment	This is done once a year
	User training	SSRL Safety Staff Individual user	Specific training beyond core modules is assigned for specialized activities based on proposal and beam time request review User completes training; tracked in central training system
	User orientation (Safety talk; Hutch authorization)	SSRL Safety Staff, Floor staff with the user team	User orientation is refreshed according to the GERT training cycle. Training is logged and log kept at user station Documented at user station and in user portal data base.
SSRL User Authorization	Safety Checklist (SCL)	SSRL Safety Staff issue and sign part 2 of Safety Checklist in "initial safety review" box	Documents authorization based on safety review
		SSRL Safety Staff issue a review summary as needed	As needed: hazard identified by SSRL Safety Staff, controls, additional training are documented on the Safety Review Summary (SRS) – part of SCL
		SSRL Safety Staff issue Safety Checklist	Safety Checklist (SCL) required for each scheduled experiment. Refers to the SRS when necessary
		Individual user initials part 1	User confirms "no new element"
Pre-job briefing and Release		Users and SSRL Safety Staff/Beam Line Scientist/Staff Scientist/DO	Meaningful discussion to make sure all elements of experiments have been evaluated and mitigated through the safety review. See discussion guidance and poster
		SSRL Safety Staff/Beam Line Scientist/Staff Scientist/DO sign part 2	Documents that the that the User understands any boundary conditions of their experiment or of the SLAC equipment, and that they are aware of any specific requirements listed in the SCL and SRS
		Duty Operator signs part 3	Documents all BL safety items checked

Execute work	SSRL Process	Responsible Parties	Comments
Change in work plan or Unexpected event?	Communicate to DO and SSRL Safety Staff	User, or BL Staff, SSRL Safety Staff, DO (walk through) initiates the communication	Follow up by Safety officer catches issues that may have come up between beam time request submission and beam use
	If minor change (i.e., within scope of procedures already reviewed and evaluated)	SSRL Safety Staff reviews safety checklist	
		Signature of amended Safety Checklist for authorization and release (see above)	
	If major change (i.e., involves new procedures)	SSRL Safety Staff reviews newly proposed procedure and prepares new SCL	
		Spokesperson or designee signs SCL	
		New SCL issued and signed off as above for authorization and release	New cycle of authorization and release
Post-job review	End of run summary	Spokesperson	Issues brought to the attention of SSRL Management
Revise approach as needed	Issues review; Identify necessary steps to remedy issues; Closure and communication	Involvement of interested parties: URA staff, SSRL Safety Staff, others as appropriate, SSRL Management; URA communicate with users and staff	

Appendices

1) Sample Safety Checklist

2) Sample Pre-job briefing poster

3) Pre-job briefing discussion guide – sample questions

4) Links for internal reference

SAMPLE SAFETY CHECKLIST

Rev:1.7 ES2 11-21-2012

SSRL/LCLS BEAM LINE SAFETY CHECKLIST ESAF2

1. EXPERIMENTER INFORMATION

TITLE: Temporally and Spatially Resolving Microscale Shale Alteration during Unconventional Simulation

BRANCHLINE	2-3	PROPOSAL:	5444B	LEAD:	Vincent Noel	SPKS:	Vincent Noel
DATE ON:	06/04/2021	DATE OFF:	06/07/2021	EXT TO:		APPROVED:	

EXPERIMENTERS COMING TO SSRL/LCLS

Name	GERT	RWT1	Nano	SAFETY		int.
Bargar, John			C	C		
Jew, Adam D.	C			C		

Name	GERT	RWT1	Nano	SAFETY		int.
Noel, Vincent	C	C	C	C		

User initials indicate the following:

(1) I am conducting the experiments as previously described and approved. I am not introducing any element that was not previously disclosed.

(2) I agree that I will keep the beamline NEAT and ORDERLY and will CLEAN UP my work area - including REMOVAL OF ALL SAMPLES - before my experiment ends. Failure to do so will impact my teams ability to access SSRL facilities in the future.

2. BEAM LINE SAFETY INSTRUCTIONS

(Including hazard and/or precaution placards to be posted.)

Special Instructions:

POST STANDARD PRECAUTIONS

Initial Safety Review: _____ Date: _____

User Safety Checkout by: _____ Date: _____

Users shall not be put online until the above line items are signed off SSRL/LCLS SO:_____ Date:_____.

3. BEAM LINE SAFETY ITEMS

(BDO checks each Beam Line Safety Item to verify complieance)

- ☐ BLA is valid
- ☐ VUV manual valves open (if applicable)
- ☐ VUV line vacuum below 5 x 10 -9
- ☐ Equipment is earthquake braced.
- ☐ No electrical hazards have been identified.
- ☐ User emergency contact numbers posted on white board.

Beam Line Duty Operator: _____ Date: _____

(BDO signs after all Beam Line Safety Instructions and items are met.)

SAMPLE SAFETY POSTER

SAMPLE QUESTIONS – SAFETY DISCUSSION

Pre-job briefing discussion guide for personnel signing part 2

The following list of questions is meant to guide the conversation towards a meaningful assessment of potential hazards. It is not an exhaustive list.

GENERAL

1) What are the critical steps or phases of this experiment?
2) How can a mistake be made at that point?
3) What is the worst thing that can go wrong?
4) What controls are needed to prevent #2 and #3?

SAMPLES	**YES**	**NO**
Is the user bringing anything not listed on the beam time request?	[ ]	[ ]
What is the sample containment?		
If samples are sealed, are there any pressure hazards?	[ ]	[ ]
If samples are open, is there potential for exposure?	[ ]	[ ]
Would it be toxic?	[ ]	[ ]
Ask why they aren't sealed.		
What is the size (scale) of the samples in use?		
May the samples be considered Nanoscale?	[ ]	[ ]
DOE notification range is less than 100 nanometers (0.1 micrometers). Verify that training has been taken or notify SSRL Safety Staff		
Do the samples contain any biohazards?	[ ]	[ ]
Human tissues?	[ ]	[ ]
Animal tissues?	[ ]	[ ]
Other? (e.g., infectious agents, airborne pathogens)	[ ]	[ ]
Radioactive materials?	[ ]	[ ]

CRYOGENS		
Is the user using LN2 or other cryogens?	[ ]	[ ]
Is the user familiar with PPE?	[ ]	[ ]
Is the user familiar with O2 deficiency safety?	[ ]	[ ]
Are samples immersed in cryogens?	[ ]	[ ]

EQUIPMENT		
Are lasers being used?	[ ]	[ ]
Are you using other hazardous equipment (e.g., equipment with radioactive source, not tested by a nationally recognized testing laboratory)?	[ ]	[ ]
Any concerns regarding vacuum/cryostats?	[ ]	[ ]
Any concerns regarding seismic bracing?	[ ]	[ ]

HAZARDOUS MATERIALS		
Are MSDS's needed?	[ ]	[ ]
Is the user using compressed gases?	[ ]	[ ]
Is the user using flammables?	[ ]	[ ]
Are chemicals appropriately contained and stored?	[ ]	[ ]

Other		
Does the user need on the job training?	[ ]	[ ]
Are there any other EH&S related concerns?	[ ]	[ ]

Help with Pre-job Briefings

- Be specific in your questions, generalities will get vague answers
- Discuss error traps (incremental changes, procedures that are not correct, work methods that are different from beam line to beam line for similar equipment), possible consequences, and needed defenses for each critical steps
- Discuss the specifics of the experiment; tailor error-prevention techniques or other defenses to the task
- Be engaging, don't conduct briefing as a monologue
- Plan, be prepared and allow time for conducting of the pre-job briefing
- Principal participants must be present for briefing
- Help user understand the scope of the task and that due consideration must be given to scope changes and scope creep
- Checklists do not engage conversation, they just check what's there/not there, not what might have changed. Ask follow up questions.
- Do not conduct in a distracting location

Answer suggesting a hazard not previously disclosed and mitigated, is a trigger for you to contact the SSRL Safety Staff. They will then make any necessary adjustments – if possible or inform the user that they are unable to go online.

Links [for internal reference]

Overview of the SLAC WPC process is given at:

https://www-internal.slac.stanford.edu/wpc/overview/ **https://internal.slac.stanford.edu/wpc/**

Reference: SLAC ESH Division
Program: Work Planning and Control
Authority: ES&H Manual, Chapter 2, Work Planning and Control
http://www-group.slac.stanford.edu/esh/general/wpc
Date Effective: 30 September 2014