

## Postshot and Abort Checklists S-AB-P-062 Rev C

Checklists are provided to provide guidance when a shot is concluded successfully or aborted. In either instance the System enters POSTSHOT. Shot Director and Power Conditioning checklists are provided for assessing laser and power conditioning performance. Lastly, a power conditioning ABORT checklist is provided.

Note the cycle time restrictions for the different laser glass sizes:

Glass Size	Charged to	Wait - min
16-mm rod	Any kV	1
40-mm rod	6.0 kV	10
15-cm disk	13.5 kV	45
40-cm disk	13.5 kV	120
	13.0 kV	110
	12.0 kV	95
	11.0 kV	80
	10.0 kV	60

### Shot Director POSTSHOT Checklist

#### Assessment and Direction

- 1) Poll the subsystem operators and PI for shot assessments.
- 2) Check with the PCT and note any bad lamps, ground faults, etc. in the logbook.
- 3) Review the following reports:

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#### Energy Diagnostic

Beamlines report, IR-energy

- 1 • This report delineates the laser output energy. Use the final energy sense point for each beam to log laser output in the SD logbook (Type 3 and above). □
- Check the output energy vs. the requested energy on the Beams page of the SRF. If  $\geq 10\%$  difference, report the finding to the PI and System Science.
- Verify the PI is satisfied with the energy on every shot.

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### Short-pulse Diagnostics

Review the SP-Diagnostic report for the following pulse characteristics and compare them to the requirements:

- Input spectrum
- Output spectrum
- UTD results
- UROSS results

- 2
- Verify the overall pulse shape with the PI, especially after the first shot.
  - Check the timing of the pulse.
  - Check the FWHM of the pulse.
  - Check the contrast of the pulse and note any amplitude modulation.
- FSD results
  - Contrast

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### UV: HED On-Target

- Use the summary at the bottom to fill in the form in the logbook after the target shot.
- 3
- Check the energy vs. the requested energy on the Beams page of the SRF. If there are significant differences (> 10%) bring this up with the PI.
  - The energy should always be verified with the PI after the first shot.
  - Notify the LFM if any of the Cell-In energies exceed 10 kJ. [TBD]

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### UV-ROSS Summary

- The upper left quadrant is a plot of each beam's pulse. Check for individual differences. Check that the shape is as expected, noting such things as the duration, and any ramp specified.
  - The lower left is the average plot of all beams along with an overlay of the fiducial. Check this for starting around T0 as well as within the peaks of the fiducial.
- 4
- Lower right is "x"s of when each beam fired. Check for around T0 or delay time on the Beams or Sources page of the SRF.
  - Check the "T0=" at the bottom. Discuss with the LSO.
  - Contact PI & LFM if the value is greater than 100 pS for no delay in SRF, or more than 100 pS off from the delay specified in the SRF.

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### Sources Shot Report

This report shows the Injection energies for the source(s) throughout the day.

- Check the ED report for the Regen, Glass Amp, LARA and OPCPA (as applicable) output and verify with the LSO that the output is within specification for that driver. Check this report for trends in increasing or decreasing energy. Also check for output energy vs. total energy as logged.
- Note any "Invalid" entries.
- Notify the LFM if there are significant changes.

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**Reduce Timing of ON Target Diagnostics**

This report is a display from an oscilloscope that gets signals from a fiducial fiber monitoring each TIM. The signal indicates when the TIM-based diagnostic fired.

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- Verify with the ESO any non-fires or timing anomalies, i.e. timing more than 3 ns from T0.

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**OTDR**

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- Check the report for abnormal events (max. signal must be less than 200V).
  - Check that the peaks are narrow. Notify the System Scientist if not.

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**IR/UV-Prepulse**

Check the scope output for energy that comes before T0. It should be flat up to T0 (or delay in the Sources page of the SRF), then spike. If prepulse is above specification, contact the LFM.

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**Laser Sources Output**

- 9
- This report trends sources output energies throughout the day. Review this report for increasing or decreasing energy trends. Also check for beamline output energy vs. total energy.
  - Notify the LFM of significant changes.

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**EEAF**

Review the PI's assessment of the shot and discuss any issues:

- 10
- Determine whether to:**
- Proceed to next planned shot.
  - Cannot proceed to planned shots.
  - Planned shots completed.

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(end of checklist)

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**Power Conditioning POSTSHOT Checklist**

**Checklist**

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- 1 Review the video record, if appropriate, for indications of problems / needed repairs.  
(PLAY starts at the beginning of the most recent record.)
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Label the appropriate color hanging folder with the DBL#:

	<b>Shot Type</b>	<b>Folder Color</b>	
2	1 – Sources to ISP	Yellow	<input type="checkbox"/>
	2 – Beamline non-prop		
	3 – Sources Shot to Injection Cal (LB)		
	4 – Sources Shot to LB&TB (no amps)	Green	
	5 – Sources Shot to LB&TB (with amps)		
	6 – Long-pulse shot	Blue	
	7 – Short-pulse shot		

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- 3 When all of the post-shot data has been polled, the pce will automatically print the charged PCU Shot Data report. This report indicates the PCU PILC bits, set point voltages (PILC and Main), actual voltages (PILC and Main), residual voltages (PILC and Main), ground faults and any fatal notifies (causing the PCU to abort).

If there are faults on the shot, an electronic Fault Report is displayed on the PCE screen, and included in the Control Room hard copy package. A hard copy is also printed in the Cap Bay work area.

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- 4 As the information comes to the screen, coordinate with the PCT's and ALT to determine and initiate needed on-condition maintenance and repair actions.
- Lamps to be replaced.
  - Other necessary Laser Bay or Capacitor Bay repairs.
  - Upload waveforms as necessary
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A POSTSHOT Comments pop-up will appear when the database transactions are complete. Certain entries will be made automatically. Use the gui to complete the post-shot comments after quantifying the faults with the PCT's and ALT.

- Post Shot comments are to contain the following (where applicable):
  - Bad Lamps (first)
  - Pre-Fires
  - 5 ○ Main on PILC's (MOP)
  - Reset on Shot (PCM Reset)
  - Any PCM's that had the firmware re-loaded
  - No PILC's
  - No Mains
  - Ground Faults indicated
  - Neg ramps (mainbank or PILC)
  - Any other problems (make concise text entry).

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After the post-shot comments have been submitted, the following reports are printed:

- A hard copy of the updated PCU Fault Report showing bad PILC bits, low waveform peaks, fatal notifies, ground faults and residual PILC and/or Main voltages in excess of 1000V.
- 6 • The Power Conditioning Summary showing the amplifier clusters, the average voltage for the cluster of the charged PCU's and the comments.

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File the printed reports:

- Staple together:
  - Summary sheet (on top please)
  - Fault Report
  - 7 ○ Post Shot Report
  - Any Waveforms uploaded
  - Voltage Poll if applicable

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**Vol. VIII System Shot Operations Manual**  
**Chapter 1 Shot Director Operating Procedures**



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If more copies of the report are needed, an entire report can be regenerated by using the menu options on the PCE.

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Additional copies of individual report files can be printed using ODV.



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If amplifier maintenance is to be performed or continued outside of Shot Operations (Watch Condition 1):

**9**

- Coordinate actions with the PCT, BLO, and ALT and ensure:
  - PCUs are manually discharged as required before Amplifier or PCU maintenance actions
  - Compliance with LFORM 4004 (Tag out / Lockout) as it is applied to these
  - operations.
  - Compliance with LFORM 4002, and 4003 (Control of Maintenance /Equipment Maintenance).



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(end of checklist)

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**Power Conditioning ABORT Checklist**

**Checklist**

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Monitor progress of the Abort on the PCE graphic display (verbal reports from the LSO, BLO, ESO, or OMEGA SD).

- During a Hard Abort (500 kVA dumped), the PCE will display any notify\_NVs received from the PCM's as they lose power.
  - 1 • During a Soft Abort: 
    - The enable signals to Master Timing are rescinded immediately and the shot triggers will not be propagated to the PCU's or the HTS.
    - The icon for each on-line PCU will turn BLACK sequentially as the PCM's respond to the Abort commands.
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Assure that system is secure.

- 2 • Press the **red dump button** if any PCU related issues are suspected.
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Notify all personnel of system status.

- 3 • Work with PCT's to establish safe status of PCU's.
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- 4 Open bay access as required.
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- 5 Review the video record, if appropriate, for indications of problems / needed repairs. (PLAY starts at the beginning of the most recent record.)
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- 6 Proceed to the POSTSHOT Checklist (see above)
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(end of checklist)

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**Document Release:**

**S-AB-P-062 Abort and Postshot checklists**

This document is a component of Vol. VIII OMEGA EP System Shot operations Manual, Chapter 1, Shot Director Operating Procedures, S-AB-P-004.

Approval for release of this document into the PDM system was granted by:

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