Electronic Radiation Safety Work Control Forms at SLAC

Zoe Van Hoover, SLAC AD Safety Officer 2012 Workshop on Accelerator Operations





Radiation Safety Work Control Form (RSWCF) Purpose

Configuration Control of Credited Radiation Safety Systems is internally required by SLAC, in order to comply with DOE Order 420.2C

- SLAC Guidelines For Operations
- Radiation Safety Systems Technical Basis Document

Credited Radiation Safety Items:

- Personnel Protection System (PPS)
- Beam Containment System (BCS)
- Shielding
- Accelerator Housing Integrity

Radiation Safety Work Control Form Purpose

Radiation Safety Work Control Form (RSWCF) is an administrative tool used to document and guide a process:

- Define Scope of Work
- Determine appropriate controls
 - Requirements before starting work (control radiological hazards during work)
 - Checkout requirements after work
- Execute work within controls
- Delineate end of work, bringing Radiation
 Safety Credited Controls back into active
 service after work and checkout/certification is
 complete



RSWCF Process Participants

Many people from multiple work groups participate in the planning, approval, and execution of work on credited radiological controls:

- Work Requestor
- Person Responsible (for executing work)
- Area Manager
- Radiation Physicist (representing Radiation Safety Officer)
- AD Safety Officer (ADSO)
- Engineering Operator in Charge (EOIC)
- Safety Systems Engineers & Technicians

RSWCF process must be understood and followed by all participants

- Ensure work is only performed under the correct controls
- Ensure Radiation Safety Credited Controls are returned to active service only when they are in a safe and certified configuration

RSWCFs: The Old Way

Paper forms were kept in a binder in the Main Control Room.

Advantages:

- Track record of use
 (20+ years, 3500+ RSWCFs)
- Robust against computer outages
- Flexible

Disadvantages:

- Only available for reference/editing in the control room
- No searchable record or history logging
- No enforcement of correct workflow
- Not linked to other work planning tools
- Readability
- Wastes paper

	Accelerator De	epartment	
Ra	diation Safety Wo	ork Control For	m
Area: LCLS LTUSD	ump Form #: 3334	/	Date: 21-5-00 2009
Section 1: Description of Wor	k to be Done (include item o	r CATER number, job title	e, etc.) Cater # 87934
Repair or Replace			pass 🗋 Unbypass
Re-Charge	DILISIS	MIS Safe	tu Demoli Estavis
(lender Hall)	FILL Q' DI	1010 2000	(Jeanp), PINQUEI
Jul Sir 9	23-09	"hath 7	Burnie 21-Sat
Person Responsible signature/da	te /	Area Manager signat	ure/date
Section 2a: Requirements Be	fore Starting Work (ADSO c	ompletes this section)	
Dischle BTH	stonners (D)	2,5760,5761	$\mathbf{\mathcal{I}}$
	i pp i c i i		
Section 2b: Requirements Aft	er Completing Work (ADSO	checks required boxes)	
BAS change X PPS cl	neckout Radiation Phy	sics inspection BC	CS checkout
OHP checkout Operat	ions Other (describ	e) (1) charge 1	37075
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fant the	<u>5 9/2/09</u>	91000	SA. UN
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Reinstalled or Unbypassed (P	PS, BCS, Operations, or Perso	n Responsible):	
Work complete (Person Resp	onsible or Area Manager):		
PPS:	1 HPa	9-23-09	
Radiation Physics:	100 (/	
BCS:	·		
OHP:			
Operations:		1	
A Other Close Unlur	s' alla	5 - 9-23	-09
A mar our our	180		
Section 4: Signoff Indicating I	Readiness for Beam to:		
11 nMG	M - (- (-		X X
Vaal Mul	2 9/2 3/09	- Suis	9/23/04
ADSO signature/date		EOIC signature/date	- Petri
March 21, 2001	SLAC-I-040-30	500-011	1.2, Page 1 of 1

Electronic Radiation Safety Work Control Forms at SLAC

RSWCFs: The New Way

Electronic forms are managed within a web browser.

Advantages:

- Available from any web browser
 - remote viewing
 - electronic signature
- Searchable record of all forms
- History logging of each form
- Enforces correct workflow
- Linked to existing electronic trouble reporting and tracking system
- Linked to electronic log
- Readable
- Flexible

Disadvantages:

- New system: learning curve for users
- Vulnerable to computer outages

In Safety Work Control Form	e This Window Refresh Forr	n Help	
)		istory	
Jumber: 5413			
t: 100530 Division: TEC	N		
Section 1: Description of Work		Section 1 Help	
Work to be Done Repair or Replace Install Remove Reinstall	Bypass 🗌 Unbypass 🗹 Trouble-Sh	oot	
Description of work to be done LCLS-I EBD: Leak check and re-charge PCPMO/QUE BTM 16 lo	osing pressure @ 10.342 PSI.		
Person Responsible Keenan, Marcus E.			RSWCF Status
OMP (EBD) PPS Zone BTH			Closed
Job 1 LCLS-I PAMM of 27-June: Leak check	and recharge EBD BTM 16.		
Area Manager Released Burrows, Kathleen K.06/25/2012 11:5 Group	7 kaiulani		
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ADSO Requirements Before Starting Work (Check all require	d boxes)		
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Disable BTH stoppers: D2, ST60, ST61			Closed
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Feedback Logou

RSWCF Workflow: New Form

Cancel			Save		
Logged in Name: Warren, Jonathan					
Logged in Role: EOIC	D				
Section 1: Description of Work	.0			Section 1 Help	
•Work to be Done					
Repair or Replace Install Rem	ove 🗆 Reinstall 🗖 Bypass 🗖	Unbypass 🗖 Tro	uble-Shoot		
Description of work to be done					
		2	3		
L		3			RSWCF Status
Person Responsible					Work Not
OArea (Select)					Approved
PPS Zone (Select)					
Job (select) -					
Area Manager Released (Select)	AM review is required				
Group //Salact)	-				
STATE LOOPED					
Cancel Save					

Electronic Radiation Safety Work Control Forms at SLAC

JWARREN

SLAC

Feedback Logout

RSWCF Workflow: Work Not Approved



8

RSWCF Workflow: Sections 1 and 2

	Vork	Section 1 Help
Work to be Done		
Repair or Replace 🗖 Insta	I 🗌 Remove 🗖 Reinstall 🔽 Bypass 🗖 Unbypass 🗖 Trouble-Shoot	
Description of work to be do	e	
nstall Bugger Plugs to ST1 and	ST2 cables to make up In Status during downtime work.	
lew action; pull wires to turnoff	Y/M signs in BTH, Dump, FEE. (see attachment)	
SR of 4000	<u>v</u>	
		RSWCF Status
Person Responsible Murphy.	James Matthew	Work Approve
Area FEE	×	
DMP (E	BD) 💌	
(select	<u>×</u>	
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	10, 10, 10, 10, 10, 10, 20, 11, 14, 40 Kalulani	
roup (Select) 💌		
ation () Dequirements	afere work starts (ADSO, BB, and EOIC completes this se	Section 2 Hole
ection 2. Requirements	service work starts (ADSC, KP, and EOIC completes this se	(ion)
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ESA BAS	*	
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RSWCF: Work Approved & Work Complete



Electronic Radiation Safety Work Control Forms at SLAC

RSWCF Workflow: Sections 3 and 4

Work Complete (Person Responsible or Area Manager)	Worker Completion Signoff	ADSO Review	
Stopper work complete and PPS wire connections restored. (see attached memo)	ST61 work complete and PPS wiring re- connected. Tested out as expected.	Miller, Paul	RSWCF Status
	-	w	WOIN Complete
76 of 2000	72 of 2000		Complete
04/04/2011 13:24 jwarren	04/04/2011 13:27 jwarren	04/04/2011 13:59 jwar	ren
PPS	Worker Completion Signoff	ADSO Review	
BTH, Dump and FEE PPS IAT testing completed.	PPS IAT testing has been completed.	🔺 Van Hoover, Zoe 👻	
	Y	w.	
44 of 2000	35 of 2000		
04/04/2011 13:24 jwarren	04/04/2011 13:58 jwarren	04/04/2011 13:59 jwar	ren i
Beam Requirements			
	<u> </u>	8	RSWCF Status
			Work Complete
Beam requirements in section 4 are complete or are not required	I, ADSO review to close		
EOIC Closure Approval			
Section 5: Attachments		Upload A New File	
Edit Name Comments			DEWCE Status
RSWCF_5053[1].pdf -			Work Complete
1-1			ton complete



Electronic RSWCF Requirements

- Accessible yet secure
- History Audit trail
- Documentation Configuration Control
- Work Flow
- Electronic Signature
- Error Handling
- Read-Only Version
- Timeout
- Integration with CATER (Comprehensive Accelerator Tool for Enhancing Reliability)
- Extensive checkout before releasing into production

CATER



- Web-based tool for reporting and tracking problems and scheduling maintenance
- Oracle database
- Developed using Oracle Application Express (APEX)

CATER	Status	Subsystem	Агеа	Description	Soln	Johs	Shon	Urgenci
93436	In Progress	Klystron Modulator	LINAC WEST	KLYS LI10 61 10-6: J7 cable connector that connects from SLED to MKSU was broken at MKSU.	5011	0003	AMRF	Sc
93435	In Progress	Camac	LINAC WEST	LI02 YCOR 900: Channel drifting out of tols even after multiple MCOR module swaps. Request DAC module replacement at LI02 crate 5 module 18.			HDWR	Sc
9 <mark>3</mark> 434	Scheduled Jobs	Electricity	LINAC EAST	Install circuit breaker in Linac Large Pumping system.		1	CEFE	Sc
93433	Review to close	Camac	LINAC WEST	LI13 LI13 LINAC Magnets: All magnets associated with SAM crate 1, module 2 show "ADC ERROR". "OK" LED not flashing. Please replace the module.			HDWR	Sc
93432	Scheduled Jobs	Other	HER	PEP II Tunnel 2A: Cut 2 1/2" hole in the expanded metal PPS gate transom for the installation of a 2" compressed airline Region 2A.		1	Other	Sc
93431	In Progress	Dc Magnets	LINAC WEST	YCOR LI02 900 LI02 YCOR 900 is drifting out of tolerance.	1		PEM	Sc
93430	Closed	Water	LINAC EAST	ACCC LI29 LI29 Collimator in housing, Leak at ACS return. Needs to be replaced.			CEFOP	Sc
93429	In Progress	Pps	FEE	Need to change S0 ST1, ST2 stopper enable-disable key switch.			CTL	Sc
93428	Review to close	Dc Magnets	LINAC WEST	LI13 LI13 Correctors: LI13 was offline fixed by CTL, then ADC errors. Did a SAM reset. Still most fail to trim.			PEM	Sc

CATER

Problem Description		
Device of the series	Problem Description	
DVR in MCC is making a clicking noise like a relay flipping on and off repeatedly. This seems to correspond with the top left quadrant video picture on the monitor next to the DVR losing and regaining its signal. The other signals from the DVR to that monitor seem fine.	*	
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Electronic RSWCF Introduction Timeline

- 2010: In-house development and testing
 - First round of development
 - Preliminary testing and feedback from operations group
 - Second round of development
 - Sept-Oct: ADSO and Maintenance Office testing
 - Nov: Created formal checkout procedure
 - Dec: Executed final checkout
- January 2011: Released for 2-Mile LINAC Facility
- May 2012: Released for SPEAR Facility
- Over 450 Electronic RSWCFs processed since introduction

- Expand for use in additional Facilities:
 - NLCTA (Next Linear Collider Test Accelerator)
 - SSRL and LCLS Experimental Facilities
- E-mail integration
- Additional CATER integration with electronic logbook