SLAC MEMORANDUM July 12, 2002

Title: Review of NLCTA Corrective Actions

To: Marc Ross, Keith Jobe

From: Sayed Rokni S. H. Rokni

I have reviewed your narrative on the recent issue involving the unattended operation of NLCTA. I have also reviewed the corrective actions, described in Khater's memo of July 11, 2002, that NLCTA, ADSO and Radiation Physics have agreed upon. I am satisfied that the causes of this event have been correctly identified and addressed; the NLCTA Beam Authorization Sheet will be returned to the Control room today.

CC:

48 K. Kase
48 H. Khater
55 P. Miller
48 W. R. Nelson
55 M. Saleski
RSO File (Memo for Khater attached)

SLAC Memorandum **Date:** July 11, 2002

To: Sayed Rokni

From: Hesham Y. Khater Hesham Khater

Subject: NLCTA Preliminary Notification Report (MCC-369)

On February 7, 2000, the Radiation Safety Committee (RSC) authorized [1] the NLCTA to operate klystrons and modulators in unattended mode. The purpose of the unattended mode of operation is to allow for "around the clock" processing of test accelerator structures. In its current form, NLCTA Beam Authorization Sheet (BAS), allows two modes of operation: (1) Beam Operation, and (2) Unattended Operation without Beam (RF sources only). NLCTA operating procedures designate an Operator In Charge (OIC) who, for the duration of one week, is responsible for all aspects of the operation. During Beam Operation, the NLCTA Operation Directive [2] requires the presence of the OIC on site. Whenever the OIC leaves the site, the OIC must designate a substitute and turn over the OIC responsibilities to the substitute. On the other hand, the unattended operation may occur without the presence of an authorized operator in the control room.

During unattended 'RF-only' operation, the OIC must complete a walkthrough inspection once per weekday. The inspection includes a check that the electron gun high voltage power supply (HVPS) is locked off. During beam operation, it is the responsibility of the authorized beam operator to make sure that the HVPS is secured when the beam operation is terminated. In addition, NLCTA operators are required to sign the Beam Authorization Sheet (BAS) and note the operational mode and beam conditions, if appropriate, in the operations log.

Description of the Incident

On Friday, June 28, planned beam operation began at 10:00 AM. ***The operation started without the required signing of the BAS***. Beam operation proceeded normally until 3:00 PM when an equipment failure in the primary RF source modulator (STA1) halted it (NLCTA beam operation cannot proceed without STA1). After an hour of diagnostic activities, the maintenance staff decided that the STA1 repair would have to await further evaluation Monday, July 1. Following the decision to terminate work on STA1, the NLCTA operations staff left for the day without securing the gun high voltage power supply. ***Procedure requires that the HVPS be turned off and secured with a padlock whenever the control room is unmanned***. However, the Personnel Protection System (PPS) control panel was properly disabled, as required by procedure, and the beam enclosure was in the fully secure 'No Access' state. Since the RF systems were off, the beam emitted from the gun had an energy less than 120 KeV.

On Saturday, June 29, at 12:30 PM a worker entered the NLCTA control room and found the electron gun high voltage power supply (HVPS) for the test accelerator turned on. He promptly switched it off and locked the breaker as required by procedure. He logged the action in the NLCTA Operations Log book. On Monday morning, July 1, the Accelerator Department Safety Officer was notified and the notification process begun. All operation of NLCTA, beam and RF-

only, was terminated pending a thorough review. On Friday, July 5, the NLCTA BAS was removed.

Description of Violations

During this incident several NLCA Operations Directives were violated by the OIC. The following is a list of the violations:

1. The directive stating that the OIC is responsible for reading and signing the BAS as part of performing the NLCTA Daily Checklist (02-03-11).
2. The directive stating that during beam operation, whenever the OIC must leave the site, the OIC must designate a substitute and turn over the OIC responsibilities to the substitute.
3. The directive stating that the OIC is required to record in the Operations Log the times at which the OIC assumes and surrenders the OIC title.
4. The directive stating that during Beam Operation (the electron gun is on), if the OIC leaves the site (unattended control room), the OIC must lock the PPS-enable key into the key safe (this action locks off the electron gun).
5. The directive stating that during shifting from Beam Operation to Unattended Operation, the OIC is required to lockout the electron gun properly.

Suggested Corrective Actions

1. Establishing an oversight process whereby the documents requiring signature (e.g., BAS, NLCTA Operation Log, etc.) are routinely checked by the Accelerator Department Safety Officer (ADSO), the responsible Radiation Physicist and the NLCTA operations staff. The oversight process includes:
   a. Scheduling routine reviews of the NLCTA documentation by the ADSO and posting the meeting schedule in the NLCTA control room area.
   b. Posting the BAS sign-off section in the NLCTA meeting room, where the daily meetings are held, in a typeface large enough to be read throughout the room, and beginning each meeting with signing it by the responsible OIC.
2. Attaching a snap hook (or carabiner) and a 'NLCTA OIC' tag to the gun padlock (lockout device). Modifying current NLCTA procedures to require the NLCTA Operator to maintain possession of the padlock whenever the gun is unlocked.
3. Requiring operators to note in the Operations Log whenever a substitution is made and another qualified operator becomes the current substitute NLCTA OIC and takes possession of the gun lock.
4. Modification of the NLCTA Operations Directives to spell out the responsibilities of the substitute OIC, including the definition of the substitution period.

References

[1] Radiation Safety Committee Meeting February 7, 2000, "Unattended Operation of NLCTA," RSC-00-001, February 15, 2000.
[2] NLCTA Operations Directives, SLAC Document 02-02-02, April 9, 2001.

Cc: Marc Ross, Keith Jobe, Mike Saleski, Kenneth Kase, Ralph Nelson