PLACING AND RETRIEVING FIELD TLDs

Purpose

This Meteorology and Air Quality Group (MAQ) procedure describes placing and retrieving thermoluminescent dosimeters (TLDs) during a normal quarterly field cycle of 90 days.

Scope

This procedure applies to the TLD dosimeters used in the measurement of environmental levels of external direct penetrating radiation as part of the Direct Penetrating Radiation Monitoring Network (DPRNET) of MAQ.

In this procedure

This procedure addresses the following major topics:

Signatures

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General information about this procedure

Attachments

This procedure has the following attachments:

Number	Attachment Title	No. of pages
1	Hazard Control Plan	1

History of revision

This table lists the revision history and effective dates of this procedure.

Revision	Date	Description of Changes
0	7/31/97	New document.
1	10/29/99	Removed steps for electrets, updated steps for TLDs.
2	2/20/01	Corrections and additions to HCP, updated steps to reflect new black badge TLDs.
3	12/22/03	Revised to reflect changes in collection assignments.
4	12/22/04	Quick-change revision to change HCP to HR.

Who requires training to this procedure?

The following personnel require training before implementing this procedure:

- Any person required to perform the field change-out process

Personnel previously trained to revision 3 of this procedure do not require re-training to this revision.

Training method

The training method for this procedure is **on-the-job** training by a previously trained individual and is documented in accordance with the procedure for training (MAQ-024).

Prerequisites

In addition to training to this procedure, the following training is also required prior to performing this procedure:

- RRES-ES-Field, "Field Safety For All Employees"
- RRES-ES-Driving, "Driving and Towing Safety For All Employees"
- Site-specific training for all areas to be visited

Periodically review the field safety information in the All Employee Handbook (see MAQ-032).

General information, continued

Definitions specific to this procedure

Change-out: the process of placing and removing TLDs or reading other monitoring devices while they are located in the field of measurement.

References

The following documents are referenced in this procedure:

- MAQ-024, "Personnel Training"
- MAQ-032, "Orienting New Employees"
- MAQ-250, "Obtaining the Environmental Dose from the Model 8823 Dosimeter"
- RRES-ES-Field, "Field Safety For All Employees"
- RRES-ES-Driving, "Driving and Towing Safety For All Employees"

Note

Actions specified within this procedure, unless preceded with "should" or "may," are to be considered mandatory guidance (i.e., "shall").

Preparations for change-out

Description of operation

Before TLDs or other monitoring devices can be placed or retrieved from the field, several processes will need to be completed. There may be on-site LANL personnel and off-site personnel that need to be informed, equipment to gather, irradiations to be performed at another LANL facility, and other requirements to be met. These processes should be completed within a week prior to beginning the field change-out.

Performing work safely

DO NOT perform work under conditions you consider unsafe. Before beginning work described in this procedure, review safety needs and requirements, identify hazards, and develop hazard mitigation measures, as described in Attachment 1. Be aware that facility configurations and hazards may change between visits.

Equipment needed to change TLDs

In general, for the normal TLDs used for the environmental networks, collect the following equipment:

- Several large (10 x 12") zip-lock bags to hold new and old TLDs, and to separate the various field-fade dosimeters from the regular ones.
- Two small coolers, one for the new TLDs (to be deployed) and one for the old TLDs (retrieved from the field).
- Permanent (waterproof) marker (to mark bags as needed).
- Extra steel rings or other devices that are used to hold the TLDs (to replace any broken or missing items).
- Extra weatherproof and sun-proof containers to protect the TLDs in the field.
- Portable barcode reader.
- Field note book, list of sites, area maps as needed, and pens.
- Spare barcoded location ID # tags (to replace unreadable or missing tags) determine which need replacement by reviewing last quarter's field logs.
- Dosimeters: one per station, plus 80 QA dosimeters as described in procedure RRES-MAQ-250 page 11 of 18.
- Cellular phone w/ backup battery for remote areas and out-of-county trips; pager for entering security areas (where cell phone batteries must be removed.)

Preparations for change-out, continued

Placing TLDs in the field

There is no perfect answer on how to place a TLD in the field. The main problems to consider are: unauthorized removal (either by teenage boys or by well-meaning LANL employees), and the effects of the weather.

- Prolonged moisture causes the TLD material to deteriorate.
- prolonged sunlight causes high readings.
- prolonged heat causes the signal to fade.
- wind damages or dislodges dosimeters.

Whenever possible:

- place TLDs within secure areas.
- protect them from heat, sun, and prolonged moisture.
- secure the dosimeters (e.g., with a binder clop) so they do not flap in the wind.
- place the dosimeters approximately 1 meter (plus or minus 20%) above the ground; this is about waist height.

Categories of dosimeters

The dosimeters are divided into the following categories:

- F00: regular field dosimeters; one is placed at each station.
- F01,2,3: QA dosimeters; in addition to F00, 3 others (total of 4) are placed at 5 QA sites.
- FD0,1,2,3: field fade dosimeters; these are exposed to 300 mrem *before* deployment, then 4 are placed at each of the 5 QA sites.
- EA0,1,2,3: "Exposed After" dosimeters; 4 of these are placed at each QA site; then they are exposed to 300 mrem *after* they have been collected from the field.
- Vault: at least 20 dosimeters are stored in the vault for (approximately) the same number of days that the others are in the field.

Steps to prepare for change-out

Perform the following steps to make the necessary preparations prior to beginning the field change-out:

Step	Action
1	Ensure all personnel performing or assisting in the changeout have the required training. For unescorted access to some areas within LANL, personnel may need to be Q-cleared, or have GET or Radiation Worker training. In addition, site-specific training is required at TA-53 (LANSCE), at TA-15 and at TA-54, Area-G.

Steps continued on next page.

Preparations for change-out, continued

Step	Action
2	Arrange with the HSR-4 Calibration Facility to (a) assemble 180 to 200 dosimeters, and (b) irradiate 20 field-fade (FD) dosimeters with 300 mrem. This will normally be done one week prior to starting the change-out, but will depend upon HSR-4's schedule. It is prudent to inform them as early as possible, and schedule a date.
3	After they have been irradiated, place the 20 FD dosimeters in a clearly-marked Ziploc bag; 4 of these will be placed at each of the 5 QA locations.
4	Inform the project leader or alternate and other relevant group personnel at least one week prior to your desire to begin the change-out; ask about any special instructions. For certain technical areas, site personnel will need to be informed in order to gain access.
5	During the same week, coordinate with the group office for the use of an appropriate vehicle, as needed (perhaps 4WD for winter or muddy conditions, or van to carry any accompanying personnel, etc.).

Planning field change-out

Description of operation

To start the field change-out requires some planning. The steps described below are only a recommended sequence of actions.

Working alone policy

The group prefers two people to travel together to collect AIRNET and DPRNET samples. However, it is acceptable for one person to collect samples. In either case, ensure you have a working cellular phone or radio in the vehicle, and a pager if entering security areas (where cell phone batteries must be removed).

Working in a facility

Work control in a laboratory facility is the responsibility of the Facility Manager. Routine sample collection activities may require facility management approval before beginning work described in this procedure; contact the facility manager before any other work, if so required.

Working at Pueblos

At Pueblos, work control is the responsibility of the Pueblo authorities. Complete the following check-in requirements.

- Check in at the Pueblo's Environmental Office or call ahead of the trip to make arrangements for access permission or escort.

Maintaining physical control of samples

A sample is physical evidence collected from a facility or the environment. All samples must be physically controlled. A sample is considered in control if it is one of the following:

- In one's physical possession.
- In one's view after being in one's physical possession.
- In one's physical possession and then locked up so that no one can tamper with it.

Dosimeter locations

The DPR project leader and lead technician maintain a list of all dosimeters and a description of their locations. The location names are maintained in the DPRNET database "Site Loc" table. Refer to this information when planning the route as described in step 1 below.

Planning field change-out, continued

Steps to begin the change-out

To begin the change-out, follow the recommended steps below:

Step	Action
1	Refer to area maps to determine the route needed to visit the maximum number of stations within the desired time frame.
2	Choose 5 locations for QC dosimeters. A good location should • be secure from theft. • have a low expected dose rate. • not have a Lucite block. (For example, suitable locations are DPRNET stations 38, 58, 72, 75, 76, 88, 89, 91, 107.) These locations will receive 12 QC dosimeters (steps 2-4 on page 11 of MAQ-250) instead of the usual 1.
3	After determining the routes needed, ensure your vehicle has enough fuel for the day.
4	Begin change-out by driving to first location.

Placing and retrieving TLDs in the field

Description of operation

Travel to each location and perform the steps below.

Steps to place and retrieve dosimeters

Perform the following steps to place the new TLDs in the field:

Step	Action
1	At a TLD location, take the new TLD(s) for the quarter being issued from the storage cooler. Ensure the field fade dosimeters are placed at the appropriate locations.
2	Using the field barcode reader, scan the barcode tag indicating the field location number. If the site's ID number is missing or unreadable, manually enter its number and make a note that the tag needs replacement. Replace any unreadable tags that were noted from the previous changeout.
3	Scan the barcode tag of the TLD(s) being retrieved. Scan the barcode tag of the TLD being deployed. At the locations that also require field-fade TLDs, also scan their barcode tag ID numbers. Record the data on the hard copy site list for a quick reference of which sites have been completed.
4	If there are any anomalies in the ID numbers or if the TLD(s) are missing, etc., note this in the "Comments" section on the barcode reader.
5	Keep the *new* and *old* dosimeters in separate coolers. **It is therefore most important that the TLDs be kept separate and that strict control is maintained in the retrieval process. This is even more important in cases where the ID number is unreadable.** About half of all tags are marked with a different color of badge label. At any one time, these marked dosimeters are either being placed or retrieved. Use this marking to help keep the dosimeters separated.
6	If a TLD's ID number is unreadable when retrieved, note this in the comments section. Log a note in the field logbook as to location and all relevant information to assist in assigning the correct ID when returning from the field later on. **If this is not done, it will be impossible to know the ID number when it comes time to read out the TLD in the lab.**

Steps continued on next page.

Placing and retrieving TLDs in the field, continued

Step	Action
7	At each QA location, place all 12 dosimeters in a clearly-marked Ziploc bag for special handling at the lab.
8	When all TLDs are placed and retrieved properly, drive to next location and repeat steps 1 through 7.
9	At the end of the collection period, leave the remaining unused new dosimeters and the old TLDs retrieved from the field in their coolers and store them at TA-54, Bldg 1001. Each day, repeat all above steps until the changeout is complete.
10	At the end of the collection process, forward the field notes and barcode-reader data to the individual using the database. If field data were collected electronically on a bar code reader or similar equipment, follow the equipment instructions to upload the data file onto a computer and then forward the file (the "issue/pickup" data) to the individual using the database.

Steps to process the dosimeters

Perform the following steps to deliver the dosimeters to HSR-4 for processing after they have been retrieved from the field:

Step	Action
1	Take the Ziploc bag of *old* dosimeters from the vault and place them with the dosimeters retrieved from the field.
2	Place all the remaining *new* dosimeters in a Ziploc bag, marked with today's date, and place them in the vault.
3	Take each of the 5 Ziploc bags, each containing 12 dosimeters collected from the QC stations, and sort them into two piles: • the 4 field fades already exposed to 300 mrem. • the 8 other dosimeters. Designate 4 of the "other" dosimeters as EA dosimeters (to be "exposed after"), place them in a marked Ziploc bag, and keep them separate.
4	Deliver two bundles of old dosimeters to the HSR-4 dosimetry lab at TA-3. • Deliver all dosimeters except the EA dosimeters to be processed in the standard way. • Deliver the EA dosimeters to the lead technician with written instructions to irradiate with 300 mrem before processing.

Records resulting from this procedure

Records

The following records generated as a result of this procedure are to be submitted **quarterly** as records to the records coordinator. Because references are made throughout the year to the quarterly results, a copy of the quarterly reports or records may be retained by the individual assigned to perform the dose calculations until they are released in the ESR.

- Field Data sheets and/or barcode reader downloaded ASCI text files

If you have read and understand the preceding document, click here to receive EDS credit.

HAZARD REVIEW

Work tasks/Steps	**Hazards, Concerns, and Potential accidents; Likelihood/ Severity**	**Controls, Preventive Measures** *(e.g., safety equipment, administrative controls, etc.)*	**Hazard Level** *from IMP 300-00-00 Hazard Grading Matrix*
Collect TLD badges according to steps in chapter "Placing and retrieving TLDs in the field" in this procedure.	Field hazards. Occasional/Negligible = Minimal	Covered in training to ENV-ES-Field.	Low
As part of sampling work, enter radiation areas and explosives testing areas.	Site-specific hazards such as high explosives testing (TA-15, TA-16, TA-49) or radiation Areas (TA-54- Area-G, TA-16) Remote / Negligible = Minimal	Comply with all site-specific access requirements. Existing facility access controls include site-specific training, sign-in/sign-out, and scheduling procedures. Area-G and TA-15 require entry through manned access control gates.	Low

Wastes or residual materials resulting from process

None.

Emergency actions to take in event of control failure

For all injuries, provide first aid and see that injured person is taken to Occupational Medicine (only if immediate medical attention is not required) or the hospital. Notify supervisor and group office as soon as possible. Follow all site-specific emergency plans for any radiation or explosives emergencies.