

MEMORANDUM

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From: Mary Logue, Associate Director, ESH&Q
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Subject: Requirements for Subcontractors Bringing Radioactive Materials onto Jefferson Lab Property

This memorandum documents the policy relating to procurement and use of non-destructive testing services involving radioactive materials. Its intent is to clarify requirements, document exceptions to standard operating procedures, and facilitate the development and consistent implementation of subcontracts covering this work. The policy may be revoked in the event the RadCon Manager believes that continued operation under these provisions threatens health and safety, impedes the ALARA process, infringes on regulatory requirements, or otherwise reduces the effectiveness of the Jefferson Lab Radiation Protection Program (RPP).

We recommend that this document be transmitted to subcontractors performing non-destructive testing (NDT) using radiation sources.

Executive Summary of Requirements

Training Requirements:

All NDT operators (except for certified radiographers and radiographer's assistants) must have current GERT training and must have device-specific training for the equipment used. This requirement applies to source use anywhere on JLab property, and is not satisfied by the use of an escort. Radiographers must have current training in accordance with 10CFR34. See "Training and Site Access" for details.

Documentation:

At least ten business days prior to the start of radiological work, a pre-work package is to be provided to RadCon. The package will contain the data specified in the section, "Pre-work Package and Notifications". This documentation should be provided to Keith Welch at welch@jlab.org. RadCon will review the information within five days and request additional information or clarifications if necessary.

Dosimetry:

All NDT operators will be issued JLab dosimeters. See the "Dosimetry" section for details.

Notifications:

24-48 hours prior to the expected date of testing, notification will be made to RadCon of the expected work. The notification should be made either to 876-1743 (24-hour on-call), or by e-mailing “radcon_ram@jlab.org”. At that time, RadCon will verify training is up to date, and if dosimetry is not already in place, will prepare dosimeters for the operators. If the testing is expected to occur off-hours, that should be discussed during the advance notification.

Upon arrival, the NDT operators will check in at the RadCon field office (or other mutually convenient location). The equipment will be inspected, personnel verified, and dosimetry issued if not already in place. Specifics of the testing will be discussed and RadCon will normally dispatch an RCT to observe the work area and provide administrative controls as required (see “Surveillance and Administrative Controls”).

Repetitive Tasks:

When it is established that NDT will be performed repetitively at some location, after initial check-in and briefing from RadCon, a routine work authorization may be given. In this event, the operators are given approval to conduct the testing for a specific location and duration. In this case, the 24-hour notice is waived. The daily check-in is not required, and a mutually agreeable location to house dosimeters is determined. However, RadCon must be notified of the testing activity (normally by phone) each time testing is done (prior to testing).

Background

From time to time, subcontractors are employed to conduct non-destructive testing (NDT) involving radioactive materials, such as radiography or soil/substrate density/moisture measurements. Jefferson Lab employs only qualified, licensed companies for this purpose. However, DOE requires that these personnel be treated as *Radiological Workers*, under the JLab RPP, while conducting work on the JLab site [10CFR835.2]. Therefore, these activities and personnel are subject to all provisions of 10CFR835, and other requirements of the RPP, including various Articles of the Jefferson Lab RadCon Manual (RCM). Exceptions to requirements in the RCM can be authorized by the RadCon Manager only when the requirement does not directly invoke a regulatory requirement or RPP commitment, and the exception does not reduce the effectiveness of the RPP.

As radiological workers operating radiation producing equipment on site, subcontractors conducting NDT are subject to the same radiological requirements as other radiological workers. Since the nature of this work involves transport and use of radioactive sources and generation of intermittent (and sometimes significant) radiation fields, the radiological conditions vary temporally and spatially, thus triggering the need for cognizance of and support from RadCon. The areas of the radiation protection program impacted by this work include personnel and area monitoring [§835 Subpart E], posting and labeling [§835 Subpart G], radiation safety training [§835 Subpart J] and sealed source control [§835 Subpart M], among others. This document describes the rationale and bases for requirements related to each of these areas for NDT subcontractors. We recommend that this document be transmitted to the subcontractor to assist in communicating JLab requirements.

Training and Site Access

DOE regulations require training commensurate with the hazards prior to individuals performing unescorted assignments as radiological workers, and before receiving occupational radiation exposure. In addition, retraining in radiation safety concepts and practices is required every two years. Workers

handling radioactive materials are, by the regulatory requirements, defined as radiological workers. Given the typical source activity and dose rates involved, it is reasonable to consider NDT source operators as “occupationally exposed” during their activities. Typical usage of NDT sources at JLab will be under the surveillance of a JLab trained worker. However, the presence of an escort does not satisfy the requirement that workers be trained “before receiving occupational dose” at a DOE facility.

JLab requires NDT subcontractors to provide evidence of training for source operators. This training is task specific, and we grant partial equivalence for that task-specific part of the radiological training. However, such training courses vary in content and quality, and it is not feasible for JLab to evaluate each training certification against DOE content requirements. In addition, NDT source users may not receive biennial retraining from their employer. In short, training requirements for NRC licensees are not equivalent to DOE training requirements.

The RadCon Manual requires persons handling radioactive material to be “Jefferson Lab trained” radiation workers. However, JLab Radworker training is targeted towards workers performing tasks associated with accelerator produced radiation and radioactive materials. In this case, there is little value added by enforcing this requirement, especially since most NDT is not conducted in accelerator-related radiological areas. We judge that a content-verifiable course of study commensurate with the radiation hazard presented by the radioactive material involved needs to be taken within two years of the operator’s work at JLab. We believe GERT training satisfies this requirement. Therefore, all NDT source operators (except as noted below) conducting testing on the JLab site shall have at a minimum, current GERT (SAF800) training, in addition to documented evidence of task-specific training for the device used. Certified radiographers and radiographer’s assistants are excepted from this requirement, as their training is judged to meet 10CFR835 requirements. Documentation must be provided that the radiographer is current in the training required by 10CFR34 (including annual refresher training).

GERT training can be obtained online at:

http://www.jlab.org/div_dept/train/online_courses/gert_04/start.html

An NDT operator who is GERT or Radiation Worker qualified at JLab is granted site access on the same conditions as other workers. However, this site access shall not be construed as permission to perform NDT on site without meeting the additional requirements below.

Dosimetry

10CFR835 provides specific requirements for issuance of dosimeters. The requirement for issuing dosimetry to a radiation worker is based on the likelihood that the worker will receive dose in excess of 100 mrem in a year. We interpret this as meaning the likelihood of receiving 100 mrem **at Jefferson Lab**. It is judged unlikely that individual NDT operators will receive over 100 mrem per year from conducting tests at JLab. This means that badging is technically “optional”, and it has the further effect that should we issue dosimeters to these workers, we are not bound to requirements for determining prior years’ doses, nor are we required to report their dose at the close of the calendar year (unless we determine through monitoring that the 100 mrem threshold was exceeded).

This condition applies to most radiation workers at JLab (relatively few workers are expected to exceed 100 mrem per year). Nevertheless, we issue dosimeters, and require their use for work within our Radiologically Controlled Areas (RCA). This requirement gives assurance that all doses are monitored, and provides evidence of the absence of exposure to potentially exposed persons.

It is assumed likely that NDT operators will exceed 100 mrem in a year from their cumulative routine exposure. The portion of that dose received at JLab is expected to be accounted for through our RPP. In addition, if an operator is determined to have an overexposure or unusual dose, JLab will incur liability to demonstrate that the anomaly did not occur while conducting work at the lab.

Given the clear nature of the NDT operators' work as "radiological", and the potential for incidents or unusual exposures, these workers are required to wear JLab-issued dosimeters when onsite.

The normal procedure for issuing dosimetry at JLab involves obtaining authorizing signatures from supervision. To streamline the process in the case of approved NDT, RadCon will acknowledge as authorization the written pre-work package provided by the JLab SOTR, work supervisor or representative containing the operators' training certifications and other required information.

As noted above, since we are judging these workers as unlikely to exceed 100 mrem in a year, we are not required to obtain prior years' dose histories, or provide annual monitoring reports. However, we are required by §835.702(d) to document all doses for the current year, in order to ensure compliance with the basic dose limits. But this requirement presumes that monitoring by each employer/facility occurs in a serial fashion. For NDT operators, monitoring is conducted by a "home" institution, and additional monitoring is performed *in parallel* by JLab. DOE has provided guidance for similar scenarios in various Radiological Control Technical Positions (RCTP). The guidance is aimed at DOE employees who travel from site to site, but a reasonable extrapolation can be made to this case. Since the home institution tracks the entire dose of record, that institution has the primary responsibility for ensuring dose limits are met. JLab monitoring provides a parallel subset of data that are applicable mainly to our ALARA goals. NDT operators who are being monitored by a licensee are not transferring to another monitoring program when they are assigned dosimetry by JLab. It is our judgment that the requirement in §835.702(d) is not strictly applicable to this case. However, since NDT operators may experience transient employment, we believe it is prudent to obtain an estimate of operators' current year's doses. An acceptable approach is to have the subcontractor include in the pre-work package an estimate of the current year's doses for the operators listed. RadCon will review the dose estimates and request updates if, in our judgment, there is reason to suspect that a worker may be approaching a limit.

Surveillance and Administrative Controls

The sources used by NDT operators produce radiation fields that, under routine circumstances would require posting of a Radiologically Controlled Area, and in some cases, Radiation or High Radiation Areas. Since the sources are generally not present for periods in excess of a normal work shift, and are attended at all times, some allowances can be made for posting of areas. In the case of radiography, 10CFR34 requires specific access controls and posting during exposures.

In addition, the RadCon Manual specifically requires the presence of RadCon personnel to monitor and control access to radiography areas. In the case of other NDT, the need for additional posting or other

administrative control is evaluated on a case basis to ensure compliance with our RPP. Providing this surveillance presumes the opportunity to inspect and assess the radioactive sources of interest in a given situation. To provide for this assessment, it is necessary for NDT operators (either directly, or through SOTR, JLab supervisor, etc.) to contact RadCon upon arriving at the lab with a source.

Items that will be checked upon arrival include the identity of the source (must be as identified in pre-job package), the general condition of source/shield/exposure device, and radiation levels associated with the device.

This also allows Radcon to issue or verify the possession of JLab dosimetry and to verify training requirements. RadCon will brief the operator on any specific limitations of use for the source or location of use, and will make appropriate entries on relevant radiological work authorizations (RWP, etc.). Normally, a RadCon Technologist will attend and monitor the job site to ensure potential exposures to JLab personnel are ALARA. In some cases, the RCT may require and direct the removal of unnecessary personnel, or establish exclusion zones or radiological areas.

In cases not involving radiography, if multiple NDT tests are planned for a specific location or work evolution (eg. repeated soil density testing during construction of a soil berm), RadCon may authorize the use of a particular source on an ongoing basis, following initial assessment of the work site, source conditions, etc. However, RadCon notification of the arrival of the source onsite shall still be made. In this case, a mutually convenient location for dosimeter storage will be arranged.

Pre-Work Package and Notifications

Upon retaining the services of an NDT subcontractor, a pre-job information package will be provided by the subcontractor, containing the following information.

1. A copy of applicable licenses for the materials expected to be brought to the JLab site
2. Identification by model and serial number of the specific sources expected to be used, and the isotope and activity for each source
3. Copies of the results of the most recent leak tests on the applicable sources
4. The names of the operators who may conduct the testing
5. Documents indicating device-specific training for the operators listed
6. For radiographers, copies of certifications and evidence of current annual refresher training
7. A signed statement containing an estimate of the current radiation dose for each operator

Normally, this information should be provided at least ten business days prior to the expected date of arrival on site. This information should be provided to Keith Welch, RadCon Deputy Head (757-269-7212, welch@jlab.org).

When NDT is scheduled, the subcontractor or his/her representative (SOTR, JLab supervisor, etc.) will notify RadCon approximately 24-48 hours in advance of the work with an estimate of the arrival date/time. This notification should be made to David Hamlette, at 757-876-1743 (24-hour on-call), or by e-mail to radcon_ram@jlab.org. At this time, RadCon will review the available information to assess status of training and dosimetry issuance. If the operators' GERT training or dosimetry issuance has not been completed, RadCon will notify the contractor's representative, and will prepare dosimetry for issuance on arrival.