Department of Energy
Laboratory Accreditation Program (DOELAP)
External Personnel Dosimetry

ONSITE ASSESSMENT REPORT

Organization: Fermi National Accelerator Laboratory (FNAL)

Onsite Assessment Dates: July 17 -18, 2018

Date Report Reviewed with Management: July 18, 2018

Assessors:

Henry Tran — 7/18/2018
Printed Name/Signature — Date

Laura Oxley — 7/18/2018
Printed Name/Signature — Date

Information for the Recipient

You are asked to respond in writing within 45 days, detailing the actions you have taken or plans you have for resolving the deficiencies and concerns identified in this report and your reasons for feeling any reported deficiencies are unwarranted. Corrective actions should fully address all deficiencies within 60 days and all concerns within 1 year from the date of this report. Failure to respond may delay an accreditation decision. Please obtain concurrence by your DOE field office. It should then be forwarded by the field office with a cover letter indicating concurrence to:

Laird C. Bean
DOELAP Senior Technical Manager
U.S. Department of Energy, Idaho Operations Office
1955 Fremont Avenue, MS 2112
Idaho Falls, ID 83415-2112

You are reminded that this Onsite Assessment Report conveys the opinions of the assessors as representatives of DOELAP. The final evaluation of your facilities for the purpose of recommending accreditation will be conducted by a DOELAP oversight board. They will review this report, your response to it, other written information submitted by you and the performance test results for your dosimetry system in making a decision.

Signed Statement

The assessors have discussed the contents of this report with members of management who agree to respond in writing to the DOELAP Senior Technical Manager within 45 days of the date of this report (with concurrence by the local DOE Office), regarding correction of deficiencies and concerns noted herein.

J. Donald Cossairt — J. Donald Cossairt
Printed Name — Signature of Authorized Representative of Management

INTRODUCTION

A DOELAP onsite assessment was conducted of the Fermi National Accelerator Laboratory dosimetry program to assure routine practices comply with DOELAP criteria. The DOELAP assessors were Henry Tran and Laura Oxley. The following people were interviewed in the course of the assessment: Susan L. McGimpsey, Dosimetry Program Manager (DPM); Kathy J. Graden, Dosimetry Program Manager Back-up; Michael C. Vincent, Radiation Physicist. Other staff contributed to the assessment process but were not interviewed directly. All the Fermi National Accelerator Laboratory staff involved in the assessment process were competent, conscientious and cooperative.

The assessment team reviewed progress towards resolving the findings identified in the previous July, 2015 DOELAP assessment and evaluated the current compliance of the program with DOELAP requirements. Seven findings were identified, including zero deficiencies, three concerns and four observations. One of the observations constituted commendations to the Fermilab dosimetry program noted as noteworthy practices.

The assessment was conducted between July 17 and 18, 2018. The following report summarizes the findings identified during this assessment.

REVIEW STATUS OF CORRECTIVE ACTIONS FOR PAST DEFICIENCIES OR CONCERNS.

Concern #1 Blind audit dosimeter irradiations are being performed on phantom with the source to irradiation distance to the center of the sensitive element. The exposure calculations need to be performed as described in the N13.11-2009 and N11.32-2008 performance test standards. Currently there is no procedure or peer reviewed spreadsheet describing the process of calculating to dose equivalent units (rem) from exposure (rad). Also, there is no procedure describing how to maintain a consistent geometry during irradiations. Per the standards the reference dose point should be located at the surface of the front face of the phantom and not the centerline of the sensitive element. (G.1, C.2, QA.8)

Status: Chapter 13 (Blind Audit Program) of the External Dosimetry Manual has been updated to provide guidance and instructions on performing blind audit irradiations for whole body dosimeters on a phantom. Specifically, Section 13.2.5 include set up and positioning of the phantom and whole body dosimeter mounting on the phantom. A paragraph (Section 13.2.6) was added to address exposures to extremity dosimeters during this assessment in a draft EDM. The final signed copy will need to be presented to the oversight board prior to their meeting in September. These practices are consistent with the DOE standards, ANSI/HPS N13.11-2009 and N13.32-2008. Evidence was presented to substantiate that the procedure is being conducted. **This finding is considered closed.**

Concern #2 Training and oversight of the DPM backup is very robust and well documented on a continuous basis and is consistent with assigned responsibilities. However, individuals at the satellite sites where the majority of the temporary dosimetry is assigned are only required to complete a one-time training class. Many of the trained individuals have not been retrained or their competency

verified and documented since 2009. Competency reviews must be performed on a documented frequency. (P16, P17)

Status: Individuals who issue dosimeters using Fermilab's electronic database have been retrained on the "Issuing Temporary Dosimetry Badges" [FN000428/CR/01] training course. The training is required on a two-year requalification. **This finding is considered closed.**

Concern #3 Landauer dose reports provided to Fermilab for the calendar year 2015 have the algorithm version printed on the report but are missing the signature of, or reference to the person with technical authority for dose approval and release. Formal approval via memo, contract or other mechanism is necessary to certify that the dose information reported by Landauer meet the quality assurance standards specified in the Fermilab contract and applicable DOELAP criteria. (R.2)

Status: Based on the review of the Landauer memo (dated August 10, 2015) with regard to "the mechanism to display authorization of radiation dosimetry report release", the assessors confirmed that all Landauer dose results are approved and released by authorized personnel in accordance with Landauer Quality Assurance Manual. This is indicated on the dose reports by Analytical Work Order number and initials of the QC person approving the release of the report. **This finding is considered closed.**

GENERAL

Comments

Fermilab has a well-established external dosimetry program and the staff has documented the program with a Technical Basis Document (TBD) and an External Dosimetry Manual (EDM) that includes a series of standard operating procedures and QA program requirements. Angular response and LLD study documentation contained in the External Dosimetry Manual Technical Basis Document is consistent with the current production version of the dose algorithm, which was used during the most recent round of DOELAP performance testing and applications.

Deficiencies

None

Concerns

None

Observations

Observation #1 Each quarter, the number of unreturned dosimeters is very low (a few dosimeters out of over 1200 dosimeters issued). The low dosimeter unreturned rate is attributed to the implementation of the dosimeter storage/distribution board practices and the consistent efforts of Fermilab External Dosimetry Program (EDP) staff. This is considered a noteworthy practice.

QUALITY ASSURANCE PROGRAM

Comments

Quality assurance requirements are described in Chapter 2 of the EDM. The QA documentation is appropriate for a program using a vendor supplied processing service. Fermilab participates in quarterly blind audit testing of both whole body and extremity dosimeters. Dosimeter irradiations are done in-house through procedures described in Chapter 13 of the EDM.

Deficiencies

None

Concerns

None

Observations

Observation #2 The Fermilab EDP relies on their EDM, External Technical Basis Manual (EDTBM), TBD, and Landauer's QA Manual to meet DOELAP checklist requirements for documentation flowdown from a programmatic QA Manual. Some of these requirements are programmatic versus processing requirements and would not be found in the Landauer QA Manual. The scattered approach to documenting these requirements and flowdown to procedures in the EDM make it difficult to show compliance. A separate Fermilab programmatic QA Manual is needed.

PERSONNEL

Comments

Fermilab is currently reorganizing their staff in the EDP organization. In addition to the current Dosimetry Program Manager (DPM), a potential new DPM is being trained to assume the DPM position within a year. Other positions include a DPM Backup, an administrative staff member and a group of individuals providing dosimetry issuing functions at three designated locations. The management and staff members of the EDP are competent, knowledgeable, and dedicated. The level of staffing is satisfactory and supportive of a quality external dosimetry operation. Communication between technical and supervisory staff is effective.

Deficiencies

None

Concerns

Concern #1 Generic position descriptions on file do not include responsibilities for the EDP that can be correlated to responsibilities assigned in the EDM. (P.1, P.2, P.5, P.6)

Concern #2 The training program is not fully documented to be adequate for training new staff members. There is no documented practice for annually ensuring staff competency reviews are performed or to ensure 2-year retraining is met. The records are either on paper in a binder or assigned a training module number and entered in the TRAIN system. This system does not incorporate a frequency requirement or reminder to ensure the two-year requalification assignments are met. (P.14, P.15, P.16, P.17, P19)

Observations

None

FACILITIES AND EQUIPMENT

Comments

The Fermilab EDP performs the majority of their QC irradiations in-house. It currently has Cs-137, Sr-90, and Am-Be irradiators available for use. Performing these irradiations in-house allows for variation of the irradiations according to programmatic needs.

Deficiencies

None

Concerns

None

Observations

None

EQUIPMENT MAINTENANCE AND CALIBRATION

Comments

Fermilab External Dosimetry Program (EDP) relies upon the outside service vendor (Landauer) for dosimetry processing and does not have any equipment to maintain. The onsite calibration facility maintains calibrated reference sources, jigs, and other equipment necessary to perform the EDP's quarterly blind audit irradiations.

Deficiencies

None

Concerns

None

Observations

None

PROCESSING PROCEDURES

Comments

All processing procedures are maintained by Landauer in accordance with the Fermilab contract. All participant dose equivalent results are calculated using an algorithm designed for compliance with DOELAP criteria and consistent with the algorithm used for DOELAP performance testing. The majority of the Fermilab EDP procedures and TBD have been updated recently to document current practices and the inclusion of Saturn Ring extremity dosimeter for the DOELAP accreditation.

Deficiencies

None

Concerns

None

Observations

None

DOSIMETERS

Comments

Fermi is seeking accreditations for 3 types of dosimeters supplied by Landauer: InLight Model 2T whole body OSL with CR-39 (beta/gamma/neutron), Saturn Ring extremity thermoluminescent dosimeter, and U Ring extremity thermoluminescent dosimeters.

Deficiencies

None

Concerns

Concern #3 The application included accreditation for both Landauer U ring and Saturn ring extremity dosimeters. However, all references to the U ring have been removed from the current EDM. U rings are continuing to be retrieved for processing this quarter and previous accreditation remains in effect until this accreditation process is complete. Therefore, documentation for the U ring needs to be included as required by the DOELAP criteria to meet ongoing accreditation until all U ring dose results are closed out and reported. (G.1, G.2, G.3, G.6, D.1, D.2, D.5, T.2)

Observations

None

REPORTS

Comments

Vendor supplied dose reports were reviewed and contain all DOELAP required elements for reporting. The DPM reviews and approves all doses prior to distribution.

Deficiencies

None

Concerns

None

Observations

Observation #3 Records do not contain sufficient identification between the Landauer myLDR system and the Fermilab electronic dose record system to allow correlation with calibration and control system records. It was not possible to identify an individual without a Fermilab ID number (i.e., a visitor) with monitoring across more than one monitoring year to pull individual dosimeter records in the event of a contested result in order to correlate the results with calibration and control system records. (Q.9)

TESTING

Comments

All Fermilab contracted vendor (Landauer) dosimeters have successfully passed the most recent DOELAP proficiency testing. The Fermilab DOELAP application for whole body testing identifies only one InLight model 2T. The InLight model 2J of the current DOELAP accreditation cycle has been dropped.

Deficiencies

None

Concerns

None

Observations

Observation #4 Technical Basis Document R.P. Note #124, Rev. 12, section 6.0 DOELAP needs a paragraph to describe which categories are tested and the justification for the extremity dosimeters similar to the section for whole body dosimeters.