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U.S. DEPARTMENT OF ENERGY

Interoffice Communication

Environment, Safety, Health & Assurance
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PH: 515/294-7922

To: Sean Whalen, Manager ESH&A
cc: Shawn Nelson, Assistant Manager ESH&A
Topical Appraisal 2015

From: Michael McGuigan, Radiation Safety Officer, ESH&A

Date: September 28, 2015

Subject: RPP Functional Element Area, Internal Dosimetry Program

The Topical Appraisal is attached.

Topical Appraisal - RPP Functional Element Area, Internal Dosimetry Program

1.0 Scope

This topical appraisal was conducted to review the Laboratory's RPP functional element area, Sealed Radiological Source Accountability and Control Requirements, 10 CFR 835.401(a), 402(c), (d), Chapter 5.0 of Guide 441-1C.

2.0 Dates

September 21-24, 2015

3.0 Methodology

The Laboratory's Radiation Protection Program's organization was reviewed within The Ames Laboratory's administrative and safety oversight system. Applicable regulations, guidance, and standards were reviewed to assure that the Laboratory is meeting current industry standards.

3.1 References

The following references were reviewed for this appraisal:

- Title 10 of Code of Federal Regulations, Part 835 (10 CFR 835), *Occupational Radiation Protection*,
- DOE Guide 441.1-1C, *Radiation Protection Programs Guide, Chapter 12.0*
- DOE Standard 1098-2008 Ch1, *Radiological Control*,
- DOE-STD-1121-2008, *Internal Dosimetry Technical Standard*

The regulatory requirements from 10 CFR 83, 10 CFR 835.401(a), 402(c), and (d), Internal Dosimetry Program requirements have been place in the matrix below. The Compliance/Comment column points to the documentation and coverage of the rule.

Subpart E– Monitoring of Individuals and Areas	
§ 835.401 General requirements.	Compliance/ Comments
(a) Monitoring of individuals and areas shall be performed to: (1) Demonstrate compliance with the regulations in this part; (2) Document radiological conditions; (3) Detect changes in radiological conditions; (4) Detect the gradual buildup of radioactive material; (5) Verify the effectiveness of engineered and administrative controls in containing radioactive material and reducing radiation exposure; and (6) Identify and control potential sources of individual exposure to radiation and/or radioactive material.	**Procedure 10202.008**, *Control of Radioactive Contamination***,** page 9: Area surveys shall be performed to document radiological conditions in the workplace, detect changes in radiological conditions, detect the gradual buildup of radioactive materials in the workplace, and verify the effectiveness of engineering and process controls in containing radioactive materials. **Procedure 10202.008**, *Control of Radioactive Contamination***,** Page 7: At a minimum, individuals exiting contaminated areas should be monitored, using either portable or automated devices. **Procedure 10202.010**, *Radiological Work Permits*, This document is guidance for work planning related to worker radiological protection at Ames Laboratory and completion of Radiological Work Permits in support of research and Facilities and Engineering Services work throughout the site.

§ 835.402 (c), (d) Individual monitoring.	Compliance/ Comments
(c) For the purpose of monitoring individual exposures to internal radiation, internal dosimetry programs (including routine bioassay programs) shall be conducted for: (1) Radiological workers who, under typical conditions, are likely to receive a committed effective dose of 0.1 rem (0.001 Sv) or more from all occupational radionuclide intakes in a year; (2) Declared pregnant workers likely to receive an intake or intakes resulting in an equivalent dose to the embryo/fetus in excess of 10 percent of the limit stated at § 835.206(a); (3) Occupationally exposed minors who are likely to receive a dose in excess of 50 percent of the applicable limit stated at § 835.207 from all radionuclide intakes in a year; or (4) Members of the public entering a controlled area likely to receive a dose in excess of 50 percent of the limit stated at § 835.208 from all radionuclide intakes in a year.	**Plan 10202.001**, *Internal Dosimetry Technical Basis Document*. This plan provides the methods and rationale supporting the Ames Laboratory internal dosimetry program. Under typical conditions at the Ames Laboratory radiological workers are not likely to receive a committed effective dose of 0.1 rem or more from all occupational radionuclide intakes in a year. The occurrence of a measurable intake of radioactive material and the potential for internal exposures at Ames Laboratory are extremely unlikely and the types, quantities and frequency of working with radioactive materials do not support establishment and maintenance of a routine bioassay program at Ames Laboratory. However a contingency plan for obtaining bioassay measurements is maintained with Argonne National Laboratory. This plan documents the Laboratory's internal dosimetry program which is implementation of the Radiation Protection Program (RPP) functional element, internal dosimetry, the regulatory provisions of which are; 10 CFR 835.401(a), 402(c), (d).
(d) Internal dose monitoring programs implemented to demonstrate compliance with § 835.402(c) shall be adequate to demonstrate compliance with the dose limits established in subpart C of this part and shall be: (1) Accredited, or excepted from accreditation, in accordance with the DOE Laboratory Accreditation Program for Radiobioassay; or (2) Determined by the Secretarial Officer responsible for environment, safety and health matters to have performance substantially equivalent to that of programs accredited under the DOE Laboratory Accreditation Program for Radiobioassay.	**Plan 10202.004, RPP** page 7: The external dose monitoring program demonstrates compliance with the dose limits established in subpart C based on the dosimetry provider's accreditation with the National Voluntary Laboratory Accreditation Program for Personnel Dosimetry, as Ames Laboratory has been granted an exception by the DOE to the DOELAP accreditation requirement. **Plan 10202.001**, *Internal Dosimetry Technical Basis Document*. Ames Laboratory has a MPO with Argonne National Lab to preform bioassay analysis on the occasion that procedures warrant the need.

3.2 Program Documentation

The following programmatic documents were reviewed:

- *Radiation Protection Program Plan* (10202.004), due for review 07-01-2016
  As a result of the June 2014 DOE Radiation Protection Program Assessment, level 2 finding, F2-1, the Laboratory's RPP is currently being reviewed. The finding stated that the Laboratory's RPP document does not address each §835 requirement. A matrix was developed to demonstrate whether all §835 requirements are being adequately addressed by the current RPP. The Laboratory also committed to developing additions/updates to the RPP as necessary and assuring the matrix will demonstrate compliance with §835 requirements. The June 2014 assessment team advised that exact wording from §835 should be imbedded in the RPP and/or supporting documentations. Matrixes were developed, and while completing the matrix gaps in administrative coverage were identified. Exact wording from §835, in entirety, are not present within the Ames Laboratory's RPP and/or supporting documentation. To correct the finding and improve the program exact, wording from §835 is being inserted into The Ames Laboratory RPP, and the Ames Laboratory Radiological Safety Program Description.

- *Ames Laboratory ESH&A Program Manual* (10200.002),

The Laboratory's Environment, Safety, Health & Assurance Program Manual (Safety Manual) was last updated in 2011. The Safety Manual is being revised. Subject Matter Experts have been assigned sections to update the Safety Manual. The Laboratory's RSO is assigned section 7, Radiological Protection Program. Section 7 is under review and is being updated.

- *ALARA Policy* (10202.001), Rev. 5.1, the procedure was last revised 05/10/2013. It is due for update 02/01/2016. No issues noted.

- *Radiological Work Permit Procedure (10202.010),* implemented 01/15/2015. Document was created per the June 2014 RPP assessment corrective action plan. It is due for update 01/15/2018. No issues noted.

- *External Dosimetry Technical Basis Document* procedure (10202.036), Rev. 4, was last updated 06/01/2013. It is due for update 06/01/2016.

- Internal Dosimetry Technical Basis Document plan (10202.001), Rev. 7, was last updated 06/01/2013. It is due for update 06/01/2016. Opportunity for improvement will be addressed at normal document review/update cycle.

- Memorandum Purchase Order (MPO), A12-0251, was last updated 10/01/2011. Expiration date is 09/30/2016. See attachment two, Memorandum Purchase Order (MPO) with Argonne National Lab. Point of contact in the file for Ames Laboratory was Jim Withers, who is no longer with the Lab. Documentation has been updated. The new point of contact is Mike McGuigan, RSO.

3.3 Training
None identified.

3.4 Personnel Interviewed
None identified.

4.0 Assessment Results & Discussion
Occupation Medicine has protocols in place for collecting, packing and contact information for mailing bioassay samples to Argonne National Laboratory for radiological analysis. Protocol points of contact were verified. One change to the contact list was made to the procedure. Sample collection kits are maintained and stored by the Occupational Medicine department. While checking kit availability it was discovered that Occupational Medicine has no bioassay kits on inventory. It was surmised that the kits were out-of-date, discarded and not replaced. Argonne National Laboratory, assay analysis, lab manager, Theresa Davis, was contacted and new kits have been ordered. Ames Laboratory Shipping department has procedures in place to handle the shipment of bioassay samples.

The Radiation Protection Program Progress Review, April 9, 2015, asserted that the Lab should review and revise the Internal Dosimetry Technical Basis document to include a comprehensive description and analysis of all of the Laboratory's radiological isotopes of concern. Ames Laboratory, ESH&A, HP group will reach out to the DOE complex and contact radiation safety SMEs at other facilities to benchmark other Radiation Protection Program internal dosimetry elements.

4.1 Strengths
None noted

4.2 Noteworthy Practices

None noted.

4.3 Findings

Opportunity for Improvement One, OFI-1-While checking bioassay kit availability it was discovered that Occupational Medicine had no bioassay kits on inventory. It was surmised that the kit was out-of-date, discarded and not replaced. Argonne National Laboratory, assay analysis, lab manager, Theresa Davis, was contacted and new kits have been ordered.

Opportunity for Improvement Two, OFI-2- The Radiation Protection Program Progress Review, April 9, 2015, asserted that the Lab should review and revise the Internal Dosimetry Technical Basis document to include a comprehensive description and analysis of all of the Laboratory's radiological isotopes of concern. Ames Laboratory, ESH&A, HP group is evaluating methodologies, and will reach out to DOE radiation safety SMEs to benchmark other Radiation Protection Program internal dosimetry elements.

5.0 Overall Conclusions

Ames Laboratory is fulfilling its obligations pertaining to Radiation Protection Program organization for implementing an internal dosimetry program that meets 10 CFR 835.401(a), 402(c), and (d).

6.0 Attachments

Attachment One: List of RPP documents
Attachment Two: Memorandum Purchase Order (MPO) with Argonne National Lab.

Attachment One - List of RPP Documents

DocNum	DocType	Current Title
10202.043	Form	MC&A Check List
10202.021	Form	Exchange of Quarterly TLD Badges
10202.034	Form	Occupational Radiation Exposure Record
10202.016	Form	Radiological Work Permit Guidance and Checklist
10202.025	Form	RWP Summary & Close Out Form
10202.047	Form	Radiological Material Datapage
10202.018	Form	General RWP Format Template
10202.044	Form	Lost Dosimeter Report
10202.041	Form	Materials Balance Area Inventory and Report Form
10202.019	Form	Specific RWP Format Template
10202.006	Form	Checklist for Initiating the use of Rad Mat/Rad Pro devices
10202.012	Form	Radiation Survey Instrument Training (AL-157)
10202.024	Form	Sealed Source Accountability Form
10202.028	Form	Ames Laboratory Air Monitoring Record
10202.023	Form	Sealed Source Inventory Form
10202.022	Form	Analytical X-Ray System Inspection and Survey Record
10202.042	Form	MC&A Nuclear Material Transfer Form
10202.003	Guide	Rad Worker Study Guide for Support Staff
10202.002	Manual	Radiological Worker Study Guide
10202.002	Plan	Materials Control and Accountability Program Plan
10202.001	Plan	Internal Radiation Dosimetry Contingency Plan
10202.005	Plan	External Dosimetry Technical Basis Document
10202.012	Policy	Walk Down of Posted General Radiological Work Permits
10202.015	Procedure	Sealed Radioactive Source Accountability and Control
10202.031	Procedure	Health Physics Group Review of Service Order Requisitions
10202.008	Procedure	Control of Radioactive Contamination
10202.064	Procedure	Facility Categorization for Radiological Material
10202.011	Procedure	Calibration of Portable Survey Instruments
10202.016	Procedure	Posting and Labeling for Radiological Control
10202.021	Procedure	Workplace Air Monitoring
10202.036	Procedure	External Dosimetry Program Implementation
10202.060	Procedure	Conducting Contamination and Area Monitoring Surveys
10202.014	Procedure	Receipt, Transfer, & Shipment of Radioactive Materials
10202.001	Charter	ALARA Committee Charter
10202.002	Charter	Laser Safety Committee Charter
10202.003	Form	Application for Use of Radioactive Materials
10202.005	Form	Application for Use of Radiation Producing Devices
10202.008	Form	Declaration of Pregnancy
10202.033	Form	Dosimetry History Request Form
10202.037	Form	Employee Radiation Dosimetry Badge Agreements and Commitments
10202.038	Form	Ames Laboratory Dosimetry Authorization Form
10202.048	Form	RW I/II (AL-207) Practical Factors Exam Employee Sign-off Record.

Attachment One - List of RPP Documents

DocNum	DocType	Current Title
10202.049	Form	Laser Hazard Assessment Form
10202.052	Form	Rad Worker II (Rad Materials) Learning Assessment b (AL-077)
10202.054	Form	Learning Assessment "General Employee Radiological Training (GERT) (AL-074)
48202.014	Form	Laser User Authorization Form
10202.001	Guide	Radiation Safety Study Guide for Users of Radiation Generating Devices
10202.001	Procedure	ALARA Procedure
10202.001	Handout	Standard for Protection Against Radiation - Notice
10202.002	Handout	Radiation Protection Program
10200.002	Manual	ESH&A Manual "Radiation Protection"
10202.002	Manual	Radiological Worker Study Guide
10202.004	Plan	Radiation Protection Program (RPP)
10202.001	Policy	ALARA Policy

Attachment Two – Memorandum Purchase Order (MPO) with Argonne Lab.

Purchase Order

Purchase Order A12-0251
PO Release Number 0

Vendor # 07515
ARGONNE NATIONAL LABORATORY
OCF-PRO, BLDG. 201, RM. 2L25
9800 SOUTH CASS AVENUE
ARGONNE, IL 60439

Vendor Email: Fax:

Buyer SPIKER, ANDREA L
Terms NET 30
FOB ORIGIN
Sales Order
Ship Via
Order Date 11/01/11
Period of Performance: 10/01/11 To 09/30/16

PO Line Number	PO Line Notes	Due Date	Order Qty	Net Unit Cost Amount	U/M	PO Line Total Amount
1	STANDING ORDER FOR SERVICES FOR POTENTIAL RADIOLOGICAL EXPOSURE THIS IS NOT A CONTRACT. IT IS A MEMORANDUM PURCHASE ORDER ISSUED FOR SERVICES, EQUIPMENT OR MATERIALS UNDER GOVERNMENT CONTRACT DE-AC02-07CH11358. THE TERMS AND CONDITIONS OF THE VENDOR'S PRIME CONTRACT WITH DOE SHALL APPLY. ACCOUNTING FOR COSTS OF MATERIALS, EQUIPMENT OR SERVICES BELOW WILL BE MADE IN ACCORDANCE WITH AND AS REQUIRED BY DOE CASH TRANSFER POLICY, DOE ACCOUNTING PRACTICES AND PROCEDURES HANDBOOK, UNLESS OTHERWISE DIRECTED BY DOE. THIS MP IS WRITTEN AS A STANDING ORDER FOR ARGONNE NATIONAL LAB PERSONNEL TO PROVIDE MEDICAL SERVICES CONSITING OF RADIO-CHEMICAL ANAYLSIS OF URINE AND FECAL SAMPLES AND WHOLE BODY COUNTING FOR POTENTIAL RADIOLOGICAL EXPOSURE, IF THOSE SERVICES ARE NEEDED AND REQUESTED BY THE AMES LABORATORY	11/01/11	1	16,000.00	EA	16,000.00
				Purchase Order Total		**$16,000.00**

Purchasing Agent

Bill To:	Ship To:	Contact:
Accounts Payable * PH(515/294-5663)	USDOE Warehouse * PH(515/294-2916)	Purchasing Office * PH(515/294-1780)

Nov 2, 2011 **Vendor Copy** 11:46:37 AM