

## ALARA

This policy establishes Ames Laboratory's program of commitment to keep all exposures to ionizing radiation **As Low As Reasonably Achievable (ALARA)**. It also establishes an Ames Laboratory administrative dose limit and in part is the implementation of the Radiation Protection Program (RPP) functional element, ALARA program, the regulatory provisions of which are detailed in 10 CFR 835 Subpart B and Subpart K.

### 1.0 APPROVAL RECORD

- Reviewed by: Document Control Coordinator (Hiliary Burns)
- Approved by: ALARA Committee Chair (Trevor Riedemann)
- Approved by: ESH&A Manager (Sean Whalen)
- Approved by: Legal Counsel (Barbara Biederman)
- Approved by: Assistant Director for Scientific Planning (Cynthia Jenks)
- Approved by: Associate Director for Sponsored Research Administration (Deb Covey)
- Approved by: Chief Operations Officer (Mark Murphy)
- Approved by: Chief Research Officer (Duane Johnson)
- Approved by: Deputy Director (Thomas Lograsso)
- Approved by: Laboratory Director (Adam Schwartz)

The official approval record for this document is maintained in the Training and Documents Office, 105 TASF.

### 2.0 REVISION/REVIEW INFORMATION

The revision description for this document is available from and maintained by the author.

### 3.0 PURPOSE AND SCOPE

This policy establishes Ames Laboratory's program of commitment to keep all exposures to ionizing radiation As Low As Reasonably Achievable (ALARA). It also establishes an Ames Laboratory administrative dose limit and in part is the implementation of the Radiation Protection Program (RPP) functional element, ALARA program, the regulatory provisions of which are detailed in 10 CFR 835 Subpart B and Subpart K, the Ames Laboratory Radiological Protection Program (RPP) as well as DOE Order 458.1 and that of the Laboratory's Environmental Radiological Protection Program (ERPP). This policy is not a substitute for the 10 CFR 835, the RPP or ERPP; it is intended to be consistent with all relevant statutory and regulatory requirements and shall be revised whenever necessary to ensure such consistency is maintained.

Should a conflict arise between the requirements of this policy and the documents specified above, the requirements of those documents shall have primacy.

### 3.0 ROLES AND RESPONSIBILITIES

With respect to a particular DOE activity, Ames Laboratory management shall be responsible for compliance with the requirements of 10 CFR 835. The Ames Laboratory Director has primary responsibility for worker health and safety and must ensure the requirements of Laboratory policies and DOE Orders and Regulations are met. The responsibility and authority for administering the ALARA program is delegated to the Health Physics Group within the ESH&A Office. Line managers are responsible for implementing the actions necessary for an

<b>Contact Person</b>	<a href="#">Michael McGuigan</a>	<b>Revision</b>	6
<b>Document</b>	Policy 10202.001	<b>Effective Date</b>	02/15/2016
		<b>Review Date</b>	02/15/2019

effective ALARA program. Ames Laboratory employees and others working in Ames Laboratory space, are responsible for following ALARA principles and procedures in their day-to-day operations. A cardinal principle is that safety is everyone's concern; this principle also applies to ALARA.

#### 4.0 CONDUCT OF ACTIVITIES/RADIOLOGICAL PROTECTION PLAN

Measures shall be taken to maintain radiation exposure in controlled areas ALARA. The primary method employed is physical design features (e.g., confinement, ventilation, remote handling, and shielding). Administrative controls are used only as supplemental methods to control radiation exposure.

For specific activities where the use of physical design features is impractical, administrative controls and procedural requirements shall be implemented to maintain radiation exposure ALARA. Optimization methods shall be employed to assure that occupational exposure is maintained ALARA in developing and justifying facility design and physical controls. The design objective for controlling personnel exposure from external sources of radiation in areas of continuous occupancy shall be to maintain exposure levels below an average of 0.5 millirem/hr and as far below this as is reasonably achievable. The design objectives for exposure rates for potential exposure to a radiological worker in an area without continuous occupancy shall be ALARA and shall not exceed 20 percent of the applicable standards per 10 CFR 835.202.

Ames Laboratory will conduct all activities in a manner that limits personnel radiation exposure to levels that are ALARA. ALARA principles will be implemented through a graded approach by considering the degree of hazard and complexity of the operation. This assessment is done within the Readiness Review process for specific activities. However, every reasonable measure consistent with technical, economic, social and regulatory concerns will be taken to reduce exposures to levels well below regulated values in carrying out the mission of the Laboratory.

For normal facility operations, the design objective, regarding the control of airborne radioactive material, shall be to avoid releases to the workplace atmosphere and, in any situation, to control the inhalation of radioactive material by workers to levels that are considered ALARA. Confinement and ventilation, as appropriate for the radionuclides present and facility operation, shall normally be used.

The design and/or modification of a facility and the selection of materials shall include features that facilitate operations, maintenance, decontamination, and decommissioning to the extent possible without compromising other requirements with which Ames Laboratory must comply.

Facilities designs are such that during routine operations the combination of physical design features and administrative control procedures provide for controlling the occupational dose to general employees so that the limits established at 10 CFR 835.202 are not exceeded and are as far below those limits as is reasonable utilizing the ALARA process.

Ames Laboratory employees or DOE personnel are prohibited from willfully taking or causing to be taken any action inconsistent with the requirements of 10 CFR 835 or any program, plan, schedule, or other process established by 10 CFR 835.

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Nothing in 10 CFR 835 or the programs, plans, schedules, or processes established to implement 10 CFR 835 shall be construed as limiting actions that may be necessary to protect the health and safety of individuals who work at Ames Laboratory and members of the public.

All radiological activities at Ames Laboratory shall be conducted in compliance with a documented radiation protection program (RPP) and ERPP approved by DOE. DOE approval of the initial Ames Laboratory RPP was received on June 23, 1995. Revisions to the RPP must be submitted for DOE approval in accordance with 10 CFR 835.101(h).

The contents of the RPP and ERPP shall be reviewed in the context of the scope of operations as submitted with the RPP and ERPP, to guarantee consistency within the nature of the activities performed at Ames Laboratory. Should the scope of operations be modified significantly, the RPP will be revised such that it reflects the proposed activity and is approved in accordance with 10 CFR 835.101(h) and that of DOE Order 458.1. The content of the Ames Laboratory RPP and ERPP are commensurate with the nature of the activities performed at the Laboratory and includes formal plans and measures for applying the ALARA process to occupational exposure.

Any task outside the scope of the RPP or ERPP shall not be initiated until an update is approved by DOE unless the changes, additions, or updates do not decrease the effectiveness of the RPP or ERPP, as determined by the ESH&A Office Health Physics Group, and the RPP or ERPP, as changed, continue to meet the requirements of 10 CFR 835, DOE Order 458.1.

Changes, additions, or updates must be submitted to DOE within 180 days of the effective date of modifications to 10 CFR 835, as required per DOE Order 458.1.

Changes, additions, or updates to the Ames Laboratory RPP or ERPP may become effective without prior DOE approval only if the changes do not decrease the effectiveness of the RPP or ERPP, as determined by the ESH&A Office Health Physics Group, and the RPP or ERPP, as changed, continues to meet the requirements of 10 CFR 835 and that of DOE Order 458.1.

Ames Laboratory will not implement proposed changes that decrease the effectiveness of our RPP or ERPP without approval by the DOE.

## 5.0 PROGRAM/POLICY/PROCEDURE INFORMATION

No activity with the potential for significant personnel radiation exposures or spread of radioactive contamination outside defined radiological areas will be performed until it is determined by the cognizant line manager the task is necessary and the measures in place are sufficient to ensure personnel doses will be kept ALARA. The Ames Laboratory ALARA procedure provides the framework for implementation and enforcement of this policy.

Radiation quantities used in the records required by 10 CFR 835 shall be clearly indicated in the special units of curie, rad, roentgen, or rem, including multiples and subdivisions of these units.

### 5.1. Regulatory Requirements and ALARA Goals

The Ames Laboratory ALARA Policy and associated ALARA procedures are based on the requirements of 10 CFR 835, DOE Order 458.1, the Ames Laboratory RPP and the Ames Laboratory ERPP. The Director's affirmation of this policy establishes the goal for

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the Laboratory to keep doses from radioactive use activities ALARA. This policy communicates management’s support and commitment to limit radiation doses to the employees, visitors, the public and the environment to those levels that are ALARA. Ames Laboratory will continually consider ways to reduce potential doses for given activities so long as the cost of the consideration does not exceed the value of the potential dose that is being saved. This policy establishes an ALARA Committee chartered for the purposes of advising and reviewing ALARA program elements and goals, and for review and advisement for activity submitted to, on review by, the Safety Review Committee where there are ALARA concerns. The ALARA Committee will report annually to the Director, the Health Physics Group, and the Manager of Environment, Safety, Health and Assurance Office and provide updates to the Director on the progress in meeting ALARA goals.

For those activities that are required by 10 CFR 835.102, 10 CFR 835.901(e), 10 CFR 835.1202(a), and 10 CFR 835.1202(b), Ames Laboratory allows a grace period, not to exceed 30 days, to accommodate scheduling needs.

**5.2. Ames Laboratory Administrative Dose Limit**

Based on historical personnel radiation dosimetry records, current activities, and projected activities involving sources of ionizing radiation at Ames Laboratory an annual administrative control level of 0.5 rems has been established. The ALARA committee via the RSO will investigate the circumstances of exposure events exceeding this limit and institute corrective actions if necessary.

**5.3. Training Requirements**

Radiation safety training on the topics established at 10 CFR 835.901(c) commensurate with the hazards in the area and the required controls shall be provided to individuals:

- Before they are permitted unescorted access to controlled areas; and
- Before they receive occupational dose during access to controlled areas at a DOE site or facility.

An individual must successfully complete a written examination and performance evaluations that demonstrate his/her knowledge of the radiation safety topics established in 10 CFR 835.901(c):

- Before being permitted unescorted access to radiological areas; and
- Before performing unescorted assignments as a radiological worker.

Radiation safety training developed at Ames Laboratory shall address, at a level of detail appropriate to the potential radiological hazards that may be encountered by that category of worker, the following topics:

- Risks of exposure to radiation and radioactive materials, including prenatal radiation exposure;
- Basic radiological fundamentals and radiation protection concepts;
- Physical design features, administrative controls, limits, policies, procedures, alarms, and other measures implemented at Ames Laboratory to manage doses

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- and maintain doses ALARA, including both routine and emergency actions;
- Individual rights and responsibilities as related to implementation of Ames Laboratory’s radiation protection program;
- Individual responsibilities for implementing ALARA measures required by 10 CFR 835.101; and
- Individual exposure reports that may be requested in accordance with 10 CFR 835.801.

The use of escorts is discouraged. However, when an escort is used in lieu of training, the escort shall:

- Have completed radiation safety training, examinations, and performance demonstrations required for entry to the area and performance of the work; and
- Ensure that all escorted individuals comply with the documented radiation protection program.

Changes to radiation protection policies and procedures will be incorporated into the training materials as they are identified and a decision made by the ESH&A Office Health Physics Group if retraining or a suitable alternative method of communicating the changes shall be employed. Radiation safety training will be provided at intervals not to exceed 24 months.

Retraining for individuals subject to the requirements of 10 CFR 835.901(b)(1) and (b)(2) does include a written examination and imposes remedial actions for those unable to satisfy the established minimum criteria for re-qualification.

## 6.0 POST PERFORMANCE ACTIVITY

The ESH&A Office Health Physics Group has the responsibility and authority to implement and maintain the ALARA program. Health Physics shall ensure the Director's goals for the program are being carried out and shall maintain all records associated with the ALARA program. Health Physics will fill the committee seats with qualified personnel as required by the ALARA Charter.

## 7.0 ADDITIONAL INFORMATION

- Health Physics Manual of Good Practices for Reducing Radiation Exposure to Levels that are As Low As Reasonably Achievable (ALARA), L.H. Munson et al., Pacific Northwest Laboratory, Richland, WA, 1988.
- Title 10, Code of Federal Regulations, Part 835, Occupational Radiation Protection, most current revision
- DOE-STD-1098-2008, Radiological Control
- DOE Order 458.1 chg 2, Radiation Protection of the Public and the Environment
- DOE Guide 441.1-1C (05/19/2008) Radiation Protection Programs Guide for use with Title 10 CFR Part 835, Occupational Radiation Protection