

SUBJECT AREA CONTENT

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Management System: [Radiological Control](#)

Subject Area: Radiological Dose Limits

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Effective Date: **Jul 29, 2010** ([Rev 1.0](#))

Periodic Review Due: **Jul 29, 2015**

Subject Matter Expert:

[Steven Coleman](#)
[Henry Kahnhauser](#)

Management System Executive:

[Steven Coleman](#)

Management System Steward:

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Introduction

A goal of Brookhaven National Laboratory is to maintain personnel radiation exposure As Low As Reasonably Achievable (ALARA) and well below regulatory dose limits. To accomplish this goal, Administrative Control Levels (ACLs) are established below the regulatory limits to help reduce individual and collective radiation doses. These control levels are multi-tiered, with increasing levels of authority required to approve higher ACLs. These controls ensure that no regulatory radiation dose limit for radiological workers, non-radiological workers, or members of the public will be exceeded.

This subject area addresses regulatory radiation dose limits and BNL ACLs under the following conditions:

1. Radiological workers entering a posted controlled and/or radiological area;
2. Untrained individuals (including employees, guests, and minors) entering posted controlled/radiological areas;
3. Off-site radiation doses to members of the general public;
4. Off-site radiological release limits for air and water;
5. Lifetime radiation doses for radiological workers; and
6. Special Control Levels for individuals entering posted controlled/radiological areas who are receiving radioisotopes as a part of radiation therapy for medical treatment.

For regulatory dose limits and BNL ACLs for declared pregnant radiological workers, refer to the [Declaration of Pregnancy](#) Subject Area.

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Section

Overview of Content (see section for full process)

[1. Regulatory Radiation Dose Limits](#)

- Line Managers establish controls for maintaining radiological exposures ALARA.
- Report exposure or suspected exposure exceeding regulatory dose limits.

[2. BNL Administrative Control Levels](#)

- Maintain radiological exposures from BNL facility operations ALARA.
- Line Managers establish Department/Division ACLs.
- Authorizations and extensions to radiation exposure ACLs.

Definitions

Exhibits

None

Forms

None

Training Requirements and Reporting Obligations

Personnel immediately report any exposure, or suspected exposure exceeding the regulatory dose limits to their supervisor, Facility Support Representative and Radiological Control Division management.

This subject area does not contain training requirements.

External/Internal Requirements

Requirement Number	Requirement Title
10 CFR 830, Subpart A	Energy, Nuclear Safety Management, Quality Assurance Requirements
10 CFR 830.200 - Subpart B	Safety Basis Requirements
10 CFR 835	Energy/Occupational Radiation Protection
20 CFR Parts 1 and 30 (EEOICPA)	Interim Final Rule Implementing the Energy Employees Occupational Illness Compensation Program Act (EEOICPA)
42 CFR 82 Dept of Health and Human Services	Methods for Radiation Dose Reconstruction Under the Energy Employees Occupational Illness Compensation Program Act of 2000; Final Rule
42 USC - Chapter 84 - Subchapter XVI (EEOICPA)	TITLE 42—THE PUBLIC HEALTH AND WELFARE, CHAPTER 84—DEPARTMENT OF ENERGY, SUBCHAPTER XVI—ENERGY EMPLOYEES OCCUPATIONAL ILLNESS COMPENSATION PROGRAM; Energy Employees Occupational Illness Compensation Program Act of 2000, as amended.(EEOICPA)
BSA Contract No. DE-AC02-98CH10886 - Clause C.4	Statement of Work
BSA Contract No. DE-AC02-98CH10886 - Clause I.52 (FAR 52.224-2)	Privacy Act (APR 1984)
O 231.1B Admin	

Change 1 (Nov 28 2012)	Environment, Safety and Health Reporting
O 410.2	Management of Nuclear Materials
O 414.1D Admin Chg 1 (May 8, 2013)	Quality Assurance
O 420.1C (Dec 12, 2012)	Facility Safety
O 433.1B (Apr 21, 2010)	Maintenance Management for DOE Nuclear Facilities
O 435.1 Change 1	CRD - Radioactive Waste Management
O 458.1 Change 2 (Jun 6, 2011)	Radiation Protection of the Public and Environment
O 460.1C (May 14, 2010)	Packaging and Transportation Safety
P 420.1 (February 8, 2011)	Department of Energy Nuclear Safety Policy
P 450.4A (Apr 25, 2011)	Integrated Safety Management Policy

References

[ALARA and Radiological Work](#) Subject Area

[BNL Radiological Control Manual](#)

[Declaration of Pregnancy](#) Subject Area

[Entry and Egress for Areas Controlled for Radiological Purposes](#) Subject Area

Standards of Performance

All staff and guests shall ensure that personnel radiation exposure is maintained As Low As Reasonably Achievable (ALARA).

All staff and guests shall comply with applicable Laboratory policies, standards, and procedures, unless a formal variance is obtained.

All staff and users shall identify, evaluate, and control hazards in order to ensure that work is conducted safely and in a manner that protects the environment and the public.

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PROCEDURE: REGULATORY RADIATION DOSE LIMITS

Management System: [Radiological Control](#)

Subject Area: [Radiological Dose Limits](#)

1. Regulatory Radiation Dose Limits

Effective Date: **Jul 29, 2010**

Subject Matter Expert:

[Steven Coleman](#)

[Henry Kahnhauser](#)

Management System Executive: [Steven Coleman](#)

Applicability

This information applies to radiological workers, supervisors of personnel monitored for radiation exposure, and employees, guests, visitors, and minors without radiological training.

Required Procedure

<p>Step 1</p>	<p>Department/Division line managers are responsible for establishing controls to ensure that the following Regulatory Annual Dose Limits are not exceeded:</p> <ul style="list-style-type: none"> • Radiological worker: 5 rem whole body (internal + external), 15 rem lens of eye, 50 rem extremity (hands and arms below the elbow, feet and legs below the knees, and skin), or 50 rem to any organ or tissue (other than lens of eye or skin); • Declared pregnant worker: 500 millirem embryo/fetus per gestation period; • Minors and students (under age 18): 100 millirem whole body (internal + external); • Visitors, guests and public (who have not completed BNL radiological training): 100 millirem. <p>Refer to the Declaration of Pregnancy Subject Area for declared pregnant worker requirements.</p>
<p>Step 2</p>	<p>Personnel without radiological training requiring access to areas controlled for radiological purposes must contact Radiological Control Division (RCD) Facility Support Representatives for access requirements to those areas.</p> <p>Refer to the Entry and Egress for Areas Controlled for Radiological Purposes Subject Area for requirements for accessing areas without radiological training.</p>
<p>Step 3</p>	<p>Personnel must immediately report any exposure, or suspected exposure exceeding the regulatory dose limits to their supervisor, Facility Support Representative and Radiological Control Division Manager.</p> <p>Note: Radiation doses due to background radiation, therapeutic and diagnostic medical procedures, and voluntary participation as a subject in medical research programs are not included in personnel radiation dose records.</p>

References

[BNL Radiological Control Manual](#)

[Declaration of Pregnancy](#) Subject Area

[Entry and Egress for Areas Controlled for Radiological Purposes](#) Subject Area

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PROCEDURE: BNL ADMINISTRATIVE CONTROL LEVELS

Management System: Radiological Control		
Subject Area: Radiological Dose Limits		
2. BNL Administrative Control Levels		
Effective Date: Jul 29, 2010	Subject Matter Expert: Steven Coleman Henry Kahnhauser	Management System Executive: Steven Coleman

Applicability

This information applies to all employees and guests who propose radiological facility and system modifications, and changes to plans and procedures that govern radiological work.

Required Procedure

BNL **Administrative Control Levels (ACLs)** for maintaining exposures from operations to guests, visitors, members of the public, and declared pregnant worker embryo/fetus are:

- Minors and students (under age 18): will not work in controlled areas or radiological areas without written consent of a parent or guardian. Contact your [Facility Support Representative](#) for access requirements and approvals.

Visitors, guests and minors (who have not completed BNL radiological training): 25 millirem per year.

- Declared pregnant worker: 350 millirem embryo/fetus per gestation period. Refer to the [Declaration of Pregnancy](#) Subject Area for declared pregnant worker requirements.

For authorization to exceed BNL ACLs, Laboratory Director and/or [Radiological Control Division Manager](#) approvals are required.

Step 1	<p>To ensure that radiation dose for the members of the general public are as low as reasonably achievable:</p> <ul style="list-style-type: none"> • Department/Division line management ensure that the normal operation of any single BNL facility does not cause off-site radiation exposure greater than 5 millirem in one year to members of the general public. • The Environmental Protection and Radiological Control Divisions review and monitor radiological operations data to ensure normal operation of all BNL facilities does not cause off-site radiation exposure greater than 25 millirem in one year to members of the general public.
Step 2	<p>Department/Division line management annually reviews prior year collective exposure and current year expected exposure. If prior year and/or expected current year collective exposure is greater than 100 person-millirem or a collective extremity dose of 10 person-rem, line management establishes ACLs.</p> <p>Refer to the ALARA and Radiological Work Subject Area for additional information on radiological controls.</p>
Step 3	<p>Department/Division line management forwards annual ACLs to the BNL ALARA Program Coordinator.</p>
Step 4	<p>To request authorization to exceed department/division radiation exposure ACLs, contact the BNL ALARA Program Coordinator, Facility Support Services Manager or Radiological Control Division Manager.</p> <p>The following authorizations apply to established Department/Division radiation exposure ACL extensions:</p> <ul style="list-style-type: none"> • Radiation exposures in excess of the Department/Division ACL but less than 1250 millirem/year require Department Chair/Division Manager approval. • Greater than 1250 millirem/year but less than 2000 millirem/year require Laboratory Director and Radiological Control Division Manager approvals. • Greater than 2000 millirem/year require Laboratory Director, Radiological Control Division Manager and DOE Secretarial Officer approvals.

References

[ALARA and Radiological Work](#) Subject Area

[Declaration of Pregnancy](#) Subject Area

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DEFINITIONS

Definition: [Radiological Dose Limits](#)

Term	Definition
Administrative Control Level (ACL)	A numerical dose constraint established at a level below the regulatory limit to administratively control and help reduce individual and collective radiation doses.
ALARA Program Coordinator	An individual who is responsible, as a minimum, for coordinating, promoting, and documenting activities to reduce occupational doses and the spread of radioactive materials to levels that are as low as reasonably achievable.
As Low As Reasonably Achievable (ALARA)	The approach to radiation protection to manage and control exposures (both individual and collective) to the work force and to the general public to as low as is reasonable, taking into account social, technical, economic, practical and public policy considerations. As used in 10CFR835, ALARA is not a dose limit, but a process that has the objective of attaining doses as far below the applicable limits of 10CFR835 as is reasonably achievable.
Controlled Area	Any area to which access is managed by or for DOE to protect individuals from exposure to radiation and/or radioactive material.
dose limit	A numerical dose constraint established by regulatory authority in federal regulation or by contractual authority through a DOE Order or Directive.
general employee	An individual who is either a DOE or DOE contractor employee, an employee of a subcontractor to a DOE contractor; or an individual who performs work for or in conjunction with DOE or utilizes DOE facilities.
member of the public	An individual who is not a general employee. An individual is not a "member of the public" during any period in which the individual receives an occupational dose.
minor	An individual under 18 years of age.

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