PAD-RAD-0101/R1AC1

Radiological Protection Program Description
For LATA Environmental Services of Kentucky, LLC
Paducah, Kentucky

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Date Issued—October 2012

Prepared for the
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Prepared by
LATA ENVIRONMENTAL SERVICES of KENTUCKY, LLC
managing the
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Paducah Gaseous Diffusion Plant
under contract DE-AC30-10CC40020

APPROVALS

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October 2012

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CONTENTS

ACRONYMS

ACL	administrative control level
AHA	Activity Hazard Assessment
ALARA	as low as reasonably achievable
ARA	airborne radioactivity area
ARM	area radiation monitor
BZA	breathing zone air
CA	contamination area
CAM	Continuous Air Monitor
CFR	*Code of Federal Regulations*
DAC	derived air concentration
DOE	U.S. Department of Energy
DOELAP	DOE Laboratory Accreditation Program
FM	facility manager
HCA	high contamination area
HEPA	high-efficiency particulate air
ISMS	Integrated Safety Management System
LATA	LATA Environmental Services of Kentucky, LLC
PIOM	project integration and operations manager
NRC	U.S. Nuclear Regulatory Commission
OSHA	Occupational Safety and Health Administration
PAAA	Price-Anderson Amendments Act
PD	Program Description
PFT	Practical Factors Training
PHP	Project Health Physicist
PNAD	personal nuclear accident dosimeter
PPE	personal protective equipment
RADCON	radiological control
RBA	radiological buffer area
RCT	radiological control technician
RGD	radiation-generating device
RMA	radioactive material area
RPP	Radiation Protection Program
RPM	Radiation Protection Manager
RSO	Radiation Safety Orientation
RSP	Radiation Safety Plan
RWP	radiological work permit
RWSST	Radiological Worker Site-Specific Training
ES&H	Environmental, Safety, and Health
SBD	Safety Basis Document
SMA	subject management area
SME	subject matter expert
TLD	thermoluminescent dosimeter

EXECUTIVE SUMMARY

The LATA Environmental Services of Kentucky, LLC, (LATA Kentucky) policy is to provide a safe and healthy workplace for all employees. Safety is the number one core value and shall always take precedence over cost and schedule. The accomplishment of this policy requires that work activities conducted for the U.S. Department of Energy (DOE) be guided by an overall Safety and Health Program at the company/functional level.

This Radiation Protection Program (RPP) Description (PD) document is intended to describe the general requirements and implementing guidance necessary for ensuring that members of the public, workers, and the environment are protected as LATA Kentucky completes its work activities.

The PD incorporates key elements of the DOE-approved RPP and radiological control (RADCON) procedures in a format that supports planning and implementation of radiation protection during LATA Kentucky work activities. The PD is applicable to both LATA Kentucky projects and LATA Kentucky personnel, LATA Kentucky subcontractors and their subtier subcontractors. Where necessary, a project or subproject Radiation Safety Plan (RSP) based on this PD also may be required to address more specific detailed project activities or subcontracted work. In all cases, the applicable elements of this PD shall be flowed down to the lowest task level to ensure compliance with radiation protection regulatory requirements.

1. INTRODUCTION

As a prime contractor to the U.S. Department of Energy (DOE), LATA Environmental Services of Kentucky, LLC, (LATA Kentucky) is required by 10 *CFR* § 835, *Occupational Radiation Protection*, to have a documented Radiation Protection Program (RPP), which must be approved by DOE.[1] The RPP specifies the actions required for implementing the requirements of 10 *CFR* § 835 in a manner that will minimize exposures to ionizing radiation; prevent the spread of radioactive contamination; and protect employees, the public, and the environment. The LATA Kentucky RPP commitments are implemented by a comprehensive Radiological Control (RADCON) Program through a system of performance documents. These performance documents include LATA Kentucky RADCON procedures that specify mandatory company-level and functional requirements that are necessary to ensure compliance with 10 *CFR* § 835.104. Requirements established in the RPP and RADCON performance documents are enforceable by DOE under the Price-Anderson Amendments Act (PAAA).

The scope of the RPP applies to all LATA Kentucky operations at locations, facilities, and sites that are within the prime contract scope of work where LATA Kentucky conducts operations for DOE. Consequently, LATA Kentucky employees, LATA Kentucky subcontractors, and subtier subcontractor personnel are obligated to comply with the applicable RADCON procedures that implement the LATA Kentucky RPP. Implementing guidance and requirements contained in this RPP Description (PD) document are intended to help itemize and clarify radiation protection responsibilities and performance expectations that are a necessary part of planning and executing radiological work supporting the LATA Kentucky contract.

This PD is a companion document with the LATA Kentucky Environment, Safety, and Health Plan, PAD-PLA-HS-001. These documents will be implemented jointly to achieve compliance with the overall LATA Kentucky Safety and Health (S&H) Program. The content of this PD also is consistent with the requirements of DOE-STD-3009-94, *Preparation Guide for U.S. Department of Energy Nonreactor Nuclear Facility Safety Analysis Reports*, DOE-STD-1098-2008, Chapter 7, *Radiation Protection*, and Chapter 7 of PRS-NFS-1394, *Safety Management Program Descriptions for Paducah Environmental Remediation Project Facilities*.

1.1 **SCOPE AND OBJECTIVE**

The objective of this PD is to describe the radiological work controls and practices necessary for radiation protection during the performance of work supporting the LATA Kentucky contract. All self-performed and newly subcontracted radiological work performed for LATA Kentucky will be performed in accordance with this document. Persons who access LATA Kentucky project sites (including employees, subcontractors, and vendors) and perform work activities associated with the scope of work are also subject to the applicable provisions of this PD and will be held responsible for adhering to the requirements as specified herein. Employees of other DOE prime contractors or the United States Enrichment Corporation (USEC) who enter LATA Kentucky project sites to perform activities for LATA Kentucky under a work authorization also are required to follow the provisions established in this PD. Employees of other DOE prime contractors or USEC who enter LATA Kentucky project sites to performing activities in support of their home organization are required to follow the RADCON Program requirements of their home organization, provided that the requirements for entry into radiological areas

[1] The approved LATA Kentucky RPP is PAD-PLA-HS-002, *Radiation Protection Program for 10 CFR 835 Occupational Radiation Protection.*

are consistent among the various entities. The crossover activities should be addressed formally through a shared site process to ensure that workplace hazards and controls are mutually understood, communicated, and consistent across the workplace interface. Personnel radiological monitoring, reporting, and training are to be performed by the employee's home organization in accordance with their RADCON policies and procedures regardless of activity.

1.2 **EXEMPTIONS DERIVED FROM APPLICATION OF AUTHORIZED LIMITS**

In accordance with 10CFR835.1(b)(6), radioactive material on or within material, equipment, and real property that is approved for unrestricted release under the authorized limits process may be excluded from regulation by 10CFR835 and falls outside the scope of the LATA KY Radiation Protection Program. The authorized limits process is defined in DOE Order 458.1 and consists of a Secretarial Officer approved analysis specifying a volumetric or surface radioactivity threshold, below which, the radioactivity is shown to not constitute a significant risk to the public and workforce. The LATA KY Radiation Protection Manager may implement radiation safety controls (e.g. dosimetry, workplace monitoring, labeling and posting, and contamination reduction controls) as best management practices in these instances. Controls will be specified in the project AHA, work control document(s), or performance document as determined by the Radiation Protection Manager and Facility Manager. Should radioactive materials in excess of those specified in the authorized limit(s) be discovered, the material, equipment, or real property in question will no longer meet the 10CFR835.1(b)(6), exemption. AC1

2. INTEGRATED SAFETY MANAGEMENT

LATA Kentucky is committed to implementing an Integrated Safety Management System (ISMS) that promotes the company's core values and the principles set forth by DOE. The principles and functions of the ISMS are used to achieve systematic integration of S&H protection into management and work practices at all levels of work. The direct involvement of the workers performing the work, beginning at the planning stage and continuing through final completion of activities, is critical to the successful development and implementation of ISMS. It is applicable to all work performed, including radiological work, under the contract whether the work is self-performed or subcontracted.

LATA Kentucky is dedicated to the concept that all accidents, injuries, and incidents are preventable and is committed to integrating safety into all aspects of work, work planning, and execution. This PD implements the environment, safety, and health policies contained in the ISMS program description PAD-PLA-SAF-001, *Integrated Safety Management System And Environmental Management System for the Paducah Environmental Remediation Project*), LATA Kentucky procedures, applicable DOE policy (i.e., DOE P 441.1, *Radiation Protection for DOE Activities*), and applicable Occupational Safety and Health Administration (OSHA) regulations found in 29 *CFR* § 1910, and 29 *CFR* § 1926.

2.1 **ZERO ACCIDENT PHILOSOPHY**

The Zero Accident Philosophy is a culture adopted by LATA Kentucky that focuses not only on just decreasing accidents, but on eliminating them altogether. The Zero Accident Philosophy adheres to the premise that all accidents are preventable. The goal of the Zero Accident Philosophy is to create a safe working environment that empowers employees to "take charge" of their own safety and to be able to stop unsafe work practices or conditions without reprisal. This goal is to be incorporated into all radiological work planning and execution.

Radiological incidents where workers may be exposed inadvertently or contamination is spread beyond established boundaries also are considered in LATA Kentucky's Zero Accident Philosophy. Each incident, regardless of how minor, is reviewed for noncompliance with 10 *CFR* § 835 and screened for potential reportability under PAAA provisions. Incidents are tracked and reviewed for potential adverse trends. Once adverse trends are identified, further corrective actions will be developed to ensure the prevention of such incidents, including the distribution of lessons learned, review/revision of established work control processes, enhancements to worker training, or revisions to LATA Kentucky performance documents.

2.2 **FACILITY MANAGEMENT**

All work performed at LATA Kentucky-managed facilities is performed in accordance with the Safety Basis Documentation (SBD) prepared for those facilities, as applicable (PAD-NS-1002, *Safety Documentation for Hazard Category 2 and 3 Nuclear Facilities* and PAD-NS-1009, *Safety Documentation for Radiological and Non-Nuclear Facilities*). All changes in work scope are approved by the facility manager (FM). Additionally, any new hazard identified in the facility as a result of planned work is discussed with the FM. The FM evaluates the change in scope or additional hazard to the requirements of the current SBD. Work is not performed until the Facility Manager is satisfied that all questions concerning the applicability of the SBD are answered and an unreviewed safety question determination has been completed, as applicable (PAD-NS-1001, *Unreviewed Safety Question Determination for Nuclear Category 2 & 3 Facilities*).

2.3 **ACTIVITY HAZARD ASSESSMENTS**

Activity Hazard Assessments (AHAs), procedures, or other appropriate work control documents are developed at the activity/task level to provide a documented, job-specific hazard assessment that addresses each step of the work process, the hazards involved, and the commensurate controls for those hazards. Project management is responsible for assuring that the AHA process is followed and that the appropriate level of documentation is provided to ensure that work may be executed in a safe and efficient manner. The project management team is responsible for ensuring the involvement of the workers and appropriate members of RADCON in the AHA process. Development and completion of the AHAs is a collaborative effort between respective S&H disciplines, job planners, and representatives of the workforce to ensure compliance with the technical S&H requirements. Projects need to plan for, and ensure safe operations, when work interfaces with other DOE prime contractors, lessees, and other subcontractors (including the LATA Kentucky RADCON Subcontractor), while working at LATA Kentucky facilities. As work proceeds, any changes to AHAs, work instructions, or other applicable work control documents, must be communicated to the RADCON organization to determine if the radiological hazards have changed and if changes in radiological protective measures are indicated prior to continuing work.

3. ORGANIZATION ROLES AND RESPONSIBILITIES

The following discussion of organization roles and responsibilities is limited to LATA Kentucky employees and subcontractors.

3.1 **MANAGER OF PROJECTS AND PROJECT DIRECTORS**

Project execution is led by a project integration and operations manager (PIOM) who is responsible and accountable for the execution of the work scope. The PIOM is a senior line manager who is fully empowered to control project resources and has cradle-to-grave responsibility for all project planning and execution. The project directors have direct and immediate responsibility for the safe performance of project activities, including field implementation of ISMS. The PIOM is personally accountable for the safe performance of work under his/her purview.

3.2 **PROJECT MANAGEMENT**

The project teams are composed of personnel matrixes to the project from the various functional organizations. The makeup of project teams varies depending on the work scope. The typical project team is composed of representatives from all disciplines who are necessary to accomplish the specific scope of work. Other functional resources and personnel with task- or discipline-specific experience are included on the team, as needed. Project teams are responsible for the planning and successful execution of the work. They develop project-specific execution plans, procedures, work packages, and subcontracting requirements, as necessary, to perform both project activities and oversight to confirm that activities comply with the specified requirements. Project teams provide the mechanism for integrating S&H considerations and controls into project activities. The project teams are responsible for defining the work scope, including prioritization of tasks and resource allocation within the project.

3.3 **FACILITY MANAGERS**

Each LATA Kentucky facility has an assigned FM who has been formally qualified and authorized by LATA Kentucky management to oversee all activities performed in his/her assigned facility/facilities and ensure they are conducted in a safe manner within the safety basis of the facility, as applicable.

The FMs generally are responsible to the PIOM for authorizing and overseeing the safe execution of all work activities in their facilities in accordance with relevant procedures.

3.4 **SUBJECT MATTER EXPERTS**

Subject matter areas (SMA) have been established and are supported by subject matter experts (SME). The SME is responsible for maintaining applicable company-level and functional performance documents and providing technical interpretation of applicable regulatory requirements. The LATA Kentucky SME for the Radiological Controls/Health Physics SMA is the RP manager (RPM). The RPM serves as the primary point-of-contact for technical LATA Kentucky radiation protection concerns with groups or organizations outside of LATA Kentucky and also as the LATA Kentucky single point-of-contact for the RPP.

3.5 **RADCON ORGANIZATION**

The RADCON organization is within the LATA Kentucky ES&H organization. The RADCON organization is responsible for implementing the LATA Kentucky RPP and the RADCON Program with the exception of radiation safety training program which is provided by the infrastructure contractor. This includes RPP elements such as the as low as reasonably achievable (ALARA) program, internal and

external dosimetry programs, worker and area monitoring programs, entry control program, radioactive source control program, and radiological records management program. The program is managed by the RPM who reports to the ES&H manager. The RPM oversees the implementation of the LATA Kentucky RPP and is supported by a team of radiological engineers, radiological control supervisors, and radiological control technicians (RCTs). Each member of the RADCON organization has the following fundamental responsibilities: (1) the performance of work in a safe manner; (2) reporting unsafe conditions and implementing Stop Work Authority, as required to prevent unsafe work conditions; (3) the assessment and control of radiological exposures of the workers, public, or environment; (4) minimizing the spread of contamination; and (5) ensuring compliance with LATA Kentucky policies and procedures.

The RPM is responsible for assigning RADCON job responsibilities and ensuring the correct interpretation of the requirements of 10 *CFR* § 835 for LATA Kentucky and subcontractors. The RPM maintains overall responsibility for all aspects of the RADCON Program. LATA Kentucky has radiological engineers in both management and technical support roles. The project health physicist (PHP) serve as project RADCON leads and are responsible for managing the day-to-day field operations of the RADCON Program in his/her specific project area. Each PHP reports to the RPM and is assigned to a specific LATA Kentucky project group. Currently, there are four project areas: Technical Programs, D&D, Waste Disposition, and Environmental Remediation and Monitoring. Day-to-day duties of the PHPs include the assignment of RCTs to individual projects and participation in incident investigations. The PHPs also are responsible for routinely interfacing with the various project managers to ensure that adequate RADCON staff is available and funded, to assist in work planning activities, preparing RADCON-related technical work documents, including ALARA reviews and work permits, to provide project level interpretation of procedures, and to ensure that radiological safety resources are integrated as necessary for planning and executing work activities. The PHPs provide technical oversight for projects to ensure that the LATA Kentucky RPP is implemented in a compliant manner. The RADCON technical programs manager (TPM) position is filled by a PHP who is responsible for the day-to-day implementation of RADCON support operations including: dosimetry, instrumentation, records and procedures management, training, source control, and quality assurance.

The TPM also assists in screening radiological incidents for potential PAAA violations and routinely interfaces with the LATA Kentucky Quality Assurance (QA) organization. Additionally, Health Physicist and Health Physicist Specialist may serve in technical support capacities and are assigned to the technical programs group.

Health Physicist and Health Physicist Specialist in this capacity report to the TPM and complete technical assignments, such as document preparation, data analysis and calculations, training module development, assessments, research, and general health physics duties. The RADCON supervisors who are assigned to support the each LATA Kentucky project group report to the radiological engineering lead.

The RADCON supervisors are responsible with providing the day-to-day job assignments for the RCTs, managing personnel-related issues, ensuring that the requirements of the Collective Bargaining Agreement are met, providing guidance on implementation of LATA Kentucky RADCON procedures, coordinating resource assignments across projects, recording and tracking RCT expenditures, and for performing QA related duties associated with RADCON Program records. RADCON supervisors are expected to have first hand, up to date knowledge of the field activities the RCTs are supporting.

The LATA Kentucky RPM responsibilities include providing strategic planning for the RADCON organization, establishing and maintaining RADCON Program and business elements, managing personnel issues, establishing and maintaining the RADCON operating budget, facilitating development of lessons learned for radiation protection concerns and process improvements, and approving and providing interpretation for radiation safety procedures and policies. The RPM reports to the S&H

manager. The RPM also ensures that the content of this PD is consistent with the requirements of DOE-STD-3009-94, Chapter 7, Radiation Protection, and Chapter 7 of PRS-NFS-1394, *Safety Management Program Descriptions for Paducah Environmental Remediation Project Facilities*. Other responsibilities include the following:

- Managing RADCON business elements including personnel, budget, and procurement;
- Maintaining DOE Laboratory Accreditation Program (DOELAP) accreditation for the internal dosimetry program;
- Participating in PAAA screenings, as required;
- Assigning radiological engineers and RADCON supervisors to support projects as needed;
- Developing and publishing periodic reports and statistics on company-wide ALARA performance metrics;
- Directing the development of and approving technical work documents and procedures;
- Approving prejob ALARA reviews, project ALARA plans and Radiological Design Reviews;
- Approving radiological work permits (RWPs) for high contamination areas (HCAs), airborne radiological areas, and hot work activities;
- Evaluating restriction of radiological worker status after violation of a RWP or RADCON Program requirement;
- Assisting in Request for Proposal formation for subcontracts that involve radiological work activity;
- Performing radiological incident review, reporting, investigation, and development of corrective actions;
- Reviewing and approving dose evaluations performed for workers who received internal dose while performing work on the project;
- Approving internal dosimetry protocols for project-specific activities;
- Reviewing and approving sitewide and project specific ALARA goals.

3.5.1 Project Health Physicist

The PHPs serve as RADCON project Leads or in a technical support capacity. PHPs act as leads and report to the RPM. PHPs interface with their assigned project manager to ensure that RADCON resources are allocated properly and to ensure that the RADCON Program is implemented compliantly within that project group.

The PHPs manage the day-to-day RADCON field operations in their respective project groups and are responsible for assignment of RCTs to subprojects within their group. The PHPs are responsible for ensuring RPP and RADCON procedural requirements are implemented in the field. PHPs are responsible for providing technical guidance to RADCON supervisors and for making key technical field decisions

and executing actions that are listed in RADCON functional performance documents. PHPs serve on project planning teams, and are responsible for integrating appropriate engineering and administrative controls into project command media. The PHPs are responsible for assisting the project managers in the development of project ALARA Goals and tracking overall project performance. The PHP's other responsibilities include these:

- Directing RADCON field activities with the assistance of their assigned RADCON supervisor;
- Ensuring that RCTs are adequately trained and equipped to support their assigned project;
- Participating in internal audits of the RADCON Program;
- Assisting the RPM in determining staffing levels of field deployed RADCON personnel;
- Working with project managers on work scope and project design;
- Performing project walk downs of fieldwork to evaluate performance in relation to RPP and procedural requirements;
- Preparing and approving RWPs for their specific project;
- Assisting the project and RPM in radiological incident review, reporting, investigation, and development of corrective actions;
- Reviewing and assisting in development of project technical work documents, including work packages and hazard analyses to ensure that proper radiological controls are instituted;
- Determining necessary hold points and limiting conditions for radiological work activities;
- Providing general oversight of field activities to evaluate compliance with the LATA Kentucky RPP;
- Submitting project ALARA plans and radiological design reviews to the RADCON manager for approval;
- Directing the collection and evaluation of field characterization data to ensure that RWPs reflect appropriate bioassay regimens for fieldwork; and
- Distributing lessons learned to the project team, as applicable.

Health Physicist and Health Physicist Specialist also may be assigned to the technical programs group to provide professional health physics support to those technical areas such as dosimetry, instrumentation, training, workplace monitoring, and technical document preparation. Health Physicist and Health Physicist Specialist assigned to this area report the RADCON Technical Program Health Physicist. Additional responsibilities include the following:

- Analyzing radiological data;
- Performing radiological calculations related to dosimetry, environmental assessment, instrumentation, and workplace monitoring;

- Preparing and performing routine RADCON internal assessments;
- Developing and implementing RCT training;
- Developing survey and release plans;
- Performing environmental risk assessments;
- Developing technical work documents, procedures, and program documents; and
- Developing instrument counting routines, calibration requirements, and mathematical models for *in situ* gamma spectroscopy systems.
- Other general health physics professional support.

3.5.2 RADCON Technical Programs Project Health Physicist

The Technical Program Health Physicist has specialized expertise in radiation protection programs and is responsible for managing the technical support elements of the RADCON Program. These elements include dosimetry, instrumentation, source control, training, assessments, procedures, records, and reporting. The Technical Program Health Physicist reports to the RPM and directs the day-to-day activities of the RADCON staff supporting the technical program elements. When the RPM is unavailable, the Technical Program Health Physicist serves as the authorized alternate.

The Technical Program Health Physicist also serves as the dosimetry manager. In this role, the Technical Program Health Physicist is responsible for all dosimetry related activities at sites where LATA Kentucky performs work.

In addition, other responsibilities include the following:

- Providing overall direction for the technical program and ensuring that the most recent guidance documents are used as appropriate;
- Developing, maintaining, and distributing LATA Kentucky dosimetry technical basis documents, bioassay protocols, QA plans, procedures, and work instructions;
- Providing day-to-day direction of technical program staff and resources;
- Performing program audits or assessments as specified in LATA Kentucky procedures, QA plans, and work authorizations;
- Developing and implementing corrective actions from audit and assessment results;
- Notifying the RPM of any significant changes or issues that could affect the technical program elements;
- Generating reports, including exposure summaries, incident reports, and assessments;
- Ensuring an adequate number of radiological instruments are calibrated properly and functioning to support project RADCON activities;

- Serving as radiological source custodian and verifying source control activities are performed in accordance with DOE and LATA Kentucky requirements;

- Assisting in the performance of PAAA screening of radiological events;

- Ensuring the Internal Dosimetry Program is in compliance with 10 *CFR* § 835, DOE G 441.1-1C, DOE-STD-1112-98, and DOE-STD-1121-98;

- Working to ensure that the DOELAP performance evaluation program administrator is notified prior to the service laboratory implementing programmatic changes that could affect the system performance with respect to meeting DOELAP criteria or evaluations;

- Establishing work authorization documents with laboratory service providers for *in vivo* and *in vitro* bioassay services and technical support, and maintaining regular communications with technical staff;

- Determining when routine, nonroutine (special), baseline, and termination bioassay monitoring is required, in accordance with the guidance found in LATA Kentucky internal dosimetry procedures and work instructions;

- Approving releases of work restrictions for personnel, as appropriate;

- Performing preliminary and final dose assessment results;

- Reviewing results of service laboratory's Bioassay Performance Evaluation and DOELAP performance testing and resolving issues associated with the evaluation and testing; and

- Developing, coordinating, and implementing RCT training programs.

3.5.3 RADCON Supervisors

RADCON supervisors have primary responsibility for the day-to-day field implementation of all applicable project RADCON activities and the activities of the RCTs to ensure that work is performed in accordance with the LATA Kentucky RPP and RADCON Program. They serve as the front line managers for the RCT staff. RADCON supervisors are assigned to specific LATA Kentucky projects by the RPM and report to the applicable PHP. The RADCON supervisors also provide technical support to project supervisors and coordinate the efficient deployment of radiation protection resources across all LATA Kentucky projects. Other responsibilities include these:

- Ensuring RCTs are provided with the necessary equipment, training, and direction to perform their job safely and efficiently;

- Ensuring job coverage turnover is performed completely and accurately;

- Assigning RCTs to specific tasks within their project groups;

- Ensuring records are reviewed and submitted in a timely manner as required by procedure;

- Providing guidance on the implementation of RADCON procedures;

- Ensuring personnel related issues are addressed in a timely fashion with assistance of PHP and RPM;
- Performing necessary research and preparing radiological work permits (RWPs) for projects;
- Interfacing with other RADCON supervisors to ensure that RCT staffing is optimized to ensure successful completion of work activities;
- Interfacing with Health Physicist to ensure that hold points and limiting conditions have been specified in the RWP and other technical work documents;
- Obtaining dosimetry information for RWPs from the dosimetry manager;
- Providing the day-to-day direction of the RCTs assigned to individual projects;
- Verifying RCTs are properly trained in accordance with LATA Kentucky requirements;
- Ensuring the requirements of the Collective Bargaining Agreement are implemented within their specific area;
- Tracking and recording RCT hours and work activities;
- Reviewing and approving RCT generated documentation, such as surveys and air sampling reports;
- Performing routine (daily) field observations to gain first hand knowledge of the fieldwork being performed;
- Interfacing with project supervisors to ensure RADCON requirements are being implemented effectively; and
- Participating in work control planning and walk down activities, as required.

4. RADCON PROGRAM ELEMENTS

The LATA Kentucky RPP is implemented through specific RADCON Program elements. The RPP specifies the actions that are required for implementing the occupational radiation protection requirements of 10 *CFR* § 835 in a manner that will minimize exposures to ionizing radiation and that will protect employees, the public, and the environment. LATA Kentucky has adopted an aggressive approach to minimizing worker exposures through an ALARA Program. The LATA Kentucky ALARA Program follows a graded approach through the application of ALARA plans, prejob ALARA reviews, workplace monitoring, work site inspections, and ALARA performance indicators. The RPP commitments are further defined and expanded in the RADCON Program through RADCON performance documents (e.g., procedures, technical basis documents, etc.).

These RADCON procedures specify those mandatory requirements that are required to ensure compliance with 10 *CFR* § 835. For the purpose of planning and executing radiological work, all LATA Kentucky personnel, subcontractors, and subtier subcontract personnel are required to comply with the LATA Kentucky RPP by complying with the applicable implementing LATA Kentucky RADCON performance documents (Appendix A).

4.1 **RADCON PROGRAM REQUIREMENTS**

The RADCON Program applies at all sites and facilities where LATA Kentucky, its subcontractors, or other prime DOE contractors conduct operations for LATA Kentucky under their contract scope. The responsibility for complying with LATA Kentucky RADCON requirements and for maintaining personnel radiation exposure ALARA starts at the employee level, progresses upward through the project organization, and includes both LATA Kentucky and subcontractor organizations, project integration and operations manager of projects (PIOM) /FMs are responsible for radiological performance within their projects, including subcontracted work. The summaries provided in this section focus on major provisions of the RADCON Program to be implemented by LATA Kentucky projects and/or LATA Kentucky project subcontractors and their subtiers based on the type of work activity and potential radiological hazards identified.

4.2 **ALARA POLICY AND PROGRAM**

The LATA Kentucky ALARA Policy, as described in the RPP, is as follows:

> The LATA Kentucky policy is to conduct radiological operations in a manner that promotes the health and safety of all employees, subcontractors, and the general public. In achieving this objective, LATA Kentucky must minimize the radiation exposure to employees, subcontractors, the public, and the environment. Deliberate efforts will be taken to further reduce exposures and releases in accordance with a process to make any such exposures or releases ALARA. The LATA Kentucky radiological control program consistently reflects this policy.

The LATA Kentucky ALARA Program is defined by two different performance documents: (1) PAD-RAD-1114, *ALARA Program*, and (2) PAD-RAD-1102, *Design and Control*. The operational planning process whereby specific tasks are evaluated to ensure workers' exposures are minimized during the work evolutions is defined in PAD-RAD-1114. The process whereby facilities or projects are evaluated before mobilization to ensure that ALARA considerations are included with specific design objectives is defined in PAD-RAD-1102.

The LATA Kentucky ALARA Policy incorporates a graded approach. The method of implementing the ALARA Program depends on the complexity and magnitude of potential radiological hazards. Complex activities with the potential for higher exposures require more thorough preplanning. The more complex activities with greater potential for exposure, more engineering and administrative control measures are expected to be incorporated to prevent inadvertent worker exposures, the spread of radiological contamination, and to minimize the generation of contaminated waste.

Projects are responsible for implementing the radiological protection requirements necessary to maintain radiation exposures ALARA during all project work. The project also is responsible for ensuring that ALARA considerations are incorporated during project or facility design and when planning for significant modification of existing processes and facilities (including activities such as major maintenance, decontamination and decommissioning, and environmental restoration). The ALARA concept applies to radiological dose reduction, contamination control, and waste minimization measures included during project/facility design and when planning for significant modification of existing facilities. Project-specific application of the ALARA process should be described in LATA Kentucky project ALARA Plans and/or subcontractor work plans/procedures and technical work documents as

appropriate. The degree of formality and the level of detail contained in these work documents are commensurate with the magnitude of the radiological hazards.

Work documents for LATA Kentucky activities with higher collective dose and/or potential for significant individual dose, have more detailed references to ALARA considerations than work documents developed for lower risk activities. Administrative Control Levels in Section 4.7.1 should be used as an aid in managing ALARA in work documents and plans.

4.3 **PLANNING FOR RADIOLOGICAL WORK**

Procedures for radiological work activity define a process for implementation of effective dose and contamination reduction and control measures through planning. Planning for radiological operations and activities is performed in accordance with a graded approach and includes controls directed toward reducing exposure, preventing the spread of radiological contamination, and minimizing the generation of contaminated wastes. Engineering controls should always be the preferred option for controlling radiological hazards over administrative controls. Dose reduction, contamination reduction, and waste minimization features should be considered in the earliest planning stages whenever applicable or feasible. These features are directed toward controlling contamination at the source, eliminating airborne radioactivity, maintaining personnel exposure below regulatory limits, and using a process that assures ALARA exposure levels and controls releases.

4.4 **RADCON PROGRAM SUPPORT**

LATA Kentucky RADCON provides radiological support services, including the services of RCTs to perform surveys and monitoring, coordinate dose assessments, identify radiological areas, and prepare RWPs. Only LATA Kentucky RADCON is authorized to perform worker protection monitoring, job coverage, authorize the release of material and equipment from a radiological area, or other activities considered to be necessary for demonstrating compliance with the LATA Kentucky RPP, 10 *CFR* § 835 requirements and RADCON functional procedures.

There are appropriate circumstances when a project subcontractor may provide qualified health physics technicians to support their field activities. These field technicians are required to follow the same radiological control provisions as other radiological workers and, regardless of their current training and qualification status, are not recognized as RCTs in accordance with the LATA Kentucky RPP or RADCON procedures. The RPM will specify or approve any radiological training requirements and scope of their responsibility for project or subcontractor-provided health physics technicians.

4.5 **LATA KENTUCKY PROJECT GENERAL RESPONSIBILITIES**

LATA Kentucky project personnel, project subcontractor, and subtier subcontractor personnel involved in activities that require radiation protection will observe the radiological controls established in the LATA Kentucky RADCON procedures. The subcontractor will comply with the requirements specified by LATA Kentucky RCTs, safety specialists, RPM, Health Physicist, or other LATA Kentucky RADCON personnel. All work in radiological areas will be performed in accordance with requirements established by LATA Kentucky RADCON personnel.

4.6 **RADIOLOGICAL PROTECTION TRAINING**

Radiological protection training requirements are, at a minimum, consistent with applicable industry standards and meet the requirements of 10 *CFR* § 835, Subpart J. All LATA Kentucky employees and subcontractors subject to occupational radiation exposure must receive radiation safety training commensurate with their job performance in accordance with RADCON procedure PAD-RAD-1601, *Radiation Safety Training*, prior to performing work in an area controlled by LATA Kentucky.

All subcontractors and their subtier personnel who will work in radiologically controlled areas also must meet the training requirements described below.

At a minimum, Radiation Safety Orientation (RSO) is required for unescorted access to Radiologically Controlled Areas at the Paducah site. RSO consists of reading a short pamphlet that discusses various radiation safety topics. Proof that the worker has read and understands the training is retained by LATA Kentucky via a signed acknowledgement statement. RSO has limited applicability, as described in LATA Kentucky Procedure PAD-RAD-1603, *Radiological Site Access Requirements and Site Access Cards*. RSO is provided by LATA Kentucky. [Note: Most workers will require General Employee Training (described below) before being allowed continuing access to Radiologically Controlled Areas.]

4.6.1 General Employee Training

This training is required biannually for all site employees, including LATA Kentucky employees, subcontractors, and visitors who require unescorted plant access. Visitor site access training, including RSO, is required for all escorted site visitors. General employee radiological training, which is

incorporated into general employee training (GET), covers the employee's responsibilities for keeping exposures to radiation and radioactive materials ALARA. The training reviews natural background and man-made sources of radiation, the whole-body radiation dose limit for non-radiological workers, the potential biological effects from chronic radiation doses, embryo and fetus protection, ALARA concepts and practices, and methods used to control radiological materials and contamination. If a person requires unescorted access to a radiological area, additional radiological safety training is required. This training is available from the LATA Kentucky training organization.

4.6.2 Radiological Worker Training I and II

This biannual training fulfills requirements for personnel whose jobs require unescorted access to radiological posted areas and exposure to radiation or radioactive material as part of their job. The training includes a comprehensive classroom curriculum, practical applications, personal protective equipment (PPE), personnel monitoring, and radiation measurements.

The training matrix in PAD-RAD-1601 defines when Radiological Worker I and II Training is required and specifies when escorts can be used in lieu of training. Whenever Radiological Worker I or II Training is required, this training must be completed before unescorted access is allowed and before unescorted assignments as a radiological worker are performed. There will be no exceptions. In extreme situations, workers without Radiological Worker I or II Training may be allowed to perform escorted assignments with RPM approval. The LATA Kentucky RPM may impose a radiological work restriction for an individual who commits a serious RADCON Program or RWP violation. The RPM may lift the restriction when the individual completes the agreed compensatory actions.

Retraining is required every 24 months. Individuals may satisfy required training and retraining by showing knowledge and understanding of the subject by written examination or demonstration, as applicable. Proof of test-out must consist of a record of completion of LATA Kentucky's computer-based training.

Workers who complete Radiological Worker I or II Training at another DOE site or facility will be required to complete LATA Kentucky's Radiological Worker Site-Specific Training (RWSST) and Practical Factors Training (PFT). Radiological Worker Core Academics (classroom or Web-based) training (Radiological Worker I or II) not specific to a given site or facility will be waived provided the following are met:

- The training has been received at another DOE site or facility within the past 24 months;

- There is proof-of-training in the form of a certification document containing the individual's name, date of training, specific topics covered, the location where the training was provided, and an appropriate official has certified the training of the individual. Acceptable proof that Radiological Worker Training has been completed is a submittal of photocopies of "Certificates of DOE Core Radiological Training," signed by the person providing the training. The following statement (or equivalent) must be on the card: "This card certifies that the employee whose name appears on the face of this card has successfully completed the stated core training course. This is subject to limitation of this specific training as identified in DOE Implementation Guidance Manuals"; and

- The individual completes LATA Kentucky RWSST and PFT from a source acceptable to LATA Kentucky.

RWSST consists of site-specific information necessary for performing radiological work on LATA Kentucky projects. This program is provided by LATA Kentucky and should be scheduled a minimum of

seven days in advance of the actual needed date. It also will be required of all individuals at time of recertification. Workers who complete Radiological Worker I or II training at another DOE site or facility will be required to complete RWSST.

Each individual must demonstrate knowledge of training content by successful completion of PFT. PFT consists of a program where workers learn how to properly don and doff radiological personal protective apparel. Workers also learn the proper protocol for entering and exiting radiological areas. PFT is provided by the LATA Kentucky's training subcontractor. PFT for RCTs is provided by the LATA Kentucky RADCON organization.

The following is applicable LATA Kentucky policy for use of escorts:

- When an escort is used in lieu of training, the escort MUST 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 RPP;

- Radiological Worker Training I is required for unescorted access into radiological buffer areas (RBAs) for radiation, radiation areas, and radioactive material areas. Radiological Worker Training I does not qualify individuals to perform work such as opening containers having potential for loose radioactive material/contamination;

- Radiological Worker Training II incorporates Radiological Worker Training I and is required for unescorted access to high radiation/very high radiation areas, contamination/high contamination areas, RBAs for contamination or contamination control zones, and airborne radioactivity areas. Radiological Worker Training II qualifies individuals to access areas and perform work where there is potential for radiation and contamination exposure (e.g., opening containers having potential for loose radioactive material); and

- Individuals not qualified with Radiological Worker Training II must not enter Airborne Radioactivity Areas, HCAs, High Radiation Areas or Very High Radiation Areas under any circumstances. Individuals may enter other Radiological Areas provided that they have a minimum of RSO and are continuously escorted by a radiological worker and perform no hands-on work activities.

Minors are prohibited from entering all Radiological Areas.

4.7 **RADIATION EXPOSURE CONTROL**

External radiation exposure control is accomplished by establishing project ALARA goals well below DOE regulatory dose limits, monitoring personnel for external radiation exposure, by tracking exposures received, and identifying and controlling radiation sources. Exposure tracking systems inform LATA Kentucky and subcontractor personnel of estimated exposures received and are used to plan radiological work. The establishment of ALARA goals and exposure tracking systems are management tools to help ensure that individual and collective exposures are minimized. Project Managers and all workers are responsible for controlling and minimizing external radiation exposures. Internal radiation exposure control is accomplished by identifying and controlling sources or potential sources of airborne radioactivity, maximizing the use of engineered controls where practical, applying respiratory protection where appropriate, and monitoring workers for internal radioactivity.

4.7.1 Administrative Control Level and Performance Goals

The radiation exposure of workers is maintained as far below DOE limits for an occupational worker as is reasonably achievable. An administrative control level (ACL) is established for planned activities to ensure that worker doses are consistently maintained at levels below the occupational exposure limits specified in 10 *CFR* § 835. The LATA Kentucky ACL for an individual occupational exposure is 2000 mrem total effective dose (TED) per year. This ACL is demonstrated through effective work planning and controls and compliance with RADCON procedures. No LATA Kentucky or subcontractor employee is allowed to exceed the annual ACL in planned work without the prior approval of the LATA Kentucky RPM and LATA Kentucky site manager. If any worker exceeds the ACL, a comprehensive investigation will be performed.

In addition, each LATA Kentucky project sets ALARA performance goals on radiological exposures that are as far below the ACL as reasonably achievable. These project ALARA performance goals may not be exceeded for any individual worker without written approval of the LATA Kentucky PIOM and RPM. The ALARA performance goals are reviewed and may be revised annually. The RPM may revise ALARA performance goals upward or downward during the year to accommodate changes in the scope, an unanticipated task, or radiological conditions. These performance goals are approved by the LATA Kentucky PIOM and submitted to the LATA Kentucky ES&H manager. Performance goals are selected to be measurable, achievable, auditable, challenging, and meaningful in occupational dose reduction.

4.7.2 Radiation Dose Limits

Mandatory annual radiation dose limits for general employees, minors, visitors and members of the public are established in 10 *CFR* § 835. The regulatory standard radiation dose limits are also specified in RADCON procedures. The dose limits are not to be exceeded in any calendar year at any sites where LATA Kentucky conducts operations for the DOE. The dose limits represent a combination of internal and external doses.

4.7.3 Embryo/Fetus Protection

It is the policy of LATA Kentucky to practice reasonable precaution in the protection of unborn children so that exposures to ionizing radiation are minimized and at the same time to provide equal employment opportunities. This policy is implemented in PAD-RAD-1203, *Embryo/Fetus Protection*.

Radiation protection for the unborn child (embryo and fetus) must be a joint effort between the female radiological worker and employer. Fetus protection provisions are designed for females who are qualified as radiological workers and who currently are (or plan to be) involved in work in LATA Kentucky radiological areas. After a female radiological worker voluntarily notifies her immediate supervisor in writing that she is pregnant or is planning a pregnancy, her supervisor then must notify (in writing) the LATA Kentucky RPM. Upon written notification, she is considered a declared pregnant worker.

For a declared pregnant worker who chooses to continue working as a radiological worker, the dose limit to the embryo/fetus from conception to birth (entire gestation period) is 500 mrem, and measures must be taken to avoid substantial variation above the uniform exposure rate necessary to meet the 500 mrem limit for the gestation period. Efforts should be made to avoid exceeding 50 mrem per month to the declared pregnant worker. If the dose to the unborn child is determined to have already exceeded 500 mrem by the time a worker notifies her supervisor in writing of her pregnancy, the worker will not be allowed to perform work where additional occupational radiation exposure is likely during the remainder of the gestation period. In any event, a reassignment of work tasks must be mutually agreeable and must not

involve a loss of pay or promotional opportunity. In addition, the declared pregnant worker must be included in the site dosimetry program during the pregnancy.

4.8 **RADIOLOGICAL MONITORING**

LATA Kentucky RADCON performance documents implement the requirements of 10 *CFR* § 835 for monitoring of areas and individuals, including external and internal exposures, contamination control, and for accident monitoring. In all cases, LATA Kentucky RADCON is responsible for providing the radiological monitoring necessary to comply with 10 *CFR* § 835 in accordance with the RPP. Such monitoring is generally performed by the RADCON organization who is also authorized to interpret monitoring results and to make changes in radiological postings, increase or decrease radiological control requirements contained in RWPs, or require the use of supplemental dosimetry. Monitoring results are available to the projects and subcontractors to assist in activity hazard analysis and job planning. Subcontractors also may perform supplemental worker protection monitoring at their discretion to augment data provided by LATA Kentucky RADCON. However, individuals who perform such monitoring will not be recognized with any radiation protection authority beyond that of a radiological worker. The LATA Kentucky RPM also may make specific worker monitoring data available to authorized subcontractor ES&H representatives if requests are made in writing and assurance is provided that such records will be handled according to the Privacy Act of 1974; 5 U.S.C. Section 552(a).

4.8.1 External Dosimetry

LATA Kentucky RADCON is responsible for issuing and analyzing external dosimeters used throughout LATA Kentucky managed areas. Monitoring for external radiation exposure is performed for LATA Kentucky personnel and subcontractors that are radiological workers (personnel qualified with Radiological Worker I or II training) that perform radiological work in LATA Kentucky managed areas. Monitoring of personnel for external radiation exposure is performed using thermoluminescent dosimeters (TLDs) or equivalent devices. Individuals that require monitoring for external radiation exposure are those that are likely to receive an effective dose equivalent to the whole body of 100 mrem or more in a year.

LATA Kentucky RADCON will issue a radiation monitoring badge (TLD or equivalent) to employees working inside Radiological Areas who are qualified with Radiological Worker I and II training and who require access to an area posted as requiring a TLD (or equivalent external exposure monitoring device). It is the worker's responsibility to ensure that these badges, when required, must be worn in accordance with LATA Kentucky training and badging requirements and at all times when working in Radiological Areas. This requirement applies to all personnel, including inspectors and supervisors. Failure to return radiation monitoring badges may result in delay of payment to a project subcontractor, potential back charge for the resulting dose evaluation, and restriction of an employee from entering radiological areas.

Personnel entering LATA Kentucky sites or facilities also are required to be monitored for external radiation exposure if they satisfy the following criteria:

- Declared pregnant workers who are likely to receive from external sources a dose equivalent in excess of 50 mrem to the embryo/fetus as a result of occupational exposure;

- Occupationally exposed minors who enter the controlled area and are likely to receive a) effective dose equivalent to the whole body of 50 mrem or more in a year; b) an equivalent dose to the lens of the eye of 750 mrem or more in a year; or c) an equivalent dose to the skin or to any extremity of 2500 mrem or more in a year;

- Members of the public entering a controlled area likely to receive a dose in excess of 50 mrem in a year from external sources; or

- As directed by the RADCON organization or RWP.

4.8.2 Internal Dosimetry

LATA Kentucky RADCON is responsible for the internal dosimetry program that is implemented throughout LATA Kentucky-managed areas. LATA Kentucky and subcontractor radiological workers considered by the LATA Kentucky dosimetry manager likely to receive intakes that could result in an internal dose (committed effective dose) in excess of 100 mrem, or who are at risk for such intakes, are evaluated for participation in a routine individual monitoring program that includes bioassay and/or personal air sampling. This evaluation is done when RWPs are prepared for the specific work to be performed. Bioassay requirements are stated on the RWP. Worker bioassay appointments are scheduled based on RWP log-in entries on specific RWPs.

The Technical Program Project Health Physicist is responsible for maintaining the records of the results of routine samples, special samples, and whole body counts made on individuals participating in the bioassay programs. This position also is responsible for maintaining records of exposures assigned to individuals, along with documentation supporting the dose calculation. As a DOE prime contractor, LATA Kentucky is responsible for bioassay and personnel dosimetry record keeping for its employees. Applicable records generated or received as a result of performing this procedure must be submitted to the Records Management and Document Control Center for record retention and disposition.

LATA Kentucky will determine which of the above individual monitoring provisions apply to an individual or work group. All personnel who are placed in the bioassay program must provide prior dose history information that will be used to determine if a baseline bioassay is required before the start of work within radiological areas where a potential for internal radiation exposure exists. All workers who are qualified with Radiological Worker II training participate in the bioassay program. If requested by RADCON, an exit urine sample or whole body count also must be provided at the completion of the employee's last day of work within radiological areas. Additional LATA Kentucky individuals could be selected at the discretion of LATA Kentucky for bioassay sampling. Urine samples and whole-body counts will be analyzed for uranium and/or other radionuclides to help determine whether the employee has received an internal radiation dose while performing work in radiological areas. In cases where acute internal radiation exposures are detected, affected workers may be required to submit follow-up special bioassay samples. Special bioassay samples are also requested when there is reason to suspect an intake based on higher than expected airborne radioactivity sample results or the worker was involved in an incident. Special bioassay sampling will typically require the collection of urine and/or fecal samples for at least five days following the suspected acute intake and may also require multiple whole-body counts.

LATA Kentucky RADCON will provide bioassay sample collection containers. It is the worker's responsibility to submit bioassay samples as required. Subcontractors are responsible for ensuring that their employees comply with their assigned bioassay appointment schedule.

LATA Kentucky dosimetry must be notified of any personnel terminations or transfers as soon as possible (preferably five days prior to termination or transfer) so that an exit (or termination) bioassay sample can be obtained readily. Failure of any employee to comply with bioassay requirements may result in delay of payment or a potential back charge for the resulting dose evaluation, if applicable, and barring of an employee from entering any Radiological Areas on other LATA Kentucky projects.

4.8.3 Nuclear Accident Dosimetry

Nuclear accident dosimetry is required where sufficient quantities and kinds of fissile material exist to potentially constitute a critical mass and where significant exposure of personnel to radiation from a nuclear accident is possible. Nuclear accident dosimetry includes fixed nuclear accident dosimeters, personnel accident dosimeters, whole body beta/gamma dosimeters, and screening techniques using activation products in the blood, hair, and other biological materials.

LATA Kentucky Nuclear Safety personnel must define areas where nuclear accident dosimeters are required and ensure proper posting, designation of area, and/or other administrative controls are taken. These controls are taken to notify personnel of the personnel nuclear accident dosimeter (PNAD) and/or TLD requirement when entering areas where it has been determined that significant exposure of personnel to radiation from a nuclear accident is possible. Personnel that are monitored routinely for external exposure who are wearing a LATA Kentucky-issued whole body TLD may use their whole body TLD as a nuclear accident dosimeter. Personnel who are not monitored routinely or do not have a whole body dosimeter who enter areas that are posted or otherwise require personnel nuclear accident dosimetry must wear a PNAD.

4.8.4 Workplace Monitoring

Workplace radiation/contamination monitoring and air monitoring programs are used to verify the integrity of radioactive materials containment and to detect inadvertent releases of those materials into the workplace. These monitoring programs are conducted under LATA Kentucky RADCON procedures. Workplace monitoring provides a control mechanism to detect and quantify external radiation and radioactive contamination levels, enables measures to be taken to prevent unanticipated and unplanned exposures, and contributes to maintaining actual exposures ALARA. Procedures require that radiological monitoring and control of the conditions at facilities be performed to ensure that 10 *CFR* § 835 limits are not exceeded.

Radiation surveys are performed by LATA Kentucky RCTs. Surveys are performed before, during, and at the completion of work that has the potential to cause changes in radiological conditions as well as routinely on predetermined schedules. Radiation surveys include dose rate measurements of the general area, dose rates at a distance of 30 cm from a source or surface of interest to evaluate potential whole body exposures, and dose rates on contact with potential sources of radiation where there is a potential for hands-on work.

Contamination surveys are conducted on a routine basis and as part of job coverage by LATA Kentucky RCTs in affected areas. Potentially contaminated items in a RBA, contamination area (CA), HCA, or airborne radioactivity area (ARA) are surveyed prior to release. Contamination surveys on materials, equipment, and portable facilities for release from a RBA, CA, HCA, or ARA are conducted by LATA Kentucky RCTs in accordance with LATA Kentucky RADCON procedures.

Area radiation monitors (ARMs) are installed in frequently occupied locations with the potential for unexpected increases in dose rates and in remote locations where there is a need for local indication of dose rates prior to personnel entering these areas. LATA Kentucky radiological engineers and RPM determine the need for and placement of ARMs.

4.8.5 Airborne Radioactivity Monitoring

Airborne radioactivity monitoring is conducted by LATA Kentucky RCTs. Radiological operations involving readily dispersible forms of radioactive materials are to be accomplished within enclosures

(glove boxes, glove-port hoods, laboratory-type hoods, etc.) whenever practicable. Portable ventilation units may be used in work areas where portions of contaminated surfaces are exposed. The air monitoring program is established in areas where an individual is likely to receive an exposure of 40 or more derived air concentration (DAC) hours or as necessary to characterize the airborne radioactivity hazard where respiratory protective devices for protection against airborne radionuclides has been prescribed.

The program includes fixed and portable air sampling equipment. At the discretion of LATA Kentucky, air samples will be taken as necessary by RADCON for airborne radioactivity. These samples will be taken in the breathing zones of workers, within the work area and downwind from the work area. RWPs will establish requirements for wearing breathing zone air (BZA) monitoring devices designed to measure radioactive material in the worker breathing zone. These samples will be collected to assess airborne radioactive material concentrations and determine whether an upgrade of respiratory protection is necessary. Personal BZA sampling also may be used to estimate dose equivalents to workers resulting from inhalation of airborne radioactive material and to identify the need for initiation of special bioassay sampling. Area air monitoring deemed necessary will be performed in a location that will not affect operations. This sampling will be conducted primarily to ensure that airborne contaminants in the general work area are maintained ALARA and to establish boundaries of airborne radioactivity areas. Monitoring frequency is at the discretion of LATA Kentucky.

Real-time fixed air sampler monitoring is to be performed as necessary to detect and provide warning of airborne radioactivity concentrations that warrant immediate action to terminate inhalation of airborne radioactive material. The application of fixed air samplers will be determined by the LATA Kentucky Health Physicist and RPM in accordance with RADCON procedures and applicable technical basis documents (TBD). Continuous air monitors (CAMs) are real-time monitors that provide an early warning of higher-than-expected levels of airborne radioactivity. CAMs are configured with an alarm feature that alerts nearby workers that airborne radioactivity was measured in excess of a pre-determined level. Alarm set points for CAMs used for routine monitoring are set at the lowest practical level so as to indicate loss of containment or the need for corrective action without causing a significant number of false alarms. Fixed location CAMs also may be installed to verify the adequacy of engineering controls such as glove-boxes or ventilation hoods or in work areas where power failures could result in the release of airborne radioactivity due to an abrupt interruption of negative ventilation.

4.8.6 Contamination Control Monitoring

The surface contamination limits in PAD-RAD-1109, *Radioactive Contamination Control and Monitoring,* are used for release from radiological areas to controlled areas. DOE Order 5400.5, *Radiation Protection of the Public and the Environment* and 10 *CFR* § 835 *Occupational Radiation Protection* establishes authorized surface contamination guidelines for release from a controlled area to an uncontrolled area without further radiological restrictions. The LATA Kentucky administrative limit for release without radiological restrictions is 80% of the 10 *CFR* § 835 limits (excluding transuranic radionuclides) in accordance with PAD-RAD-1109. Only LATA Kentucky RCTs are authorized to perform the above surveys and make the release decisions.

Personnel survey instruments are to be used at step-off areas by personnel exiting areas who are required to perform a full body frisk after removing protective clothing. RADCON and/or supervisors are notified if contamination is detected.

The requirement to remove PPE and frisk prior to exiting the step-off area may be preempted during emergency situations when personnel are to report to the designated assembly points and monitoring systems. Removal of protective clothing and monitoring is then accomplished at the assembly point. If individuals are contaminated above the action level, personnel decontamination is performed. If

contamination is not readily removable, contaminated personnel are transported to a medical facility and decontaminated by medical personnel. Emergency medical treatment will take precedence over radiological considerations.

All personnel exiting a RBA, CA, HCA, or ARA must survey themselves (or be surveyed by an RCT) and personal, hand-carried articles such as flashlights, clip boards, or hard hats for contamination using LATA Kentucky-provided whole-body or hand-held contamination monitors, as appropriate. In the event that contamination is found on the person's skin or clothing, the individual must notify LATA Kentucky's RCTs for decontamination as directed before the individual is permitted to leave the area.

Authorization for material and equipment release from radiological areas to controlled areas or for unrestricted release may only be granted by a LATA Kentucky RCT, Project Health Physicist, radiation supervisor, or RPM. All vehicles, heavy equipment, tools, and equipment being removed from work areas must be free of gross mud and debris. In addition, such equipment exiting an RBA, CA, HCA, and ARA, as applicable, will be surveyed by LATA Kentucky RCTs for radioactive contamination and will not be released for unrestricted use until it meets LATA Kentucky's unrestricted release criteria. Projects are not permitted to remove potentially contaminated equipment for unrestricted (off-site) release without written authorization that the equipment has been subjected to radiological survey and has met the appropriate release criteria.

Alternatively, contaminated equipment or material may be removed from the site in accordance with applicable U.S. Department of Transportation requirements if the destination facility has an appropriate U.S. Nuclear Regulatory Commission (NRC) (or State Agreement) license. The project or subcontractor is responsible for washing and decontaminating equipment and tools at a LATA Kentucky-approved location. The Project Health Physicist or RPM will specify the details necessary to include in survey documentation necessary to show that decontamination was completed. QA surveys may be required prior to release as specified in a written survey and release plan.

As part of a project's routine vehicle and equipment maintenance program, air filters, oil filters, or engine oil may require radiological surveys or sampling by LATA Kentucky RCTs based on the length of time the equipment has been exposed to airborne radioactivity. The project is responsible for providing qualified maintenance personnel who will support this radiological screening activity as well as perform limited dismantlement to provide access to normally inaccessible surfaces. This requirement also applies to vehicles and equipment that is designated for offsite release for unrestricted use. It is the project‘s responsibility to properly dispose of materials, liquids, etc., after radiological analyses are completed.

A LATA Kentucky RCT may collect a wipe sample from the interior face-pieces of respirators used in Radiological Areas to monitor for loose radioactive contamination and to document respirator cleanliness or effectiveness. Positive radioactive contamination results on any smear sample will require a contamination investigation and cleaning of the respirator before additional use. Positive contamination results caused by respirator failure may necessitate the initiation of special bioassay monitoring of the affected worker. The project is responsible to ensure that its workers are made available for respirator monitoring as required by LATA Kentucky.

4.8.7 Contamination Control

All personnel performing radiological work will take appropriate precautions and measures to control the potential for spread of contamination from radiological areas into unaffected areas.

This will be accomplished by implementing engineering controls, administrative controls, and compliance with LATA Kentucky RADCON personnel direction, ALARA, and RWP requirements for the area.

Additional measures that will be implemented during site activities in a radiological area to prevent the spread of contamination include the following:

- Surveys of equipment and personnel;
- Decontamination of equipment and personnel, if needed;
- Covering of controls and equipment (to the extent practicable) with a plastic barrier to protect from potentially contaminated media at the site;
- Provision of clean work surfaces (i.e., gravel or mats);
- Use of rubber tire equipment instead of tracked equipment, as applicable;
- Selection of equipment with low ground pressures to help prevent marring;
- Implementation of good housekeeping practices during all activities;
- Ensuring that all personnel have the proper training to don, wear, and doff PPE;
- Assisting personnel to inspect their PPE for rips, tears, holes, etc;
- Notification of the LATA Kentucky RADCON personnel if PPE becomes ripped or torn while in a radiological area;
- Use of dust suppression;
- Use of air monitoring equipment; and
- Use of respiratory protection, as required.

All vehicles, equipment, and tools are subject to an incoming radiological survey, conducted by RADCON upon arrival at the site, before being placed into service. Upon removal from the site, an outgoing radiological survey by the RADCON may be required.

It is the project's responsibility to ensure that all hoses and cords crossing a CA, HCA, or ARA boundary are marked and secured to help minimize the spread of contamination and safety hazards. Electrical cords and lines that are not under pressure and do not contain radioactive material may be taped in place and tagged near the end to indicate that external surfaces may be contaminated. Hoses containing water under high pressure must be secured, where possible to prevent whiplash motions caused by loss of operator control. Hoses that may contain radioactive contamination must be conspicuously labeled "Caution-Internal Contamination" or "Caution-Potential Internal Contamination." Labels or tags must have a yellow background, at least one magenta radiation symbol, and magenta lettering. Labeling is not required on portions of hose inside Radiological Areas. Labels and tags must be placed on opposing sides of the hose, where necessary, to ensure that they are clearly visible from all vantage points and hose positions.

Unless otherwise specified, the project must procure sufficient tools so that tools frequently required in a RBA, CA, HCA, or ARA may be marked and designated for use in a radiological area. A method to control the issuance and use of tools dedicated to these specified areas must be developed. In the event that repairs or modifications to tools or equipment are needed, the repairs or changes must be made,

where reasonably practicable, in a non-radiological area and/or a portion of the Site with low levels of contamination.

4.8.8 Radiological Area Entry Control

The RWP is the primary administrative mechanism used to establish radiological entry controls and protective measures for intended work activities. The RWP informs workers of area radiological conditions and entry requirements, and provides a mechanism to relate worker exposure to specific work activities. Written RWPs are used to control entry into radiological areas in accordance with PAD-RAD-1104, *Radiological Area Entry Control*. An individual may not enter a radiological area without an approved RWP and signing the RWP to assure verbatim compliance with all applicable controls prescribed in the RWP including: training, anticontamination protective clothing, dosimetry requirements, and briefings as required. LATA Kentucky's RADCON organization is responsible for preparing all RWPs based on the appropriate AHA (or equivalent documented activity hazard analysis process) and associated work control documents. Radiological areas are as follows:

- Radiation Area
- High Radiation Area
- Very High Radiation Area
- Airborne Radioactivity Area
- Contamination Area
- High Contamination Area

It is the project's responsibility to recognize when an RWP may be required and to request a RWP during their work planning process. To request a RWP, the project must complete an RWP Request form in conjunction with RADCON or provide a detailed explanation of the scope of work, documented results of an AHA process, and applicable technical work documents to RADCON a minimum of three days before the RWP is needed. As part of the work planning process, RADCON will specify controls, limiting conditions, and hold points for incorporation into project technical work documents such as work instructions or procedures. The RWP will specify appropriate radiological controls (including engineering and administrative controls, anticontamination protective apparel, etc.) necessary to protect personnel and minimize releases to the environment based on accepted work planning documents, and ALARA principles. The AHA and technical work documents used will be identified on the RWP and a copy of the RWP will be included in the work package.

The documents provided to the RADCON organization must be adequate to support the preparation of an RWP. If the documents do not provide an adequate basis for the preparation of an RWP as a result of lack of detail or appropriate information, the requestor must revise and resubmit the request.

The project is also responsible for recognizing that an RWP to be issued to cover planned work may require the development of a prejob ALARA Review. The RADCON organization is responsible for developing the prejob ALARA Review based on project team input and supporting work control documents. Prejob ALARA Reviews that require the LATA Kentucky PIOM and RPM approval require at least 10 working days to develop and issue. The time may be shortened or lengthened based on the quality of the input or the complexity of the planned work.

The project is responsible for providing labor and material to erect and maintain any radiological barriers, barricades, shielding, warning devices, or locks needed to safely control the work site in accordance with the determinations made regarding entry control, posting and labeling requirements made by the RADCON supervisor, radiological engineer or RPM. The designated Facility Manager is responsible for Radiological Area Entry Control must ensure that no controls are installed that would prevent rapid evacuation of personnel under emergency conditions.

Permanent barricades are used to augment administrative controls whenever necessary.

The LATA Kentucky RPM must approve controls devised for access to a High Radiation Area where radiation levels exist such that an individual could exceed a deep dose equivalent to the whole body of 1 rem in any one hour at 30 centimeters from the source or from any surface that the radiation penetrates.

Individuals may be restricted from entering Radiological Areas for medical procedures involving administration of radioisotopes for diagnostic or therapeutic purposes or violating an RWP or RADCON Program requirement. Restrictions involving a RADCON Program violation may include:

- Failing to comply with required bioassay appointment schedule;
- Failing to return a TLD or PNAD;
- Failing any part of Radiological Work I or Radiological Worker II training during the re-qualification process;
- Failing to successfully complete the requalification process within the specified two-year time frame; or
- Committing procedural or radiological control violation(s) in the workplace.

4.8.9 Radiological Posting

All entrances to Radiological Areas and Radioactive Material Areas (RMA) are clearly and conspicuously posted with the appropriate radiological postings. Signs at entrance points identify the type(s) of radiological areas and the facility/area specific entry requirements for radiological control, such as RWP and dosimetry requirements. Only LATA Kentucky RCTs will designate, establish, and maintain all radiological posting. No other personnel are authorized to place or remove any radiological posting. In some cases, Industrial Safety or Nuclear Criticality posting designations may be used concurrently with radiological postings if authorized by the RPM.

Workers should be aware of entry requirements and the information provided by radiological posting. If more than one radiological condition exists in an area and requires posting, each condition must be identified by posting all radiological conditions on one or more signs (user-changeable signs using inserts, for example) using the most stringent heading and listing the Radiological Areas or other radiological posted areas in decreasing order of importance. Any supplemental information will follow the Radiological Areas or other radiological posted areas designations. From most to least stringent, the hierarchy of posting is as follows:

- Very High Radiation Area

- High Radiation Area
- Airborne Radioactivity Area
- HCA
- Radiation Area
- CA
- Radioactive Material Area
- Soil CA
- Fixed CA
- RBA
- Underground Radioactive Material Area

4.8.10 Radioactive Material Labeling/Tagging

LATA Kentucky procedures require that each item or container of radioactive material bear a durable, clearly visible label bearing the standard radiation warning trefoil and the words "Caution, Radioactive Material," or "Danger, Radioactive Material." The label must provide sufficient information to permit individuals handling, using, or working in the vicinity of the items or containers to take precautions to avoid or control exposures.

Internally contaminated or potentially internally contaminated materials or equipment is individually labeled with the words "Caution, Internal Contamination" or "Caution, Potential Internal Contamination," as applicable. Radiological-use vacuum cleaners must be uniquely marked and labeled to identify both their internal and external contamination characteristics.

Sealed and unsealed sources or their associated storage containers are labeled as radioactive material and storage containers and devices containing a sealed source are clearly marked.

If material or equipment is taken from a Radiological Area or RMA and placed in the Controlled Area, and has not been surveyed adequately to allow unrestricted release, then the material and equipment must be tagged as radioactive with a yellow tag. The material or equipment also must be continually in the possession of a trained Radiation Worker.

4.8.11 Use of Temporary Showers and Change Rooms

Unless otherwise specified in subcontract specifications, the project provides a suitable location for cleaning and storage of respirators, boots, and other reusable PPE. Contaminated items must remain inside the radiological area or RBA as applicable, until successfully decontaminated. Cleaned PPE, such as face shields and respirators that come into contact with the wearer's face, and issued non-personal protective clothing, must be inspected before reuse.

Where shower facilities are required by the project scope of work, the responsible party must provide decontamination trailers equipped with showers and change rooms in accordance with OSHA regulation 1910.120(n) (7). Each employee must perform a full body frisk for radiological contamination upon exiting a radiological area before entering the shower facility unless exempted by the RPM. LATA Kentucky RADCON RCTs will perform routine contamination surveys in shower facilities. The shower facility will be maintained in a clean and sanitary condition at all times.

PPE and anticontamination clothing is segregated and disposed of in accordance with the following protocol:

- Labeled radioactive material disposal bags will be provided by the project for placement of soiled reusable cotton coveralls, inner-alls, socks, towels, and disposable PPE;

- Bagged reusable PPE is sealed and removed to LATA Kentucky-furnished containers supplied for that purpose near the access control point; and

- Used disposable PPE, respirator cartridges, and other disposable items are containerized and taken to a designated location for disposal.

4.8.12 Vacuum Cleaners and Portable Air-Handling Equipment

All vacuum cleaners and portable air-handling equipment to be used for radiological materials must be equipped with high-efficiency particulate air (HEPA) filters that meet the requirements of the American National Standards Institute/Underwriters' Laboratories, Inc. 586.

Users must ensure that vacuum cleaners used for radiological work meet the following criteria:

- Uniquely marked and labeled;

- Controlled by an RWP for radiological use;

- Physically controlled to prevent unauthorized use;

- Designed to ensure HEPA filter integrity under conditions of use; and

- Designed and controlled to prevent unauthorized or accidental access to the inner surfaces of the vacuum.

If the air handling equipment is used in radiological areas, LATA Kentucky RCTs will perform periodic contamination surveys for vacuum cleaners or HEPA units in use. Radiological labels on these units must be updated at the time of the survey to indicate contamination levels. These labels must be updated as directed by LATA Kentucky RADCON. The frequency of contamination surveys will depend on the specific use. When not in use, the vacuum hose or other openings on the HEPA units must be secured closed so as to prevent contamination release.

4.9 **RADIOACTIVE SOURCE CONTROL**

Projects must not possess radioactive sources onsite (to include sources authorized for use in industrial radiography devices, moisture density devices and instrument calibration sources) unless in accordance

with the following authorizations:

- Specifically authorized by LATA Kentucky RADCON.
- Authorized by LATA Kentucky based on the subcontractor's current license with the NRC or an Agreement State.
- Procured by LATA Kentucky in accordance with PAD-RAD-1302, *Radioactive Source Control*.
- Acquisition and proposed uses of all sealed and unsealed sources must be approved by the RPM.

4.10 **RADIATION-GENERATING DEVICES**

LATA Kentucky procedure PAD-RAD-1301, *Radiation Generating Devices*, provides requirements for the selection, procurement, installation, operation, and maintenance of nonmedical radiation-generating devices (RGDs) that are used to support work under the LATA Kentucky RPP. The requirements established in this procedure are in addition to those that are established in LATA Kentucky Procedure PAD-RAD-1302, *Radioactive Source Control.* RGDs include the following:

- Sealed gamma-ray and neutron sources that emit radiation fields that exceed 100 mrem at 30 cm;
- Small (<10 MeV) accelerators that are used for radiography or other single-use source;
- Industrial X-ray radiography equipment;
- Analytical X-ray or electron beam machines;
- Cabinet X-ray systems; and
- Other electrical-generating devices that incidentally produce X-rays.

4.11 **PERSONAL PROTECTIVE EQUIPMENT**

LATA Kentucky ES&H personnel and performance documents specify the PPE required for specific activities, tasks, and work zones in the task-specific AHAs, RWPs, procedures, or other work control documentation or permits. This specification shall be based on possible site contaminants; chemical, physical, and radiological hazards information, OSHA requirements, and/or LATA Kentucky procedures. LATA Kentucky S&H personnel and LATA Kentucky Training Subcontractor shall instruct all site personnel in donning and doffing procedures prior to beginning any work activities.

4.11.1 Selection and Use of Personal Protective Apparel for Radioactive Contamination Control

Protective clothing/apparel is required for certain activities within radiological areas. Pursuant to 10 *CFR* § 835.1102(e), personal protective apparel must be required for entry into areas in which removable contamination exists at levels exceeding 10 *CFR* § 835, Appendix D, values. The type of clothing required is dependent upon the type and level of contamination anticipated and consistent with the individual's work assignment. The protective clothing requirements for radiological control are specified in the applicable RWP.

Protective clothing for radiation protection that has been used or laundered is to be considered to be contaminated above levels for unrestricted use and any such defective or damaged protective clothing must be disposed of as radioactive waste. Damaged unused protective clothing, designated for radiological use, must not be disposed in conventional sanitary waste receptacles. Any radiation symbols or markings must be removed or sufficiently defaced prior to disposal or the unused garments should be included with low-level radioactive waste streams.

4.11.2 Respiratory Protection

In areas with potential for airborne radiological contamination, RADCON personnel perform an evaluation of the work area before respirator selection and periodically during respirator use to verify that the proper type of respirator is being used. The project/subcontractor RSP must provide guidelines for selecting respiratory protection equipment for protection against airborne radioactivity in accordance with provisions PAD-PLA-HS-001, *Worker Safety and Health Program Description*. All personnel who use respiratory equipment are required to be trained, qualified, appropriately fit-tested, and must have medical clearance for working in environments where respiratory protection is required. Respirators for radiological exposure control are to be controlled, issued, and inspected per LATA Kentucky and/or facility procedures.

Respiratory protection may be required during activities based upon RWP requirements and/or sampling results provided by LATA Kentucky RADCON personnel and Appendix B, "Airborne Radioactivity Guidelines for Respiratory Protection Selection." If respiratory protection is required, full-face air purifying respirators equipped with high-efficiency particulate air cartridges that are approved for protection against radionuclides should be sufficient. However, the need for any respiratory protection equipment with greater protection factors may be specified at the discretion of LATA Kentucky RADCON.

4.12 **RADIOLOGICAL PROTECTION INSTRUMENTATION**

Properly selected, operated, maintained, and calibrated radiological instrumentation is to be employed to implement an effective radiological control program. Radiological instrumentation is divided into several broad categories, such as portable radiation dose rate survey instrumentation, contamination monitoring instrumentation, air monitoring instrumentation, and nonportable instrumentation.

Procedures or Work Instructions govern the requirements for calibration of radiological protection instrumentation. The standards used for calibrating instrument functions are directly or indirectly traceable to a National Institute of Standards and Technology standard. Portable instrumentation is to be calibrated before initial use, after maintenance or adjustment, following any modification or alteration that may affect instrument response, and at intervals not to exceed one year. Calibration is to be performed on other radiological instruments as specified in site/facility procedures. The calibration status of fixed instruments and instrumentation systems is to be tracked.

As required, source and background checks are to be performed on portable radiological instrumentation to verify that the instruments respond properly to radiation prior to daily use. Before each use, as required, each portable survey meter must be visually examined for defects, current calibration dates, and battery conditions if the instrument has a built-in battery check. Any instrument that is outside of calibration limits, past the calibration period, or suspected of providing incorrect in-service measurements is to be removed from service pending a satisfactory passed source check or calibration. Operational checks are also performed on fixed instrumentation for proper operation, as appropriate.

In rare cases where the projects or project subcontractor health physics technicians are performing contamination or waste segregation support, portable radiological survey instruments must be properly calibrated, maintained, and receive appropriate performance checks prior to each use. The RPM will review and approve subcontractor procedures for instrument use, calibration, maintenance, performance checks, and methods for documenting radiological survey results.

4.13 **RADIOLOGICAL PROTECTION RECORD KEEPING**

The records of RPP-related activities are prepared, maintained, and dispositioned in accordance with contract requirements and applicable procedures. As a minimum, those items listed in 10 *CFR* § 835 are controlled to ensure adequate review, approval for release by designated individuals, and distribution to specified locations. Radiation exposures received at the facilities under the LATA Kentucky Prime Contract are maintained in a database and reported annually as required by 10 *CFR* § 835.801. Annual reports are also made to the DOE. Individual dose totals and ALARA goals are tracked. Airborne radioactivity monitoring records are retained to provide a chronological historical record of the conditions under which personnel were exposed.

5. REFERENCES

10 *CFR* § 835, *Occupational Radiation Protection.*

29 *CFR* § 1910, *Occupational Safety and Health Standards.*

29 *CFR* § 1926, *Safety and Health Regulations for Construction.*

DOE Order 5400, *Radiation Protection of the Public and the Environment*

DOE G 441.1-1C, *Radiation Protection Programs Guide for Use with Title 10 CFR § 835, Occupational Radiation Protection*

DOE-STD-1098-2008, *Radiation Protection*

PAD-PLA-HS-002, *Radiation Protection Program for the Paducah Environmental Remediation Project, Paducah, Kentucky*

PAD-PLA-SAF-001, *Integrated Safety Management System and Environmental Management System Description for the Paducah Environmental Remediation Project, Paducah, Kentucky.*

PAD-RAD-1603, *Radiological Site Access Requirements and Site Access Cards.*

PAD-SH-2010, *Hazard Assessment.*

PAD-RAD-1114, *ALARA Program.*

PAD-RAD-1203, *Embryo/Fetus Protection.*

PAD-RAD-1102, *Design and Control.*

PAD-RAD-1302, *Radioactive Source Control.*

PAD-RAD-1106, *Selection and Use of Anti-Contamination Clothing.*

PAD-RAD-1301, *Radiation-Generating Devices.*

PAD-RAD-1104, *Radiological Area Entry Control*.

PAD-RAD-1601, *Radiation Safety Training.*

PAD-IH-5151, *Issue, Control, and Use of Respiratory Equipment*

PAD-RAD-0201, *Internal Dosimetry Technical Basis Document for LATA Environmental Services of Kentucky, LLC.*

PAD-RAD-1502, *RADCON Internal Assessment Program.*

PAD-RAD-1101, *Radiation Exposure Limits*.

PAD-RAD-1206, *Planned Special Exposures.*

PAD-RAD-1205, *Skin Dose Assessment.*

PAD-RAD-1202, *External Dosimetry.*

PAD-RAD-1201, *Internal Dosimetry.*

PAD-RAD-1111, *Workplace Monitoring*.

PAD-RAD-1107, *Workplace Air Monitoring for Radioactivity.*

PAD-RAD-1110, *Radiation Surveys*.

PAD-RAD-1109, *Radioactive Contamination Control and Monitoring.*

PAD-RAD-1108, *Posting and Labeling.*

PAD-RAD-1401, *Radiation Protection Program Records.*

PAD-RAD-1204, *Reports to Individuals.*

PAD-RAD-1117, *Accidents and Emergencies.*

PAD-RAD-1103, *Personnel and Personal Effects Decontamination.*

PAD-RAD-1105, *Receipt, Transport, and Movement of Radioactive Materials.*

PAD-RAD-0104, *Radiation Protection Glossary*

PRS-NFS-1394, *Safety Management Program Descriptions for Paducah Environmental Remediation Project Facilities*

PAD-NS-1001, *Unreviewed Safety Question Determination for Nuclear Category 2 & 3 Facilities*

PAD-NS-1002, *Safety Documentation for Hazard Category 2 and 3 Nuclear Facilities.*

PAD-NS-1009, *Safety Documentation for Radiological and Non-Nuclear Facilities.*

APPENDIX A

RADCON PROGRAM ELEMENT PROCEDURES

RADCON PROGRAM ELEMENT PROCEDURES

The following RADCON procedures are flow down procedures from the Radiation Protection Program (RPP) for 10*CFR* 835, *Occupational Radiation Protection*:

PAD-RAD-1101, *Radiation Exposure Limits*

PAD-RAD-1102, *Design and Control.*

PAD-RAD-1103, *Personnel and Personal Effects Decontamination.*

PAD-RAD-1104, *Radiological Area Entry Control*

PAD-RAD-1105, *Receipt, Transport, and Movement of Radioactive Materials*

PAD-RAD-1106, *Selection and Use of Anti-Contamination Clothing*

PAD-RAD-1107, *Workplace Air Monitoring for Radioactivity*

PAD-RAD-1108, *Posting and Labeling.*

PAD-RAD-1109, *Radioactive Contamination Control and Monitoring.*

PAD-RAD-1110, *Radiation Surveys*

PAD-RAD-1111, *Workplace Monitoring*

PAD-RAD-1114, *ALARA Program*

PAD-RAD-1117, *Accidents and Emergencies*

PAD-RAD-1201, *Internal Dosimetry*

PAD-RAD-1202, *External Dosimetry*

PAD-RAD-1203, *Embryo/Fetus Protection*

PAD-RAD-1204, *Reports to Individuals*

PAD-RAD-1205, *Skin Dose Assessment*

PAD-RAD-1206, *Planned Special Exposures*

PAD-RAD-1301, *Radiation-Generating Devices*

PAD-RAD-1302, *Radioactive Source Control.*

PAD-RAD-1401, *Radiation Protection Program Records*

PAD-RAD-1502, *RADCON Internal Audit Program*

PAD-RAD-1601, *Radiation Safety Training*

PAD-RAD-1602, *Radiological Control Technician Training*

PAD-RAD-1603, *Radiological Site Access Requirements and Site Access Cards*

APPENDIX B

AIRBORNE RADIOACTIVITY GUIDELINES FOR RESPIRATORY PROTECTION SELECTION

Airborne Radioactivity Guidelines For Respiratory Protection Selection

Level of airborne radioactivity[1]	Minimum respiratory protection
No potential for exceeding 25% of DAC	None
Potential to exceed 25% of DAC and no potential to exceed 10 DACs	Full face piece air purifying respirator with appropriate cartridge or canister. If no appropriate cartridge or canister is available, upgrade to supplied air respiratory protection
Potential to exceed 25% of DAC and no potential to exceed 10 DACs	Full face piece continuous flow supplied air system
Potential to exceed 10 DACs and no potential to exceed 250 DACs	Full face piece pressure demand supplied air system
Potential to exceed 250 DACs	Level A protective clothing and SCBA

[1] If more than one radionuclide is present, the DAC will be the sum of the ratios of the individual radionuclide concentrations to their applicable DACs.

NOTE: Other hazards such as heat stress may be taken into account when selecting respiratory protection.

DAC = Derived Air Concentration
SCBA = self-contained breathing apparatus

APPENDIX C

RADIOLOGICAL CONTROL ORGANIZATION

Radiological Control