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Companywide	Management Control Procedure	For Additional Info: <a href="http://EDMS">http://EDMS</a>	Effective Date: 12/12/13
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Manual: 15B – Radiation Protection Procedures  
 \*The current revision can be verified on EDMS.

**USE TYPE 3**

Change Number: 340733

## 1. INTRODUCTION

### 1.1 Purpose

The purpose of the ALARA program is to reduce, control, and maintain radiation exposures as far below the applicable controlling limits of 10 CFR 835 and the company Radiological Control Manual (RCM) as is reasonably achievable. The fundamental ALARA principles do not rely solely on elimination of exposures but also include consideration of the overall benefit from the activity causing the exposures. The ALARA program takes into account social, technical, economic, practical, and public policy considerations in maintaining occupational radiation exposures and radiological releases to levels of ALARA. The ALARA program is implemented through appropriate control of radioactive material, contamination, and airborne radioactivity as directed in other procedures.

### 1.2 Scope and Applicability

This procedure provides the program implementing the ICP ALARA program, and provides for the creation and function of the ICP and Project *ALARA Committees* (see def.) This procedure establishes the process for reporting and tracking ALARA goals and performing ALARA reviews, and establishes the process for evaluating costs and benefits of implementing ALARA protective measures (APMs) to reduce personnel dose and control radiological contamination.

**NOTE:** *The term “project” is used throughout this document to refer to the five “Area Projects” defined in PDD-1005. Each area project has established a Project ALARA Committee. Area projects may collaborate to form a joint Project ALARA Committee. (i.e., TAN/RTC/PBF and Misc. Sites have collaborated on a single Committee.)*

## 2. RESPONSIBILITIES

Performer	Responsibilities
<u>Site Senior Executive</u>	Provide an ALARA Policy Statement to establish management commitment and participation in the ALARA program.
<u>Radiological Control Director</u>	Provide program requirements and staff support for implementation of the ALARA program.

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Performer	Responsibilities
<u>ICP/Project ALARA Committee Chairperson</u>	Implement program and preside over the ICP/Project ALARA Committee meetings.
<u>ICP/Project ALARA Coordinator</u>	Coordinate and support implementation of the ALARA program(s).
<u>ICP/Project ALARA Committee.</u>	Provide oversight, review, focus and direction for improvement in the radiological protection work activities and ALARA program implementation.
<u>Line Management</u>	Employ ALARA principles in execution of work.

### 3. PREREQUISITES

None

### 4. INSTRUCTIONS

#### 4.1 ICP ALARA Committee Membership

- 4.1.1 A senior ICP manager appointed by the senior site executive chairs the ICP ALARA Committee.
- 4.1.2 ICP ALARA Committee members normally include the chairperson of each project ALARA Committee and the Radiological Control (RadCon) director and staff.
- 4.1.3 The ICP ALARA coordinator is appointed by the ICP RadCon director from the RadCon staff and will normally serves as administrator.
- 4.1.4 The project RadCon staff serve as advisors to the committee.

#### 4.2 ICP ALARA Committee/Responsibilities

- 4.2.1 Site Senior Executive: Approve an ALARA Policy Statement to establish management commitment and participation in the ALARA Program.

- 4.2.1.1 Appoint a senior manager to chair the ICP ALARA Committee.

**NOTE:** *In keeping with ISMS guiding principles a senior line manager should serve as the chair.*

- 4.2.1.2 Provide resources and support to the ALARA Program.

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- 4.2.2 Radiological Control Director: Provide program requirements and staff support for implementation of the ALARA program.
- 4.2.2.1 Appoint an individual as the ICP ALARA coordinator to assist and provide technical support to the ICP ALARA Committee chairperson.
- 4.2.2.2 Establish and maintain a radiological performance monitoring program.
- 4.2.3 ICP ALARA Committee Chairperson: Preside over the ICP ALARA Committee meetings.
- 4.2.3.1 Prepare an agenda, and schedule periodic (typically one per calendar quarter) ICP ALARA Committee meetings with the assistance of the ICP ALARA coordinator.
- 4.2.3.2 Facilitate senior management commitment to the ICP ALARA and Radiological Control Programs with periodic briefs/status reports in senior staff meetings, and solicit financial and time support as applicable for program success.
- 4.2.3.3 Review requests for individual worker ACL extensions on form 441.64.
- 4.2.4 ICP ALARA Coordinator: Serve as ICP ALARA Committee administrator. Coordinate and support implementation of the ALARA program.
- 4.2.4.1 Assist the ICP ALARA Committee chairperson in preparing and scheduling meetings and issue meeting minutes.
- 4.2.4.2 Provide technical support and assistance to the ICP ALARA Committee and the project ALARA Committees in implementing the ALARA program.
- 4.2.4.3 Maintain a roster of meeting attendees
- 4.2.4.4 Consolidate the project (or facility) ALARA goals into a single *ALARA (radiological) performance goal* (see def.).

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4.2.5 ICP ALARA Committee: Provide oversight, adequacy review, focus and direction to maintain sitewide radiation exposure as low as reasonably achievable and for continuous improvement in the radiological protection work activities and ALARA program implementation.

4.2.5.1 Review and concur with the ICP ALARA annual dose goal and the ICP administrative control level (ACL)

4.2.5.2 Monitor and communicate improvements in radiological control methods and technologies that will strengthen the ICP ALARA Program.

4.2.5.3 Review the ICP and project level radiological performance goals and indicators during committee meetings.

4.2.5.4 Promote ALARA and RadCon Awareness by providing a forum for feedback and improvement across the ICP and sharing facility and project ALARA lessons learned.

4.2.5.5 Review activities of the project ALARA Committees to ensure that all organizations are maintaining an effective ALARA program.

#### 4.3 Project ALARA Committee/Responsibilities

**NOTE:** *Project ALARA committees include active participation of the work force and are established to evaluate ALARA goals, provide input for ALARA reviews, and to assist line management in the safe conduct of radiological work.*

4.3.1 Project Radiological Control Managers: When considered appropriate, assemble a quorum of the project ALARA committee.

**NOTE 1:** *In cases involving routine work outside facilities or for establishing annual ALARA goals the line-management and the project ALARA chairman would approve estimates and goals without convening a committee.*

**NOTE 2:** *The INTEC ALARA Committee membership will include representation from NRC licensed facilities managed and operated through INTEC.*

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- 4.3.2 Project Management: Select the ALARA chairperson and appoint members requested by the ALARA chairperson in support of the ALARA Policy.

**NOTE:** *RCM, Article 138, states committee members “should include managers and workers from the line, technical support organizations and the Radiological Control organization. A line manager, such as the Manager of Operations, Research, or Maintenance normally will serve as the Chairperson.” Members should have knowledge of, and an interest in, ALARA principles.*

- 4.3.2.1 Establish individual radiological worker ALARA goals consistent with “planned” work scope for the coming calendar year. The goals should be established by the end of the current calendar year or as early as possible thereafter, pending identification of planned work.
- 4.3.2.2 Provide the goal information to the project ALARA Coordinator for review and concurrence (see step 4.3.5.6).

- 4.3.3 Project ALARA Chairperson: Ensure the ALARA program is implemented at projects by requesting management to appoint membership, which should include managers and workers from line organizations, technical support organizations, and Radiological Control.

- 4.3.3.1 Preside over the committee meetings and activities of the committee.
- 4.3.3.2 Assemble an ALARA Committee meeting as dictated when radiological work activities or conditions meet the ALARA Committee trigger levels in section 4.6.6, or as requested by the Project Radiological Control Manager, and/or as necessary to effectively implement the responsibilities of the ALARA Committee and an effective ALARA Program.
- 4.3.3.3 Determine the minimum number of members to constitute a quorum for committee meetings. Minimum members will be the Chairman, Coordinator and Project RadCon Manager or their designated alternates.
- 4.3.3.4 Review revisions to radiological work that received an ALARA Committee Review to determine if a full committee review of the modified work process is required.
- 4.3.3.5 Request facility/project management to actively participate in the ALARA program.

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- 4.3.3.6 Review and approve ALARA program documentation, including ALARA committee minutes, notices, reports, and communications.
- 4.3.3.7 Approve committee responses, track organizational radiation exposures, and submit the project radiation exposure goals to the ICP ALARA Committee.
- 4.3.3.8 Ensure the necessary technical, administrative, and supervisory resources are allocated, based on management commitment established in step 4.1.1.
- 4.3.4 Project Radiological Control Managers:
  - 4.3.4.1 Select and appoint a project ALARA Committee coordinator.
  - 4.3.4.2 Ensure effective ALARA reviews are conducted.
  - 4.3.4.3 Attend and provide technical oversight of ALARA Committee meetings.
- 4.3.5 Project ALARA Coordinator: Serve as committee administrator and provide technical support and assistance to the ALARA Committee in implementing the ALARA program.
  - 4.3.5.1 Assist the ALARA Committee chairperson in preparing, conducting and scheduling meetings, issue meeting minutes including a record of attendees, and maintain the committee records.
  - 4.3.5.2 Distribute meeting notices to members and other invitees as far in advance of the meeting as possible.
  - 4.3.5.3 Invite the affected Project ALARA Chairperson, ALARA Coordinator and Project RadCon Manager when an ALARA Committee Review is conducted by a Project ALARA Committee for work inside another facility. (i.e., RWMC or D&D ALARA Committee review is held for work inside the INTEC Facility.)
  - 4.3.5.4 Coordinate, promote, and document radiological activities that reduce occupational radiation exposures and minimize the spread of radioactive materials.

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- 4.3.5.5 Inform the ALARA Committee of the performance goals and the effectiveness of the ALARA program.
- 4.3.5.6 Coordinate preparation of *individual ALARA goals* (see def.) based on projected work scope using past histories and new planned work evaluations and submit individual ALARA goals to Radiation Dosimetry and Records (RDR) or input individual exposure goals into Sentinel prior to the end of the current calendar year or as early as possible thereafter pending identification of planned work for the upcoming year.
- 4.3.5.7 Submit individual ALARA goal revisions (using form 441.64) to Radiation Dosimetry and Records (RDR) when properly justified in writing or through electronic transmittal by line managers/supervisors.
- 4.3.5.8 Track and prepare the project collective radiation exposure ALARA goals, as developed by line managers/supervisors, and submit them to the ICP ALARA coordinator by February 15 of each year or as early as possible thereafter, pending identification of planned work.
- 4.3.5.9 Submit revisions of project ALARA goals to the ICP ALARA chair and coordinator, with applicable justification, when work scope or other significant changes occur.
- 4.3.6 Project ALARA Committee Members: Represent their specific organization with organization approval authority.
- 4.3.6.1 Make recommendations to management to minimize radiation exposures and radiological releases.
- 4.3.6.2 Track radiation exposures of personnel in the organization they represent. Review exposures for possible ways to meet ALARA.
- 4.3.6.3 Evaluate ALARA goals as compared to actual occupational radiation exposure received.
- 4.3.6.4 Assist project management in establishing individual and organization exposure goals for the coming year, as requested. Forward the organization's total exposure goals to the ALARA coordinator by January 10 of each year (or as early as possible thereafter pending identification of planned work), and the goals for each individual working in that

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organization by November 20 of the current year (or as early as possible thereafter pending identification of planned work) for the coming year.

4.3.6.5 Perform job or project work plan reviews as provided for the ALARA Committee prior to the committee meeting.

4.3.7 Project ALARA Committee: Ensure ALARA principles are incorporated in the conduct of the Radiological Control Program.

4.3.7.1 Make recommendations to management to improve progress toward minimization of radiation exposure and radiological releases.

4.3.7.2 Review specific jobs that meet the criteria in section 4.6.6.

4.3.7.3 Review and approve the project occupational radiation exposure ALARA goals.

4.3.7.4 An ICP ALARA Committee review and approval is required prior to allowing a project or facility ALARA goal to exceed 120% of the approved goal.

**NOTE:** *The collective radiation exposure ALARA goals are established for the calendar year and include matrixed, construction, and subcontractor personnel occupational radiation exposures.*

4.3.7.4.1 Communicate these goals to project personnel using posters, direct interface with workers or other appropriate methods.

4.3.7.5 Evaluate ALARA goals as compared to actual occupational radiation exposure received.

4.3.7.6 Promote ALARA awareness and lessons learned dissemination.

4.3.7.7 Review project activities and ALARA goals, and make recommendations, and/or assign action items to ensure proper attention to dose reduction and radiological materials control is considered in planning and work control documentation.

4.3.7.8 Evaluate the best available methods and technologies that will strengthen the ALARA Program.

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**4.4 General Responsibilities**

- 4.4.1 Line Management and Job Supervisors: Promote ALARA attitudes and philosophy by demonstrating support and commitment to the ALARA program.
- 4.4.2 Line Management and Job Supervisors: Develop organizational ALARA performance goals for each project based on projected work scope and anticipated exposure for all tasks.
- 4.4.2.1 Monitor task performance against goals or estimates and evaluate and address causes of variances exceeding 120% as appropriate.
- 4.4.3 Line Management and Job Supervisors: Assist project management in establishing employee individual annual (January 1 through December 31) ALARA goals for those individuals expected to receive occupational exposure (typically those with RadWorker I or II training) to meet the needs of the planned ALARA goal(s) (see step 4.3.2.1).
- 4.4.3.1 If an individual's total effective dose (TED) includes dose from off-site activities, (reported on NRC form 4 or equivalent) the individual's ALARA goal may be set at a level equal to the off site dose plus the goal the individual would have with no off-site dose, provided setting such a goal would not cause the individual to exceed the limits established in 10 CFR 835.202.
- 4.4.3.2 Approval to exceed the company established Administrative Control Level (ACL) is not required unless the individual ALARA goal is being raised to a level which exceeds the current company ACL plus the off-site dose.
- 4.4.4 Line Management and Job Supervisors: Radiological workers should be made aware of their individual ALARA goal for the coming year by December 31 or as early as possible thereafter, pending identification of planned work. Individual ALARA goal performance status should be tracked and communicated to these workers.
- 4.4.5 Line Management and Job Supervisors: Conduct operations in a manner to ensure that occupational radiation exposure to employees, the environment, and the general public is as far below the established limits as reasonably achievable.
- 4.4.6 Line Management and Job Supervisors: Track and trend occupational radiation exposures of personnel.

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- 4.4.6.1 Identify employees whose exposures are significantly higher than others with similar job assignments.
- 4.4.6.2 Identify employees who may exceed their individual ALARA goal; determine and correct the cause.
- 4.4.6.3 Notify appropriate management of employees who are approaching their individual ALARA goal, for re-evaluation of both individual and company needs. The individual should be informed and involved in the evaluation.
- NOTE:** *The above re-evaluation may include actions ranging from reassignment to low dose jobs to increasing ALARA goals.*
- 4.4.6.4 Send requests for changes to an individual's ALARA goal on form 441.64, Radiation Exposure Extension Authorization to the project ALARA coordinator in writing or by electronic transmittal.
- 4.4.7 Line Management and Job Supervisors: Conduct pre-job briefings and feedback meetings per MCP-3003, Performing Pre-Job Briefings and Documenting Feedback.
- 4.4.8 Job Supervisors, Planners, Responsible Person(s), and Project Managers: Complete form 441.47, a RadCon Pre-Job “Planning” Checklist, or equivalent, for a radiological work activity to aid with development of work package steps.
- 4.4.9 Job Supervisors, Planners, Responsible Person(s), and Project Managers: When a work activity meets or exceeds the established ALARA Committee trigger levels established in step 4.6.6, discuss considerations to be implemented during planning with the ALARA chairperson or ALARA Committee.
- 4.4.9.1 Maintain completed form 441.47 or equivalent with the work package.
- 4.4.9.2 Review steps 4.6.6-4.6.7 with the ALARA Committee, and ensure the applicable planning steps are included to reduce exposure to levels ALARA.
- 4.4.10 Project Manager or Project Manager’s Designee: Provide justification to the project ALARA chairperson or ALARA coordinator when a change to the project ALARA goal is warranted. The discussion should include:
- A. changes in work schedule or work scope

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- B. unplanned work activities
- C. difficulties encountered during work activities
- D. lessons learned

4.4.11 Project Managers and Radiological Engineering: Evaluate *optimization methods* (see def.) to ensure that occupational exposure to personnel is maintained ALARA when developing, documenting, and justifying facility design and physical controls.

**NOTE:** *The DOE Science and Technology Organization (www.osti.gov) and the Nuclear industry maintain many ALARA related WEB sites that can provide valuable lessons learned, tooling and techniques to reduce exposures when conducting radiological work.*

4.4.12 All Employees/Subcontractors: Demonstrate responsibility and accountability through an informed, disciplined, and cautious attitude to the ALARA and Radiological Control program.

4.4.13 All Employees/Subcontractors: Understand that proper radiological controls are an integral part of daily duties.

4.4.14 All Employees/Subcontractors: Be knowledgeable about the work environment and those aspects of radiological control that are important to developing a better worker attitude and perspective.

4.4.15 All Employees/Subcontractors: Cooperate with the Radiological Control organization.

4.4.16 All Employees/Subcontractors: Know that management and all workers share responsibility for radiological control.

#### **4.5 ALARA Design Review Process**

4.5.1 Designers: Request radiological engineering support early (by Title I design review) in the planning and design of new facilities or modification of existing facilities that are associated with handling, processing, or storage of radioactive material in accordance with 10 CFR 835 subpart K.

4.5.2 Designers/Radiological Engineering: Use form 431.01, Radiological Control Design Review or equivalent (containing at least the information on the form), to develop methods to implement ALARA processes into the early design and to support design modifications.

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- 4.5.3 Radiological Engineering: Recommend ALARA measures to facilitate control of radiation exposure in controlled areas through facility and equipment design and administrative control.
- 4.5.4 Radiological Engineering: Perform design reviews early in the design stage and throughout the entire work activity or work project using form 431.01 or equivalent (containing at least the information on the form).
- 4.5.4.1 Ensure that reasonable radiological considerations have been integrated into the design, the construction procedures, and the plans for decommissioning.
- 4.5.4.2 Evaluate, at a minimum, the primary methods used as physical design features, including:
- A. general configuration of the facility
  - B. confinement and ventilation
  - C. remote handling and remote equipment
  - D. shielding
  - E. containment
  - F. decontamination capabilities.
- 4.5.5 Management: Normally plan to use administrative controls as supplemental methods to control radiation exposure.
- 4.5.5.1 Evaluate methods to minimize hands-on work or to expedite work when hands-on is the only practical option.
- 4.5.6 Radiological Engineering/Managers: Use optimization methods for ALARA in developing and justifying facility design and physical controls during the design of new facilities or modification of existing facilities.
- NOTE:** *Step 4.5.6.1 design criteria is from 10 CFR 835.1002.(b) as a requirement for occupational personnel protection. It is not intended that routine continuous occupancy (2,000 hours/year) in radiation fields of 0.5 mrem/hr will be acceptable for workers at the ICP.*
- 4.5.6.1 Ensure the design objective for controlling personnel exposures from external sources of radiation in areas of continuous occupancy (2,000 hours/year) is to maintain

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exposure levels below an average of 0.5 mrem per hour and as far below this average as is reasonably achievable

4.5.6.2 Ensure the design objectives for exposure rates for potential exposure to a radiological worker where occupancy differs from the above are ALARA and do not exceed 20 % of the applicable standards in 10 CFR 835.202.

4.5.6.3 Ensure the design objective for control of airborne radioactive materials under normal conditions is to avoid releases to the work place atmosphere and to control inhalation of such materials by workers to levels that are ALARA.

4.5.6.4 Ensure the design or modification of a facility and the selection of materials includes features that facilitate operations, maintenance, decontamination, and decommissioning.

4.5.7 Radiological Engineering: Maintain a copy of form 431.01, "Radiological Control Design Review," or equivalent in the project RadCon filing system to document the review was completed.

**NOTE:** *Decisions on the cost/benefit of reducing occupational dose involves judgments on the relative value of social, technical, and economic factors, considering the benefits arising out of the activity, potential detriments from the activity, and possible detriments from not performing the activity.*

4.5.8 Project Managers and Radiological Engineering: Use optimization techniques, including cost/benefit analysis, as a fundamental part of radiological design analysis and work review to establish APM to minimize radiological exposure (Appendix A provides examples.)

4.5.8.1 Use the ICP ALARA Committee to review and evaluate larger person-rem evaluations if the costs appear to be justifiable.

**NOTE:** *The ALARA Committee will make appropriate recommendations to senior staff for their approval or disapproval, as applicable.*

## 4.6 ALARA Review Process

4.6.1 Line Managers/Project Managers: Employ the ISMS process to obtain Radiological Control reviews during work planning phases.

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4.6.1.1 Request a formal, documented ALARA review from radiological support personnel for radiological work activities or tasks with the potential to exceed the following company RCM trigger levels:

**NOTE:** *In accordance with RCM Article 312.3, routine, non-complex work activities covered with a general RWP (such as low-level radiological work in laboratories) do not require an ALARA review.*

- A. individual exposures exceeding 100 mrem equivalent dose to the whole body
- B. a collective task dose of 500 mrem equivalent dose to the whole body
- C. predicted airborne radioactivity concentrations greater than 1 derived air concentration (DAC) without respiratory protection and 100 DAC with respiratory protection
- D. work area removable contamination 100 times values listed in the ICP RadCon Manual Table 2-2.
- E. entry into areas where dose rates are greater than 1 rem/hour equivalent dose to the whole body
- F. potential radioactive releases to the environment are greater than or equal to 1 Derived Concentration Guide (DCG).
- G. tasks involving unique isotopes or uncharacterized radiological areas.

4.6.2 Radiological Engineering: Conduct an ALARA review using form 441.10, ALARA Review, or equivalent when work activities meet one of the above trigger levels, and consider the following:

**NOTE:** *These items should normally be incorporated in the work plan.*

- A. inclusion of Radiological Control hold points in the technical work documents
- B. elimination or reduction of radioactivity through work sequencing, line flushing and decontamination

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- C. use of work processes (including worker positioning) and special tooling to reduce time in the work area
- D. use of engineered controls, including fixatives or covering work areas, to minimize the spread of contamination and generation of airborne radioactivity
- E. specification of special radiological training or unique monitoring requirements, including special equipment or dosimetry needs such as bioassay and extremity monitoring
- F. use of mockup training for first of kind, high exposure or complex tasks
- G. engineering, design, and use of temporary shielding to reduce radiation levels and time in radiation fields
- H. walkdown or dry-run of activity using applicable procedures
- I. staging and prefabrication of necessary materials and special tools
- J. maximization of prefabrication and shop work
- K. review of abnormal and emergency procedures and plans
- L. establishment of success or completion criteria, with contingency plans to anticipate difficulties
- M. development of a pre-job estimate of work task and collective dose to be incurred for the job, documenting discrete activity dose rate and time estimates when necessary to define controls or dosimetry needs
- N. provisions for waste minimization and disposal
- O. identification of points where signatures and second party or independent verifications are required.
- P. documentation of basis when administrative controls have been selected over engineered controls, such as use of respirator in lieu of using ventilation or a containment.
- Q. consideration of unique aspects of Decontamination and Decommissioning work with focus on unique hazards and potential for legacy related problems.

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- R. Consideration for modification of standardized radiological PPE for safety concerns, (i.e. heat stress concerns).
- 4.6.3 Project Radiological Control Manager: Review and approve, in writing, situations when engineered controls are discounted due to impracticality of implementation, such as due to the costs to install ventilation or containment in a large contaminated area.
- 4.6.4 Project Radiological Control Manager: Ensure personnel assigned to conduct ALARA reviews are trained and familiar with unique facility hazards and effective control requirements.
- 4.6.4.1 Review and approve ALARA review packages to confirm that the procedural requirements for the initial ALARA review have been met and the appropriate radiological controls have been specified.
- 4.6.4.2 Ensure a project ALARA committee review is performed when the trigger limits of section 4.6.6 are met or unique situations would be best served by a committee review.
- 4.6.5 Line Managers, Radiological Engineering and Planners: Incorporate the review requirements into the job plans, procedures, work packages or RWP as appropriate.
- 4.6.6 Line Manager, and Radiological Engineering: Contact the project ALARA Chairperson or ALARA Coordinator to request a project ALARA Committee review for specific jobs at a minimum when:
- A. individual dose is anticipated to exceed the *Administrative Control Level* (see def.), Total Effective Dose (TED)
  - B. collective dose of 5 rem TED
  - C. anticipated tasks could result in project collective dose exceeding the project collective occupational radiation exposure goal
  - D. radiological work activity is infrequent (i.e., activities for which project or worker planning and execution experience are insufficient to provide assurance of adequate radiological controls) or represent first-time operations.
  - E. work activities have a high potential for unknown radiological consequences.

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- F. a request for an ALARA Committee review is made citing a specific radiological control issue/concern.

**NOTE 1:** *Tasks to consider may include opening lines or systems with unknown content, opening a radiological system for the first time, first time entry into a potential high radiation area with no prior knowledge of probable consequence, or probable high levels of contamination where dose rates and contamination levels could increase rapidly.*

**NOTE 2:** *Large projects, as defined in the initial ALARA review, should be reevaluated by the project ALARA Committee anytime the job scope changes potential worker exposure, or for long-term jobs, every six months.*

- 4.6.7 Project ALARA Committee: Review infrequent or first time radiological work activities that involve dose rates or contamination levels that are not routinely handled. This would include work that involves radionuclides that are not easy to characterize. The extent of this review will be commensurate with the expected and potential hazards and required controls and will ensure:

- A. senior management review directed toward anticipation of concerns and emphasis on specification of protective measures
- B. enhanced line and Radiological Control organization management oversight during the initiation and conduct of the work

- 4.6.8 Line Manager, and Radiological Engineering Submit any revisions of work or ALARA Reviews that received a project ALARA Committee Review, to the Project ALARA Chairman to determine if a full committee review for the modified work process is required.

- 4.6.9 Project ALARA Chairman In consultation with the Project RadCon Manager, determine the need for a full committee review of work or ALARA review revisions that initially received a full committee review.

**NOTE** *At a minimum, changes resulting in an increase of individual or collective dose estimates or changes in radiological controls should be reviewed by the Chairman and the Project RadCon Manager. Significant changes in radiological controls or increases in dose estimates, or changes that may result in a significant increase in the organizational ALARA Goal should have a full committee review*

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- 4.6.10 Project ALARA Committee/Radiological Engineering: Document ALARA reviews using form 441.10, or equivalent. Maintain the completed form as a record.

**4.7 Resolution of Committee Issues and Action Items**

- 4.7.1 Issues, as defined in MCP-598 “Corrective Action System,” identified in ALARA Committee meetings will be entered and tracked in ICARE in accordance with MCP-598. Assigned action items identified in ALARA Committee meetings will be tracked by the appropriate project or site ALARA Coordinator to ensure action items are resolved and closed.

**5. RECORDS**

ALARA Policy Statement

Form 431.01, Radiological Control Design Review

Form 441.10, ALARA Review

Form 441.47, Radiological Control Pre-Job Planning Checklist

ALARA Committee meeting minutes, notices, reports

ALARA goals as shown in Performance Indicator Report

**NOTE:** *The Records Schedule Matrix, located on the intranet at [http://edms.inel.gov/docs/matrix/mtx\\_menu.html](http://edms.inel.gov/docs/matrix/mtx_menu.html), and the applicable facility, organization, program, or project records management plan and records type list provide current information on uniform file codes, disposition authorities, and retention periods for these records.*

**6. DEFINITIONS**

*Administrative Control Level.* A numerical dose constraint established at a level below the regulatory limits to administratively control and help reduce individual and collective dose.

*ALARA Committee.* A multi-disciplined forum that reviews and advises management. Members of the ALARA Committee will be representatives from the organizations that expect personnel to receive occupational radiation exposure. The membership should include managers and workers from the line, the technical support organization, and the Radiological Control Organization.

*ALARA (radiological) performance goal.* An administrative objective that focuses efforts on improving radiological performance. Goals are intended as a measure of and

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motivation for improvement, not an end in themselves. These performance indicators are not to be viewed narrowly as numerical goals, but should be used as tools to assist management in focusing their priorities and attention.

*Individual ALARA goal.* Individual dose goal which serves to assist management in controlling individual and organizational radiation dose. The individual ALARA goals may be increased or decreased depending on the work activities with appropriate justification.

*Optimization method.* A documented method that describes how the factors affecting a protection decision, i.e., social, technical, economic, practical, and public policy, are assigned values to compare detriments and benefits.

**7. REFERENCES**

See Appendix B, Procedure Basis Document

**8. APPENDICES**

Appendix A, Examples of Cost Benefit Analysis

Appendix B, Procedure Basis Document

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## Appendix A

## Examples of Cost Benefit Analysis

The establishment of a value for person-rem provides managers with a tool to be used for cost/benefit analysis in terms of planning methods to reduce radiation exposure. The dollar value helps managers decide the cost effectiveness of implementing an ALARA Protective Measure (APM) to reduce personnel exposure.

\$10,000/person-rem is a typical value used as the cost-benefit tool. Managers may approve \$25,000 as the value to save large amounts of collective total effective dose (TED). The ICP ALARA Committee should review requests to spend dollars exceeding \$25,000 per person-rem, and senior staff should approve the request based on the ALARA Committee recommendation(s). Some simple examples follow:

Examples:

1. Work is planned to paint and insulate a facility that houses a radioactive waste storage tank. Based on prior surveys and estimated exposure, the job will cost about 3 person-rem to complete ( $\$10,000 \times 3 = \$30,000$  in exposure detriment). By using remote monitoring and using shielding around the tank at a cost of \$9,200, personnel dose can be reduced to 0.7 person-rem;  $0.7 \times \$10,000 = \$7,000$  detriment. By subtracting the reduced detriment from the original detriment, we see that savings are  $\$30,000 - \$7,000 = \underline{\$23,000}$ . Spending \$9,200 to save \$23,000 is cost effective.
2. In the example above, if robotics were planned to do installation of the shielding at a cost of \$50,000 to reduce dose to 0.2 person-rem, the values become  $\$30,000 - \$2,000 = \underline{\$28,000}$  savings in exposure detriment. Spending \$50,000 to save \$28,000 is not cost effective ( $\$50,000 - \$28,000 = \$22,000$  in added cost).
3. Using the same example: Doing work in the facility over a period of time, say for the calendar year, and leaving the shielding in place or re-installing the shielding as needed for other maintenance work, etc., would save an additional 10 person-rem exposure during the year. The additional 10-rem reduction of dose should encourage managers to re-evaluate the decision to not use robotics. 10 person-rem is worth \$100,000 in exposure detriment. The original job saves only \$28,000 by use of robotics; a differential of  $\$50,000 - 28,000 = \$22,000$ . However, over the calendar year, an additional savings of \$100,000 ( $10 \text{ rem} \times \$10,000 = \$100,000$ ) would be realized. During the initial job-planning phase, robotics could not be justified because of the apparent added cost. Looking at the total savings ( $\$100,000 + \$28,000 = \$128,000$ ), the initial expenditure of \$50,000 to save \$128,000 in one calendar year can easily be justified. The dose reduction would continue in future years due to the original APM purchase of robotics.

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## Appendix B

### Procedure Basis Document

Step Number	Basis	Source	Citation
4.2.1	Senior Site Executive and senior staff support and commitment to ALARA	RCM PRD-183	Articles 121 and 138
4.2.2	Radiological Control Director responsibility	RCM PRD-183	Article 141
4.2.3	ALARA Chair responsibility	RCM PRD-183	Article 121 and 138
4.2.4	ALARA Coordinator responsibilities		
4.2.5	ICP ALARA Committee	RCM PRD-183	Article 138,
4.3	Project ALARA Committee responsibilities	RCM PRD-183	Articles 138, 312 and 313
4.3.2	Project Management selection of the ALARA Chairperson	RCM PRD-183	Article 138
4.3.2.1- 4.3.2.2	Individual goals	RCM PRD-183	Article 132
4.3.3	Project ALARA Chairperson	RCM PRD-183	Article 138
4.3.4	Project RadCon Manager's responsibilities	10 CFR 835	§ 103
4.3.5	Project ALARA Coordinator responsibilities	RCM PRD-183	Articles 138, 141 and 143
4.3.7	Project ALARA Committee actions	RCM PRD-183	Article 138
4.4.1	Line management/project management commitment to ALARA	RCM PRD-183	Articles 117, 121, 125.
4.4.8 - 4.4.9.2	ALARA Planning Form 441.47	10 CFR 835 RCM PRD-183	§ 704(b) Article 312

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<b>Step Number</b>	<b>Basis</b>	<b>Source</b>	<b>Citation</b>
4.4	General Responsibilities	RCM PRD-183	Articles 117 and 122
4.5	ALARA Design Review	RCM PRD-183  10 CFR 835	Articles 128, 311, 312 and 381  § 1001, 1002 & 1003
4.5.5	Use of Administrative Controls	RCM PRD-183 10 CFR 835	Article 311  § 1003
4.5.6.4	Design Criteria	RCM PRD-183	Article 381
4.5.7	Document Design Reviews	RCM PRD-183 10 CFR 835	Article 742  §704.6
4.6	ALARA Review Process	RCM PRD-183	Articles 312, 313 & 315
5.0	Records	RCM PRD-183 10 CFR 835	Article 742  § 701