Radiological Guide for Planners (U)

Westinghouse Savannah River Company
Savannah River Site
Aiken, SC 29808

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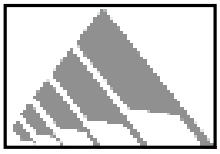

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Radiological Guide for Planners(U)

High Level Waste - Safety & Health Operations

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Preface

Department of Energy Radiological Control Policy

ALARA

Personal radiation exposure shall be maintained As-Low-As-Reasonably-Achievable (ALARA). [835.1003 (a)(3)]

Radiation exposure of the work force and public shall be controlled such that radiation exposures are well below regulatory limits and that there is no radiation exposure without commensurate benefit.

Ownership

Each person involved in radiological work is expected to demonstrate responsibility and accountability through an informed, disciplined, and cautious attitude toward radiation and radioactivity.

Excellence

Excellent performance is evident when radiation exposures are maintained well below regulatory limits, contamination is minimal, radioactivity is well controlled, and radiological spills or uncontrolled releases are prevented.

Continuous improvement is essential to excellence in radiological control.

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Introduction

This document was developed to provide consistent guidance to High Level Waste Management Division (HLWMD) personnel responsible for planning tasks that involve radiological work. It was based on the *Westinghouse Radiological Containment Guide* to accomplish the following:

- minimize personnel contamination
- prevent the spread of contamination
- minimize the required use of protective clothing and personal protective equipment

In addition, the *Radiological Guide for Planners* was specifically designed to improve the integration of radiological controls into work planning and execution activities. It is imperative that the **Integrated Safety Management System (ISMS)** core functions (Figure 1) are adequately addressed, especially the *Feedback/Improvement function*, to ensure continuous improvement in radiological controls. This document provides a disciplined approach to successfully perform radiological work in a safe, cost-effective, and timely manner. The *Radiological Guide for Planners* was developed by Environment Safety Health and Quality Assurance (ESH&QA)/Safety and Health Operation (S&HO) for use within the HLWM Division and other SRS facilities. This guide has since been adopted for use throughout the DOE complex. ESH&QA/S&HO is firmly committed to provide leadership in radiological work planning well into the future.

Please use this document and provide feedback on how it can be improved. As we continue to pursue new missions for SRS, our ability to demonstrate a disciplined approach to radiological work planning, in parallel with safety excellence, is essential to our success.

How to Use this Planning Guide

First, turn to the ISMS flowchart (Figure 2) to begin.

Secondly, “define the radiological scope” of the job/task being planned by reviewing Section I. Then refer back to Figure 2 and define the radiological scope by selecting one of three choices; Routine Stable Operations, Routine/Elevated Rad Conditions, or Non-Routine or Complex Work, and follow that flow path. The flowchart may refer you to Section III or Section IV. These sections should explain or provide additional information to help you understand and then decide which flow path is necessary for the job/task.

Note: References to Radiological Controls, RC, and RADCON are used interchangeably in this guide in association with action steps and hold points.

Thirdly, according to the flow path taken on the flowchart, other figures and Table A-1 (Figure 3) may also be referenced. Address or complete as appropriate.

Finally, according to the path taken on the flowchart, this guide may reference several WSRC Manual 5Q procedures to aid in the planning process. Address each procedure appropriately.

Responsibilities

Work Control Planner: Responsible for the planning of the activity to be performed. Must be familiar with the job scope, prints, radiological conditions, etc. Information may be obtained also by performance of a walkdown of the job and area in which the task is to be performed. The planners activities would include requesting the RWP, detailing of work steps, quality hold points, Radiological Control Action Steps and Radiological Control Hold Points, etc.

Radiological Control Work Specialist: Responsible for generating Radiological Work Permits (RWP) and the review of work packages for proper incorporation of radiological controls. Assists the work control planner in the establishment and understanding of radiological controls. This includes the review of Radiological Control Action Steps and Radiological Control Hold oints into the work planning process.

Figure 1
Radiological Guide for Planners
Summary Flow Diagram

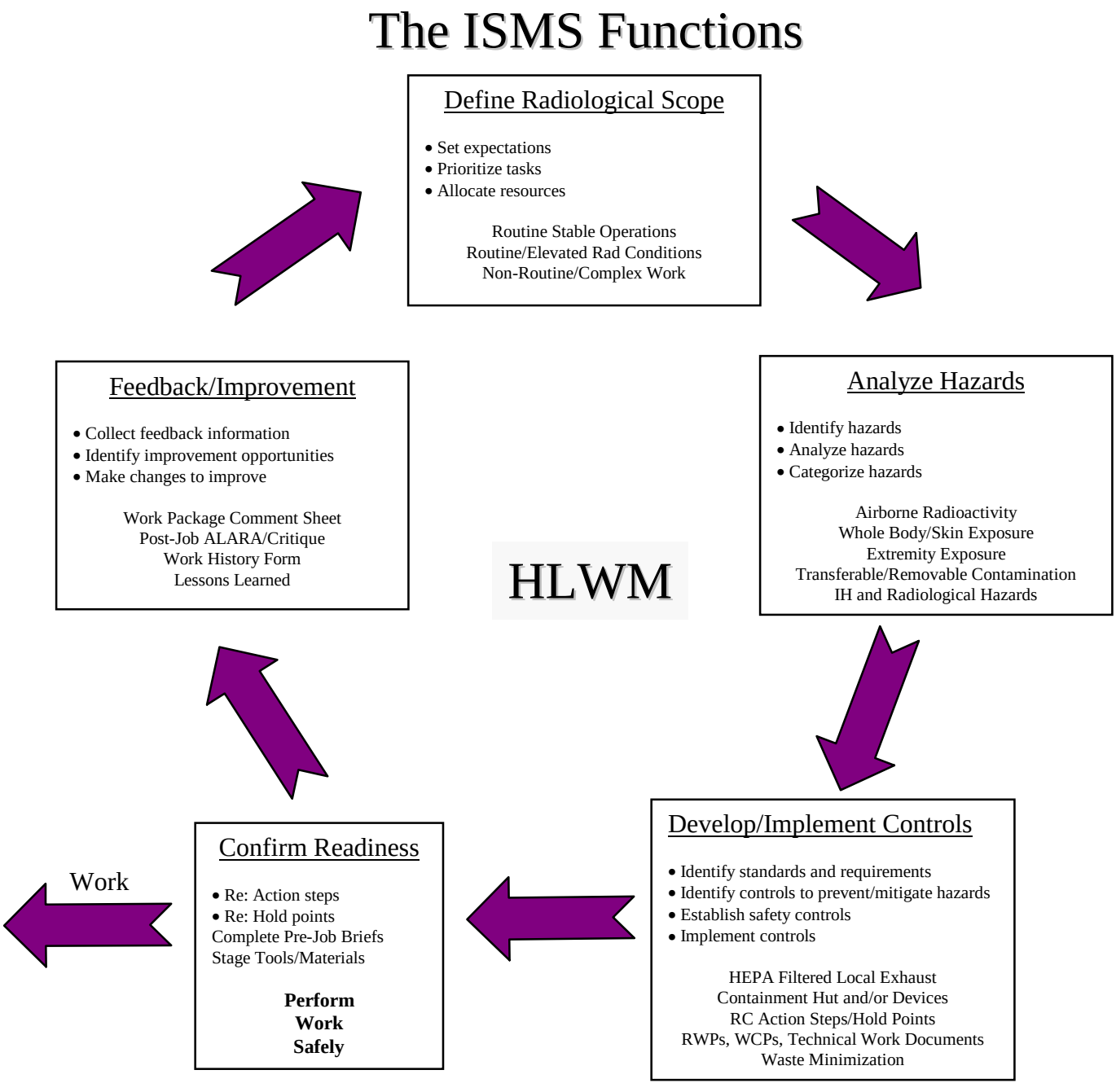
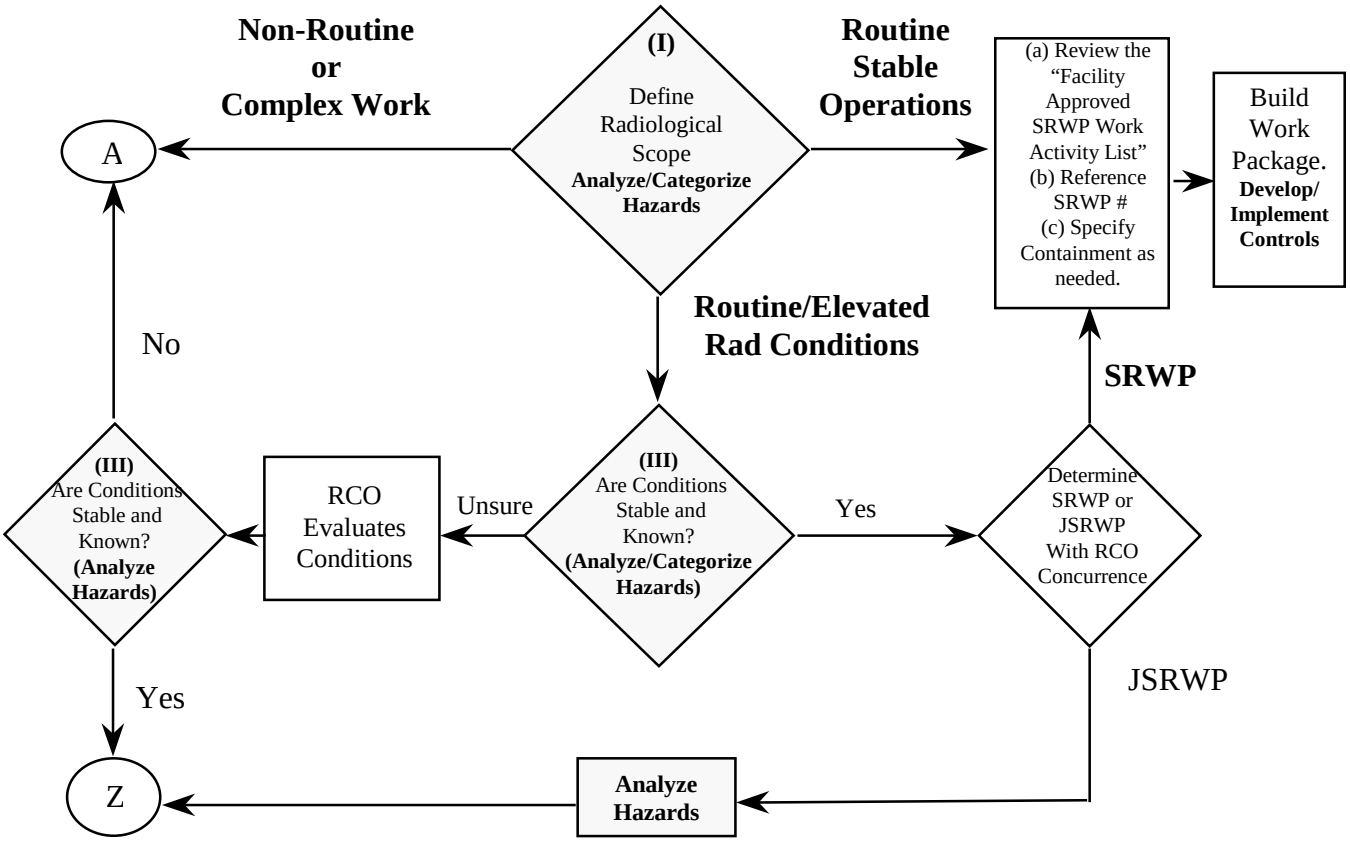


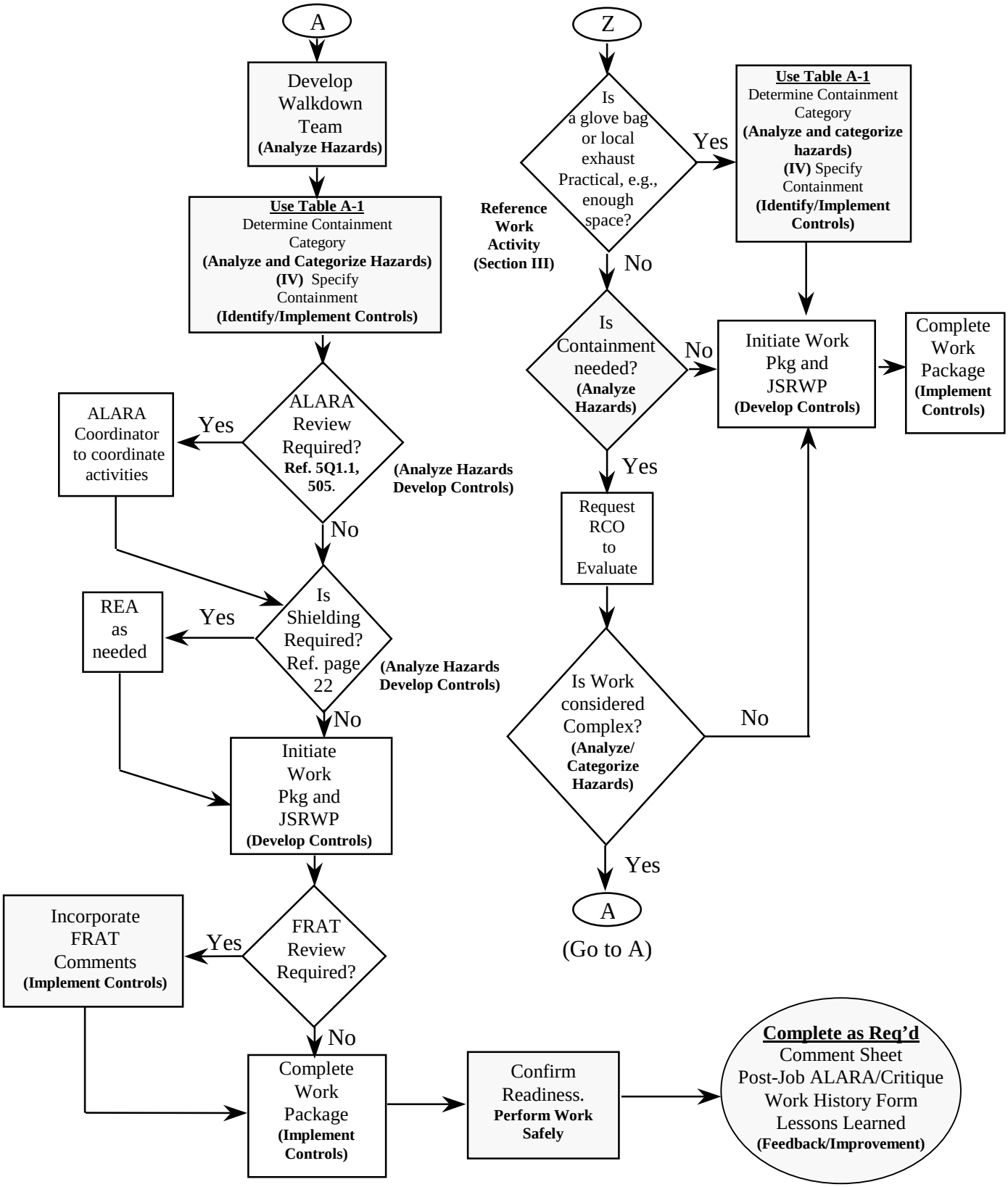
Figure 2
Integrated Safety Management System Flowchart



SRWP - Standing Radiological Work Permit
JSRWP - Job-Specific Radiological Work Permit
FRAT - Facility Radiological Assessment Team
REA - Request For Engineering Assistance

(continued on next page)

Figure 2
Integrated Safety Management System Flowchart, contd



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Section I – Define Radiological Scope

Routine Stable Operations

Routine operations are defined as activities that are regular, normal business; performed by prescribed instructions or a series of steps of a more or less unvarying manner; or repetitive/recurring, customary, usual, or steady. Standing Radiological Work Permits (SRWPs) are used to control routine or repetitive activities in areas with well-characterized and stable radiological conditions. *Reference "Facility Approved Work Activities Covered by SRWPs"*. An RC Action Step(s) may be required.

***Note**: Above and below grade work (e.g., sump entry) may require an RCO evaluation. An RC Action Step, requiring RCO to perform a radiological survey prior to initiating work, should be added to work package when applicable.*

Routine Stable Operations - Does Not Include:

- entry into High Radiation Areas
- entry into Very High Radiation Areas
- entry into High Contamination Areas (removable)
- entry into existing Airborne Radioactivity Areas

Routine/Elevated Conditions

Routine/Elevated jobs are more complex than routine stable operations because of the radiological aspects, and not because of job difficulty. Work under these conditions is considered routine in nature but may pose a potential hazard to radiological workers and to the facility. Activities may involve transferable contamination and airborne radioactivity. RCO will determine if job/task requires either a Job-Specific Radiological Work Permit (JSRWP) or a Standing Radiological Work Permit (SRWP). Usually, an RC Action Step(s) is required.

Examples:
- Sludge/Salt Sounding/Steel Tape
- Repacking valves
- Lead/shielding removal
- Waste transfer line "jacket" line break (w/no contamination history)
- HEPA filter replacement
- Special test procedure that requires multiple line breaks

Routine/Elevated Conditions - Generally Does Not Include:

- entry into High Radiation Areas
- entry into Very High Radiation Areas

Note: *Exception would be dip sampling where the rate may be greater than 100 mrem/hr.*

Non-Routine/Complex Work

Activities are defined as tasks outside the normal work activities; performed by a comprehensive group of instructions consisting of elaborate or interrelated parts or ideas; or unusual or changing conditions. This type of activity can involve high levels of radiation exposure, high levels of transferable contamination, and exposure to Airborne Radioactivity. Complex jobs generally have challenging radiological aspects. A JSRWP is mandatory for complex work. At a minimum, an RC Action Step is required, and possibly RC Hold Points (reference 5Q1.1, 530). Consult RC Work Control for RC Hold Point applicability (Section V). Complex jobs require extensive radiological planning. A Facility Radiological Assessment Team (FRAT) review may also be required.

Examples: Waste tank Slurry pump and jumper removal
Waste tank Diversion box line break/maintenance
Process filter replacement (WPT Filter Cell)
Entry into High or Very High Radiation Areas
Waste transfer line “core” line break
Melter replacement at DWPF

Note: *Incorporate Lessons Learned and Post-Job ALARA/Critique comments from previous job evolutions.*

Section II – Containment Overview

Containment encompasses various engineered barriers that can be applied in varying degrees, and is not limited to the concept of total enclosure. Containment should prevent the spread of radioactive contamination. From a radiological controls perspective, it is preferred to evaluate containment first and discuss how to perform the task rather than work into some form of containment as an alternative to personnel protective equipment (PPE).

Two key principals influence the application of containment:

- Establishing the contamination barrier as close to the source as possible.
- Using containment around work areas in order to reduce the level of PPE.

Establishing effective containment involves going through a thought process involving the following general steps:

1. Defining the type of containment needed.
2. Determining that the type of containment is appropriate and adequate for the intended activity
3. Designing the containment.
4. Obtaining, installing, and using the containment.

Much of this thought process should begin in the initial planning stages for the job while in work control. Containment in some form should be the normal thought process for both known and "potentially" contaminated systems and equipment. Consideration must be given to the potential hazard associated with the system being worked**.** Historical files and databases can provide assistance to the work control process if properly recorded for the task being performed.

This guide as well as the Radiological Containment Guide provides a step by step process for the evaluation of the task to be performed. Personnel must be realistic as to the current or "potential" conditions that could exist for a job. In many cases, what may be perceived as the easiest method (i.e., no containment) can pose the highest risk to personnel and the facility. When a realistic approach is taken on a job, measures can be applied that will control the spread of contamination at the worksite, and protect personnel on the job, the facility, and the environment. These measures can lead to minimal PPE for personnel while maintaining a safety factor for the job.

This evaluation is determined by the level of removable contamination, the stability of the contamination, and the type of work to be performed. In this evaluation, a true assessment must be made of contamination levels that may be encountered during the job. This may involve contamination that may not be present at the initiation of the job. Planning must involve assessment of the full potential of the task. Aspects of containment revolve around risk and the hazard. Oftentimes, personnel feel that containment slows the task and hampers work, but if the work is suspended due to higher than expected levels of contamination, time is also lost.

Some secondary considerations in determining the use of containment follow.

- **Surrounding work area contamination levels** – Controlling the spread of contamination in an area by using containment should be performed. The task should include maintaining this condition and minimizing the use of PPE. If conditions in an area will require PPE, then containment should be utilized to keep the area at least to the pre-job conditions.

- **Impact of containment failure during a job** - What will happen if your controls fail? Will a spread of contamination occur that will impact the facility and/or the personnel working the job?

- **Area dose rates at the jobsite** - If dose rates are high, then methods should be considered that take into account both the exposure to personnel as well as the possibility of the spread of contamination due to not being able to adequately survey.

- **Size of the area** - Tailor the containment toward the task being performed. Evaluate various alternatives on performing a job, and apply a method of containment that achieves the desired goal while minimizing waste, time, etc.

Some form of containment should be considered in every instance. If no risk is present based upon the above secondary considerations, then containment may not be necessary. As the risk increases, or the potential of risk, contamination controls must be implemented appropriate to the task and hazard, which may include total containment. Total encapsulation or total containment is the standard for contamination levels greater than **2000 dpm alpha/100 cm^2** and/or **100,000 dpm beta-gamma/100 cm^2** or when the task being performed can generate transferable or airborne radioactive contamination. When total containment cannot be utilized or cannot be applied at the source, a deviation letter must be written and approved by the Facility Manager and RCO Facility Manager. This deviation letter will state compensatory actions that will be taken during the job to minimize the risk, since total containment cannot be achieved. It is also recommended that contamination controls for levels below 2000 dpm alpha/100 cm^2 and/or 100,000 dpm beta-gamma/100 cm^2 be detailed so that emphasis is placed on keeping contamination at the source, and reducing its spread and impact to personnel, the facility, and the environment.

Figure 3 shows Table A-1 from the Radiological Containment Guide, which provides direction on how to determine the appropriate type of containment versus the hazard. Figure 4 “Containment Selection Process” can also serve as an aid in the planning process.

Section III – Are Conditions Stable and Known?

Removable Contamination Levels (Refer to Figure 3)

Removable contamination is defined as radioactive material that can be removed from surfaces by nondestructive means such as: casual contact, wiping, brushing, or washing. Criteria are broken down into three distinct categories, (1) those being less than 10 times Table 2-2* (<10,000 dpm $\beta\gamma$, <200 dpm α), (2) 10 to 100 times Table 2-2* (10,000 to 100,000 dpm $\beta\gamma$ or 200 to 2000 dpm α), or (3) greater than 100 times Table 2-2* (>100,000 dpm $\beta\gamma$, >2000 dpm α). If the most likely contamination levels cannot be obtained from survey or historical data, the most limiting category should be used.

**Removable contamination levels refer to the DOE Radiological Control Manual and the Code of Federal Regulations 10CFR835, Appendix D and are for a 100 cm^2 area.*

Contamination Stability

As noted above, removable contamination is defined as radioactive material that can be removed from surfaces by casual contact. Stability is a qualitative assessment of how easily this transfer occurs and how easily the contamination may be transported from surface to surface or surface to air. For determining contamination stability, criteria are broken down into three categories: high, medium, and low. For example, contamination that, if disturbed, readily resuspends into the air would be categorized as low stability; while contamination suspended in liquid, or on a moist or oily surface, would generally be considered high stability. In addition, other contamination surfaces would generally fall between the aforementioned criteria based on surface texture weathering and a variety of other considered factors.

Work Activity

Work activities are considered to be those actions that will be performed in the contaminated portion of the work area. The containment selection process breaks work activities into five categories:

1. Simple material movement such as walking, lifting, and carrying.
2. Vigorous material movement such as repackaging waste, HEPA filter manipulation, packing replacement, etc.
3. Using power tools in the area or manually cutting, abrading, or shaping the material.
4. Using low-velocity power tools (portable band saws, electric drills operated at low speeds, etc.) on the contaminated components.
5. Using high-velocity power tools (grinders, high-speed drills, etc.) on the contaminated components.

Other considerations should include: impact of containment failure, area dose rates, waste minimization, ventilation, etc. When all factors are considered, the final determination may vary from the matrix.

Containment Categories

The containment category is a grading process that involves removable contamination levels, contamination stability, and the type of operation or work to be performed. Based upon these three areas, the task will grade out into one of four existing containment categories (Figure 3).

Figure 3
Table A-1. Recommended Containments for Specific Work Activities
Radiological Containment Guide (WSRC-OS-94-14)

Removable Contamination Level (per 100 cm^2)	Contamination Stability	Operation	**Containment Category**
<10 times Table 2-2 (<10,000 dpm βγ, <200 dpm α) 6	Very Stable 4	Simple material movement 5	Very Low Risk Total = 15-20
<100 times Table 2-2 (10,000 to 100,000 dpm βγ or 200 to 2000 dpm α) 12	Moderately Stable 8	Vigorous material movement 10	Low Risk Total = 21-31
>100 times Table 2-2 (>100,000 dpm βγ, >2000 dpm α) 18	Low Stability 12	Use of power tools in area or manual cutting, shaping, or abrading of material 15	Moderate Risk Total = 32-45
		Use of low velocity power tools to cut, shape, or abrade material 20	High Risk Total >45
		Use of high velocity power tools to cut, shape, or abrade material 25	
_____	+ _____	+ _____	= _____

Instructions: Select the appropriate block from each of the first three columns. Add the numbers from the appropriate block in each column and select the appropriate containment class. Figure 4 serves as an aid in the containment selection process.

NOTES:

1. Removable contamination level refers to the DOE Radiological Control Manual Table 2-2.
2. Containment requirements may be revised up or down based on general area contamination levels, or dose rates, and personnel protection afforded (for example: respirators, ventilation, engineering controls).
3. When contamination levels cannot be verified, either by survey or historical data, the most limiting level for contamination should be used.
4. The values on the chart call for subjective analysis. The Radiological Control Organization is responsible for making the final determination of the level of containment. This should be done in consultation with the line organization.

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Section IV – Containment Category Overview

The appropriate containment for a given task should be selected based on the fundamental concepts of contamination control and personnel safety. In this document, containment has been broken down into three categories. The categories are subjective in nature. Table A-1 (Figure3) provides guidelines for determining containment by using removable contamination levels, contamination stability, and type of operation to determine a containment category. This table is a guide from which to begin the planning and evaluation process, and is not intended to be the sole means of determining what level of containment should be used.

Very Low Risk

For tasks involving a very small risk of contamination spread, no specific containment beyond the administrative controls of good work practices would apply. This does not preclude using containment; it instead leaves the selection to the workers. Experience and training of the workforce would be the basis for containment selection. In this category, containment might be a damp rag/sponge, sleeving, an air curtain, drop cloths, wet sponge, or even a plastic bag.

Low Risk

Tasks where the risk of contamination spread is low but a containment device is specified. Examples of devices in this category are: catch containment, drip pans, bull pens, sleeving, air curtains, etc.

Moderate Risk

Tasks where the risk of contamination spread is moderate usually require total containment. Containment for this type of work is obtained by heavy sleeving, non-certified/certified glovebag, or a containment hut.

High Risk

Tasks where the risk of contamination spread is high and containment should be accomplished by using ventilated huts or glovebags; used independently or in conjunction with each other. Local exhaust, e.g., a Mac 21 or equivalent, may also be used in conjunction with ventilated huts to capture contaminants at or near the source, and/or limit the spread of contamination. The ventilated hut and/or glovebag must be approved/certified by RCO.

Note: If containment does not meet approval/certification criteria per 5Q1.2, 496, a containment deviation letter is required.

Special Notes

Always include provisions for leak collection device container size e.g., 5-gal bottle, 55-gal drum, etc., when applicable. Collection device must be large enough to handle expected amount of liquid.

Avoid recommending glovebags for systems under "any" pressure.

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Section V – Administrative Controls/Miscellaneous

Note: *Many Complex job evolutions may require a temporary shift reassignment of involved work groups. Ensure that the possibility of shift reassignment is communicated to all involved work groups during the planning process to minimize delays.*

Required RC Action Step

Action steps are a cautionary step in a technical work document requiring Radiological Control Operations personnel to perform some action or verification of lesser significance than a RC Hold Point. Radiological Control Action Steps should generally consist of 3 parts: 1) the RCO action to be performed, 2) a limit that is being surveyed for, and 3) direction if the limit is exceeded. Action steps may be utilized in various manners (i.e., as awareness step to act as a buffer prior to reaching the RWP suspension limits, or it may direct suspension of activity based upon the reaching of a suspension limit itself).

When using action steps, the planner must realistically assess the real and/or potential hazard associated with the activity to be performed. If the activity is determined to be routine and/or low risk to personnel and the facility, then general action steps are sufficient. If contamination levels are reached, then direction in the action step will allow a path forward without necessarily revising the work package (i.e., decon and/or apply containment). Other activities related to the use of containment will be performed by skill of the craft (i.e., certifying the glovebag) since the original planning did not capture this activity due to the assessed risk. This allows the work to continue based on the RWP suspension guides not being exceeded, but employing proper controls based on containment guides and the level of risk. If RWP suspension limits are reached then the job will be placed in a safe configuration and personnel will halt the activity.

When a planned activity is known to require containment, the planner should include RC Action Steps for RCO to certify the containment. The difference for these types of packages is that while RCO should know these requirements it should be detailed as part of the planning process. In most cases, there will be a combination of instructions and RC Action Steps.

Examples of Radiological Control Action Steps are detailed for both general activities and some facility specific types of work. See Figure 5 for examples of Radiological Control Action Steps.

Radiological Control Hold Point

Hold Points are cautionary steps in technical work documents requiring Radiological Control Operations to perform some action or verification to prevent: 1) radiation exposures in excess of Administrative Control Levels, 2) high airborne radiological concentrations, or 3) the release of radioactivity to the environment. Steps must be detailed to provide direction as a result of RCO survey or verification (Figure 6).

ALARA Statement

Note: *The following ALARA Statement may be used in conjunction with the applicable RC Action Steps.*

ALARA – Upon RCO initial verification, if radiation or contamination levels exceed 80% of the RWP suspension guide limits during the job/task; suspend work, contact LWG Supervisor & RCO Supervision for a path forward. This should include determination of the cause, decon or reduction of exposure, and possible revision to the RWP for new suspension limits.

If RC Action Steps are maintained at levels below the RWP suspension limits, using them as stepping stones toward the suspension limit, then the technical work document should be maintained within acceptable levels that are recognized by all lead supervisors.

Shielding Requirements

In Non-Routine/Complex Work the use of shielding should be considered. If a source of radiation can be shielded, resulting in an overall person-rem exposure savings of at least one half of the predicted unshielded exposure, or 100 mrem whichever is smaller, the use of shielding should be considered.

5Q Pre-Job Briefing Requirements

The *Lead Work Group Supervisor or Craft Foreman* is responsible for conducting any pre-job briefings, documenting attendance and topics discussed, and ensuring that this information is maintained with the technical work document (Reference 5Q1.1, 504).

Figure 4

Reference: WSRC Radiological Containment Guide, WHC-EP-0749

Containment Selection Process

Work Package Number _____ **Date** _____
Brief Job Description _____

General Discussion: This form was developed as a tool to assist in the selection of containment during the early planning stages of work, specifically when performing job walk downs. The document that controls the work should indicate the need for and the type of containment to be used. A walk down should be pre-scheduled, which typically includes a representative from RCO, Lead Work Group, Operations, and other affected work groups. One of the key principles in the application of containments is to establish the containment as near to the source as possible.

Good containment selection should accomplish the following:

- Minimize personnel contamination
- Prevent the spread of contamination
- Minimize the use of PCs and PPE
- Minimize generation of waste

① **Select the appropriate block from each of the first three columns, then add the assigned value from each column to determine the containment category.**

Removable Contamination Level (per 100 cm^2)	Contamination Stability	Operations	Containment Category
<10 times Table 2-2 <10,000 dpm βγ; <200 dpm α **Value = 6**	**Very Stable** Suspended in liquid, or on a moist or oily surface **Value = 4**	**Simple Material Movement** walking, lifting, carrying **Value = 5**	**Very Low Risk** **Total = 15 - 20**
<100 times Table 2-2 10,000 to 100,000 dpm βγ or 200 to 2000 dpm α **Value = 12**	**Moderately Stable** Based on surface texture, weathering, and other factors **Value = 8**	**Vigorous Material Movement** repackaging waste, HEPA filter manipulation, packing replacement, **Value = 10**	**Low Risk** **Total = 21 - 31**
>100 times Table 2-2 >100,000 dpm βγ; >2000 dpm α **Value = 18**	**Low Stability** Readily re-suspends in air. **Value = 12**	**Use Of Power Tools** in the area or manual cutting, shaping, or abrading of contaminated material **Value = 15**	**Moderate Risk** **Total = 32 – 45**
		Use Of Low Velocity Power Tools to cut, shape or abrade material, i.e., band saws, electric drills operated at low speeds on contaminated components **Value = 20**	**High Risk** **Total > 45**
		Use Of High Velocity Power Tools to cut, shape, or abrade material, i.e., grinders, high-speed drills, on contaminated components **Value = 25**	
Value _____ +	**Value** _____ +	**Value** _____ =	**Total** _____

Containment Selection Process, contd

Work Package Number_____

② **Check containment category identified on page 1.**

☐ **Very Low Risk (Total = 15-20)** Small risk of contamination spread - minimal containment, if any (damp rag, sleeving, plastic bag) selection left to workers - skill of craft.

☐ **Low Risk (Total = 21-31)** Risk of contamination spread is low, but containment device is specified. Examples are catch containments, drip pans, windbreaks, sleeving, air curtains, etc.

☐ **Moderate Risk (Total = 32-45)** Risk of contamination spread is moderate - heavy sleeving, glovebags, poly bottles, or non-ventilated huts. Total enclosure.

☐ **High Risk (Total > 45)** Risk of contamination spread is high – glovebags and/or ventilated hut, used independently or in conjunction with each other. Total enclosure.

③ **Check containment selection.**

Low Risk (Total = 15-20)	Moderate Risk (Total = 21-31)	High Risk (Total > 45)
☐ Ventilated Hood	☐ Glove Bag (HEPA filtered)	☐ Shielded Containment/Cask
☐ Additional Wall	☐ Poly Bottle (HEPA filtered)	☐ Glovebag/Hut (Ventilated)
☐ Plastic Bag	☐ Hut (Unventilated)	☐ Special Containment (specify)
☐ Sleeving	☐ Heavy Sleeving	☐ Combination Containments (specify)
☐ Drop Cloth/Diaper	☐ Other (specify)*	☐ Other (specify)*
☐ Windbreak		
☐ Lay Down Area		
☐ Catch Containment/Pan		
☐ Other (specify)*		

*When using "Other" containment, the level of control should meet or exceed the requirements of the Risk Category.

④ **Indicate hut specifications if hut is required (length x width x height) . Diagram glovebag or hut if needed for special configuration**

☐ Ventilation Method: Forced ____ Passive _____ (# _____ air exchanges/hr)
☐ Number of Windows
☐ Number of Airlocks
☐ Removable Roof (for Crane/Lifting Accessibility)
☐ Enclosed Pathways (for entry/egress)

Comments (List Any Special Instructions) _____

_____

Personnel Performing Walkdown

_____ _____

_____ _____

Figure 5

Examples of Various Radiological Control Action Steps

NOTE: The following are examples only. These steps should be adapted to the job and the radiological conditions during the performance of the activity. Total containment refers to containment at the source (glovebag, sleeving, etc.) except for welding, which refers to a hut. Deviations to total containment must be approved by the Facility Manager and the RCO Facility Manager.

Initial Checks:

RCO will survey work area prior to start of work to verify that conditions have not changed. If conditions have changed, identify source, decon and/or install containment as appropriate.

Line Breaks:

RCO will survey prior to and during line break. If contamination exceeds or has the potential to exceed 2,000 dpm alpha or 100,000 dpm beta-gamma per 100 cm^2, decon and/or install total containment.

Request RCO to perform a radiation and contamination survey at line break or system opening to verify conditions. If radiation and/or contamination is detected, suspend work and notify facility RCO and LWG supervision for guidance. If no radiation and/or contamination is detected, proceed to next step.

Coating, Painting, Insulation, Heat Tracing, or any type of Fixative Coating:

Request RCO to perform a radiation and contamination survey prior to and during insulation removal, to verify conditions. If radiation and/or contamination is detected, install containment. If no radiation and/or contamination is detected, proceed to next step.

RCO to survey surfaces to be covered (i.e., fixative coatings). If contamination is detected, decon until FREE of contamination. If these conditions can not be met, decon to ALARA and obtain approval from S&HO Level 3 Manager prior to covering any contaminated surface.

Cutting or Burning (i.e., torch, heat producing device), Welding, or Grinding:

RCO to survey surfaces to be welded/burned to include all adjacent areas within 2 feet that have the potential to become heated during the activity. If contamination is detected, install total containment or obtain approved deviation.

Glovebag Activities:

RCO to survey during glovebag activities. If contamination breaches containment, decon/seal contamination prior to continuing work. Prior to glovebag removal, contaminated surfaces are not to exceed 2,000 dpm alpha or 100,000 dpm beta-gamma per 100 cm^2. Continue to decon to *no detectable* after glovebag removal.

Drilling, Cutting, Scarifying, Chipping, or other Power Tool:

RCO to survey affected area. If contamination is detected, install total containment or obtain approved deviation.

Request RCO to perform a fixed and transferable/removable contamination survey on _____ prior to performing _____ activities. If any detectable fixed or removable contamination is detected, install total containment or obtain approved deviation. If free of fixed and transferable/removable contamination, proceed to next step.

Examples of More Specific Radiological Control Action Steps, contd

Asphalt Removal/Soil Sampling:

Request RCO to perform a radiation and contamination survey to verify conditions prior to removing concrete/asphalt. If contamination is detected, install containment prior to cutting/chipping asphalt. If no contamination is detected, proceed to next step.

After concrete/asphalt has been removed, request RCO to survey soil for transferable/removable contamination. If radiation and/or contamination is detected, suspend work and notify facility RCO and LWG supervision for guidance. If no radiation and/or contamination is detected, proceed to next step.

(For all excavations greater than 6 in.)
Note: Ensure RCO has installed a portable Area Radiation Monitor (ARM) or VAMP at the jobsite and perform a daily operability/source check prior to work.

RCO to survey sample locations. If the levels of contamination increase during the sampling process, additional samples may be required to determine the extent of contamination (length, depth, level of contamination). Sample locations as identified on field sketch shall be dug to a depth of _____. Initial sample depth of 6 in., then at 12-in. increments to the expected depth of excavation. Deposit all sampled soil on plastic adjacent to the excavation until survey results are available.

Note: STATE the number of sample locations required and the dimensions of the excavation. For excavation within a Controlled Area, a minimum of one sample location per 85 sq ft, and outside of a Controlled Area, a minimum of one sample location per 43 sq ft shall be identified. Requirements per 5Q1.2-485.

Sampling Plan Approved by RCO Facility Manager _____

Radiation Surveys/Transfers of Radioactive Material:

RCO to perform a radiation survey to ensure that all general-area readings are below posted limits. If radiation rates exceed posted limits or RWP suspension guides, re-post area and notify RCO supervision.

Airborne Radioactivity Surveys:

RCO to perform survey for airborne radioactivity to ensure that DAC levels do not exceed identified field estimates. If DAC levels exceed field DAC estimates defined by RCO or RWP suspension guides, suspend work, evaluate conditions, and notify RCO supervision.

(continued on next page)

Examples of More Specific Radiological Control Action Steps, contd

Probe Removal:

Note: During probe removal, the concern is high contamination and high extremity rates. Probes with a radiological history should be removed, at a minimum, with plastic sleeving. Add shielding sleeve to plastic sleeving as determined by the historical data or potential from probe location.

RCO to survey during removal of probe. If contamination breaches containment, decon or seal. If extremity rates exceed 1 rem/hr, limit exposure time to less than 2 minutes unless approval is obtained from Lead Work Group Supervisor and RCO Supervisor.

Provide lines to "State New Working Rate" along with approval lines for each work group and RCO.

Example:
RCO to survey during the removal of probe. If contamination breaches containment, decon or seal. If extremity rates exceed 1 rem/hr, limit exposure time to less than 2 minutes unless approval is obtained from Lead Work Group Supervisor and RCO Supervisor.

NOTE
Remove the probe in the metal probe containment device that was fabricated in Step 4 Item 9.

Exposure Rate: _____

HLWM Supervisor: _____

RCO Supervisor: _____

Note: Use total containment or approved Deviation to containment for conductivity probe removal.

VERIFICATION SURVEY

RCO to survey during the job and verify that the containment is not breached during valve replacement. If contamination is detected during valve replacement, decon or seal to *no detectable*. If whole body rate exceeds predetermined levels, stop the work, place in a safe condition; and to continue obtain CSTM and RCO supervision approval, and document the New Rate below.

Provide lines to "State New Working Rate" along with approval lines for each work group and RCO.

Example:
RCO to survey during the job and verify that the containment is not breached during valve replacement. If contamination is detected during valve replacement, decon or seal to *no detectable*. If whole body rate exceeds 10 mrem/hr, stop the work, place in a safe condition; and to continue obtain CSTM and RCO supervision approval, and document the New Rate below.

New Rate _____

CSTM Signature _____ Date _____

RCO Signature _____ Date _____

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Figure 6

Sample RADCON Hold Point (OSR 4-901)

(Action Statement)----------

RCO HOLD POINT LIMITS

CONTAMINATION LEVELS Limit	DOSE RATES Limit	AIR ACTIVITY Limit
_____ dpm/100cm^2 Alpha	_____Extremity	_____DAC PU
_____ dpm/100cm^2 Beta/Gamma	_____Skin	_____DAC U
_____ dpm/100cm^2 Tritium	_____Penetrating	_____DAC FP
		_____DAC Tritium

Other_____
_____
_____

IF all Radiological Data as determined by survey is less than or equal to RCO Hold Point Limits, **THEN**

Sign the RCO Hold Point Limit and **PROCEED** to next step.

RCO Signature_____Date_____Time_____

Reader-Worker method may be used to complete the above if necessary. (2S)

IF Radiological Data exceeds the hold point limit, **THEN**
PERFORM the following.

1. SUSPEND/STOP WORK
2. NOTIFY SUPERVISOR
3. TAKE APPROPRIATE ACTIONS AS DIRECTED BY SUPERVISION. THIS MAY INCLUDE EMERGENCY ACTIONS OUTSIDE THE TWD.
4. NOTIFY FACILITY SHIFT MANAGER. (CIRCLE RADCON ITEMS THAT ARE NOT WITHIN LIMITS)

ACTION TAKEN IF RCO HOLD POINTS ARE NOT SATISFIED:

_____

RCO Supervisor Signature_____ Date_____ Time_____
LWG Supervisor Signature_____Date_____ Time_____
Facility Shift Manager Signature_____ Date_____ Time_____

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Appendix A - Acronyms

ALARA – As-Low-As-Reasonably-Achievable

ARM – Area Radiation Monitor

DOE – Department of Energy

DWPF – Defense Waste Processing Facility

ESH&QA – Environment Safety Health and Quality Assurance

FRAT – Facility Radiological Assessment Team

HEPA – High Efficiency Particulate Air

HLW – High Level Waste

HLWM – High Level Waste Maintenance

ISMS – Integrated Safety Management System

JSRWP – Job-Specific Radiological Work Permit

LWG – Lead Work Group

RBA – Radiological Buffer Area

RC – Radiological Control

RCO – Radiological Control Operations

REA – Request for Engineering Assistance

RWP – Radiological Work Permit

S&HO – Safety and Health Operations

SRS – Savannah River Site

SRWP – Standing Radiological Work Permit

VAMP – Victoreen Area Monitoring Packet

WCP – Work Clearance Permit

WPT – Waste Pretreatment

WSRC – Westinghouse Savannah River Company

Appendix B – Acknowledgments

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