

# **NUCLEAR INDUSTRY STANDARD PROCESS**

## **Radiological Protection**

Level 3 – Information Use

### **Radiological Protection Fundamentals**

**NISP-RP-011**

**Revision: 1**

**Industry Approval Date: September 10, 2018**

*This is an industry document for standardizing radiation protection processes. Standard processes and requirements are established to eliminate site-specific radiation protection procedures. The Institute for Nuclear Power Operations (INPO) maintains current procedures on the INPO website. Approval authority is granted by the industry contingent on a structured review and approval process by representatives of utility radiation protection organizations.*

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## **1.0 Introduction**

- 1.1. This procedure describes the core values and behaviors that are necessary to implement effective radiological protection fundamentals for the protection of workers and the public. Radiation protection personnel are expected to understand and apply these values and behaviors during the conduct of assigned work.

## **2.0 Scope**

- 2.1 This procedure identifies the fundamentals that must be applied during the conduct of assigned work. The unwavering commitment of radiological protection professionals is protection of plant personnel and the public from unplanned exposure to the plant's radioactive source term. Radiological protection professionals achieve this by implementing a robust radiological protection program that includes a strong foundation of fundamentals and a culture that strives for continuous improvement. Some of the key attributes of a robust program and the focus of this good practice include, monitoring radiological conditions, control of radiological work, managing radiological risk, interaction and teamwork, and knowledge and skills.
- 2.2 Member utilities are expected to use this standard to implement effective radiological protection fundamentals for the protection of workers and the public.
- 2.3 This procedure will provide a compilation of excellence in fundamental radiological protection practices. This document further describes some of the knowledge, skills and behavior attributes needed to function as a high performing radiological protection organization. Managers, supervisors and technicians should use this document to promote use of fundamentals, increase engagement, and to improve personnel and plant performance.

## **3.0 Definitions**

- 3.1 Terms, acronyms, and definitions are provided in NISP-RP-013, *Radiation Protection Standard Glossary of Terms*.

## **4.0 Responsibilities**

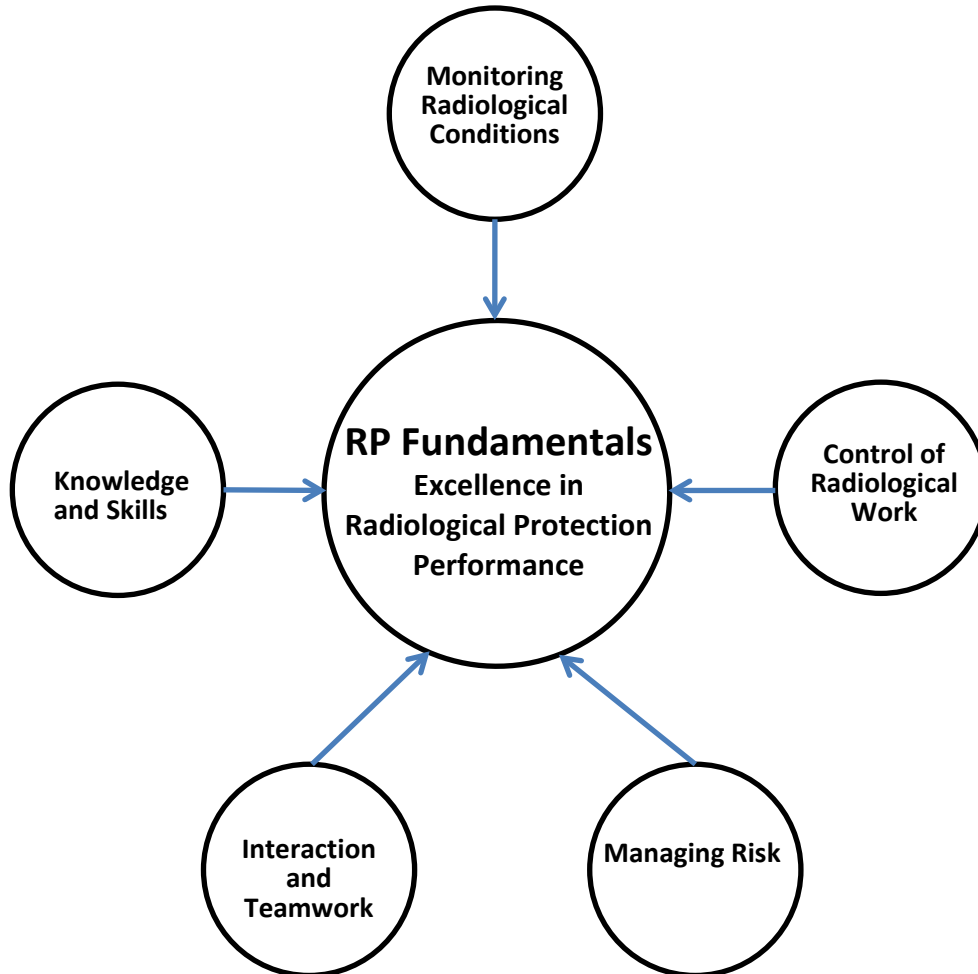
- 4.1 Radiation Protection is responsible for the implementation of the requirements of this procedure per Efficiency Bulletin 17-01 and the Nuclear Industry Standard Process Initiative.

## **5.0 General Requirements**

- 5.1 The values and behaviors in this procedure are incorporated, discussed, and emphasized as part of the training programs, department meetings, and pre-job briefs as applicable for RP personnel.

## 6.0 Process Instructions

The diagram below illustrates the key fundamental attributes that must be demonstrated by RP personnel during the conduct of work.



**NOTE:** Attachment 1 displays a summary of the fundamental attributes contained in this document for use as a visual aid and communication tool.

### 6.1 Monitoring Radiological Conditions

Radiation Protection (RP) personnel apply knowledge, skills and behaviors to ensure radiological conditions are anticipated, detected and verified. RP personnel:

- 6.1.1 Understand and value the importance of selecting the correct radiological instrument (e.g. detector type, air sampler, etc.) for the task based on knowledge of historical

conditions, anticipated source-term, knowledge of plant the system, component configuration, and the type of work activity.

- 6.1.2 Adhere to a belief that area postings, radioactive materials clearly labeled, verbal and written radiological instructions are critical to workers being informed of radiological conditions.
- 6.1.3 Recognize work activities that pose elevated risk to unplanned internal or external radiological exposure and apply appropriate monitoring, control, and intervention (including exercising stop work authority) to mitigate the hazard.
- 6.1.4 Understand the real and potential radiological hazard of high radiological risk work activities. Applies the knowledge for necessary controls, monitoring, and responsibility to correct or stop work to prevent actual radiological exposure conditions occur.
- 6.1.5 Understand the importance of performing comprehensive radiation and contamination surveys, and documenting the results with sufficient clarity and detail necessary to depict accurate work area radiological conditions.

## **6.2 Control of Radiological Work**

The knowledge, skills, behaviors, and practices needed to ensure work activities are performed in a radiologically safe and reliable manner. RP personnel:

- 6.2.1 Minimize the potential for unplanned dose by applying learnings from operational experience developing comprehensive radiation work permits, radiological plans, engineering controls, radiological procedures, and coaching/correcting worker behaviors.
- 6.2.2 Understand the potential risks and apply necessary controls when transferring radioactive material (including waste) within and out of radiologically controlled area.
- 6.2.3 Recognize and anticipate critical radiological work steps and hold points and apply appropriate counter measures to mitigate the hazards.
- 6.2.4 Ensure the controls for loose, fixed and airborne contamination at the job site are applied, including effectively monitored to prevent unplanned dose or the spread of the contamination.
- 6.2.5 Ensure dosimetry is appropriate, worn and located properly, and alarm set points are adequate to allow workers to work, but also warn workers of changing or unexpected conditions.
- 6.2.6 Ensure verbal and written radiological work instructions provide workers with timely, accurate radiological information, appropriate protective and contingency measures, and stop work criteria.

- 6.2.7 Use precise communications when describing radiological values and associated units of measure involved. For example, briefing radiological dose rates, discussing self reading dosimeter alarm dose and dose rates set points, or contamination levels.
- 6.2.8 Engage supervision and planners when RWPs or other radiological plans are unclear or inadequate.
- 6.2.9 Routinely challenge, coach workers, and reinforce the importance of understanding radiological conditions and adherence to radiological work requirements.

### **6.3 Interaction and Teamwork**

Recognize that a successful RP program relies on the support and actions of others, both within and outside of the department. RP personnel:

- 6.3.1 Maintain self-awareness of competency in performing radiological protection tasks and activities. As a result, there is a willingness to seek assistance from other RP personnel to benefit from individual and team experience for improving individual standards and proficiency.
- 6.3.2 Strive to develop professional, working, and trusting relationship with peers and radiation workers, but not rely or assume that relationship will result in implementation of sound radiological work practices.
- 6.3.3 Coach and correct worker behaviors in a professional manner to reinforce expected standards, while self-critiquing behaviors and actions to identify opportunities to improve performance.
- 6.3.4 Provide critical input to radiological safety products, such as procedures, RWPs and ALARA plans, to improve the effectiveness of radiological controls.

### **6.4 Managing Radiological Risk**

Apply radiological protection principles, protective measures, and conservative decision making to ensure optimal protection of workers and the environment. RP personnel:

- 6.4.1 Recognize decision making and actions must place a greater value on safety over production.
- 6.4.2 Stop work when faced with uncertainty, unexpected radiological conditions, or working outside of established plans.
- 6.4.3 Raise questions to better understand work activities and plant conditions that have the potential to adversely affect radiological conditions.

6.4.4 Ensure critical steps, hold points, contingencies, and stop-work criteria are established and well understood by all personnel involved in high radiological risk work activities.

6.4.5 Understand and provide a direct oversight role to minimize the probability and consequence of an event, balancing direction of work, stepping out of role, and recognizing deviation from work plans and standards.

## **6.5 Knowledge and Skills**

Acquire and maintain essential knowledge and skills to perform assigned radiological protection activities. RP personnel:

6.5.1 Understand radiological theories and principles and apply this knowledge to assigned work activities. For example, while selecting an instrument to perform a survey; provide job coverage; establish radiological postings; or understanding what can cause a change in radiological conditions.

6.5.2 Understand the radiological impact of plant system operations for both normal and abnormal conditions.

6.5.3 Recognize and communicates personal proficiency shortfalls when assigned tasks.

6.5.4 Understand must-know operating experience, how it relates and is applied to assigned work.

6.5.5 Take ownership in the effectiveness and value of training to improve and promote excellence by influencing training content, openly participating in training, and providing feedback.

## **7.0 Records/Documentation**

NONE

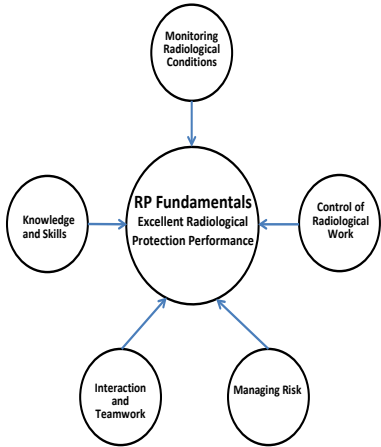
## **8.0 References**

8.1 INPO 05-008, Radiological Protection at Nuclear Power Stations

## **9.0 Attachments**

9.1 Attachment 1 - Radiological Protection Fundamentals

## ATTACHMENT 1 Radiological Protection Fundamentals

MONITORING RADIOLOGICAL CONDITION		CONTROL OF RADIOLOGICAL WORK
<p><b>Radiation Protection (RP) Personnel apply knowledge, skill, and behaviors to ensure radiological conditions are anticipated, detected and verified. RP Personnel:</b></p>	<p><b>Radiation Protection Fundamentals</b></p>	<p><b>The knowledge, skills, behaviors, and practices needed to ensure radiological work is performed in a safe and reliable manner. RP Personnel:</b></p>
<ul style="list-style-type: none"> <li>» Understand and value the importance of selecting the correct radiological instrument (e.g. detector type, air sampler, etc.) for the task based on knowledge of historical conditions, anticipated source-term, knowledge of plant the system, component configuration, and the type of work activity.</li> <li>» Adhere to a belief that area postings, radioactive materials clearly labeled, verbal and written radiological instructions are critical to workers being informed of radiological conditions.</li> <li>» Recognize work activities that pose elevated risk to unplanned internal or external radiological exposure and apply appropriate monitoring, control, and intervention (including exercising stop work authority) to mitigate the hazard.</li> <li>» Understand the real and potential radiological hazard of high radiological risk work activities. Applies the knowledge for necessary controls, monitoring, and responsibility to correct or stop work to prevent actual radiological exposure conditions occur.</li> <li>» Understand the importance of performing comprehensive radiation and contamination surveys, and documenting the results with sufficient clarity and detail necessary to depict accurate work area radiological conditions..</li> </ul>		<ul style="list-style-type: none"> <li>» Minimize the potential for unplanned dose by applying learnings from operational experience developing comprehensive radiation work permits, radiological plans, engineering controls, radiological procedures, and coaching/correcting worker behaviors.</li> <li>» Understand the potential risks and apply necessary controls when transferring radioactive material (including waste) within and out of radiologically controlled area.</li> <li>» Recognize and anticipate critical radiological work steps and hold points and apply appropriate counter measures to mitigate the hazards.</li> <li>» Ensure the controls for loose, fixed and airborne contamination at the job site are applied, including effectively monitored to prevent unplanned dose or the spread of the contamination.</li> <li>» Ensure dosimetry is appropriate, worn and located properly, and alarm set points are adequate to allow workers to work, but also warn workers of changing or unexpected conditions.</li> <li>» Ensure verbal and written radiological work instructions provide workers with timely, accurate radiological information, appropriate protective and contingency measures, and stop work criteria.</li> <li>» Use precise communications when describing radiological values and associated units of measure. For example, briefing radiological dose rates, discussing self reading dosimeter alarm dose and dose rates set points, or contamination levels.</li> <li>» Engage supervision and planners when RWPs or other radiological plans are unclear or inadequate.</li> <li>» Routinely challenge, coach workers, and reinforce the importance of understanding radiological conditions and adherence to radiological work requirements.</li> </ul>
MANAGING Radiological RISK	KNOWLEDGE AND SKILLS	INTERACTION AND TEAMWORK
<p><b>Apply radiological protection principles and protective measures to ensure optimal protection of workers and the environment. RP Personnel:</b></p>	<p><b>Acquire and maintain essential knowledge and skills to perform assigned radiological protection activities. RP Personnel:</b></p>	<p><b>Recognize that a successful RP program relies on the support and actions of others, both within and outside of the department. RP Personnel:</b></p>
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