NUCLEAR INDUSTRY STANDARD PROCESS

Radiological Protection

Level 3 – Information Use

Control of Radioactive Material

NISP-RP-007

Revision: 1
Industry Approval Date: October 30, 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. The purpose of this procedure is to provide guidance for the survey, release or control of materials from Radiologically Controlled Areas.

1.2. This procedure does not provide guidance for the control or release of materials packaged for transportation under DOT regulations.

1.3. This procedure does not provide guidance for control of radioactive sources which may be used at the station for calibration or instrument response verification or Special Nuclear Material.

2.0 Scope

2.1 This procedure describes the normal process for monitoring material exiting from the radiologically controlled area assuming contamination monitors are operational. In the event equipment is not available site specific procedures will provide guidance to personnel.

2.2 The forms referenced by this procedure are examples used to describe the pertinent information that should be recorded for future reference. Plant procedures may specify the use of equivalent forms or the use of electronic media for the same purposes.

2.3 Member utilities are expected to use this standard to enable supplemental workers to transition between nuclear power plants. Compliance with these instructions is expected without additional site requirements or process deviations being imposed that may require additional training or challenge the performance of supplemental workers.

2.4 This is an information use procedure that will be used to train and instruct supplemental radiological protection technicians. Member utilities may implement these process requirements in site procedures provided the site procedures are equivalent and updated whenever this Nuclear Industry Standard Process (NISP) is revised. Member utilities may also elect to delete equivalent site-specific procedures and use this procedure for training and instruction. Current revisions are maintained on the INPO website.

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.

4.2 Plant personnel are responsible to:

4.2.1 Notify RP prior to bringing RAM onsite.

4.2.2 Maintain positive control of RAM being handled or generated in order to prevent unwarranted exposure to other workers.

4.2.3 Notify a qualified individual for surveys to remove materials from a contaminated area.

4.2.4 Ensure RAM is moved in accordance with Radiation Protection (RP) instructions.

4.2.5 Notify RP immediately upon discovering known or suspected radioactive material outside an RCA.

4.2.6 Prevent materials from becoming radioactive by keeping unnecessary materials/items out of RCAs.

4.2.7 Minimize the potential for creating mixed waste by eliminating, to the extent possible, the use of hazardous materials in the RCAs.

4.2.8 Monitor themselves and their personal items using plant equipment

4.2.9 Notify Radiation Protection (RP) for surveys prior to removing items (excluding personal items) from the RCA

4.3 Radiation Protection Technicians (RPTs), or other trained and qualified individuals are responsible to:

4.3.1 Monitor and identify material as RAM

4.3.2 Survey, label, and mark RAM, as required.

4.3.3 Provide direction for packaging, moving, and storing RAM.

4.3.4 Perform radiological surveys of RAM areas, as required.

4.3.5 Control of their LHRA/HRA keys, which allows for them to be worn through whole body monitors instead of using the TEM.

4.4 Radiation Protection Supervision is responsible to:

4.4.1 Approve authorized individuals to remove unique or specialized items/tools identified as RAM from the RCA, for use in non-RCA areas.

4.5 The Radiation Protection Manager (RPM) or designee is responsible to:

4.5.1 Direct RP Department activities, as necessary to provide the technical, administrative, and material support, required to implement a RAM Control

Program.

5.0 General Requirements

5.1 Lanyards, hard hats, badges and primary and secondary dosimetry may remain on the individual and worn through the whole body contamination monitors.

5.2 Personal items should not be taken inside the RCA. Personal items inside pockets or worn on the belt such as cell phones, pagers, radios and keys may remain on the individual and worn through the whole body contamination monitors, if not used in a contaminated area.

5.2.1 Items removed from pockets while in the RCA should be monitored using the Tool and Equipment Monitor (TEM) prior to leaving the RCA.

5.3 Items used during the entry in a contamination area should always be released in a TEM. These items include

a. Data logging devices including lap top computers

b. Radio's

c. Flashlights

d. Hand carried items such as notebooks and pens.

5.4 Gloves should always be monitored in a TEM for release.

5.5 Security personnel may wear tactical gear such as weapons, ammunition, emergency respiratory equipment, gloves, or other security equipment through the personnel whole body contamination monitors for release.

5.5.1 In the event an alarm occurs on the whole body contamination monitors indicating potential contamination of security equipment, RP is to provide oversight of the survey and decontamination of the security equipment but should not touch any of the equipment.

5.6 Except for personal items release of material from radiological control can only be performed by a ANSI qualified Radiation Protection technician.

> NOTE: When attempting to release components or parts it is essential to understand where the item originated from and the potential radiological hazard so that proper surveys can be performed. Items from waste gas or similar systems can be contaminated with pure beta emitters and must be surveyed with the appropriate instrument capable of measuring beta activity

5.7 Items suspected of having the potential for being contaminated with pure beta emitters, such as components from PWR waste gas or BWR off gas systems shall be surveyed with an instrument capable of detecting beta activity.

5.8 In addition to typical release survey requirements, items which could have been contaminated with alpha contamination must be surveyed with an instrument capable of detecting alpha contamination.

> NOTE: Extreme care must be taken when surveying items with radioactive sources so that the source is not damaged in the process. In addition use a survey method that would detect if the source was leaking (e.g., An Am-241 sealed source should be smeared and counted using the appropriate survey instrumentation to detect alpha contamination)

5.9 Smoke detectors, or other plant equipment containing radioactive sources, cannot be free released without RP Supervision approval.

5.10 Alarm set points for TEM will be established by the site based on background, instrument efficiency, and hard to detect radionuclides and should alarm when 5000 dpm of radioactivity has been detected.

5.11 Release of non-personal items should be completed by using a TEM. If the size of the object prevents the use of a tool monitor then RP Supervision will determine the survey methods. As a minimum:

a. Smear for External Contamination

b. Direct Frisker for Fixed Contamination

c. Evaluate and determine potential for internal contamination

d. Consider documenting the release method on Attachment 3, Unconditional Release Survey Plan.

5.12 Attachment 4, Unconditional Release of Certain Equipment, provides the survey methodology for items such as computers, breakers, cameras, gauges and power tools. When using Attachment 4, there is no need to complete Attachment 3, Unconditional Release Survey Plan.

5.13 If monitoring multiple items concurrently in the TEM, consider the effects of self-shielding. Avoid stacking items when possible. The shielding effects of approximately ¼ inch of steel or 2 inches of paper may reduce monitor sensitivity to unacceptable levels.

5.14 Alarms on a TEM indicate the presence of radioactive material and proper contamination controls will be implemented by the RP Technician in response to alarms. As a minimum wear protective gloves for removing the item and performing additional surveys.

5.15 Items suspected of containing natural radioactive material, such as welding rods or camera lens, can be released, with RP Supervisor approval, after gamma spectroscopy indicates only natural products are present and any unidentified gamma photo peaks have been resolved.

NOTE: Items which have been proved to contain only naturally occurring isotopes do not have to be labeled as radioactive material.

5.16 Items may be considered free released as long as all of the following criteria are met:

a. No detectable fixed activity above background, other than naturally occurring isotopes.

b. No detectable loose surface contamination.

c. No detectable/ suspected internal contamination

d. No detectable alpha contamination

e. No radioactive labels or markings

5.17 Items which indicate the presence of radioactive material, other than naturally occurring, must be labeled in accordance with NISP-RP-004, Radiological Posting and Labeling.

5.18 For the release of a large volume of equipment, or for the release of very large items, a survey plan should be developed using Attachment 3, Unconditional Release Survey Plan.

5.19 Control of Materials/Items Entering the RCA

5.19.1 **MINIMIZE** the material entering the RCA in order to reduce radioactive waste. For example, packing boxes and other wrapping materials should be removed prior to taking tools, equipment, or parts into the RCA.

5.19.2 Materials entering the RCA that are known to contain radionuclides should be sampled or monitored prior to entry to establish a baseline for subsequent release from the RCA. This will be performed at the discretion of Radiation Protection Supervision.

a. **If <u>no</u>** activity is detected on the entry survey and byproduct material is detected on the exit survey, then **CONCLUDE** that the item was contaminated at the station.

b. **If** activity is detected on an entry survey, then **CONSIDER** all or part of the following:

- **ENSURE** the item is properly labeled or marked as radioactive material.
- **PERFORM** qualitative isotopic evaluation, unless the items have an established history for naturally occurring radiation.

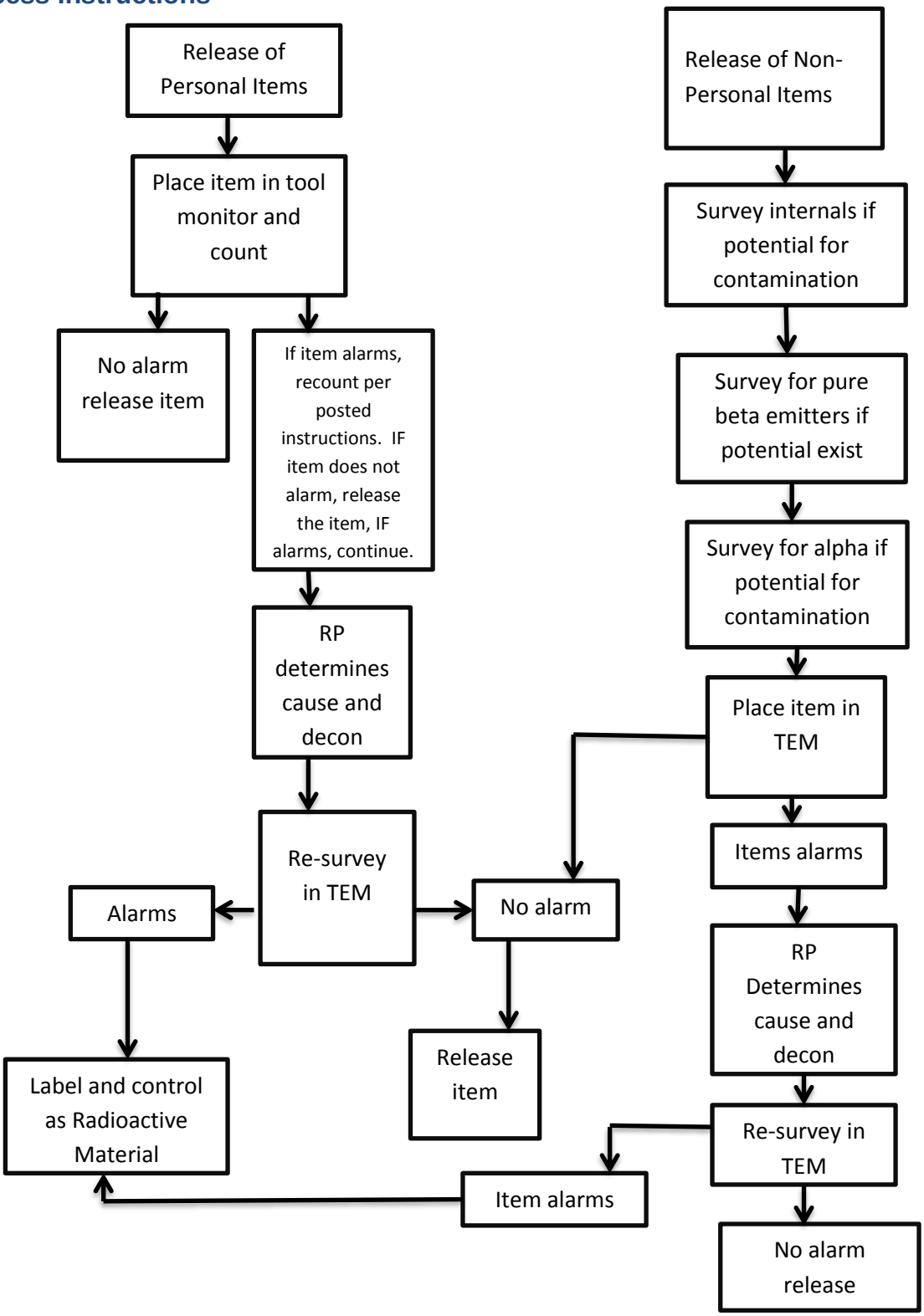
c. **If** the activity is initially determined to be naturally occurring radiation, **then:**

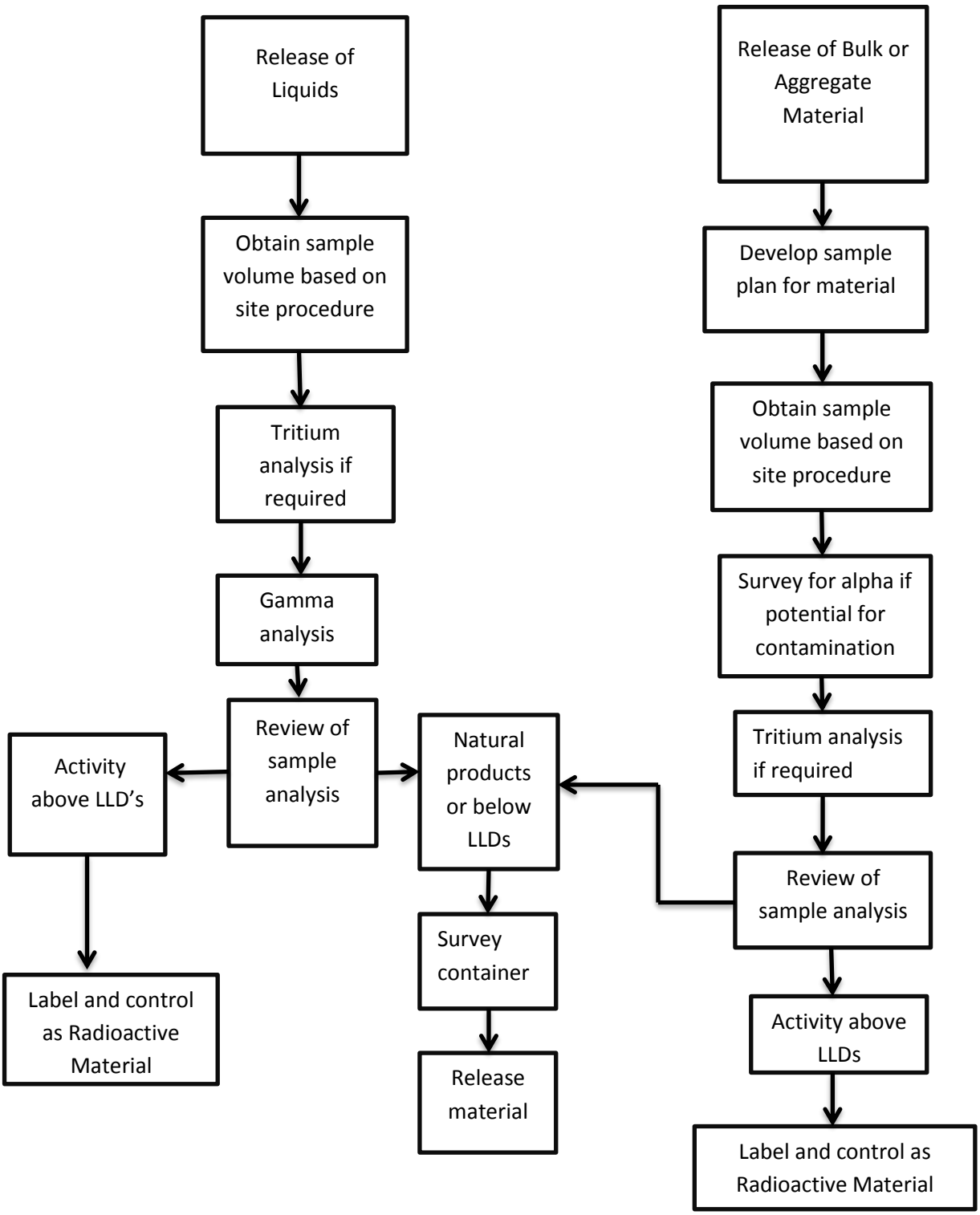
- **PERFORM** a smear survey to confirm that no detectable removable byproduct radioactive material is present.
- **ENSURE** that the exit survey results are consistent with the entrance survey based on instrumentation used and statistical variance.

d. **NOTIFY** RP Supervision of any entry surveys that indicate the presence of byproduct material to ensure that the station will **<u>not</u>** be held accountable for contaminating equipment that arrived above detection thresholds.

e. Unexpected discovery of byproduct material on an entry survey should be documented via the Corrective Action Program.

6.0 Process Instructions




Release of Liquids
Obtain sample volume based on site procedure
Tritium analysis if required
Gamma analysis
Review of sample analysis
Activity above LLD's
Label and control as Radioactive Material
Natural products or below LLDs
Survey container
Release material
Release of Bulk or Aggregate Material
Develop sample plan for material
Obtain sample volume based on site procedure
Survey for alpha if potential for contamination
Tritium analysis if required
Review of sample analysis
Activity above LLDs
Label and control as Radioactive Material

6.1 Release of Personal Items

NOTE: Site specific procedures, if applicable, may contain a list of additional personal items that radworkers can monitor through the TEM.

6.1.1 Individuals may release personal items through the use of a TEM by the following method:

a. Place items in the center of the TEM and minimize stacking of materials.

b. Initiate the count

c. No alarm, individual may retrieve the item from the unit.

d. If an alarm occurs, initiate count cycle again on the TEM as per posted instructions. If alarm occurs do not open the unit but contact RP for additional surveying. No alarm, individual may remove the item.

e. RP will determine the cause of the alarm and decontaminate the item as appropriate.

f. RP will place item in TEM after decontamination. No alarm the item may be released.

NOTE: Items which have been proved to contain only naturally occurring isotopes do not have to be labeled as radioactive material

g. Any item which cannot clear a TEM will be controlled as radioactive material and labeled in accordance with NISP-RP-004, Radiological Posting and Labeling.

NOTE: Only ANSI Qualified RPTs or individuals under the direct supervision of an ANSI RPT can release non-personnel items.

6.2 Release of non-personal items

6.2.1 Non-personal items such as tools, plant components, parts, or other solid items can be released using the following method:

NOTE: To determine the potential for internal contamination it is important to understand how the item was used and where it came from and the history of the station. Items removed from systems with contaminated liquid or gas should be suspected to have internal contamination. However non-radioactive system components can become contaminated through leaks or spills over the history of the plant.

a. If internal contamination is suspected then the unit must be disassembled so internal surfaces can be surveyed. If the internal conditions cannot be verified the item is to be controlled as radioactive material.

b. If alpha contamination is suspected (i.e. from an Alpha Level 3 area with less than or equal to 50:1 ratio) then complete a direct/ loose surface alpha survey.

c. If no detectable activity is noted during internal or alpha contamination surveys then place the item in the center of a TEM and activate the count cycle.

d. If pure beta contamination is suspected, then complete a direct/loose surface beta survey.

e. If the item is too large to place inside a TEM then contact RP Supervision for proper survey methods to release the item.

f. If the item had been disassembled it must be placed back into the same configuration for monitoring as it will be used once free released. It cannot be released piece by piece.

6.2.2 If the TEM does not alarm, then the item may be released

6.2.3 If an alarm occurs on the TEM, then initiate a second count as per posted instructions. If no alarm occurs item can be released. If second alarms occurs take the following actions:

> NOTE: Wear gloves as a minimum for removing items and performing additional surveys.

a. Using proper contamination controls remove the item from the monitor and determine the cause of the alarm.

b. Take appropriate actions such as decontaminate the component or removed the item causing the alarm.

> NOTE: Items which have been proved to contain only naturally occurring isotopes do not have to be labeled as radioactive material.

c. Re-monitor the item after corrective actions have been taken. If the item had been disassembled it must be placed back into the same configuration for monitoring as it will be used once free released. It cannot be released piece by piece.

d. If alarms or indications of radioactive material are still present then control the item in accordance with procedure NISP-RP-004, Radiological Posting and Labeling.

e. If no indications of activity above background the item may be free released.

6.2.4 Survey methodology has been defined for computers, video monitors, breakers, cameras, gauges and power tools in Attachment 4, Unconditional Release of Certain Equipment.

6.2.5 For the release of a large volume of equipment, or for the release of very large items, a survey plan should be developed using Attachment 3, Unconditional Release Survey Plan.

6.2.6 If the item is released by survey methods other than a TEM then document the release on Attachment 1, Unconditional Release Survey Log.

6.2.7 Refer to NISP-RP-006, *Personnel Contamination Monitoring,* for release of personnel clothing which has been contaminated and deconned.

6.3 Release of Liquids

NOTE: Liquids cannot be released by monitoring only in a TEM but must include sample analysis, unless the container holding the liquids was unopened while in the RCA.

6.3.1 Site specific procedures, if applicable, will provide guidance for sample methods for liquids including the sample container and volume requirements.

6.3.2 Liquids can only be released after a review of all analysis has been completed.

NOTE: Over time contaminates can settle to the bottom of the storage container. In addition some contaminates may be suspended or trapped in oil which may rise to the surface. The sample method has to be designed to ensure you are getting a true representative sample of the contents

6.3.3 Ensure a representative sample of the liquid is obtained. This may require the liquid to be mixed or recirculated to ensure some contaminates have not separated in the liquid.

6.3.4 Control the liquid as radioactive material until the sample indicates it can be free released.

6.3.5 Analyze liquids to environmental LLD for gamma emitters.

6.3.6 Analyze liquids for tritium, if there is the potential for tritium activity to be present, to LLD specified by site specific procedure.

6.3.7 If no activity, other than naturally occurring isotopes the item can be released. Survey the exterior container to ensure it is free of radioactive material by monitoring in the TEM or completing a smear and direct frisk.

6.3.8 Consider other controls which may be required for the liquids such as flammable, safety, or environmental toxic hazards.

6.4 Release of Bulk or Aggregate Materials

6.4.1 Site specific procedures, if applicable, will provide guidance for sample methods for bulk or aggregate materials including the sample container and volume requirements.

6.4.2 Bulk or aggregate material can only be released after a review of all analysis has been completed.

6.4.3 Ensure enough samples are taken of the bulk or aggregate material to determine the radiological characteristic of the overall volume. The sample plan should be approved by RP Supervision.

6.4.4 Examples of bulk or aggregate materials are sand, soil, concrete rubble, gravel, resins or other types of material where the concentration of radioactive material is expected to be uniform if present.

6.4.5 If the bulk or aggregate material is concrete, or from a location where a radioactive liquid spill could have occurred, consider the need for sampling for tritium contamination.

6.4.6 Bulk or aggregate materials should be controlled as radioactive material until sample results indicate it can be free released.

> NOTE: Cesium-137 may be detected in bulk materials, such as soil, as a result from fallout from atomic bomb testing. Sites may develop technical papers determining the amount of Cs-137 found in soil, or other bulk materials, and include those values as part of the sites background determination.

6.4.7 Bulk or aggregate material can be released once sample analysis indicates only the presence of naturally occurring radioisotopes or no detectable by-produce material when analyzed to environmental LLDs.

a. Aggregate materials should be surveyed with a micro-R meter prior to release as determined by RP supervision.

6.5 Control of Radioactive Material Temporarily Released

6.5.1 With RP Supervisor approval, items which have been surveyed and found to be radioactive can be temporarily released based on the following criteria:

a. Item is labeled as radioactive material in accordance with NISP-RP-004, Radiological Posting and Labeling.

b. No loose surface contamination

c. No potential for spills or leaks

d. Item is being transported to an area that satisfies NISP-RP-004, Radiological Posting and Labeling, and proper radiological controls have been established.

e. Individual transporting the material is logged in on the appropriate RWP and understands the requirements of transporting the material directly to the radioactive materials area.

f. The dose rate on the item is <2.0 mrem/hr at 30cm.

6.5.2 Conditionally released items are to be documented on Attachment 2, Radioactive Material Log or similar document.

6.6 Storage of Radioactive Material

6.6.1 If the amount of licensed material stored in an area or room exceeds 10 times the quantity specified in 10CFR20, Appendix C, then the area is required to be posted in accordance with NISP-RP-004, Radiological Posting and Labeling.

6.6.2 If the potential exists for the movement of radioactive material to change the dose rates at the boundary of the storage area then radiation protection will perform a survey and document the radiological conditions. Update the postings and controls in accordance with NISP-RP-004, Radiological Posting and Labeling.

6.6.3 Consider the following potential impacts before radioactive material is stored inside the RCA.

a. Impacts on low dose waiting areas

b. Impacts on ALARA estimates

c. Impacts on plant operating systems such as Area Radiation Monitors

d. Potential for contamination spread

e. Potential for spill of liquids into clean areas or clean systems

f. Impacts on fire loading and fire zones

g. General housekeeping

6.6.4 Contact the appropriate site personnel for instructions for storage of mixed hazardous waste or material. Some common mixed waste hazards are batteries, chemicals, and combustible liquids.

6.6.5 Items placed in storage should be clearly labeled in accordance with NISP-RP-004, Radiological Posting and Labeling, showing all radiological hazards and the contents of the package. Label should be attached in a manner to be easy to read.

6.6.6 Items must be stored in containers suitable to prevent the spread of contamination. The container design should take into consideration the expected duration the item is projected to be in storage. Containers should be subjected to periodic inspections to ensure they do not degrade over time.

6.6.7 Radioactive material stored in outside areas where the material is subject to exposure to weather hazards should meet the following requirements:

a. Be contained in water tight containers with the lids secured in place. If the size of the object is too large to fit inside a manufactured container contact RP Supervision for direction on the proper storage method.

b. Boxes or containers are inspected for leaks prior to being loaded

c. Containers are staged/stored in areas not subject to flooding

d. Inspected at a frequency as defined by specific site procedures

6.7 Movement of Radioactive Material

6.7.1 All radioactive material shall be properly labeled in accordance with NISP-RP-004, Radiological Posting and Labeling, prior to be transported from one location to another.

6.7.2 The individual transporting the material has the responsibility to ensure it reaches its final destination and is inside a properly posted area.

6.7.3 The potential impact on plant operating equipment must be considered when transporting radioactive material. Radiation and Process monitor set points should be understood before transporting material in close proximity.

6.7.4 If the potential exists for the movement of radioactive material to change the dose rates at the boundary of the storage area then radiation protection will perform a survey and document the radiological conditions. Update the postings and controls in accordance with NISP-RP-004, Radiological Posting and Labeling.

6.7.5 The movement of highly radioactive material (i.e. > 1 R/hr at 30 cm) can impact the sites 10CFR37 security requirements. Prior to movement contact RP Supervision to determine the potential impacts to the stations 10CFR37 implementation plan.

6.7.6 The individual transporting the radioactive material has the responsibility to be aware of all the hazards associated with it including both radiological and industrial.

6.7.7 Radiation workers may transport radioactive material inside the RCA with dose rates which are <80 mR/hr contact and $\leq$ 4 mR/hr at 30cm as long as the following conditions have been met:

a. The item has been labeled in accordance with NISP-RP-004, Radiological Posting and Labeling

b. The item is properly contained to prevent the spread of contamination

6.7.8 Radiation workers may transport radioactive material inside the RCA with dose rates > 4 mR/hr at 30cm but <80 mR/hr at 30cm as long as the following conditions have been met:

a. The item has been labeled in accordance with NISP-RP-004, Radiological Posting and Labeling

b. RP approves the movement of the item to the new storage location and agrees to the transport route and determines the radiological controls.

c. The area is properly posted and the addition of the item will not change the radiological boundaries.

d. The item is properly contained to prevent the spread of contamination.

6.7.9 Radiation Protection must escort all radioactive material with a dose rate ≥ 80 mR/hr at 30cm.

6.7.10 Radiation workers may transport radioactive material outside the RCA between established posted radioactive material storage areas as long as the following conditions have been met:

a. Notify Radiation Protection for approval prior to transport

b. The item has been labeled in accordance with NISP-RP-004, Radiological Posting and Labeling

c. The item is properly contained to prevent the spread of contamination

d. The dose rate on the item is < 4 mR/hr at 30cm and <80 mR/hr contact.

6.7.11 Radiation protection must escort all radioactive material with a dose rate ≥ 4 mR/hr at 30cm or ≥80 mR/hr contact outside the RCA.

7.0 Records/Documentation

7.1 Retain copies of documentation generated as a result of implementing this procedure in accordance with the provisions of the station records management program. This program will include appropriate controls for storage and preservation.

7.2 Computer generated equivalents may be used in place of the Attachments provided that, at a minimum, the appropriate information contained on the Attachment is contained on the equivalent.

8.0 References

8.1 Commitments

NONE

8.2 General

8.2.1 EPRI 1019224, Radioactive Material Monitoring and Control Guideline

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

8.2.3 US NRC IE Circular 81-07, "Control of Radioactively Contaminated Material"

8.2.4 US NRC Information Notice No. 85-92: "Surveys of Wastes Before Disposal From Nuclear Reactor Facilities."

8.2.5 US NRC Definition of Restricted Area from NRC reference library

8.2.6 10 CFR Part 50.75, "Reporting and Recordkeeping for Decommissioning Planning."

8.2.7 NUREG/CR-5569, "Health Physics Positions Data Base," HPPOS 238.

8.2.8 EPRI Alpha Monitoring and Control Guidelines for Operating Nuclear Power Stations, Revision 2

8.2.9 EPRI 1019224, Radioactive Material Monitoring and Control Guideline

9.0 Attachments

9.1 Attachment 1 - Unconditional Release Log – Sample

9.2 Attachment 2 – Radioactive Material Log

9.3 Attachment 3 – Unconditional Release Survey Plan – Sample

9.4 Attachment 4 – Unconditional Release of Certain Equipment

ATTACHMENT 1
Unconditional Release Log – Sample
Page 1 of 1

Survey Location

Date/time	Instrument Number	Description of material and results of survey	Survey method	Print/Sign	Badge

Reviewed by: _____/_____ Date: _____

RP Supervisor print/sign

Retention per station records retention

ATTACHMENT 2
Radioactive Material Log – Sample
Page 1 of 1

Item description	
Owner/Department	
Individual accountable for control of RAM	
Fixed contamination levels	
Is the item properly labeled as RAM	
Location to be used	
Has location been properly posted for RAM	
Authorized by RP Supervisor	
Release date	
Expected return date	
Special instructions **1. The item is transported to and deposited in an RCA.** **2. The item is not left unattended in an un-posted area.** **3. The item cannot be transported through a food prep or use area.** **4. The item cannot be disassembled.** **5. The item can only be transported to the designated location.**	

Reviewed by: _____/_____ Date: _____

RP Supervisor - print/sign

Retention per station records retention

ATTACHMENT 3
Unconditional Release Survey Plan – Sample
Page 1 of 2

Release Location:
Prepared By:
Description of Material to be Released:
RP and Decontamination Staffing Requirements:
Special Instrumentation Needs (Large area probes, etc.):
Special Decontamination Equipment or Process Needed:
Material Tracking Process to prevent release of material prior to completing all surveys:

ATTACHMENT 3
Unconditional Release Survey Plan – Sample
Page 2 of 2

Survey Place Keeping Techniques:
Independent Survey Required? YES NO
Management Oversight Plan:

Plan Approved By: _____/_____ Date: _____

RP Supervisor print/sign

Retention per station records retention

ATTACHMENT 4
Unconditional Release of Certain Equipment
Page 1 of 6

Instructions
1. A TEM shall be used for all equipment that fits in the TEM, with the exception of items known to contain naturally occurring radioactive material.
2. Hand tools are available in the RCA and should not be brought into the RCA.

Computer or Video Monitors		**Internal Survey**	**External Survey**	**Notes**
	Fixed	(Required if indirect survey is required) - Frisk accessible internal surfaces using a frisker probe.	Frisk accessible external surfaces using a frisker probe.	Some computer monitors have natural radioactive material in the screen. The TEM is able to detect this material, but a frisker probe may **not** detect it. Prior to taking monitors into the plant, always survey video monitors screens for baseline.
	Loose	If the computer has a fan and the fan used a filter over the intake vents, check the filter for direct with a frisker. If contamination is detected on the filter, the equipment will be disassembled and internals surveyed. If the intake vents were not covered by a filter, the fan and fan shroud needs to be smeared by Q-tip or disassemble the equipment.	Smear accessible external surfaces using a Q-tip and/or wipe.	
Breakers		**Internal Survey**	**External Survey**	**Notes**
	Fixed	Frisk accessible internal surfaces.	Frisk accessible external surfaces using a frisker probe.	CAUTION: Internal capacitors may still be energized.
	Loose	The outer housing must be removed and accessible internal areas smeared. Pay particular attention to vents, housing seams, and oily/greasy areas. Ensure that you check the inside of springs (coils) for indirect contamination.	Smear accessible external surfaces using a Q-tip and/or wipe.	The arc chutes are made of materials that include NATURALLY OCCURING OR BACKGROUND RADIATION and normally read direct (4-6K dpm). Removal of arc chutes is not required for unconditional release as long as direct frisk indicates the expected 4-6K dpm.

ATTACHMENT 4
Unconditional Release of Certain Equipment
Page 2 of 6

Cameras		**Internal Survey**	**External Survey**	**Notes**
	Fixed	Internal (required if camera was opened in RCA) - Frisk accessible internal surfaces using a frisker probe.	Frisk accessible external surfaces using a frisker probe or use a TEM.	Some camera lenses and camera batteries contain NATURALLY OCCURING OR BACKGROUND RADIATION. The TEM is able to detect this material, but a frisker probe may **not** detect it. Prior to taking cameras into the plant, always survey them for baseline. Remember to bag cameras if they are taken into contaminated areas.
	Loose	(Required if camera was taken into a contaminated area) - Smear accessible internal surfaces using a Q-tip and/or wipe.	Smear accessible external surfaces using a Q-tip and/or wipe.	
Gauges		**Internal Survey**	**External Survey**	**Notes**
	Fixed	**Not** required.	Frisk and TEM (if possible) accessible external surfaces (using a frisker probe), must be free of contamination.	With this type of equipment, both the TEM, (if the gauge fits into the TEM,) and frisker probe should be used to perform an unconditional release.
	Loose	The inlet and outlet of the gauge shall be smeared (using a wipe or Q-tip). If any internal contamination is found, then the tool can **not** be released (even after decon).	Smear accessible external surfaces using a wipe.	
Electric Power Tools		**Internal Survey**	**External Survey**	**Notes**
	Fixed	Required if air cooled.	Frisk and TEM, (if possible) accessible external surfaces using a frisker probe.	With this type of equipment, both the TEM, (if the tool fits into the TEM) and a frisker probe shall be used to perform an unconditional release.
	Loose	Smear the cooling vents using a wipe or Q-tip. If any internal contamination is found, then the tool can **not** be released (unless disassembled and decontaminated).	Smear accessible external surfaces using a wipe.	

ATTACHMENT 4
Unconditional Release of Certain Equipment
Page 3 of 6

Unsealed Batteries		**Internal Survey**	**External Survey**	**Notes**
	Fixed	Determine if a volumetric analysis is required per section 6.3	Frisk accessible external surfaces using a frisker probe or use a TEM.	
	Loose		Smear accessible external surfaces using a wipe.	
Gas Bottles		**Internal Survey**	**External Survey**	**Notes**
	Fixed	**Not** required.	Frisk accessible external surfaces.	Give special attention to paint on the bottom of gas bottles that may be contaminated.
	Loose	**Not** required.	Smear accessible external surfaces.	
Piping/Tubing **A-Frames/ Hoses**		**Internal Survey**	**External Survey**	**Notes**
	Fixed	If internal surface accessible to a frisker probe, then perform a direct frisk. Otherwise, remove internal surface material by sanding/ sampling the inside ends of the piping or tubing. Survey the removed material using a frisker probe.	Frisk or TEM accessible external surfaces using a frisker probe.	To help release new piping, hoses, or tubing, the ends of new material should be taped or covered with FME barrier as soon as possible. Unconditional release must be approved by the Radiation Protection Supervisor or designee. If any contamination using a frisker probe is found, then that piping or tubing can **not** be released (even after decontamination).
	Loose	The internal surfaces shall be smeared by running smear material into the ends (approximately five inches) of the tubing or piping. The use of fish tape may aid in smearing the internal areas.	Smear accessible external surfaces using a wipe.	

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Scaffold		**Internal Survey**	**External Survey**	**Notes**
	Fixed	If an opening to the internal surface area is available, then remove internal surface material from the internal surface of the scaffolding by sanding. Survey the removed material using a frisker probe.	Frisk accessible external surfaces using a frisker probe.	Unconditional release of scaffolds must be approved by the Radiation Protection Supervisor.
	Loose	Smear the inside of the ends of scaffolding that is open. If contamination is found, then the scaffold can **not** be released even after decontamination.	Smear accessible external surfaces using a Q-tip, bottle brush and/or wipe.	
Rope or Cable or Welding Lead		**Internal Survey**	**External Survey**	**Notes**
	Fixed	**Not** required.	Frisk or TEM accessible external surfaces using a frisker probe.	The TEM can be used to release this type of material. If material is too big to fit into the TEM, then use a frisker probe.
	Loose	If there is internal surface, then smear inside the ends (approximately 5 inches). If any contamination is found, then the material can **not** be released (even after decontamination).	Smear accessible external surfaces using a wipe.	Welding Lead often contains NATURALLY OCCURING OR BACKGROUND RADIATION.

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Equipment using Nickel-Cadmium or Nickel Metal Hydride (NiMH) Batteries		**Internal Survey**	**External Survey**	**Notes**
	Fixed	**No** special requirements	**No** special requirements	If the equipment fits into the TEM, then the batteries must be removed before checking the equipment. If the batteries can **not** be removed, then smear and frisk all accessible surfaces with a frisker probe or equivalent. Survey may show presence of NATURALLY OCCURING OR BACKGROUND RADIATION.
	Loose	**No** special requirements	**No** special requirements	
Welders/Battery Chargers/Air Conditioners		**Internal Survey**	**External Survey**	**Notes**
	Fixed	Frisk accessible internal surfaces using a frisker probe. If any contamination is found, then that component can **not** be released until decontaminated and resurveyed.	Frisk or TEM accessible external surfaces using a frisker probe.	CAUTION: Internal capacitors may still be energized. These items often will fit in TEM and thus a TEM survey may be performed.
	Loose	Smear accessible internal surfaces using a Q-tip and/or wipe. If any internal contamination is found, then that component can **not** be released until decontaminated and resurveyed.	Smear accessible external surfaces. If a filter was over the intake vents, then check the filter for direct using a frisker probe. If any contamination is detected on the filter, then the equipment must be disassembled and internals must be checked. If the intake vents were not covered by a filter, then disassemble the equipment.	

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		Internal Survey	**External Survey**	**Notes**
Hot Sticks	**Fixed**	**Not** required.	Frisk or TEM accessible external surfaces using a frisker probe.	Do **not** use masslin due to historical OE for electricity being conducted due to oil transfer.
	Loose	**Not** required.	Smear accessible external surfaces using disc smears or any other smear media that does not transfer impregnated oils or other such media that could conduct electricity.	