NPG Standard Programs and Processes	**Radiological Risk Management**	**NPG-SPP-05.2.6** **Rev. 0005**

Quality Related	☑ Yes	☐ No
PORC Required	☐ Yes	☑ No
10CFR50.59 Review	☐ Yes	☑ No
10CFR72.48 Review	☐ Yes	☑ No

SPP Lead	Sandra L Anderson
Validated By	J. W. Fuller
Validation Date	12-11-2019
Review Frequency	4 years

Effective Date 03-05-2021

Level of Use: Information Use

Responsible Peer Team: Radiation Protection (RP)

Approved by: J. Steve McCamy — Corporate Functional Area Manager (CFAM)

03-05-2021 — Date

Revision Log

Revision or Change Number	Effective Date	Affected Page Numbers	Description of Revision/Change
3	02/13/2019	6-7	Added step 3.2.2E to ensure diving operations are included in the plan with details commensurate with the established level of risk This change implements the PCR which is documented in CR 1487723 and was written to address the Corrective Action from CR 1464279.
4	12/12/2019	All	Drafted changes and present changes to the TVA ALARA Superintendent Peer Team per CR 147490 to improved radiological risk, in alignment with NPG-SPP-07.3 and INPO 05-008. These changes also incorporated clarifications and enhancements identified in these CRs, as well: 1368784, included 1.5 rem/hr as a dose rate that triggers High Radiological Risk Management to be consistent with the INPO Best Practice for Identification and Controls for Work with Radiological Risk, 1407810, 1435707 and 1450180, deleted Attachment 2, Radiological Risk Required Controls and Approvals, based on peer team recommendations, 1424615, reformatted and added specific activities for pressurized water reactors for Attachment 1, 1435682, aligned to latest revision of NPG-SPP-07.3 (see related CR 1368786). Canceled TVA Forms 41546 and 41547. Corrected typographical errors. Revision bars included except for Attachment 1, which was reformatted with several changes.
5	03/05/2021	All	Revised wording in Section 3.1.3 to align with NPG-SPP-07.3, Section 3.4 wording. Also clarified wording in Attachment 1 CR 1617516. Corrected procedure referenced for diving operations in Section 3.2.2 and updated the References section per CR 1629594. Defined acronyms. Revision bars included.

Table of Contents

1.0 PURPOSE

This procedure establishes the responsibilities, duties, controls, conduct, and oversight of radiological risk sensitive work conducted inside a Radiologically Controlled Area (RCA).

A. Establish the highest possible levels of personal safety; inclusive of industrial and radiological safety.

B. Ensure there is sufficient preparation and adequate resources for the work

C. Ensure there is adequate management and supervisory oversight and control during the work.

2.0 SCOPE

This instruction contains planning measures required for identifying and controlling radiological risk for planned work activities inside the RCA. This instruction applies to all groups planning and performing work at TVA Nuclear Power Group (NPG) facilities.

Review Cadence: This procedure will be reviewed at least once per four years (+3 months) with document of completion of the Cadence Review/Administrative Validation in the Validation Date and Validated By fields on the Standard Programs and Processes (SPP) coversheet.

3.0 PROCESS

3.1 Roles and Responsibilities

3.1.1 Radiation Protection Manager (RPM) or Designee

A. Review and approve ALL High Radiological Risk activities.

B. Forward ALL High Radiological Risk activities specified in Section 3.1.3 to the Critical Evolutions committee for approval.

3.1.2 RP Management

A. Review and approve each task that was determined to be MEDIUM or HIGH Radiological Risk by verifying the source of the data is actual, current, and applicable to the location and description of the task, and by verifying the validity of the assumptions made about the work process and radiological conditions are valid.

B. Provide oversight for HIGH Radiological Risk work, unless waived by the Radiation Protection (RP) Manager.

C. Participate in HIGH Radiological Risk work pre-job briefs.

D. Ensure the assessed Radiological Risk is downgraded when conditions no longer require higher levels of control.

3.1.3 Critical Evolutions Committee Chair

A. Critical Evolution Committee Chair or designee approval required for the following High Radiological Risk activities as identified in NPG-SPP-07.3, Work Activity Risk Management Processes.

1. Entry into a Very High Radiation Area

2. Nuclear diving activity in a radioactive system

3. Requires an Inside Polar Crane Wall (PWR) or Drywell (BWR) entry at power

4. Any activity the RPM deems prudent for presentation to a critical evolutions meeting

3.1.4 Work Group Supervisor

A. Assign a responsible owner as the single point of contact for performance of a HIGH Radiological Risk task.

B. Participate in job planning.

C. Collaborate with RP As Low As Reasonably Achievable (ALARA) to establish compensatory actions for MEDIUM or HIGH Radiological Risk Management reviews.

D. Coordinate support with other work / support groups as required.

3.1.5 Owner

A. Oversight and management of activities designated as HIGH Radiological Risk work

B. Lead pre job brief of HIGH Radiological Risk work

3.1.6 ALARA Staff, RP Field Operations Supervisors, or RP Control Point Coordinators

Perform preliminary assessment of Work Orders and other assigned tasks for Radiological Risk.

3.2 Instructions

3.2.1 Radiological Risk Characterization

A. ALARA Staff, RP Field OPS Supervisors, or RP Control Point Coordinators performing reviews of Work Orders or other upcoming tasks perform an initial screening for MEDIUM and HIGH Radiological Risk, using Attachment 1, Radiological Risk Characterization and Operational Impact.

1. Notify the ALARA staff of new tasks screened as HIGH or MEDIUM Radiological risk.

3.2.1 Radiological Risk Characterization (continued)

2. Coordinate with Operations Senior Reactor Operator (SRO) for final determination of HIGH Radiological Risk activities as described in NPG-SPP-07.3, Work Activity Risk Management Process.

3. Screen for a change in Risk when notified of a change in job conditions or scope. For any increase in the Radiological Risk level; for example, MEDIUM to HIGH risk, the screener will notify RP Management, immediately upon recognition.

B. RP Management reviews each task classified as MEDIUM or HIGH Radiological Risk and validate the assessment is correct by:

1. Verifying the source of the data is accurate, current, and applicable to the location and description of the task.

2. Verifying the assumptions made about the work process and radiological conditions are valid.

3.2.2 Planning and Conduct

A. If work is classified as MEDIUM Radiological Risk, then it is to be controlled and approved as required in accordance with NPG-SPP-05.18, Radiation Work Permits. Required controls will be stated in the RWP, if no ALARA Plan is used.

B. If work is classified as HIGH Radiological Risk, then the High Risk Management Plan (TVA form 41218) is to be approved as required in accordance with, NPG-SPP-07.3, Work Activity Risk Management Process. Risk classified per section 3.1.3 of this instruction require Critical Evolutions final approval; remaining High Radiological Risk activities require RPM final approval.

C. The owner will work with the RP ALARA staff to develop plans (Micro ALARA Plan (MAP) / ALARA Plan / Radiation Work Permit and/or High Risk Management Plan) as required for controlling radiological risk associated with the work activities.

D. ALARA Plan / Radiation Work Permit (RWP) or work instructions should include compensatory actions to minimize or mitigate expected radiological hazards.

E. Ensure diving operations are included in the plan with details commensurate with the established level of risk. The plan should:

1. Require coordination between RP Field Ops and ALARA.

2. Designate dedicated positions for diving activities, including RP supervisors and technicians.

3. Establish specific job coverage requirements utilizing NISP-RP-010 and RCTP-115, Diving Operations on the Refuel Floor, or RCTP-116, Diving Operations in the Radiologically Controlled Area, as appropriate, including expectations for the following:

a. Minimum frequency for re-survey of the dive area

3.2.2 Planning and Conduct (continued)

b. Survey documentation of confirmatory and verification measurements

c. Posting and labeling

F. For potential radioactive effluent pathways not evaluated per station commitment documents (ODCM), HIGH Risk radiological work planning shall identify additional radiological effluent monitoring and initiating triggers in order to plan mitigating actions to minimize and monitor releases.

G. Prior to the start of any work, the owner and RP ensure the following:

1. The work is within the scope approved by the Work Order or as described in the controlling procedure.

2. Conditions and hazards are within planning assumptions of the Micro ALARA Plan (MAP) / ALARA Plan or the controlling RP procedure.

3. Requirements and actions to manage the work are identified in the MAP / ALARA Plan or the controlling RP procedure.

4. The RWP is appropriate for the work.

5. All required reviews and approvals are obtained prior to starting the work.

H. All HIGH Radiological Risk work requires a dedicated pre-job briefing.

1. Pre-job briefings to include significant aspects of work to be performed, clearly defined contingencies, and stop work criteria.

2. Briefings to be attended by all essential workers, line supervision, and RP personnel.

I. If radiological conditions or job scope change during the job that would result in an increase in the Radiological Risk level, then:

1. STOP work.

2. Reassess the Radiological Risk Characterization starting at step 3.2.A.

3. Work may restarted after the required planning is complete and approvals have been obtained..

J. Post-Job Critique / Review

Conduct a Post-Job Critique for HIGH Radiological Risk work in accordance with NPG-SPP-05.2.1, Operational ALARA Planning and Controls, as appropriate.

4.0 RECORDS

4.1 QA Records

None

4.2 Non-QA Records

None

5.0 DEFINITIONS

Compensatory Actions: Actions designed to mitigate elements of inherent risk or identified task related Radiological Risk.

HIGH Radiological Risk: Radiological work where detailed planning along with multiple and diverse barriers are essential to prevent radiological events involving significant radiation levels, threats to individual regulatory radiation exposure limits, or may result in unanalyzed effluent release pathways to the environment or exposure to members of the public.

MEDIUM Radiological Risk: Radiological work where planned barriers are desirable to prevent inadequately controlled radiation levels, reduce threats for unplanned / unmonitored dose, minimize potential for EPRI level 2 or level 3 personnel contamination events or prevent potential contamination of non-radiological facilities or the environment within the protected area.

Owner: Individual designated to be the single point of contact by the primary organization performing the work / job. The particular position (**Task Manager, Task Coordinator, or Test Director**) is assigned by the performing organization using NPG-SPP-07.3, Work Activity Risk Management Process or NPG-SPP-10.6, Infrequently Performed Tests or Evolutions.

Work / Job: The performance of activities or functions that include troubleshooting, procedure preparation, clearance and tagging, modifications, testing, operations, and maintenance. Work can be planned with multiple tasks or activities.

6.0 REFERENCES

6.1 Requirement Documents

A. NISP-RP-010, Radiological Job Coverage

B. NPG-SPP-05.2.1, Operational ALARA Planning and Controls

C. NPG-SPP-07.3, Work Activity Risk Management Process

D. RCTP-115, Diving Operations on the Refuel Floor

E. RCTP-116, Diving Operations in the Radiologically Controlled Area

6.2 Development References

A. 10CFR20, Standards for Protection Against Radiation

B. Regulatory Guide 8.15, Acceptable Programs for Respiratory Protection

C. INPO L2 11-41 Unplanned Exposures from Highly Radioactive In-Core Components

D. INPO SOER 01-1, Unplanned Radiation Exposures

E. INPO 05-008, Radiological Protection at Nuclear Power Stations

F. NPG-SPP-05.1, Radiological Controls

G. NPG-SPP-05.1.3, Radiological Stop Work Authority

H. NPG-SPP-05.2, ALARA Program

I. NPG-SPP-05.2.3, Outage Exposure Estimating and Tracking

J. NPG-SPP-05.10, Radiological Respiratory Protection Program

K. NPG-SPP-05.18, Radiation Work Permits

L. NPG-SPP-07.3, Work Activity Risk Management Process

M. NPG-SPP-10.6, Infrequently Performed Tests or Evolutions

N. ODCM, Offsite Dose Calculation Manual

Attachment 1
(Page 1 of 3)

Radiological Risk Characterization and Operational Impact

Risk Category	√	HIGH Risk Activities
Significant Radiation		
(MAXIMO Code 3.1)	☐	*Is in a Very High Radiation Area (Keyway)
(MAXIMO Code 3.4)	☐	*Involves Nuclear Diving activities in a radioactive system
(MAXIMO Code 3.6)	☐	*Requires an Inside Polar Crane Wall (PWR) or Drywell (BWR) entry at power
(MAXIMO Code 3.7)	☐	Implements plant response to SOER 01-1, Unplanned Radiation Exposures, for dose and dose rate limits - For example, would be exposed to 1,500 mrem per hr OR would receive 500 mrem in a single entry
	☐	Has potential for shallow dose equivalent rate to the skin in excess of 10 rad/hr OR to an individual directly handling items with contact dose equivalent rate (beta plus gamma) exceeding 10 rad/hr
	☐	Removing irradiated hardware from water/shielding in the reactor vessel, cavity, spent fuel pool, or transfer canal (Note: This does not apply to moving fuel unless the fuel is damaged)
	☐	Handling equipment or tools after used to cut or repair irradiated hardware or components (for example , a crusher-shearer)
	☐	Involves Radiography
	☐	BWR - Replacing or repairing equipment associated with source range monitors, intermediate-range monitors, and local power range monitors or TIP detectors, and repairing TIP drive units that could result in inadvertent movement of the TIP detectors
	☐	BWR - Replacing or repairing drive and shuttle tubes, including activities performed on the drive motors that could result in retraction of the drive/shuttle tube assembly if performed improperly
	☐	PWR - Replacing or repairing in-core detectors, or repairing in-core detector drive units that could result inadvertent movement of the detectors
	☐	PWR - Completing activities associated with disassembly or reassembling the seal table (in-core instrument plate) that could result in a worker moving or retracting a thimble prior to establishing controls in under vessel areas
	☐	PWR - Retracting in-core thimbles
	☐	PWR - Accessing areas, such as beneath the reactor vessel or around the seal table (in-core instrument plate), during periods when in-core detectors could be operated

Attachment 1
(Page 2 of 3)

Radiological Risk Characterization and Operational Impact

Risk Category	√	HIGH Risk Activities
Significant Contamination (Alpha/Discrete Particles/Skin Dose) (MAXIMO Code 3.8)	☐	Shows work area contamination levels greater than or equal to 1 rad/hr on a smear as measured with an open window ion chamber
	☐	Has potential for worker exposure to radioactive particles that exceed 750 mRad/hr as measured with an open window (no correction factor applied)
	☐	Involves entry into areas or work activities where alpha contamination levels meet the criteria for "EPRI Alpha Level III" areas
Airborne (MAXIMO Code 3.9)	☐	Has potential for exposure to airborne radioactivity concentration (excluding noble gas) exceeding 10 DAC OR for an individual to receive 40 DAC-hrs in a single entry
Rad Material Control/ Effluent Release/ Environmental Control (MAXIMO Code 3.10)	☐	Creates a potential radioactive effluent pathway that is not evaluated in accordance with the site's ODCM or equivalent
	☐	Involves transportation of radioactive materials classified as higher risk in accordance with SER 2-09, Recurring Events: Radioactive Shipments Exceed Regulatory Limits). Example, events where shifting of tools, equipment, or highly radioactive particles, could result in exceeding Department of Transportation limits
Discretionary (Any activity at the discretion of the RPM) (MAXIMO Code 3.11)	☐	Activities with significant ALARA implications, when recommended by ALARA.
	☐	Involves initial surveys and validation of worker protective controls in the areas that OE has shown to be subject to rapid increase in radiation level - for example, BWR TIP drive area, PWR incore detector, and under vessel areas - Once initial surveys are complete and protective controls are established and validated, the radiological risk may be reclassified as medium or low radiological risk
	☐	*Any activity the RPM deems prudent for presentation to a critical evolutions meeting
*Note 1 - * Those High Radiological Risk Activities as described in NPG-SPP-07.3, Section 3.4.D (denoted as 3.1, 3.4, 3.6 and RP Manager discretion) require Critical Evolutions Committee Approval* *Note 2 - MAXIMO Codes are used for work activity planning purposes only*		

Attachment 1
(Page 3 of 3)

Radiological Risk Characterization and Operational Impact

Risk Category	√	MEDIUM Risk Activities
Significant Radiation	☐	Work activities where the worker whole body dose rates are > 100 mrem/hr (gamma plus neutron) AND the planned exposure per individual entry is > 200 mrem
	☐	Handling any irradiated materials underwater (including irradiated fuel handling)
	☐	Removal of any items from radioactive pools (Torus/Suppression Pool, Cavity, Transfer Canal, Equipment Pool, and Spent Fuel Pool)
	☐	Activity involving non-uniform radiation fields where multiple dosimetry is used OR where workers primary dosimetry is moved to a location other than the front of the torso AND including any use of EDEX
	☐	Activities subject to or which may significantly change or elevate radiological conditions such that existing radiological permits or controls would be insufficient (including establishing initial controls and postings for fuel transfer, cavity draining or forced oxygenation of the RCS, and primary resin transfers)
Significant Contamination (Alpha/Discrete Particles/Skin Dose)	☐	Activity involves disassembly, inspection and /or handling components with potential for contamination levels to exceed 200,000 dpm/100 cm2
	☐	Work in areas where general Beta-Gamma contamination exceeds 200,000 dpm/100 cm2 OR in any area meeting criteria for an EPRI Level 2 alpha area (with the actual presence of alpha contamination)
	☐	Potential exposure to radioactive particles > 50,000 ccpm as measured with a standard frisker
	☐	Flushing, draining, or venting a highly contaminated or high activity system with previous history to cause a spread of contamination or PCE
Airborne	☐	Activity has potential for exposure to airborne concentrations (excluding Noble Gas) exceeding 1 DAC OR for an individual to receive 4 DAC-hrs in a single entry
	☐	Abrasive or aggressive mechanical action, such as grinding, machining, or flapping and welding on contaminated material with transferable beta-gamma contamination > 50,000 dpm/100 cm2 OR any potential fixed alpha contamination
Rad Material Control/ Effluent Release/ Environmental Control	☐	Radiological work in buildings not designed for radiological work (e.g., machining in a non-radiological machine shop) or the activity can result in radioactive spills contacting soil
	☐	Radiological work outdoors or in tents
Discretionary	☐	Any activity the RP Manager deems prudent to control as a MEDIUM Radiological Risk Activity

Source Notes
(Page 1 of 1)

Requirements Statement	Source Document	Implementing Statement

None