Nuclear Fleet

Administrative Procedure

Title: Radiological Risk Assessment Process

Procedure Number	Revision Number	Effective Date and Approvals On File
RP-AA-275	5	

Revision Summary

Revision 005

Attachment 1 (Form 730733) was reformatted and updated to reflect the verbiage in INPO 05-008, Guidelines for Radiological Protection at Nuclear Power Stations, R003. The reference section was also updated to add revision 003 to INPO 05-008 and to add a new reference cited in Attachment 1 (SER 2-09, Recurring Events: Radioactive Shipments Exceed Regulatory Limits).

Functional Area Manager: Manager Radiological Protection and Chemistry

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1.0 PURPOSE

The purpose of this procedure is to provide the Radiological Protection Department with process guidance for work activity management and subsequent risk assessment of scheduled, non-scheduled and emergent work activities. Implementation of this process will enable Radiological Protection Management to ensure RP and the site is providing the appropriate oversight for higher-risk work activities.

This procedure establishes the administrative controls, responsibilities, duties for direction, control, conduct, and oversight of radiological risk significant work, which includes:

- Establishing the highest possible levels of personal safety, including industrial and radiological safety
- Ensuring there is sufficient preparation and resources for the work
- Ensuring there is adequate management and supervisory oversight and control during conduct of the work

2.0 SCOPE

The classification of level of radiological risk should normally be made during the planning process. Emergent work and known, repetitive tasks are also evaluated against the definition of medium and high radiological risk work.

Adherence to this procedure is intended to ensure all work with radiological risk is identified, to enable supervisory oversight as appropriate, and to provide consistency in the performance of briefings across the department. RP Supervision may direct the use of this procedure for any evolution, even if the work does not meet the strict definition of medium or high radiological risk work.

Emergencies and unplanned events characterized by risks sufficient to require immediate action to avoid or mitigate abrupt or rapidly deteriorating situations are addressed in the station Emergency Plan and Emergency Plan Implementing Procedures and the requirements of this procedure do not apply.

3.0 INSTRUCTIONS

3.1 Radiological Risk Assessment of Work Activities

NOTE: The designation of risk is applied to work activities based on evaluation of the probability that an undesired event may occur during execution of the task and the potential consequences of that undesired event.

NOTE: For scheduled work activities that have been screened as meeting the criteria of High Radiological Risk, approved Radiological Risk Plans should be submitted to the activity owner by T-6.

RP Planners/ RWP Writers/ ALARA Staff

3.1.1 **REVIEW** on-line (i.e., T-12, T-10, T-6, T-5, T-2, T-0, POD) and outage schedules as appropriate.

3.1.2 **ATTEND** scheduled Work Control meetings that discuss the status of ongoing and upcoming activities (i.e., On-line/Outage schedule review meetings).

3.1.3 Between the T-10 and T-6 work week planning meetings, **USE** Attachment 1, Radiological Risk Screening Worksheet, to perform a screening for Medium and High Radiological Risk assessment of work to be conducted.

3.1.4 **IF** work is determined to be of Medium or High Radiological Risk, **THEN COMPLETE** Attachment 1, Radiological Risk Screening Worksheet, and **SEND** to RP Supervision for review and approval.

RP Supervision/ Lead Tech

3.1.5 **REVIEW** and **APPROVE** Attachment 1, Radiological Risk Screening Worksheet, for each task classified as Medium or High Radiological Risk for correct assessment by performing the following:

- Identifying the potential radiological hazards associated with the job
- Ensuring the source of the data is accurate, current, and applicable to the location and description of the task
- Ensuring the assumptions made about the work process and radiological conditions are valid
- Reviewing any relevant OE associated with similar work

> **NOTE:** When available, Medium or High Radiological Risk activities should follow the requirements specified in work-specific governing procedures, such as, RP-AA-260, Control of Radiography, RP-AA-261, Control of Radiological Diving Activities, RP-AA-262, Radiological Controls for Steam Generator Primary Side Work.

RP Supervision/ Lead Tech/ RP Planner/ RWP Writers/ ALARA Staff

3.1.6 **IF** the work activity has been determined to be High Radiological Risk, **THEN DEVELOP** a Radiological Risk Plan in accordance with Attachment 2, Radiological Risk Plan.

3.1.7 **IF** the work activity has been determined to be High Radiological Risk, **THEN OBTAIN** and **REVIEW** documents that direct the field activities, which may include the following:

- Plant operating procedures
- Maintenance procedures
- Engineering work tasks
- Work orders
- Special work instructions (SWI)
- Other appropriate document(s)

> **NOTE:** Radiological considerations are not intended to provide details normally specified by a RWP. It may be appropriate to require RP notification or an RP sign-off before specific steps are performed.

3.1.8 **EVALUATE** if radiological considerations to prevent unplanned exposures have been integrated into the appropriate document that directs the field activity, including the following whenever applicable: (Ref. 5.4.6)

- Cautions or radiological hold points prior to steps that could cause a significant increase in work area dose rates or result in changing radiological conditions
- Radiological survey requirements
- Dose rate stop-work criteria

3.1.9 **IF** radiological protection considerations have **NOT** been incorporated into the appropriate field document, **THEN SPECIFY** on the Radiological Risk Plan which of the following are required to be added to the appropriate field document by the Work Activity Owner prior to the start of work to ensure radiological controls are **NOT** missed during the activity**:**

- Action steps
- Hold points
- Notes
- Cautions
- Precautions

3.1.10 **IF** work activities /risk assessment include any of the following, **THEN INCORPORATE** specific radiological protection instructions and **PERFORM** Challenge Reviews as necessary to validate radiological work controls, RWP controls, ALARA plans, and risk plans:

- Removal of any irradiated items, or equipment/tools after they have been used to cut or repair irradiated hardware or components (e.g., a crusher shearer) from radioactive pools such as the cavity, transfer canal, or spent fuel pool with the potential to exceed 1000 mrem/hr at 30 cm
- Activities which have the potential to expose individuals to whole body dose rates in excess of 10 rem/hr

3.1.11 **IF** required by Superintendent HP Operations, **THEN DEVELOP** Radiological Risk Plan in accordance with Attachment 2, Radiological Risk Plan, for Medium Risk Radiological work.

3.1.12 **OBTAIN** required approvals for Attachment 2, Radiological Risk Plan, for Medium Risk Radiological work from:

- RP Supervisor
- Superintendent Health Physics Operations
- Responsible Work Group
- Manager Radiological Protection and Chemistry or designee

3.1.13 **ENSURE** work controls for Medium Radiological Risk work are specified in one or more of the following documents, as appropriate:

- Specific RWP/RWP task
- Procedure
- Micro ALARA Plan
- ALARA Plan

3.1.14 **PERFORM** the following when a work activity has been classified as High Radiological Risk:

a. **NOTIFY** Risk Review Team/Plan of the Day Team and Responsible Work Group that Radiological High Risk Plan is required.

b. **REQUEST** the following information from High Risk Activity owner:

- Responsible Craft Supervisor
- Single point of contact for job to interact with RP planning

RP Planner/ RWP Writers/ ALARA Staff

3.1.15 **WHEN** requested, **THEN ASSIST** craft performing work in developing Radiological High Risk Plan by performing the following:

- **REVIEW** and **ENSURE** all radiological activities have been properly identified.
- **ASSIST** in identification of radiological assumptions and implications.
- **ASSIST** in determining what is the worst radiological event that can happen.
- **ASSIST** in determining what actions can be taken to mitigate the radiological risks.

3.1.16 **ENSURE** work controls for High Radiological Risk work are specified in one or more of the following documents, as appropriate:

- Specific RWP/RWP task
- Procedure
- Micro ALARA Plan
- ALARA Plan

3.1.17 **OBTAIN** required approvals for Attachment 2, Radiological Risk Plan, for High Risk Radiological work from:

- RP Supervisor
- Superintendent Health Physics Operations
- Responsible Work Group
- Manager Outage and Planning
- Manager Radiological Protection and Chemistry or designee
- Plant Manager

3.1.18 **SUBMIT** to Work Activity Owner an approved High Radiological Risk Plan.

3.2 Radiological Risk Assessment of Emergent Work During Off Hours

NOTE: RP Technicians may be designated to perform risk assessments, briefings and oversight on emergent activities outside of normal working hours. On-site RP Personnel are responsible to notify appropriate Supervision/management in the event that Medium or High Radiological Risk activities are identified.

All RP Personnel

3.2.1 **WHEN** notified that emergent work has been identified, **THEN PERFORM** the following:

- **ENSURE** the assumptions made about the work process and radiological conditions are valid.
- **ENSURE** all radiological activities have been properly identified.
- **IDENTIFY** the potential radiological hazards associated with the job.

3.2.2 **SCREEN** work activity for Medium or High Radiological Risk using Attachment 1, Radiological Risk Screening Worksheet.

3.2.3 **NOTIFY** appropriate RP Supervision/management of emergent Medium or High Radiological Risk work.

3.2.4 **IF** work has been determined to be Medium or High Radiological Risk work, **THEN DEVELOP** a Radiological Risk Plan in accordance with Attachment 2, Radiological Risk Plan, if required.

3.2.5 **OBTAIN** required approvals of the Radiological Risk Plan and specific RWP/ RWP task, which may be per telecon.

3.2.6 **SUBMIT** to the High Risk Activity owner an approved High Radiological Risk Plan.

3.2.7 **WHEN** requested, **THEN ASSIST** the craft performing the work in developing the Radiological High Risk Plan by performing the following:

- **REVIEW** and **ENSURE** all radiological activities have been properly identified.
- **ASSIST** in identification of radiological assumptions and implications.
- **ASSIST** in determining what is the worst radiological event that can happen.
- **ASSIST** in determining what actions can be taken to mitigate the radiological risks.

3.3 Risk Assessment Meeting

> **NOTE:** The individuals involved in the risk assessment meeting are responsible for agreeing that the department can support all scheduled work for the time period that is being committed to or identify to Planning and Scheduling Department any concerns with the proposed schedule.

Superintendent HP Operations

3.3.1 **SCHEDULE** RP risk assessment meetings at the following frequencies:

- During non-outage periods, the meeting should be held weekly.
- During outage periods, the meeting should be held in sufficient time to focus on the work activities for the next two to three shifts.
- Ad hoc RP Risk Assessment meetings should be held to address job scope changes, unexpected conditions and planned or on-going maintenance work and operational evolutions that could create a radiological environment greater than the limits specified for the risk.

RP Supervisors/ Health Physicist/ Lead Tech/ RP Planners/ RWP Writers/ ALARA staff

3.3.2 **PERFORM** the following at each RP Risk Assessment meeting:

- **IDENTIFY** upcoming work activities that have Medium or High Radiological Risk implications and will require RP support.
- **IDENTIFY** any known non-scheduled and potential emergent work activities.
- **DETERMINE** the priority of potentially conflicting work activities.
- **DISCUSS** RP-related information obtained from meetings attended, as appropriate
- **EVALUATE** RP resources to support scheduled work activities for the upcoming period as, appropriate.
- **SUBMIT** completed Attachment 1, Radiological Risk Screening Worksheet and Attachment 2, Radiological Risk Plan, for review and approval.

NOTE: When available, Medium or High Radiological Risk activities should follow the requirements specified in work-specific governing procedures such as RP-AA-260, Control of Radiography, RP-AA-261, Control of Radiological Diving Activities, and RP-AA-262, Radiological Controls for Steam Generator Primary Side Work.

NOTE: Approvals for the Radiological Risk Plan are to be obtained prior to the T-6 work planning week and submitted to the craft performing the activity.

Superintendent HP Operations or Designee

3.3.3 **REVIEW** and **APPROVE** completed Attachment 2, Radiological Risk Plan.

- **REVIEW** and **APPROVE** the assumptions made about the work process and radiological conditions (e.g., if an incore detector and cable have been stuck in the reactor core, assess the anticipated radiation levels based on the component and irradiation time). (Ref. 5.4.6)
- **REVIEW** mitigation and defensive barriers applied to High Risk activities.
- **DETERMINE** if additional controls are necessary to ensure satisfactory completion of job.
- **ENSURE** that appropriate compensatory measures have been taken into consideration to minimize the impact of performing high-risk activities.
- **PERFORM** an evaluation to determine if conditions exist that would limit oversight of a work activity meeting the criteria for high radiological risk (e.g., ALARA considerations, physical constraints, or duration/scheduling of work activity).
- **DETERMINE** if additional reviews are required (above those specified in the procedure) and that appropriate oversight is provided for high-risk activities.
- **REVIEW** the radiological considerations to prevent unplanned exposures that have been integrated into plant procedures or other appropriate document that directs the field activities to ensure radiological controls are **NOT** missed during the activity. (Ref. 5.4.6)
- **DETERMINE** if a challenge review should be performed as appropriate to ensure best practices are incorporated into planning for this type of work. (Ref. 5.4.6)

3.3.4 **SUBMIT** completed Attachment 2, Radiological Risk Plan, to Manager Radiological Protection and Chemistry for approval.

3.3.5 **ASSIGN** supervisory oversight of all High Radiological Risk tasks to an individual other than the same person who directs execution of the task.

3.3.6 **DETERMINE** if Medium Risk Radiological work requires RP supervisory oversight.

RP Supervisors

3.3.7 **COMMUNICATE** activities discussed at the RP Risk Assessment Meeting using the primary mode of communication to the on-duty work force, so that information is available for subsequent crew briefings, HP turnover, and status meetings, including selected personnel assignments and Low Risk activities.

INFORMATION USE

3.4 Oversight of High Risk Work Activities

RP Supervisors/ Health Physicist/ Lead Tech

3.4.1 **PERFORM** oversight during the planning, preparation and execution of all high-risk activities or at discretion of Superintendent HP Operations.

3.4.2 **ENSURE** the following prior to the start of any Medium or High Radiological Risk work:

- Work is within the scope approved by the work order and described in the controlling RP procedure or RWP/micro-ALARA/ALARA Plan.
- Conditions and hazards are within planning assumptions in the RWP/ micro-ALARA/ALARA Plan.
- Requirements and actions to manage the work are identified in the RWP/ micro-ALARA/ALARA Plan.
- RWP is appropriate for the work and specific job controls have been added to the RWP as determined by the approved Attachment 2, Radiological Risk Plan.
- All required reviews and approvals are obtained prior to starting the work.

3.4.3 **ENSURE** time spent providing oversight in the field for high risk activities is commensurate with the risk associated with the activity and adequate to ensure that programmatic deficiencies do **NOT** exist due to a lack of management involvement.

3.4.4 **PERFORM** direct oversight for those work activities identified in Attachment 2, Radiological Risk Plan.

NOTE: Radiological Protection personnel have the responsibility and authority to stop or to prevent initiation of a job, evolution, test, or any work activity involving radiological protection if continued performance of the work would result in the violation of NRC regulations, Radiological Protection standards or plant procedures, Radiation Work Permits (RWPs), ALARA instructions, or would otherwise endanger the safety of personnel.

3.4.5 **DIRECT** action is expected from the observer if there are situations or conditions that could cause personnel injury, higher than expected exposure, equipment damage, or unit trip.

3.4.6 **ENSURE** lessons learned, if applicable, from high risk activities are captured in one of the following:

- eSoms entry
- WOBS entry
- Post Job Critique
- Condition Report

3.4.7 **DOCUMENT** field observation performed during high risk activities in eSoms or HU Work Observation Database.

4.0 RECORDS

4.1 The following record(s) completed as a result of this procedure are required to be transmitted to Nuclear Document Management (NDM). The records have been identified and retention requirements established for the Nuclear Records Retention Schedule (NRRS) per RM-AA-101, Record Creation, Transmittal, and Retrieval:

4.1.1 Quality Assurance Records

- Attachment 2, Radiological Risk Plan

4.1.2 Non-Quality Assurance Records

None

4.2 The following record(s) completed as a result of this procedure are **NOT** required to be transmitted to NDM, but are required to be retained as indicated below. The NRRS has been updated and Alternate Storage approved per RM-AA-101 for Quality Assurance Records.

4.2.1 Quality Assurance Records

None

4.2.2 Non-Quality Assurance Records

None

4.3 The following item(s) completed as a result of this procedure are **NOT** records and are **NOT** required to be transmitted to NDM.

- Attachment 1, Radiological Risk Screening Worksheet

5.0 ADMINISTRATIVE INFORMATION

5.1 Commitments

5.1.1 Surry Power Station Units 1 and 2 NRC Inspection Report Nos. 50-280/88-1- and 50-281/88-10, Serial No. 88-387, Response to Notice of Violation Reported During the NRC Inspection Conducted on March 5-11 and 23-25, 1988.

5.1.2 North Anna Power Station Units 1 and 2 Inspection Report Nos. 50-338/ 89-15 and 50-339/89-15, Serial No. 89-464, Response to the Notice of Violation Reported During the NRC Inspection Conducted Between May 1, 1989 and May 5, 1989.

5.2 Responsibilities

5.2.1 Manager Radiological Protection and Chemistry or designee is responsible for:

- Ensuring that all Radiological Protection personnel are in compliance with the risk assessment process
- Selecting other activities to be controlled as High Radiological Risk
- Reviewing and approving all Radiological Risk Plans

5.2.2 Superintendent Health Physics Operations or designee is responsible for:

- Attending RP Risk Assessment Meetings
- Reviewing and approving all Radiological Risk Plans
- Reviewing and approving all RWPs with High Radiological Risk Work
- Ensuring that appropriate compensatory measures are taken to minimize the impact of performing high-risk activities
- Selecting other activities to be controlled as High Radiological Risk
- Ensuring that appropriate oversight is provided for high-risk activities

5.2.3 RP Supervisors (First Line) are responsible for:

- Attending RP Risk Assessment Meetings
- Developing Radiological Risk Plans
- Reassessing potential risk associated with conducting work if plant conditions do not remain within specified limits
- Considering the human element as part of the risk assessment (for example, worker qualification, worker experience, procedure clarity, work environment, error- likely situations, and worker fatigue)
- Providing dedicated oversight for High Radiological Risk Work
- Participating in High Radiological Risk Work pre-job briefs
- Participating in High Radiological Risk Work planning meetings

5.2.4 Lead RP Technicians are responsible for the following when assigned by RP Supervision:

- Attending RP Risk Assessment Meetings
- Developing Radiological Risk Plans
- Reassessing potential risk associated with conducting work if plant conditions do not remain within specified limits
- Providing dedicated oversight for High Radiological Risk Work
- Participating in High Radiological Risk Work pre-job briefs
- Participating in High Radiological Risk Work planning meetings

5.2.5 RP Planners/RWP Writer/ALARA Staff are responsible for:

- Attending RP Risk Assessment Meetings
- Developing Radiological Risk Plans
- Reviewing on-line and outage schedules as appropriate to identify upcoming work that needs to be discussed in the next scheduled Risk Assessment Meeting
- Identifying any known non-scheduled and emergent work activities that need to be discussed in the next Risk Assessment Meeting
- Pre-Screen routine and repetitive outage work by completing Attachment 1, Radiological Risk Screening Worksheet
- Ensuring planned or on-going maintenance work and operational evolutions will not create a radiological environment greater than the limits specified for the risk

NOTE: RP Technicians may be designated to perform risk assessments, briefings and oversight on emergent activities outside of normal working hours. On-site RP Personnel are responsible to notify appropriate Supervision/management in the event that Medium or High Radiological Risk activities are identified.

5.2.6 All RP Personnel are responsible for:

- Assisting in performing risk assessment for emergent work activities during non-normal work hours
- Notifying appropriate RP Supervision/management in the event that Medium or High Radiological Risk activities are identified
- Ensuring that appropriate compensatory measures are taken to minimize the impact of performing High Radiological Risk tasks
- Communicating changes in work scope that could result in changing the level of RP risk for the activity
- Stopping work if on-going maintenance work and operational evolutions will or have created a radiological environment greater than the specified limits and a Risk Plan is now required

5.3 Definitions

5.3.1 Challenge Review

A review and assessment of the radiological work control procedures, RWP controls, ALARA plans, and radiological risk plans developed to manage and mitigate radiological risk. The review will be conducted by RP management to determine if multiple diverse barriers exist to prevent radiological events. The review should ensure that proper RP oversight and resources have been assigned and that contingency plans exist to mitigate radiological consequences. Any shortcomings identified during the Challenge Review will be incorporated into the risk plans prior to the start of the work activity.

5.3.2 Contingency Plan

An approved plan for actions to be taken for potential emergent conditions such as:

- Discovery of equipment/component degradation
- Additional tools/equipment needed
- Increases in task scope
- Potential hazards (e.g., fire, radioactive spills, radiation exposure)
- Failures, errors, and inadvertent actuations

5.3.3 Emergent Work

High priority work added after Schedule Freeze (scheduled work of a lower priority may be impacted, if necessary).

5.3.4 High Radiological Risk Work

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

5.3.5 Low Radiological Risk Work

Radiological work that has a low probability that an undesired effect will occur and for which the consequences of the undesired effect are low.

5.3.6 Medium Radiological Risk Work

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

5.3.7 **Radiation Work Permit (RWP)**

A document that provides a method for documenting and controlling work with potential or actual radiological hazards. The RWP represents the primary formal administrative control mechanism for Radiological Protection Supervision to communicate radiological conditions and job controls to radiation workers.

5.3.8 **Responsible Work Group**

Any group performing corrective, preventive, modification, troubleshooting, inspection, or testing activity on installed plant equipment, including groups in Maintenance, Operations, NSS, Safety, and Plant Engineering that may require a ORA Plan.

5.3.9 **RP Risk Assessment Meeting**

The RP Risk Assessment Meeting is the forum for communicating scheduled/non-scheduled work activities for the next week and associated risk assessment for these activities.

5.3.10 **Risk Assessment**

The methodology to assess the risk to safe and efficient plant operation associated with performing work, and establishing the necessary requirements and contingency actions for managing the conduct of Risk Significant Work.

5.3.11 **Risk Review Team (RRT)/Plan of the Day Team (POD)**

The (RRT/POD) is normally comprised of:

- Outage & Planning Scheduling Supervisor
- Work Week Coordinator
- Operations Maintenance Advisor
- Maintenance Work Group Coordinators
- Engineering Coordinator
- Nuclear Site Services
- Radiological Protection
- Security
- Procurement
- Procedures
- Site Safety

5.3.12 **Risk Significant Work (referred to as High or Medium Risk Work throughout this procedure)**

Activity that poses a potential hazard to Nuclear Safety, risk to generation, industrial safety, radiological safety, environmental safety, which may require additional planning, special precautions, and management oversight to adequately manage the risks.

5.3.13 **Specific RWP**

A RWP issued for jobs of a non-repetitive nature where the radiological conditions are moderate to high and radiological conditions are subject to significant changes or specific controls are considered appropriate (e.g., maintenance on contaminated equipment, opening/accessing systems that contain radioactive material, manipulating high activity radioactive sources).

5.3.14 **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.

5.4 References

5.4.1 Best Practice Document prepared by industry radiation protection (RP) managers to assist member utilities in “Identification and Controls for Work with Radiological Risk,” approved on June 13, 2011

5.4.2 EPRI, Alpha Monitoring Guidelines for Operating Nuclear Power Stations, Revision 2, 3002000409 Final Report, dated August 2013

5.4.3 Nondestructive Evaluation: Recommended Practices for Maintaining Radiation Safety of Radiographic Operations at a Nuclear Plant, 1022356, December 2010; EPRI, Palo Alto, CA

5.4.4 INPO 05-008, Guidelines for Radiological Protection at Nuclear Power Stations, R003

5.4.5 INPO SOER 01-1, Unplanned Radiation Exposures

5.4.6 INPO IER L2-11-41, Unplanned Personnel Exposures from Highly Radioactive In-Core Components

5.4.7 INPO Event Report IER 11-43, Alpha Contamination Issues, November 2, 2011

5.4.8 INPO SEN 279, Exposure of Two Workers in Excess of Regulatory Annual Dose Limits, November 13, 2009

5.4.9 ITC-SA-04-02, Assessment of Nuclear Business Unit for Adverse Trends in Radiological Protection Events, prepared by M. L. Johnson and approved by R. B. Evans, dated 4/29/04

5.4.10 CR-04-08868, Disposing of High Level Filters in U2 Solid Radwaste Resulted in 2 Level 1 PCRs due to High Airborne Activity Levels

5.4.11 MP-MPO-04088, Verification of Neutron Calibration Factor, from Allan M. Johnson to A. F. Armagno, July 6, 2004

5.4.12 MP-SA-06-02, High Radiological Risk Work Control, Sept. 5, 2006 - Sept. 29, 2006, Team Lead - Mike Wood. Corrective action captured in CR-06-09026, AR 06004905

5.4.13 SER 2-09, Recurring Events: Radioactive Shipments Exceed Regulatory Limits

5.4.14 KPS-CAP27932/RCE689, High Radiation Area not controlled or posted during transfer of filter.

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Radiological Risk Screening Worksheet

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All "NO" answers to the Risk questions indicate the work poses LOW Risk to Radiological Safety.
Any "YES" answers requires Attachment 1 to be physically completed and reviewed by RP Supervision.
If more than one "YES" is answered, select the highest risk level for controls.
Items 1-28 are taken directly from Ref. 5.4.4.

Job Description:	Check One	Radiological Risk Level
1. Implements plant response to SOER 01-1, Unplanned Radiation Exposures, for dose and dose rate limits—For example, a worker would be exposed to 1,500 mrem per hour **OR** would receive 500 mrem in a single entry. (Ref. 5.4.5)	Yes ☐ No ☐	High
2. Involves entry into 'bioshield' with reactor critical.	Yes ☐ No ☐	High
3. Involves initial surveys and validation of worker protective controls in areas that operating experience has shown to be subject to rapid increases in radiation level—for example, PWR incore detector, and undervessel 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.	Yes ☐ No ☐	High
4. Removing irradiated hardware from the water/shielding in the reactor vessel, equipment pool, or spent fuel pool. (Note: This does **NOT** apply to moving fuel unless the fuel is damaged.)	Yes ☐ No ☐	High
5. Has potential for exposure to airborne radioactivity concentration (excluding noble gas) exceeding 10 derived-air-concentrations (DAC) **OR** for an individual to receive 40 DAC-hours in a single entry.	Yes ☐ No ☐	High
6. Has potential for shallow-dose equivalent rate to the skin in excess of 10 rads per hour **OR** to the individual directly handling items with contact dose equivalent rate (beta plus gamma) exceeding 10 rads per hour.	Yes ☐ No ☐	High
7. Shows work area contamination levels greater than or equal to 1 rad per hour on a smear as measured with an open window ion chamber.	Yes ☐ No ☐	High
8. Has potential for worker exposure to radioactive particles exceeding 750 mrad per hour as measured with an open window ion chamber (no correction factor applied).	Yes ☐ No ☐	High
9. Handling equipment or tools after they are used to cut or repair irradiated hardware or components (for example, a crusher-shearer).	Yes ☐ No ☐	High
10. Involves radiography.	Yes ☐ No ☐	High
11. Involves entry to areas or work activities where alpha contamination levels meet the criteria for EPRI Alpha Level III areas.	Yes ☐ No ☐	High
12. Involves diving activities in radiologically controlled areas such as spent fuel pools, reactor cavities or transfer canals. (Ref. 5.1.2)	Yes ☐ No ☐	High
13. Creates a potential radioactive effluent pathway **NOT** evaluated in accordance with the site's off-site dose calculation manual or equivalent—High-risk radiological work planning shall identify additional radiological effluent monitoring and initiate triggers to order planned mitigating actions to minimize and monitor releases. The intended audience for these high-risk briefings may be limited to persons with responsibility to direct or implement planned mitigating strategies, such as containment managers, supplemental hatch closure teams, and so forth.	Yes ☐ No ☐	High

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14. Involves transportation of radioactive materials classified as higher risk in accordance with SER 2-09, Recurring Events: Radioactive Shipments Exceed Regulatory Limits.*	Yes ☐ No ☐	High
15. Replacing or repairing in-core detectors, or repairing in-core detector drive units that could result in inadvertent movement of the detectors.	Yes ☐ No ☐	High
16. Completing activities associated with disassembling 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 undervessel areas.	Yes ☐ No ☐	High
17. Retracting in-core thimbles.	Yes ☐ No ☐	High
18. 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.	Yes ☐ No ☐	High
19. Workers are expected to be exposed to external dose rates exceeding 100 mrem (gamma plus neutron) per hour **AND** the planned exposure per individual entry is greater than 200 mrem.	Yes ☐ No ☐	Medium
20. The activity involves handling any irradiated materials underwater or removing any items from radioactive pools such as the reactor cavity/transfer canal and spent fuel pools.	Yes ☐ No ☐	Medium
21. The activity has the potential for exposure to airborne radioactivity concentration (excluding noble gas) exceeding 1 DAC **OR** for an individual to receive 4 DAC-hours in a single entry.	Yes ☐ No ☐	Medium
22. The activity involves work in areas where general contamination levels are greater than 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).	Yes ☐ No ☐	Medium
23. The activity involves abrasive or aggressive mechanical action, such as grinding, machining, or flapping and welding on contaminated material with transferable beta-gamma contamination levels greater than 50,000 dpm/100 cm² **OR** any potential fixed alpha contamination. (Ref. 5.4.7)	Yes ☐ No ☐	Medium
24. The activity has potential for exposure to radioactive particles that are greater than 50,000 counts per minute as measured with a standard frisker.	Yes ☐ No ☐	Medium
25. The activity involves nonuniform radiation fields where multiple dosimetry is used **OR** where the worker's primary dosimeter is moved to a location other than the front of the torso **AND** including any use of EDEX with or without personal shielding vests	Yes ☐ No ☐	Medium
26. The activity involves disassembly, inspection and/or handling components with the potential for contamination levels to exceed 200,000 dpm/100 cm².	Yes ☐ No ☐	Medium
27. The activity involves tasks subject to changing and elevated radiological conditions. (Examples include establishing initial controls and postings for fuel transfer, forced oxygenation of the RCS, and primary resin transfers.)	Yes ☐ No ☐	Medium
28. The activity involves radiological work outdoors or in buildings **NOT** designed for the work (such as machining a radioactive pump seal in a non-radiological machine shop), or the activity can result in radioactive spills contacting soil.	Yes ☐ No ☐	Medium

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29. Activities which have the potential to expose individuals to Whole Body dose rates in excess of 10 rem/hr. Examples of activities to consider but are not limited to: • Entry into in-core thimble areas/under vessel areas or around the seal table during periods when the in-core detectors could be operated. (Once initial surveys are complete and after protective controls are established and validated, the radiological risk may be reclassified as medium radiological risk). • Work on the in-core detector system inside containment. This includes repairing or replacing in-core detectors, working on the in-core drive units, disassembling or reassembling the seal table, and retracting incore thimbles. (Comm. 5.1.1) • Movement of reactor components (e.g., core barrel, reactor head, upper internals). • Movement or transfer of highly activated resins within system piping or shipping liners. • Movement or transfer of primary system filters. • Transfer canal entry, when drained. • Removal (or potential removal) of CRDMs, source range monitors, excore detectors, fixed incore detectors (i.e., MPS Unit 2) or other potentially irradiated components from the water/shielding in the reactor vessel, cavity, or Spent Fuel Pool (SFP).	Yes ☐ No ☐	High
30. Any activity the Manager RP & CH deems prudent to control as a high risk activity.	Yes ☐ No ☐	High

*Attachment 2, Radiological Risk Plan, not required for high risk shipments where site specific shipping procedures provide adequate risk management controls as outlined in SER 02-09 or aligned with latest industry best practices.

Risk Assessment by: _____ _____
Print/Sign Date

RP Supervisor: _____ _____
Print/Sign Date

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Radiological Risk Plan

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Work Activity Description:

Risk Level: ☐ Medium Radiological Risk ☐ High Radiological Risk

Work Activity Owner: Scheduled Start Date:

Review of procedures or other appropriate documents that directs the field activities performed: ☐ Yes ☐ No Document Number(s)
(If required specify what action steps, hold points, notes, cautions, and precautions are required to be added prior to the start of work in the comments and other controls section)

Challenge Review Required ☐ Yes ☐ No

Oversight Requirements:
Level of Oversight Involvement: ☐ RP Technician Lead ☐ RP Supervision ☐ Health Physicist
Oversight Assigned to:
Direct oversight required during the following evolutions:
1.
2.
3.
4.

Conditions that would limit oversight of the work activity:
☐ ALARA considerations ☐ Physical Constraints ☐ Duration/Scheduling of Work Activity
☐ Other
Discuss alternate methods that will be implemented to achieve oversight.

Requirements and actions to manage the work are identified in:
☐ Specific RWP/RWP task: ☐ RP Procedure:
☐ Micro ALARA Plan: ☐ ALARA Plan:
☐ Detailed Budget Analysis ☐ Other:

Work Area Radiological Conditions:
Dose Rates:
Contamination Levels:
Other Radiological Concerns or Assumptions:

Mitigation and defensive barriers applied to Medium and High Risk activities:
What defensive barriers will be applied to mitigate the consequences of an error during this activity:
1.
2.
3.
4.

Contingency Actions / Compensatory Measures	
Worst case consequences (Ask the ***"what if"*** question)	**Contingency Action / Compensatory Measure**
1.	1.
2.	2.
3.	3.
4.	4.

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Radiological Risk Plan
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Determine if additional controls are necessary to ensure satisfactory completion of job:

Additional Radiological Controls Based on Conditions or Exposure	
☐ **WORKER TRAINING** ☐ Mock-up Training ☐ Rehearsals (dry runs) ☐ Special Training – photos / video ☐ Special Qualifications	☐ **DECONTAMINATION** ☐ Hand Wiping ☐ Strippable Paint ☐ Fix loose material ☐ Portable Underwater Filter System (Tri-Nuc)
☐ **SHIELDING** ☐ System Flush ☐ Component Shielding ☐ Work Area Shielding ☐ Fill adjacent piping with water ☐ Shielded casks or container ☐ System Draining	☐ **VENTILATION** ☐ HEPA filtered Ventilation ☐ HEPA Sweep ☐ Dry Vacuum Cleaner ☐ Wet Vacuum Cleaner ☐ Component / Area misting
☐ **DOSIMETRY** ☐ LED Light ☐ PAM ☐ Telemetric SRD ☐ Direct Reading Neutron Dosimeter ☐ SRD setpoint Change ☐ Multiple Whole Body Dosimetry ☐ Extremity Dosimetry ☐ Dosimetry Relocation	☐ **CONTAMINATION CONTROL** ☐ Special Containment ☐ Catch Containment ☐ Glove bag ☐ Bull Pen ☐ Tent ☐ Curtain Walls ☐ Lay down Area ☐ Buffer zone
☐ **AIR SAMPLING** ☐ Iso-kinetic A/S ☐ Personnel Air Sampler ☐ Breathing Zone A/S ☐ Work Zone A/S ☐ Count Air sample for Alpha	☐ **HP COVERAGE** ☐ Continuous ☐ Routine ☐ RMS Coverage ☐ Stay Time required ☐ Discrete Particle Controls ☐ Cameras ☐ Communication ☐ Formalized Turnover Process (High Risk Jobs)
☐ **RESPIRATORY PROTECTION** ☐ Type:	
Comments and other controls:	

Prepared By: _____ (RP Personnel Print/Sign) _____ (Date)

Approved by: _____ (RP Supervisor Print/Sign (not required if a Supervisor is the Preparer)) _____ (Date)

Approved by: _____ (Superintendent HP Operations Print/Sign) _____ (Date)

Approved by: _____ (Responsible Work Group Print/Sign) _____ (Date)

Approved by: (High Risk Only) _____ (Manager Outage and Planning Print/Sign) _____ (Date)

Approved by: _____ (Manager Radiological Protection and Chemistry Print/Sign) _____ (Date)

Approved by: (High Risk Only) _____ (Plant Manager Print/Sign) _____ (Date)

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