Managing Radiological Risk

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Palo Verde Nuclear Generating Station utilizes a prescribed process for evaluating Radiological Risk associated with planned work activities. This process ensures adequate administrative controls are established, including Radiation Protection requirements and oversight actions necessary for radiological work meeting the thresholds of medium and high radiological risk categories.

This includes:

- Establishing the highest possible levels of radiological safety
- Ensuring sufficient preparation and resources
- Ensuring adequate management and supervisory oversight and control during the conduct of the significant radiological risk work

Medium Risk: Radiological work where pre-planned barriers are implemented to prevent improper access to high radiation areas, reduce the potential for unplanned/unmonitored dose, to minimize the potential for EPRI level 2 or level 3 personnel contamination events, or to prevent potential contamination of non-radiological facilities or the environment within the protected area.

Risk Category	Medium Risk Activities	Radiological Risk Level	Risk Level Code
High Radiation	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 > 200 mrem.	Medium	RM-1
	Involves handling any irradiated materials underwater or removal of any items from radioactive pools such as reactor cavity, transfer canal, and spent fuel pool	Medium	RM-2
	Involves work in non-uniform radiation fields where multiple dosimetry is used.	Medium	RM-3
	CH and PC Resin Transfers	Medium	RM-4
	Activities in areas subject to changing and elevated radiological conditions caused by the forced oxygenation of RCS (i.e., peroxide injection).	Medium	RM-5
	Containment entries at power where work activities are on the 140' elevation or above (to include lubricating CEDM fans). This does not include 140' airlock maintenance / operation or traveling between the airlock and the south stairwell.	Medium	RM-6
	Containment entries at power inside the following cubicles: Pressurizer, Pressurizer Spray Valves 100E and 100F, Reactor Drain Tank, 111' Regen HX Room, 100' Regen HX Valve Gallery OR entry inside the pump bay bioshield above the 134' elevation.	Medium	RM-7
	Activities involving Incore Instrumentation (ICIs) or Control Element Assemblies (CEAs) which are normal outage maintenance activities.	Medium	RM-8
	Involves activities working in front of an open Primary Steam Generator manway (Reach-Ins may be included if effective dose equivalent-external (EDEX) is used) OR Reaching into a Secondary Side Steam Generator handhole.	Medium	RM-9
Contamination Alpha / Discrete Particles / Skin Dose	Involves work in areas where general contamination levels are greater than 200,000 dpm/100 cm^2 OR within Posted Alpha Level II Areas.	Medium	CM-1
	A potential for exposure to radioactive particles that are greater than 500,000 dpm as measured with a standard frisker.	Medium	CM-2
	Disassembly, inspection and/or handling components with contamination levels exceeding 200,000 dpm/100 cm^2 following the initial decontamination of the area(s) of the component that is being inspected/worked.	Medium	CM-3
	Involves non-aggressive activities on an Alpha Level III Component such as an RP survey, decon, engineering inspection, testing, and taking measurements.	Medium	CM-4
	Flushing, draining or venting of a highly contaminated or high activity system that has the potential or has previous history to cause a spread of contamination or personal contamination event.	Medium	CM-5
Airborne	Has 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. (TEDE ALARA evaluation required)	Medium	AM-1
	Work activity involving abrasive or aggressive mechanical action such as grinding, machining or lapping and welding on contaminated material with beta-gamma contamination levels greater than 50,000 dpm/100 cm^2.	Medium	AM-2
Effluents	Involves radiological work outdoors or in buildings not designed for radiological work (such as machining a radioactive pump seal in a non radiological machine shop) OR activity can result in radioactive spills contacting soil.	Medium	EM-1
Miscellaneous	Any activity that the ALARA Planning Supervisor deems prudent to control as a Medium Risk radiological activity.	Medium	MM-1

High Risk: Radiological work where detailed planning and dynamic barriers are needed to prevent radiological events involving significant radiation levels that pose 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.

Risk Category	High Risk Activities	Radiological Risk Level	Risk Level Code
High Radiation	Activities involving the removal of stuck Incore Instrumentation (ICIs) or Control Element Assemblies (CEAs) which could be completely removed from the reactor by inadvertent movement or if activity is performed improperly.	High	RH-1
	Entry into the Incore Chase under the vessel.	High	RH-2
	Work activities where whole body dose rates are greater than or equal to 1000 mrem/hr OR the dose estimate for a worker is expected to be equal to or exceed 300 mrem in a single entry. If effective dose equivalent-external (EDEX) is used with multiple dosimetry, this dose rate / dose would apply to the whole body compartment(s) that comprise the trunk only.	High	RH-3
	Containment entries at power inside the pump bay bioshield 134' elevation and below.	High	RH-4
	Involves work in the 127' Containment Regenerative Heat Exchanger room with no shielding installed.	High	RH-5
	Full / Half jumps into the Primary Side Steam Generators OR Primary Side Steam Generator Maintenance requiring reach-ins when effective dose equivalent-external (EDEX) is not used.	High	RH-6
	Work activities on the 114' elevation of the Reactor Cavity when the Reactor Head is above the flange OR work activities on the 98' elevation of the Reactor Cavity.	High	RH-7
Contamination Alpha / Discrete Particles / Skin Dose	Potential shallow dose equivalent exposure rate in excess of 10 rads open window (OW) per hour OR individual directly handling items with contact dose equivalent rate exceeding 10 rads per hour (OW).	High	CH-1
	Work area contamination levels in excess of 1 rad per hour on a smear (OW).	High	CH-2
	Potential for worker exposure to radioactive particles that exceeds 400 mrad per hour (OW).	High	CH-3
	Entry into a large area, tank, tent, or a similar space that a worker(s) can occupy which is posted an Alpha Level III Area (i.e., not a "reach-in").	High	CH-4
	Involves surface destruction or aggressive mechanical action on an Alpha Level III Component.	High	CH-5
	Initial Cavity Decontamination / Flange inspection on the 114' cavity or below (activity may be downgraded to Medium Radiological Risk depending on assessment).	High	CH-6
Airborne	Potential for exposure to airborne radioactivity concentrations (excluding noble gas) exceeding 10 DAC. (TEDE ALARA evaluation required)	High	AH-1
	Performing high speed grinding or lapping in confined areas on contaminated surfaces of a Level II or III Alpha component.	High	AH-2
Diving	Diving activities in spent fuel pool, refuel pool, or transfer canals.	High	DH-1
Effluents / Environmental	Potential radioactive effluent pathway is not evaluated per the Off Site Dose Calculation Manual.	High	EH-1
Radiography	Radiography activities (does not include activities such as boundary guards or individuals transporting film)	High	TH-1
Miscellaneous	Any activity that the Radiation Protection Manager deems prudent to control as a High Risk radiological activity.	High	MH-1

The associated presentation will outline efforts utilized to better manage radiological risk.