

# Discussion of On-site and Off-site Dose Criteria in RG 1.183

Sam Lafountain, Lead Engineer, Southern  
Company

Frankie Pimentel, Sr. Project Manager -  
Engineering & Risk, NEI



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# Supporting Documents for Change to CR Design Criteria



- Review of “Control Room Design Criteria and Radiological Health Effects”  
[ML23027A059](#)
  - “Design Criteria” do not represent actual or expected occupational exposures but rather are “figures of merit” used to confirm performance and requirements for SSCs important to safety
  - The control room design criteria are not intended to be operational limits and should not be used to imply what is an acceptable exposure during emergency conditions
  - The limit for occupational exposures remains 5 rem TEDE per 10CFR20
  - Dose Constraints for planned special exposures allow up to 10 rem (provided lifetime exposure does not exceed 25 rem)
  - “the control room design criteria are applicable to a low-frequency event, whereas the planned special exposure is designed for a more likely routine radiological exposure event. Based on a potential radiological risk each rule is intending to protect against, the applicable dose constraints for less likely emergency events should be aligned (higher) than the dose constraints for the lower frequency events (planned special exposures) at 0.10 sievert (Sv) (10 rem) as well as routine occupational exposures 0.05 Sv (5 rem).”

# Supporting Documents for Change to CR Design Criteria



- 2013 PAG Manual

Guideline	Activity
5 rem	Occupational Exposures
10 rem	Protecting valuable property necessary for public welfare (e.g. a power plant)
25 rem	Lifesaving or protection of large populations

- The PAG manual appears to be in alignment with a frequency/probability-based approach for acceptable exposures

# Proposed Changes To Table 7 (RG-1.183 R1)



**Table 7. Accident Dose Criteria for EAB, LPZ, and Control Room Locations**

Accident or Case	EAB and LPZ Dose Criteria (TEDE)	Control Room Dose Criteria (TEDE)	Analysis Release Duration
MHA LOCA	25 <u>rem</u>	25 <u>rem</u>	Unchanged
BWR Main Steam Line Break Fuel Damage or Pre-Accident Spike Equilibrium Iodine Activity	25 <u>rem</u>  10 <u>rem</u>	10 <u>rem</u>	Unchanged
BWR Rod Drop Accident	10 <u>rem</u>	10 <u>rem</u>	Unchanged
PWR SGTR Fuel Damage or Pre-Accident Spike Concurrent Iodine Spike	25 <u>rem</u>  10 <u>rem</u>	10 <u>rem</u>	Unchanged
PWR Main Steamline Break Fuel Damage or Pre-Accident Spike Concurrent Iodine Spike	25 <u>rem</u>  10 <u>rem</u>	10 <u>rem</u>	Unchanged
PWR Locked Rotor	10 <u>rem</u>	10 <u>rem</u>	Unchanged
PWR Control Rod Ejection	10 <u>rem</u>	10 <u>rem</u>	Unchanged
Fuel Handling Accident	10 <u>rem</u>	10 <u>rem</u>	Unchanged

# Supporting Information for Table 7 Changes



- Based on review of Baseline Risk Index information presented in workshop #2, there is a clear demarcation between SGTRs / other non-LOCA transients (CDF ~  $1\text{E-}06 \text{ yr}^{-1}$ ) and LOCAs (CDF ~  $1\text{E-}09 \text{ yr}^{-1}$ )
- For non-MHA events, proposed CR and offsite criteria at 10 rem TEDE
  - Exception – Events with current offsite criterion of 25 rem (e.g., pre-accident spike) left unchanged
  - Consistent with low end of proposed range in IE rulemaking basis document
  - No observed health effects - Health Physics Society Position Statement PS010-4, “Radiation Risk in Perspective,” January 2020, states in part, “...below levels of about 100 mSv (**10 rem**) above background from all sources combined, the observed radiation effects in people are not statistically different from zero.”

# Supporting Information for Table 7 Changes



- For MHA LOCA, proposed CR and offsite criteria at 25 rem TEDE
  - Offsite criterion unchanged from what is in 50.67 now
  - Reflects extremely low probability and its use as a design criterion (i.e., does not represent actual or expected occupational exposures)
  - Releases from a LOCA based on a 10 CFR 50.46 compliant thermal-hydraulic analysis are many orders of magnitude less than what is postulated in MHA LOCA
  - Considering the importance of control room habitability, the selection of updated values for control room design criterion should be more aligned with the various U.S. and international organizations recommendations for emergency dose limitations
  - 25 rem is consistent with PAG manual guidance for activities involving lifesaving or protection of large populations
  - Less than IAEA GSR Part 7<sup>1</sup> guideline for restricting exposure of emergency workers performing lifesaving actions (50 rem)
  - Does not change the occupational dose limits in 10 CFR 20

1 - [P\\_1708\\_web.pdf \(iaea.org\)](#)