

## Radiation Response Worker Exposure Guides (PAGs) in the Early Phase

Total Effective Dose Equivalent (TEDE) Guideline <sup>6</sup>	Worker Activity	Condition
5 rem (0.05 Sv)	All <b>occupational</b> exposures	<ul style="list-style-type: none"> <li>• All reasonably achievable actions have been taken to minimize dose.</li> </ul>
10 rem (0.1 Sv)	Protecting valuable property necessary for public welfare (e.g., a power plant)	<ul style="list-style-type: none"> <li>• All appropriate actions and controls have been implemented; however exceeding 5 rem is unavoidable.</li> <li>• Responders have been fully informed of the risks of exposures they may experience.</li> <li>• Dose &gt; 5 rem is on a voluntary basis.</li> <li>• Appropriate respiratory protection and other PPE is provided and used.</li> <li>• Monitoring is available to project or measure dose</li> </ul>
25 rem (0.25 Sv)	Lifesaving or protection of large populations  <u>RDD</u> incident: this dose level unlikely to be reached for response workers  <u>IND</u> incident: this dose level is conceivable for response workers	<ul style="list-style-type: none"> <li>• All appropriate actions and controls have been implemented; however exceeding 5 rem is unavoidable.</li> <li>• Responders have been fully informed of the risks of exposures they may experience.</li> <li>• Dose &gt; 5 rem is on a voluntary basis.</li> <li>• Appropriate respiratory protection and other PPE is provided and used.</li> <li>• Monitoring is available to project or measure dose.</li> </ul>

<sup>1</sup> Adapted from [Planning Guidance for Protection and Recovery Following Radiological Dispersal Device \(RDD\) and Improvised Nuclear Device \(IND\) Incidents](#) (PDF - 394 KB) (DHS/FEMA, published in Federal Register, August 1, 2008, Z-RIN 1660-ZA02)

<sup>2</sup> In the intermediate and late phases, standard worker protections, including the 5 rem occupational dose limit, would normally apply.

<sup>3</sup> Other decision points for restricting response workers' activities have been recommended by various other agencies, as noted in table below.

Agency	Summary Information	Original Document
National Council on Radiation Protection and Measurements (NCRP)	<a href="#">NCRP Radiation Protection Guidelines: Control of Radiation Dose in the Control Zones</a>	<a href="#">Key Elements of Preparing Emergency Responders for Nuclear and Radiological Terrorism</a> (NCRP Commentary No. 19), National Council on Radiation Protection and Measurements, Bethesda, MD, December 2005, page 19. Purchase required; see <a href="#">Free Overview</a> (PDF - 219 KB).
International Atomic Energy Agency (IAEA)	<a href="#">IAEA Emergency Worker Turn-back Dose Guidance</a>	<a href="#">Manual for First Responders to a Radiological Emergency</a> (PDF - 2.2 MB) (CTIF, IAEA, PAHO, WHO, October 2006, page 41)
Conference of Radiation Control Program Directors, Inc. (CRCPD)	<a href="#">CRCPD Turn-back Exposure Rates and Dose Guidelines</a>	<a href="#">Handbook for Responding to a Radiological Dispersal Device (Dirty Bomb): First Responder's Guide: The First 12 Hours (CRCPD Publication 06-6)</a> (PDF - 4.26 MB), page 28. Conference of Radiation Control Program Directors, Inc. Frankfort, Kentucky, 2006.
International Commission on Radiological Protection (ICRP)	<a href="#">ICRP Guidance for Occupational Exposure</a>	<a href="#">Protecting People Against Radiation Exposure in the Event of a Radiological Attack</a> (ICRP Publication 96), International Commission on Radiological Protection, 2005, page 51.

<sup>4</sup> Because each incident is unique, it is impossible to develop a single turn-back dose level for all responders in all events. Therefore, the 5, 10, and 25 rem guidelines in this table should not be viewed as absolute standards applicable to the full range of incidents covered in this guidance, but rather serve as decision points for making worker protection decisions during emergencies. Incident Commanders should use the "as low as reasonably achievable (ALARA)" principle. During planning and training, managers and responders should acquire the knowledge necessary to understand the acute and chronic risks of exposure, especially at higher radiation levels.

<sup>5</sup> By agreement with the Environmental Protection Agency (EPA), guidance in this August 1, 2008 Federal Register document will be incorporated without change into the currently ongoing revision of the 1992 [EPA Manual of Protective Actions for Nuclear Incidents](#) (the PAG Manual). This Federal Register notice of final guidance will therefore, sunset upon publication of the new [EPA PAG Manual](#).

<sup>6</sup> For potential doses >10 rem, special medical monitoring programs should be employed, and exposure should be tracked in terms of the unit of absorbed dose ([rad](#)) rather than [TEDE](#) (rem).