


# Nuclear Power Plant Emergencies





INSTRUCTOR GUIDANCE	CONTENT
<div data-bbox="237 520 675 850"><p>CERT Basic Training Hazards</p><p>FEMA citizen corps</p></div> <p><b>Display Slide N-0</b></p> <div data-bbox="237 953 675 1283"><p><b>A Nuclear Power Plant...</b></p><ul style="list-style-type: none"><li>• Conforms to national safety guidelines</li><li>• Is typically a safe and secure operation</li><li>• Can, however, be an epicenter of disaster should an accident occur</li></ul><p>FEMA CERT N-1</p></div> <p><b>Display Slide N-1</b></p> <div data-bbox="237 1388 675 1717"><p><b>Radiation Exposure</b></p><ul style="list-style-type: none"><li>• Daily exposure from natural sources</li><li>• Small traces present in food and water</li><li>• Radiation released from manmade sources</li><li>• Radiation has cumulative effect<ul style="list-style-type: none"><li>▪ Longer person exposed to radiation, greater risk of adverse effects</li></ul></li><li>• High exposure to radiation can cause serious illness or death</li></ul><p>FEMA CERT N-2</p></div> <p><b>Display Slide N-2</b></p>	<p><b>Introduction</b></p> <p>Explain that the construction and operation of nuclear power plants are closely monitored and regulated by the Nuclear Regulatory Commission (NRC). The Federal Emergency Management Agency (FEMA) also regulates emergency planning requirements for nuclear power plants. However, accidents at these plants are possible.</p> <p>Point out that an accident could result in dangerous levels of radiation that could affect the health and safety of the public living near the nuclear power plant.</p> <p><b>What is Radiation?</b></p> <p>Explain that radioactive materials are composed of unstable atoms. These atoms give off excess energy until they become stable. The energy emitted is <u>radiation</u>.</p>

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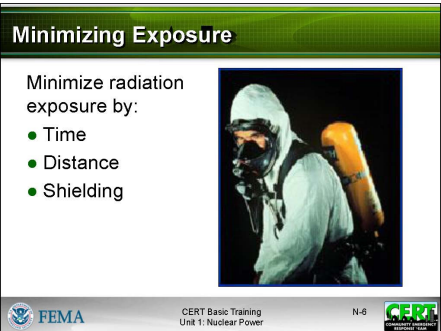
INSTRUCTOR GUIDANCE	CONTENT
<div data-bbox="240 976 673 1302"> <p><b>Radiation</b></p> <ul style="list-style-type: none"> <li>● Potential danger from accident at nuclear power plant is exposure to radiation</li> <li>● Area affected by radioactive material release is determined by: <ul style="list-style-type: none"> <li>▪ Amount of radiation released from plant</li> <li>▪ Wind direction and speed</li> <li>▪ Weather conditions</li> </ul> </li> </ul> <p>FEMA CERT Basic Training Unit 1: Nuclear Power N-3 CERT</p> </div> <p><b>Display Slide N-3</b></p>	<p>Point out that each of us is exposed daily to radiation from natural sources, including the sun and the Earth. Small traces of radiation are present in food and water. Radiation also is released from manmade sources, such as x-ray machines, television sets, and microwave ovens.</p> <p>Continue by explaining that nuclear power plants use the heat generated from nuclear fission in a contained environment to convert water to steam, which powers generators to produce electricity.</p> <p>Stress that <u>radiation has a cumulative effect</u>. The longer a person is exposed to radiation, the greater the risk of adverse effects. A high exposure to radiation can cause serious illness or death.</p> <p>Emphasize that the <u>potential danger from an accident at a nuclear power plant is exposure to radiation</u>. This exposure could come from the release of radioactive material from the plant into the environment, usually characterized by a plume (cloud-like) formation of radioactive gases and particles.</p> <p>Point out that the area affected by radioactive material release is determined by:</p> <ul style="list-style-type: none"> <li>▪ The amount of radiation released from the plant.</li> <li>▪ Wind direction and speed.</li> <li>▪ Weather conditions.</li> </ul>

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<p data-bbox="245 373 511 405"><b>Major Hazards</b></p> <ul data-bbox="261 426 630 548" style="list-style-type: none"><li>• Major hazards to people in the vicinity of the plume<ul data-bbox="285 478 553 548" style="list-style-type: none"><li>▪ <u>Radiation exposure</u> to the body</li><li>▪ <u>Inhalation</u> of radioactive materials</li><li>▪ <u>Ingestion</u> of radioactive materials</li></ul></li></ul> <p data-bbox="240 653 673 688"> CERT Basic Training Unit 1: Nuclear Power N-4 </p>	<p data-bbox="704 369 829 401"><b>Hazards</b></p> <p data-bbox="704 422 1463 495">Describe the major hazards to people in the vicinity of the radiation plume:</p> <ul data-bbox="704 512 1468 688" style="list-style-type: none"><li>▪ <u>Radiation exposure</u> to the body from the cloud and particles deposited on the ground.</li><li>▪ <u>Inhalation</u> of radioactive materials.</li><li>▪ <u>Ingestion</u> of radioactive materials.</li></ul> <p data-bbox="704 705 1455 810">Emphasize that if an accident occurred involving a radioactive material release at a nuclear power plant, local authorities would:</p> <ul data-bbox="704 831 1479 993" style="list-style-type: none"><li>▪ Activate warning sirens or another approved alert method.</li><li>▪ Provide instructions through the Emergency Alert System (EAS) on local television and radio stations.</li></ul>
<p data-bbox="245 1066 537 1098"><b>Emergency Planning Zones</b></p> <ul data-bbox="261 1119 630 1262" style="list-style-type: none"><li>• EPZ within a <u>10-mile radius</u> of the plant<ul data-bbox="285 1150 610 1188" style="list-style-type: none"><li>▪ Possible that people could be harmed by direct radiation exposure</li></ul></li><li>• EPZ within <u>50-mile radius</u> from the plant<ul data-bbox="285 1220 630 1262" style="list-style-type: none"><li>▪ Radioactive materials could contaminate water supplies, food crops, and livestock</li></ul></li></ul> <p data-bbox="240 1346 673 1381"> CERT Basic Training Unit 1: Nuclear Power N-5 </p>	<p data-bbox="704 1056 1122 1087"><b>Emergency Planning Zones</b></p> <p data-bbox="704 1108 1500 1287">Tell the group that local and State governments, Federal agencies, and the electric utilities have emergency response plans in the event of a nuclear power plant emergency. The plans define two Emergency Planning Zones (EPZs).</p> <p data-bbox="704 1360 1219 1392">Explain the EPZs to the participants:</p> <ul data-bbox="704 1413 1507 1682" style="list-style-type: none"><li>▪ One EPZ covers an area within a <u>10-mile radius</u> of the plant where it is possible that <u>people could be harmed by direct radiation exposure</u>.</li><li>▪ The other EPZ covers a broader area, usually up to a <u>50-mile radius</u> from the plant, where <u>radioactive materials could contaminate water supplies, food crops, and livestock</u>.</li></ul>

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 <p>Allow the participants time to respond.</p>  <p><b>Display Slide N-6</b></p> <p><a href="http://www.osha.gov/SLTC/etools/ics/images/respirator_01.jpg">http://www.osha.gov/SLTC/etools/ics/images/respirator_01.jpg</a></p>	<h3>Minimizing Radiation Exposure</h3> <p><b>What are the three ways to minimize radiation exposure?</b></p> <p>Use the slide to discuss the ways to minimize radiation exposure. Tell the participants that exposure can be minimized by:</p> <ul style="list-style-type: none"><li>▪ <b>Time.</b> Limit your time exposed to radioactive material. Most radioactivity loses its strength fairly quickly. In a nuclear power plant accident, local authorities will monitor any release of radiation and determine when the threat has passed.</li><li>▪ <b>Distance.</b> The more distance between you and the source of the radiation, the better. In a serious nuclear power plant accident, local authorities will call for an evacuation to increase the distance between you and the radiation. (Evacuation also reduces the period of time of exposure.)</li><li>▪ <b>Shielding.</b> The more heavy and dense material between you and the source of the radiation, the better. This is why local authorities could advise you to remain indoors if an accident occurs. In some cases, the walls in your home would be sufficient shielding to protect you.</li></ul>



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<div data-bbox="240 384 673 709"><p><b>During an Emergency</b></p><ul style="list-style-type: none"><li>• Listen to warning</li><li>• Stay tuned to local radio or television</li><li>• Evacuate, if advised to do so</li><li>• If not advised to evacuate, shelter in place</li></ul><p>FEMA CERT Basic Training Unit 1: Nuclear Power N-8</p></div> <p data-bbox="240 751 500 787"><b>Display Slide N-8</b></p>	<p data-bbox="706 352 1226 388">Be sure to make the following points:</p> <ul style="list-style-type: none"><li>▪ <u>Listen to the warning.</u> Not all incidents result in the release of radiation. The incident could be contained inside the plant and pose no danger to the public.</li><li>▪ <u>Stay tuned to local radio or television.</u> Local authorities will provide specific information and instructions.<ul style="list-style-type: none"><li>• The advice given will depend on the nature of the emergency, how quickly it is evolving, and how much radiation, if any, is likely to be released.</li><li>• Local instructions should take precedence over any advice given on national broadcasts or in books.</li><li>• Review the public information materials that you received from the power company or government officials.</li></ul></li><li>▪ <u>Evacuate, if you are advised to do so.</u><ul style="list-style-type: none"><li>• Close and lock doors and windows.</li><li>• Keep car windows and vents closed. Use recirculated air.</li><li>• Listen to the radio for evacuation routes and other instructions.</li></ul></li><li>▪ If you are not advised to evacuate, <u>shelter in place.</u><ul style="list-style-type: none"><li>• Close doors and windows.</li><li>• Turn off the air-conditioner, ventilation fans, furnace, and other air intakes.</li><li>• Go to a basement or other underground area if possible.</li><li>• Keep a battery-powered radio with you at all times.</li></ul></li></ul>

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<div data-bbox="240 422 675 474" style="background-color: #4F81BD; color: white; padding: 2px;"><b>During an Emergency</b></div> <ul style="list-style-type: none"> <li>● Shelter livestock; give them stored feed</li> <li>● Do not use telephone</li> <li>● If you suspect exposure, shower thoroughly               <ul style="list-style-type: none"> <li>■ Change clothes and shoes</li> <li>■ Put exposed clothing in plastic bag</li> <li>■ Seal bag, and place it out of way</li> </ul> </li> <li>● Put food in covered containers</li> </ul> <div data-bbox="240 709 675 747" style="font-size: small; border-top: 1px solid black; padding-top: 2px;">  <span style="margin-left: 100px;">CERT Basic Training Unit 1: Nuclear Power</span> <span style="float: right; margin-right: 20px;">N-9</span>  </div> <p><b>Display Slide N-9</b></p> <div data-bbox="240 1136 315 1209" style="text-align: center; margin-top: 20px;">  </div> <p>Allow the participants time to respond.</p> <div data-bbox="240 1486 675 1539" style="background-color: #4F81BD; color: white; padding: 2px;"><b>After an Emergency</b></div> <ul style="list-style-type: none"> <li>● If told to evacuate, return home only when local authorities say that it safe</li> <li>● If advised to stay in home, remain inside</li> <li>● Get medical treatment for any unusual symptoms</li> </ul> <div data-bbox="240 1780 675 1818" style="font-size: small; border-top: 1px solid black; padding-top: 2px;">  <span style="margin-left: 100px;">CERT Basic Training Unit 1: Nuclear Power</span> <span style="float: right; margin-right: 20px;">N-10</span>  </div> <p><b>Display Slide N-10</b></p>	<p><b>During a Nuclear Power Plant Emergency (continued)</b></p> <p>Continue with the following points:</p> <ul style="list-style-type: none"> <li>■ <u>Shelter livestock and give them stored feed</u>, if time permits.</li> <li>■ <u>Do not use the telephone unless it is absolutely necessary.</u> Lines will be needed for emergency calls.</li> <li>■ <u>If you suspect exposure, shower thoroughly.</u> <ul style="list-style-type: none"> <li>● Change clothes and shoes.</li> <li>● Put exposed clothing in a plastic bag.</li> <li>● Seal the bag, and place it out of the way.</li> </ul> </li> <li>■ <u>Put food in covered containers or in the refrigerator.</u> Food not previously covered should be washed before being put in containers.</li> </ul> <p><b>After a Nuclear Power Plant Emergency</b></p> <p><b>What should you do <u>after</u> a nuclear power plant emergency?</b></p> <p>Summarize the discussion using the information from the slides that follow.</p> <p>Emphasize the following points:</p> <ul style="list-style-type: none"> <li>■ If told to evacuate, <u>return home only when local authorities say that it safe</u> to do so.</li> <li>■ <u>If advised to stay in the home</u>, remain inside until local authorities indicate that it is safe.</li> <li>■ <u>Get medical treatment</u> for any unusual symptoms, such as the rapid onset of vomiting that may be related to radiation exposure.</li> </ul>

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	<p><b>Does anyone have additional questions, comments, or concerns about nuclear power plant emergencies?</b></p>