ground water in the region surrounding Yucca Mountain;
(d) Careful sealing of the borehole does not occur, instead natural degradation processes gradually modify the borehole;
(e) Only releases of radionuclides that occur as a result of the intrusion and that are transported through the resulting borehole to the saturated zone are projected; and
(f) No releases are included which are caused by unlikely natural processes and events.

<table>
<thead>
<tr>
<th>Radionuclide or type of radiation emitted</th>
<th>Limit</th>
<th>Is natural background included?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Combined radium-226 and radium-228</td>
<td>5 picocuries per liter</td>
<td>Yes.</td>
</tr>
<tr>
<td>(including radium-226 but excluding radon and uranium).</td>
<td>15 picocuries per liter</td>
<td>Yes.</td>
</tr>
<tr>
<td>Combined beta and photon emitting radionuclides</td>
<td>40 microsieverts (4 millirem) per year to the whole body or any organ, based on drinking 2 liters of water per day from the representative volume.</td>
<td>No.</td>
</tr>
</tbody>
</table>

§ 197.31 What is a representative volume?
(a) It is the volume of ground water that would be withdrawn annually from an aquifer containing less than 10,000 milligrams of total dissolved solids per liter of water to supply a given water demand. The DOE must project the concentration of radionuclides released from the Yucca Mountain disposal system that will be in the representative volume. The DOE must then use the projected concentrations to demonstrate a reasonable expectation to NRC that the Yucca Mountain disposal system complies with §197.30.

The DOE must make the following assumptions concerning the representative volume:
(1) It includes the highest concentration level in the plume of contamination in the accessible environment;
(2) Its position and dimensions in the aquifer are determined using average hydrologic characteristics which have cautious, but reasonable, values representative of the aquifers along the radionuclide migration path from the Yucca Mountain repository to the accessible environment as determined by site characterization; and
(3) It contains 3,000 acre-feet of water (about 3,714,450,000 liters or 977,486,000 gallons).
(b) The DOE must use one of two alternative methods for determining the dimensions of the representative volume. The DOE must propose its chosen method, and any underlying assumptions, to NRC for approval.
(1) The DOE may calculate the dimensions as a well-capture zone. If DOE uses this approach, it must assume that the:
   (i) Water supply well(s) has (have) characteristics consistent with public water supply wells in the Town of Amargosa Valley, Nevada, for example, well-bore size and length of the screened intervals;
   (ii) Screened interval(s) include(s) the highest concentration in the plume of contamination in the accessible environment; and
   (iii) Pumping rates and the placement of the well(s) must be set to produce an annual withdrawal equal to the representative volume and to tap the highest concentration within the plume of contamination.
(2) The DOE may calculate the dimensions as a slice of the plume. If DOE uses this approach, it must: