1) Advance scientific and public understanding of Iowan exposure to radium using public water system data

2) Use this information to inform policy-making decisions to keep Iowans safe
Radium and radon pose large risks to Iowans.

Percentage of radium violations in Iowa

<table>
<thead>
<tr>
<th>Year</th>
<th>Percentage of Total Health-based Standard Violations</th>
</tr>
</thead>
<tbody>
<tr>
<td>2019</td>
<td>Failure to conduct Start-up: 16.7, Copper: 12.5, Arsenic: 11.7, Nitrate nitrogen: 10.8, GWR TT: 3.3</td>
</tr>
<tr>
<td>2018</td>
<td>Failure to conduct Start-up: 16.5, Copper: 15.6, Arsenic: 9.5, Nitrate nitrogen: 6.9, GWR TT: 4.5</td>
</tr>
<tr>
<td>2017</td>
<td>Failure to conduct Start-up: 11.5, Copper: 9.8, Arsenic: 9.8, Nitrate nitrogen: 6.6, GWR TT: 4.1</td>
</tr>
<tr>
<td>2016</td>
<td>Failure to conduct Start-up: 10.7, Copper: 10, Arsenic: 7.9, Nitrate nitrogen: 7.9, GWR TT: 3.3</td>
</tr>
</tbody>
</table>
Radium and radon pose large risks to Iowans.
Correlating radium with other common groundwater constituents will make it easier to detect.

Can we expect to see radium in areas with other constituents that are more easily measured?

Ra-226,228
TDS
U
Th
Seasonal changes in water treatment approaches can introduce unexpected levels of radium

How could seasonal changes in water treatment affect radium concentrations coming into PWSs?

Summer Surface Water + Summer Groundwater = Hybrid Influent

Nitrate & Solids
Data-backed policy is a necessity for keeping Iowans safe

How can the Radionuclides Rule be improved?

Radium counts can be highly variable

**Reduced Monitoring**

If the average of the initial monitoring results for each contaminant is below the detection limit: One sample every 9 years.

If the average of the initial monitoring results for each contaminant is greater than or equal to the detection limit, but less than or equal to one-half the MCL: One sample every 6 years.

If the average of the initial monitoring results for each contaminant is greater than one-half the MCL, but less than or equal to the MCL: One sample every 3 years.

**Increased Monitoring**

A system with an entry point result above the MCL must return to quarterly sampling until 4 consecutive quarterly samples are below the MCL.

**Regulated Contaminants**

<table>
<thead>
<tr>
<th>Regulated Radionuclide</th>
<th>MCL</th>
<th>MCLG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beta/photon emitters*</td>
<td>4 mrem/yr</td>
<td>0</td>
</tr>
<tr>
<td>Gross alpha particle</td>
<td>15 pCi/L</td>
<td>0</td>
</tr>
<tr>
<td>Combined radium-226/228</td>
<td>5 pCi/L</td>
<td>0</td>
</tr>
<tr>
<td>Uranium</td>
<td>30 µg/L</td>
<td>0</td>
</tr>
</tbody>
</table>

* A total of 168 individual beta particle and photon emitters may be used to calculate compliance with the MCL.
Looking Forward

State of Iowa
Public Drinking Water Program
2019 Annual Compliance Report

Environmental Services Division
Water Quality Bureau
Water Supply Engineering & Operations Sections
June 2020
Iowa Department of Natural Resources
Kayla Lyon, Director

Radium Count In Lansing Water Supply Alamakee Co.

Special thanks to Maggie Carolan, Dr. Dave Cwiertny, and Dr. Tori Forbes for providing me with this opportunity!