Proposed Rule Making Action Alert
Radium Containing Sludge Disposal

Presenters:
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Housekeeping Items

- Phones Shall Remain On Mute
- Note Toolbar On Right
- Submit Questions Utilizing Question Panel
- Answer Pole Questions Utilizing Poling Panel
Presentation Outline

- Background Information
- 1984 Memorandum of Agreement
- Joliet Recent Sludge Disposal Permitting History
- Radium Sludge Content Standards In Other States
- Proposed Rule Summary
- Rulemaking Process Next Steps
- Assessment of Proposed Impact
- Questions & Additional Discussion
Background Information

Typical NE Illinois Geology & Deep Sandstone (SS) Wells

Northeastern, Illinois General Stratigraphy Map

Generalized Well Construction Schematic

<table>
<thead>
<tr>
<th>SYSTEM</th>
<th>SERIES</th>
<th>GROUP OR FORMATION</th>
<th>AQUIFER</th>
<th>LYS</th>
<th>THICKNESS (FT)</th>
<th>DESCRIPTION</th>
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<tbody>
<tr>
<td>Silurian</td>
<td>Recent</td>
<td>Pliocene</td>
<td>Sands and gravel</td>
<td>0-300</td>
<td>Unconformity, clastic clays, sands, and gravels</td>
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<td>Maquoketa</td>
<td>Recent</td>
<td>Keokuk</td>
<td>Sands and gravel</td>
<td>0-180</td>
<td>Unconformity, clastic clays, sands, and gravels</td>
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<td>Recent</td>
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<td>Sands and gravel</td>
<td>0-70</td>
<td>Unconformity, clastic clays, sands, and gravels</td>
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</tr>
<tr>
<td>Ancell/St. Peter SS</td>
<td>Recent</td>
<td>Keokuk</td>
<td>Sands and gravel</td>
<td>0-210</td>
<td>Unconformity, clastic clays, sands, and gravels</td>
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<td>Mt. Simon SS</td>
<td>Recent</td>
<td>Keokuk</td>
<td>Sands and gravel</td>
<td>0-300</td>
<td>Unconformity, clastic clays, sands, and gravels</td>
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<tr>
<td>Mt. Simon SS</td>
<td>Recent</td>
<td>Keokuk</td>
<td>Sands and gravel</td>
<td>0-200</td>
<td>Unconformity, clastic clays, sands, and gravels</td>
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<tr>
<td>Eminence Potosi</td>
<td>Recent</td>
<td>Keokuk</td>
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<td>Unconformity, clastic clays, sands, and gravels</td>
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<tr>
<td>Ironton/Galesville SS</td>
<td>Recent</td>
<td>Keokuk</td>
<td>Sands and gravel</td>
<td>0-200</td>
<td>Unconformity, clastic clays, sands, and gravels</td>
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<tr>
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<td>Recent</td>
<td>Keokuk</td>
<td>Sands and gravel</td>
<td>0-200</td>
<td>Unconformity, clastic clays, sands, and gravels</td>
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<tr>
<td>Eau Claire</td>
<td>Recent</td>
<td>Keokuk</td>
<td>Sands and gravel</td>
<td>0-200</td>
<td>Unconformity, clastic clays, sands, and gravels</td>
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<td>Eau Claire</td>
<td>Recent</td>
<td>Keokuk</td>
<td>Sands and gravel</td>
<td>0-200</td>
<td>Unconformity, clastic clays, sands, and gravels</td>
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</table>

Silurian

Maquoketa

Galena Platteville

Ancell/St. Peter SS

Prairie du Chien

Eminence Potosi

Ironton/Galesville SS

Eau Claire

Mt. Simon SS
Background Information

Radium Concentrations In Cambrian/Ordovician Wells
Typical Water Treatment Systems For Radium

- Best Available Technologies
  - Lime Softening
  - Reverse Osmosis
  - Cation Exchange

- Additional Systems
  - HMO
  - Radium Selective Ion Exchange

Waste Discharge With Radium

Residuals Disposal

Landfill

OR

Field

Sanitary → WWTF

Sanitary → WWTF

Sanitary → WWTF

LLRW Landfill
Background Information (Cont.)

Fate of Radium In WWTF

Legend
- Liquid Phase
- Solid Phase

Headworks

Raw Sewage Pump Station

Primary Settling Tank(s)

Aeration Tank(s)

Final Settling Tank(s)

Disinfection

Creek/River

Biosolids Stabilization

Biosolids Dewatering

Biosolids Storage

Biosolids Disposal

Landfill

Farm Fields

Liquid Sludge Storage

Biosolids Dewatering

Creek/River

Ra

W.A.S.

R.A.S.

Ra

Legend
- Liquid Phase
- Solid Phase
Current Radium Containing Sludge Licensing Requirements

- There are no exempt concentrations or quantities for Radium
- Therefore – all radium concentrated from the treatment of drinking water or sewage sludge are subject to the licensing requirements of IEMA-IDNS
1984 MOA Summary (IEPA ↔ IDNS)
- Applied to water treatment residuals and sewage treatment sludges containing naturally occurring radium
- Established an exemption from licensure
- Un-promulgated rulemaking → Should have been established in rules

As Presented By IEMA At September 30, 2009 Hearing
Memorandum of Agreement – MOA (Cont.)

- Residuals/Sludges Containing < 5 pCi/g
  - Landfill Disposal
  - Land application for soil conditioning with 0.1 pCi/g soil concentration increase limit

As Presented By IEMA At September 30, 2009 Hearing
Residuals/Sludges Containing > 5 pCi/g and < 50 pCi/g

- Landfill disposal → with 10 feet of cover (at landfill closure) & radon emanation limit of 5 pCi/m²-s
- Land application for soil conditioning with 0.1 pCi/g soil concentration increase limit
Residuals/Sludges Containing > 50 pCi/g

- Method of disposal must be reviewed and approved in advance by IDNS
- Landfill disposal → with 10 feet of cover (at landfill closure) & radon emanation limit of 5 pCi/m²-s
- Land application for soil conditioning with radon emanation limit of 5 pCi/m²-s & 0.1 pCi/g soil concentration increase limit
Additional Provisions

- Alternate methods of sludge disposal
  - Review by IDNS in advance
  - Radon emanation rate limit of 5 pCi/m²-s
  - Reasonable Assurance against accidental intrusion
- Requirements for analysis by certified laboratory
- Communication between IDNS & IEPA
Joliet Recent Sludge Permitting History

- 2004 Joliet Requests IEPA Review of MOA
  - Requested 5 applications per field
  - Rejected by IEMA as “unrestricted” and could result in future “land use restrictions”

- Information available
  - Radium in influent, effluent and sludge from Joliet’s 2 wastewater plants
  - IEMA and IDNS had no data
Joliet Recent Sludge Permitting History (Cont.)

  - Joliet establishes complete Team
    - Water Supply Engineer, Wastewater Treatment Engineer, Agronomist, Health Physicist
  - IEPA enforced 1984 MOA for the 1st time in October 2006 → Joliet 0.1 pCi/g
    - Limited Joliet to 1 application per field
  - January 2007
    - Interim 0.4 pCi/gm
    - Dose limit 10 milli-rem per year
Joliet Recent Sludge Permitting History (Cont.)

- Independent modeling by Joliet/RSSI and IEMA
- Inputs consistent with new subdivision on 40 acres of cornfield.
  - Topsoil removed beneath house.
- Alternate Disposal Methods
  - Alternate Applications
  - Blending
  - Landfill disposal
Modeling by IEMA
- Topsoil under house
- Supported their 0.4 pci/gm proposal
- “We already gave you a 400% increase”
Joliet appeal to IPCB (2008 – 2009)

- IEPA-IEMA Meeting
  - Nothing good
  - Landfill cost 4 times current
    - Requires construction of drying facilities

- Joliet IEPA Meeting
  - Discussed options
  - Joliet decided to appeal
  - IEPA approve reporting issue and denied 1.0 pCi/g
    - Reverted to 0.1 pCi/g

- Hearing January 2009
IPCBC Findings

- 1984 MOA NOT VALID
  - Was improper rulemaking with no ability for the public to comment.
- Joliet did not demonstrate that radium would not pollute water
  - Did not include on-site wells and vegetable garden in the modeling.
Current Status

- IEPA cannot use 1984 MOA as reason for 0.4 pCi/g
- Additional study
  - Modeling with on site wells and drinking water increases dose by about 15%,
  - Allows Joliet 17 applications in 33 years
- Where does topsoil go?
  - At Public Hearing, IEMA questioned the ultimate location
    - Schools
    - Playgrounds
- RSSI Preparing Modeling results
  - NO PROBLEM ANTICIPATED.
Other State Radium Containing Sludge Standards

- **Colorado**
  - Land application limit of 10 pCi/g
  - General licensing requirement

- **Wisconsin**
  - Lifetime land application limit of 2.0 pCi/g
  - Agencies monitor radium content of sludge once per year
  - Application rates are recorded on typical reports and submitted to IDNR field offices
  - Radium loadings monitored by agency and IDNR field offices
Proposed Rule Summary

- Codifies current draft revised MOA between IEMA and IEPA
- Provides exemption from licensure by IEMA-DRS (makes the land application program viable)

As Presented By IEMA At September 30, 2009 Hearing
For water treatment residuals and sewage treatment sludges with radium concentrations \( \leq 200 \text{ pCi/g} \), this rule provides exclusion from:

- Licensure
- IL Low Level Radioactive Waste (LLRW) Management Act
- LLRW fees & reporting requirements
- Tracking System reporting

As Presented By IEMA At September 30, 2009 Hearing
Proposed Rule Summary (Cont.)

- Registration with IEMA

  - Owners and operators of plants producing residuals and sludges containing radium

  - Owners and operators of permitted landfills receiving residuals and/or sludges containing radium

  - No fee required

As Presented By IEMA At September 30, 2009 Hearing
For residuals/sludges containing < 5 pCi/gm

- Landfill disposal
- Land application for soil conditioning with 0.4 pCi/g soil concentration increase limit
- Allowable soil concentration increase raised by 300% (0.1 to 0.4 pCi/g)

As Presented By IEMA At September 30, 2009 Hearing
For residuals/sludges containing > 5 and ≤ 50 pCi/g:

- Landfill disposal – w/ 10 ft. of cover and radon emanation limit of 5 pCi/m²-s
- Land application for soil conditioning w/ 0.4 pCi/g soil concentration increase limit
For residuals/sludges containing > 50 and < 200 pCi/g:

- Method of disposal must be reviewed and approved in advance by IEMA
- Out of state landfill disposal
- Disposal in a licensed LLRW disposal facility
Rulemaking Process Next Steps

Schedule:

- First Publication: August 28, 2009
- First Hearing: September 30, 2009
- Written Testimony Due: November 13, 2009
- Second Publication: TBD
- JCAR Review: 45 Days with Possible Extension
Rulemaking Process Next Steps (Cont.)

- Recommended written testimony topics;
  Comment on:
  - Radium content in sludge and the effects of the new rule
  - Cost implications for community/agency
  - Dissatisfaction with the rulemaking process
  - Need to incorporate communities’ concerns as any final rule
  - Any unique factors of community/municipality that may be negatively impacted as a result of new rule
  - Deficiencies concerning first publication (see next slide)
Deficiencies of first publication

- Lack of timely notice of proposed rulemaking
- Insufficient time between notice of hearing and hearing date (i.e., 12 days)
- Insufficient time for hearing and comments (i.e., 4 hour hearing and 10 minutes/speaker)
- Location of hearing (i.e., Springfield v. Northern Illinois- location of communities affected)
- Failure to include fact sheet and fact sheet attachment with initial proposal
Effect of Sludge Radium Concentrations on Land Application Site Life
(Based on Generic Sludge Characteristics from 35 IAC 391 Apps. D and E)
### Sample Lime Softening WTP Sludge Disposal Summaries

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<th>WTP A</th>
<th>WTP B</th>
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<tr>
<td>Population Served</td>
<td>25,000</td>
<td>185,000</td>
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<tr>
<td>Annual Sludge Prod. [dry tons/yr]</td>
<td>1,100</td>
<td>14,000</td>
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<tr>
<td>Sludge Disposal Method</td>
<td>Land Appl.</td>
<td>Landfill</td>
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<tr>
<td>Land Application Rate [dry tons/ac]</td>
<td>1.4</td>
<td>NA</td>
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<tr>
<td>Current Site Life [years]</td>
<td>833 (Mn)</td>
<td>NA</td>
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<tr>
<td>Radium Content [pCi/g]</td>
<td>8.2</td>
<td>6.3 – 12.0</td>
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<tr>
<td>Revised Site Life @ Ra = 0.4 pCi/g [years]</td>
<td>75</td>
<td>NA</td>
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<tr>
<td>Unit Cost For Disposal [$/dry ton]</td>
<td>$37</td>
<td>$105</td>
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Sample WWTF Biosolids Disposal Summaries

**WWTF A**
- Population: 14,000
- Annual Sludge Production: 100 dry tons/yr
- Radium Concentration In Sludge: > 50 pCi/l
- Current Dewatering & Land Application Costs: $60,000 – $70,000 / year
- Projected Costs For Local Landfill Disposal: $68,000 – $78,000 / year
- Projected Δ Costs To Go To Local Landfill: $8,000 / year
- Projected Cost For Out Of State Landfill: ???

**WWTF B**
- Population: 250,000
- Annual Sludge Production: 33,000 yd³ / yr
- Current Land Application Costs: $263,000 / year*
- Projected Costs For Local Landfill Disposal: $997,000 / year*
- Projected Δ Costs To Go To Local Landfill: $734,000 / year

* Dewatered sludge, excluding hauling costs
Sample WWTF Biosolids Disposal Summaries

- **Community C**
  - Population: 165,000
  - Two WWTFs
  - Liquid Sludge Storage & Land Application
  - Radium Concentration In Sludge: 16.9 / 43.8 pCi/l
  - Average Land Application Rate: 3.5 dry tons/ac
  - **Present Value Of Land Application Options**
    - Current Program $10,264,662
    - Blended Application $13,188,567
    - Landfill Disposal $48,083,408
Questions & Contact Information

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