Beryllium Proposed Rule Overview

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Duke Energy
Where can we encounter Beryllium?

- Per EPRI, beryllium exposure potential include:
  - Disturbance of fly ash (Trace amounts)
  - Hot work on copper alloys (Range can vary from trace to higher %):
    - Copper connectors
    - Turbine bushings
    - Switchgear
    - Overhead bus bars
  - Hot work on aluminum alloys (Varies from trace to higher %)
  - Stators in hydroelectric plants (Range unknown)
Where can we encounter Beryllium?

Per OSHA:

- Abrasive blasting materials made from coal slag (e.g. Black Beauty)
  - OSHA and NIOSH have reported overexposures to current PEL

NOTE: OSHA considers abrasive blasting to be a ‘construction’ activity
Beryllium Proposed Rule – As Written

Good news

- As written, OSHA says will not cover ash at coal plants.
  - Trigger is > 0.1 % Be and coal fly ash is trace Be
- As written, OSHA says will not cover abrasive blasting
  - Abrasive blasting is a ‘construction activity’ and proposed rule only covers general industry activities

Bad news

- 22 alternatives provided with 6 potentially impacting electric utility operations.
  - Need to focus at least on these 6 alternatives
  - OSHA could easily apply any of the 22, so must review all
Beryllium Proposed Rule – As Written

- Standard proposed to protect from:
  - Chronic beryllium disease (CBD)
  - Beryllium Sensitization
  - Lung Cancer

- Proposed Limits
  - PEL = 0.2 ug/m³ (90% reduction)
  - AL = 0.1 ug/m³
  - STEL = 2.0 ug/m³ (15 minutes)
Exposure monitoring
- Periodic monitoring limited to **annual** if:
  - At / Above AL or At / Below PEL

Be Work Areas
- Applies where any level of Be is present
  - Includes posting area and written exposure control plan

Regulated areas
- Apply when > PEL or > STEL
- All regulated areas are working areas, so requires written plan
Methods of compliance
- Detailed written exposure control plan
  - Inventories of jobs with:
    - Exposures at any level
    - Exposures > AL
    - Exposure > PEL or STEL
  - Inventory of engineering controls and work practice controls
  - Procedures for contamination reduction
- Very specific engineering controls
- Respiratory protection
  - Same as other standards
Beryllium Proposed Rule – As Written

- **Methods of compliance**
  - **Personal protective clothing/equipment**
    - Required when:
      - Exceed PEL or STEL
      - Clothing or skin *visibly* contaminated
  - **Hygiene/work practices**
    - Must maintain surfaces ‘as free as practicable’ of Be
  - **Housekeeping**
    - Same as other standards
Medical surveillance
- Very specific medical tests for Be sensitization
- Referral to Chronic Beryllium Disease (CBD) diagnostic center if symptoms identified

Medical Removal (similar to lead standard)
- If > AL and confirmed positive for sensitization or confirmed CBD, then must offer employee a choice:
  - Full time use of respirator where > AL or
  - Removal to comparable work
    - If such work not available, paid leave for 6 months and maintain base earnings, seniority and other benefits
Beryllium Proposed Rule

- Hazard Communication
  - Specific wording on:
    - Warning signs for regulated areas
    - Warning labels for contaminated clothing/equipment containers
  - Be hazards per HazCom and training on specific aspects of Be compliance program

- Recordkeeping
  - Same as other standards
Beryllium Proposed Rule

- Compliance dates
  - Effective date – 60 days after final rule publication
  - Start up date (most of standard) – 90 days from effective date
  - Change rooms – 1 year from effective date
  - Engineering controls – 2 years from effective date

- Non-mandatory appendices
  - Appendix A – Testing for Beryllium Sensitization
  - Appendix B – Control Strategies to Minimize Exposure
# Beryllium Regulatory Alternatives Summary

<table>
<thead>
<tr>
<th>Category</th>
<th>Number of Reg. Alternatives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scope</td>
<td>4</td>
</tr>
<tr>
<td>Exposure Limits</td>
<td>3</td>
</tr>
<tr>
<td>Method of Compliance</td>
<td>1</td>
</tr>
<tr>
<td>Ancillary Provisions (other than Exposure Limits)</td>
<td>2</td>
</tr>
<tr>
<td>Exposure Monitoring</td>
<td>3</td>
</tr>
<tr>
<td>Regulated Areas</td>
<td>1</td>
</tr>
<tr>
<td>Personal Protective Clothing/Equipment</td>
<td>1</td>
</tr>
<tr>
<td>Medical Surveillance</td>
<td>9</td>
</tr>
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<td>Medical Removal</td>
<td>1</td>
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## Beryllium Reg Alternatives - Key 6 for Electric Utilities

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<tr>
<th>Reg Alternative Category</th>
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<th>Coal plants (fly ash)</th>
<th>Construction (abrasive blasting)</th>
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<tbody>
<tr>
<td>As written</td>
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<td>As written</td>
<td>N</td>
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<tr>
<td>Scope</td>
<td>1a</td>
<td>General industry including trace amounts (&lt; 0.1%). No coverage for construction</td>
<td>Y</td>
<td>N</td>
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- All requirements of “As Written” standard would apply to fly ash areas
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<td><strong>Scope</strong></td>
<td>1b</td>
<td>Same as 1a, but exempt if can prove that operations are &lt; AL and/or &lt; = STEL. No coverage for construction</td>
<td>Y</td>
<td>N</td>
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- All requirements of “As Written” standard would apply to fly ash areas
- Exempt only if can prove < AL and/or < STEL
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<td>Scope</td>
<td>2a</td>
<td>General industry and construction operations including abrasive blasting. Does not include trace amounts (&lt; 0.1%)</td>
<td>N</td>
<td>Y</td>
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- Would apply to construction activities (e.g. coal slag abrasives like Black Beauty)
- Does not apply to fly ash areas
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<td>Scope</td>
<td>2b</td>
<td>Z-table changes only to include new PEL and new STEL. Covers general industry and construction. Includes trace amounts (&lt; 0.1%)</td>
<td>Y</td>
<td>Y</td>
</tr>
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- Would apply **only** the new PEL and STEL to fly ash and construction activities.
- No other provisions would apply for these areas.
- Full standard would apply to other areas (e.g. copper alloys if > 0.1%)
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<td>21a</td>
<td>For construction and trace amounts apply only new PEL of 0.2 ug/m³ and medical coverage.</td>
<td>Y</td>
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- Would apply only the new PEL and medical surveillance if it is exceeded for fly ash and construction activities.
- No other provisions would apply for these areas
- Full standard would apply to other areas (e.g. copper alloys if > 0.1%)
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<td>Medical Surveillance</td>
<td>21b</td>
<td>For construction and trace amounts keep current PEL of 2.0 ug/m³ and add only medical coverage.</td>
<td>Y</td>
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- Would keep the current PEL and medical surveillance if it is exceeded for fly ash and construction activities.
- No other provisions would apply for these areas
- Full standard including new PEL would apply to other areas (e.g. copper alloys if > 0.1%)
Duke Energy impact evaluation
- 212 personal samples in Duke Energy’s IH database
- No STEL samples

22 clearly exceed proposed PEL (10%)
- Most associated with SCR ash work, ESP and baghouse work
- 1 nuclear sample – stick welding inside piping

58 have Det. Limit between current and proposed PEL (27%)
- 39 of these are associated with welding/grinding
- Not specific on presence of copper alloys
- Means that we do not know if are in compliance with proposed rule in those areas
101 exceed proposed AL (50%)
- Most associated with hot work

68 have Det. Limit between current and proposed AL (32%)
- 53 of these are associated with welding/grinding
  - Means that we do not know if we would trigger AL requirements for those areas
OSHA states that they *might* adopt any of alternatives listed as part of this rulemaking or at a later time

- Cannot presume that utilities will be exempt!

If OSHA keeps as written, potential coverage could still exist for copper alloy related exposures if > 0.1% Beryllium

- One EEI member has raised questions about exposures in garages to copper alloys

- Chronic Beryllium Disease (CBD) often mis-diagnosed as sarcoidosis
  - Study in Canada showed high levels of sarcoidosis among electric utility workers.
Potential issues identified

- Informal data discussions suggests:
  - May be a large number of historical samples where Det. Limit is > new AL or PEL
  - May be limited data for comparison to proposed STEL
  - Limits use of historical data to avoid initial monitoring

- NIOSH 7300 (most commonly used historically) is not listed in examples of methods meeting OSHA’s criteria

- Written exposure control plans for any level of Be, not just > PEL/STEL
  - Includes housekeeping provisions triggered for any exposure potential
Potential issues identified

- Training required at any potential for airborne Be, not just > AL or > PEL

- Medical surveillance triggers include vague symptoms:
  - Shortness of breath after short walk or climbing stairs
  - Persistent dry cough
  - Chest pain
  - Fatigue

- Medical removal provisions
  - Can be triggered at AL, if positive sensitization or CBD diagnosis
Questions