

Summary of BHSC/SAS Comments on the OSHA Beryllium Rulemaking Proposal

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Disclaimers

- This presentation is a summary of comments developed by a task group of the BHSC/SAS and submitted to OSHA. The task group consisted of BHSC/SAS members who volunteered to participate.
- The task group focused on portions of the OSHA proposal related to sampling and analysis or other industrial hygiene considerations, and did not consider portions related to medical surveillance and removal.
- The comments were not reviewed by the rest of the BHSC/SAS and may or may not reflect their views.
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How This Summary Is Organized (Part 1)

- **Subsections (proposed 29 CFR 1910.1024) and Regulatory Alternatives**
 - (a) Scope and application, including alternatives 1a, 1b, 2a, and 2b
 - (b) Definitions ← No comments
 - (c) Permissible Exposure Limits including alternatives 3, 4, and 5
 - (d) Exposure Monitoring, including alternatives 9, 10, and 11
 - (e) Beryllium work areas and regulated areas, including alternative 12
 - (f) Methods of compliance, including alternative 6
 - (g) Respiratory protection ← Comments only to OSHA questions
 - (h) PPE requirements, including alternative 13
 - (i) Hygiene areas/practices ← Comments only to OSHA questions
 - (j) Housekeeping ← Comments only to OSHA questions
 - Alternatives 7 and 8 (relating to ancillary provisions in general)
 - (k) Medical surveillance, including alternatives 14-21 ← No comments (deferred to Med/Epi S/C)
 - (l) Medical removal, including alternative 22 ← No comments (deferred to Med/Epi S/C)
 - (m) Hazard communication ← No comments (deferred to Risk Communication S/C)



Subsection (a) and Alternatives 1a, 1b, 2a, and 2b

- **Scope and Application**

- Applies to general industry, but not to construction or shipyards/maritime (for these the current PEL of 2.0 $\mu\text{g}/\text{m}^3$ will apply)
- Exempts articles that contain Be but are not processed by the employer
- Exempts materials containing <0.1% Be by weight

- **No comments on subsection (a) itself**

- **Regulatory alternatives 1a, 1b**

- Supported 1a (would remove the <0.1 weight percent exemption); did not support 1b (would retain exclusion for those who can demonstrate that Be cannot be released above action level or STEL)
- Supported including construction workers in the proposal (alternative 2a would include construction and shipyards/maritime)
- Did not support 2b (would include construction and shipyard/maritime only for the PEL and STEL)



Subsection (c) and Alternatives 3, 4, and 5

- **PEL and STEL**
 - PEL of 0.2 $\mu\text{g}/\text{m}^3$ (versus current 2.0)
 - Action level of half the PEL (would be below the current 10 CFR 850 action level)
 - STEL of 2.0 $\mu\text{g}/\text{m}^3$ (15 minute exposure)
- **No comments on subsection (c) itself**
- **Regulatory alternatives 3, 4, and 5**
 - Alt. 3 would set STEL at five times the PEL
 - Alt. 4 would set the PEL at 0.1 $\mu\text{g}/\text{m}^3$, which would be less than the current 10 CFR 850 action level)
 - Alt. 5 would set the PEL at 0.5 $\mu\text{g}/\text{m}^3$
 - Task group did not support any of these alternatives – felt that the current proposal provided best balance considering available studies, economic factors, and analytical chemistry capabilities



Subsection (d) and Alternatives 9, 10, 11

- **Exposure Assessment**

- Breathing zone samples sufficient to characterize per shift/job class/work area
- STEL monitoring when likely to exceed STEL
- Analytical accuracy of $\pm 25\%$ at action level
- Initial monitoring required unless representative historical or objective data available
- Annual monitoring if initial exposures above AL but below PEL

- **Comments on this subsection**

- Analytical accuracy requirement poses some challenges (next slides)

- **Regulatory alternatives 9, 10, and 11**

- Would call for sampling every 180 days under various scenarios
- Task group noted that 180 days would be better than annually, but made no other comment



Subsection (d) – Analytical Accuracy at Action Level

Sampling Rate (L/min)	Sampling duration (hr) and resulting volume of air drawn (cubic meters)					
	0.25 hr (15-minute STEL)	0.5 hr (30-minute STEL)	1.0 hr	2.0 hr	4.0 hr	8.0 hr (conventional TWA interval)
2.0	0.03 m3	0.06 m3	0.12 m3	0.24 m3	0.48 m3	0.96 m3
3.5	0.05 m3	0.10 m3	0.21 m3	0.42 m3	0.84 m3	1.68 m3
4.0	0.06 m3	0.12 m3	0.24 m3	0.48 m3	0.96 m3	1.92 m3

Action Level (AL)	AL ($\mu\text{g}/\text{m}^3$)	Volume of air collected (m3) and resulting mass collected on filter (μg)					
		0.03 m3	0.06 m3	0.25 m3	0.5 m3	1.0 m3	2.0 m3
Regulatory Alternative 4	0.05	0.0015 μg	0.003 μg	0.013 μg	0.025 μg	0.05 μg	0.1 μg
OSHA proposed	0.1	0.003 μg	0.006 μg	0.025 μg	0.050 μg	0.10 μg	0.2 μg
Current DOE	0.2	0.006 μg	0.012 μg	0.050 μg	0.10 μg	0.20 μg	0.4 μg
Regulatory Alternative 5	0.25	0.0075 μg	0.015 μg	0.063 μg	0.13 μg	0.25 μg	0.5 μg

- PEL and STEL are based on mass per volume of air, but lab detection is based on mass only (whatever is on the filter)
- MQL for ICP-AES is 0.03 $\mu\text{g}/\text{sample}$; ICP-MS 0.004, fluorescence 0.005 (all based on ASTM standards) – ICP-AES can achieve 0.01 when used with a column separation method
- Values in red are below all analytical limits; values in yellow are below ICP-

Subsection (e) and Alternative 12

- **Beryllium work areas and regulated areas**
 - Work area – where exposure is expected
 - Regulated area – where exposure above PEL or STEL expected, requiring PPE and respiratory protection
- **No comments on this subsection**
- **Regulatory alternatives 12**
 - Would remove requirement for regulated areas
 - Task group did not support this alternative



Subsection (f) and Alternative 6

- **Methods of compliance**
 - Specified warning signs for regulated areas
 - Labels for bags/containers with items visibly contaminated with Be
 - Training and information for employees
- **No comments on this subsection**
- **Regulatory alternative 6**
 - Would eliminate mandatory use of certain engineering controls when above AL but below PEL
 - Task group did not support this alternative; hierarchy of controls begins with engineering controls



Subsection (h) and Alternative 13

- **PPE Requirements**
 - When exposures reasonably expected to exceed PEL or STEL
 - Where clothing or skin may become “visibly contaminated”
 - Where skin can be exposed to soluble Be compounds
- **No comments on this subsection**
- **Regulatory alternative 13**
 - Would require PPE whenever there is contact with beryllium or beryllium contaminated surfaces
 - Task group supports this alternative – additional discussion under Question 19 – “visibly contaminated” is not a sufficient standard



Ancillary Provisions and Alternatives 7 and 8

- Regulatory alternatives 7 and 8
 - Alt. 7 would remove ancillary provisions and make the proposal PEL only
 - Alt. 8 would modify when some ancillary requirements would apply (generally more lenient than current proposal)
 - Task group did not recommend either of these
 - *Ancillary provisions are needed along with the PEL of 0.2 $\mu\text{g}/\text{m}^3$ for adequate worker protection*
 - *Ancillary provisions provide guidance needed by general industry*



Subsection (n)

- **Recordkeeping Requirements**

- Sampling and analysis results, methods used, evidence of accuracy
- PPE in use at time of monitoring
- Historical/objective data, if any, used to satisfy initial monitoring requirements
- Medical surveillance and training records

- **Comment on this subsection**

- Recordkeeping should include information regarding the purpose and rationale for the sampling performed, sufficient to show that the exposure monitoring requirements are being met



Subsection (o)

- **Effective Dates**

- N + 0 = date final rule is published
- N + 60 days = rule takes effect
- N + 150 days = rule is enforceable
- N + one year = change rooms must be provided
- N + two years = required engineering controls must be implemented

- **Comments on this subsection related to analytical considerations**

- Most labs now use ICP-AES but will probably need to switch to ICP-MS or fluorescence
- Accreditation not required under OSHA proposal but is required by 10 CFR 850/851
- Timeline for AIHA accreditation of a new method is typically 222 calendar days; this does NOT include pre-accreditation tasks such as equipment procurement, setup, QC program development, and analyst training



How This Summary Is Organized (Part 2)

- OSHA Questions

- OSHA solicited feedback on 37 questions (beginning at 80 FR 47572)
- Task group responded to 13 of these questions (11, 12, 14, 15, 17, 18, 19, 20, 21, 22, 34, 36, and 37)



Question 11

- *Do you currently monitor for beryllium exposures in your workplace? If so, how often? Please provide the reasoning for the frequency of your monitoring. If periodic monitoring is performed at your workplace for exposures other than beryllium, with what frequency is it repeated?*
- Answer provided was an excerpt from the Hanford CBDPP and covered the following areas:
 - Exposure monitoring
 - Initial personal/area air monitoring
 - Negative exposure assessment
 - Periodic personal air monitoring



Question 12

- *Is it reasonable to allow discontinuation of monitoring based on one sample below the action level? Should more than one result below the action level be required to discontinue monitoring?*
- The task group would not consider a single sample to be a reasonable determination of exposures through monitoring.
- The task group would propose that a performance-based strategy would replace the specification-based strategy outlined in this proposed regulation.
- If a performance-based strategy is deemed too difficult to enforce, then the task group would propose that a minimum of six (6) samples (AIHA guidance) to reduce uncertainty in the exposure profile.



Question 14

- *Please describe work settings where establishing regulated areas could be problematic or infeasible. If establishing regulated areas is problematic, what approaches might be used to warn employees in such work settings of high risk areas?*
- Task group supports mandatory regulated areas
- For outdoor or dynamic construction environments, controlled access and egress points, as well as proper postings and perimeter monitoring, can help maintain regulated areas.
- Consistent with OSHA asbestos regulations and with 10 CFR 850



Question 15

- *Do you usually use engineering or work practices controls (local exhaust ventilation, isolation, substitution) to reduce beryllium exposures? If so, which controls do you use?*
- Conventional hierarchy of industrial hygiene controls is used to reduce and minimize potential exposures
- Implemented through engineering controls, administrative controls, and personal protective equipment (PPE)



Question 17

- *OSHA's asbestos standard (29 CFR 1910.1001) requires employers to provide each employee with a tight-fitting, powered air-purifying respirator (PAPR) instead of a negative pressure respirator when the employee chooses to use a PAPR and it provides adequate protection to the employee. Should the beryllium standard similarly require employers to provide PAPRs (instead of allowing a negative pressure respirator) when requested by the employee? Are there other circumstances where a PAPR should be specified as the appropriate respiratory protection? Please provide the basis for your response and any applicable supporting information.*
- Yes, the PAPR alternative should be available
- Hood PAPR (as well as tight-fitting) should be acceptable provided the APF is 1,000 or better, in accordance with 29 CFR 1910.134(d)(3)(i)(A)



Question 18

- *Do you currently require specific PPE or respirators when employees are working with beryllium? If so, what type?*
- Yes – specifics are site-dependent
- Example from one site was provided:
 - Initial D&D activities required PPE including hoods
 - Regulated areas require full-face respiratory protection



Question 19

- *(excerpted) Is “visibly contaminated” an appropriate trigger for PPE? Is there reason to require PPE where employees’ skin can be exposed to insoluble beryllium compounds? Please provide the basis for your response and any applicable supporting information.*
- No – analytical data from some DOE sites has shown contamination even when not visible, sometimes exceeding DOE release criteria
- Numerous studies have NOT indicated a direct relationship between beryllium surface contamination and airborne inhalation exposures



Question 20

- *The proposal requires employers to provide showers in their facilities if (A) exposure exceeds or can reasonably be expected to exceed the TWA PEL or STEL; and (B) beryllium can reasonably be expected to contaminate employees' hair or body parts other than hands, face, and neck. Is this requirement reasonable and adequately protective of beryllium-exposed workers? Should OSHA amend the provision to require showers in facilities where exposures exceed the PEL or STEL, without regard to areas of bodily contamination?*
- OSHA should not amend the current provisions and, therefore, should require showers in facilities where exposures can reasonably be expected to exceed the PEL and/or STEL
- Use of showers should be mandatory for workers in regulated areas



Question 21

- *The proposed rule prohibits dry sweeping or brushing for cleaning surfaces in beryllium work areas unless HEPA-filtered vacuuming or other methods that minimize the likelihood and level of exposure have been tried and were not effective. Please comment on this provision. What methods do you use to clean work surfaces at your facility? Are HEPA-filtered vacuuming or other methods to minimize beryllium exposure used to clean surfaces at your facility? Have they been effective? Are there any circumstances under which dry sweeping or brushing are necessary? Please explain your response.*
- Dry sweeping should never be used for beryllium; it will disturb settled dust and can exacerbate airborne contamination.
- If dry wiping is absolutely necessary, use a dry wiping cloth (example: SymWipe™)
- HEPA vacuuming, while considered to be the most effective method for cleaning surfaces, is not necessarily effective in minimizing the spread of contamination.

- If OSHA were to prescribe HEPA filtered equipment use, it would be wise to include a demonstrated monitoring plan of particle counting during



Question 22

- *The proposed rule requires that materials designated for recycling that are visibly contaminated with beryllium particulate shall be cleaned to remove visible particulate, or placed in sealed, impermeable enclosures. However, small particles ($<10 \mu\text{g}$) may not be visible to the naked eye, and there are studies suggesting that small particles may penetrate the skin, beyond which beryllium sensitization can occur (Tinkle et al., 2003). OSHA requests feedback on this provision. Should OSHA require that all material to be recycled be decontaminated regardless of perceived surface cleanliness? Should OSHA require that all material disposed or discarded be in enclosures regardless of perceived surface cleanliness? Please provide explanation or data to support your comments.*
- Task group believes that only items that are intended to remain onsite or scheduled to be used at another facility that has established beryllium regulated areas (and will be used in these regulated areas) can be considered for recycling.
- Items that cannot be cleaned to DOE housekeeping limit ($3 \mu\text{g}/100 \text{ cm}^2$) should be discarded and disposed appropriately.

Question 34

- *Some OSHA health standards include appendices that address topics such as the hazards associated with the regulated substance, health screening considerations, occupational disease questionnaires, and PLHCP obligations. In this proposed rule, OSHA has included a non-mandatory appendix to describe and discuss the BeLPT (Appendix A), and a non-mandatory appendix presenting a non-exhaustive list of engineering controls employers may use to comply with paragraph (f) (Appendix B). What would be the advantages and disadvantages of including each appendix in the final rule?*
- Both are useful summaries
- However, Appendix A will become outdated with new information from future studies
- Appendix B implies OSHA endorsement of an ACGIH® product, which is strongly discouraged by ACGIH®



Question 36

- *(excerpted) The current beryllium proposal includes triggers that require employers to initiate certain provisions, programs, and activities to protect workers from beryllium exposure. ... Are the triggers OSHA has proposed appropriate? ... For example are the triggers in the proposed standard appropriate for Alternative #1a, which would expand the scope of the proposed standard to include all operations in general industry where beryllium exists only as a trace contaminant (less than 0.1% beryllium by weight)? Are the triggers appropriate for the alternatives that change the TWA PEL, STEL, and action level? Please specify the trigger and the alternative, if applicable, and why you agree or disagree with the trigger.*
- Trigger point #1 – Areas where there is, or there is a reasonable expectation of, exposure to airborne beryllium
 - Initial determination not practical for construction or maritime; workplace characterization is more important
 - Washing facilities should be for all exposed skin



Question 37

- *(excerpted) OSHA requests comment on the potential overlap of DOE's rule with OSHA's proposed rule.*
- **Areas of potential overlap or conflict:**
 - 10 CFR 851.23(a)(3) could be read to require provisions of OSHA proposal (including ancillary provision) to apply to DOE facilities
 - Adoption of Regulatory Alternative 4 (PEL = 0.1 $\mu\text{g}/\text{m}^3$) could result in a PEL below the current DOE action level
- **The task group contacted DOE officials to confirm their intent to provide a regulatory clarification that the ancillary provisions in OSHA's proposed rule would not apply to DOE facilities.**
- **No additional comments**



And Now, The Panel Discussion

