

# Beryllium – OSHA Proposed Regulatory Update

Presented to BHSC

Steven Lee, Beryllium and Confined Space Program SME

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# Beryllium regulatory and historical exposure limits

Agency	Type	Level	Comments
American Conference of Governmental Industrial Hygienists (ACGIH)	Air	0.05 $\mu\text{g}/\text{m}^3$	Inhalable fraction. Notice of Intended Change, 2009; TLV-TWA*
	Air	0.2 $\mu\text{g}/\text{m}^3$	Notice of Intended Change, 2007; TLV-TWA*
	Air	2 $\mu\text{g}/\text{m}^3$	Advisory; TLV-TWA*
Department of Energy (DOE) – 10CFR850 (1999)	Air	2 $\mu\text{g}/\text{m}^3$	Regulation; PEL† as TWA
	Air	0.2 $\mu\text{g}/\text{m}^3$	Regulation; Action Level as TWA
	Surface	0.2 $\mu\text{g}/100 \text{ cm}^2$	Release criteria to general public
NIOSH	Air	0.5 $\mu\text{g}/\text{m}^3$	Advisory; 10-hour TWA; REL
Occupational Safety and Health Administration	Air	2 $\mu\text{g}/\text{m}^3$	Regulation; PEL† as TWA
		5 $\mu\text{g}/\text{m}^3$	Regulation; Ceiling
		25 $\mu\text{g}/\text{m}^3$	Regulation; STEL‡

\* TLV-TWA (threshold limit value-time-weighted average): time-weighted average concentration to which nearly all workers may be repeatedly exposed for a normal workday and a 40-hour workweek.

† PEL (permissible exposure limit): highest level of beryllium in air to which a worker may be exposed, averaged over an 8-hour workday..

‡ STEL (short-term exposure limit): usually determined by a 15-minute sampling period.

$\mu\text{g}/\text{m}^3$  = micrograms per cubic meter; g = grams

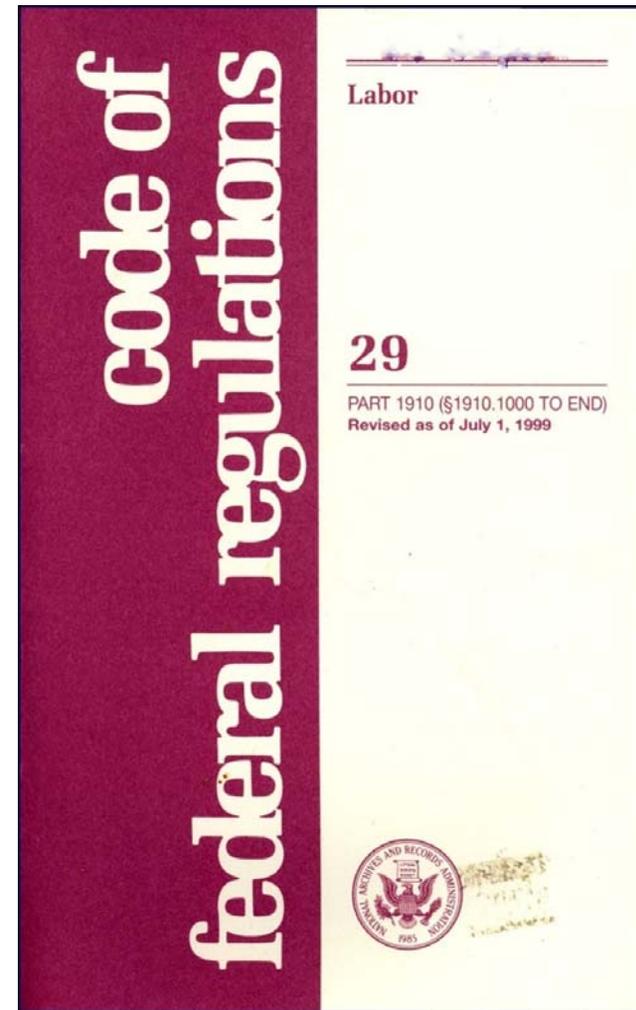
# An effort to revise the OSHA Beryllium Regulation is proceeding



- Lower airborne exposure limits are being considered by OSHA (probably)
  - Regulatory Request for Information (November 2002)
  - SBRBFA Report Completed (January 2008)
  - Initiated Peer Review of Health Effects and Risk Assessment (March 2010)
  - Regulatory Document submitted to OMB (September 5, 2014)
- Occupational exposure limits range from:
  - Action Limit: 0.1-0.5 ug/m<sup>3</sup>
  - Permissible Exposure Limit: 0.1-0.5 µg/m<sup>3</sup>
  - Short Term Exposure Limit: 1-5 µg/m<sup>3</sup>

# Proposed OSHA regulation provides a general framework for working with beryllium

- Substance specific regulation that focuses on occupational exposure to beryllium and beryllium compounds in General Industry
- Components focus on:
  - Written Exposure Control Plan
  - Engineering Controls
  - Exposure Assessments
  - Beryllium Areas and Regulated Areas
  - Medical Surveillance and Removal
  - PPE
  - Hygiene Areas and Practices
  - Housekeeping
  - Training



# Potential Updates to Exposure Limits narrows occupational exposure limit range

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Department of Energy (DOE) – 10CFR850 (1999)	Air	2.0 $\mu\text{g}/\text{m}^3$	Regulation; PEL† as TWA
	Air	0.2 $\mu\text{g}/\text{m}^3$	Regulation; Action Level as TWA
	Surface	0.2 $\mu\text{g}/100 \text{ cm}^2$	Release criteria to general public
NIOSH	Air	0.5 $\mu\text{g}/\text{m}^3$	Advisory; 10-hour TWA; REL
Occupational Safety and Health Administration	Air	0.1 $\mu\text{g}/\text{m}^3$	Regulation; AL as TWA
		0.2 $\mu\text{g}/\text{m}^3$	Regulation; PEL† as TWA
		2 $\mu\text{g}/\text{m}^3$	Regulation; STEL‡

\* TLV-TWA (threshold limit value-time-weighted average): time-weighted average concentration to which nearly all workers may be repeatedly exposed for a normal workday and a 40-hour workweek.

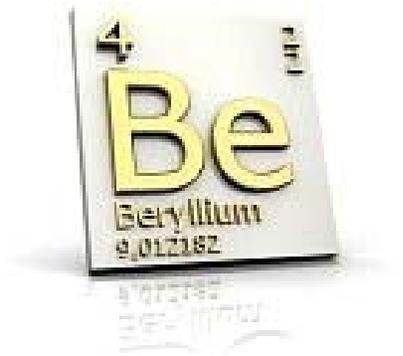
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$\mu\text{g}/\text{m}^3$  = micrograms per cubic meter; g = grams

# Proposed (New) definitions and requirements

- Proposal contains 13 new definitions; several of which are different than what appears in 10 CFR 850:
  - Action Level
  - Beryllium work area
  - Confirmed Positive
  - Exposure and exposure to beryllium
  - Regulated area



These definitions have the potential to clarify DOE definitions or become sources of ambiguity.

# Proposed (New) definitions

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- **Action Level** means a concentration of airborne beryllium of 0.1 micrograms per cubic meter of air ( $\mu\text{g}/\text{m}^3$ ) calculated as an 8-hr time-weighted average (TWA).
- **Beryllium work area** means any work area where employees are, or can reasonably be expected to be, exposed to airborne beryllium, regardless of the level of exposure.
- **Confirmed positive** means two abnormal test results from either consecutive BeLPTs or a second abnormal BeLPT result within a 2-year period of the first abnormal test result.

# Proposed (New) definitions

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- **Exposure and exposure to beryllium** mean the exposure to airborne beryllium that would occur if the employee were not using a respirator.
- **Regulated area** means an area that the employer must demarcate, including temporary work areas where maintenance or non-routine tasks are performed, where an employee's exposure exceeds, or can reasonably be expected to exceed, either of the permissible exposure limits (PELs).

# Occupational Exposure Limits are reduced

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- Permissible Exposure Limit (PEL) is reduced by 90%
  - 0.2  $\mu\text{g}/\text{m}^3$  as an 8-hr Time Weighted Average (TWA)
- Short Term Exposure Limit (STEL) is reduced by 99.7%
  - 2.0  $\mu\text{g}/\text{m}^3$  as an 8-hr Time Weighted Average (TWA)
- New proposed definition includes an Action Level (AL) that is defined as 0.1  $\mu\text{g}/\text{m}^3$  as an 8-hr TWA

One part of many changes in the proposed substance-specific standard.

# Program requirements driven by the PEL

OEL	Proposed Requirements
0.2 $\mu\text{g}/\text{m}^3$	<p>Initial and periodic (annual) exposure monitoring.</p> <p>Written notification to employee identifying source of exposure and actions taken or that will be taken by the employer to reduce worker exposure.</p> <p>Designation and demarcation of Regulated Beryllium Areas; limited access to specific personnel.</p> <p>PPE and Respiratory Protection.</p> <p>Medical Surveillance.</p> <p>Hygiene Areas (includes capability to provide shower).</p>

## OEL and AL may also require...

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- Exposure monitoring at or above the PEL or STEL requires:
  - Similar written notification to the employee
  - PPE and Respiratory Protection requirements
  - Inventory of operations and job titles
- Exposure monitoring at or above the AL requires:
  - Annual periodic monitoring of activities or operations
  - Inventory of operations and job titles
- Any airborne exposure level requires:
  - Demarcation of beryllium area or regulated area regardless of level of exposure
  - Inventory of operations and job titles

Standard requires inventory information, procedures, etc. to be captured in the written program.

# Medical Surveillance requirements

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- 4 medical enrollment classifications are provided:
  - Employees who work in a Regulated Area more than 30 days in the last 12 months
  - Employee(s) who show signs or symptoms of CBD
  - Employee who is exposed to beryllium during an emergency
  - Employee who is / has been exposed to airborne beryllium above the PEL for more than 30 days in a 12-month period for 5 years or more
- Medical surveillance is provided annually to those who meet either bullet 1 or 2
- Medical surveillance is provided at the termination of employment for those who meet either bullet 1, 2 or 3

Work location and employee exposure drive medical surveillance.

# Offer of medical surveillance is structured by exposure classification

Category	Periodicity	Medical Examination
1 or 2	Annual	Medical and work history  Physical examination; focusing on the respiratory tract and skin breaks and wounds  Pulmonary function tests  BeLPT*
3	Initial	See above.
4	Biennial	Low dose helical tomography (CT Scan)

\* Offered at initial examination and within 2 years from first examination.

Medical examination is different from DOE requirements.  
CT scan is offered to employees with a higher risk of airborne exposure.

# Physician or other licensed health care professional

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- Standard information to be provided to the PLHCP:
  - Description of employee job duties (former and current) that relate to the employee's occupational exposure
  - Occupational exposures, if any
  - Description of PPE and respiratory protection used
  - Information, if any, pertaining to other work-related medical examinations
- Written medical opinion within 30 days
  - Potential for increased risk for exposure
  - Recommendations to limit employee exposure

# Medical removal provisions

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- Eligibility requirements for medical removal focus on:
  - Work assignment in an area with exposure at or above the AL
  - Diagnosis with CBD or confirmed positive
- Medical removal options include:
  - Remain in a job with exposures at or above the AL
    - Note: employee must wear respirator to minimize exposure
  - Removal to a comparable work or placement on paid leave
    - Note: employer to maintain employee's base earnings, seniority, and other rights and benefits for 6 months
    - Comparable work location's work environment needs to maintain an exposure below the AL

Medical removal is similar but different from DOE requirements.  
No airborne exposure to beryllium is the preferred recommendation.

# 10 CFR 850 requirements differ from the OSHA proposal

Section	Proposed Requirement	Impact
Exposure Limits - Air	<p>Lowers airborne exposure limit by 90% from current OSHA PEL</p> <p>Includes STEL and AL</p>	Increases technical challenges for short-term exposures
Medical Surveillance	<p>Offer of surveillance based on:</p> <ul style="list-style-type: none"> <li>• Work in a regulated area greater than 30 days in the past 12 months;</li> <li>• Individuals with signs / symptoms of CBD</li> <li>• Individual exposed during an emergency</li> <li>• Individuals exposed to OEL for greater than 30 days in a 12 month period for 5-years or more</li> </ul>	<p>Implement standard medical examination with an emphasis on respiratory tract examination, PFT, and BeLPT (every 2 years)</p> <p>Increased management tracking and oversight based upon worker classification</p> <p>Requires occupational medical group, safety professionals, and line management to identify requirements for medical surveillance:</p> <ul style="list-style-type: none"> <li>• annual for individuals who meet first two criteria</li> <li>• offer at termination of individual who meets first three criteria</li> <li>• offer of a low dose CT Scan every two years for duration of employment for individual who meets fourth criteria                             <ul style="list-style-type: none"> <li>• CT for employees exposed at or above the PEL</li> </ul> </li> </ul>

OSHA PEL changes DOE PEL per language in 10 CFR 850.  
DOE is planning on revising 10 CFR 850.

