

The Evolution of Occupational Safety and Health from its Origins in Public Health

**Yuma Pacific-Southwest Section of the AIHA
January 23, 2025**

Frank Hearl, P.E.

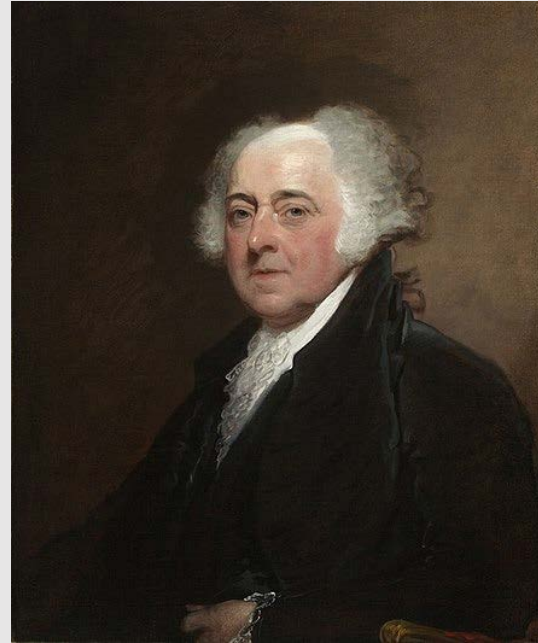
Hearl Environmental Consulting LLC

Frederick, Maryland



In the beginning...

- July 16, 1798
- An Act for the Relief of Sick and Disabled Seamen
- Twenty-cents from the wage of each merchant seaman
- To build or rent hospitals and provide for their care
- Created the **Marine Hospital Fund**
- Department of the Treasury



John Adams
President of the United States
1797-1801

Marine Hospital Service

- Organized Marine Hospitals to become the “Marine Hospital Service” in 1871
- Dr. John Maynard Woodworth became first *Supervising Surgeon General* of the Marine Hospital Service.
- In 1879, Dr. Woodworth died at age 41.



John Maynard Woodworth

Commissioned Corps

- Second Supervising Surgeon General: John B. Hamilton
- Served 1879 – 1891
- Commissioned Corps created by legislation in 1889



Mission Expansion and Reorganization

In 1902, agency was renamed the *Public Health and Marine Hospital Service*



August 1912



Occupational Health and Safety in the United States



Triangle Shirtwaist Fire – March 25, 1911

- Fire in factory in Greenwich Village, Manhattan
- Garment worker deaths – 146
- Doors to exits and stairwells were locked
- Building did not have sprinklers
- Firetruck ladders reached only to 6th floor
- Led to adoption of new safety standards
- Led to creation of American Society of Safety Professionals (ASSP)



*Presently the “Brown Building”
23-29 Washington Place, NYC*

Pittsburgh Marine Hospital

- US Public Health Service established the Division of Industrial Hygiene (1914)
- Renamed to Office of Industrial Hygiene and Sanitation (1915)
- Was the first US laboratory dedicated to study of occupational health
- Located at the Pittsburgh Marine Hospital
- Response to a series of coal mine disasters
 - Over 3,000 died in 1907 alone.
- US Bureau of Mines (USBM) created July 1, 1910, in Department of Interior by the Organic Act
- Established USBM Research Center in Pittsburgh at the Bruceton, PA site.



Pittsburgh Marine Hospital

Presently Allegheny County Health Department, Building 1, 3901 Penn Ave

USPHS-USBM Collaboration (1922)

Serial No. 2392

September, 1922.

U5M
No 2392



REPORTS OF INVESTIGATIONS

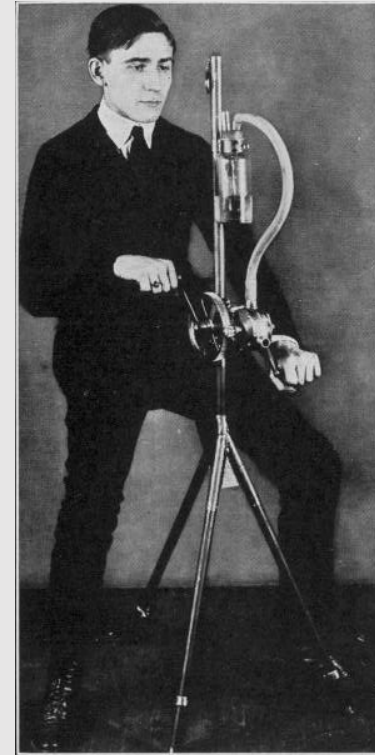
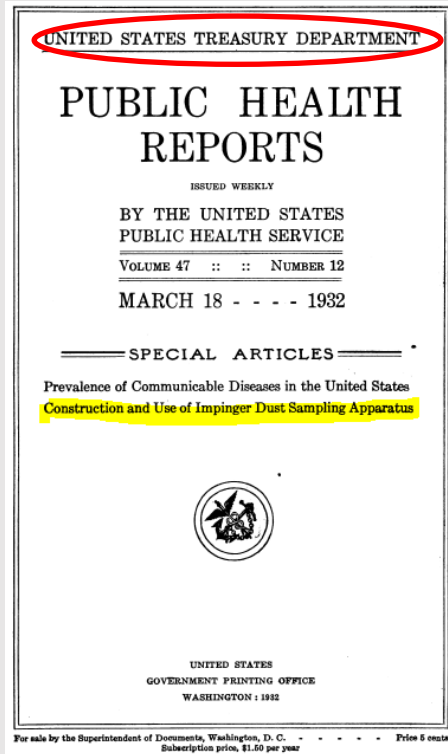
BUREAU OF MINES - - DEPARTMENT OF THE INTERIOR

A NEW INSTRUMENT FOR SAMPLING AERIAL DUST.

By Leonard Greenburg (Assistant sanitary engineer, (R) U. S. Public Health Service)
and
George W. Smith, (Junior physical chemist, U. S. Bureau of Mines).

The Bureau of Mines and the Public Health Service, cognizant of the importance of dust in the causation of pulmonary disease, have conducted numerous

Greenburg-Smith Impinger (1932)



<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1996240>

Division of Industrial Hygiene moves to Washington, D.C.

- Located at **Hygienic Laboratory** in Washington, D.C.
 - 1951 Constitution Ave, NW
 - *Now Dept. of Interior South*
- Hygienic Laboratory becomes the National Institute of Health (NIH)
- Bethesda Maryland Campus (1938)
- NIH Building 2:
 - Industrial Hygiene Laboratory
 - Among the first three buildings on the new NIH Campus.



What the well-dressed IH was wearing in 1940's



Using an Alnor Velometer - 1942



PHS Officer at Ohio TNT plant – Sep '43

Cincinnati: Environmental Health

- Cincinnati Marine Hospital (1815-1905)
- Re-opened by the PHS in 1912
- Stream Pollution Investigations Station
- Moved to **Robert A. Taft Sanitary Engineering Center** in 1954
- Federal Water Quality Administration in Dept. of Interior (1966)
- Became part of the new EPA in 1970



Cincinnati: Occupational Health

- 1950 – Public Health Service - Division of Industrial Hygiene moved to **1014 Broadway** in Cincinnati, Ohio
- 1960 – Division of Industrial Hygiene – under PHS Division of Environmental Health
- Mid-1960's – PHS, Division of Occupational Health
- 1968 – Bureau of Occupational Safety and Health (BOSH)
- BOSH Lab facilities at:
 - 1014 Broadway
 - Taft Laboratory (fully NIOSH in 1978)
 - John Weld Peck Federal Building



1014 Broadway (1974)



Robert A Taft Laboratory (1954)

Taft Laboratory Today



American Conference of Governmental Industrial Hygienists (ACGIH)

- Founded June 27, 1938, as the National Conference of Governmental Industrial Hygienists (NCGIH)
 - Founders: ***John J. Bloomfield and Royd R. Sayers***
 - Limited to 2 representatives from each IH-related agency
- Name changed to ACGIH in 1946
 - Open to all IH personnel in the agencies plus international
- Published Maximum Allowable Concentrations in 1946
- Threshold Limit Values (TLVs®) introduced in 1956
- Documentation of the TLVs® began in 1962

Home of ACGIH



1014 Broadway (1974)

From 1964 Transactions of the ACGIH:

-23-

MODUS OPERANDI OF THRESHOLD LIMITS COMMITTEE OF A.C.G.I.H.

Herbert E. Stokinger, Ph.D., Chairman
Threshold Limits Committee

American Conference of Governmental Industrial Hygienists
1014 Broadway
Cincinnati 2, Ohio

The Threshold Limits Committee is becoming increasingly aware that its activities are being more closely scrutinized as a result of impending changes in the Walsh-Healey Act that may make the Committee's actions more binding on industry. In this light, three main trouble spots appear to be developing: (1) Real concern has been expressed over the Committee's business with limits based on reasons other than health; (2) fear has been expressed that the Committee may not be cognizant of all the industrial experience available; and (3) suspicion is voiced that the Committee may on occasion be arbitrary and capricious. Because there tends to be fear and suspicion when

American Industrial Hygiene Association (AIHA)

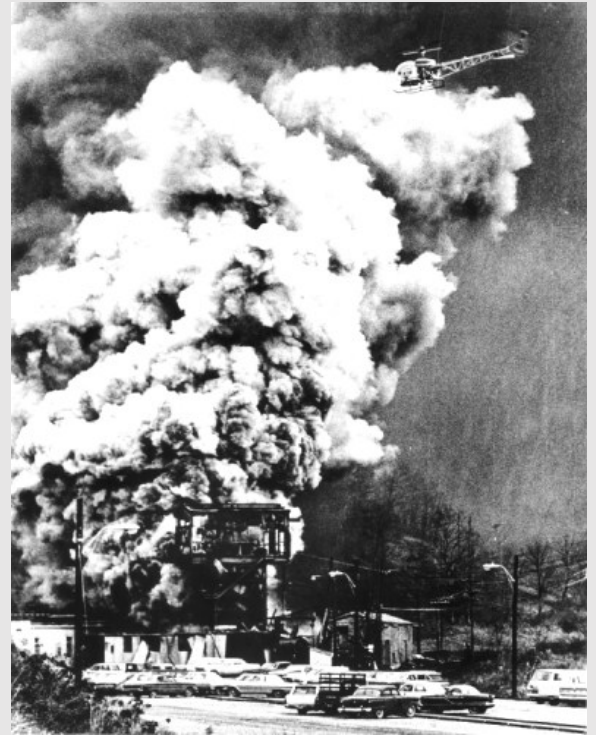
- American Association of Industrial Physicians and Surgeons (AAIPS)
 - Organized American Conference on Industrial Diseases
 - In 1938, AAIPS proposed a separate association of industrial hygienists
- AIHA formally founded on June 6, 1939
- AIHA continued to meet jointly with AAIPS until 1960
- In 1961, AIHA and ACGIH jointly sponsored an industrial hygiene conference.

The OSHA / MSHA / NIOSH Era



Farmington Mine Disaster (1968)

- November 20, 1968
- 99 miners in the mine
- 21 were rescued, 78 died
- January 1969 - Conference on mine safety
- December 30, 1969:
 - Federal Coal Mine Health and Safety Act of 1969
 - Created Mining Enforcement and Safety Administration (MESA) in Department of Interior



Legislative Changes

- 1969 – **Coal Mine Safety and Health Act**
 - Mining Enforcement and Safety Administration – MESA (Interior)
- 1970 – **Occupational Safety and Health Act**
 - National Institute for Occupational Safety and Health – NIOSH (**HEW** → **HHS**)
 - Occupational Safety and Health Administration – OSHA (Labor)
- 1977 – **The Federal Mine Safety and Health Act**
 - Mine Safety and Health Administration – MSHA (Labor)
 - Incorporated coal and metal/non-metal mining in one Act
- 1996 – Reorganization eliminating US Bureau of Mines
 - Mine safety research transferred to NIOSH (1997)
 - Included 413 USBM employees and the Pittsburgh & Spokane properties
 - Moved Respirator Branch from Morgantown to Pittsburgh and created
 - National Personal Protective Technology Laboratory – NPPTL

Director, BOSH – First Director NIOSH

- Marcus Key, MD, MSH
– RADM, USPHS
- Director, NIOSH until 1974
- Lead studies of:
 - Coal workers pneumoconiosis
 - Asbestosis and mesothelioma
 - Vinyl chloride & liver cancer
- Past President of the ACGIH
- Past President of ACOEM



Occupational Safety & Health in Morgantown, WV

- Appalachian Laboratory for Occupational Respiratory Disease (ALFORD)
 - Created in the US Public Health Service in 1967
 - Located originally in basement of West Virginia University (WVU) Hospital
- New Building: Appalachian Center for Occupational Safety and Health (1971)
- Testing and Certification Laboratory (TCL) (May 1972)
 - Air Sampling Instruments Section (Detector Tube, Coal Mine Dust Samplers)
 - Safety Equipment Section (Hard hats, safety shoes, gloves)
 - Physical Agents Section (Noise, heat, radiation)
 - **Respirator Section – from USBM**
 - Quality Assurance Section

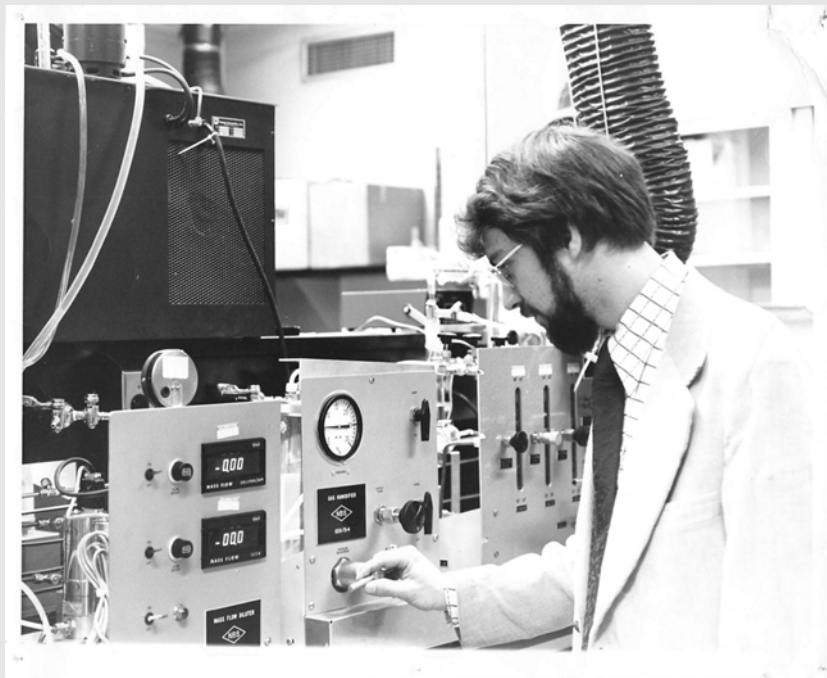
Groundbreaking Ceremony for Morgantown Building June 29, 1969 – Sen. Robert Byrd with the shovel



Appalachian Laboratory (1976)



ALOSH Awards Ceremony – 04/02/1976



Gas Detector Tube Certification Program

Directors of NIOSH



L-R: Anthony Robbins, J Donald Millar, Linda Rosenstock,
John Finklea, Marcus Key



John Howard

Federal Laboratories in Salt Lake City, Utah

USPHS → NIOSH, OSHA

- Uranium Miners Study & western area OHS
 - Victor Archer, Joe Wagoner (Cincinnati)
 - Howard Kusnetz – method for radon daughters
- Western Area Laboratory for Occupational Safety and Health (WALOSH)
- 1976 - WALOSH closed by NIOSH (Dr. Finklea)
 - Industrial Hygiene Staff transitioned to:
 - OSHA, NIOSH (Morgantown)
 - Rocky Mountain Center for Occupational Safety and Health at the University of Utah



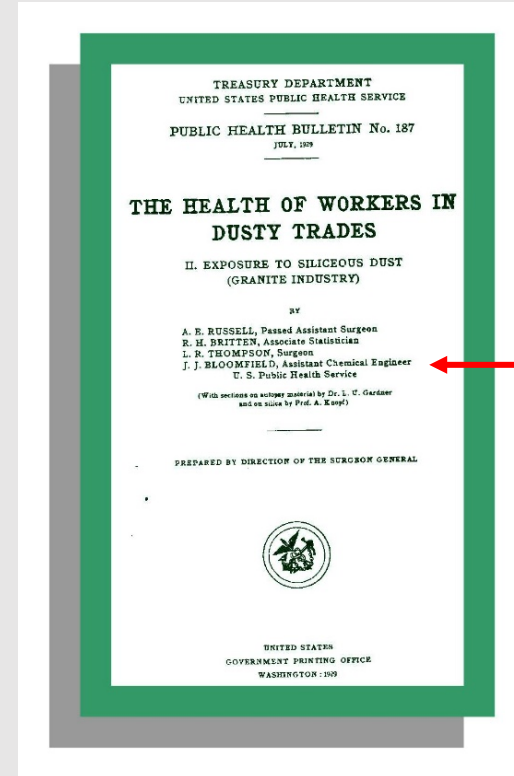
“What is past is prologue.” Case Study: Silica



Photograph by [Mike Peel](http://www.mikepeel.net) (www.mikepeel.net).

USPHS – Dusty Trades Studies (1922 - 1929)

- I. Portland Cement
- II. Granite Industry
- III. Coal Mining
- IV. Textile Plant
- V. Silverware Manufacture
- VI. Municipal Dust



Dusty Trades Study – USPHS, 1929

Industry	Disease	Silica Content	Dust Levels mppcf
Cement	Bronchitis Influenza	6-8 %	26
Granite	Silicosis TB	35%	36-59
Coal	Fibrosis	31%	82
Textile	Negative	Unknown	7
Silverware	Negative	1.7	5
Municipal	Negative	Unknown	4

Thompson, Brundage, Russell, Bloomfield, 1929

Hawks Nest Tunnel Disaster

Gauley Bridge, West Virginia

- Started work in 1927
- There were 1,213 workers who worked for at least 2-months
- 764 (63%) died within 7-years
- US Congressional Hearings
- 1934 - USBM given regulatory authority over respiratory protection
- 1936 - National Conference on Silicosis
- 1936 Walsh-Healy Act
 - forerunner to the OSH Act of 1970



Labor Secretary Frances Perkins receives report on silicosis. On her left is Dr. R.R. Sayers, U.S. Public Health Service, in charge of Division of Industrial Hygiene.

Report photo: <https://www.loc.gov/item/2016871222/>

Restudy of Granite Workers (Russell, 1941)

Work Group	Dust Level mppcf	Absentee Rate Per 1000 yr	Silicosis or TB
A. Hand Pneumatic Tool Cutters	40-60	215	Serious Disease
B. Surface Machine Operators	40-60	215	Serious Disease
C. Plant Average	20	105	Some Disease
D. Low Dust Areas	6-9	61	Negative

Dust Standard

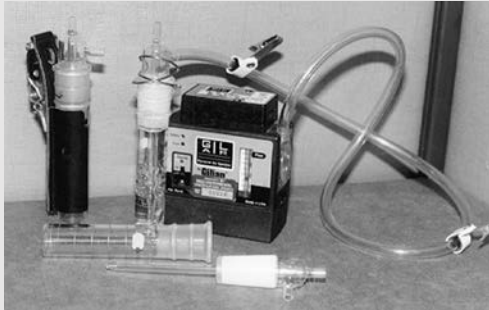
“Thus, it would appear a safe limit lies somewhere between the amount of dustiness found in groups C and D or between 9 and 20 million particles.”

Russell, 1941

Vermont Granite Dust Limit - 10 mppcf

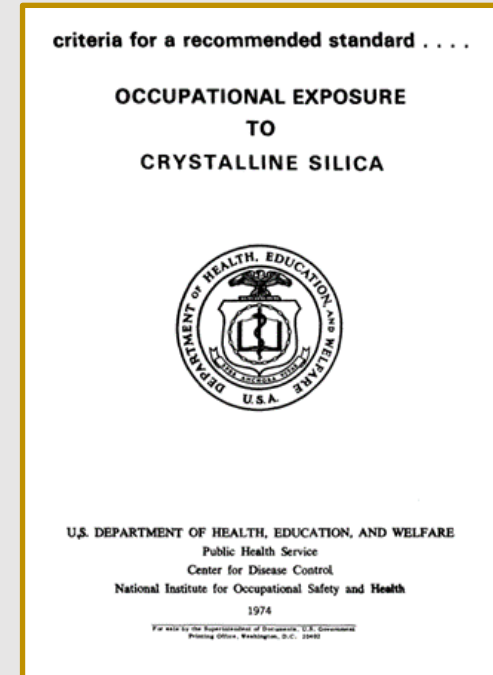


Sampling: Particle Count to Particle Mass (1960's)



NIOSH Recommended Exposure Limit 1974

$$\text{REL} = 0.05 \text{ mg/m}^3$$



Continuing NIOSH Silica Studies (1976-2002)



NIOSH HAZARD REVIEW

**Health Effects of Occupational
Exposure to Respirable
Crystalline Silica**

DEPARTMENT OF HEALTH AND HUMAN SERVICES
Centers for Disease Control and Prevention
National Institute for Occupational Safety and Health

April 2002

Impact: Requires Sustained Continuous Effort ...sometimes for *decades!*



2016

16286 Federal Register / Vol. 81, No. 58 / Friday, March 25, 2016 / Rules and Regulations

**DEPARTMENT OF LABOR
Occupational Safety and Health
Administration**

29 CFR Parts 1910, 1915, and 1926
[Docket No. OSHA-2010-0034]

RIN 1218-AB70

**Occupational Exposure to Respirable
Crystalline Silica**

AGENCY: Occupational Safety and Health
Administration (OSHA), Department of
Labor.

ACTION: Final rule.

announcing the Office of Management
and Budget has approved them under
the Paperwork Reduction Act.

ADDRESSES: In accordance with 28
U.S.C. 2112(a), the Agency designates
Ann Rosenthal, Associate Solicitor of
Labor for Occupational Safety and
Health, Office of the Solicitor of Labor,
Room S-4004, U.S. Department of
Labor, 200 Constitution Avenue NW.,
Washington, DC 20210, to receive
petitions for review of the final rule.

FOR FURTHER INFORMATION CONTACT: For
general information and press inquiries,
contact Frank Meilinger, Director, Office
of Communications, Room N-3647.

Citation Method

In the docket for the respirable
crystalline silica rulemaking, found at
<http://www.regulations.gov>, every
submission was assigned a document
identification (ID) number that consists
of the docket number (OSHA-2010-
0034) followed by an additional four-
digit number. For example, the
document ID number for OSHA's
Preliminary Economic Analysis and
Initial Regulatory Flexibility Analysis is
OSHA-2010-0034-1720. Some
document ID numbers include one or
more attachments, such as the National
Institute for Occupational Safety and
Health (NIOSH) Technical Report

PEL = 0.05 mg/m³

Summary

- “If I have seen further, it is by standing on the shoulders of giants.”

Sr Isaac Newton

- Unfortunately, sometimes it takes a disaster for motivation.
- Patience and persistence pays!

Thanks!

Frank Hearl, P.E.
Captain, USPHS (ret.)

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