The Brick Industry Association

OSHA's Proposed Crystalline Silica Rulemaking

OMB/OIRA Meeting

April, 7, 2011

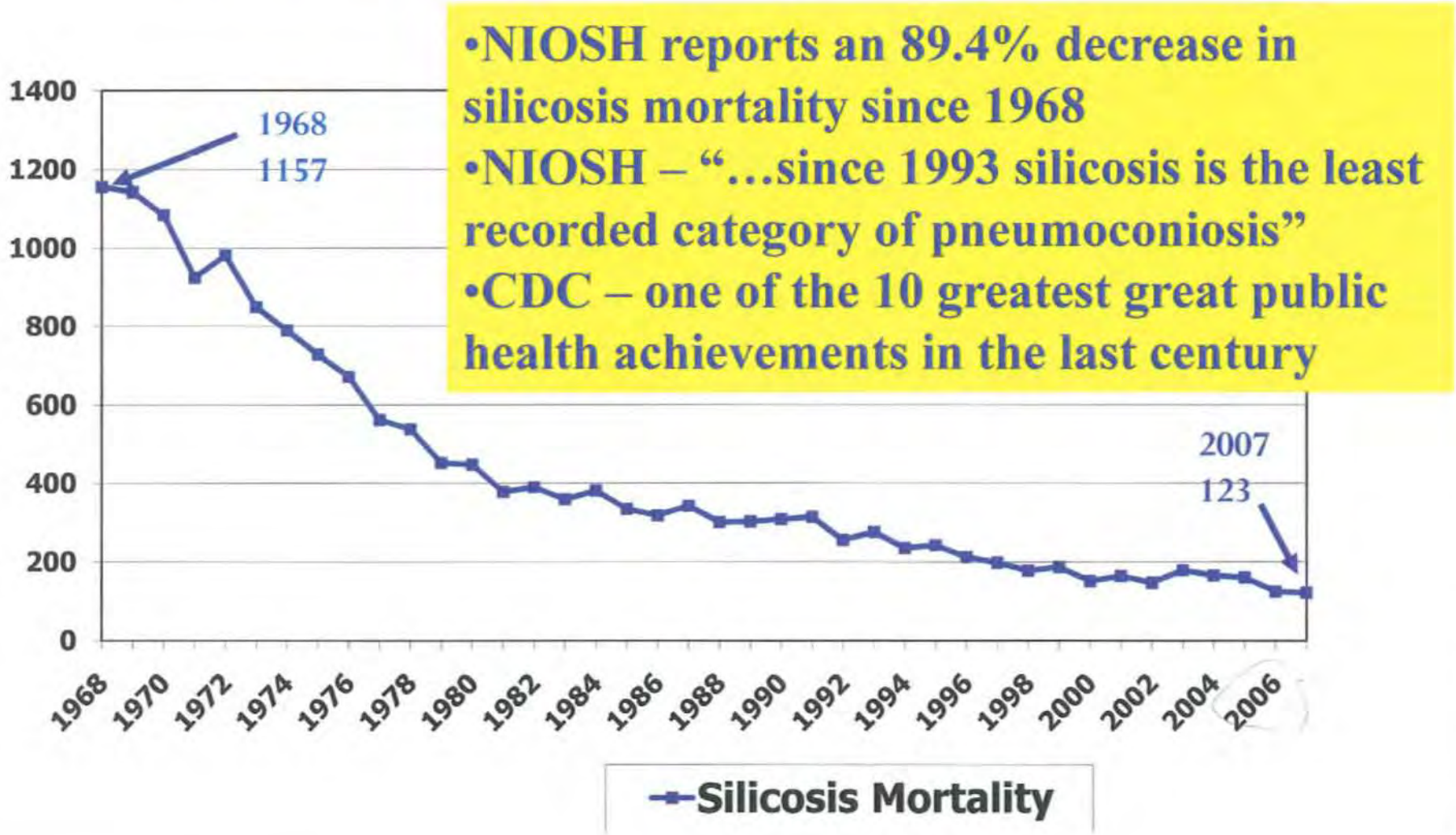
Overall Introductory Points

- Our industry is committed to providing safe environment for our employees.
- We want to do our share.
- Economic downturn has hit us hard.
- Even without downturn, it is important that all resources that are spent create a benefit.
- We do not believe silica rule will have a benefit to our industry.
- Data show that the brick industry has low health risk associated with silica exposure and it is significantly different from that in other industries.

Main Points for OMB/OIRA

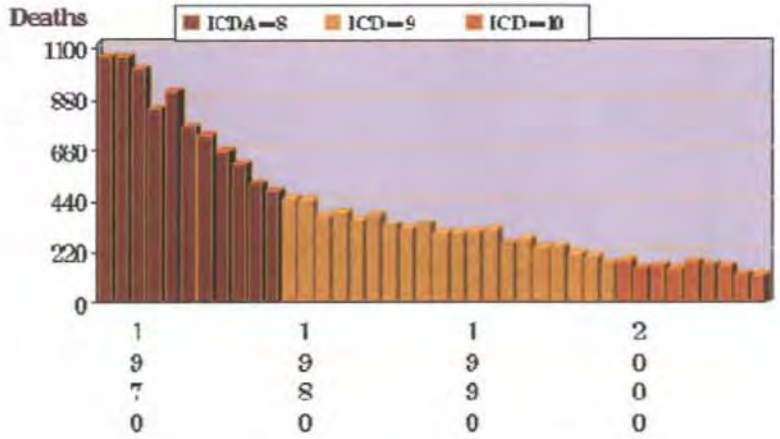
1. There is compelling scientific data demonstrating that no significant silicosis risk exists that justifies any reduction in the crystalline PEL for brick industry workers.
   - Moreover, the risk assessments for silica in brick manufacturing demonstrate brickworkers are adequately protected from silicosis at the current PEL.
2. OSHA has the statutory authority to maintain the current PEL for brick manufacturing workers, even should OSHA reduce that PEL for industry in general.
3. The U.S. brick industry has been devastated by the economic downturn in home and office construction and an unnecessary reduction in the PEL will further erode the market for brick compared with cheaper and less environmentally friendly siding alternatives.

Trend In Silicosis Mortality in the U.S.



- **NIOSH reports an 89.4% decrease in silicosis mortality since 1968**
- **NIOSH – "…since 1993 silicosis is the least recorded category of pneumoconiosis"**
- **CDC – one of the 10 greatest great public health achievements in the last century**

Multiple Cause ≠ Underlying Cause of Death

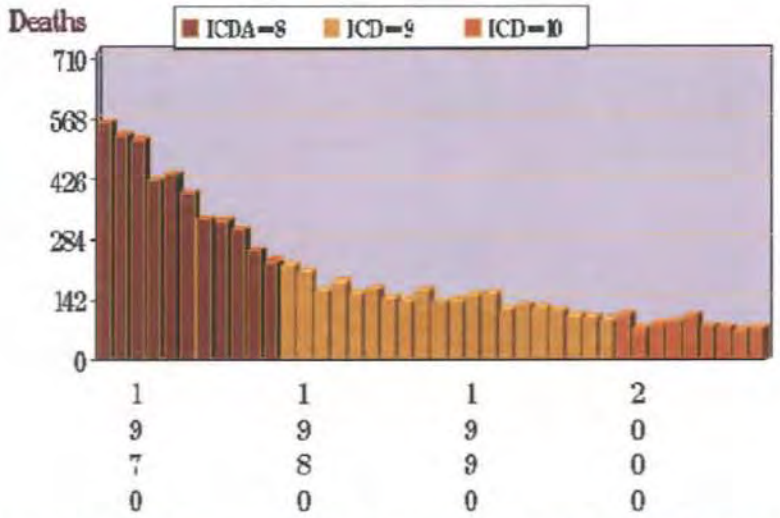


SOURCE: National Occupational Respiratory Mortality System, CDC, NIOSH

1970	1975	1980	1985	1990	1995	2000	2005	2007
1013	656	449	335	308	242	152	161	123

Multiple cause of death lists the immediate cause of death, antecedent causes giving rise to the immediate cause, and other significant conditions contributing to the death also may be entered by the medical certifier (underlying cause and up to 19 contributing causes).

Multiple Cause ≠ Underlying Cause of Death



SOURCE: National Occupational Respiratory Mortality System, CDC, NIOSH

1970	1975	1980	1985	1990	1995	2000	2005	2007
519	327	207	143	150	114	72	74	73

The WHO defines the underlying cause-of-death as (a) the disease or injury which initiated the train of events leading directly to death, or (b) the circumstances of the accident or violence which produced the fatal injury.

Background Prevalence of Reported Pneumoconiosis in Non-dust Exposed Workers

Table 1—*Prevalence of Small Opacities (≥1/0) in Subjects Unexposed to Dusts*

Published Studies, First Author (yr)	Unexposed Population	No. of Readers	No. of Opacities >1/0 (% Opacities)	N
Europe				
Glover[10] (1980)	Men chosen from electoral rolls, N Wales	3	39 (9.7%)	402
Jakobsson[20] (1995)	White collar workers from asbestos cement plant, Sweden	5	2 (6.8%)	29
Zitting[19] (1995)	Representative sample of Finnish population over age 30 yr	2	408 (11.7%)	3,494
North America				
Epstein[11] (1984)	Adults admitted to a university medical center, Philadelphia	2	22 (11%)	200
Castellan[12] (1985)	Blue collar employees in nondusty jobs, southern United States	3	3 (0.21%)	1,422
Kilburn[13] (1986)	a. Stratified sample of population in Michigan	3	3 (0.25%)	1,167
	b. Long Beach, Calif census tract	3	29 (2.1%)	1,347
Kennedy[21] (1991)	a. Employed bus mechanics, Canada	2	3 (4.5%)	66
	b. Retired grain and civic workers	2	4 (4.8%)	83

Conclusion: These results indicate that background levels of opacities consistent with the radiographic appearance of pneumoconiosis exists in populations considered to be free of occupational dust exposure. Meyer JD, et al, Chest 1997; 111:404-10

Brick Studies Prevalence & Exposure Data

Name of Study	No. of Plants in Study	Workers Examined	No. of Silicosis Cases	Exposure (minimum – maximum)		TLV Exceedance
				Particle Counts [1]	Gravimetric Concentration [2]	
WV State Health Dept Report (1939)	20	325	2 (0.6%)	3 – 1,260		0.33 – 126
NC Brick (Trice, 1941)	48	1,555	0	1-816		0.11-81.6
English Brickworks (Keatinge, 1949)	3	73	1 (1.4)	0.5 - 17		0.05 – 1.7
Ontario Brick Study (Rajhans, 1972)	8 Brick 2 Tile	1,166	0	67 – 1,026		8.27 – 114
NIOSH NC Brick Workers Study (Stringer, 1978)	7	229	Brick - 3/229 (1.3%) Controls - 5/184 (2.7%)		No Dust Data	
NIOSH NC Brick Workers Study (Anderson, 1980)	5 Brick 2 Pipe	506	Brick - 8/506 (1.6%) Controls - 12/155 (2.2%)		0.029 – 7.95	0.29 - 79.5
UK Brick Study (Love, 1999)	18	1,831	≥ 1/0 - 25 (1.4%) ≥ 2/1 - 7 (0.38%)		.06 – 3.8	0.6 - 38
BIA Study (Glenn, 2007)	13	701	0		No Dust Data	
		6,386	39 (0.6%)			

[1] Dust counts expressed in millions of particles per cubic foot (mppcf). 10,000,000 mppcf = 0.1 milligram per cubic meter (mg/m^3

[2] Gravimetric concentration expressed in milligrams per cubic meter (mg/m^3).

Ontario Clay Brick Data (Rajhans, 1972)

Plant No.[1]	% Free Silica (Resp.)	Impinger Count (mppcf)	TLV (mppcf)	TLV Exceedance [2]
1	15	271	8.8	30.79
2	21	580	8.5	68.23
3	14.7	1026	9.2	114
4	20	128	8.5	15.05
5	7.5	19	13.7	1.39
6	20	175	8.6	20.34
7	19	322	8.7	37.01
8	18	67	8.1	8.27
9	12.5	12	8.4	1.43
10	10	12	9.5	1.26

[1] Plants 5, 9 & 10 are clay pipe plants.

[2] TLV exceedance is the multiple of how many times the exposure was above the TLV and is calculated as TLV Exceedance = Impinger Count (mppcf) ÷ TLV (mppcf).

- Exposures in brick plants were 8 to 114 times the TLV's
- Tile plants had relatively low dust counts - 1.26 to 1.43 times the TLV'S.
- Even with this excessive dust concentration, no radiological signs of silicosis were found among the workers.
- "It appears from this survey that the present ACGIH TLV's for [silica] dust are probably not applicable to the brick industry."

Health and Safety Executive
Respirable crystalline silica – Phase 1
Variability in fibrogenic potency and exposure-response relationships for silicosis

- This document addresses two issues:
  - Whether or not the fibrogenic potency (i.e ability to cause silicosis) of crystalline silica is variable, and if so, what are the factors that influence its variability.
  - In the light of currently available information, what is the most reliable view that can be formed of the exposure-response relationship(s) for the development of silicosis.

Health and Safety Executive
Respirable crystalline silica – Phase 1

- The HSE concluded that all forms of respirable crystalline silica dusts of occupational relevance have the potential to cause silicosis.
- However, human experience and experimental evidence both indicate that at specified levels of exposure, the potential to cause silicosis may be influenced by:
  - by the presence of surrounding minerals associated with the crystalline silica, and
  - the type of industrial processing.
- Such factors are capable of modifying the surface chemistry and thus the biological effects of crystalline silica, as well as changing the particle size characteristics.
- Thus, in different occupational settings, exposures to the same airborne mass concentrations of respirable crystalline silica might pose greater or lesser risks to health depending on the influence of such factors, referred to as "Potency Factors".

HSE, 2002, Respirable Crystalline Silica – Phase 1, Variability in fibrogenic potency and exposure-response relationships.

Health and Safety Executive Variability Due to the Presence of Other Minerals

- Occupational exposure to quartz may occur as a result of its close geological association with aluminum-containing clay minerals, such as muds, marls or shale-based clays.
- Such materials are used in the brick clay industry to make bricks, tiles and pipes.
- There is experimental, animal and human evidence all consistently pointing in the same direction to indicate that the toxic effects of quartz are reduced in the presence of such aluminum-containing clay minerals.
- It has been suggested that this is due to the binding of aluminum ions (Al3+) to the surface silanol groups of quartz.

HSE, 2002, Respirable Crystalline Silica – Phase 1, Variability in fibrogenic potency and exposure-response relationships.

Institute for Occupational Medicine
British Brick Clay Study

- Love et al conducted a cross-sectional survey of 1925 workers in 18 brickworks in Britain (1990-91).
- Plants included were selected because working processes had changed little during recent decades.
  - Thereby giving some credence to the estimates of cumulative exposure.
- Plants manufactured non-refractory products such as bricks, pipes and tiles.
- Plants used either soft clay, marl, soft mud, or harder shale-based clays.
- Conversion of quartz present in the clays to cristobalite is unlikely.
  - Bricks are not held in the kilns and furnaces for long enough for this process to occur.
- More than 1400 personal samples were collected for respirable dust and the quartz content was determined.
- Chest-radiography was carried out on 1831 current workers at each plant.

Institute for Occupational Medicine, 1994, IOM Report TM/94/07; Love RG, et al, 1999; Miller and Soutar, 2007.

IOM British Brickworks Dust Data

- Concentrations of respirable dust and quartz ranged from:
  - Means of 0.4 mg/m^3 respirable dust and 0.04 quartz mg/m^3 for non-process workers.
  - Means of 10 respirable dust and 0.62 mg/m^3 quartz for kiln demolition workers.
  - Overall mean of 0.11 mg/m^3 for respirable quartz.
- 10% of all respirable quartz exposures exceeded 0.4 . mg/m^3
- Estimates of cumulative exposure to respirable dust and quartz were determined for each worker, taking account of the exposures in each occupational group, kiln type, and the plant site.
- Cumulative exposures to respirable quartz ranged from 0.01 –10 mg/m^3.

Institute for Occupational Medicine, 1994, IOM Report TM/94/07; Love RG, et al, 1999; Miller and Soutar, 2007.

IOM British Brickworks X-Ray Results

- Chest X-Rays were classified by 3 experienced readers using the 1980 ILO classification system.
- Some divergence of scores across the 3 readers was noted.
  - Overall 25 workers (1.4% of workforce), had a profusion of small opacities >1/0.
  - 7 of these 25 workers (0.4% of workforce) had a profusion of small opacities > 2/1.
  - This prevalence (1.4%) is less than IOM found in recent studies of:
    - opencast coalminers (4.4%),
    - hard rock quarry workers (4.7%), and
    - non-dust-exposed postal and telecommunication workers (2.7%).
- Review of the abnormal chest radiographs by a further chest physician indicated that the pattern of small opacities was not typical of silicosis.
  - More likely a mixed dust type of pneumoconiosis.
- Analyses revealed that the risks of having opacities >1/0 differed by site,
  - and were influenced by age, smoking and cumulative exposure to dust and to quartz.
- Logistic regression suggested that radiological abnormality was associated more so with quartz rather than dust.
- Predicted prevalences of opacities 1/0+ in non-smoking workers exposed to 0.1 mg.m^3 respirable quartz for 10 and 20 years were 0.2 and 0.9% respectively.

Institute for Occupational Medicine, 1994, IOM Report TM/94/07; Love RG, et al, 1999; Miller and Soutar, 2007.

OSHA Authority to Maintain the Current PEL for Brick Manufacturing

- This issue has been addressed in the BIA letter to the Acting Assistant Secretary of OSHA dated October 21, 2010 (enclosed in packet).
- Given the low health risk associated with silica exposure in the brick industry the question becomes whether and to what extent this information must bear on OSHA's HEA and QRA,
  - and OSHA's authority to impose any new silica exposure standard on the brick industry (irrespective of the merits of imposing such a standard on other industries).
- Before OSHA can promulgate a health standard for the workplace, the Agency must determine that there is a "significant risk of material health impairment" which the proposed standard is intended to remedy. (the *"Benzene" decision).*
- *Benzene* held further that OSHA first must find that the "workplaces in question are not safe," meaning that they are unsafe "in the sense that significant risks are present and can be eliminated or lessened by a change in practices."

Economic Information

Overview

	2005	2007	2009	Source
Employment in manufacturing	15,000	14000	6,000	Annual Brick Industry Report
Number of plants	Over 200	Over 152	Over 170	Annual Brick Industry Reports
Revenue of brick shipments	$2.12 billion	$1.82 billion	$940 million	U.S. Census, July 2010
Monetary value of brick manufacturing	$2.5 billion	$1.9 billion	$1.0 billion	Annual Brick Industry Report[1]
Capacity utilization	93.5%	76.34%	34.3%	Annual Brick Industry Reports.

[1]This figure includes wages – including union labor

While all manufacturing is down, production at brick plants is down more.

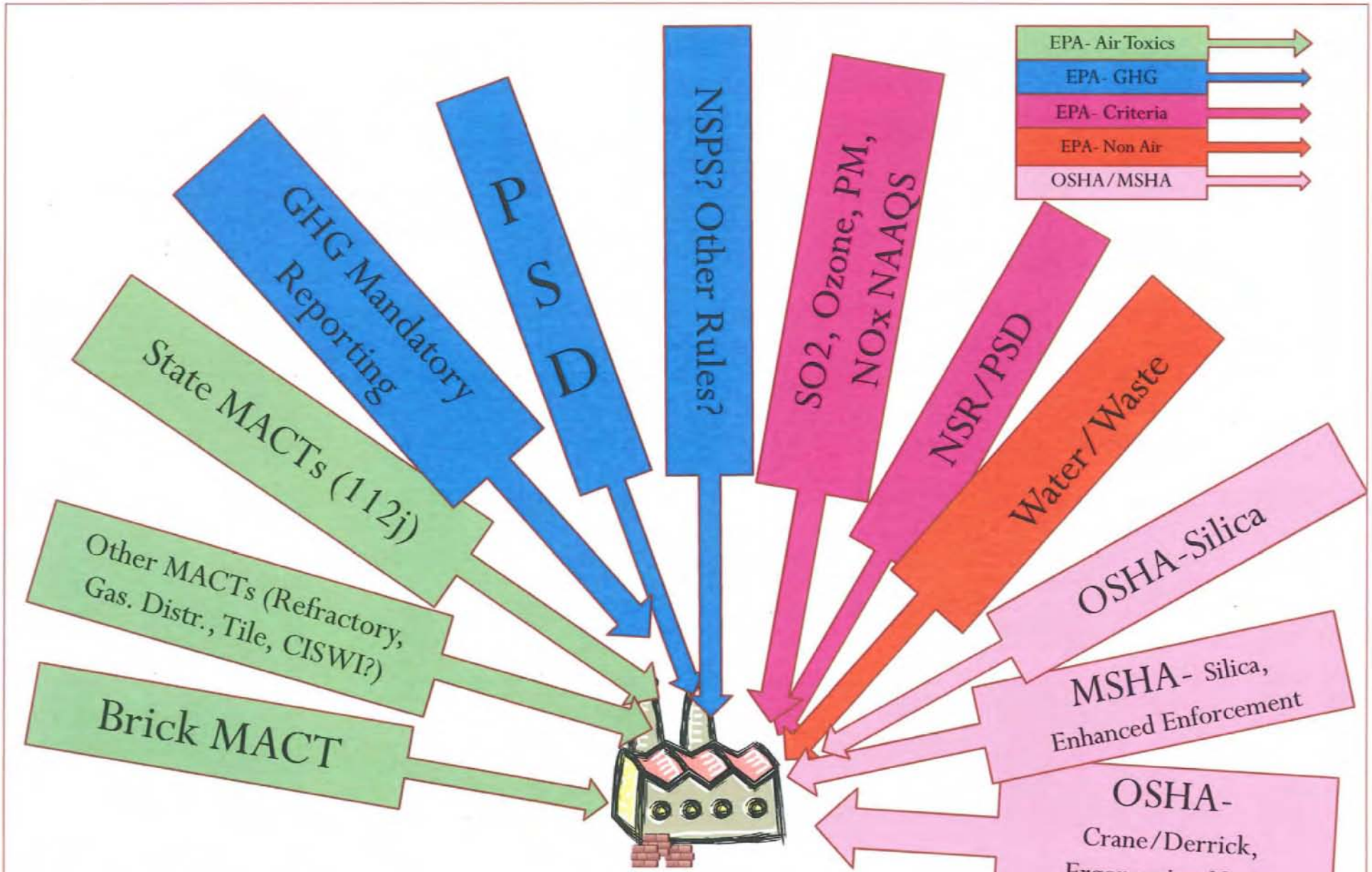
- From the US Census (2009)
  - The average plant utilization for *all* manufacturing is 64.3%
  - The brick/refractory industries have an average capacity utilization rate of 44.1%

Additional Regulatory Burden

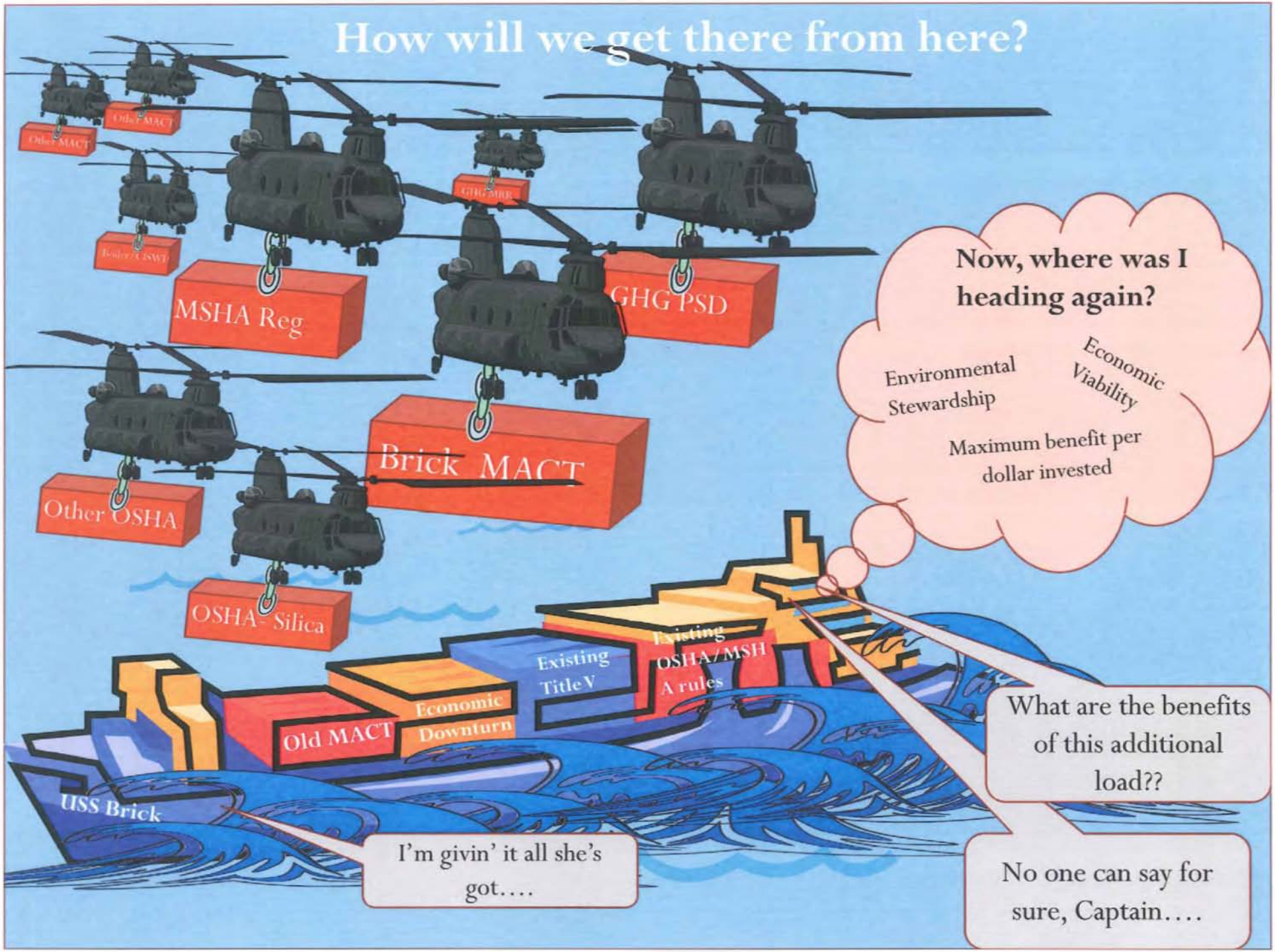
- Brick industry subject to numerous upcoming regulatory actions and enhanced enforcement
- By US EPA
  - GHG Regulations
  - Revisions to National Ambient Air Quality Standards
  - Air Toxics regulation (i.e., MACT)
- Others from OSHA
  - Crane and Derrick
  - Noise
  - Global Harmonization

Quick Look at just one other rule
EPA's Brick MACT

- Promulgated in 2003; compliance by 2006, vacated in 2007
  - Over $100 million spent as result of this rule
  - EPA now re-developing. EPA estimates
    - $500 million in capital costs
    - $180 million annual costs (including amortized capital costs)
  - BIA actively working with EPA to identify more effective approach (less cost, same benefit)



Conflicting priorities with finite resources


How will we get there from here?
Other MACT
Other MACT
Boiler/CISWI
MSHA Reg
GHG MRR
GHG PSD
Brick MACT
Other OSHA
OSHA - Silica
Now, where was I heading again?
Environmental Stewardship
Economic Viability
Maximum benefit per dollar invested
Existing OSHA/MSH A rules
Existing Title V
Economic Downturn
Old MACT
USS Brick
What are the benefits of this additional load??
I'm givin' it all she's got....
No one can say for sure, Captain....