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September 10, 1993

Dr. Richard W. Niemeier, Ph.D.
Director
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Centers for Disease Control
National Institute for Occupational Safety & Health
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Dear Dr. Niemeier:

I am pleased to have the opportunity to participate in the review and development of the draft Respirable Coal Mine Dust criteria document. Although I have years experience in Occupational and Preventive Medicine, I have only been associated with coal mining for the past years. Currently I am responsible for the ranging from surface mining to underground mining including continuous mining and longwall methods. Over the past years I have had the opportunity to personally observe and to review most routine underground and surface mining tasks. The review of the draft document has been both a challenge and a tremendous learning opportunity for me.

My goal is to optimally protect both the health and the safety of U.S Miners based on the best possible scientific evidence- without needlessly compromising American industry in a now global marketplace. Although data on the health effects of coal dust exposure from foreign countries are very useful in forming hypotheses and predictions, for the most part, I consider health data from U.S. mining more relevant to U.S. miners than data from foreign sources.

Due to the time constraints associated with the review process, I was unable to adequately review aspects of the document regarding exposure sampling technology and strategies and therefore refrain from commenting on those issues.

On other issues, I reviewed most of the pertinent referenced source documents and attempted to find other relevant sources. In analyzing the information available and in forming

my own interpretations, I reached different conclusions from the authors on several important aspects. Criticism of the document is intended in a constructive manner with the hopes of stimulating a fresh look at some of the key questions from a new or different perspective.

At the peer review meeting in Cincinnati in July, there seemed to be a consensus of opinions that *there should be a silica standard separate from the coal dust standard* and that both should be enforced where relevant. It was agreed that there were no data available indicating a synergistic effect. I will not comment further on this point at this time.

The data presented overall did not convince me that there is a need for a lower coal dust standard throughout the United States. To the contrary, *the overall weight of the evidence indicates that the 2 mg/m^3 standard has proven very effective in preventing PMF among U.S. miners.* One point that is clearly borne out by the data is that there is an extreme variability in the toxicity of coal dust from east to west -- from anthracite to lignite. I see a *need for a standard that recognizes this difference and is equally protective for all miners.* For anthracite coal, a separate standard is indicated. In reviewing the literature carefully, it is apparent *that there is an age dependent baseline prevalence of radiographic small rounded opacities in the general population.* Therefore, it is unreasonable to expect the prevalence of small rounded opacities in miners to ever go below this baseline. Further work is needed to define this relationship.

The data utilized by the authors to include surface mining under a more stringent standard really point toward the need to enforce existing silica exposures and perhaps the need for a separate anthracite standard. I am in disagreement with the authors regarding the demonstrated need for mandatory medical surveillance for all surface miners.

The most significant cause of morbidity and mortality among underground miners is clearly traumatic injuries. Different underground mining methods are associated with different serious injury risks. *The safety impact of any new proposed health standard must be taken into account if it will cause a shift in mining methodology.* I have provided data that can be useful in performing the necessary risk analysis.

The authors offer some data and regression models that suggest that coal dust exposure causes chronic obstructive pulmonary disease (COPD). The magnitude of the effect calculated from regression models is not clinically significant and pales in comparison with the effect seen with cigarette smoking. Pulmonary function testing may be useful on an epidemiological basis and as part of a general health screening but is *neither specific enough nor sensitive enough to detect any coal dust related change in function for any one individual.*

The transfer option is not well thought out, either in its philosophy or in its impact. The probability of preventing the progression of disease is minuscule. *The Americans with Disabilities Act offers a much more reasonable structure for decision making with regard to disabilities and accommodations.*

Lastly, I recommend that further evaluation of the acceptability and effectiveness of newer generation respiratory protective technology be undertaken. I offer anecdotal evidence regarding this issue, not because it is proof that this technology is acceptable or effective, but because I think that it is unreasonable not to consider it without careful evaluation. The potential value of this technology in coal mining as well as in any other dusty industry is immense.

My analysis and specific recommendations follow:

Sincerely,

[redacted]

[redacted]
Attachment

External Scientific Review/Comments: **NIOSH Draft Respirable Coal Mine Dust Criteria Document (6/24/93)**

Reviewer: [redacted]
Date: 9/13/93

I. The Need for a New Standard

II. Baseline Prevalence of Radiographic Appearance of Pneumoconiosis

III. Miner Age in Coal Mining Industry

IV. Coal Rank, PMF, CWP and Geographic Variation

V. The Significance of Data From Anthracite Coal Dust Exposure

VI. U.S. Data on Coal Workers Pneumoconiosis vs. Predictive Correlation Based on British Data

VII. Competing Causes of Morbidity and Mortality in Underground Mining

VIII. Use of Air Stream Helmets for Personal Respiratory Protection

IX. Health Hazards Among Surface Miners

X. COPD and Smoking Issues

XI. Medical Surveillance vs. Medical Screening

XII. Transfer Option - Fallacy and Philosophy

XIII. Additional References to Consider

[redacted]

I. The Need for a New Standard?

The draft criteria document presents much information about the adverse health effects of coal dust exposure. The authors fail, however, to demonstrate a need for a lower coal mine dust exposure standard.

It is well known that progressive massive fibrosis (PMF) was a significant health problem among underground miners in Pennsylvania and Appalachia prior to 1969 and that there is a long latency period for its development. It is also well documented that simple coal workers pneumoconiosis (CWP) invariably precedes the development of PMF.

The most logical approach to answering the question: *"Is the current standard working?"* is to look at U.S. underground miners by region who started working underground after the current standard was enacted. At the external peer review meeting in Cincinnati on July 30, I asked the question "How many cases of PMF have occurred to date among underground miners who began working underground after 1969?" The response from Morgantown indicated that they had not looked at the data in this fashion.

NIOSH has 20+ years of real data on real U.S. underground miners who have worked under the existing standard. Data on the first 10 years were reported (Althouse, 1986); however, no followup presentations have been made to address the key issue - *is the current standard working?* Data presented by Attfield & Castellan in 1992 provide the most comprehensive source for the data to date, however, the data are not presented in a manner suitable to answer the essential question.

In Table I-1 and Figure I-1 I have tabulated the data as best I could from Figure 2 (Attfield et al, 1992). NIOSH has access to these actual data but they have not been published in tabular form that I could find. Additionally looking at these same data broken down by geographic region would give a much clearer picture of the current status. From these data it is apparent that the ***prevalence of CWP among underground miners who started working underground after 1969 is essentially the same as background prevalence in the general population.***

In Section 2.3.3.1 the authors state that "there is evidence that CWP category 1 or greater has been increasing since 1985" based on the data presentation in the draft Figure 2.2. This conclusion is very tenuous for several reasons.

1) The participation in the CWXSP dropped drastically between 1971 and 1988. Even between the data points for 1985 and 1988 there was over a four fold decline in miner participation rate.

2) No effort was made to determine the effect of the selection bias due to the decline in miner participation.

3) The X-rays were read by different readers in each round.

4) There has been a general tendency for X-ray readings to be more "conservative" over time.

5) Other presentations of U.S. miner experience show continued declines in CWP and PMF.

The authors present data and references that clearly indicate that the current coal dust standard is protective, yet they assert that PMF continues to be a significant problem and that further protection is necessary.

In Section 7.1.5.1 they claim that "These studies indicate that from 4 to 55 cases of PMF per 1000 miners will be prevented each year by reducing exposure to a mean of 1 mg/m^3." This is the centerpiece justification that is provided for the need for a lower coal mine dust standard.

This claim does not, however, fit the data presented and referenced:

- There are currently approximately 78,000 underground coal miners in the U.S. This implies that between 312 and 4290 new cases of PMF can be prevented each year and by inference, more than 312-4290 new cases are currently occurring each year.

- PMF is a chronic disease that lasts for years. Most data regarding PMF are presented in terms of prevalence, that is, the number of cases existing in a population at any one time. The prevalence is essentially the accumulation of all of the cases that have occurred over past years that are still working. The prevalence must always be substantially higher than the incidence (the number of new cases occurring each year) for chronic diseases such as PMF.

[redacted]

- In 1984 NIOSH presented the final report from round three of the National Coal Study. From regional prevalence data (PMF) in that report, it can be directly calculated that in 1980, only 1185 cases of PMF existed in the U.S. among underground miners (255 in Pennsylvania, 843 in West Virginia, 87 in the rest of Appalachia and essentially none in the midwest or west).

- Data consistently indicate that the prevalence of PMF among U.S. underground miners has steadily declined since adoption of the current standard over 20 years ago.

- Of the 1185 cases existing in 1980, most can be attributable to mining exposures prior to the current standard. Miners not exposed to coal dust prior to the current standard would be expected to have a much lower prevalence of PMF.

It appears that the authors are claiming to prevent more cases of PMF each year than had accumulated in the entire underground workforce prior to 1980.

The authors assert that PMF can and does develop in miners with no previous evidence of CWP. This is a somewhat misleading statement. In the Hodus and Attfield 1990 paper, of 69 cases, only 3 for sure (but possibly 10 miners) had a clean chest at the start of the risk period, while for the remainder, a background of small lesions did exist five years earlier. It is clear from the distribution of small legions at the point in time that PMF was found, that simple CWP had progressed. Taken at face value, the study indicates that quite rapid progression of CWP had taken place over a five year interval. If massive lesions in coal workers exist on a background of no CWP, a diagnosis of PMF is highly suspect. Further re-evaluation of the cases from this study to include details of exposure, job, past history and an objective re-reading of the films needs to be done and tabulated on a case by case basis prior to recommending regulatory changes based on this study.

TABLE I-1

PREVALENCE OF CATEGORY 1 OR GREATER SMALL ROUNDED OPACITIES BY ROUND OF THE NATIONAL STUDY OF COAL WORKERS PNEUMOCONIOSIS AND BY TENURE GROUP. SINGLE READER AT ROUND1; MEDIAN READINGS FOR OTHER ROUNDS. DATA APPROXIMATE, READ FROM FIGURE 2, ATTFIELD ET AL, 1992. DATA NOT AVAILABLE IN TABULAR FORM OTHERWISE.

		YEAR =>	1971	1975	1979	1985
		ROUND =>	1	2	3	4
YRS MINING	MEDIAN	EST AGE				
0	0	28.5	0	2	0	1.2
1	1	29.5	0	1	0	0
2-4	3	31.3	1.5	1.5	0	1
5-9	7	35.0	1.5	2	0	0
10-14	12	39.6	5	3	1.2	1
15-19	17	44.2	6	6	3	1.2
20-24	22	48.8	13	13	2.5	6
25-29	27	53.4	15	16	12.5	3.5
30+	35	60.7	22	23	15	12

MINERS STARTING MINING AFTER 1969

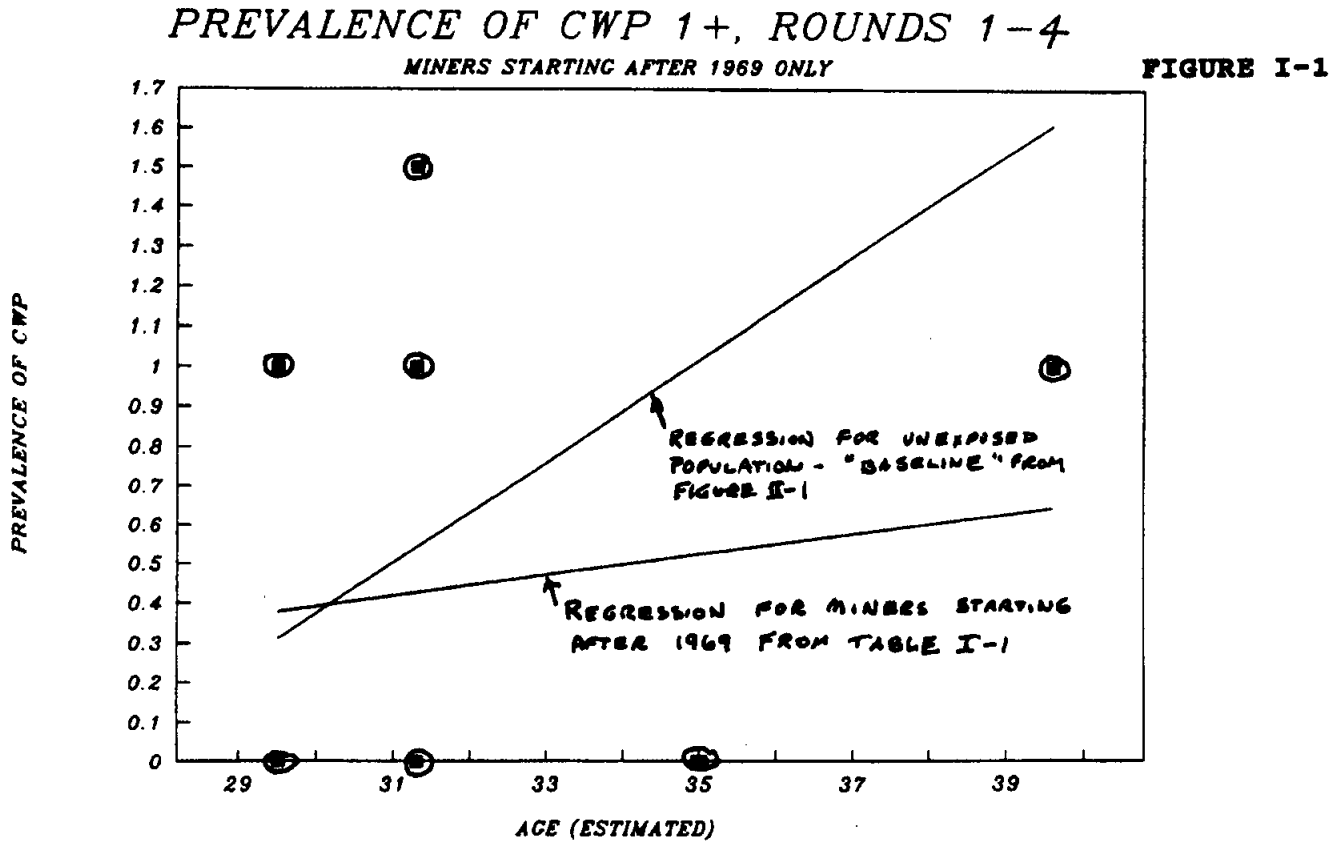


FIGURE I-1

II. Baseline Prevalence of Radiographic Appearance of Pneumoconiosis

In 1973 Morgan et al noted that as people age, chest X-ray film abnormalities develop that may be confused with those of pneumoconiosis, especially in heavy smokers. Positive findings were present in 20% of smokers and in 2.2% of non smokers. This study indicates that small irregular opacities are directly related to age and smoking habits among workers not exposed to hazardous dust.

Other studies have shown that small round opacities are not related to smoking, however, very little data are available regarding the baseline prevalence of small rounded opacities as a function of age in a population not exposed to hazardous dust. With high dust exposures and high prevalence of pneumoconiosis prior to 1970, this was probably of minimal importance. With low dust exposure and low prevalence of pneumoconiosis, knowing this population baseline of radiographic appearance of pneumoconiosis becomes critical.

Clearly, non-dust related medical diseases such as sarcoidosis, eosinophilic granuloma, collagen vascular disease, interstitial pneumonitis, congestive heart failure, emphysema, metastatic tumor, interstitial fibrosis and lymphangitic tumor may produce small opacities similar to those seen with pneumoconiosis. Obesity may also affect the appearance of a chest X-ray due to overlying soft tissue and less than full inspiration.

The authors address this issue superficially in Section 4.1.2.1.4 referencing studies by Castellan and Epstein, however, they make no attempt to define this baseline. These plus additional references providing limited data on "CWP" in non-exposed populations are tabulated in Table II-1 and shown graphically in Figure II-1. *There is a definite baseline of "CWP" in non-mining unexposed populations that increases with age.*

NIOSH has extensive data available (initial CXR's) from the NCWSP that could be invaluable in developing an accurate age vs "CWP" relationship for unexposed populations. To my knowledge these data have not been reported in the open literature. Presumably a relationship similar to that shown in Figure II-1 could be generated. Most certainly, an assumption of a baseline prevalence of zero or near zero is inappropriate.

Additionally, chest X-ray readings are not static over time. As shown in Figure II-2, only 6 of 32 (19%) of miners with X-rays classified as Category 1/0 or greater at round 1 had a reading of 1/0 or greater 8-10 years later at round 3 while 26/32 (81%) reverted to Category 0. Whatever this transient phenomenon is, it is likely to also occur in a non-mining population.

FIGURE I

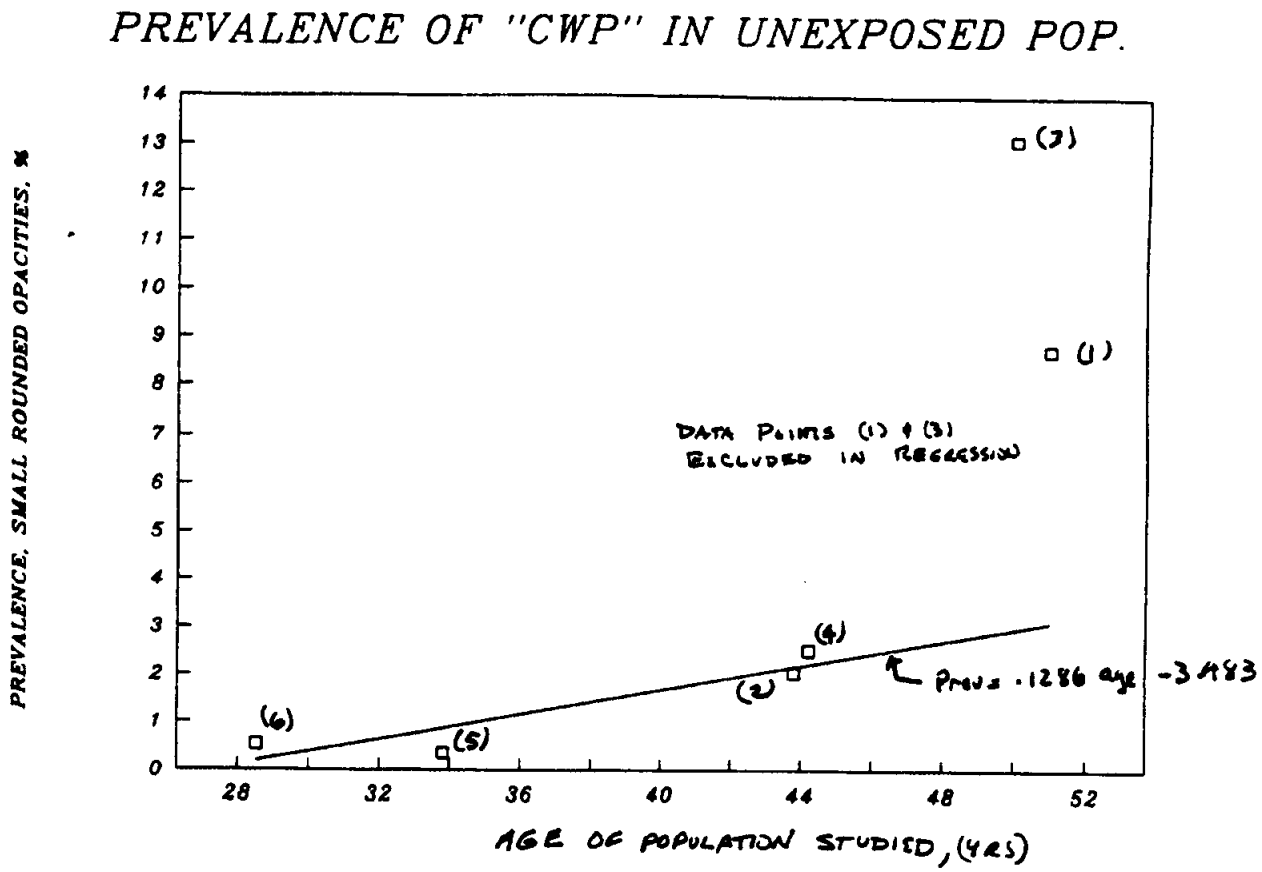


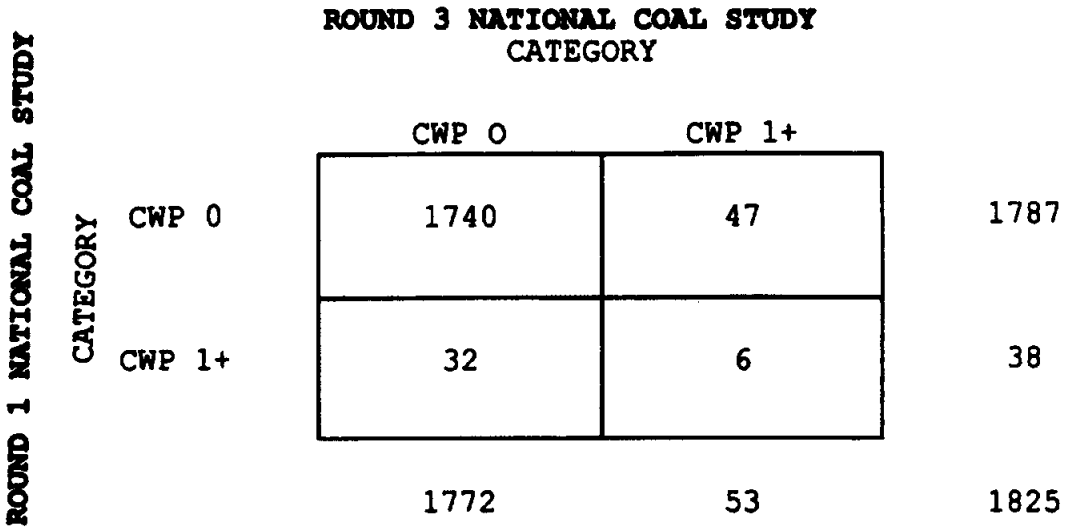
TABLE II-1

STUDIES REPORTING PREVALENCE OF "CWP" IN UNEXPOSED POPULATION

		N	POP AGE	"CWP"	"CWP" AGE	PREV
(1)	HYATT ET AL, 1963	23	51	2	51	8.70%
(2)	ENTERLINE,1967	194	43.8	4	(h)	2.06%
		153	43.8	3	(h)	1.96%
(3)	HIGGENS ET AL, 1968	61	50 (f)	8 (e)	57.5(f)	13.11%
(4)	EPSTEIN ET AL, 1983	200	44.2	5 (a)	54.7	2.50%
		200	44.2	17 (b)	54.7	8.50%
(5)	CASTELLAN 1985	1422	33.8	5 (a)	42.6	.35%
		1422	33.8	8 (b)	50.5	.56%
(6)	ALTHOUSE ET AL 1986	13,309	28.5 (g)	59 (a,c)	(h)	.44%
		13,287	28.5 (g)	81 (a,d)	(h)	.61%

(a) rounded opacities
(b) irregular opacities
(c) epidemiological readings
(d) screening readings
(e) exposed to non mining dust
(f) estimated from report
(g) estimated from other data
(h) not reported, no estimate

FIGURE II-2



X-RAY CATEGORIES FOR SMALL ROUNDED OPACITIES AT ROUND 1 AND ROUND 3 FOR NEW MINERS - SOURCE - NATIONAL COAL STUDY - FINAL REPORT FROM ROUND THREE OF THE STUDY - 1984

III.

Most of the data presented by the authors have consistently been reported with years of mining experience as the primary independent variable. This presumes that underground mining experience is the causative factor. In order to explore the hypothesis that the effects noted are related to age and not to coal dust exposure, similar presentations of health effects with age as the independent variable are necessary. The authors do not adequately explore this hypothesis, and by recommending lower exposure standards, may actually be trying to protect miners from the effects of aging.

Obviously, age correlates strongly with years underground experience. Using data from the National Coal Study and related research, final report from Round 3 (1984), I looked at age as a function of experience for U.S. miners. This is presented as Figures III-1 and III-2. This relationship was used to estimate miner ages from exposure cohort groups elsewhere in these comments.

Additionally, a "lifetime" working career of 40 years starting at age 18 is assumed to be appropriate without apparent justification. An average age of 28.5 starting years mining for U.S. miners is much more consistent with a lifetime mining career of 30-35 years than 40-45 years. Over 75 percent of miners in 1980 had less than 20 years underground experience.

FROM NATIONAL COAL STUDY AND RELATED RESEARCH
FINAL REPORT FROM ROUND 3 OF THE STUDY
NIOSH - MORGANTOWN, 1984

FIGURE III-1

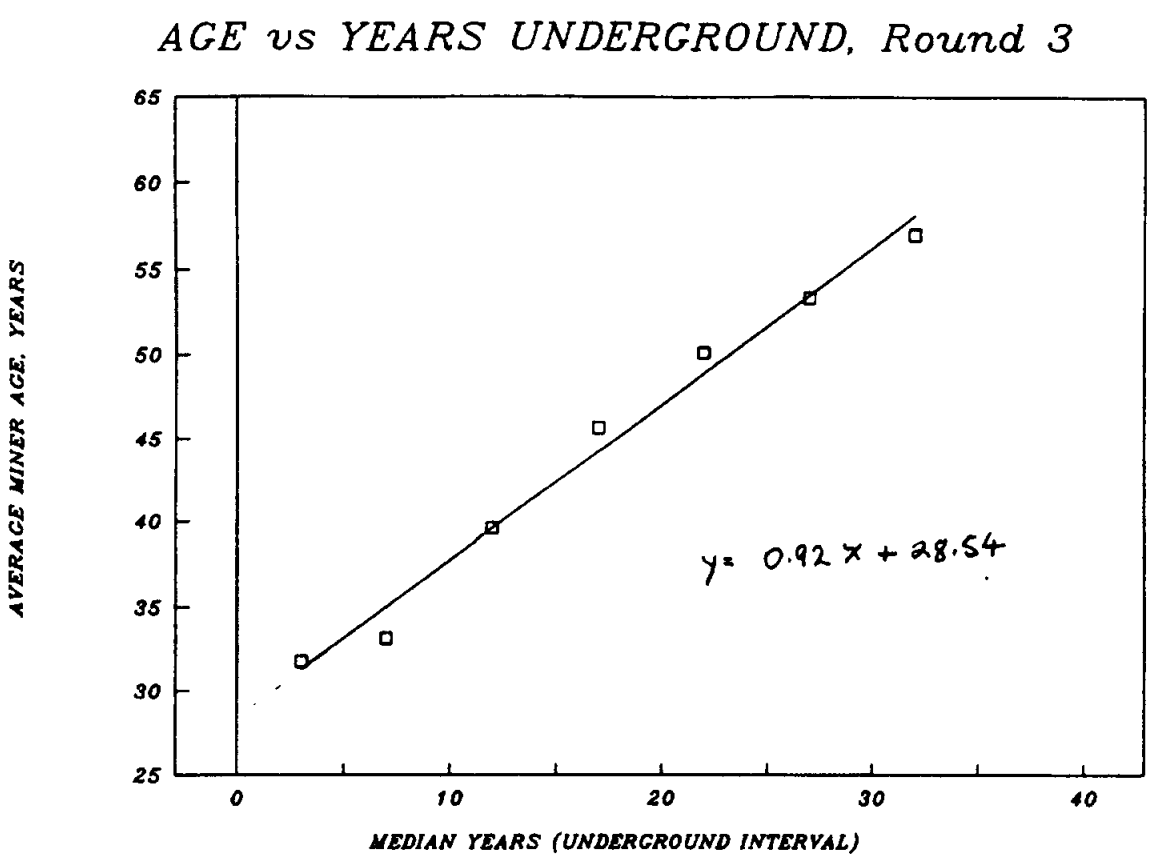
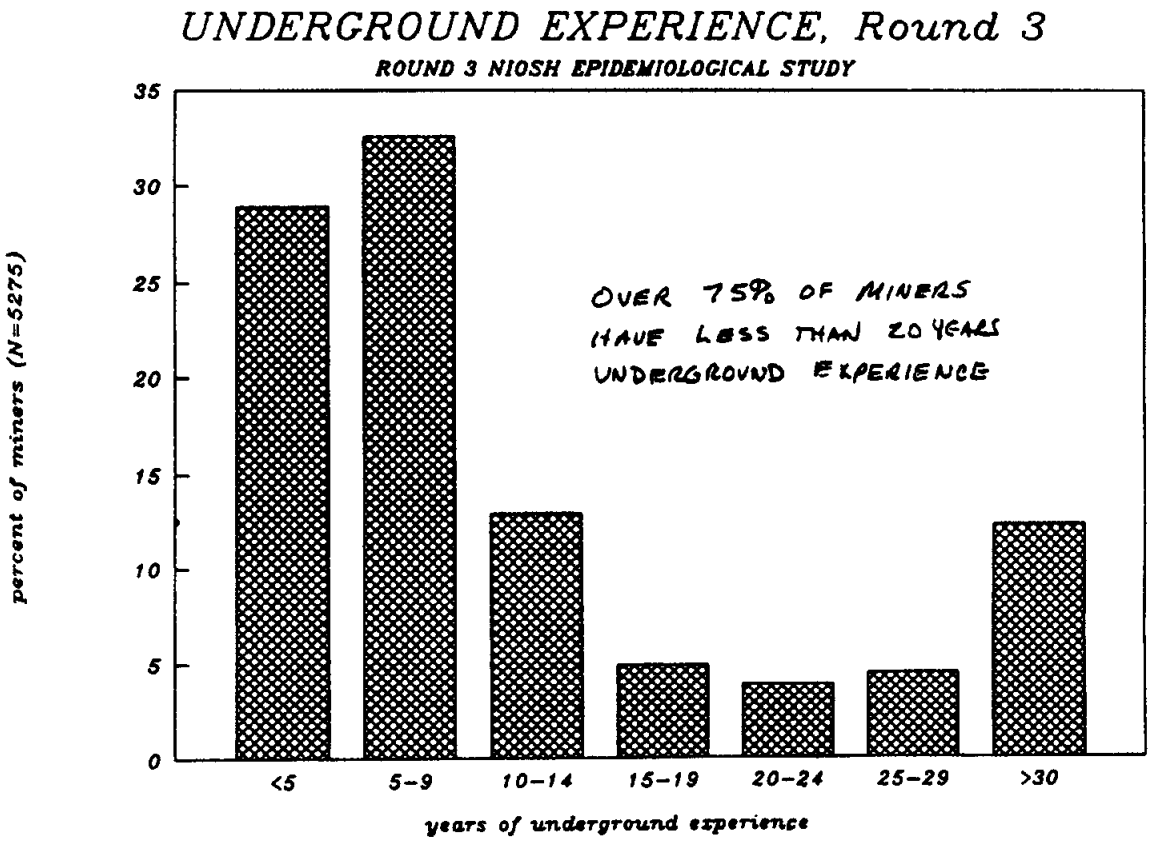


FIGURE III-2



IV. Coal Rank, PMF, CWP and Geographic Variation

Tokuhata et al, 1970 pointed out that *in the period 1957-1959 "50 percent of the pneumoconiosis mortality and 93 percent of all deaths from antracosilicois were reported from Pennsylvania."*

Lainhart, 1969 reported data collected between 1963 and 1965 by the USPHS. Table IV-1 from that report clearly shows significant regional findings. Figure IV-5 from the same study presents the same data clearly showing that the *majority of the risk is among miners from Pennsylvania and Appalachia.*

Attfield et al, 1984 points out that "analysis of data from the first two rounds of the National Coal Study (NCS) has shown *a trend in prevalence of CWP from east to west of the United States...the Anthracite region in eastern Pennsylvania showed a distinctly higher prevalence of CWP than all of the bituminous areas. Within the bituminous area, central Pennsylvania had the greatest prevalence followed by the Appalachian region (Western Pennsylvania to Alabama) and the midwestern mines in Illinois and Western Kentucky. The western mines in Colorado and Utah had the lowest prevalences."*

Figures VI-3 shows the regional variations of coal rank. Figure IV-1 shows the number of underground mines at risk by region. Figures IV-3 and IV-4 show the number of cases and prevalence in 1980 by region. Two points become clear when looking at these data:

1) Miners in the eastern states, particularly West Virginia have the highest risk of PMF. *This risk correlates with the rank of coal mined in each respective region.* The risk of PMF in Western States was essentially zero.

2) Although the prevalence of CWP varied slightly by geographic region, the effect was not nearly as strong as the correlation with PMF. These *data suggest that CWP in the Western States is not associated with increased risk of PMF and/or* the greatest contribution to CWP is age and not coal dust exposure.

The authors of the draft document (and associated references) points out very clearly that there is a definite geographic variation in the prevalence of CWP and PMF that correlates strongly with coal rank in the

respective regions. Even though the underlying mechanism remains elusive the empirical data are overwhelming.

It is not at all clear, however, why the current coal dust standard does not take into account regional variations in the toxicity of coal dust even though the variation was apparent at the time that the law was drafted It is not reasonable to allow eastern underground miners exposures that place them at known higher risks than miners from the west and midwest.

The authors in this draft coal mine dust criteria document clearly miss the target in proposing - again - a standard that does not take coal rank into account. They dismiss considering coal rank, reasoning that even though "several epidemiologic studies have shown that the prevalence of CWP and PMF increases with increasing coal rank", since "studies in animals to respirable coal dust of different rank have not found differences in the effects of exposure to high or low rank coal." Somehow NIOSH seems to have their reasoning backward on this point...*with extensive epidemiological studies, rat studies are irrelevant.*

NIOSH also reasons that "studies to date have not found a coal rank effect on the exposure response relationship between respirable coal mine dust and the development of chronic obstructive pulmonary disease." I find this statement incorrect based upon the references cited. Attfield and Hoddus provided regression coefficients that included "regional effects relative to the west"...a surrogate for coal rank. Additionally, a definite effect of rank on lung volumes is very apparent in data presented by Morgan et al, 1974.

The data presented in this draft clearly indicate that allowable coal dust exposures should be inversely related to coal rank so that miners are allowed the same protection from PMF throughout the U.S.

TABLE IV-1

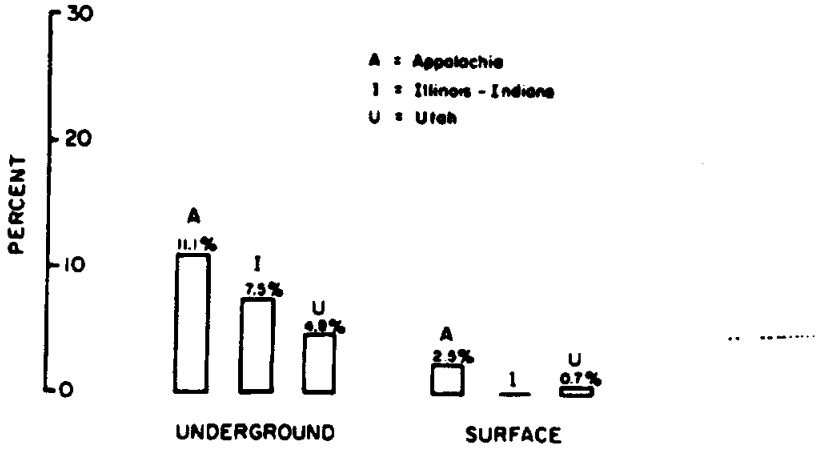
PNEUMOCONIOSIS IN WORKING COAL MINERS
BY ROENTGENOGRAPHIC CATEGORY

Pneumoconiosis Roentgenographic (Category)	Appalachia		Illinois–Indiana		Utah	
	No.	%	No.	%	No.	%
None	2,146	84.9	372	78.5	543	94.3
Suspect	135	5.3	73	15.4	11	1.9
Simple	172	6.8	22	4.6	18	3.1
Complicated	76	3.0	7	1.5	4	0.7
Total	2,529		474		576	
No roentgenograms	20		3		0	

TABLE IV

DEFINITE PNEUMOCONIOSIS AMONG WORKING COAL MINERS

Pneumoconiosis Among Working Groups	Appalachia		Illinois–Indiana		Utah	
	No.	%	No.	%	No.	%
Underground Workers						
With pneumoconiosis	237	11.1	29	7.5	21	4.8
Without pneumoconiosis	1,895	-----	360	-----	416	-----
Total	2,132		389		437	
Surface Workers						
With pneumoconiosis	10	2.5	0	0.0	1	0.7
Without pneumoconiosis	383	-----	85	-----	136	-----
Total	393		85		137	
Total with roentgenograms	2,525		474		573	
Unknown history or no roentgenograms	27		3		3	
Total	2,549		477		576	



Definite pneumoconiosis among working coal miners.

FIGURE IV-1

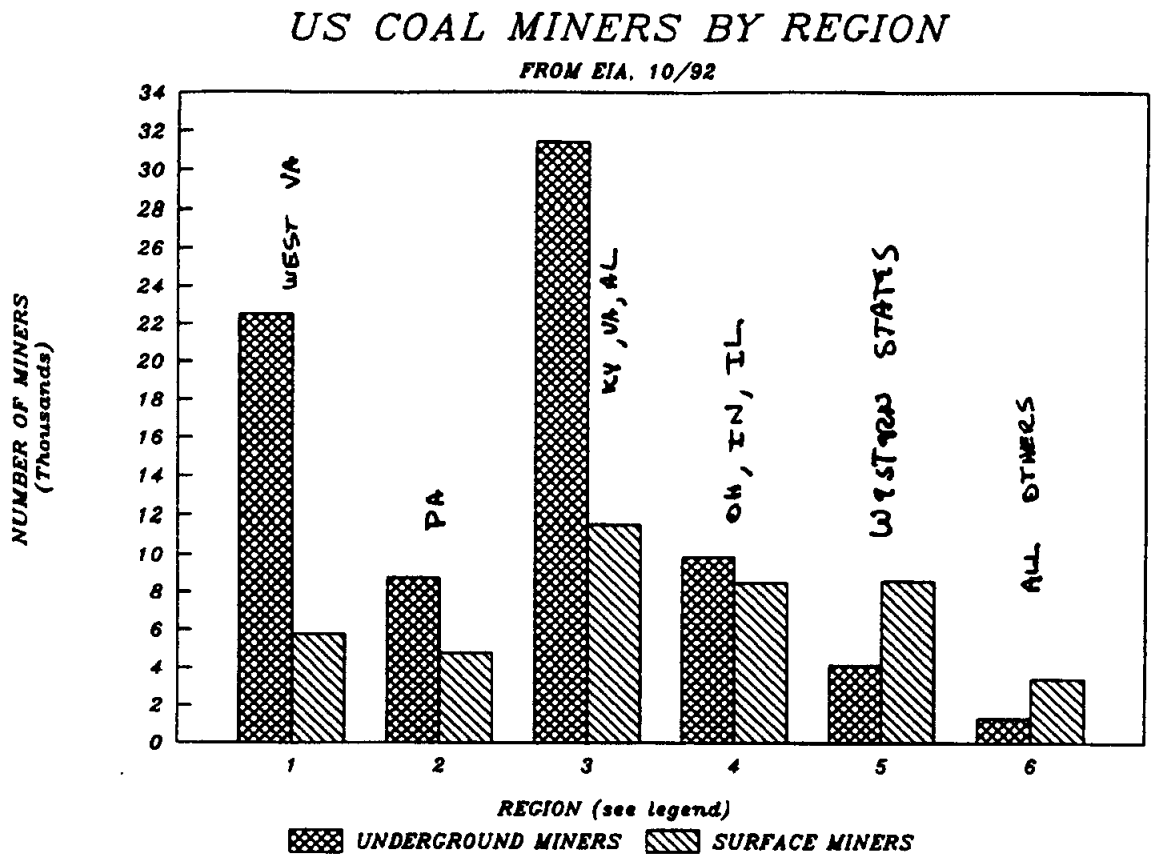
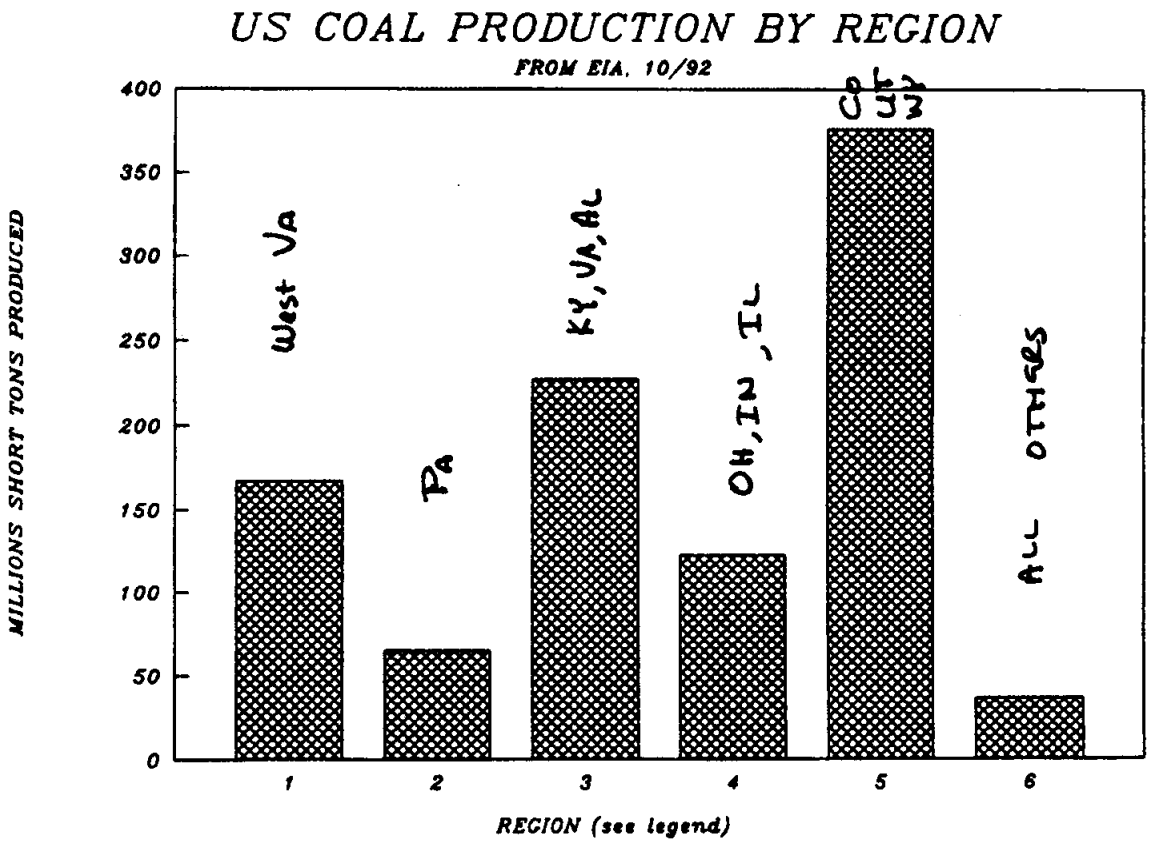


FIGURE IV-2



ESTIMATIONS BASED ON : NATIONAL COAL STUDY & RELATED RESEARCH
FINAL REPORT FROM ROUNGD THREE OF STUDY
NIOSH, MORGANTOWN, WV PB85-221026, 1984

8/12/93

FIGURE :

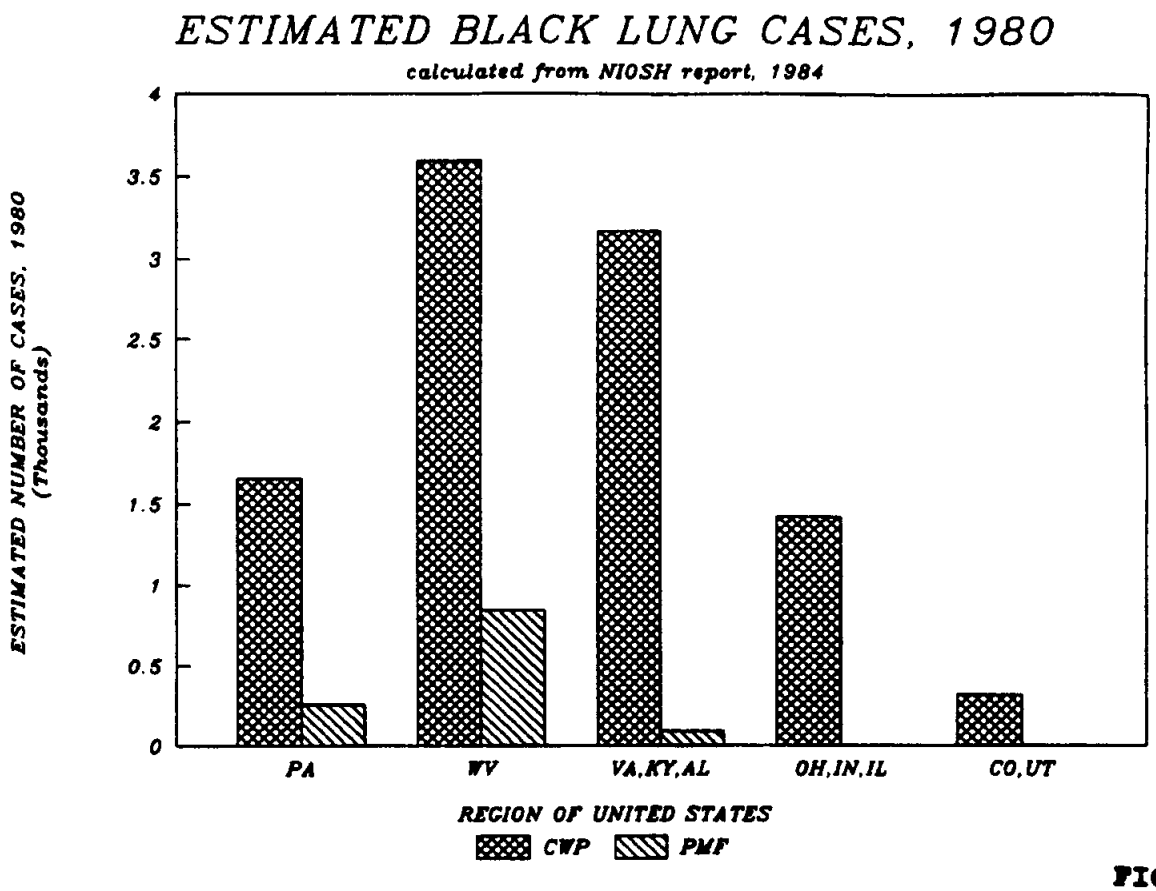
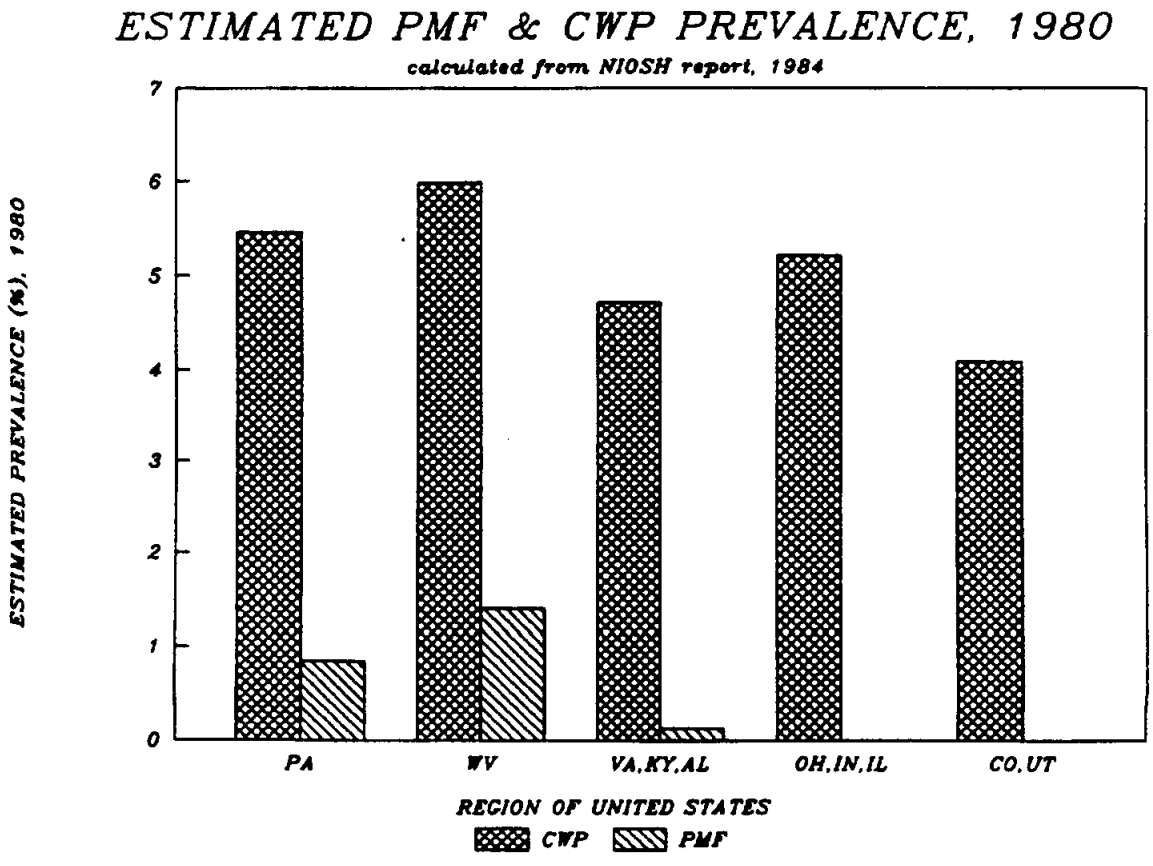


FIGURE IV-



CWP = SIMPLE COAL MINERS PNEUMOCONIOSIS, AN X-RAY FINDING, NO RELATED DISABILITY
PMF = PROGRESSIVE MASSIVE FIBROSIS (CLASSICAL BLACK LUNG), RELATED DISABILITY & DEATH

FIGURE IV-5

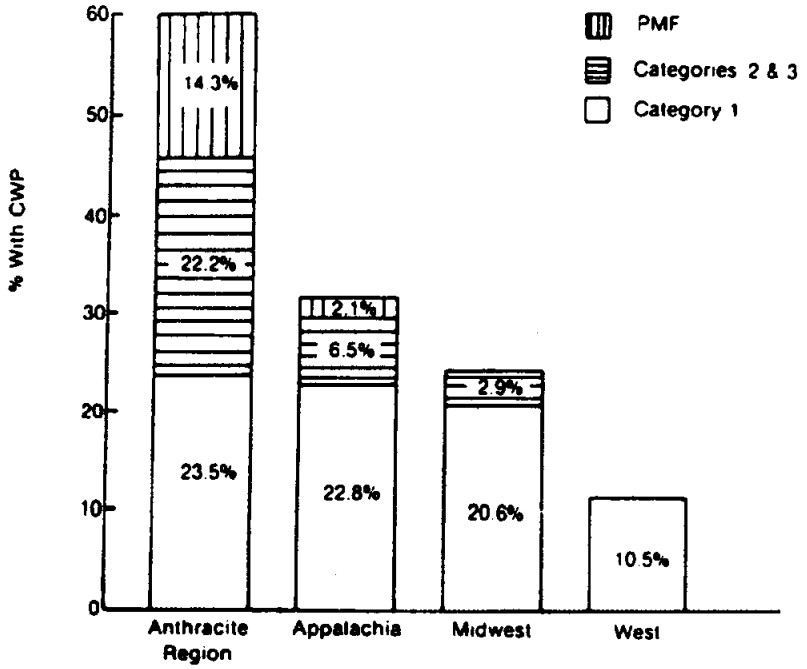


Figure 9. Prevalence of coalworkers' pneumoconiosis by region of the United States and by years spent working underground. (*From* Morgan, W. K. C., et al.: Arch. Env. Health, 27:221, 1973. Reproduced with permission.)

V. The Significance of Data from Anthracite Coal Dust Exposure

In Figure VI-1 and VI-2, I have plotted U.S. coal productivity by type since 1970. It is obvious from this presentation that the overall trend is for less and less anthracite coal production and more and more subbituminous and lignite coal from the west. In fact, anthracite coal currently accounts for approximately 0.3% current U.S. coal production.

Data regarding adverse health effects from anthracite coal dust exposure indicate that it is indeed very toxic, however *it is not relevant to 99.7% of U.S. coal mining*. The data presented demand a separate and much more stringent standard for anthracite coal dust.

FIGURE V-1

U.S. COAL PRODUCTIVITY BY MINING METHOD

SOURCE: EIA ANN. ENRGY REV 1991

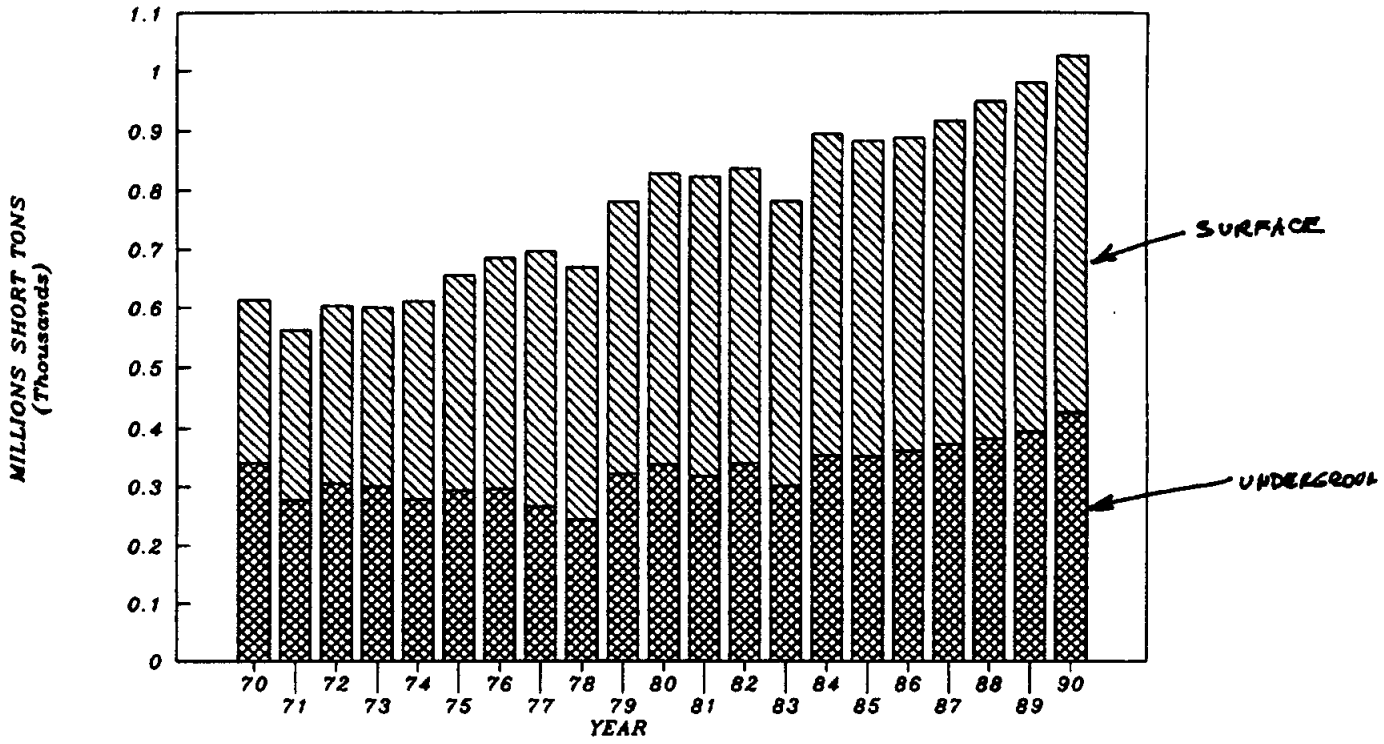
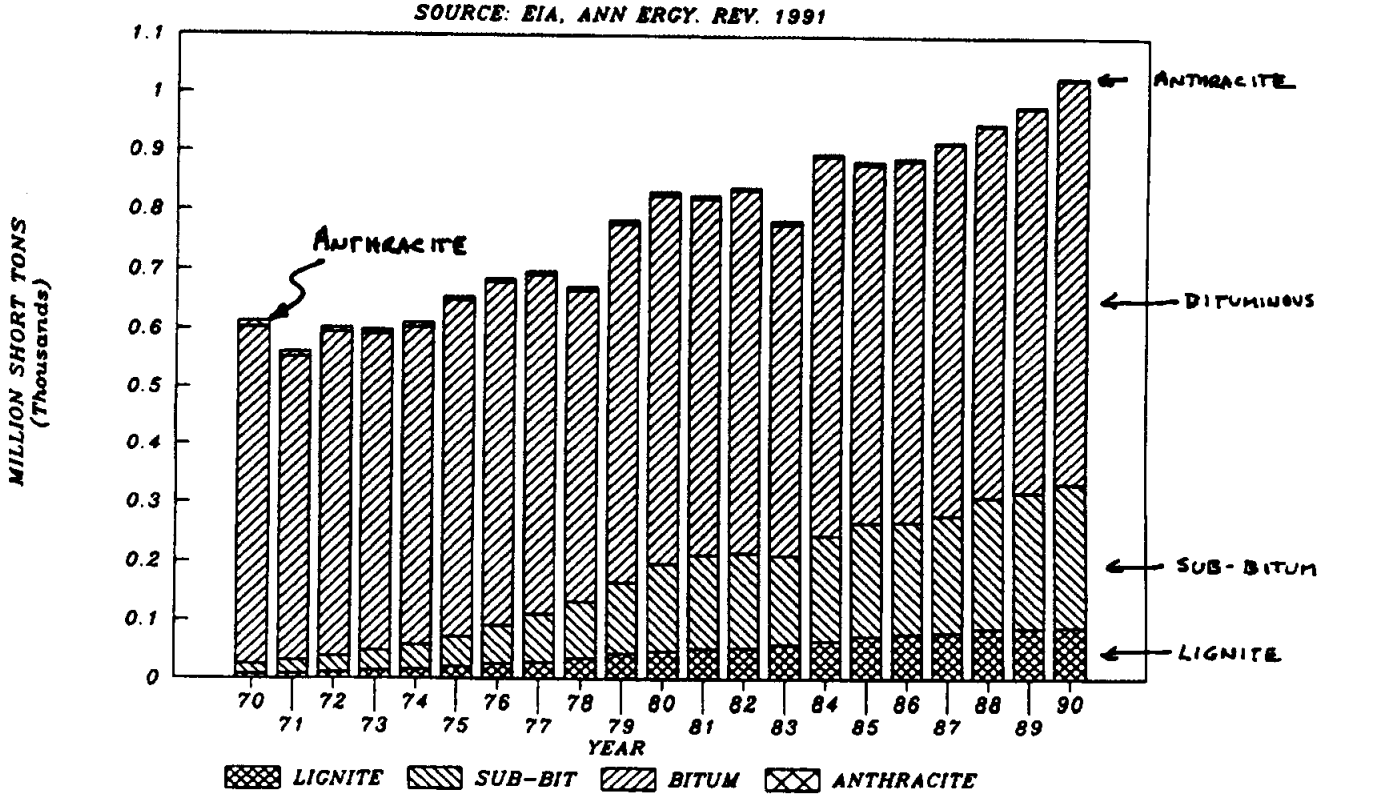


FIGURE V-2

U.S. COAL PRODUCTIVITY BY TYPE & YEAR

SOURCE: EIA, ANN ERGY. REV. 1991



VI. U.S. Data on Coal Workers Pneumoconiosis vs. Predictive Correlation Based on British Data

The authors base much of their case for the need of a lower coal dust standard on correlations from British data collected between 1953 and 1977. The most recent predictions provided to NIOSH from Hurley and McClaren 1987 incorporate coal rank as a predictor of pneumoconiosis. Coal rank (expressed as % carbon) is found to correlate very strongly with the risk of pneumoconiosis within the range of coal found in the U.K. (80-95%). Figure VI-1 shows the relative risk of PMF based on predictions from Hurley and McClaren 1987. This is generally consistent with data presented in Figure 2, Hurley et al, 1987. Predictions of CWP as a function of years of exposure and as a function of age for 1 mg lifetime exposures and for 2 mg lifetime exposures are presented as Figures VI-4 through VI-7. *Even at these high coal rank levels, predictions of CWP as a function of age are not substantially higher than population background presented in Figures II-1.* Additionally Figure VI-3 demonstrates that rank of coal mined in the U.S. is significantly lower than the range of the correlation based on British data.

On Table 4.6 of the NIOSH draft, Hurley and McClaren's correlations are used to predict the risk of PMF and CWP for various ranks of coal. Risks for anthracite, 89%C and 83%C coal are consistent with the relative risks plotted in Figure VI-1, however the authors continue to predict risks for low rank U.S. coal (60-65% C) that is well outside the range of data used for the correlation. *Extrapolation of empirical data to this degree is unjustified.* Figure VI-3 shows that the valid data range for coal, representing less than 0.3% of U.S. coal production. 99.7% of U.S. coal produced is essentially outside the range of the reference data.

Table 4.6 in the NIOSH draft is presented to show a calculated risk for exposure to coal dust at 2 mg/m^3 exposure. Table 4.3 presents similar data from U.S. coal miners between 1961 and 1970 (when exposures were much higher than 2 mg/m^3 -- likely around 6-8 mg/m^3 according to Table 3-8 in the NIOSH draft). These data are compared in Table VI-1. Many studies have shown that cumulative exposure is highly correlated with CWP and PMF. Considering that exposure duration was approximately 20 years in Table 4.3, the risk estimates in Table 4.6 appear to overstate the risk by at least 50-100% when compared with data in Table 4.3 of the draft document.

The estimates in Table 4.6 also appear to overstate the risk when looked at in comparison with substantial data (Attfield et al, 1992) that show dramatic drops in prevalence of CWP and PMF since 1969.

TABLE VI-1

	NIOSH=> TABLE 4.6 40 YEAR EXPOSURE STARTING AGE 18 2 MG EXPOSURE CWP 1+ RISK,%	PMF RISK,%	NIOSH=> TABLE 4.3 AVG 20 YRS EXPOSURE ?STARTING AGE 28.5 ?6-8 MG EXPOSURE CWP 1+ RISK,%	PMF RISK,%
PENNSYLVANIA	31.7	8.9	27*	8.9
SOUTH WEST VA	28.2	6.5	30*	6.6*
APPALACHIA	12.1	2.2	8*	2.2*
MIDWEST	8.9	1.5	6	1.5
WEST	6.7	1.3	4	0.7

* averaged from several studies listed on table 4.3

FIGURE VI-1

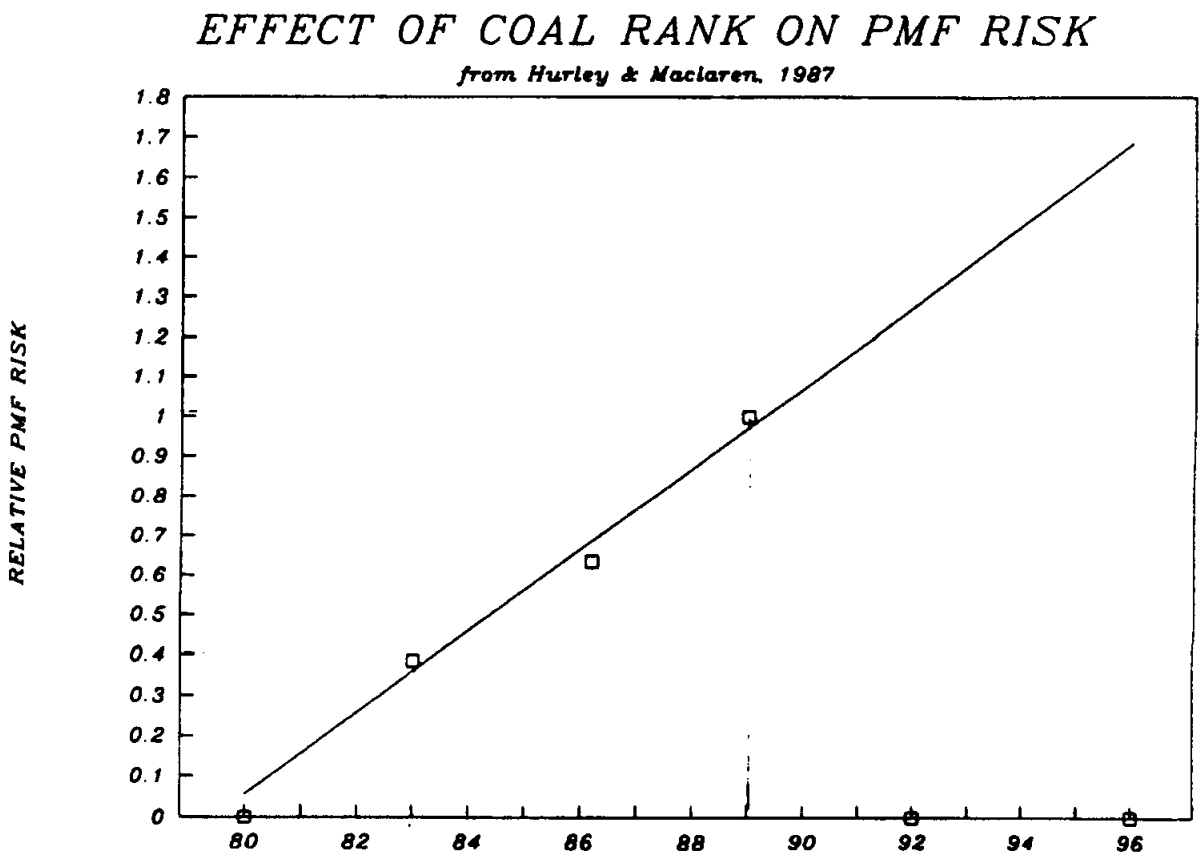


FIGURE VI-2

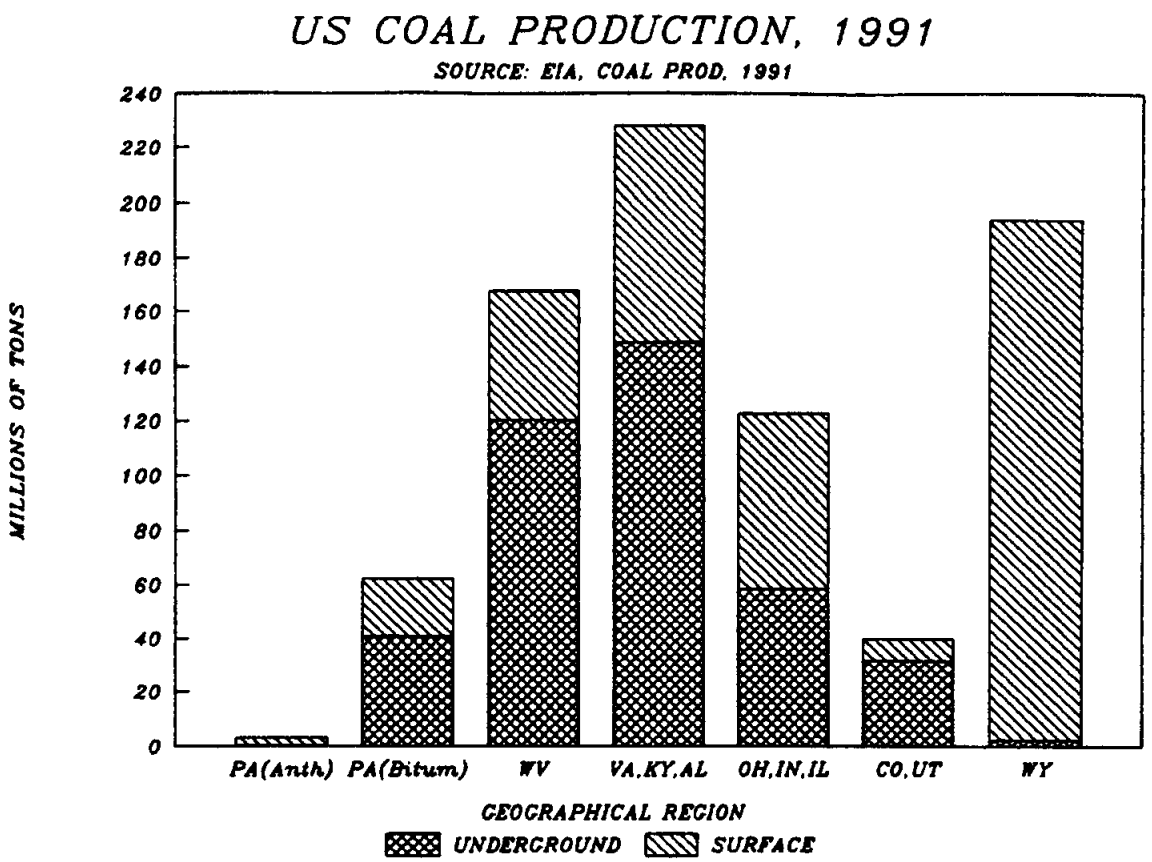
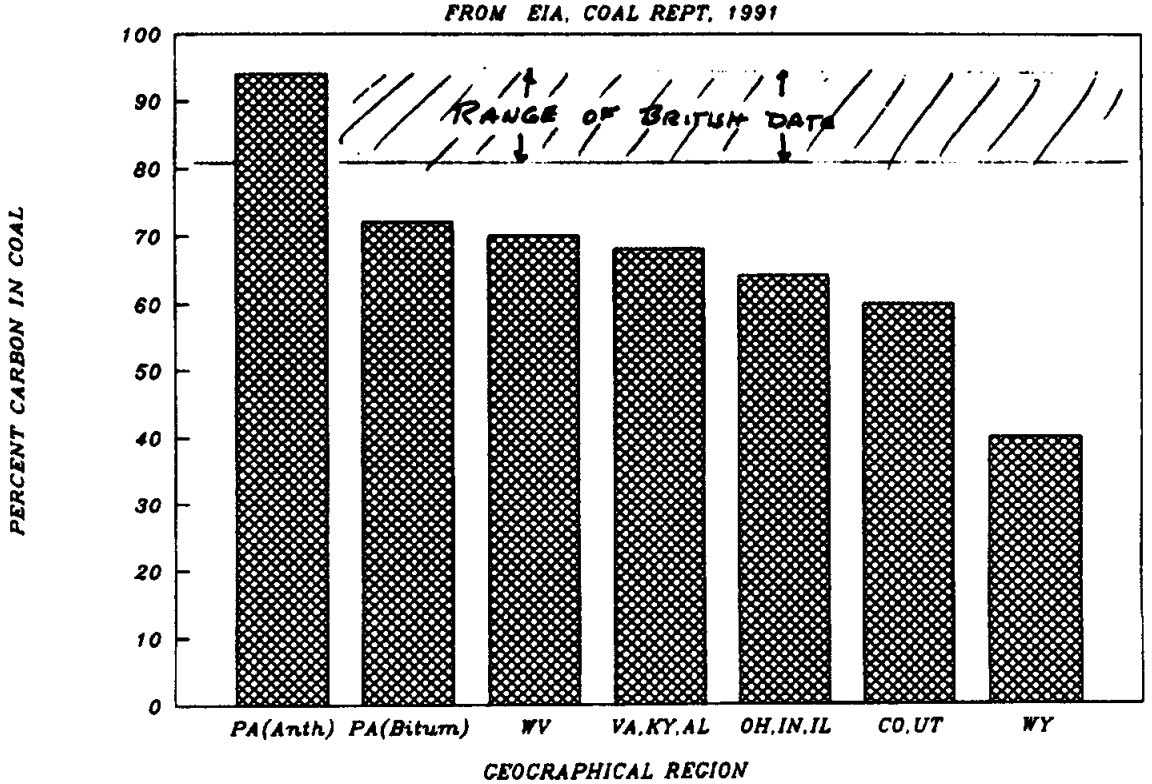


FIGURE VI-3



FIGURE

PROBABILITY OF CWP 1+, 2MG EXPOSURE

BASED ON BRITISH DATA

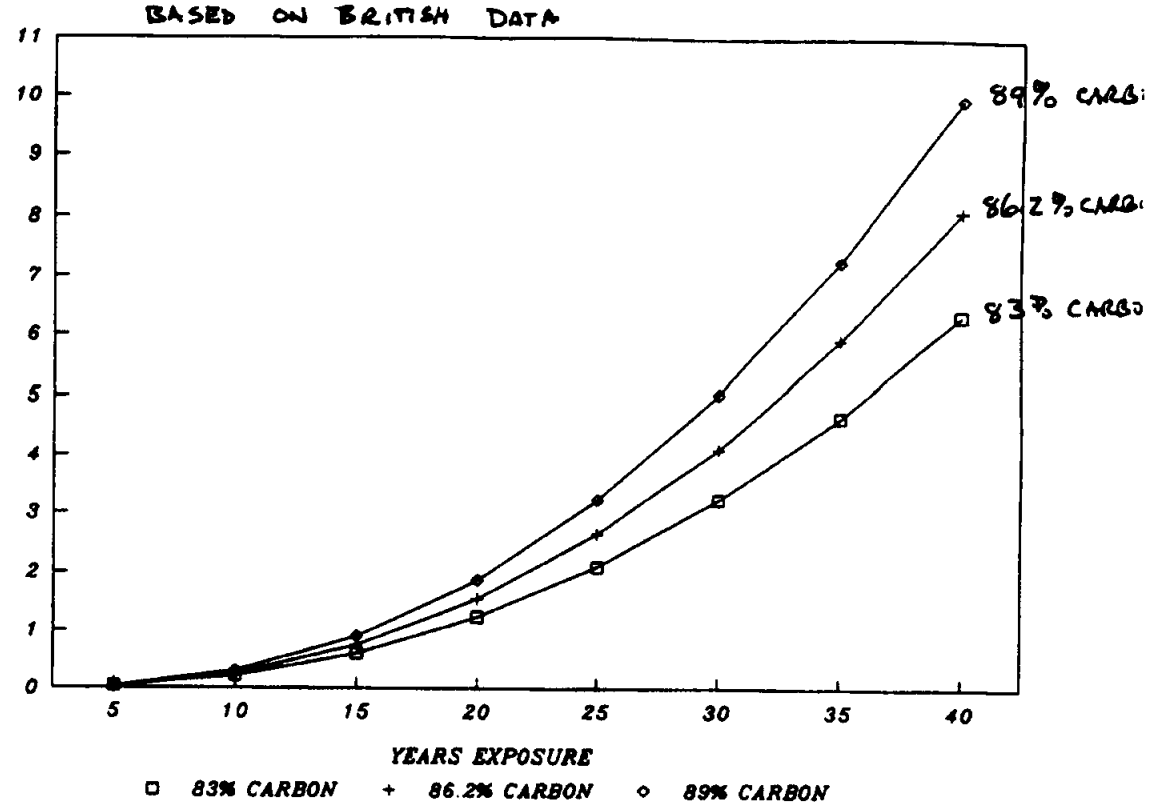
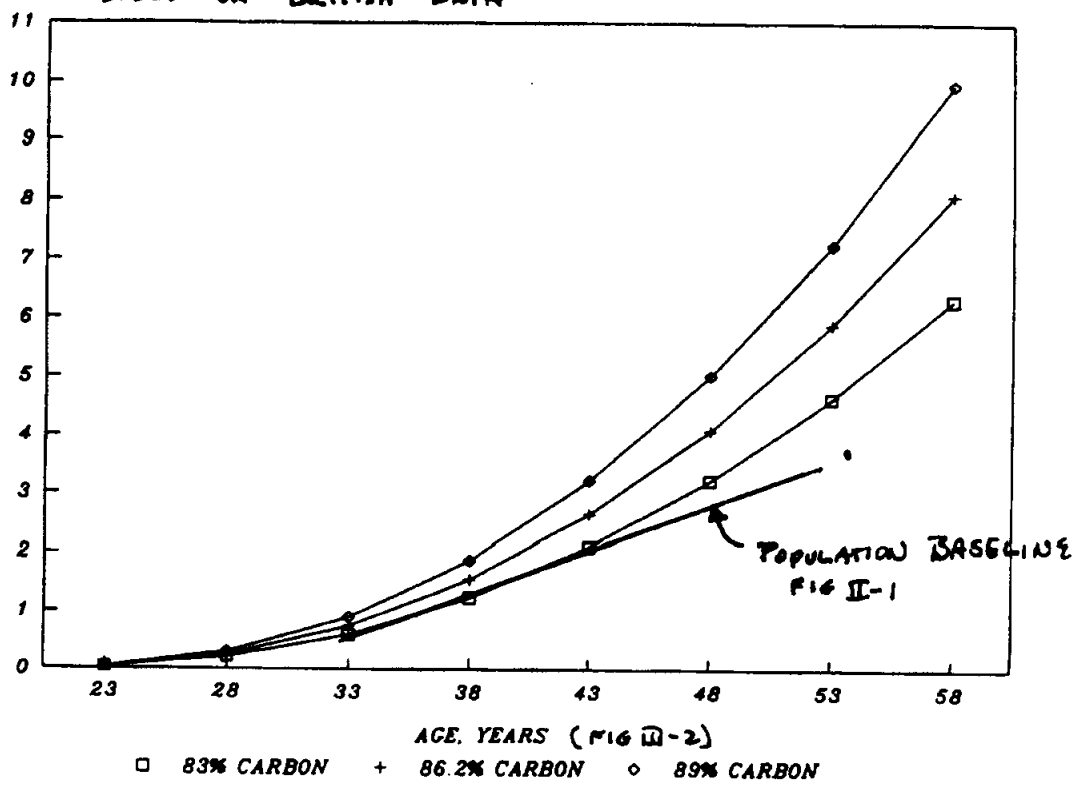


FIGURE VI-

PROBABILITY OF CWP 1+, 2MG EXPOSURE

BASED ON BRITISH DATA



FROM HURLEY & Mc.

FIGURE VI-6

1 MG EXPOSURE, PROBABILITY OF CWP 1+

BASED ON BRITISH DATA

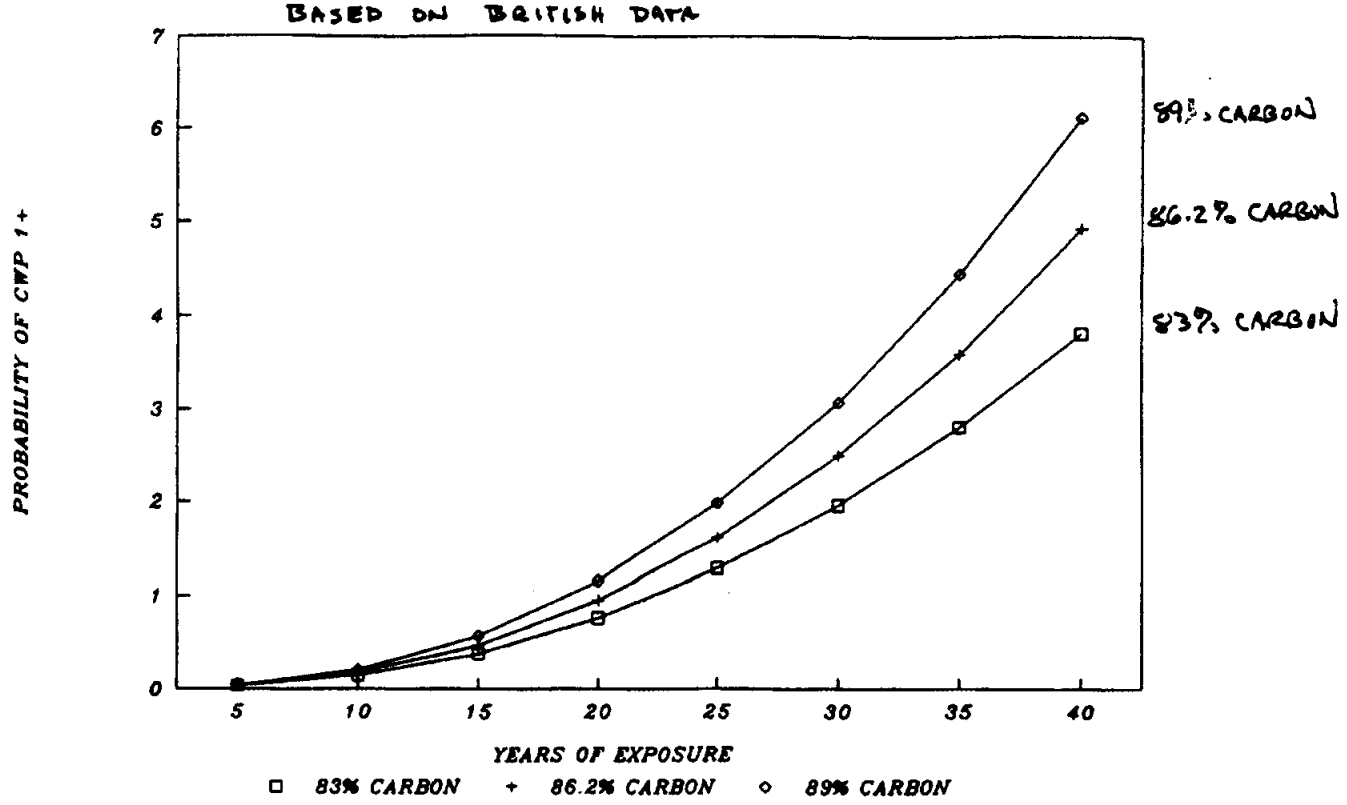
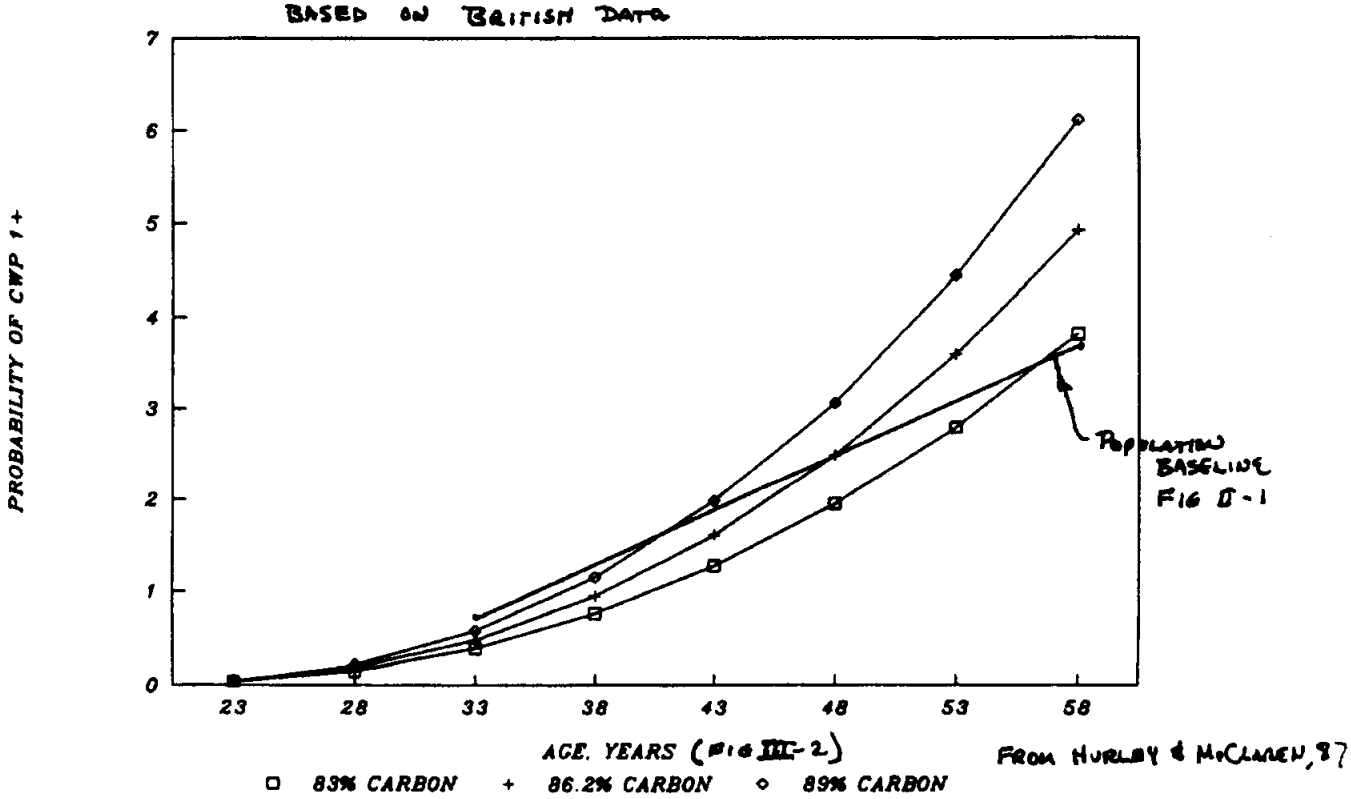


FIGURE VI-7

1 MG EXPOSURE, PROBABILITY OF CWP 1+

BASED ON BRITISH DATA



FROM HURLEY & McCLARKEN, 87

VII. Competing Causes of Morbidity and Mortality in Underground Mining

NIOSH appropriately points out in Figure 2.1 of the draft document that underground mining is a hazardous occupation. There are two fundamentally different methods of mining practiced in U.S. coal mines at the current time; longwall and continuous mining. Longwall mining is associated with moderately higher coal dust exposure levels than is continuous mining. A lower standard would likely result in a slower conversion from continuous mining to longwall mining or even a reversion to continuous mining from longwall mining.

Intuitively, it seems logical to assume that longwall mining would be safer than continuous mining methods. This is especially true with the advancement of support shield technology and the fact that fewer people are exposed to the face conditions resulting in less exposure to hazards. Safety advantages of modern longwall methods are seen in the following areas:

1) Less material handling associated with bolting supplies, rock dust, cable handling.

2) Less exposure to haulage hazards.

3) Less exposure to unsupported roof and less roof bolting.

4) Less exposure to pinch points or accidents associated with the relocation of equipment to new cutting positions.

Figure VII-1 shows the significant safety advantages of longwall over continuous mining techniques in 1990. Any change in coal dust exposure standards that would discourage longwall mining in favor of continuous mining would result in a net increase in morbidity and mortality for underground miners. A roof fall fatality is just as real as a fatality resulting from PMF. The major difference is that accidental deaths and disabilities generally occur at much younger ages than do deaths and disabilities from dust exposure. If years of life lost or years of useful life lost were compared in Figure VII-1, the difference between the two mining methods would be even more dramatic.

NIOSH appropriately does not look at economics when recommending exposure levels. ***They cannot ignore competing causes of morbidity and mortality that may result from lower recommended exposure levels.***

FIGURE VII-

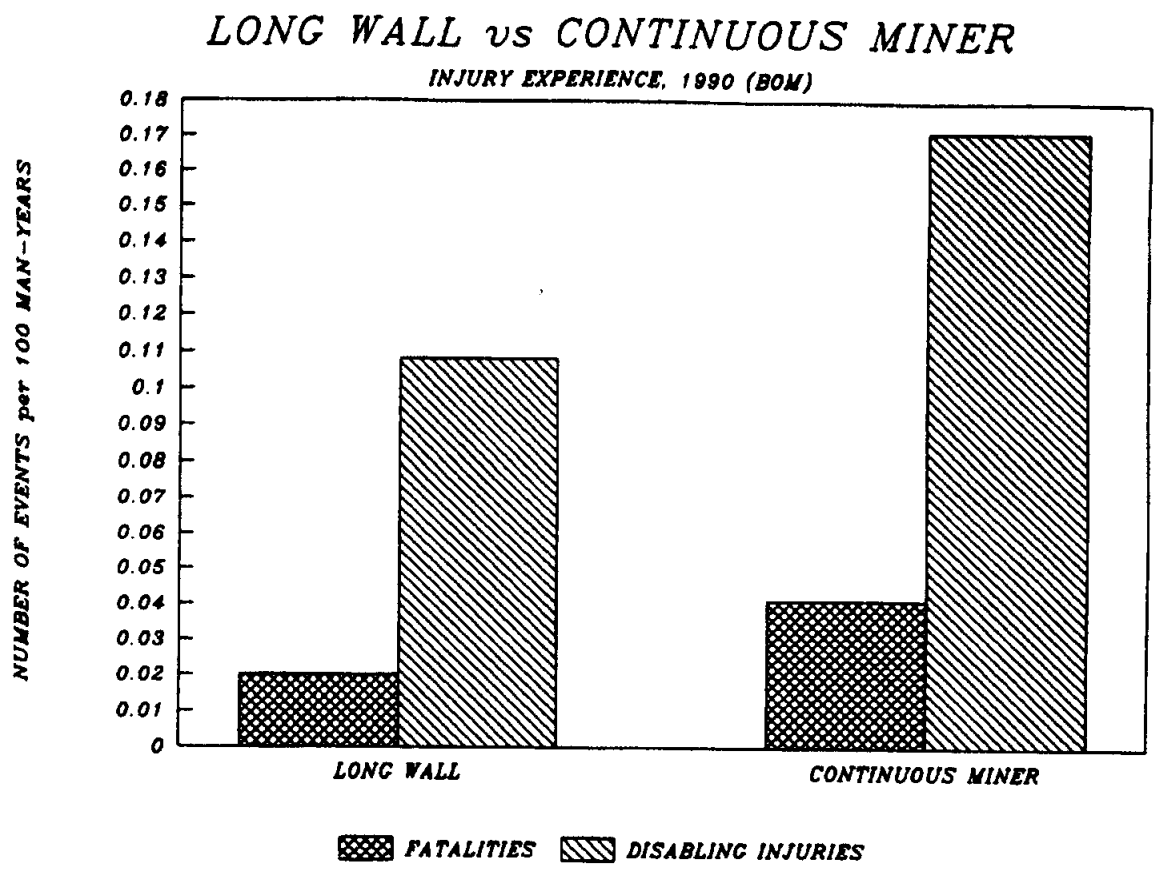
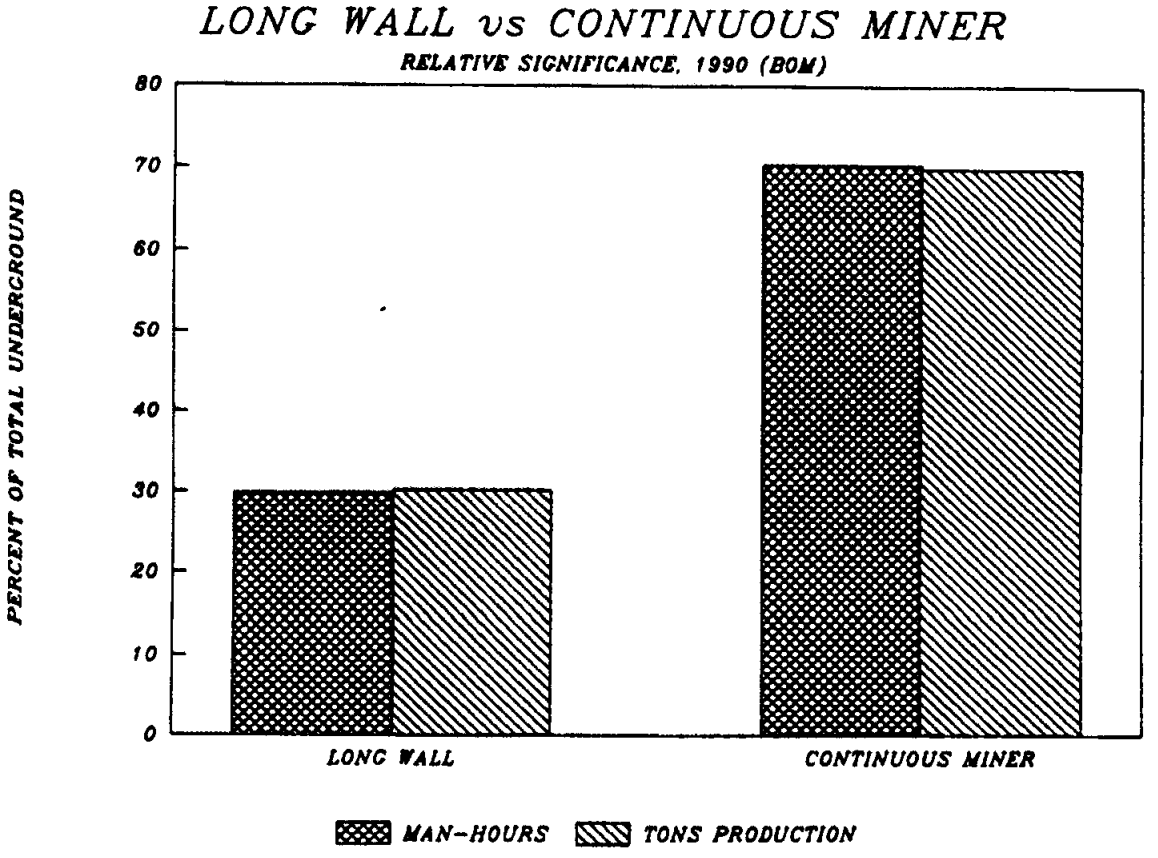


FIGURE VII-2



VIII. Use of Air Stream Helmets for Personal Respiratory Protection

The authors of the draft assert that a REL of 0.9 mg/m³ does not assure zero risk of coal miners developing simple or complicated pneumoconiosis or COPD. This is implicit in the no threshold model.

This is inconsistent with their statement that "for respirable coal dust levels < 0.9 mg/m³ or for crystalline silica levels < 0.05 mg/m³ no respirator is required...*respiratory protection should not be used routinely to prevent or minimize exposure*". This statement, actively discouraging the use of new generation respiratory protective technology in the presence of a quantifiable respiratory risk goes counter to every principle of preventive medicine that I have learned.

Miners should be encouraged to use and management should be provided with incentives to supply air helmets while maintaining dust levels as low as reasonably achievable with 1990's technology.

My staff has surveyed 12 coal mine operators to determine if they use air-stream helmets. Five companies responded positively and reported strong miner acceptance. Anecdotal replies include:

1) "Our miners would strike if we attempted to remove our air-stream helmets."

2) "Non-face miners are now asking for the helmets."

3) "Our injury rates (frequency and severity) have declined since the introduction of the air hats."

Injury rates at the surveyed mines reportedly have remained the same or have been reduced at all mines utilizing air hats. Specifically, eye injuries have been reduced and trip hazards remain unchanged.

Studies (NIOSH, MSHA, BOM) with first generation air stream helmets indicated very good user acceptance and protection factors of 100 under ideal conditions. Even in air velocities of 400-1600 FPM, protection factors of 1 and 4 respectively were observed. Two of the five mining companies that we surveyed reported that they had inside-outside air hat exposure data that indicate 95-97% decrease in actual exposure on longwall crews. These companies choose not to release their actual data.

With the first generation helmets, the motor, fan and filter were located in the helmet. Fourth and fifth generation air-stream helmets are now available. Upgrades from the first generation include:

1) Battery life increase from less than 8 hours to over 10 hours.

2) Movement of filters and motor to a belt pack which allows for more comfort and prolonged filter life.

3) Improved visor for peripheral vision.

4) Volumetric flow increase which decreases fogging potential, provides adequate flow rate for heavy labor, and prevents negative pressure when inhaling.

5) Redesign of the check seal and chin seal devices prevents aspiration or injection potential due to helmet orientation in higher air velocity situations.

NIOSH has not tested or released any test data on air-stream helmets or air hats since their field studies on the first generation equipment in the mid-1970s. This new technology has the potential to nearly eliminate pneumoconioses in any dusty workplaces. NIOSH has an obligation to adequately assess the effectiveness and miner acceptability of air-stream helmets and to recommend incentives to operators and miners to promote their use if proven effective and acceptable.

IX. Health Hazards Among Surface Miners

The authors allege (p. 27) that surface miners are at risk of developing simple CWP. While ignoring the 1963-1965 USPHS study reported by Lainhart, 1969 (see Table IV-1) they base their recommendation on:

1) Two NIOSH Health Hazard Evaluations - these studies indicated a possible increased risk of silicosis among drillers and driller helpers. This is not a surprising finding and enforcement of the existing silica standard would minimize this risk. NIOSH fails to recognize the advances in technology (water injection, pressurized cabs, etc.) that minimize current risk at surface mines. NIOSH did not document PMF among surface workers and numbers were too small for statistical significance.

"HHE's by their very nature, are rarely if ever representative of ordinary working conditions, are usually site specific, are often brought about by complaint or other extraordinary situations, generally involve high selectivity and thus are not normally generalizable" (Reger et al 1990)

2) Fairman et al, 1977

In this study, a prevalence of 2.5% CWP 1 was found among miners who had never worked underground. None of the cases CWP 2+ were related to surface mining operations and most were related to previous underground mining. Average age of surface miners with CWP 1 was not given. They concluded that *"current surface mining techniques are not likely to lead to the development of pneumoconiosis."*

Amandus et al 1984 revisited the same study and among bituminous surface miners without prior underground mining experience, found 2.4% prevalence of CWP 1 and no cases of CWP 2+, although a much higher prevalence was noted at the one anthracite surface mine.

3) Amandus et al 1989 reported on a study of 1061 males in the *anthracite region of Pennsylvania*. An excess prevalence of radiographic small rounded opacities was apparent among drillers and were suggestive of silica exposure. Tenure in other coal surface jobs or in coal cleaning plants was not correlated with significant health effects.

In summary, the only significant findings among the few surface mining studies cited indicate that:

1) ***Prior underground miners who work in surface mines have an excess prevalence of CWP.*** From the dates of the studies, these miners had most of there underground exposure before 1969. Extending a "Medical Surveillance" program to all surface miners based on this finding makes no more sense than extending the program to include all other occupations into which ex-underground miners have migrated.

2) ***A suggestion that anthracite surface miners have an increased risk of CWP.*** This finding cannot be generalized to bituminous surface mines due to the very well documented high risk of anthracite coal dust relative to U.S. bituminous coal dust. Additionally since anthracite production currently constitutes only 0.3% of coal production, it is relevant only to anthracite miners.

3) ***Surface drillers using old technology have an increased risk of silicosis.*** Enforcement of the existing silica standard (which is possible with 1993 mining technology) would drastically minimize this risk if not eliminate it entirely. This finding does not justify extending a "Surveillance Program" to all other surface miners.

X. COPD and Smoking Issues

The authors recommend a major change in the definition and scope of coal dust related conditions by including COPD. Whereas CWP and PMF have been clearly shown to be associated with coal dust exposure and not with cigarette smoking, *COPD is primarily a disease caused by smoking.*

Although the authors assert that the effect from smoking is additive and not synergistic with the effect from coal dust exposure, the distinction is irrelevant because of the small magnitude of the effect. Using regression coefficients reported by Attfield and Hoddus, I prepared Figures X-1 and X-2 to visualize the magnitude of a calculated effect.

This model fundamentally conflicts with NIOSH data (Section 4.1.2.2.3). NIOSH reports that: "In a longitudinal study of new coal miners (those who began working in mining since 1970), the average dust exposure related loss was 13.8 ML per gh/m^3 during the first 3 to 4 years of mining (at round 2 of the NSCWP), *with no additional exposure related loss over the next approximately 13 years (between rounds 2 and 4 of the NSCWP)*...the results of these studies suggest a nonlinear relationship between the loss of FEV1 and increasing cumulative dust exposure...."

Section 5.2.5.1 of the NIOSH draft states that: "The average 40 year loss of FEV1 with exposure to 2 mg/m^3 dust is about 100 ml; however, this average loss in lung function may mask a more severe decline in a sensitive subgroup of miners..*although studies of U.S. coal miners have not identified a sensitive subgroup*". This 100 ml loss is equivalent to the normal test to test variation for most adults on a single day.

NIOSH puts this 100 ml loss over a 40 year working life into perspective in Section 5.2.5.5"...to develop clinically significant airflow obstruction, the average rate of decline of FEV1 over adult life probably needs to be greater than 90 ml/yr..."

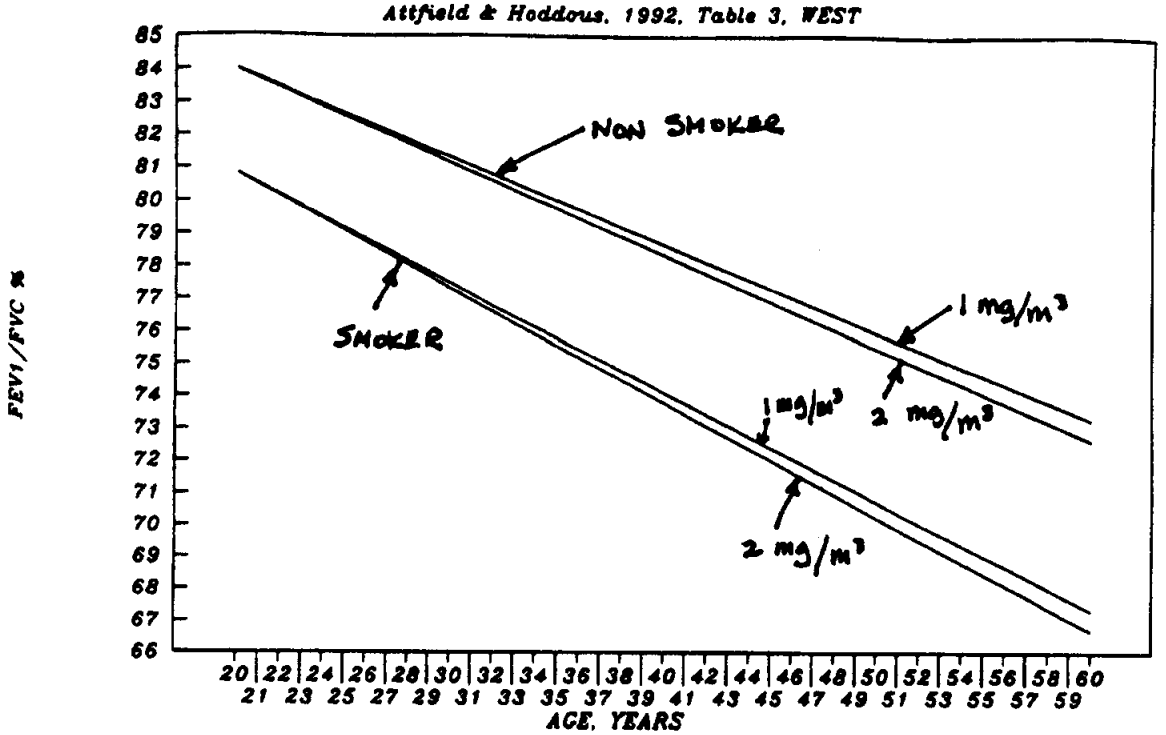
Several studies are documented in the draft that clearly indicate that airways disease caused by coal dust alone is not a cause of mortality among coal miners. Amandus, 1983 reported the study of appalachian bituminous coal miners. *The SMR for non-malignant respiratory disease among miners and ex-miners who were smokers was 304.9 compared with a SMR of 76.1 for nonsmokers.*

NIOSH states their goal of limiting exposure concentrations at which no worker will suffer impaired health or functional capacity or diminished life expectancy as a result of work experience. ***NIOSH not only fails to document that COPD from coal dust exposure causes impaired health, functional capacity or diminished life expectancy, they have documented that it doesn't meet these criteria.*** **Only if cigarette smoking is considered a work experience can COPD meet these criteria.**

FIGURE X-1

FEV1/FVC% VS AGE, CALCULATED

Attfield & Hoddous, 1992, Table 3, WEST

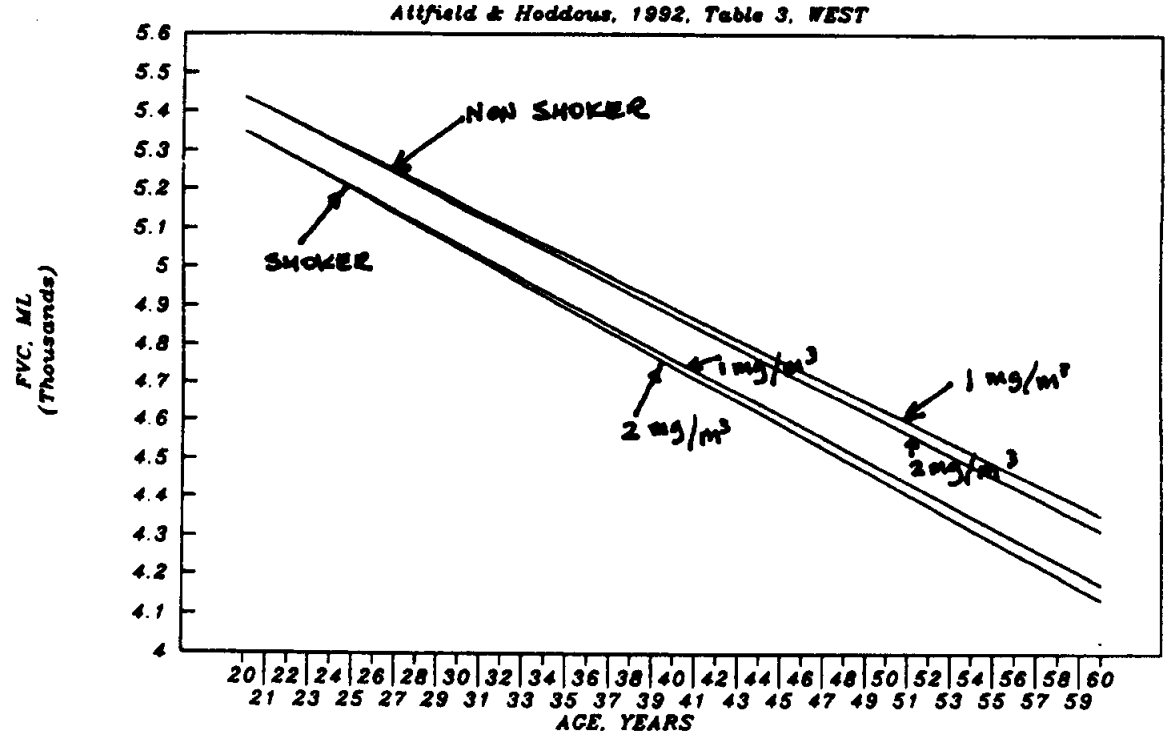


FROM REGRESSION COEFFICIENTS REPORTED BY ATTFIELD & HODDOUS 1992
ASSUMPTIONS: 68" WHITE MALE STARTING MINING & SMOKING @ AGE 20
SMOKES 1 PACK PER DAY, 2000 HRS/YEAR UNDERGROUND

FVC VS AGE, CALCULATED

FIGURE X-2

Attfield & Hoddous, 1992, Table 3, WEST



XI. Medical Surveillance vs Medical Screening

The authors fail to clearly distinguish between the purpose and capabilities of medical surveillance and medical screening. The criteria for effective screening are nicely laid out in Chapter 5. *Unfortunately neither CWP or COPD are appropriate diseases to screen for because:*

1) *Both can be prevented primarily by exposure control.*

2) *There is no indication that removal from coal dust exposure will alter the course of either process once they are diagnosed and neither are curable.*

3) *The tests do not have good specificity for coal dust related disease. Thus the predictive power of a positive test, either chest X-ray or pulmonary function test as proposed will be quite low.*

There is no indication that the current "surveillance" program has benefited any of the miners who have participated.

Medical surveillance is useful and necessary to establish the effectiveness of current and perhaps future standards. The effectiveness of the current program is hampered by:

1) Low and declining voluntary participation. A statistical mandatory random sampling would provide more useful data for this purpose.

2) Although the exposure data are collected by MSHA, they are intentionally not kept so that exposure data can be correlated with any observed adverse effects and help establish dose-response relationships necessary for optimal exposure limit setting.

3) The lack of meaningful feedback to mine operators that may indicate potential "hot spots" where there is increased incidence or prevalence of effects, thus allowing responsible operator to institute further exposure mitigating strategies.

4) The lack of pulmonary function data and a thorough respiratory questionnaire severely hampers the ability of the program to determine the effectiveness of the current standard..much less the need for a more stringent standard. The proposed respiratory

questionnaire in Appendix A is lacking in any questions regarding smoking history, the use of respiratory protection or hobbies.

Very few coal mine operators currently perform any medical screening or surveillance activities, partly because of the NCWXSP. Other segments of American industry have very active medical screening and surveillance programs (Conway et al, JOM, 1993) OSHA mandates that corporations perform medical surveillance examinations for a number of different potential exposures. A similar approach to "privatize" medical surveillance activities for underground coal miners and to maintain a NIOSH epidemiological function is much more practical and logical solution.

XII. Transfer Option - Fallacy and Philosophy

In Section 1.5 the authors recommend extending an option to a miner to allow him or her to transfer to "another position in an area of the mine where the concentration of respirable coal dust is as low as feasible....the transfer option shall be voluntary.." this is consistent with the current standard but differs in that:

1) The transfer is to an area where the concentration is as low as feasible...*essentially meaning transfer to a surface position since the definition of a mine has been extended in Section 1.1.2.*

2) The criteria for offering the option has been extended from Category 1 CWP to also include miners with pulmonary function test abnormalities.

In section 2.3.3.2 and 5.2.25.7.1 the authors clearly state that the transfer option is ineffective in preventing PMF and that *only 1 in 10,000 cases of PMF could be prevented if all eligible miners elected to transfer*...this statement is based upon extensive studies of British miners that show that *progression of CWP is not prevented by removal from the exposure.*

Furthermore, Category 1+ CWP is not necessarily permanent; fully 26/32 (81%) of miners with X-rays classified as CWP 1/0+ on round 1 of the NCS were classified as Category 0 in round 3 (8-10 years later) as shown in Figure II-2. *Is the transfer option to be rescinded when a miner reverts to Category 0? (Likewise is the transfer option to be rescinded if pulmonary function tests improve?)*

In section 5.2.5.7.1 the authors go on to state that with regard to airways obstruction, *"insufficient study has been done on the effectiveness of the transfer program to make specific conclusions"*. Incredibly they conclude that the only "reasonable alternative is to offer the miner the opportunity to continue working in an area with a lower dust concentration. This recommendation which has significant impact to mine operators is based on intuition and not on science.

In Section 5, NIOSH presents criteria to be used for transfer based on pulmonary function tests, but does not assess the practical impact o these criteria on a real working population. I used NIOSH criteria to analyze

pulmonary function test data that I had available to me on 1623 non-underground mining employees, all of which was collected under NIOSH standards. The results of my analysis are presented in Table XII-1 and the data are presented graphically in Figures XII-1 through XII-6. The recommendations for transfer would result in an estimated 12.4% of an average work force being offered a transfer option. I did not have smoking data available to correlate with the PFT data to determine the effect of smoking on meeting the criteria for a transfer option. Data are presented in Table 7.3 of the NIOSH draft that indicate that *smokers would be expected to have severe obstructive disease (FEV1 <65%) 7:1 over non-smokers*.

In 1992 the Americans with Disabilities Act (ADA) came into effect for most mine operators. This monumental piece of social legislation provides an appropriate framework to address a miner's ability to perform his or her job. The same criteria that need to be applied in the pre-placement situation are most appropriate:

1) *Can the miner perform the job with or without accommodations?*

2) *Does the miner have a medical condition that poses a direct threat to the health and safety of the individual or to others?*

Under the ADA and with the transfer option as proposed by NIOSH, a mine operator would have to hire a new miner if he/she meets the above conditions. If a new miner hired to work underground is found to have reduced pulmonary function tests or CWP, he or she would be granted a transfer option immediately.

The ADA provides the proper framework for making decisions regarding disability and accommodations while protecting miners from the fear of discrimination that has largely been responsible for 77% of letter carriers to date not exercising their option.

TABLE XII-1

ANALYSIS OF 1623 NON UNDERGROUND MINING EMPLOYEES

RESTRICTIVE CRITERIA

OBSTRUCTIVE CRITERIA

	NORMAL	MILD	MODERATE	SEVERE	SUM	%
NORMAL	1422	39	8	1	1470	90.6%
MILD	121	4	4	0	129	7.9%
MODERATE	19	2	2	0	23	1.4%
SEVERE	1	0	0	0	1	0.1%
SUM	1563	45	14	1	1623	
%	96.3%	2.8%	0.9%	0.1%	100.0%	

FAILURE OBSTRUCTIVE = 8.7%
FAILURE RESTRICTIVE = 3.0%
FAILURE COMBINED = 0.7%
OVERALL FAILURE = 12.4%

FIGURE XII-1

FEV1/FVC MALES

1488 NON MINING MALES

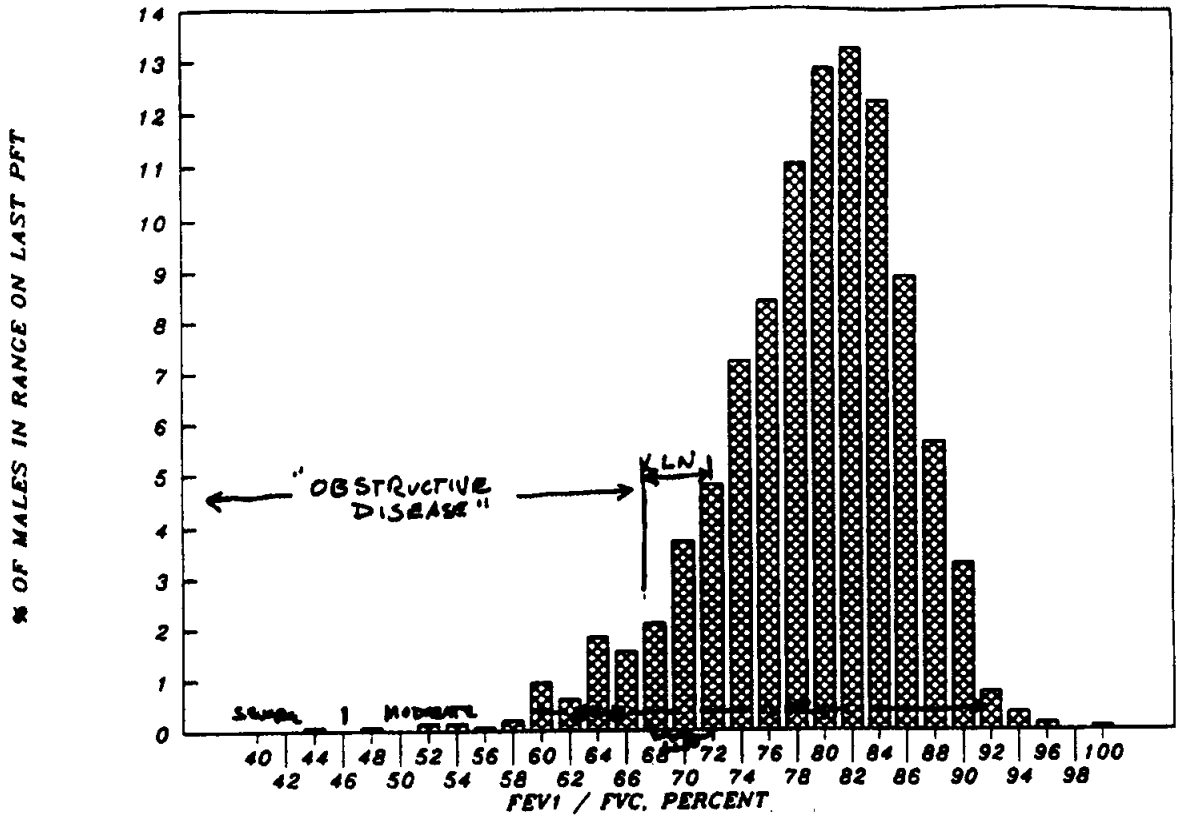
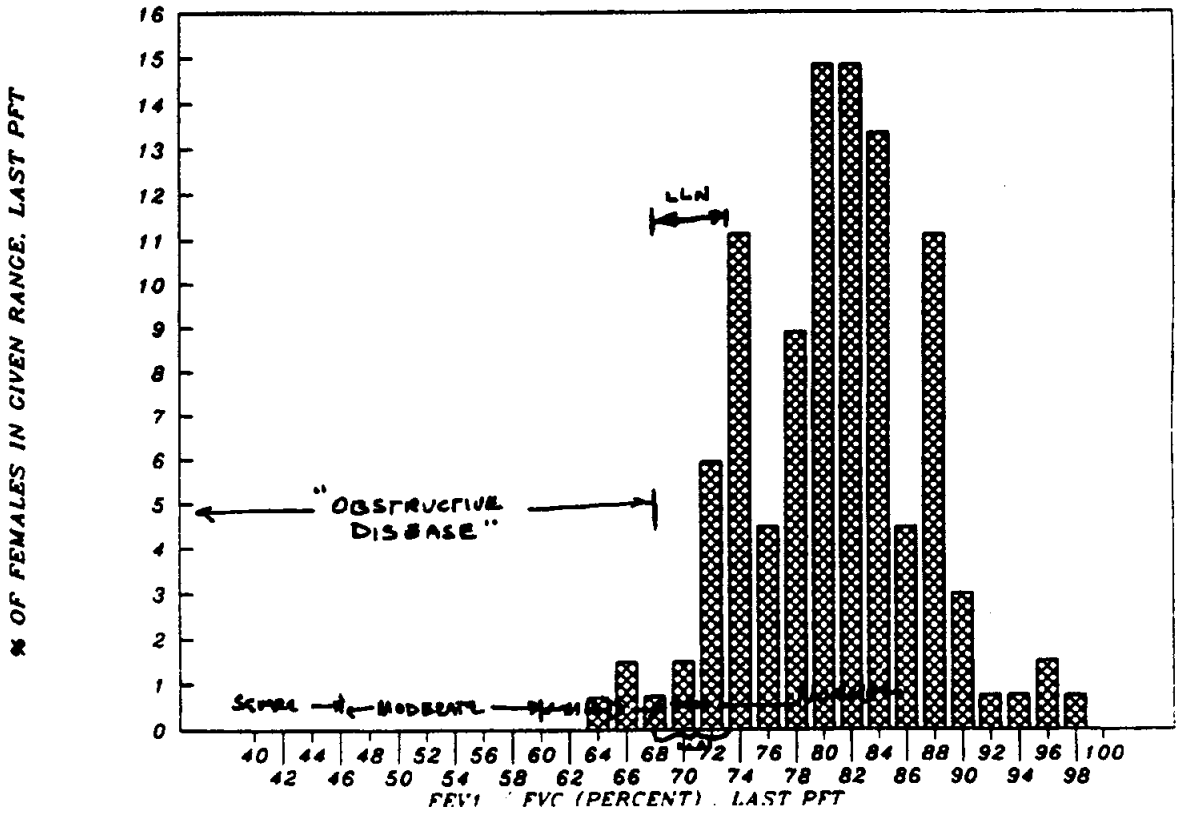


FIGURE XII-2

FEV1 / FVC FEMALES

NON MINING FEMALE EMPLOYEES. N=135



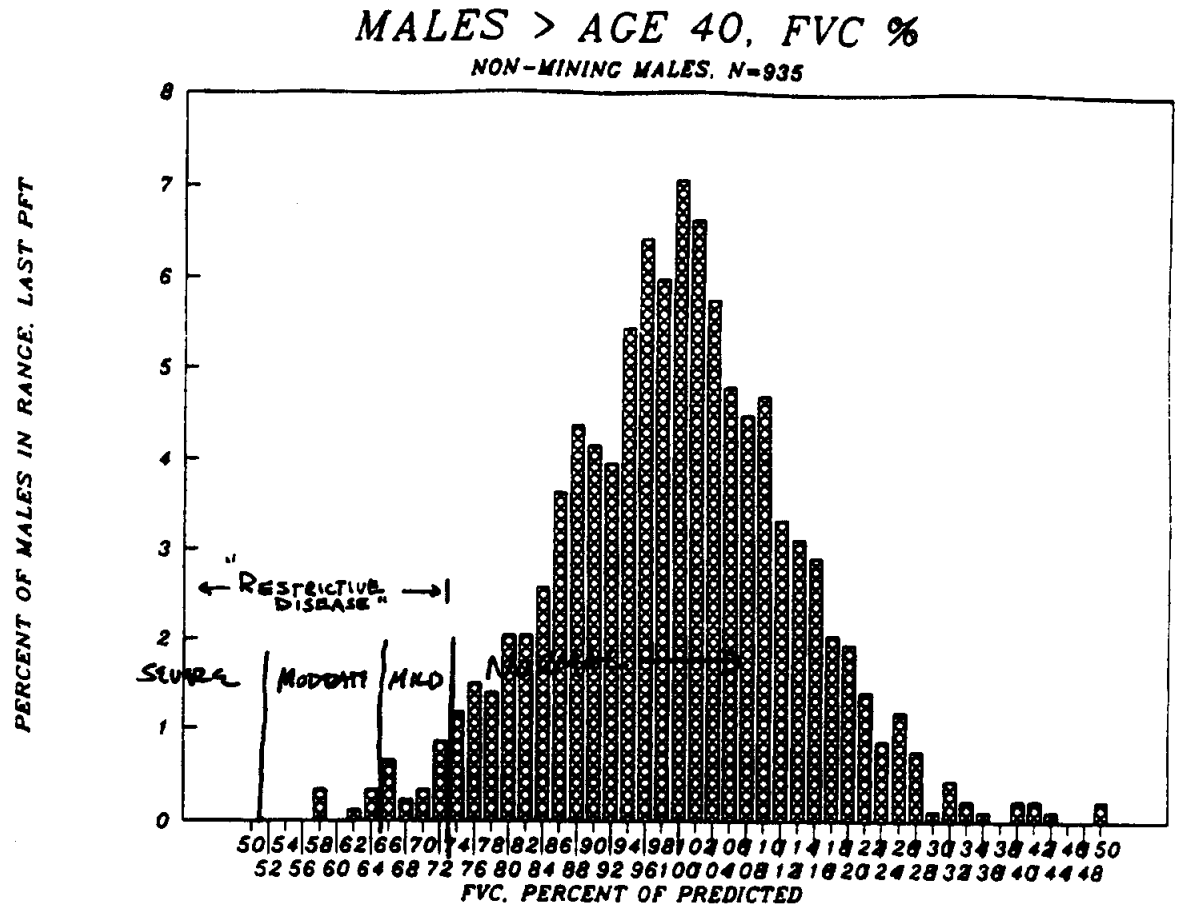
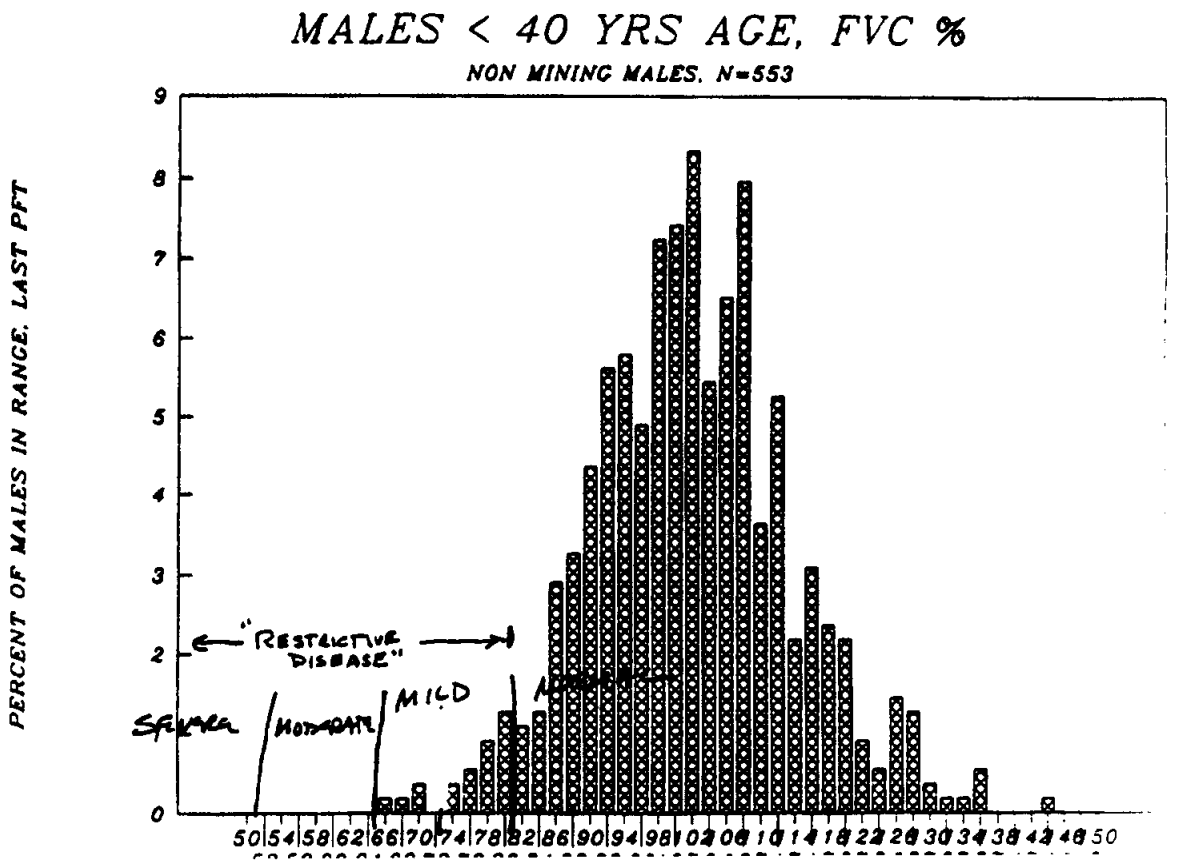

MALES > AGE 40, FVC %
NON-MINING MALES, N=935
PERCENT OF MALES IN RANGE, LAST PFT
"RESTRICTIVE DISEASE"
SEVERE
MODERATE
MILD
FVC, PERCENT OF PREDICTED

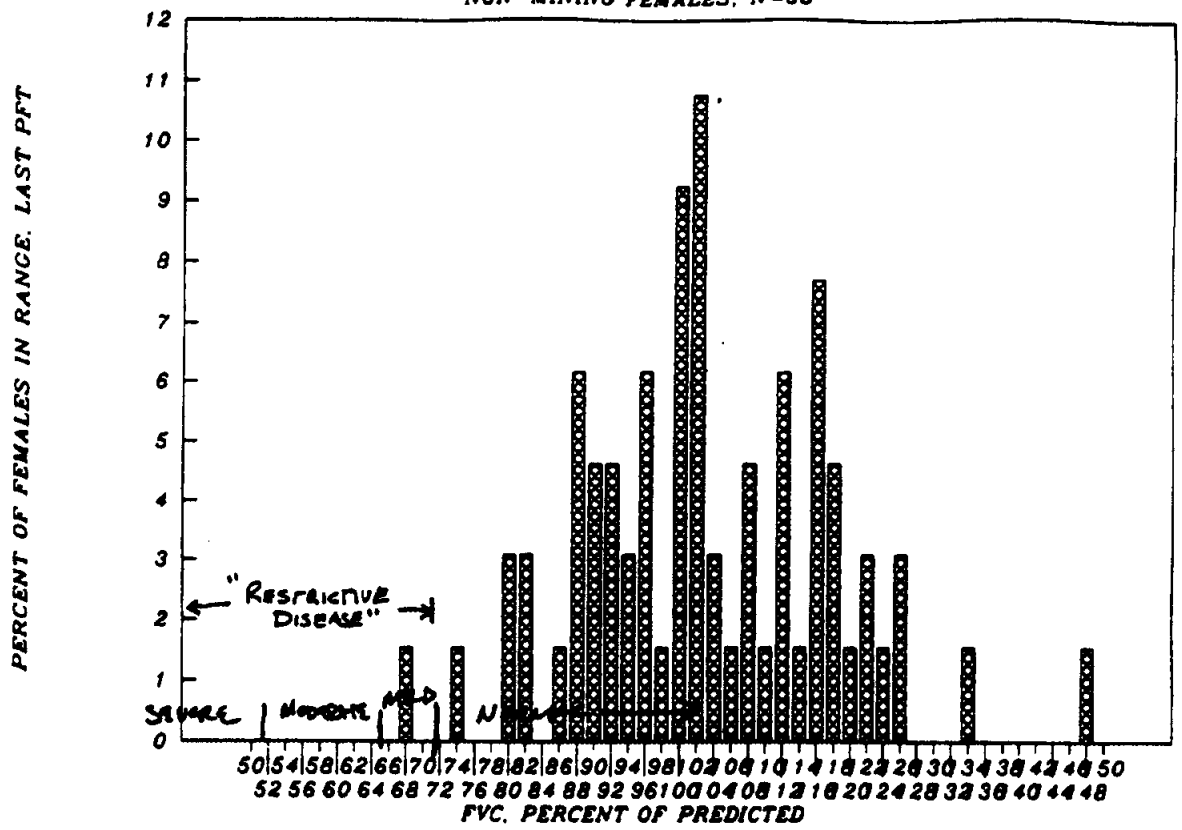
FIGURE 1


MALES < 40 YRS AGE, FVC %
NON MINING MALES, N=553
PERCENT OF MALES IN RANGE, LAST PFT
"RESTRICTIVE DISEASE"
MILD
MODERATE

FEMALES > AGE 40, FVC %

FIGURE XII-5

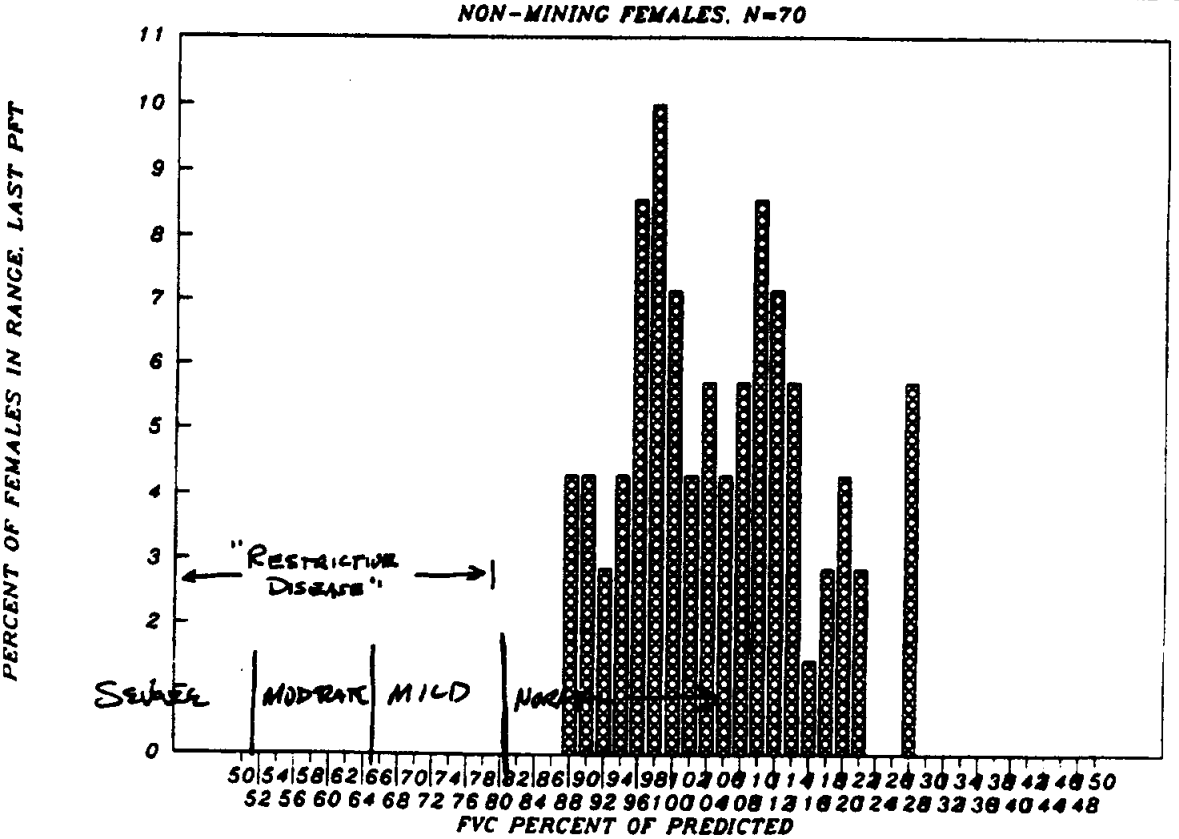
NON-MINING FEMALES, N=65



FEMALES < AGE 40, FVC %

FIGURE XII-6

NON-MINING FEMALES, N=70



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10. Energy Information Administration [1992] "The U.S. Coal Industry, 1970-1990: Two Decades of Change"

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12. Conway, H., Simmons, J., Talbert, T., [1993] "The Occupational Safety and Health Administration's 1990-1991, Survey of Occupational Medical Surveillance Prevalence and type of Current Practices" JOM 35 pages 659-700

a) BOM data regarding Longwall v.s. Continuous Miner injury statistics - Extracted from MSHA database.

b) Page 3, The Coal Chronicle, June, 1993

c) Section IV from EEOC Technical Assistance Manual for the Americans with Disabilities Act.

COAL MINE DATA FOR YEARS 1988-90 (LONGWALL) MINING
ONLY COAL MINERS HAVING ACCIDENTS FOR YEARS 1988-90

YEAR	TOTAL NO. MINES	TOTAL NO. ACCIDENTS	TOTAL MEN IN MINES	TOTAL MAN HOURS	TOTAL PRODUCTIONS	*IR NUMBER HOURS	*IR2 TOTAL PRODUCTION
1990	84	1,446	22,265	49,884,972	168,345,688	5.80	9.02
1989	82	1,377	22,401	46,114,344	146,858,328	5.97	9.43
1988	81	1,327	20,529	43,386,588	131,225,864	6.12	10.11

DEGREE OF INJURY FOR LONGWALL MINING

	DEGREE OF INJURIES 0	1	2	3,4,5	6	>=7	TOTAL
1990	282	5	27	936	236	40	1,446

COAL MINE DATA FOR YEARS 1988-90 (CONTINUOUS) MINING
ONLY COAL MINERS HAVING ACCIDENTS FOR YEARS 1988-90

YEAR	TOTAL NO. MINES	TOTAL NO. ACCIDENTS	TOTAL MEN IN MINES	TOTAL MAN HOURS	TOTAL PRODUCTIONS	*IR NUMBER HOURS	*IR2 TOTAL PRODUCTION
1990	814	8,304	57,166	117,918,320	370,922,432	14.08	22.39
1989	765	8,265	55,130	110,944,720	331,423,456	14.94	25.00
1988	745	9,056	55,359	112,379,912	317,823,984	16.09	28.37

DEGREE OF INJURY FOR CONTINUOUS MINING

	DEGREE OF INJURIES 0	1	2	3,4,5	6	>=7	TOTAL
1990	1,593	24	101	3,162	1,135	269	8,304

*IR = (NUMBER OF INJURY OCCURRENCES/NUMBER OF EMPLOYEE HOURS)*200,000
*IR2 = (NUMBER OF INJURY OCCURRENCES/TOTAL PRODUCTION)*1000000

You've come a long way ...

Air purifying helmet gives miners extra protection against respiratory ailments

By David T. Sibray

At least one West Virginia coal company is offering its miners the added protection of an air-purifying helmet, reaching above and beyond federal safety law.

The mine's superintendent says it makes him feel better to help the miners fight respiratory problems inherent in the industry.

"Hopefully, it will make people feel better and therefore increase production," said Jerry Swanson, superintendent of Eastern Associated Coal Co.'s Lightfoot No. 1 mine at Wharton.

"However, I watched my father-in-law die. It was a five-year ordeal, watching a loved one deteriorate to nothing. So I'd rather do this for my men," Swanson said.

Eastern supplied 25 of the state-of-the-art AH21 helmets to the miners at Lightfoot No.1. Each costs around $500, Swanson said.

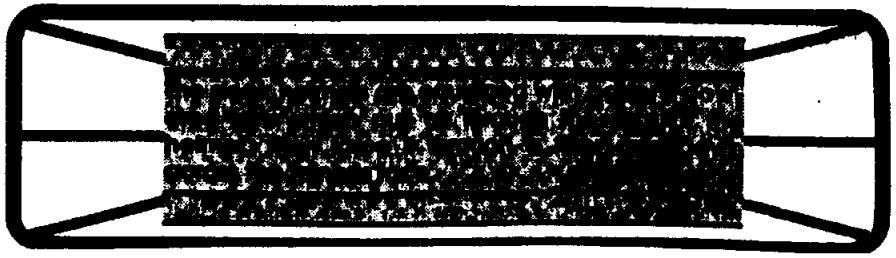
The sleek helmets are equipped with battery-powered fans which pull air through the rear of the helmet, then force it through a filter and down across the miner's face.

Although white when new, many miners soon paint them black.

Produced by Racal Health and Safety, Inc., of Frederick, Md., the AH21 filters 170 liters of air a minute.

Swanson said the company provided the helmets as an option, however he'd like to see all miners donning the helmet, were it possible.

The battery pack which runs the airflow system is relatively lightweight and can run for eight hours, according to a Racal spokesperson.



← Left

The Coal Chronicle/Rick Barbero

Tour guides at Beckley's Exhibition Coal Mine, Melvin Pack (left) and Steven Bilbrey illustrate the differences in an early miner's helmet, worn by Pack, and the state-of-the-art version provided to miners at Eastern Associated's Lightfoot No. 1 mine at Wharton.

APPENDIX

4.4 Establishing Job-Related Qualification Standards

The ADA does not restrict an employer's authority to establish needed job qualifications, including requirements related to:

- education;
- skills;
- work experience;
- licenses or certification;
- physical and mental abilities;
- health and safety; or
- other job-related requirements, such as judgment, ability to work under pressure or interpersonal skills.

Physical and Mental Qualification Standards

An employer may establish physical or mental qualifications that are necessary to perform specific jobs (for example, jobs in the transportation and construction industries; police and fire fighter jobs; security guard jobs) or to protect health and safety.

However, as with other job qualification standards, if a physical or mental qualification standard screens out an individual with a disability or a class of individuals with disabilities, the employer must be prepared to show that the standard is:

- **job-related and**
- **consistent with business necessity.**

Even if a physical or mental qualification standard is job-related and necessary for a business, if it is applied to exclude an otherwise qualified individual with a disability, the employer must consider whether there is a reasonable accommodation that would enable this person to meet the standard. The employer does not have to consider such accommodations in establishing a standard, but only when an otherwise qualified person with a disability requests an accommodation.

> For example: An employer has a forklift operator job. The essential function of the job is mechanical operation of the forklift machinery. The job has a physical requirement of ability to lift a

70 pound weight, because the operator must be able to remove and replace the 70 pound battery which powers the forklift. This standard is job-related. However, it would be a reasonable accommodation to eliminate this standard for an otherwise qualified forklift operator who could not lift a 70 pound weight because of a disability, if other operators or employees are available to help this person remove and replace the battery.

Evaluating Physical and Mental Qualification Standards Under the ADA

Employers generally have two kinds of physical or mental standards:

1. Standards that may exclude an entire class of individuals with disabilities.

   For example: No person who has epilepsy, diabetes, or a heart or back condition is eligible for a job.

2. Standards that measure a physical or mental ability needed to perform a job.

   For example: The person in the job must be able to lift x pounds for x hours daily, or run x miles in x minutes.

Standards that exclude an entire class of individuals with disabilities

"Blanket" exclusions of this kind usually have been established because employers believed them to be necessary for health or safety reasons. Such standards also may be used to screen out people who an employer fears, or assumes, may cause higher medical insurance or workers' compensation costs, or may have a higher rate of absenteeism.

Employers who have such standards should review them carefully. In most cases, they will not meet ADA requirements.

The ADA recognizes legitimate employer concerns and the requirements of other laws for health and safety in the workplace. An employer is not required to hire or retain an individual who would pose a "direct threat" to health or safety (see below). But the ADA requires an objective assessment of a particular individual's current ability to perform a job safely and effectively. Generalized "blanket" exclusions of an entire group of people with a certain disability prevent such an individual consideration. Such class-wide exclusions that do not reflect up-to-date

medical knowledge and technology, or that are based on fears about future medical or workers' compensation costs, are unlikely to survive a legal challenge under the ADA. (However, the ADA recognizes employers' obligations to comply with Federal laws that mandate such exclusions in certain occupations. [See Health and Safety Requirements of Other Federal or State Laws below.])

The ADA requires that:

- any determination of a direct threat to health or safety must be based on an individualized assessment of objective and specific evidence about a particular individual's present ability to perform essential job functions, not on general assumptions or speculations about a disability. (See Standards Necessary for Health and Safety: A "Direct Threat" below).

  > For example: An employer who excludes all persons who have epilepsy from jobs that require use of dangerous machinery will be required to look at the life experience and work history of an individual who has epilepsy. The individual evaluation should take into account the type of job, the degree of seizure control, the type(s) of seizures (if any), whether the person has an "aura" (warning of seizure), the person's reliability in taking prescribed anti-convulsant medication, and any side effects of such medication. Individuals who have no seizures because they regularly take prescribed medication, or who have sufficient advance warning of a seizure so that they can stop hazardous activity, would not pose a "direct threat" to safety.

Standards that measure needed physical or mental ability to perform a job

Specific physical or mental abilities may be needed to perform certain types of jobs.

> For example: Candidates for jobs such as airline pilots, policemen and firefighters may be required to meet certain physical and psychological qualifications.

In establishing physical or mental standards for such jobs, an employer does not have to show that these standards are "job related," justified by "business necessity" or that they relate only to "essential" functions of the job. However, if such a standard screens out an otherwise qualified individual with a disability, the employer must be prepared to show that the standard, as applied, is job-related and consistent with business

necessity under the ADA. And, even if this can be shown, the employer must consider whether this individual could meet the standard with a **reasonable accommodation.**

> For example: A police department that requires all its officers to be able to make forcible arrests and to perform all job functions in the department might be able to justify stringent physical requirements for all officers, if in fact they are all required to be available for any duty in an emergency.
>
> However, if a position in a mailroom required as a qualification standard that the person in the job be able to reach high enough to place and retrieve packages from 6-foot high shelves, an employer would have to consider whether there was an accommodation that would enable a person with a disability that prevented reaching that high to perform these essential functions. Possible accommodations might include lowering the shelf-height, providing a step stool or other assistive device.

Physical agility tests

An employer may give a physical agility test to determine physical qualifications necessary for certain jobs prior to making a job offer if it is simply an agility test and not a medical examination. Such a test would not be subject to the prohibition against pre-employment medical examinations if given to all similarly situated applicants or employees, regardless of disability. However, if an agility test screens out or tends to screen out an individual with a disability or a class of such individuals because of disability, the employer must be prepared to show that the test is job-related and consistent with business necessity and that the test or the job cannot be performed with a reasonable accommodation.

It is important to understand the distinction between physical agility tests and prohibited pre-employment medical inquiries and examinations One difference is that agility tests do not involve medical examinations or diagnoses by a physician, while medical examinations may involve a doctor.

> For example: At the pre-offer stage, a police department may conduct an agility test to measure a candidate's ability to walk, run, jump, or lift in relation to specific job duties, but it cannot require the applicant to have a medical screening before taking th agility test. Nor can it administer a medical examination before making a conditional job offer to this person.

Some employers currently may require a medical screening before administering a physical agility test to assure that the test will not harm the applicant. There are two ways that an employer can handle this problem under the ADA:

- the employer can request the applicant's physician to respond to a very restricted inquiry which describes the specific agility test and asks: "Can this person safely perform this test?"

- the employer may administer the physical agility test after making a conditional job offer, and in this way may obtain any necessary medical information, as permitted under the ADA. (See Chapter VI.) The employer may find it more cost-efficient to administer such tests only to those candidates who have met other job qualifications.

4.5 Standards Necessary for Health and Safety: A "Direct Threat"

An employer may require as a qualification standard that an individual not pose a "direct threat" to the health or safety of the individual or others, if this standard is applied to all applicants for a particular job. However, an employer must meet very specific and stringent requirements under the ADA to establish that such a "direct threat" exists.

The employer must be prepared to show that there is:

- **significant risk of substantial harm;**

- **the specific risk must be identified;**

- **it must be a current risk, not one that is speculative or remote;**

- **the assessment of risk must be based on objective medical or other factual evidence regarding a particular individual; and**

- **even if a genuine significant risk of substantial harm exists, the employer must consider whether the risk can be eliminated or reduced below the level of a "direct threat" by reasonable accommodation.**

Looking at each of these requirements more closely:

1. **Significant risk of substantial harm**

An employer cannot deny an employment opportunity to an individual with a disability merely because of a slightly increased risk. The employer must be prepared to show that there is a **significant risk, that is, a high probability of substantial harm**, if the person were employed.

The assessment of risk cannot be based on mere speculation unrelated to the individual in question.

> For example: An employer cannot assume that a person with cerebral palsy who has restricted manual dexterity cannot work in a laboratory because s/he will pose a risk of breaking vessels with dangerous contents. The abilities or limitations of a particular individual with cerebral palsy must be evaluated.

2. **The specific risk must be identified**

If an individual has a disability, the employer must identify the aspect of the disability that would pose a direct threat, considering the following factors:

- the **duration** of the risk.

  > For example: An elementary school teacher who has tuberculosis may pose a risk to the health of children in her classroom. However, with proper medication, this person's disease would be contagious for only a two-week period. With an accommodation of two-weeks absence from the classroom, this teacher would not pose a "direct threat."

- the **nature and severity** of the potential harm.

  > For example: A person with epilepsy, who has lost consciousness during seizures within the past year, might seriously endanger her own life and the lives of others if employed as a bus driver. But this person would not pose a severe threat of harm if employed in a clerical job.

- the **likelihood** that the potential harm will occur.

For example: An employer may believe that there is a risk of employing an individual with HIV disease as a teacher. However, it is medically established that this disease can only be transmitted through sexual contact, use of infected needles, or other entry into a person's blood stream. There is little or no likelihood that employing this person as a teacher would pose a risk of transmitting this disease.

and

- the imminence of the potential harm.

  For example: A physician's evaluation of an applicant for a heavy labor job that indicated the individual had a disc condition that might worsen in 8 or 10 years would not be sufficient indication of imminent potential harm.

If the perceived risk to health or safety arises from the behavior of an individual with a mental or emotional disability, the employer must identify the specific behavior that would pose the "direct threat".

3. **The risk must be current, not one that is speculative or remote**

The employer must show that there is a current risk -- "a high probability of substantial harm" -- to health or safety based on the individual's present ability to perform the essential functions of the job. A determination that an individual would pose a "direct threat" cannot be based on speculation about future risk. This includes speculation that an individual's disability may become more severe. An assessment of risk cannot be based on speculation that the individual will become unable to perform a job in the future, or that this individual may cause increased health insurance or workers compensation costs, or will have excessive absenteeism. (See Insurance, Chapter VII., and Workers' Compensation, Chapter IX.)

4. **The assessment of risk must be based on objective medical or other evidence related to a particular individual**

The determination that an individual applicant or employee with a disability poses a "direct threat" to health or safety must be based

on objective, factual evidence related to that individual's present ability to safely perform the essential functions of a job. It cannot be based on unfounded assumptions, fears, or stereotypes about the nature or effect of a disability or of disability generally. Nor can such a determination be based on patronizing assumptions that an individual with a disability may endanger himself or herself by performing a particular job.

> For example: An employer may not exclude a person with a vision impairment from a job that requires a great deal of reading because of concern that the strain of heavy reading may further impair her sight.

The determination of a "direct threat" to health or safety must be based on a reasonable medical judgement that relies on the most current medical knowledge and/or the best available objective evidence. This may include:

- **input from the individual with a disability;**
- **the experience of this individual in previous jobs;**
- **documentation from medical doctors, psychologists, rehabilitation counselors, physical or occupational therapists, or others who have expertise in the disability involved and/or direct knowledge of the individual with a disability.**

Where the psychological behavior of an employee suggests a threat to safety, factual evidence of this behavior also may constitute evidence of a "direct threat." An employee's violent, aggressive, destructive or threatening behavior may provide such evidence.

Employers should be careful to assure that assessments of "direct threat" to health or safety are based on current medical knowledge and other kinds of evidence listed above, rather than relying on generalized and frequently out-of- date assumptions about risk associated with certain disabilities. They should be aware that Federal contractors who have had similar disability nondiscrimination requirements under the Rehabilitation Act have had to make substantial backpay and other financial payments because they excluded individuals with disabilities who were qualified to perform their jobs, based on generalized assumptions that were not supported by evidence about the individual concerned.

Examples of Contractor Cases:

- A highly qualified experienced worker was rejected for a sheet metal job because of a company's general medical policy excluding anyone with epilepsy from this job. The company asserted that this person posed a danger to himself and to others because of the possibility that he might have a seizure on the job. However, this individual had been seizure-free for 6 years and co-workers on a previous job testified that he carefully followed his prescribed medication schedule. The company was found to have discriminated against this individual and was required to hire him, incurring large back pay and other costs.

- An applicant who was deaf in one ear was rejected for an aircraft mechanic job because the company feared that his impairment might cause a future workers' compensation claim. His previous work record gave ample evidence of his ability to perform the aircraft mechanic job. The company was found to have discriminated because it provided no evidence that this person would have been a danger to himself or to others on the job.

- An experienced carpenter was not hired because a blood pressure reading by the company doctor at the end of a physical exam was above the company's general medical standard. However, his own doctor provided evidence of much lower readings, based on measurements of his blood pressure at several times during a physical exam. This doctor testified that the individual could safely perform the carpenter's job because he had only mild hypertension. Other expert medical evidence confirmed that a single blood pressure reading was not sufficient to determine if a person has hypertension, that such a reading clearly was not sufficient to determine if a person could perform a particular job, and that hypertension has very different effects on different people. In this case, it was found that there was merely a slightly elevated risk, and that a remote possibility of future injury was not sufficient to disqualify an otherwise qualified person. (Note that while it is possible that a person with mild hypertension does not have an impairment that "substantially limits a major life activity," in this case the person was excluded because he was "regarded as" having such an impairment. The employer was still required to show that this person posed a "direct threat" to safety.)

"Direct Threat" to Self

An employer may require that an individual not pose a direct threat of harm to his or her own safety or health, as well as to the health or safety of others. However, as emphasized above, such determinations must be strictly based on valid medical analyses or other objective evidence related to this individual, using the factors set out above. A determination that a person might cause harm to himself or herself cannot be based on stereotypes, patronizing assumptions about a person with a disability, or generalized fears about risks that might occur if an individual with a disability is placed in a certain job. Any such determination must be based on evidence of specific risk to a particular individual.

> For example: An employer would not be required to hire an individual disabled by narcolepsy who frequently and unexpectedly loses consciousness to operate a power saw or other dangerous equipment, if there is no accommodation that would reduce or eliminate the risk of harm. But an advertising agency could not reject an applicant for a copywriter job who has a history of mental illness, based on a generalized fear that working in this high stress job might trigger a relapse of the individual's mental illness. Nor could an employer reject an applicant with a visual or mobility disability because of a generalized fear of risks to this person in the event of a fire or other emergency.

5. **If there is a significant risk, reasonable accommodation must be considered**

Where there is a significant risk of substantial harm to health or safety, an employer still must consider whether there is a reasonable accommodation that would eliminate this risk or reduce the risk so that it is below the level of a "direct threat."

> For example: A deaf bus mechanic was denied employment because the transit authority feared that he had a high probability of being injured by buses moving in and out of the garage. It was not clear that there was, in fact, a "high probability" of harm in this case, but the mechanic suggested an effective accommodation that enabled him to perform his job with little or no risk. He worked in a corner of the garage, facing outward, so that he could see moving buses. A co-worker was designated to

alert him with a tap on the shoulder if any dangerous situation should arise.

"Direct Threat" and Accommodation in Food Handling Jobs

The ADA includes a specific application of the "direct threat" standard and the obligation for reasonable accommodation in regard to individuals who have infectious or communicable diseases that may be transmitted through the handling of food.

The law provides that the U.S. Department of Health and Human Services (HHS) must prepare and update annually a list of contagious diseases that are transmitted through the handling of food and the methods by which these diseases are transmitted.

When an individual who has one of the listed diseases applies for work or works in a job involving food handling, the employer must consider whether there is a reasonable accommodation that will eliminate the risk of transmitting the disease through handling of food. If there is such an accommodation, and it would not impose an undue hardship, the employer must provide the accommodation.

An employer would not be required to hire a job applicant in such a situation if no reasonable accommodation is possible. However, an employer would be required to consider accommodating an employee by reassignment to a position that does not require handling of food, if such a position is available, the employee is qualified for it, and it would not pose an undue hardship.

In August 1991, the Centers for Disease Control (CDC) of the Public Health Service in HHS issued a list of infectious and communicable diseases that are transmitted through handling of food, together with information about how these diseases are transmitted. The list of diseases is brief. In conformance with established medical opinion, it does not include AIDS or the HIV virus. In issuing the list, the CDC emphasized that the greatest danger of food-transmitted illness comes from contamination of infected food-producing animals and contamination in food processing, rather than from handling of food by persons with infectious or communicable diseases. The CDC also emphasized that proper personal hygiene and sanitation in food-handling jobs were the most important measures to prevent transmission of disease.

The CDC list of diseases that are transmitted through food handling and recommendations for preventing such transmission appears in Appendix C.

4.6 Health and Safety Requirements of Other Federal or State Laws

The ADA recognizes employers' obligations to comply with requirements of other laws that establish health and safety standards. However, the Act gives greater weight to Federal than to state or local law.

1. Federal Laws and Regulations

The ADA does not override health and safety requirements established under other Federal laws. If a standard is required by another Federal law, an employer must comply with it and does not have to show that the standard is job related and consistent with business necessity.

> For example: An employee who is being hired to drive a vehicle in interstate commerce must meet safety requirements established by the U.S. Department of Transportation. Employers also must conform to health and safety requirements of the U.S. Occupational Safety and Health Administration (OSHA).

However, an employer still has the obligation under the ADA to consider whether there is a reasonable accommodation, consistent with the standards of other Federal laws, that will prevent exclusion of qualified individuals with disabilities who can perform jobs without violating the standards of those laws.

> For example: In hiring a person to drive a vehicle in interstate commerce, an employer must conform to existing Department of Transportation regulations that exclude any person with epilepsy, diabetes, and certain other conditions from such a job.
>
> But, for example, if DOT regulations require that a truck have 3 grab bars in specified places, and an otherwise qualified individual with a disability could perform essential job functions with the assistance of 2 additional grab bars, it would be a reasonable accommodation to add these bars, unless this would be an undue hardship.

The Department of Transportation, as directed by Congress, currently is reviewing several motor vehicle standards that require "blanket" exclusions of individuals with diabetes, epilepsy and certain other disabilities.

2. State and Local Laws

The ADA does not override state or local laws designed to protect public health and safety, except where such laws conflict with ADA requirements. This means that if there is a state or local law that would exclude an individual with a disability for a particular job or profession because of a health or safety risk, the employer still must assess whether a particular individual would pose a "direct threat" to health or safety under the ADA standard. If there is such a "direct threat," the employer also must consider whether it could be eliminated or reduced below the level of a "direct threat" by reasonable accommodation. An employer may not rely on the existence of a state or local law that conflicts with ADA requirements as a defense to a charge of discrimination.

> For example: A state law that required a schoolbus driver to have a high level of hearing in both ears without use of a hearing aid was found by a court to violate Section 504 of the Rehabilitation Act, and would violate the ADA. The court found that the driver could perform his job with a hearing aid without a risk to safety.

(See further guidance on Medical Examinations and Inquiries in Chapter VI.)

Degree of injury is coded on a PER INJURY basis.

DEGREE	DEFINITION
1	Death Fatal
2	Permanent Total or permanent partial disability
3	Days away from work only
4	Days away from work and days of restricted activity
5	Days of restricted work activity only
6	Injuries that do not result in death, nor days away from work, nor days of restricted work activity.
7	Occupational illnesses not classified 1 thru 6.
8	Fatal and nonfatal injuries due to natural causes to employees on company business.
9	Fatal and nonfatal cases involving nonemployees on or off mine property
10	All other cases (includes first aid)