PLAINTIFF'S
EXHIBIT
KRC-227

Epidemiology

- First well documented case of pulmonary asbestosis reported in 1906 in an asbestos textile worker, the sole survivor of 10 men in an asbestos carding room. (Murray)

- Pancoast reported 1917, 17 cases of pulmonary fibrosis in a Pa. asbestos plant.

- By 1930, 75 cases had been reported.

- 1928 British Ministry of Labor studied radiographs of 363 workers engaged in asbestos textile manufacturing -- 95 (26.2%) had pulmonary fibrosis. Of those with 20 or more years service, 80% had fibrosis. Other studies in US confirmed findings.

- USPHs did first detailed study of asbestos workers in US in 1937, on 511 workers. A positive dose response relationship was found between exposure and clinical symptoms.

- From this observation, an occupational exposure limit of 5×10^6 fibers per cubic foot (177 $fccm^{-1}$) was established. NEW STD = 0.1 f/cc

- First suggestion of relationship between asbestos and lung cancer came in 1937 both in US and UK when cancer of lung was found in 3 asbestos workers who had died of asbestosis.

- Confirmed in 1947 by Doll who studied 113 textile workers exposed more than 20 years. There were 11 deaths from lung cancer when only 0.8 was expected.

- Conclusive evidence of relationships between mesothelioma of pleura and asbestos did not come until 1960 when Wagner reported on 33 mesotheliomata in crocidolite miners in South Africa.

- Both pleural and parenchymal x-ray changes are time and dose dependent.

- Obstructive airway disease may be evident many years before x-ray changes are present and pulmonary fibrosis, etc., may continue to progress after removal from exposure.

- Selikoff (1979) noted 4 fold increases in lung cancer among 17,800 asbestos insulation workers. Also noted that mesothelioma more strongly associated with exposure to amosite and crocidolite.

- Selikoff in same study demonstrated that latency period exceeds 15 years in lung cancer after asbestos exposure, while latency for mesothelioma is 25-40 years.

- See chart for combined risk with smoking.

- Study has demonstrated that there is no threshold below which there is no risk.

- Dement has shown a 2 fold increase in lung cancers mortality after cumulative exposures of 27 fiber years or 10 years at 2.7 fibers/cc, etc.

- Pleural plaques associated with SMR of 2.5.

No CURE — 100% FATAL

ERG

10/6/86

PPG / TYLER ≈ 500 PERSONS.

>3μφ x >5μ LENGTH

L/D ≥ 3/1

HEALTH EFFECTS

ASBESTOSIS

- Diffuse Interstitial Fibrosis of the Lung
- Radiographic Abnormalities
- Physical Symptoms
  - Breathlessness
  - Cough
  - Pain or Tightness in Chest
- Associated Diseases
  - Does not contribute to TB or Bronchitis

- Medical Examinations
  - OSHA Requirements
    - Chest X-Ray
    - Pulmonary Function Testing
  - Medical Symptoms
    - Radiographic Abnormalities
    - Decrease in Lung Volume & Flows
    - Rales
    - Restricted Chest Motion
    - Pleural Effusion

EPIDEMIOLOGY: ASBESTOSIS

Selikoff; radiographic evidence; 1117 insulation workers

Years worked	Percent with asbestosis
<1 - 9	10.4
10 - 19	44.1
20 -29	72.8
>40	94.2

Note: Asbestosis mortality increased 2.8x if smoked.

DMM

DIFFUSE MALIGNANT MESOTHELIOMA (RARE)

1. SIGNAL TUMOR OF ASBESTOS EXPOSURE
2. NEARLY 85% OF DMM CASES HAVE HISTORY OF ASBESTOS EXPOSURE
3. NORMAL (?) INCIDENCE RATE = 0.24%
4. WORKER INCIDENCE RATE ~10%
5. LATENCY PERIOD ~ 35 - 40 YEARS
6. NO ASSOCIATION WITH CIGARETTE SMOKING

STEVE MCQUEEN
ZINKS-SHIPYARD

1A 187328

EPIDEMIOLOGY: LUNG CANCER

Group	Deaths	Expected
113 (+20 yrs./asbestosis)	11	0.8
632 (insulation workers)	93	13.3
933 (amosite factory)	84	13.4
17,800 (insulation workers)	486	105.6
544 (Quebec chrysotile miners)	28	11.1
(Quebec chrysotile miners)	3x max. exp. vs. min. exp.	

Conclusion: Latency period of ~ 20 years before increase in cancer noted.