RECEIVED JUL 12 1972 (110)

BOSTON UNIVERSITY MEDICAL CENTER

BOSTON UNIVERSITY SCHOOL OF MEDICINE

80 EAST CONCORD STREET, BOSTON, MASSACHUSETTS 02118

Thoracic Services

JUL 27 1972

July 7, 1972

TO: Dr. Thomas H. Davison
Dr. Ray Huffman
Mr. Clifford L. Shockley
Mr. John F. Mall

FROM: Dr. Edward A. Gaensler

RE: Health Examination, Employees of J.-M. Billerica Plant 1971/72

Enclosed you will find a computer summary including years of J.-M. employment, date, age, and some notations concerning history, physical examination, pulmonary function, x-ray diagnosis and "other significant diseases concerning 65 individuals that we examined during our survey. Two of these individuals subsequently had additional very extensive arterial blood, alveolar gas and diffusion studies at rest and during exercise.

Concerning x-ray examination, we have reviewed all old films made available and have classified our present films according to the new UICC/Cincinnati classification. The type of infiltration is indicated under p, q, r (there were none), under s, t, u or linear shadows "1" representing very fine shadows, "2" coarser shadows that do not obliterate normal lung markings and "3" very coarse shadows (there were none). Also indicated is a finding of ground-glass densities that we think of great significance. Pleural involvement is indicated as well. The last column "overall severity" is according to the UICC/Cincinnati classification. For example, "22" stands for 2/2.

Our definition of asbestosis: In a letter by Dr. Huffman of 2/16/72 it is stated that "all cases of asbestosis, whether slight, moderate or severe, must be reported to the Federal Government within 48 hours of the diagnosis." This may well be the law. However, our experience indicates that with presently available criteria a diagnosis of "slight asbestosis" cannot be made with any degree of certainty. Indeed, in a shipyard survey that we published in the NEJM in December, 1971 it was shown that a diagnosis of "slight asbestosis" occurred almost as often in a group of unexposed controls than in a group of exposed pipe coverers. We have

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therefore limited our diagnosis to moderate (there were 8 such individuals) and severe (there were no such individuals). We base our diagnosis of asbestosis on the following factors: a chest radiograph compatible with a diagnosis of asbestosis of severity 2/1 or greater according to the UICC classification; typical dry rales with a "close-to-the-ear" sound (cellophane rales) heard in two or more places (2+); trauma that, according to the Fletcher classification is 2+ or more severe; a vital capacity that is less than 80% of predicted according to the Kory formula and a single breath diffusing capacity that is less than 80% of predicted according to our own normal standards; and definite finger clubbing. Any individual that had three or more of these six clinical criteria was considered to have asbestosis, the severity of "moderate" or "severe" being based on the severity of these abnormalities particularly the chest roentgenogram.

Individuals with moderately advanced asbestosis: 8 (12.3%)

Humphreys
Pimental
Fortin
Hewitt
Couture
Lewis
Haybutt
Clark

Among these individuals there were the following symptoms and signs: An x-ray of 2/1 or more severe (8), a single breath diffusing capacity less than 80% of predicted (8), vital capacity less than 80% of predicted (3), marked clubbing (3), dry rales (4), and dyspnea Grade 2 or more (1). This group is remarkable only because of the low prevalence of shortness of breath. Among these 8 individuals one had 5 criteria, 5 had 4 criteria, and 2 had 3 of the criteria.

You will note that a number of individuals, particularly among those exposed for more than 10 years, had one or two of the criteria. The significance of these, particularly of an isolated reduction of vital capacity or diffusing capacity is not clear at the moment and the solution of this problem is one of our principal research efforts.

Three other individuals deserve special comment:

4818, Mr. Shattuck, had 4 of the criteria including clubbing, a vital capacity of 67%, a diffusing capacity of 64% and a 2/1 x-ray. He has been employed at J.-M. for 32 years. However, he had chest trauma as a child with many fractured ribs, had an abnormal x-ray while in the service in 1940 and presently has an asymmetrical chest wall with extensive pleural calcifications on the side of the old trauma. In addition he also has some degree of obstructive lung disease. We feel that this man most likely has moderately advanced asbestosis particularly because of the finger clubbing but that evaluation of his other data is impossible in the light of his chest trauma and calcifications.

4855, Mr. Guillemette: This patient had a 2/1 x-ray, and a diffusing capacity of only 48%. However, he has been employed at J.-M. for only 7 years and his pre-employment x-ray showed exactly the same 2/1 changes as his present film does. He was employed at a fertilizer plant for many years with heavy dust exposure with a great variety of minerals. We conclude that this man has interstitial pneumonitis of unknown etiology.

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4028, Sinard: This man has a vital capacity of 79%, a diffusing capacity of 67% and a 1/2 x-ray. In other words, he has only 2 of the criteria mentioned above. He has been employed at J.-M. only 11 years and his pre-employment film at that time showed exactly the same slight changes that are seen now. He also had a markedly elevated right diaphragm 11 years ago and now. We conclude that this man has minimal pulmonary fibrosis or interstitial pneumonitis of unknown etiology.

Other Pulmonary Disease:

Chronic Bronchitis	10	(4 with asbestosis)
Emphysema	8	(1 with asbestosis)
Bronchial Asthma (asymptomatic)	2	
Acute Bronchopneumonia	1	
Severe Chest Trauma Sequellae	1	(with ? asbestosis)

Other Important Disease:

Marked Obesity	5
Hypertension	8
ASHD with or without Angina	4
Rheumatoid Arthritis	2
Diabetes	1
Idiopath. Hypoglycemia	1
Duodenal Ulcer	1
Thyrotoxicosis (Treated)	1
Glaucoma (Treated)	1

Suggestions for Re-Evaluation:

Mr. Mall has discussed with me a suitable schedule for future re-evaluation. From the three attached tables you will note that virtually all of the above-mentioned abnormalities, both as isolated findings and combined for "asbestosis," occurred in men employed for 10 years or more. We would suggest, therefore, that all men employed for 10 or more years have an annual re-evaluation, in groups of 4, approximately during the same months that they were seen in 1971 or 1972. This would represent approximately two-thirds of the group. In addition, we would suggest that we see all men who have been employed one year or more and who have not been seen previously. As for the remainder, I would think that examination every other year or possibly every three years should suffice. Previous surveys at other plants suggest that probably every three years would be a more suitable interval.

Other Studies:

During this survey we made two-K and three-K x-ray magnification studies of the right lower half of the lung field of all workers. These films are now being interpreted by a group that is not familiar with the age or exposure history of these individuals. You will be informed if this additional study should prove rewarding. All men also had casts made of their right index finger. It does not appear at the moment that various quantitative morphometric studies of these casts will be more rewarding than simple inspection by a knowledgeable physician. All of the studies included here were performed by a small on-line computer that prepared the spirometer, added gases, switched valves, read gas concentrations and calculated and reported all of the results. Also in this group, all the data were subsequently recalculated by hand. Among the 46 measurements made in each of the 63 individuals

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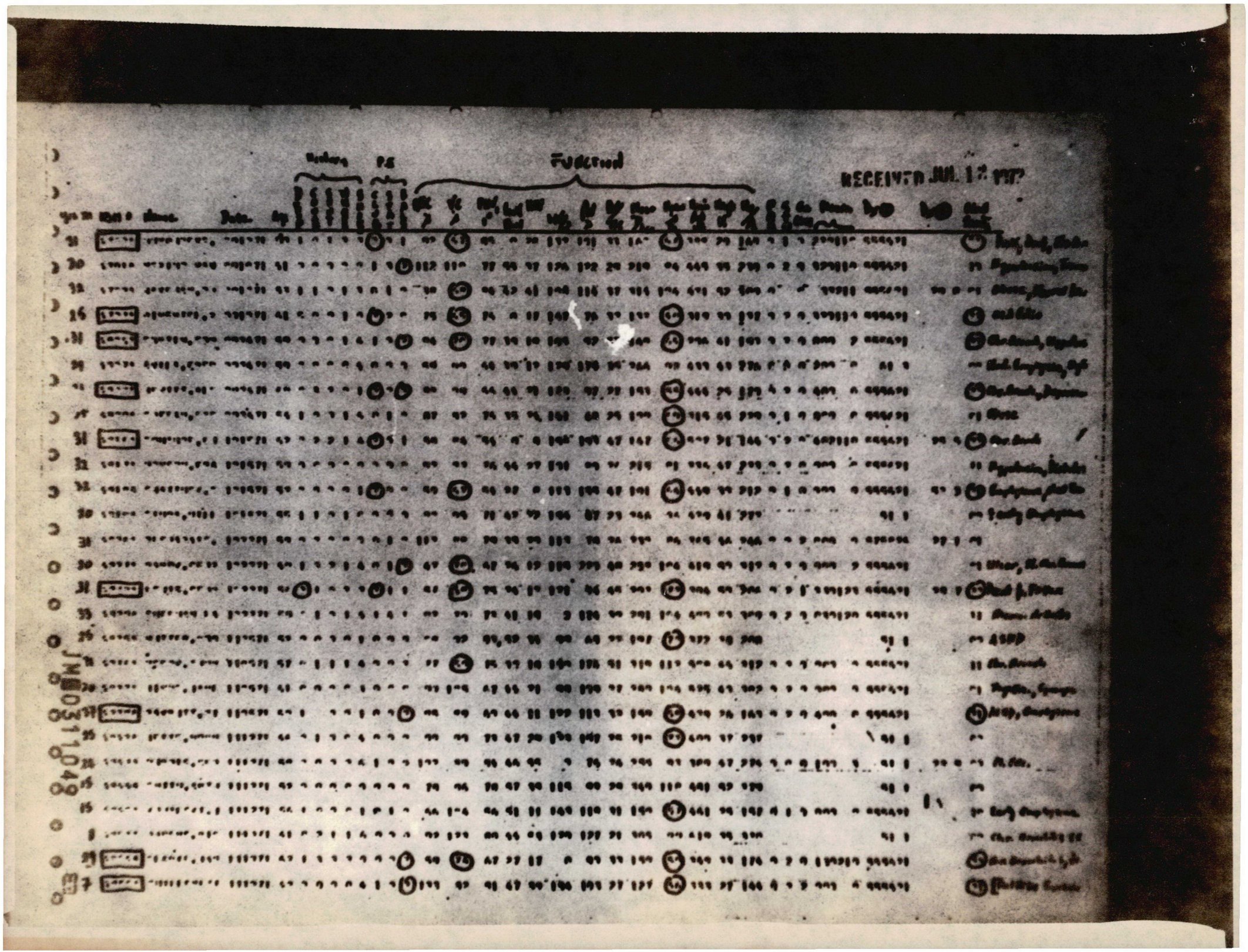
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the computer was in error on one occasion when a subject exhaled a small amount and then hesitated for a considerable time before completing the vital capacity. That is one error in 2,990 determinations. The technicians and physicians who subsequently recalculated all of these results made 47 errors in these same 2,990 determinations.

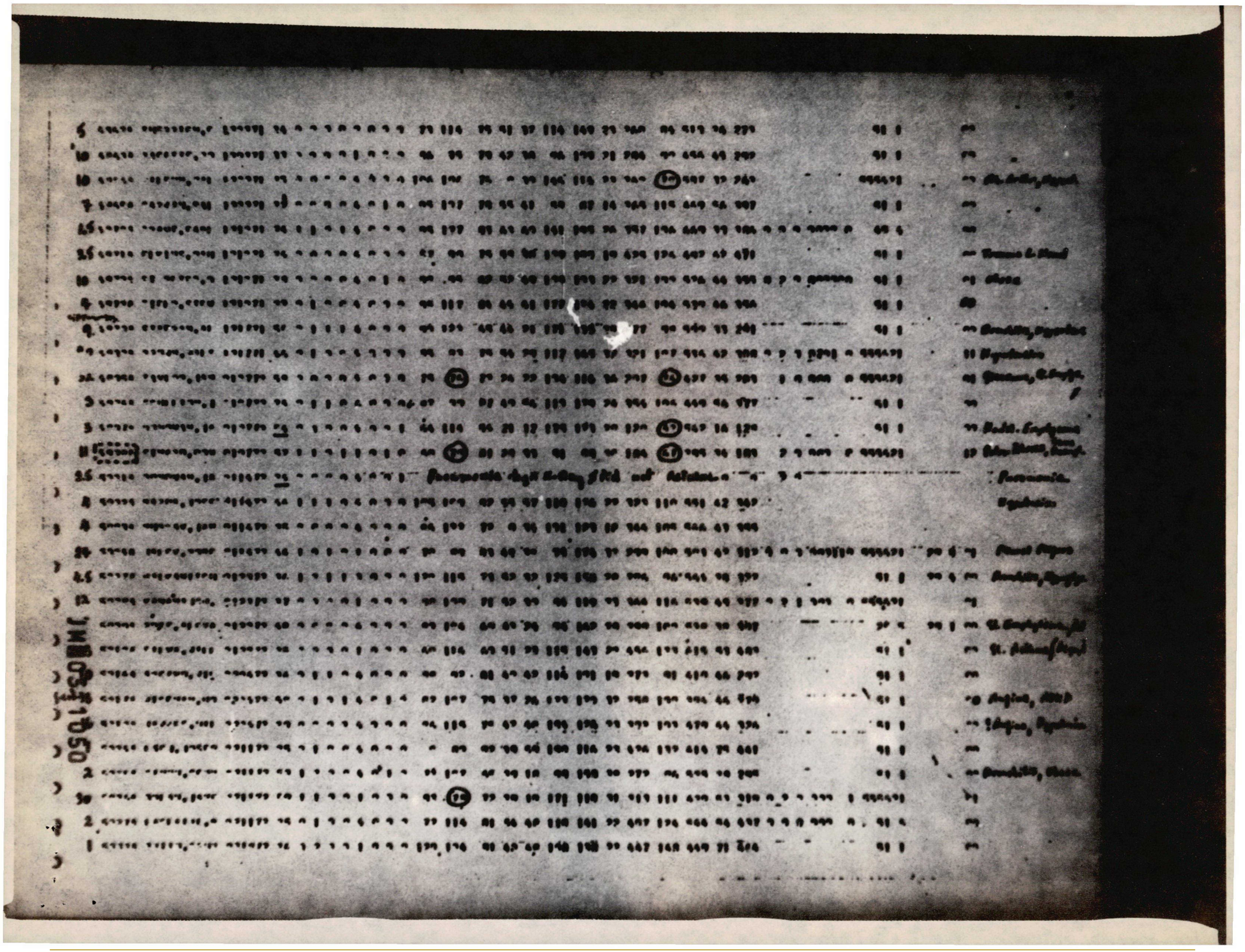
The Thoracic Services of Boston University have been awarded a SCOR (Specialized Center of Research) grant in the pulmonary field on June 1 of this year. Evaluation of the causes and natural history of chronic interstitial pneumonia including asbestosis is one of the main subjects of study. We are looking forward to continue this work for Billerica and we are now considering the inclusion of an unexposed control population from that local area. We found at a shipyard in Maine that a great deal of pulmonary disease attributed to asbestos exposure was in fact "random noise" and occurred with almost the same frequency in unexposed persons. We would also be glad if you would consider extending this study to your other two plants in the New England area.

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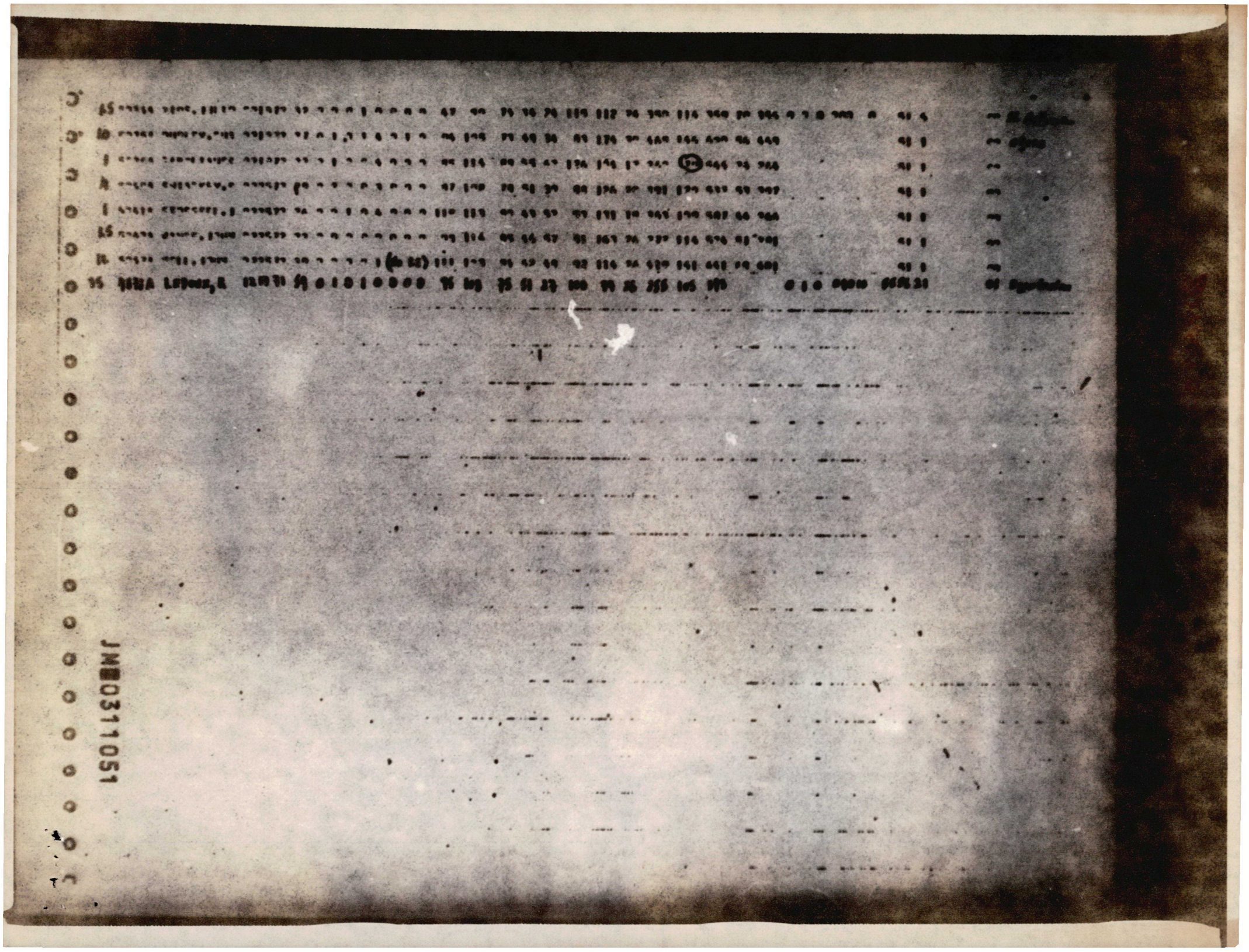
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