

A final report
September 1988

RESEARCH ON HEALTH EFFECTS AND PARTICLE CHARACTERIZATION TO IMPROVE SILICA DUST CONTROL IN UNDERGROUND COAL MINES

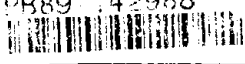
Interagency Agreement H0358030
NIOSH

BUREAU OF MINES
UNITED STATES DEPARTMENT OF THE INTERIOR



REPRODUCED BY
U.S. DEPARTMENT OF COMMERCE
NATIONAL TECHNICAL INFORMATION SERVICE
SPRINGFIELD, VA. 22161

50772-101

REPORT DOCUMENTATION PAGE		1. REPORT NO. OFR 3-89	2.	PB89 42988 	
4. Title and Subtitle Research on Health Effects and Particle Characterization to Improve Silica Dust Control in Underground Coal mines				5. Report Date September 1988	
7. Author(s) K. Weber, J. Tucker, L. Stettler, W. Wallace				6.	
9. Performing Organization Name and Address Division of Respiratory Disease Studies National Institute for Occupational Safety and Health 944 Chestnut Ridge Road Morgantown, WV 26505				8. Performing Organization Report No.	
10. Project/Task/Work Unit No.				11. Contract(C) or Grant(G) No. (C) H0358030 (G)	
12. Sponsoring Organization Name and Address U.S. Department of the Interior Bureau of Mines Branch of Procurement, Pittsburgh Cochrans Mill Road, P.O. Box 18107, Pittsburgh, PA 15236				13. Type of Report & Period Covered FINAL REPORT August 1986 - Sept. 1988	
14.					
15. Supplementary Notes					
16. Abstract (Limit 200 words) Silica particles are known to induce lung damage when inhaled. It has been known for many years that "pure" silica particles, when inhaled in large amounts, leads to an acute, deadly form of silicosis. Silica particles are part of the occupational exposure in coal mining. The National Coal Workers Autopsy Study was surveyed from 1971-1980 and silicosis was found to be present in 13% of the cases. Silica particle size determinations were made using 22 human lungs and the geometric size distributions showed a mean of less than one micron. No acute silicosis cases were found. These small sized respirable particles would have to be eliminated to prevent silicosis from occurring. The cytotoxic potential of silica quartz dust can be affected by respirable particle surface properties. This research investigated a method to characterize the surface elemental composition of quartz respirable particles which may be contaminated or occluded in mixed dust atmospheres. Also, a surface modification of quartz was investigated which significantly alters the cytotoxic potential without producing a readily measurable elemental composition change. Effects on particle hemolytic potential of boiling quartz dust in glass are quantitated.					
17. Document Analysis a. Descriptors Silica Silicosis Cytotoxic Respirable b. Identifiers/Open-Ended Terms National Coal Workers Autopsy Study c. COSATI Field/Group					
18. Availability Statement			19. Security Class (This Report) Unclassified		21. No. of Pages 338
			20. Security Class (This Page) Unclassified		22. Price PC \$36.95 / MF \$56.95

(See ANSI-Z39.18)

See Instructions on Reverse

OPTIONAL FORM 272 (4-77)
(Formerly NTIS-35)
Department of Commerce

DISCLAIMER

The views and conclusions contained in this document are those of the authors and should not be interpreted as necessarily representing the official policies or recommendations of the Interior Department's Bureau of Mines or of the U.S. Government.

FOREWORD

This report was prepared by the Division of Respiratory Disease Studies (DRDS) of NIOSH under Interagency Agreement No. HO358030. The agreement was initiated under the program title "Research new concepts for reducing silica dust in underground coal mines." It was administered under the technical direction of the Pittsburgh Research Center with Steven Page acting as the Technical Project Officer. Ms. Gerry Puskar was the Contract Officer for the Bureau. This report summarizes the work completed on the contract during the period August 1986 through September 1988. This report was submitted by the authors in September 1988.

The technical effort was performed by the Division of Respiratory Disease Studies (DRDS) of the National Institute for Occupational Safety and Health (NIOSH) located in Morgantown, West Virginia, and the Division of Biological and Behavioral Sciences (DBBS) of NIOSH located in Cincinnati, Ohio. The program manager was Dr. Kenneth Weber. Work on silica particles in human lungs was performed under the direction of Drs. James Tucker and Francis Green from DRDS and Dr. Lloyd Stettler from DBBS. Work on the characterization of silica particle surface properties was performed under the direction of Dr. William Wallace and Michael Keane of DRDS. Specific personnel working on each program are identified separately in the descriptions of each program.

The authors of this report (Drs. Kenneth Weber, James Tucker, Lloyd Stettler, William Wallace, and Michael Keane) sincerely thank the Bureau of Mines for their support and encouragement during the tenure of this agreement.

CONTENTS

	<u>Page</u>
1. Introduction	7
2. Background	7
3. Characteristics of quartz particles in the lungs of autopsied coal miners	8
3.1 Prevalence of silicosis at death in coal miners	8
3.1.1 Approach	8
3.1.2 Methods and materials	8
3.1.3 Results	11
3.1.4 Discussion	16
3.1.5 Summary and conclusions	17
3.2 Silica lung particle size determinations in coal miner lungs	19
3.2.1 Approach	19
3.2.2 Methods and materials	19
3.2.3 Results	21
3.2.4 Discussion	22
3.2.5 Summary and conclusions	24
4. Characterization of surface properties affecting the activity of the "free silica" fraction of respirable dust	48
4.1 Surface properties affecting quartz cytotoxicity	48
4.2 Scanning electron microscopy- energy dispersive x-ray elemental analysis method for surface contaminants on silica particles	49
4.2.1 Theory	49
4.2.2 Experimental Results	54
4.3 Modification of respirable quartz particle cytotoxicity by surface treatment	56
4.3.1 Suppression of quartz toxicity to pulmonary macrophages	56
4.3.2 Treatment method and assay methods	57
4.3.3 Summary results	58
4.3.4 Research hypothesis	59
References	69
Appendix 1	71
Appendix 2	143
Appendix 3	278

FIGURES

1. An example of Grade I (mild) silicosis	9
2. An example of Grade II (moderate) silicosis	10
3. An example of Grade III (severe) silicosis	10
4a. Coal worker's lung with a small silicotic nodule	43
4b. Coal worker's lung taken with a cross polarizing filter	43
4c. Regional lymphatic tissue from a coal worker's lung	43
4d. Birefringent particles in lymphatic tissue	43
5a. SEI of a lesion in a silicotic lung	44
5b. BSI of a silicotic lung	44
5c-e. Energy dispersive spectra of particles in 5b	44

FIGURES - continued

	<u>Page</u>
6a. BEI of a typical field of view	45
6b-d. Energy dispersive spectra of particles indicated in 6a	45
7. Silica median diameter distribution in coal worker's lungs	46
8. Silica median diameter distribution in urban lungs	47
9. Nomenclature and sign conventions for SEM-EDX analysis	50
10. Theoretical ratio of line intensities	60
11. Experimental ratio of silicon line intensities - titanium	61
12. Experimental ratio of silicon line intensities - crocidolite fibers	62
13. Hemolytic potential of respirable quartz dust	63
14. Hemolytic potential of native and boiled quartz dust	64
15. Hemolytic potential of native and boiled quartz dust	65
16. Hemolytic potential of boiled quartz dust - delay	66
17. Hemolytic potential of boiled quartz dust - changing boiling times	67
18. Hemolytic potential of boiled quartz dust - changing boiling materials	68

TABLES

1. Characteristics of NCWAS Population (1971-1980)	11
2. NCWAS population by State	11
3. Prevalence of silicosis and CWP in NCWAS (1971-1980)	12
4. Grade of silicosis by CWP	12
5. Silicosis prevalence by major job classification	13
6. Prevalence of silicosis by job ranked by severity	14
7. Prevalence of silicosis by primary State of mining	15
8. Silicosis by years in underground mining	15
9. Coal miner specimen information	25
10. Analyzed elements and X-ray windows	26-27
11. Chemistry definition file - major particle classes	28-29
12. Silica particle size data for lungs	30
13. Total exogenous particle size data for lungs	31
14. Silica particle size data for lungs - graphical	32
15. Total exogenous particle size data for lungs - graphical	33
16. Particle concentration/composition data for lungs 1-5	34
17. Particle concentration/composition data for lungs 6-10	35
18. Particle concentration/composition data for lungs 11-15	36
19. Particle concentration/composition data for lungs 16-21	37
20. Particle concentration/composition data for upper lobe (lung 22)	38
21. Particle concentration/composition data for lower lobe (lung 22)	39
22. Summary particle data for 21 coal miner lungs	40
23. Summary particle data for 87 urban lungs	41
24. Relative intensities of X-ray emission lines	55
25. Relative intensities of SEM-EDX lines	56

1. INTRODUCTION

This document is the final technical report for the United States Bureau of Mines - NIOSH Interagency Agreement No. H035803, "Research on Health Effects and Particle Characterization to Improve Silica Dust Control."

The objectives of the agreement were 1) to determine the prevalence of silicosis in a population of autopsied coal miners, 2) to determine relationships between silicosis in coal workers and mining areas and job categories, 3) to determine silica particle size distributions and numbers of silica particles in autopsied human lungs, 4) to analyze a method for characterization of quartz particle surface properties and 5) to investigate a quartz surface modification procedure which can affect the cytotoxic potential of respirable quartz dusts.

This report presents the details of the approaches, methods, results, discussions and conclusions related to each objective of the study.

2. BACKGROUND

Particulate matter has been recognized as a cause of various lung diseases, the pneumoconiosis, for many years. Specific pneumoconiosis such as coalworkers' pneumoconiosis and silicosis result from the inhalation of particles at the worksite. In many instances, there are simultaneous exposures to many different types of particles. This is particularly true for coal miners where simultaneous exposures to coal dust, silica, and various aluminum silicates are common.

Exposure to silica in coal mining operations is of increasing concern since MSHA data as analyzed by NIOSH indicates that an increasing number of mines are unable to comply with the free silica standard. The extent of the health problem associated with this failure of compliance is difficult to assess as coal workers' pneumoconiosis and silicosis produce similar opacities on the chest radiograph. Morphologically, however, the lesions are distinctive. Part of this study was to examine lungs of autopsied coal miners to assess histologically the prevalence of silicosis in miners. On the assumption that we would find some silicosis among the mining population, we undertook a study to quantitate the size distribution and number of silica particles in the lungs of autopsied miners.

Some foreign and domestic studies have found regional differences in disease prevalence versus respirable dust or quartz fraction mining exposures. Cellular experiments have found respirable particle surface area and surface contamination can affect the cytotoxic properties of dusts. Part of this study investigated a method to characterize possible surface occlusion or contamination of quartz dusts to evaluate the role of such surface coating on the pathogenic potential of the dust. In the course of this and related studies we discovered that some simple physical preparation steps used in dust studies could suppress cytotoxic properties of quartz particles. Thermal treatment in aqueous media can significantly alter the cytotoxic properties

without producing a readily measured surface compositional change. Experimental results of these surface modification studies are presented.

3. CHARACTERISTICS OF QUARTZ PARTICLES IN THE LUNGS OF AUTOPSIED COAL MINERS

The studies to meet the objectives of this part of the study will be separated in two parts. The first part will describe the study involving the prevalence of silicosis and its relationship with mining and job categories and the second part will describe the studies on the particle size distributions and number of particles in autopsied lungs.

3.1 PREVALENCE OF SILICOSIS AT DEATH IN COAL MINERS by

Francis Green, Rochelle Althouse, and
Kenneth Weber with the technical assistance of
James Tucker, Lunette Utter, Nadia El-Ayouby and Martha Saab

3.1.1 APPROACH

Silica exposure has long been recognized as a respiratory hazard in coal mining, and workers in certain job categories within the mines, such as tunnel drillers, roof bolters, and motormen are at high risk for silicosis (1,2,3). Despite these observations and much debate over the years concerning the role of silica in the pathogenesis of pneumoconiosis in coal workers, there is remarkably little information on the prevalence of silicosis in coal miner populations. This can be largely attributed to difficulties in distinguishing silicosis from coal workers' pneumoconiosis (CWP) on the chest radiograph, and to a lesser extent to a paucity of suitable autopsy material.

The United States has a unique autopsy program for former underground coal miners which was initiated under Title 42 of the Federal Coal Mine Health and Safety Act of 1969 (4). This program, called the National Coal Workers' Autopsy Study (NCWAS), is administered by the Division of Respiratory Disease Studies of the National Institute for Occupational Safety and Health (NIOSH), Morgantown, WV.

Each case submitted includes pathologic material and information on the miner's work tenure, primary job, and the most recent mine location. This information forms the basis for this study: to determine the prevalence of silicosis in this population of coal miners and the possible relationships between the previously mentioned factors and silicosis.

3.1.2 METHODS AND MATERIALS

Lung tissues from 3,365 autopsied coal miners submitted to the NCWAS during the decade 1971-1980 formed the study population. The NCWAS is a voluntary program that is restricted to former coal miners who have worked in an underground mine one day or more. The regulations require that a minimum of three slides and blocks of lung tissue are submitted with the autopsy protocol, together with a questionnaire completed by a close relative of the deceased coal miner. This questionnaire includes information on the number of years of surface and underground coal mining, the location of the most recent mine where the miner worked, the primary job in which the miner was employed,

as well as a detailed smoking history. The demographic and occupational data was computer coded into the NCWAS files using NIOSH job classification codes.

Tissue sections from all cases in the NCWAS over the decade 1971 through the end of 1980 were assessed for the presence of silicotic lesions in the pulmonary parenchyma and tracheo-bronchial lymph nodes. There was an average of 4 sections per case with a range of 3 to 22. The degree of silicosis in the pulmonary parenchyma was graded subjectively into three groups of severity - mild, moderate, and severe (Grades I, II and III, respectively) - based upon the profusion and size of the silicotic lesions in the sections. Examples of typical grades of silicosis are illustrated in Figures 1 through 3. Grade 3 included conglomerate lesions measuring more than 1 cm in diameter (PMF). Only classical silicotic nodules were graded: lesions of acute silicosis (silicotic alveolar proteinosis) or accelerated silicosis were not identified in any of the cases. Silicotic nodules were identified by standard histopathological criteria (5). The nodules exhibited central whorled and hyalinized collagen. The periphery of the lesions showed a variable configuration; the majority had irregular stellate mantles of coal dust containing macrophages in a reticulin stroma. Confluence of nodules was frequently seen. The type and severity of coal workers' pneumoconiosis was also assessed by criteria developed by a joint committee of NIOSH and the College of American Pathologists (6). The macular and nodular lesions of simple CWP were further subjectively graded into three grades of severity - mild, moderate, and severe - based upon profusion and size of the lesions in the sections. The data was analyzed using descriptive statistics.



Fig. 1. Low magnification micrograph of coal worker's lung showing a small, discrete, rounded silicotic nodule within the pulmonary interstitium adjacent to a muscular pulmonary artery. This case was classified as Grade I (mild) silicosis. (H & E x 40)

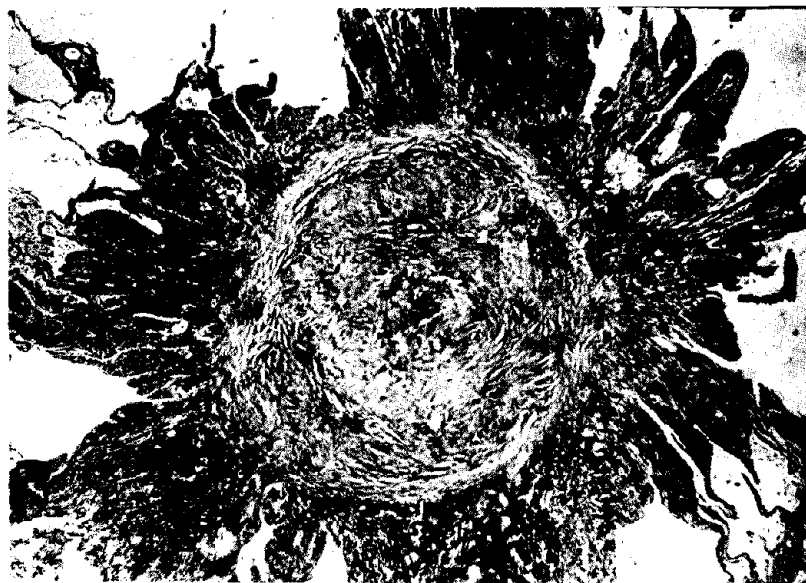


Fig. 2. Larger silicotic nodule from a case classified as Grade II (moderate) silicosis. The lesion shows a hyalinized central area of concentrically arranged collagen fibres surrounded by a stellate mantle of coal dust containing macrophages in a reticulin stroma. This histological pattern is highly characteristic of silicosis in coal workers. (H & E x 20)

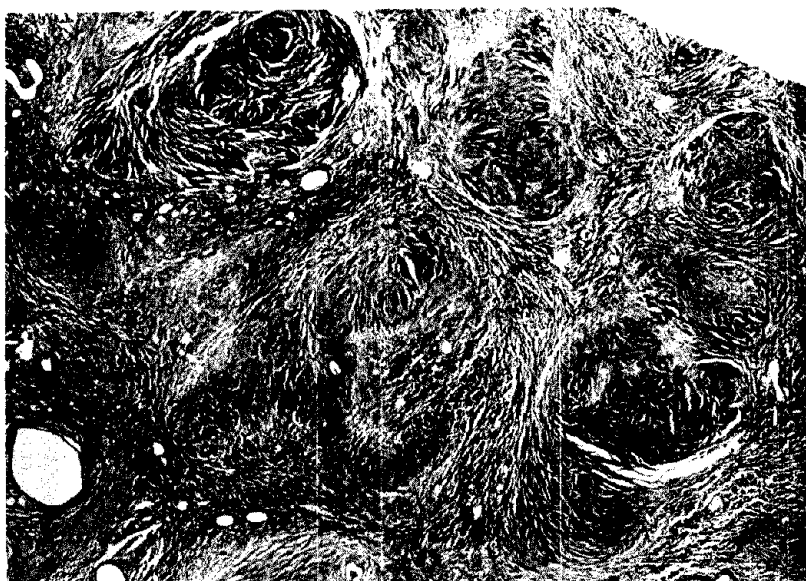


Fig. 3. Silicotic massive fibrosis. Discrete fused nodules are apparent. This case was classified as Grade III (severe) silicosis. (H & E x 20)

3.1.3 RESULTS

Table 1 shows the demographic characteristics and smoking histories of the NCWAS population (1971-1980).

TABLE 1. - Characteristics of NCWAS Population - 1971-1980

NUMBER	3,365
MEAN AGE AT DEATH	62 $\pm$ 12 (SD) years
AVERAGE YEARS WORKED IN UNDERGROUND MINES	26 $\pm$ 14 (SD) years
RACE/SEX	94% white males
CIGARETTE SMOKERS (EVER)	74%
AVERAGE PACK YEAR CONSUMPTION FOR SMOKERS	24 $\pm$ 20

Table 2 shows the NCWAS submissions by state for the same years. The majority of submissions were received from the Appalachian states of Pennsylvania and West Virginia.

TABLE 2. - NCWAS Population by State

<u>STATE *</u>	<u>NUMBER</u>	<u>PERCENT</u>
Pennsylvania	1460	46
West Virginia	948	30
Kentucky	214	7
Virginia	159	5
Ohio	114	4
Illinois	95	3
Wyoming	45	1
Colorado	42	1

* Only states with 1% or more of the total submission are included.

The prevalences of the various pneumoconiotic lesions in the NCWAS population are shown in Table 3. Pulmonary parenchymal silicosis is seen in 12.6%, and silicotic nodules were seen in the lymph nodes of 52.9% of cases. Of cases with parenchymal silicosis, 89% showed silicotic nodules in the lymph nodes. Macular lesions were seen in 45.6% of cases, and macules with focal emphysema (corresponding to a diagnosis of simple CWP) were present in 35.8% of miners. Nodular lesions of simple CWP and progressive massive fibrosis occurred less frequently, 18.9% and 5.5%, respectively.

TABLE 3. - Prevalence of Silicosis and Coal Workers' Pneumoconiosis using Histopathology in NCWAS (1971-1980)

SILICOSIS	12.6%
SILICOTIC NODULES IN LYMPH NODES	52.9% *
MACULES	45.6%
MACULES AND FOCAL EMPHYSEMA	35.8%
NODULES	18.9%
PROGRESSIVE MASSIVE FIBROSIS	5.5%

* Based on 1,675 cases where lymph node sections were present.

Silicosis was rarely encountered as an isolated type of pneumoconiosis, usually occurring against a background of simple CWP. Table 4 presents the percentage of miners with silicosis by CWP grouping. This shows that only 7.2% of lungs without any form of CWP showed lesions of silicosis, whereas with increasing category of CWP there is a corresponding increase in the prevalence and severity of silicosis. The mean tenure of each CWP grouping showed a very slight increasing trend with CWP severity varying over a three year range.

TABLE 4. - Grade of Silicosis by Coal Workers' Pneumoconiosis

PNEUMOCONIOSIS CLASSIFICATION (Highest Category)	MEAN TENURE YEARS	% WITH SILICOSIS	% WITH GRADE I	% WITH GRADE II/III
No CWP	32	7.2%	4.2%	3.0%
Macules plus Focal Emphysema	33	22%	12%	10%
Nodules	34	32%	15%	17%
PMF	35	51%	11%	39%

The relationship between prevalence of silicosis and principal job within the mine is shown in Tables 5 and 6. Table 5 shows that the highest prevalence of silicosis was observed in transportation workers, a rate almost twice that seen in face workers. As would be expected, maintenance workers and other miners primarily employed in surface activities at underground mines, had the lowest prevalence of silicosis (8.4% and 6.4%, respectively). A more detailed tabulation of job category rank by severity of silicosis is shown in Table 6. Motormen have the highest overall prevalence of silicosis (25.0%) as well as the highest prevalence of severe disease (16.2%). Electricians have the lowest overall prevalence of silicosis (7.6%), as well as the lowest overall prevalence of severe disease (3.6%). The prevalence of silicosis in roof bolters was similar to that seen in face workers, although the proportion of severe disease was higher in the roof bolters.

TABLE 5. - Silicosis Prevalence by Major Job Classification

JOB GROUPING	TOTAL # IN JOB GROUP	% SILICOSIS IN JOB GROUP
Transportation	821	24.2
Face Activities	1490	12.5
Miscellaneous (Foremen, Section Boss)	410	12.2
Maintenance	439	8.4
Surface Activities (at Underground Mines)	249	6.4

TABLE 6. - Prevalence of Silicosis by Job* Ranked by Severity

JOB	N	TENURE MEAN	GRADE I (%)	GRADE II/III (%)	OVERALL %
Motormen	320	32.2	8.8	16.2	25.0
Bonders & Trackmen	54	31.7	5.6	9.3	14.4
Cutting Machine	140	33.5	4.0	8.9	12.8
Foremen	144	33.1	8.3	6.9	15.3
Loaders & Diggers	770	27.3	5.8	6.6	12.4
Continuous Mine Oper.	136	28.7	6.6	5.8	12.5
Roof Bolters	97	26.7	7.2	5.5	12.3
Misc. Drillers	75	29.9	9.3	5.4	14.7
General Face	122	28.5	5.7	4.9	10.6
Shuttle Car Oper.	105	29.3	7.6	4.8	12.4
Loading Machine Oper.	111	29.9	6.3	4.5	10.8
Electricians	198	31.3	4.0	3.6	7.6

* Jobs with > 50 cases in this study.

Table 7 shows the prevalence of silicosis by primary state in which the miner worked. The highest prevalence of silicosis was seen in miners from the Appalachian states of Pennsylvania (14.8%), West Virginia (13.7%), and the Rocky Mountain states of Wyoming and Utah (14.2%). Low prevalences of silicosis were seen from miners working in Virginia, Kentucky, Illinois, and Ohio. Eighteen miners were identified whose last place of employment was at a Pennsylvania anthracite mine. In this group, approximately one-fourth had evidence of silicosis.

TABLE 7. - Prevalence of Silicosis by Primary State of Mining

STATE	# IN NCWAS	TENURE MEAN	PREVALENCE OF SILICOSIS (By Grade)			
			I	II	III	TOTAL
Pennsylvania	1476	30.0	6.6	5.4	2.8	14.8
Pennsylvania (Anth.)	18	33.4	22.2	0.0	5.6	27.8
Wyoming & Utah	56	25.1	7.1	5.3	1.8	14.2
West Virginia	936	28.5	6.9	4.3	2.5	13.7
Colorado	42	31.0	9.5	0.0	0.0	9.5
Virginia	123	24.6	4.9	1.6	0.0	6.5
Illinois	95	27.8	1.0	3.2	1.0	5.2
Kentucky	202	25.5	3.5	1.0	0.0	4.5
Ohio	122	28.9	2.5	1.6	0.0	4.1

Table 8 shows the relationship between the years in underground mining and severity of silicosis. Mean tenure for all miners with silicosis was 34 ± 12 years. Tenure was grouped into low (0-20 years), medium (20-40 years), and high (40+ years). There is a clear and consistent relationship between length of underground mining with prevalence and severity of silicosis indicating a dose response effect.

TABLE 8. - Silicosis by Years in Underground Mining

YEARS IN MINING	NUMBER OF CASES	SILICOSIS GRADE			
		0	I	II	III
0-20 YRS	799	94.6%	2.4%	2.4%	1.0%
20-40 YRS	1658	85.9%	7.6%	4.5%	1.9%
Over 40 YRS	846	82.9%	7.6%	5.6%	3.8%

3.1.4 DISCUSSION

The data presented here indicates that a significant proportion of U.S. underground coal miners have received high enough concentrations of free silica in the respirable fraction of coal mine dust to produce silicosis. The 12.6% prevalence noted in this study is remarkably similar to the 13% prevalence noted by Laqueur in a series of autopsied coal miners from southern West Virginia (7). We have been unable to identify prevalence data from other countries. The paucity of data on prevalence of silicosis in coal workers is related in part to the difficulty in distinguishing between the opacities produced by silicosis from those produced by simple CWP on the chest radiograph. The radiographic sign of eggshell calcification (8), although indicative of a reaction to silica in the tracheo-bronchial lymph nodes, is not specific for this disease, and data presented in this paper, showing a high proportion of silicotic nodules in the tracheo-bronchial lymph nodes in the absence of parenchymal lesions, would also indicate that the sign has little diagnostic usefulness for parenchymal silicosis. Correlative studies from the Institute of Occupational Medicine in Edinbrough have shown that the r-type small opacities of simple pneumoconiosis seen on the chest x-ray correlate with silicotic nodules on histopathologic examination (9, 10).

A relationship was noted between severity of coal workers' pneumoconiosis and the presence of silicotic lesions in the lung. This was most marked in miners with PMF in whom over 50% showed silicotic lesions in the pulmonary parenchyma. Although this is an interesting finding, it does not necessarily imply a role of silica in the pathogenesis of PMF (11, 12). We feel that the association can best be explained in terms of dose response with both silicosis and PMF occurring in miners with long work tenures and high cumulative exposures to coal mine dust.

The study also showed a relationship between length of underground mining with prevalence and severity of silicosis. Unfortunately, exposure data were not available for these mines during the decades when exposures most likely occurred. Therefore, true dose response data cannot be obtained from this study. It is of interest to note that, although longer tenures of work correlated with increasing prevalence and severity of silicosis, there were miners with short work histories who also developed silicosis. This indicates that acute high exposures or individual susceptibility may also play a role in the development of silicosis in U.S. coal miners.

Exposure to quartz at underground and surface coal mines depends on a number of factors. The quartz dust itself is largely derived from the rock strata adjacent to the coal seams, as the latter contains relatively small concentrations of quartz. Quartz exposures, therefore, may depend upon a number of factors including the geology of the coal deposit and adjacent rock strata, the height of the coal seam, faults and undulations, the method of mining, and the specific job of the miner. It is, therefore, not surprising that there are regional and occupational variations in the prevalence of silicosis. Although the numbers are small, the very high prevalence of silicosis in the Pennsylvania anthracite miners is in keeping with previously published epidemiologic studies documenting high pneumoconiosis prevalence in anthracite miners (13). Pennsylvania anthracite mines have low undulating seams requiring the use of sand on the tracks to improve traction and removal of large amounts of overburden in order to extract the coal.

Operations such as roof bolting, tunnel and surface drilling, and transportation are associated with high silica exposures, and miners employed in these jobs are more likely to develop silicosis (2, 14). This study generally supports these observations. An exception to this may be the moderate prevalence of silicosis noted in the roof bolters. However, our data may underestimate the true risk for silicosis in roof bolters as they had the lowest work tenures of any job category (26.7 years). Moreover, the proportion with severe disease, categories 2 or 3, was higher in the roof bolters than in the face workers. Motormen who had the highest overall prevalence of silicosis as well as the highest prevalence of severe disease are known to be at high risk for silicosis due to the use of traction material containing up to 81% free silica on the tram car tracks (15).

Several considerations should be noted in generalizing from these data to the entire population of miners. The NCWAS population is a biased sample and includes only a relative small proportion of all miners who die. Estimates based on the expected death rates amongst retired and active underground coal miners during the decade of 1970-1980 indicate that slightly less than 10% of coal miners who die are entered into the NCWAS program. It is likely that miners submitted to the NCWAS have less occupational disease than miners that are not included, as more severely affected miners may be already receiving compensation at death, and thus, their families would be less likely to request an autopsy. If this interpretation is true, we expect that in the overall population of miners at death, a greater proportion would have silicosis; thus, data based on the NCWAS would give a relative underestimate. Studies of working bituminous coal miners from western Pennsylvania and with long tenures (20-30 years) in the early 1960's showed prevalences of $\approx$ 5% PMF (16), whereas for retired miners of less than 30 years mining the prevalence was 7.5%. Although these studies were based on radiographic examination, there is a good correlation between radiographic and pathologic diagnosis of PMF (17). Based on these findings, the underestimate of severe CWP appears small.

In conclusion, the data presented here indicates that a significant portion of U.S. underground coal miners have received high enough doses of silica in the respirable fraction of the coal mine dust to produce silicosis. The disease observed in this study represents the effects of exposures received more than ten years prior to death due to the known long latency period of silicosis. Respirable dust levels during the decades in which most of these miners received their exposures were certainly much greater than miners are receiving today. It is likely, therefore, that the prevalence of silicosis will decrease in coming decades. The NCWAS population can serve a useful purpose in monitoring disease prevalence in the future.

3.1.5 SUMMARY AND CONCLUSIONS

This study was initiated in order to determine the prevalence and pathological features of silicosis in coal miners. The population base was 3,365 autopsied miners submitted to the U.S. National Coal Workers' Autopsy Study between 1971 and 1980. This program is voluntary and covers an

estimated 10% of all coal workers who die. The mean age at death of the population was 62 years of whom 75% were current or ex-smokers at the time of death. The average work tenure was 26 years. Lung sections from all cases were reviewed and the type and severity of pneumoconiosis documented. These findings were correlated with years of mining, job history, and geographic location of mine. Classical silicotic nodules were found in 12.6% of the population. There was a significant relationship between length of underground mining and prevalence and severity of silicosis, indicating a dose response effect. The study also showed that job category and geographic location of the mine were important determinants of silicosis prevalence, and that silicosis was strongly associated with higher categories of coal workers' pneumoconiosis (CWP).

3.2 SILICA LUNG PARTICLE SIZE DETERMINATION IN COAL MINER LUNGS

by

Lloyd E. Stettler, James H. Tucker, Robert D. Riley
S. Frank Platek, J. Pat Mastin, Frank H.Y. Green
and Edward Zuchelkowski with technical
assistance of Diane Schwegler-Berry

3.2.1 APPROACH

In order to develop the technologies to control silica exposure in mines, it is clearly important to quantify the size fractions of inhaled silica particles which are preferentially retained by the lung. SEM-based automated image analysis has been routinely used to characterize particles extracted from lung tissues (18-20). Large numbers of particles may be quickly sized and chemically characterized using this instrumentation.

In the work being reported here, the particulate burdens of tissues from 22 coal miners were determined using SEM-based automated image analysis and contrasted with the particulate burdens of Cincinnati, Ohio urban residents who had no overt pneumoconioses. For the coal miner lungs, particle size data for the total dust as well as the component of this dust, which was considered to be silica, will be presented.

3.2.2 METHODS AND MATERIALS

Lung Specimens

Selection of lung specimens for use in this study was based primarily on two factors; 1) The availability of both slides and wet-formalin fixed tissues for analysis and 2) that selected cases represent the various gradients of disease (i.e., stages of CWP and/or silicosis) and/or dust exposure as related to the miner's job and/or tenure. Fixed wet lung tissues and slides were available for approximately 260 of the 3,365 autopsied miners submitted to the U.S. National Coal Workers' Autopsy Study (NCWAS) from 1971 to 1980. Additional cases were reviewed and selected from mine accident cases submitted to this laboratory since 1980.

Based on the review of the subjects' work and medical histories, histopathology, and/or examination by polarizing light microscopy, tissues from 21 of these subjects were selected for particulate analysis. Both paraffin-embedded and wet, formalin-fixed tissues were available for all of the subjects selected.

Two mm thick sections of whole freeze-dried lung specimens from coal miners were also available for analysis. Portions of a whole lung section from one subject (lung #22) were analyzed to provide some information on particle distributions within the lung. A total of 24 circular sections were taken from the whole lung section using a 4 mm diameter cork borer. Twelve sections were taken from the upper and lower lobes. Of these 12 sections, 6 were taken from areas of heavy particle deposition and 6 were taken from

adjacent (control) areas with no visible particles. The six sections from the adjacent areas for the upper or lower lobes were pooled for particle analysis.

Subject data for all of the analyzed lungs in terms of age, job setting, etc. is summarized in Table 9.

Tissue Processing

Processing of tissue for image analysis consisted of taking 1-2 grams of wet tissue from each of the bulk pieces of formalin-fixed lungs and mincing into 1 mm³ pieces using a clean, stainless steel razor blade and then freeze-drying to constant weight. Approximately 0.1-0.2 g of the freeze-dried tissue was placed in a clean glass vial and then ashed in a low temperature asher at 90 watts using an oxygen pressure of 2 torr. An empty glass vial was also placed in the asher at this time and was processed similarly throughout the sample preparation steps as a blank for the lung sample(s) being ashed. At the end of this period, the vials were removed from the asher and placed on a vortex mixer for one minute to disperse the ash. If large pieces of unashed material remained after this process, the sample was re-ashed for an additional 7 hours. Each 4 mm diameter section taken from the whole lung section was weighed and ashed in similar fashion.

A suspension of the ash from each sample was made using 50 ml of a 0.05% solution of Aerosol OT in filtered, de-ionized water. The resulting suspensions were sonicated in an ultrasonic bath for 15 minutes. The suspensions were made up to a final volume of 100 ml with filtered, de-ionized water to which 1 ml of glacial acetic acid had been added and allowed to sit overnight. Aliquots of the suspensions for sample and blank were then filtered onto 25 mm diameter, 0.1 um pore size Nuclepore¹ filters.

For in situ evaluation, five micron sections were cut from the paraffin-embedded tissue from selected lungs for both light and scanning electron microscopy (SEM). Conventional H&E, Masson's trichrome, Wilder's reticulum and Movats pentachrome stained slides were prepared for histopathology examination. Polarizing light microscopy (PLM) was used for the detection of birefringent material in areas of particulate accumulation and within lesions in the lung (Fig. 4, A-D). In selected cases, adjacent sections to those examined by light microscopy were mounted on a carbon planchet and deparaffinized for SEM-EDXA analysis of the particles (Fig. 5, A-E). The carbon planchet mounted 5. micron sections were examined in a Etec SEM using an accelerating voltage of 20 kV and backscattered electron image (BEI). Individual particles were analyzed using an EG&G Ortec EEDS II energy dispersive X-ray analysis system.

Automated Particle Analysis

Particles found on the filter preparation for each lung and blank were analyzed using a scanning electron microscope (Hitachi S-570 or ISI Super

¹ The use of trade names does not imply endorsement by the Bureau of Mines.

IIIA) equipped with a Kevex 7000 energy dispersive x-ray analysis system and a LeMont Scientific DA-10 image analysis system using the backscattered electron image. For each lung filter preparation, all of the particles (a minimum of 1000) in a minimum of twenty randomly selected fields of view at a magnification of 1000X were sized and analyzed for 31 elements using an x-ray spectrum acquire time of 5 seconds (Fig. 6, A-D). Particles found in a minimum of 20 randomly selected fields of view for the blanks were similarly analyzed. The image analysis particle recognition parameter (off particle searching point density) used at the 1000X magnification was such that all particles 0.2 μ m and greater in diameter should be found and analyzed. For these analyses, net x-ray intensities for each element were determined using the pre-selected peak and background windows shown in Table 10. An element was defined as present according to the relationship

$$I_p = I_B + 3 I_B^{1/2}, \quad (1)$$

where I_p is the peak elemental intensity and I_B is the average background intensity for each element.

Each analyzed particle was categorized using a chemistry definition file which classified the particles based on their major elemental components and the net fractional x-ray intensities for these components. A single chemistry file was found to be suitable for all lungs analyzed in this study. The major definition characteristics for each of the 14 major chemical classes in this file are given in Table 11. These definitions range from the very tightly defined one element classes such as silica, rutile-like, and alumina-like to very broadly defined classes which allow a wide variation in elemental x-ray intensities. Major classes can be subclassified by further restricting the elemental limits within a class.

3.2.3 RESULTS

Particle size data for both particles classified as silica as well as the total exogenous particulate burden for each of the 22 lungs analyzed in this study are summarized in Tables 12-15. Individual particle size data for the lungs, both circular area equivalent and mass diameters determined by the image analyzer, are attached as Appendix 1. These circular area equivalent diameter data were generally log-normally distributed as shown in the cumulative particle size log-probability plots for each lung which are attached as Appendix 2. Individual sample number median diameters for silica are plotted in Figure 7 for those lungs which had a single piece of tissue analyzed (lungs 1-21).

The LeMont mass median diameters shown in Tables 12 and 13 and in Appendix 1 were calculated from the individual particle size data (circular area equivalent diameters) generated by the LeMont image analyzer. Individual particle volumes were calculated from each particle's circular area equivalent diameter assuming that all particles were spherical. Individual particle masses were then calculated from these volumes using bulk particle densities.

The LeMont generated mass median aerodynamic diameters for the total exogenous and silica categories given were calculated from the equation

$$\text{MMAD} = \text{MMD} \times \rho^{1/2}, \quad (2)$$

where MMAD is the mass median aerodynamic diameter, MMD is the mass median diameter, and ρ is the bulk particle density.

The data in Tables 14 and 15 were derived from the log-probability plots of the LeMont-generated circular area equivalent diameter data for each lung. For lungs in which the individual circular area equivalent diameters were log-normally distributed and at least 250 particles were sized, a second set of mass median diameters were calculated using the Hatch-Choate equation (21).

$$\log \text{MMD} = \log d_n + 6.908 \log^2 \sigma_g \quad (3)$$

where d_n is the number median diameter and σ_g is the geometric standard deviation determined from the log-probability plots of the size data. A second set of mass median aerodynamic diameters were then calculated using equation 2 with the second set of MMD values determined by equation 3.

Particle composition/concentration data for each of the 22 lungs analyzed in this study are summarized in Tables 16-21. Copies of the individual data summaries for each lung (summary output from the LeMont image analyzer) are attached as Appendix 3. The particle composition/concentration data shown in Tables 16-19 for the 21 lungs for which single pieces of lung tissue were analyzed are summarized in Table 22.

3.2.4 DISCUSSION

A major goal of this work was to determine the size range of silica particles retained within the lung. This information could then be used to develop the appropriate technology to control silica exposure in the mines. As is shown in Figure 7, the silica number median diameter distribution for the 21 lungs for which a single piece of tissue was analyzed is relatively narrow, ranging from 0.50 to 0.83 micrometers. The data from lung 22 for which different sites were sampled and analyzed further indicate that the differences in sizes retained vary little (0.50-0.66) within an individual lung.

One might question whether there is something unique about this set of 22 lungs and whether the distribution of number median diameters shown in Figure 7 is atypical. To answer this question, the number median diameters for the silica particles found in the analyses of 87 lungs from subjects from the Cincinnati, Ohio urban area is shown in Figure 8. The instrumentation and procedures used to generate the data in Figure 8 were the same as used for the coal miner lungs. As is shown by this data, the number median diameter distribution for silica in the 87 urban lungs is quite comparable to that seen in the coal miners. Greater than 70% of the silica number median diameters for both lung sets fall between 0.5 and 0.8 micrometers. It is clear from this data that the lung is an excellent size selector and that all lungs

operate similarly in this size retention process. Thus in the mines, it is silica particles less than 1 micrometer in physical diameter which must be controlled since these particles form the bulk of the particles retained by the lung.

In addition to number median diameters, size data is also presented in Tables 12-15 in terms of mass median and mass median aerodynamic diameters (MMD and MMAD). The LeMont mass median diameter data (Tables 12 and 13) must be considered gross approximations since the assumption of spherical shape used in the calculation of the data is obviously poor. Furthermore, this calculated MMD is drastically and unrealistically affected by the presence of one or two large particles. For example, the calculated silica MMD for lung 19 is 11.68 (Table 12). However, one large particle classified as silica accounted for almost 78% of the total mass of all 250 silica particles analyzed (Appendix 1). Whether this one particle is statistically significant is very questionable. Much more reliable mass median diameters may be determined for log-normally distributed particle size data through application of the Hatch-Choate equation (Equation 3). Thus, the second set of mass median diameter data (Tables 14 and 15) should be used in any future applications of the data presented in this report.

Conversion of particle number/size data to aerodynamic particle data is very tenuous since size, shape, and density affect aerodynamic behavior (21). Thus all mass median aerodynamic diameter data shown in Tables 12-15 must be considered approximate at best with the LeMont data (Tables 12 and 13) being the poorer of the two sets since these data are so susceptible to small numbers of large particles as discussed earlier. While the mass median aerodynamic diameter data for silica shown in Table 14 must be regarded as fairly crude approximations, these data do imply that silica particles having aerodynamic diameters less than about seven micrometers must be controlled in the mining environment since in only three of the 35 specimens shown in Table 14 were the mass median aerodynamic diameters greater than seven micrometers.

The particle concentration data for the 21 lungs as summarized in Table 22 show considerable variation with a maximum of over a 38-fold difference in total exogenous particle concentrations seen. The range of silica concentrations was even larger with the maximum difference being over 92-fold. Similarly, large variations (Tables 20-21) were also seen within an individual lung (lung 22) for total exogenous particle concentration with over a six-fold range seen between the pigmented areas and over a 39-fold range seen between the pigmented areas and the adjacent non-pigmented areas. The range of silica concentrations seen within the same lung varied almost six-fold between pigmented areas and over 83-fold between the pigmented and non-pigmented areas.

The large variations in particle concentration between very small samples of tissue taken from the same lung illustrate the fact that the particle concentration data are representative only of the volume analyzed and are, most likely, not representative of the entire lung. One would expect, however, that larger pieces of tissue would be more representative than smaller pieces, i.e., there would be less overall variation in particle concentration between larger pieces than smaller pieces.

In general, one would expect much higher particle concentrations in coal miners' lungs than in the lungs of the general populace. Furthermore, if the particulate burden of "normal" lungs can be assumed to arise from the earth's crust, one would expect the types of inorganic particles found in the miners' lungs to be similar in composition to those in normal lungs. To this end, particle concentration data from the 87 Cincinnati, Ohio subjects is presented in Table 23. The data in Table 23 is representative of the average lung particle concentrations since aliquots of whole lung homogenates were analyzed in this study. While the particle concentration data for the 21 miner lungs as summarized in Table 22 may not be representative of the entire lungs for these subjects, it is readily apparent that the individual pieces of tissue from these lungs which were analyzed in this study generally contain much higher average total exogenous (six-fold), silica (eight-fold), and aluminum silicate (nine-fold) particle concentrations than the urban lungs. Moreover, beyond these apparent differences in various particle concentrations, there is a close similarity between the miners' lungs and the urban lungs in terms of the type of particles found with aluminum silicates, silica, and rutile-like particles being the top three particle types in both lung sets.

One final point of interest in the coal miners' lungs is the correlation, if any, between overall silica concentration level and the incidence of silicosis. Bearing in mind the potential for wide concentration variations within the lung and the fact that the light microscopic silicosis evaluations may have been made on sections of tissue far removed from the area where the tissue for particle analysis was taken, there does seem to be a general correlation between silica concentration and the silicosis diagnosis. Lungs 1, 6-10, and 16 were diagnosed as having silicosis. Of these, lungs 8, 9, 1, 16, and 7 had, in order, the highest silica concentrations seen in the 21-lung set. Lungs 6 and 10 were ranked ninth and sixteenth respectively in silica concentration.

3.2.5 SUMMARY AND CONCLUSION

The particulate burdens of lung tissue from 21 coal miners were determined using SEM-based automated image analysis. The selected subjects represented varied medical histories and mining experience, both in terms of job setting and tenure. Particle size data for the 21 coal miner lungs were quite similar despite the varied medical and work histories. The median circular area equivalent diameters for the exogenous particles in the 21 lungs ranged from 0.47 to 0.87 μm . Median diameters for silica ranged from 0.50 to 0.83 μm while the aluminum silicate median diameters ranged from 0.6 to 0.95 μm . The number median diameter distribution for silica in urban lungs is quite comparable to that seen in coal miners with greater than 70% of silica median diameters for both lung sets falling between 0.5 and 0.8 μm .

TABLE 9. - Coal Miner Specimen Information

Lung	Age at Death	Years in Mining	Job Classification	Cause of Death	Silicosis
1	57	14	Motorman	Cardiac	Yes
2	53	16	Coal loader	Cardiac	No
3	38	11	Coal loader	Cardiac	No
4	41	8	Miner operator	Accident	No
5	43	23	Roof bolter	Cardiac	No
6	53	32	Motorman	Cardiac	Yes
7	60	35	Coal loader	Renal Insufficiency	Yes
8	52	23	Buggy operator	Tuberculosis	Yes
9	53	32	Brakeman	Drowning	Yes
10	66	30	Coal loader	Chronic lung Disease	Yes
11	23	NA*	Longwall faceman	Accident	No
12	31	NA	Longwall mechanic	Accident	No
13	28	NA	Loading machine operator	Accident	No
14	28	NA	Beltman	Accident	No
15	32	NA	Longwall cornerman	Accident	No
16	58	39	Foreman	Accident	Yes
17	37	17	Miner operator	Accident	No
18	26	6	Jack setter	Accident	No
19	30	8	Electrician/mechanic	Accident	No
20	45	26	Miner operator	Accident	No
21	56	17	Shuttle car operator	Accident	No

*NA = not available

TABLE 10. - Analyzed Elements and X-ray Windows

Element	Left Background Window keV	Peak Window keV	Right Background Window keV
Na	0.92-0.94	1.00-1.08	1.14-1.16
Mg	1.14-1.16	1.22-1.30	1.36-1.38
Al	1.36-1.38	1.44-1.52	1.58-1.60
Si	1.58-1.60	1.70-1.78	1.88-1.90
P	1.88-1.90	1.98-2.06	2.16-2.18
S	2.16-2.18	2.26-2.34	2.48-2.50
Cl	2.48-2.50	2.58-2.66	2.78-2.80
Cd	2.92-2.98	3.10-3.16	3.18-3.18
K	3.18-3.18	3.26-3.34	3.40-3.40
Sn	3.40-3.40	3.42-3.46	3.52-3.54
Ca	3.52-3.54	3.66-3.74	3.84-3.86
Sc	3.84-3.86	4.06-4.14	4.32-4.34
Ti	4.32-4.34	4.48-4.56	4.72-4.74
V	4.72-4.74	4.92-5.00	5.20-5.22
Cr	5.20-5.22	5.38-5.46	5.66-5.68
Mn	5.66-5.68	5.86-5.94	6.14-6.16
Fe	6.14-6.16	6.36-6.44	6.62-6.64
Co	6.74-6.76	6.90-6.98	7.04-7.08
Ni	7.24-7.26	7.44-7.52	7.68-7.70
Cu	7.84-7.86	8.00-8.08	8.22-8.24

TABLE 10 (continued) - Analyzed Elements and X-Ray Windows

Element	Left Background Window keV	Peak Window keV	Right Background Window keV
W	8.22-8.24	8.34-8.44	8.56-8.56
Zn	8.56-8.56	8.60-8.68	8.84-8.90
Hg	9.66-9.74	9.94-10.02	10.22-10.30
Pb	10.22-10.30	10.50-10.60	10.82-10.90
Se	10.82-10.90	11.20-11.28	11.48-11.56
Br	11.48-11.56	11.88-11.96	12.38-12.46
Sr	13.68-13.76	14.14-14.22	14.46-14.54
Y	14.46-14.54	14.90-14.98	15.30-15.38
Zr	15.30-15.38	15.70-15.78	16.14-16.22
Nb	16.14-16.22	16.54-16.62	17.02-17.10
Mo	17.02-17.10	17.40-17.48	17.70-17.78

TABLE 11. - Chemistry Definition File - Major Particle Classes

Major Class	Allowable Net Fractional X-ray Intensity
Silica	$0.90 \leq \text{Si} \leq 1.00$ $0.00 \leq \text{Df}^a \leq 0.10$
Aluminum Silicate	$0.10 \leq \text{Al} \leq 0.50$ $0.50 \leq \text{Si} \leq 0.90$ $0.00 \leq \text{Df} \leq 0.50$
Magnesium Silicate	$0.05 \leq \text{Mg} \leq 0.50$ $0.00 \leq \text{Fe} \leq 0.50$ $0.50 \leq \text{Si} \leq 0.90$ $0.00 \leq \text{Al} \leq 0.05$ $0.00 \leq \text{Df} \leq 0.001$
Iron Oxide-like	$0.90 \leq \text{Fe} \leq 1.00$ $0.00 \leq \text{P} \leq 0.001$ $0.00 \leq \text{Df} \leq 0.10$
Rutile-like	$0.90 \leq \text{Ti} \leq 1.00$ $0.00 \leq \text{Df} \leq 0.10$
Alumina-like	$0.90 \leq \text{Al} \leq 1.00$ $0.00 \leq \text{Df} \leq 0.10$
Combination-Endogenous	$0.01 \leq \text{P} \leq 1.00$ $0.00 \leq \text{Zr} \leq 0.001$ $0.00 \leq \text{Y} \leq 0.001$ $0.00 \leq \text{Df} \leq 0.99$
Silicon Rich	$0.50 \leq \text{Si} \leq 0.90$ $0.00 \leq \text{Zr} \leq 0.001$ $0.00 \leq \text{Df} \leq 0.50$
Iron Rich	$0.50 \leq \text{Fe} \leq 0.90$ $0.00 \leq \text{Df} \leq 0.50$
Titanium Rich	$0.50 \leq \text{Ti} \leq 0.90$ $0.00 \leq \text{Df} \leq 0.50$

^a Df refers to the fractional x-ray contribution of all remaining elements not previously specified in a class.

TABLE 11 (continued). - Chemistry Definition File - Major Particle Classes

Major Class	Allowable Net Fractional X-ray Intensity
Other Aluminum Silicates	$0.10 \leq Al \leq 0.50$ $0.10 \leq Si \leq 0.50$ $0.00 \leq Df \leq 0.70$
No X-rays	$0.00 \leq Df \leq 0.001$
Aluminum Rich	$0.50 \leq Al \leq 0.90$ $0.00 \leq Df \leq 0.50$
Miscellaneous	No requirements. All remaining particles are placed in this class.

TABLE 12. - Silica Particle Size Data for Lungs 1-22 (LeMont)

Lung	Number of Particles Analyzed	Number Median Diameter (um)	Mass Median Diameter (um)	Mass Median Aerodynamic Diameter (um)
1	397	0.66	2.01	3.28
2	89	0.81	2.55	4.17
3	62	0.76	1.51	2.46
4	312	0.82	2.15	3.51
5	226	0.63	2.34	3.82
6	451	0.62	2.35	3.84
7	436	0.58	2.62	4.28
8	608	0.74	2.27	3.70
9	705	0.53	2.24	3.65
10	483	0.62	2.97	4.85
11	403	0.54	2.17	3.54
12	349	0.62	2.39	3.89
13	705	0.50	1.91	3.11
14	391	0.60	3.54	5.78
15	466	0.59	1.88	3.07
16	385	0.60	1.74	2.84
17	392	0.83	2.48	4.04
18	480	0.77	2.01	3.28
19	250	0.67	11.68	19.04
20	193	0.71	2.52	4.10
21	270	0.73	3.17	5.17
Lung 22				
U-1	456	0.54	2.47	4.03
U-2	428	0.58	3.36	5.48
U-3	531	0.59	6.46	10.54
U-4	442	0.51	3.56	5.81
U-5	449	0.54	3.28	5.34
U-6	523	0.66	2.14	3.48
Control 1-6	610	0.54	4.13	6.74
L-1	659	0.53	2.25	3.66
L-2	438	0.50	2.24	3.65
L-3	489	0.51	1.90	3.10
L-4	375	0.51	2.63	4.29
L-5	391	0.56	2.30	3.76
L-6	325	0.55	3.82	6.23
Control 1-6	261	0.50	1.65	2.69

TABLE 13. - Total Exogenous Particle Size Data for Lungs 1-22 (LeMont)

Lung	Number of Particles Analyzed	Number Median Diameter (um)	Mass Median Diameter (um)	Mass Median Aerodynamic Diameter (um)
1	1382	0.70	4.19	7.25
2	1063	0.76	3.86	6.69
3	536	0.87	6.90	11.96
4	1727	0.71	2.93	5.07
5	1086	0.61	2.99	5.18
6	1334	0.72	3.78	6.54
7	1469	0.70	2.97	5.14
8	2449	0.80	3.60	6.23
9	2069	0.65	3.83	6.64
10	1087	0.70	4.89	8.47
11	1048	0.55	2.71	4.69
12	1049	0.61	3.45	5.97
13	1342	0.54	2.50	4.33
14	1164	0.61	4.03	6.97
15	1134	0.47	2.66	4.60
16	1102	0.60	3.61	6.25
17	1624	0.86	5.10	8.83
18	2148	0.78	3.82	6.62
19	1091	0.73	5.96	10.33
20	1123	0.72	4.13	7.14
21	1110	0.67	3.77	6.53
Lung 22				
U-1	1093	0.54	2.77	4.80
U-2	1024	0.56	3.40	5.89
U-3	1035	0.56	16.66	28.85
U-4	1094	0.53	4.51	7.81
U-5	1021	0.51	5.43	9.41
U-6	1125	0.63	2.98	5.17
Control 1-6	1099	0.50	7.31	12.66
L-1	1467	0.53	2.52	4.36
L-2	1098	0.50	2.44	4.23
L-3	1098	0.51	3.34	5.79
L-4	1120	0.52	3.22	5.58
L-5	1157	0.59	2.86	4.95
L-6	1053	0.57	2.88	4.99
Control 1-6	1167	0.51	4.75	8.15

TABLE 14. - Silica Particle Size Data for Lungs 1-21
(Graphical/Hatch-Choate)

Lung	Number of Particles Analyzed	Number Median Diameter (um)	Geometric Standard Deviation	Mass Median Diameter (um)	Mass Median Aerodynamic Diameter (um)
1	397	0.66	2.03	2.94	4.82
2	89	----	----	----	----
3	62	----	----	----	----
4	312	0.80	2.04	3.62	5.95
5	226	----	----	----	----
6	451	0.65	2.13	3.60	5.91
7	436	0.60	2.00	2.55	4.19
8	608	0.75	2.05	3.51	5.77
9	705	0.55	1.87	1.79	2.94
10	483	0.62	2.35	5.58	9.16
11	403	0.54	2.05	2.53	4.15
12	349	0.63	2.23	4.34	7.14
13	705	0.50	2.07	2.45	4.02
14	391	0.60	2.17	3.61	5.94
15	466	0.58	2.05	2.71	4.45
16	385	0.59	1.95	2.26	3.72
17	392	0.84	1.95	3.18	5.23
18	480	0.74	1.92	2.65	4.35
19	250	0.66	1.97	2.66	4.38
20	193	----	----	----	----
21	270	0.69	2.12	3.74	6.14
Lung 22					
U-1	456	0.55	1.93	2.01	3.31
U-2	428	0.61	2.32	5.12	8.42
U-3	531	0.61	2.03	2.74	4.50
U-4	442	0.49	2.12	2.68	4.40
U-5	449	0.54	2.26	3.93	6.45
U-6	523	0.63	2.02	2.78	4.57
Control 1-6	610	0.53	2.23	3.65	6.00
L-1	659	0.55	2.14	3.13	5.15
L-2	438	0.51	2.20	3.32	5.45
L-3	489	0.52	2.07	2.55	4.19
L-4	375	0.49	2.10	2.57	4.21
L-5	391	0.53	2.19	3.37	5.54
L-6	325	0.53	2.18	3.27	5.38
Control 1-6	261	0.48	2.12	2.64	4.34

TABLE 15. - Total Exogenous Particle Size Data for Lungs 1-21
(Graphical/Hatch-Choate)

Lung	Number of Particles Analyzed	Number Median Diameter (um)	Geometric Standard Deviation	Mass Median Diameter (um)	Mass Median Aerodynamic Diameter (um)
1	1382	0.71	2.14	4.07	7.04
2	1063	0.74	2.50	9.17	15.88
3	536	0.90	2.40	9.04	15.65
4	1727	0.72	2.05	3.39	5.87
5	1086	0.62	2.09	3.18	5.51
6	1334	0.73	2.22	4.90	8.48
7	1469	0.70	2.16	4.14	7.17
8	2449	0.80	2.12	4.33	7.50
9	2069	0.67	2.07	3.31	5.72
10	1087	0.70	2.52	9.12	15.79
11	1048	0.55	2.12	3.02	5.24
12	1049	0.63	2.33	5.37	9.30
13	1342	0.54	2.18	3.35	5.80
14	1164	0.62	2.32	5.25	9.10
15	1134	0.50	2.05	2.34	4.06
16	1102	0.61	2.08	3.04	5.27
17	1624	0.89	2.17	5.35	9.27
18	2148	0.78	2.08	3.87	6.71
19	1091	0.80	2.41	8.18	14.17
20	1123	0.72	2.26	5.32	9.22
21	1110	0.67	2.20	4.35	7.54
Lung 22					
U-1	1093	0.56	2.12	3.00	5.19
U-2	1024	0.59	2.31	4.81	8.34
U-3	1035	0.58	2.17	3.51	6.08
U-4	1094	0.54	2.15	3.13	5.41
U-5	1021	0.53	2.22	3.61	6.25
U-6	1125	0.60	2.12	3.32	5.76
Control 1-6	1099	0.50	2.32	4.23	7.33
L-1	1467	0.55	2.19	3.49	6.05
L-2	1098	0.50	2.16	2.95	5.12
L-3	1098	0.52	2.16	3.09	5.35
L-4	1120	0.52	2.22	3.49	6.04
L-5	1157	0.57	2.14	3.24	5.62
L-6	1053	0.57	2.31	4.63	8.03
Control 1-6	1167	0.52	2.41	5.28	9.15

TABLE 16. - Particle Concentration/Composition Data for Lungs 1-5

Particle Type	<u>Particle Concentration (millions/g of dry lung)</u>				
	Lung 1	Lung 2	Lung 3	Lung 4	Lung 5
Total Exogenous	4997	1644	257	5972	2736
Silica	1440	135	27	1078	567
Aluminum Silicate	2923	488	138	3962	1942
Magnesium Silicate	62	13	9	63	8
Rutile-like	207	39	0	195	53
Alumina-like	11	8	1	132	3
Exog.-Endog. Comb. ^a	50	743	72	60	25
Silicon Rich	120	41	3	17	35
Iron Rich	37	35	2	198	5
Titanium Rich	69	30	6	167	51
Other Aluminum Silicates	25	20	1	21	5
Aluminum Rich	36	6	0	38	10
Miscellaneous	18	87	3	42	33

^a Exog.-Endog. Comb. is a subclass of "Combination Endogenous" (Table 3). Particles in this subclass have a major exogenous component in addition to an endogenous component and are considered to be of exogenous origin.

TABLE 17. - Particle Concentration/Composition Data for Lungs 6-10

Particle Type	<u>Particle Concentration (millions/g of dry lung)</u>				
	Lung 6	Lung 7	Lung 8	Lung 9	Lung 10
Total Exogenous	2788	3703	9991	5239	1097
Silica	946	1100	2484	1795	489
Aluminum Silicate	1178	2248	6943	3100	400
Magnesium Silicate	29	8	12	36	59
Rutile-like	38	149	257	122	56
Alumina-like	11	0	20	0	1
Exog.-Endog. Comb.	459	50	70	45	21
Silicon Rich	44	28	29	28	27
Iron Rich	4	20	4	23	5
Titanium Rich	27	88	94	59	8
Other Aluminum Silicates	11	5	37	10	7
Aluminum Rich	8	3	25	25	14
Miscellaneous	33	5	16	0	11

TABLE 18. - Particle Concentration/Composition Data for Lungs 11-15

Particle Type	<u>Particle Concentration (millions/g of dry lung)</u>				
	Lung 11	Lung 12	Lung 13	Lung 14	Lung 15
Total Exogenous	1261	1455	1039	1083	2592
Silica	494	484	548	362	1070
Aluminum Silicate	469	796	344	471	541
Magnesium Silicate	5	4	6	4	30
Rutile-like	93	45	44	65	679
Alumina-like	2	4	2	3	2
Exog.-Endog. Comb.	2	4	5	6	29
Silicon Rich	69	39	50	86	64
Iron Rich	10	8	6	9	21
Titanium Rich	75	42	13	50	55
Other Aluminum Silicates	2	4	2	1	12
Aluminum Rich	7	4	3	0	7
Miscellaneous	32	18	14	27	81

TABLE 19. - Particle Concentration/Composition Data for Lungs 16-21

Particle Type	<u>Particle Concentration (millions/g of dry lung)</u>					
	Lung 16	Lung 17	Lung 18	Lung 19	Lung 20	Lung 21
Total Exogenous	3868	2576	2376	509	3748	4129
Silica	1351	626	533	116	636	1005
Aluminum Silicate	2130	1629	1437	219	2512	2536
Magnesium Silicate	4	30	20	37	13	37
Rutile-like	113	51	45	7	44	216
Alumina-like	14	13	0	1	7	22
Exog.-Endog. Comb.	70	79	90	100	201	26
Silicon Rich	39	22	57	4	104	138
Iron Rich	35	10	42	7	67	34
Titanium Rich	60	18	27	3	57	48
Other Aluminum Silicates	0	35	38	1	67	15
Aluminum Rich	18	19	7	2	10	26
Miscellaneous	35	43	81	13	30	26

TABLE 20. - Particle Concentration/Composition Data for
Lung 22 - Upper Lobe Specimens

<u>Particle Concentration (millions/g of dry lung)</u>							
Particle Type	<u>Upper Lobe Sample Identification</u>						Control 1-6
	U-1	U-2	U-3	U-4	U-5	U-6	
Total Exogenous	12252	15243	4133	14784	12007	6376	1123
Silica	5090	6345	2125	5941	5250	2952	600
Aluminum Silicate	5217	6957	1352	6808	5009	2650	154
Magnesium Silicate	22	45	8	81	35	28	20
Rutile -like	382	433	129	393	366	182	69
Alumina -like	135	45	20	122	95	34	28
Exog. -Endog. Comb.	68	104	24	162	94	62	2
Silicon Rich	225	388	129	393	284	85	64
Iron Rich	292	224	129	353	366	108	91
Titanium Rich	157	194	93	122	130	74	40
Other Aluminum Silicates	67	105	16	149	47	57	7
Aluminum Rich	247	134	20	41	95	63	5
Misc.	349	269	89	217	236	80	42

TABLE 21. - Particle Concentration/Composition Data for
Lung 22 - Lower Lobe Specimens

Particle Type	<u>Particle Concentration (millions/g of dry lung)</u>						
	<u>LOWER Lobe Sample Identification</u>						Control 1-6
	L-1	L-2	L-3	L-4	L-5	L-6	
Total Exogenous	27895	27674	25979	15944	18327	20788	710
Silica	12528	11033	11563	5330	6187	6394	150
Aluminum Silicate	12374	12593	11077	9218	10788	13380	161
Magnesium Silicate	75	50	378	70	0	18	1
Rutile -like	833	878	1058	508	377	364	24
Alumina -like	0	24	46	56	0	0	14
Exog. -Endog. Comb.	153	581	190	143	95	19	250
Silicon Rich	171	252	261	86	79	119	13
Iron Rich	357	373	512	94	139	146	37
Titanium Rich	284	276	353	155	316	174	8
Other Aluminum Silicates	209	151	24	57	111	40	4
Aluminum Rich	190	353	237	100	143	60	4
Misc.	722	1109	281	127	94	75	44

TABLE 22. - Summary Particle Data for 21 Coal Miner Lungs

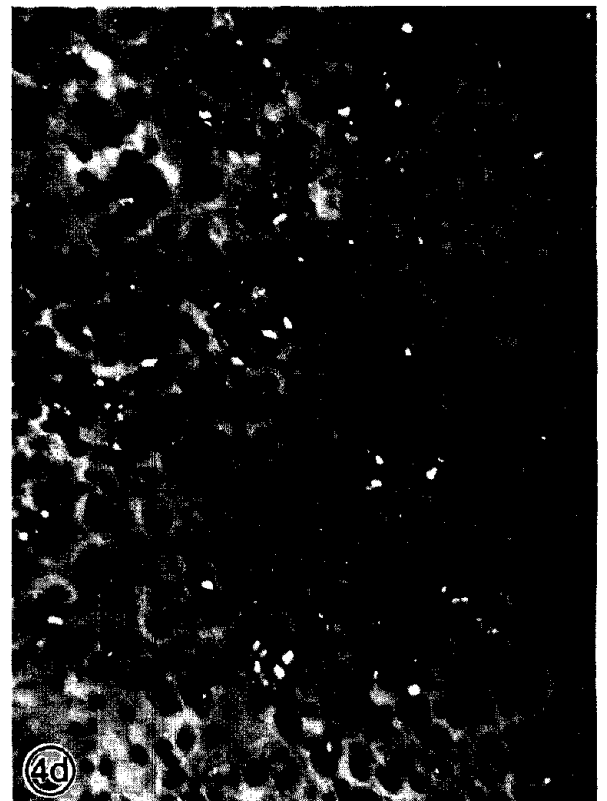
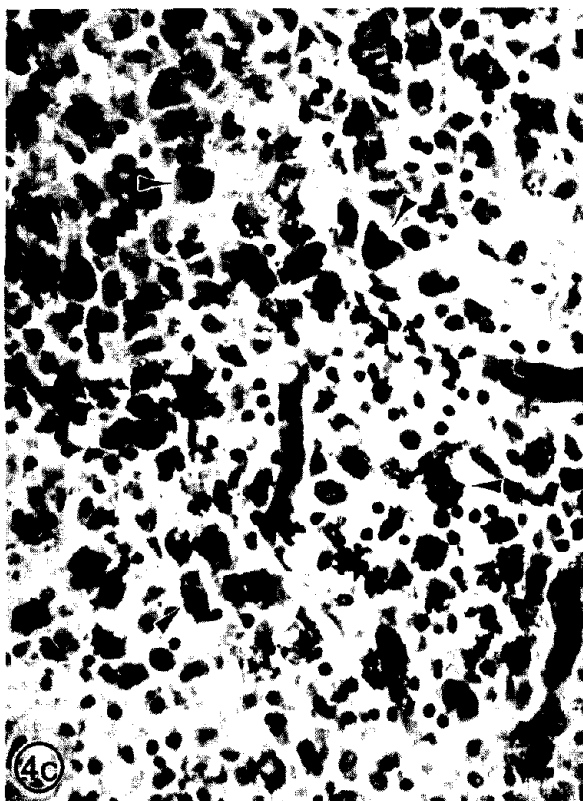
Particle Type	<u>Particle Concentration (millions/g of dry lung)</u>				
	Mean	Standard Deviation	Minimum	Median	Maximum
Total Exogenous	3003	2267	257	2592	9991
Silica	823	594	27	626	2484
Aluminum Silicate	1734	1629	138	1437	6943
Magnesium Silicate	23	20	4	13	63
Rutile-like	120	147	0	56	679
Alumina-like	12	28	0	3	132
Exog.-Endog. Comb.	105	177	2	50	743
Silicon Rich	50	36	3	39	138
Iron Rich	28	42	2	10	198
Titanium Rich	50	38	3	50	167
Other Al Silicates	15	17	0	10	67
Aluminum Rich	13	11	0	8	38
Miscellaneous	31	25	0	27	87

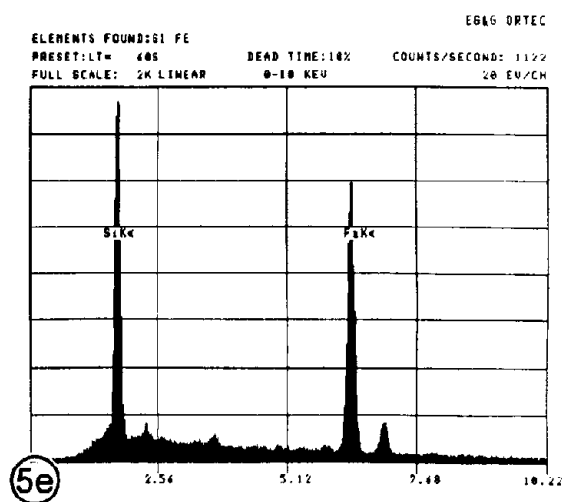
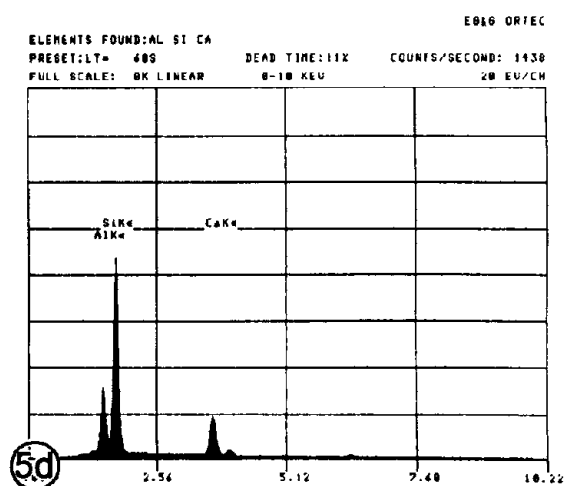
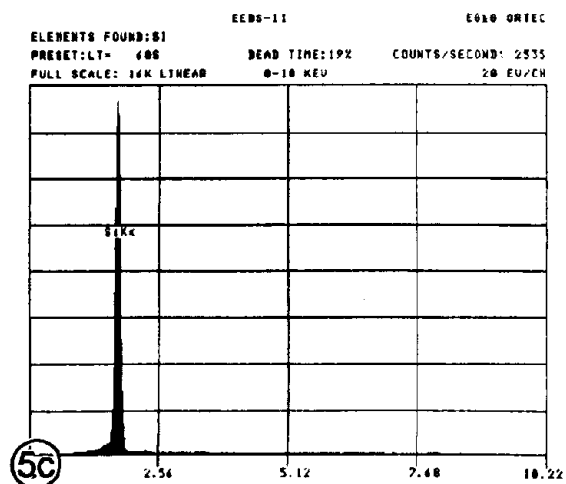
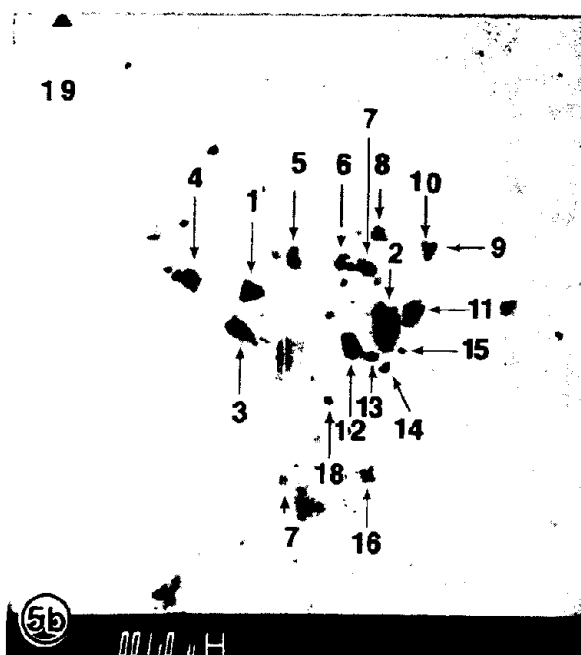
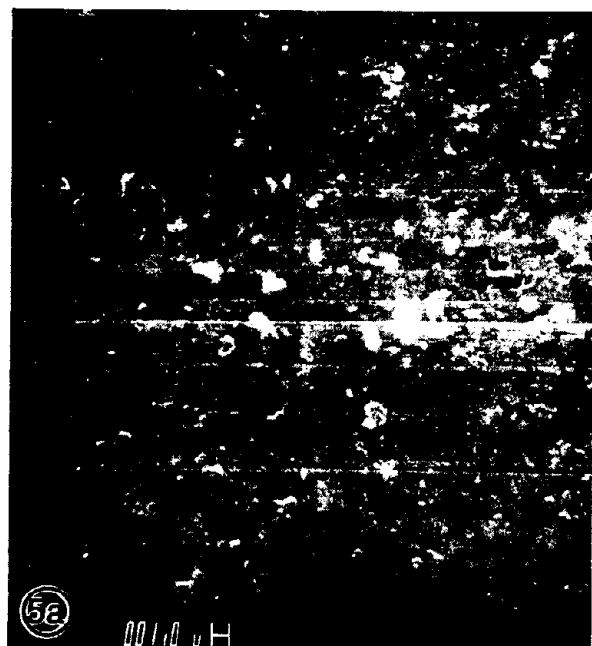
TABLE 23. - Summary Particle Data for 87 Urban Lungs

Particle Type	<u>Particle Concentration (millions/g of dry lung)</u>				
	Mean	Standard Deviation	Minimum	Median	Maximum
Total Exogenous	477	380	71	374	1862
Silica	94	70	11	72	337
Aluminum Silicate	179	144	21	127	762
Magnesium Silicate	9	8	0	6	34
Rutile-like	55	115	2	29	942
Alumina-like	3	6	0	1	53
Exog.-Endog. Comb.	44	80	1	17	561
Silicon Rich	12	9	2	10	55
Iron Rich	22	23	1	15	145
Titanium Rich	14	12	1	10	67
Other Al Silicates	7	7	0	5	33
Aluminum Rich	22	22	1	13	115
Miscellaneous	15	13	1	11	63

FIGURE LEGENDS

- Fig. 4a. Section of coal worker's lung (Case #16) illustrating a small silicotic nodule within the pulmonary interstitium. (Wilders X70)
- Fig. 4b. Same lung as in Fig. 4a taken with cross polarizing filter. Area shown lies adjacent to a small silicotic nodule (not shown) and shows proliferating coal dust laden macrophages enmeshed in a connective tissue stroma. Note the distribution of birefringent particles. (H&E X180)
- Fig. 4c. Regional lymphatic tissue from same case as Fig. 4a showing phagocytic cells containing dust (arrows). (H&E X450)
- Fig. 4d. Same field as in Fig. 4c taken with cross polarizing filters showing birefringent particles. (H&E X450)
- Fig. 5a. Secondary Electron Image (SEI) of lesion in silicotic lung of coal miner (Case 16). Particulate material is faintly apparent against the organic tissue matrix. (uncoated tissue section X2000)
- Fig. 5b. Same field using Backscattered Electron Imaging (BSI). Mineral particulate stands out against the organic matrix. (uncoated tissue section X2000)
- Fig. 5c-e Energy Dispersive Spectra of numbered particles in 5b. Fig. 5c Particles 1, 2, 5, 6, 7, 8, 9, 10, 12, 13, 14, 17, 18, 19. Fig. 5d Particle 11 and Fig. 5e Particles 3, 4, 16.
- Fig. 6a. A Backscattered Electron Image (BEI) of a typical field of view from one of the ashed lung preparations.
- Fig. 6b-d Energy Dispersive Spectra of the indicated particles in 3a.





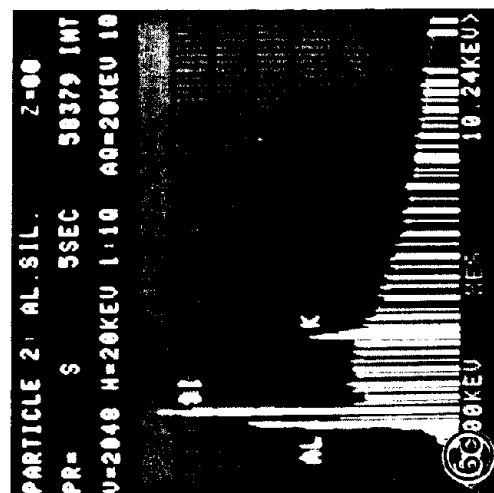
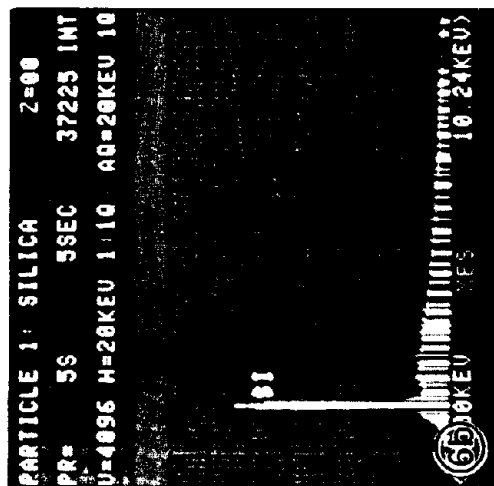
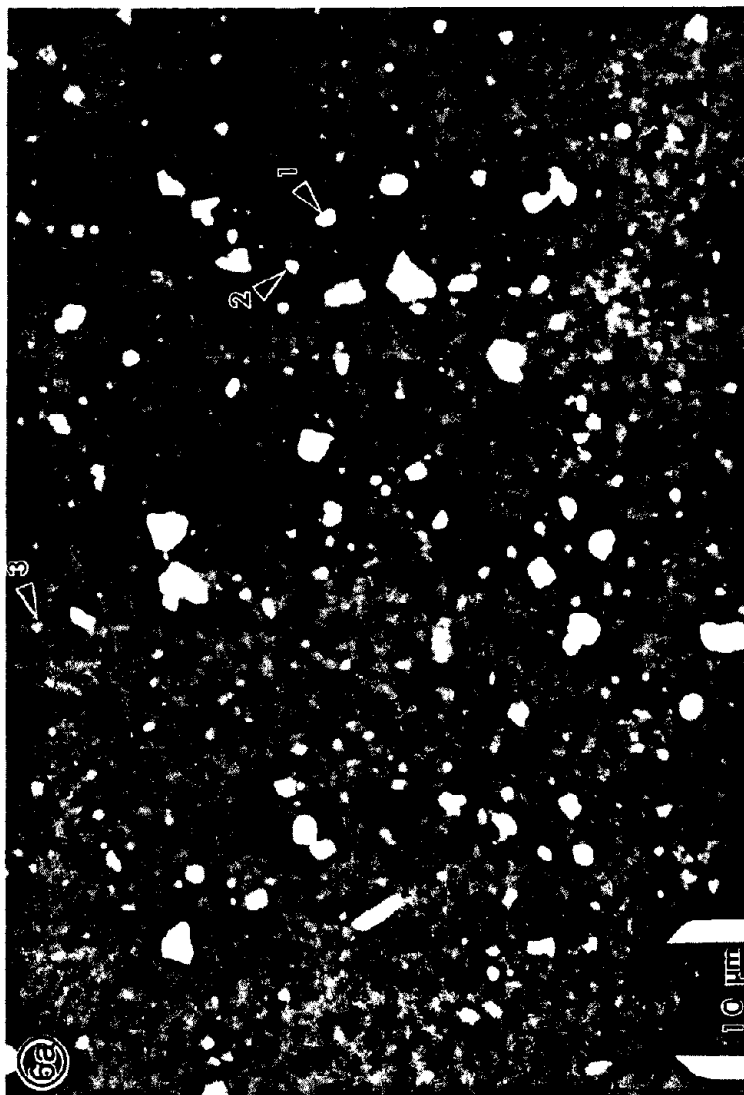


FIGURE 7
Silica Median Diameter Distribution
for Coal Miners' Lungs 1-21

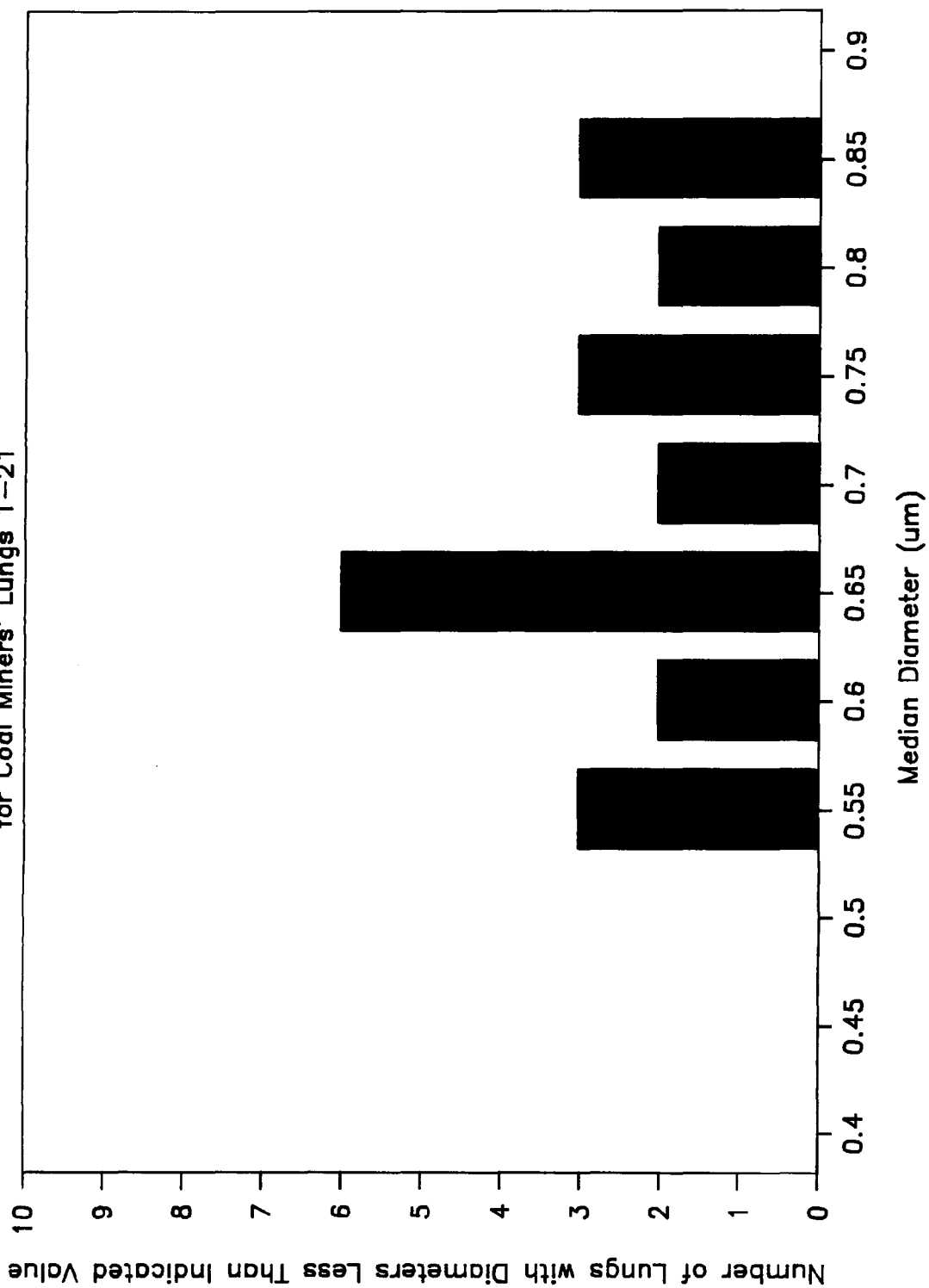
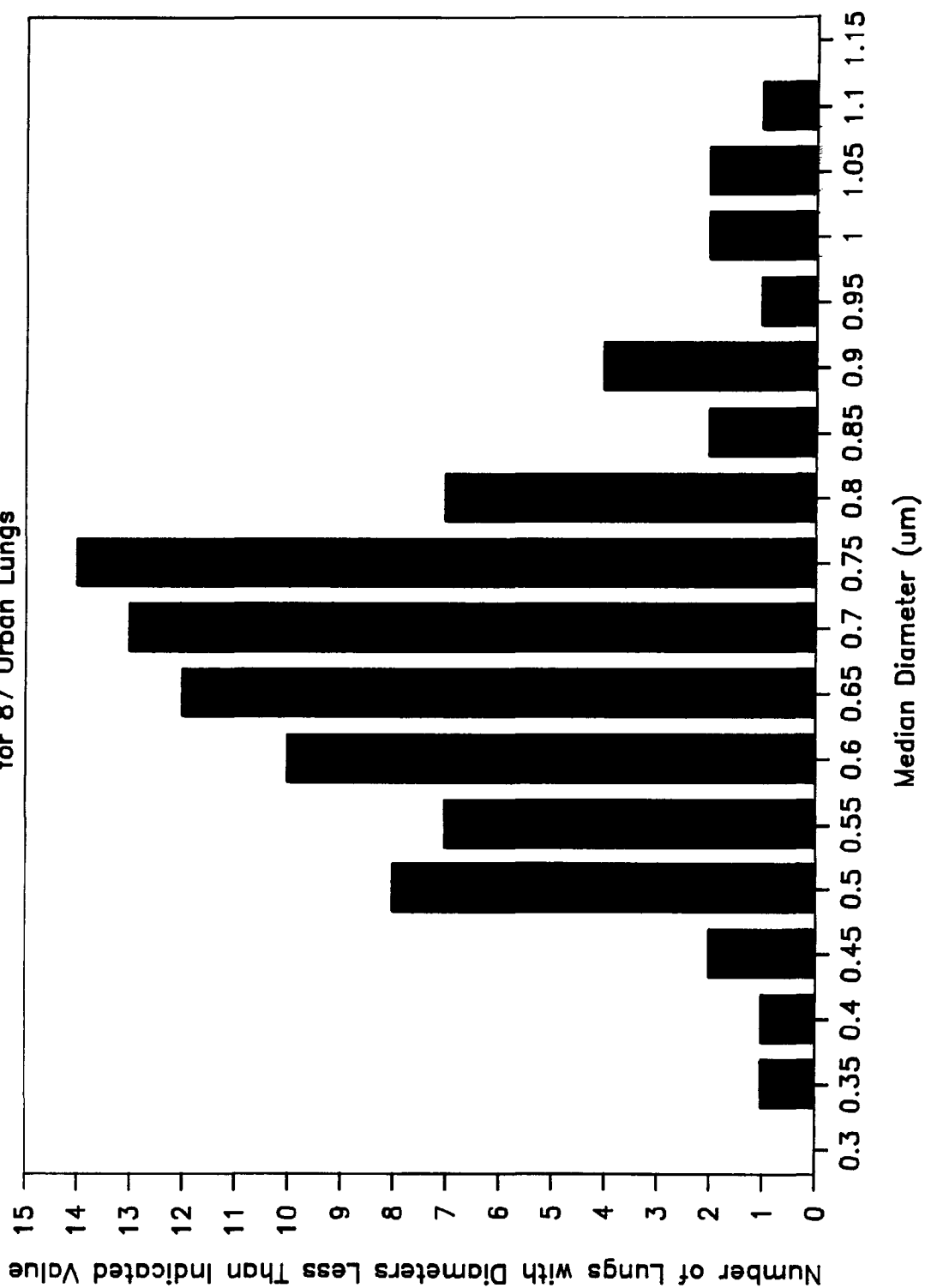


FIGURE 8
Silica Median Diameter Distribution
for 87 Urban Lungs



4. CHARACTERIZATION OF SURFACE PROPERTIES AFFECTING THE ACTIVITY OF THE "FREE SILICA" FRACTION OF RESPIRABLE DUSTS

by

W. E. Wallace and M. J. Keane

4.1 SURFACE PROPERTIES AFFECTING QUARTZ CYTOTOXICITY

The mass percentage of quartz, sometimes referred to as the "free silica" content, is one respirable mine dust parameter measured to provide information for control of potentially hazardous exposures. The MSHA standard method for this is based on infrared spectroscopic methods. Other methods can also be used to measure the silica fraction of a collected, mixed composition respirable dust. For research purposes these frequently include X-ray diffraction or scanning electron microscopy in concert with energy dispersive X-ray analysis (SEM-EDX).

In the lung, respired mineral dust interaction with tissue involves the surface of the deposited particles. The cytotoxic potential in vitro and in vivo of a given mass of quartz dust in the general respirable size range may be dependent on the specific surface area of the dust and on the degree of contamination, occlusion, or modification of the dust surface.

In this project we have investigated two aspects of the role of dust surface properties in determining the disease-inducing potential of respirable quartz.

The first is the question of determining the degree of surface contamination of respirable quartz particles. That is, we investigated the feasibility of measuring low levels of surface associated contaminants of other than silicon elemental composition which might mask or alter in whole or in part the native quartz surface cytotoxic potential. We have modelled and performed limited testing of a modification of conventional SEM-EDX analysis to distinguish alumino-silicate and magnesium silicate surface occlusion from underlying silica particles. The second is an investigation of some treatments which can significantly alter the cytotoxic potential of quartz dust surface without changing the silicon elemental composition of the particle in a readily measurable way. These two studies indicate the possibility that compositional or structural features of dust surfaces may affect the cytotoxic potential of a given mass of respirable quartz dust. The treatment investigations additionally may be of some interest regarding mineral processing.

This chapter provides an analysis of the use of SEM-EDX at differing electron beam accelerating voltages to distinguish and semi-quantitate surface contaminants of aluminum or magnesium silicates on silica particles. The next chapter reviews our findings on the suppression of quartz cytotoxicity by relatively mild surface treatment procedures.

4.2 SCANNING ELECTRON MICROSCOPY - ENERGY DISPERSIVE X-RAY ELEMENTAL ANALYSIS METHODS FOR SURFACE CONTAMINANTS ON SILICA PARTICLES

4.2.1 THEORY

Typically, SEM-EDX analyses are performed using an electron beam accelerating voltage of 20 to 30 KeV. At such high voltages the electron beam penetrates the material being studied to a depth of more than a micrometer. The resultant energy dispersive X-ray spectra provide elemental composition data averaged throughout this depth.

However, if the accelerating voltage is lowered, then the electron beam penetrates less deeply into the material. The extinction of the electron beam intensity, E , with distance into the material, x , has been modelled to obey a Beer-Lambert form of behavior

$$dE = -k_e E dx$$

where k_e , the extinction coefficient, is approximately related to the electron beam accelerating voltage V as

$$k_e = A V^{-3/2}$$

between 5 and 15 KeV, and as

$$k_e = BV^{-2}$$

between 15 and 25 KeV (Cosslett and Thomas, Brit. J. Appl. Phys. 15 883, 1944).

The possibility thus exists to distinguish surface layer from substrate layer composition of a material with differing surface and bulk composition.

Our interest is in determining if there is such a surface versus bulk composition structure to respirable sized particles (micrometer diameter range) which are characterized in mixed dusts by IR or XRD to contain a certain percent quartz. The basic question is whether this mass percent composition faithfully and consistently measures or correlates with the available quartz surface area in the mixed dust, the toxicological properties of the dust being in large part dependent on the mineral surface area which is biologically accessible to pulmonary tissue. SEM-EDX at high voltages when performed on such dust often indicates the presence of aluminum in addition to silicon for an individual particle. Frequently such analysis defines a particle to be quartz if it is $\geq 95\%$ silicon as determined by the ratio of intensity of the silicon line to those of the other lines present in the X-ray spectra. To look at the relationship of particle coating thickness, material properties, accelerating voltage, and consequent spectral line intensity ratios, consider a simplified one-dimensional model of X-ray emission induced by electron bombardment of a two phase material.

An electron beam of intensity E_0 is incident on the surface of the coating ($X=0$, $Z=L$). The coating is of thickness T . Figure 9 is a schematic showing the sign conventions for the analysis.

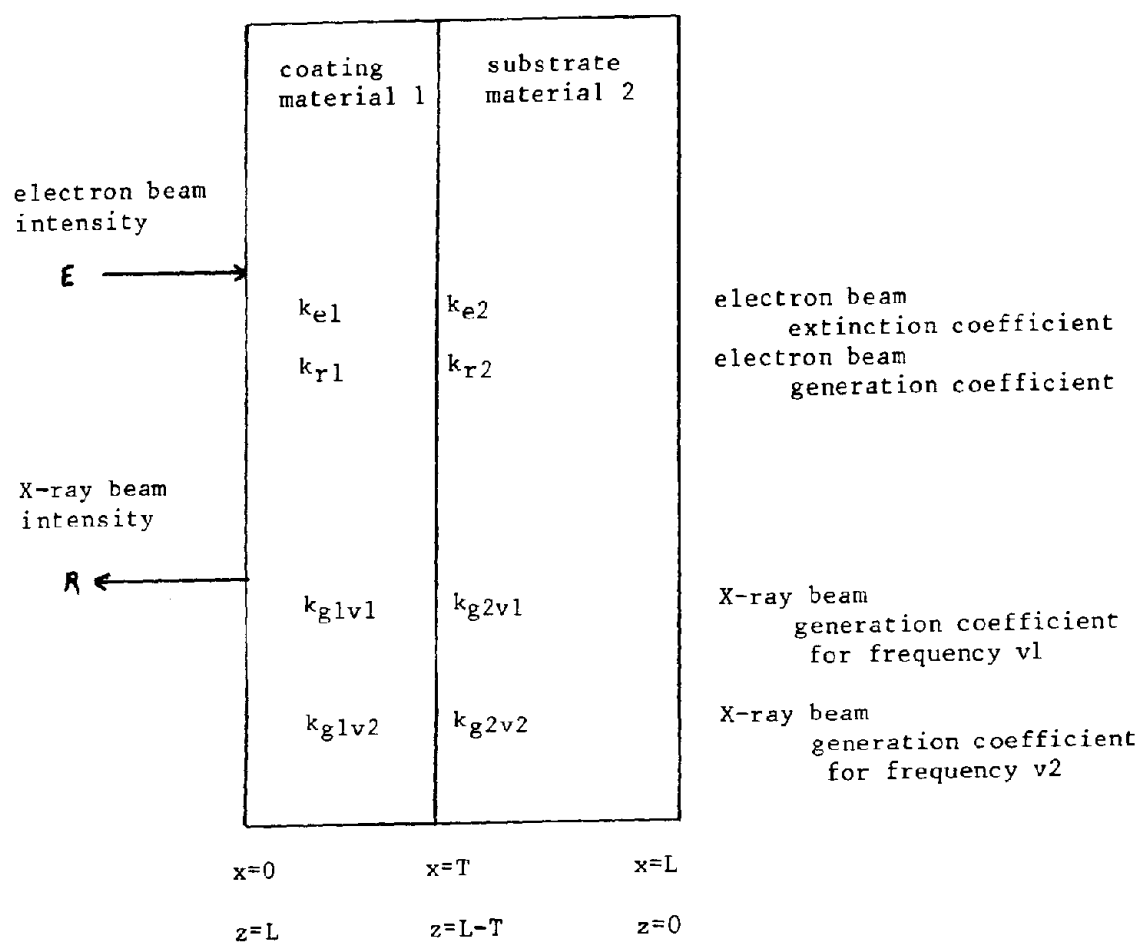


Fig. 9. Nomenclature and sign convention for one-dimensional analysis of SEM-EDX signal intensities from a coated particle.

In passing through a differential thickness of material 1, the coating, the electron beam intensity is diminished by

$$dE_1 = - k_{e1} E_1 dx$$

and in material 2, the substrate, by

$$dE_2 = - k_{e2} E_2 dx$$

The intensity of the X-ray beam at the wavelength of interest propagating in the positive z - direction is designated by R . The intensity of the X-ray beam as it exits the top of the coating, R_1 ($x=0$, $z=L$) is taken to be the recorded SEM-EDX signal.

As the X-rays pass through a differential thickness of material 1, they are extinguished by

$$dR_1 = - k_{r1} R_1 dz$$

But within that thickness the electron beam may also be generating X-rays at the monitored wavelength according to

$$dR_1 = + k_{g1} E_1 dz.$$

Thus, the X-ray intensity exiting the differential thickness in the positive z -direction has changed from that entering by

$$dR_1 = - k_{r1} R_1 dz + k_{g1} E_1 dz.$$

Similarly for the substrate material

$$dR_2 = - k_{r2} R_2 dz + k_{g2} E_2 dz$$

The electron beam intensity at any depth x in the coating is found from

$$\int_0^x \frac{dE_1}{E_1} = \int_0^x -k_{e1} dx$$

to be

$$E_1 (x) = E_0 e^{-k_{e1}x}$$

and, in particular, at the coating-substrate interface

$$E_1 (T) = E_0 e^{-k_{e1}T}$$

The electron beam intensity at any depth x in the substrate is found from

$$\int_T^x \frac{dE_2}{E_2} = \int_T^x -k_{e2} dx$$

to be

$$E_2(x) = E_2(T)e^{-k_{e2}(x-T)}$$

But at the interface

$$E_1(T) = E_2(T)$$

so

$$E_2(x) = E_0e^{-k_{e1}T}e^{-k_{e2}(x-T)}$$

For convenience changing variables by $x = L - z$

$$E_1(z) = E_0e^{-k_{e1}(L-z)}$$

$$\begin{aligned} E_2(z) &= E_0e^{-k_{e1}T}e^{-k_{e2}(L-z-T)} \\ &= E_0e^{-(k_{e1}-k_{e2})T}e^{-k_{e2}L}e^{k_{e2}z} \end{aligned}$$

To find the X-ray intensity in the positive Z-direction in material 1, combine the expressions for dR_1 and dE_1 to give

$$dR_1 = -k_{r1}R_1dz + k_{g1}E_0e^{-k_{e1}(L-z)}dz$$

This first order differential equation may be solved subject to the boundary condition that at the interface X-rays are entering from material 2 into material 1. Their intensity is not yet known so we designate it R_T ; that is,

$$R_1(z=L-T) = R_2(z=L-T) = R_T$$

This differential equation for X-ray intensity in material 2 can be solved in terms of the unknown boundary value to give

$$R_1(z) = \frac{-k_{g1}E_0e^{k_{e1}L}(e^{-k_{r1}z} - e^{k_{e1}z}) + R_Te^{-k_{r1}z}}{k_{r1} + k_{e1}}$$

To find the X-ray intensity in the substrate one solves

$$dR_2 = -k_{r2}R_2dz + k_{g2}E_0e^{-(k_{e1}-k_{e2})T}e^{-k_{e2}L}e^{k_{e2}z}dz$$

subject to the boundary condition that no X-rays are entering the bottom of the substrate, that is,

$$R_2(z=0) = 0$$

One obtains

$$R_2(z) = \frac{k_{g2}E_0e^{-(k_{e1}-k_{e2})T}e^{-k_{e2}L}[(e^{k_{e2}z} - e^{-k_{r2}z})]}{k_{r2} + k_{e2}}$$

Equating the expressions for $R_1(z)$ and $R_2(z)$ at the interface

$$R_1(L-T) = R_2(L-T)$$

provides an expression for R^T :

$$R_T = \frac{k_{g2} E_0 e^{-(k_{e1}-k_{e2})T} e^{-k_{e2}L} (e^{+k_{e2}(L-T)} - e^{k_{r2}(L-T)})}{k_{r2} + k_{e2}}$$

which can be used in the expression for $R_1(z)$ to find the X-ray intensity in the coating. In particular, the X-ray intensity exiting the top of the coating, which is proportional to the observed signal, per unit incident electron beam intensity, is

$$\begin{aligned} \frac{R_1(x=0)}{E_0} &= \frac{k_{g1}}{k_{r1} + k_{e1}} [1 - e^{-(k_{e1}+k_{r1})T}] \\ &+ \frac{k_{g2}}{k_{r2} + k_{e2}} e^{-(k_{e1}+k_{e2})T} [1 - e^{+(k_{e2}+k_{r2})T} - e^{-(k_{e2}+k_{r2})L}] \end{aligned}$$

Thus, if one measures the extinction coefficients k_{r1} , k_{r2} , k_{e1} , k_{e2} and the generation coefficients k_{g1} , k_{g2} on pure materials 1 and 2 then one can extract an approximation of the coating thickness from measurements of the relative X-ray intensities from coating and substrate signals versus accelerating voltages.

To look at the underlying functional dependence of the ratio of substrate to coating signal, consider the expression for $R_1(L)/E_0$ for X-ray emissions from different elements in the substrate and coating. Let the electromagnetic signal from the substrate have frequency ν_2 , and from the coating have frequency ν_1 . In general, the extinction coefficients for electron beam and X-ray adsorption and for x-ray generation will be different. To examine the simplest case assume x-rays of frequency ν_1 are generated only by the coating, and ν_2 only by the substrate:

$$k_{g1, \nu_1} = g_1, \quad k_{g2, \nu_1} = 0$$

and

$$k_{g1, \nu_2} = 0, \quad k_{g2, \nu_2} = g_2.$$

Assume electron beam and x-ray extinction coefficients are the same for each medium:

$$k_{e1} = k_{e2} = k_e.$$

$$k_{r1, \nu_1} = k_{r1, \nu_2} = k_{r2, \nu_1} = k_{r2, \nu_2} = k_r.$$

Also assume the substrate is "thick" compared to T and compared to electron and X-ray diminution characteristic depths. Then the signal expressions become

$$\frac{R_1(x=0)}{E_0} \big|_{v2} = \frac{\epsilon_2}{k_r + k_e} [e^{-(k_e + k_r)T}]$$

and

$$\frac{R_1(x=0)}{E_0} \big|_{v1} = - \frac{\epsilon_1}{k_r + k_e} [1 - e^{-(k_e + k_r)L}]$$

In the simplest case assume equally effective x-ray signal production by the two media, that is,

$$\epsilon_1 = \epsilon_2 = \epsilon.$$

Then the fraction of substrate signal to substrate and coating signal is then

$$\frac{R_1(x=0)/E_0 \big|_{v2}}{R_1(x=0)/E_0 \big|_{v2} + R_1(x=0)/E_0 \big|_{v1}} = e^{-(k_r + k_e)T} = e^{-k_r T} \text{EXP}[-AT(V^{-3/2})]$$

Fig. 10 shows this simplified functional dependence for

$$Y = \text{EXP}[-AT(V^{-3/2})]$$

for several values of "AT". To apply the full formula requires pure material measurements to obtain extinction and generation coefficients.

4.2.2 EXPERIMENTAL RESULTS

We here present some data on the relationship of measured fraction of SEM-EDX signal coming from the substrate to coating thickness and electron beam accelerating voltage. The resolution degradation with decreasing accelerating voltage for the SEM available to us limits us to 5 to 10 KEV as the lowest workable voltage. The status of newer SEM technology might make it possible to work at lower voltages - essentially, the lower the voltage the thinner the coating which one can distinguish. The limit is the accelerating voltage needed to provide sufficient electron beam energy to excite the primary X-ray line specific for the element of interest. In the data which follow, voltages down to 5 kV are used. This is still high compared to the K lines of silicon, aluminum, and magnesium, so coatings of less than 1 micrometer thickness can be resolved from bulk contaminant composition. However intensities for other elements shown are diminished.

Table 24 provides data for an 0.25 micron diameter crocidolite fiber on a six micron silica sphere. An increase of aluminum-to-silicon with decreasing voltage demonstrates the effect of voltage on surface-to-substrate contribution to the spectra.

Table 24

Relative intensities of X-ray emission lines versus electron beam accelerating voltage for Scanning Electron Microscopy - Energy Dispersive X-Ray (SEM-EDX) analyses of an 0.25 micrometer diameter asbestos fiber on an 6.0 micrometer diameter silica sphere on a tin sample plate. The Si, Al, and Mg lines are all below 5 kV and their ratios can be used to distinguish surface from bulk composition.

	<u>20 Kev</u>	<u>10 KeV</u>	<u>5 Kev</u>
Mg%	2.92	3.64	7.70
Al%	2.12	2.46	4.24
Si%	77.49	86.04	88.06
Sn%	17.47	7.85	0

Fig. 11 shows the percent substrate (Titanium) for silica particles of 0.5, 1, and 3 micrometers sitting on a Titanium metal block. That is, the SEM-EDX elemental composition percentage for Titanium, %Ti, and for silicon, %Si, are used to compute

$$\% \text{ substrate (Ti)} = \frac{\% \text{Ti}}{\% \text{Ti} + \% \text{Si}} \times 100$$

as a function of electron beam accelerating voltage V (in kilovolts) for different particle diameters, D. As is seen, at a given voltage the percent substrate signal increases for decreasing particle size. That is, the smaller the particle the lesser the fraction of the signal originating from the particle. And as the accelerating voltage is dropped, the contribution to the signal from the coating becomes dominant. Note that the 5 kV induced values cannot be used for Ti.

Because of low resolution at low voltages with the SEM scope used, it was difficult to locate sub-micrometer diameter particles at 10 Kev and below, and to center the beam on the particle. Therefore, we worked in part with asbestos fibers on a substrate block, and crossing the surface of an underlying particle. It is easier to locate and center the beam on a fiber. And the circular cross-section of the fiber provides a better estimate of the thickness of the particle than for a not-necessarily-spherical clay particle.

Table 25 shows the silicon and aluminum lines of an agglomerate particle of kaolin of unknown but approximately one micron thickness on a larger silica substrate particle about seven microns across. At 20 keV the particle would be defined typically as a silica particle with some aluminum contamination observed in the spectra. At five keV the particle would be defined to be a clay particle.

Table 25

Relative intensities of SEM-EDX lines versus accelerating voltage for a kaolin chip of 0.7 micrometer lateral dimension on an 5 micron silica sphere on a tin plate.

	<u>20 Kev</u>	<u>10 KeV</u>	<u>5 Key</u>
Al%	6.37	20.02	36.27
Si%	55.02	57.18	63.73
Sn%	38.61	22.80	0

Fig. 12 shows signal ratios from crocidolite asbestos fibers on a Tin substrate block. An 0.5 micrometer diameter fiber could be seen down to 5 KeV, but the excitation voltage is insufficient for Tin there.

It appears that with this system coatings down to about 0.1 micrometer can be "resolved", and perhaps lower, for elements with K lines below 2 or 3 kV. This is fortunate for silicon, aluminum, and magnesium, but not for iron or other elements of interest. Scanning Auger spectroscopy looks at the composition to a depth on the order of 10 angstroms, or .001 micrometers. It may be possible to use SEM-EDX in concert with Scanning Auger, leaving a one-to-two order of magnitude "gap" between perhaps 0.1 and .001 micrometers, to semi-quantitate surface versus bulk composition of respirable particles. The use of other X-ray lines, L lines, stimulated from an element by the electron beam might help to overcome two restrictions. Requiring lower excitation energies, those lines could provide signals at lower electron beam accelerating voltages, thus resolving thinner coatings. And elements whose K lines are at energies which are not excited at 5 kV might be analyzed at that voltage using the lower energy spectral lines. Tests using SEM with wavelength dispersive X-ray detection provide evidence for such a feasibility.

4.3 MODIFICATION OF RESPIRABLE QUARTZ PARTICLE CYTOTOXICITY BY SURFACE TREATMENT

4.3.1 SUPPRESSION OF QUARTZ TOXICITY TO PULMONARY MACROPHAGES

Research underway to determine interactions of quartz and other mineral dust surfaces with pulmonary fluids and alveolar macrophages in culture found that when dusts were autoclaved in aqueous suspension, their cytotoxic effects on macrophages were suppressed, in some cases fully and even after several days incubation with the cells. (Hill, C. A., Wallace, W. E., Keane, M. J., Page, S. J., Bolsaitis, P., Razzaboni, B. L., Vallyathan, V. and Mike, P.; "Alteration of Respirable Quartz Particle Cytotoxicity by Thermal Treatment in Aqueous Media"; Proceedings: VII International Pneumoconiosis Conference, Pittsburgh, Pa., 1988; In Press.) This finding was in direct contradiction to

earlier results from both short term macrophage lysosomal enzyme release assays, as well as longer term cytotoxicity assays from macrophages in culture; in those studies, dusts were steam autoclaved at 121°C with no liquid water present.

4.3.2. TREATMENT METHODS AND ASSAY METHODS

It was decided to use the hemolysis assay to further investigate these findings, because of the sensitivity, simplicity and cost. Briefly, dusts suspended in buffer are mixed with an equal volume of 4% sheep red blood cells, incubated 60 min. at 37°C with periodic mixing, the cells spun down, and the absorbance of the released hemoglobin from any lysed cells read at 540 nm. Absorbance values are compared to positive controls (100% lysed cells) and negative controls (cells in buffer only).

Initial experiments involved bringing deionized water to a boil, adding to the dry dust (12 mg) in glass tubes, vortexing, and boiling for periods up to 60 min., without stirring. After the boiling period was completed, sample tubes were spun down for 60 sec., the supernatant discarded, and the dust resuspended in PBS buffer and run in the hemolysis assay. Results indicated that the toxicity was reduced almost to zero at 1 mg/ml, and increased in a roughly linear fashion to approximately full (native dust) toxicity at 20 mg/ml dust concentration during boiling (Fig. 13). When individual magnetic stirrers were used in each sample, results were similar, except the toxicity was reduced to virtually zero at concentrations to 5 mg/ml, and then increased in a linear fashion. The treatment was also applied to kaolin and alumina dusts; kaolin was unaffected, but alumina was similarly detoxified.

Experiments involving various boiling times showed a weak dependence of detoxification with time, except at 1 mg/ml, where the effect seemed significant (Fig. 14). Samples were also vacuum dried after boiling, and assayed the following day; fully detoxified samples remained the same, and partially detoxified samples had less toxicity than replicate samples promptly assayed (Fig. 15).

Samples were also left standing for extended periods after boiling, in the supernatant from the boiling water. Fully detoxified samples (1 mg/ml) remained at zero toxicity after 4 days; samples at higher concentrations showed some increase with time, as shown in Fig. 16. Samples were also boiled for specific periods, centrifuged, and the medium changed to fresh water. The toxicity was reduced to very low levels, as shown in Fig. 17.

Certain samples in the assay yielded consistently anomolous results, and were difficult to reconcile with any simple physical model; specifically, samples boiled at 0.5 mg/ml were not detoxified. The only experimental difference in these samples was that they were boiled in plastic (polycarbonate) centrifuge tubes, since glass tubes were not available in an appropriate size. When quartz was boiled in polycarbonate and Tefzel tubes, only partial detoxification was seen (Fig. 18). When boiled in additionally purified and filtered water that had been boiled in polycarbonate, no detoxification was seen at any concentration.

An additional anomolous result occurred when there was a catastrophic failure in the reverse osmosis water purification cartridge in the NIOSH/ALOSH building distilled water system, resulting in a higher impurity level than that present in tap water. Toxicity was partially suppressed in all samples, even those boiled in polycarbonate. When the system was restored to proper operation, the results agreed with previous findings.

Since the effect seemed clearly to be an effect of the glass containers, additional experiments were done to clarify the finding. Quartz dusts were boiled in polycarbonate-boiled water with varying amounts of 3 mm soda-lime glass beads. Results showed a dependence of detoxification on the number of glass beads, and thus the glass surface area present. The converse of this hypothesis, that polycarbonate somehow suppressed the detoxification of quartz, was tested by boiling quartz in flint glass tubes with polycarbonate pieces in suspension; no significant effect of the polycarbonate was seen.

Quartz samples were also boiled with sodium and calcium chloride solutions of several different concentrations; the effects were weak, slightly lessening the detoxification.

4.3.3 SUMMARY RESULTS

At this point, several conclusions may be stated, and a working hypothesis formulated, namely:

- Quartz boiled in flint glass for times greater than ten minutes at concentrations between 1 and 10 mg/ml is partially to fully detoxified in the Hemolysis assay.

- The effect is strongly concentration dependent between 10 and 30 mg/ml

- If a change is made to fresh boiling water midway in the process, then full detoxification occurs across the entire concentration range

- The effect is present only in samples boiled in flint or borosilicate glass tubes; inert plastic tubes do not show the effect.

- The effect is only moderately time-dependent; at most concentrations, the effect seems nearly complete at 10-15 minutes or less.

- The effect seems to persist on mild drying (overnight vacuum drying)

- Fully detoxified samples appear to show little or no cytotoxicity after soaking in the supernatant from boiling for periods up to 5 days; partially detoxified samples show a gradual increase with time.

- The detoxification seems approximately proportional to available surface area of glass present during boiling.

4.3.4 RESEARCH HYPOTHESIS

Further investigation is needed to more fully clarify the mechanism of silica detoxification, but a partial hypothesis can be stated:

Boiling water releases a soluble or partially soluble factor, probably sodium and/or calcium silicates or hydroxides, which react or are physically adsorbed on the quartz surface, which fully or partially detoxifies the mineral surfaces, as shown in in-vitro cellular toxicity assays.

Suggested strategies for clarifying this would include ESCA and/or Auger surface analysis to determine the surface elemental composition and chemical state(s). If acid-base reactions are involved, the pH dependence of detoxification should be looked at in detail; preliminary data indicate that this is an important variable. Diffuse Reflectance Fourier transform Infrared Spectrophotometry may also yield some information on the surface chemistry of the native and surface-modified quartz.

Current directions in this project are the investigation of the effect of pH and soluble silicates on the detoxification, and physical methods to investigate surface chemical composition.

The prime questions here are whether quartz can be surface modified so that it becomes biologically inert (non-fibrogenic). The first question is:

What physical and chemical conditions are necessary and sufficient to passivate the quartz surface? This project has partially answered this question since; 1) the process proceeds in aqueous solution; 2) the concentration of (less than 5 micron) quartz in suspension must be less than 10 mg/ml; 3) soda-lime or borosilicate glass of sufficient surface area must be present; and 4) the temperature must be close to 100°C.

The second question is whether the passivation effect persists. The effect would have to be verified in long term experiments involving physical and/or chemical methods, as well as in vitro assays, and possibly in vivo bioassays.

Question three is whether this approach is feasible as a prevention strategy. With some additional research on question one, the kinetics and chemical engineering practical approaches would seem feasible to study. The major unknown here is still question two; development of long-term predictive assays for silicosis-inducing minerals is still an area fertile for research. No single assay is without some criticism or controversy.

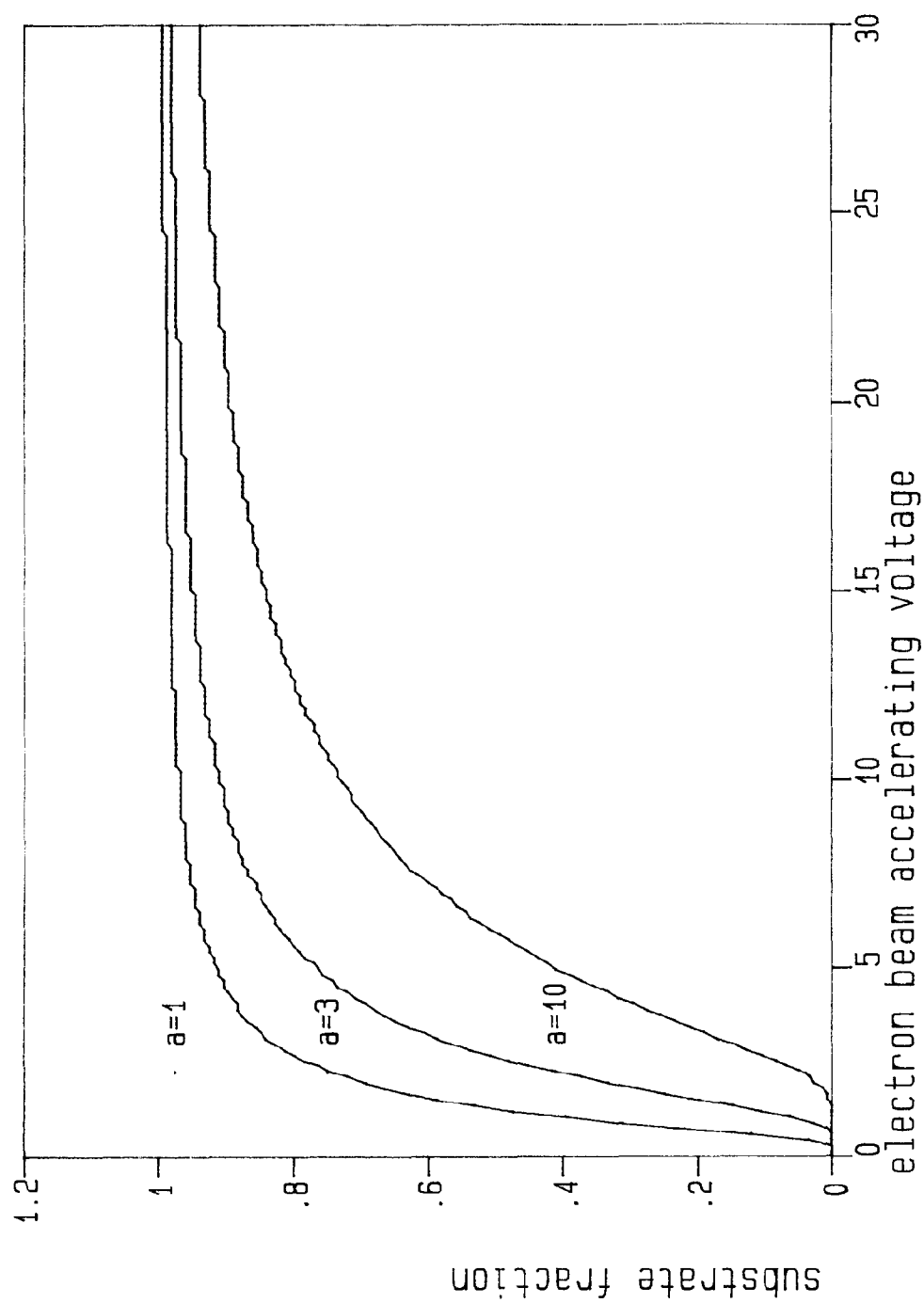


Fig. 10. Theoretical ratio of substrate to substrate plus coating SEM-EDX line intensities versus electron beam accelerating voltage for various coating thicknesses.

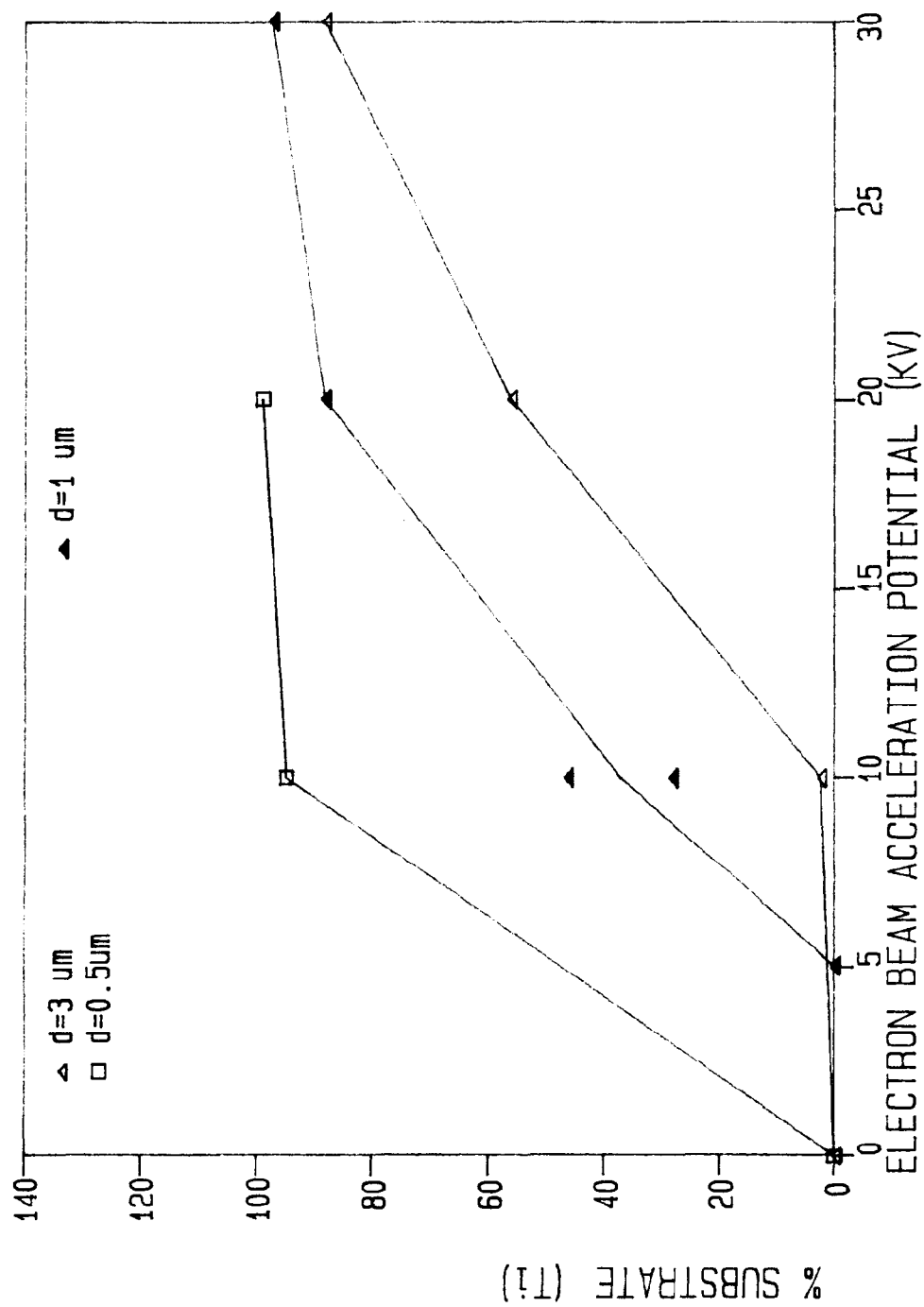


Fig. 11. Experimental ratio of silicon to titanium SEM-EDX line intensities for silica spheres of three different diameters on a titanium block.

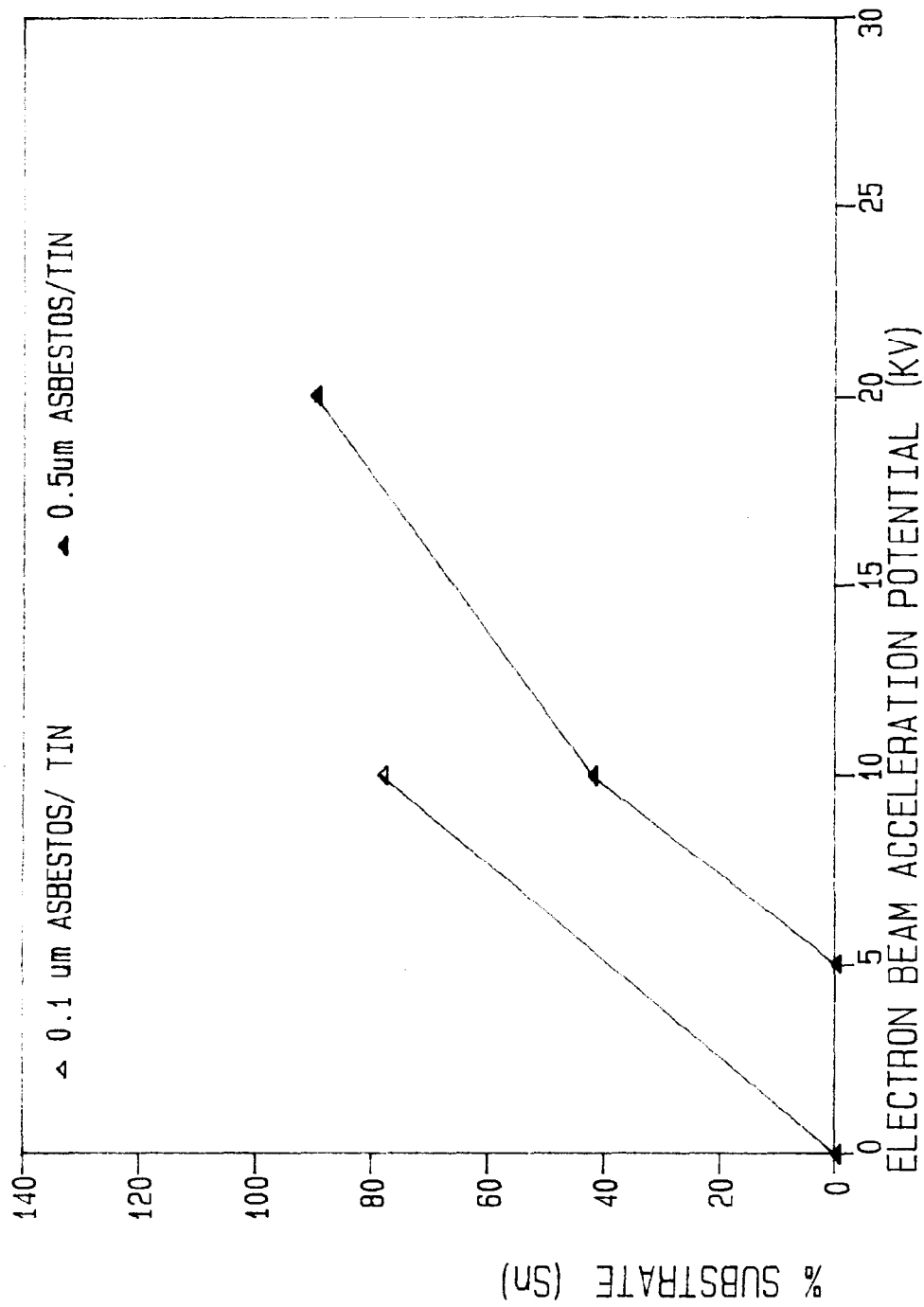


Fig. 12. Experimental ratio of silicon to silicon and tin SEM-EDX line intensities for crocidolite fibers of two different diameters on a tin block.

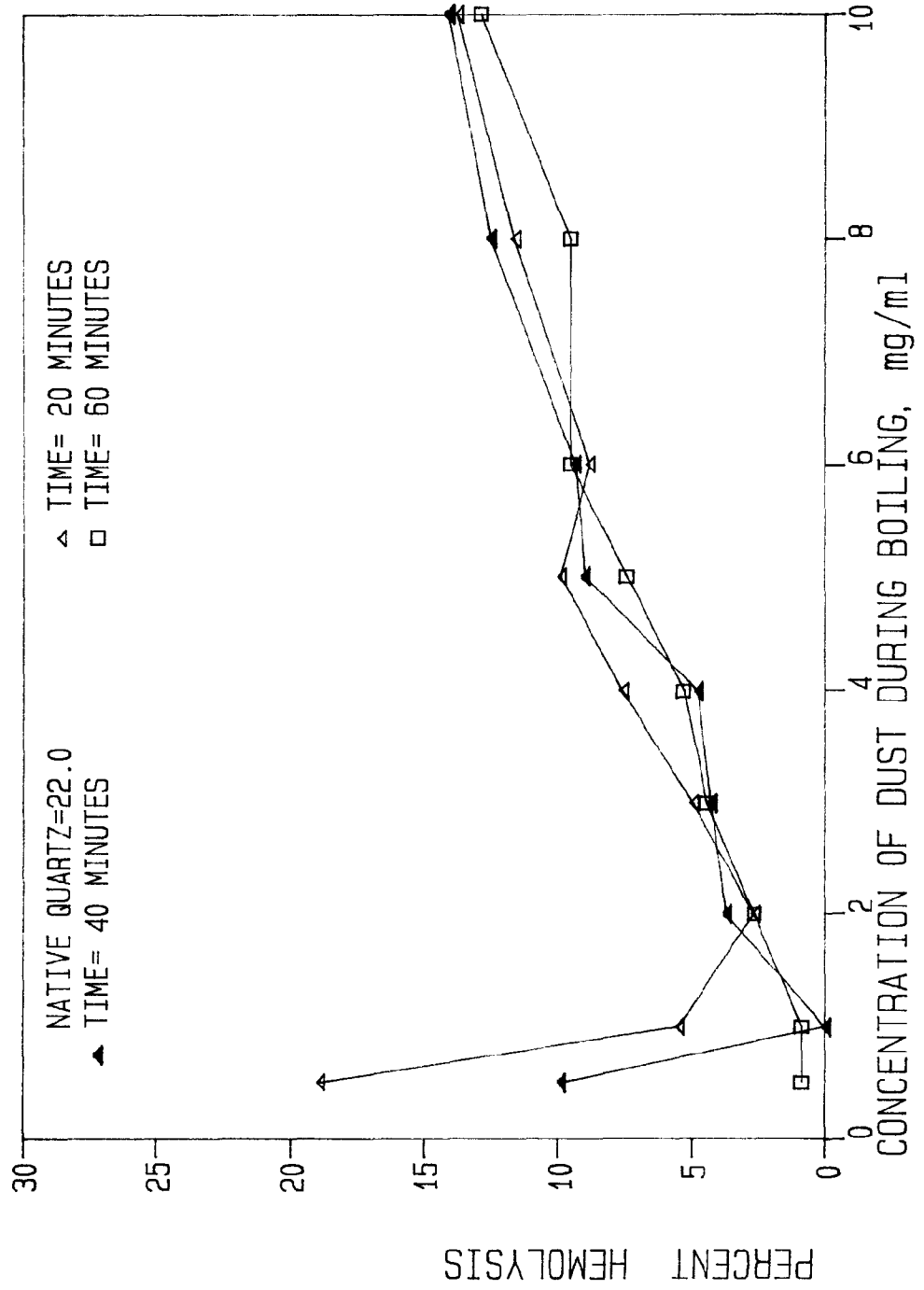


Fig. 13. Hemolytic potential of respirable quartz dust versus dust concentration in distilled water during pretreatment boiling, for various boiling times.

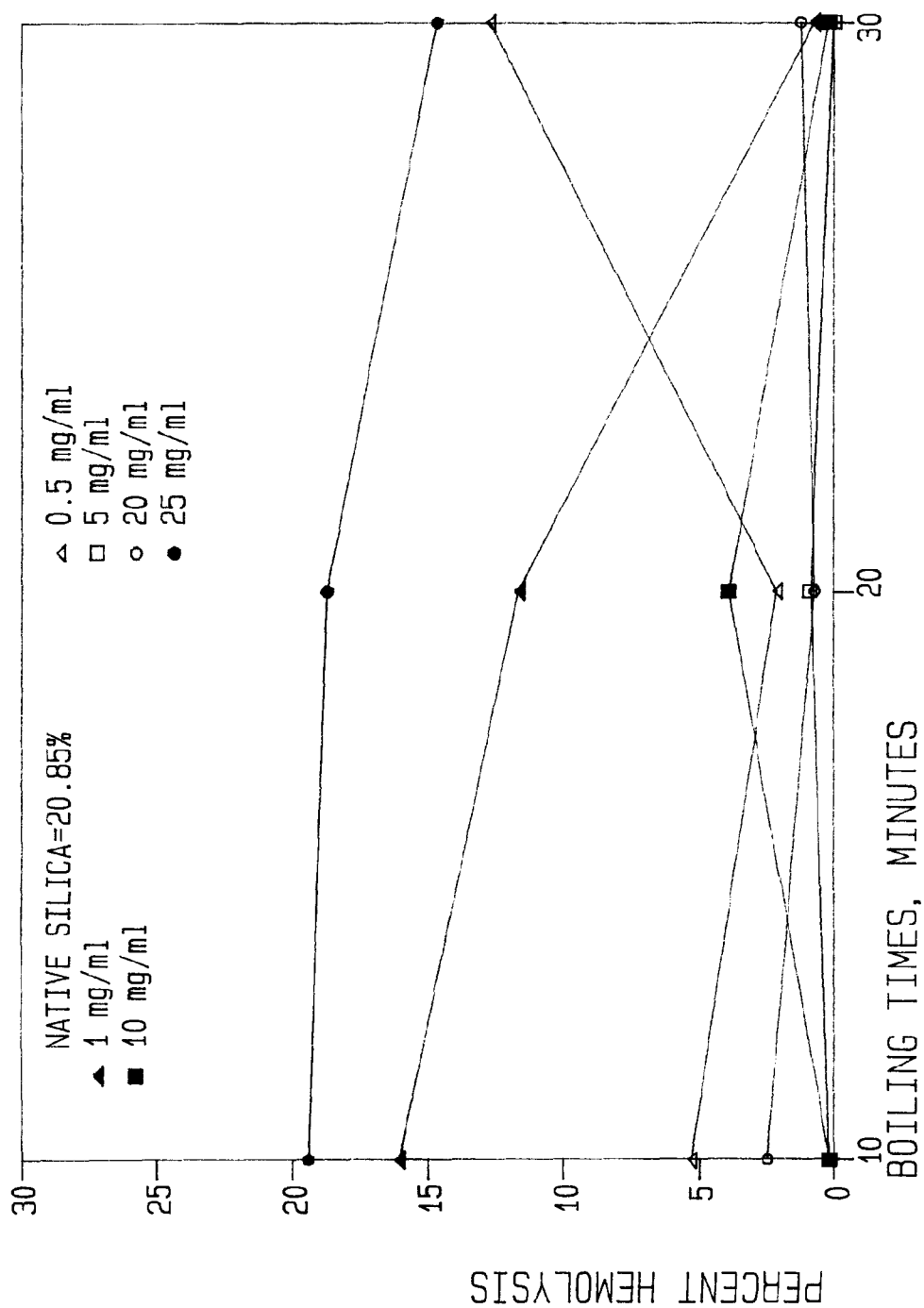


Fig. 14. Hemolytic potential of native and boiled respirable quartz dust versus boiling time for various concentrations of quartz-to-water during boiling.

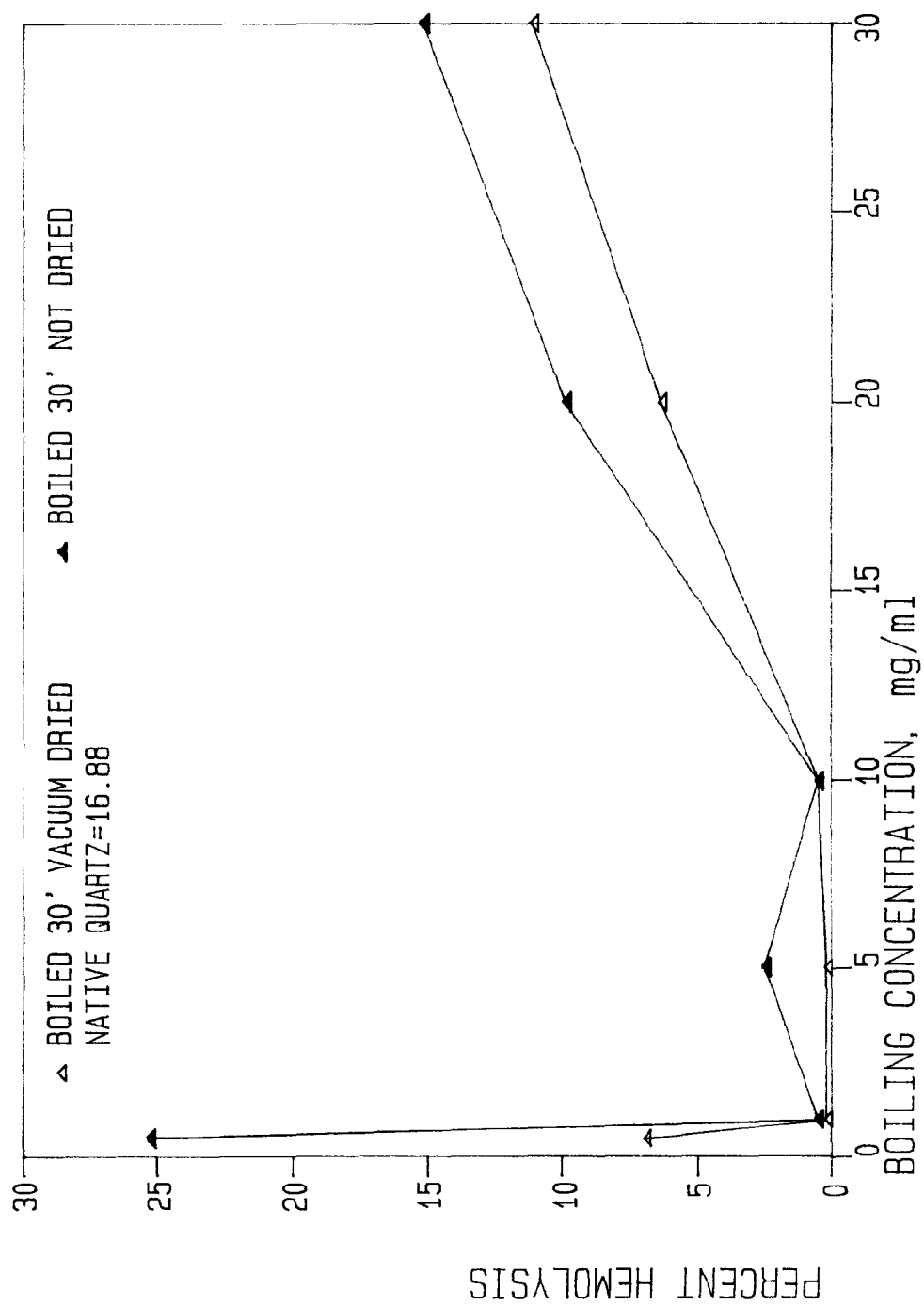


Fig 15. Hemolytic potential of native and boiled respirable quartz dust versus dust-to-water concentration during boiling for samples decanted and promptly assayed, and for samples decanted and vacuum dried before assay.

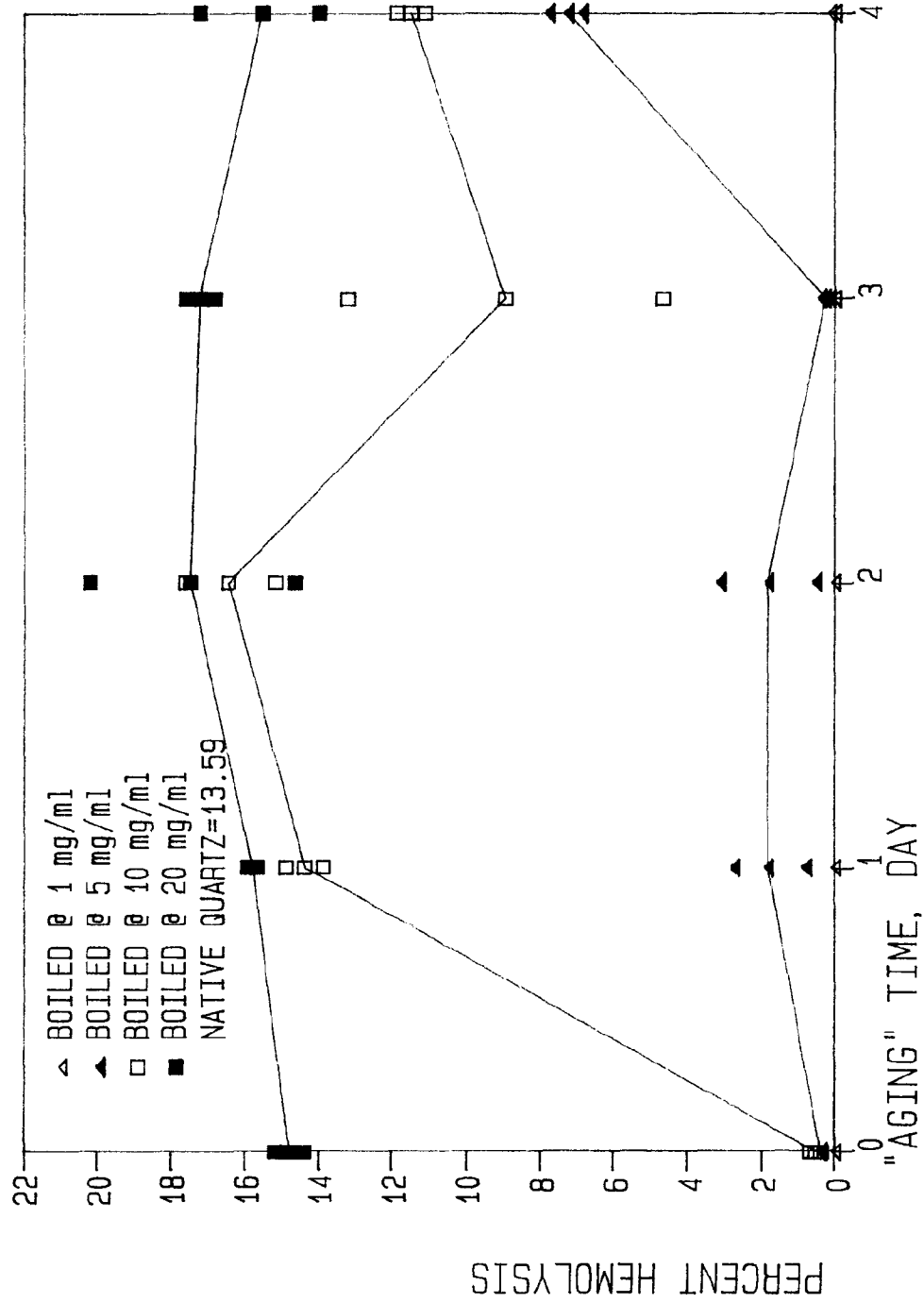


Fig. 16. Hemolytic potential of boiled respirable quartz versus delay between boiling and assay for various dust-to-water concentrations during boiling.

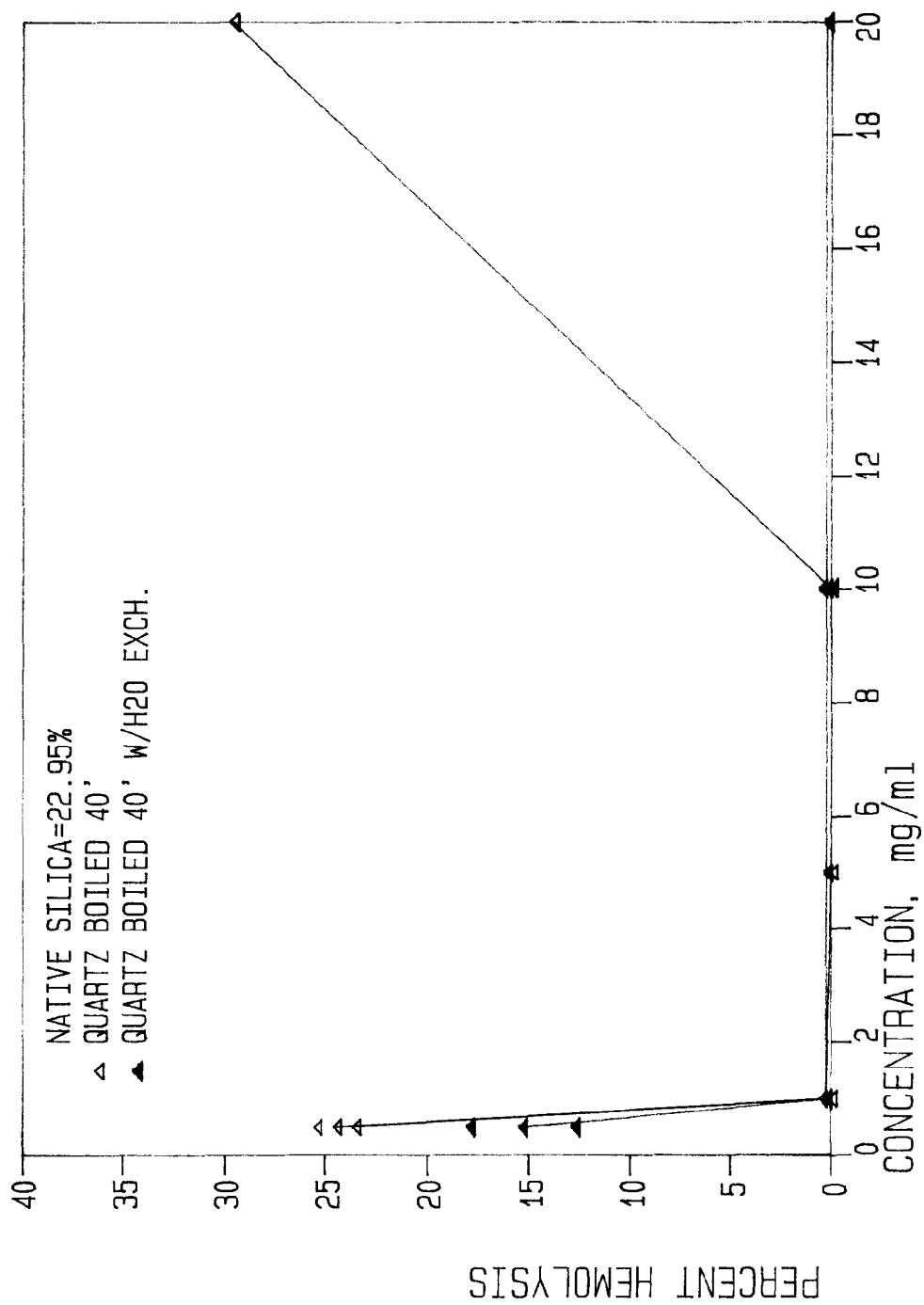


Fig. 17. Hemolytic potential of boiled respirable quartz dust versus dust-to-water concentration during boiling for samples boiled 40 minutes and for samples boiled 20 minutes, the medium changed to fresh water, and then boiled 20 minutes more.

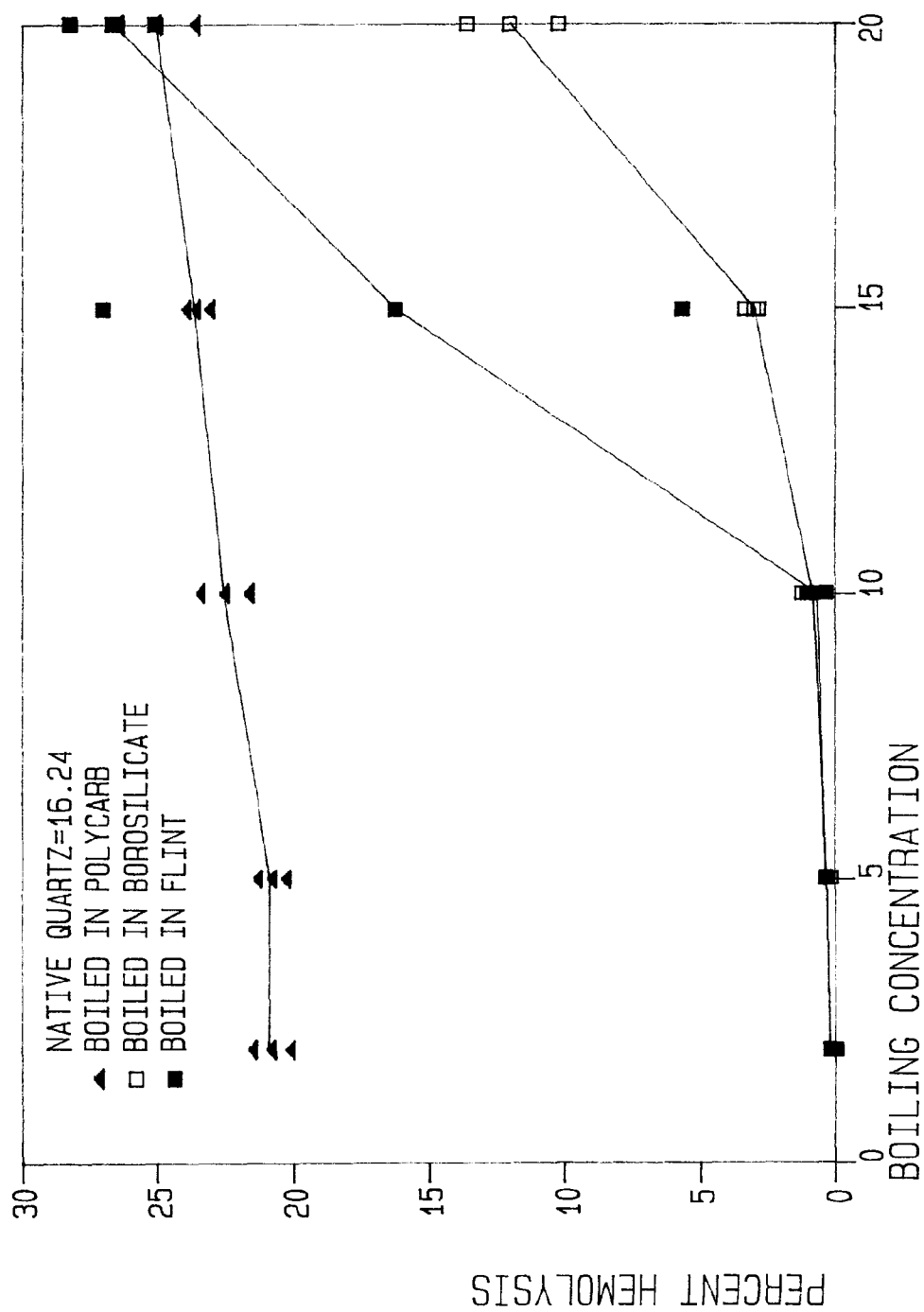


Fig. 18. Hemolytic potential of boiled respirable quartz dust versus dust-to-water concentration during boiling for different boiling tube materials: flint glass, borosilicate glass, polycarbonate.

REFERENCES

1. Banks, D. E., M. A. Bauer, R. M. Castellan, and N. L. Lapp. Silicosis in Surface Coal Mine Drillers. *Thorax* 38:275-278, 1983.
2. Seaton, A., J. A. Dick, J. Dodgson, and M. Jacobsen. Quartz and Pneumoconiosis in Coal Miners. *Lancet* Vol. 2 (8258):1272-1275, 1981.
3. Walton, W. H., J. Dodgson, G. G. Haddon, and M. Jacobsen. The Effect of Quartz and Other Non-coal Dusts on Coal Workers' Pneumoconiosis. In: *Inhaled Particles IV* edited by Walton W. H., Oxford, Pergamon, Vol. 2:669-690, 1977.
4. Cassidy, E. P. The National Coal Workers' Autopsy Study. *Arch Pathol* 94:133, 1972. Federal Coal Mine Health and Safety Act, Public Law 91-173, December 30, 1969.
5. Craighead, J. E., et al. Diseases Associated with Exposure to Silica and Non-fibrous Silicate Minerals. Report of Joint NIOSH/Silicosis and Silicate Disease Committee. *Arch. Path. Lab. Med.* 112:673-720, 1988.
6. Kleinerman, J., F. H. Y. Green, R. Harley, et al. Pathology Standards for Coal Workers' Pneumoconiosis. *Arch. Path. Lab. Med.* 103:375-431, 1979.
7. Laqueur, W. A. Final Report on the Pathology of Coal Workers' Pneumoconiosis and Related Investigations (PHS Grant #65-65-9), Beckley, WV, Appalachian Regional Hospital, 1966.
8. Parkes, W. R. Occupational Lung Disorders. Second Edition, Butterworth's, London, 7:146-151, 1982.
9. Ruckley, V. A., J. M. Fernie, J. S. Chapman, et al. Comparison of Radiographic Appearances with Associated Pathology and Lung Dust Content in a Group of Coal Workers. *Br. J. Indus. Med.* 41:459-467, 1982.
10. Davis, J. M. G., J. Chapman, P. Collings, et al. Variations in the Histological Patterns of the Lesions of Coal Workers in Britain and their Relationship to Lung Dust Content. *Am. Rev. Resp. Dis.* Vol. 128:118-124, 1983.
11. Jacobsen, M., W. M. Maclaren. Unusual Pulmonary Observations and Exposure to Coal Mine Dust: A Case Control Study. *Ann. Occup. Hyg.* 26:753-765, 1982.
12. Green, F. H. Y., W. A. Laqueur. Coal Workers' Pneumoconiosis. *Path. Ann.* 15:333-410, 1980.
13. Morgan, W.K.C., D. B. Burgess, G. Jacobson, et al. The Prevalence of Coal Workers' Pneumoconiosis in U.S. Coal Miners. *Arch. Environ. Health* 27:221-226, 1973.
14. Morgan, W. K. C., A. Seaton. Occupational Lung Diseases. Second Edition, W. B. Saunders Company, Philadelphia, 7:83-86, 1984.

15. Baier, E. J. Comparison of Dust Exposure in Pennsylvania Anthracite and Bituminous Coal Mines. *Am. Indus. Hyg. Assoc.* 25:476-480, 1964.
16. McBride, W. W., E. Pendergrass, and J. Lieben. Pneumoconiosis Study of Western Pennsylvania Bituminous Coal Miners. *J. Occup. Med.* 5:376-388, 1963.
17. Rossiter, C. E. Relation Between Content and Composition of Coal Worker's Lung and Radiological Appearances. *Br. J. Ind. Med.* 29:31-44, 1972.
18. Stettler, L. E., D. H. Groth, and S. F. Platek. Automated Characterization of Particulates Extracted from Human Lungs: Three Cases of Tungsten Carbide Exposure. *Scan. Elect. Micros.* I: 439-448, 1983.
19. Gylseth, B., L. E. Stettler, G. Mowe, V. Skaug, and B. Lexow. A Striking Deposition of Mineral Particles in the Lungs of a Farmer - A Case Report. *Am. J. Ind. Med.* 6: 231-240, 1984.
20. Stettler, L. E., S. F. Platek, R. D. Riley, D. H. Groth, and J. P. Mastin. Particle Contents of Urban Lungs - An Update, In "Microbeam Analysis"--1986, A. D. Romig and W. F. Chambers, Eds., San Francisco Press, San Francisco, 1986, pp. 547-550.
21. Stockham, J. D., E. G. Fochtman, Eds., Particle Size Analysis. Ann Arbor Science, Ann Arbor, 1977, pp. 1-12.

APPENDIX 1

LEMONT PARTICLE SIZE DATA FOR 35 COAL MINER LUNG SAMPLES

The data presented in Appendix 1 consists of histogram frequency/particle size plots and mass/size distributions for the silica and total exogenous particles analyzed for each lung preparation. The mass/size distributions were calculated assuming all particles were spherical and had densities equivalent to their bulk density. The LeMont calculated mass median and mass median aerodynamic diameters are also presented for each lung and particle type.

SAMPLE ID: LUNG 1 - PREP 3389 IML D-570

7-JUL-88

AREA EQUIV. DIAM (UM) DISTRIBUTION FOR SILICA

MACR = 1

AVG=8.20E-01 DEV=5.78E-01 XDEV=7.04E+01 MEDIAN=6.60E-01 MOST PROB.=6.78E-01

Class	0	1	2
limit	Count	%	%
0.0780	0.	0.00[	
0.0950	3.	0.76[**	
0.1177	0.	0.00[	
0.1445	1.	0.25[*	
0.1774	8.	2.02[*****	
0.2179	8.	2.02[*****	
0.2676	19.	4.79[*****	
0.3286	29.	7.30[*****	
0.4036	28.	7.05[*****	
0.4956	45.	11.34[*****	
0.6086	39.	9.82[*****	
0.7474	50.	12.59[*****	
0.9179	34.	8.56[*****	
1.1272	45.	11.34[*****	
1.3842	32.	8.06[*****	
1.6999	21.	5.29[*****	
2.0876	19.	4.79[*****	
2.5637	11.	2.77[*****	
3.1483	2.	0.50[*	
3.8663	3.	0.76[**	
4.7480	0.	0.00[	
5.8308	0.	0.00[	
7.1605	0.	0.00[	
8.7935	0.	0.00[	
10.799	0.	0.00[	

MASS PERCENTAGE VERSUS DIAMETER FOR MACR 1 SILICA

MASS MEDIAN DIA.= 2.01E+00 UM. RHO= 2.660 AERODYNAMIC DIA.= 3.28E+00 UM.

DIA. (UM.)	RAW COUNT	PERCENTAGES BY COUNT		PERCENTAGES BY MASS	
		DIFF.	INTEGRAL	DIFF.	INTEGRAL
7.80E-02	0.	0.0000	0.0000	0.0000	0.0000
9.58E-02	3.	0.7557	0.7557	0.0003	0.0003
1.18E-01	0.	0.0000	0.7557	0.0000	0.0003
1.44E-01	1.	0.2519	1.0076	0.0003	0.0006
1.77E-01	8.	2.0151	3.0227	0.0049	0.0055
2.18E-01	8.	2.0151	5.0378	0.0091	0.0146
2.68E-01	19.	4.7859	9.8237	0.0400	0.0546
3.29E-01	29.	7.3048	17.1285	0.1129	0.1675
4.04E-01	28.	7.0529	24.1814	0.2019	0.3694
4.96E-01	45.	11.3350	35.5164	0.6011	0.9705
6.09E-01	39.	9.8237	45.3400	0.9648	1.9353
7.47E-01	50.	12.5945	57.9345	2.2909	4.2262
9.18E-01	34.	8.5642	66.4987	2.8851	7.1113
1.13E+00	45.	11.3350	77.8338	7.0720	14.1832
1.38E+00	32.	8.0605	85.8942	9.3139	23.4971
1.70E+00	21.	5.2897	91.1839	11.3201	34.8172
2.09E+00	19.	4.7859	95.9698	18.9686	53.7859
2.56E+00	11.	2.7708	98.7406	20.3389	74.1247
3.15E+00	2.	0.5038	99.2443	6.8488	80.9736
3.87E+00	3.	0.7557	100.0000	19.0264	100.0000
4.75E+00	0.	0.0000	100.0000	0.0000	100.0000
5.83E+00	0.	0.0000	100.0000	0.0000	100.0000
7.16E+00	0.	0.0000	100.0000	0.0000	100.0000
8.79E+00	0.	0.0000	100.0000	0.0000	100.0000
1.08E+01	0.	0.0000	100.0000	0.0000	100.0000

SAMPLE ID: LUNG 1 - PREP 3389 1ML D-570

7-JUL-88

AREA EQUIV. DIAM (UM) DISTRIBUTION FOR TOT. EXOGENOUS MACR = 15

AVG=9.51E-01 DEV=0.00E-01 ZDEV=0.00E-01 MEDIAN=7.04E-01 MOST PROB.=5.52E-01

Class	Count	%
0.0780	0.	0.00[
0.0958	6.	0.43[*
0.1177	2.	0.14[
0.1445	6.	0.43[*
0.1774	22.	1.59[****
0.2179	36.	2.60[*****
0.2676	55.	3.98[*****
0.3286	82.	5.93[*****
0.4036	105.	7.60[*****
0.4956	128.	9.26[*****
0.6086	152.	11.00[*****
0.7474	141.	10.20[*****
0.9179	124.	8.97[*****
1.1272	149.	10.78[*****
1.3842	105.	7.60[*****
1.6999	89.	6.44[*****
2.0876	75.	5.43[*****
2.5637	50.	3.62[*****
3.1483	17.	1.23[***
3.8663	19.	1.37[****
4.7480	10.	0.72[**
5.8308	3.	0.22[*
7.1605	4.	0.29[*
8.7935	1.	0.07[
10.799	1.	0.07[

MASS PERCENTAGE VERSUS DIAMETER FOR MACR 15 TOT. EXOGENOUS

MASS MEDIAN DIA.= 4.19E+00 UM. RHO= 3.000 AERODYNAMIC DIA.= 7.25E+00 UM.

DIA. (UM.)	RAW COUNT	PERCENTAGES BY COUNT		PERCENTAGES BY MASS	
		DIFF.	INTEGRAL	DIFF.	INTEGRAL
7.80E-02	0.	0.0000	0.0000	0.0000	0.0000
9.58E-02	6.	0.4342	0.4342	0.0001	0.0001
1.18E-01	2.	0.1447	0.5789	0.0000	0.0001
1.44E-01	6.	0.4342	1.0130	0.0002	0.0003
1.77E-01	22.	1.5919	2.6049	0.0013	0.0016
2.18E-01	36.	2.6049	5.2098	0.0040	0.0056
2.68E-01	55.	3.9797	9.1896	0.0112	0.0168
3.29E-01	82.	5.9334	15.1230	0.0311	0.0479
4.04E-01	105.	7.5977	22.7207	0.0736	0.1215
4.96E-01	128.	9.2619	31.9826	0.1663	0.2878
6.09E-01	152.	10.9986	42.9812	0.3656	0.6534
7.47E-01	141.	10.2026	53.1838	0.6282	1.2816
9.18E-01	124.	8.9725	62.1563	1.0232	2.3048
1.13E+00	149.	10.7815	72.9378	2.2770	4.5817
1.38E+00	105.	7.5977	80.5355	2.9718	7.5535
1.70E+00	89.	6.4399	86.9754	4.6651	12.2186
2.09E+00	75.	5.4269	92.4023	7.2809	19.4996
2.56E+00	50.	3.6179	96.0203	8.9897	28.4893
3.15E+00	17.	1.2301	97.2504	5.6608	34.1501
3.87E+00	19.	1.3748	98.6252	11.7175	45.8676
4.75E+00	10.	0.7236	99.3488	11.4217	57.2893
5.83E+00	3.	0.2171	99.5658	6.3460	63.6353
7.16E+00	4.	0.2894	99.8553	15.6709	79.3062
8.79E+00	1.	0.0724	99.9276	7.2558	86.5620
1.08E+01	1.	0.0724	100.0000	13.4380	100.0000

SAMPLE ID: LUNG 2 - PREP 3480 1ML D-573,580

7-JUL-88

AREA EQUIV. DIAM (UM) DISTRIBUTION FOR SILICA

MACR = 1

AVG=9.93E-01 DEV=7.13E-01 XDEV=7.17E+01 MEDIAN=8.14E-01 MOST PROB.=6.78E-01

Class	Count	%	0	1	2
0.0421	0.	0.00	[		
0.0517	0.	0.00	[		
0.0635	0.	0.00	[		
0.0780	0.	0.00	[		
0.0958	0.	0.00	[		
0.1177	2.	2.25	[*****		
0.1445	2.	2.25	[*****		
0.1774	0.	0.00	[		
0.2179	1.	1.12	[***		
0.2676	3.	3.37	[*****		
0.3286	3.	3.37	[*****		
0.4036	4.	4.49	[*****		
0.4956	9.	10.11	[*****		
0.6086	4.	4.49	[*****		
0.7474	13.	14.61	[*****		
0.9179	9.	10.11	[*****		
1.1272	11.	12.36	[*****		
1.3842	8.	8.99	[*****		
1.6999	8.	8.99	[*****		
2.0876	6.	6.74	[*****		
2.5637	2.	2.25	[*****		
3.1483	2.	2.25	[*****		
3.8663	2.	2.25	[*****		
4.7480	0.	0.00	[		
5.8308	0.	0.00	[		
7.1605	0.	0.00	[		

MASS PERCENTAGE VERSUS DIAMETER FOR MACR 1 SILICA

MASS MEDIAN DIA.= 2.55E+00 UM. RHO= 2.660 AERODYNAMIC DIA.= 4.17E+00 UM.

DIA. (UM.)	RAW COUNT	PERCENTAGES BY COUNT		PERCENTAGES BY MASS	
		DIFF.	INTEGRAL	DIFF.	INTEGRAL
4.21E-02	0.	0.0000	0.0000	0.0000	0.0000
5.17E-02	0.	0.0000	0.0000	0.0000	0.0000
6.35E-02	0.	0.0000	0.0000	0.0000	0.0000
7.80E-02	0.	0.0000	0.0000	0.0000	0.0000
9.58E-02	0.	0.0000	0.0000	0.0000	0.0000
1.18E-01	2.	2.2472	2.2472	0.0009	0.0009
1.44E-01	2.	2.2472	4.4944	0.0017	0.0026
1.77E-01	0.	0.0000	4.4944	0.0000	0.0026
2.18E-01	1.	1.1236	5.6180	0.0029	0.0055
2.68E-01	3.	3.3708	8.9888	0.0161	0.0216
3.29E-01	3.	3.3708	12.3596	0.0298	0.0514
4.04E-01	4.	4.4944	16.8539	0.0736	0.1249
4.96E-01	9.	10.1124	26.9663	0.3065	0.4315
6.09E-01	4.	4.4944	31.4607	0.2523	0.6838
7.47E-01	13.	14.6067	46.0674	1.5187	2.2025
9.18E-01	9.	10.1124	56.1798	1.9473	4.1498
1.13E+00	11.	12.3596	68.5393	4.4079	8.5577
1.38E+00	8.	8.9888	77.5281	5.9372	14.4949
1.70E+00	8.	8.9888	86.5169	10.9960	25.4909
2.09E+00	6.	6.7416	93.2584	15.2737	40.7647
2.56E+00	2.	2.2472	95.5056	9.4292	50.1939
3.15E+00	2.	2.2472	97.7528	17.4633	67.6572
3.87E+00	2.	2.2472	100.0000	32.3428	100.0000
4.75E+00	0.	0.0000	100.0000	0.0000	100.0000
5.83E+00	0.	0.0000	100.0000	0.0000	100.0000
7.16E+00	0.	0.0000	100.0000	0.0000	100.0000

AREA EQUIV. DIAM (UM) DISTRIBUTION FOR TOT. EXOGENOUS MACR = 15

AVG=1.06E+00 DEV=0.00E-01 %DEV=0.00E-01 MEDIAN=7.61E-01 MOST PROB.=1.02E+00

Class	Count	%	0	1	2
0.0421	0.	0.00	[		
0.0517	2.	0.19	[*		
0.0635	0.	0.00	[		
0.0780	2.	0.19	[*		
0.0958	5.	0.47	[*		
0.1177	14.	1.32	[****		
0.1445	13.	1.22	[***		
0.1774	26.	2.45	[*****		
0.2179	26.	2.45	[*****		
0.2676	58.	5.46	[*****		
0.3286	53.	4.99	[*****		
0.4036	73.	6.87	[*****		
0.4956	79.	7.43	[*****		
0.6086	85.	8.00	[*****		
0.7474	88.	8.28	[*****		
0.9179	93.	8.75	[*****		
1.1272	107.	10.07	[*****		
1.3842	63.	5.93	[*****		
1.6999	84.	7.90	[*****		
2.0876	60.	5.64	[*****		
2.5637	58.	5.46	[*****		
3.1483	35.	3.29	[*****		
3.8663	16.	1.51	[****		
4.7480	9.	0.85	[**		
5.8308	10.	0.94	[***		
7.1605	4.	0.38	[*		

MASS PERCENTAGE VERSUS DIAMETER FOR MACR 15 TOT. EXOGENOUS

MASS MEDIAN DIA.= 3.86E+00 UM. RHO= 3.000 AERODYNAMIC DIA.= 6.69E+00 UM.

DIA. (UM.)	RAW COUNT	PERCENTAGES BY COUNT		PERCENTAGES BY MASS	
		DIFF.	INTEGRAL	DIFF.	INTEGRAL
4.21E-02	0.	0.0000	0.0000	0.0000	0.0000
5.17E-02	2.	0.1881	0.1881	0.0000	0.0000
6.35E-02	0.	0.0000	0.1881	0.0000	0.0000
7.80E-02	2.	0.1881	0.3763	0.0000	0.0000
9.58E-02	5.	0.4704	0.8467	0.0000	0.0001
1.18E-01	14.	1.3170	2.1637	0.0003	0.0003
1.44E-01	13.	1.2230	3.3866	0.0004	0.0008
1.77E-01	26.	2.4459	5.8325	0.0016	0.0024
2.18E-01	26.	2.4459	8.2785	0.0030	0.0055
2.68E-01	58.	5.4563	13.7347	0.0126	0.0180
3.29E-01	53.	4.9859	18.7206	0.0213	0.0393
4.04E-01	73.	6.8674	25.5880	0.0543	0.0936
4.96E-01	79.	7.4318	33.0198	0.1089	0.2025
6.09E-01	85.	7.9962	41.0160	0.2169	0.4195
7.47E-01	88.	8.2785	49.2945	0.4160	0.8354
9.18E-01	93.	8.7488	58.0433	0.8141	1.6496
1.13E+00	107.	10.0659	68.1091	1.7348	3.3844
1.38E+00	63.	5.9266	74.0358	1.8917	5.2761
1.70E+00	84.	7.9022	81.9379	4.6715	9.9476
2.09E+00	60.	5.6444	87.5823	6.1798	16.1274
2.56E+00	58.	5.4563	93.0386	11.0638	27.1911
3.15E+00	35.	3.2926	96.3311	12.3650	39.5561
3.87E+00	16.	1.5052	97.8363	10.4688	50.0249
4.75E+00	9.	0.8467	98.6830	10.9061	60.9310
5.83E+00	10.	0.9407	99.6237	22.4429	83.3739
7.16E+00	4.	0.3763	100.0000	16.6261	100.0000

SAMPLE ID: LUNG 3 - PREP 3395 3ML D-565,566

7-JUL-88

AREA EQUIV. DIAM (UM) DISTRIBUTION FOR SILICA MACR = 1

AVS=8.35E-01 DEV=4.53E-01 XDEV=5.42E+01 MEDIAN=7.63E-01 MOST PROB.=8.33E-01

Class	Count	%
0.0635	0.	0.00[
0.0780	0.	0.00[
0.0958	0.	0.00[
0.1177	0.	0.00[
0.1445	0.	0.00[
0.1774	1.	1.61[****
0.2179	0.	0.00[
0.2676	2.	3.23[*****
0.3286	2.	3.23[*****
0.4036	6.	9.68[*****
0.4956	5.	8.06[*****
0.6086	6.	9.68[*****
0.7474	8.	12.90[*****
0.9179	11.	17.74[*****
1.1272	7.	11.29[*****
1.3842	4.	6.45[*****
1.6999	7.	11.29[*****
2.0876	3.	4.84[*****
2.5637	0.	0.00[
3.1483	0.	0.00[
3.8663	0.	0.00[
4.7480	0.	0.00[
5.8306	0.	0.00[
7.1605	0.	0.00[
8.7935	0.	0.00[
10.799	0.	0.00[
13.262	0.	0.00[
16.286	0.	0.00[

SAMPLE ID: LUNG 3 - PREP 3395 3ML D-565,566

7-JUL-88

MASS PERCENTAGE VERSUS DIAMETER FOR MACR 1 SILICA

MASS MEDIAN DIA.= 1.51E+00 UM. RHO= 2.660 AERODYNAMIC DIA.= 2.46E+00 UM.

DIA. (UM.)	RAW COUNT	PERCENTAGES BY COUNT		PERCENTAGES BY MASS	
		DIFF.	INTEGRAL	DIFF.	INTEGRAL
5.35E-02	0.	0.0000	0.0000	0.0000	0.0000
7.80E-02	0.	0.0000	0.0000	0.0000	0.0000
9.58E-02	0.	0.0000	0.0000	0.0000	0.0000
1.18E-01	0.	0.0000	0.0000	0.0000	0.0000
1.44E-01	0.	0.0000	0.0000	0.0000	0.0000
1.77E-01	1.	1.6129	1.6129	0.0058	0.0058
2.18E-01	0.	0.0000	1.6129	0.0000	0.0058
2.68E-01	2.	3.2258	4.8387	0.0397	0.0454
3.29E-01	2.	3.2258	8.0645	0.0734	0.1189
4.04E-01	6.	9.6774	17.7419	0.4081	0.5270
4.96E-01	5.	8.0645	25.8065	0.6298	1.1568
6.09E-01	6.	9.6774	35.4839	1.3998	2.5566
7.47E-01	8.	12.9032	48.3871	3.4567	6.0133
9.18E-01	11.	17.7419	66.1290	8.8026	14.8159
1.13E+00	7.	11.2903	77.4194	10.3745	25.1903
1.38E+00	4.	6.4516	83.8710	10.9794	36.1698
1.70E+00	7.	11.2903	95.1613	35.5851	71.7549
2.09E+00	3.	4.8387	100.0000	28.2451	100.0000
2.56E+00	0.	0.0000	100.0000	0.0000	100.0000
3.15E+00	0.	0.0000	100.0000	0.0000	100.0000
3.87E+00	0.	0.0000	100.0000	0.0000	100.0000
4.75E+00	0.	0.0000	100.0000	0.0000	100.0000
5.83E+00	0.	0.0000	100.0000	0.0000	100.0000
7.16E+00	0.	0.0000	100.0000	0.0000	100.0000
8.79E+00	0.	0.0000	100.0000	0.0000	100.0000
1.08E+01	0.	0.0000	100.0000	0.0000	100.0000
1.33E+01	0.	0.0000	100.0000	0.0000	100.0000
1.63E+01	0.	0.0000	100.0000	0.0000	100.0000

SAMPLE ID: LUNG 3 - PREP 3395 3ML D-565,566

7-JUL-88

AREA EQUIV. DIAM (UM) DISTRIBUTION FOR TOT. EXOGENOUS MACR = 15

AVG=1.30E+00 DEV=1.33E+00 XDEV=1.03E+02 MEDIAN=8.65E-01 MOST PROB.=8.33E-01

Class	0	1	2
limit	Count	%	
0.0635	0.	0.00[	
0.0780	2.	0.37[*	
0.0958	0.	0.00[	
0.1177	0.	0.00[	
0.1445	3.	0.56[**	
0.1774	3.	0.56[**	
0.2179	12.	2.24[*****	
0.2676	17.	3.17[*****	
0.3286	25.	4.66[*****	
0.4036	33.	6.16[*****	
0.4956	43.	8.02[*****	
0.6086	46.	8.58[*****	
0.7474	48.	8.96[*****	
0.9179	52.	9.70[*****	
1.1272	37.	6.90[*****	
1.3842	40.	7.46[*****	
1.6999	46.	8.58[*****	
2.0876	36.	6.72[*****	
2.5637	32.	5.97[*****	
3.1483	22.	4.10[*****	
3.8663	16.	2.99[*****	
4.7480	8.	1.49[****	
5.8308	9.	1.68[****	
7.1605	3.	0.56[**	
8.7935	1.	0.19[*	
10.799	1.	0.19[*	
13.262	0.	0.00[	
16.286	1.	0.19[*	

SAMPLE ID: LUNG 3 - PREP 3395 3ML D-565,566

7-JUL-88

MASS PERCENTAGE VERSUS DIAMETER FOR MACR 15 TOT. EXOGENOUS

MASS MEDIAN DIA.= 6.90E+00 UM. RHO= 3.000 AERODYNAMIC DIA.= 1.20E+01 UM.

DIA. (UM.)	RAW COUNT	PERCENTAGES BY COUNT		PERCENTAGES BY MASS	
		DIFF.	INTEGRAL	DIFF.	INTEGRAL
6.35E-02	0.	0.0000	0.0000	0.0000	0.0000
7.80E-02	2.	0.3731	0.3731	0.0000	0.0000
9.58E-02	0.	0.0000	0.3731	0.0000	0.0000
1.18E-01	0.	0.0000	0.3731	0.0000	0.0000
1.44E-01	3.	0.5597	0.9328	0.0001	0.0001
1.77E-01	3.	0.5597	1.4925	0.0001	0.0002
2.18E-01	12.	2.2388	3.7313	0.0010	0.0012
2.68E-01	17.	3.1716	6.9030	0.0025	0.0037
3.29E-01	25.	4.6642	11.5672	0.0069	0.0105
4.04E-01	33.	6.1567	17.7239	0.0168	0.0273
4.96E-01	43.	8.0224	25.7463	0.0404	0.0677
6.09E-01	46.	8.5821	34.3284	0.0801	0.1479
7.47E-01	48.	8.9552	43.2836	0.1548	0.3027
9.18E-01	52.	9.7015	52.9851	0.3107	0.6134
1.13E+00	37.	6.9030	59.8881	0.4094	1.0227
1.38E+00	40.	7.4627	67.3507	0.8197	1.8424
1.70E+00	46.	8.5821	75.9328	1.7458	3.5883
2.09E+00	36.	6.7164	82.6493	2.5304	6.1187
2.56E+00	32.	5.9701	88.6194	4.1658	10.2844
3.15E+00	22.	4.1045	92.7239	5.3042	15.5886
3.87E+00	16.	2.9851	95.7090	7.1444	22.7330
4.75E+00	8.	1.4925	97.2015	6.6159	29.3489
5.83E+00	9.	1.6791	98.8806	13.7845	43.1333
7.16E+00	3.	0.5597	99.4403	8.5098	51.6431
8.79E+00	1.	0.1866	99.6269	5.2535	56.8967
1.08E+01	1.	0.1866	99.8134	9.7297	66.6264
1.33E+01	0.	0.0000	99.8134	0.0000	66.6264
1.63E+01	1.	0.1866	100.0000	33.3736	100.0000

SAMPLE ID: LUNG 4 - PREP 3401 IML D-17

8-JUL-88

AREA EQUIV. DIAM (UM) DISTRIBUTION FOR SILICA

MACR = 1

AVG=9.64E-01 DEV=6.34E-01 XDEV=6.57E+01 MEDIAN=8.16E-01 MOST PROB.=8.33E-01

Class	0	1	2
limit	Count	%	0
0.0635	0.	0.000	
0.0780	0.	0.000	
0.0958	0.	0.000	
0.1177	0.	0.000	
0.1445	1.	0.320*	
0.1774	1.	0.320*	
0.2179	4.	1.280***	
0.2676	7.	2.240*****	
0.3286	23.	7.370*****	
0.4036	16.	5.130*****	
0.4956	29.	9.290*****	
0.6086	27.	8.650*****	
0.7474	32.	10.260*****	
0.9179	40.	12.820*****	
1.1272	32.	10.260*****	
1.3842	34.	10.900*****	
1.6999	23.	7.370*****	
2.0876	22.	7.050*****	
2.5637	16.	5.130*****	
3.1483	3.	0.960***	
3.8663	0.	0.000	
4.7480	2.	0.640**	
5.8308	0.	0.000	
7.1605	0.	0.000	
8.7935	0.	0.000	
10.799	0.	0.000	

MASS PERCENTAGE VERSUS DIAMETER FOR MACR 1 SILICA

MASS MEDIAN DIA. = 2.15E+00 UM. RHD = 2.660 AERODYNAMIC DIA. = 3.51E+00 UM.

DIA. (UM.)	RAW COUNT	PERCENTAGES BY COUNT		PERCENTAGES BY MASS	
		DIFF.	INTEGRAL	DIFF.	INTEGRAL
6.35E-02	0.	0.0000	0.0000	0.0000	0.0000
7.80E-02	0.	0.0000	0.0000	0.0000	0.0000
9.58E-02	0.	0.0000	0.0000	0.0000	0.0000
1.18E-01	0.	0.0000	0.0000	0.0000	0.0000
1.44E-01	1.	0.3205	0.3205	0.0003	0.0003
1.77E-01	1.	0.3205	0.6410	0.0005	0.0008
2.18E-01	4.	1.2821	1.9231	0.0038	0.0046
2.68E-01	7.	2.2436	4.1667	0.0124	0.0170
3.29E-01	23.	7.3718	11.5385	0.0754	0.0924
4.04E-01	16.	5.1282	16.6667	0.0972	0.1896
4.96E-01	29.	9.2949	25.9615	0.3251	0.5157
6.09E-01	27.	8.6538	34.6154	0.5624	1.0781
7.47E-01	32.	10.2564	44.8718	1.2344	2.3124
9.18E-01	40.	12.8205	57.6923	2.8576	5.1701
1.13E+00	32.	10.2564	67.9487	4.2340	9.4040
1.38E+00	34.	10.8974	78.8462	8.3316	17.7357
1.70E+00	23.	7.3718	86.2180	10.4383	28.1739
2.09E+00	22.	7.0513	93.2692	18.4916	46.6655
2.56E+00	16.	5.1282	98.3974	24.9071	71.5726
3.15E+00	3.	0.9615	99.3590	8.6492	80.2218
3.87E+00	0.	0.0000	99.3590	0.0000	80.2218
4.75E+00	2.	0.6410	100.0000	19.7782	100.0000
5.83E+00	0.	0.0000	100.0000	0.0000	100.0000
7.16E+00	0.	0.0000	100.0000	0.0000	100.0000
8.79E+00	0.	0.0000	100.0000	0.0000	100.0000
1.08E+01	0.	0.0000	100.0000	0.0000	100.0000

SAMPLE ID: LUNG 4 - PREP 3401 IML D-17

8-JUL-88

AREA EQUIV. DIAM (UM) DISTRIBUTION FOR TOT. EXOGENOUS MACR = 15

AVG=9.25E-01 DEV=0.00E-01 XDEV=0.00E-01 MEDIAN=7.09E-01 MOST PROB.=5.52E-01

Class	0	1	2
limit	Count	%	0
0.0635	0.	0.00[	
0.0780	2.	0.12[	
0.0958	2.	0.12[	
0.1177	2.	0.12[	
0.1445	5.	0.29[*	
0.1774	11.	0.64[**	
0.2179	27.	1.56[****	
0.2676	60.	3.47[*****	
0.3286	117.	6.77[*****	
0.4036	138.	7.99[*****	
0.4956	170.	9.84[*****	
0.6086	193.	11.18[*****	
0.7474	189.	10.94[*****	
0.9179	189.	10.94[*****	
1.1272	154.	8.92[*****	
1.3842	153.	8.86[*****	
1.6999	107.	6.20[*****	
2.0876	86.	4.98[*****	
2.5637	61.	3.53[*****	
3.1463	32.	1.85[*****	
3.8663	19.	1.10[***	
4.7460	7.	0.41[*	
5.8308	2.	0.12[	
7.1605	0.	0.00[	
8.7935	0.	0.00[	
10.799	1.	0.06[	

MASS PERCENTAGE VERSUS DIAMETER FOR MACR 15 TOT. EXOGENOUS

MASS MEDIAN DIA. = 2.93E+00 UM. RHO= 3.000 AERODYNAMIC DIA. = 5.07E+00 UM.

DIA. (UM.)	RAW COUNT	PERCENTAGES BY COUNT		PERCENTAGES BY MASS	
		DIFF.	INTEGRAL	DIFF.	INTEGRAL
6.35E-02	0.	0.0000	0.0000	0.0000	0.0000
7.80E-02	2.	0.1158	0.1158	0.0000	0.0000
9.58E-02	2.	0.1158	0.2316	0.0000	0.0000
1.18E-01	2.	0.1158	0.3474	0.0000	0.0001
1.44E-01	5.	0.2895	0.6369	0.0002	0.0003
1.77E-01	11.	0.6369	1.2739	0.0008	0.0011
2.18E-01	27.	1.5634	2.8373	0.0036	0.0047
2.68E-01	60.	3.4742	6.3115	0.0148	0.0195
3.29E-01	117.	6.7748	13.0863	0.0535	0.0729
4.04E-01	138.	7.9907	21.0770	0.1168	0.1897
4.96E-01	170.	9.8437	30.9207	0.2664	0.4561
6.09E-01	193.	11.1754	42.0961	0.5601	1.0162
7.47E-01	189.	10.9438	53.0400	1.0159	2.0320
9.18E-01	189.	10.9438	63.9838	1.8814	3.9134
1.13E+00	154.	8.9172	72.9010	2.8392	6.7526
1.38E+00	153.	8.8593	81.7603	5.2242	11.9768
1.70E+00	107.	6.1957	87.9560	6.7664	18.7432
2.09E+00	86.	4.9797	92.9357	10.0722	28.8155
2.56E+00	61.	3.5321	96.4679	13.2315	42.0469
3.15E+00	32.	1.8529	98.3208	12.8552	54.9021
3.87E+00	19.	1.1002	99.4210	14.1363	69.0384
4.75E+00	7.	0.4053	99.8263	9.6456	78.6840
5.83E+00	2.	0.1158	99.9421	5.1040	83.7880
7.16E+00	0.	0.0000	99.9421	0.0000	83.7880
8.79E+00	0.	0.0000	99.9421	0.0000	83.7880
1.08E+01	1.	0.0579	100.0000	16.2120	100.0000

SAMPLE ID: LUNG 5 - PREP 3478 1ML D-569

7-JUL-88

AREA EQUIV. DIAM (UM) DISTRIBUTION FOR SILICA MACR : 1

AVG=8.02E-01 DEV=8.09E-01 %DEV=7.38E+01 MEDIAN=6.34E-01 MOST PROB.=4.50E-01

Limit	Class	Count	%	0	1	2
0.0227	0.	0.00	0.00			
0.0279	0.	0.00	0.00			
0.0343	0.	0.00	0.00			
0.0421	0.	0.00	0.00			
0.0517	0.	0.00	0.00			
0.0635	0.	0.00	0.00			
0.0780	0.	0.00	0.00			
0.0958	2.	0.88	**			
0.1177	0.	0.00				
0.1445	4.	1.77	****			
0.1774	4.	1.77	****			
0.2179	9.	3.98	*****			
0.2676	11.	4.87	*****			
0.3286	12.	5.31	*****			
0.4036	17.	7.52	*****			
0.4956	29.	12.83	*****			
0.6086	21.	9.29	*****			
0.7474	22.	9.73	*****			
0.9179	24.	10.62	*****			
1.1272	23.	10.18	*****			
1.3842	17.	7.52	*****			
1.6999	13.	5.75	*****			
2.0876	8.	3.54	*****			
2.5637	5.	2.21	*****			
3.1483	3.	1.33	****			
3.8663	1.	0.44	*			
4.7480	1.	0.44	*			
5.8308	0.	0.00				

SAMPLE ID: LUNG 5 - PREP 3478 1ML D-569

7-JUL-88

MASS PERCENTAGE VERSUS DIAMETER FOR MACR 1 SILICA

MASS MEDIAN DIA.= 2.34E+00 UM. RHO= 2.660 AERODYNAMIC DIA.= 3.82E+00 UM.

DIA. (UM.)	RAW COUNT	PERCENTAGES BY COUNT		PERCENTAGES BY MASS	
		DIFF.	INTEGRAL	DIFF.	INTEGRAL
2.27E-02	0.	0.0000	0.0000	0.0000	0.0000
2.79E-02	0.	0.0000	0.0000	0.0000	0.0000
3.43E-02	0.	0.0000	0.0000	0.0000	0.0000
4.21E-02	0.	0.0000	0.0000	0.0000	0.0000
5.17E-02	0.	0.0000	0.0000	0.0000	0.0000
6.35E-02	0.	0.0000	0.0000	0.0000	0.0000
7.80E-02	0.	0.0000	0.0000	0.0000	0.0000
9.58E-02	2.	0.8850	0.8850	0.0003	0.0003
1.18E-01	0.	0.0000	0.8850	0.0000	0.0003
1.44E-01	4.	1.7699	2.6549	0.0020	0.0023
1.77E-01	4.	1.7699	4.4248	0.0038	0.0061
2.19E-01	9.	3.9823	8.4071	0.0156	0.0217
2.68E-01	11.	4.8673	13.2743	0.0354	0.0571
3.29E-01	12.	5.3097	18.5841	0.0715	0.1287
4.04E-01	17.	7.5221	26.1062	0.1677	0.3164
4.96E-01	29.	12.8319	38.9381	0.5930	0.9094
6.09E-01	21.	9.2920	48.2301	0.7953	1.7047
7.47E-01	22.	9.7345	57.9646	1.5431	3.2478
9.18E-01	24.	10.6195	68.5841	3.1177	6.3655
1.13E+00	23.	10.1770	78.7611	5.5335	11.8990
1.38E+00	17.	7.5221	86.2832	7.5749	19.4739
1.70E+00	13.	5.7522	92.0354	10.7280	30.2019
2.09E+00	8.	3.5398	95.5752	12.2269	42.4289
2.56E+00	5.	2.2124	97.7876	14.1530	56.5819
3.15E+00	3.	1.3274	99.1151	15.7272	72.3091
3.87E+00	1.	0.4425	99.5575	9.7092	82.0182
4.75E+00	1.	0.4425	100.0000	17.9818	100.0000
5.83E+00	0.	0.0000	100.0000	0.0000	100.0000

SAMPLE ID: LUNG 5 - PREP 3478 IML D-569

7-JUL-88

AREA EQUIV. DIAM (UM) DISTRIBUTION FOR TOT. EXOGENOUS MACR = 15

AVG=8.27E-01 DEV=0.00E-01 %DEV=0.00E-01 MEDIAN=6.12E-01 MOST PROB.=4.50E-01

Class	Count	%	0	1	2
0.0227	0.	0.00			
0.0279	1.	0.09			
0.0343	0.	0.00			
0.0421	0.	0.00			
0.0517	0.	0.00			
0.0635	1.	0.09			
0.0780	3.	0.28	*		
0.0958	4.	0.37	*		
0.1177	5.	0.46	*		
0.1445	18.	1.60	****		
0.1774	15.	1.38	****		
0.2179	33.	3.04	*****		
0.2676	63.	5.80	*****		
0.3286	64.	5.89	*****		
0.4036	90.	8.29	*****		
0.4956	128.	11.79	*****		
0.6066	115.	10.59	*****		
0.7474	109.	10.04	*****		
0.9179	115.	10.59	*****		
1.1272	91.	8.38	*****		
1.3842	79.	7.27	*****		
1.6799	55.	5.06	*****		
2.0876	32.	2.95	*****		
2.5637	24.	2.21	*****		
3.1483	24.	2.21	*****		
3.8663	7.	0.64	**		
4.7480	6.	0.55	*		
5.8308	4.	0.37	*		

SAMPLE ID: LUNG 5 - PREP 3478 IML D-569

7-JUL-88

MASS PERCENTAGE VERSUS DIAMETER FOR MACR 15 TOT. EXOGENOUS

MASS MEDIAN DIA.= 2.99E+00 UM. RHD= 3.000 AERODYNAMIC DIA.= 5.18E+00 UM.

DIA. (UM.)	RAW COUNT	PERCENTAGES BY COUNT		PERCENTAGES BY MASS	
		DIFF.	INTEGRAL	DIFF.	INTEGRAL
2.27E-02	0.	0.0000	0.0000	0.0000	0.0000
2.79E-02	1.	0.0921	0.0921	0.0000	0.0000
3.43E-02	0.	0.0000	0.0921	0.0000	0.0000
4.21E-02	0.	0.0000	0.0921	0.0000	0.0000
5.17E-02	0.	0.0000	0.0921	0.0000	0.0000
6.35E-02	1.	0.0921	0.1842	0.0000	0.0000
7.80E-02	3.	0.2762	0.4604	0.0000	0.0000
9.58E-02	4.	0.3683	0.8287	0.0001	0.0001
1.18E-01	5.	0.4604	1.2891	0.0002	0.0002
1.44E-01	18.	1.6575	2.9466	0.0013	0.0017
1.77E-01	15.	1.3812	4.3278	0.0021	0.0037
2.18E-01	33.	3.0387	7.3665	0.0084	0.0121
2.68E-01	63.	5.8011	13.1676	0.0296	0.0417
3.29E-01	64.	5.8932	19.0608	0.0557	0.0973
4.04E-01	90.	8.2673	27.3481	0.1450	0.2423
4.96E-01	128.	11.7864	39.1344	0.3819	0.6242
6.09E-01	115.	10.5893	49.7238	0.6354	1.2596
7.47E-01	109.	10.0368	59.7606	1.1154	2.3750
9.18E-01	115.	10.5893	70.3499	2.1795	4.5545
1.13E+00	91.	8.3794	78.7293	3.1941	7.7487
1.38E+00	79.	7.2744	86.0037	5.1356	12.8843
1.70E+00	55.	5.0645	91.0681	6.6218	19.5061
2.09E+00	32.	2.9466	94.0147	7.1354	26.6415
2.56E+00	24.	2.2099	96.2247	9.9113	36.5528
3.15E+00	24.	2.2099	98.4346	18.3561	54.9089
3.87E+00	7.	0.6446	99.0792	9.9156	64.8245
4.75E+00	6.	0.5525	99.6317	15.7406	80.5651
5.83E+00	4.	0.3683	100.0000	19.4349	100.0000

SAMPLE ID: LUNG 6 - PREP 3409 IML D-2,9

21-DEC-87

AREA EQUIV. DIAM (UM) DISTRIBUTION FOR SILICA

MOCR = 1

AVG=8.46E-01 DEV=6.55E-01 ADEV=7.74E+01 MEDIAN=6.23E-01 MOST PROB.=4.50E-01

Class	0	1	2	3	4	5
limit	Count	%				
0.0227	0.	0.00[				
0.0279	1.	0.22[				
0.0343	0.	0.00[				
0.0421	0.	0.00[				
0.0517	0.	0.00[				
0.0635	0.	0.00[				
0.0780	0.	0.00[				
0.0958	2.	0.44[				
0.1177	2.	0.44[				
0.1445	1.	0.22[				
0.1774	2.	0.44[				
0.2179	9.	2.00[**				
0.2676	29.	6.43[*****				
0.3286	36.	7.98[*****				
0.4036	38.	8.43[*****				
0.4956	55.	12.20[*****				
0.6086	46.	10.20[*****				
0.7474	42.	9.31[*****				
0.9179	40.	8.87[*****				
1.1272	34.	7.54[*****				
1.3842	44.	9.75[*****				
1.6999	20.	4.43[****				
2.0876	20.	4.43[****				
2.5637	18.	3.99[****				
3.1483	9.	2.00[**				
3.8663	1.	0.22[				
4.7480	2.	0.44[				
5.8308	0.	0.00[				
7.1605	0.	0.00[				
8.7935	0.	0.00[				
10.799	0.	0.00[				

SAMPLE ID: LUNG 6 - PREP 3409 IML D-2,9

21-DEC-87

WBS PERCENTAGE VERSUS DIAMETER FOR MOCR 1 SILICA

WBS MEDIAN DIA. = 2.35E+00 UM. RWD = 2.660 AERODYNAMIC DIA. = 3.84E+00 UM

DIA. (UM)	WBS COUNT	PERCENTAGES BY COUNT		PERCENTAGES BY WBS	
		DIFF.	INTERNAL	DIFF.	INTERNAL
2.27E-02	0.	0.0000	0.0000	0.0000	0.0000
2.79E-02	1.	0.2217	0.2217	0.0000	0.0000
3.43E-02	0.	0.0000	0.2217	0.0000	0.0000
4.21E-02	0.	0.0000	0.2217	0.0000	0.0000
5.17E-02	0.	0.0000	0.2217	0.0000	0.0000
6.35E-02	0.	0.0000	0.2217	0.0000	0.0000
7.80E-02	0.	0.0000	0.2217	0.0000	0.0000
9.58E-02	2.	0.4435	0.6652	0.0001	0.0001
1.18E-01	2.	0.4435	1.1086	0.0002	0.0004
1.44E-01	1.	0.2217	1.3304	0.0002	0.0006
1.77E-01	2.	0.4435	1.7738	0.0008	0.0014
2.18E-01	9.	1.9955	3.7694	0.0068	0.0082
2.68E-01	29.	6.4302	10.1996	0.0405	0.0487
3.29E-01	36.	7.9823	18.1818	0.0931	0.1418
4.04E-01	38.	8.4257	26.6075	0.1821	0.3239
4.96E-01	55.	12.1951	38.8027	0.4881	0.8120
6.09E-01	46.	10.1996	49.0022	0.7561	1.5681
7.47E-01	42.	9.3126	58.3149	1.2785	2.8466
9.18E-01	40.	8.8692	67.1840	2.2531	5.1017
1.13E+00	34.	7.5388	74.7228	3.3501	8.4518
1.38E+00	44.	9.7561	84.4789	4.5087	12.9605
1.70E+00	20.	4.4346	88.9135	7.1629	20.1234
2.09E+00	20.	4.4346	93.3481	13.2660	33.3893
2.58E+00	18.	3.9911	97.3393	22.1124	55.5018
3.15E+00	9.	1.9956	99.3348	29.4763	84.9784
3.87E+00	1.	0.2217	99.5566	4.2137	89.1921
4.73E+00	2.	0.4435	100.0000	13.6079	100.0000
5.83E+00	0.	0.0000	100.0000	0.0000	100.0000
7.16E+00	0.	0.0000	100.0000	0.0000	100.0000
8.79E+00	0.	0.0000	100.0000	0.0000	100.0000
1.08E+01	0.	0.0000	100.0000	0.0000	100.0000

AREA ERUV. DIAM (UM) DISTRIBUTION FOR TOT. EXOGENOUS APCR = 15

AVG=3.95E-01 DEV=8.73E-01 KDEV=8.77E+01 MEDIAN=7.16E-01 MOST PROB.=6.78E-01

Class	0	1	2	3	4	5
limit	Count	%				
0.0227	0.	0.00[				
0.0279	1.	0.07[				
0.0343	0.	0.00[				
0.0421	0.	0.00[				
0.0517	0.	0.00[				
0.0635	0.	0.00[				
0.0780	1.	0.07[				
0.0958	2.	0.15[				
0.1177	4.	0.30[				
0.1445	7.	0.52[*				
0.1774	15.	1.12[*				
0.2179	24.	1.80[**				
0.2676	35.	4.12[***				
0.3286	53.	6.97[****				
0.4036	96.	7.20[*****				
0.4956	129.	9.67[*****				
0.6006	131.	9.82[*****				
0.7474	141.	10.57[*****				
0.9179	125.	9.37[*****				
1.1272	116.	8.70[*****				
1.3842	115.	8.62[*****				
1.6999	68.	5.10[*****				
2.0876	82.	6.15[*****				
2.5637	54.	4.05[****				
3.1483	34.	2.55[***				
3.8663	18.	1.35[**				
4.7480	14.	1.05[*				
5.8308	7.	0.52[*				
7.1605	1.	0.07[				
8.7935	0.	0.00[				
10.799	1.	0.07[				

SAMPLE ID: LUNG 6 - PREP 3409 INL D-2,9

21-DEC-87

MASS PERCENTAGE VERSUS DIAMETER FOR APCR 15 TOT. EXOGENOUS

MASS MEDIAN DIA. = 3.78E+00 ULM RMD= 3.000 PNEUMODYNAMIC DIA. = 5.54E+00 ULM

DIA. (UL)	COUNT	PERCENTAGES BY COUNT		PERCENTAGES BY MASS	
		DIFF.	INTEGRAL	DIFF.	INTEGRAL
2.27E-02	0.	0.0000	0.0000	0.0000	0.0000
2.79E-02	1.	0.0750	0.0750	0.0000	0.0000
3.43E-02	0.	0.0000	0.0750	0.0000	0.0000
4.21E-02	0.	0.0000	0.0750	0.0000	0.0000
5.17E-02	0.	0.0000	0.0750	0.0000	0.0000
6.35E-02	0.	0.0000	0.0750	0.0000	0.0000
7.80E-02	1.	0.0750	0.1499	0.0000	0.0000
9.58E-02	2.	0.1499	0.2999	0.0000	0.0000
1.18E-01	4.	0.2999	0.5997	0.0001	0.0001
1.44E-01	7.	0.5247	1.1244	0.0002	0.0003
1.77E-01	15.	1.1244	2.2489	0.0009	0.0012
2.18E-01	24.	1.7991	4.0480	0.0027	0.0039
2.68E-01	35.	4.1229	8.1709	0.0113	0.0132
3.29E-01	53.	6.9715	15.1424	0.0335	0.0508
4.04E-01	96.	7.1964	22.3388	0.0679	0.1187
4.95E-01	129.	9.6702	32.0090	0.1691	0.2878
6.09E-01	131.	9.8201	41.8291	0.3180	0.6058
7.47E-01	141.	10.5697	52.3988	0.6339	1.2397
9.18E-01	125.	9.3703	61.7691	1.0408	2.2805
1.13E+00	116.	8.6857	70.4548	1.7888	4.0694
1.38E+00	115.	8.6207	79.0855	3.2844	7.3538
1.70E+00	68.	5.0975	84.1829	3.9969	10.9507
2.09E+00	82.	6.1469	90.3298	8.0330	18.9837
2.56E+00	54.	4.0480	94.3778	9.7974	28.7811
3.15E+00	34.	2.5487	96.9265	11.4248	40.2058
3.87E+00	18.	1.3493	98.2759	11.2019	51.4077
4.73E+00	14.	1.0495	99.3253	16.1361	67.5438
5.83E+00	7.	0.5247	99.8501	14.9423	82.4861
7.16E+00	1.	0.0750	99.9250	3.9534	86.4395
8.79E+00	0.	0.0000	99.9250	0.0000	86.4395
1.08E+01	1.	0.0750	100.0000	13.5605	100.0000

SAMPLE ID: LUNG 7 - PREP 3415 1ML D-584

7-JUL-88

AREA EQUIV. DIAM (UM) DISTRIBUTION FOR SILICA

MACR = 1

AVG=7.00E-01 DEV=6.17E-01 XDEV=8.06E+01 MEDIAN=5.93E-01 MOST PROB.=5.52E-01

Class	Count	%	0	1	2
0.0421	0.	0.00	[		
0.0517	1.	0.23	[*		
0.0635	0.	0.00	[		
0.0780	1.	0.23	[*		
0.0958	1.	0.23	[*		
0.1177	4.	0.92	[**		
0.1445	0.	1.38	[****		
0.1774	4.	0.92	[**		
0.2179	14.	3.21	[*****		
0.2676	22.	5.05	[*****		
0.3286	27.	6.19	[*****		
0.4036	40.	9.17	[*****		
0.4956	54.	12.39	[*****		
0.6086	57.	13.07	[*****		
0.7474	47.	10.78	[*****		
0.9179	35.	8.03	[*****		
1.1272	39.	8.94	[*****		
1.3842	33.	7.57	[*****		
1.6999	23.	5.25	[*****		
2.0876	10.	2.29	[*****		
2.5637	9.	2.06	[*****		
3.1483	3.	0.69	[**		
3.8663	3.	0.69	[**		
4.7480	3.	0.69	[**		
5.8308	0.	0.00	[		

MASS PERCENTAGE VERSUS DIAMETER FOR MACR 1 SILICA

MASS MEDIAN DIA.= 2.62E+00 UM. RHO= 2.660 AERODYNAMIC DIA.= 4.28E+00 UM.

DIA. (UM.)	RAW COUNT	PERCENTAGES BY COUNT		PERCENTAGES BY MASS	
		DIFF.	INTEGRAL	DIFF.	INTEGRAL
4.21E-02	0.	0.0000	0.0000	0.0000	0.0000
5.17E-02	1.	0.2294	0.2294	0.0000	0.0000
6.35E-02	0.	0.0000	0.2294	0.0000	0.0000
7.80E-02	1.	0.2294	0.4587	0.0000	0.0001
9.58E-02	1.	0.2294	0.6881	0.0001	0.0001
1.18E-01	4.	0.9174	1.6055	0.0006	0.0007
1.44E-01	6.	1.3761	2.9817	0.0016	0.0023
1.77E-01	4.	0.9174	3.8991	0.0019	0.0042
2.18E-01	14.	3.2110	7.1101	0.0125	0.0167
2.66E-01	22.	5.0459	12.1560	0.0364	0.0531
3.29E-01	27.	6.1927	18.3486	0.0828	0.1359
4.04E-01	40.	9.1743	27.5229	0.2271	0.3630
4.96E-01	54.	12.3853	39.9083	0.5679	0.9310
6.09E-01	57.	13.0734	52.9817	1.1102	2.0412
7.47E-01	47.	10.7798	63.7615	1.6955	3.7366
9.18E-01	35.	8.0275	71.7890	2.3383	6.0750
1.13E+00	39.	8.9450	80.7339	4.8257	10.9007
1.38E+00	33.	7.5688	88.3028	7.5624	18.4630
1.70E+00	23.	5.2752	93.5780	9.7616	28.2246
2.09E+00	10.	2.2936	95.8716	7.8604	36.0850
2.56E+00	9.	2.0642	97.9358	13.1020	49.1871
3.15E+00	3.	0.6881	98.6239	8.0885	57.2756
3.87E+00	3.	0.6881	99.3119	14.9803	72.2559
4.75E+00	3.	0.6881	100.0000	27.7441	100.0000
5.83E+00	0.	0.0000	100.0000	0.0000	100.0000

SAMPLE ID: LUNG 7 - PREP 3415 IML D-584

7-JUL-86

AREA EQUIV. DIAM (UM) DISTRIBUTION FOR TOT. EXOGENOUS MACR = 15

AVG=9.17E-01 DEV=7.44E-01 ZDEV=8.12E+01 MEDIAN=6.76E-01 MOST PROB.=5.52E-01

Class	Count	%	0	1	2
0.0421	0.	0.00			
0.0517	1.	0.07			
0.0635	1.	0.07			
0.0780	5.	0.34	*		
0.0958	6.	0.41	*		
0.1177	11.	0.75	**		
0.1445	15.	1.02	***		
0.1774	23.	1.57	****		
0.2179	38.	2.59	*****		
0.2676	56.	3.81	*****		
0.3286	78.	5.31	*****		
0.4036	114.	7.76	*****		
0.4956	143.	9.73	*****		
0.6086	151.	10.28	*****		
0.7474	147.	10.01	*****		
0.9179	128.	8.71	*****		
1.1272	137.	9.33	*****		
1.3842	137.	9.33	*****		
1.6999	105.	7.15	*****		
2.0876	65.	4.42	*****		
2.5637	51.	3.47	*****		
3.1483	25.	1.70	*****		
3.8663	17.	1.16	***		
4.7480	10.	0.68	**		
5.8308	5.	0.34	*		

MASS PERCENTAGE VERSUS DIAMETER FOR MACR 15 TOT. EXOGENOUS

MASS MEDIAN DIA.= 2.97E+00 UM. RHO= 3.000 AERODYNAMIC DIA.= 5.14E+00 UM.

DIA. (UM.)	RAW COUNT	PERCENTAGES BY COUNT		PERCENTAGES BY MASS	
		DIFF.	INTEGRAL	DIFF.	INTEGRAL
4.21E-02	0.	0.0000	0.0000	0.0000	0.0000
5.17E-02	1.	0.0681	0.0681	0.0000	0.0000
6.35E-02	1.	0.0681	0.1361	0.0000	0.0000
7.80E-02	5.	0.3404	0.4765	0.0000	0.0000
9.58E-02	6.	0.4084	0.8850	0.0001	0.0001
1.18E-01	11.	0.7486	1.6336	0.0003	0.0004
1.44E-01	15.	1.0211	2.6549	0.0007	0.0011
1.77E-01	23.	1.5657	4.2206	0.0020	0.0030
2.18E-01	38.	2.5868	6.8074	0.0060	0.0090
2.68E-01	56.	3.8121	10.6195	0.0163	0.0253
3.29E-01	78.	5.3097	15.9292	0.0421	0.0674
4.04E-01	114.	7.7604	23.6896	0.1140	0.1814
4.96E-01	143.	9.7345	33.4241	0.2648	0.4462
6.09E-01	151.	10.2791	43.7032	0.5178	0.9640
7.47E-01	147.	10.0068	53.7100	0.9336	1.8976
9.18E-01	128.	8.7134	62.4234	1.5056	3.4032
1.13E+00	137.	9.3261	71.7495	2.9845	6.3877
1.38E+00	137.	9.3261	81.0756	5.5274	11.9152
1.70E+00	105.	7.1477	88.2233	7.8459	19.7611
2.09E+00	65.	4.4248	92.6481	8.9953	28.7564
2.56E+00	51.	3.4717	96.1198	13.0715	41.8279
3.15E+00	25.	1.7018	97.8216	11.8672	53.6951
3.87E+00	17.	1.1572	98.9789	14.9454	68.6404
4.75E+00	10.	0.6807	99.6596	16.2820	84.9225
5.83E+00	5.	0.3404	100.0000	15.6775	100.0000

SAMPLE ID: LUNG 8 - PREP 3427 0.5ML D-4,5,9

11-JUL-88

AREA EQUIV. DIAM (UM) DISTRIBUTION FOR SILICA

MACR = 1

AVG=9.41E-01 DEV=6.56E-01 %DEV=6.97E+01 MEDIAN=7.37E-01 MOST PROB.=6.78E-01

Class	0	1	2
limit	Count	%	
0.0780	0.	0.00I	
0.0958	1.	0.16I	
0.1177	0.	0.00I	
0.1445	1.	0.16I	
0.1774	1.	0.16I	
0.2179	9.	1.48I****	
0.2676	17.	2.80I*****	
0.3286	36.	5.92I*****	
0.4036	59.	9.70I*****	
0.4956	58.	9.54I*****	
0.6086	60.	9.87I*****	
0.7474	67.	11.02I*****	
0.9179	55.	9.05I*****	
1.1272	63.	10.36I*****	
1.3842	63.	10.36I*****	
1.6999	37.	6.09I*****	
2.0876	41.	6.74I*****	
2.5637	23.	3.78I*****	
3.1483	8.	1.32I****	
3.8663	8.	1.32I****	
4.7480	1.	0.16I	
5.8308	0.	0.00I	
7.1605	0.	0.00I	
8.7935	0.	0.00I	
10.799	0.	0.00I	

MASS PERCENTAGE VERSUS DIAMETER FOR MACR 1 SILICA

MASS MEDIAN DIA. = 2.27E+00 UM. RHO = 2.660 AERODYNAMIC DIA. = 3.70E+00 UM.

DIA. (UM.)	RAW COUNT	PERCENTAGES BY COUNT		PERCENTAGES BY MASS	
		DIFF.	INTEGRAL	DIFF.	INTEGRAL
7.80E-02	0.	0.0000	0.0000	0.0000	0.0000
9.56E-02	1.	0.1645	0.1645	0.0000	0.0000
1.18E-01	0.	0.0000	0.1645	0.0000	0.0000
1.44E-01	1.	0.1645	0.3289	0.0001	0.0002
1.77E-01	1.	0.1645	0.4934	0.0003	0.0004
2.18E-01	9.	1.4803	1.9737	0.0044	0.0049
2.68E-01	17.	2.7961	4.7697	0.0154	0.0202
3.29E-01	36.	5.9211	10.6908	0.0604	0.0806
4.04E-01	59.	9.7039	20.3947	0.1833	0.2640
4.96E-01	58.	9.5395	29.9342	0.3338	0.5977
6.09E-01	60.	9.8684	39.8026	0.6394	1.2371
7.47E-01	67.	11.0197	50.8224	1.3224	2.5596
9.18E-01	55.	9.0461	59.8684	2.0105	4.5701
1.13E+00	63.	10.3618	70.2303	4.2652	8.8353
1.38E+00	63.	10.3618	80.5921	7.8994	16.7347
1.70E+00	37.	6.0855	86.6776	8.5922	25.3269
2.09E+00	41.	6.7434	93.4211	17.6335	42.9604
2.56E+00	23.	3.7829	97.2039	18.3203	61.2808
3.15E+00	8.	1.3158	98.5197	11.8018	73.0825
3.87E+00	8.	1.3158	99.8355	21.8574	94.9399
4.75E+00	1.	0.1645	100.0000	5.0601	100.0000
5.83E+00	0.	0.0000	100.0000	0.0000	100.0000
7.16E+00	0.	0.0000	100.0000	0.0000	100.0000
8.79E+00	0.	0.0000	100.0000	0.0000	100.0000
1.08E+01	0.	0.0000	100.0000	0.0000	100.0000

SAMPLE ID: LUNG 8 - PREP 3427 0.5ML D-4,5,9

11-JUL-88

AREA EQUIV. DIAM (UM) DISTRIBUTION FOR TOT. EXOGENOUS MACR = 15

AVG=1.05E+00 DEV=0.00E-01 XDEV=0.00E-01 MEDIAN=8.00E-01 MOST PROB.=1.02E+00

Class	0	1	2
limit	Count	%	
0.0780	0.	0.00[	
0.0958	4.	0.16[	
0.1177	3.	0.12[	
0.1445	5.	0.24[*	
0.1774	10.	0.41[*	
0.2179	36.	1.47[****	
0.2676	72.	2.94[*****	
0.3286	127.	5.19[*****	
0.4036	203.	8.29[*****	
0.4956	211.	8.62[*****	
0.6086	226.	9.23[*****	
0.7474	254.	10.37[*****	
0.9179	236.	9.64[*****	
1.1272	272.	11.11[*****	
1.3842	207.	8.45[*****	
1.6999	181.	7.39[*****	
2.0876	157.	6.41[*****	
2.5637	107.	4.37[*****	
3.1483	58.	2.37[*****	
3.8663	46.	1.88[*****	
4.7480	17.	0.69[**	
5.8308	11.	0.45[*	
7.1605	2.	0.08[	
8.7935	1.	0.04[	
10.799	2.	0.08[	

MASS PERCENTAGE VERSUS DIAMETER FOR MACR 15 TOT. EXOGENOUS

MASS MEDIAN DIA. = 3.60E+00 UM. RHO = 3.000 AERODYNAMIC DIA. = 6.23E+00 UM.

DIA. (UM.)	RAW COUNT	PERCENTAGES BY COUNT		PERCENTAGES BY MASS	
		DIFF.	INTEGRAL	DIFF.	INTEGRAL
7.80E-02	0.	0.0000	0.0000	0.0000	0.0000
9.58E-02	4.	0.1633	0.1633	0.0000	0.0000
1.18E-01	3.	0.1225	0.2858	0.0000	0.0000
1.44E-01	5.	0.2450	0.5308	0.0001	0.0001
1.77E-01	10.	0.4083	0.9392	0.0003	0.0005
2.18E-01	36.	1.4700	2.4091	0.0021	0.0025
2.68E-01	72.	2.9400	5.3491	0.0077	0.0103
3.29E-01	127.	5.1858	10.5349	0.0253	0.0355
4.04E-01	203.	8.2891	18.8240	0.0748	0.1103
4.96E-01	211.	8.6158	27.4398	0.1439	0.2542
6.09E-01	226.	9.2283	36.6680	0.2855	0.5397
7.47E-01	254.	10.3716	47.0396	0.5943	1.1340
9.18E-01	236.	9.6366	56.6762	1.0226	2.1566
1.13E+00	272.	11.1066	67.7828	2.1828	4.3394
1.38E+00	207.	8.4524	76.2352	3.0766	7.4161
1.70E+00	181.	7.3908	83.6260	4.9823	12.3984
2.09E+00	157.	6.4108	90.0368	8.0040	20.4023
2.56E+00	107.	4.3691	94.4059	10.1028	30.5051
3.15E+00	58.	2.3683	96.7742	10.1423	40.6474
3.87E+00	46.	1.8783	98.6525	14.8976	55.5450
4.75E+00	17.	0.6942	99.3467	10.1967	65.7417
5.83E+00	11.	0.4492	99.7959	12.2195	77.9612
7.16E+00	2.	0.0817	99.8775	4.1147	82.0759
8.79E+00	1.	0.0408	99.9183	3.8103	85.8862
1.08E+01	2.	0.0817	100.0000	14.1138	100.0000

AREA EQUIV. DIAM (UM) DISTRIBUTION FOR SILICA MACR = 1

AVG=6.97E-01 DEV=5.34E-01 XDEV=7.66E+01 MEDIAN=5.32E-01 MOST PROB.=4.50E-01

Class	Count	%	0	1	2
limit	Count	%	0	0	0
0.0517	0.	0.000			
0.0635	1.	0.140			
0.0780	0.	0.000			
0.0958	0.	0.000			
0.1177	2.	0.280*			
0.1445	4.	0.570**			
0.1774	5.	0.710**			
0.2179	18.	2.550*****			
0.2576	45.	6.380*****			
0.3286	65.	9.220*****			
0.4036	87.	12.340*****			
0.4956	96.	13.620*****			
0.6086	91.	12.910*****			
0.7474	67.	9.500*****			
0.9179	70.	9.930*****			
1.1272	53.	7.520*****			
1.3842	39.	5.530*****			
1.6999	21.	2.980*****			
2.0876	19.	2.700*****			
2.5637	14.	1.990****			
3.1483	6.	0.850**			
3.8663	0.	0.000			
4.7480	1.	0.140			
5.8308	1.	0.140			
7.1605	0.	0.000			
8.7935	0.	0.000			

MASS PERCENTAGE VERSUS DIAMETER FOR MACR 1 SILICA

MASS MEDIAN DIA. = 2.24E+00 UM. RHO = 2.660 AERODYNAMIC DIA. = 3.65E+00 UM.

DIA. (UM.)	RAW COUNT	PERCENTAGES BY COUNT		PERCENTAGES BY MASS	
		DIFF.	INTEGRAL	DIFF.	INTEGRAL
5.17E-02	0.	0.0000	0.0000	0.0000	0.0000
6.35E-02	1.	0.1418	0.1418	0.0000	0.0000
7.80E-02	0.	0.0000	0.1418	0.0000	0.0000
9.58E-02	0.	0.0000	0.1418	0.0000	0.0000
1.18E-01	2.	0.2837	0.4255	0.0002	0.0003
1.44E-01	4.	0.5674	0.9929	0.0009	0.0012
1.77E-01	5.	0.7092	1.7021	0.0021	0.0033
2.18E-01	18.	2.5532	4.2553	0.0142	0.0176
2.68E-01	45.	6.3830	10.6383	0.0660	0.0835
3.29E-01	65.	9.2199	19.8582	0.1765	0.2600
4.04E-01	87.	12.3404	32.1986	0.4374	0.6974
4.95E-01	96.	13.6170	45.8156	0.8939	1.5914
6.09E-01	91.	12.9078	58.7234	1.5694	3.1608
7.47E-01	67.	9.5035	68.2270	2.1400	5.3008
9.18E-01	70.	9.9291	78.1560	4.1409	9.4416
1.13E+00	53.	7.5177	85.6738	5.8066	15.2482
1.38E+00	39.	5.5319	91.2057	7.9133	23.1616
1.70E+00	21.	2.9787	94.1844	7.8916	31.0532
2.09E+00	19.	2.6950	96.8794	13.2236	44.2768
2.56E+00	14.	1.9858	98.8652	18.0458	62.3226
3.15E+00	6.	0.8511	99.7163	14.3236	76.6462
3.87E+00	0.	0.0000	99.7163	0.0000	76.6462
4.75E+00	1.	0.1418	99.8582	8.1885	84.8346
5.83E+00	1.	0.1418	100.0000	15.1654	100.0000
7.16E+00	0.	0.0000	100.0000	0.0000	100.0000
8.79E+00	0.	0.0000	100.0000	0.0000	100.0000

AREA EQUIV. DIAM (UM) DISTRIBUTION FOR TOT. EXOGENOUS MACR = 15

AVG=8.96E-01 DEV=0.00E-01 %DEV=0.00E-01 MEDIAN=6.54E-01 MOST PROB.=4.50E-01

Class	0	1	2
limit	Count	%	0
0.0517	0.	0.00[	0
0.0635	1.	0.05[	
0.0780	0.	0.00[	
0.0958	2.	0.10[	
0.1177	5.	0.24[*	
0.1445	8.	0.39[*	
0.1774	13.	0.63[**	
0.2179	41.	1.98[*****	
0.2676	101.	4.88[*****	
0.3286	134.	6.48[*****	
0.4036	187.	9.04[*****	
0.4956	241.	11.65[*****	
0.6086	228.	11.02[*****	
0.7474	224.	10.83[*****	
0.9179	220.	10.63[*****	
1.1272	172.	8.31[*****	
1.3842	149.	7.20[*****	
1.6999	107.	5.17[*****	
2.0876	91.	4.40[*****	
2.5637	59.	2.85[*****	
3.1483	35.	1.69[*****	
3.8663	20.	0.97[***	
4.7480	18.	0.87[**	
5.8308	9.	0.43[*	
7.1605	3.	0.14[	
8.7935	1.	0.05[	

MASS PERCENTAGE VERSUS DIAMETER FOR MACR 15 TOT. EXOGENOUS

MASS MEDIAN DIA.= 3.83E+00 UM. RHO= 3.000 AERODYNAMIC DIA.= 6.64E+00 UM.

DIA. (UM.)	RAW COUNT	PERCENTAGES BY COUNT		PERCENTAGES BY MASS	
		DIFF.	INTEGRAL	DIFF.	INTEGRAL
5.17E-02	0.	0.0000	0.0000	0.0000	0.0000
6.35E-02	1.	0.0483	0.0483	0.0000	0.0000
7.80E-02	0.	0.0000	0.0483	0.0000	0.0000
9.58E-02	2.	0.0967	0.1450	0.0000	0.0000
1.18E-01	5.	0.2417	0.3867	0.0001	0.0001
1.44E-01	8.	0.3867	0.7733	0.0002	0.0003
1.77E-01	13.	0.6283	1.4016	0.0007	0.0010
2.18E-01	41.	1.9816	3.3833	0.0038	0.0048
2.68E-01	101.	4.8816	8.2649	0.0174	0.0222
3.29E-01	134.	6.4766	14.7414	0.0429	0.0651
4.04E-01	187.	9.0382	23.7796	0.1108	0.1759
4.96E-01	241.	11.6481	35.4277	0.2644	0.4403
6.09E-01	228.	11.0198	46.4476	0.4633	0.9037
7.47E-01	224.	10.8265	57.2740	0.8431	1.7467
9.18E-01	220.	10.6332	67.9072	1.5335	3.2802
1.13E+00	172.	8.3132	76.2204	2.2205	5.5007
1.38E+00	149.	7.2015	83.4219	3.5625	9.0632
1.70E+00	107.	5.1716	88.5935	4.7381	13.8013
2.09E+00	91.	4.3983	92.9918	7.4630	21.2642
2.56E+00	59.	2.8516	95.8434	8.9613	30.2256
3.15E+00	35.	1.6916	97.5350	9.8456	40.0711
3.87E+00	20.	0.9667	98.5017	10.4197	50.4908
4.75E+00	18.	0.8700	99.3717	17.3679	67.8587
5.83E+00	9.	0.4350	99.8067	16.0830	83.9417
7.16E+00	3.	0.1450	99.9517	9.3288	93.8705
8.79E+00	1.	0.0483	100.0000	6.1295	100.0000

SAMPLE ID: LUNG 10 - PREP 3439 ZML D-585

7-JUL-88

AREA EQUIV. DIAM (UM) DISTRIBUTION FOR SILICA MACR = 1

AVG=8.63E+01 DEV=7.57E+01 COEF=0.89E+01 MEDIAN=6.21E+01 MOST PROB. = 6.78E+01

Class	Count	%	0	1	2
0.0227	0.	0.00[			
0.0279	0.	0.00[			
0.0343	0.	0.00[			
0.0421	0.	0.00[			
0.0517	1.	0.21[*			
0.0635	0.	0.00[			
0.0750	2.	0.41[*			
0.0958	4.	0.83[*			
0.1177	0.	1.24[*			
0.1445	9.	1.86[*			
0.1774	5.	1.04[*			
0.2179	24.	4.97[*			
0.2676	26.	5.38[*			
0.3286	33.	6.83[*			
0.4036	38.	7.87[*			
0.4958	47.	9.73[*			
0.6086	42.	8.70[*			
0.7474	49.	10.14[*			
0.9179	45.	9.32[*			
1.1272	32.	6.63[*			
1.3842	31.	6.42[*			
1.6999	30.	6.21[*			
2.0876	23.	4.78[*			
2.5637	17.	3.52[*			
3.1483	7.	1.45[*			
3.8663	9.	1.86[*			
4.7480	2.	0.41[*			
5.8308	1.	0.21[*			
7.1605	0.	0.00[			
8.7935	0.	0.00[			
10.799	0.	0.00[			
13.262	0.	0.00[			

SAMPLE ID: LUNG 10 - PREP 3439 ZML D-585

7-JUL-88

MASS PERCENTAGE VERSUS DIAMETER FOR MACR 1 SILICA

MASS MEDIAN DIA. = 2.97E+00 UM. RHO = 2.660 AERODYNAMIC DIA. = 4.85E+00 UM.

DIA. (UM.)	RAW COUNT	PERCENTAGES BY COUNT		PERCENTAGES BY MASS	
		DIFF.	INTEGRAL	DIFF.	INTEGRAL
2.27E-02	0.	0.0000	0.0000	0.0000	0.0000
2.79E-02	0.	0.0000	0.0000	0.0000	0.0000
3.43E-02	0.	0.0000	0.0000	0.0000	0.0000
4.21E-02	0.	0.0000	0.0000	0.0000	0.0000
5.17E-02	1.	0.2070	0.2070	0.0000	0.0000
6.35E-02	0.	0.0000	0.2070	0.0000	0.0000
7.80E-02	2.	0.4141	0.6211	0.0000	0.0001
9.58E-02	4.	0.8282	1.4493	0.0002	0.0002
1.18E-01	6.	1.2422	2.6915	0.0005	0.0007
1.44E-01	9.	1.8634	4.5549	0.0014	0.0021
1.77E-01	5.	1.0352	5.5901	0.0014	0.0035
2.18E-01	24.	4.9689	10.5590	0.0124	0.0159
2.68E-01	26.	5.3830	15.9420	0.0219	0.0409
3.29E-01	33.	6.8323	22.7743	0.0586	0.0995
4.04E-01	38.	7.8675	30.6418	0.1251	0.2246
4.96E-01	47.	9.7308	40.3727	0.2865	0.5111
6.09E-01	42.	8.6957	49.0683	0.4741	0.9852
7.47E-01	49.	10.1449	59.2133	1.0245	2.0097
9.18E-01	45.	9.3168	68.5300	1.7425	3.7522
1.13E+00	32.	6.6253	75.1553	2.2949	6.0471
1.38E+00	31.	6.4182	81.5735	4.1174	10.1646
1.70E+00	30.	6.2112	87.7847	7.3797	17.5442
2.09E+00	23.	4.7619	92.5466	10.4784	28.0227
2.56E+00	17.	3.5197	96.0663	14.3439	42.3666
3.15E+00	7.	1.4493	97.5155	16.9388	53.3053
3.87E+00	9.	1.8634	99.3789	26.0474	79.3527
4.75E+00	2.	0.4141	99.7930	10.7202	90.0729
5.83E+00	1.	0.2070	100.0000	9.9271	100.0000
7.16E+00	0.	0.0000	100.0000	0.0000	100.0000
8.79E+00	0.	0.0000	100.0000	0.0000	100.0000
1.08E+01	0.	0.0000	100.0000	0.0000	100.0000
1.33E+01	0.	0.0000	100.0000	0.0000	100.0000

AREA EQUIV. DIAM (UM) DISTRIBUTION FOR TOT. EXOGENOUS MACR = 15

AVG=1.33E+00 DEV=0.00E+01 ZDEV=0.00E+01 MEDIAN=6.99E+01 MOST PROB.=3.66E+01

Class	Count	1	2
0.0000	0.	0.00[	
0.0027	1.	0.09[	
0.0043	0.	0.00[	
0.0041	0.	0.00[	
0.0051	2.	0.18[	
0.0035	0.	0.00[	
0.0050	3.	0.28[*	
0.0056	7.	0.84[**	
0.0177	7.	0.84[**	
0.0445	14.	1.29[***	
0.1774	17.	1.56[****	
0.2179	43.	3.98[*****	
0.2676	65.	5.98[*****	
0.3286	64.	5.89[*****	
0.4036	92.	8.46[*****	
0.4956	88.	8.10[*****	
0.6086	82.	7.54[*****	
0.7474	90.	8.28[*****	
0.9179	91.	8.37[*****	
1.1272	83.	7.64[*****	
1.3842	80.	7.36[*****	
1.6799	76.	6.99[*****	
2.0676	58.	5.34[*****	
2.5637	40.	3.68[*****	
3.1483	30.	2.76[*****	
3.8663	27.	2.48[*****	
4.7480	11.	1.01[***	
5.8308	11.	1.01[***	
7.1605	3.	0.28[*	
8.7935	1.	0.09[	
10.799	0.	0.00[	
13.262	1.	0.09[	

SAMPLE ID: LUNG 10 - PREP 3439 ZML D-585

7-JUL-88

MASS PERCENTAGE VERSUS DIAMETER FOR MACR 15 TOT. EXOGENOUS

MASS MEDIAN DIA.= 4.89E+00 UM. RHO= 3.000 AERODYNAMIC DIA.= 8.47E+00 UM.

DIA. (UM.)	RAW COUNT	PERCENTAGES BY COUNT		PERCENTAGES BY MASS	
		DIFF.	INTEGRAL	DIFF.	INTEGRAL
2.27E-02	0.	0.0000	0.0000	0.0000	0.0000
2.79E-02	1.	0.0920	0.0920	0.0000	0.0000
3.43E-02	0.	0.0000	0.0920	0.0000	0.0000
4.21E-02	0.	0.0000	0.0920	0.0000	0.0000
5.17E-02	2.	0.1840	0.2760	0.0000	0.0000
6.35E-02	0.	0.0000	0.2760	0.0000	0.0000
7.80E-02	3.	0.2760	0.5520	0.0000	0.0000
9.58E-02	7.	0.6440	1.1960	0.0001	0.0001
1.16E-01	7.	0.6440	1.8399	0.0001	0.0002
1.44E-01	14.	1.2879	3.1279	0.0004	0.0005
1.77E-01	17.	1.5639	4.6918	0.0008	0.0013
2.16E-01	43.	3.9558	8.6477	0.0037	0.0050
2.68E-01	65.	5.9798	14.6274	0.0104	0.0154
3.29E-01	64.	5.8878	20.5152	0.0189	0.0343
4.04E-01	92.	8.4637	28.9788	0.0503	0.0846
4.96E-01	88.	8.0957	37.0745	0.0891	0.1737
6.09E-01	82.	7.5437	44.6182	0.1538	0.3274
7.47E-01	90.	8.2797	52.8979	0.3126	0.6400
9.18E-01	91.	8.3717	61.2696	0.5853	1.2253
1.13E+00	83.	7.6357	68.9053	0.9888	2.2141
1.38E+00	80.	7.3597	76.2650	1.7656	3.9791
1.70E+00	76.	6.9917	83.2567	3.1055	7.0846
2.09E+00	58.	5.3358	88.5925	4.3893	11.4739
2.56E+00	40.	3.6799	92.2723	5.8063	17.0802
3.15E+00	30.	2.7599	95.0322	7.7873	24.8675
3.87E+00	27.	2.4839	97.5161	12.9802	37.8477
4.75E+00	11.	1.0120	98.5281	9.7940	47.6418
5.83E+00	11.	1.0120	99.5400	18.1390	65.7807
7.16E+00	3.	0.2760	99.8160	9.1620	74.9428
8.79E+00	1.	0.0920	99.9080	5.8562	80.5990
1.08E+01	0.	0.0000	99.9080	0.0000	80.5990
1.33E+01	1.	0.0920	100.0000	19.4010	100.0000

SAMPLE ID: LUNG 11 - PREP 3501 2ML D-57B

7-JUL-88

AREA EQUIV. DIAM (UM) DISTRIBUTION FOR SILICA MACR = 1

AVG=7.02E-01 DEV=5.61E-01 KDEV=7.99E+01 MEDIAN=5.35E-01 MOST PROB.=5.52E-01

Class	0	1	2
limit	Count	%	0
0.0421	0.	0.00[	
0.0517	0.	0.00[	
0.0635	1.	0.25[*	
0.0790	0.	0.00[	
0.0958	1.	0.25[*	
0.1177	3.	0.74[**	
0.1445	4.	0.99[***	
0.1774	8.	1.99[*****	
0.2179	19.	4.71[*****	
0.2676	27.	6.70[*****	
0.3286	34.	8.44[*****	
0.4036	38.	9.43[*****	
0.4956	48.	11.91[*****	
0.6086	53.	13.15[*****	
0.7474	51.	12.66[*****	
0.9179	21.	5.21[*****	
1.1272	30.	7.44[*****	
1.3842	22.	5.46[*****	
1.6999	18.	4.47[*****	
2.0876	11.	2.73[*****	
2.5637	7.	1.74[*****	
3.1483	5.	1.24[***	
3.8663	2.	0.50[*	
4.7480	0.	0.00[	
5.8308	0.	0.00[	
7.1605	0.	0.00[	

MASS PERCENTAGE VERSUS DIAMETER FOR MACR 1 SILICA

MASS MEDIAN DIA.= 2.17E+00 UM, RHO= 2.660 AERODYNAMIC DIA.= 3.54E+00 UM.

DIA. (UM.)	RAW COUNT	PERCENTAGES BY COUNT		PERCENTAGES BY MASS	
		DIFF.	INTEGRAL	DIFF.	INTEGRAL
4.21E-02	0.	0.0000	0.0000	0.0000	0.0000
5.17E-02	0.	0.0000	0.0000	0.0000	0.0000
6.35E-02	1.	0.2481	0.2481	0.0000	0.0000
7.80E-02	0.	0.0000	0.2481	0.0000	0.0000
9.58E-02	1.	0.2481	0.4963	0.0001	0.0002
1.18E-01	3.	0.7444	1.2407	0.0007	0.0008
1.44E-01	4.	0.9926	2.2333	0.0016	0.0024
1.77E-01	8.	1.9851	4.2184	0.0060	0.0085
2.18E-01	19.	4.7146	8.9330	0.0266	0.0351
2.68E-01	27.	6.6998	15.6328	0.0760	0.1051
3.29E-01	34.	8.4367	24.0695	0.1632	0.2683
4.04E-01	38.	9.4293	33.4988	0.3379	0.6062
4.96E-01	48.	11.9107	45.4094	0.7904	1.3966
6.09E-01	53.	13.1514	58.5608	1.6164	3.0130
7.47E-01	51.	12.6551	71.2159	2.8807	5.8937
9.18E-01	21.	5.2109	76.4268	2.1968	8.0906
1.13E+00	30.	7.4442	83.8710	5.8123	13.9029
1.38E+00	22.	5.4591	89.3300	7.8941	21.7970
1.70E+00	18.	4.4665	93.7965	11.9620	33.7591
2.09E+00	11.	2.7295	96.5261	13.5367	47.2978
2.56E+00	7.	1.7370	98.2630	15.9563	63.2541
3.15E+00	5.	1.2407	99.5037	21.1084	84.3625
3.87E+00	2.	0.4963	100.0000	15.6375	100.0000
4.75E+00	0.	0.0000	100.0000	0.0000	100.0000
5.83E+00	0.	0.0000	100.0000	0.0000	100.0000
7.16E+00	0.	0.0000	100.0000	0.0000	100.0000

AREA EQUIV. DIAM (UM) DISTRIBUTION FOR TOT. EXOGENOUS MACR = 15

AVG=7.28E-01 DEV=6.21E-01 XDEV=8.54E+01 MEDIAN=5.49E-01 MOST PROB.=5.52E-01

Class	Count	%
0.0421	0.	0.00[
0.0517	1.	0.10[
0.0635	4.	0.38[*
0.0780	1.	0.10[
0.0958	10.	0.95[***
0.1177	12.	1.15[***
0.1445	12.	1.15[***
0.1774	22.	2.10[*****
0.2179	43.	4.10[*****
0.2676	77.	7.35[*****
0.3286	87.	8.30[*****
0.4036	82.	7.82[*****
0.4956	115.	10.97[*****
0.6086	123.	11.74[*****
0.7474	112.	10.69[*****
0.9179	91.	8.68[*****
1.1272	74.	7.06[*****
1.3842	57.	5.44[*****
1.6999	52.	4.76[*****
2.0876	32.	3.05[*****
2.5637	17.	1.62[****
3.1483	15.	1.43[****
3.8663	6.	0.57[**
4.7480	1.	0.10[
5.8308	1.	0.10[
7.1605	1.	0.10[

MASS PERCENTAGE VERSUS DIAMETER FOR MACR 15 TOT. EXOGENOUS

MASS MEDIAN DIA.= 2.71E+00 UM. RHO= 3.000 AERODYNAMIC DIA.= 4.69E+00 UM.

DIA. (UM.)	RAW COUNT	PERCENTAGES BY COUNT		PERCENTAGES BY MASS	
		DIFF.	INTEGRAL	DIFF.	INTEGRAL
4.21E-02	0.	0.0000	0.0000	0.0000	0.0000
5.17E-02	1.	0.0954	0.0954	0.0000	0.0000
6.35E-02	4.	0.3817	0.4771	0.0000	0.0000
7.80E-02	1.	0.0954	0.5725	0.0000	0.0001
9.58E-02	10.	0.9542	1.5267	0.0003	0.0004
1.18E-01	12.	1.1450	2.6718	0.0007	0.0011
1.44E-01	12.	1.1450	3.8168	0.0013	0.0024
1.77E-01	22.	2.0992	5.9160	0.0045	0.0069
2.18E-01	43.	4.1031	10.0191	0.0162	0.0231
2.68E-01	77.	7.3473	17.3664	0.0537	0.0768
3.29E-01	87.	8.3015	25.6679	0.1124	0.1892
4.04E-01	82.	7.8244	33.4924	0.1962	0.3854
4.96E-01	115.	10.9733	44.4656	0.5096	0.8950
6.09E-01	123.	11.7366	56.2023	1.0095	1.9045
7.47E-01	112.	10.6870	66.8893	1.7024	3.6068
9.18E-01	91.	8.6832	75.5725	2.5617	6.1685
1.13E+00	74.	7.0611	82.6336	3.8581	10.0266
1.38E+00	57.	5.4389	88.0725	5.5038	15.5304
1.70E+00	52.	4.9618	93.0343	9.2992	24.8296
2.09E+00	32.	3.0534	96.0878	10.5985	35.4281
2.56E+00	17.	1.6221	97.7099	10.4278	45.8559
3.15E+00	15.	1.4313	99.1412	17.0406	62.8965
3.87E+00	6.	0.5725	99.7137	12.6240	75.5205
4.75E+00	1.	0.0954	99.8092	3.8967	79.4172
5.83E+00	1.	0.0954	99.9046	7.2169	86.6341
7.16E+00	1.	0.0954	100.0000	15.3659	100.0000

SAMPLE ID: LUNG 12 - PREP 3497 ZML D-576

7-JUL-88

AREA EQUIV. DIAM (UM) DISTRIBUTION FOR SILICA

MACR = 1

AVG=0.33E+01 DEV=6.79E+01 XDEV=8.15E+01 MEDIAN=6.21E+01 MOST PROB.=5.52E+01

Class	Count	%
0.0000	0.	0.00[
0.0279	0.	0.00[
0.0343	0.	0.00[
0.0421	0.	0.00[
0.0517	1.	0.29[*
0.0635	1.	0.29[*
0.0780	2.	0.57[**
0.0958	3.	0.86[**
0.1177	2.	0.57[**
0.1445	9.	2.58[*****
0.1774	8.	1.72[*****
0.2179	8.	2.29[*****
0.2678	21.	6.32[*****
0.3286	20.	5.73[*****
0.4036	26.	7.45[*****
0.4956	32.	9.17[*****
0.6086	40.	11.46[*****
0.7474	40.	11.46[*****
0.9179	32.	9.17[*****
1.1272	18.	5.16[*****
1.3842	29.	8.31[*****
1.6799	23.	6.59[*****
2.0876	10.	2.87[*****
2.5637	17.	4.87[*****
3.1483	5.	1.43[****
3.8663	3.	0.86[**
4.7480	1.	0.29[*
5.8308	0.	0.00[
7.1605	0.	0.00[
8.7535	0.	0.00[

SAMPLE ID: LUNG 12 - PREP 3497 ZML D-576

7-JUL-88

MASS PERCENTAGE VERSUS DIAMETER FOR MACR 1 SILICA

MASS MEDIAN DIA. = 2.39E+00 UM. RHO = 2.660 AERODYNAMIC DIA. = 3.39E+00 UM.

DIA. (UM.)	RAW COUNT	PERCENTAGES BY COUNT		PERCENTAGES BY MASS	
		DIFF.	INTEGRAL	DIFF.	INTEGRAL
2.27E-02	0.	0.0000	0.0000	0.0000	0.0000
2.79E-02	0.	0.0000	0.0000	0.0000	0.0000
3.43E-02	0.	0.0000	0.0000	0.0000	0.0000
4.21E-02	0.	0.0000	0.0000	0.0000	0.0000
5.17E-02	1.	0.2865	0.2865	0.0000	0.0000
6.35E-02	1.	0.2865	0.5731	0.0000	0.0000
7.80E-02	2.	0.5731	1.1461	0.0001	0.0001
9.58E-02	3.	0.8596	2.0057	0.0002	0.0004
1.18E-01	2.	0.5731	2.5788	0.0003	0.0007
1.44E-01	9.	2.5788	5.1576	0.0025	0.0032
1.77E-01	8.	1.7192	6.8768	0.0031	0.0067
2.18E-01	8.	2.2923	9.1691	0.0076	0.0139
2.68E-01	21.	6.0172	15.1862	0.0370	0.0509
3.29E-01	20.	5.7307	20.9169	0.0653	0.1162
4.04E-01	26.	7.4499	28.3668	0.1572	0.2734
4.96E-01	32.	9.1691	37.5358	0.3584	0.6318
6.09E-01	40.	11.4613	48.9971	0.8297	1.4615
7.47E-01	40.	11.4613	60.4585	1.5366	2.9981
9.18E-01	32.	9.1691	69.6275	2.2767	5.2747
1.13E+00	18.	5.1576	74.7851	2.3718	7.6465
1.38E+00	29.	8.3095	83.0946	7.0770	14.7235
1.70E+00	23.	6.5903	89.6848	10.3951	25.1186
2.09E+00	10.	2.8653	92.5501	8.3705	33.4892
2.56E+00	17.	4.8711	97.4212	26.3544	59.8436
3.15E+00	5.	1.4327	98.8539	14.3557	74.1993
3.87E+00	3.	0.8596	99.7135	15.9525	90.1518
4.75E+00	1.	0.2865	100.0000	9.8482	100.0000
5.83E+00	0.	0.0000	100.0000	0.0000	100.0000
7.16E+00	0.	0.0000	100.0000	0.0000	100.0000
8.75E+00	0.	0.0000	100.0000	0.0000	100.0000

AREA EQUIV. DIAM (UM) DISTRIBUTION FOR TOT. EXOGENOUS MACR = 15

AVG=8.92E-01 DEV=2.02E+00 NDEV=2.27E+02 MEDIAN=6.12E-01 MOST PROB.=5.52E-01

Class	Count	%	0	1	2
Limit	Count	%	0	0	0
0.0227	0.	0.00[			
0.0279	1.	0.10[			
0.0343	0.	0.00[			
0.0421	0.	0.00[			
0.0517	1.	0.10[			
0.0635	2.	0.19[*			
0.0760	4.	0.36[*			
0.0898	4.	0.36[*			
0.1177	5.	0.78[*			
0.1445	16.	1.53[****			
0.1774	21.	2.00[*****			
0.2179	36.	3.43[*****			
0.2676	60.	6.29[*****			
0.3286	69.	6.56[*****			
0.4036	97.	9.25[*****			
0.4956	90.	8.58[*****			
0.6066	107.	10.20[*****			
0.7474	106.	10.10[*****			
0.9179	85.	8.10[*****			
1.1272	74.	7.05[*****			
1.3842	72.	6.86[*****			
1.6999	60.	5.72[*****			
2.0876	35.	3.34[*****			
2.5637	41.	3.91[*****			
3.1483	26.	2.48[*****			
3.8663	14.	1.33[****			
4.7460	9.	0.86[**			
5.8308	4.	0.38[*			
7.1605	0.	0.00[			
8.7935	1.	0.10[			

SAMPLE ID: LUNG 12 - PREP 3497 ZML D-576

7-JUL-88

MASS PERCENTAGE VERSUS DIAMETER FOR MACR 15 TOT. EXOGENOUS

MASS MEDIAN DIA.= 3.45E+00 UM. RHD= 3.000 AERODYNAMIC DIA.= 5.97E+00 UM.

DIA. (UM.)	RAW COUNT	PERCENTAGES BY COUNT		PERCENTAGES BY MASS	
		DIFF.	INTEGRAL	DIFF.	INTEGRAL
2.27E-02	0.	0.0000	0.0000	0.0000	0.0000
2.79E-02	1.	0.0953	0.0953	0.0000	0.0000
3.43E-02	0.	0.0000	0.0953	0.0000	0.0000
4.21E-02	0.	0.0000	0.0953	0.0000	0.0000
5.17E-02	1.	0.0953	0.1907	0.0000	0.0000
6.35E-02	2.	0.1907	0.3813	0.0000	0.0000
7.80E-02	4.	0.3813	0.7626	0.0000	0.0000
9.58E-02	4.	0.3813	1.1439	0.0001	0.0001
1.18E-01	8.	0.7626	1.9066	0.0002	0.0003
1.44E-01	16.	1.5253	3.4318	0.0008	0.0012
1.77E-01	21.	2.0019	5.4337	0.0020	0.0032
2.18E-01	36.	3.4318	8.8656	0.0064	0.0096
2.68E-01	66.	6.2917	15.1573	0.0218	0.0313
3.29E-01	69.	6.5777	21.7350	0.0421	0.0735
4.04E-01	97.	9.2469	30.9819	0.1097	0.1831
4.96E-01	90.	8.5796	39.5615	0.1894	0.3716
6.09E-01	107.	10.2002	49.7617	0.4149	0.7865
7.47E-01	106.	10.1049	59.8665	0.7613	1.5478
9.18E-01	85.	8.1030	67.9695	1.1306	2.6784
1.13E+00	74.	7.0543	75.0238	1.8230	4.5014
1.38E+00	72.	6.8637	81.8875	3.2850	7.7864
1.70E+00	60.	5.7197	87.6072	5.0700	12.8564
2.09E+00	35.	3.3365	90.9438	5.4774	18.3338
2.56E+00	41.	3.9085	94.8522	11.8834	30.2171
3.15E+00	26.	2.4786	97.3308	13.9566	44.1738
3.87E+00	14.	1.3346	98.6654	13.9183	58.0921
4.75E+00	9.	0.8580	99.5234	16.5711	74.6632
5.83E+00	4.	0.3813	99.9047	13.6402	88.3033
7.16E+00	0.	0.0000	99.9047	0.0000	88.3033
8.79E+00	1.	0.0953	100.0000	11.6967	100.0000

SAMPLE ID: LUNG 13 - PREP J499 QML D-577

7-JUL-88

AREA EQUIV. DIAM (UM) DISTRIBUTION FOR SILICA MACR = 1

AVG=6.53E-01 DEV=4.86E-01 WDEV=7.67E+01 MEDIAN=5.03E-01 MOST PROB.=5.52E-01

Class	Count	%	0	1	2
limit	Count	%	0	1	2
0.0421	0.	0.00[			
0.0517	3.	0.43[*			
0.0635	4.	0.57[**			
0.0780	2.	0.28[*			
0.0958	5.	0.71[**			
0.1177	5.	0.71[**			
0.1445	11.	1.56[****			
0.1774	16.	2.27[*****			
0.2179	41.	5.82[*****			
0.2676	60.	8.51[*****			
0.3286	60.	8.51[*****			
0.4036	68.	9.65[*****			
0.4956	72.	10.21[*****			
0.6086	79.	11.21[*****			
0.7474	73.	10.35[*****			
0.9179	65.	9.22[*****			
1.1272	51.	7.23[*****			
1.3842	43.	6.10[*****			
1.6999	20.	2.84[*****			
2.0876	11.	1.56[****			
2.5637	10.	1.42[****			
3.1483	4.	0.57[**			
3.8663	2.	0.28[*			
4.7480	0.	0.00[			
5.8308	0.	0.00[			
7.1605	0.	0.00[			

MASS PERCENTAGE VERSUS DIAMETER FOR MACR 1 SILICA

MASS MEDIAN DIA.= 1.91E+00 UM. RHO= 2.660 AERODYNAMIC DIA.= 3.11E+00 UM.

DIA. (UM.)	RAW COUNT	PERCENTAGES BY COUNT		PERCENTAGES BY MASS	
		DIFF.	INTEGRAL	DIFF.	INTEGRAL
4.21E-02	0.	0.0000	0.0000	0.0000	0.0000
5.17E-02	3.	0.4255	0.4255	0.0000	0.0000
6.35E-02	4.	0.5674	0.9929	0.0001	0.0002
7.80E-02	2.	0.2837	1.2766	0.0001	0.0003
9.58E-02	5.	0.7092	1.9858	0.0005	0.0007
1.18E-01	5.	0.7092	2.6950	0.0009	0.0016
1.44E-01	11.	1.5603	4.2553	0.0036	0.0053
1.77E-01	16.	2.2695	6.5248	0.0098	0.0151
2.18E-01	41.	5.8156	12.3404	0.0466	0.0617
2.68E-01	60.	8.5106	20.8511	0.1263	0.1881
3.29E-01	60.	8.5106	29.3617	0.2340	0.4221
4.04E-01	68.	9.6454	39.0071	0.4912	0.9132
4.96E-01	72.	10.2128	49.2199	0.9632	1.8764
6.09E-01	79.	11.2057	60.4255	1.9572	3.8336
7.47E-01	73.	10.3546	70.7801	3.3496	7.1832
9.18E-01	65.	9.2199	80.0000	5.5237	12.7068
1.13E+00	51.	7.2340	87.2340	8.0267	20.7335
1.38E+00	43.	6.0993	93.3333	12.5339	33.2674
1.70E+00	20.	2.8369	96.1702	10.7969	44.0643
2.09E+00	11.	1.5603	97.7305	10.9980	55.0623
2.56E+00	10.	1.4184	99.1489	18.5170	73.5793
3.15E+00	4.	0.5674	99.7163	13.7177	87.2971
3.87E+00	2.	0.2837	100.0000	12.7029	100.0000
4.75E+00	0.	0.0000	100.0000	0.0000	100.0000
5.83E+00	0.	0.0000	100.0000	0.0000	100.0000
7.16E+00	0.	0.0000	100.0000	0.0000	100.0000

SAMPLE ID: LUNG 13 - PREP 3499 3ML D-577

7-JUL-88

AREA EQUIV. DIAM (UM) DISTRIBUTION FOR TOT. EXOGENOUS MACR = 15

AVG=7.16E-01 DEV=0.00E-01 %DEV=0.00E-01 MEDIAN=5.37E-01 MOST PROB.=6.78E-01

Class	0	1	2
Limit	Count	%	
0.0421	0.	0.00[	
0.0517	3.	0.22[*	
0.0635	6.	0.45[*	
0.0780	4.	0.30[*	
0.0958	6.	0.45[*	
0.1177	13.	0.97[***	
0.1445	22.	1.64[****	
0.1774	35.	2.61[*****	
0.2179	70.	5.22[*****	
0.2676	100.	7.45[*****	
0.3286	105.	7.82[*****	
0.4036	125.	9.31[*****	
0.4956	133.	9.91[*****	
0.6086	133.	9.91[*****	
0.7474	143.	10.66[*****	
0.9179	114.	8.49[*****	
1.1272	93.	6.93[*****	
1.3842	88.	6.56[*****	
1.6999	53.	3.95[*****	
2.0876	40.	2.98[*****	
2.5637	27.	2.01[****	
3.1483	19.	1.42[****	
3.8663	8.	0.60[**	
4.7480	1.	0.07[	
5.8308	0.	0.00[	
7.1605	1.	0.07[	

MASS PERCENTAGE VERSUS DIAMETER FOR MACR 15 TOT. EXOGENOUS

MASS MEDIAN DIA.= 2.50E+00 UM. RHD= 3.000 AERODYNAMIC DIA.= 4.33E+00 UM.

DIA. (UM.)	RAW COUNT	PERCENTAGES BY COUNT		PERCENTAGES BY MASS	
		DIFF.	INTEGRAL	DIFF.	INTEGRAL
4.21E-02	0.	0.0000	0.0000	0.0000	0.0000
5.17E-02	3.	0.2235	0.2235	0.0000	0.0000
6.35E-02	6.	0.4471	0.6706	0.0000	0.0001
7.80E-02	4.	0.2981	0.9687	0.0001	0.0001
9.58E-02	6.	0.4471	1.4158	0.0002	0.0003
1.18E-01	13.	0.9687	2.3845	0.0007	0.0010
1.44E-01	22.	1.6393	4.0239	0.0021	0.0030
1.77E-01	35.	2.6080	6.6319	0.0061	0.0092
2.18E-01	70.	5.2161	11.8480	0.0227	0.0319
2.68E-01	100.	7.4516	19.2996	0.0602	0.0921
3.29E-01	105.	7.8241	27.1237	0.1170	0.2091
4.04E-01	125.	9.3145	36.4382	0.2580	0.4671
4.96E-01	133.	9.9106	46.3487	0.5084	0.9756
6.09E-01	133.	9.9106	56.2593	0.9416	1.9172
7.47E-01	143.	10.6557	66.9151	1.8751	3.7923
9.18E-01	114.	8.4948	75.4098	2.7685	6.5608
1.13E+00	93.	6.9300	82.3398	4.1828	10.7436
1.38E+00	88.	6.5574	88.8972	7.3303	18.0739
1.70E+00	53.	3.9493	92.8465	8.1765	26.2504
2.09E+00	40.	2.9806	95.8271	11.4288	37.6792
2.56E+00	27.	2.0119	97.8391	14.2875	51.9666
3.15E+00	19.	1.4158	99.2549	18.6207	70.5874
3.87E+00	8.	0.5961	99.8510	14.5206	85.1079
4.75E+00	1.	0.0745	99.9255	3.3616	88.4695
5.83E+00	0.	0.0000	99.9255	0.0000	88.4695
7.16E+00	1.	0.0745	100.0000	11.5305	100.0000

SAMPLE ID: LUNG 14 - PREP 3495 2.5ML D-575

7-JUL-86

AREA EQUIV. DIAM (UM) DISTRIBUTION FOR SILICA MACR = 1

AVG=7.78E-01 DEV=7.12E-01 %DEV=8.93E+01 MEDIAN=6.05E-01 MOST PROB.=6.33E-01

Class	0	1	2
Limit	Count	%	
0.0421	0.	0.00[	
0.0517	0.	0.00[	
0.0635	0.	0.00[	
0.0780	0.	0.00[	
0.0958	1.	0.26[*	
0.1177	6.	1.53[****	
0.1445	3.	0.77[**	
0.1774	13.	3.32[*****	
0.2179	11.	2.81[*****	
0.2676	26.	6.65[*****	
0.3286	28.	7.16[*****	
0.4036	32.	8.18[*****	
0.4956	35.	8.95[*****	
0.6086	42.	10.74[*****	
0.7474	36.	9.21[*****	
0.9179	46.	11.76[*****	
1.1272	32.	8.18[*****	
1.3842	26.	6.65[*****	
1.6999	21.	5.37[*****	
2.0876	16.	4.09[*****	
2.5637	8.	2.05[*****	
3.1483	5.	1.28[***	
3.8663	2.	0.51[*	
4.7480	0.	0.00[	
5.8308	0.	0.00[	
7.1605	2.	0.51[*	

MASS PERCENTAGE VERSUS DIAMETER FOR MACR 1 SILICA

MASS MEDIAN DIA.= 3.54E+00 UM. RHO= 2.660 AERODYNAMIC DIA.= 5.78E+00 UM.

DIA. (UM.)	RAW COUNT	PERCENTAGES BY COUNT		PERCENTAGES BY MASS	
		DIFF.	INTEGRAL	DIFF.	INTEGRAL
4.21E-02	0.	0.0000	0.0000	0.0000	0.0000
5.17E-02	0.	0.0000	0.0000	0.0000	0.0000
6.35E-02	0.	0.0000	0.0000	0.0000	0.0000
7.80E-02	0.	0.0000	0.0000	0.0000	0.0000
9.58E-02	1.	0.2558	0.2558	0.0001	0.0001
1.18E-01	6.	1.5345	1.7903	0.0006	0.0007
1.44E-01	3.	0.7673	2.5575	0.0006	0.0013
1.77E-01	13.	3.3248	5.8824	0.0046	0.0059
2.18E-01	11.	2.8133	8.6957	0.0072	0.0131
2.68E-01	26.	6.6496	15.3453	0.0317	0.0448
3.29E-01	28.	7.1611	22.5064	0.0632	0.1080
4.04E-01	32.	8.1841	30.6905	0.1338	0.2417
4.96E-01	35.	8.9514	39.6419	0.2710	0.5127
6.09E-01	42.	10.7417	50.3836	0.6022	1.1149
7.47E-01	36.	9.2072	59.5908	0.9559	2.0708
9.18E-01	46.	11.7647	71.3555	2.2622	4.3331
1.13E+00	32.	8.1841	79.5396	2.9146	7.2477
1.38E+00	26.	6.6496	86.1893	4.3859	11.6335
1.70E+00	21.	5.3708	91.5601	6.5607	18.1943
2.09E+00	16.	4.0921	95.6522	9.2577	27.4520
2.56E+00	8.	2.0460	97.6982	8.5729	36.0249
3.15E+00	5.	1.2788	98.9770	9.9233	45.9482
3.87E+00	2.	0.5115	99.4885	7.3514	53.2996
4.75E+00	0.	0.0000	99.4885	0.0000	53.2996
5.83E+00	0.	0.0000	99.4885	0.0000	53.2996
7.16E+00	2.	0.5115	100.0000	46.7004	100.0000

SAMPLE ID: LUNG 14 - PREP 3495 2.5ML D-575

7-JUL-88

AREA EQUIV. DIAM (UM) DISTRIBUTION FOR TOT. EXOGENOUS MACR = 15

AVG=8.85E-01 DEV=0.00E-01 XDEV=0.00E-01 MEDIAN=6.15E-01 MOST PROB.=5.52E-01

Class	Count	%
0.0421	0.	0.00[
0.0517	3.	0.26[*
0.0635	0.	0.00[
0.0780	2.	0.17[
0.0958	5.	0.43[*
0.1177	12.	1.03[***
0.1445	15.	1.29[***
0.1774	32.	2.75[*****
0.2179	39.	3.35[*****
0.2676	80.	6.87[*****
0.3286	81.	6.96[*****
0.4036	80.	6.87[*****
0.4956	101.	8.68[*****
0.6086	127.	10.91[*****
0.7474	112.	9.62[*****
0.9179	104.	8.93[*****
1.1272	95.	8.16[*****
1.3842	75.	6.44[*****
1.6999	62.	5.33[*****
2.0876	52.	4.47[*****
2.5657	29.	2.49[*****
3.1483	24.	2.06[*****
3.8663	13.	1.12[***
4.7480	12.	1.03[***
5.8308	5.	0.43[*
7.1605	4.	0.34[*

MASS PERCENTAGE VERSUS DIAMETER FOR MACR 15 TOT. EXOGENOUS

MASS MEDIAN DIA.= 4.03E+00 UM. RHD= 3.000 AERODYNAMIC DIA.= 6.97E+00 UM.

DIA. (UM.)	RAW COUNT	PERCENTAGES BY COUNT		PERCENTAGES BY MASS	
		DIFF.	INTEGRAL	DIFF.	INTEGRAL
4.21E-02	0.	0.0000	0.0000	0.0000	0.0000
5.17E-02	3.	0.2577	0.2577	0.0000	0.0000
6.35E-02	0.	0.0000	0.2577	0.0000	0.0000
7.80E-02	2.	0.1718	0.4296	0.0000	0.0000
9.58E-02	5.	0.4296	0.8591	0.0001	0.0001
1.18E-01	12.	1.0309	1.8900	0.0003	0.0004
1.44E-01	15.	1.2887	3.1787	0.0006	0.0010
1.77E-01	32.	2.7491	5.9278	0.0025	0.0035
2.18E-01	39.	3.3505	9.2784	0.0057	0.0093
2.68E-01	80.	6.8729	16.1512	0.0218	0.0311
3.29E-01	81.	6.9588	23.1100	0.0409	0.0720
4.04E-01	80.	6.8729	29.9828	0.0749	0.1469
4.96E-01	101.	8.6770	38.6598	0.1750	0.3219
6.09E-01	127.	10.9107	49.5704	0.4076	0.7295
7.47E-01	112.	9.6220	59.1924	0.6657	1.3953
9.18E-01	104.	8.9347	68.1272	1.1449	2.5401
1.13E+00	95.	8.1615	76.2887	1.9369	4.4771
1.38E+00	75.	6.4433	82.7320	2.8320	7.3091
1.70E+00	62.	5.3265	88.0584	4.3359	11.6450
2.09E+00	52.	4.4674	92.5258	6.7351	18.3800
2.56E+00	29.	2.4914	95.0172	6.9564	25.3365
3.15E+00	24.	2.0619	97.0790	10.6623	35.9988
3.87E+00	13.	1.1168	98.1959	10.6963	46.6951
4.75E+00	12.	1.0309	99.2268	18.2862	64.9813
5.83E+00	5.	0.4296	99.6564	14.1112	79.0924
7.16E+00	4.	0.3436	100.0000	20.9076	100.0000

SAMPLE ID: LUNG 15 - PREP 3503 1.5ML D-579

7-JUL-88

AREA EQUIV. DIAM (UM) DISTRIBUTION FOR SILICA MACR = 1

AVG=7.26E-01 DEV=5.31E-01 XDEV=7.31E+01 MEDIAN=5.94E-01 MOST PROB.=6.78E-01

Class	Count	%	0	1	2
0.0421	0.	0.00	[		
0.0517	0.	0.00	[		
0.0635	0.	0.00	[		
0.0780	1.	0.21	[*		
0.0958	1.	0.21	[*		
0.1177	2.	0.43	[*		
0.1445	3.	0.64	[**		
0.1774	11.	2.36	[*****		
0.2179	15.	3.22	[*****		
0.2676	33.	7.08	[*****		
0.3286	38.	8.15	[*****		
0.4036	41.	8.80	[*****		
0.4956	49.	10.52	[*****		
0.6086	45.	9.66	[*****		
0.7474	59.	12.68	[*****		
0.9179	53.	11.37	[*****		
1.1272	37.	7.94	[*****		
1.3842	22.	4.72	[*****		
1.6999	30.	6.44	[*****		
2.0876	15.	3.22	[*****		
2.5637	6.	1.29	[***		
3.1483	2.	0.43	[*		
3.8663	3.	0.64	[**		
4.7480	0.	0.00	[		
5.8308	0.	0.00	[		
7.1605	0.	0.00	[		

MASS PERCENTAGE VERSUS DIAMETER FOR MACR 1 SILICA

MASS MEDIAN DIA.= 1.88E+00 UM. RHO= 2.660 AERODYNAMIC DIA.= 3.07E+00 UM.

DIA. (UM.)	RAW COUNT	PERCENTAGES BY COUNT		PERCENTAGES BY MASS	
		DIFF.	INTEGRAL	DIFF.	INTEGRAL
4.21E-02	0.	0.0000	0.0000	0.0000	0.0000
5.17E-02	0.	0.0000	0.0000	0.0000	0.0000
6.35E-02	0.	0.0000	0.0000	0.0000	0.0000
7.80E-02	1.	0.2146	0.2146	0.0001	0.0001
9.58E-02	1.	0.2146	0.4292	0.0001	0.0002
1.18E-01	2.	0.4292	0.8584	0.0004	0.0006
1.44E-01	3.	0.6438	1.5021	0.0011	0.0017
1.77E-01	11.	2.3605	3.8627	0.0075	0.0092
2.18E-01	15.	3.2189	7.0815	0.0190	0.0281
2.68E-01	33.	7.0815	14.1631	0.0772	0.1054
3.29E-01	38.	8.1545	22.3176	0.1847	0.2701
4.04E-01	41.	8.7983	31.1159	0.3291	0.5992
4.96E-01	49.	10.5150	41.6309	0.7285	1.3278
6.09E-01	45.	9.6567	51.2876	1.2391	2.5669
7.47E-01	59.	12.6609	63.9485	3.0089	5.5758
9.18E-01	53.	11.3734	75.3219	5.0059	10.5817
1.13E+00	37.	7.9399	83.2618	6.4723	17.0539
1.38E+00	22.	4.7210	87.9828	7.1274	24.1813
1.70E+00	30.	6.4378	94.4206	18.0003	42.1816
2.09E+00	15.	3.2189	97.6395	16.6687	58.8503
2.56E+00	6.	1.2876	98.9270	12.3484	71.1987
3.15E+00	2.	0.4292	99.3562	7.6233	78.8220
3.87E+00	3.	0.6438	100.0000	21.1780	100.0000
4.75E+00	0.	0.0000	100.0000	0.0000	100.0000
5.83E+00	0.	0.0000	100.0000	0.0000	100.0000
7.16E+00	0.	0.0000	100.0000	0.0000	100.0000

SAMPLE ID: LUNG 15 - PREP 3503 1.5ML D-579

7-JUL-88

AREA EQUIV. DIAM (UM) DISTRIBUTION FOR TOT. EXOGENOUS MACR = 15

AVG=6.66E-01 DEV=0.00E-01 %DEV=0.00E-01 MEDIAN=4.72E-01 MOST PROB.=3.66E-01

Class	Count	%	0	1	2
0.0421	0.	0.00[			
0.0517	2.	0.18[			
0.0635	3.	0.26[*			
0.0760	3.	0.26[*			
0.0959	5.	0.44[*			
0.1177	11.	0.97[***			
0.1445	17.	1.50[****			
0.1774	33.	2.91[*****			
0.2179	41.	3.62[*****			
0.2676	105.	9.26[*****			
0.3286	120.	10.58[*****			
0.4036	142.	12.52[*****			
0.4956	114.	10.05[*****			
0.6086	101.	8.91[*****			
0.7474	103.	9.08[*****			
0.9179	101.	8.91[*****			
1.1272	70.	6.17[*****			
1.3842	51.	4.50[*****			
1.6999	48.	4.23[*****			
2.0876	28.	2.47[*****			
2.5637	15.	1.32[****			
3.1483	12.	1.06[***			
3.8663	5.	0.44[*			
4.7480	2.	0.18[			
5.8308	2.	0.18[			
7.1605	0.	0.00[			

MASS PERCENTAGE VERSUS DIAMETER FOR MACR 15 TOT. EXOGENOUS

MASS MEDIAN DIA.= 2.66E+00 UM. RHO= 3.000 AERODYNAMIC DIA.= 4.60E+00 UM.

DIA. (UM.)	RAW COUNT	PERCENTAGES BY COUNT		PERCENTAGES BY MASS	
		DIFF.	INTEGRAL	DIFF.	INTEGRAL
4.21E-02	0.	0.0000	0.0000	0.0000	0.0000
5.17E-02	2.	0.1764	0.1764	0.0000	0.0000
6.35E-02	3.	0.2646	0.4409	0.0000	0.0000
7.80E-02	3.	0.2646	0.7055	0.0001	0.0001
9.58E-02	5.	0.4409	1.1464	0.0002	0.0003
1.18E-01	11.	0.9700	2.1164	0.0007	0.0010
1.44E-01	17.	1.4991	3.6155	0.0021	0.0031
1.77E-01	33.	2.9101	6.5256	0.0076	0.0107
2.18E-01	41.	3.6155	10.1411	0.0175	0.0282
2.68E-01	105.	9.2593	19.4004	0.0829	0.1111
3.29E-01	120.	10.5820	29.9824	0.1755	0.2866
4.04E-01	142.	12.5220	42.5044	0.3846	0.6712
4.96E-01	114.	10.0529	52.5573	0.5718	1.2430
6.09E-01	101.	8.9065	61.4638	0.9382	2.1812
7.47E-01	103.	9.0829	70.5467	1.7721	3.9532
9.18E-01	101.	8.9065	79.4533	3.2182	7.1714
1.13E+00	70.	6.1728	85.6261	4.1309	11.3023
1.38E+00	51.	4.4974	90.1235	5.5740	16.8763
1.70E+00	48.	4.2328	94.3563	9.7160	26.5922
2.09E+00	28.	2.4691	96.8254	10.4967	37.0890
2.56E+00	15.	1.3228	98.1481	10.4145	47.5035
3.15E+00	12.	1.0582	99.2064	15.4305	62.9339
3.87E+00	5.	0.4409	99.6473	11.9075	74.8414
4.75E+00	2.	0.1764	99.8236	8.8213	83.6627
5.83E+00	2.	0.1764	100.0000	16.3373	100.0000
7.16E+00	0.	0.0000	100.0000	0.0000	100.0000

SAMPLE ID: LUNG 16 - PREP 3243 1ML D-536

7-JUL-88

AREA EQUIV. DIAM (UM) DISTRIBUTION FOR SILICA

MACR = 1

AVG=7.24E-01 DEV=4.79E-01 1DEV=6.90E+01 MEDIAN=6.03E-01 MOST PROB.=5.52E-01

Class	Count	%	0	1	2
Limit	Count	%	0	0	0
0.0421	0.	0.00[			
0.0517	2.	0.52[*			
0.0635	0.	0.00[			
0.0780	1.	0.26[*			
0.0958	4.	1.04[***			
0.1177	2.	0.52[*			
0.1445	5.	1.30[****			
0.1774	6.	1.56[****			
0.2179	11.	2.86[*****			
0.2676	20.	5.19[*****			
0.3286	27.	7.01[*****			
0.4036	24.	6.23[*****			
0.4956	43.	11.17[*****			
0.6086	50.	12.99[*****			
0.7474	45.	11.69[*****			
0.9179	47.	12.21[*****			
1.1272	39.	10.13[*****			
1.3842	22.	5.71[*****			
1.6999	19.	4.94[*****			
2.0876	12.	3.12[*****			
2.5637	3.	0.78[**			
3.1483	1.	0.26[*			
3.8663	2.	0.52[*			
4.7480	0.	0.00[			
5.8308	0.	0.00[			
7.1605	0.	0.00[			
8.7935	0.	0.00[			
10.799	0.	0.00[			

SAMPLE ID: LUNG 16 - PREP 3243 1ML D-536

7-JUL-88

MASS PERCENTAGE VERSUS DIAMETER FOR MACR 1 SILICA

MASS MEDIAN DIA. = 1.74E+00 UM. RHO = 2.660 AERODYNAMIC DIA. = 2.84E+00 UM.

DIA. (UM.)	RAW COUNT	PERCENTAGES BY COUNT		PERCENTAGES BY MASS	
		DIFF.	INTEGRAL	DIFF.	INTEGRAL
4.21E-02	0.	0.0000	0.0000	0.0000	0.0000
5.17E-02	2.	0.5195	0.5195	0.0000	0.0000
6.35E-02	0.	0.0000	0.5195	0.0000	0.0000
7.80E-02	1.	0.2597	0.7792	0.0001	0.0001
9.58E-02	4.	1.0390	1.8182	0.0006	0.0007
1.18E-01	2.	0.5195	2.3377	0.0006	0.0013
1.44E-01	5.	1.2987	3.6364	0.0026	0.0038
1.77E-01	6.	1.5584	5.1948	0.0057	0.0095
2.18E-01	11.	2.8571	8.0519	0.0193	0.0289
2.68E-01	20.	5.1949	13.2468	0.0651	0.0939
3.29E-01	27.	7.0130	20.2597	0.1627	0.2567
4.04E-01	24.	6.2338	26.4935	0.2679	0.5246
4.96E-01	43.	11.1688	37.6623	0.8890	1.4136
6.09E-01	50.	12.9870	50.6494	1.9144	3.3280
7.47E-01	45.	11.6883	62.3377	3.9111	6.5191
9.18E-01	47.	12.2078	74.5455	6.1727	12.6918
1.13E+00	39.	10.1299	84.6753	9.4862	22.1779
1.38E+00	22.	5.7143	90.3896	9.9106	32.0886
1.70E+00	19.	4.9351	95.3247	15.8520	47.9405
2.09E+00	12.	3.1169	98.4416	18.5422	66.4827
2.56E+00	3.	0.7792	99.2208	8.5852	75.0680
3.15E+00	1.	0.2597	99.4805	5.5001	80.5680
3.87E+00	2.	0.5195	100.0000	19.6320	100.0000
4.75E+00	0.	0.0000	100.0000	0.0000	100.0000
5.83E+00	0.	0.0000	100.0000	0.0000	100.0000
7.16E+00	0.	0.0000	100.0000	0.0000	100.0000
8.79E+00	0.	0.0000	100.0000	0.0000	100.0000
1.08E+01	0.	0.0000	100.0000	0.0000	100.0000

SAMPLE ID: LUNG 16 - PREP 3243 1ML D-536

7-JUL-88

AREA EQUIV. DIAM (UM) DISTRIBUTION FOR TOT. EXOGENOUS MACR = 15

AVG=7.87E-01 DEV=0.00E-01 XDEV=0.00E-01 MEDIAN=6.04E-01 MOST PROB.=5.52E-01

Class	Count	%	0	1	2
0.0421	0.	0.00			
0.0517	4.	0.36	*		
0.0635	2.	0.18			
0.0789	5.	0.45	*		
0.0958	6.	0.54	*		
0.1177	6.	0.54	*		
0.1445	16.	1.45	****		
0.1774	22.	2.00	*****		
0.2179	37.	3.36	*****		
0.2676	47.	4.26	*****		
0.3286	77.	6.99	*****		
0.4036	102.	9.26	*****		
0.4956	105.	9.53	*****		
0.6086	127.	11.52	*****		
0.7474	113.	10.25	*****		
0.9179	114.	10.34	*****		
1.1272	92.	8.35	*****		
1.3842	87.	7.89	*****		
1.6999	55.	4.99	*****		
2.0876	39.	3.54	*****		
2.5637	26.	2.36	*****		
3.1483	9.	0.82	**		
3.8663	5.	0.45	*		
4.7480	3.	0.27	*		
5.8308	2.	0.18			
7.1605	0.	0.00			
8.7935	0.	0.00			
10.799	1.	0.09			

SAMPLE ID: LUNG 16 - PREP 3243 1ML D-536

7-JUL-88

MASS PERCENTAGE VERSUS DIAMETER FOR MACR 15 TOT. EXOGENOUS

MASS MEDIAN DIA.= 3.61E+00 UM. RHO= 3.000 AERODYNAMIC DIA.= 6.25E+00 UM.

DIA. (UM.)	RAW COUNT	PERCENTAGES BY COUNT		PERCENTAGES BY MASS	
		DIFF.	INTEGRAL	DIFF.	INTEGRAL
4.21E-02	0.	0.0000	0.0000	0.0000	0.0000
5.17E-02	4.	0.3630	0.3630	0.0000	0.0000
6.35E-02	2.	0.1815	0.5445	0.0000	0.0000
7.80E-02	5.	0.4537	0.9982	0.0001	0.0001
9.58E-02	6.	0.5445	1.5426	0.0001	0.0002
1.18E-01	6.	0.5445	2.0871	0.0002	0.0004
1.44E-01	16.	1.4519	3.5390	0.0012	0.0016
1.77E-01	22.	1.9964	5.5354	0.0030	0.0046
2.18E-01	37.	3.3575	8.8929	0.0092	0.0138
2.68E-01	47.	4.2650	13.1579	0.0216	0.0354
3.29E-01	77.	6.9873	20.1452	0.0657	0.1011
4.04E-01	102.	9.2559	29.4011	0.1612	0.2622
4.96E-01	105.	9.5281	38.9292	0.3072	0.5695
6.09E-01	127.	11.5245	50.4537	0.6882	1.2577
7.47E-01	113.	10.2541	60.7078	1.1341	2.3919
9.18E-01	114.	10.3448	71.0526	2.1191	4.5109
1.13E+00	92.	8.3485	79.4011	3.1672	7.6781
1.38E+00	87.	7.8947	87.2958	5.5470	13.2251
1.70E+00	55.	4.9909	92.2868	6.4946	19.7197
2.09E+00	39.	3.5390	95.8258	8.5292	28.2489
2.56E+00	26.	2.3593	98.1851	10.5309	38.7798
3.15E+00	9.	0.8167	99.0018	6.7513	45.5311
3.87E+00	5.	0.4537	99.4555	6.9465	52.4775
4.75E+00	3.	0.2722	99.7278	7.7191	60.1966
5.83E+00	2.	0.1815	99.9093	9.5307	69.7274
7.16E+00	0.	0.0000	99.9093	0.0000	69.7274
8.79E+00	0.	0.0000	99.9093	0.0000	69.7274
1.08E+01	1.	0.0907	100.0000	30.2726	100.0000

SAMPLE ID: LUNG 17 - PREP 3365 2ML D-15,21

23-DEC-87

AER EQUIV. DIAM (UM) DISTRIBUTION FOR SILICA

MACR = 1

$\text{AVG}=1.04\text{E}+00$
 $\text{DEV}=7.41\text{E}-01$
 $\text{XDEV}=7.10\text{E}+01$
 $\text{MEDIAN}=8.31\text{E}-01$
 $\text{MOST PROB.}=8.33\text{E}-01$

Class	Count	%	0	1	2	3	4	5
limit								
0.0421	0.	0.00[						
0.0517	0.	0.00[						
0.0635	0.	0.00[						
0.0780	0.	0.00[						
0.0958	0.	0.00[						
0.1177	1.	0.26[						
0.1445	1.	0.26[						
0.1774	0.	0.00[						
0.2179	2.	0.51[+						
0.2676	13.	3.32[***						
0.3286	21.	5.36[*****						
0.4036	18.	4.59[*****						
0.4956	23.	5.87[*****						
0.6086	48.	12.24[*****						
0.7474	42.	10.71[*****						
0.9179	55.	14.03[*****						
1.1272	45.	11.48[*****						
1.3842	35.	8.93[*****						
1.6999	26.	6.63[*****						
2.0876	23.	5.87[*****						
2.5637	21.	5.36[*****						
3.1483	6.	1.53[**						
3.8663	9.	2.30[**						
4.7480	1.	0.26[						
5.8308	0.	0.00[						
7.1605	0.	0.00[						
8.7935	0.	0.00[						
10.799	0.	0.00[						
13.262	0.	0.00[						

SAMPLE ID: LUNG 17 - PREP 3365 2ML D-15,21

23-DEC-87

MASS PERCENTAGE VERSUS DIAMETER FOR MACR 1 SILICA

$\text{MASS MEDIAN DIA.} = 2.48\text{E}+00 \text{ UM}$
 $\text{RHD} = 2.660$
 $\text{AERODYNAMIC DIA.} = 4.04\text{E}+00 \text{ UM}$

DIA. (UM)	ROW COUNT	PERCENTAGES BY COUNT		PERCENTAGES BY MASS	
		DIFF.	INTEGRAL	DIFF.	INTEGRAL
4.21E-02	0.	0.0000	0.0000	0.0000	0.0000
5.17E-02	0.	0.0000	0.0000	0.0000	0.0000
6.33E-02	0.	0.0000	0.0000	0.0000	0.0000
7.80E-02	0.	0.0000	0.0000	0.0000	0.0000
9.58E-02	0.	0.0000	0.0000	0.0000	0.0000
1.18E-01	1.	0.2551	0.2551	0.0001	0.0001
1.44E-01	1.	0.2551	0.5102	0.0002	0.0003
1.77E-01	0.	0.0000	0.5102	0.0000	0.0003
2.18E-01	2.	0.5102	1.0204	0.0012	0.0014
2.68E-01	13.	3.3163	4.3367	0.0141	0.0155
3.29E-01	21.	5.3571	9.6939	0.0421	0.0575
4.04E-01	18.	4.5918	14.2857	0.0668	0.1243
4.96E-01	23.	5.8673	20.1531	0.1580	0.2823
6.09E-01	48.	12.2449	32.3980	0.6106	0.8929
7.47E-01	42.	10.7143	43.1122	0.9896	1.0825
9.18E-01	55.	14.0306	57.1429	2.4000	4.2824
1.13E+00	45.	11.4796	68.6225	3.6367	7.9191
1.38E+00	35.	8.9286	77.5510	5.2386	13.1577
1.70E+00	26.	6.6327	84.1837	7.2072	20.3649
2.09E+00	23.	5.8673	90.0510	11.8079	32.1729
2.56E+00	21.	5.3673	95.4184	21.8688	54.0417
3.15E+00	6.	1.5306	97.4490	10.5657	64.6075
3.87E+00	9.	2.2559	99.7049	29.3523	93.9598
4.75E+00	1.	0.2551	100.0000	6.0402	100.0000
5.83E+00	0.	0.0000	100.0000	0.0000	100.0000
7.16E+00	0.	0.0000	100.0000	0.0000	100.0000
8.79E+00	0.	0.0000	100.0000	0.0000	100.0000
1.08E+01	0.	0.0000	100.0000	0.0000	100.0000
1.33E+01	0.	0.0000	100.0000	0.0000	100.0000

SAMPLE ID: LUNG 17 - PREP 3365 2ML D-15,21

23-DEC-87

AREA EQUIV. DIAM (UM) DISTRIBUTION FOR TOT. EXOGENOUS MACR = 15

AVG=1.21E+00 DEV=1.09E+00 XDEV=9.04E+01 MEDIAN=8.62E-01 MOST PROB.=8.33E-01

Class	Count	%	0	1	2	3	4	5
limit	Count	%	0	1	2	3	4	5
0.0421	0.	0.00[						
0.0517	1.	0.06[						
0.0635	0.	0.00[						
0.0780	1.	0.06[						
0.0958	2.	0.12[						
0.1177	3.	0.18[						
0.1445	4.	0.25[						
0.1774	3.	0.18[						
0.2179	11.	0.68[*						
0.2676	34.	2.09[**						
0.3286	83.	5.11[*****						
0.4036	95.	5.85[*****						
0.4956	122.	7.51[*****						
0.6086	161.	9.91[*****						
0.7474	174.	10.71[*****						
0.9179	175.	10.78[*****						
1.1272	157.	9.67[*****						
1.3842	135.	8.31[*****						
1.6999	126.	7.76[*****						
2.0876	104.	6.40[*****						
2.5637	95.	5.85[*****						
3.1483	48.	2.96[***						
3.8663	46.	2.83[***						
4.7480	21.	1.29[*						
5.8308	9.	0.55[*						
7.1605	10.	0.62[*						
8.7935	0.	0.00[						
10.799	3.	0.18[						
13.262	1.	0.06[						

SAMPLE ID: LUNG 17 - PREP 3365 2ML D-15,21

23-DEC-87

MASS PERCENTAGE VERSUS DIAMETER FOR MACR 15 TOT. EXOGENOUS

MASS MEDIAN DIA. = 5.10E+00 UM RMD= 3.000 AERODYNAMIC DIA. = 8.83E+00 UM

DIA. (UM.)	COUNT	PERCENTAGES BY COUNT		PERCENTAGES BY MASS	
		DIFF.	INTEGRAL	DIFF.	INTEGRAL
4.21E-02	0.	0.0000	0.0000	0.0000	0.0000
5.17E-02	1.	0.0616	0.0616	0.0000	0.0000
6.35E-02	0.	0.0000	0.0616	0.0000	0.0000
7.80E-02	1.	0.0616	0.1232	0.0000	0.0000
9.58E-02	2.	0.1232	0.2463	0.0000	0.0000
1.18E-01	3.	0.1847	0.4310	0.0000	0.0000
1.44E-01	4.	0.2463	0.6773	0.0001	0.0001
1.77E-01	3.	0.1847	0.8621	0.0001	0.0002
2.18E-01	11.	0.6773	1.5394	0.0005	0.0007
2.68E-01	34.	2.0936	3.6330	0.0030	0.0036
3.29E-01	83.	5.1108	8.7438	0.0134	0.0170
4.04E-01	95.	5.8498	14.5936	0.0264	0.0454
4.96E-01	122.	7.5123	22.1059	0.0675	0.1130
6.09E-01	161.	9.9138	32.0197	0.1651	0.2780
7.47E-01	174.	10.7143	42.7340	0.3304	0.6084
9.18E-01	175.	10.7759	53.5099	0.6154	1.2239
1.13E+00	157.	9.6675	63.1773	1.0226	2.2464
1.38E+00	135.	8.3128	71.4902	1.6285	3.8749
1.70E+00	126.	7.7586	79.2488	2.8149	6.6898
2.09E+00	104.	6.4039	85.6527	4.3031	10.9929
2.56E+00	95.	5.8498	91.5025	7.2798	18.2728
3.15E+00	48.	2.9557	94.4581	6.8123	25.0850
3.87E+00	46.	2.8325	97.2906	12.0909	37.1759
4.75E+00	21.	1.2931	98.5837	10.2228	47.3987
5.83E+00	9.	0.5542	99.1379	8.1142	55.5129
7.16E+00	10.	0.6158	99.7537	16.6976	72.2105
8.79E+00	0.	0.0000	99.7537	0.0000	72.2105
1.08E+01	3.	0.1847	99.9384	17.1821	89.3926
1.33E+01	1.	0.0616	100.0000	10.6074	100.0000

SAMPLE ID: LUNG 18 - PREP 3371 3ML D-15, 16

11-JUL-88

AREA EQUIV. DIAM (UM) DISTRIBUTION FOR SILICA

MACR = 1

AVG=8.99E-01 DEV=5.84E-01 XDEV=6.50E+01 MEDIAN=7.69E-01 MOST PROB.=1.02E+00

Class	Count	%	0	1	2
limit	Count	%	0	0	0
0.0780	0.	0.00			
0.0958	0.	0.00			
0.1177	0.	0.00			
0.1445	1.	0.21	*		
0.1774	2.	0.42	*		
0.2179	4.	0.83	**		
0.2676	9.	1.88	*****		
0.3286	35.	7.29	*****		
0.4036	35.	7.29	*****		
0.4956	44.	9.17	*****		
0.6086	45.	9.37	*****		
0.7474	57.	11.88	*****		
0.9179	64.	13.33	*****		
1.1272	65.	13.54	*****		
1.3842	37.	7.71	*****		
1.6999	36.	7.50	*****		
2.0876	28.	5.83	*****		
2.5637	7.	1.45	****		
3.1483	7.	1.45	****		
3.8663	3.	0.62	**		
4.7480	1.	0.21	*		
5.8308	0.	0.00			
7.1605	0.	0.00			
8.7935	0.	0.00			
10.799	0.	0.00			

MASS PERCENTAGE VERSUS DIAMETER FOR MACR 1 SILICA

MASS MEDIAN DIA. = 2.01E+00 UM. RHO = 2.660 AERODYNAMIC DIA. = 3.28E+00 UM.

DIA. (UM.)	COUNT	PERCENTAGES BY COUNT		PERCENTAGES BY MASS	
		DIFF.	INTEGRAL	DIFF.	INTEGRAL
7.80E-02	0.	0.0000	0.0000	0.0000	0.0000
9.58E-02	0.	0.0000	0.0000	0.0000	0.0000
1.18E-01	0.	0.0000	0.0000	0.0000	0.0000
1.44E-01	1.	0.2083	0.2083	0.0002	0.0002
1.77E-01	2.	0.4167	0.6250	0.0008	0.0011
2.18E-01	4.	0.8333	1.4583	0.0031	0.0042
2.68E-01	9.	1.8750	3.3333	0.0129	0.0171
3.29E-01	35.	7.2917	10.6250	0.0932	0.1104
4.04E-01	35.	7.2917	17.9167	0.1727	0.2830
4.96E-01	44.	9.1667	27.0833	0.4020	0.6851
6.09E-01	45.	9.3750	36.4583	0.7615	1.4466
7.47E-01	57.	11.8750	48.3333	1.7865	3.2330
9.18E-01	64.	13.3333	61.6667	3.7149	6.9480
1.13E+00	65.	13.5417	75.2083	6.9877	13.9356
1.38E+00	37.	7.7083	82.9167	7.3667	21.3024
1.70E+00	36.	7.5000	90.4167	13.2747	34.5771
2.09E+00	28.	5.8333	96.2500	19.1219	53.6990
2.56E+00	7.	1.4583	97.7083	8.8537	62.5527
3.15E+00	7.	1.4583	99.1667	16.3974	78.9500
3.87E+00	3.	0.6250	99.7917	13.0151	91.9651
4.75E+00	1.	0.2083	100.0000	8.0349	100.0000
5.83E+00	0.	0.0000	100.0000	0.0000	100.0000
7.16E+00	0.	0.0000	100.0000	0.0000	100.0000
8.79E+00	0.	0.0000	100.0000	0.0000	100.0000
1.08E+01	0.	0.0000	100.0000	0.0000	100.0000

SAMPLE ID: LUNG 18 - PREP 3371 3ML D-15,16

11-JUL-88

AREA EQUIV. DIAM (UM) DISTRIBUTION FOR TOT. EXOGENOUS MACR = 15

AVG=1.03E+00 DEV=8.76E-01 XDEV=8.53E+01 MEDIAN=7.77E-01 MOST PROB.=8.33E-01

Class	Count	%	0	1	2
limit	Count	%	0	1	2
0.0780	0.	0.00			
0.0958	3.	0.14			
0.1177	2.	0.09			
0.1445	9.	0.42	*		
0.1774	11.	0.51	*		
0.2179	26.	1.21	***		
0.2676	61.	2.84	*****		
0.3286	117.	5.45	*****		
0.4036	166.	7.73	*****		
0.4956	211.	9.82	*****		
0.6086	223.	10.38	*****		
0.7474	206.	9.59	*****		
0.9179	227.	10.57	*****		
1.1272	222.	10.34	*****		
1.3842	187.	8.71	*****		
1.6999	156.	7.26	*****		
2.0876	130.	6.05	*****		
2.5637	73.	3.40	*****		
3.1483	52.	2.42	*****		
3.8663	37.	1.72	*****		
4.7480	12.	0.56	**		
5.8308	9.	0.42	*		
7.1605	4.	0.19	*		
8.7935	3.	0.14			
10.799	1.	0.05			

MASS PERCENTAGE VERSUS DIAMETER FOR MACR 15 TOT. EXOGENOUS

MASS MEDIAN DIA. = 3.82E+00 UM. RHO = 3.000 AERODYNAMIC DIA. = 6.62E+00 UM.

DIA. (UM.)	RAW COUNT	PERCENTAGES BY COUNT		PERCENTAGES BY MASS	
		DIFF.	INTEGRAL	DIFF.	INTEGRAL
7.80E-02	0.	0.0000	0.0000	0.0000	0.0000
9.58E-02	3.	0.1397	0.1397	0.0000	0.0000
1.18E-01	2.	0.0931	0.2328	0.0000	0.0000
1.44E-01	9.	0.4190	0.6518	0.0002	0.0002
1.77E-01	11.	0.5121	1.1639	0.0004	0.0006
2.18E-01	26.	1.2104	2.3743	0.0017	0.0023
2.68E-01	61.	2.8399	5.2142	0.0073	0.0096
3.29E-01	117.	5.4469	10.6611	0.0260	0.0357
4.04E-01	166.	7.7281	18.3892	0.0684	0.1041
4.96E-01	211.	9.8231	28.2123	0.1611	0.2652
6.09E-01	223.	10.3818	38.5940	0.3153	0.5805
7.47E-01	206.	9.5903	48.1844	0.5394	1.1199
9.18E-01	227.	10.5680	58.7523	1.1009	2.2208
1.13E+00	222.	10.3352	69.0875	1.9940	4.2147
1.38E+00	187.	8.7058	77.7933	3.1107	7.3255
1.70E+00	156.	7.2626	85.0559	4.8061	12.1316
2.09E+00	130.	6.0521	91.1080	7.4176	19.5492
2.56E+00	73.	3.3985	94.5065	7.7143	27.2634
3.15E+00	52.	2.4209	96.9274	10.1771	37.4406
3.87E+00	37.	1.7225	98.6499	13.4114	50.8520
4.75E+00	12.	0.5587	99.2086	8.0557	58.9078
5.83E+00	9.	0.4190	99.6276	11.1897	70.0974
7.16E+00	4.	0.1862	99.8138	9.2106	79.3080
8.79E+00	3.	0.1397	99.9535	12.7938	92.1018
1.08E+01	1.	0.0466	100.0000	7.8982	100.0000

SAMPLE ID: LUNG 19 - PREP 3377 AM. D-14

11-JUL-88

AREA EQUIV. DIAM (UM) DISTRIBUTION FOR SILICA

MACR = 1

AVG=9.71E-01 DEV=9.05E-01 NDEV=1.04E+02 MEDIAN=6.68E-01 MOST PROB.=4.50E-01

Class	Count	%	0	1	2
limit	Count	%	0	0	0
0.0227	0.	0.00E			
0.0279	0.	0.00E			
0.0343	0.	0.00E			
0.0421	0.	0.00E			
0.0517	1.	0.40E*			
0.0635	0.	0.00E			
0.0780	0.	0.00E			
0.0958	2.	0.80E**			
0.1177	1.	0.40E*			
0.1445	2.	0.80E**			
0.1774	1.	0.40E*			
0.2179	3.	1.20E***			
0.2676	10.	4.00E*****			
0.3286	16.	6.40E*****			
0.4036	24.	9.60E*****			
0.4956	29.	11.60E*****			
0.6086	24.	9.60E*****			
0.7474	28.	11.20E*****			
0.9179	25.	10.00E*****			
1.1272	25.	10.00E*****			
1.3842	27.	10.80E*****			
1.6999	14.	5.60E*****			
2.0876	8.	3.20E*****			
2.5637	2.	0.80E**			
3.1483	4.	1.60E****			
3.8663	2.	0.80E**			
4.7480	1.	0.40E*			
5.8308	0.	0.00E			
7.1605	0.	0.00E			
8.7935	0.	0.00E			
10.799	0.	0.00E			
13.252	1.	0.40E*			

SAMPLE ID: LUNG 19 - PREP 3377 AM. D-14

11-JUL-88

MASS PERCENTAGE VERSUS DIAMETER FOR MACR 1 SILICA

MASS MEDIAN DIA.= 1.17E+01 UM. RHO= 2.650 AERODYNAMIC DIA.= 1.90E+01 UM.

DIA. (UM.)	RAW COUNT	PERCENTAGES BY COUNT		PERCENTAGES BY MASS	
		DIFF.	INTEGRAL	DIFF.	INTEGRAL
2.27E-02	0.	0.0000	0.0000	0.0000	0.0000
2.79E-02	0.	0.0000	0.0000	0.0000	0.0000
3.43E-02	0.	0.0000	0.0000	0.0000	0.0000
4.21E-02	0.	0.0000	0.0000	0.0000	0.0000
5.17E-02	1.	0.4000	0.4000	0.0000	0.0000
6.35E-02	0.	0.0000	0.4000	0.0000	0.0000
7.80E-02	0.	0.0000	0.4000	0.0000	0.0000
9.58E-02	2.	0.8000	1.2000	0.0001	0.0001
1.18E-01	1.	0.4000	1.6000	0.0001	0.0001
1.44E-01	2.	0.8000	2.4000	0.0002	0.0003
1.77E-01	1.	0.4000	2.8000	0.0002	0.0005
2.18E-01	3.	1.2000	4.0000	0.0010	0.0015
2.68E-01	10.	4.0000	8.0000	0.0064	0.0079
3.29E-01	16.	6.4000	14.4000	0.0189	0.0268
4.04E-01	24.	9.6000	24.0000	0.0525	0.0793
4.96E-01	29.	11.6000	35.6000	0.1175	0.1968
6.09E-01	24.	9.6000	45.2000	0.1801	0.3768
7.47E-01	28.	11.2000	56.4000	0.3891	0.7659
9.18E-01	25.	10.0000	66.4000	0.6434	1.4093
1.13E+00	25.	10.0000	76.4000	1.1915	2.6008
1.38E+00	27.	10.8000	87.2000	2.3833	4.9841
1.70E+00	14.	5.6000	92.8000	2.2887	7.2728
2.09E+00	8.	3.2000	96.0000	2.4222	9.6950
2.56E+00	2.	0.8000	96.8000	1.1215	10.8165
3.15E+00	4.	1.6000	98.4000	4.1541	14.9706
3.87E+00	2.	0.8000	99.2000	3.8468	18.8174
4.75E+00	1.	0.4000	99.6000	3.5622	22.3796
5.83E+00	0.	0.0000	99.6000	0.0000	22.3796
7.16E+00	0.	0.0000	99.6000	0.0000	22.3796
8.79E+00	0.	0.0000	99.6000	0.0000	22.3796
1.08E+01	0.	0.0000	99.6000	0.0000	22.3796
1.33E+01	1.	0.4000	100.0000	77.6204	100.0000

AREA EQUIV. DIAM (UM) DISTRIBUTION FOR TOT. EXOGENOUS MACR = 15

AVG=1.19E+00 DEV=0.00E+01 XDEV=0.00E+01 MEDIAN=7.31E-01 MOST PROB.=4.50E-01

Class	Count	%	0	1	2
0.0227	0.	0.000			
0.0279	1.	0.090			
0.0343	0.	0.000			
0.0421	0.	0.000			
0.0517	2.	0.180			
0.0635	1.	0.090			
0.0780	1.	0.090			
0.0958	3.	0.270*			
0.1177	3.	0.270*			
0.1445	6.	0.550*			
0.1774	9.	0.820**			
0.2179	14.	1.280***			
0.2676	38.	3.480*****			
0.3286	57.	5.220*****			
0.4035	87.	7.970*****			
0.4956	119.	10.910*****			
0.6086	138.	9.900*****			
0.7474	139.	9.990*****			
0.9179	95.	8.710*****			
1.1272	71.	6.510*****			
1.3842	78.	7.150*****			
1.6999	71.	6.510*****			
2.0876	52.	4.770*****			
2.5637	41.	3.760*****			
3.1483	50.	4.580*****			
3.8663	26.	2.380*****			
4.7480	27.	2.470*****			
5.8308	10.	0.920**			
7.1605	4.	0.370*			
8.7935	6.	0.550*			
10.799	0.	0.000			
13.252	2.	0.180			

SAMPLE ID: LUNG 19 - PREP 3377 4ML D-14

11-JUL-88

MASS PERCENTAGE VERSUS DIAMETER FOR MACR 15 TOT. EXOGENOUS

MASS MEDIAN DIA. = 5.96E+00 UM. RHO = 3.000 AERODYNAMIC DIA. = 1.03E+01 UM.

DIA. (UM.)	RAW COUNT	PERCENTAGES BY COUNT		PERCENTAGES BY MASS	
		DIFF.	INTEGRAL	DIFF.	INTEGRAL
2.27E-02	0.	0.0000	0.0000	0.0000	0.0000
2.79E-02	1.	0.0917	0.0917	0.0000	0.0000
3.43E-02	0.	0.0000	0.0917	0.0000	0.0000
4.21E-02	0.	0.0000	0.0917	0.0000	0.0000
5.17E-02	2.	0.1833	0.2750	0.0000	0.0000
6.35E-02	1.	0.0917	0.3666	0.0000	0.0000
7.80E-02	1.	0.0917	0.4583	0.0000	0.0000
9.58E-02	3.	0.2750	0.7333	0.0000	0.0000
1.18E-01	3.	0.2750	1.0082	0.0000	0.0000
1.44E-01	6.	0.5500	1.5582	0.0001	0.0001
1.77E-01	9.	0.8249	2.3831	0.0002	0.0004
2.18E-01	14.	1.2832	3.6664	0.0007	0.0011
2.68E-01	38.	3.4830	7.1494	0.0036	0.0047
3.29E-01	57.	5.2246	12.3740	0.0100	0.0148
4.04E-01	87.	7.9743	20.3483	0.0284	0.0432
4.96E-01	119.	10.9074	31.2557	0.0719	0.1151
6.09E-01	138.	9.8992	41.1549	0.1209	0.2360
7.47E-01	139.	9.9908	51.1457	0.2260	0.4620
9.18E-01	95.	8.7076	59.8533	0.3648	0.8268
1.13E+00	71.	6.5078	66.3611	0.5050	1.3318
1.38E+00	78.	7.1494	73.5105	1.0274	2.3592
1.70E+00	71.	6.5078	80.0183	1.7321	4.0913
2.09E+00	52.	4.7663	84.7846	2.3494	6.4407
2.56E+00	41.	3.7580	88.5426	3.4308	9.8715
3.15E+00	50.	4.5830	93.1256	7.7487	17.6201
3.87E+00	26.	2.3831	95.5087	7.4625	25.0826
4.75E+00	27.	2.4748	97.9835	14.3524	39.4350
5.83E+00	10.	0.9166	98.9001	9.8449	49.2799
7.16E+00	4.	0.3666	99.2667	7.2933	56.5731
8.79E+00	6.	0.5500	99.8167	20.2612	76.8343
1.08E+01	0.	0.0000	99.8167	0.0000	76.8343
1.33E+01	2.	0.1833	100.0000	23.1657	100.0000

SAMPLE ID: LUNG 20 - PREP 3492 IML D-574

7-JUL-88

AREA EQUIV. DIAM (UM) DISTRIBUTION FOR SILICA

MACR = 1

AVG=9.30E-01 DEV=7.52E-01 %DEV=8.08E+01 MEDIAN=7.14E-01 MOST PROB.=6.78E-01

Class	Count	%	1	2
0.0227	0.	0.00[		
0.0279	0.	0.00[		
0.0343	0.	0.00[		
0.0421	0.	0.00[		
0.0517	0.	0.00[		
0.0635	1.	0.52[*		
0.0780	0.	0.00[		
0.0958	0.	0.00[		
0.1177	1.	0.52[*		
0.1445	1.	0.52[*		
0.1774	6.	3.11[*****		
0.2179	4.	2.07[*****		
0.2676	14.	7.23[*****		
0.3286	11.	5.70[*****		
0.4036	9.	4.66[*****		
0.4956	19.	9.84[*****		
0.6086	13.	6.74[*****		
0.7474	23.	11.92[*****		
0.9179	20.	10.36[*****		
1.1272	19.	9.84[*****		
1.3842	11.	5.70[*****		
1.6999	17.	8.81[*****		
2.0876	6.	3.11[*****		
2.5637	11.	5.70[*****		
3.1483	3.	1.53[****		
3.8663	3.	1.55[****		
4.7480	1.	0.52[*		
5.8308	0.	0.00[		
7.1605	0.	0.00[		
8.7935	0.	0.00[		
10.799	0.	0.00[		
13.262	0.	0.00[		

SAMPLE ID: LUNG 20 - PREP 3492 IML D-574

7-JUL-88

MASS PERCENTAGE VERSUS DIAMETER FOR MACR 1 SILICA

MASS MEDIAN DIA.= 2.52E+00 UM. RMD= 2.660 AERODYNAMIC DIA.= 4.10E+00 UM.

DIA. (UM.)	RAW COUNT	PERCENTAGES BY COUNT		PERCENTAGES BY MASS	
		DIFF.	INTEGRAL	DIFF.	INTEGRAL
2.27E-02	0.	0.0000	0.0000	0.0000	0.0000
2.79E-02	0.	0.0000	0.0000	0.0000	0.0000
3.43E-02	0.	0.0000	0.0000	0.0000	0.0000
4.21E-02	0.	0.0000	0.0000	0.0000	0.0000
5.17E-02	0.	0.0000	0.0000	0.0000	0.0000
6.35E-02	1.	0.5181	0.5181	0.0000	0.0000
7.80E-02	0.	0.0000	0.5181	0.0000	0.0000
9.58E-02	0.	0.0000	0.5181	0.0000	0.0000
1.18E-01	1.	0.5181	1.0363	0.0002	0.0002
1.44E-01	1.	0.5181	1.5544	0.0004	0.0004
1.77E-01	6.	3.1088	4.6632	0.0043	0.0049
2.18E-01	4.	2.0725	6.7358	0.0053	0.0102
2.68E-01	14.	7.2539	13.9996	0.0342	0.0443
3.29E-01	11.	5.6995	19.6991	0.0497	0.0940
4.04E-01	9.	4.6632	24.3523	0.0753	0.1693
4.96E-01	19.	9.8446	34.1969	0.2944	0.4637
6.09E-01	13.	6.7358	40.9326	0.3731	0.8368
7.47E-01	23.	11.9171	52.8497	1.2225	2.0594
9.18E-01	20.	10.3627	63.2124	1.9688	4.0282
1.13E+00	19.	9.8446	73.0570	3.4641	7.4922
1.38E+00	11.	5.6995	78.7565	3.7143	11.2065
1.70E+00	17.	8.8083	87.5648	10.6312	21.8377
2.09E+00	6.	3.1088	90.6736	6.9492	28.7869
2.56E+00	11.	5.6995	96.3731	23.5954	52.3824
3.15E+00	3.	1.5544	97.9275	11.9181	64.3005
3.87E+00	3.	1.5544	99.4819	22.0729	86.3734
4.75E+00	1.	0.5181	100.0000	13.6256	100.0000
5.83E+00	0.	0.0000	100.0000	0.0000	100.0000
7.16E+00	0.	0.0000	100.0000	0.0000	100.0000
8.79E+00	0.	0.0000	100.0000	0.0000	100.0000
1.08E+01	0.	0.0000	100.0000	0.0000	100.0000
1.33E+01	0.	0.0000	100.0000	0.0000	100.0000

AREA EQUIV. DIAM (UM) DISTRIBUTION FOR TOT. EXOGENOUS MACR = 15

AVS=9.59E-01 DEV=0.00E+01 ZDEV=0.00E+01 MEDIAN=7.23E-01 MOST PROB.=5.78E-01

Limit	Class	Count	%	0	1	2
0.0227	0.	0.	0.00[			
0.0279	0.	0.	0.00[			
0.0343	0.	0.	0.00[			
0.0421	0.	0.	0.00[			
0.0517	1.	0.	0.09[			
0.0635	3.	0.	0.27[*			
0.0760	2.	0.	0.18[			
0.0958	2.	0.	0.18[			
0.1177	9.	0.	0.80[**			
0.1445	11.	0.	0.98[***			
0.1774	18.	1.	1.60[****			
0.2179	27.	2.	2.40[*****			
0.2676	49.	4.	4.36[*****			
0.3286	74.	6.	6.59[*****			
0.4036	65.	5.	5.79[*****			
0.4956	98.	8.	8.73[*****			
0.6086	103.	9.	9.17[*****			
0.7474	121.	10.	10.77[*****			
0.9179	114.	10.	10.15[*****			
1.1272	100.	8.	8.90[*****			
1.3842	75.	6.	6.68[*****			
1.6999	85.	7.	7.57[*****			
2.0876	57.	5.	5.08[*****			
2.5637	45.	4.	4.01[*****			
3.1483	30.	2.	2.67[*****			
3.8663	17.	1.	1.51[****			
4.7480	12.	1.	1.07[***			
5.8308	3.	0.	0.27[*			
7.1605	0.	0.	0.00[			
8.7935	1.	0.	0.09[			
10.799	0.	0.	0.00[			
13.262	1.	0.	0.09[			

SAMPLE ID: LUNG 20 - PREP 3492 IML D-574

7-JUL-88

MASS PERCENTAGE VERSUS DIAMETER FOR MACR 15 TOT. EXOGENOUS

MASS MEDIAN DIA.= 4.13E+00 UM. RHO= 3.000 AERODYNAMIC DIA.= 7.14E+00 UM.

DIA. (UM.)	RAW COUNT	PERCENTAGES BY COUNT		PERCENTAGES BY MASS	
		DIFF.	INTEGRAL	DIFF.	INTEGRAL
2.27E-02	0.	0.0000	0.0000	0.0000	0.0000
2.79E-02	0.	0.0000	0.0000	0.0000	0.0000
3.43E-02	0.	0.0000	0.0000	0.0000	0.0000
4.21E-02	0.	0.0000	0.0000	0.0000	0.0000
5.17E-02	1.	0.0890	0.0890	0.0000	0.0000
6.35E-02	3.	0.2671	0.3562	0.0000	0.0000
7.30E-02	2.	0.1781	0.5343	0.0000	0.0000
9.58E-02	2.	0.1781	0.7124	0.0000	0.0000
1.18E-01	9.	0.8014	1.5138	0.0002	0.0002
1.44E-01	11.	0.9795	2.4933	0.0004	0.0006
1.77E-01	18.	1.6028	4.0962	0.0011	0.0017
2.18E-01	27.	2.4043	6.5004	0.0031	0.0048
2.68E-01	49.	4.3633	10.8638	0.0104	0.0152
3.29E-01	74.	6.5895	17.4533	0.0291	0.0443
4.04E-01	65.	5.7881	23.2413	0.0472	0.0916
4.76E-01	98.	8.7266	31.9679	0.1321	0.2237
6.09E-01	103.	9.1719	41.1398	0.2572	0.4809
7.47E-01	121.	10.7747	51.9145	0.5595	1.0404
9.18E-01	114.	10.1514	62.0659	0.9764	2.0168
1.13E+00	100.	8.9047	70.9706	1.5862	3.6030
1.38E+00	75.	6.6785	77.6492	2.2033	5.8062
1.70E+00	85.	7.5690	85.2182	4.6246	10.4308
2.09E+00	57.	5.0757	90.2939	5.7436	16.1744
2.56E+00	45.	4.0071	94.3010	8.3979	24.5723
3.15E+00	30.	2.6714	96.9724	10.3688	34.9411
3.87E+00	17.	1.5138	98.4862	10.8820	45.8231
4.75E+00	12.	1.0686	99.5548	14.2263	60.0494
5.83E+00	3.	0.2671	99.8219	6.5869	66.6363
7.16E+00	0.	0.0000	99.8219	0.0000	66.6363
8.79E+00	1.	0.0890	99.9110	7.5312	74.1675
1.08E+01	0.	0.0000	99.9110	0.0000	74.1675
1.33E+01	1.	0.0890	100.0000	25.8325	100.0000

SAMPLE ID: LUNG 21 - PREP 3383 IML D-569

7-JUL-88

AREA EQUIV. DIAM (UM) DISTRIBUTION FOR SILICA MACR = 1

AVG=8.64E-01 DEV=7.04E-01 %DEV=7.76E+01 MEDIAN=7.28E-01 MOST PROB.=8.33E-01

Class	0	1	2
limit	Count	%	%
0.0517	0.	0.00[	
0.0635	0.	0.00[	
0.0780	0.	0.00[	
0.0958	0.	0.00[	
0.1177	1.	0.37[*	
0.1445	3.	1.11[***	
0.1774	1.	0.37[*	
0.2179	10.	3.70[*****	
0.2676	15.	5.56[*****	
0.3286	16.	5.93[*****	
0.4036	20.	7.41[*****	
0.4956	20.	7.41[*****	
0.6086	24.	8.89[*****	
0.7474	29.	10.74[*****	
0.9179	38.	14.07[*****	
1.1272	29.	10.74[*****	
1.3842	16.	5.93[*****	
1.6999	23.	8.52[*****	
2.0876	12.	4.44[*****	
2.5637	6.	2.22[*****	
3.1483	2.	0.74[**	
3.8663	2.	0.74[**	
4.7430	2.	0.74[**	
5.8308	1.	0.37[*	
7.1605	0.	0.00[	

MASS PERCENTAGE VERSUS DIAMETER FOR MACR 1 SILICA

MASS MEDIAN DIA.= 3.17E+00 UM. RHO= 2.660 AERODYNAMIC DIA.= 5.17E+00 UM.

DIA. (UM.)	RAW COUNT	PERCENTAGES BY COUNT		PERCENTAGES BY MASS	
		DIFF.	INTEGRAL	DIFF.	INTEGRAL
5.17E-02	0.	0.0000	0.0000	0.0000	0.0000
6.35E-02	0.	0.0000	0.0000	0.0000	0.0000
7.80E-02	0.	0.0000	0.0000	0.0000	0.0000
9.58E-02	0.	0.0000	0.0000	0.0000	0.0000
1.18E-01	1.	0.3704	0.3704	0.0002	0.0002
1.44E-01	3.	1.1111	1.4815	0.0009	0.0010
1.77E-01	1.	0.3704	1.8519	0.0005	0.0016
2.18E-01	10.	3.7037	5.5556	0.0099	0.0114
2.68E-01	15.	5.5556	11.1111	0.0274	0.0388
3.29E-01	16.	5.9259	17.0370	0.0541	0.0929
4.04E-01	20.	7.4074	24.4444	0.1253	0.2182
4.96E-01	20.	7.4074	31.8519	0.2320	0.4503
6.09E-01	24.	8.8889	40.7407	0.5157	0.9660
7.47E-01	29.	10.7407	51.4815	1.1541	2.1200
9.18E-01	38.	14.0741	65.5556	2.8007	4.9207
1.13E+00	29.	10.7407	76.2963	3.9585	8.8793
1.38E+00	16.	5.9259	82.2222	4.0449	12.9242
1.70E+00	23.	8.5185	90.7407	10.7688	23.6930
2.09E+00	12.	4.4444	95.1852	10.4057	34.0987
2.56E+00	6.	2.2222	97.4074	9.6359	43.7346
3.15E+00	2.	0.7407	98.1481	5.9487	49.6833
3.87E+00	2.	0.7407	98.8889	11.0173	60.7006
4.75E+00	2.	0.7407	99.6296	20.4044	81.1050
5.83E+00	1.	0.3704	100.0000	18.8949	100.0000
7.16E+00	0.	0.0000	100.0000	0.0000	100.0000

SAMPLE ID: LUNG 21 - PREP 3383 1ML D-569

7-JUL-98

AREA EQUIV. DIAM (UM) DISTRIBUTION FOR TOT. EXOGENOUS MACR = 15

AVG=9.16E-01 DEV=8.26E-01 XDEV=9.01E+01 MEDIAN=6.65E-01 MOST PROB.=5.52E-01

Class	Count	%	0	1	2
0.0517	0.	0.00			
0.0635	2.	0.18			
0.0780	2.	0.18			
0.0958	3.	0.27	*		
0.1177	6.	0.54	*		
0.1445	11.	0.99	***		
0.1774	11.	0.99	***		
0.2179	29.	2.61	*****		
0.2676	63.	5.68	*****		
0.3286	78.	7.03	*****		
0.4036	91.	8.20	*****		
0.4956	95.	8.56	*****		
0.6086	118.	10.63	*****		
0.7474	113.	10.18	*****		
0.9179	107.	9.64	*****		
1.1272	106.	9.55	*****		
1.3842	64.	5.77	*****		
1.6999	74.	6.67	*****		
2.0876	55.	4.95	*****		
2.5637	30.	2.70	*****		
3.1483	17.	1.53	****		
3.8663	15.	1.35	****		
4.7480	12.	1.08	***		
5.8308	7.	0.63	**		
7.1605	1.	0.09			

MASS PERCENTAGE VERSUS DIAMETER FOR MACR 15 TOT. EXOGENOUS

MASS MEDIAN DIA.= 3.77E+00 UM. RHO= 3.000 AERODYNAMIC DIA.= 6.53E+00 UM.

DIA. (UM.)	RAW COUNT	PERCENTAGES BY COUNT		PERCENTAGES BY MASS	
		DIFF.	INTEGRAL	DIFF.	INTEGRAL
5.17E-02	0.	0.0000	0.0000	0.0000	0.0000
6.35E-02	2.	0.1802	0.1802	0.0000	0.0000
7.80E-02	2.	0.1802	0.3604	0.0000	0.0000
9.58E-02	3.	0.2703	0.6306	0.0000	0.0001
1.18E-01	6.	0.5405	1.1712	0.0002	0.0002
1.44E-01	11.	0.9910	2.1622	0.0005	0.0007
1.77E-01	11.	0.9910	3.1532	0.0010	0.0017
2.18E-01	29.	2.6126	5.7658	0.0048	0.0065
2.68E-01	63.	5.6757	11.4414	0.0191	0.0256
3.29E-01	78.	7.0270	18.4685	0.0439	0.0695
4.04E-01	91.	8.1982	26.6667	0.0948	0.1644
4.96E-01	95.	8.5586	35.2252	0.1834	0.3477
6.09E-01	118.	10.6306	45.8559	0.4218	0.7696
7.47E-01	113.	10.1802	56.0360	0.7482	1.5177
9.18E-01	107.	9.6396	65.6757	1.3121	2.8298
1.13E+00	106.	9.5495	75.2252	2.4073	5.2371
1.38E+00	64.	5.7658	80.9910	2.6919	7.9290
1.70E+00	74.	6.6667	87.6577	5.7644	13.6934
2.09E+00	55.	4.9550	92.6126	7.9348	21.6282
2.56E+00	30.	2.7027	95.3153	8.0158	29.6440
3.15E+00	17.	1.5315	96.8469	8.4125	38.0566
3.87E+00	15.	1.3514	98.1982	13.7474	51.8039
4.75E+00	12.	1.0811	99.2793	20.3686	72.1725
5.83E+00	7.	0.6306	99.9099	22.0054	94.1779
7.16E+00	1.	0.0901	100.0000	5.8221	100.0000

SAMPLE ID: LUNG 22 - PREP 2711 U-1 GML D-398

11-JUL-88

AREA EQUIV. DIAM (UM) DISTRIBUTION FOR SILICA

MACR = 1

AVG=7.05E+01 DEV=5.69E+01 YDEV=8.07E+01 MEDIAN=5.39E+01 MOST PROB.=5.52E+01

Class	Count	%	0	1	2
limit	Count	%	0	0	0
0.0227	0.	0.00[			
0.0279	0.	0.00[			
0.0343	0.	0.00[			
0.0421	0.	0.00[			
0.0517	0.	0.00[			
0.0635	1.	0.22[*			
0.0780	1.	0.22[*			
0.0958	1.	0.22[*			
0.1177	4.	0.88[**			
0.1445	6.	1.32[****			
0.1774	9.	1.97[*****			
0.2179	18.	3.95[*****			
0.2676	19.	4.17[*****			
0.3286	39.	8.55[*****			
0.4036	51.	11.16[*****			
0.4956	54.	11.84[*****			
0.6086	65.	14.25[*****			
0.7474	46.	10.09[*****			
0.9179	37.	8.11[*****			
1.1272	38.	8.33[*****			
1.3842	23.	5.04[*****			
1.6999	16.	3.51[*****			
2.0876	11.	2.41[*****			
2.5637	7.	1.54[****			
3.1483	7.	1.54[****			
3.8663	2.	0.44[*			
4.7480	1.	0.22[*			
5.8308	0.	0.00[			

SAMPLE ID: LUNG 22 - PREP 2711 U-1 GML D-398

11-JUL-88

MASS PERCENTAGE VERSUS DIAMETER FOR MACR 1 SILICA

MASS MEDIAN DIA. = 2.47E+00 UM. RHO = 2.660 AERODYNAMIC DIA. = 4.03E+00 UM.

DIA. (UM.)	RAW COUNT	PERCENTAGES BY COUNT		PERCENTAGES BY MASS	
		DIFF.	INTEGRAL	DIFF.	INTEGRAL
2.27E-02	0.	0.0000	0.0000	0.0000	0.0000
2.79E-02	0.	0.0000	0.0000	0.0000	0.0000
3.43E-02	0.	0.0000	0.0000	0.0000	0.0000
4.21E-02	0.	0.0000	0.0000	0.0000	0.0000
5.17E-02	0.	0.0000	0.0000	0.0000	0.0000
6.35E-02	1.	0.2193	0.2193	0.0000	0.0000
7.80E-02	1.	0.2193	0.4386	0.0001	0.0001
9.59E-02	1.	0.2193	0.6579	0.0001	0.0002
1.19E-01	4.	0.8772	1.5351	0.0007	0.0009
1.44E-01	6.	1.3158	2.8509	0.0020	0.0028
1.77E-01	9.	1.9737	4.8246	0.0054	0.0082
2.19E-01	18.	3.9474	8.7719	0.0201	0.0283
2.68E-01	19.	4.1667	12.9386	0.0393	0.0676
3.29E-01	39.	8.5526	21.4912	0.1492	0.2168
4.04E-01	51.	11.1842	32.6754	0.3614	0.5782
4.96E-01	54.	11.8421	44.5175	0.7087	1.2869
6.09E-01	65.	14.2544	58.7719	1.5799	2.8667
7.47E-01	46.	10.0877	68.8596	2.0707	4.9374
9.18E-01	37.	8.1140	76.9737	3.0847	8.0221
1.13E+00	38.	8.3333	85.3070	5.8674	13.8894
1.38E+00	23.	5.0439	90.3509	6.5772	20.4666
1.70E+00	16.	3.5088	93.8597	8.4739	28.9404
2.09E+00	11.	2.4123	96.2719	10.7896	39.7300
2.56E+00	7.	1.5351	97.8070	12.7163	52.4463
3.15E+00	7.	1.5351	99.3421	20.5512	75.9975
3.87E+00	2.	0.4386	99.7807	22.4622	98.4597
4.75E+00	1.	0.2193	100.0000	11.5403	100.0000
5.83E+00	0.	0.0000	100.0000	0.0000	100.0000

AREA EQUIV. DIAM (UM) DISTRIBUTION FOR TOT. EXOGENOUS MACR = 15

AVG=7.50E-01 DEV=0.00E-01 XDEV=0.00E-01 MEDIAN=5.43E-01 MOST PROB.=5.52E-01

Limit	Class	Count	%	0	1	2
0.0227	0.	0.	0.00[	0	0	0
0.0279	1.	0.	0.05[			
0.0343	0.	0.	0.00[			
0.0421	0.	0.	0.00[			
0.0517	2.	0.	0.18[			
0.0635	2.	0.	0.18[			
0.0780	4.	0.	0.37[*			
0.0958	5.	0.	0.46[*			
0.1177	12.	0.	1.10[***			
0.1445	12.	0.	1.10[***			
0.1774	27.	0.	2.47[*****			
0.2179	42.	0.	3.84[*****			
0.2676	54.	0.	4.94[*****			
0.3286	106.	0.	9.70[*****			
0.4036	110.	0.	10.06[*****			
0.4956	116.	0.	10.61[*****			
0.6086	128.	0.	11.71[*****			
0.7474	109.	0.	9.97[*****			
0.9179	90.	0.	8.23[*****			
1.1272	78.	0.	7.14[*****			
1.3842	57.	0.	5.22[*****			
1.6979	48.	0.	4.39[*****			
2.0876	31.	0.	2.84[*****			
2.5637	23.	0.	2.10[*****			
3.1483	22.	0.	2.01[*****			
3.8663	9.	0.	0.82[**			
4.7460	4.	0.	0.37[*			
5.8308	1.	0.	0.09[			

SAMPLE ID: LUNG 22 - PREP 2711 U-1 AML D-398

11-JUL-88

MASS PERCENTAGE VERSUS DIAMETER FOR MACR 15 TOT. EXOGENOUS

MASS MEDIAN DIA.= 2.77E+00 UM. RHD= 3.000 AERODYNAMIC DIA.= 4.80E+00 UM.

DIA. (UM.)	RAW COUNT	PERCENTAGES BY COUNT		PERCENTAGES BY MASS	
		DIFF.	INTEGRAL	DIFF.	INTEGRAL
2.27E-02	0.	0.0000	0.0000	0.0000	0.0000
2.79E-02	1.	0.0915	0.0915	0.0000	0.0000
3.43E-02	0.	0.0000	0.0915	0.0000	0.0000
4.21E-02	0.	0.0000	0.0915	0.0000	0.0000
5.17E-02	2.	0.1830	0.2745	0.0000	0.0000
6.35E-02	2.	0.1830	0.4575	0.0000	0.0000
7.80E-02	4.	0.3660	0.8234	0.0001	0.0001
9.58E-02	5.	0.4575	1.2809	0.0001	0.0002
1.18E-01	12.	1.0979	2.3788	0.0006	0.0008
1.44E-01	12.	1.0979	3.4767	0.0011	0.0020
1.77E-01	27.	2.4703	5.9469	0.0048	0.0067
2.18E-01	42.	3.8426	9.7896	0.0137	0.0204
2.68E-01	54.	4.9405	14.7301	0.0326	0.0531
3.29E-01	106.	9.6981	24.4282	0.1186	0.1716
4.04E-01	110.	10.0640	34.4922	0.2279	0.3996
4.96E-01	116.	10.6130	45.1052	0.4451	0.8447
6.09E-01	128.	11.7109	56.8161	0.9097	1.7544
7.47E-01	109.	9.9726	66.7887	1.4347	3.1891
9.18E-01	90.	8.2342	75.0229	2.1940	5.3830
1.13E+00	78.	7.1363	82.1592	3.5215	8.9046
1.38E+00	57.	5.2150	87.3742	4.7661	13.6707
1.70E+00	48.	4.3916	91.7658	7.4333	21.1040
2.09E+00	31.	2.8362	94.6020	8.8910	29.9950
2.56E+00	23.	2.1043	96.7063	12.2171	42.2122
3.15E+00	22.	2.0128	98.7191	21.6429	63.8551
3.87E+00	9.	0.8234	99.5425	16.3978	80.2529
4.75E+00	4.	0.3660	99.9085	13.4976	93.7505
5.83E+00	1.	0.0915	100.0000	6.2495	100.0000

SAMPLE ID: LUNG 22 - PREP 2712 U-2 8ML D-396

11-JUL-88

AREA EQUIV. DIAM (UM) DISTRIBUTION FOR SILICA

MACR = 1

AVG=8.51E-01 DEV=7.90E-01 %DEV=9.28E+01 MEDIAN=5.82E-01 MOST PROB.=4.50E-01

Class	0	1	2
limit	Count	%	0-----0-----0
0.0421	0.	0.00[	
0.0517	1.	0.23[*	
0.0635	1.	0.23[*	
0.0780	1.	0.23[*	
0.0958	3.	0.70[**	
0.1177	4.	0.93[***	
0.1445	3.	0.70[**	
0.1774	14.	3.27[*****	
0.2179	17.	3.97[*****	
0.2676	23.	5.37[*****	
0.3286	32.	7.48[*****	
0.4036	35.	8.18[*****	
0.4956	54.	12.62[*****	
0.6086	34.	7.94[*****	
0.7474	42.	9.81[*****	
0.9179	39.	9.11[*****	
1.1272	23.	5.37[*****	
1.3842	23.	5.37[*****	
1.6999	27.	5.31[*****	
2.0876	25.	5.84[*****	
2.5637	8.	1.87[*****	
3.1483	7.	1.64[*****	
3.8663	6.	1.40[*****	
4.7480	5.	1.17[***	
5.8308	1.	0.23[*	
7.1605	0.	0.00[	

MASS PERCENTAGE VERSUS DIAMETER FOR MACR 1 SILICA

MASS MEDIAN DIA.= 3.36E+00 UM. RHD= 2.660 AERODYNAMIC DIA.= 5.48E+00 UM.

DIA. (UM.)	RAW COUNT	PERCENTAGES BY COUNT		PERCENTAGES BY MASS	
		DIFF.	INTEGRAL	DIFF.	INTEGRAL
4.21E-02	0.	0.0000	0.0000	0.0000	0.0000
5.17E-02	1.	0.2336	0.2336	0.0000	0.0000
6.35E-02	1.	0.2336	0.4673	0.0000	0.0000
7.80E-02	1.	0.2336	0.7009	0.0000	0.0000
9.58E-02	3.	0.7009	1.4019	0.0001	0.0002
1.18E-01	4.	0.9346	2.3364	0.0003	0.0005
1.44E-01	3.	0.7009	3.0374	0.0005	0.0010
1.77E-01	14.	3.2710	6.3084	0.0040	0.0050
2.18E-01	17.	3.9720	10.2804	0.0090	0.0140
2.68E-01	23.	5.3738	15.6542	0.0226	0.0365
3.29E-01	32.	7.4766	23.1308	0.0581	0.0947
4.04E-01	35.	8.1776	31.3084	0.1178	0.2124
4.96E-01	54.	12.6168	43.9252	0.3365	0.5489
6.09E-01	34.	7.9439	51.8692	0.3924	0.7413
7.47E-01	42.	9.8131	61.6822	0.8976	1.8389
9.18E-01	39.	9.1121	70.7944	1.5437	3.3826
1.13E+00	23.	5.3738	76.1682	1.6861	5.0688
1.38E+00	23.	5.3738	81.5421	3.1228	8.1915
1.70E+00	27.	6.3084	87.8505	6.7893	14.9808
2.09E+00	25.	5.8411	93.6916	11.6427	26.6235
2.56E+00	8.	1.8692	95.5608	6.9001	33.5236
3.15E+00	7.	1.6355	97.1963	11.1818	44.7055
3.87E+00	6.	1.4019	98.5981	17.7506	62.4563
4.75E+00	5.	1.1682	99.7664	27.3960	89.8523
5.83E+00	1.	0.2336	100.0000	10.1477	100.0000
7.16E+00	0.	0.0000	100.0000	0.0000	100.0000

AREA EQUIV. DIAM (UM) DISTRIBUTION FOR TOT. EXOGENOUS MACR = 15

AVG=8.30E-01 DEV=0.00E-01 %DEV=0.00E-01 MEDIAN=5.64E-01 MOST PROB.=4.50E-01

Class	Count	%
0.0421	0.	0.00[
0.0517	3.	0.29[*
0.0635	2.	0.20[*
0.0760	1.	0.10[
0.0958	8.	0.78[**
0.1177	11.	1.07[***
0.1445	13.	1.27[***
0.1774	24.	2.34[*****
0.2179	39.	3.31[*****
0.2676	62.	6.05[*****
0.3286	76.	7.42[*****
0.4036	103.	10.06[*****
0.4956	112.	10.94[*****
0.6086	96.	9.37[*****
0.7474	95.	9.28[*****
0.9179	96.	9.37[*****
1.1272	57.	5.57[*****
1.3842	53.	5.18[*****
1.6999	57.	5.57[*****
2.0876	50.	4.88[*****
2.5637	21.	2.05[*****
3.1483	17.	1.66[****
3.8663	17.	1.66[****
4.7480	7.	0.68[**
5.8308	3.	0.29[*
7.1605	1.	0.10[

MASS PERCENTAGE VERSUS DIAMETER FOR MACR 15 TOT. EXOGENOUS

MASS MEDIAN DIA.= 3.40E+00 UM. RHO= 3.000 AERODYNAMIC DIA.= 5.89E+00 UM.

DIA. (UM.)	RAW COUNT	PERCENTAGES BY COUNT		PERCENTAGES BY MASS	
		DIFF.	INTEGRAL	DIFF.	INTEGRAL
4.21E-02	0.	0.0000	0.0000	0.0000	0.0000
5.17E-02	3.	0.2930	0.2930	0.0000	0.0000
6.35E-02	2.	0.1953	0.4883	0.0000	0.0000
7.80E-02	1.	0.0977	0.5859	0.0000	0.0000
9.58E-02	8.	0.7812	1.3672	0.0001	0.0002
1.18E-01	11.	1.0742	2.4414	0.0004	0.0006
1.44E-01	13.	1.2695	3.7109	0.0008	0.0014
1.77E-01	24.	2.3437	6.0547	0.0029	0.0043
2.16E-01	39.	3.8086	9.8633	0.0086	0.0128
2.68E-01	62.	6.0547	15.9180	0.0253	0.0361
3.29E-01	76.	7.4219	23.3398	0.0574	0.0956
4.04E-01	103.	10.0586	33.3984	0.1442	0.2398
4.96E-01	112.	10.9375	44.3359	0.2903	0.5301
6.09E-01	96.	9.3750	53.7109	0.4609	0.9910
7.47E-01	95.	9.2773	62.9883	0.8447	1.8357
9.18E-01	96.	9.3750	72.3633	1.5810	3.4167
1.13E+00	57.	5.5664	77.9297	1.7385	5.1552
1.38E+00	53.	5.1758	83.1055	2.9938	8.1490
1.70E+00	57.	5.5664	88.6719	5.9632	14.1122
2.09E+00	50.	4.8828	93.5547	9.6877	23.7999
2.56E+00	21.	2.0508	95.6055	7.5357	31.3356
3.15E+00	17.	1.6602	97.2656	11.2980	42.6336
3.87E+00	17.	1.6602	98.9258	20.9245	63.5581
4.75E+00	7.	0.6836	99.6094	15.9571	79.5152
5.83E+00	3.	0.2930	99.9023	12.6657	92.1809
7.16E+00	1.	0.0977	100.0000	7.8191	100.0000

SAMPLE ID: LUNG 22 - PREP 2727 U-3 30ML D-401

11-JUL-88

AREA EQUIV. DIAM (UM) DISTRIBUTION FOR SILICA

MACR = 1

AVG=5.43E-01 DEV=8.93E-01 WDEV=1.06E+02 MEDIAN=5.86E-01 MOST PROB.=5.52E-01

Class	Count	%	1	2
Limit	Count	%		
0.0227	0.	0.00		
0.0279	0.	0.00		
0.0343	0.	0.00		
0.0421	0.	0.00		
0.0517	0.	0.00		
0.0635	0.	0.00		
0.0780	3.	0.56	**	
0.0958	1.	0.19	*	
0.1177	3.	0.56	**	
0.1445	6.	1.13	***	
0.1774	7.	1.67	****	
0.2179	15.	2.82	*****	
0.2676	19.	3.58	*****	
0.3286	48.	8.04	*****	
0.4036	45.	8.47	*****	
0.4956	61.	11.49	*****	
0.6086	69.	12.99	*****	
0.7474	58.	10.92	*****	
0.9139	43.	8.10	*****	
1.1272	42.	7.91	*****	
1.3842	36.	6.78	*****	
1.6799	30.	5.65	*****	
2.0676	16.	3.01	*****	
2.5637	5.	0.94	***	
3.1483	3.	1.51	***	
3.8663	5.	0.94	***	
4.7480	1.	0.19	*	
5.8308	4.	0.75	**	
7.1635	1.	0.19	*	
8.7935	3.	0.56	**	
10.799	0.	0.00		
13.262	0.	0.00		
16.286	0.	0.00		
20.000	0.	0.00		

SAMPLE ID: LUNG 22 - PREP 2727 U-3 30ML D-401

11-JUL-88

MASS PERCENTAGE VERSUS DIAMETER FOR MACR 1 SILICA

MASS MEDIAN DIA.= 6.46E+00 UM. RHO= 2.660 AERODYNAMIC DIA.= 1.05E+01 UM.

DIA. (UM.)	RAW COUNT	PERCENTAGES BY COUNT		PERCENTAGES BY MASS	
		DIFF.	INTEGRAL	DIFF.	INTEGRAL
2.27E-02	0.	0.0000	0.0000	0.0000	0.0000
2.79E-02	0.	0.0000	0.0000	0.0000	0.0000
3.43E-02	0.	0.0000	0.0000	0.0000	0.0000
4.21E-02	0.	0.0000	0.0000	0.0000	0.0000
5.17E-02	0.	0.0000	0.0000	0.0000	0.0000
6.35E-02	0.	0.0000	0.0000	0.0000	0.0000
7.80E-02	3.	0.5650	0.5650	0.0000	0.0000
9.58E-02	1.	0.1883	0.7533	0.0000	0.0001
1.18E-01	3.	0.5650	1.3183	0.0001	0.0002
1.44E-01	6.	1.1299	2.4482	0.0004	0.0006
1.77E-01	9.	1.6949	4.1431	0.0011	0.0017
2.18E-01	15.	2.8249	6.9680	0.0035	0.0052
2.68E-01	19.	3.5782	10.5461	0.0082	0.0133
3.29E-01	48.	8.0395	18.5857	0.0382	0.0515
4.04E-01	45.	8.4746	28.0603	0.0663	0.1177
4.96E-01	61.	11.4878	39.5480	0.1663	0.2841
6.09E-01	69.	12.9944	52.5424	0.3484	0.6325
7.47E-01	58.	10.9228	63.4652	0.5425	1.1750
9.18E-01	43.	8.0979	71.5631	0.7443	1.9198
1.13E+00	42.	7.9096	79.4727	1.3474	3.2672
1.38E+00	36.	6.7797	86.2524	2.1389	5.4061
1.70E+00	30.	5.6497	91.9021	3.3011	8.7072
2.09E+00	16.	3.0132	94.9153	3.2807	11.9879
2.56E+00	5.	0.9416	95.8569	1.8872	13.8750
3.15E+00	5.	1.5066	97.3635	5.5922	19.4473
3.87E+00	5.	0.9416	98.3051	6.4731	25.9204
4.75E+00	1.	0.1883	98.4934	2.3977	28.3181
5.83E+00	4.	0.7533	99.2467	17.7626	46.0807
7.16E+00	1.	0.1883	99.4350	8.2243	54.3049
8.79E+00	3.	0.5650	100.0000	45.6951	100.0000
1.08E+01	0.	0.0000	100.0000	0.0000	100.0000
1.33E+01	0.	0.0000	100.0000	0.0000	100.0000
1.63E+01	0.	0.0000	100.0000	0.0000	100.0000
2.00E+01	0.	0.0000	100.0000	0.0000	100.0000

AREA EQUIV. DIAM (UM) DISTRIBUTION FOR TOT. EXOGENOUS MACR = 15

AVG=0.127E+01 DEV=0.00E+01 ADEV=0.00E+01 MEDIAN=5.62E-01 MOST PROB.=4.50E-01

Class	Count	1	2
0.0227	0.	0.000	0.000
0.0279	1.	0.100	0.100
0.0343	0.	0.000	0.000
0.0421	0.	0.000	0.000
0.0517	1.	0.100	0.100
0.0635	2.	0.190*	0.190*
0.0750	3.	0.290*	0.290*
0.0958	4.	0.390*	0.390*
0.1177	9.	0.870**	0.870**
0.1445	17.	1.640***	1.640***
0.1774	17.	1.640***	1.640***
0.2179	35.	3.380*****	3.380*****
0.2676	55.	5.310*****	5.310*****
0.3286	94.	9.080*****	9.080*****
0.4006	101.	9.760*****	9.760*****
0.4956	117.	11.300*****	11.300*****
0.6066	104.	10.050*****	10.050*****
0.7474	97.	9.370*****	9.370*****
0.9179	83.	8.020*****	8.020*****
1.1272	81.	7.930*****	7.930*****
1.3842	66.	6.380*****	6.380*****
1.6999	59.	5.700*****	5.700*****
2.0876	38.	3.870*****	3.870*****
2.5607	14.	1.350****	1.350****
3.1463	14.	1.350****	1.350****
3.8663	8.	0.770**	0.770**
4.7460	4.	0.390*	0.390*
5.8308	5.	0.480*	0.480*
7.1605	2.	0.190*	0.190*
8.7925	3.	0.290*	0.290*
10.799	0.	0.000	0.000
13.262	0.	0.000	0.000
16.286	0.	0.000	0.000
20.000	1.	0.100	0.100

SAMPLE ID: LUNG 22 - PREP 2727 U-3 30ML D-401

11-JUL-88

MASS PERCENTAGE VERSUS DIAMETER FOR MACR 15 TOT. EXOGENOUS

MASS MEDIAN DIA.= 1.67E+01 UM. RHO= 3.000 AERODYNAMIC DIA.= 1.88E+01 UM.

DIA. (UM.)	RAW COUNT	PERCENTAGES BY COUNT		PERCENTAGES BY MASS	
		DIFF.	INTEGRAL	DIFF.	INTEGRAL
2.27E-02	0.	0.0000	0.0000	0.0000	0.0000
2.79E-02	1.	0.0966	0.0966	0.0000	0.0000
3.43E-02	0.	0.0000	0.0966	0.0000	0.0000
4.21E-02	0.	0.0000	0.0966	0.0000	0.0000
5.17E-02	1.	0.0966	0.1932	0.0000	0.0000
6.35E-02	2.	0.1932	0.3865	0.0000	0.0000
7.80E-02	3.	0.2899	0.6763	0.0000	0.0000
9.56E-02	4.	0.3865	1.0628	0.0000	0.0000
1.18E-01	9.	0.8676	1.9324	0.0001	0.0001
1.44E-01	17.	1.6425	3.5749	0.0004	0.0005
1.77E-01	17.	1.6425	5.2174	0.0007	0.0012
2.18E-01	35.	3.3816	8.5990	0.0025	0.0037
2.68E-01	55.	5.3140	13.9130	0.0073	0.0110
3.29E-01	94.	9.0821	22.9952	0.0232	0.0341
4.04E-01	101.	9.7585	32.7536	0.0461	0.0802
4.96E-01	117.	11.3043	44.0580	0.0988	0.1790
6.09E-01	104.	10.0483	54.1063	0.1627	0.3417
7.47E-01	97.	9.3720	63.4783	0.2811	0.6228
9.13E-01	83.	8.0193	71.4976	0.4454	1.0682
1.10E+00	81.	7.8261	79.3237	0.8050	1.8733
1.38E+00	66.	6.3768	85.7005	1.2149	3.0882
1.70E+00	59.	5.7005	91.4010	2.0114	5.0995
2.09E+00	38.	3.6715	95.0725	2.3992	7.4988
2.56E+00	14.	1.3527	96.4251	1.6371	9.1358
3.15E+00	14.	1.3527	97.7778	3.0319	12.1678
3.87E+00	8.	0.7729	98.5507	3.2087	15.3765
4.75E+00	4.	0.3865	98.9372	2.9714	18.3479
5.83E+00	5.	0.4831	99.4203	6.3788	25.2267
7.16E+00	2.	0.1932	99.6135	5.0960	30.3227
8.79E+00	3.	0.2899	99.9034	14.1569	44.4796
1.08E+01	0.	0.0000	99.9034	0.0000	44.4796
1.33E+01	0.	0.0000	99.9034	0.0000	44.4796
1.63E+01	0.	0.0000	99.9034	0.0000	44.4796
2.00E+01	1.	0.0966	100.0000	55.5204	100.0000

SAMPLE ID: LUNG 22 - PREP 2714 U-4 7ML D-415

11-JUL-88

AREA EQUIV. DIAM (UM) DISTRIBUTION FOR SILICA

MACR = 1

AVG=6.38E-01 DEV=6.81E-01 XDEV=9.70E+01 MEDIAN=5.06E-01 MOST PROB.=5.52E-01

Class	Count	%	0	1	2
0.0421	0.	0.00[			
0.0517	1.	0.23[*			
0.0635	0.	0.00[			
0.0750	1.	0.23[*			
0.0958	2.	0.45[*			
0.1177	7.	1.58[****			
0.1445	5.	1.36[****			
0.1774	16.	3.62[*****			
0.2179	31.	7.01[*****			
0.2676	30.	6.79[*****			
0.3286	37.	8.37[*****			
0.4036	35.	7.92[*****			
0.4956	50.	11.31[*****			
0.6086	55.	12.44[*****			
0.7474	43.	9.73[*****			
0.9179	33.	7.47[*****			
1.1272	39.	8.82[*****			
1.3842	18.	4.07[*****			
1.6999	11.	2.49[*****			
2.0876	10.	2.26[*****			
2.5637	4.	0.90[**			
3.1483	5.	1.13[***			
3.8663	5.	1.13[***			
4.7480	2.	0.45[*			
5.8308	0.	0.00[			
7.1605	1.	0.23[*			
8.7935	0.	0.00[			
10.799	0.	0.00[			

SAMPLE ID: LUNG 22 - PREP 2714 U-4 7ML D-415

11-JUL-88

MASS PERCENTAGE VERSUS DIAMETER FOR MACR 1 SILICA

MASS MEDIAN DIA.= 3.56E+00 UM. RHO= 2.660 AERODYNAMIC DIA.= 5.61E+00 UM.

DIA. (UM.)	RAW COUNT	PERCENTAGES BY COUNT		PERCENTAGES BY MASS	
		DIFF.	INTEGRAL	DIFF.	INTEGRAL
4.21E-02	0.	0.0000	0.0000	0.0000	0.0000
5.17E-02	1.	0.2262	0.2262	0.0000	0.0000
6.35E-02	0.	0.0000	0.2262	0.0000	0.0000
7.80E-02	1.	0.2262	0.4525	0.0000	0.0000
9.58E-02	2.	0.4525	0.9050	0.0001	0.0002
1.18E-01	7.	1.5837	2.4887	0.0008	0.0010
1.44E-01	6.	1.3575	3.8462	0.0013	0.0023
1.77E-01	16.	3.6199	7.4661	0.0063	0.0086
2.18E-01	31.	7.0136	14.4796	0.0228	0.0314
2.66E-01	30.	6.7873	21.2670	0.0408	0.0722
3.29E-01	37.	8.3710	29.6380	0.0932	0.1654
4.04E-01	35.	7.9186	37.5566	0.1633	0.3287
4.96E-01	50.	11.3122	48.8688	0.4320	0.7607
6.09E-01	55.	12.4434	61.3122	0.8801	1.6408
7.47E-01	43.	9.7285	71.0407	1.2744	2.9151
9.18E-01	33.	7.4661	78.5068	1.8113	4.7264
1.13E+00	39.	8.8235	87.3303	3.9645	8.6909
1.38E+00	18.	4.0724	91.4027	3.3888	12.0798
1.70E+00	11.	2.4887	93.8914	3.8355	15.9153
2.09E+00	10.	2.2624	96.1538	6.4577	22.3730
2.56E+00	4.	0.9050	97.0588	4.7840	27.1570
3.15E+00	5.	1.1312	98.1900	11.0752	38.2322
3.87E+00	5.	1.1312	99.3212	20.5117	58.7439
4.75E+00	2.	0.4525	99.7738	15.1954	73.9393
5.83E+00	0.	0.0000	99.7738	0.0000	73.9393
7.16E+00	1.	0.2262	100.0000	26.0606	100.0000
8.79E+00	0.	0.0000	100.0000	0.0000	100.0000
1.08E+01	0.	0.0000	100.0000	0.0000	100.0000

AREA EQUIV. DIAM (UM) DISTRIBUTION FOR TOT. EXOGENOUS MACR = 15

 AVG=7.67E-01 DEV=8.07E-01 XDEV=1.05E+02 MEDIAN=5.34E-01 MOST PROB.=5.52E-01

Class	0	1	2
limit	Count	%	%
0.0421	0.	0.00[	
0.0517	5.	0.46[*	
0.0635	1.	0.09[	
0.0780	4.	0.37[*	
0.0958	5.	0.46[*	
0.1177	10.	0.91[**	
0.1445	17.	1.55[****	
0.1774	26.	2.38[*****	
0.2179	57.	5.21[*****	
0.2676	69.	6.31[*****	
0.3266	95.	8.68[*****	
0.4036	101.	9.23[*****	
0.4956	114.	10.42[*****	
0.6086	125.	11.43[*****	
0.7474	116.	10.60[*****	
0.9179	88.	8.04[*****	
1.1272	75.	6.86[*****	
1.3842	56.	5.12[*****	
1.6999	37.	3.38[*****	
2.0876	29.	2.65[*****	
2.5637	19.	1.74[*****	
3.1483	18.	1.65[*****	
3.8663	16.	1.46[*****	
4.7480	5.	0.46[*	
5.8308	1.	0.09[	
7.1605	4.	0.37[*	
8.7935	0.	0.00[	
10.799	1.	0.09[	

SAMPLE ID: LUNG 22 - PREP 2714 U-4 7ML D-415

11-JUL-88

MASS PERCENTAGE VERSUS DIAMETER FOR MACR 15 TOT. EXOGENOUS

 MASS MEDIAN DIA.= 4.51E+00 UM. RHD= 3.000 AERODYNAMIC DIA.= 7.81E+00 UM.

DIA. (UM.)	RAW COUNT	PERCENTAGES BY COUNT		PERCENTAGES BY MASS	
		DIFF.	INTEGRAL	DIFF.	INTEGRAL
4.21E-02	0.	0.0000	0.0000	0.0000	0.0000
5.17E-02	5.	0.4570	0.4570	0.0000	0.0000
6.35E-02	1.	0.0914	0.5484	0.0000	0.0000
7.80E-02	4.	0.3656	0.9141	0.0000	0.0000
9.58E-02	5.	0.4570	1.3711	0.0001	0.0001
1.18E-01	10.	0.9141	2.2852	0.0003	0.0004
1.44E-01	17.	1.5539	3.8391	0.0006	0.0012
1.77E-01	26.	2.3766	6.2157	0.0024	0.0036
2.18E-01	57.	5.2102	11.4260	0.0096	0.0132
2.68E-01	69.	6.3071	17.7331	0.0215	0.0347
3.29E-01	95.	8.6837	26.4168	0.0549	0.0895
4.04E-01	101.	9.2322	35.6490	0.1081	0.1977
4.96E-01	114.	10.4205	46.0695	0.2260	0.4237
6.09E-01	125.	11.4260	57.4954	0.4589	0.8827
7.47E-01	116.	10.6033	68.0987	0.7988	1.6715
9.18E-01	88.	8.0439	76.1426	1.1082	2.7797
1.13E+00	75.	6.8556	82.9982	1.7493	4.5290
1.38E+00	56.	5.1188	88.1170	2.4190	6.9480
1.70E+00	37.	3.3821	91.4991	2.9601	9.9082
2.09E+00	29.	2.6508	94.1499	4.2969	14.2051
2.56E+00	19.	1.7367	95.8867	5.2139	19.4189
3.15E+00	18.	1.6453	97.5320	7.1481	26.5671
3.87E+00	16.	1.4625	98.9945	15.0602	43.6272
4.75E+00	5.	0.4570	99.4516	8.7163	52.3435
5.83E+00	1.	0.0914	99.5430	3.2286	55.5721
7.16E+00	4.	0.3656	99.9086	23.9179	79.4900
8.79E+00	0.	0.0000	99.9086	0.0000	79.4900
1.08E+01	1.	0.0914	100.0000	20.5100	100.0000

SAMPLE 10: LUNG 22 - PREP 2715 U-5 7ML D-397.481

11-JUL-88

AREA EQUIV. DIAM. (UM) DISTRIBUTION FOR SILICA

MACR: 1

AVG=7.76E+01 DEV=7.02E+01 NDEV=9.71E+01 MEDIAN=5.38E+01 MGS1 PROB=3.66E-01

Class	Count	1	2
0.0227	0.	0.000	0.000
0.0279	1.	0.220*	
0.0343	0.	0.000	
0.0421	0.	0.000	
0.0517	2.	0.450*	
0.0625	1.	0.220*	
0.0750	1.	0.220*	
0.0958	4.	0.890**	
0.1177	10.	2.230*****	
0.1445	11.	2.490*****	
0.1774	7.	1.560****	
0.2179	22.	4.900*****	
0.2676	27.	6.010*****	
0.3286	34.	7.570*****	
0.4036	51.	11.360*****	
0.4954	38.	8.460*****	
0.6086	41.	9.130*****	
0.7474	50.	11.140*****	
0.9179	33.	7.350*****	
1.1272	35.	7.800*****	
1.3842	22.	4.900*****	
1.6777	13.	4.010*****	
2.0676	13.	2.930*****	
2.5637	15.	3.540*****	
3.1483	6.	1.340****	
3.8663	4.	0.890**	
4.7480	1.	0.220*	
5.8396	1.	0.220*	
7.1605	1.	0.220*	
8.7935	0.	0.000	
10.799	0.	0.000	
13.232	0.	0.000	

SAMPLE 10: LUNG 22 - PREP 2715 U-5 7ML D-397.481

11-JUL-88

MASS PERCENTAGE VERSUS DIAMETER FOR MACR 1 SILICA

MASS MEDIAN DIA.= 5.38E+00 UM. RHO= 2.650 AERODYNAMIC DIA.= 5.34E+00 UM.

DIA. (UM.)	RAW COUNT	PERCENTAGES BY COUNT		PERCENTAGES BY MASS	
		DIFF.	INTEGRAL	DIFF.	INTEGRAL
2.27E-02	0.	0.0000	0.0000	0.0000	0.0000
2.79E-02	1.	0.2227	0.2227	0.0000	0.0000
3.43E-02	0.	0.0000	0.2227	0.0000	0.0000
4.21E-02	0.	0.0000	0.2227	0.0000	0.0000
5.17E-02	2.	0.4454	0.6682	0.0000	0.0000
6.35E-02	1.	0.2227	0.8909	0.0000	0.0000
7.80E-02	1.	0.2227	1.1136	0.0000	0.0001
9.58E-02	4.	0.8909	2.0045	0.0002	0.0003
1.18E-01	10.	2.2272	4.2316	0.0009	0.0012
1.44E-01	11.	2.4499	6.6815	0.0019	0.0031
1.77E-01	7.	1.5590	8.2405	0.0033	0.0054
2.18E-01	22.	4.8996	13.1403	0.0132	0.0186
2.68E-01	27.	6.0134	19.1537	0.0300	0.0486
3.29E-01	34.	7.5724	26.7261	0.0700	0.1186
4.04E-01	51.	11.3586	38.0846	0.1944	0.3130
4.96E-01	38.	8.4633	46.5479	0.2682	0.5812
6.09E-01	41.	9.1314	55.6793	0.5360	1.1172
7.47E-01	50.	11.1359	66.8151	1.2106	2.3278
9.18E-01	33.	7.3497	74.1648	1.4796	3.8076
1.13E+00	35.	7.7951	81.9599	2.9068	6.7144
1.38E+00	22.	4.8996	86.8597	3.3839	10.0983
1.70E+00	15.	4.0089	90.8686	5.1276	15.2259
2.09E+00	13.	2.8953	93.7639	6.8586	22.0845
2.56E+00	15.	3.5408	97.3047	14.6567	36.7412
3.15E+00	6.	1.3363	98.6410	16.3580	47.5992
3.87E+00	4.	0.8909	99.5319	13.4063	61.0055
4.75E+00	1.	0.2227	99.7546	6.2672	67.2127
5.83E+00	1.	0.2227	99.9773	11.4961	78.7088
7.16E+00	1.	0.2227	100.0000	21.2912	100.0000
8.79E+00	0.	0.0000	100.0000	0.0000	100.0000
1.08E+01	0.	0.0000	100.0000	0.0000	100.0000
1.33E+01	0.	0.0000	100.0000	0.0000	100.0000

AREA EQUIV. DIAM (UM) DISTRIBUTION FOR TOT. EXOGENOUS MACR = 15

AVG=7.50E-01 DEV=0.00E-01 XDEV=0.00E-01 MEDIAN=5.14E-01 MOST PROB.=3.56E-01

Class	Count	1	2
0.0227	0.	0.000	0.000
0.0279	1.	0.100	0.100
0.0343	0.	0.000	0.000
0.0421	0.	0.000	0.000
0.0517	3.	0.290*	0.290*
0.0635	5.	0.230*	0.230*
0.0780	4.	0.390*	0.390*
0.0956	6.	0.590**	0.590**
0.1177	18.	1.760*****	1.760*****
0.1445	19.	1.860*****	1.860*****
0.1774	26.	2.550*****	2.550*****
0.2179	45.	4.410*****	4.410*****
0.2676	72.	7.050*****	7.050*****
0.3286	84.	8.230*****	8.230*****
0.4036	119.	11.560*****	11.560*****
0.4956	93.	9.110*****	9.110*****
0.5986	106.	10.360*****	10.360*****
0.7474	32.	3.030*****	3.030*****
0.9179	32.	3.030*****	3.030*****
1.1272	74.	7.250*****	7.250*****
1.3842	61.	5.970*****	5.970*****
1.6799	36.	3.530*****	3.530*****
2.0676	29.	2.840*****	2.840*****
2.5637	28.	2.740*****	2.740*****
3.1483	16.	1.570****	1.570****
3.8663	5.	0.490*	0.490*
4.7480	4.	0.390*	0.390*
5.8308	3.	0.290*	0.290*
7.1605	1.	0.100	0.100
8.7935	0.	0.000	0.000
10.799	0.	0.000	0.000
13.262	1.	0.100	0.100

SAMPLE ID: LUNG 22 - PREP 2715 U-5 TML D-397.4B1

11-JUL-86

MASS PERCENTAGE VERSUS DIAMETER FOR MACR 15 TOT. EXOGENOUS

MASS MEDIAN DIA.= 5.43E+00 UM. RHO= 3.000 AERODYNAMIC DIA.= 9.41E+00 UM.

DIA. (UM.)	SAW COUNT	PERCENTAGES BY COUNT		PERCENTAGES BY MASS	
		DIFF.	INTEGRAL	DIFF.	INTEGRAL
2.27E-02	0.	0.0000	0.0000	0.0000	0.0000
2.79E-02	1.	0.0979	0.0979	0.0000	0.0000
3.43E-02	0.	0.0000	0.0979	0.0000	0.0000
4.21E-02	0.	0.0000	0.0979	0.0000	0.0000
5.17E-02	3.	0.2938	0.3918	0.0000	0.0000
6.35E-02	5.	0.2938	0.6856	0.0000	0.0000
7.80E-02	4.	0.3918	1.0774	0.0000	0.0001
9.58E-02	6.	0.5877	1.6650	0.0001	0.0001
1.18E-01	18.	1.7630	3.4280	0.0005	0.0006
1.44E-01	19.	1.8609	5.2889	0.0010	0.0016
1.77E-01	26.	2.5465	7.8355	0.0025	0.0041
2.18E-01	45.	4.4074	12.2429	0.0080	0.0121
2.68E-01	72.	7.0519	19.2948	0.0236	0.0357
3.29E-01	84.	8.2272	27.5220	0.0511	0.0868
4.04E-01	119.	11.5552	39.1773	0.1340	0.2208
4.96E-01	93.	9.1087	48.2860	0.1940	0.4148
6.09E-01	106.	10.3620	58.6480	0.4094	0.8242
7.47E-01	82.	8.0313	66.6793	0.5866	1.4108
9.18E-01	82.	8.0313	74.7307	1.0864	2.4971
1.13E+00	74.	7.2478	81.9785	1.8157	4.3129
1.38E+00	61.	5.9745	87.9530	2.7720	7.0849
1.70E+00	36.	3.5260	91.4789	3.0299	10.1148
2.09E+00	29.	2.8404	94.3193	4.5203	14.6351
2.56E+00	28.	2.7424	97.0617	6.0832	22.7183
3.15E+00	16.	1.5671	98.6288	8.5545	31.2728
3.87E+00	5.	0.4697	99.1185	9.9510	36.2239
4.75E+00	4.	0.3918	99.5103	7.3256	43.5595
5.83E+00	3.	0.2938	99.8041	10.1694	53.7489
7.16E+00	1.	0.0979	99.9021	6.2904	60.0393
8.79E+00	0.	0.0000	99.9021	0.0000	60.0393
1.08E+01	0.	0.0000	99.9021	0.0000	60.0393
1.33E+01	1.	0.3979	100.0000	39.9607	100.0000

SAMPLE ID: LUNG 22 - PREP 2716 U-6 TML D-415,416

11-JUL-88

AREA EQUIV. DIAM (UM) DISTRIBUTION FOR SILICA

MACR = 1

AVG=7.91E-01 DEV=0.70E-01 MODV=7.00E+01 MEDIAN=6.58E-01 MOST PROB.=6.78E-01

Class	Count	%	0	1	2
0.0227	0.	0.00[			
0.0279	0.	0.00[			
0.0343	0.	0.00[			
0.0421	0.	0.00[			
0.0517	1.	0.19[*			
0.0633	3.	0.57[**			
0.0780	4.	0.76[**			
0.0958	1.	0.19[*			
0.1177	2.	0.38[*			
0.1445	3.	0.57[**			
0.1774	6.	1.15[***			
0.2179	15.	2.67[*****			
0.2676	28.	5.35[*****			
0.3286	36.	6.86[*****			
0.4036	42.	8.03[*****			
0.4956	52.	9.94[*****			
0.6086	43.	8.22[*****			
0.7474	71.	13.58[*****			
0.9179	53.	10.13[*****			
1.1272	61.	11.66[*****			
1.3842	40.	7.65[*****			
1.6999	27.	5.16[*****			
2.0876	13.	2.49[*****			
2.5637	10.	1.91[*****			
3.1483	11.	2.10[*****			
3.8663	1.	0.19[*			
4.7486	0.	0.00[			
5.8308	0.	0.00[			
7.1605	0.	0.00[			
8.7935	0.	0.00[			
10.799	0.	0.00[			

SAMPLE ID: LUNG 22 - PREP 2716 U-6 TML D-415,416

11-JUL-88

MASS PERCENTAGE VERSUS DIAMETER FOR MACR 1 SILICA

MASS MEDIAN DIA.= 2.14E+00 UM. RHD= 3.660 AERODYNAMIC DIA.= 3.49E+00 UM.

DIA. (UM.)	RAW COUNT	PERCENTAGES BY COUNT		PERCENTAGES BY MASS	
		DIFF.	INTEGRAL	DIFF.	INTEGRAL
2.27E-02	0.	0.0000	0.0000	0.0000	0.0000
2.79E-02	0.	0.0000	0.0000	0.0000	0.0000
3.43E-02	0.	0.0000	0.0000	0.0000	0.0000
4.21E-02	0.	0.0000	0.0000	0.0000	0.0000
5.17E-02	1.	0.1912	0.1912	0.0000	0.0000
6.35E-02	3.	0.5736	0.7648	0.0001	0.0001
7.80E-02	4.	0.7648	1.5296	0.0002	0.0003
9.58E-02	1.	0.1912	1.7208	0.0001	0.0003
1.18E-01	2.	0.3824	2.1033	0.0003	0.0006
1.44E-01	3.	0.5736	2.6769	0.0006	0.0014
1.77E-01	6.	1.1472	3.8241	0.0030	0.0045
2.18E-01	15.	2.6681	6.4922	0.0140	0.0185
2.68E-01	28.	5.3537	12.0459	0.0485	0.0671
3.29E-01	36.	6.8634	18.9293	0.1156	0.1826
4.04E-01	42.	8.0306	26.9598	0.2497	0.4324
4.96E-01	52.	9.9426	36.9025	0.5726	1.0050
6.09E-01	43.	8.2218	45.1243	0.8770	1.8820
7.47E-01	71.	13.5755	58.6998	2.6819	4.5639
9.18E-01	53.	10.1338	68.8337	3.7077	8.2716
1.13E+00	61.	11.6635	80.4971	7.9034	16.1751
1.38E+00	40.	7.6482	88.1453	9.5983	25.7734
1.70E+00	27.	5.1625	93.3078	11.9992	37.7726
2.09E+00	13.	2.4857	95.7935	10.6999	48.4725
2.56E+00	10.	1.9120	97.7056	15.2437	63.7162
3.15E+00	11.	2.1033	99.8088	31.0551	94.7713
3.87E+00	1.	0.1912	100.0000	5.2287	100.0000
4.75E+00	0.	0.0000	100.0000	0.0000	100.0000
5.83E+00	0.	0.0000	100.0000	0.0000	100.0000
7.16E+00	0.	0.0000	100.0000	0.0000	100.0000
8.79E+00	0.	0.0000	100.0000	0.0000	100.0000
1.08E+01	0.	0.0000	100.0000	0.0000	100.0000

AREA EQUIV. DIAM (UM) DISTRIBUTION FOR TOT. EXOGENOUS MACR = 15

AVG=8.02E-01 DEV=6.82E-01 XDEV=8.50E+01 MEDIAN=6.31E-01 MOST PROB.=6.78E-01

Class	Count	%	0	1	2
0.0227	0.	0.00[			
0.0279	1.	0.09[			
0.0343	0.	0.00[			
0.0421	0.	0.00[			
0.0517	3.	0.27[*			
0.0635	3.	0.27[*			
0.0780	6.	0.53[*			
0.0958	4.	0.36[*			
0.1177	8.	0.71[**			
0.1445	16.	1.42[***			
0.1774	20.	1.78[****			
0.2179	38.	3.08[*****			
0.2676	66.	5.87[*****			
0.3286	91.	7.20[*****			
0.4036	93.	7.38[*****			
0.4956	115.	10.22[*****			
0.6066	95.	8.44[*****			
0.7474	146.	12.35[*****			
0.9179	105.	9.33[*****			
1.1272	112.	9.96[*****			
1.3842	75.	6.67[*****			
1.6999	56.	4.96[*****			
2.0676	29.	2.58[*****			
2.5637	28.	2.49[*****			
3.1483	26.	2.31[*****			
3.8663	6.	0.53[*			
4.7480	1.	0.09[			
5.8308	1.	0.09[			
7.1695	0.	0.00[			
8.7935	0.	0.00[			
10.799	1.	0.09[			

SAMPLE ID: LUNG 22 - PREP 2716 U-6 7ML D-415,416

11-JUL-68

MASS PERCENTAGE VERSUS DIAMETER FOR MACR 15 TOT. EXOGENOUS

MASS MEDIAN DIA.= 2.98E+00 UM, RHD= 3.000 AERODYNAMIC DIA.= 5.17E+00 UM.

DIA. (UM.)	RAW COUNT	PERCENTAGES BY COUNT		PERCENTAGES BY MASS	
		DIFF.	INTEGRAL	DIFF.	INTEGRAL
2.27E-02	0.	0.0000	0.0000	0.0000	0.0000
2.79E-02	1.	0.0689	0.0689	0.0000	0.0000
3.43E-02	0.	0.0000	0.0689	0.0000	0.0000
4.21E-02	0.	0.0000	0.0689	0.0000	0.0000
5.17E-02	3.	0.2667	0.3556	0.0000	0.0000
6.35E-02	3.	0.2667	0.6222	0.0000	0.0000
7.80E-02	6.	0.5333	1.1556	0.0001	0.0001
9.58E-02	4.	0.3556	1.5111	0.0001	0.0002
1.18E-01	8.	0.7111	2.2222	0.0003	0.0005
1.44E-01	16.	1.4222	3.6444	0.0011	0.0016
1.77E-01	20.	1.7778	5.4222	0.0026	0.0042
2.18E-01	38.	3.6778	9.1000	0.0092	0.0134
2.68E-01	66.	5.8667	14.9667	0.0295	0.0429
3.29E-01	91.	7.2000	21.6667	0.0672	0.1101
4.04E-01	93.	7.3778	29.0444	0.1274	0.2375
4.96E-01	115.	10.2222	39.2667	0.3270	0.5646
6.09E-01	95.	8.4444	47.7111	0.5003	1.0649
7.47E-01	146.	12.9778	60.6889	1.4241	2.4890
9.18E-01	105.	9.3333	70.2222	1.8968	4.3858
1.13E+00	112.	9.9556	80.1778	3.7472	8.1330
1.38E+00	75.	6.6667	86.8444	4.6473	12.7802
1.70E+00	56.	4.9778	91.8222	6.4265	19.2068
2.09E+00	29.	2.5778	94.4000	6.1636	25.3704
2.56E+00	28.	2.4889	96.8889	11.0217	36.3921
3.15E+00	26.	2.3111	99.2000	18.9546	55.3467
3.87E+00	6.	0.5333	99.7333	8.1011	63.4478
4.75E+00	1.	0.0889	99.8222	2.5006	65.9484
5.83E+00	1.	0.0889	99.9111	4.6312	70.5796
7.16E+00	0.	0.0000	99.9111	0.0000	70.5796
8.79E+00	0.	0.0000	99.9111	0.0000	70.5796
1.08E+01	1.	0.0889	100.0000	29.4204	100.0000

SAMPLE ID: LUNG 22 - PREP 2773 CUI-CUG 70ML D-416,480 11-JUL-98

AREA EQUIV. DIAM (UM) DISTRIBUTION FOR SILICA MACR = 1

AVG=7.64E+01 DEV=7.75E+01 CDEV=1.00E+02 MEDIAN=5.42E+01 MOST PROB.=5.52E+01

Class	Count	%	1	2
0.0421	0.	0.00[		
0.0517	4.	0.66[**		
0.0635	0.	0.00[		
0.0780	5.	0.82[**		
0.0958	2.	0.33[*		
0.1177	4.	0.66[**		
0.1443	16.	2.62[*****		
0.1774	20.	3.28[*****		
0.2179	37.	6.07[*****		
0.2676	34.	5.57[*****		
0.3256	46.	7.54[*****		
0.4036	46.	7.54[*****		
0.4956	60.	9.84[*****		
0.6086	75.	12.39[*****		
0.7474	60.	9.84[*****		
0.9179	50.	8.20[*****		
1.1272	40.	6.56[*****		
1.3842	37.	6.07[*****		
1.6999	26.	4.26[*****		
2.0876	16.	2.62[*****		
2.5637	6.	0.98[***		
3.1483	13.	2.13[*****		
3.8663	3.	0.49[*		
4.7480	5.	0.82[**		
5.8308	5.	0.82[**		
7.1605	0.	0.00[		
8.7935	0.	0.00[		
10.799	0.	0.00[		

SAMPLE ID: LUNG 22 - PREP 2773 CUI-CUG 70ML D-416,480 11-JUL-98

MASS PERCENTAGE VERSUS DIAMETER FOR MACR 1 SILICA

MASS MEDIAN DIA.= 4.13E+00 UM. RHD= 2.660 AERODYNAMIC DIA.= 6.74E+00 UM.

DIA. (UM.)	RAW COUNT	PERCENTAGES BY COUNT		PERCENTAGES BY MASS	
		DIFF.	INTEGRAL	DIFF.	INTEGRAL
4.21E-02	0.	0.0000	0.0000	0.0000	0.0000
5.17E-02	4.	0.6557	0.6557	0.0000	0.0000
6.35E-02	0.	0.0000	0.6557	0.0000	0.0000
7.80E-02	5.	0.8197	1.4754	0.0001	0.0001
9.58E-02	2.	0.3279	1.8033	0.0001	0.0002
1.16E-01	4.	0.6557	2.4590	0.0002	0.0004
1.44E-01	16.	2.6230	5.0820	0.0018	0.0022
1.77E-01	20.	3.2787	8.3607	0.0041	0.0063
2.18E-01	37.	6.0656	14.4262	0.0140	0.0203
2.66E-01	34.	5.5738	20.0000	0.0239	0.0442
3.29E-01	46.	7.5410	27.5410	0.0598	0.1040
4.04E-01	46.	7.5410	35.0820	0.1108	0.2148
4.96E-01	60.	9.8361	44.9180	0.2676	0.4824
6.09E-01	75.	12.2951	57.2131	0.6196	1.1019
7.47E-01	60.	9.8361	67.0492	0.9180	2.0199
9.13E-01	50.	8.1967	75.2459	1.4167	3.4366
1.13E+00	40.	6.5574	81.8033	2.0991	5.5357
1.38E+00	37.	6.0656	87.8689	3.5960	9.1318
1.70E+00	26.	4.2623	92.1312	4.6890	13.8118
2.09E+00	16.	2.6230	94.7541	5.3339	19.1457
2.56E+00	6.	0.9836	95.7377	6.7045	22.8502
3.15E+00	13.	2.1311	97.8689	14.6652	37.5154
3.87E+00	3.	0.4918	98.3607	6.3533	44.0687
4.75E+00	5.	0.8197	99.1803	19.6110	63.6796
5.83E+00	5.	0.8197	100.0000	36.3204	100.0000
7.16E+00	0.	0.0000	100.0000	0.0000	100.0000
8.79E+00	0.	0.0000	100.0000	0.0000	100.0000
1.08E+01	0.	0.0000	100.0000	0.0000	100.0000

SAMPLE ID: LUNG 22 - PREP 2773 CUI-CUG 70ML D-416,480

11-JUL-88

AREA EQUIV. DIAM (UM) DISTRIBUTION FOR TOT. EXOGENOUS MACR = 15

AVG=7.67E+01 DEV=5.58E+01 XDEV=1.25E+02 MEDIAN=5.01E+01 MOST PROB.=5.52E+01

DIAM	COUNT	PERCENT	PERCENT
DIAM	COUNT	PERCENT	PERCENT
0.0421	0.	0.000	0.000
0.0517	5.	0.450	0.450
0.0635	0.	0.000	0.000
0.0750	5.	0.750	0.750
0.0958	7.	0.840	0.840
0.1177	10.	1.180	1.180
0.1445	26.	2.370	2.370
0.1774	40.	3.540	3.540
0.2179	71.	6.460	6.460
0.2678	80.	7.550	7.550
0.3286	92.	8.370	8.370
0.4036	96.	8.740	8.740
0.4956	103.	9.370	9.370
0.6066	117.	10.650	10.650
0.7474	96.	8.740	8.740
0.9175	78.	7.100	7.100
1.1272	74.	6.730	6.730
1.3842	60.	5.460	5.460
1.6999	40.	3.640	3.640
2.0878	31.	2.820	2.820
2.5637	14.	1.270	1.270
3.1455	18.	1.640	1.640
3.8663	5.	0.750	0.750
4.7480	5.	0.550	0.550
5.8008	5.	0.450	0.450
7.1605	3.	0.270	0.270
8.7935	2.	0.180	0.180
10.799	3.	0.270	0.270

SAMPLE ID: LUNG 22 - PREP 2773 CUI-CUG 70ML D-416,480

11-JUL-88

MASS PERCENTAGE VERSUS DIAMETER FOR MACR 15 TOT. EXOGENOUS

MASS MEDIAN DIA. = 7.31E+00 UM. RHD= 3.000 AERODYNAMIC DIA. = 1.27E+01 UM.

DIA. (UM.)	COUNT	PERCENTAGES BY COUNT		PERCENTAGES BY MASS	
		DIFF.	INTEGRAL	DIFF.	INTEGRAL
4.21E-02	0.	0.0000	0.0000	0.0000	0.0000
5.17E-02	5.	0.4550	0.4550	0.0000	0.0000
6.35E-02	0.	0.0000	0.4550	0.0000	0.0000
7.80E-02	5.	0.7279	1.1829	0.0000	0.0000
9.58E-02	7.	0.6369	1.8198	0.0001	0.0001
1.18E-01	10.	1.1829	3.0027	0.0002	0.0003
1.44E-01	26.	2.3658	5.3685	0.0008	0.0011
1.77E-01	40.	3.5397	9.0082	0.0022	0.0033
2.18E-01	71.	6.4604	15.4686	0.0073	0.0107
2.68E-01	80.	7.3523	23.0209	0.0159	0.0265
3.29E-01	92.	8.3712	31.3922	0.0326	0.0591
4.04E-01	96.	8.7352	40.1274	0.0629	0.1220
4.96E-01	103.	9.3722	49.4995	0.1250	0.2470
6.09E-01	117.	10.6460	60.1456	0.2630	0.5100
7.47E-01	96.	9.7352	69.8808	0.3997	0.9097
9.18E-01	78.	7.0974	75.9782	0.6015	1.5112
1.13E+00	74.	6.7334	82.7116	1.0568	2.5680
1.38E+00	60.	5.4595	88.1711	1.5870	4.1550
1.70E+00	40.	3.6397	91.8107	1.9594	6.1144
2.09E+00	31.	2.8207	94.6315	2.8124	8.9269
2.56E+00	14.	1.2739	95.9054	2.3523	11.2792
3.15E+00	18.	1.6379	97.5433	5.6014	16.8806
3.87E+00	5.	0.7279	98.2712	4.6107	21.4913
4.75E+00	5.	0.5460	98.8171	6.4044	27.8957
5.83E+00	5.	0.4550	99.2721	9.3943	37.7800
7.16E+00	3.	0.2730	99.5450	10.5537	48.7637
8.79E+00	2.	0.1829	99.7279	13.5615	62.3252
1.08E+01	3.	0.2730	100.0000	27.6748	100.0000

AREA EQUIV. DIAM (UM) DISTRIBUTION FOR SILICA

MACR = 1

AVG=7.15E-01 DEV=5.87E-01 NDEV=6.21E+01 MEDIAN=5.32E-01 MOST PROB.=4.50E-01

Class	0	1	2
Limit	Count	%	
0.0227	0.	0.00[	
0.0279	0.	0.00[	
0.0343	0.	0.00[	
0.0421	0.	0.00[	
0.0517	1.	0.15[	
0.0635	1.	0.15[	
0.0780	3.	0.46[*	
0.0958	5.	0.61[**	
0.1177	8.	1.01[***	
0.1445	14.	2.12[*****	
0.1774	19.	2.88[*****	
0.2179	21.	3.19[*****	
0.2676	42.	6.37[*****	
0.3286	64.	9.71[*****	
0.4036	61.	9.26[*****	
0.4956	71.	10.77[*****	
0.6086	69.	10.47[*****	
0.7474	55.	8.35[*****	
0.9179	56.	8.50[*****	
1.1272	56.	8.50[*****	
1.3842	42.	6.37[*****	
1.6999	31.	4.70[*****	
2.0876	18.	2.73[*****	
2.5637	15.	2.28[*****	
3.1483	4.	0.61[**	
3.8663	5.	0.76[**	
4.7480	1.	0.15[	
5.8308	0.	0.00[	
7.1605	0.	0.00[	

SAMPLE ID: LUNG 22 - PREP 2677 L-1 TML D-452

11-JUL-88

MASS PERCENTAGE VERSUS DIAMETER FOR MACR 1 SILICA

MASS MEDIAN DIA.= 2.25E+00 UM. RHD= 2.660 AERODYNAMIC DIA.= 3.66E+00 UM.

DIA. (UM.)	RAW COUNT	PERCENTAGES BY COUNT		PERCENTAGES BY MASS	
		DIFF.	INTEGRAL	DIFF.	INTEGRAL
2.27E-02	0.	0.0000	0.0000	0.0000	0.0000
2.79E-02	0.	0.0000	0.0000	0.0000	0.0000
3.43E-02	0.	0.0000	0.0000	0.0000	0.0000
4.21E-02	0.	0.0000	0.0000	0.0000	0.0000
5.17E-02	1.	0.1517	0.1517	0.0000	0.0000
6.35E-02	1.	0.1517	0.3035	0.0000	0.0000
7.80E-02	3.	0.4552	0.7587	0.0001	0.0001
9.58E-02	5.	0.9105	1.6692	0.0004	0.0005
1.18E-01	8.	1.2140	2.8832	0.0009	0.0015
1.44E-01	14.	2.1244	5.0076	0.0031	0.0045
1.77E-01	19.	2.2762	7.2838	0.0061	0.0106
2.18E-01	21.	3.1866	10.4704	0.0158	0.0264
2.68E-01	42.	6.3733	16.8437	0.0584	0.0847
3.29E-01	64.	9.7117	26.5554	0.1647	0.2494
4.04E-01	61.	9.2564	35.8118	0.2907	0.5401
4.96E-01	71.	10.7739	46.5857	0.6267	1.1667
6.09E-01	69.	10.4704	57.0561	1.1279	2.2947
7.47E-01	55.	8.3460	65.4021	1.6651	3.9597
9.18E-01	56.	8.4977	73.8999	3.1399	7.0996
1.13E+00	56.	8.4977	82.3976	5.8152	12.9148
1.38E+00	42.	6.3733	88.7709	8.0775	20.9923
1.70E+00	31.	4.7041	93.4750	11.0418	32.0341
2.09E+00	18.	2.7314	96.2064	11.8741	43.9083
2.56E+00	15.	2.2762	98.4826	18.3262	62.2345
3.15E+00	4.	0.6076	99.0895	9.0509	71.2854
3.87E+00	5.	0.7587	99.8483	20.9523	92.2387
4.75E+00	1.	0.1517	100.0000	7.7613	100.0000
5.83E+00	0.	0.0000	100.0000	0.0000	100.0000
7.16E+00	0.	0.0000	100.0000	0.0000	100.0000

AREA EQUIV. DIAM (UM) DISTRIBUTION FOR TOT. EXOGENOUS MACR = 15

AVE=7.33E-01 DEV=0.00E-01 XDEV=0.00E-01 MEDIAN=5.31E-01 MOST PROB.=4.50E-01

Limit	Class	Count	%	0	1	2
0.0227	0.	0.000	0.000	0.000	0.000	0.000
0.0279	0.	0.000	0.000	0.000	0.000	0.000
0.0343	0.	0.000	0.000	0.000	0.000	0.000
0.0421	0.	0.000	0.000	0.000	0.000	0.000
0.0517	2.	0.140	0.140	0.140	0.140	0.140
0.0635	1.	0.070	0.070	0.070	0.070	0.070
0.0790	5.	0.340	0.340	0.340	0.340	0.340
0.0958	7.	0.480	0.480	0.480	0.480	0.480
0.1177	22.	1.500	1.500	1.500	1.500	1.500
0.1443	22.	1.500	1.500	1.500	1.500	1.500
0.1774	35.	2.390	2.390	2.390	2.390	2.390
0.2179	62.	4.230	4.230	4.230	4.230	4.230
0.2673	101.	6.380	6.380	6.380	6.380	6.380
0.3286	132.	9.000	9.000	9.000	9.000	9.000
0.4036	134.	9.130	9.130	9.130	9.130	9.130
0.4956	165.	11.250	11.250	11.250	11.250	11.250
0.6086	146.	9.950	9.950	9.950	9.950	9.950
0.7474	125.	8.520	8.520	8.520	8.520	8.520
0.9179	121.	8.250	8.250	8.250	8.250	8.250
1.1272	112.	7.630	7.630	7.630	7.630	7.630
1.3842	87.	5.930	5.930	5.930	5.930	5.930
1.6999	79.	5.090	5.090	5.090	5.090	5.090
2.0876	50.	3.410	3.410	3.410	3.410	3.410
2.5637	28.	1.910	1.910	1.910	1.910	1.910
3.1483	19.	1.300	1.300	1.300	1.300	1.300
3.8663	9.	0.550	0.550	0.550	0.550	0.550
4.7480	2.	0.140	0.140	0.140	0.140	0.140
5.8308	1.	0.070	0.070	0.070	0.070	0.070
7.1605	1.	0.070	0.070	0.070	0.070	0.070

SAMPLE ID: LUNG 22 - PREP 2877 L-1 7ML D-452

11-JUL-68

MASS PERCENTAGE VERSUS DIAMETER FOR MACR 15 TOT. EXOGENOUS

MASS MEDIAN DIA. = 2.52E+00 UM. RHD = 3.000 AERODYNAMIC DIA. = 4.36E+00 UM.

DIA. (UM.)	RAW COUNT	PERCENTAGES BY COUNT		PERCENTAGES BY MASS	
		DIFF.	INTEGRAL	DIFF.	INTEGRAL
2.27E-02	0.	0.0000	0.0000	0.0000	0.0000
2.79E-02	0.	0.0000	0.0000	0.0000	0.0000
3.43E-02	0.	0.0000	0.0000	0.0000	0.0000
4.21E-02	0.	0.0000	0.0000	0.0000	0.0000
5.17E-02	2.	0.1363	0.1363	0.0000	0.0000
6.35E-02	1.	0.0682	0.2045	0.0000	0.0000
7.80E-02	5.	0.5408	0.5453	0.0001	0.0001
9.58E-02	7.	0.4772	1.0225	0.0002	0.0002
1.18E-01	22.	1.4997	2.5222	0.0010	0.0012
1.44E-01	22.	1.4997	4.0219	0.0018	0.0030
1.77E-01	35.	2.3858	6.4076	0.0052	0.0082
2.18E-01	62.	4.2263	10.6339	0.0171	0.0252
2.68E-01	101.	6.3848	17.5187	0.0515	0.0768
3.29E-01	132.	9.9980	26.5167	0.1247	0.2015
4.04E-01	134.	9.1343	35.6510	0.2345	0.4360
4.96E-01	165.	11.2474	46.8984	0.5348	0.9708
6.09E-01	146.	9.9523	56.8507	0.5764	1.5471
7.47E-01	125.	8.5208	65.3715	1.3896	3.2367
9.18E-01	121.	8.2481	73.6196	2.4913	5.7280
1.13E+00	112.	7.6346	81.2543	4.2707	9.9987
1.38E+00	87.	5.9305	87.1847	6.1440	16.1427
1.70E+00	79.	5.3851	92.5699	10.3327	26.4754
2.09E+00	50.	3.4083	95.9782	12.1117	38.5872
2.56E+00	28.	1.9087	97.8869	12.5616	51.1488
3.15E+00	19.	1.2952	99.1820	15.7866	66.9356
3.87E+00	9.	0.5453	99.7273	12.3106	79.2462
4.75E+00	2.	0.1363	99.8637	5.7000	84.9461
5.83E+00	1.	0.0682	99.9318	5.2793	90.2244
7.16E+00	1.	0.0682	100.0000	9.7756	100.0000

SAMPLE ID: LUNG 22 - PREP 2879 L-2 5ML D-453

11-JUL-88

AREA EQUIV. DIAM (UM) DISTRIBUTION FOR SILICA

MACR = 1

AVG=5.74E-01 DEV=5.66E-01 %DEV=8.39E+01 MEDIAN=5.04E-01 MOST PROB.=4.50E-01

```

----- Class -----0          1          2
Limit Count % 0-----0-----0
0.0421 0. 0.00[
0.0517 1. 0.23[*
0.0635 1. 0.23[*
0.0790 4. 0.91[**
0.0958 5. 1.14[***
0.1177 8. 1.83[****
0.1445 6. 1.37[****
0.1774 8. 1.83[****
0.2179 28. 6.39[*****
0.2676 31. 7.08[*****
0.3286 39. 8.70[*****
0.4036 36. 8.22[*****
0.4956 49. 11.19[*****
0.6086 42. 9.59[*****
0.7474 37. 8.45[*****
0.9179 41. 9.36[*****
1.1272 35. 7.99[*****
1.3842 27. 6.16[*****
1.6999 16. 3.65[*****
2.0876 12. 2.74[*****
2.5637 7. 1.60[****
3.1483 2. 0.46[*
3.8663 1. 0.23[*
4.7480 2. 0.46[*
5.8308 0. 0.00[

```

MASS PERCENTAGE VERSUS DIAMETER FOR MACR 1 SILICA

MASS MEDIAN DIA.= 2.24E+00 UM. RHO= 2.660 AERODYNAMIC DIA.= 3.65E+00 UM.

DIA. (UM.)	RAW COUNT	PERCENTAGES BY COUNT		PERCENTAGES BY MASS	
		DIFF.	INTEGRAL	DIFF.	INTEGRAL
4.21E-02	0.	0.0000	0.0000	0.0000	0.0000
5.17E-02	1.	0.2283	0.2283	0.0000	0.0000
6.35E-02	1.	0.2283	0.4566	0.0000	0.0000
7.80E-02	4.	0.9132	1.3699	0.0002	0.0003
9.58E-02	5.	1.1416	2.5114	0.0005	0.0008
1.18E-01	8.	1.8265	4.3379	0.0016	0.0024
1.44E-01	6.	1.3699	5.7078	0.0022	0.0046
1.77E-01	8.	1.8265	7.5342	0.0054	0.0100
2.18E-01	28.	6.3927	13.9269	0.0349	0.0449
2.68E-01	31.	7.0776	21.0046	0.0716	0.1165
3.29E-01	39.	8.7041	29.7087	0.1669	0.2835
4.04E-01	36.	8.2192	38.1279	0.2854	0.5689
4.96E-01	49.	11.1872	49.3151	0.7174	1.2883
6.09E-01	42.	9.5890	58.9041	1.1421	2.4304
7.47E-01	37.	8.4475	67.3516	1.8634	4.2938
9.18E-01	41.	9.3607	76.7123	3.8242	8.1180
1.13E+00	35.	7.9909	84.7032	6.0461	14.1641
1.38E+00	27.	6.1644	90.8676	8.6382	22.8023
1.70E+00	16.	3.6530	94.5206	9.4805	32.2827
2.09E+00	12.	2.7397	97.2603	13.1686	45.4514
2.56E+00	7.	1.5982	98.8585	14.2269	59.6782
3.15E+00	2.	0.4566	99.3151	7.5282	67.2065
3.87E+00	1.	0.2283	99.5434	6.9713	74.1777
4.75E+00	2.	0.4566	100.0000	25.8223	100.0000
5.83E+00	0.	0.0000	100.0000	0.0000	100.0000

SAMPLE ID: LUNG 22 - PREP 2879 L-2 SML 0-453

11-JUL-66

AREA EQUIV. DIAM (UM) DISTRIBUTION FOR TOT. EXOGENOUS MACR = 15

AVG=6.73E-01 DEV=0.00E-01 XDEV=0.00E-01 MEDIAN=4.99E-01 MOST PROB.=4.50E-01

Class	Count	%	0	1	2
0.0421	0.	0.00			
0.0517	5.	0.46	*		
0.0635	3.	0.27	*		
0.0780	7.	0.64	**		
0.0958	16.	1.46	****		
0.1177	14.	1.28	***		
0.1445	19.	1.73	****		
0.1774	19.	1.73	****		
0.2175	70.	6.38	*****		
0.2676	79.	7.17	*****		
0.3286	94.	8.56	*****		
0.4036	97.	8.83	*****		
0.4956	123.	11.20	*****		
0.6086	110.	10.02	*****		
0.7474	106.	9.65	*****		
0.9175	103.	9.38	*****		
1.1272	72.	6.56	*****		
1.3842	53.	4.83	*****		
1.6799	38.	3.46	*****		
2.0876	29.	2.64	*****		
2.5637	23.	2.09	*****		
3.1483	12.	1.09	***		
3.8663	1.	0.09			
4.7480	4.	0.36	*		
5.8308	1.	0.09			

MASS PERCENTAGE VERSUS DIAMETER FOR MACR 15 TOT. EXOGENOUS

MASS MEDIAN DIA.= 2.44E+00 UM, RHO= 3.000 AERODYNAMIC DIA.= 4.23E+00 UM.

DIA. (UM.)	RAW COUNT	PERCENTAGES BY COUNT		PERCENTAGES BY MASS	
		DIFF.	INTEGRAL	DIFF.	INTEGRAL
4.21E-02	0.	0.0000	0.0000	0.0000	0.0000
5.17E-02	5.	0.4554	0.4554	0.0000	0.0000
6.35E-02	3.	0.2732	0.7286	0.0000	0.0001
7.80E-02	7.	0.6375	1.3661	0.0001	0.0002
9.58E-02	16.	1.4572	2.8233	0.0006	0.0008
1.19E-01	14.	1.2750	4.0984	0.0010	0.0018
1.44E-01	19.	1.7304	5.8288	0.0025	0.0043
1.77E-01	19.	1.7304	7.5592	0.0046	0.0089
2.18E-01	70.	6.3752	13.9344	0.0313	0.0401
2.68E-01	79.	7.1949	21.1293	0.0654	0.1055
3.29E-01	94.	8.5610	29.6903	0.1440	0.2495
4.04E-01	97.	8.8342	38.5246	0.2752	0.5247
4.96E-01	123.	11.2022	49.7268	0.6464	1.1711
6.09E-01	110.	10.0182	59.7450	1.0706	2.2418
7.47E-01	106.	9.6539	69.3989	1.9108	4.1525
9.18E-01	103.	9.3807	78.7796	3.4387	7.5912
1.13E+00	72.	6.5574	85.3370	4.4518	12.0430
1.38E+00	53.	4.8270	90.1639	6.0692	18.1122
1.70E+00	38.	3.4608	93.6248	8.0591	26.1713
2.09E+00	29.	2.6412	96.2659	11.3908	37.5621
2.56E+00	23.	2.0947	98.3607	16.7315	54.2936
3.15E+00	12.	1.0929	99.4536	16.1674	70.4610
3.87E+00	1.	0.0911	99.5446	2.4952	72.9562
4.75E+00	4.	0.3643	99.9089	18.4850	91.4412
5.83E+00	1.	0.0911	100.0000	8.5588	100.0000

SAMPLE ID: LUNG 22 - PREP 2881 L-3 PML D-462

11-JUL-88

AREA EQUIV. DIAM (UM) DISTRIBUTION FOR SILICA MACR = 1

AVG=6.62E-01 DEV=5.03E-01 XDEV=7.59E-01 MEDIAN=5.13E-01 MOST PROB.=4.50E-01

Class	Count	%
0.0227	0.	0.00[
0.0279	0.	0.00[
0.0343	0.	0.00[
0.0421	0.	0.00[
0.0517	2.	0.41[*]
0.0635	1.	0.20[*]
0.0780	1.	0.20[*]
0.0958	6.	1.23[***]
0.1177	3.	0.61[**]
0.1445	9.	1.64[****]
0.1774	14.	2.66[*****]
0.2179	21.	4.29[*****]
0.2676	29.	5.93[*****]
0.3286	38.	7.77[*****]
0.4036	50.	10.22[*****]
0.4956	63.	12.88[*****]
0.6086	50.	10.22[*****]
0.7474	49.	10.02[*****]
0.9179	48.	9.62[*****]
1.1272	30.	6.13[*****]
1.3842	39.	7.96[*****]
1.6999	14.	2.66[*****]
2.0876	10.	2.04[*****]
2.5637	7.	1.43[****]
3.1463	4.	0.82[**]
3.8663	1.	0.20[*]
4.7460	0.	0.00[
5.8308	0.	0.00[
7.1605	0.	0.00[
8.7935	0.	0.00[

SAMPLE ID: LUNG 22 - PREP 2881 L-3 PML D-462

11-JUL-88

MASS PERCENTAGE VERSUS DIAMETER FOR MACR 1 SILICA

MASS MEDIAN DIA.= 1.90E+00 UM. RHO= 2.660 AERODYNAMIC DIA.= 3.10E+00 UM.

DIA. (UM.)	RAW COUNT	PERCENTAGES BY COUNT		PERCENTAGES BY MASS	
		DIFF.	INTEGRAL	DIFF.	INTEGRAL
2.27E-02	0.	0.0000	0.0000	0.0000	0.0000
2.79E-02	0.	0.0000	0.0000	0.0000	0.0000
3.43E-02	0.	0.0000	0.0000	0.0000	0.0000
4.21E-02	0.	0.0000	0.0000	0.0000	0.0000
5.17E-02	2.	0.4090	0.4090	0.0000	0.0000
6.35E-02	1.	0.2045	0.6135	0.0000	0.0001
7.80E-02	1.	0.2045	0.8180	0.0001	0.0001
9.58E-02	6.	1.2270	2.0450	0.0008	0.0009
1.18E-01	3.	0.6135	2.6585	0.0007	0.0015
1.44E-01	9.	1.5405	4.4990	0.0039	0.0056
1.77E-01	14.	2.8630	7.3620	0.0114	0.0169
2.18E-01	21.	4.2945	11.6564	0.0315	0.0485
2.68E-01	29.	5.9305	17.5869	0.0807	0.1291
3.29E-01	38.	7.7710	25.3579	0.1958	0.3249
4.04E-01	50.	10.2249	35.5828	0.4771	0.8020
4.96E-01	63.	12.8804	48.4633	1.1134	1.9154
6.09E-01	50.	10.2249	58.6912	1.6366	3.5520
7.47E-01	49.	10.0204	68.7117	2.9703	6.5225
9.18E-01	48.	9.8160	78.5276	5.3889	11.9113
1.13E+00	30.	6.1350	84.6626	6.2378	18.1491
1.38E+00	39.	7.9755	92.6380	15.0186	33.1677
1.70E+00	14.	2.8630	95.5010	9.9649	43.1526
2.09E+00	10.	2.0450	97.5460	13.2839	56.3615
2.56E+00	7.	1.4315	98.9775	17.1244	73.4859
3.15E+00	4.	0.8180	99.7955	18.1230	91.6089
3.87E+00	1.	0.2045	100.0000	6.5911	100.0000
4.75E+00	0.	0.0000	100.0000	0.0000	100.0000
5.83E+00	0.	0.0000	100.0000	0.0000	100.0000
7.16E+00	0.	0.0000	100.0000	0.0000	100.0000
8.79E+00	0.	0.0000	100.0000	0.0000	100.0000

AREA EQUIV. DIAM. (UM) DISTRIBUTION FOR TOT. EXOGENOUS MACR = 15

AVG=7.11E-01 DEV=0.00E+01 XDEV=0.00E+01 MEDIAN=5.11E-01 POST PROB.=0.66E-01

Class	Count	%		
0.0227	0.	0.000		
0.0279	1.	0.000		
0.0343	0.	0.000		
0.0421	0.	0.000		
0.0517	3.	0.270*		
0.0635	4.	0.360*		
0.0750	1.	0.070		
0.0958	9.	0.630**		
0.1177	13.	1.180***		
0.1445	20.	1.820****		
0.1774	37.	3.370*****		
0.2179	54.	4.920*****		
0.2676	71.	6.470*****		
0.3286	91.	8.290*****		
0.4036	117.	10.660*****		
0.4956	114.	10.380*****		
0.6086	103.	9.380*****		
0.7474	108.	9.640*****		
0.9179	103.	9.380*****		
1.1272	71.	6.470*****		
1.3842	58.	5.190*****		
1.6999	34.	3.100*****		
2.0876	30.	2.700*****		
2.5637	20.	1.820****		
3.1483	12.	1.090***		
3.8663	8.	0.720**		
4.7460	3.	0.270*		
5.8308	2.	0.180		
7.1905	0.	0.000		
8.7935	1.	0.090		

SAMPLE ID: LUNG 22 - PREP 2881 1-3 PML D-462

11-JUL-88

MASS PERCENTAGE VERSUS DIAMETER FOR MACR 15 TOT. EXOGENOUS

MASS MEDIAN DIA.= 3.34E+00 UM. RHD= 3.000 AERODYNAMIC DIA.= 5.79E+00 UM.

DIA. (UM.)	RAW COUNT	PERCENTAGES BY COUNT		PERCENTAGES BY MASS	
		DIFF.	INTEGRAL	DIFF.	INTEGRAL
2.27E-02	0.	0.0000	0.0000	0.0000	0.0000
2.79E-02	1.	0.0911	0.0911	0.0000	0.0000
3.43E-02	0.	0.0000	0.0911	0.0000	0.0000
4.21E-02	0.	0.0000	0.0911	0.0000	0.0000
5.17E-02	3.	0.2732	0.3643	0.0000	0.0000
6.35E-02	4.	0.3643	0.7286	0.0000	0.0000
7.80E-02	1.	0.0911	0.8197	0.0000	0.0001
9.56E-02	9.	0.8197	1.6393	0.0002	0.0003
1.18E-01	13.	1.1840	2.8233	0.0006	0.0009
1.44E-01	20.	1.8215	4.6448	0.0017	0.0026
1.77E-01	37.	3.3679	8.0146	0.0060	0.0086
2.18E-01	54.	4.7180	12.7326	0.0161	0.0247
2.68E-01	71.	6.4663	19.1989	0.0392	0.0639
3.29E-01	91.	8.2978	27.4867	0.0931	0.1570
4.04E-01	117.	10.6597	38.1464	0.2217	0.3787
4.96E-01	114.	10.3825	48.5289	0.4001	0.7788
6.09E-01	103.	9.3807	57.9096	0.6695	1.4483
7.47E-01	108.	9.8361	67.7457	1.0001	2.4484
9.18E-01	108.	9.3807	77.1264	2.2964	5.0448
1.13E+00	71.	6.4663	83.5927	2.9317	7.9765
1.38E+00	58.	5.1931	88.7858	5.2002	13.1767
1.70E+00	34.	3.0965	91.8823	4.8155	17.9912
2.09E+00	30.	2.7322	94.6145	7.8692	25.8614
2.56E+00	20.	1.8215	96.4360	9.7161	35.5775
3.15E+00	12.	1.0929	97.5289	10.7968	46.3743
3.87E+00	8.	0.7286	98.2575	13.3308	59.7051
4.75E+00	3.	0.2732	98.5307	7.2584	66.9635
5.83E+00	2.	0.1821	98.7128	11.4313	80.3949
7.16E+00	0.	0.0000	98.7128	0.0000	80.3949
8.79E+00	1.	0.0911	100.0000	19.6051	100.0000

SAMPLE ID: LUNG 22 - PREP 2883 L-4 7ML D-463

11-JUL-88

AREA EQUIV. DIAM (UM) DISTRIBUTION FOR SILICA

MACR = 1

AVG=6.59E+01 DEV=5.97E+01 NDEV=9.06E+01 MEDIAN=5.06E+01 MOST PROB.=5.52E+01

CLASS	1	2
11111	0	0
0.0227	0.	0.00[
0.0279	1.	0.27[*
0.0343	0.	0.00[
0.0421	0.	0.00[
0.0517	0.	0.00[
0.0635	0.	0.00[
0.0780	2.	0.53[*
0.0958	4.	1.07[***
0.1177	4.	1.07[***
0.1445	12.	3.20[*****
0.1774	14.	3.73[*****
0.2179	15.	4.00[*****
0.2675	30.	8.00[*****
0.3286	28.	7.47[*****
0.4036	38.	10.13[*****
0.4958	35.	9.33[*****
0.6086	47.	12.53[*****
0.7474	38.	10.13[*****
0.9179	36.	9.60[*****
1.1272	21.	5.60[*****
1.3842	16.	4.27[*****
1.6999	14.	3.73[*****
2.0876	8.	2.13[*****
2.5637	6.	1.60[****
3.1483	2.	0.53[*
3.8663	2.	0.53[*
4.7480	2.	0.53[*
5.8308	0.	0.00[
7.1605	0.	0.00[

SAMPLE ID: LUNG 22 - PREP 2883 L-4 7ML D-463

11-JUL-88

MASS PERCENTAGE VERSUS DIAMETER FOR MACR 1 SILICA

MASS MEDIAN DIA.= 3.63E+00 UM. RHO= 2.660 AERODYNAMIC DIA.= 4.29E+00 UM.

DIA. (UM.)	RAW COUNT	PERCENTAGES BY COUNT		PERCENTAGES BY MASS	
		DIFF.	INTEGRAL	DIFF.	INTEGRAL
2.27E-02	0.	0.0000	0.0000	0.0000	0.0000
2.79E-02	1.	0.2667	0.2667	0.0000	0.0000
3.43E-02	0.	0.0000	0.2667	0.0000	0.0000
4.21E-02	0.	0.0000	0.2667	0.0000	0.0000
5.17E-02	0.	0.0000	0.2667	0.0000	0.0000
6.35E-02	0.	0.0000	0.2667	0.0000	0.0000
7.80E-02	2.	0.5333	0.8000	0.0001	0.0001
9.58E-02	4.	1.0667	1.8667	0.0005	0.0006
1.15E-01	4.	1.0667	2.9333	0.0008	0.0014
1.44E-01	12.	3.2000	6.1333	0.0047	0.0061
1.77E-01	14.	3.7333	9.8667	0.0102	0.0163
2.15E-01	15.	4.0000	13.8667	0.0202	0.0364
2.68E-01	30.	8.0000	21.8667	0.0746	0.1111
3.29E-01	28.	7.4667	29.3333	0.1290	0.2401
4.04E-01	35.	10.1333	39.4667	0.3243	0.5644
4.96E-01	35.	9.3333	48.8000	0.5532	1.1176
6.09E-01	47.	12.5333	61.3333	1.3758	2.4934
7.47E-01	38.	10.1333	71.4667	2.0601	4.5535
9.18E-01	35.	9.6000	81.0667	3.6146	8.1681
1.13E+00	21.	5.6000	86.6667	3.9051	12.0731
1.38E+00	16.	4.2667	90.9333	5.5103	17.5835
1.70E+00	14.	3.7333	94.6667	8.9297	26.5132
2.09E+00	8.	2.1333	96.8000	9.4504	35.9636
2.56E+00	6.	1.6000	98.4000	13.1269	49.0905
3.15E+00	2.	0.5333	98.9333	8.1039	57.1944
3.87E+00	2.	0.5333	99.4667	15.8087	72.2032
4.75E+00	2.	0.5333	100.0000	27.7968	100.0000
5.83E+00	0.	0.0000	100.0000	0.0000	100.0000
7.16E+00	0.	0.0000	100.0000	0.0000	100.0000

AREA EQUIV. DIAM (UM) DISTRIBUTION FOR TOT. EXOGENOUS MACR = 15

AVG=7.23E+01 DEV=5.23E+00 XDEV=7.14E+02 MEDIAN=5.21E+01 MOST PROB.=5.52E+01

Class	Count	%	0	1	2
0.0227	0.	0.00%	0	0	0
0.0279	1.	0.00%	0	0	0
0.0343	0.	0.00%	0	0	0
0.0421	0.	0.00%	0	0	0
0.0517	3.	0.27%	*		
0.0635	5.	0.45%	*		
0.0760	10.	0.57%	**		
0.0958	8.	0.71%	**		
0.1177	12.	1.07%	***		
0.1445	27.	2.41%	*****		
0.1774	34.	3.04%	*****		
0.2179	45.	4.02%	*****		
0.2675	83.	7.41%	*****		
0.3266	85.	7.59%	*****		
0.4036	112.	10.00%	*****		
0.4956	106.	9.46%	*****		
0.6086	130.	11.61%	*****		
0.7474	101.	9.02%	*****		
0.9179	78.	6.95%	*****		
1.1272	75.	6.70%	*****		
1.3942	47.	4.20%	*****		
1.6999	46.	4.11%	*****		
2.0876	32.	2.86%	*****		
2.5637	19.	1.50%	*****		
3.1483	15.	1.34%	****		
3.8663	9.	0.71%	**		
4.7460	5.	0.45%	*		
5.8308	3.	0.27%	*		
7.1605	1.	0.09%			

SAMPLE ID: LUNG 22 - PREP 2883 L-4 7ML D-463

11-JUL-68

MASS PERCENTAGE VERSUS DIAMETER FOR MACR 15 TOT. EXOGENOUS

MASS MEDIAN DIA. = 3.22E+00 UM. RHO = 3.000 AERODYNAMIC DIA. = 5.58E+00 UM.

DIA. (UM.)	RAW COUNT	PERCENTAGES BY COUNT		PERCENTAGES BY MASS	
		DIFF.	INTEGRAL	DIFF.	INTEGRAL
2.27E-02	0.	0.0000	0.0000	0.0000	0.0000
2.79E-02	1.	0.0893	0.0893	0.0000	0.0000
3.43E-02	0.	0.0000	0.0893	0.0000	0.0000
4.21E-02	0.	0.0000	0.0893	0.0000	0.0000
5.17E-02	3.	0.2679	0.3571	0.0000	0.0000
6.35E-02	5.	0.4464	0.8036	0.0000	0.0000
7.80E-02	10.	0.8929	1.6964	0.0001	0.0002
9.58E-02	8.	0.7143	2.4107	0.0002	0.0004
1.18E-01	12.	1.0714	3.4821	0.0005	0.0009
1.44E-01	27.	2.4107	5.8929	0.0021	0.0030
1.77E-01	34.	3.0357	8.9286	0.0050	0.0080
2.18E-01	45.	4.0179	12.9464	0.0122	0.0201
2.68E-01	83.	7.4107	20.3571	0.0416	0.0618
3.29E-01	85.	7.5893	27.9464	0.0789	0.1407
4.04E-01	112.	10.0000	37.9464	0.1926	0.3333
4.96E-01	106.	9.4643	47.4107	0.3376	0.6710
6.09E-01	130.	11.6071	59.0179	0.7669	1.4379
7.47E-01	101.	9.0179	68.0357	1.1035	2.5414
9.18E-01	78.	6.9500	76.7857	1.7831	4.3245
1.13E+00	75.	6.6964	83.4821	2.5108	7.3353
1.38E+00	47.	4.1964	87.6786	3.2622	10.5975
1.70E+00	46.	4.1071	91.7857	5.5132	16.5107
2.09E+00	32.	2.8571	94.6429	7.6185	24.1292
2.56E+00	19.	1.5000	97.1429	12.3460	36.4752
3.15E+00	15.	1.3393	98.4821	12.2493	48.7245
3.87E+00	9.	0.7143	99.1964	12.9993	60.5239
4.75E+00	5.	0.4464	99.6429	14.0053	74.8292
5.83E+00	3.	0.2679	99.9107	15.5630	90.3922
7.16E+00	1.	0.0893	100.0000	7.5078	100.0000

SAMPLE ID: LUNG 22 - PREF 2685 L-5 TML D-464

11-JUL-86

AREA EQUIV. DIAM (UM) DISTRIBUTION FOR SILICA

MACR = 1

AVG=7.00E+01 DEV=5.70E+01 WDEV=8.15E+01 MEDIAN=5.58E+01 MOST PROB.=6.78E+01

Class	Count	%
0.0421	0.	0.00
0.0517	0.	0.00
0.0625	0.	0.00
0.0786	3.	0.77
0.0958	2.	0.51
0.1177	5.	1.25
0.1445	15.	3.84
0.1774	13.	3.32
0.2179	15.	3.84
0.2676	25.	6.39
0.3256	23.	5.88
0.4036	43.	11.00
0.4956	31.	7.93
0.5856	37.	9.46
0.7474	52.	13.30
0.9179	37.	9.46
1.1272	23.	5.88
1.3842	23.	7.42
1.6999	16.	4.09
2.0876	9.	2.30
2.5637	5.	1.25
3.1483	5.	1.25
3.8663	3.	0.77
4.7486	0.	0.00
5.8308	0.	0.00
7.1605	0.	0.00

MASS PERCENTAGE VERSUS DIAMETER FOR MACR 1 SILICA

MASS MEDIAN DIA.= 2.30E+00 UM. RHD= 2.660 AERODYNAMIC DIA.= 3.76E+00 UM.

DIA. (UM.)	RAW COUNT	PERCENTAGES BY COUNT		PERCENTAGES BY MASS	
		DIFF.	INTEGRAL	DIFF.	INTEGRAL
4.21E-02	0.	0.0000	0.0000	0.0000	0.0000
5.17E-02	0.	0.0000	0.0000	0.0000	0.0000
6.35E-02	0.	0.0000	0.0000	0.0000	0.0000
7.80E-02	3.	0.7673	0.7673	0.0002	0.0002
9.58E-02	2.	0.5115	1.2788	0.0002	0.0004
1.18E-01	5.	1.2788	2.5575	0.0011	0.0015
1.44E-01	15.	3.8363	6.3939	0.0060	0.0075
1.77E-01	13.	3.3248	9.7187	0.0097	0.0172
2.18E-01	15.	3.8363	13.5550	0.0207	0.0379
2.68E-01	25.	6.3939	19.9489	0.0638	0.1017
3.29E-01	23.	5.8824	25.8312	0.1087	0.2104
4.04E-01	43.	10.9974	36.8286	0.3764	0.5866
4.95E-01	31.	7.9284	44.7570	0.5026	1.0893
6.09E-01	37.	9.4629	54.2200	1.1109	2.2003
7.47E-01	52.	13.2992	67.5192	2.3916	5.0919
9.18E-01	37.	9.4629	76.9821	3.8105	8.9024
1.13E+00	23.	5.8824	82.8645	4.3670	13.2693
1.38E+00	23.	7.4169	90.2813	10.2444	23.5337
1.70E+00	15.	4.0921	94.3734	10.4679	34.0016
2.09E+00	9.	2.3016	96.6752	10.9051	44.9067
2.56E+00	5.	1.2788	97.9540	11.2204	56.1271
3.15E+00	5.	1.2788	99.2327	20.7807	76.9079
3.87E+00	3.	0.7673	100.0000	23.0921	100.0000
4.75E+00	0.	0.0000	100.0000	0.0000	100.0000
5.83E+00	0.	0.0000	100.0000	0.0000	100.0000
7.16E+00	0.	0.0000	100.0000	0.0000	100.0000

AREA EQUIV. DIAM (UM) DISTRIBUTION FOR TOT. EXOGENOUS MACR = 15

AVG=7.87E-01 DEV=6.46E-01 XDEV=8.56E-01 MEDIAN=5.74E-01 MOST PROB.=6.78E-01

Class	Count	%
0.0421	0.	0.00%
0.0517	1.	0.09%
0.0635	0.	0.00%
0.0780	7.	0.61%**
0.0958	5.	0.43%*
0.1177	14.	1.21%***
0.1445	27.	2.33%*****
0.1774	25.	2.16%*****
0.2179	45.	3.89%*****
0.2676	74.	6.40%*****
0.3286	75.	6.48%*****
0.4036	99.	8.56%*****
0.4956	108.	9.35%*****
0.6086	113.	9.77%*****
0.7474	138.	11.93%*****
0.9179	128.	11.06%*****
1.1272	86.	7.43%*****
1.3842	78.	6.74%*****
1.6999	50.	4.32%*****
2.0876	34.	2.94%*****
2.5637	22.	1.90%*****
3.1483	13.	1.12%***
3.8663	10.	0.86%**
4.7480	3.	0.26%*
5.8308	1.	0.09%
7.1605	1.	0.09%

MASS PERCENTAGE VERSUS DIAMETER FOR MACR 15 TOT. EXOGENOUS

MASS MEDIAN DIA.= 2.86E+00 UM. RHC= 3.000 AERODYNAMIC DIA.= 4.75E+00 UM.

DIA. (UM.)	RAW COUNT	PERCENTAGES BY COUNT		PERCENTAGES BY MASS	
		DIFF.	INTEGRAL	DIFF.	INTEGRAL
4.21E-02	0.	0.0000	0.0000	0.0000	0.0000
5.17E-02	1.	0.0864	0.0864	0.0000	0.0000
6.35E-02	0.	0.0000	0.0864	0.0000	0.0000
7.80E-02	7.	0.6050	0.6914	0.0001	0.0001
9.58E-02	5.	0.4322	1.1236	0.0001	0.0002
1.18E-01	14.	1.2100	2.3336	0.0007	0.0009
1.44E-01	27.	2.3336	4.6672	0.0024	0.0034
1.77E-01	25.	2.1608	6.8280	0.0042	0.0076
2.18E-01	45.	3.8594	10.7174	0.0140	0.0215
2.68E-01	74.	6.3959	17.1132	0.0426	0.0641
3.29E-01	75.	6.4823	23.5955	0.0799	0.1439
4.04E-01	99.	8.5566	32.1521	0.1953	0.3392
4.96E-01	108.	9.3545	41.4666	0.3945	0.7337
6.09E-01	113.	9.7666	51.2332	0.7645	1.4982
7.47E-01	138.	11.9274	63.1606	1.7291	3.2272
9.18E-01	128.	11.0631	74.2437	2.9703	6.1975
1.13E+00	86.	7.4330	81.6768	3.6960	9.8935
1.38E+00	78.	6.7416	88.4183	6.2084	16.1019
1.70E+00	50.	4.3215	92.7398	7.3707	23.4726
2.09E+00	34.	2.9386	95.6785	9.2825	32.7551
2.56E+00	22.	1.9015	97.5799	11.1240	43.8792
3.15E+00	13.	1.1236	98.7035	12.1740	56.0532
3.87E+00	10.	0.8643	99.5678	17.3437	73.3969
4.75E+00	3.	0.2593	99.8271	9.6364	83.0332
5.83E+00	1.	0.0864	99.9136	5.9490	88.9822
7.16E+00	1.	0.0864	100.0000	11.0178	100.0000

AREA EQUIV. DIAM (UM) DISTRIBUTION FOR SILICA MACR = 1

AVG=7.29E-01 DEV=7.08E-01 WDEV=9.71E+01 MEDIAN=5.31E-01 MOST PROB.=5.52E-01

Class	Count	%	0	1	2
0.0421	0.	0.00[			
0.0517	1.	0.31[*			
0.0635	0.	0.00[			
0.0780	0.	0.00[			
0.0955	2.	0.62[**			
0.1177	4.	1.23[***			
0.1445	6.	2.46[*****			
0.1774	12.	3.69[*****			
0.2179	15.	4.62[*****			
0.2676	27.	8.31[*****			
0.3286	22.	6.77[*****			
0.4036	27.	8.31[*****			
0.4956	27.	8.31[*****			
0.6066	36.	11.08[*****			
0.7474	35.	10.77[*****			
0.9175	29.	8.92[*****			
1.1272	34.	10.46[*****			
1.3842	10.	3.08[*****			
1.6999	11.	3.38[*****			
2.0876	13.	4.00[*****			
2.5637	4.	1.23[***			
3.1483	2.	0.62[**			
3.8663	3.	0.92[**			
4.7480	2.	0.62[**			
5.8308	0.	0.00[			
7.1605	1.	0.31[*			

MASS PERCENTAGE VERSUS DIAMETER FOR MACR 1 SILICA

MASS MEDIAN DIA.= 0.82E+00 UM. RHC= 2.660 AERODYNAMIC DIA.= 6.23E+00 UM.

DIA. (UM.)	RAW COUNT	PERCENTAGES BY COUNT		PERCENTAGES BY MASS	
		DIFF.	INTEGRAL	DIFF.	INTEGRAL
4.21E-02	0.	0.0000	0.0000	0.0000	0.0000
5.17E-02	1.	0.3077	0.3077	0.0000	0.0000
6.35E-02	0.	0.0000	0.3077	0.0000	0.0000
7.80E-02	0.	0.0000	0.3077	0.0000	0.0000
9.58E-02	2.	0.6154	0.9231	0.0001	0.0002
1.18E-01	4.	1.2308	2.1538	0.0006	0.0007
1.44E-01	6.	2.4615	4.6154	0.0020	0.0027
1.77E-01	12.	3.6923	8.3077	0.0057	0.0084
2.16E-01	15.	4.6154	12.9231	0.0131	0.0215
2.68E-01	27.	8.3077	21.2308	0.0437	0.0652
3.29E-01	22.	6.7692	28.0000	0.0660	0.1312
4.04E-01	27.	8.3077	36.3077	0.1499	0.2811
4.96E-01	27.	8.3077	44.6154	0.2776	0.5587
6.09E-01	36.	11.0769	55.6923	0.6856	1.2444
7.47E-01	35.	10.7692	66.4615	1.2345	2.4789
9.18E-01	29.	8.9231	75.3846	1.8945	4.3734
1.13E+00	34.	10.4615	85.8462	4.1135	8.4869
1.38E+00	10.	3.0769	88.9231	2.2407	10.7276
1.70E+00	11.	3.3846	92.3077	4.5649	15.2925
2.09E+00	13.	4.0000	96.3077	9.9916	25.2841
2.56E+00	4.	1.2308	97.5385	5.6538	30.9779
3.15E+00	2.	0.6154	98.1538	5.2726	36.2505
3.87E+00	3.	0.9231	99.0769	14.6475	50.8980
4.75E+00	2.	0.6154	99.6923	18.0852	68.9833
5.83E+00	0.	0.0000	99.6923	0.0000	68.9833
7.16E+00	1.	0.3077	100.0000	31.0168	100.0000

SAMPLE ID: LONG II - PREP 2887 L-6 DML 3-465

11-JUL-86

AREA EQUIV. DIAM (UM) DISTRIBUTION FOR TOT. EXOGENOUS MACR = 15

AVG=7.87E-01 DEV=7.13E-01 WDEV=9.06E-01 MEDIAN=5.65E-01 MOST PROB.=3.66E-01

Class	Count	%
0.0421	0.	0.00%
0.0517	1.	0.09%
0.0635	0.	0.00%
0.0750	1.	0.09%
0.0958	5.	0.47%
0.1177	14.	1.33%****
0.1443	21.	1.99%*****
0.1774	31.	2.94%*****
0.2179	50.	4.75%*****
0.2676	70.	6.65%*****
0.3286	76.	7.22%*****
0.4036	113.	10.73%*****
0.4956	87.	8.26%*****
0.6086	93.	8.83%*****
0.7474	101.	9.59%*****
0.9179	97.	9.21%*****
1.1272	75.	7.12%*****
1.3842	52.	4.94%*****
1.6799	65.	6.17%*****
2.0876	42.	3.99%*****
2.5637	28.	2.66%*****
3.1483	15.	1.42%****
3.8663	9.	0.85%**
4.7480	5.	0.47%*
5.8308	1.	0.09%
7.1605	1.	0.09%

MASS PERCENTAGE VERSUS DIAMETER FOR MACR 15 TOT. EXOGENOUS

MASS MEDIAN DIA.= 2.88E+00 UM. RHQ= 3.000 AERODYNAMIC DIA.= 4.59E+00 UM.

DIA. (UM.)	RAW COUNT	PERCENTAGES BY COUNT		PERCENTAGES BY MASS	
		DIFF.	INTEGRAL	DIFF.	INTEGRAL
4.21E-02	0.	0.0000	0.0000	0.0000	0.0000
5.17E-02	1.	0.0950	0.0950	0.0000	0.0000
6.35E-02	0.	0.0000	0.0950	0.0000	0.0000
7.80E-02	1.	0.0950	0.1899	0.0000	0.0000
9.58E-02	5.	0.4748	0.6648	0.0001	0.0001
1.18E-01	14.	1.3295	1.9943	0.0006	0.0006
1.44E-01	21.	1.9943	3.9886	0.0017	0.0025
1.77E-01	31.	2.9440	6.9326	0.0047	0.0072
2.18E-01	50.	4.7483	11.6809	0.0141	0.0213
2.68E-01	70.	6.6477	18.3286	0.0366	0.0579
3.29E-01	76.	7.2175	25.5461	0.0735	0.1314
4.04E-01	113.	10.7312	36.2773	0.2025	0.3339
4.96E-01	87.	8.2621	44.5394	0.2887	0.6225
6.09E-01	93.	8.8319	53.3713	0.5715	1.1941
7.47E-01	101.	9.5916	62.9630	1.1496	2.3436
9.18E-01	97.	9.2118	72.1747	2.0447	4.3884
1.13E+00	75.	7.1225	79.2972	2.9280	7.3154
1.38E+00	52.	4.9383	84.2355	3.7598	11.0762
1.70E+00	65.	6.1728	90.4083	8.7042	19.7805
2.09E+00	42.	3.9886	94.3969	10.4164	30.1968
2.56E+00	28.	2.6591	97.0560	12.8611	43.0579
3.15E+00	15.	1.4245	98.4805	12.7603	55.8182
3.87E+00	9.	0.8547	99.3352	14.1796	69.9978
4.75E+00	5.	0.4748	99.8101	14.5895	84.5873
5.83E+00	1.	0.0950	99.9050	5.4041	89.9914
7.16E+00	1.	0.0950	100.0000	10.0086	100.0000

SAMPLE ID: LUNG 22 - PREP 2669 CL1-CL6 65ML D-468

11-JUL-88

AREA EQUIV. DIAM (UM) DISTRIBUTION FOR SILICA

MACR = 1

AVE=6.18E+01 DEV=4.72E+01 XDEV=7.64E+01 MEDIAN=5.82E+01 MOST PROB.=6.78E+01

DIAM	COUNT	%	0	1	2
0.0421	0.	0.00[			
0.0517	2.	0.77[**			
0.0635	0.	0.00[			
0.0750	4.	1.53[****			
0.0955	2.	0.77[**			
0.1177	3.	1.15[***			
0.1445	5.	1.92[****			
0.1774	11.	4.21[*****			
0.2179	9.	3.45[*****			
0.2676	20.	7.66[*****			
0.3286	22.	8.43[*****			
0.4036	31.	11.88[*****			
0.4956	20.	7.66[*****			
0.6086	28.	9.96[*****			
0.7474	36.	13.79[*****			
0.9179	22.	8.43[*****			
1.1272	14.	5.36[*****			
1.3842	17.	6.51[*****			
1.6999	8.	3.07[*****			
2.0676	4.	1.53[***			
2.5637	4.	1.53[***			
3.1463	1.	0.38[*			
3.8663	0.	0.00[			
4.7460	0.	0.00[			
5.8308	0.	0.00[			
7.1605	0.	0.00[			
8.7925	0.	0.00[			

SAMPLE ID: LUNG 22 - PREP 2669 CL1-CL6 65ML D-468

11-JUL-88

MASS PERCENTAGE VERSUS DIAMETER FOR MACR 1 SILICA

MASS MEDIAN DIA.= 1.65E+00 UM. RHO= 2.660 AERODYNAMIC DIA.= 2.69E+00 UM.

DIA. (UM.)	RAW COUNT	PERCENTAGES BY COUNT		PERCENTAGES BY MASS	
		DIFF.	INTEGRAL	DIFF.	INTEGRAL
4.21E-02	0.	0.0000	0.0000	0.0000	0.0000
5.17E-02	2.	0.7663	0.7663	0.0001	0.0001
6.35E-02	0.	0.0000	0.7663	0.0000	0.0001
7.50E-02	4.	1.5326	2.2969	0.0007	0.0006
9.58E-02	2.	0.7663	3.0651	0.0006	0.0014
1.18E-01	3.	1.1494	4.2146	0.0017	0.0031
1.44E-01	5.	1.9157	6.1303	0.0053	0.0084
1.77E-01	11.	4.2146	10.3448	0.0217	0.0301
2.13E-01	9.	3.4483	13.7931	0.0329	0.0630
2.68E-01	20.	7.6626	21.4559	0.1353	0.1984
3.29E-01	22.	8.4291	29.8851	0.2757	0.4741
4.04E-01	31.	11.8774	41.7625	0.7196	1.1937
4.96E-01	20.	7.6628	49.4253	0.8598	2.0534
6.09E-01	28.	9.9617	59.3870	2.0701	4.1235
7.47E-01	36.	13.7931	73.1801	5.3084	9.4319
9.13E-01	22.	8.4291	81.6092	6.0081	15.4399
1.13E+00	14.	5.3640	86.9732	7.0809	22.5209
1.38E+00	17.	6.5134	93.4866	15.9244	38.4453
1.70E+00	8.	3.0651	96.5517	13.8789	52.3242
2.09E+00	4.	1.5326	98.0843	12.8522	65.1763
2.56E+00	4.	1.5326	99.6169	23.8927	88.9791
3.15E+00	1.	0.3831	100.0000	11.0209	100.0000
3.87E+00	0.	0.0000	100.0000	0.0000	100.0000
4.75E+00	0.	0.0000	100.0000	0.0000	100.0000
5.83E+00	0.	0.0000	100.0000	0.0000	100.0000
7.16E+00	0.	0.0000	100.0000	0.0000	100.0000
8.79E+00	0.	0.0000	100.0000	0.0000	100.0000

AREA EQUIV. DIAM (UM) DISTRIBUTION FOR TOT. EXOGENOUS MACR = 15

AVG=7.80E-01 DEV=0.00E-01 XDEV=0.00E-01 MEDIAN=5.06E-01 MOST PROB.=6.78E-01

Class	Count	%	0	1	2
Limit	Count	%	0	0	0
0.0421	0.	0.00			
0.0517	3.	0.25	*		
0.0635	5.	0.43	*		
0.0780	8.	0.69	**		
0.0958	10.	0.86	**		
0.1177	19.	1.53	****		
0.1445	36.	3.18	*****		
0.1774	39.	3.34	*****		
0.2179	61.	5.23	*****		
0.2676	84.	7.20	*****		
0.3236	102.	8.74	*****		
0.4036	102.	8.74	*****		
0.4926	104.	9.11	*****		
0.6066	97.	8.31	*****		
0.7474	106.	9.25	*****		
0.9179	86.	7.37	*****		
1.1272	73.	6.26	*****		
1.3842	66.	5.66	*****		
1.6999	53.	4.54	*****		
2.0876	35.	3.00	*****		
2.5637	31.	2.66	*****		
3.1483	14.	1.20	***		
3.8663	11.	0.94	***		
4.7480	9.	0.77	**		
5.8368	7.	0.60	**		
7.1605	2.	0.17			
8.7935	0.	0.17			

SAMPLE ID: LUNG 22 - PREP 2889 DL1-DL6 SML D-468

11-JUL-88

MASS PERCENTAGE VERSUS DIAMETER FOR MACR 15 TOT. EXOGENOUS

MASS MEDIAN DIA.= 4.71E+00 UM. RHD= 3.000 AERODYNAMIC DIA.= 2.15E+00 UM.

DIA. (UM.)	RAW COUNT	PERCENTAGES BY COUNT		PERCENTAGES BY MASS	
		DIFF.	INTEGRAL	DIFF.	INTEGRAL
4.21E-02	0.	0.0000	0.0000	0.0000	0.0000
5.17E-02	3.	0.2571	0.2571	0.0000	0.0000
6.35E-02	5.	0.4284	0.6855	0.0000	0.0000
7.80E-02	8.	0.6855	1.3710	0.0001	0.0001
9.58E-02	10.	0.8569	2.2279	0.0001	0.0002
1.18E-01	19.	1.6261	3.8560	0.0004	0.0006
1.44E-01	36.	3.0846	6.9409	0.0016	0.0022
1.77E-01	39.	3.3419	10.2828	0.0031	0.0053
2.16E-01	61.	5.2271	15.5099	0.0089	0.0142
2.66E-01	84.	7.1979	22.7078	0.0228	0.0370
3.29E-01	102.	8.7404	31.4482	0.0513	0.0883
4.04E-01	102.	8.7404	40.1885	0.0950	0.1833
4.96E-01	104.	9.1117	49.3003	0.1794	0.3627
6.09E-01	97.	8.3119	57.4122	0.3098	0.6725
7.47E-01	106.	9.2545	66.6667	0.6389	1.3114
9.18E-01	86.	7.3693	74.0360	0.9423	2.2537
1.13E+00	73.	6.2554	80.2914	1.4613	3.7350
1.38E+00	66.	5.6555	85.9469	2.4204	6.2153
1.70E+00	53.	4.5416	90.4884	3.6889	9.9043
2.09E+00	35.	2.9991	93.4876	4.5117	14.4160
2.56E+00	31.	2.6564	96.1440	7.4009	21.8169
3.15E+00	14.	1.1997	97.3436	8.1902	28.0071
3.87E+00	11.	0.9426	98.2862	9.0075	37.0150
4.75E+00	9.	0.7712	99.0574	13.6496	50.6646
5.83E+00	7.	0.5995	99.6572	19.6620	70.3266
7.16E+00	2.	0.1714	99.8286	10.4042	80.7309
8.79E+00	0.	0.1714	100.0000	19.2691	100.0000

APPENDIX 2

CUMULATIVE PARTICLE SIZE LOG-PROBABILITY PLOTS FOR 35 COAL MINER LUNG SAMPLES

The data presented in Appendix 2 consist of cumulative frequency/particle size log-probability plots for the 35 coal miner lung specimens analyzed. The circular area equivalent diameter/frequency data presented in Appendix 1 were used by a minicomputer to prepare the least squares regression curves shown in the plots.

The accuracy of the data derived from the log-probability plots in Appendix 2 depends on the numbers of particles analyzed. A total of 250 was arbitrarily chosen as the minimum number of particles required for preparing the plots. Hence, plots were not prepared for the silica distributions for lungs 2, 3, 5, and 20 because less than 250 silica particles were analyzed for these lungs. Also, note that, in general, the upper and lower 10% of the cumulative data were not used in preparing the plots since there were usually not enough particles within these fractions to be statistically significant.

The number median diameters for each size distribution were determined from each plot. Also calculated from each plot was the geometric standard deviation, σ_g , which is defined as the size at the 84.1% value divided by the number median size. Mass median and mass median aerodynamic diameters were then calculated as outlined in the text and presented in Tables 12 through 15.

25-May-88

LUNG 1

-- SILICA

DIAMETER	LOG.DIAM.	COUNT	CUM.COUNT	PERCENT	CUM.PERC.	PROB.	PRED.PROB
0.0227	-1.64397	0	0	0.00%	0.00%		
0.0279	-1.55439	0	0	0.00%	0.00%		
0.0343	-1.46470	0	0	0.00%	0.00%		
0.0421	-1.37571	0	0	0.00%	0.00%		
0.0517	-1.28650	0	0	0.00%	0.00%		
0.0635	-1.19722	0	0	0.00%	0.00%		
0.078	-1.10790	0	0	0.00%	0.00%		
0.0958	-1.01863	3	3	0.76%	0.76%		
0.118	-0.92811	0	3	0.00%	0.76%		
0.144	-0.84163	1	4	0.25%	1.01%		
0.177	-0.75202	8	12	2.02%	3.02%		
0.218	-0.66154	8	20	2.02%	5.04%		
0.268	-0.57186	19	39	4.79%	9.82%		
0.329	-0.48280	29	68	7.30%	17.13%	-0.95112	-0.47549
0.404	-0.39361	28	96	7.05%	24.18%	-0.70857	-0.40101
0.496	-0.30451	45	141	11.34%	35.52%	-0.37916	-0.29986
0.609	-0.21538	39	180	9.82%	45.34%	-0.11992	-0.22026
0.747	-0.12667	50	230	12.59%	57.93%	0.204946	-0.12050
0.918	-0.03715	34	264	8.56%	66.50%	0.434486	-0.05002
1.13	0.053078	45	309	11.34%	77.83%	0.773636	0.054111
1.38	0.139879	32	341	8.06%	85.89%	1.072446	0.145863
1.7	0.230448	21	362	5.29%	91.18%		
2.09	0.320146	19	381	4.79%	95.97%		
2.56	0.408239	11	392	2.77%	98.74%		
3.15	0.498310	2	394	0.50%	99.24%		
3.87	0.587710	3	397	0.76%	100.00%		
4.75	0.676693	0	397	0.00%	100.00%		
5.83	0.765668	0	397	0.00%	100.00%		
7.16	0.854913	0	397	0.00%	100.00%		
8.79	0.943988	0	397	0.00%	100.00%		
10.8	1.033423	0	397	0.00%	100.00%		
13.3	1.123851	0	397	0.00%	100.00%		
16.3	1.212187	0	397	0.00%	100.00%		
20	1.301029	0	397	0.00%	100.00%		

Regression Output:

Constant -0.18344
 Std Err of Y Est 0.008106
 R Squared 0.998817
 No. of Observations 8
 Degrees of Freedom 6

X Coefficient(s) 0.307059
 Std Err of Coef. 0.004313

0.655479 = GEOM.MED.

1.329286 = 84.1 %

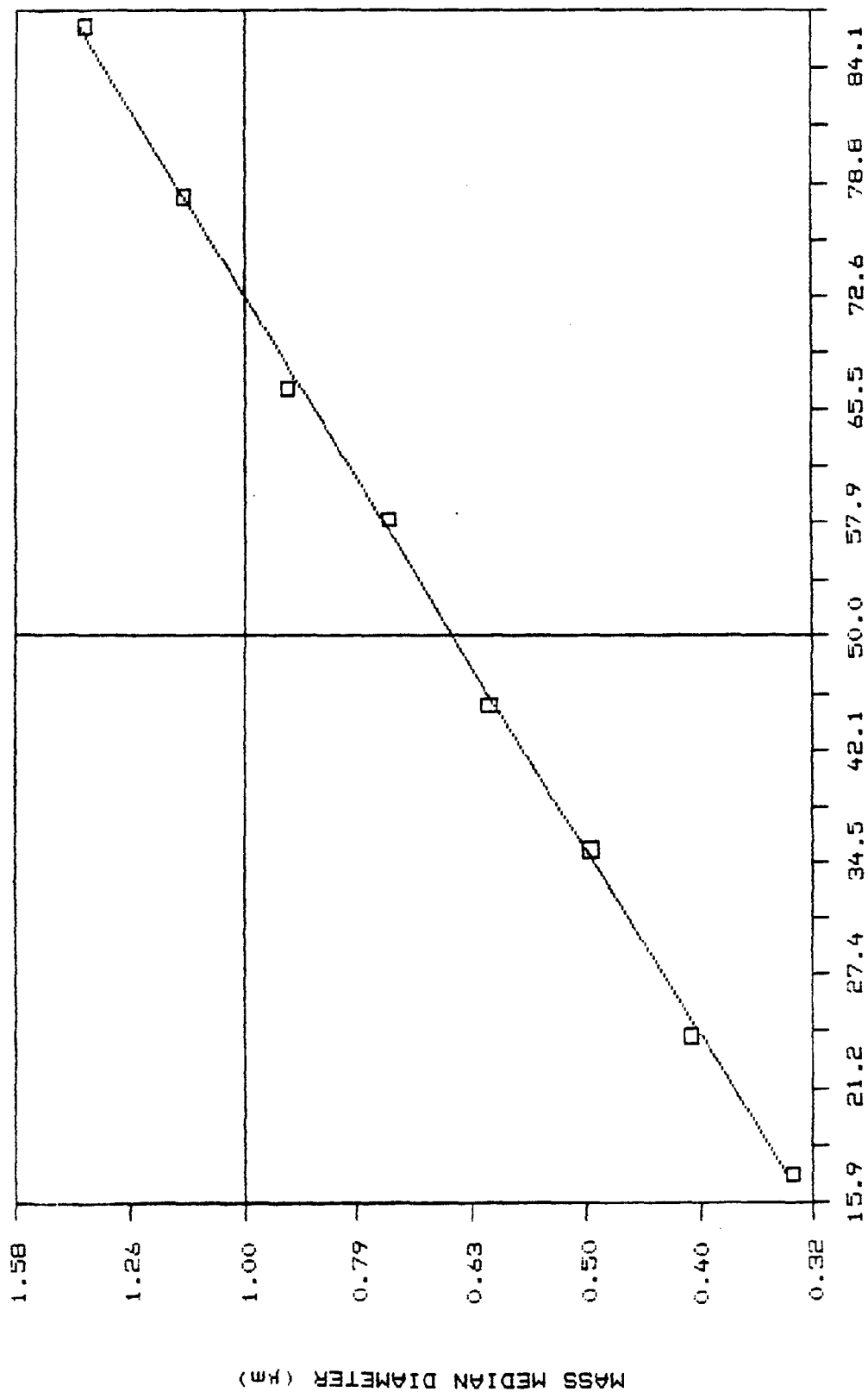
2.027960 = GEOM.STD.DEV.

2.936861 = MASS MED.DIAM.

2.7 = DENSITY

4.825755 = AERO.DIAM.

LUNG 1 -- SILICA



PERCENT OF PARTICLES LESS THAN STATED DIAMETER

25-May-88

LUNG 1

-- EXOGENOUS

						FREQ.		FREQ.	
DIAMETER	LOG.DIAM.	COUNT	CUM.COUNT	PERCENT	CUM.PERC.	CUM.PERC.	CUM.FREQ.	CUM.FREQ.	CUM.FREQ.
0.0227	-1.64397	0	0	0.00%	0.00%				
0.0279	-1.55439	0	0	0.00%	0.00%				
0.0343	-1.46470	0	0	0.00%	0.00%				
0.0421	-1.37571	0	0	0.00%	0.00%				
0.0517	-1.28650	0	0	0.00%	0.00%				
0.0635	-1.19722	0	0	0.00%	0.00%				
0.075	-1.10790	0	0	0.00%	0.00%				
0.0958	-1.01663	6	6	0.43%	0.43%				
0.118	-0.92911	2	8	0.14%	0.58%				
0.144	-0.84163	6	14	0.43%	1.01%				
0.177	-0.75302	22	36	1.59%	2.60%				
0.212	-0.66154	35	72	2.60%	5.21%				
0.268	-0.57186	55	127	3.98%	9.19%				
0.329	-0.48280	82	209	5.93%	15.12%	-1.03998	-0.48764		
0.404	-0.39361	105	314	7.60%	22.72%	-0.75545	-0.39682		
0.496	-0.30451	128	442	9.26%	31.98%	-0.47690	-0.30467		
0.609	-0.21538	152	594	11.00%	42.98%	-0.18107	-0.20680		
0.747	-0.12667	141	735	10.20%	53.18%	0.081854	-0.11981		
0.913	-0.03715	124	859	8.97%	62.16%	0.316409	-0.04221		
1.13	0.053078	149	1008	10.78%	72.94%	0.619614	0.058155		
1.38	0.139879	105	1113	7.60%	80.54%	0.865738	0.139514		
1.7	0.230448	89	1202	6.44%	86.98%	1.117771	0.223535		
2.09	0.320146	75	1277	5.43%	92.40%				
2.55	0.408239	50	1327	3.62%	96.02%				
3.15	0.498310	17	1344	1.23%	97.25%				
3.87	0.587710	19	1363	1.37%	98.63%				
4.75	0.676693	10	1373	0.72%	99.35%				
5.83	0.765666	3	1376	0.22%	99.57%				
7.16	0.854913	4	1380	0.29%	99.86%				
8.77	0.943938	1	1381	0.07%	99.93%				
10.6	1.033423	1	1382	0.07%	100.00%				
13.3	1.123851	0	1382	0.00%	100.00%				
16.3	1.212187	0	1382	0.00%	100.00%				
20	1.301029	0	1382	0.00%	100.00%				

Regression Output:

Constant -0.14689
 Std Err of Y Est 0.006018
 R Squared 0.999457
 No. of Observations 6
 Degrees of Freedom 7

0.713022 = GEOM.MED.

1.327326 = 84.1 %

2.142045 = GEOM.STD.DEV.

X Coefficient(s) 0.330828
 Std Err of Coef. 0.002885

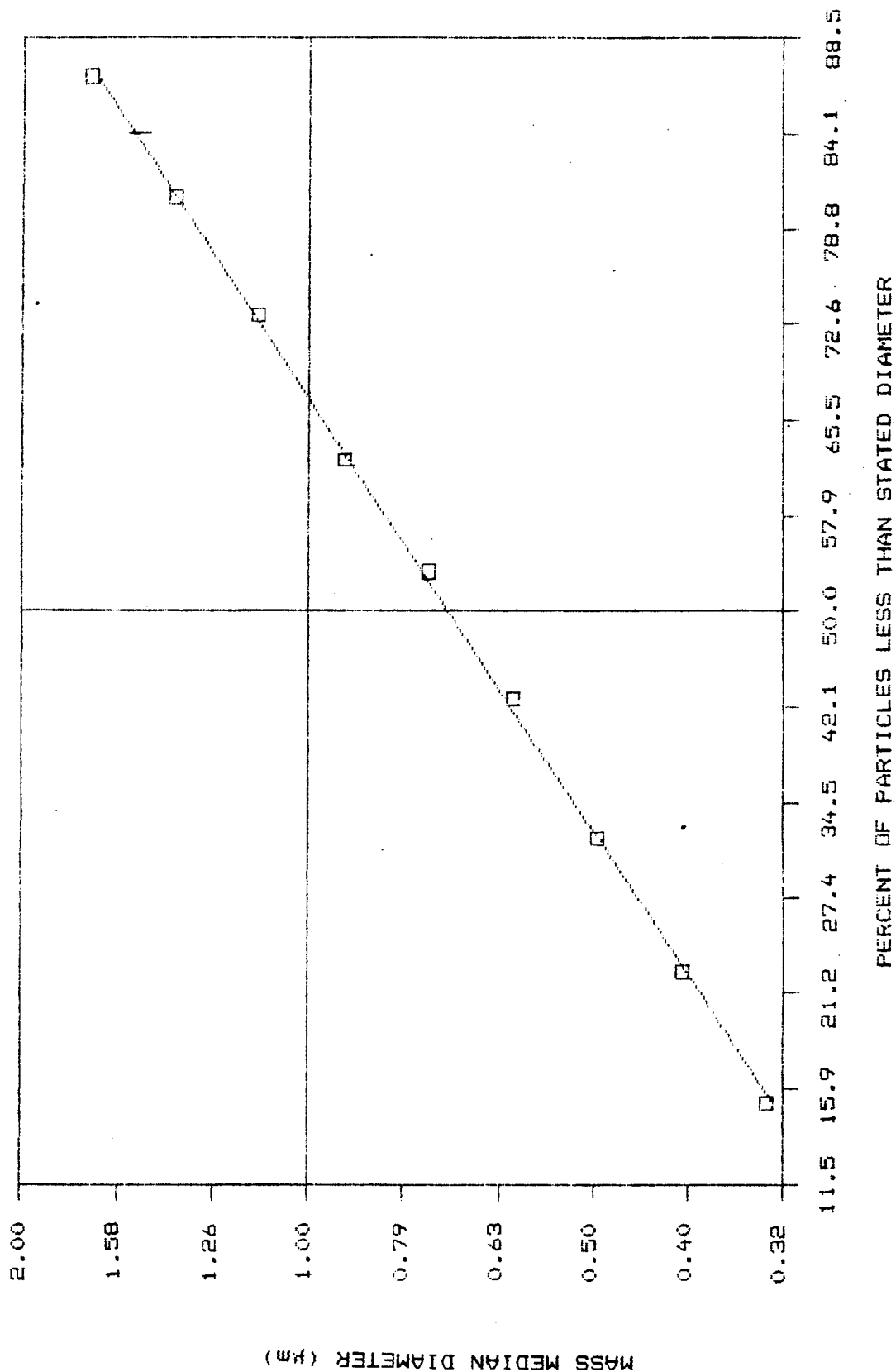
4.066002 = MASS MED.DIAM.

3 = DENSITY

7.042522 = ARPD.DIAM.

--- EXOGENOUS

LUNG 1



25-May-88

LUNG 2

-- EXOGENOUS

DIAMETER	LOG.DIAM.	COUNT	CUM.COUNT	PERCENT	CUM.PERC.	PROB.	PRED.PROB.
=====	=====	=====	=====	=====	=====	=====	=====
0.0227	-1.64397	0	0	0.00%	0.00%		
0.0279	-1.55439	0	0	0.00%	0.00%		
0.0343	-1.46470	0	0	0.00%	0.00%		
0.0421	-1.37571	0	0	0.00%	0.00%		
0.0517	-1.28650	2	2	0.19%	0.19%		
0.0635	-1.19722	0	2	0.00%	0.19%		
0.078	-1.10790	2	4	0.19%	0.38%		
0.0958	-1.01863	5	9	0.47%	0.85%		
0.118	-0.92811	14	23	1.32%	2.16%		
0.144	-0.84163	13	36	1.22%	3.39%		
0.177	-0.75202	26	62	2.45%	5.83%		
0.218	-0.66154	26	88	2.45%	8.28%		
0.268	-0.57186	58	146	5.46%	13.73%	-1.08841	-0.56093
0.329	-0.48280	53	199	4.99%	18.72%	-0.89227	-0.48298
0.404	-0.39361	73	272	6.87%	25.59%	-0.66467	-0.39254
0.496	-0.30451	79	351	7.43%	33.02%	-0.44786	-0.30638
0.609	-0.21538	85	436	8.00%	41.02%	-0.23242	-0.22076
0.747	-0.12667	88	524	8.28%	49.29%	-0.01812	-0.13560
0.918	-0.03715	93	617	8.75%	58.04%	0.207788	-0.04583
1.13	0.053078	107	724	10.07%	68.11%	0.479488	0.062139
1.38	0.139879	63	787	5.93%	74.04%	0.653120	0.131139
1.7	0.230448	84	871	7.90%	81.94%	0.916260	0.235709
2.09	0.320146	60	931	5.64%	87.58%	1.147475	0.327592
2.56	0.408239	58	989	5.46%	93.04%		
3.15	0.498310	35	1024	3.29%	96.33%		
3.87	0.587710	16	1040	1.51%	97.84%		
4.75	0.676693	9	1049	0.85%	98.68%		
5.83	0.765668	10	1059	0.94%	99.62%		
7.16	0.854913	4	1063	0.38%	100.00%		
8.79	0.943988	0	1063	0.00%	100.00%		
10.8	1.033423	0	1063	0.00%	100.00%		
13.3	1.123851	0	1063	0.00%	100.00%		
16.3	1.212187	0	1063	0.00%	100.00%		
20	1.301029	0	1063	0.00%	100.00%		

Regression Output:

Constant -0.12840
 Std Err of Y Est 0.007815
 R Squared 0.999371
 No. of Observations 11
 Degrees of Freedom 9

0.744037 = GEOM.MED.

1.857749 = 84.1 %

2.496848 = GEOM.STD.DEV.

X Coefficient(s) 0.397392
 Std Err of Coef. 0.003322

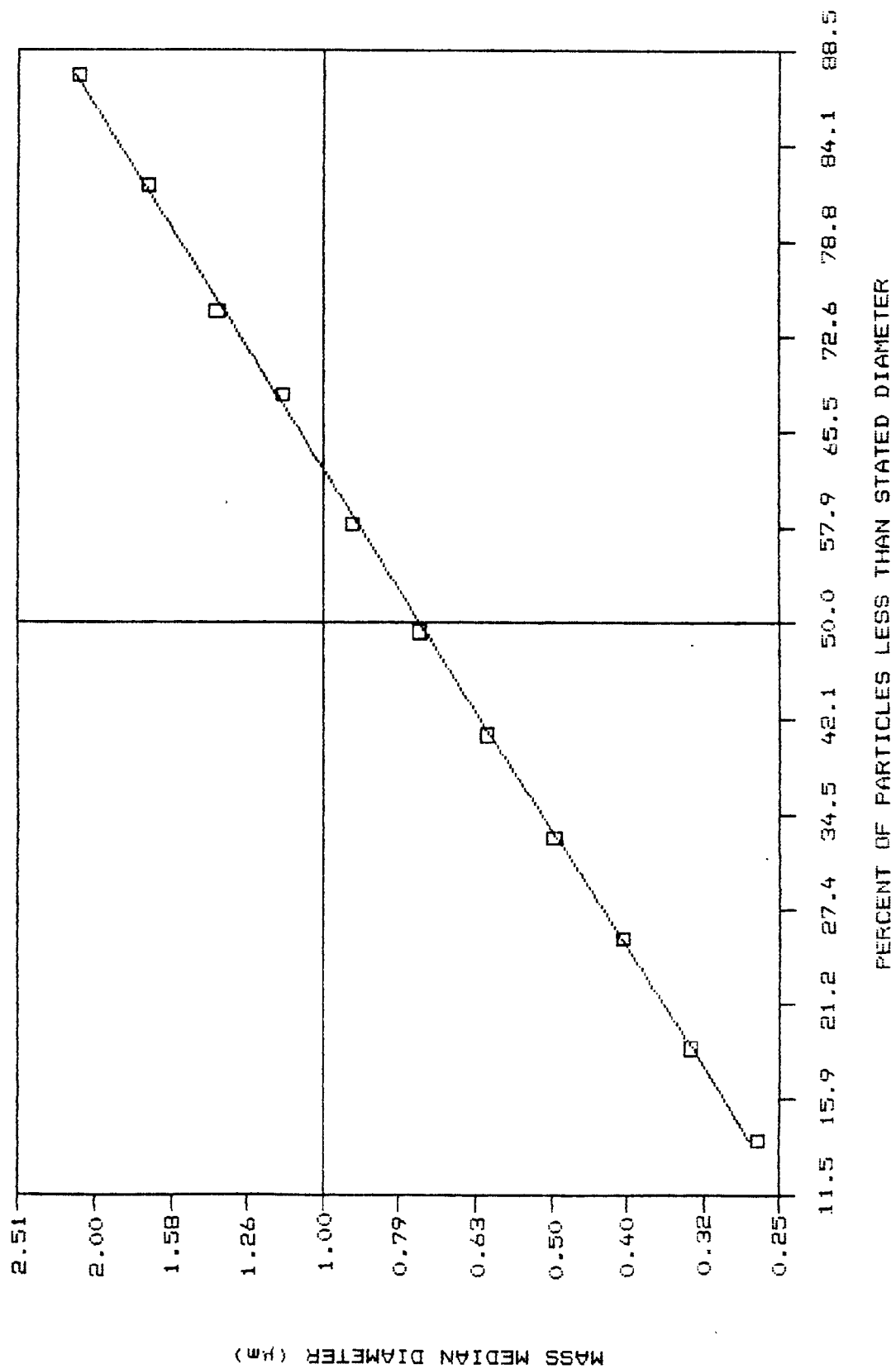
9.172977 = MASS MED.DIAM.

3 = DENSITY

15.88806 = AERO.DIAM.

LUNG 2

-- EXOGENOUS



25-May-88

LUNG 3

-- EXOGENOUS

DIAMETER	LOG.DIAM.	COUNT	CUM.COUNT	PERCENT	CUM.PERC.	CUM.PERC.	CUM.FRED.
0.0227	-1.64397	0	0	0.00%	0.00%		
0.0279	-1.55439	0	0	0.00%	0.00%		
0.0343	-1.46470	0	0	0.00%	0.00%		
0.0421	-1.37571	0	0	0.00%	0.00%		
0.0517	-1.28650	0	0	0.00%	0.00%		
0.0635	-1.19722	0	0	0.00%	0.00%		
0.078	-1.10790	2	2	0.37%	0.37%		
0.0958	-1.01863	0	2	0.00%	0.37%		
0.118	-0.92811	0	2	0.00%	0.37%		
0.144	-0.84163	3	5	0.56%	0.93%		
0.177	-0.75202	3	8	0.56%	1.49%		
0.218	-0.66154	12	20	2.24%	3.73%		
0.268	-0.57186	17	37	3.17%	6.90%		
0.329	-0.48280	25	62	4.66%	11.57%	-1.18788	-0.49949
0.404	-0.39361	33	95	6.16%	17.72%	-0.92876	-0.40076
0.496	-0.30451	43	138	8.02%	25.75%	-0.65980	-0.29828
0.609	-0.21538	46	184	8.58%	34.33%	-0.41165	-0.20373
0.747	-0.12667	48	232	8.96%	43.28%	-0.17320	-0.11288
0.918	-0.03715	52	284	9.70%	52.99%	0.076737	-0.01764
1.13	0.053078	37	321	6.90%	59.89%	0.256203	0.050734
1.38	0.139879	40	361	7.46%	67.35%	0.458201	0.127700
1.7	0.230448	46	407	8.58%	75.93%	0.712193	0.224476
2.09	0.320146	36	443	6.72%	82.65%	0.942728	0.312315
2.56	0.408239	32	475	5.97%	88.62%	1.197021	0.409206
3.15	0.498310	22	497	4.10%	92.72%		
3.87	0.587710	16	513	2.99%	95.71%		
4.75	0.676693	8	521	1.49%	97.20%		
5.83	0.763668	9	530	1.68%	98.88%		
7.16	0.854913	3	533	0.56%	99.44%		
8.79	0.943988	1	534	0.19%	99.63%		
10.8	1.033423	1	535	0.19%	99.81%		
13.3	1.123851	0	535	0.00%	99.81%		
16.3	1.212187	1	536	0.19%	100.00%		
20	1.301029	0	536	0.00%	100.00%		

Regression Output:

Constant -0.04688
Std Err of Y Est 0.012142
R Squared 0.998481
No. of Observations 11
Degrees of Freedom 9

0.397668 = GEDM.MED.

2.158424 = 84.1 %

2.404478 = GEDM.STD.DEV.

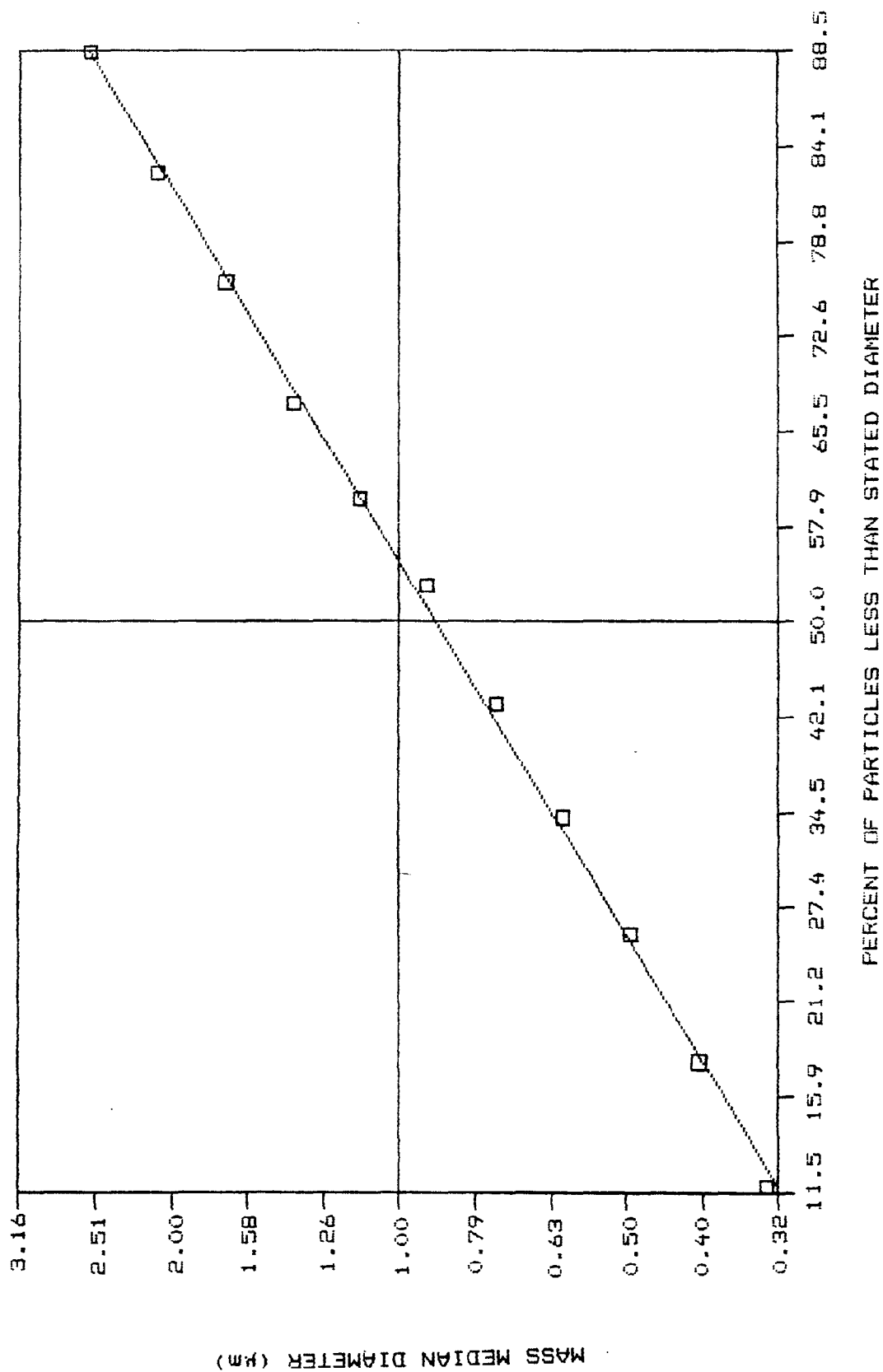
X Coefficient(s) 0.381020
Std Err of Coef. 0.004952

9.036459 = MASS MED.DIAM.

3 = DENSITY

15.65160 = AERO.DIAM.

LUNG 3 -- EXOGENOUS



25-May-88

LUNG 4

-- SILICA

DIAMETER	LOG.DIAM.	COUNT	CUM.COUNT	PERCENT	CUM.PERC.	PROB.	PRED.PROB.
0.0227	-1.64397	0	0	0.00%	0.00%		
0.0279	-1.55439	0	0	0.00%	0.00%		
0.0343	-1.46470	0	0	0.00%	0.00%		
0.0421	-1.37571	0	0	0.00%	0.00%		
0.0517	-1.28650	0	0	0.00%	0.00%		
0.0635	-1.19722	0	0	0.00%	0.00%		
0.078	-1.10790	0	0	0.00%	0.00%		
0.0958	-1.01863	0	0	0.00%	0.00%		
0.118	-0.92811	0	0	0.00%	0.00%		
0.144	-0.84163	1	1	0.32%	0.32%		
0.177	-0.75202	1	2	0.32%	0.64%		
0.218	-0.66154	4	6	1.28%	1.92%		
0.268	-0.57186	7	13	2.24%	4.17%		
0.329	-0.48280	23	36	7.37%	11.54%	-1.18928	-0.46679
0.404	-0.39361	16	52	5.13%	16.67%	-0.96877	-0.39870
0.496	-0.30451	29	81	9.29%	25.96%	-0.65320	-0.30125
0.609	-0.21538	27	108	8.65%	34.62%	-0.40377	-0.22423
0.747	-0.12667	32	140	10.26%	44.87%	-0.13203	-0.14032
0.918	-0.03715	40	180	12.82%	57.69%	0.198623	-0.03822
1.13	0.053078	32	212	10.26%	67.95%	0.474971	0.047111
1.38	0.139879	34	246	10.90%	78.85%	0.807428	0.149770
1.7	0.230448	23	269	7.37%	86.22%	1.086363	0.235903
2.09	0.320146	22	291	7.05%	93.27%		
2.56	0.408239	16	307	5.13%	98.40%		
3.15	0.498310	3	310	0.96%	99.36%		
3.87	0.587710	0	310	0.00%	99.36%		
4.75	0.676693	2	312	0.64%	100.00%		
5.83	0.765668	0	312	0.00%	100.00%		
7.16	0.854913	0	312	0.00%	100.00%		
8.79	0.943988	0	312	0.00%	100.00%		
10.8	1.033423	0	312	0.00%	100.00%		
13.3	1.123851	0	312	0.00%	100.00%		

Regression Output:

Constant	-0.09955
Std Err of Y Est	0.010154
R Squared	0.998485
No. of Observations	9
Degrees of Freedom	7

X Coefficient(s)	0.308790
Std Err of Coef.	0.004545

0.795142 = GEOM.MED.

1.618956 = 84.1 %

2.036058 = GEOM.STD.DEV.

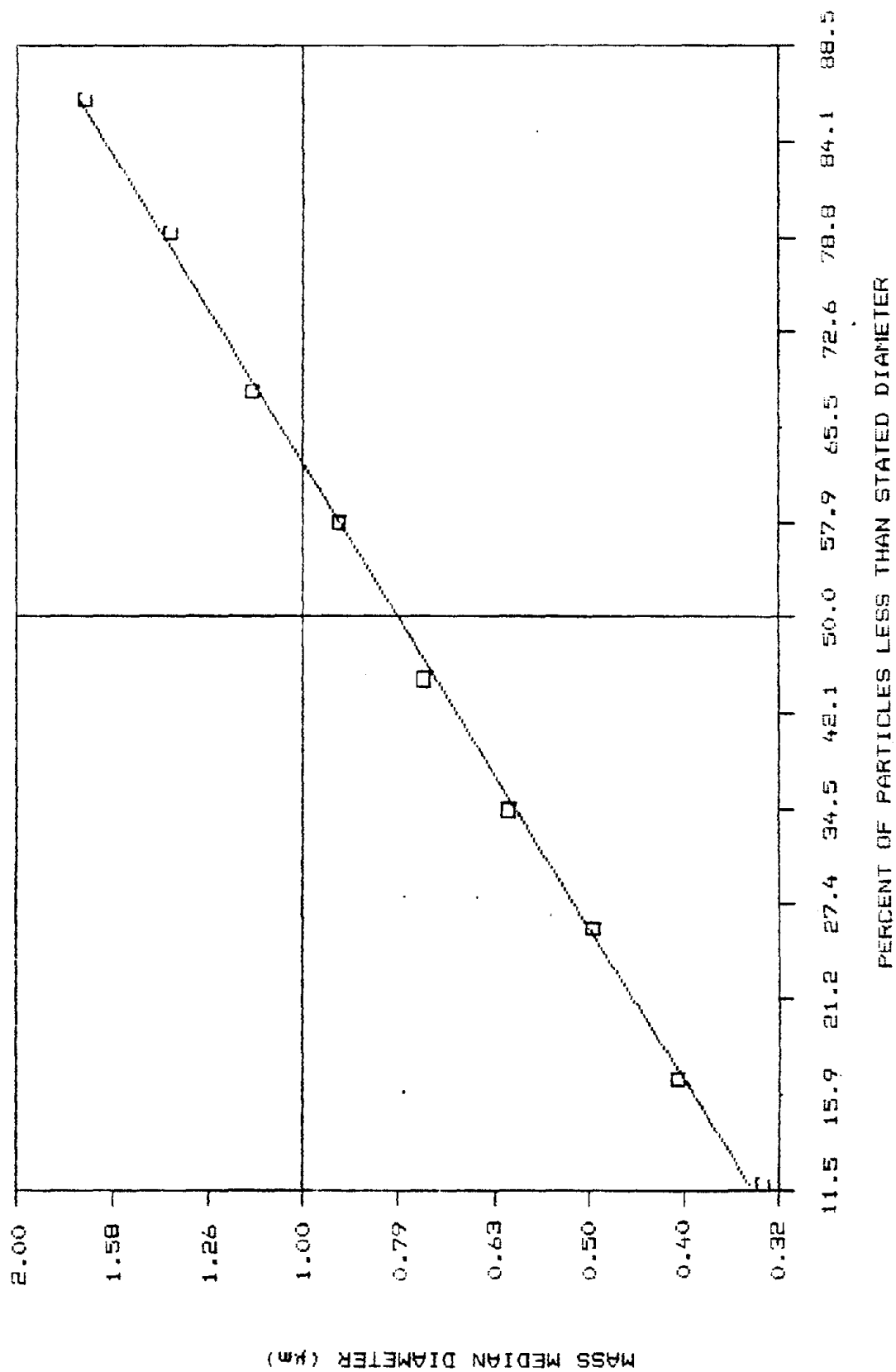
3.623533 = MASS MED.DIAM.

2.7 = DENSITY

5.954072 = AERO.DIAM.

--- SILICA

LUNG 4



26-May-88

LUNG 4

-- EXOGENOUS

						PROB.	PRED.PROB
DIAMETER	LUG.DIAM.	COUNT	CUM.COUNT	PERCENT	CUM.PERC.	CUM.PERC.	CUM.PREC.
=====							
0.0227	-1.64397	0	0	0.00%	0.00%		
0.0279	-1.55439	0	0	0.00%	0.00%		
0.0343	-1.46470	0	0	0.00%	0.00%		
0.0421	-1.37571	0	0	0.00%	0.00%		
0.0517	-1.28650	0	0	0.00%	0.00%		
0.0635	-1.19722	0	0	0.00%	0.00%		
0.078	-1.10790	2	2	0.12%	0.12%		
0.0958	-1.01863	2	4	0.12%	0.23%		
0.118	-0.92811	2	6	0.12%	0.35%		
0.144	-0.84163	5	11	0.29%	0.64%		
0.177	-0.75202	11	22	0.64%	1.27%		
0.218	-0.66154	27	49	1.56%	2.84%		
0.268	-0.57186	60	109	3.47%	6.31%		
0.329	-0.48280	117	226	6.77%	13.09%	-1.11700	-0.49242
0.404	-0.39361	138	364	7.99%	21.08%	-0.81002	-0.39656
0.496	-0.30451	170	534	9.84%	30.92%	-0.50698	-0.30193
0.609	-0.21538	193	727	11.18%	42.10%	-0.20414	-0.20736
0.747	-0.12667	189	916	10.94%	53.04%	0.078150	-0.11921
0.918	-0.03715	189	1105	10.94%	63.98%	0.365589	-0.02945
1.13	0.053078	154	1259	8.92%	72.90%	0.618708	0.049585
1.38	0.139879	153	1412	8.86%	81.76%	0.909744	0.140467
1.7	0.230448	107	1519	6.20%	87.96%	1.164988	0.220173
2.09	0.320146	86	1605	4.98%	92.94%		
2.56	0.408239	61	1666	3.53%	96.47%		
3.15	0.498310	32	1698	1.85%	98.32%		
3.87	0.587710	19	1717	1.10%	99.42%		
4.75	0.676693	7	1724	0.41%	99.83%		
5.83	0.765668	2	1726	0.12%	99.94%		
7.16	0.854913	0	1726	0.00%	99.94%		
8.79	0.943988	0	1726	0.00%	99.94%		
10.8	1.033423	1	1727	0.06%	100.00%		
13.3	1.123851	0	1727	0.00%	100.00%		
16.3	1.212187	0	1727	0.00%	100.00%		
20	1.301029	0	1727	0.00%	100.00%		

Regression Output:

Constant -0.14362
 Std Err of Y Est 0.007609
 R Squared 0.999149
 No. of Observations 9
 Degrees of Freedom 7

0.718421 = GEOM.MED.

1.474524 = 84.1 %

2.052448 = GEOM.STD.DEV.

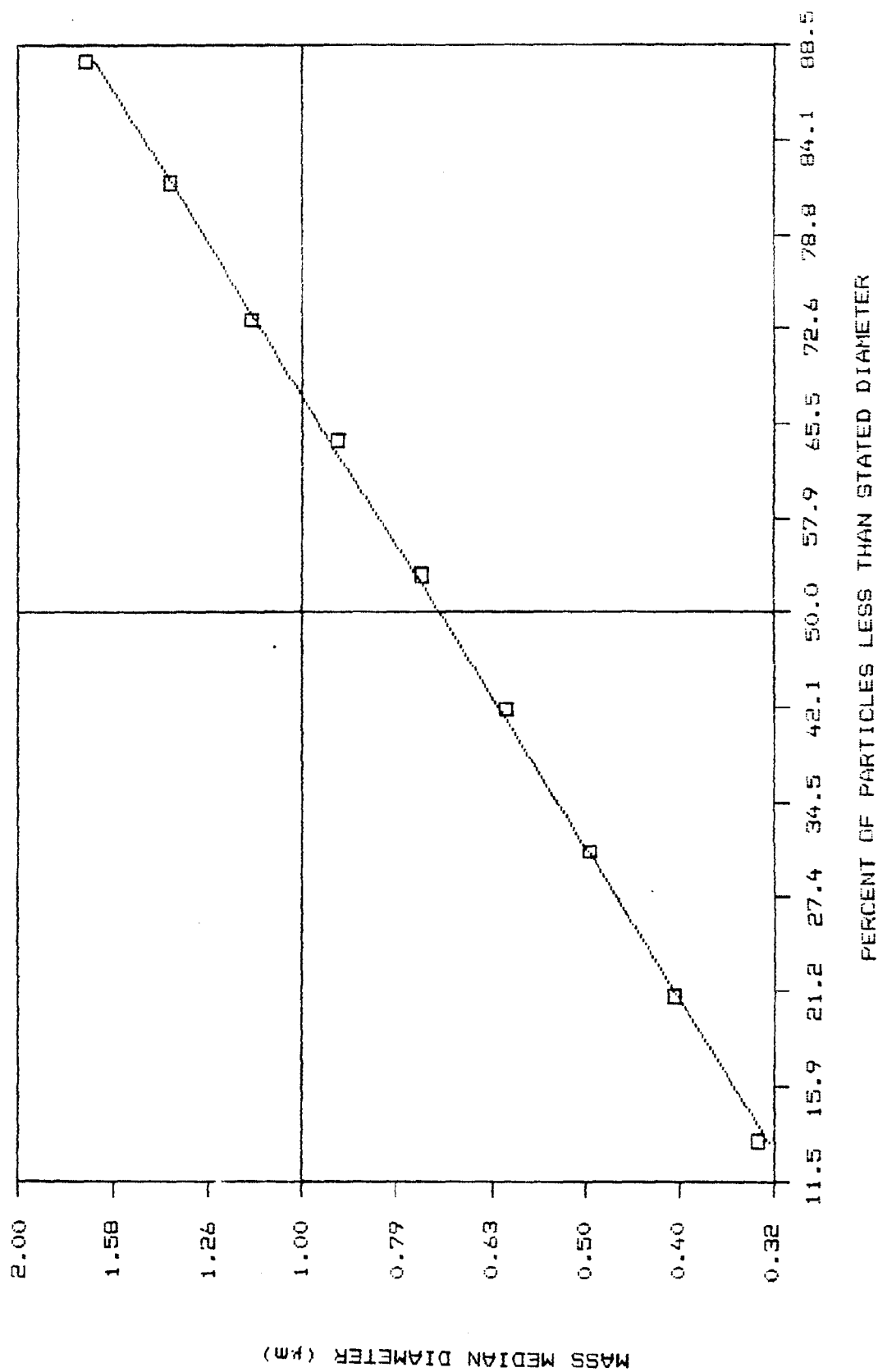
X Coefficient(s) 0.312272
 Std Err of Coef. 0.003443

3.388492 = MASS MED.DIAM.

3 = DENSITY

5.869041 = AERO.DIAM.

LUNG 4 -- EXOGENOUS



25-May-88

LUNG 5 .

-- EXOGENOUS

DIAMETER	LOG.DIAM.	COUNT	CUM.COUNT	PERCENT	CUM.PERC.	PROB.	PRED.PROB.
=====	=====	=====	=====	=====	=====	=====	=====
0.0227	-1.64397	0	0	0.00%	0.00%		
0.0279	-1.55439	1	1	0.09%	0.09%		
0.0343	-1.46470	0	1	0.00%	0.09%		
0.0421	-1.37571	0	1	0.00%	0.09%		
0.0517	-1.28650	0	1	0.00%	0.09%		
0.0635	-1.19722	1	2	0.09%	0.18%		
0.078	-1.10790	3	5	0.28%	0.46%		
0.0958	-1.01863	4	9	0.37%	0.83%		
0.118	-0.92811	5	14	0.46%	1.29%		
0.144	-0.84163	18	32	1.66%	2.95%		
0.177	-0.75202	15	47	1.38%	4.33%		
0.218	-0.66154	33	80	3.04%	7.37%		
0.268	-0.57186	63	143	5.80%	13.17%	-1.11336	-0.56478
0.329	-0.48280	64	207	5.89%	19.06%	-0.88007	-0.48996
0.404	-0.39361	90	297	8.29%	27.35%	-0.61123	-0.40375
0.496	-0.30451	128	425	11.79%	39.13%	-0.28204	-0.29817
0.609	-0.21538	115	540	10.59%	49.72%	-0.00709	-0.20999
0.747	-0.12667	109	649	10.04%	59.76%	0.252843	-0.12663
0.918	-0.03715	115	764	10.59%	70.35%	0.543489	-0.03342
1.13	0.053078	91	855	8.38%	78.73%	0.803485	0.049958
1.38	0.139879	79	934	7.27%	86.00%	1.077129	0.137718
1.7	0.230448	55	989	5.06%	91.07%		
2.09	0.320146	32	1021	2.95%	94.01%		
2.56	0.408239	24	1045	2.21%	96.22%		
3.15	0.498310	24	1069	2.21%	98.43%		
3.87	0.587710	7	1076	0.64%	99.08%		
4.75	0.676693	6	1082	0.55%	99.63%		
5.83	0.765668	4	1086	0.37%	100.00%		
7.16	0.854913	0	1086	0.00%	100.00%		
8.79	0.943988	0	1086	0.00%	100.00%		
10.8	1.033423	0	1086	0.00%	100.00%		
13.3	1.123851	0	1086	0.00%	100.00%		
16.3	1.212187	0	1086	0.00%	100.00%		
20	1.301029	0	1086	0.00%	100.00%		

Regression Output:

Constant -0.20772
 Std Err of Y Est 0.006564
 R Squared 0.999366
 No. of Observations 9
 Degrees of Freedom 7

0.617835 = GEOM.MED.

1.297126 = 84.1 %

2.092695 = GEOM.STD.DEV.

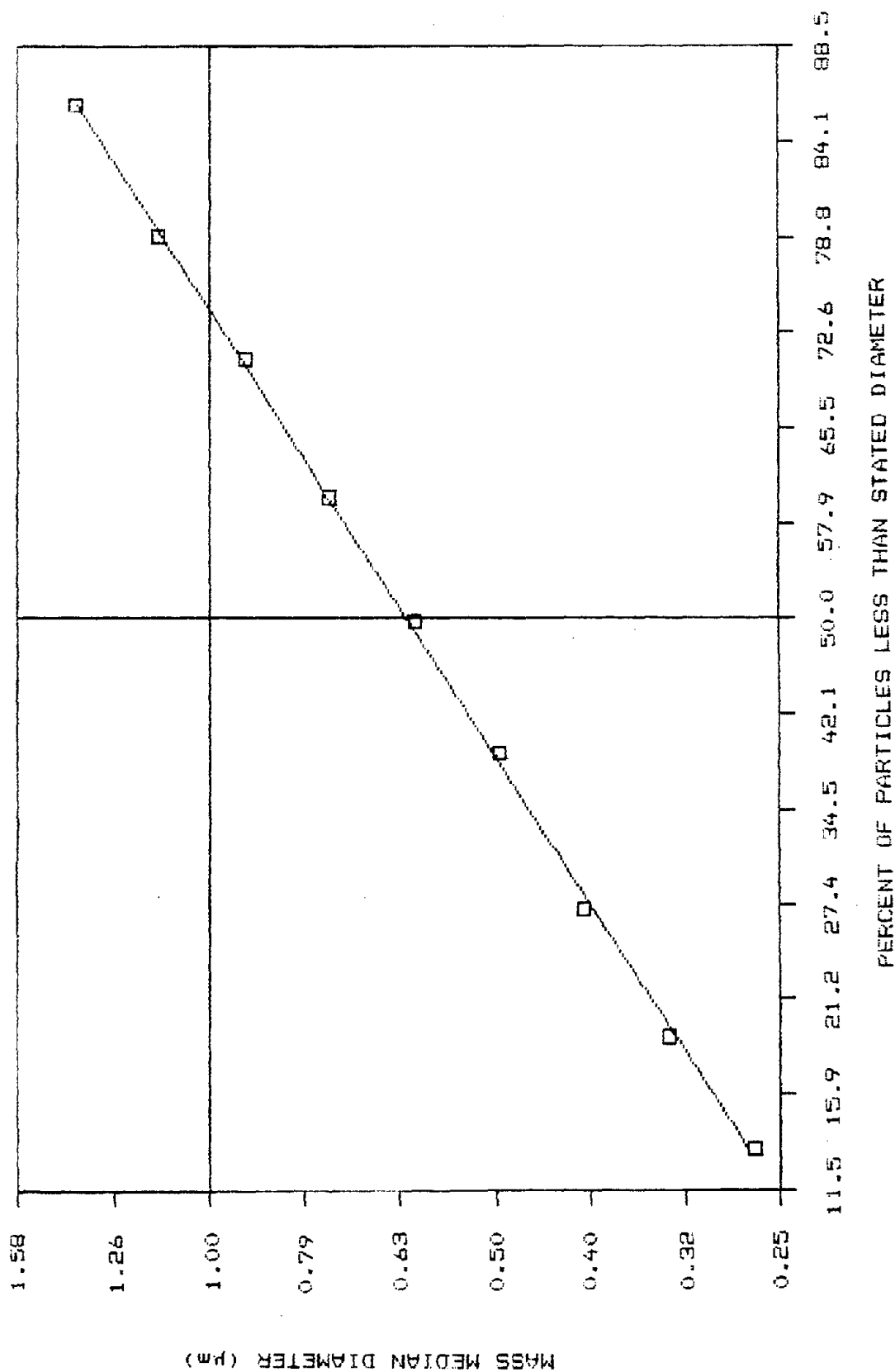
X Coefficient(s) 0.320706
 Std Err of Coef. 0.003051

3.182590 = MASS MED.DIAM.

3 = DENSITY

5.512408 = AERO.DIAM.

LUNG 5 -- EXOGENOUS



26-May-88

LUNG 6

-- SILICA

						PROB.	FREQ.PROB
DIAMETER	LOG.DIAM.	COUNT	CUM.COUNT	PERCENT	CUM.PERC.	CUM.PERC.	CUM.FREQ.
=====							
0.0227	-1.64397	0	0	0.00%	0.00%		
0.0279	-1.55439	1	1	0.22%	0.22%		
0.0343	-1.46470	0	1	0.00%	0.22%		
0.0421	-1.37571	0	1	0.00%	0.22%		
0.0517	-1.28650	0	1	0.00%	0.22%		
0.0635	-1.19722	0	1	0.00%	0.22%		
0.078	-1.10790	0	1	0.00%	0.22%		
0.0958	-1.01863	2	3	0.44%	0.67%		
0.118	-0.92811	2	5	0.44%	1.11%		
0.144	-0.84163	1	6	0.22%	1.33%		
0.177	-0.75202	2	8	0.44%	1.77%		
0.218	-0.66154	9	17	2.00%	3.77%		
0.268	-0.57186	29	46	6.43%	10.20%	-1.25747	-0.59749
0.329	-0.48280	36	82	7.98%	18.18%	-0.91186	-0.48427
0.404	-0.39361	38	120	8.43%	26.61%	-0.63353	-0.39310
0.496	-0.30451	55	175	12.20%	38.80%	-0.29085	-0.28084
0.609	-0.21538	46	221	10.20%	49.00%	-0.02563	-0.19396
0.747	-0.12667	42	263	9.31%	58.31%	0.214889	-0.11517
0.918	-0.03715	40	303	8.87%	67.18%	0.453544	-0.03699
1.13	0.053078	34	337	7.54%	74.72%	0.674280	0.035316
1.38	0.139879	44	381	9.76%	84.48%	1.013855	0.146555
1.7	0.230448	20	401	4.43%	88.91%	1.211640	0.211346
2.09	0.320146	20	421	4.43%	93.35%		
2.56	0.408239	18	439	3.99%	97.34%		
3.15	0.498310	9	448	2.00%	99.33%		
3.87	0.587710	1	449	0.22%	99.56%		
4.75	0.676693	2	451	0.44%	100.00%		
5.83	0.765668	0	451	0.00%	100.00%		
7.16	0.854913	0	451	0.00%	100.00%		
8.79	0.943988	0	451	0.00%	100.00%		
10.8	1.033423	0	451	0.00%	100.00%		
13.3	1.123851	0	451	0.00%	100.00%		

Regression Output:

Constant -0.18556
 Std Err of Y Est 0.017804
 R Squared 0.996129
 No. of Observations 10
 Degrees of Freedom 8

X Coefficient(s) 0.327582
 Std Err of Coef. 0.007219

0.652280 = GEOM.MED.

1.386809 = 84.1 %

2.126093 = GEOM.STD.DEV.

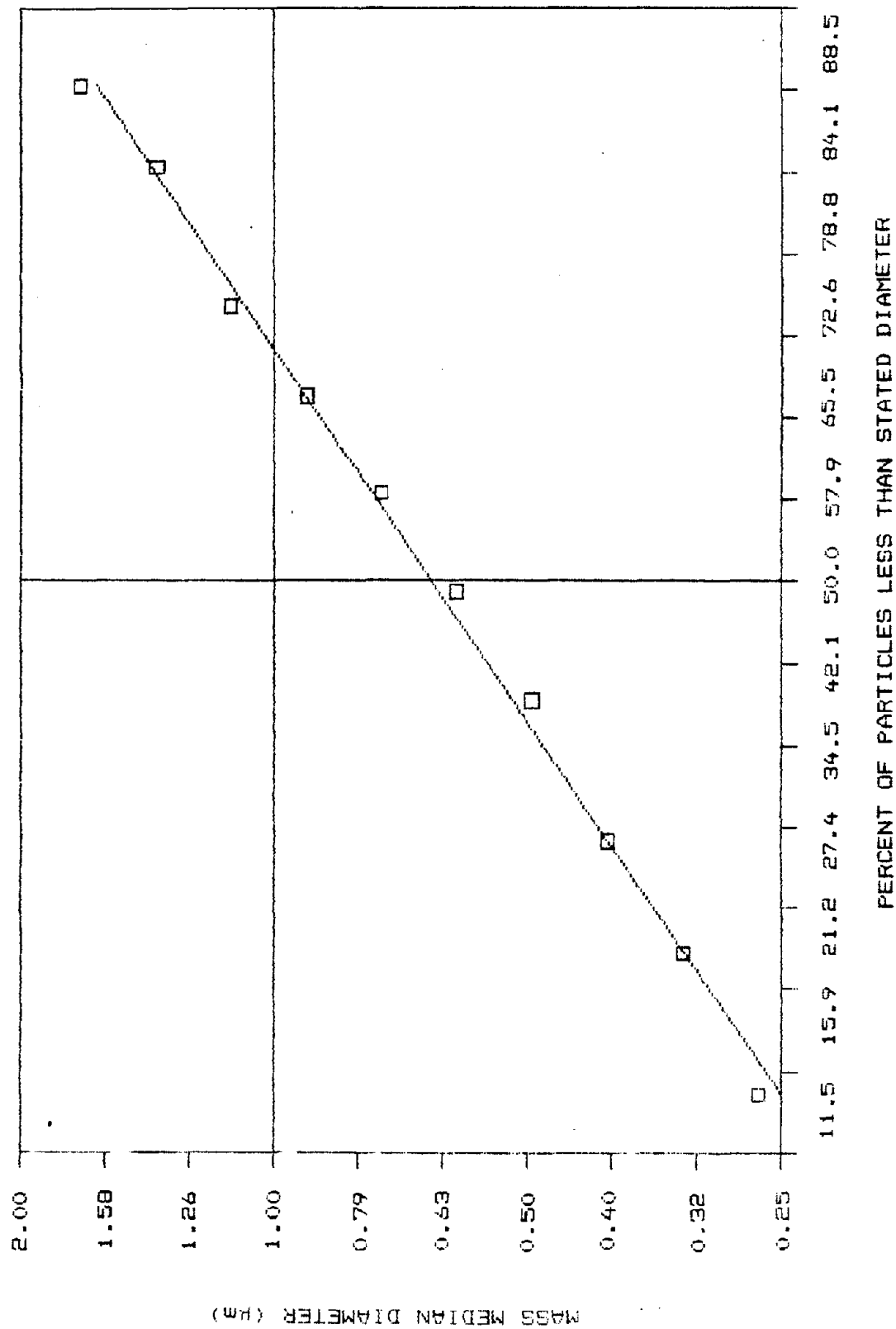
3.595286 = MASS MED.DIAM.

2.7 = DENSITY

5.907658 = AERO.DIAM.

LUNG 6

-- SILICA



25-May-88

LUNG 6

-- EXOGENOUS

DIAMETER	LOG.DIAM.	COUNT	CUM.COUNT	PERCENT	CUM.PERC.	PROB.	PRED.PROB
						CUM.PERC.	CUM.PREC.
0.0227	-1.64397	0	0	0.00%	0.00%		
0.0279	-1.55439	1	1	0.07%	0.07%		
0.0343	-1.46470	0	1	0.00%	0.07%		
0.0421	-1.37571	0	1	0.00%	0.07%		
0.0517	-1.28650	0	1	0.00%	0.07%		
0.0635	-1.19722	0	1	0.00%	0.07%		
0.078	-1.10790	1	2	0.07%	0.15%		
0.0958	-1.01863	2	4	0.15%	0.30%		
0.118	-0.92811	4	8	0.30%	0.60%		
0.144	-0.84163	7	15	0.52%	1.12%		
0.177	-0.75202	15	30	1.12%	2.25%		
0.218	-0.66154	24	54	1.80%	4.05%		
0.268	-0.57186	55	109	4.12%	8.17%		
0.329	-0.48280	93	202	6.97%	15.14%	-1.02919	-0.49166
0.404	-0.39361	96	298	7.20%	22.34%	-0.76795	-0.40133
0.496	-0.30451	129	427	9.67%	32.01%	-0.47616	-0.30045
0.609	-0.21538	131	558	9.82%	41.83%	-0.21112	-0.20881
0.747	-0.12667	141	699	10.57%	52.40%	0.061649	-0.11450
0.918	-0.03715	125	824	9.37%	61.77%	0.306072	-0.02999
1.13	0.053078	116	940	8.70%	70.46%	0.546818	0.053240
1.38	0.139879	115	1055	8.62%	79.09%	0.815535	0.146148
1.7	0.230448	68	1123	5.10%	84.18%	1.002021	0.210625
2.09	0.320146	82	1205	6.15%	90.33%		
2.56	0.408239	54	1259	4.05%	94.38%		
3.15	0.498310	34	1293	2.55%	96.93%		
3.87	0.587710	18	1311	1.35%	98.28%		
4.75	0.676693	14	1325	1.05%	99.33%		
5.83	0.765668	7	1332	0.52%	99.85%		
7.16	0.854913	1	1333	0.07%	99.93%		
8.79	0.943988	0	1333	0.00%	99.93%		
10.8	1.033423	1	1334	0.07%	100.00%		
13.3	1.123851	0	1334	0.00%	100.00%		
16.3	1.212187	0	1334	0.00%	100.00%		
20	1.301029	0	1334	0.00%	100.00%		

Regression Output:

Constant -0.13582
 Std Err of Y Est 0.010885
 R Squared 0.998259
 No. of Observations 9
 Degrees of Freedom 7

X Coefficient(s) 0.345746
 Std Err of Coef. 0.005457

0.731441 = GEOM.MED.

1.621534 = 84.1 %

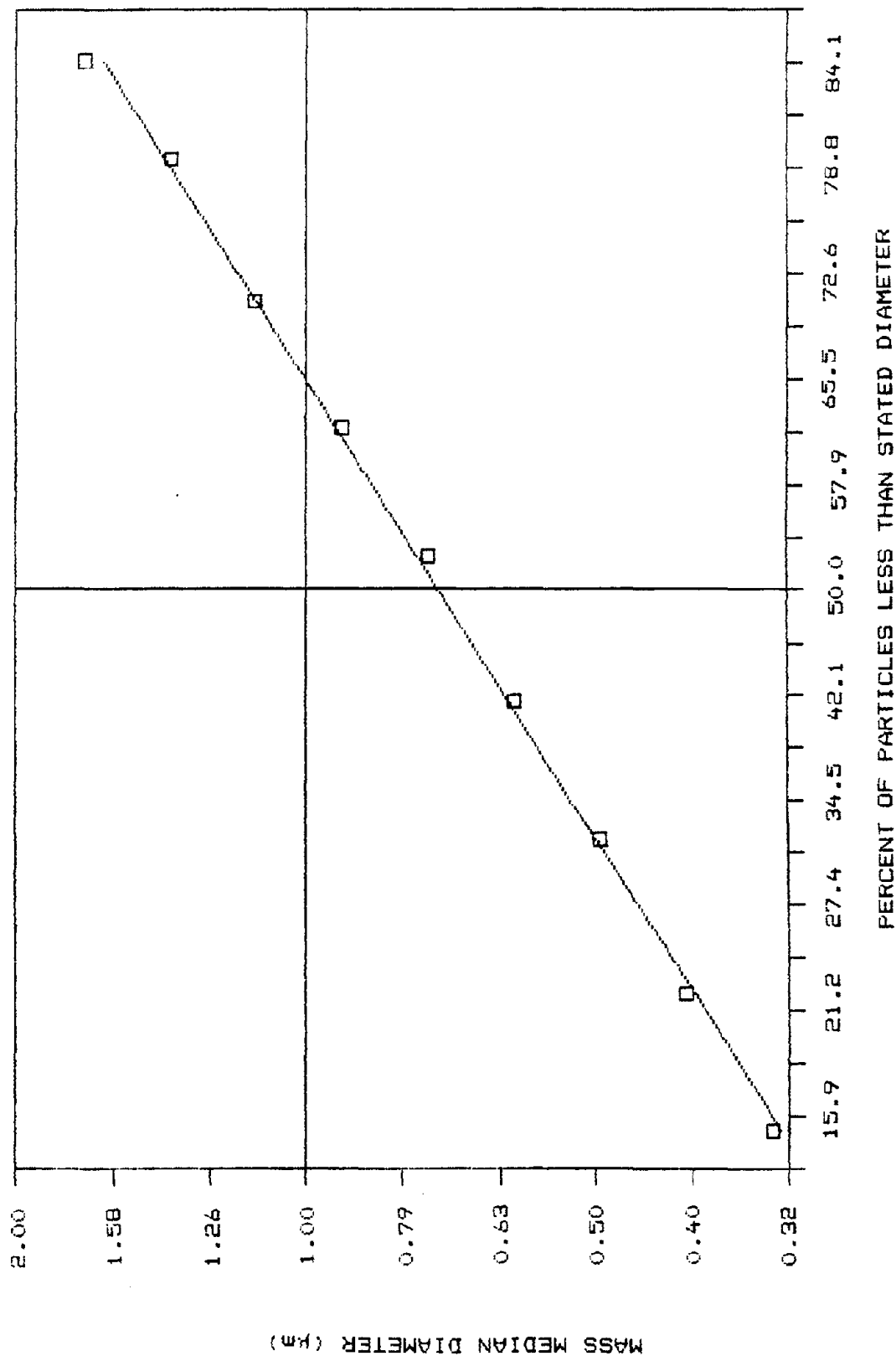
2.216902 = GEOM.STD.DEV.

4.897412 = MASS MED.DIAM.

3 = DENSITY

8.482566 = AERO.DIAM.

LUNG 6 -- EXOGENOUS



26-May-88

LUNG 7

-- SILICA

DIAMETER	LOG.DIAM.	COUNT	CUM.COUNT	PERCENT	CUM.PERC.	PROB.	PRED.PROB
0.0227	-1.64397	0	0	0.00%	0.00%		
0.0279	-1.55439	0	0	0.00%	0.00%		
0.0343	-1.46470	0	0	0.00%	0.00%		
0.0421	-1.37571	0	0	0.00%	0.00%		
0.0517	-1.28650	1	1	0.23%	0.23%		
0.0635	-1.19722	0	1	0.00%	0.23%		
0.078	-1.10790	1	2	0.23%	0.46%		
0.0958	-1.01863	1	3	0.23%	0.69%		
0.118	-0.92811	4	7	0.92%	1.61%		
0.144	-0.84163	6	13	1.38%	2.98%		
0.177	-0.75202	4	17	0.92%	3.90%		
0.218	-0.66154	14	31	3.21%	7.11%		
0.268	-0.57186	22	53	5.05%	12.16%	-1.15970	-0.56968
0.329	-0.48280	27	80	6.19%	18.35%	-0.90576	-0.49316
0.404	-0.39361	40	120	9.17%	27.52%	-0.60601	-0.40284
0.496	-0.30451	54	174	12.39%	39.91%	-0.26157	-0.29906
0.609	-0.21538	57	231	13.07%	52.98%	0.076649	-0.19714
0.747	-0.12667	47	278	10.78%	63.76%	0.359570	-0.11189
0.918	-0.03715	35	313	8.03%	71.79%	0.585579	-0.04379
1.13	0.053078	39	352	8.94%	80.73%	0.872764	0.042740
1.38	0.139879	33	385	7.57%	88.30%	1.181575	0.135791
1.7	0.230448	23	408	5.28%	93.58%		
2.09	0.320146	10	418	2.29%	95.87%		
2.56	0.408239	9	427	2.06%	97.94%		
3.15	0.498310	3	430	0.69%	98.62%		
3.87	0.587710	3	433	0.69%	99.31%		
4.75	0.676693	3	436	0.69%	100.00%		
5.83	0.765668	0	436	0.00%	100.00%		
7.16	0.854913	0	436	0.00%	100.00%		
8.79	0.943988	0	436	0.00%	100.00%		
10.8	1.033423	0	436	0.00%	100.00%		
13.3	1.123851	0	436	0.00%	100.00%		
16.3	1.212187	0	436	0.00%	100.00%		
20	1.301029	0	436	0.00%	100.00%		

Regression Output:

Constant -0.22024
Std Err of Y Est 0.011624
R Squared 0.998013
No. of Observations 9
Degrees of Freedom 7

0.602223 = GEOM.MED.

1.205255 = 84.1.%

2.001342 = GEOM.STD.DEV.

2.552503 = MASS MED.DIAM.

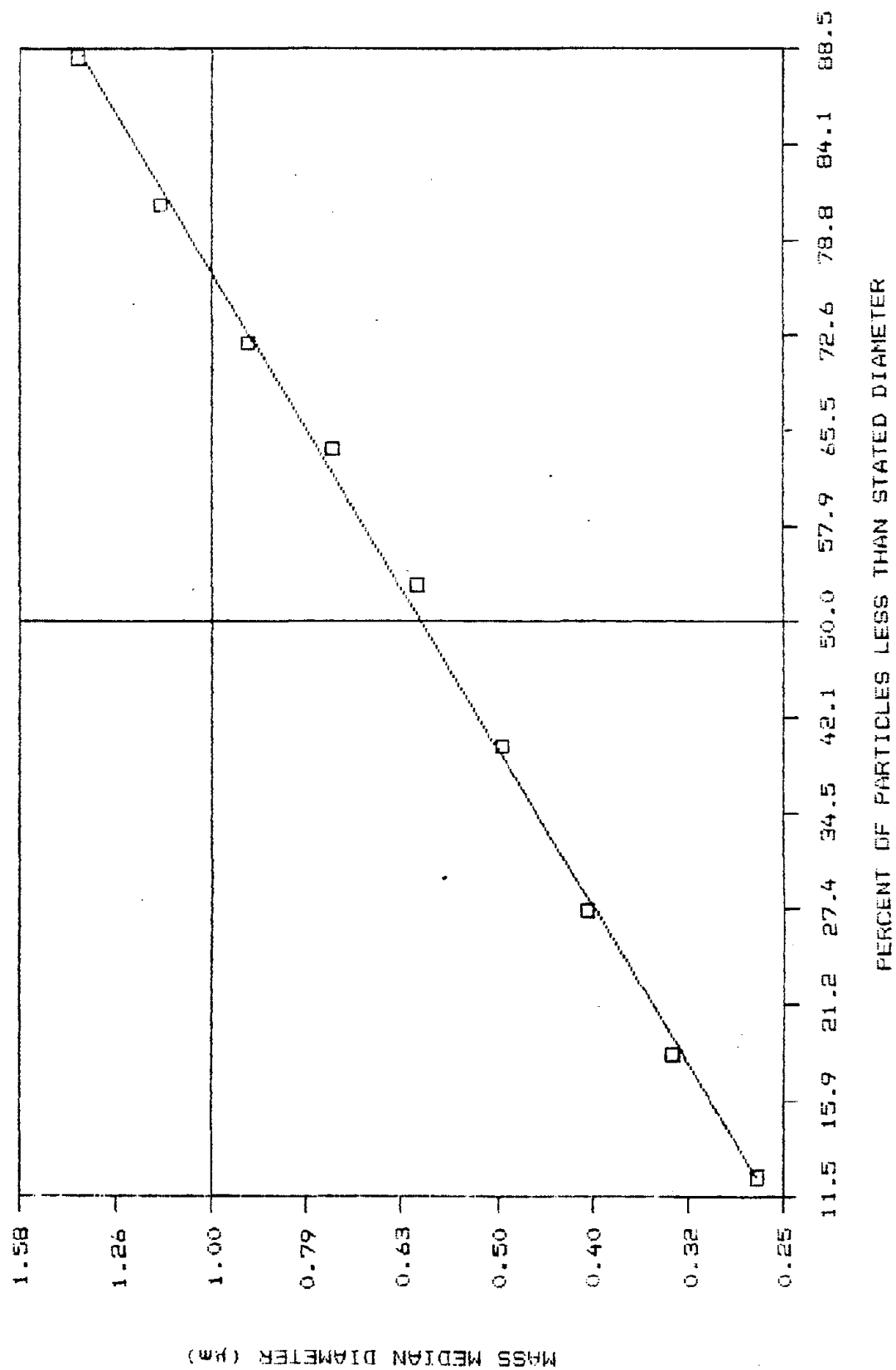
2.7 = DENSITY

4.194191 = AERO.DIAM.

X Coefficient(s) 0.301321
Std Err of Coef. 0.005080

LUNG 7

-- SILICA



25-May-88

LUNG 7

-- EXOGENOUS

						PROB.	PRED.PROB
DIAMETER	LOG.DIAM.	COUNT	CUM.COUNT	PERCENT	CUM.PERC.	CUM.PERC.	CUM.PREC.
=====							
0.0227	-1.64397	0	0	0.00%	0.00%		
0.0279	-1.55439	0	0	0.00%	0.00%		
0.0343	-1.46470	0	0	0.00%	0.00%		
0.0421	-1.37571	0	0	0.00%	0.00%		
0.0517	-1.28650	1	1	0.07%	0.07%		
0.0635	-1.19722	1	2	0.07%	0.14%		
0.078	-1.10790	5	7	0.34%	0.48%		
0.0958	-1.01863	6	13	0.41%	0.88%		
0.118	-0.92811	11	24	0.75%	1.63%		
0.144	-0.84163	15	39	1.02%	2.65%		
0.177	-0.75202	23	62	1.57%	4.22%		
0.218	-0.66154	38	100	2.59%	6.81%		
0.268	-0.57186	56	156	3.81%	10.62%	-1.23543	-0.56728
0.329	-0.48280	78	234	5.31%	15.93%	-0.99757	-0.48780
0.404	-0.39361	114	348	7.76%	23.69%	-0.72420	-0.39646
0.496	-0.30451	143	491	9.73%	33.42%	-0.43662	-0.30037
0.609	-0.21538	151	642	10.28%	43.70%	-0.16230	-0.20871
0.747	-0.12667	147	789	10.01%	53.71%	0.095413	-0.12260
0.918	-0.03715	128	917	8.71%	62.42%	0.323557	-0.04637
1.13	0.053078	137	1054	9.33%	71.75%	0.584412	0.040782
1.38	0.139879	137	1191	9.33%	81.08%	0.884949	0.141201
1.7	0.230448	105	1296	7.15%	88.22%	1.177744	0.239032
2.09	0.320146	65	1361	4.42%	92.65%		
2.56	0.408239	51	1412	3.47%	96.12%		
3.15	0.498310	25	1437	1.70%	97.82%		
3.87	0.587710	17	1454	1.16%	98.98%		
4.75	0.676693	10	1464	0.68%	99.66%		
5.83	0.765668	5	1469	0.34%	100.00%		
7.16	0.854913	0	1469	0.00%	100.00%		
8.79	0.943988	0	1469	0.00%	100.00%		
10.8	1.033423	0	1469	0.00%	100.00%		
13.3	1.123851	0	1469	0.00%	100.00%		
16.3	1.212187	0	1469	0.00%	100.00%		
20	1.301029	0	1469	0.00%	100.00%		

Regression Output:

Constant -0.15448
 Std Err of Y Est 0.007448
 R Squared 0.999322
 No. of Observations 10
 Degrees of Freedom 8

0.700668 = GEOM.MED.

1.512316 = 84.1 %

2.158390 = GEOM.STD.DEV.

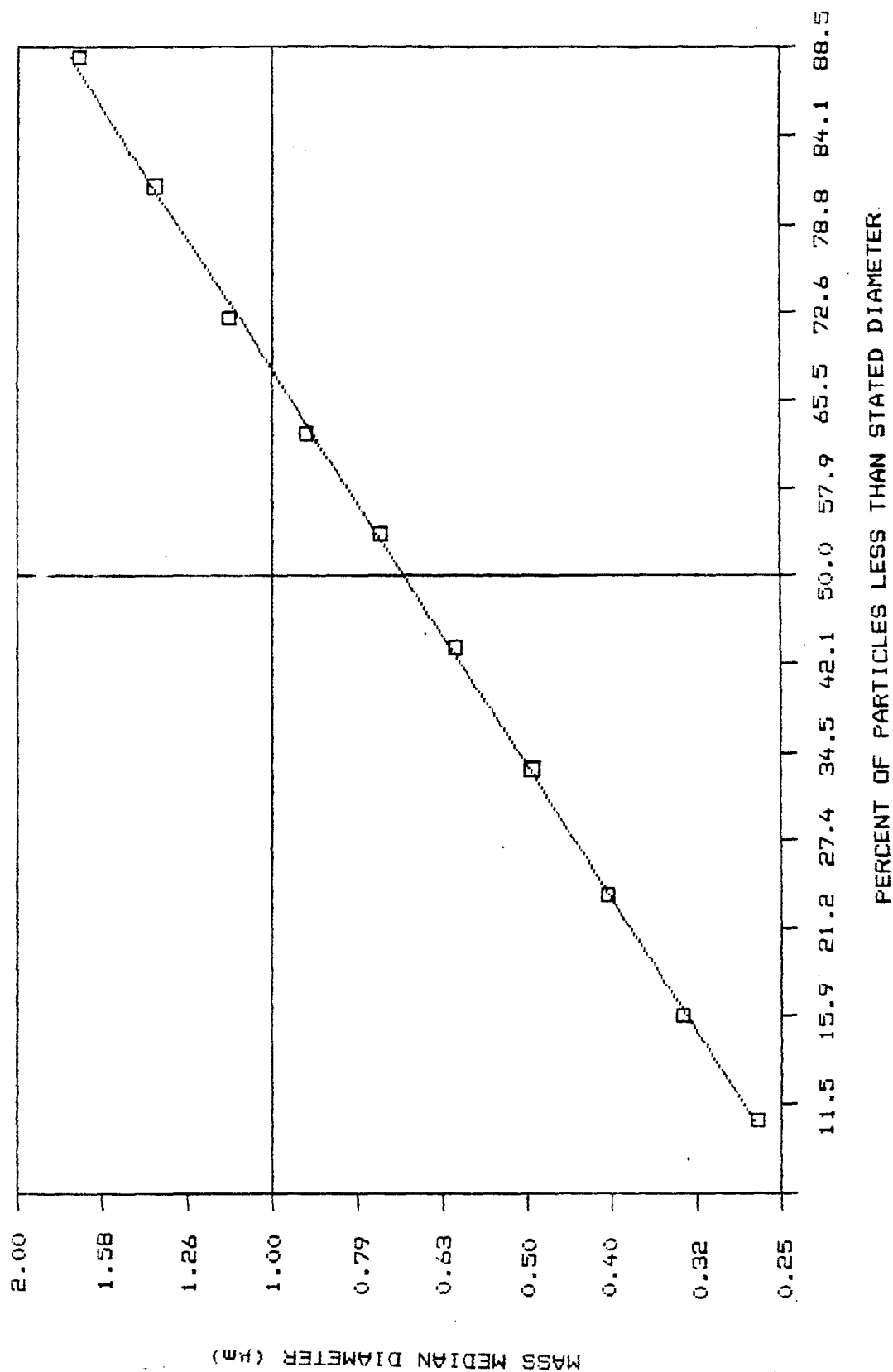
4.137539 = MASS MED.DIAM.

3 = DENSITY

7.166427 = AERO.DIAM.

X Coefficient(s) 0.334130
 Std Err of Coef. 0.003075

LUNG 7 -- EXOGENOUS



26-May-88

LUNG 8

-- SILICA

DIAMETER	LOG.DIAM.	COUNT	CUM.COUNT	PERCENT	CUM.PERC.	CUM.PERC.	CUM.PERC.	PROB.	PRED.PROB
0.0227	-1.64397	0	0	0.00%	0.00%				
0.0279	-1.55439	0	0	0.00%	0.00%				
0.0343	-1.46470	0	0	0.00%	0.00%				
0.0421	-1.37571	0	0	0.00%	0.00%				
0.0517	-1.28650	0	0	0.00%	0.00%				
0.0635	-1.19722	0	0	0.00%	0.00%				
0.078	-1.10790	0	0	0.00%	0.00%				
0.0958	-1.01863	1	1	0.16%	0.16%				
0.113	-0.92811	0	1	0.00%	0.16%				
0.144	-0.84163	1	2	0.16%	0.33%				
0.177	-0.75202	1	3	0.16%	0.49%				
0.218	-0.66154	9	12	1.48%	1.97%				
0.268	-0.57186	17	29	2.80%	4.77%				
0.329	-0.48280	36	65	5.92%	10.69%	-1.23174	-0.50724		
0.404	-0.39361	59	124	9.70%	20.39%	-0.83331	-0.38319		
0.496	-0.30451	58	182	9.54%	29.93%	-0.53527	-0.29040		
0.609	-0.21538	60	242	9.87%	39.80%	-0.26436	-0.20606		
0.747	-0.12667	67	309	11.02%	50.82%	0.021125	-0.11718		
0.919	-0.03715	55	364	9.05%	59.87%	0.255685	-0.04415		
1.13	0.053078	63	427	10.36%	70.23%	0.540027	0.044368		
1.38	0.139879	63	490	10.36%	80.59%	0.867739	0.146395		
1.7	0.230448	37	527	6.09%	86.68%	1.106490	0.220725		
2.09	0.320146	41	568	6.74%	93.42%				
2.56	0.408239	23	591	3.78%	97.20%				
3.15	0.498310	8	599	1.32%	98.52%				
3.87	0.587710	8	607	1.32%	99.84%				
4.75	0.676693	1	608	0.16%	100.00%				
5.83	0.765668	0	608	0.00%	100.00%				
7.16	0.854913	0	608	0.00%	100.00%				
8.79	0.943988	0	608	0.00%	100.00%				
10.8	1.033423	0	608	0.00%	100.00%				
13.3	1.123851	0	608	0.00%	100.00%				

Regression Output:

Constant -0.12375
Std Err of Y Est 0.013855
R Squared 0.997179
No. of Observations 9
Degrees of Freedom 7

0.752040 = GEOM.MED.

1.540182 = 84.1 %

2.048004 = GEOM.STD.DEV.

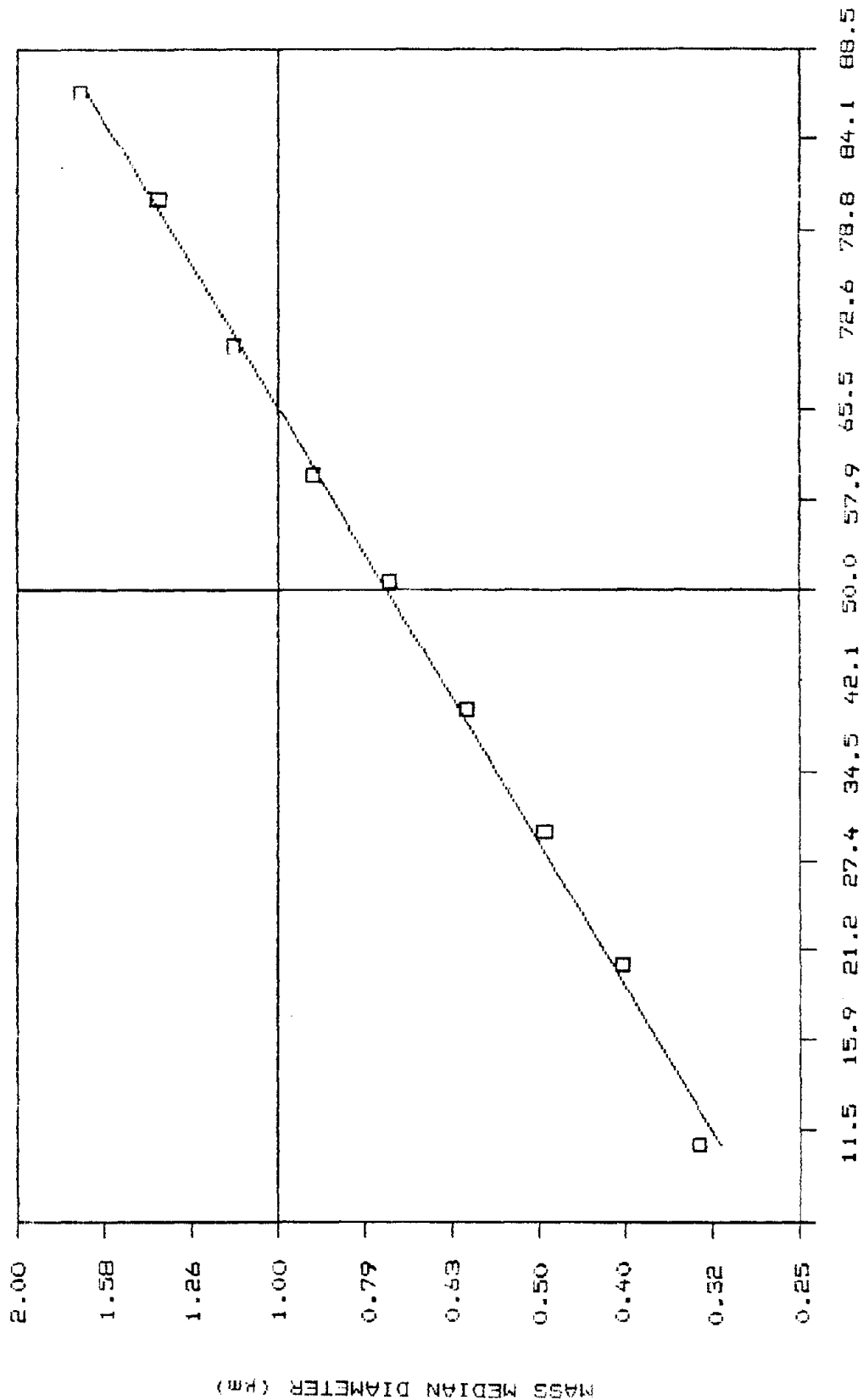
3.514086 = MASS MED.DIAM.

2.7 = DENSITY

5.774232 = AERO.DIAM.

X Coefficient(s) 0.311330
Std Err of Coef. 0.006257

LUNG 8 -- SILICA



25-May-88

LUNG 8

-- EXOGENOUS

				PROB.	FRED.PROB
DIAMETER	LOG.DIAM.	COUNT	CUM.COUNT	PERCENT	CUM.PERC.CUM.PERC.CUM.PREC.
=====					
0.0227	-1.64397	0	0	0.00%	0.00%
0.0279	-1.55439	0	0	0.00%	0.00%
0.0343	-1.46470	0	0	0.00%	0.00%
0.0421	-1.37571	0	0	0.00%	0.00%
0.0517	-1.28650	0	0	0.00%	0.00%
0.0635	-1.19722	0	0	0.00%	0.00%
0.078	-1.10790	0	0	0.00%	0.00%
0.0958	-1.01863	4	4	0.16%	0.16%
0.118	-0.92811	3	7	0.12%	0.29%
0.144	-0.84163	6	13	0.24%	0.53%
0.177	-0.75202	10	23	0.41%	0.94%
0.218	-0.66154	36	59	1.47%	2.41%
0.268	-0.57186	72	131	2.94%	5.35%
0.329	-0.48280	127	258	5.19%	10.53%-1.23981 -0.50072
0.404	-0.39361	203	461	8.29%	18.82%-0.88855 -0.38627
0.496	-0.30451	211	672	8.62%	27.44%-0.60849 -0.29501
0.609	-0.21538	226	898	9.23%	36.67%-0.34797 -0.21012
0.747	-0.12667	254	1152	10.37%	47.04%-0.07610 -0.12154
0.918	-0.03715	236	1388	9.64%	56.68%0.172163 -0.04064
1.13	0.053078	272	1660	11.11%	67.78%0.470306 0.056503
1.38	0.139879	207	1867	8.45%	76.24%0.721805 0.138452
1.7	0.230448	181	2048	7.39%	83.63%0.980112 0.222619
2.09	0.320146	157	2205	6.41%	90.04%
2.56	0.408239	107	2312	4.37%	94.41%
3.15	0.498310	58	2370	2.37%	96.77%
3.87	0.587710	46	2416	1.88%	98.65%
4.75	0.676693	17	2433	0.69%	99.35%
5.83	0.765668	11	2444	0.45%	99.80%
7.16	0.854913	2	2446	0.08%	99.88%
8.79	0.943988	1	2447	0.04%	99.92%
10.8	1.033423	2	2449	0.08%	100.00%
13.3	1.123851	0	2449	0.00%	100.00%
16.3	1.212187	0	2449	0.00%	100.00%
20	1.301029	0	2449	0.00%	100.00%

Regression Output:

Constant -0.09674
 Std Err of Y Est 0.009310
 R Squared 0.998726
 No. of Observations 9
 Degrees of Freedom 7

0.800307 = GEOM.MED.

1.694727 = 84.1 %

2.117593 = GEOM.STD.DEV.

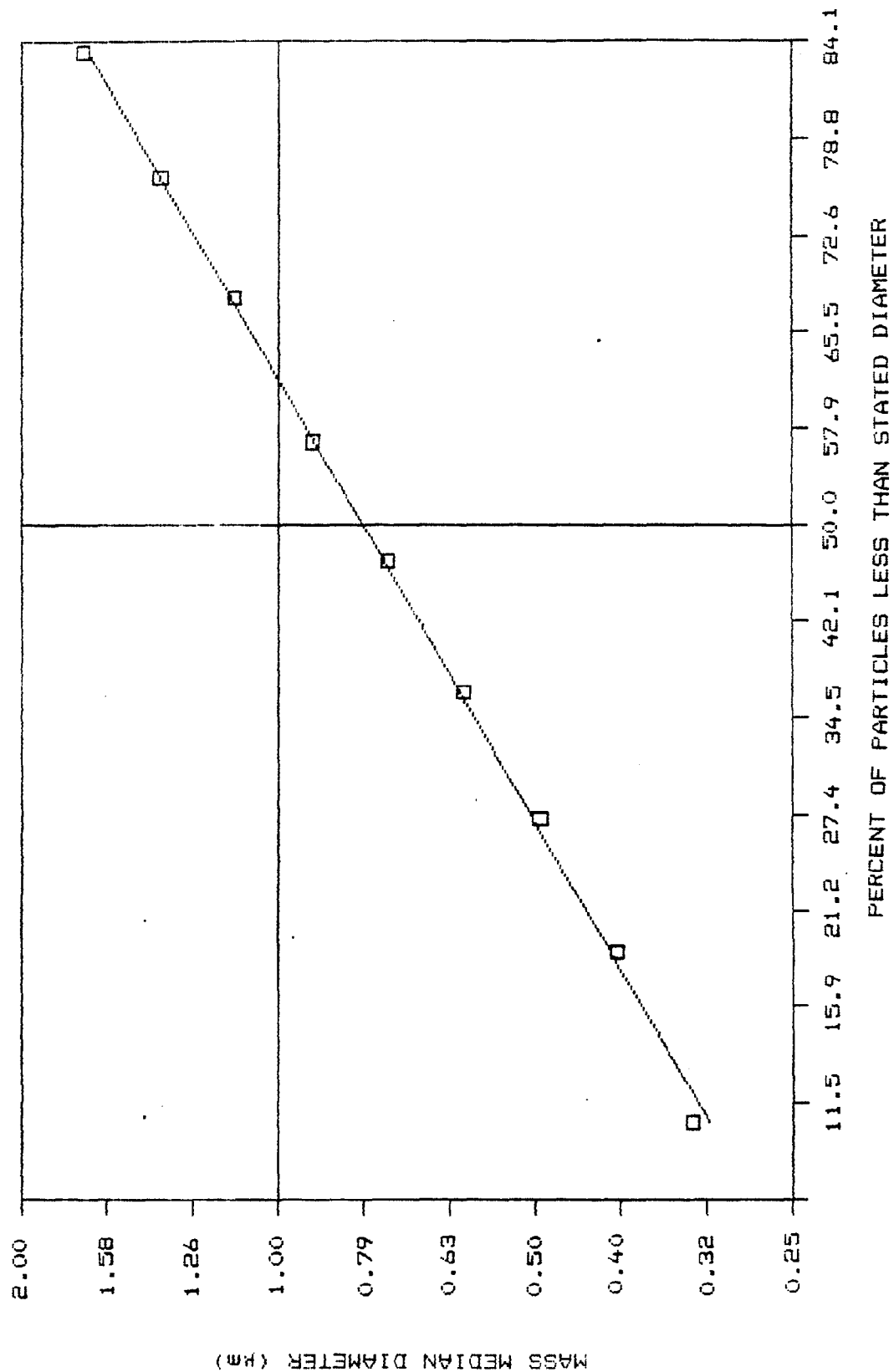
X Coefficient(s) 0.325842
 Std Err of Coef. 0.004397

4.332146 = MASS MED.DIAM.

3 = DENSITY

7.503497 = AERO.DIAM.

LUNG 8 *--- EXOGENOUS*



26-May-88

LUNG 9

-- SILICA

DIAMETER	LOG.DIAM.	COUNT	CUM.COUNT	PERCENT	CUM.PERC.	PROB.	PRED.PROB
0.0227	-1.64397	0	0	0.00%	0.00%		
0.0279	-1.55439	0	0	0.00%	0.00%		
0.0343	-1.46470	0	0	0.00%	0.00%		
0.0421	-1.37571	0	0	0.00%	0.00%		
0.0517	-1.28650	0	0	0.00%	0.00%		
0.0635	-1.19722	1	1	0.14%	0.14%		
0.078	-1.10790	0	1	0.00%	0.14%		
0.0958	-1.01863	0	1	0.00%	0.14%		
0.118	-0.92811	2	3	0.28%	0.43%		
0.144	-0.84163	4	7	0.57%	0.99%		
0.177	-0.75202	5	12	0.71%	1.70%		
0.218	-0.66154	18	30	2.55%	4.26%		
0.268	-0.57186	45	75	6.38%	10.64%	-1.23445	-0.59129
0.329	-0.48280	65	140	9.22%	19.86%	-0.85191	-0.48744
0.404	-0.39361	87	227	12.34%	32.20%	-0.47083	-0.38398
0.496	-0.30451	96	323	13.62%	45.82%	-0.10764	-0.28539
0.609	-0.21538	91	414	12.91%	58.72%	0.225587	-0.19492
0.747	-0.12667	67	481	9.50%	68.23%	0.482811	-0.12509
0.918	-0.03715	70	551	9.93%	78.16%	0.784306	-0.04324
1.13	0.053078	53	604	7.52%	85.67%	1.063085	0.032435
1.38	0.139879	39	643	5.53%	91.21%		
1.7	0.230448	21	664	2.98%	94.18%		
2.09	0.320146	19	683	2.70%	96.88%		
2.56	0.408239	14	697	1.99%	98.87%		
3.15	0.498310	6	703	0.85%	99.72%		
3.87	0.587710	0	703	0.00%	99.72%		
4.75	0.676693	1	704	0.14%	99.86%		
5.83	0.765668	1	705	0.14%	100.00%		
7.16	0.854913	0	705	0.00%	100.00%		
8.79	0.943988	0	705	0.00%	100.00%		
10.8	1.033423	0	705	0.00%	100.00%		
13.3	1.123851	0	705	0.00%	100.00%		

Regression Output:

Constant -0.25616
Std Err of Y Est 0.017038
R Squared 0.994787
No. of Observations 8
Degrees of Freedom 6

0.554412 = GEOM.MED.

1.035879 = 84.1 %

1.868428 = GEOM.STD.DEV.

X Coefficient(s) 0.271476
Std Err of Coef. 0.008022

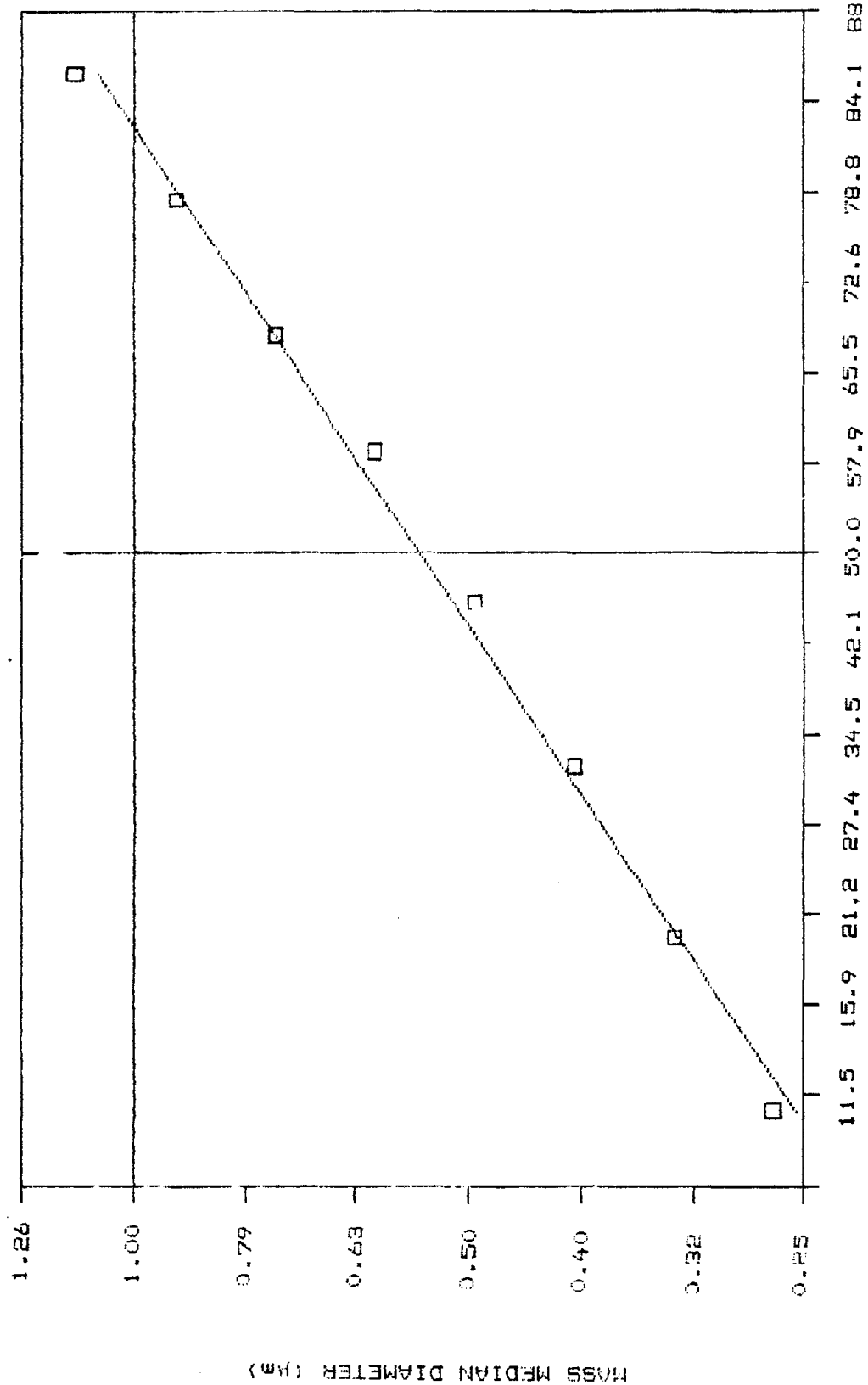
1.790394 = MASS MED.DIAM.

2.7 = DENSITY

2.941917 = AERO.DIAM.

LUNG 9

-- SILICA



25-May-88

LUNG 9

-- EXOGENOUS

DIAMETER	LOG.DIAM.	COUNT	CUM.COUNT	PERCENT	CUM.PERC.	PROB.	PRED.PROB
0.0227	-1.64397	0	0	0.00%	0.00%		
0.0279	-1.55439	0	0	0.00%	0.00%		
0.0343	-1.46470	0	0	0.00%	0.00%		
0.0421	-1.37571	0	0	0.00%	0.00%		
0.0517	-1.28650	0	0	0.00%	0.00%		
0.0635	-1.19722	1	1	0.05%	0.05%		
0.078	-1.10790	0	1	0.00%	0.05%		
0.0958	-1.01863	2	3	0.10%	0.15%		
0.118	-0.92811	5	8	0.24%	0.39%		
0.144	-0.84163	8	16	0.39%	0.77%		
0.177	-0.75202	13	29	0.63%	1.40%		
0.218	-0.66154	41	70	1.98%	3.38%		
0.268	-0.57186	101	171	4.88%	8.27%		
0.329	-0.48280	134	305	6.48%	14.75%	-1.04540	-0.50355
0.404	-0.39361	187	492	9.04%	23.79%	-0.72096	-0.40087
0.496	-0.30451	241	733	11.65%	35.44%	-0.38110	-0.29331
0.609	-0.21538	228	961	11.03%	46.47%	-0.09077	-0.20142
0.747	-0.12667	224	1185	10.83%	57.30%	0.188441	-0.11305
0.918	-0.03715	220	1405	10.64%	67.94%	0.474727	-0.02244
1.13	0.053078	172	1577	8.32%	76.26%	0.722509	0.055979
1.38	0.139879	149	1726	7.21%	83.46%	0.973758	0.135499
1.7	0.230448	107	1833	5.17%	88.64%	1.197857	0.206426
2.09	0.320146	91	1924	4.40%	93.04%		
2.56	0.408239	58	1982	2.80%	95.84%		
3.15	0.498310	35	2017	1.69%	97.53%		
3.87	0.587710	20	2037	0.97%	98.50%		
4.75	0.676693	18	2055	0.87%	99.37%		
5.83	0.765668	9	2064	0.44%	99.81%		
7.16	0.854913	3	2067	0.15%	99.95%		
8.79	0.943988	1	2068	0.05%	100.00%		
10.8	1.033423	0	2068	0.00%	100.00%		
13.3	1.123851	0	2068	0.00%	100.00%		
16.3	1.212187	0	2068	0.00%	100.00%		
20	1.301029	0	2068	0.00%	100.00%		

Regression Output:

Constant	-0.17269
Std Err of Y Est	0.016084
R Squared	0.996199
No. of Observations	9
Degrees of Freedom	7

X Coefficient(s)	0.316496
Std Err of Coef.	0.007388

0.671905 = GEOM.MED.

1.392531 = 84.1 %

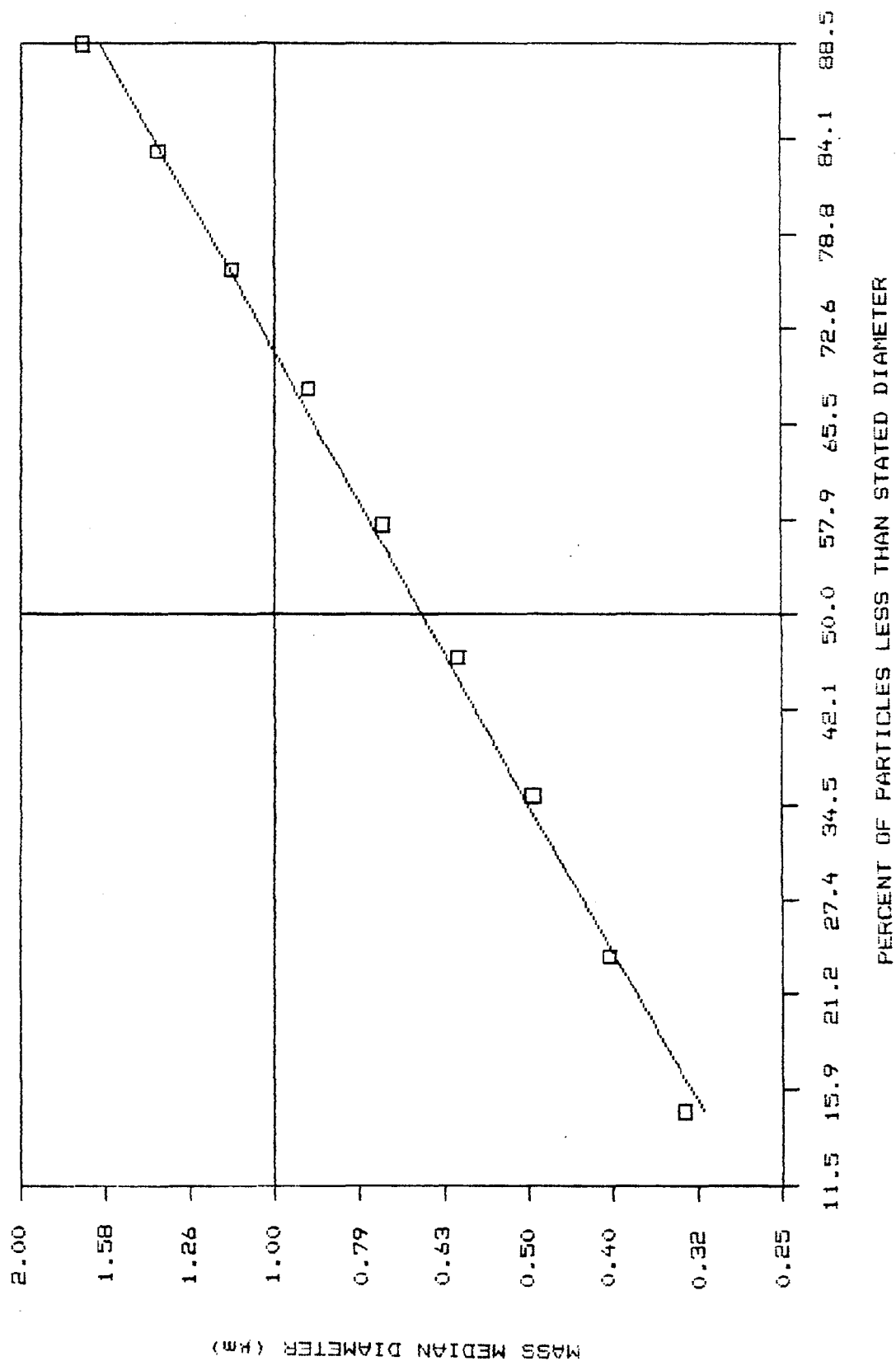
2.072510 = GEOM.STD.DEV.

3.305853 = MASS MED.DIAM.

3 = DENSITY

5.725905 = AERO.DIAM.

LUNG 9 -- EXOGENOUS



26-May-88

LUNG 10

-- SILICA

DIAMETER	LOG.DIAM.	COUNT	CUM.COUNT	PERCENT	CUM.PERC.	PROB.	PRED.PROB
0.0227	-1.64397	0	0	0.00%	0.00%		
0.0279	-1.55439	0	0	0.00%	0.00%		
0.0343	-1.46470	0	0	0.00%	0.00%		
0.0421	-1.37571	0	0	0.00%	0.00%		
0.0517	-1.28650	1	1	0.21%	0.21%		
0.0635	-1.19722	0	1	0.00%	0.21%		
0.078	-1.10740	2	3	0.41%	0.62%		
0.0958	-1.01863	4	7	0.83%	1.45%		
0.118	-0.92811	6	13	1.24%	2.69%		
0.144	-0.84163	9	22	1.86%	4.55%		
0.177	-0.75202	5	27	1.04%	5.59%		
0.218	-0.66154	24	51	4.97%	10.56%	-1.23856	-0.66504
0.268	-0.57186	26	77	5.38%	15.94%	-0.99706	-0.57540
0.329	-0.48280	33	110	6.83%	22.77%	-0.75371	-0.48508
0.404	-0.39361	38	148	7.87%	30.64%	-0.51494	-0.39646
0.496	-0.30451	47	195	9.73%	40.37%	-0.24933	-0.29788
0.609	-0.21538	42	237	8.70%	49.07%	-0.02393	-0.21422
0.747	-0.12667	49	286	10.14%	59.21%	0.238442	-0.11684
0.918	-0.03715	45	331	9.32%	68.53%	0.491380	-0.02296
1.13	0.053078	32	363	6.63%	75.16%	0.687731	0.049913
1.38	0.139879	31	394	6.42%	81.57%	0.902930	0.129785
1.7	0.230448	30	424	6.21%	87.78%	1.156914	0.224053
2.09	0.320146	23	447	4.76%	92.55%		
2.56	0.408239	17	464	3.52%	96.07%		
3.15	0.498310	7	471	1.45%	97.52%		
3.87	0.587710	9	480	1.86%	99.38%		
4.75	0.676693	2	482	0.41%	99.79%		
5.83	0.765668	1	483	0.21%	100.00%		
7.16	0.854913	0	483	0.00%	100.00%		
8.79	0.943988	0	483	0.00%	100.00%		
10.8	1.033423	0	483	0.00%	100.00%		
13.3	1.123851	0	483	0.00%	100.00%		
16.3	1.212187	0	483	0.00%	100.00%		
20	1.301029	0	483	0.00%	100.00%		

Regression Output:

Constant -0.20534
Std Err of Y Est 0.007706
R Squared 0.999388
No. of Observations 11
Degrees of Freedom 9

0.623244 = GEOM.MED.

1.464919 = 84.1 %

2.350472 = GEOM.STD.DEV.

X Coefficient(s) 0.371155
Std Err of Coef. 0.003060

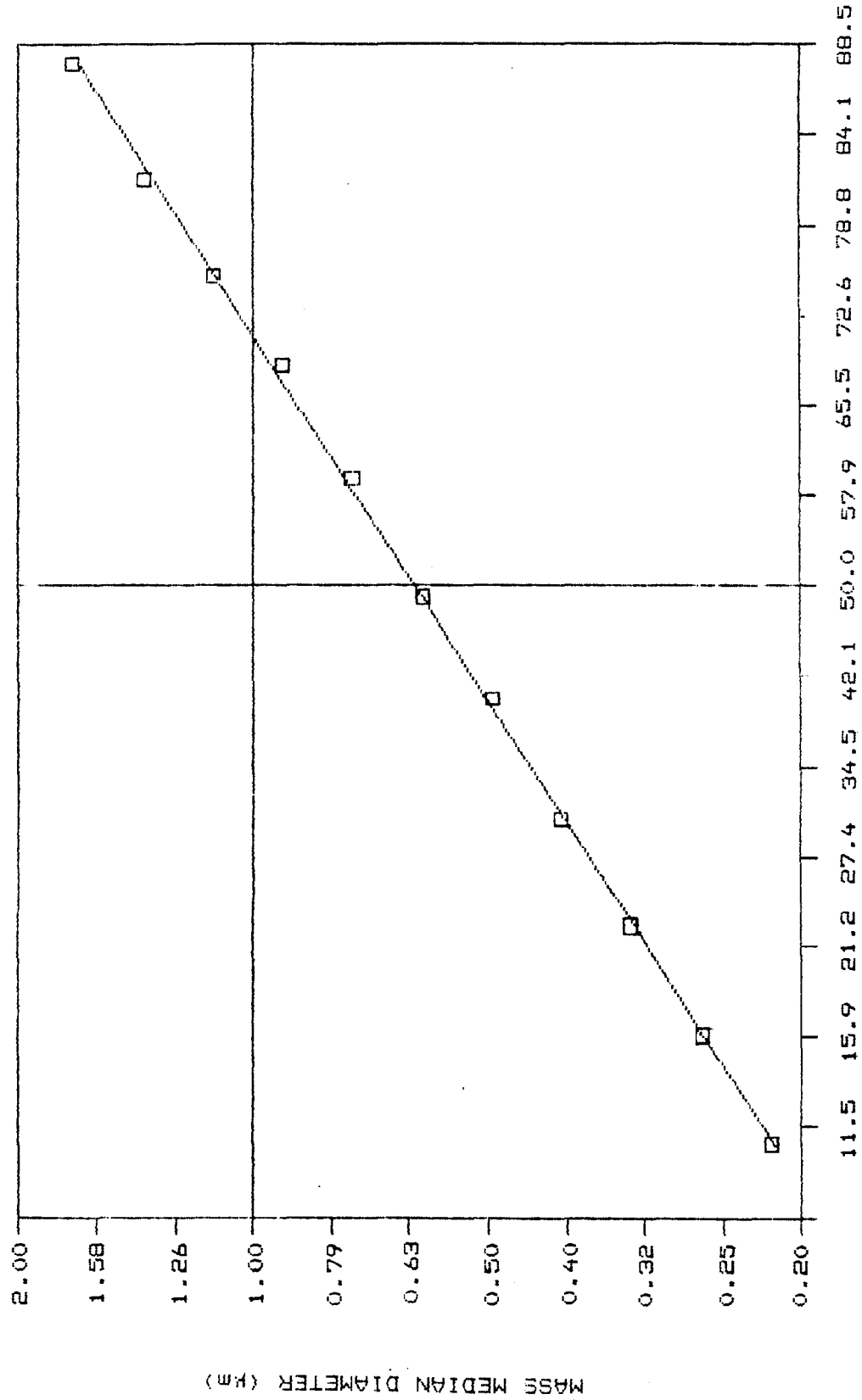
5.575424 = MASS MED.DIAM.

2.7 = DENSITY

9.161357 = AERO.DIAM.

LUNG 10

-- SILICA



25-May-88

LUNG 10

- EXOGENOUS

				PROB.	PRED.PROB
DIAMETER	LOG.DIAM.	COUNT	CUM.COUNT	PERCENT	CUM.PERC.CUM.PERC.CUM.PREC.
=====					
0.0227	-1.64397	0	0	0.00%	0.00%
0.0279	-1.55439	1	1	0.09%	0.09%
0.0343	-1.46470	0	1	0.00%	0.09%
0.0421	-1.37571	0	1	0.00%	0.09%
0.0517	-1.28650	2	3	0.18%	0.28%
0.0635	-1.19722	0	3	0.00%	0.28%
0.078	-1.10790	3	6	0.28%	0.55%
0.0958	-1.01863	7	13	0.64%	1.20%
0.118	-0.92811	7	20	0.64%	1.84%
0.144	-0.84163	14	34	1.29%	3.13%
0.177	-0.75202	17	51	1.56%	4.69%
0.218	-0.66154	43	94	3.96%	8.65%
0.268	-0.57186	65	159	5.98%	14.63%-1.05044
0.329	-0.48280	64	223	5.89%	20.52%-0.82917
0.404	-0.39361	92	315	8.46%	28.98%-0.56301
0.496	-0.30451	88	403	8.10%	37.07%-0.33702
0.609	-0.21538	82	485	7.54%	44.62%-0.13859
0.747	-0.12667	90	575	8.28%	52.90%0.074492
0.918	-0.03715	91	666	8.37%	61.27%0.292772
1.13	0.053078	83	749	7.64%	68.91%0.502030
1.38	0.139879	80	829	7.36%	76.26%0.722754
1.7	0.230448	76	905	6.99%	83.26%0.965828
2.09	0.320146	58	963	5.34%	88.59%1.195695
2.56	0.408239	40	1003	3.68%	92.27%
3.15	0.498310	30	1033	2.76%	95.03%
3.87	0.587710	27	1060	2.48%	97.52%
4.75	0.676693	11	1071	1.01%	98.53%
5.83	0.765668	11	1082	1.01%	99.54%
7.16	0.854913	3	1085	0.28%	99.82%
8.79	0.943988	1	1086	0.09%	99.91%
10.8	1.033423	0	1086	0.00%	99.91%
13.3	1.123851	1	1087	0.09%	100.00%
16.3	1.212187	0	1087	0.00%	100.00%
20	1.301029	0	1087	0.00%	100.00%

Regression Output:

Constant -0.15675
 Std Err of Y Est 0.007414
 R Squared 0.999434
 No. of Observations 11
 Degrees of Freedom 9

0.697016 = GEOM.MED.

1.759181 = 84.1 %

2.523873 = GEOM.STD.DEV.

X Coefficient(s) 0.402067
 Std Err of Coef. 0.003188

9.119664 = MASS MED.DIAM.

3 = DENSITY

15.79572 = AERO.DIAM.

25-May-88

LUNG 10

- EXOGENOUS

DIAMETER	LOG.DIAM.	COUNT	CUM.COUNT	PERCENT	CUM.PERC.	PROB.	PRED.PROB
0.0227	-1.64397	0	0	0.00%	0.00%		
0.0279	-1.55439	1	1	0.09%	0.09%		
0.0343	-1.46470	0	1	0.00%	0.09%		
0.0421	-1.37571	0	1	0.00%	0.09%		
0.0517	-1.28650	2	3	0.18%	0.28%		
0.0635	-1.19722	0	3	0.00%	0.28%		
0.078	-1.10790	3	6	0.28%	0.55%		
0.0958	-1.01863	7	13	0.64%	1.20%		
0.118	-0.92811	7	20	0.64%	1.84%		
0.144	-0.84163	14	34	1.29%	3.13%		
0.177	-0.75202	17	51	1.56%	4.69%		
0.218	-0.66154	43	94	3.96%	8.65%		
0.268	-0.57186	65	159	5.98%	14.63%	-1.05044	-0.57910
0.329	-0.48280	64	223	5.89%	20.52%	-0.82917	-0.49014
0.404	-0.39361	92	315	8.46%	28.98%	-0.56301	-0.38312
0.496	-0.30451	88	403	8.10%	37.07%	-0.33702	-0.29226
0.609	-0.21538	82	485	7.54%	44.62%	-0.13859	-0.21248
0.747	-0.12667	90	575	8.28%	52.90%	0.074492	-0.12680
0.918	-0.03715	91	666	8.37%	61.27%	0.292772	-0.03904
1.13	0.053078	83	749	7.64%	68.91%	0.502030	0.045093
1.38	0.139879	80	829	7.36%	76.26%	0.722754	0.133839
1.7	0.230448	76	905	6.99%	83.26%	0.965828	0.231571
2.09	0.320146	58	963	5.34%	88.59%	1.195695	0.323993
2.56	0.408239	40	1003	3.68%	92.27%		
3.15	0.498310	30	1033	2.76%	95.03%		
3.87	0.587710	27	1060	2.48%	97.52%		
4.75	0.676693	11	1071	1.01%	98.53%		
5.83	0.765668	11	1082	1.01%	99.54%		
7.16	0.854913	3	1085	0.28%	99.82%		
8.79	0.943988	1	1086	0.09%	99.91%		
10.8	1.033423	0	1086	0.00%	99.91%		
13.3	1.123851	1	1087	0.09%	100.00%		
16.3	1.212187	0	1087	0.00%	100.00%		
20	1.301029	0	1087	0.00%	100.00%		

Regression Output:

Constant -0.15675
 Std Err of Y Est 0.007414
 R Squared 0.999434
 No. of Observations 11
 Degrees of Freedom 9

X Coefficient(s) 0.402067
 Std Err of Coef. 0.003188

0.697016 = GEOM.MED.

1.759181 = 84.1 %

2.523873 = GEOM.STD.DEV.

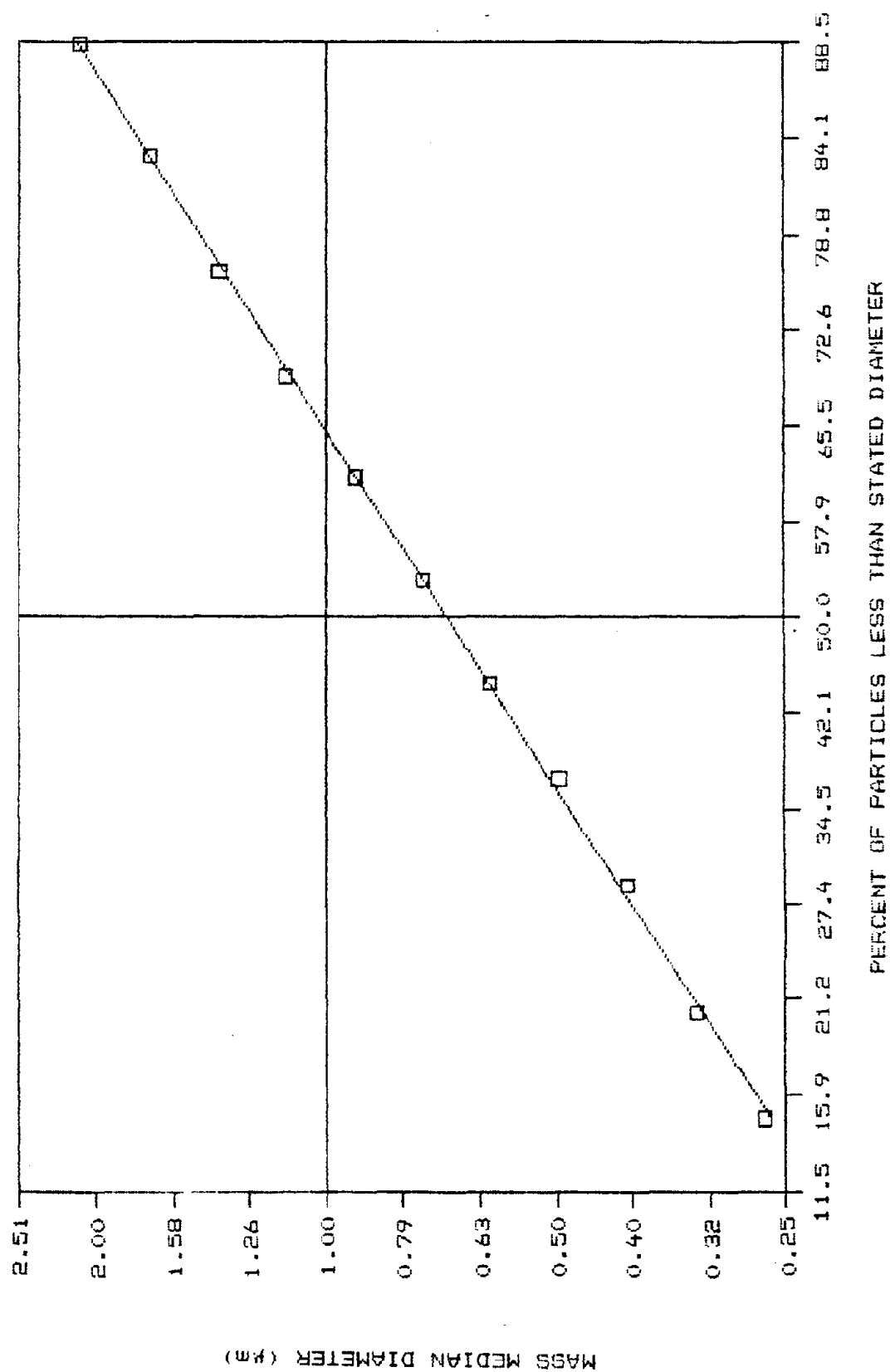
9.119664 = MASS MED.DIAM.

3 = DENSITY

15.79572 = AERO.DIAM.

LUNG 10

-- EXOGENOUS



26-May-88

LUNG 11

-- SILICA

DIAMETER	LOG.DIAM.	COUNT	CUM.COUNT	PERCENT	CUM.PERC.	PROB.	FRED.PROB
DIAMETER	LOG.DIAM.	COUNT	CUM.COUNT	PERCENT	CUM.PERC.	CUM.PERC.	CUM.PREC.
0.0227	-1.64397	0	0	0.00%	0.00%		
0.0279	-1.55439	0	0	0.00%	0.00%		
0.0343	-1.46470	0	0	0.00%	0.00%		
0.0421	-1.37571	0	0	0.00%	0.00%		
0.0517	-1.28650	0	0	0.00%	0.00%		
0.0635	-1.19722	1	1	0.25%	0.25%		
0.078	-1.10790	0	1	0.00%	0.25%		
0.0958	-1.01863	1	2	0.25%	0.50%		
0.118	-0.92811	3	5	0.74%	1.24%		
0.144	-0.84163	4	9	0.99%	2.23%		
0.177	-0.75202	8	17	1.99%	4.22%		
0.218	-0.66154	19	36	4.71%	8.93%		
0.268	-0.57186	27	63	6.70%	15.63%	-1.00937	-0.58026
0.329	-0.48280	34	97	8.44%	24.07%	-0.71212	-0.48775
0.404	-0.39361	38	135	9.43%	33.50%	-0.43455	-0.40138
0.496	-0.30451	48	183	11.91%	45.41%	-0.11813	-0.30291
0.609	-0.21538	53	236	13.15%	58.56%	0.221327	-0.19727
0.747	-0.12667	51	287	12.66%	71.22%	0.568716	-0.08917
0.918	-0.03715	21	308	5.21%	76.43%	0.727926	-0.03962
1.13	0.053078	30	338	7.44%	83.87%	0.989694	0.041833
1.38	0.139879	22	360	5.46%	89.33%	1.232821	0.117492
1.7	0.230448	18	378	4.47%	93.80%		
2.09	0.320146	11	389	2.73%	96.53%		
2.56	0.408239	7	396	1.74%	98.26%		
3.15	0.498310	5	401	1.24%	99.50%		
3.87	0.587710	2	403	0.50%	100.00%		
4.75	0.676693	0	403	0.00%	100.00%		
5.83	0.765668	0	403	0.00%	100.00%		
7.16	0.854913	0	403	0.00%	100.00%		
8.79	0.943988	0	403	0.00%	100.00%		
10.8	1.033423	0	403	0.00%	100.00%		
13.3	1.123851	0	403	0.00%	100.00%		
16.3	1.212187	0	403	0.00%	100.00%		
20	1.301029	0	403	0.00%	100.00%		

Regression Output:

Constant -0.26615
Std Err of Y Est 0.018997
R Squared 0.994695
No. of Observations 9
Degrees of Freedom 7

0.541811 = GEOM.MED.

1.109277 = 84.1 %

2.047350 = GEOM.STD.DEV.

2.528264 = MASS MED.DIAM.

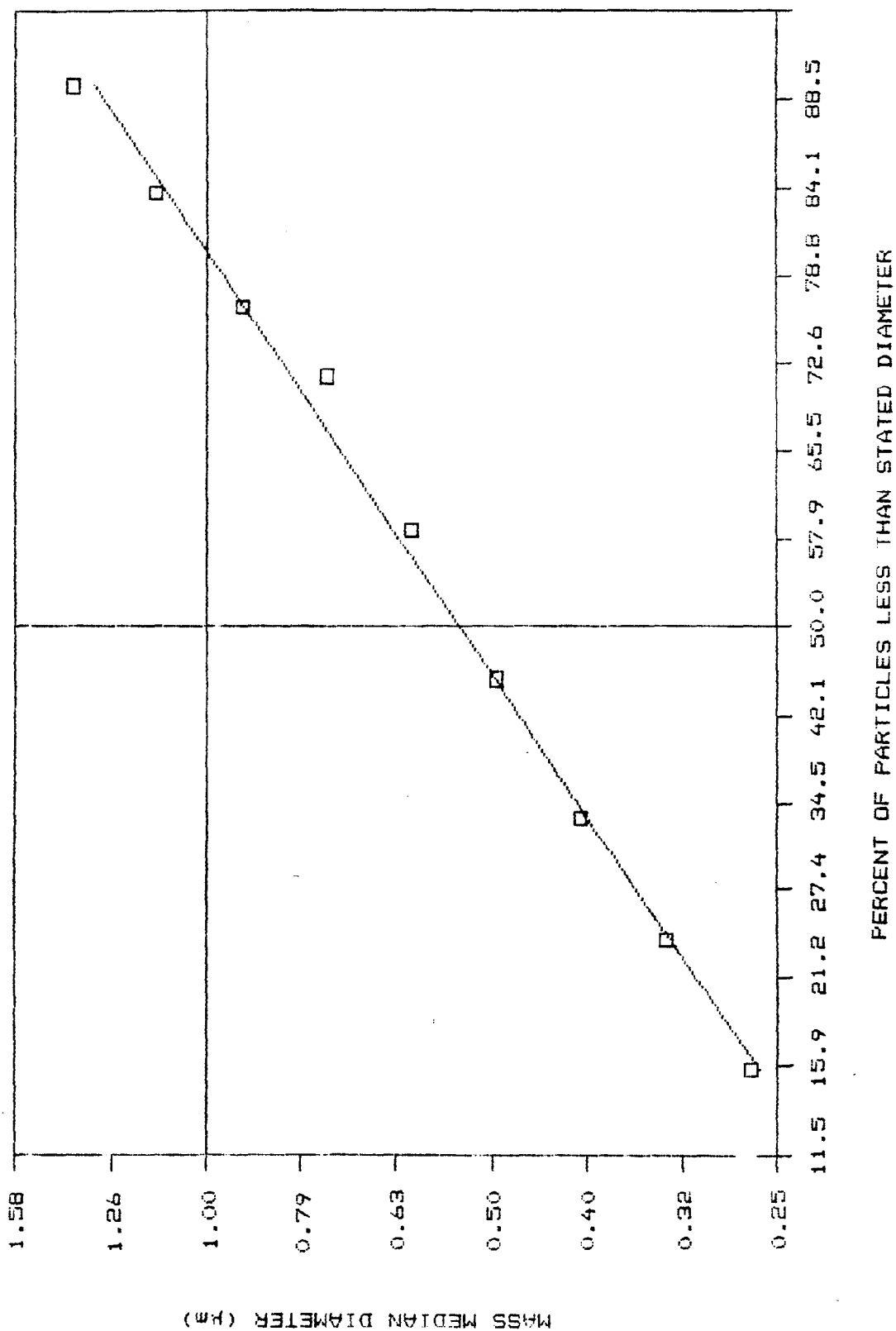
2.7 = DENSITY

4.154361 = AERD.DIAM.

X Coefficient(s) 0.311192
Std Err of Coef. 0.008589

LUNG 11

-- SILICA



25-May-88

LUNG 11

-- EXOGENOUS

DIAMETER	LOG.DIAM.	COUNT	CUM.COUNT	PERCENT	CUM.PERC.	PROB.	PRED.PROB
DIAMETER	LOG.DIAM.	COUNT	CUM.COUNT	PERCENT	CUM.PERC.	CUM.PERC.	CUM.PRED.
0.0227	-1.64397	0	0	0.00%	0.00%		
0.0279	-1.55439	0	0	0.00%	0.00%		
0.0343	-1.46470	0	0	0.00%	0.00%		
0.0421	-1.37571	0	0	0.00%	0.00%		
0.0517	-1.28650	1	1	0.10%	0.10%		
0.0635	-1.19722	4	5	0.38%	0.48%		
0.078	-1.10790	1	6	0.10%	0.57%		
0.0958	-1.01863	10	16	0.95%	1.53%		
0.118	-0.92811	12	28	1.15%	2.67%		
0.144	-0.84163	12	40	1.15%	3.82%		
0.177	-0.75202	22	62	2.10%	5.92%		
0.218	-0.66154	43	105	4.10%	10.02%	-1.26715	-0.67366
0.268	-0.57186	77	182	7.35%	17.37%	-0.94213	-0.56732
0.329	-0.48280	87	269	8.30%	25.67%	-0.66221	-0.47573
0.404	-0.39361	82	351	7.82%	33.49%	-0.43473	-0.40131
0.496	-0.30451	115	466	10.97%	44.47%	-0.14254	-0.30571
0.609	-0.21538	123	589	11.74%	56.20%	0.159856	-0.20677
0.747	-0.12667	112	701	10.69%	66.89%	0.445332	-0.11337
0.918	-0.03715	91	792	8.68%	75.57%	0.700812	-0.02978
1.13	0.053078	74	866	7.06%	82.63%	0.942139	0.049173
1.38	0.139879	57	923	5.44%	88.07%	1.170525	0.123896
1.7	0.230448	52	975	4.96%	93.03%		
2.09	0.320146	32	1007	3.05%	96.09%		
2.56	0.408239	17	1024	1.62%	97.71%		
3.15	0.498310	15	1039	1.43%	99.14%		
3.87	0.587710	6	1045	0.57%	99.71%		
4.75	0.676693	1	1046	0.10%	99.81%		
5.83	0.765668	1	1047	0.10%	99.90%		
7.16	0.854913	1	1048	0.10%	100.00%		
8.79	0.943988	0	1048	0.00%	100.00%		
10.8	1.033423	0	1048	0.00%	100.00%		
13.3	1.123851	0	1048	0.00%	100.00%		
16.3	1.212187	0	1048	0.00%	100.00%		
20	1.301029	0	1048	0.00%	100.00%		

Regression Output:

Constant -0.25907
Std Err of Y Est 0.010333
R Squared 0.998696
No. of Observations 10
Degrees of Freedom 8

X Coefficient(s) 0.327180
Std Err of Coef. 0.004179

0.550711 = GEOM.MED.

1.169780 = 84.1 %

2.124125 = GEOM.STD.DEV.

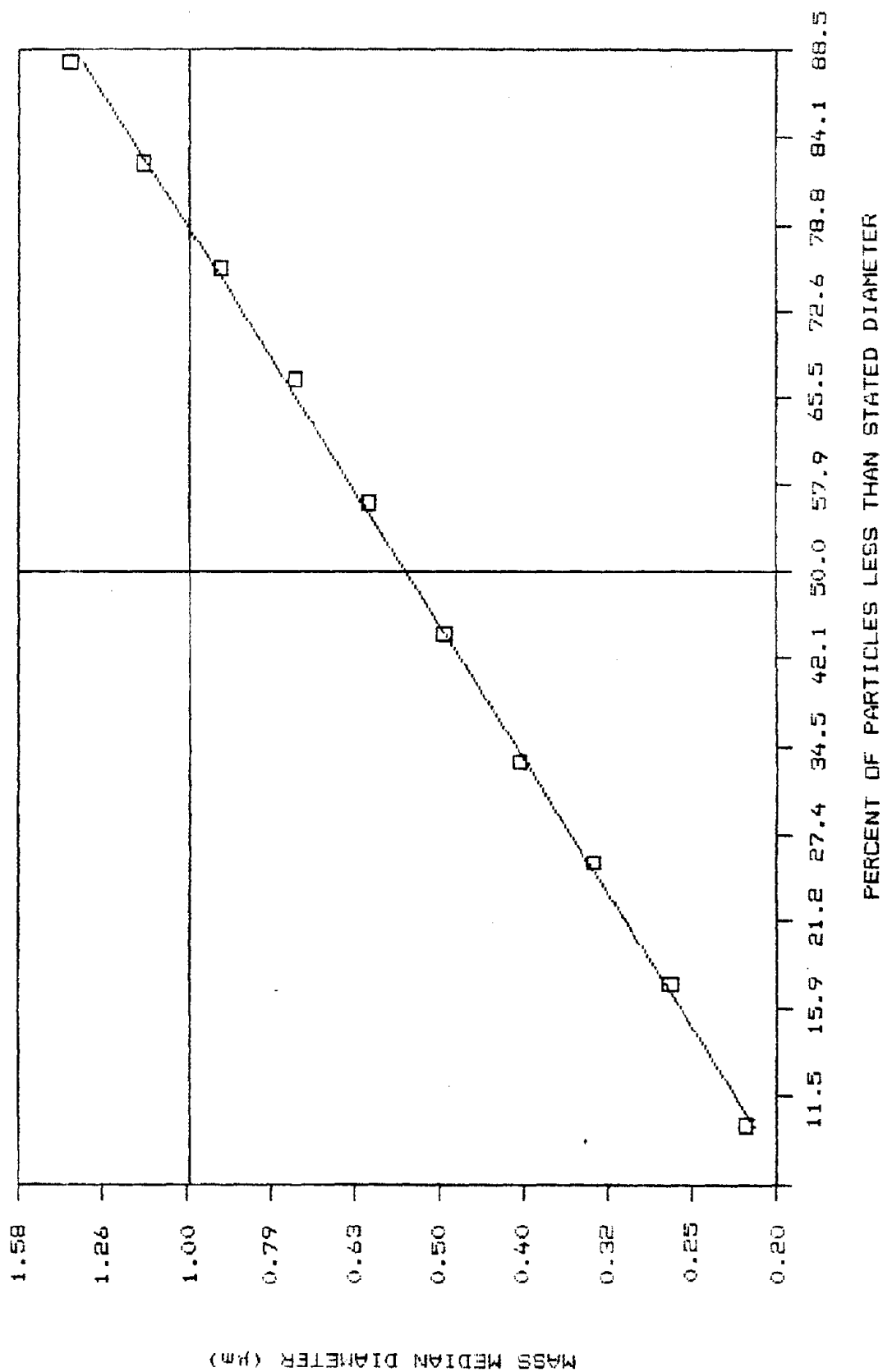
3.022760 = MASS MED.DIAM.

3 = DENSITY

5.235575 = AERO.DIAM.

LUNG 11

-- EXOGENOUS



26-May-88

LUNG 12

-- SILICA

DIAMETER	LOG.DIAM.	COUNT	CUM.COUNT	PERCENT	CUM.PERC.	PROB.	PRED.PROB.
=====	=====	=====	=====	=====	=====	=====	=====
0.0227	-1.64397	0	0	0.00%	0.00%		
0.0279	-1.55439	0	0	0.00%	0.00%		
0.0343	-1.46470	0	0	0.00%	0.00%		
0.0421	-1.37571	0	0	0.00%	0.00%		
0.0517	-1.28650	1	1	0.29%	0.29%		
0.0635	-1.19722	1	2	0.29%	0.57%		
0.078	-1.10790	2	4	0.57%	1.15%		
0.0958	-1.01863	3	7	0.86%	2.01%		
0.118	-0.92811	2	9	0.57%	2.58%		
0.144	-0.84163	9	18	2.58%	5.16%		
0.177	-0.75202	6	24	1.72%	6.88%		
0.218	-0.66154	8	32	2.29%	9.17%		
0.268	-0.57186	21	53	6.02%	15.19%	-1.02740	-0.56085
0.329	-0.48280	20	73	5.73%	20.92%	-0.81545	-0.48692
0.404	-0.39361	26	99	7.45%	28.37%	-0.58098	-0.40514
0.496	-0.30451	32	131	9.17%	37.54%	-0.32464	-0.31573
0.609	-0.21538	40	171	11.46%	49.00%	-0.02576	-0.21147
0.747	-0.12667	40	211	11.46%	60.46%	0.271266	-0.10787
0.918	-0.03715	32	243	9.17%	69.63%	0.522664	-0.02018
1.13	0.053078	18	261	5.16%	74.79%	0.676210	0.033371
1.38	0.139879	29	290	8.31%	83.09%	0.959616	0.132224
1.7	0.230448	23	313	6.59%	89.68%	1.251339	0.233978
2.09	0.320146	10	323	2.87%	92.55%		
2.56	0.408239	17	340	4.87%	97.42%		
3.15	0.498310	5	345	1.43%	98.85%		
3.87	0.587710	3	348	0.86%	99.71%		
4.75	0.676693	1	349	0.29%	100.00%		
5.83	0.765668	0	349	0.00%	100.00%		
7.16	0.854913	0	349	0.00%	100.00%		
8.79	0.943988	0	349	0.00%	100.00%		
10.8	1.033423	0	349	0.00%	100.00%		
13.3	1.123851	0	349	0.00%	100.00%		
16.3	1.212187	0	349	0.00%	100.00%		
20	1.301029	0	349	0.00%	100.00%		

Regression Output:

Constant -0.20249
 Std Err of Y Est 0.013752
 R Squared 0.997690
 No. of Observations 10
 Degrees of Freedom 8

X Coefficient(s) 0.348802
 Std Err of Coef. 0.005933

0.627346 = GEOM.MED.

1.400587 = 84.1 %

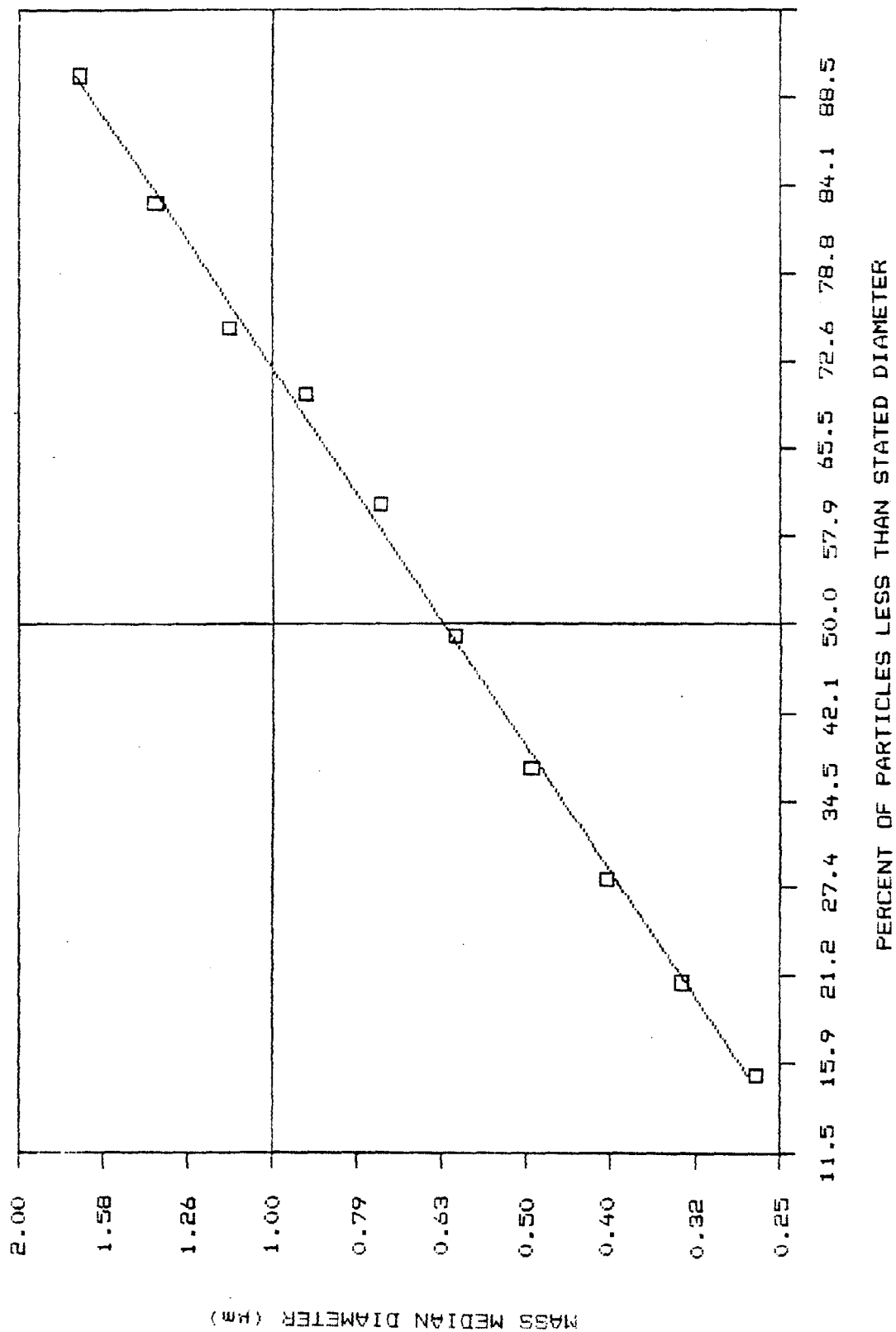
2.232558 = GEOM.STD.DEV.

4.344687 = MASS MED.DIAM.

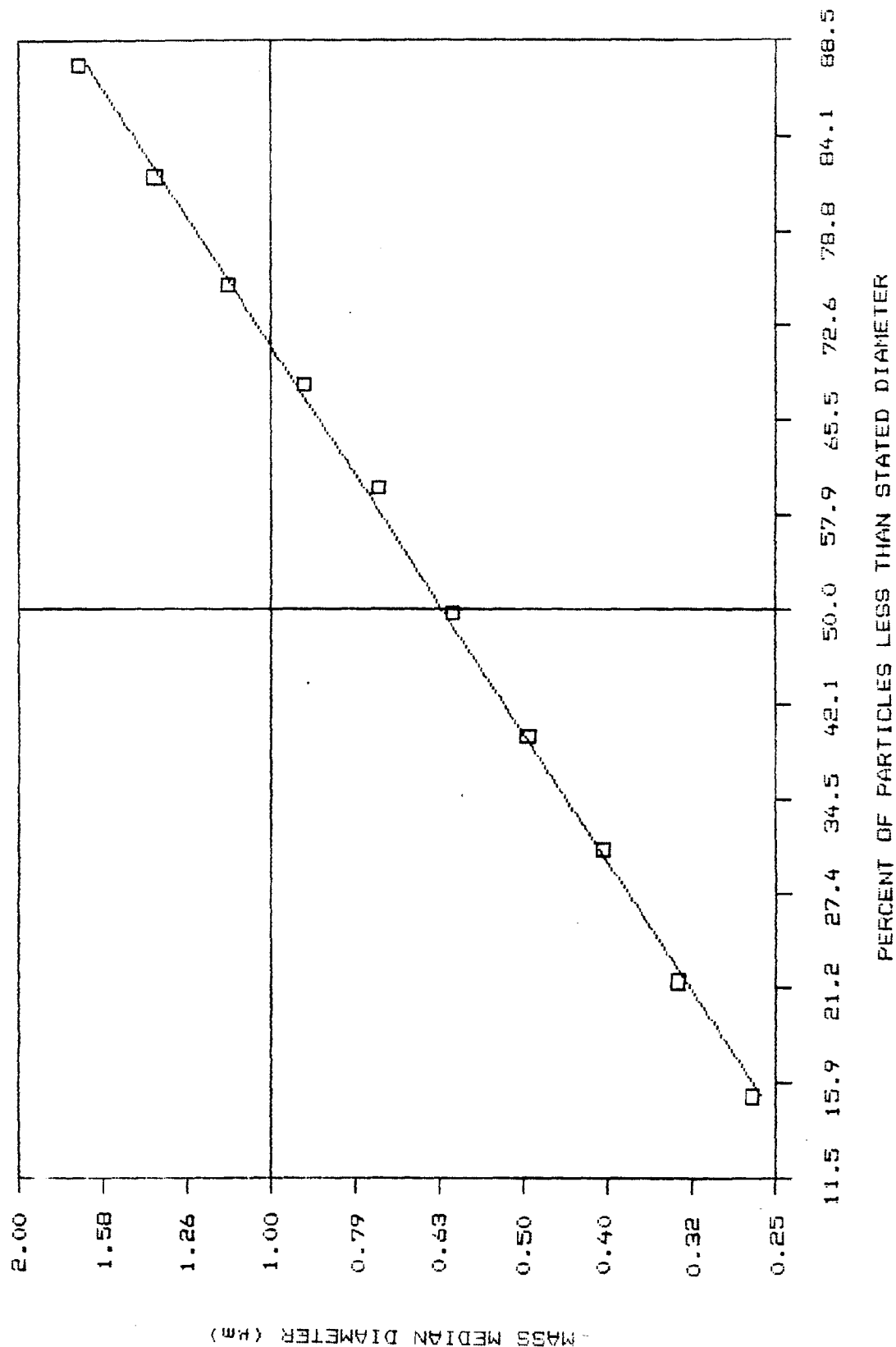
2.7 = DENSITY

7.139049 = AERO.DIAM.

LUNG 12 -- SILICA



LUNG 12 --- EXOGENOUS



25-May-88

LUNG 12 ,

-- EXOGENOUS

DIAMETER	LOG.DIAM.	COUNT	CUM.COUNT	PERCENT	CUM.PERC.	PROB.	PRED.PROB
0.0227	-1.64397	0	0	0.00%	0.00%		
0.0279	-1.55439	1	1	0.10%	0.10%		
0.0343	-1.46470	0	1	0.00%	0.10%		
0.0421	-1.37571	0	1	0.00%	0.10%		
0.0517	-1.28650	1	2	0.10%	0.19%		
0.0635	-1.19722	2	4	0.19%	0.38%		
0.078	-1.10790	4	8	0.38%	0.76%		
0.0958	-1.01863	4	12	0.38%	1.14%		
0.118	-0.92811	8	20	0.76%	1.91%		
0.144	-0.84163	16	36	1.53%	3.43%		
0.177	-0.75202	21	57	2.00%	5.43%		
0.218	-0.66154	36	93	3.43%	8.87%		
0.268	-0.57186	66	159	6.29%	15.16%	-1.02858	-0.58117
0.329	-0.48280	69	228	6.58%	21.73%	-0.78793	-0.49273
0.404	-0.39361	97	325	9.25%	30.98%	-0.50524	-0.38884
0.496	-0.30451	90	415	8.58%	39.56%	-0.27073	-0.30266
0.609	-0.21538	107	522	10.20%	49.76%	-0.00612	-0.20542
0.747	-0.12667	106	628	10.10%	59.87%	0.255636	-0.10922
0.918	-0.03715	85	713	8.10%	67.97%	0.475555	-0.02840
1.13	0.053078	74	787	7.05%	75.02%	0.683631	0.048059
1.38	0.139879	72	859	6.86%	81.89%	0.914408	0.132868
1.7	0.230448	60	919	5.72%	87.61%	1.148632	0.218945
2.09	0.320146	35	954	3.34%	90.94%		
2.56	0.408239	41	995	3.91%	94.85%		
3.15	0.498310	26	1021	2.48%	97.33%		
3.87	0.587710	14	1035	1.33%	98.67%		
4.75	0.676693	9	1044	0.86%	99.52%		
5.83	0.765668	4	1048	0.38%	99.90%		
7.16	0.854913	0	1048	0.00%	99.90%		
8.79	0.943988	1	1049	0.10%	100.00%		
10.8	1.033423	0	1049	0.00%	100.00%		
13.3	1.123851	0	1049	0.00%	100.00%		
16.3	1.212187	0	1049	0.00%	100.00%		
20	1.301029	0	1049	0.00%	100.00%		

Regression Output:

Constant -0.20317
Std Err of Y Est 0.010597
R Squared 0.998628
No. of Observations 10
Degrees of Freedom 8

X Coefficient(s) 0.367497
Std Err of Coef. 0.004814

0.626363 = GEOM.MED.

1.459900 = 84.1 %

2.330757 = GEOM.STD.DEV.

5.367602 = MASS MED.DIAM.

3 = DENSITY

9.296959 = AERO.DIAM.

26-May-88

LUNG 13

-- SILICA

188

		PROB. PRED.PROB			
DIAMETER	LOG.DIAM.	COUNT	CUM.COUNT	PERCENT	CUM.PERC.CUM.PERC.CUM.PREC.
0.0227	-1.64397	0	0	0.00%	0.00%
0.0279	-1.55439	0	0	0.00%	0.00%
0.0343	-1.46470	0	0	0.00%	0.00%
0.0421	-1.37571	0	0	0.00%	0.00%
0.0517	-1.28650	3	3	0.43%	0.43%
0.0635	-1.19722	4	7	0.57%	0.99%
0.078	-1.10790	2	9	0.28%	1.28%
0.0958	-1.01863	5	14	0.71%	1.99%
0.118	-0.92811	5	19	0.71%	2.70%
0.144	-0.84163	11	30	1.56%	4.26%
0.177	-0.75202	16	46	2.27%	6.52%
0.218	-0.66154	41	87	5.82%	12.34%
0.268	-0.57186	60	147	8.51%	20.85%
0.329	-0.48280	60	207	8.51%	29.36%
0.404	-0.39361	68	275	9.65%	39.01%
0.496	-0.30451	72	347	10.21%	49.22%
0.609	-0.21538	79	426	11.21%	60.43%
0.747	-0.12667	73	499	10.35%	70.78%
0.918	-0.03715	65	564	9.22%	80.00%
1.13	0.053078	51	615	7.23%	87.23%
1.38	0.139879	43	658	6.10%	93.33%
1.7	0.230448	20	678	2.84%	96.17%
2.09	0.320146	11	689	1.56%	97.73%
2.56	0.408239	10	699	1.42%	99.15%
3.15	0.498310	4	703	0.57%	99.72%
3.87	0.587710	2	705	0.28%	100.00%
4.75	0.676693	0	705	0.00%	100.00%
5.83	0.765668	0	705	0.00%	100.00%
7.16	0.854913	0	705	0.00%	100.00%
8.79	0.943988	0	705	0.00%	100.00%
10.8	1.033423	0	705	0.00%	100.00%
13.3	1.123851	0	705	0.00%	100.00%
16.3	1.212187	0	705	0.00%	100.00%
20	1.301029	0	705	0.00%	100.00%

Regression Output:

Constant	-0.30375
Std Err of Y Est	0.005243
R Squared	0.999597
No. of Observations	9
Degrees of Freedom	7

X Coefficient(s)	0.316700
Std Err of Coef.	0.002403

0.496877 = GEOM.MED.

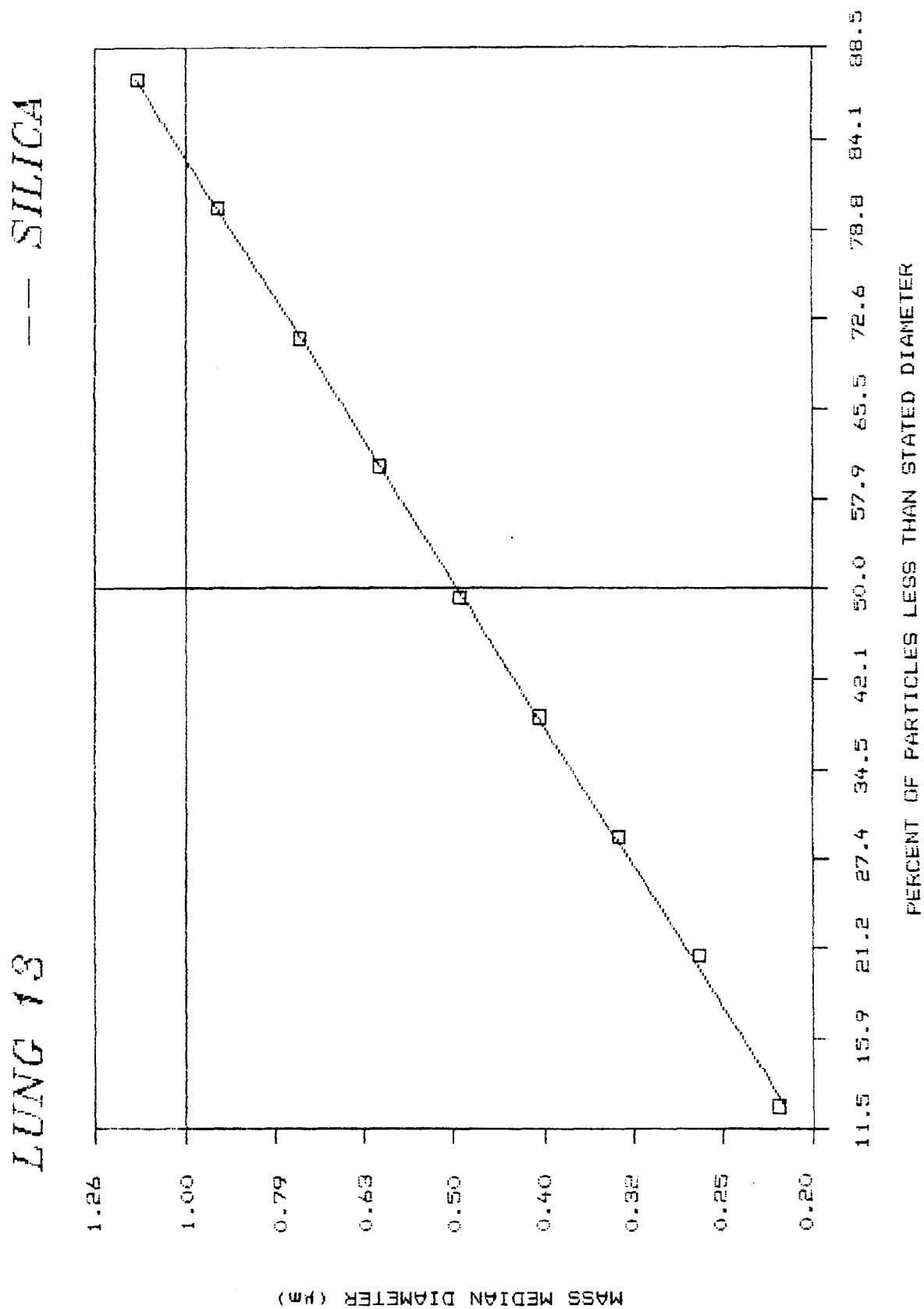
1.030267 = 84.1 %

2.073485 = GEOM.STD.DEV.

2.449727 = MASS MED.DIAM.

2.7 = DENSITY

4.025313 = AERO.DIAM.



25-May-88.

LUNG 13 .

-- EXOGENOUS

				PROB.	PRED.PROB
DIAMETER	LOG.DIAM.	COUNT	CUM.COUNT	PERCENT	CUM.PERC.CUM.PERC.CUM.FREC.
0.0227	-1.64397	0	0	0.00%	0.00%
0.0279	-1.55439	0	0	0.00%	0.00%
0.0343	-1.46470	0	0	0.00%	0.00%
0.0421	-1.37571	0	0	0.00%	0.00%
0.0517	-1.28650	3	3	0.22%	0.22%
0.0635	-1.19722	6	9	0.45%	0.67%
0.078	-1.10790	4	13	0.30%	0.97%
0.0958	-1.01863	6	19	0.45%	1.42%
0.118	-0.92811	13	32	0.97%	2.38%
0.144	-0.84163	22	54	1.64%	4.02%
0.177	-0.75202	35	89	2.61%	6.63%
0.218	-0.66154	70	159	5.22%	11.85%-1.17432 -0.66797
0.268	-0.57186	100	259	7.45%	19.30%-0.87157 -0.56721
0.329	-0.48280	105	364	7.82%	27.12%-0.61796 -0.48112
0.404	-0.39361	125	489	9.31%	36.44%-0.35417 -0.39158
0.496	-0.30431	133	622	9.91%	46.35%-0.09389 -0.30324
0.609	-0.21538	133	755	9.91%	56.26%0.161336 -0.21660
0.747	-0.12667	143	898	10.66%	66.92%0.446048 -0.11796
0.918	-0.03715	114	1012	8.49%	75.41%0.695700 -0.03522
1.13	0.053078	93	1105	6.93%	82.34%0.931139 0.044693
1.38	0.139879	88	1193	6.56%	88.90%1.210820 0.139626
1.7	0.230448	53	1246	3.95%	92.85%
2.09	0.320146	40	1286	2.98%	95.83%
2.56	0.408239	27	1313	2.01%	97.84%
3.15	0.498310	19	1332	1.42%	99.25%
3.87	0.587710	8	1340	0.60%	99.85%
4.75	0.676693	1	1341	0.07%	99.93%
5.83	0.765668	0	1341	0.00%	99.93%
7.16	0.854913	1	1342	0.07%	100.00%
8.79	0.943988	0	1342	0.00%	100.00%
10.8	1.033423	0	1342	0.00%	100.00%
13.3	1.123851	0	1342	0.00%	100.00%
16.3	1.212187	0	1342	0.00%	100.00%
20	1.301029	0	1342	0.00%	100.00%

Regression Output:

Constant -0.27136
 Std Err of Y Est 0.005268
 R Squared 0.999661
 No. of Observations 10
 Degrees of Freedom 8

X Coefficient(s) 0.339434
 Std Err of Coef. 0.002209

0.535342 = GEOM.MED.

1.169679 = 84.1 %

2.184916 = GEOM.STD.DEV.

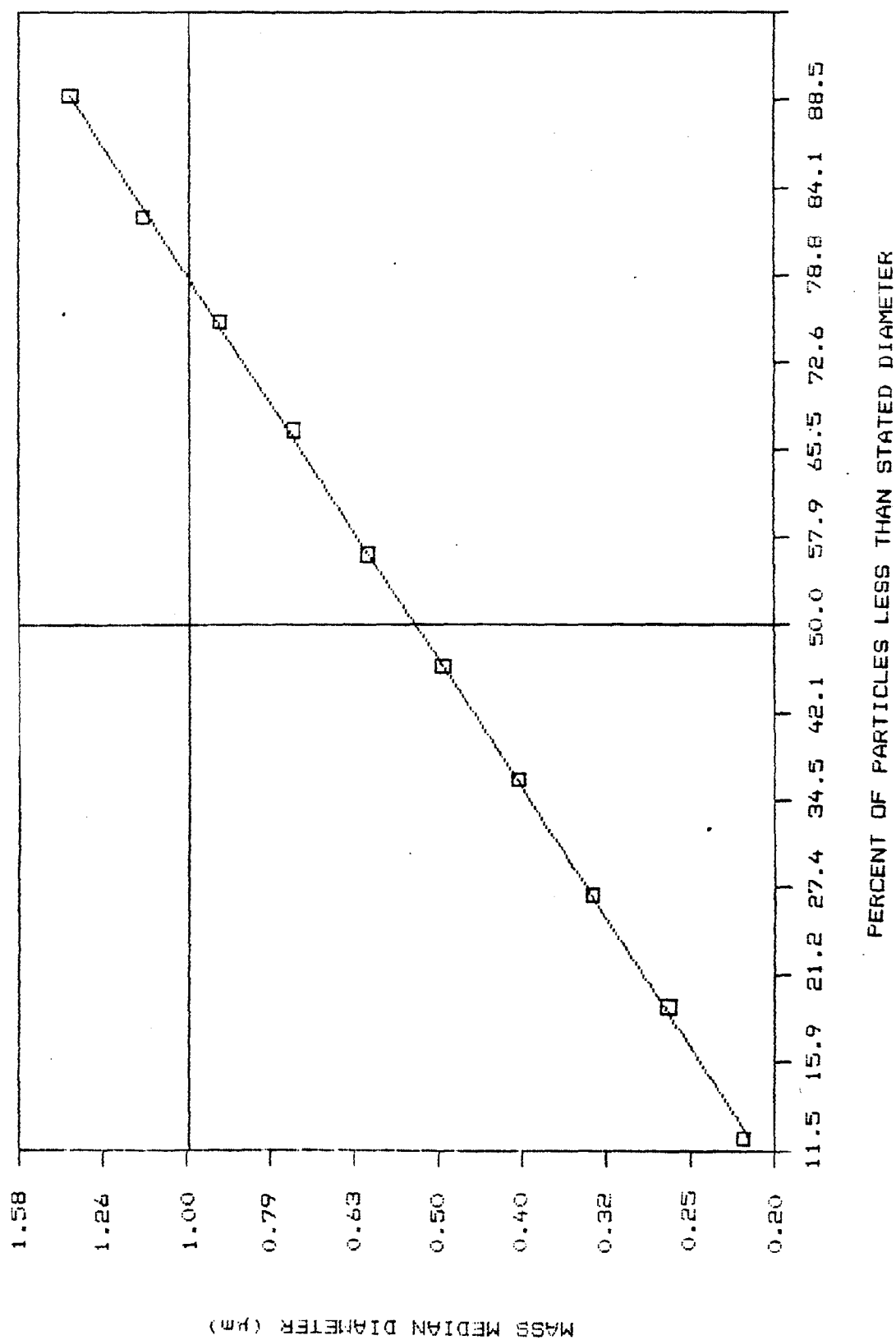
3.346142 = MASS MED.DIAM.

3 = DENSITY

5.795689 = AERG.DIAM.

LUNG 13

-- EXOGENOUS



26-May-88

LUNG 14

-- SILICA

DIAMETER	LOG.DIAM.	COUNT	CUM.COUNT	PERCENT	CUM.PERC.	PROB.	PRED.PROB
0.0227	-1.64397	0	0	0.00%	0.00%		
0.0279	-1.55439	0	0	0.00%	0.00%		
0.0343	-1.46470	0	0	0.00%	0.00%		
0.0421	-1.37571	0	0	0.00%	0.00%		
0.0517	-1.28650	0	0	0.00%	0.00%		
0.0635	-1.19722	0	0	0.00%	0.00%		
0.078	-1.10790	0	0	0.00%	0.00%		
0.0958	-1.01863	1	1	0.26%	0.26%		
0.118	-0.92811	6	7	1.53%	1.79%		
0.144	-0.84163	3	10	0.77%	2.56%		
0.177	-0.75202	13	23	3.32%	5.88%		
0.218	-0.66154	11	34	2.81%	8.70%		
0.268	-0.57186	26	60	6.65%	15.35%	-1.02094	-0.56531
0.329	-0.48280	28	88	7.16%	22.51%	-0.76245	-0.47845
0.404	-0.39361	32	120	8.18%	30.69%	-0.51355	-0.39481
0.496	-0.30451	35	155	8.95%	39.64%	-0.26861	-0.31249
0.609	-0.21538	42	197	10.74%	50.38%	0.009854	-0.21892
0.747	-0.12667	36	233	9.21%	59.59%	0.248372	-0.13877
0.918	-0.03715	46	279	11.76%	71.36%	0.572812	-0.02974
1.13	0.053078	32	311	8.18%	79.54%	0.831057	0.057036
1.38	0.139879	26	337	6.65%	86.19%	1.085121	0.142413
1.7	0.230448	21	358	5.37%	91.56%		
2.09	0.320146	16	374	4.09%	95.65%		
2.56	0.408239	8	382	2.05%	97.70%		
3.15	0.498310	5	387	1.28%	98.98%		
3.87	0.587710	2	389	0.51%	99.49%		
4.75	0.676693	0	389	0.00%	99.49%		
5.83	0.765668	0	389	0.00%	99.49%		
7.16	0.854913	2	391	0.51%	100.00%		
8.79	0.943988	0	391	0.00%	100.00%		
10.8	1.033423	0	391	0.00%	100.00%		
13.3	1.123851	0	391	0.00%	100.00%		
16.3	1.212187	0	391	0.00%	100.00%		
20	1.301029	0	391	0.00%	100.00%		

Regression Output:

Constant	-0.22223
Std Err of Y Est	0.007198
R Squared	0.999238
No. of Observations	9
Degrees of Freedom	7

X Coefficient(s)	0.336042
Std Err of Coef.	0.003506

0.599467 = GEOM.MED.

1.299596 = 84.1 %

2.167918 = GEOM.STD.DEV.

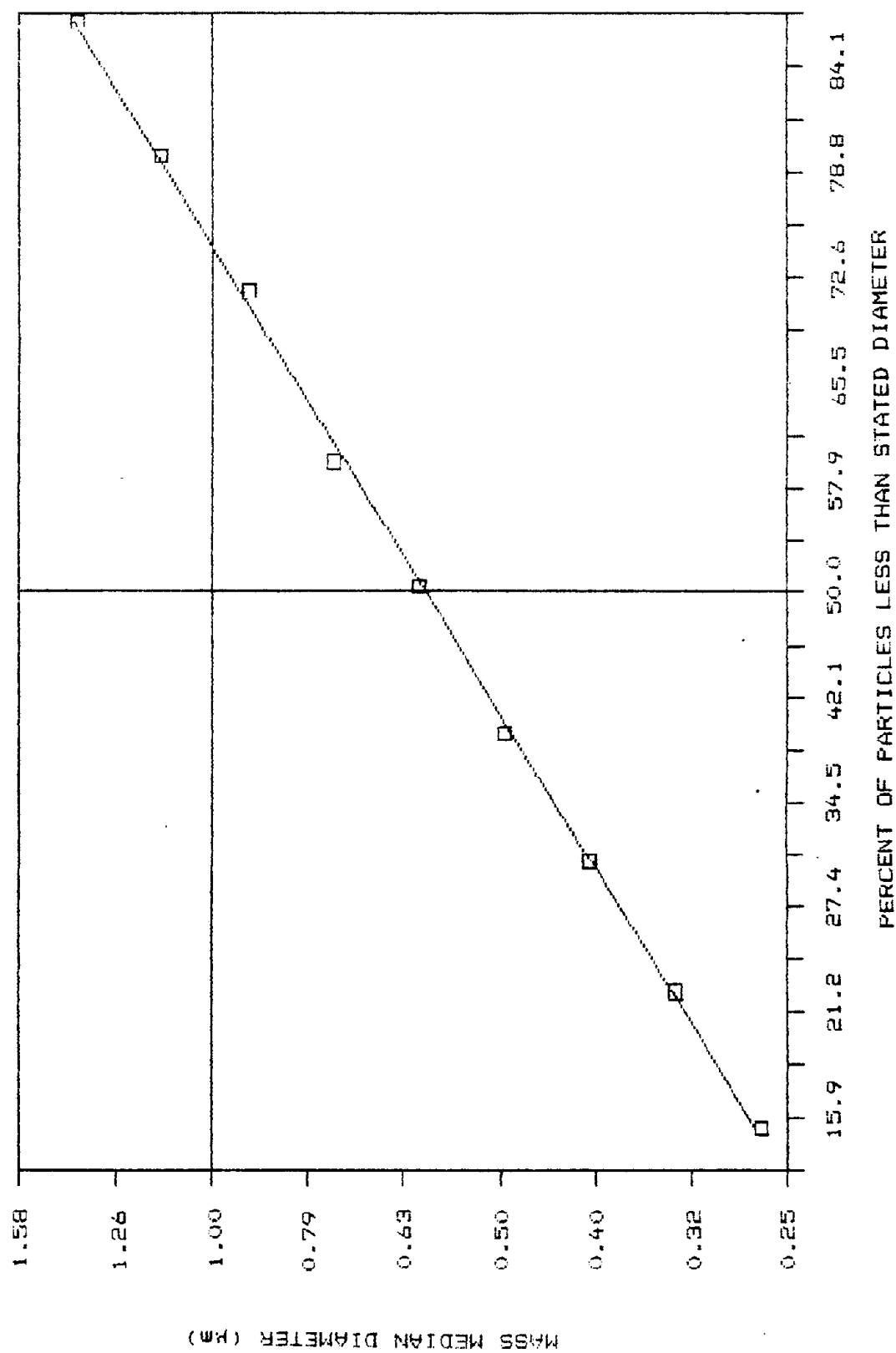
3.612853 = MASS MED.DIAM.

2.7 = DENSITY

5.936524 = AERO.DIAM.

LUNG 14

--- SILICA



25-May-68

LUNG 14

-- EXOGENOUS

DIAMETER	LOG.DIAM.	COUNT	CUM.COUNT	PERCENT	CUM.PERC.	PROB.	PRED.PROB
						CUM.PERC.	CUM.PREC.
0.0227	-1.64397	0	0	0.00%	0.00%		
0.0279	-1.55439	0	0	0.00%	0.00%		
0.0343	-1.46470	0	0	0.00%	0.00%		
0.0421	-1.37571	0	0	0.00%	0.00%		
0.0517	-1.28650	3	3	0.26%	0.26%		
0.0635	-1.19722	0	3	0.00%	0.26%		
0.078	-1.10790	2	5	0.17%	0.43%		
0.0958	-1.01863	5	10	0.43%	0.86%		
0.118	-0.92811	12	22	1.03%	1.89%		
0.144	-0.84163	15	37	1.29%	3.18%		
0.177	-0.75202	32	69	2.75%	5.93%		
0.218	-0.66154	39	108	3.35%	9.28%		
0.268	-0.57186	80	188	6.87%	16.15%	-0.98882	-0.56925
0.329	-0.48280	81	269	6.96%	23.11%	-0.74282	-0.47913
0.404	-0.39361	80	349	6.87%	29.98%	-0.53387	-0.40257
0.496	-0.30451	101	450	8.68%	38.66%	-0.29465	-0.31493
0.609	-0.21538	127	577	10.91%	49.57%	-0.01103	-0.21102
0.747	-0.12667	112	689	9.62%	59.19%	0.237896	-0.11982
0.918	-0.03715	104	793	8.93%	68.13%	0.479996	-0.03112
1.13	0.053078	95	888	8.16%	76.29%	0.723511	0.058090
1.38	0.139879	75	963	6.44%	82.73%	0.945846	0.139546
1.7	0.230448	62	1025	5.33%	88.06%	1.169853	0.221616
2.09	0.320146	52	1077	4.47%	92.53%		
2.56	0.408239	29	1106	2.49%	95.02%		
3.15	0.498310	24	1130	2.06%	97.08%		
3.87	0.587710	13	1143	1.12%	98.20%		
4.75	0.676693	12	1155	1.03%	99.23%		
5.83	0.765668	5	1160	0.43%	99.66%		
7.16	0.854913	4	1164	0.34%	100.00%		
8.79	0.943988	0	1164	0.00%	100.00%		
10.8	1.033423	0	1164	0.00%	100.00%		
13.3	1.123851	0	1164	0.00%	100.00%		
16.3	1.212187	0	1164	0.00%	100.00%		
20	1.301029	0	1164	0.00%	100.00%		

Regression Output:

Constant -0.20698
 Std Err of Y Est 0.007199
 R Squared 0.999367
 No. of Observations 10
 Degrees of Freedom 8

X Coefficient(s) 0.366369
 Std Err of Coef. 0.003259

0.620894 = GEOM.MED.

1.443401 = 84.1 %

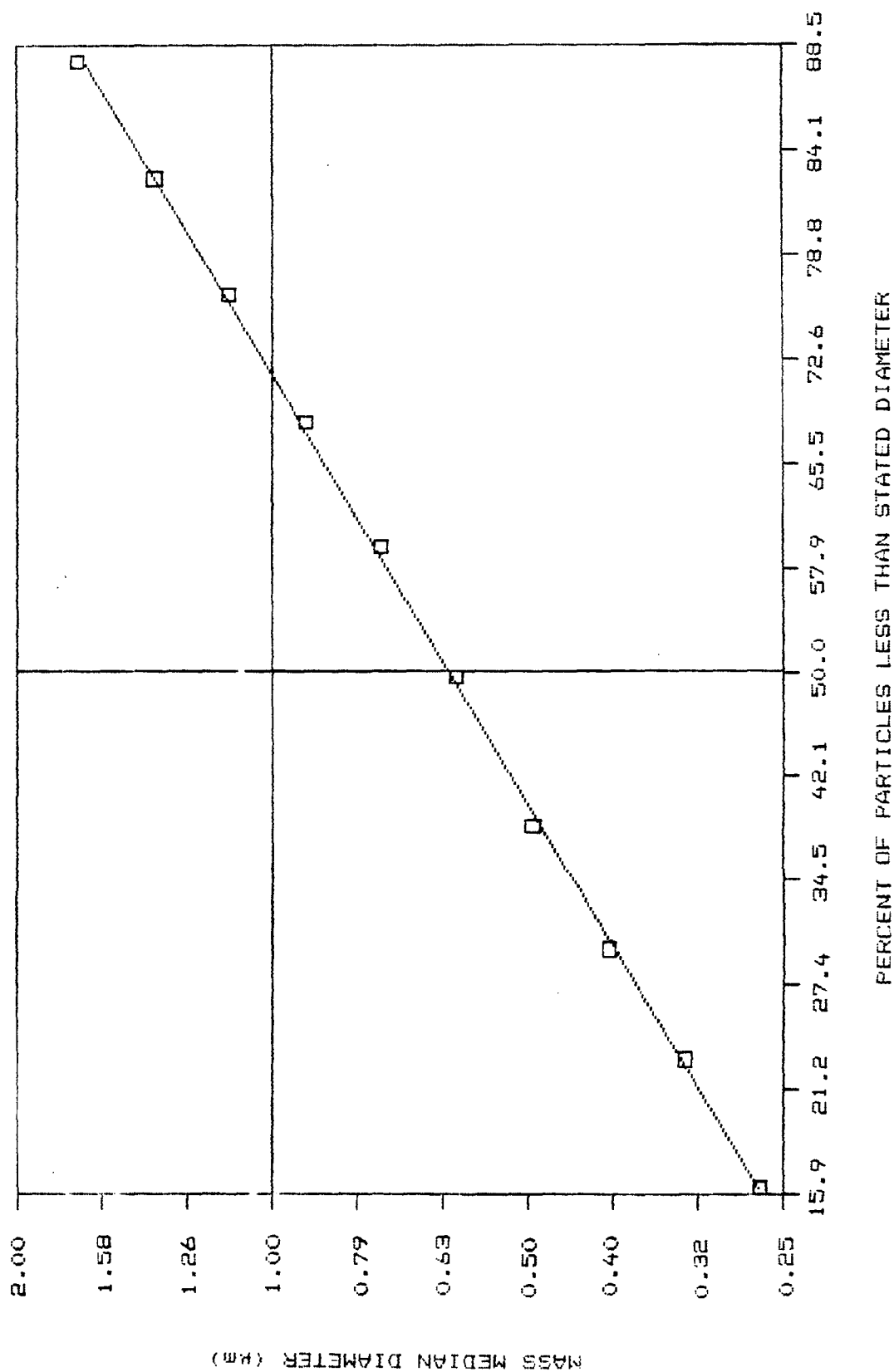
2.324712 = GEOM.STD.DEV.

5.251144 = MASS MED.DIAM.

3 = DENSITY

9.095249 = AERO.DIAM.

LUNG 14 -- EXOGENOUS



26-May-88

LUNG 15.

-- SILICA

DIAMETER	LOG.DIAM.	COUNT	CUM.COUNT	PERCENT	CUM.PERC.	PROB.	PRED.PROB
0.0227	-1.64397	0	0	0.00%	0.00%		
0.0279	-1.55439	0	0	0.00%	0.00%		
0.0343	-1.46470	0	0	0.00%	0.00%		
0.0421	-1.37571	0	0	0.00%	0.00%		
0.0517	-1.28650	0	0	0.00%	0.00%		
0.0635	-1.19722	0	0	0.00%	0.00%		
0.078	-1.10790	1	1	0.21%	0.21%		
0.0958	-1.01863	1	2	0.21%	0.43%		
0.118	-0.92811	2	4	0.43%	0.86%		
0.144	-0.84163	3	7	0.64%	1.50%		
0.177	-0.75202	11	18	2.36%	3.86%		
0.218	-0.66154	15	33	3.22%	7.08%		
0.268	-0.57186	33	66	7.08%	14.16%	-1.07000	-0.57212
0.329	-0.48280	38	104	8.15%	22.32%	-0.76865	-0.47817
0.404	-0.39361	41	145	8.80%	31.12%	-0.50142	-0.39486
0.496	-0.30451	49	194	10.52%	41.63%	-0.21630	-0.30597
0.609	-0.21538	45	239	9.66%	51.29%	0.033078	-0.22822
0.747	-0.12667	59	298	12.66%	63.95%	0.364633	-0.12486
0.918	-0.03715	53	351	11.37%	75.32%	0.692943	-0.02250
1.13	0.053078	37	388	7.94%	83.26%	0.966025	0.062630
1.38	0.139879	22	410	4.72%	87.98%	1.166260	0.125056
1.7	0.230448	30	440	6.44%	94.42%		
2.09	0.320146	15	455	3.22%	97.64%		
2.56	0.408239	6	461	1.29%	98.93%		
3.15	0.498310	2	463	0.43%	99.36%		
3.87	0.587710	3	466	0.64%	100.00%		
4.75	0.676693	0	466	0.00%	100.00%		
5.83	0.765668	0	466	0.00%	100.00%		
7.16	0.854913	0	466	0.00%	100.00%		
8.79	0.943988	0	466	0.00%	100.00%		
10.8	1.033423	0	466	0.00%	100.00%		
13.3	1.123851	0	466	0.00%	100.00%		
16.3	1.212187	0	466	0.00%	100.00%		
20	1.301029	0	466	0.00%	100.00%		

Regression Outputs:

Constant -0.23854
 Std Err of Y Est 0.010135
 R Squared 0.998490
 No. of Observations 9
 Degrees of Freedom 7

0.577375 = GEOM.MED.

1.183646 = 84.1 %

2.050045 = GEOM.STD.DEV.

2.709517 = MASS MED.DIAM.

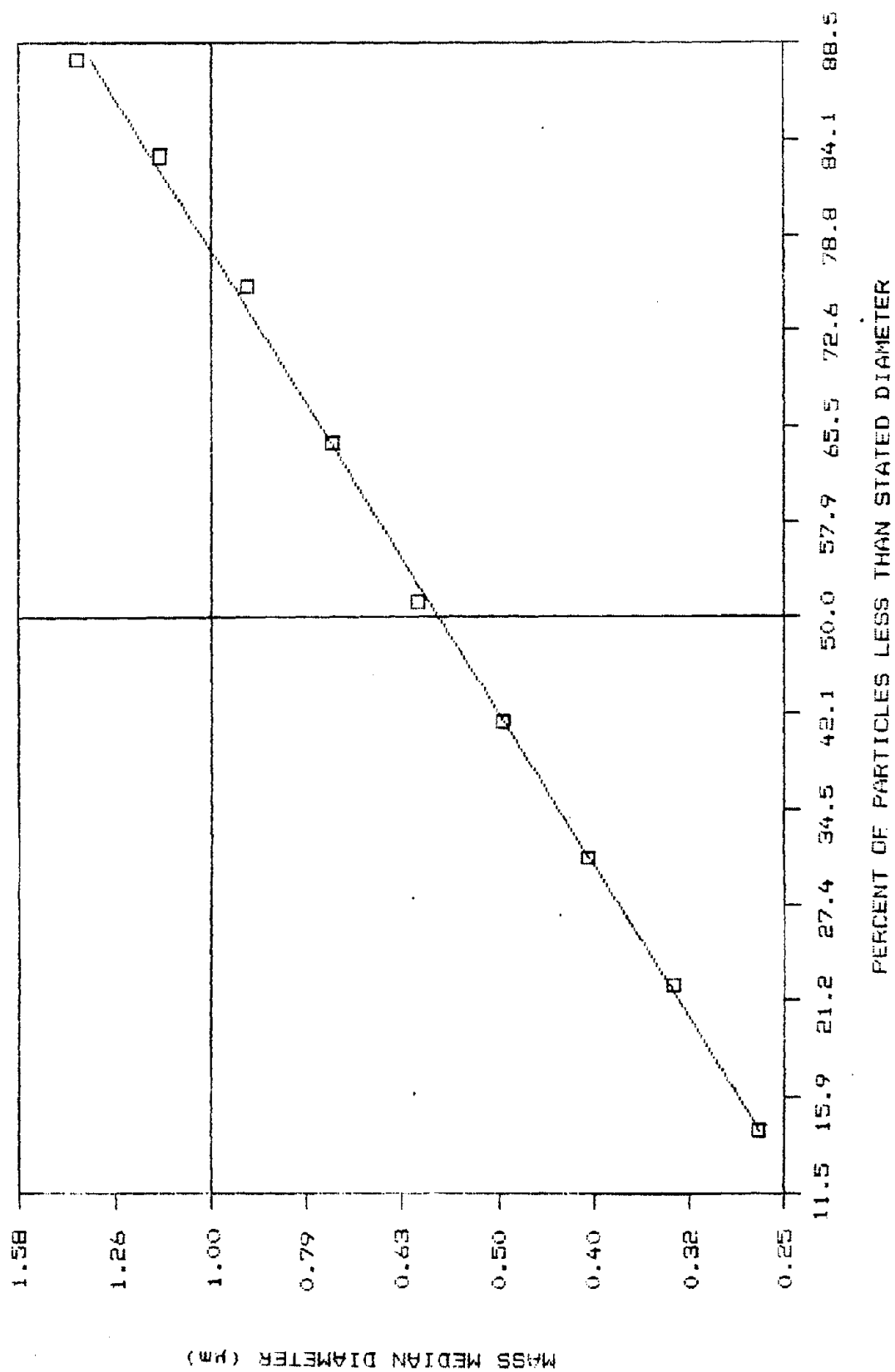
2.7 = DENSITY

4.452191 = AERO.DIAM.

X Coefficient(s) 0.311763
 Std Err of Coef. 0.004582

--- SILICA

LUNG 15



25-May-88

LUNG 15

-- EXOGENOUS

DIAMETER	LOG.DIAM.	COUNT	CUM.COUNT	PERCENT	CUM.PERC.	PROB.	PRED.PROB
0.0227	-1.64397	0	0	0.00%	0.00%		
0.0279	-1.55439	0	0	0.00%	0.00%		
0.0343	-1.46470	0	0	0.00%	0.00%		
0.0421	-1.37571	0	0	0.00%	0.00%		
0.0517	-1.28650	2	2	0.18%	0.18%		
0.0635	-1.19722	3	5	0.26%	0.44%		
0.078	-1.10790	3	8	0.26%	0.71%		
0.0958	-1.01863	5	13	0.44%	1.15%		
0.118	-0.92811	11	24	0.97%	2.12%		
0.144	-0.84163	17	41	1.50%	3.62%		
0.177	-0.75202	33	74	2.91%	6.53%		
0.218	-0.66154	41	115	3.62%	10.14%	-1.26059	-0.69589
0.268	-0.57186	105	220	9.26%	19.40%	-0.86800	-0.57342
0.329	-0.48280	120	340	10.58%	29.98%	-0.53388	-0.46918
0.404	-0.39361	142	482	12.52%	42.50%	-0.19349	-0.36299
0.496	-0.30451	114	596	10.05%	52.56%	0.065727	-0.28212
0.609	-0.21538	101	697	8.91%	61.46%	0.297940	-0.20968
0.747	-0.12667	103	800	9.08%	70.55%	0.549197	-0.13129
0.918	-0.03715	101	901	8.91%	79.45%	0.828091	-0.04428
1.13	0.053078	70	971	6.17%	85.63%	1.061073	0.028394
1.38	0.139879	51	1022	4.50%	90.12%		
1.7	0.230448	48	1070	4.23%	94.36%		
2.09	0.320146	28	1098	2.47%	96.83%		
2.56	0.408239	15	1113	1.32%	98.15%		
3.15	0.498310	12	1125	1.06%	99.21%		
3.87	0.587710	5	1130	0.44%	99.65%		
4.75	0.676693	2	1132	0.18%	99.82%		
5.83	0.765668	2	1134	0.18%	100.00%		
7.16	0.854913	0	1134	0.00%	100.00%		
8.79	0.943988	0	1134	0.00%	100.00%		
10.8	1.033423	0	1134	0.00%	100.00%		
13.3	1.123851	0	1134	0.00%	100.00%		
16.3	1.212187	0	1134	0.00%	100.00%		
20	1.301029	0	1134	0.00%	100.00%		

Regression Output:

Constant -0.30262
Std Err of Y Est 0.022429
R Squared 0.992626
No. of Observations 9
Degrees of Freedom 7

X Coefficient(s) 0.311970
Std Err of Coef. 0.010162

0.498162 = GEOM.MED.

1.021742 = 84.1 %

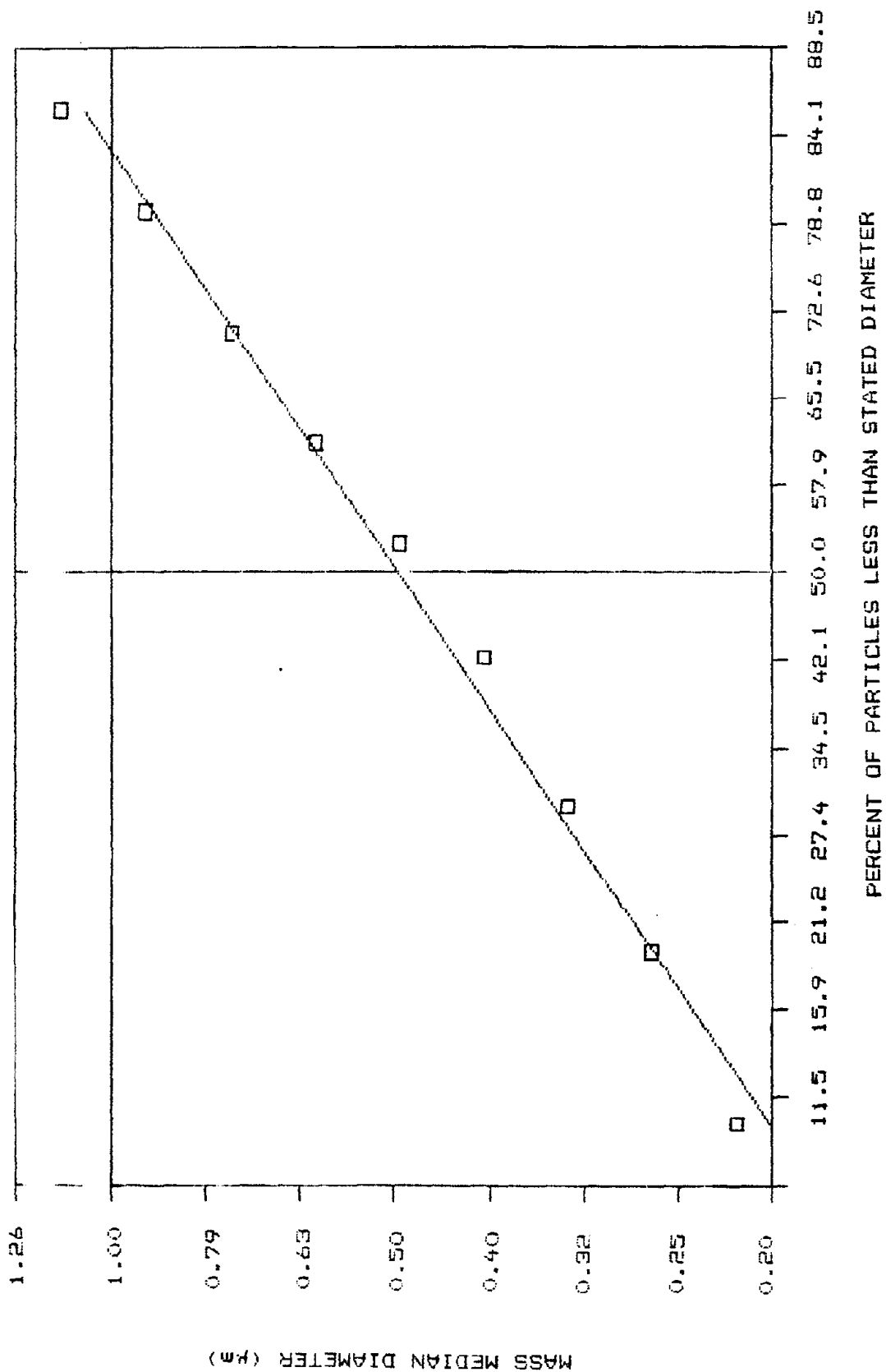
2.051022 = GEOM.STD.DEV.

2.342589 = MASS MED.DIAM.

3 = DENSITY

4.057483 = AERO.DIAM.

LUNG 15 -- EXOGENOUS



26-May-88

LUNG 16

-- SILICA

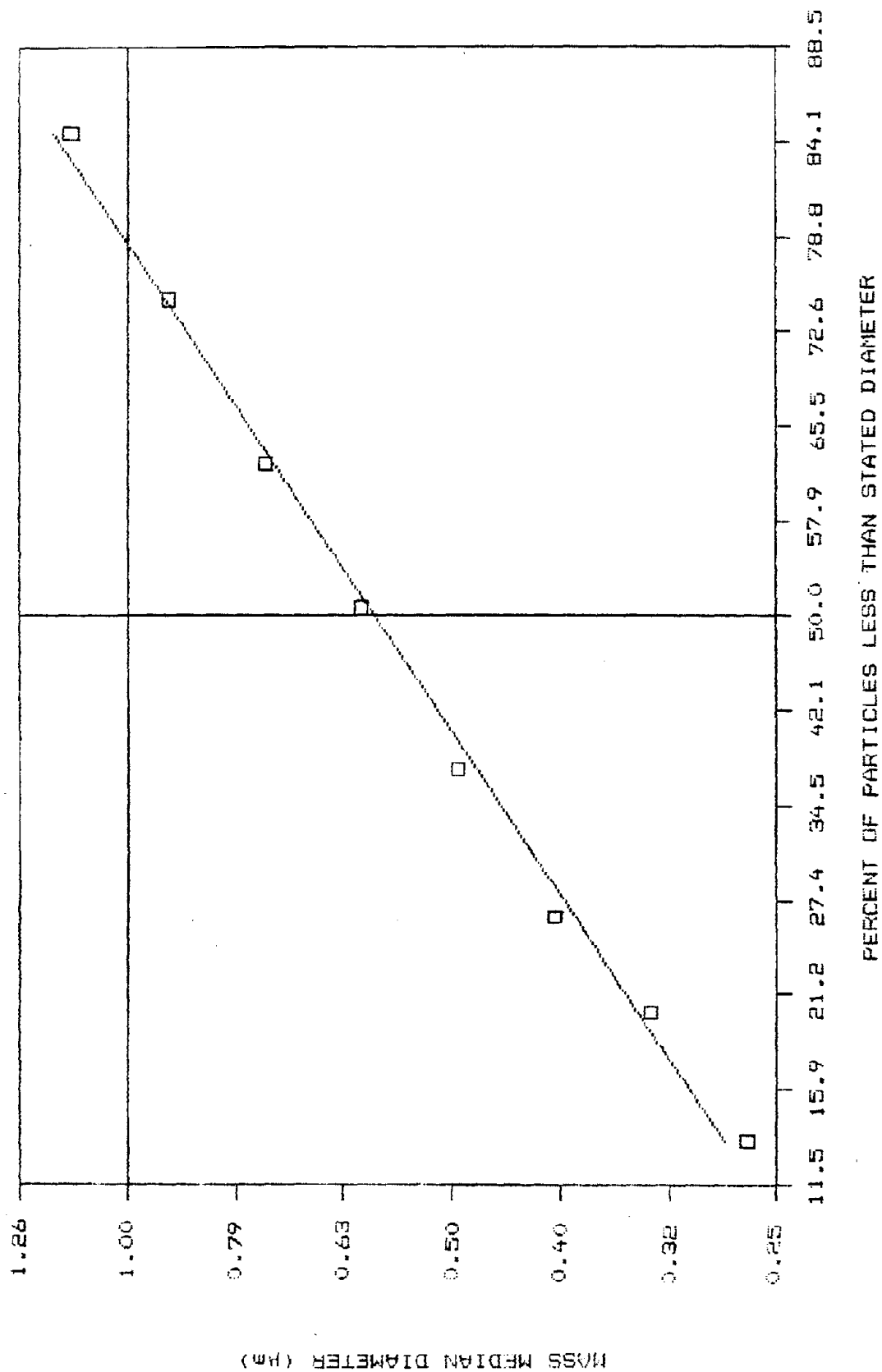
DIAMETER	LOG.DIAM.	COUNT	CUM.COUNT	PERCENT	CUM.PERC.	CUM.PERC.	CUM.PRED.
0.0227	-1.64397	0	0	0.00%	0.00%		
0.0279	-1.55439	0	0	0.00%	0.00%		
0.0343	-1.46470	0	0	0.00%	0.00%		
0.0421	-1.37571	0	0	0.00%	0.00%		
0.0517	-1.28650	2	2	0.52%	0.52%		
0.0635	-1.19722	0	2	0.00%	0.52%		
0.078	-1.10790	1	3	0.26%	0.78%		
0.0958	-1.01863	4	7	1.04%	1.82%		
0.118	-0.92811	2	9	0.52%	2.34%		
0.144	-0.84163	5	14	1.30%	3.64%		
0.177	-0.75202	6	20	1.56%	5.19%		
0.218	-0.66154	11	31	2.86%	8.05%		
0.268	-0.57186	20	51	5.19%	13.25%	-1.10984	-0.55037
0.329	-0.48280	27	78	7.01%	20.26%	-0.83797	-0.47140
0.404	-0.39361	24	102	6.23%	26.49%	-0.63699	-0.41303
0.496	-0.30451	43	145	11.17%	37.66%	-0.32126	-0.32132
0.609	-0.21538	50	195	12.99%	50.65%	0.016680	-0.22316
0.747	-0.12667	45	240	11.69%	62.34%	0.321261	-0.13469
0.918	-0.03715	47	287	12.21%	74.55%	0.668793	-0.03374
1.13	0.053078	39	326	10.13%	84.68%	1.021782	0.068788
1.38	0.139879	22	348	5.71%	90.39%		
1.7	0.230448	19	367	4.94%	95.32%		
2.09	0.320146	12	379	3.12%	98.44%		
2.56	0.408239	3	382	0.78%	99.22%		
3.15	0.498310	1	383	0.26%	99.48%		
3.87	0.587710	2	385	0.52%	100.00%		
4.75	0.676693	0	385	0.00%	100.00%		
5.83	0.765668	0	385	0.00%	100.00%		
7.16	0.854913	0	385	0.00%	100.00%		
8.79	0.943988	0	385	0.00%	100.00%		
10.8	1.033423	0	385	0.00%	100.00%		
13.3	1.123851	0	385	0.00%	100.00%		
16.3	1.212187	0	385	0.00%	100.00%		
20	1.301029	0	385	0.00%	100.00%		

Regression Output:

Constant	-0.22800	0.591553 = GEOM.MED.
Std Err of Y Est	0.016501	
R Squared	0.995110	1.154677 = 84.1 %
No. of Observations	8	
Degrees of Freedom	6	1.951941 = GEOM.STD.DEV.
X Coefficient(s)	0.290466	2.263752 = MASS MED.DIAM.
Std Err of Coef.	0.008311	
		2.7 = DENSITY
		3.719724 = AERO.DIAM.

--- SILICA

LUNG 16



25-May-88

LUNG 16

-- EXOGENOUS

202

DIAMETER	LUG.DIAM.	COUNT	CUM.COUNT	PERCENT	CUM.PERC.	PROB.	PRED.PROB
0.0227	-1.64397	0	0	0.00%	0.00%		
0.0279	-1.55439	0	0	0.00%	0.00%		
0.0343	-1.46470	0	0	0.00%	0.00%		
0.0421	-1.37571	0	0	0.00%	0.00%		
0.0517	-1.28650	4	4	0.36%	0.36%		
0.0635	-1.19722	2	6	0.18%	0.54%		
0.078	-1.10790	5	11	0.45%	1.00%		
0.0958	-1.01863	6	17	0.54%	1.54%		
0.118	-0.92811	6	23	0.54%	2.09%		
0.144	-0.84163	16	39	1.45%	3.54%		
0.177	-0.75202	22	61	2.00%	5.54%		
0.218	-0.66154	37	98	3.36%	8.89%		
0.268	-0.57186	47	145	4.26%	13.16%	-1.11380	-0.57066
0.329	-0.48280	77	222	6.99%	20.15%	-0.84193	-0.48413
0.404	-0.39361	102	324	9.26%	29.40%	-0.55071	-0.39144
0.496	-0.30451	105	429	9.53%	38.93%	-0.28749	-0.30766
0.609	-0.21538	127	556	11.52%	50.45%	0.011654	-0.21245
0.747	-0.12667	113	669	10.25%	60.71%	0.277867	-0.12772
0.918	-0.03715	114	783	10.34%	71.05%	0.563938	-0.03667
1.13	0.053078	92	875	8.35%	79.40%	0.826303	0.046833
1.38	0.139879	87	962	7.89%	87.30%	1.134288	0.144859
1.7	0.230448	55	1017	4.99%	92.29%		
2.09	0.320146	39	1056	3.54%	95.83%		
2.56	0.408239	26	1082	2.36%	98.19%		
3.15	0.498310	9	1091	0.82%	99.00%		
3.87	0.587710	5	1096	0.45%	99.46%		
4.75	0.676693	3	1099	0.27%	99.73%		
5.83	0.765668	2	1101	0.18%	99.91%		
7.16	0.854913	0	1101	0.00%	99.91%		
8.79	0.943988	0	1101	0.00%	99.91%		
10.8	1.033423	1	1102	0.09%	100.00%		
13.3	1.123851	0	1102	0.00%	100.00%		
16.3	1.212187	0	1102	0.00%	100.00%		
20	1.301029	0	1102	0.00%	100.00%		

Regression Output:

Constant -0.21616
 Std Err of Y Est 0.003616
 R Squared 0.999807
 No. of Observations 9
 Degrees of Freedom 7

X Coefficient(s) 0.318281
 Std Err of Coef. 0.001668

0.607906 = GEOM.MED.

1.265080 = 84.1 %

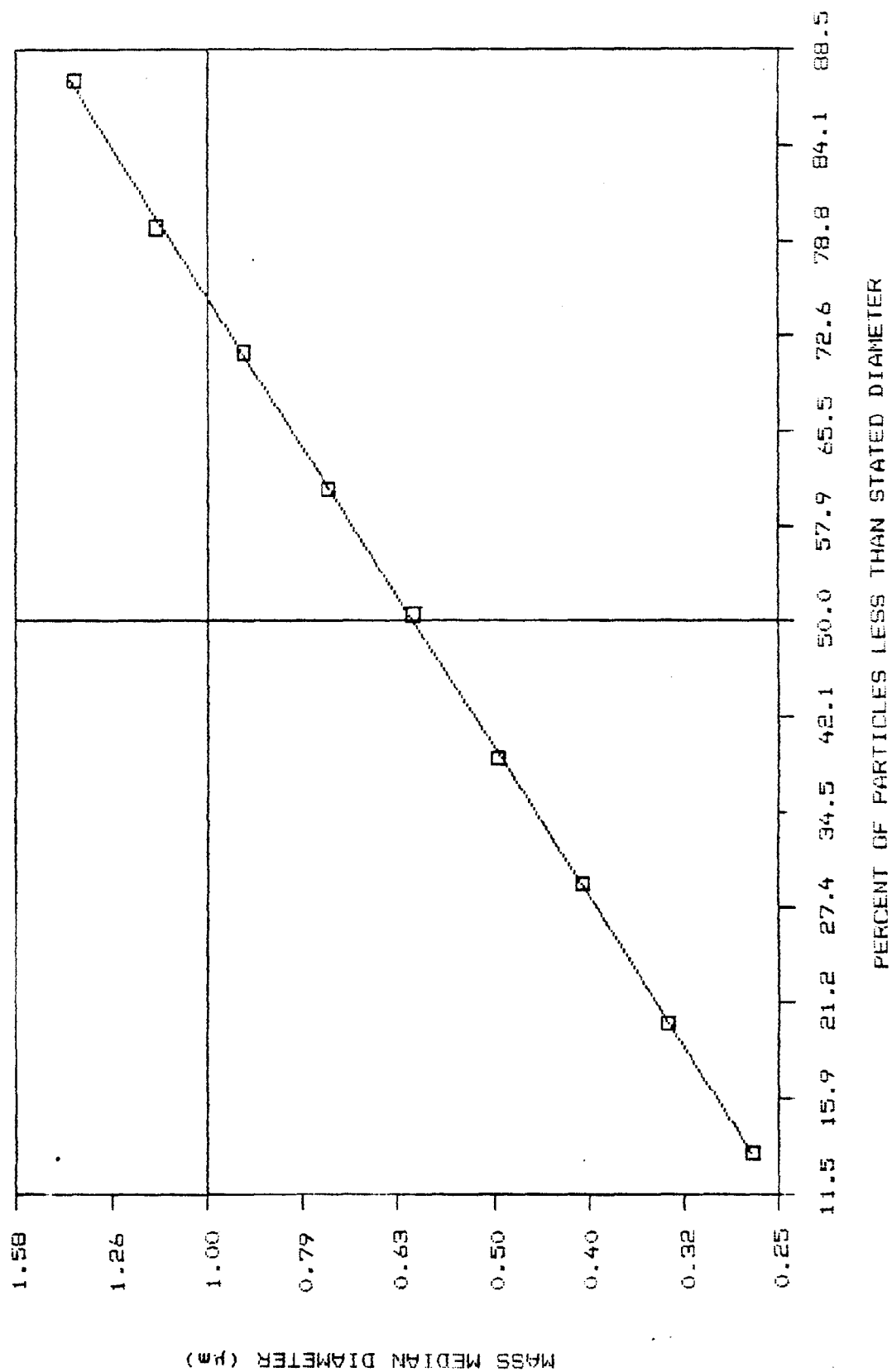
2.081044 = GEOM.STD.DEV.

3.045358 = MASS MED.DIAM.

3 = DENSITY

5.274716 = AERO.DIAM.

LUNG 16 — EXOGENOUS



26-May-88

LUNG 17

-- SILICA

204

DIAMETER	LOG.DIAM.	COUNT	CUM.COUNT	PERCENT	CUM.PERC.	PROB.	PRED.PROB
0.0227	-1.64397	0	0	0.00%	0.00%		
0.0279	-1.55439	0	0	0.00%	0.00%		
0.0343	-1.46470	0	0	0.00%	0.00%		
0.0421	-1.37571	0	0	0.00%	0.00%		
0.0517	-1.28650	0	0	0.00%	0.00%		
0.0635	-1.19722	0	0	0.00%	0.00%		
0.078	-1.10790	0	0	0.00%	0.00%		
0.0958	-1.01863	0	0	0.00%	0.00%		
0.118	-0.92811	1	1	0.26%	0.26%		
0.144	-0.84163	1	2	0.26%	0.51%		
0.177	-0.75202	0	2	0.00%	0.51%		
0.218	-0.66154	2	4	0.51%	1.02%		
0.268	-0.57186	13	17	3.32%	4.34%		
0.329	-0.48280	21	38	5.36%	9.69%		
0.404	-0.39361	18	56	4.59%	14.29%	-1.06479	-0.38668
0.496	-0.30451	23	79	5.87%	20.15%	-0.84166	-0.32198
0.609	-0.21538	48	127	12.24%	32.40%	-0.46523	-0.21284
0.747	-0.12667	42	169	10.71%	43.11%	-0.17766	-0.12946
0.918	-0.03715	55	224	14.03%	57.14%	0.184303	-0.02451
1.13	0.053078	45	269	11.48%	68.62%	0.493999	0.065283
1.38	0.139879	35	304	8.93%	77.55%	0.764338	0.143668
1.7	0.230448	26	330	6.63%	84.18%	1.002052	0.212592
2.09	0.320146	23	353	5.87%	90.05%		
2.56	0.408239	23	376	5.87%	95.92%		
3.15	0.498310	6	382	1.53%	97.45%		
3.87	0.587710	9	391	2.30%	99.74%		
4.75	0.676693	1	392	0.26%	100.00%		
5.83	0.765668	0	392	0.00%	100.00%		
7.16	0.854913	0	392	0.00%	100.00%		
8.79	0.943988	0	392	0.00%	100.00%		
10.8	1.033423	0	392	0.00%	100.00%		
13.3	1.123851	0	392	0.00%	100.00%		
16.3	1.212187	0	392	0.00%	100.00%		
20	1.301029	0	392	0.00%	100.00%		

Regression Output:

Constant -0.07795
Std Err of Y Est 0.012971
R Squared 0.996973
No. of Observations 8
Degrees of Freedom 6

0.835698 = GEOM.MED.

1.629287 = 84.1 %

1.949611 = GEOM.STD.DEV.

X Coefficient(s) 0.289948
Std Err of Coef. 0.006522

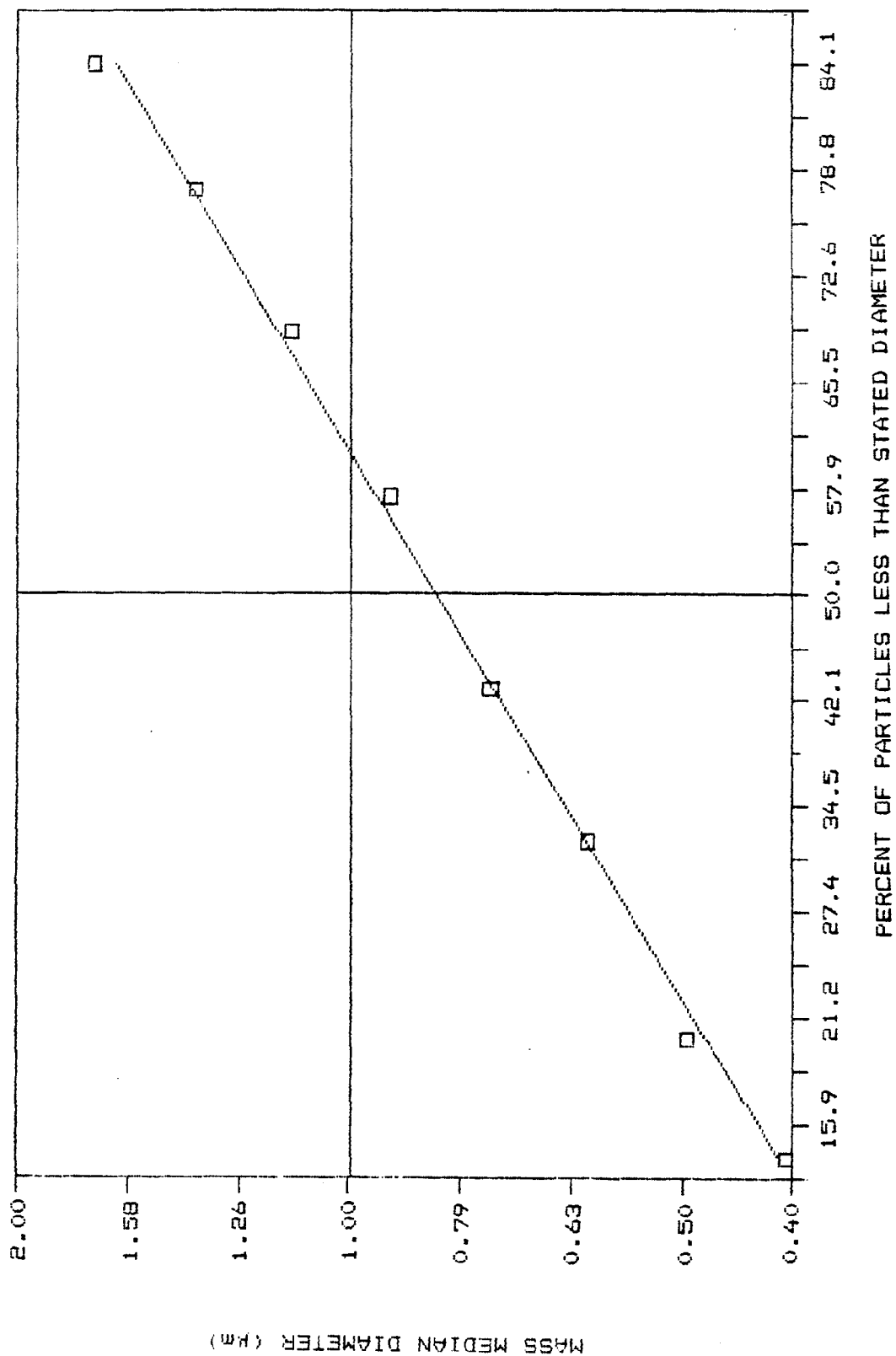
3.182763 = MASS MED.DIAM.

2.7 = DENSITY

5.229814 = AERO.DIAM.

--- SILICA

LUNG 17



25-May-88

LUNG 17

-- EXOGENOUS

DIAMETER	LOG.DIAM.	COUNT	CUM.COUNT	PERCENT	CUM.PERC.	PROB.	FRED.PROB
0.0227	-1.64397	0	0	0.00%	0.00%		
0.0279	-1.55439	0	0	0.00%	0.00%		
0.0343	-1.46470	0	0	0.00%	0.00%		
0.0421	-1.37571	0	0	0.00%	0.00%		
0.0517	-1.28650	1	1	0.06%	0.06%		
0.0635	-1.19722	0	1	0.00%	0.06%		
0.078	-1.10790	1	2	0.06%	0.12%		
0.0958	-1.01863	2	4	0.12%	0.25%		
0.118	-0.92811	3	7	0.18%	0.43%		
0.144	-0.84163	4	11	0.25%	0.68%		
0.177	-0.75202	3	14	0.18%	0.86%		
0.218	-0.66154	11	25	0.68%	1.54%		
0.268	-0.57186	34	59	2.09%	3.63%		
0.329	-0.48280	83	142	5.11%	8.74%		
0.404	-0.39361	95	237	5.85%	14.59%	-1.05185	-0.40575
0.496	-0.30451	122	359	7.51%	22.11%	-0.77562	-0.31289
0.609	-0.21538	161	520	9.91%	32.02%	-0.47585	-0.21212
0.747	-0.12667	174	694	10.71%	42.73%	-0.18751	-0.11518
0.918	-0.03715	175	869	10.78%	53.51%	0.090254	-0.02181
1.13	0.053078	157	1026	9.67%	63.18%	0.343804	0.063424
1.38	0.139879	135	1161	8.31%	71.49%	0.576769	0.141739
1.7	0.230448	126	1287	7.76%	79.25%	0.821096	0.223874
2.09	0.320146	104	1391	6.40%	85.65%	1.062196	0.304924
2.56	0.408239	95	1486	5.85%	91.50%		
3.15	0.498310	48	1534	2.96%	94.46%		
3.87	0.587710	46	1580	2.83%	97.29%		
4.75	0.676693	21	1601	1.29%	98.58%		
5.83	0.765668	9	1610	0.55%	99.14%		
7.16	0.854913	10	1620	0.62%	99.75%		
8.79	0.943988	0	1620	0.00%	99.75%		
10.8	1.033423	3	1623	0.18%	99.94%		
13.3	1.123851	1	1624	0.06%	100.00%		
16.3	1.212187	0	1624	0.00%	100.00%		
20	1.301029	0	1624	0.00%	100.00%		

Regression Output:

Constant -0.05215
Std Err of Y Est 0.011838
R Squared 0.997943
No. of Observations 9
Degrees of Freedom 7

X Coefficient(s) 0.336168
Std Err of Coef. 0.005767

0.886845 = GEOM.MED.

1.923162 = 84.1 %

2.168544 = GEOM.STD.DEV.

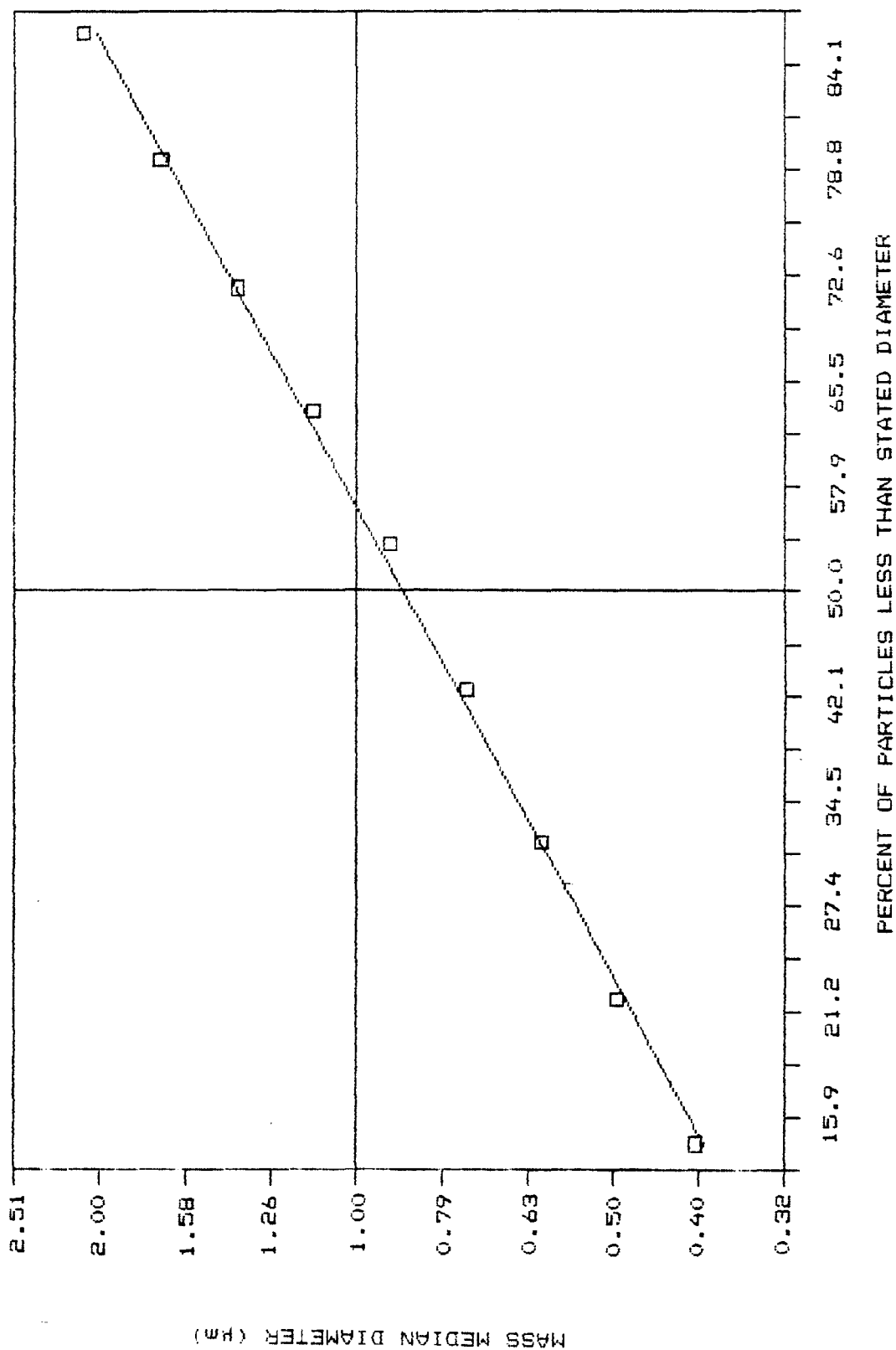
5.351982 = MASS MED.DIAM.

3 = DENSITY

9.269905 = AERO.DIAM.

LUNG 17

-- EXOGENOUS



26-May-88

LUNG 18.

-- SILICA

DIAMETER	LOG.DIAM.	COUNT	CUM.COUNT	PERCENT	CUM.PERC.	PROB.	PRED.PROB
0.0227	-1.64397	0	0	0.00%	0.00%		
0.0279	-1.55439	0	0	0.00%	0.00%		
0.0343	-1.46470	0	0	0.00%	0.00%		
0.0421	-1.37571	0	0	0.00%	0.00%		
0.0517	-1.28650	0	0	0.00%	0.00%		
0.0635	-1.19722	0	0	0.00%	0.00%		
0.078	-1.10790	0	0	0.00%	0.00%		
0.0958	-1.01863	0	0	0.00%	0.00%		
0.118	-0.92811	0	0	0.00%	0.00%		
0.144	-0.84163	1	1	0.21%	0.21%		
0.177	-0.75202	2	3	0.42%	0.63%		
0.218	-0.66154	4	7	0.83%	1.46%		
0.268	-0.57186	9	16	1.88%	3.33%		
0.329	-0.48280	35	51	7.29%	10.63%	-1.23514	-0.47637
0.404	-0.39361	35	86	7.29%	17.92%	-0.92162	-0.38784
0.496	-0.30451	44	130	9.17%	27.08%	-0.61917	-0.30244
0.609	-0.21538	45	175	9.38%	36.46%	-0.35362	-0.22745
0.747	-0.12667	57	232	11.88%	48.33%	-0.04282	-0.13968
0.918	-0.03715	64	296	13.33%	61.67%	0.303341	-0.04193
1.13	0.053078	65	361	13.54%	75.21%	0.689389	0.067075
1.38	0.139879	37	398	7.71%	82.92%	0.952839	0.141469
1.7	0.230448	36	434	7.50%	90.42%		
2.09	0.320146	28	462	5.83%	96.25%		
2.56	0.408239	7	469	1.46%	97.71%		
3.15	0.498310	7	476	1.46%	99.17%		
3.87	0.587710	3	479	0.63%	99.79%		
4.75	0.676693	1	480	0.21%	100.00%		
5.83	0.765668	0	480	0.00%	100.00%		
7.16	0.854913	0	480	0.00%	100.00%		
8.79	0.943988	0	480	0.00%	100.00%		
10.8	1.033423	0	480	0.00%	100.00%		
13.3	1.123851	0	480	0.00%	100.00%		
16.3	1.212187	0	480	0.00%	100.00%		
20	1.301029	0	480	0.00%	100.00%		

Regression Output:

Constant -0.12759
Std Err of Y Est 0.010125
R Squared 0.998154
No. of Observations 8
Degrees of Freedom 6

X Coefficient(s) 0.282382
Std Err of Coef. 0.004957

0.745425 = GEOM.MED.

1.428192 = 84.1 %

1.915943 = GEOM.STD.DEV.

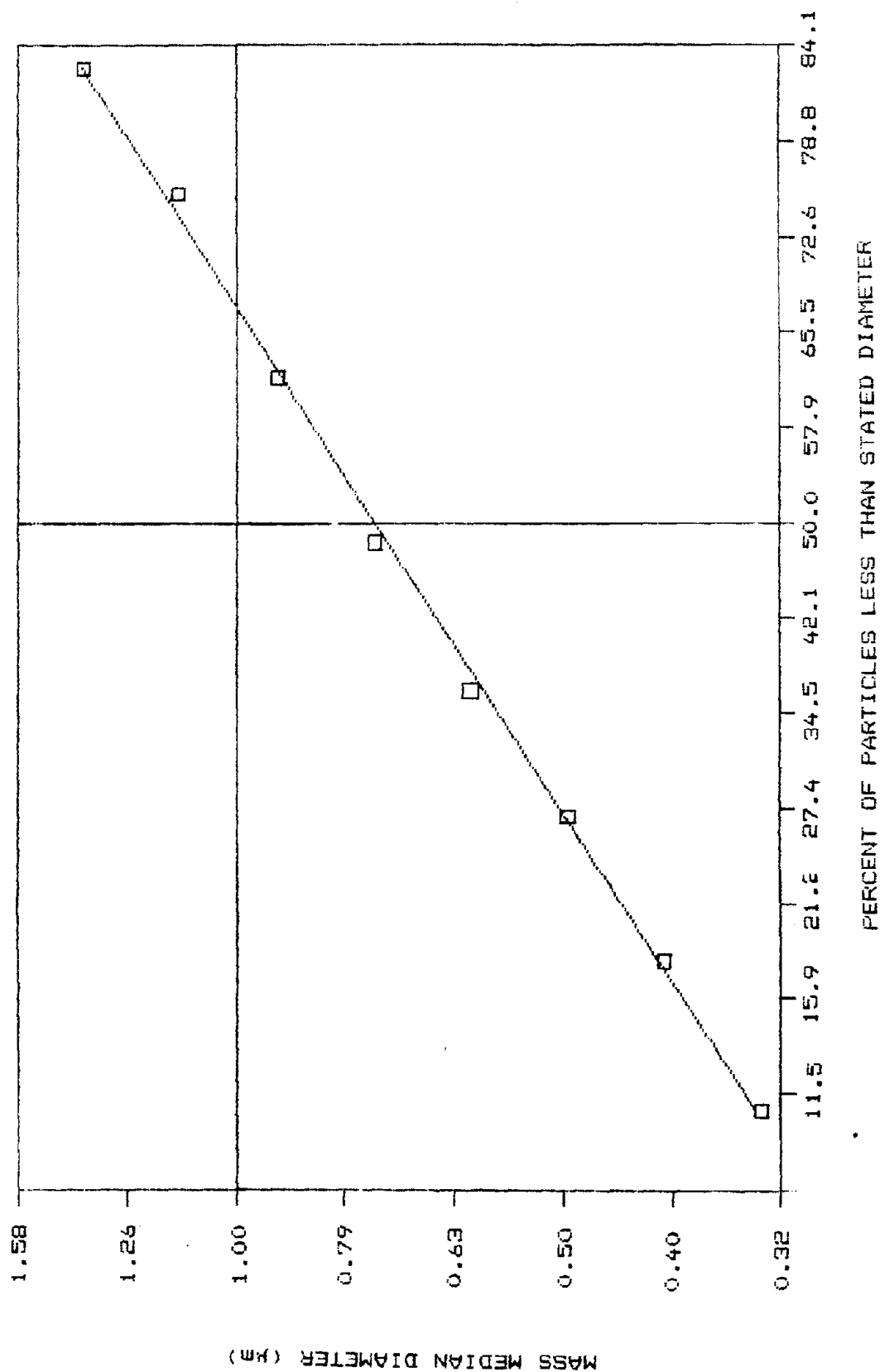
2.650013 = MASS MED.DIAM.

2.7 = DENSITY

4.354417 = AERO.DIAM.

--- SILICA

LUNG 18



25-May-88

LUNG 18

-- EXOGENOUS

DIAMETER	LOG.DIAM.	COUNT	CUM.COUNT	PERCENT	CUM.PERC.	PROB.	PRED.PROB
						CUM.PERC.	CUM.PREC.
0.0227	-1.64397	0	0	0.00%	0.00%		
0.0279	-1.55439	0	0	0.00%	0.00%		
0.0343	-1.46470	0	0	0.00%	0.00%		
0.0421	-1.37571	0	0	0.00%	0.00%		
0.0517	-1.28650	0	0	0.00%	0.00%		
0.0635	-1.19722	0	0	0.00%	0.00%		
0.078	-1.10790	0	0	0.00%	0.00%		
0.0958	-1.01863	3	3	0.14%	0.14%		
0.118	-0.92811	2	5	0.09%	0.23%		
0.144	-0.84163	9	14	0.42%	0.65%		
0.177	-0.75202	11	25	0.51%	1.16%		
0.218	-0.66154	26	51	1.21%	2.37%		
0.268	-0.57186	61	112	2.84%	5.21%		
0.329	-0.48280	117	229	5.45%	10.66%	-1.23328	-0.49934
0.404	-0.39361	166	395	7.73%	18.39%	-0.90428	-0.39490
0.496	-0.30451	211	606	9.82%	28.21%	-0.58554	-0.29372
0.609	-0.21538	223	829	10.38%	38.59%	-0.29640	-0.20194
0.747	-0.12667	206	1035	9.59%	48.18%	-0.04665	-0.12266
0.918	-0.03715	227	1262	10.57%	58.75%	0.226346	-0.03601
1.13	0.053078	222	1484	10.34%	69.09%	0.507220	0.053146
1.38	0.139879	187	1671	8.71%	77.79%	0.772302	0.137291
1.7	0.230448	156	1827	7.26%	85.06%	1.037322	0.221416
2.09	0.320146	130	1957	6.05%	91.11%		
2.56	0.408239	73	2030	3.40%	94.51%		
3.15	0.498310	52	2082	2.42%	96.93%		
3.87	0.587710	37	2119	1.72%	98.65%		
4.75	0.676693	12	2131	0.56%	99.21%		
5.83	0.765668	9	2140	0.42%	99.63%		
7.16	0.854913	4	2144	0.19%	99.81%		
8.79	0.943988	3	2147	0.14%	99.95%		
10.8	1.033423	1	2148	0.05%	100.00%		
13.3	1.123851	0	2148	0.00%	100.00%		
16.3	1.212187	0	2148	0.00%	100.00%		
20	1.301029	0	2148	0.00%	100.00%		

Regression Output:

Constant -0.10786
Std Err of Y Est 0.009839
R Squared 0.998577
No. of Observations 9
Degrees of Freedom 7

X Coefficient(s) 0.317430
Std Err of Coef. 0.004528

0.780080 = GEOM.MED.

1.620202 = 84.1 %

2.076969 = GEOM.STD.DEV.

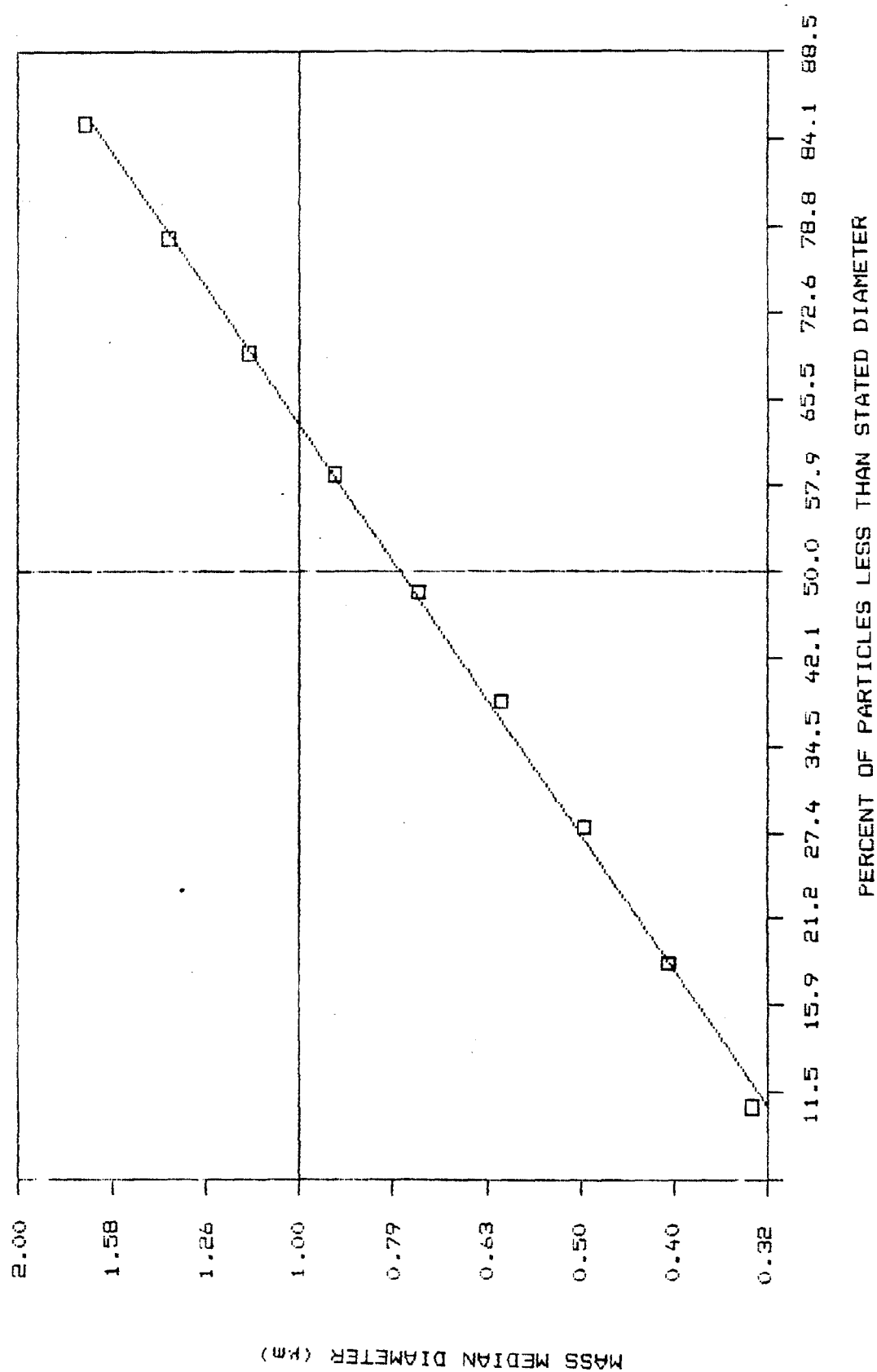
3.874376 = MASS MED.DIAM.

3 = DENSITY

6.710617 = AERO.DIAM.

LUNG 18

-- EXOGENOUS



26-May-88

LUNG 19

-- SILICA

212

DIAMETER	LOG.DIAM.	COUNT	CUM.COUNT	PERCENT	CUM.PERC.	PROB.	PRED.PROB
						CUM.PERC.	CUM.PREC.
0.0227	-1.64397	0	0	0.00%	0.00%		
0.0279	-1.55439	0	0	0.00%	0.00%		
0.0343	-1.46470	0	0	0.00%	0.00%		
0.0421	-1.37571	0	0	0.00%	0.00%		
0.0517	-1.28650	1	1	0.40%	0.40%		
0.0635	-1.19722	0	1	0.00%	0.40%		
0.078	-1.10790	0	1	0.00%	0.40%		
0.0958	-1.01863	2	3	0.80%	1.20%		
0.118	-0.92811	1	4	0.40%	1.60%		
0.144	-0.84163	2	6	0.80%	2.40%		
0.177	-0.75202	1	7	0.40%	2.80%		
0.218	-0.66154	3	10	1.20%	4.00%		
0.268	-0.57186	10	20	4.00%	8.00%		
0.329	-0.48280	16	36	6.40%	14.40%	-1.05997	-0.49070
0.404	-0.39361	24	60	9.60%	24.00%	-0.71432	-0.38857
0.496	-0.30451	29	89	11.60%	35.60%	-0.37688	-0.28887
0.609	-0.21538	24	113	9.60%	45.20%	-0.12354	-0.21401
0.747	-0.12667	28	141	11.20%	56.40%	0.164988	-0.12876
0.918	-0.03715	25	166	10.00%	66.40%	0.431751	-0.04994
1.13	0.053078	25	191	10.00%	76.40%	0.727069	0.037318
1.38	0.139879	27	218	10.80%	87.20%	1.129921	0.156351
1.7	0.230448	14	232	5.60%	92.80%		
2.09	0.320146	8	240	3.20%	96.00%		
2.56	0.408239	2	242	0.80%	96.80%		
3.15	0.498310	4	246	1.60%	98.40%		
3.87	0.587710	2	248	0.80%	99.20%		
4.75	0.676693	1	249	0.40%	99.60%		
5.83	0.765668	0	249	0.00%	99.60%		
7.16	0.854913	0	249	0.00%	99.60%		
8.79	0.943988	0	249	0.00%	99.60%		
10.8	1.033423	0	249	0.00%	99.60%		
13.3	1.123851	1	250	0.40%	100.00%		

Regression Output:

Constant -0.17751
Std Err of Y Est 0.013051
R Squared 0.996933
No. of Observations 8
Degrees of Freedom 6

0.664489 = GEOM.MED.

1.312087 = 84.1 %

1.974578 = GEOM.STD.DEV.

X Coefficient(s) 0.295474
Std Err of Coef. 0.006689

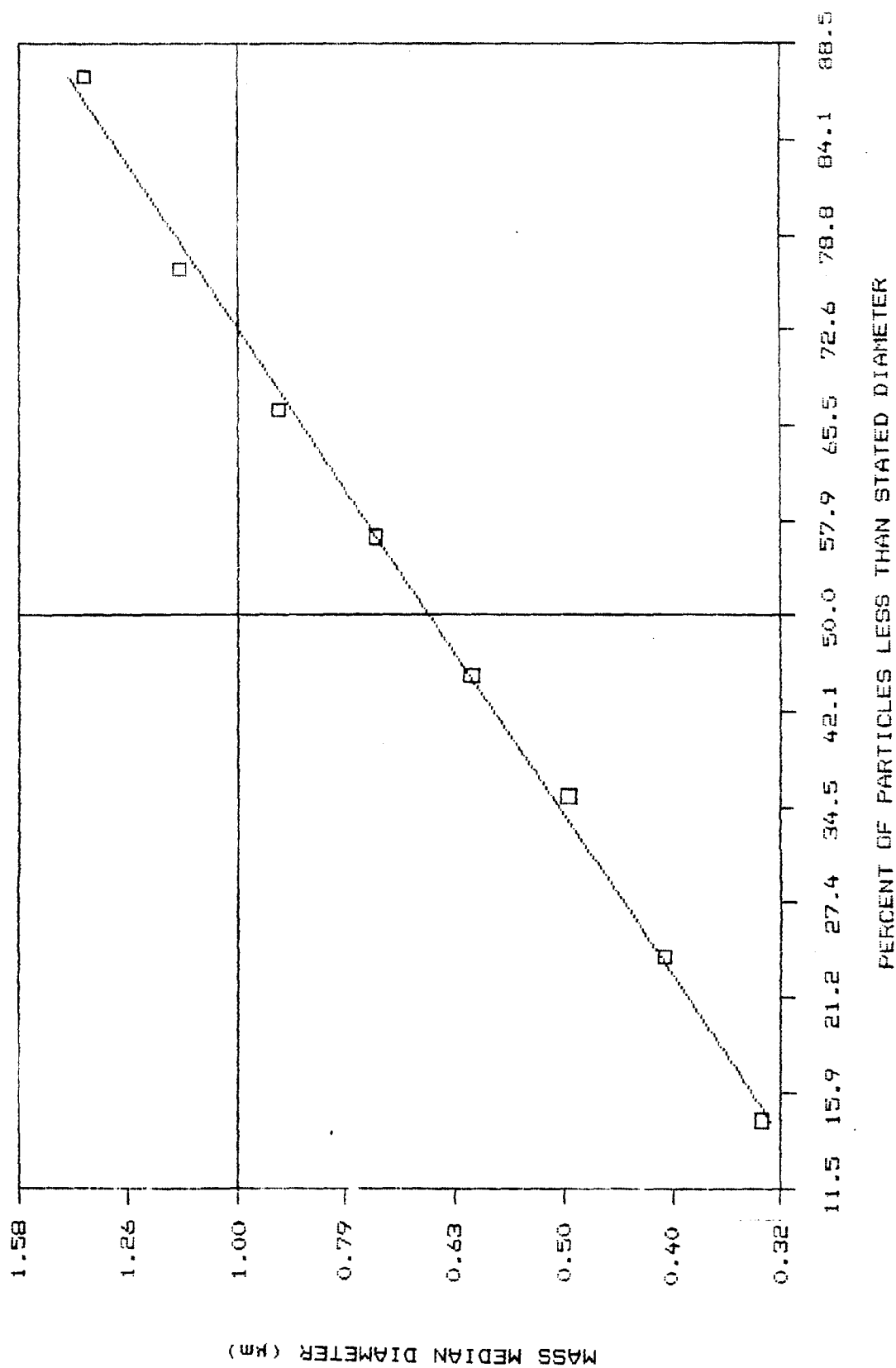
2.664353 = MASS MED.DIAM.

2.7 = DENSITY

4.377979 = AERO.DIAM.

LUNG 19

--- SILICA



25-May-88

LUNG 19

-- EXOGENOUS

DIAMETER	LOG.DIAM.	COUNT	CUM.COUNT	PERCENT	CUM.PERC.	PROB.	FRED.PROB.
0.0227	-1.64397	0	0	0.00%	0.00%		
0.0279	-1.55439	1	1	0.09%	0.09%		
0.0343	-1.46470	0	1	0.00%	0.09%		
0.0421	-1.37571	0	1	0.00%	0.09%		
0.0517	-1.28650	2	3	0.18%	0.27%		
0.0635	-1.19722	1	4	0.09%	0.37%		
0.078	-1.10790	1	5	0.09%	0.46%		
0.0958	-1.01863	3	8	0.27%	0.73%		
0.118	-0.92811	3	11	0.27%	1.01%		
0.144	-0.84163	6	17	0.55%	1.56%		
0.177	-0.75202	9	26	0.82%	2.38%		
0.218	-0.66154	14	40	1.28%	3.67%		
0.268	-0.57186	38	78	3.48%	7.15%		
0.329	-0.48280	57	135	5.22%	12.37%	-1.14950	-0.53594
0.404	-0.39361	87	222	7.97%	20.35%	-0.83491	-0.41568
0.496	-0.30451	119	341	10.91%	31.26%	-0.49745	-0.28668
0.609	-0.21538	108	449	9.90%	41.15%	-0.22877	-0.18397
0.747	-0.12667	109	558	9.99%	51.15%	0.029434	-0.08526
0.918	-0.03715	95	653	8.71%	59.85%	0.255288	0.001077
1.13	0.053078	71	724	6.51%	66.36%	0.430675	0.068124
1.38	0.139879	78	802	7.15%	73.51%	0.637113	0.147041
1.7	0.230448	71	873	6.51%	80.02%	0.847613	0.227511
2.09	0.320146	52	925	4.77%	84.78%	1.026220	0.295788
2.56	0.408239	41	966	3.76%	88.54%	1.193249	0.359640
3.15	0.498310	50	1016	4.58%	93.13%		
3.87	0.587710	26	1042	2.38%	95.51%		
4.75	0.676693	27	1069	2.47%	97.98%		
5.83	0.765668	10	1079	0.92%	98.90%		
7.16	0.854913	4	1083	0.37%	99.27%		
8.79	0.943988	6	1089	0.55%	99.82%		
10.8	1.033423	0	1089	0.00%	99.82%		
13.3	1.123851	2	1091	0.18%	100.00%		
16.3	1.212187	0	1091	0.00%	100.00%		
20	1.301029	0	1091	0.00%	100.00%		

Regression Output:

Constant -0.09651
Std Err of Y Est 0.035015
R Squared 0.987375
No. of Observations 11
Degrees of Freedom 9

X Coefficient(s) 0.382280
Std Err of Coef. 0.014408

0.800728 = GEOM.MED.

1.930924 = 84.1 %

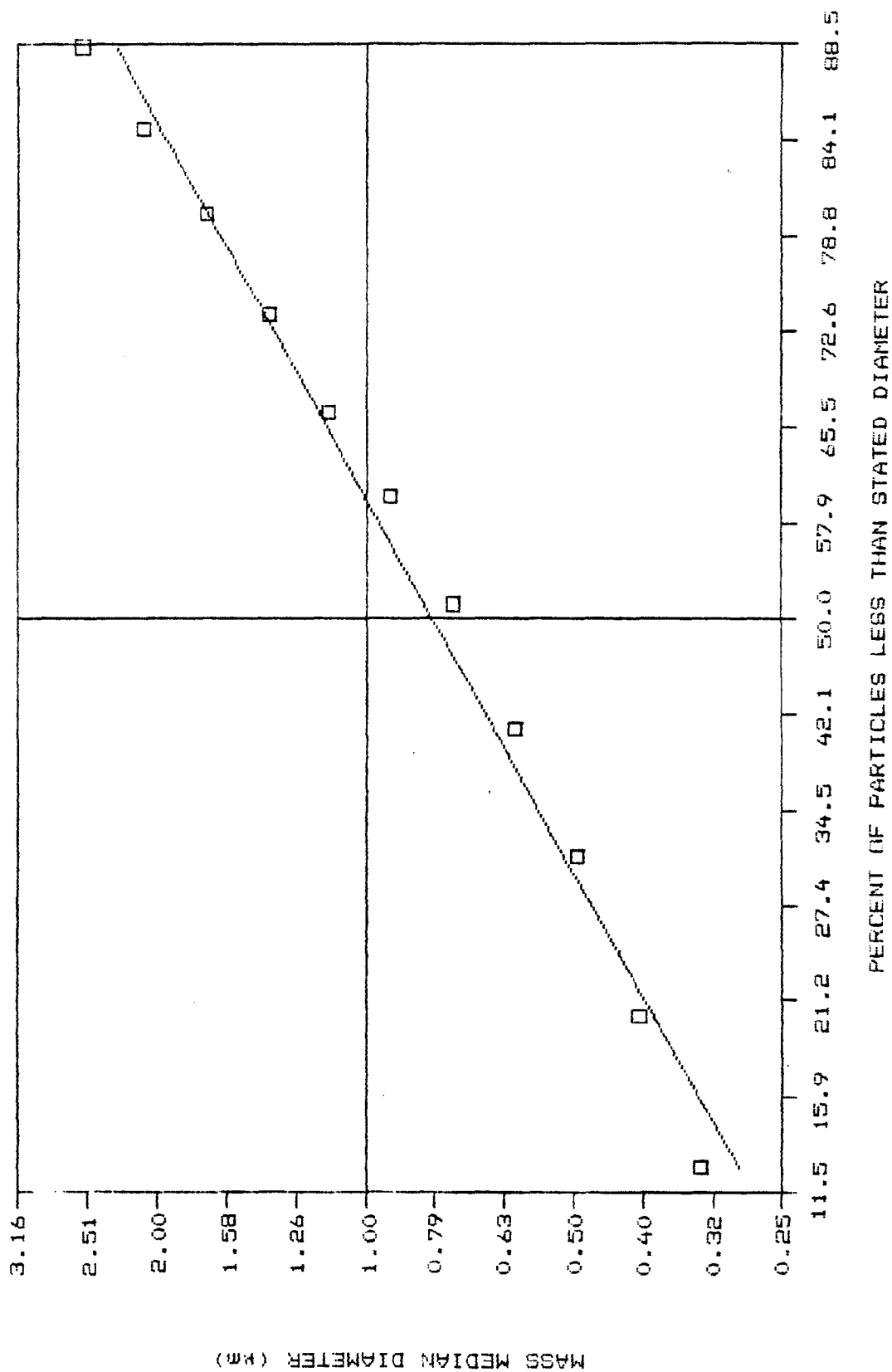
2.411460 = GEOM.STD.DEV.

8.184780 = MASS MED.DIAM.

3 = DENSITY

14.17645 = AERO.DIAM.

LUNG 19 -- EXOGENOUS



25-May-88

LUNG 20

-- EXOGENOUS

					PROB.	PRED.PROB
DIAMETER	LOG.DIAM.	COUNT	CUM.COUNT	PERCENT	CUM.PERC.	CUM.PERC.
0.0227	-1.64397	0	0	0.00%	0.00%	
0.0279	-1.55439	0	0	0.00%	0.00%	
0.0343	-1.46470	0	0	0.00%	0.00%	
0.0421	-1.37571	0	0	0.00%	0.00%	
0.0517	-1.28650	1	1	0.09%	0.09%	
0.0635	-1.19722	3	4	0.27%	0.36%	
0.078	-1.10790	2	6	0.18%	0.53%	
0.0958	-1.01863	2	8	0.18%	0.71%	
0.118	-0.92811	9	17	0.80%	1.51%	
0.144	-0.84163	11	28	0.98%	2.49%	
0.177	-0.75202	18	46	1.60%	4.10%	
0.218	-0.66154	27	73	2.40%	6.50%	
0.268	-0.57186	49	122	4.36%	10.86%	-1.22289 -0.57303
0.329	-0.48280	74	196	6.59%	17.45%	-0.93887 -0.47247
0.404	-0.39361	65	261	5.79%	23.24%	-0.73858 -0.40155
0.496	-0.30451	98	359	8.73%	31.97%	-0.47731 -0.30904
0.609	-0.21538	103	462	9.17%	41.14%	-0.22917 -0.22118
0.747	-0.12667	121	583	10.77%	51.91%	0.049194 -0.12261
0.918	-0.03715	114	697	10.15%	62.07%	0.313993 -0.02885
1.13	0.053078	100	797	8.90%	70.97%	0.561541 0.058792
1.38	0.139879	75	872	6.68%	77.65%	0.767559 0.131738
1.7	0.230448	85	957	7.57%	85.22%	1.044023 0.229628
2.09	0.320146	57	1014	5.08%	90.29%	
2.56	0.408239	45	1059	4.01%	94.30%	
3.15	0.498310	30	1089	2.67%	96.97%	
3.87	0.587710	17	1106	1.51%	98.49%	
4.75	0.676693	12	1118	1.07%	99.55%	
5.83	0.765668	3	1121	0.27%	99.82%	
7.16	0.854913	0	1121	0.00%	99.82%	
8.79	0.943988	1	1122	0.09%	99.91%	
10.8	1.033423	0	1122	0.00%	99.91%	
13.3	1.123851	1	1123	0.09%	100.00%	
16.3	1.212187	0	1123	0.00%	100.00%	
20	1.301029	0	1123	0.00%	100.00%	

Regression Output:

Constant -0.14003
Std Err of Y Est 0.007160
R Squared 0.999373
No. of Observations 10
Degrees of Freedom 8

X Coefficient(s) 0.354078
Std Err of Coef. 0.003133

0.724372 = GEOM.MED.

1.636971 = 84.1 %

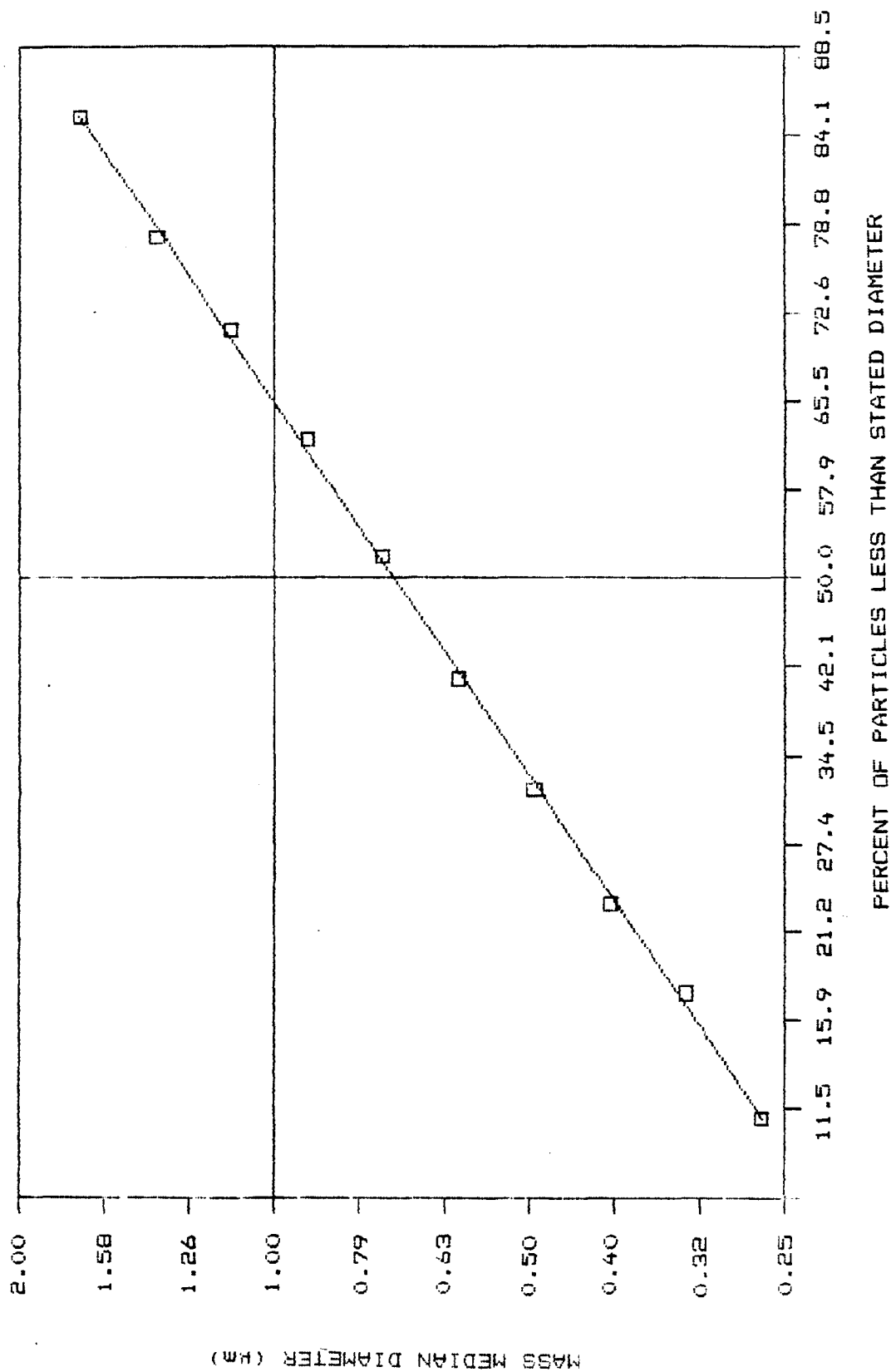
2.259846 = GEOM.STD.DEV.

5.321466 = MASS MED.DIAM.

3 = DENSITY

9.217050 = AERO.DIAM.

LUNG 20 -- EXOGENOUS



26-May-88

LUNG 21

-- SILICA

						PROB.	FRED.PROB
DIAMETER	LOG.DIAM.	COUNT	CUM.COUNT	PERCENT	CUM.PERC.	CUM.PERC.	CUM.FREC.
=====							
0.0227	-1.64397	0	0	0.00%	0.00%		
0.0279	-1.55439	0	0	0.00%	0.00%		
0.0343	-1.46470	0	0	0.00%	0.00%		
0.0421	-1.37571	0	0	0.00%	0.00%		
0.0517	-1.28650	0	0	0.00%	0.00%		
0.0635	-1.19722	0	0	0.00%	0.00%		
0.078	-1.10790	0	0	0.00%	0.00%		
0.0958	-1.01863	0	0	0.00%	0.00%		
0.118	-0.92811	1	1	0.37%	0.37%		
0.144	-0.84163	3	4	1.11%	1.48%		
0.177	-0.75202	1	5	0.37%	1.85%		
0.218	-0.66154	10	15	3.70%	5.56%		
0.268	-0.57186	15	30	5.56%	11.11%	-1.21040	-0.55614
0.329	-0.48280	16	46	5.93%	17.04%	-0.95459	-0.47275
0.404	-0.39361	20	66	7.41%	24.44%	-0.70027	-0.38983
0.496	-0.30451	20	86	7.41%	31.85%	-0.48058	-0.31821
0.609	-0.21538	24	110	8.89%	40.74%	-0.23965	-0.23966
0.747	-0.12667	29	139	10.74%	51.48%	0.038062	-0.14912
0.918	-0.03715	38	177	14.07%	65.56%	0.408465	-0.02836
1.13	0.053078	29	206	10.74%	76.30%	0.723755	0.074425
1.38	0.139879	16	222	5.93%	82.22%	0.926767	0.140611
1.7	0.230448	23	245	8.52%	90.74%		
2.09	0.320146	12	257	4.44%	95.19%		
2.56	0.408239	6	263	2.22%	97.41%		
3.15	0.498310	2	265	0.74%	98.15%		
3.87	0.587710	2	267	0.74%	98.89%		
4.75	0.676693	2	269	0.74%	99.63%		
5.83	0.765668	1	270	0.37%	100.00%		
7.16	0.854913	0	270	0.00%	100.00%		
8.79	0.943988	0	270	0.00%	100.00%		
10.8	1.033423	0	270	0.00%	100.00%		
13.3	1.123851	0	270	0.00%	100.00%		
16.3	1.212187	0	270	0.00%	100.00%		
20	1.301029	0	270	0.00%	100.00%		

Regression Output:

Constant -0.16153
Std Err of Y Est 0.017634
R Squared 0.995428
No. of Observations 9
Degrees of Freedom 7

X Coefficient(s) 0.326019
Std Err of Coef. 0.008350

0.689393 = GEOM.MED.

1.460450 = 84.1 %

2.118457 = GEOM.STD.DEV.

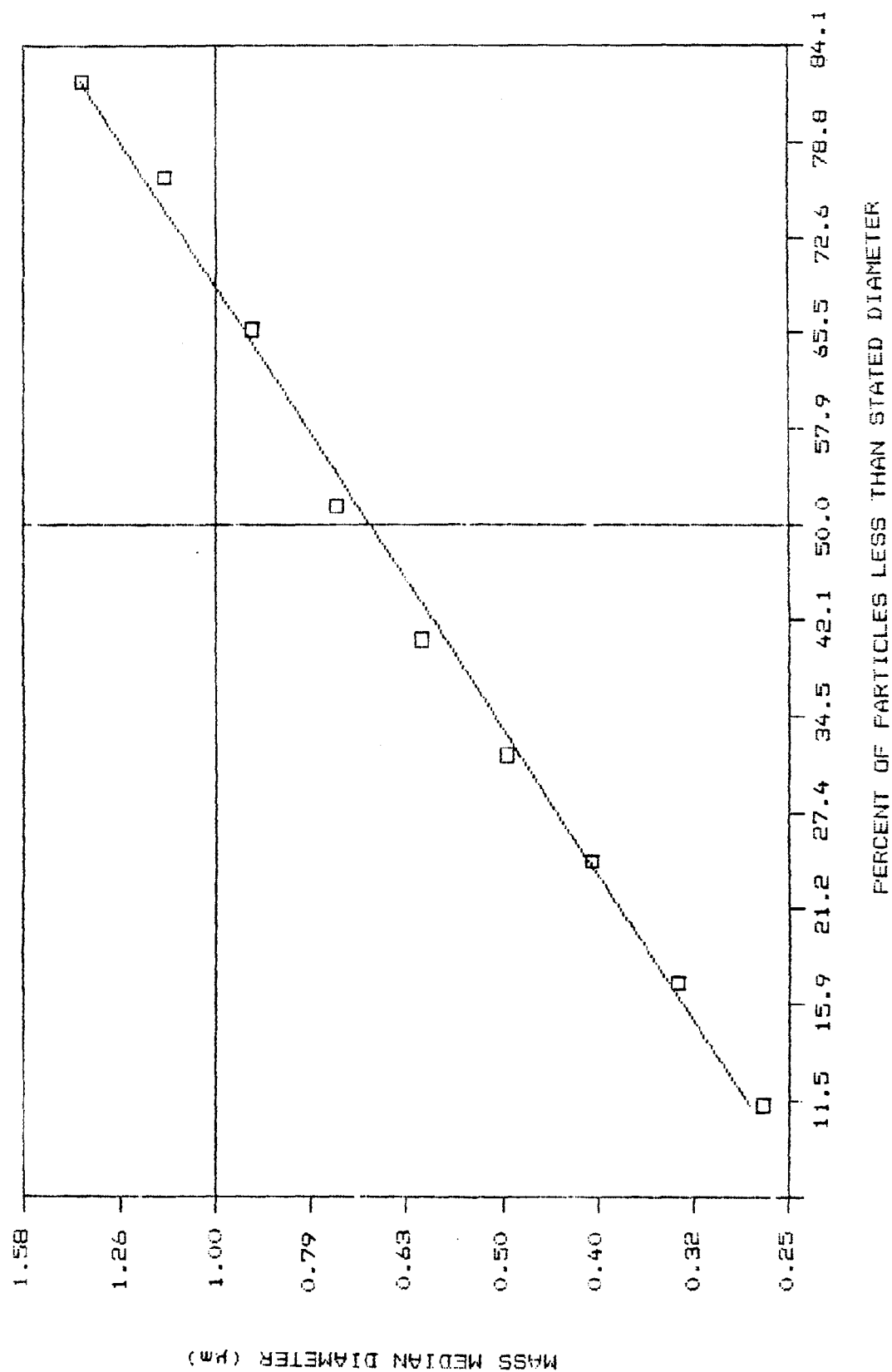
3.738614 = MASS MED.DIAM.

2.7 = DENSITY

5.143170 = AERO.DIAM.

LUNG 21

-- SILICA



25-May-88

LUNG 21

--- EXOGENOUS

DIAMETER	LOG.DIAM.	COUNT	CUM.COUNT	PERCENT	CUM.PERC.	PROB.	PRED.PROB.
DIAMETER	LOG.DIAM.	COUNT	CUM.COUNT	PERCENT	CUM.PERC.	CUM.PERC.	CUM.PREC.
0.0227	-1.64397	0	0	0.00%	0.00%		
0.0279	-1.55439	0	0	0.00%	0.00%		
0.0343	-1.46470	0	0	0.00%	0.00%		
0.0421	-1.37571	0	0	0.00%	0.00%		
0.0517	-1.28650	0	0	0.00%	0.00%		
0.0635	-1.19722	2	2	0.18%	0.18%		
0.078	-1.10790	2	4	0.18%	0.36%		
0.0958	-1.01863	3	7	0.27%	0.63%		
0.118	-0.92811	6	13	0.54%	1.17%		
0.144	-0.84163	11	24	0.99%	2.16%		
0.177	-0.75202	11	35	0.99%	3.15%		
0.213	-0.66154	29	64	2.61%	5.77%		
0.268	-0.57126	63	127	5.68%	11.44%	-1.19403	-0.58256
0.329	-0.48280	78	205	7.03%	18.47%	-0.90140	-0.48224
0.404	-0.39361	91	296	8.20%	26.67%	-0.63174	-0.38980
0.496	-0.30451	95	391	8.56%	35.23%	-0.38709	-0.30593
0.609	-0.21538	118	509	10.63%	45.86%	-0.10661	-0.20978
0.747	-0.12667	113	622	10.18%	56.04%	0.155543	-0.11991
0.918	-0.03715	107	729	9.64%	65.68%	0.411766	-0.03207
1.13	0.053078	106	835	9.55%	75.23%	0.689917	0.063276
1.38	0.139879	64	899	5.77%	80.99%	0.881922	0.129098
1.7	0.230448	74	973	6.67%	87.66%	1.150977	0.221334
2.09	0.320146	55	1028	4.95%	92.61%		
2.56	0.408239	30	1058	2.70%	95.32%		
3.15	0.498310	17	1075	1.53%	96.85%		
3.87	0.587710	15	1090	1.35%	98.20%		
4.75	0.676693	12	1102	1.08%	99.28%		
5.83	0.765668	7	1109	0.63%	99.91%		
7.16	0.854913	1	1110	0.09%	100.00%		
8.79	0.943988	0	1110	0.00%	100.00%		
10.8	1.033423	0	1110	0.00%	100.00%		
13.3	1.123851	0	1110	0.00%	100.00%		
16.3	1.212187	0	1110	0.00%	100.00%		
20	1.301029	0	1110	0.00%	100.00%		

Regression Output:

Constant -0.17323
Std Err of Y Est 0.008197
R Squared 0.999179
No. of Observations 10
Degrees of Freedom 8

X Coefficient(s) 0.342812
Std Err of Coef. 0.003473

0.671064 = GEOM.MED.

1.477668 = 84.1 %

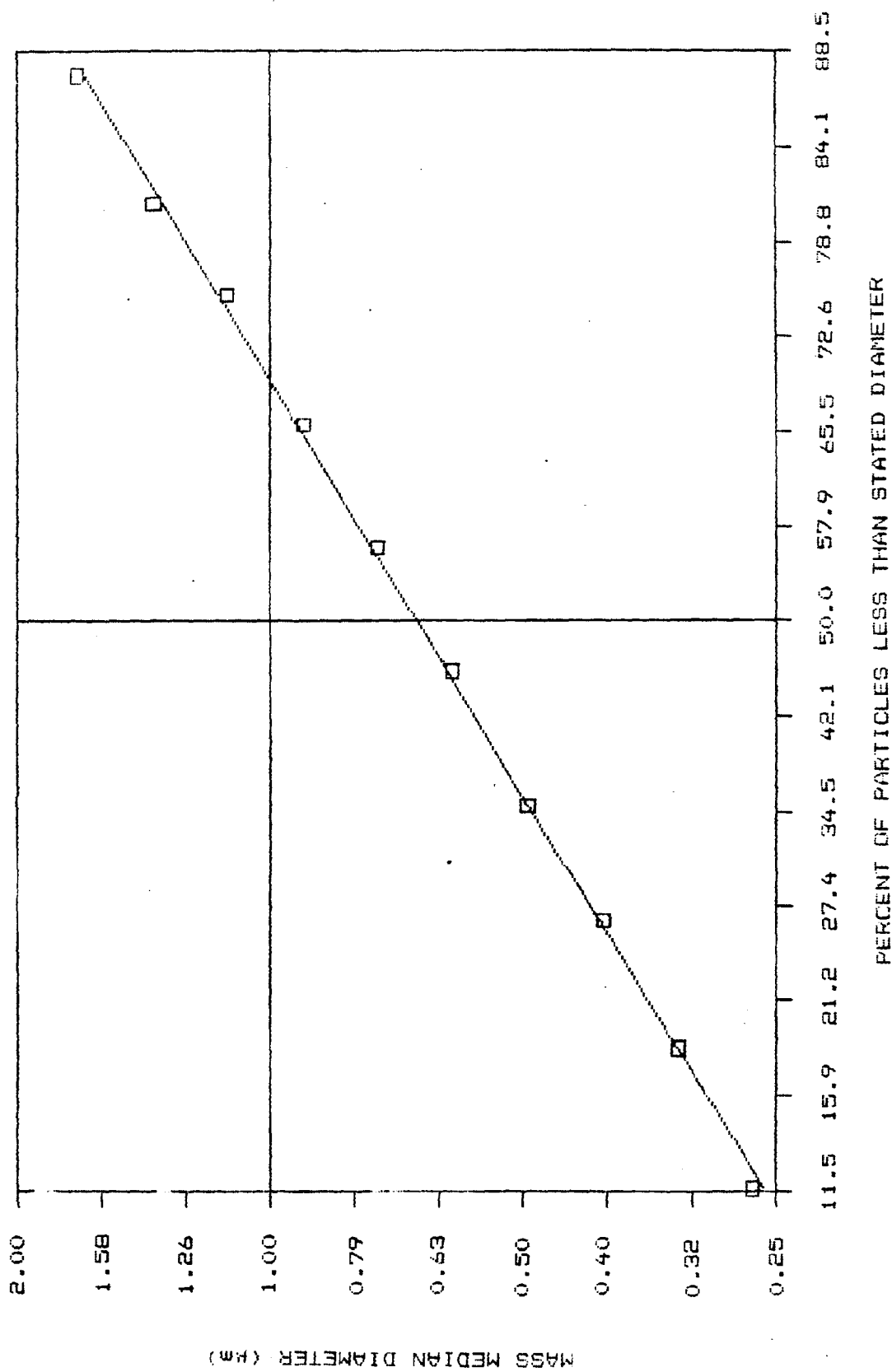
2.201976 = GEOM.STD.DEV.

4.351075 = MASS MED.DIAM.

3 = DENSITY

7.536283 = AERO.DIAM.

LUNG 21 -- EXOGENOUS



26-May-88

LUNG 22

-- SILICA

DIAMETER	LOG.DIAM.	COUNT	CUM.COUNT	PERCENT	CUM.PERC.	PROB.	PRED.PROB
0.0227	-1.64397	0	0	0.00%	0.00%		
0.0279	-1.55439	0	0	0.00%	0.00%		
0.0343	-1.46470	0	0	0.00%	0.00%		
0.0421	-1.37571	0	0	0.00%	0.00%		
0.0517	-1.28650	0	0	0.00%	0.00%		
0.0635	-1.19722	1	1	0.22%	0.22%		
0.078	-1.10790	1	2	0.22%	0.44%		
0.0958	-1.01863	1	3	0.22%	0.66%		
0.113	-0.92811	4	7	0.88%	1.54%		
0.144	-0.84163	6	13	1.32%	2.85%		
0.177	-0.75202	9	22	1.97%	4.82%		
0.218	-0.66154	18	40	3.95%	8.77%		
0.268	-0.57186	19	59	4.17%	12.94%	-1.12364	-0.58104
0.329	-0.48280	39	98	8.55%	21.49%	-0.79607	-0.48743
0.404	-0.39361	51	149	11.18%	32.68%	-0.45746	-0.39068
0.496	-0.30451	54	203	11.84%	44.52%	-0.14119	-0.30030
0.609	-0.21538	65	268	14.25%	58.77%	0.226859	-0.19512
0.747	-0.12667	46	314	10.09%	68.86%	0.500733	-0.11686
0.918	-0.03715	37	351	8.11%	76.97%	0.745531	-0.04691
1.13	0.053078	38	389	8.33%	85.31%	1.047712	0.039433
1.38	0.139879	23	412	5.04%	90.35%		
1.7	0.230448	16	428	3.51%	93.86%		
2.09	0.320146	11	439	2.41%	96.27%		
2.56	0.408239	7	446	1.54%	97.81%		
3.15	0.498310	7	453	1.54%	99.34%		
3.87	0.587710	2	455	0.44%	99.78%		
4.75	0.676693	1	456	0.22%	100.00%		
5.83	0.765668	0	456	0.00%	100.00%		
7.16	0.854913	0	456	0.00%	100.00%		
8.79	0.943988	0	456	0.00%	100.00%		
10.8	1.033423	0	456	0.00%	100.00%		
13.3	1.123851	0	456	0.00%	100.00%		

Regression Output:

Constant -0.25995
 Std Err of Y Est 0.012382
 R Squared 0.997247
 No. of Observations 8
 Degrees of Freedom 6

X Coefficient(s) 0.285755
 Std Err of Coef. 0.006129

0.549596 = GEOM.MED.

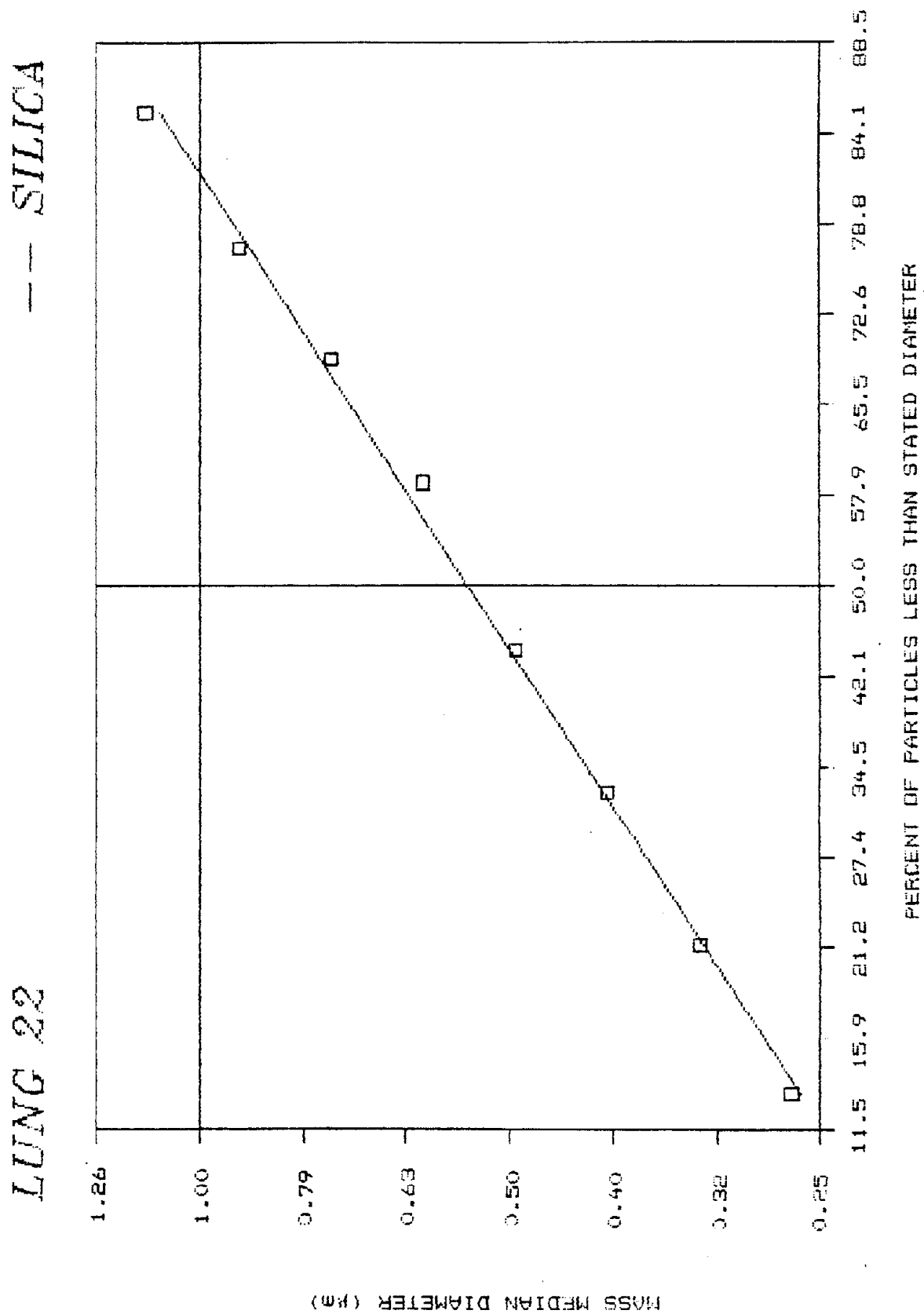
1.061206 = 84.1 %

1.930881 = GEOM.STD.DEV.

2.014306 = MASS MED.DIAM.

2.7 = DENSITY

3.309843 = AERO.DIAM.



25-May-88

LUNG 22

-- EXUGEN.

DIAMETER	LOG.DIAM.	COUNT	CUM.COUNT	PERCENT	CUM.PERC.	PROB.	FEEL.PROB
0.0227	-1.64397	0	0	0.00%	0.00%		
0.0279	-1.55439	1	1	0.09%	0.09%		
0.0343	-1.46470	0	1	0.00%	0.09%		
0.0421	-1.37571	0	1	0.00%	0.09%		
0.0517	-1.28650	2	3	0.18%	0.27%		
0.0635	-1.19722	2	5	0.18%	0.46%		
0.078	-1.10790	4	9	0.37%	0.82%		
0.0958	-1.01863	5	14	0.46%	1.28%		
0.118	-0.92811	12	26	1.10%	2.38%		
0.144	-0.84163	12	38	1.10%	3.48%		
0.177	-0.75202	27	65	2.47%	5.95%		
0.218	-0.66154	42	107	3.84%	9.79%		
0.268	-0.57186	54	161	4.94%	14.73%	-1.04618	-0.59505
0.329	-0.48280	106	267	9.70%	24.43%	-0.76079	-0.45287
0.404	-0.39361	110	377	10.06%	34.49%	-0.40715	-0.33712
0.496	-0.30451	116	493	10.61%	45.11%	-0.12599	-0.29584
0.609	-0.21538	128	621	11.71%	56.82%	0.175801	-0.19744
0.747	-0.12667	109	730	9.97%	66.79%	0.442533	-0.11065
0.918	-0.03715	90	820	8.23%	75.02%	0.683602	-0.03221
1.13	0.053078	78	898	7.14%	82.16%	0.924429	0.048147
1.38	0.139879	57	955	5.22%	87.37%	1.137875	0.115599
1.7	0.230448	48	1003	4.39%	91.77%		
2.09	0.320146	31	1034	2.84%	94.60%		
2.56	0.408239	23	1057	2.10%	96.71%		
3.15	0.498310	22	1079	2.01%	98.72%		
3.87	0.587710	9	1088	0.82%	99.54%		
4.75	0.676693	4	1092	0.37%	99.91%		
5.83	0.765668	1	1093	0.09%	100.00%		
7.16	0.854913	0	1093	0.00%	100.00%		
8.79	0.943988	0	1093	0.00%	100.00%		
10.8	1.033423	0	1093	0.00%	100.00%		
13.3	1.123851	0	1093	0.00%	100.00%		
16.3	1.212187	0	1093	0.00%	100.00%		
20	1.301029	0	1093	0.00%	100.00%		

Regression Output:

Constant -0.25464
 Std Err of Y Est 0.016471
 R Squared 0.996011
 No. of Observations 9
 Degrees of Freedom 7

X Coefficient(s) 0.325384
 Std Err of Coef. 0.007782

0.556355 = GEOM.MED.

1.176893 = 84.1 %

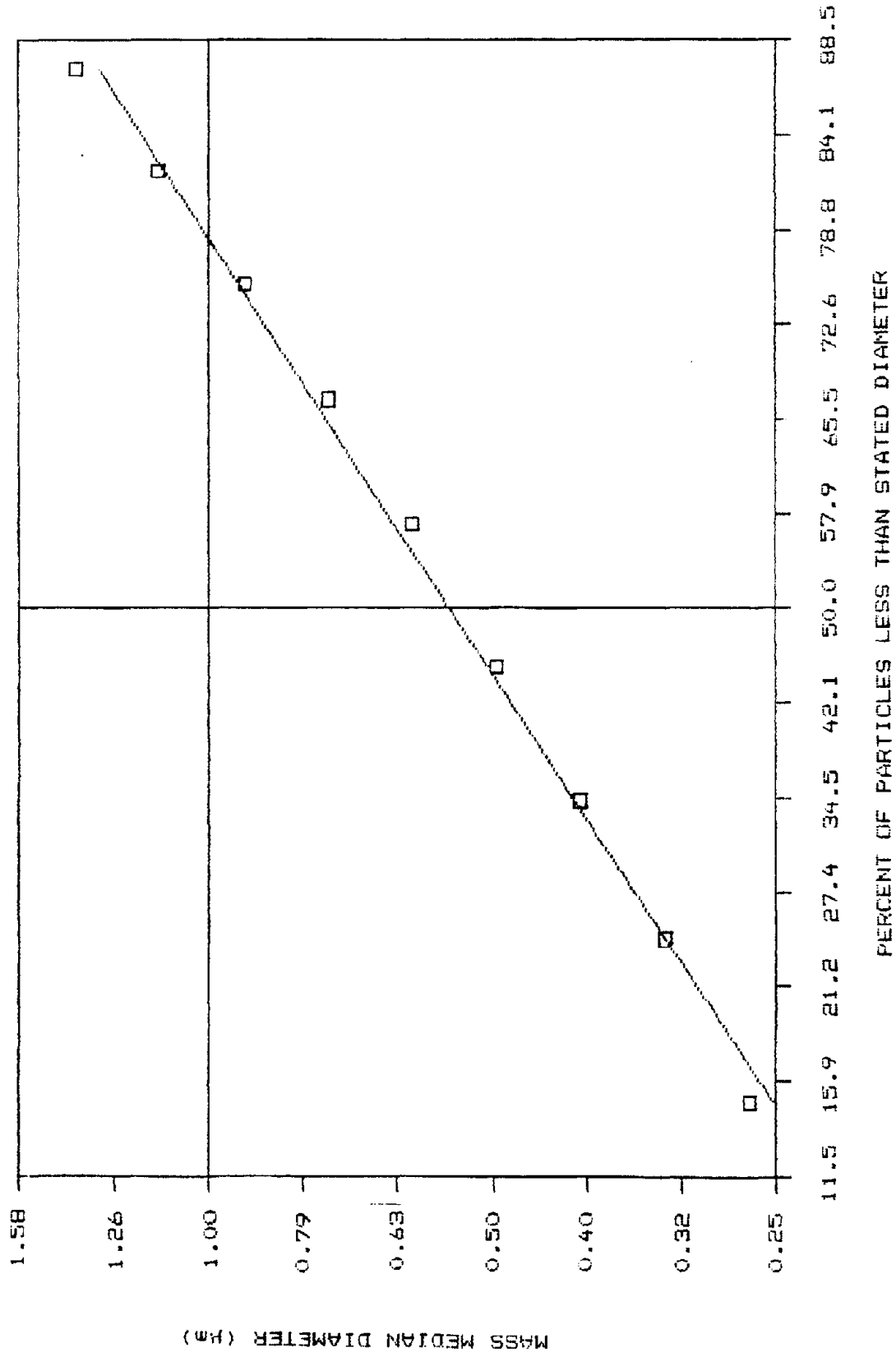
2.115361 = GEOM.STD.DEV.

2.997354 = MASS MED.DIAM.

3 = DENSITY

5.191570 = AERO.DIAM.

LUNG 22 - EXOGEN



26-May-88

LUNG 22

-- SILICA

DIAMETER	LOG.DIAM.	COUNT	CUM.COUNT	PERCENT	CUM.PERC.	PROB.	FRED.PROB
0.0227	-1.64397	0	0	0.00%	0.00%		
0.0279	-1.55439	0	0	0.00%	0.00%		
0.0343	-1.46470	0	0	0.00%	0.00%		
0.0421	-1.37571	0	0	0.00%	0.00%		
0.0517	-1.28650	1	1	0.23%	0.23%		
0.0635	-1.19722	1	2	0.23%	0.47%		
0.078	-1.10790	1	3	0.23%	0.70%		
0.0958	-1.01863	3	6	0.70%	1.40%		
0.118	-0.92811	4	10	0.93%	2.34%		
0.144	-0.84163	3	13	0.70%	3.04%		
0.177	-0.75202	14	27	3.27%	6.31%		
0.218	-0.66154	17	44	3.97%	10.28%	-1.25318	-0.67545
0.268	-0.57186	23	67	5.37%	15.65%	-1.00851	-0.58586
0.329	-0.48280	32	99	7.48%	23.13%	-0.74215	-0.48833
0.404	-0.39361	35	134	8.18%	31.31%	-0.49596	-0.39818
0.496	-0.30451	54	188	12.62%	43.93%	-0.15654	-0.27390
0.609	-0.21538	34	222	7.94%	51.87%	0.048027	-0.19899
0.747	-0.12667	42	264	9.81%	61.68%	0.303756	-0.10535
0.918	-0.03715	39	303	9.11%	70.79%	0.556401	-0.01284
1.13	0.053078	23	326	5.37%	76.17%	0.719671	0.046943
1.38	0.139879	23	349	5.37%	81.54%	0.901786	0.113628
1.7	0.230448	27	376	6.31%	87.85%	1.160006	0.208180
2.09	0.320146	25	401	5.84%	93.69%		
2.56	0.408239	8	409	1.87%	95.56%		
3.15	0.498310	7	416	1.64%	97.20%		
3.87	0.587710	6	422	1.40%	98.60%		
4.75	0.676693	5	427	1.17%	99.77%		
5.83	0.765668	1	428	0.23%	100.00%		
7.16	0.854913	0	428	0.00%	100.00%		
8.79	0.943988	0	428	0.00%	100.00%		
10.8	1.033423	0	428	0.00%	100.00%		
13.3	1.123851	0	428	0.00%	100.00%		

Regression Output:

Constant -0.21657
Std Err of Y Est 0.020858
R Squared 0.995519
No. of Observations 11
Degrees of Freedom 9

X Coefficient(s) 0.366168
Std Err of Coef. 0.008187

0.607326 = GEOM.MED.

1.411209 = 84.1 %

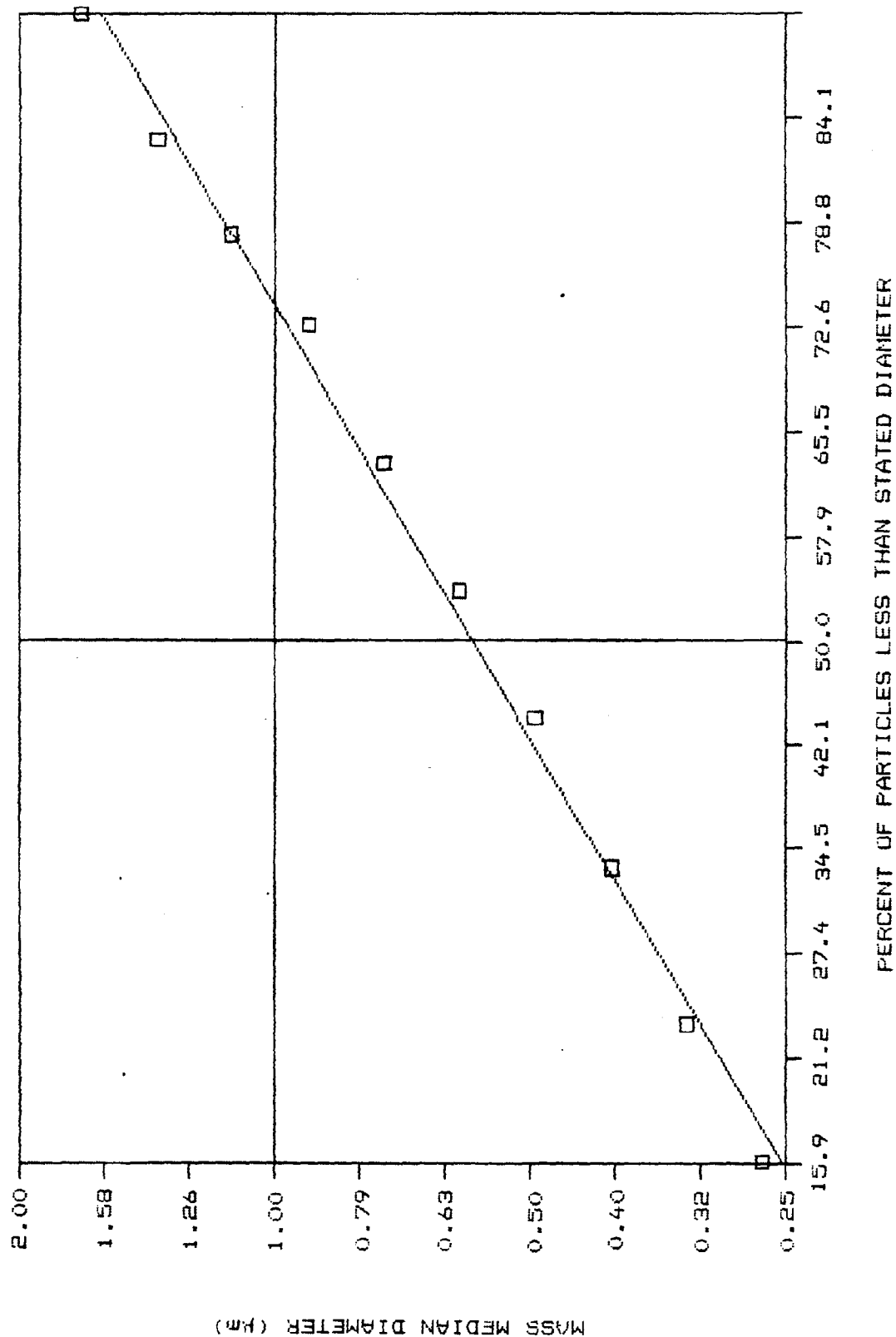
2.323640 = GEOM.STD.DEV.

5.124425 = MASS MED.DIAM.

2.7 = DENSITY

8.420290 = AERO.DIAM.

LUNG 22 - EXOGEN



27 May-88

LUNG 22

-- EXOGEN

DIAMETER	LOG.DIAM.	COUNT	CUM.COUNT	PERCENT	CUM.PERC.	PROB.	PRED.PROB
0.0227	-1.64397	0	0	0.00%	0.00%		
0.0279	-1.55439	0	0	0.00%	0.00%		
0.0343	-1.46470	0	0	0.00%	0.00%		
0.0421	-1.37571	0	0	0.00%	0.00%		
0.0517	-1.28650	3	3	0.29%	0.29%		
0.0635	-1.19722	2	5	0.20%	0.49%		
0.078	-1.10790	1	6	0.10%	0.59%		
0.0958	-1.01863	8	14	0.78%	1.37%		
0.118	-0.92811	11	25	1.07%	2.44%		
0.144	-0.84163	13	38	1.27%	3.71%		
0.177	-0.75202	24	62	2.34%	6.05%		
0.218	-0.66154	39	101	3.81%	9.86%		
0.268	-0.57186	62	163	6.05%	15.92%	-0.99801	-0.59406
0.329	-0.48280	76	239	7.42%	23.34%	-0.73541	-0.49855
0.404	-0.39361	103	342	10.06%	33.40%	-0.43733	-0.39015
0.496	-0.30451	112	454	10.94%	44.34%	-0.14590	-0.28416
0.609	-0.21538	96	550	9.38%	53.71%	0.095437	-0.19639
0.747	-0.12667	95	645	9.28%	62.99%	0.338717	-0.10792
0.918	-0.03715	96	741	9.38%	72.36%	0.602619	-0.01194
1.13	0.053078	57	798	5.57%	77.93%	0.776804	0.051398
1.38	0.139879	53	851	5.18%	83.11%	0.960033	0.118034
1.7	0.230448	57	908	5.57%	88.67%	1.199610	0.205162
2.09	0.320146	50	958	4.88%	93.55%		
2.56	0.408239	21	979	2.05%	95.61%		
3.15	0.498310	17	996	1.66%	97.27%		
3.87	0.587710	17	1013	1.66%	98.93%		
4.75	0.676693	7	1020	0.68%	99.61%		
5.83	0.765668	3	1023	0.29%	99.90%		
7.16	0.854913	1	1024	0.10%	100.00%		
8.79	0.943988	0	1024	0.00%	100.00%		
10.8	1.033423	0	1024	0.00%	100.00%		
13.3	1.123851	0	1024	0.00%	100.00%		
16.3	1.212187	0	1024	0.00%	100.00%		
20	1.301029	0	1024	0.00%	100.00%		

Regression Output:

Constant -0.23110
 Std Err of Y Est 0.021313
 R Squared 0.994453
 No. of Observations 10
 Degrees of Freedom 8

X Coefficient(s) 0.363675
 Std Err of Coef. 0.009602

0.587345 = GEOM.MED.

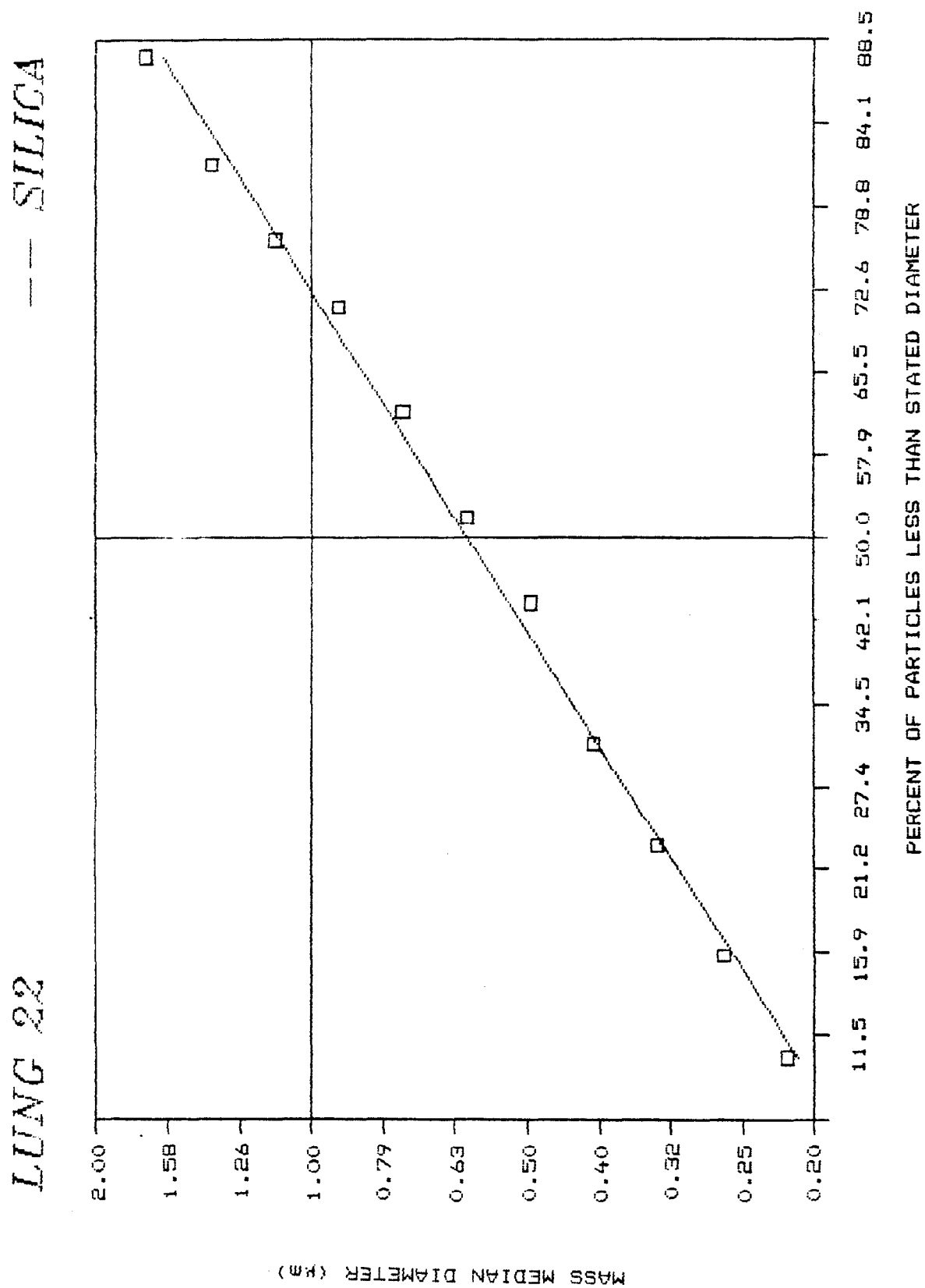
1.356966 = 84.1 %

2.310338 = GEOM.STD.DEV.

4.814430 = MASS MED.DIAM.

3 = DENSITY

8.338837 = AERO.DIAM.



DIAMETER	LOG.DIAM.	COUNT	CUM.COUNT	PERCENT	CUM.PERC.	PROB.	PRED.PROB.
=====	=====	=====	=====	=====	=====	=====	=====
0.0227	-1.64397	0	0	0.00%	0.00%		
0.0279	-1.55439	0	0	0.00%	0.00%		
0.0343	-1.46470	0	0	0.00%	0.00%		
0.0421	-1.37571	0	0	0.00%	0.00%		
0.0517	-1.28650	0	0	0.00%	0.00%		
0.0635	-1.19722	0	0	0.00%	0.00%		
0.078	-1.10790	3	3	0.56%	0.56%		
0.0958	-1.01863	1	4	0.19%	0.75%		
0.118	-0.92811	3	7	0.56%	1.32%		
0.144	-0.84163	6	13	1.13%	2.45%		
0.177	-0.75202	9	22	1.69%	4.14%		
0.218	-0.66154	15	37	2.82%	6.97%		
0.268	-0.57186	19	56	3.58%	10.55%	-1.23923	-0.59416
0.329	-0.48280	48	104	9.04%	19.59%	-0.86146	-0.47820
0.404	-0.39361	45	149	8.47%	28.06%	-0.59003	-0.39488
0.496	-0.30451	61	210	11.49%	39.55%	-0.27109	-0.29698
0.609	-0.21538	69	279	12.99%	52.54%	0.065343	-0.19370
0.747	-0.12667	58	337	10.92%	63.47%	0.351564	-0.10584
0.918	-0.03715	43	380	8.10%	71.56%	0.578916	-0.03606
1.13	0.053078	42	422	7.91%	79.47%	0.828757	0.040632
1.38	0.139879	36	458	6.78%	86.25%	1.087854	0.120165
1.7	0.230448	30	488	5.65%	91.90%		
2.09	0.320146	16	504	3.01%	94.92%		
2.56	0.408239	5	509	0.94%	95.86%		
3.15	0.498310	8	517	1.51%	97.36%		
3.87	0.587710	5	522	0.94%	98.31%		
4.75	0.676693	1	523	0.19%	98.49%		
5.83	0.765668	4	527	0.75%	99.25%		
7.16	0.854913	1	528	0.19%	99.44%		
8.79	0.943988	3	531	0.56%	100.00%		
10.9	1.033423	0	531	0.00%	100.00%		
13.3	1.123851	0	531	0.00%	100.00%		
16.3	1.212187	0	531	0.00%	100.00%		
20	1.301029	0	531	0.00%	100.00%		

Regression Output:

Constant -0.21376
Std Err of Y Est 0.017009
R Squared 0.995747
No. of Observations 9
Degrees of Freedom 7

X Coefficient(s) 0.306964
Std Err of Coef. 0.007582

0.611269 = GEOM.MED.

1.239360 = 84.1 %

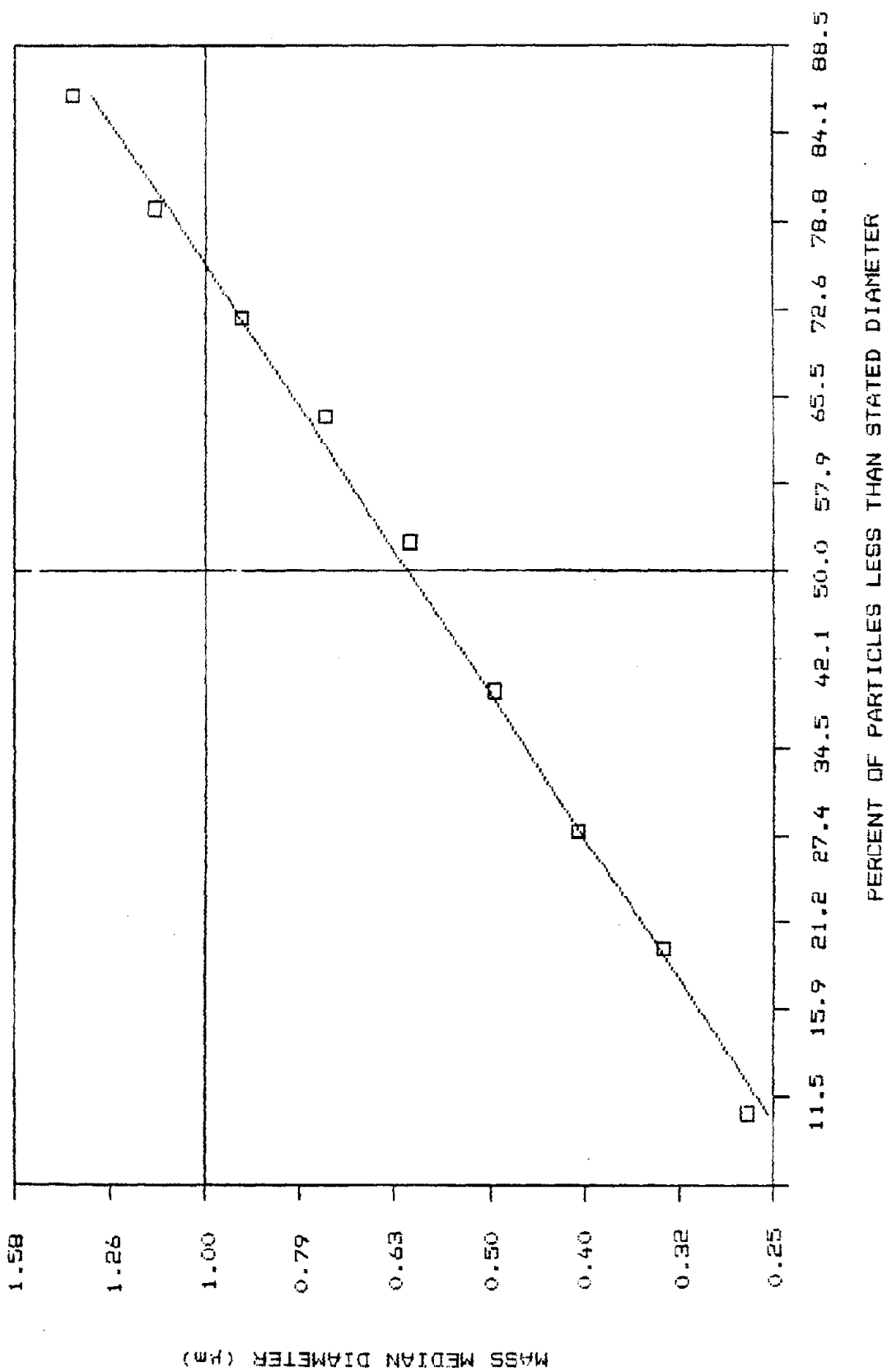
2.027518 = GEOM.STD.DEV.

2.736247 = MASS MED.DIAM.

2.7 = DENSITY

4.496113 = AERO.DIAM.

LUNG 22 - SILICA



DIAMETER	LOG.DIAM.	COUNT	CUM.COUNT	PERCENT	CUM.PERC.	CUM.PERC.	CUM.PERC.	PRED.PROB.
0.0227	-1.64397	0	0	0.00%	0.00%			
0.0279	-1.55439	1	1	0.10%	0.10%			
0.0343	-1.46470	0	1	0.00%	0.10%			
0.0421	-1.37571	0	1	0.00%	0.10%			
0.0517	-1.28650	1	2	0.10%	0.19%			
0.0635	-1.19722	2	4	0.19%	0.39%			
0.078	-1.10790	3	7	0.29%	0.68%			
0.0958	-1.01863	4	11	0.39%	1.06%			
0.118	-0.92811	9	20	0.87%	1.93%			
0.144	-0.84163	17	37	1.64%	3.57%			
0.177	-0.75202	17	54	1.64%	5.22%			
0.218	-0.66154	35	89	3.38%	8.60%			
0.268	-0.57186	55	144	5.31%	13.91%	-1.08070	-0.59644	
0.329	-0.48280	94	238	9.08%	23.00%	-0.74654	-0.48425	
0.404	-0.39361	101	339	9.76%	32.75%	-0.45528	-0.38646	
0.496	-0.30451	117	456	11.30%	44.06%	-0.15310	-0.28501	
0.609	-0.21538	104	560	10.05%	54.11%	0.105633	-0.19814	
0.747	-0.12667	97	657	9.37%	63.48%	0.351918	-0.11545	
0.918	-0.03715	83	740	8.02%	71.50%	0.576988	-0.03989	
1.13	0.053078	81	821	7.83%	79.32%	0.823654	0.042922	
1.38	0.139879	66	887	6.38%	85.70%	1.064215	0.123687	
1.7	0.230448	59	946	5.70%	91.40%			
2.09	0.320146	38	984	3.67%	95.07%			
2.56	0.408239	14	998	1.35%	96.43%			
3.15	0.498310	14	1012	1.35%	97.78%			
3.87	0.587710	8	1020	0.77%	98.55%			
4.75	0.676693	4	1024	0.39%	98.94%			
5.83	0.765668	5	1029	0.48%	99.42%			
7.16	0.854913	2	1031	0.19%	99.61%			
8.79	0.943988	3	1034	0.29%	99.90%			
10.8	1.033423	0	1034	0.00%	99.90%			
13.3	1.123851	0	1034	0.00%	99.90%			
16.3	1.212187	0	1034	0.00%	99.90%			
20	1.301029	1	1035	0.10%	100.00%			

Regression Output:

Constant -0.23361
 Std Err of Y Est 0.016185
 R Squared 0.996149
 No. of Observations 9
 Degrees of Freedom 7

X Coefficient(s) 0.335739
 Std Err of Coef. 0.007889

0.583968 = GEOM.MED.

1.265110 = 84.1 %

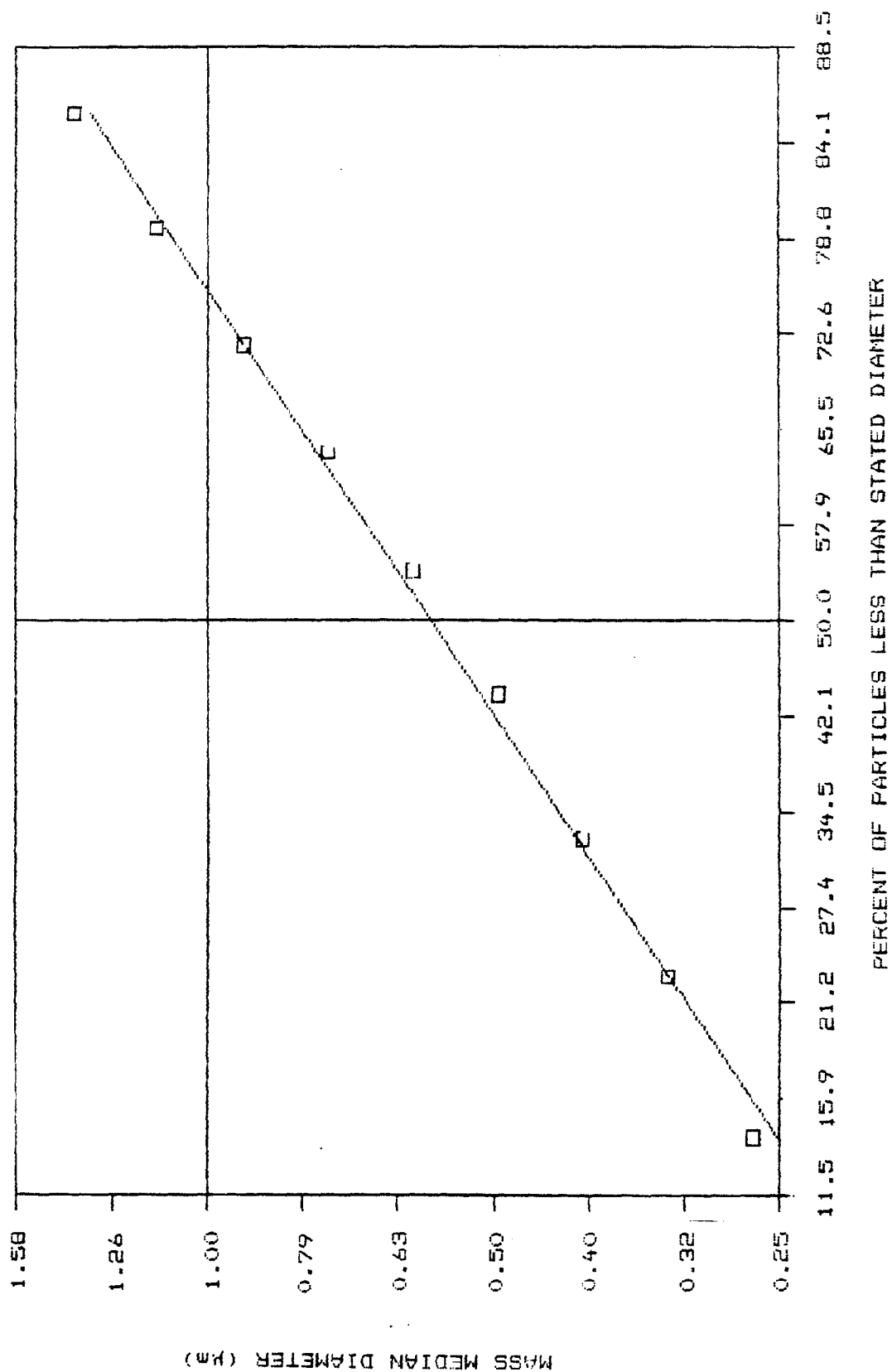
2.166401 = GEOM.STD.DEV.

3.508034 = MASS MED.DIAM.

3 = DENSITY

6.076093 = AERO.DIAM.

LUNG 22 -- EXOGEN



26-May-88

LUNG 22

-- SILICA

				PROB.	PRED.PROB	
DIAMETER	LOG.DIAM.	COUNT	CUM.COUNT	PERCENT	CUM.PERC.	CUM.PERC.CUM.PREC.
0.0227	-1.64397	0	0	0.00%	0.00%	
0.0279	-1.55439	0	0	0.00%	0.00%	
0.0343	-1.46470	0	0	0.00%	0.00%	
0.0421	-1.37571	0	0	0.00%	0.00%	
0.0517	-1.28650	1	1	0.23%	0.23%	
0.0635	-1.19722	0	1	0.00%	0.23%	
0.078	-1.10790	1	2	0.23%	0.45%	
0.0958	-1.01863	2	4	0.45%	0.90%	
0.118	-0.92811	7	11	1.58%	2.49%	
0.144	-0.84163	6	17	1.36%	3.85%	
0.177	-0.75202	16	33	3.62%	7.47%	
0.218	-0.66154	31	64	7.01%	14.48%	-1.05662 -0.64990
0.268	-0.57186	30	94	6.79%	21.27%	-0.80361 -0.56747
0.329	-0.48280	37	131	8.37%	29.64%	-0.54383 -0.48284
0.404	-0.39361	35	166	7.92%	37.56%	-0.32409 -0.41125
0.496	-0.30451	50	216	11.31%	48.87%	-0.02906 -0.31513
0.609	-0.21538	55	271	12.44%	61.31%	0.293907 -0.20990
0.747	-0.12667	43	314	9.73%	71.04%	0.563590 -0.12204
0.918	-0.03715	33	347	7.47%	78.51%	0.796010 -0.04632
1.13	0.053078	39	386	8.82%	87.33%	1.135865 0.064397
1.38	0.139879	18	404	4.07%	91.40%	
1.7	0.230448	11	415	2.49%	93.89%	
2.09	0.320146	10	425	2.26%	96.15%	
2.56	0.408239	4	429	0.90%	97.06%	
3.15	0.498310	5	434	1.13%	98.19%	
3.87	0.587710	5	439	1.13%	99.32%	
4.75	0.676693	2	441	0.45%	99.77%	
5.83	0.765668	0	441	0.00%	99.77%	
7.16	0.854913	1	442	0.23%	100.00%	
8.79	0.943988	0	442	0.00%	100.00%	
10.8	1.033423	0	442	0.00%	100.00%	
13.3	1.123851	0	442	0.00%	100.00%	

Regression Output:

Constant -0.30566
Std Err of Y Est 0.010966
R Squared 0.998237
No. of Observations 9
Degrees of Freedom 7

X Coefficient(s) 0.325795
Std Err of Coef. 0.005174

0.494695 = GEOM.MED.

1.047450 = 84.1 %

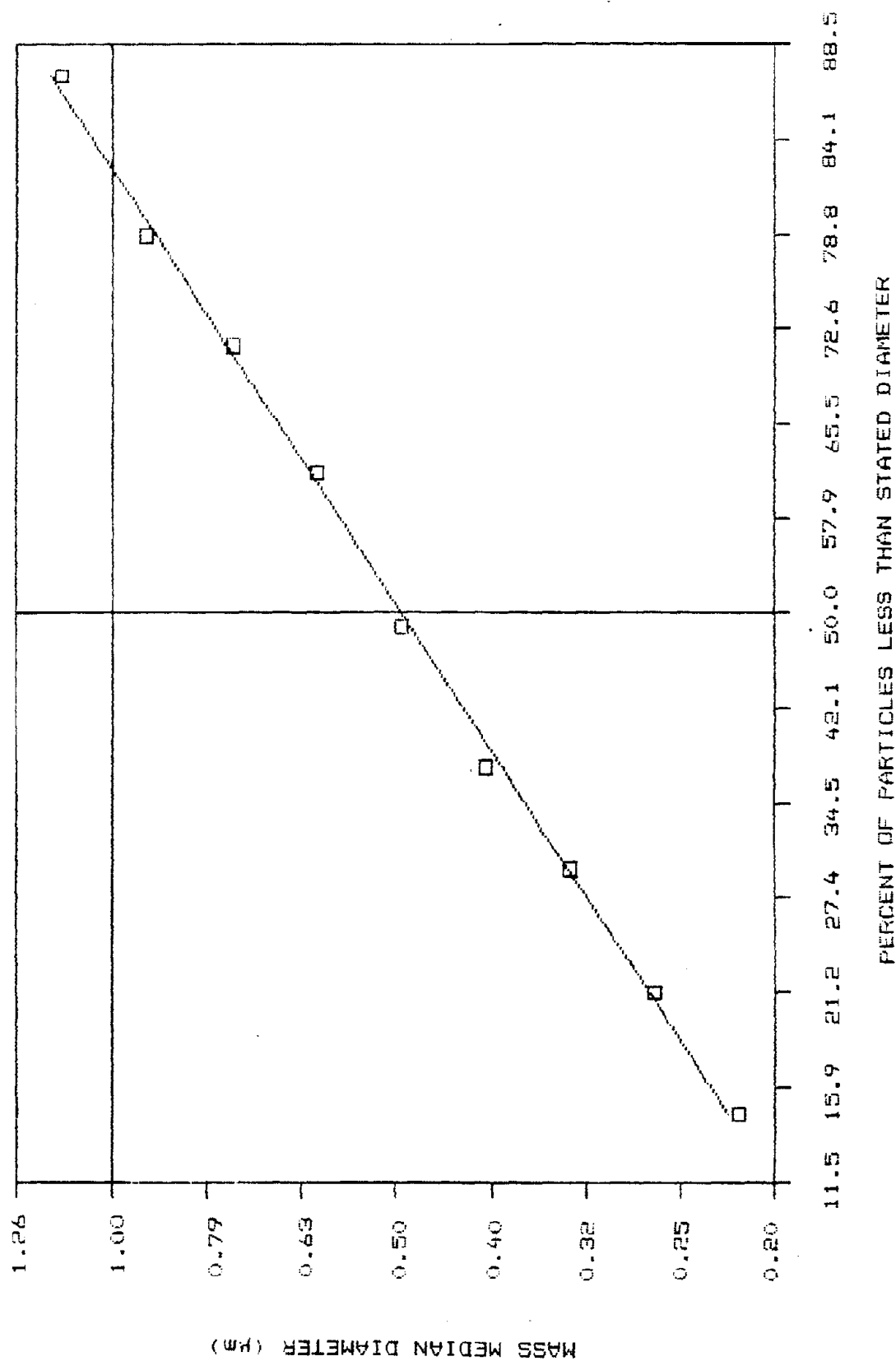
2.117365 = GEOM.STD.DEV.

2.676536 = MASS MED.DIAM.

2.7 = DENSITY

4.397997 = AERU.DIAM.

LUNG 22 — SILICA



26-May-88

LUNG 22

-- EXOGEN

DIAMETER	LOG.DIAM.	COUNT	CUM.COUNT	PERCENT	CUM.PERC.	PROB.	FRED.PROB
0.0227	-1.64397	0	0	0.00%	0.00%		
0.0279	-1.55439	0	0	0.00%	0.00%		
0.0343	-1.46470	0	0	0.00%	0.00%		
0.0421	-1.37571	0	0	0.00%	0.00%		
0.0517	-1.28650	5	5	0.46%	0.46%		
0.0635	-1.19722	1	6	0.09%	0.55%		
0.078	-1.10790	4	10	0.37%	0.91%		
0.0958	-1.01863	5	15	0.46%	1.37%		
0.118	-0.92811	10	25	0.91%	2.29%		
0.144	-0.84163	17	42	1.55%	3.84%		
0.177	-0.75202	26	68	2.38%	6.22%		
0.218	-0.66154	57	125	5.21%	11.43%	-1.19479	-0.66684
0.268	-0.57186	69	194	6.31%	17.73%	-0.92842	-0.57824
0.329	-0.48280	95	289	8.68%	26.42%	-0.63931	-0.48207
0.404	-0.39361	101	390	9.23%	35.65%	-0.37555	-0.39433
0.496	-0.30451	114	504	10.42%	46.07%	-0.10110	-0.30303
0.609	-0.21538	125	629	11.43%	57.50%	0.193488	-0.20504
0.747	-0.12667	116	745	10.60%	68.10%	0.479195	-0.11000
0.918	-0.03715	88	833	8.04%	76.14%	0.718855	-0.03028
1.13	0.053078	75	908	6.86%	83.00%	0.955939	0.048579
1.38	0.139879	56	964	5.12%	88.12%	1.172649	0.120665
1.7	0.230448	37	1001	3.38%	91.50%		
2.09	0.320146	29	1030	2.65%	94.15%		
2.56	0.408239	19	1049	1.74%	95.89%		
3.15	0.498310	13	1067	1.65%	97.53%		
3.87	0.587710	16	1083	1.46%	98.99%		
4.75	0.676693	5	1088	0.46%	99.45%		
5.83	0.765668	1	1089	0.09%	99.54%		
7.16	0.854913	4	1093	0.37%	99.91%		
8.79	0.943988	0	1093	0.00%	99.91%		
10.8	1.033423	1	1094	0.09%	100.00%		
13.3	1.123851	0	1094	0.00%	100.00%		
16.3	1.212187	0	1094	0.00%	100.00%		
20	1.301029	0	1094	0.00%	100.00%		

Regression Output:

Constant -0.26940
 Std Err of Y Est 0.010568
 R Squared 0.998636
 No. of Observations 10
 Degrees of Freedom 8

X Coefficient(s) 0.332641
 Std Err of Coef. 0.004345

0.537766 = GEOM.MED.

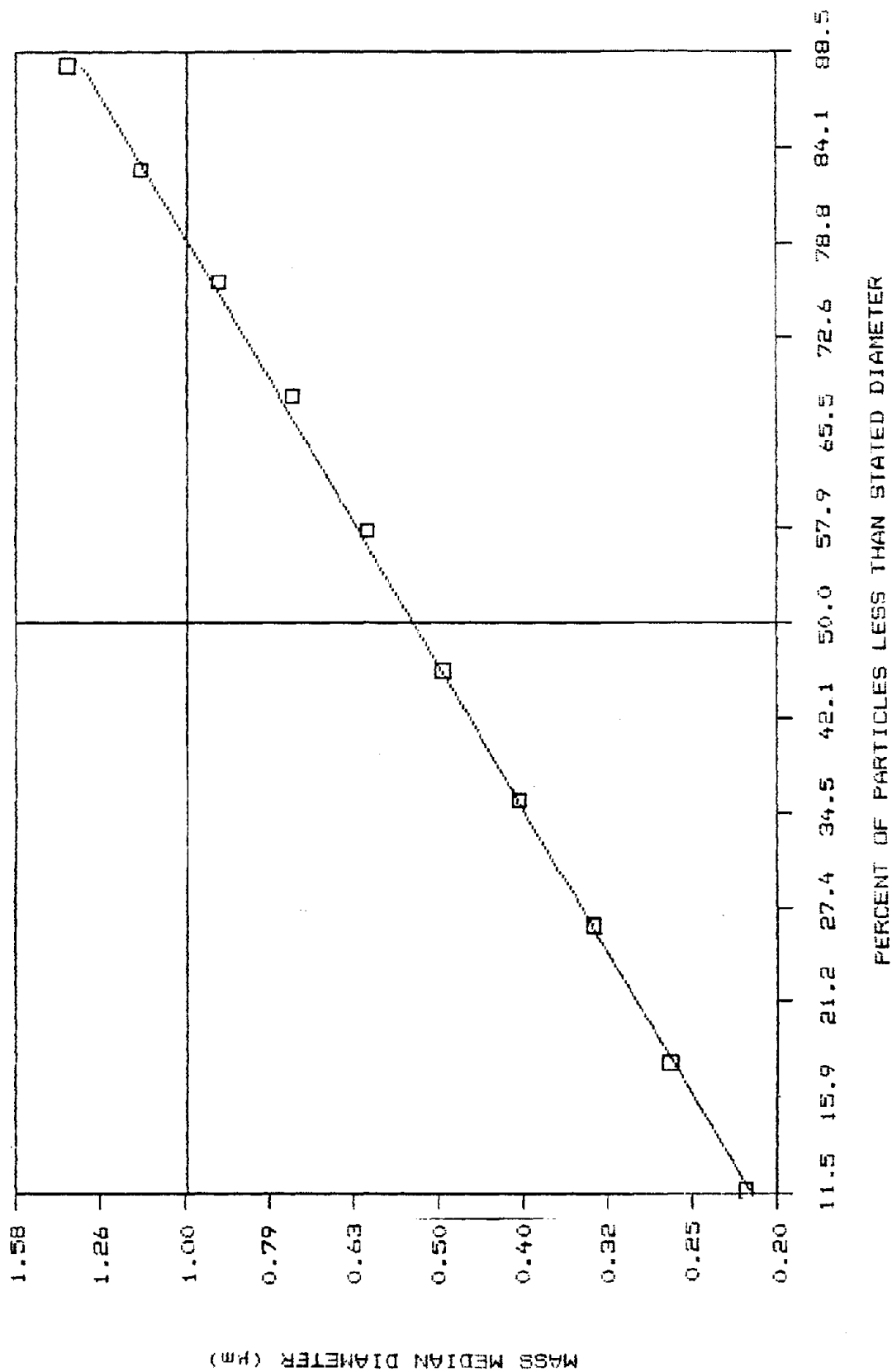
1.156739 = 84.1 %

2.151007 = GEOM.STD.DEV.

3.125852 = MASS MED.DIAM.

3 = DENSITY

5.414135 = AERO.DIAM.

LUNG 22 — *EXOGEN*

26-May-88

LUNG 22

-- SILICA

DIAMETER	LOG.DIAM.	COUNT	CUM.COUNT	PERCENT	CUM.PERC.	PROB.	PRED.PROB.
0.0227	-1.64397	0	0	0.00%	0.00%		
0.0279	-1.55439	1	1	0.22%	0.22%		
0.0343	-1.46470	0	1	0.00%	0.22%		
0.0421	-1.37571	0	1	0.00%	0.22%		
0.0517	-1.28650	2	3	0.45%	0.67%		
0.0635	-1.19722	1	4	0.22%	0.89%		
0.078	-1.10790	1	5	0.22%	1.11%		
0.0958	-1.01863	4	9	0.89%	2.00%		
0.118	-0.92811	10	19	2.23%	4.23%		
0.144	-0.84163	11	30	2.45%	6.68%		
0.177	-0.75202	7	37	1.86%	8.54%		
0.218	-0.66154	22	59	4.90%	13.44%	-1.11458	-0.66318
0.268	-0.57186	27	86	6.01%	19.45%	-0.87675	-0.57911
0.329	-0.48280	34	120	7.57%	26.99%	-0.62994	-0.49186
0.404	-0.39361	51	171	11.36%	38.35%	-0.30997	-0.37876
0.496	-0.30451	38	209	8.46%	46.81%	-0.08876	-0.30056
0.609	-0.21538	41	250	9.13%	55.94%	0.146296	-0.21747
0.747	-0.12667	50	300	11.14%	67.08%	0.443269	-0.11250
0.918	-0.03715	33	333	7.35%	74.43%	0.657076	-0.03692
1.13	0.053078	35	368	7.80%	82.23%	0.917070	0.054980
1.38	0.139879	22	390	4.90%	87.13%	1.114587	0.124799
1.7	0.230448	18	408	4.01%	91.14%		
2.09	0.320146	13	421	2.90%	94.04%		
2.56	0.408239	15	436	3.34%	97.38%		
3.15	0.498310	6	442	1.34%	98.72%		
3.87	0.587710	4	446	0.89%	99.61%		
4.75	0.676693	1	447	0.22%	99.83%		
5.83	0.765668	1	448	0.22%	99.99%		
7.16	0.854913	1	449	0.22%	100.00%		
8.79	0.943988	0	449	0.00%	100.00%		
10.8	1.033423	0	449	0.00%	100.00%		
13.3	1.123851	0	449	0.00%	100.00%		

Regression Output:

Constant	-0.26919
Std Err of Y Est	0.010063
R Squared	0.998763
No. of Observations	10
Degrees of Freedom	8

X Coefficient(s)	0.353485
Std Err of Coef.	0.004396

0.538033 = GEOM.MED.

1.214212 = 84.1 %

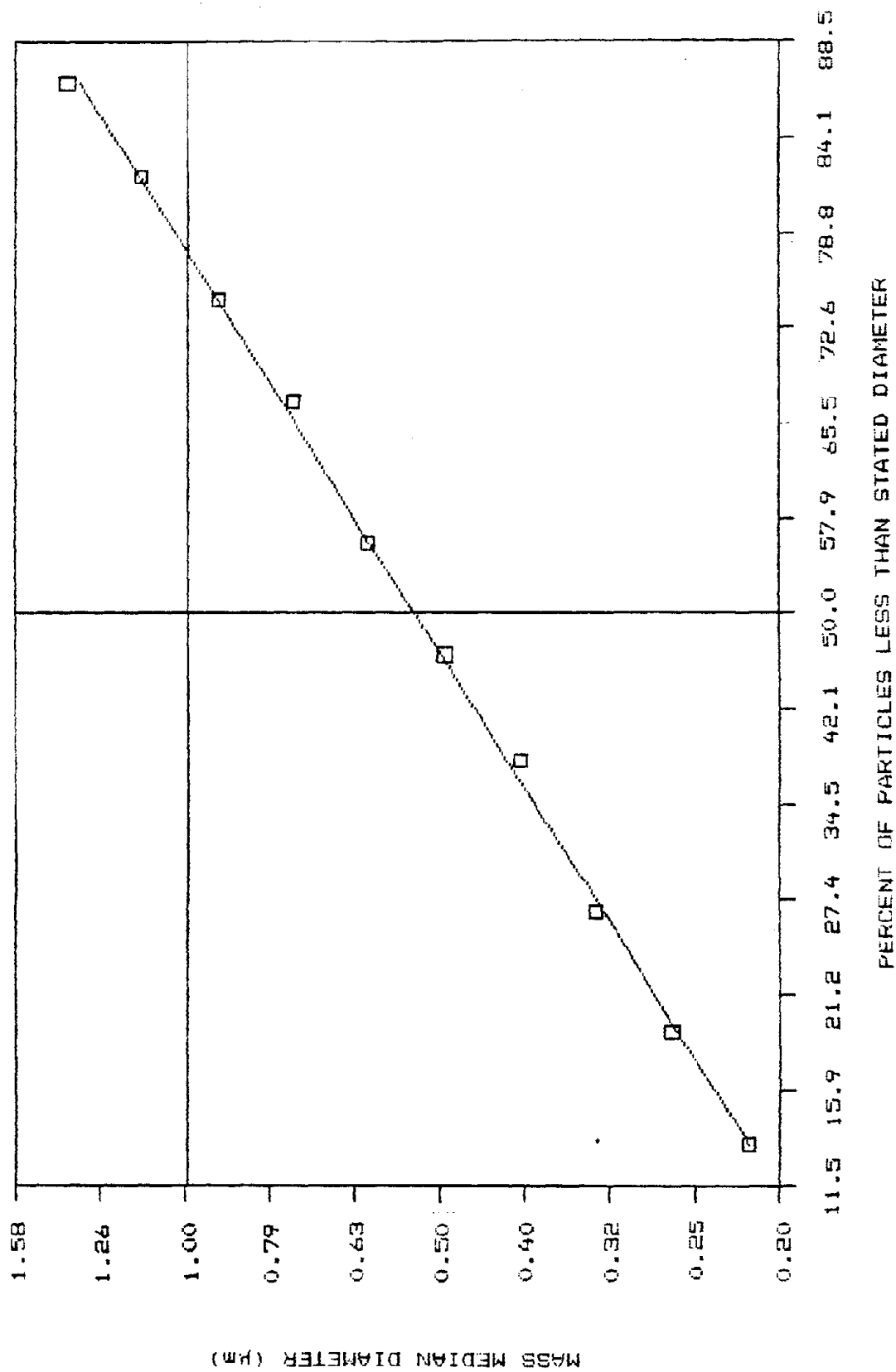
2.256758 = GEOM.STD.DEV.

3.926230 = MASS MED.DIAM.

2.7 = DENSITY

6.451455 = AERO.DIAM.

LUNG 22 — *SILICA*



26-May-88

LUNG 22

-- EXOGEN

DIAMETER	LOG.DIAM.	COUNT	CUM.COUNT	PERCENT	CUM.PERC.	PROB.	PRED.PROB
0.0227	-1.64397	0	0	0.00%	0.00%		
0.0279	-1.55439	1	1	0.10%	0.10%		
0.0343	-1.46470	0	1	0.00%	0.10%		
0.0421	-1.37571	0	1	0.00%	0.10%		
0.0517	-1.28650	3	4	0.29%	0.39%		
0.0635	-1.19722	3	7	0.29%	0.69%		
0.078	-1.10790	4	11	0.39%	1.08%		
0.0958	-1.01863	6	17	0.59%	1.67%		
0.118	-0.92811	18	35	1.76%	3.43%		
0.144	-0.84163	19	54	1.86%	5.29%		
0.177	-0.75202	26	80	2.55%	7.84%		
0.218	-0.66154	45	125	4.41%	12.24%	-1.15562	-0.67752
0.268	-0.57186	72	197	7.05%	19.29%	-0.87174	-0.57892
0.329	-0.48280	84	281	8.23%	27.52%	-0.60603	-0.48663
0.404	-0.39361	119	400	11.66%	39.18%	-0.28091	-0.37370
0.496	-0.30451	93	493	9.11%	48.29%	-0.04403	-0.29143
0.609	-0.21538	106	599	10.38%	58.67%	0.224135	-0.19829
0.747	-0.12667	82	681	8.03%	66.70%	0.440051	-0.12329
0.918	-0.03715	82	763	8.03%	74.73%	0.674522	-0.04185
1.13	0.053078	74	837	7.25%	81.98%	0.917753	0.042621
1.38	0.139879	61	898	5.97%	87.95%	1.164846	0.128443
1.7	0.230448	36	934	3.53%	91.48%		
2.09	0.320146	29	963	2.84%	94.32%		
2.56	0.408239	28	991	2.74%	97.06%		
3.15	0.498310	16	1007	1.57%	98.63%		
3.87	0.587710	5	1012	0.49%	99.12%		
4.75	0.676693	4	1016	0.39%	99.51%		
5.83	0.765668	3	1019	0.29%	99.80%		
7.16	0.854913	1	1020	0.10%	99.90%		
8.79	0.943988	0	1020	0.00%	99.90%		
10.8	1.033423	0	1020	0.00%	99.90%		
13.3	1.123851	1	1021	0.10%	100.00%		
16.3	1.212187	0	1021	0.00%	100.00%		
20	1.301029	0	1021	0.00%	100.00%		

Regression Output:

Constant -0.27614
Std Err of Y Est 0.013476
R Squared 0.997782
No. of Observations 10
Degrees of Freedom 8

X Coefficient(s) 0.347328
Std Err of Coef. 0.005788

0.529491 = GEOM.MED.

1.178115 = 84.1 %

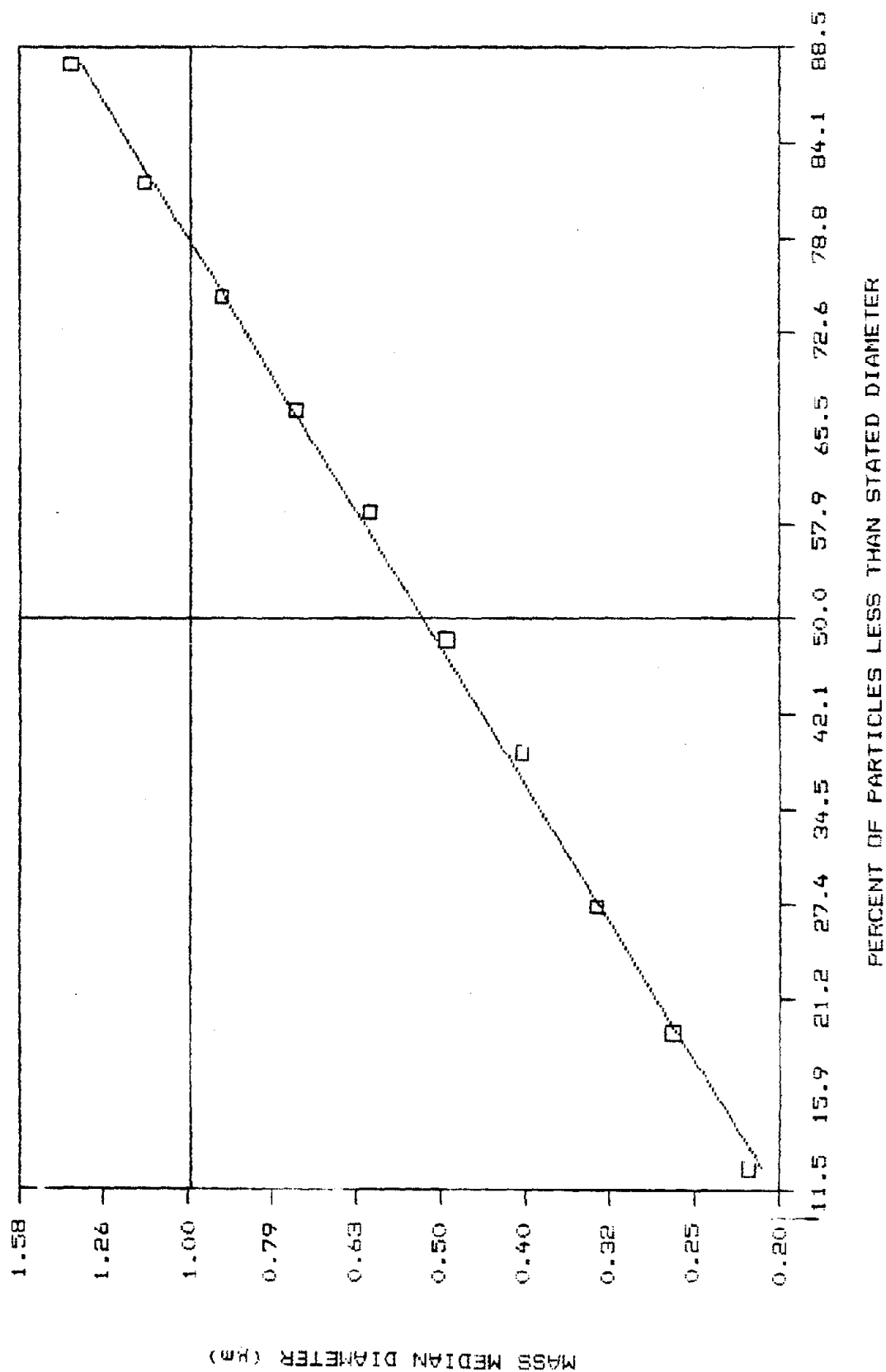
2.224993 = GEOM.STD.DEV.

3.607627 = MASS MED.DIAM.

3 = DENSITY

6.248594 = AERO.DIAM.

LUNG 22 — EXOGEN



26-May-88

LUNG 22

-- SILICA

DIAMETER	LOG.DIAM.	COUNT	CUM.COUNT	PERCENT	CUM.PERC.	PROB.	PRED.PROB
0.0227	-1.64397	0	0	0.00%	0.00%		
0.0279	-1.55439	0	0	0.00%	0.00%		
0.0343	-1.46470	0	0	0.00%	0.00%		
0.0421	-1.37571	0	0	0.00%	0.00%		
0.0517	-1.28650	1	1	0.19%	0.19%		
0.0635	-1.19722	3	4	0.57%	0.76%		
0.078	-1.10790	4	8	0.76%	1.53%		
0.0958	-1.01863	1	9	0.19%	1.72%		
0.118	-0.92811	2	11	0.38%	2.10%		
0.144	-0.84163	3	14	0.57%	2.68%		
0.177	-0.75202	6	20	1.15%	3.82%		
0.218	-0.66154	15	35	2.87%	6.69%		
0.268	-0.57186	28	63	5.35%	12.05%	-1.16489	-0.55909
0.329	-0.48280	36	99	6.88%	18.93%	-0.88477	-0.47338
0.404	-0.39361	42	141	8.03%	26.96%	-0.62289	-0.39325
0.496	-0.30451	52	193	9.94%	36.90%	-0.34165	-0.30719
0.609	-0.21538	43	236	8.22%	45.12%	-0.12550	-0.24105
0.747	-0.12667	71	307	13.58%	58.70%	0.224969	-0.13381
0.918	-0.03715	53	360	10.13%	68.83%	0.499994	-0.04966
1.13	0.053078	61	421	11.66%	80.50%	0.864386	0.061832
1.38	0.139879	40	461	7.65%	88.15%	1.174003	0.156569
1.7	0.230448	27	488	5.16%	93.31%		
2.09	0.320146	13	501	2.49%	95.79%		
2.56	0.408239	10	511	1.91%	97.71%		
3.15	0.498310	11	522	2.10%	99.81%		
3.87	0.587710	1	523	0.19%	100.00%		
4.75	0.676693	0	523	0.00%	100.00%		
5.83	0.765668	0	523	0.00%	100.00%		
7.16	0.854913	0	523	0.00%	100.00%		
8.79	0.943988	0	523	0.00%	100.00%		
10.8	1.033423	0	523	0.00%	100.00%		
13.3	1.123851	0	523	0.00%	100.00%		

Regression Output:

Constant -0.20265
 Std Err of Y Est 0.014545
 R Squared 0.996890
 No. of Observations 9
 Degrees of Freedom 7

X Coefficient(s) 0.305983
 Std Err of Coef. 0.006459

0.627110 = GEOM.MED.

1.268608 = 84.1 %

2.022942 = GEOM.STD.DEV.

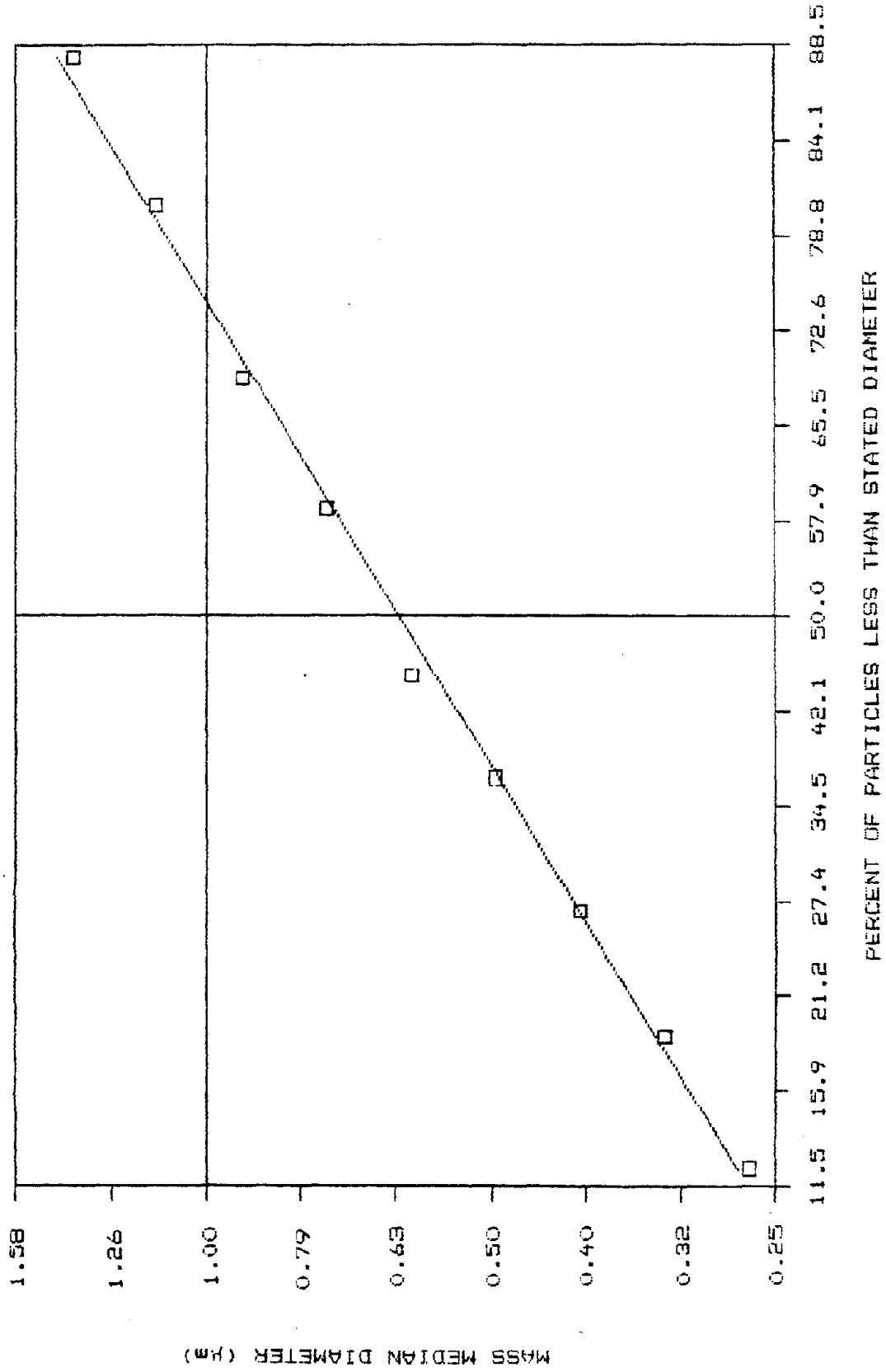
2.780431 = MASS MED.DIAM.

2.7 = DENSITY

4.568715 = AERO.DIAM.

LUNG 22

- SILICA



26-May-88

LUNG 22

-- EXOGEN

DIAMETER	LOG.DIAM.	COUNT	CUM.COUNT	PERCENT	CUM.PERC.	PROB.	PRED.PROB
						CUM.PERC.	CUM.PREC.
0.0227	-1.64397	0	0	0.00%	0.00%		
0.0279	-1.55439	1	1	0.09%	0.09%		
0.0343	-1.46470	0	1	0.00%	0.09%		
0.0421	-1.37571	0	1	0.00%	0.09%		
0.0517	-1.28650	3	4	0.27%	0.36%		
0.0635	-1.19722	3	7	0.27%	0.62%		
0.078	-1.10790	6	13	0.53%	1.16%		
0.0958	-1.01863	4	17	0.36%	1.51%		
0.118	-0.92811	8	25	0.71%	2.22%		
0.144	-0.84163	16	41	1.42%	3.64%		
0.177	-0.75202	20	61	1.78%	5.42%		
0.218	-0.66154	38	99	3.38%	8.80%		
0.268	-0.57186	66	165	5.87%	14.67%	-1.04880	-0.56142
0.329	-0.48280	81	246	7.20%	21.87%	-0.78355	-0.47461
0.404	-0.39361	83	329	7.38%	29.24%	-0.55526	-0.39990
0.496	-0.30451	115	444	10.22%	39.47%	-0.27324	-0.30760
0.609	-0.21538	95	539	8.44%	47.91%	-0.05367	-0.23574
0.747	-0.12667	146	685	12.98%	60.89%	0.282666	-0.12567
0.918	-0.03715	105	790	9.33%	70.22%	0.539794	-0.04152
1.13	0.053078	112	902	9.96%	80.18%	0.853174	0.061038
1.38	0.139879	75	977	6.67%	86.84%	1.113906	0.146367
1.7	0.230448	56	1033	4.98%	91.82%		
2.09	0.320146	29	1062	2.58%	94.40%		
2.56	0.408239	28	1090	2.49%	96.89%		
3.15	0.498310	26	1116	2.31%	99.20%		
3.87	0.587710	6	1122	0.53%	99.73%		
4.75	0.676693	1	1123	0.09%	99.82%		
5.83	0.765668	1	1124	0.09%	99.91%		
7.16	0.854913	0	1124	0.00%	99.91%		
8.79	0.943988	0	1124	0.00%	99.91%		
10.8	1.033423	1	1125	0.09%	100.00%		
13.3	1.123851	0	1125	0.00%	100.00%		
16.3	1.212187	0	1125	0.00%	100.00%		
20	1.301029	0	1125	0.00%	100.00%		

Regression Output:

Constant	-0.21817
Std Err of Y Est	0.010456
R Squared	0.998392
No. of Observations	9
Degrees of Freedom	7

X Coefficient(s)	0.327268
Std Err of Coef.	0.004962

0.605091 = GEOM.MED.

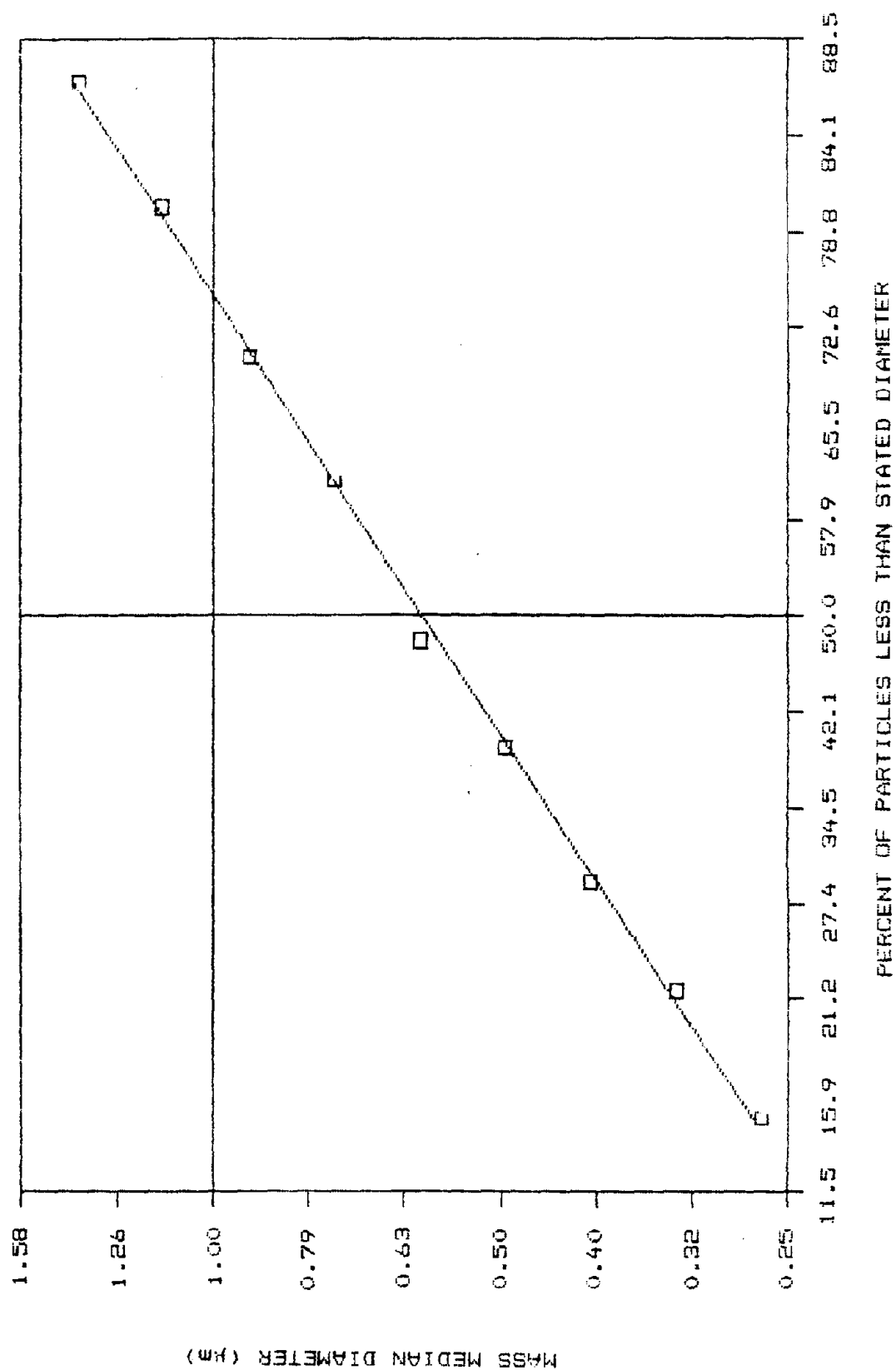
1.285552 = 84.1 %

2.124558 = GEOM.STD.DEV.

3.324309 = MASS MED.DIAM.

3 = DENSITY

5.757872 = AERO.DIAM.

LUNG 22 *- EXOGEN*

26-May-88

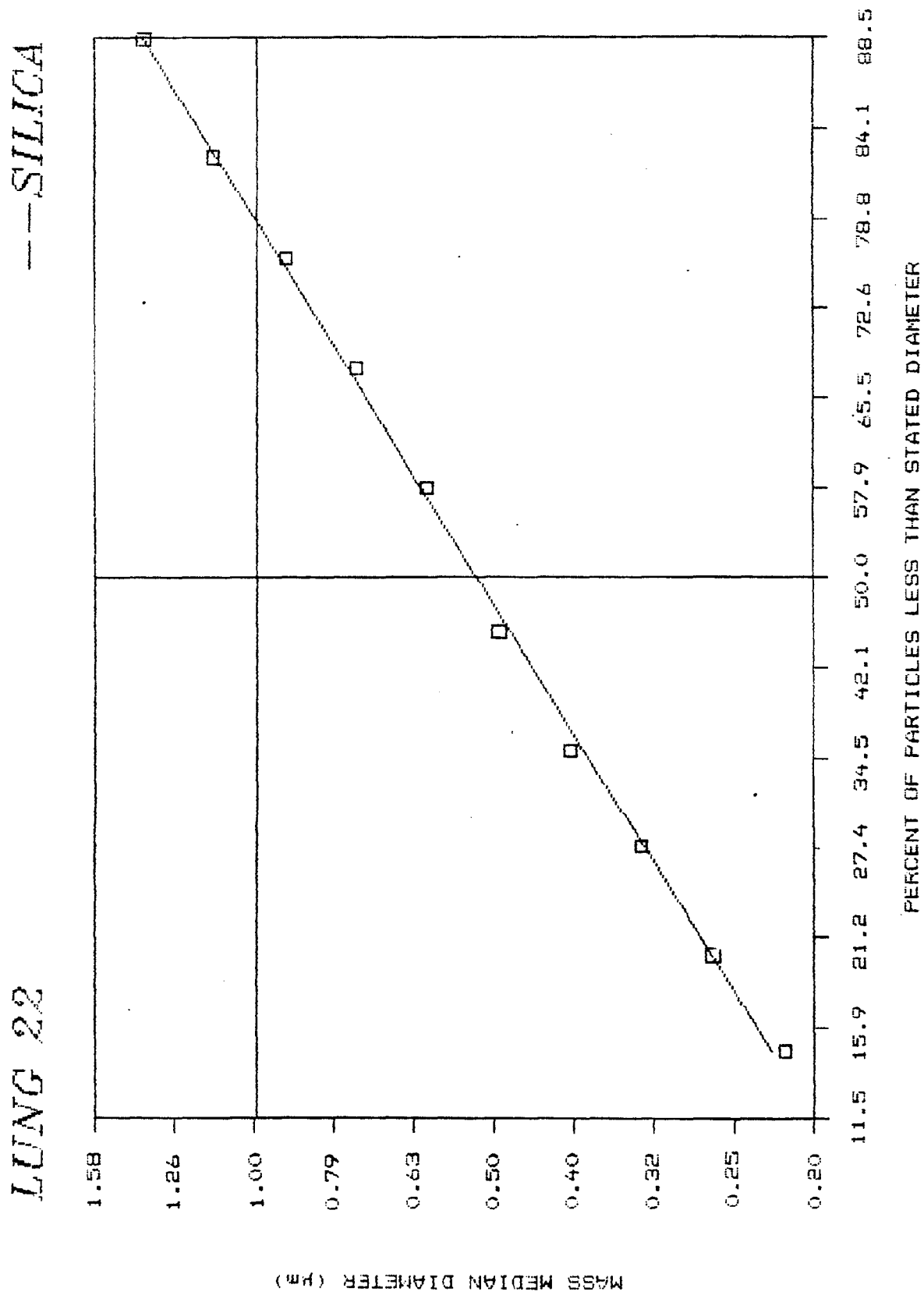
LUNG 22

-- SILICA

DIAMETER	LOG.DIAM.	COUNT	CUM.COUNT	PERCENT	CUM.PERC.	PROB.	PRED.PROB
						CUM.PERC.	CUM.PREC.
0.0227	-1.64397	0	0	0.00%	0.00%		
0.0279	-1.55439	0	0	0.00%	0.00%		
0.0343	-1.46470	0	0	0.00%	0.00%		
0.0421	-1.37571	0	0	0.00%	0.00%		
0.0517	-1.28650	4	4	0.66%	0.66%		
0.0635	-1.19722	0	4	0.00%	0.66%		
0.078	-1.10790	5	9	0.83%	1.49%		
0.0958	-1.01863	2	11	0.33%	1.82%		
0.118	-0.92811	4	15	0.66%	2.48%		
0.144	-0.84163	16	31	2.64%	5.12%		
0.177	-0.75202	20	51	3.31%	8.43%		
0.218	-0.66154	37	88	6.12%	14.55%	-1.05386	-0.64530
0.268	-0.57186	34	122	5.62%	20.17%	-0.84123	-0.57115
0.329	-0.48280	46	168	7.60%	27.77%	-0.59869	-0.48656
0.404	-0.39361	46	214	7.60%	35.37%	-0.38309	-0.41137
0.496	-0.30451	60	274	9.92%	45.29%	-0.12124	-0.32005
0.609	-0.21538	75	349	12.40%	57.69%	0.198457	-0.20856
0.747	-0.12667	60	409	9.92%	67.60%	0.465270	-0.11551
0.918	-0.03715	50	459	8.26%	75.87%	0.710132	-0.03011
1.13	0.053078	40	499	6.61%	82.48%	0.936351	0.048773
1.38	0.139879	37	536	6.12%	88.60%	1.195822	0.139262
1.7	0.230448	26	562	4.30%	92.89%		
2.09	0.320146	16	578	2.64%	95.54%		
2.56	0.408239	6	584	0.99%	96.53%		
3.15	0.498310	13	597	2.15%	98.68%		
3.87	0.587710	3	600	0.50%	99.17%		
4.75	0.676693	5	605	0.83%	100.00%		
5.83	0.765668	0	605	0.00%	100.00%		
7.16	0.854913	0	605	0.00%	100.00%		
8.79	0.943988	0	605	0.00%	100.00%		
10.8	1.033423	0	605	0.00%	100.00%		
13.3	1.123851	0	605	0.00%	100.00%		

Regression Output:

Constant	-0.27777	0.527504 = GEOM.MED.
Std Err of Y Est	0.011590	
R Squared	0.998359	1.177525 = 84.1 %
No. of Observations	10	
Dedrees of Freedom	8	2.232256 = GEOM.STD.DEV.
X Coefficient(s)	0.348744	3.650849 = MASS MED.DIAM.
Std Err of Coef.	0.004997	
		2.7 = DENSITY
		5.998957 = AERO.DIAM.



26-May-88

LUNG 22

--EXOGEN

DIAMETER	LOG.DIAM.	COUNT	CUM.COUNT	PERCENT	CUM.PERC.	CUM.PERC.	CUM.PREC.
0.0227	-1.64397	0	0	0.00%	0.00%		
0.0279	-1.55439	0	0	0.00%	0.00%		
0.0343	-1.46470	0	0	0.00%	0.00%		
0.0421	-1.37571	0	0	0.00%	0.00%		
0.0517	-1.28650	5	5	0.45%	0.45%		
0.0635	-1.19722	0	5	0.00%	0.45%		
0.078	-1.10790	8	13	0.73%	1.18%		
0.0958	-1.01863	7	20	0.64%	1.82%		
0.118	-0.92811	13	33	1.18%	3.00%		
0.144	-0.84163	26	59	2.37%	5.37%		
0.177	-0.75202	40	99	3.64%	9.01%		
0.218	-0.66154	71	170	6.46%	15.47%	-1.01596	-0.57131
0.268	-0.57186	83	253	7.55%	23.02%	-0.74570	-0.57238
0.329	-0.48280	92	345	8.37%	31.39%	-0.49358	-0.48008
0.404	-0.39361	96	441	8.74%	40.13%	-0.25579	-0.39303
0.496	-0.30451	103	544	9.37%	49.50%	-0.01285	-0.30409
0.609	-0.21538	117	661	10.65%	60.15%	0.262998	-0.20311
0.747	-0.12667	96	757	8.74%	68.88%	0.501334	-0.11586
0.918	-0.03715	78	835	7.10%	75.98%	0.713630	-0.03814
1.13	0.053078	74	909	6.73%	82.71%	0.945076	0.046582
1.38	0.139879	60	969	5.46%	88.17%	1.175237	0.130840
1.7	0.230448	40	1009	3.64%	91.81%		
2.09	0.320146	31	1040	2.82%	94.63%		
2.56	0.408239	14	1054	1.27%	95.91%		
3.15	0.498310	18	1072	1.64%	97.54%		
3.87	0.587710	8	1080	0.73%	98.27%		
4.75	0.676693	6	1086	0.55%	98.82%		
5.83	0.765668	5	1091	0.45%	99.27%		
7.16	0.854913	3	1094	0.27%	99.55%		
8.79	0.943988	2	1096	0.18%	99.73%		
10.8	1.033423	3	1099	0.27%	100.00%		
13.3	1.123851	0	1099	0.00%	100.00%		
16.3	1.212187	0	1099	0.00%	100.00%		
20	1.301029	0	1099	0.00%	100.00%		

Regression Output:

Constant -0.29939
Std Err of Y Est 0.007873
R Squared 0.999242
No. of Observations 10
Degrees of Freedom 8

X Coefficient(s) 0.366080
Std Err of Coef. 0.003562

0.501889 = GEOM.MED.

1.165974 = 34.1 %

2.323169 = GEOM.STD.DEV.

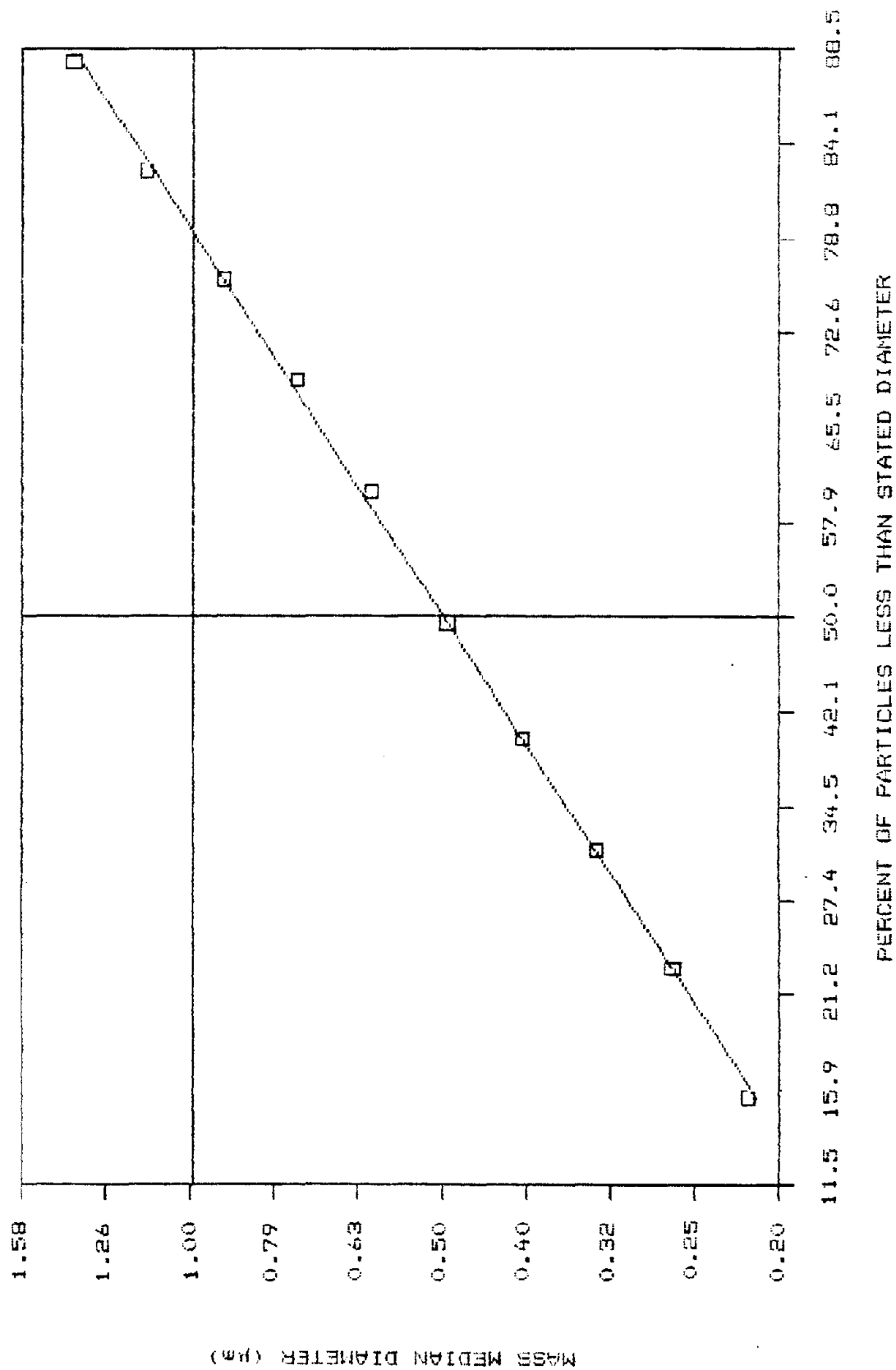
4.230440 = MASS MED.DIAM.

3 = DENSITY

7.327338 = AERO.DIAM.

---EXOGEN

LUNG 22



26-May-88

LUNG 22

-- SILICA

DIAMETER	LOG.DIAM.	COUNT	CUM.COUNT	PERCENT	CUM.PERC.	PROB.	PRED.PROB
0.0227	-1.64397	0	0	0.00%	0.00%		
0.0279	-1.55439	0	0	0.00%	0.00%		
0.0343	-1.46470	0	0	0.00%	0.00%		
0.0421	-1.37571	0	0	0.00%	0.00%		
0.0517	-1.28650	1	1	0.15%	0.15%		
0.0635	-1.19722	1	2	0.15%	0.30%		
0.078	-1.10790	3	5	0.46%	0.76%		
0.0958	-1.01863	6	11	0.91%	1.67%		
0.118	-0.92811	8	19	1.21%	2.88%		
0.144	-0.84163	14	33	2.12%	5.01%		
0.177	-0.75202	15	48	2.28%	7.29%		
0.218	-0.66154	21	69	3.19%	10.47%	-1.24318	-0.67449
0.268	-0.57186	42	111	6.37%	16.84%	-0.96197	-0.58130
0.329	-0.48280	64	175	9.71%	26.56%	-0.63511	-0.47298
0.404	-0.39361	61	236	9.26%	35.81%	-0.37113	-0.38530
0.496	-0.30451	71	307	10.77%	46.59%	-0.08779	-0.29160
0.609	-0.21538	69	376	10.47%	57.06%	0.182045	-0.20218
0.747	-0.12667	55	431	8.35%	65.40%	0.404254	-0.12854
0.918	-0.03715	56	487	8.50%	73.90%	0.648965	-0.04744
1.13	0.053078	56	543	8.50%	82.40%	0.933294	0.046777
1.38	0.139879	42	585	6.37%	88.77%	1.204516	0.136658
1.7	0.230448	31	616	4.70%	93.47%		
2.09	0.320146	18	634	2.73%	96.21%		
2.56	0.408239	15	649	2.28%	98.48%		
3.15	0.498310	4	653	0.61%	99.09%		
3.87	0.587710	5	658	0.76%	99.85%		
4.75	0.676693	1	659	0.15%	100.00%		
5.83	0.765668	0	659	0.00%	100.00%		
7.16	0.854913	0	659	0.00%	100.00%		
8.79	0.943988	0	659	0.00%	100.00%		
10.8	1.033423	0	659	0.00%	100.00%		
13.3	1.123851	0	659	0.00%	100.00%		

Regression Output:

Constant -0.26250
 Std Err of Y Est 0.010721
 R Squared 0.998596
 No. of Observations 10
 Degrees of Freedom 8

X Coefficient(s) 0.331392
 Std Err of Coef. 0.004392

0.546374 = GEOM.MED.

1.171879 = 84.1 %

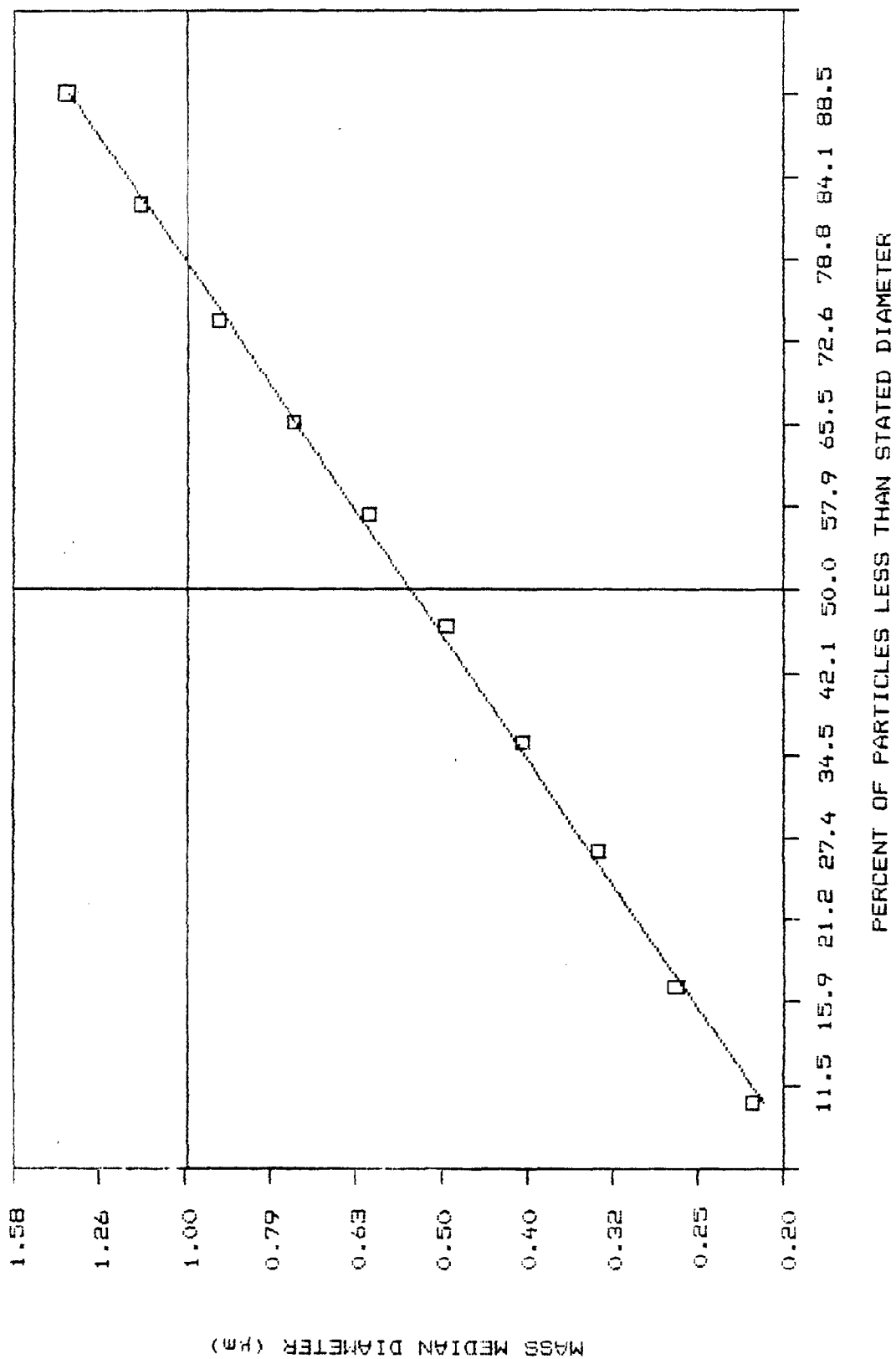
2.144828 = GEOM.STD.DEV.

3.134253 = MASS MED.DIAM.

2.7 = DENSITY

5.150103 = AERO.DIAM.

LUNG 22 - SILICA



26 May-88

LUNG 22

--EXUGEN

DIAMETER	LUG.DIAM.	COUNT	CUM.COUNT	PERCENT	CUM.PERC.	CUM.PERC.	CUM.PREC.
0.0227	-1.64397	0	0	0.00%	0.00%		
0.0279	-1.55439	0	0	0.00%	0.00%		
0.0343	-1.46470	0	0	0.00%	0.00%		
0.0421	-1.37571	0	0	0.00%	0.00%		
0.0517	-1.28650	2	2	0.14%	0.14%		
0.0635	-1.19722	1	3	0.07%	0.20%		
0.078	-1.10790	5	8	0.34%	0.55%		
0.0958	-1.01863	7	15	0.48%	1.02%		
0.118	-0.92811	22	37	1.50%	2.52%		
0.144	-0.84163	22	59	1.50%	4.02%		
0.177	-0.75202	35	94	2.39%	6.41%		
0.218	-0.66154	62	156	4.23%	10.63%	-1.23468	-0.68022
0.268	-0.57186	101	257	6.88%	17.52%	-0.93642	-0.57854
0.329	-0.48280	132	389	9.00%	26.52%	-0.63628	-0.47623
0.404	-0.39361	134	523	9.13%	35.65%	-0.37550	-0.38733
0.496	-0.30451	165	688	11.25%	46.90%	-0.07973	-0.28651
0.609	-0.21538	146	834	9.95%	56.85%	0.176701	-0.19909
0.747	-0.12667	125	959	8.52%	65.37%	0.403414	-0.12180
0.918	-0.03715	121	1080	8.25%	73.62%	0.640426	-0.04101
1.13	0.053078	112	1192	7.63%	81.25%	0.891372	0.044533
1.38	0.139879	87	1279	5.93%	87.18%	1.129227	0.125617
1.7	0.230448	79	1358	5.39%	92.57%		
2.09	0.320146	50	1408	3.41%	95.98%		
2.56	0.408239	28	1436	1.91%	97.89%		
3.15	0.498310	19	1455	1.30%	99.18%		
3.87	0.587710	8	1463	0.55%	99.73%		
4.75	0.676693	2	1465	0.14%	99.86%		
5.83	0.765668	1	1466	0.07%	99.93%		
7.16	0.854913	1	1467	0.07%	100.00%		
8.79	0.943988	0	1467	0.00%	100.00%		
10.8	1.033423	0	1467	0.00%	100.00%		
13.3	1.123851	0	1467	0.00%	100.00%		
16.3	1.212187	0	1467	0.00%	100.00%		
20	1.301029	0	1467	0.00%	100.00%		

Regression Output:

Constant -0.25932
 Std Err of Y Est 0.013138
 R Squared 0.997892
 No. of Observations 10
 Degrees of Freedom 8

X Coefficient(s) 0.340892
 Std Err of Coef. 0.005538

0.550391 = GEOM.MED.

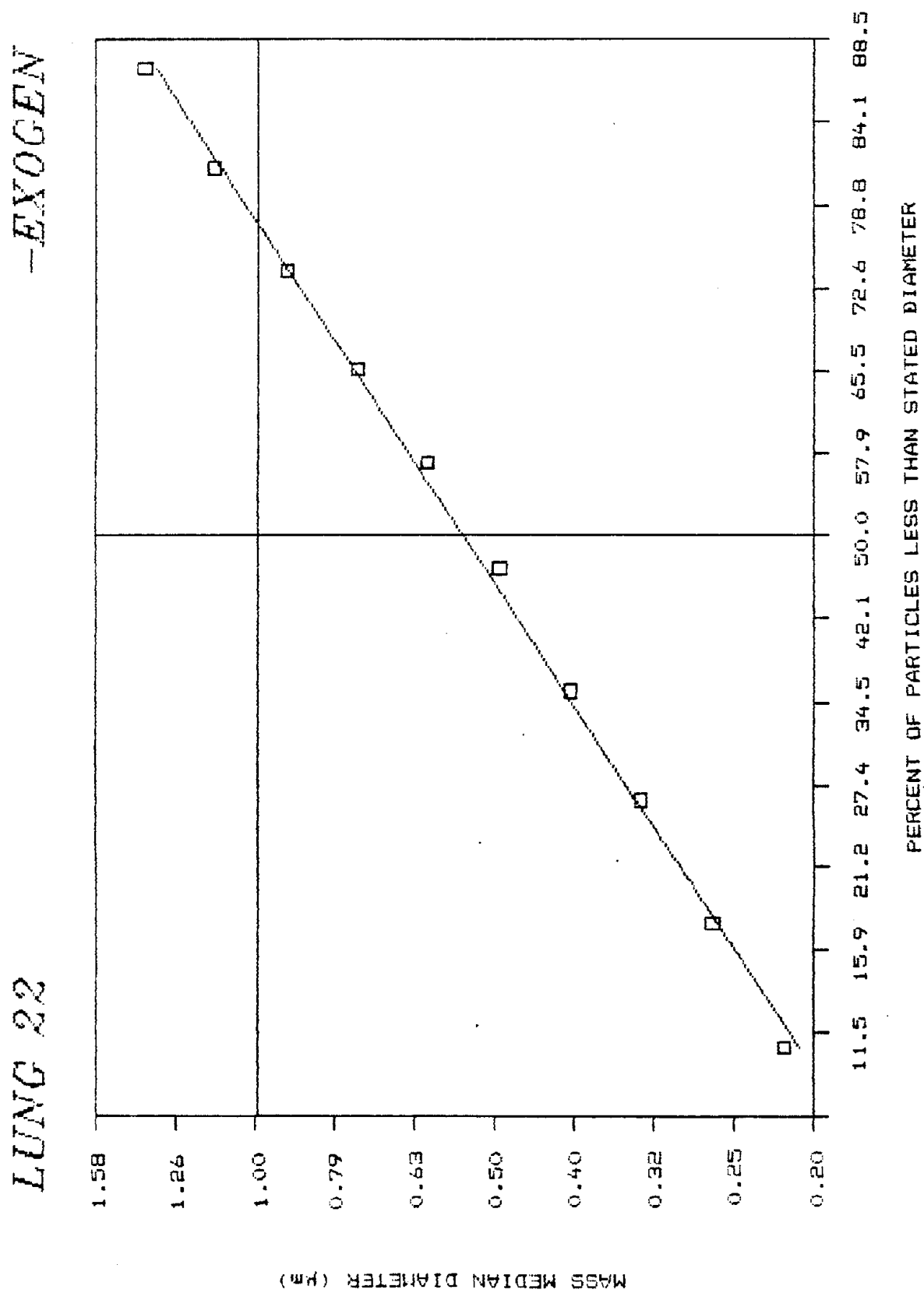
1.206602 = 84.1 %

2.192264 = GEOM.STD.DEV.

3.494912 = MASS MED.DIAM.

3 = DENSITY

6.053366 = AERO.DIAM.



26-May-88

LUNG 22

-- SILICA

DIAMETER	LOG.DIAM.	COUNT	CUM.COUNT	PERCENT	CUM.PERC.	PROB.	PRED.PROB
0.0227	-1.64397	0	0	0.00%	0.00%		
0.0279	-1.55439	0	0	0.00%	0.00%		
0.0343	-1.46470	0	0	0.00%	0.00%		
0.0421	-1.37571	0	0	0.00%	0.00%		
0.0517	-1.28650	1	1	0.23%	0.23%		
0.0635	-1.19722	1	2	0.23%	0.46%		
0.078	-1.10790	4	6	0.91%	1.37%		
0.0958	-1.01863	5	11	1.14%	2.51%		
0.118	-0.92811	8	19	1.83%	4.34%		
0.144	-0.84163	6	25	1.37%	5.71%		
0.177	-0.75202	8	33	1.83%	7.53%		
0.218	-0.66154	28	61	6.39%	13.93%	-1.08010	-0.66354
0.268	-0.57186	31	92	7.08%	21.00%	-0.81248	-0.57168
0.329	-0.48280	39	131	8.90%	29.91%	-0.53601	-0.47679
0.404	-0.39361	36	167	8.22%	38.13%	-0.30882	-0.39881
0.496	-0.30451	49	216	11.19%	49.32%	-0.01759	-0.29885
0.609	-0.21538	42	258	9.59%	58.90%	0.230326	-0.21375
0.747	-0.12667	37	295	8.45%	67.35%	0.458224	-0.13553
0.918	-0.03715	41	336	9.36%	76.71%	0.737093	-0.03981
1.13	0.053078	35	371	7.99%	84.70%	1.022912	0.058293
1.38	0.139879	27	398	6.16%	90.87%		
1.7	0.230448	16	414	3.65%	94.52%		
2.09	0.320146	12	426	2.74%	97.26%		
2.56	0.408239	7	433	1.60%	98.86%		
3.15	0.498310	2	435	0.46%	99.32%		
3.87	0.587710	1	436	0.23%	99.54%		
4.75	0.676693	2	438	0.46%	100.00%		
5.83	0.765668	0	438	0.00%	100.00%		
7.16	0.854913	0	438	0.00%	100.00%		
8.79	0.943988	0	438	0.00%	100.00%		
10.8	1.033423	0	438	0.00%	100.00%		
13.3	1.123851	0	438	0.00%	100.00%		

Regression Output:

Constant	-0.29281
Std Err of Y Est	0.005535
R Squared	0.999550
No. of Observations	9
Degrees of Freedom	7

X Coefficient(s)	0.343240
Std Err of Coef.	0.002749

0.509552 = GEOM.MED.

1.123127 = 84.1 %

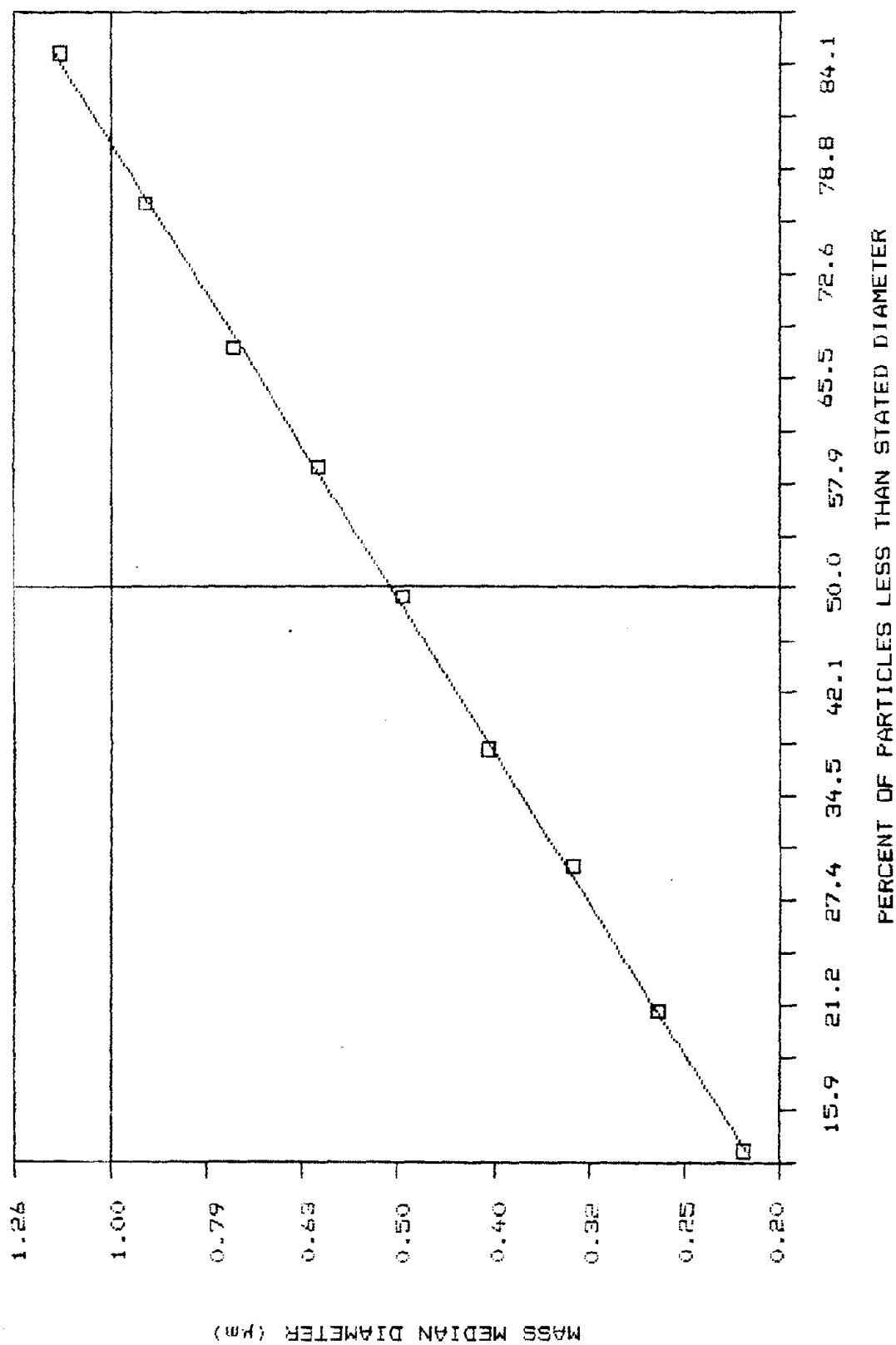
2.204145 = GEOM.STD.DEV.

3.319301 = MASS MED.DIAM.

2.7 = DENSITY

5.454169 = AERO.DIAM.

LUNG 22 - SILICA



26-May-68

LUNG 22

--EXOGEN

DIAMETER	LOG.DIAM.	COUNT	CUM.COUNT	PERCENT	CUM.PERC.	PROB.	PRED.PROB
0.0227	-1.64397	0	0	0.00%	0.00%		
0.0279	-1.55439	0	0	0.00%	0.00%		
0.0343	-1.46470	0	0	0.00%	0.00%		
0.0421	-1.37571	0	0	0.00%	0.00%		
0.0517	-1.28650	5	5	0.46%	0.46%		
0.0635	-1.19722	3	8	0.27%	0.73%		
0.078	-1.10790	7	15	0.64%	1.37%		
0.0958	-1.01863	16	31	1.46%	2.82%		
0.118	-0.92811	14	45	1.28%	4.10%		
0.144	-0.84163	19	64	1.73%	5.83%		
0.177	-0.75202	19	83	1.73%	7.56%		
0.218	-0.66154	70	153	6.38%	13.93%	-1.07978	-0.66098
0.268	-0.57186	79	232	7.19%	21.13%	-0.80825	-0.57028
0.329	-0.48280	94	326	8.56%	29.69%	-0.54232	-0.48145
0.404	-0.39361	97	423	8.83%	38.52%	-0.29824	-0.39993
0.496	-0.30451	123	546	11.20%	49.73%	-0.00701	-0.30265
0.609	-0.21538	110	656	10.02%	59.74%	0.252432	-0.21598
0.747	-0.12667	106	762	9.65%	69.40%	0.516114	-0.12791
0.918	-0.03715	103	865	9.38%	78.78%	0.805181	-0.03135
1.13	0.053078	72	937	6.56%	85.34%	1.048958	0.050075
1.38	0.139879	53	990	4.83%	90.16%		
1.7	0.230448	38	1028	3.46%	93.62%		
2.09	0.320146	29	1057	2.64%	96.27%		
2.56	0.408239	23	1080	2.09%	98.36%		
3.15	0.498310	12	1092	1.09%	99.45%		
3.87	0.587710	1	1093	0.09%	99.54%		
4.75	0.676693	4	1097	0.36%	99.91%		
5.83	0.765668	1	1098	0.09%	100.00%		
7.16	0.854913	0	1098	0.00%	100.00%		
8.79	0.943988	0	1098	0.00%	100.00%		
10.8	1.033423	0	1098	0.00%	100.00%		
13.3	1.123851	0	1098	0.00%	100.00%		
16.3	1.212187	0	1098	0.00%	100.00%		
20	1.301029	0	1098	0.00%	100.00%		

Regression Output:

Constant -0.30030
Std Err of Y Est 0.003635
R Squared 0.999806
No. of Observations 9
Degrees of Freedom 7

X Coefficient(s) 0.334028
Std Err of Coef. 0.001757

0.500833 = GEOM.MED.

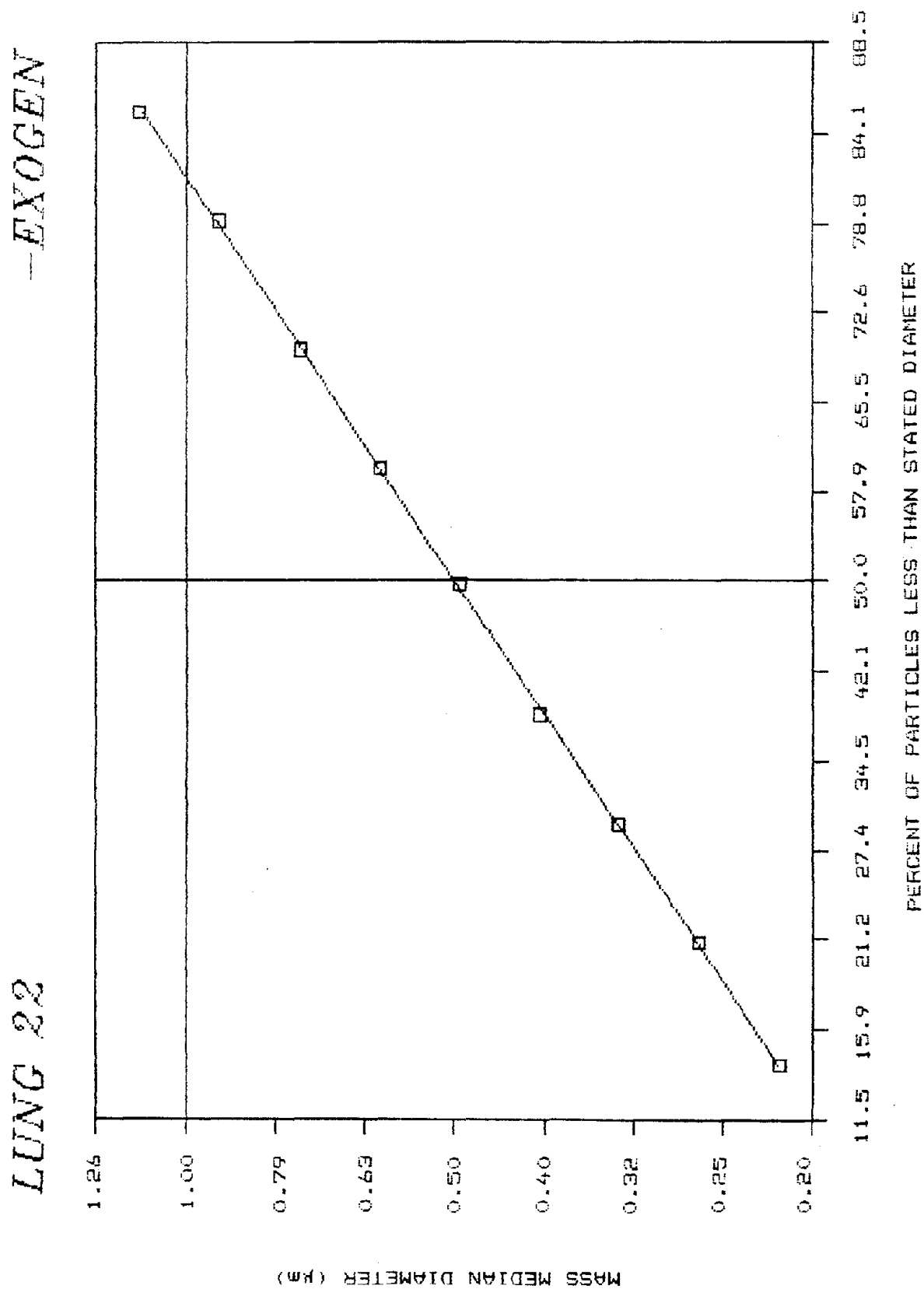
1.080741 = 84.1 %

2.157887 = GEOM.STD.DEV.

2.954302 = MASS MED.DIAM.

3 = DENSITY

5.117001 = AERO.DIAM.



27-May-88

LUNG 22

-- SILICA

DIAMETER	LOG.DIAM.	COUNT	CUM.COUNT	PERCENT	CUM.PERC.	PROB.	PRED.PROB
0.0227	-1.64397	0	0	0.00%	0.00%		
0.0279	-1.55439	0	0	0.00%	0.00%		
0.0343	-1.46470	0	0	0.00%	0.00%		
0.0421	-1.37571	0	0	0.00%	0.00%		
0.0517	-1.28650	2	2	0.41%	0.41%		
0.0635	-1.19722	1	3	0.20%	0.61%		
0.078	-1.10790	1	4	0.20%	0.82%		
0.0958	-1.01863	6	10	1.23%	2.04%		
0.118	-0.92811	3	13	0.61%	2.66%		
0.144	-0.84163	9	22	1.84%	4.50%		
0.177	-0.75202	14	36	2.86%	7.36%		
0.218	-0.66154	21	57	4.29%	11.66%	-1.18354	-0.65449
0.268	-0.57186	29	86	5.93%	17.59%	-0.93387	-0.57573
0.329	-0.48280	38	124	7.77%	25.36%	-0.67178	-0.49305
0.404	-0.39361	50	174	10.22%	35.58%	-0.37735	-0.40017
0.496	-0.30451	63	237	12.88%	48.47%	-0.03940	-0.29356
0.609	-0.21538	50	287	10.22%	58.69%	0.224743	-0.21023
0.747	-0.12667	49	336	10.02%	68.71%	0.496529	-0.12449
0.918	-0.03715	48	384	9.82%	78.53%	0.796708	-0.02979
1.13	0.053078	30	414	6.13%	84.66%	1.021266	0.041039
1.38	0.139879	39	453	7.98%	92.64%		
1.7	0.230448	14	467	2.86%	95.50%		
2.09	0.320146	10	477	2.04%	97.55%		
2.56	0.408239	7	484	1.43%	98.98%		
3.15	0.498310	4	488	0.82%	99.80%		
3.87	0.587710	1	489	0.20%	100.00%		
4.75	0.676693	0	489	0.00%	100.00%		
5.83	0.765668	0	489	0.00%	100.00%		
7.16	0.854913	0	489	0.00%	100.00%		
8.79	0.943988	0	489	0.00%	100.00%		
10.8	1.033423	0	489	0.00%	100.00%		
13.3	1.123851	0	489	0.00%	100.00%		
16.3	1.212187	0	489	0.00%	100.00%		
20	1.301029	0	489	0.00%	100.00%		

Regression Output:

Constant -0.28112
Std Err of Y Est 0.008968
R Squared 0.998821
No. of Observations 9
Degrees of Freedom 7

X Coefficient(s) 0.315460
Std Err of Coef. 0.004096

0.523444 = GEOM.MED.

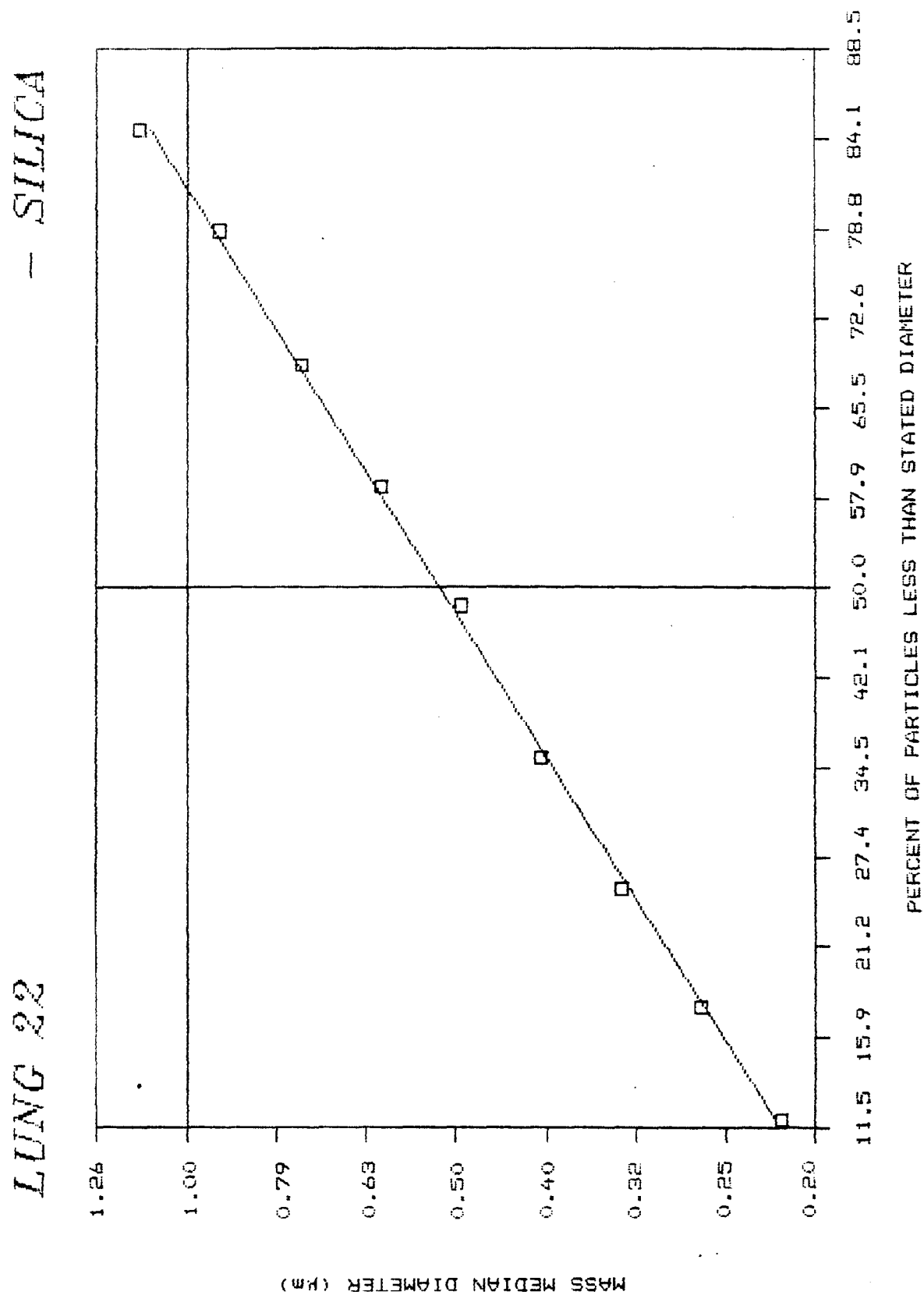
1.082259 = 84.1 %

2.067573 = GEOM.STD.DEV.

2.548731 = MASS MED.DIAM.

2.7 = DENSITY

4.187993 = AERO.DIAM.



26-May-88

LUNG 22

--EXOGEN

260

DIAMETER	LOG.DIAM.	COUNT	CUM.COUNT	PERCENT	CUM.PERC.	PROB.	PRED.PROB
0.0227	-1.64397	0	0	0.00%	0.00%		
0.0279	-1.55439	1	1	0.09%	0.09%		
0.0343	-1.46470	0	1	0.00%	0.09%		
0.0421	-1.37571	0	1	0.00%	0.09%		
0.0517	-1.28650	3	4	0.27%	0.36%		
0.0635	-1.19722	4	8	0.36%	0.73%		
0.078	-1.10790	1	9	0.09%	0.82%		
0.0958	-1.01863	9	18	0.82%	1.64%		
0.118	-0.92811	13	31	1.18%	2.82%		
0.144	-0.84163	20	51	1.82%	4.64%		
0.177	-0.75202	37	88	3.37%	8.01%		
0.218	-0.66154	54	142	4.92%	12.93%	-1.12391	-0.66235
0.268	-0.57186	71	213	6.47%	19.40%	-0.86805	-0.57661
0.329	-0.48280	91	304	8.29%	27.69%	-0.60113	-0.48716
0.404	-0.39361	117	421	10.66%	38.34%	-0.30309	-0.38729
0.496	-0.30451	114	535	10.38%	48.72%	-0.03275	-0.29669
0.609	-0.21538	103	638	9.38%	58.11%	0.209418	-0.21554
0.747	-0.12667	108	746	9.84%	67.94%	0.474774	-0.12662
0.918	-0.03715	103	849	9.38%	77.32%	0.756863	-0.03209
1.13	0.053078	71	920	6.47%	83.79%	0.986467	0.044852
1.38	0.139879	68	988	6.19%	89.98%	1.267200	0.138928
1.7	0.230448	34	1022	3.10%	93.08%		
2.09	0.320146	30	1052	2.73%	95.81%		
2.56	0.408239	20	1072	1.82%	97.63%		
3.15	0.498310	12	1084	1.09%	98.72%		
3.87	0.587710	8	1092	0.73%	99.45%		
4.75	0.676693	3	1095	0.27%	99.73%		
5.83	0.765668	2	1097	0.18%	99.91%		
7.16	0.854913	0	1097	0.00%	99.91%		
8.79	0.943988	1	1098	0.09%	100.00%		
10.8	1.033423	0	1098	0.00%	100.00%		
13.3	1.123851	0	1098	0.00%	100.00%		
16.3	1.212187	0	1098	0.00%	100.00%		
20	1.201029	0	1098	0.00%	100.00%		

Regression Output:

Constant -0.28572
 Std Err of Y Est 0.005450
 R Squared 0.999637
 No. of Observations 10
 Degrees of Freedom 8

X Coefficient(s) 0.335109
 Std Err of Coef. 0.002256

0.517937 = GEOM.MED.

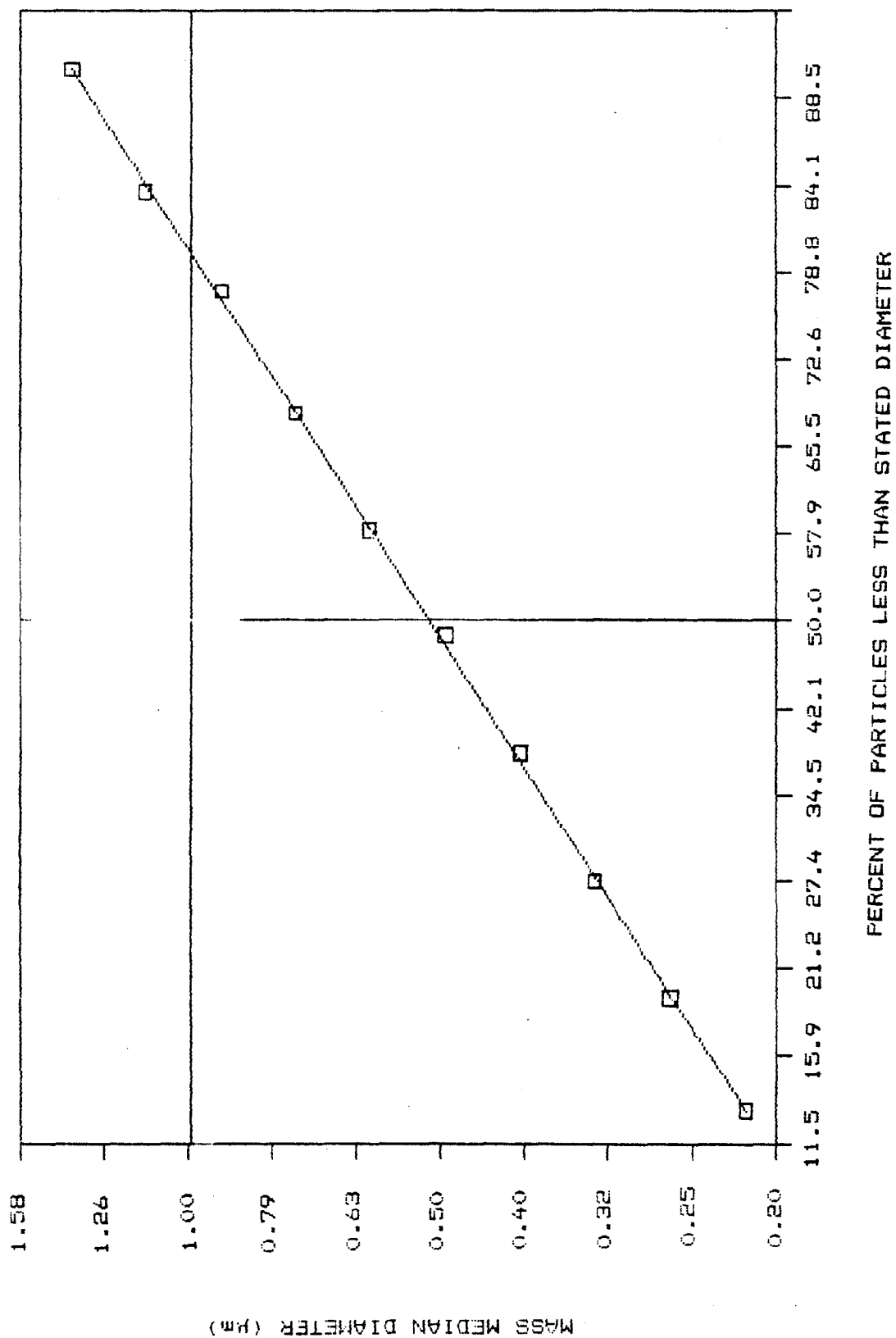
1.120436 = 84.1 %

2.163266 = GEOM.STD.DEV.

3.090554 = MASS MED.DIAM.

3 = DENSITY

5.352997 = AERO.DIAM.

LUNG 22
-EXOGEN

27-May-88

LUNG 22

-- SILICA

DIAMETER	LOG.DIAM.	COUNT	CUM.COUNT	PERCENT	CUM.PERC.	PROB.	PRED.PROB
0.0227	-1.64397	0	0	0.00%	0.00%		
0.0279	-1.55439	1	1	0.27%	0.27%		
0.0343	-1.46470	0	1	0.00%	0.27%		
0.0421	-1.37571	0	1	0.00%	0.27%		
0.0517	-1.28650	0	1	0.00%	0.27%		
0.0635	-1.19722	0	1	0.00%	0.27%		
0.078	-1.10790	2	3	0.53%	0.80%		
0.0958	-1.01863	4	7	1.07%	1.87%		
0.118	-0.92811	4	11	1.07%	2.93%		
0.144	-0.84163	12	23	3.20%	6.13%		
0.177	-0.75202	14	37	3.73%	9.87%		
0.218	-0.66154	15	52	4.00%	13.87%	-1.08270	-0.65850
0.268	-0.57186	30	82	8.00%	21.87%	-0.78355	-0.56205
0.329	-0.48280	28	110	7.47%	29.33%	-0.55268	-0.48762
0.404	-0.39361	38	148	10.13%	39.47%	-0.27324	-0.39754
0.496	-0.30451	35	183	9.33%	48.80%	-0.03082	-0.31938
0.609	-0.21538	47	230	12.53%	61.33%	0.294468	-0.21451
0.747	-0.12667	38	268	10.13%	71.47%	0.576078	-0.12372
0.918	-0.03715	36	304	9.60%	81.07%	0.884631	-0.02425
1.13	0.053078	21	325	5.60%	86.67%	1.106005	0.047117
1.38	0.139879	16	341	4.27%	90.93%		
1.7	0.230448	14	355	3.73%	94.67%		
2.09	0.320146	8	363	2.13%	96.80%		
2.56	0.408239	6	369	1.60%	98.40%		
3.15	0.498310	2	371	0.53%	98.93%		
3.87	0.587710	2	373	0.53%	99.47%		
4.75	0.676693	2	375	0.53%	100.00%		
5.83	0.765668	0	375	0.00%	100.00%		
7.16	0.854913	0	375	0.00%	100.00%		
8.79	0.943988	0	375	0.00%	100.00%		
10.8	1.033423	0	375	0.00%	100.00%		
13.3	1.123851	0	375	0.00%	100.00%		

Regression Output:

Constant -0.30944
Std Err of Y Est 0.009076
R Squared 0.998792
No. of Observations 9
Degrees of Freedom 7

X Coefficient(s) 0.322390
Std Err of Coef. 0.004236

0.490401 = GEOM.MED.

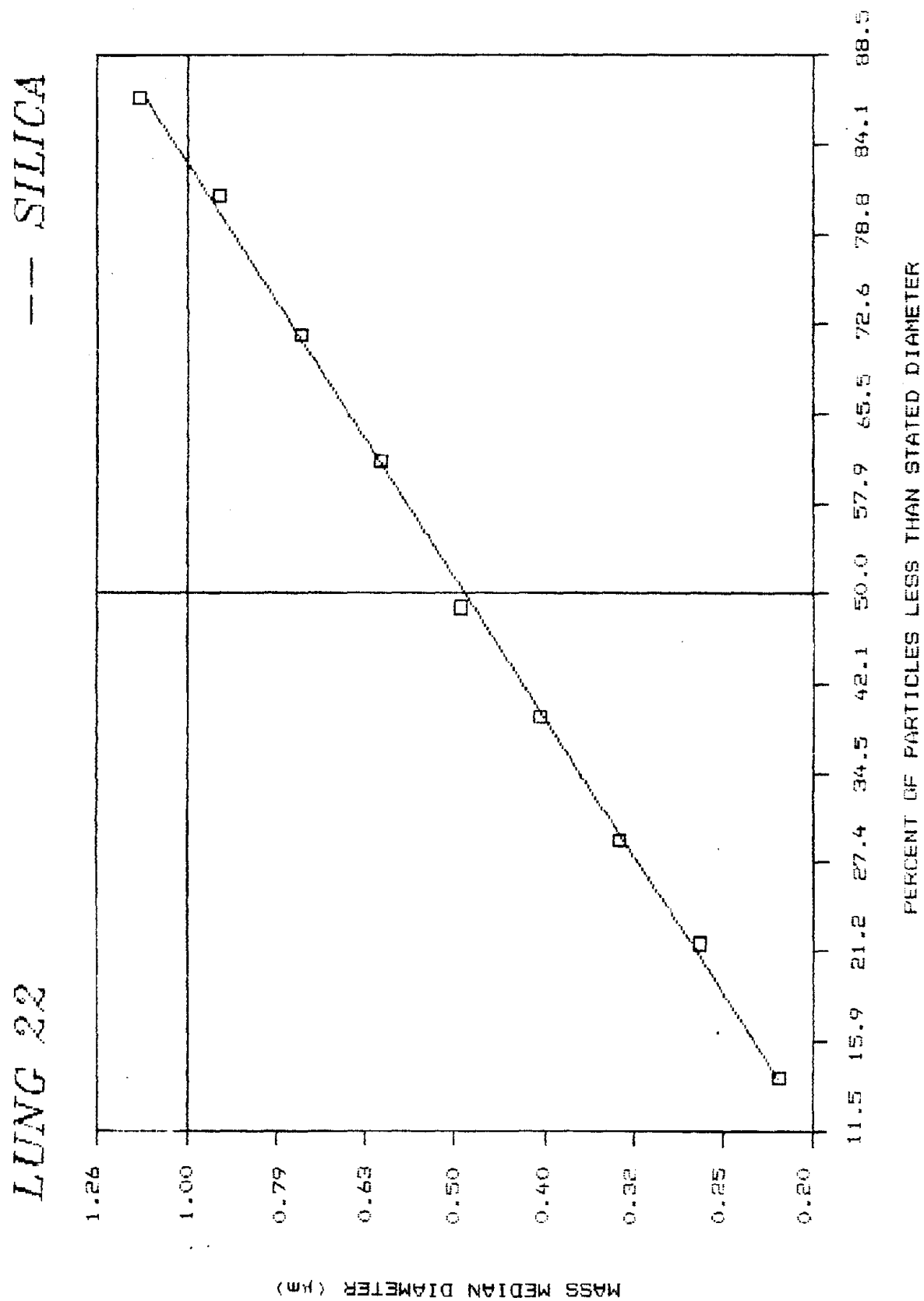
1.030249 = 84.1 %

2.100827 = GEOM.STD.DEV.

2.561763 = MASS MED.DIAM.

2.7 = DENSITY

4.209407 = AERO.DIAM.



26-May-88

LUNG 22

--EXOGEN

DIAMETER	LOG.DIAM.	COUNT	CUM.COUNT	PERCENT	CUM.PERC.	PROB.	PRED.PROB
=====	=====	=====	=====	=====	=====	=====	=====
0.0227	-1.64397	0	0	0.00%	0.00%		
0.0279	-1.55439	1	1	0.09%	0.09%		
0.0343	-1.46470	0	1	0.00%	0.09%		
0.0421	-1.37571	0	1	0.00%	0.09%		
0.0517	-1.28650	3	4	0.27%	0.36%		
0.0635	-1.19722	5	9	0.45%	0.80%		
0.078	-1.10790	10	19	0.89%	1.70%		
0.0958	-1.01863	8	27	0.71%	2.41%		
0.118	-0.92811	12	39	1.07%	3.48%		
0.144	-0.84163	27	66	2.41%	5.89%		
0.177	-0.75202	34	100	3.04%	8.93%		
0.212	-0.66154	45	145	4.02%	12.95%	-1.12329	-0.67056
0.268	-0.57186	83	228	7.41%	20.36%	-0.83460	-0.57080
0.329	-0.48280	85	313	7.59%	27.95%	-0.59341	-0.48744
0.404	-0.39361	112	425	10.00%	37.95%	-0.31366	-0.39076
0.496	-0.30451	106	531	9.46%	47.41%	-0.06655	-0.30535
0.609	-0.21538	130	661	11.61%	59.02%	0.233311	-0.20172
0.747	-0.12667	101	762	9.02%	68.04%	0.477420	-0.11735
0.918	-0.03715	98	860	8.75%	76.79%	0.739457	-0.02679
1.13	0.053078	75	935	6.70%	83.48%	0.974527	0.054441
1.38	0.139879	47	982	4.20%	87.68%	1.151952	0.115759
1.7	0.230448	46	1028	4.11%	91.79%		
2.09	0.320146	32	1060	2.86%	94.64%		
2.56	0.408239	28	1088	2.50%	97.14%		
3.15	0.498310	15	1103	1.34%	98.48%		
3.87	0.587710	8	1111	0.71%	99.20%		
4.75	0.676693	5	1116	0.45%	99.64%		
5.83	0.765668	3	1119	0.27%	99.91%		
7.16	0.854913	1	1120	0.09%	100.00%		
8.79	0.943988	0	1120	0.00%	100.00%		
10.8	1.033423	0	1120	0.00%	100.00%		
13.3	1.123851	0	1120	0.00%	100.00%		
16.3	1.212187	0	1120	0.00%	100.00%		
20	1.301029	0	1120	0.00%	100.00%		

Regression Output:

Constant -0.28235
Std Err of Y Est 0.011604
R Squared 0.998356
No. of Observations 10
Degrees of Freedom 8

X Coefficient(s) 0.345602
Std Err of Coef. 0.004958

0.521966 = GEOM.MED.

1.156763 = 84.1 %

2.216165 = GEOM.STD.DEV.

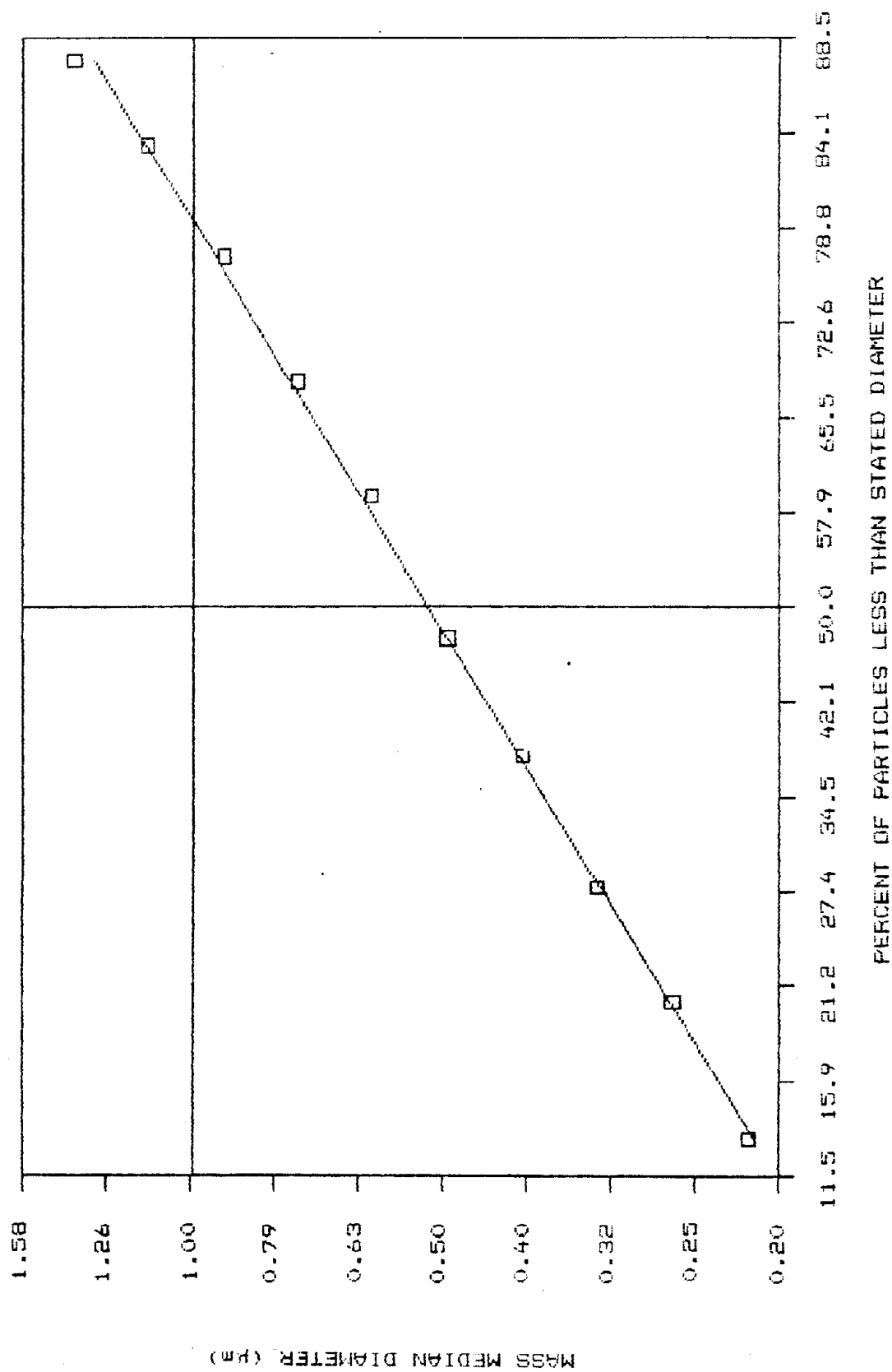
3.489311 = MASS MED.DIAM.

3 = DENSITY

6.043664 = AERO.DIAM.

LUNG 22

--EXOGEN



				PROB.		FRED.PROB	
DIAMETER	LOG.DIAM.	COUNT	CUM.COUNT	PERCENT	CUM.PERC.	CUM.PERC.	CUM.FRED.
=====							
0.0227	-1.64397	0	0	0.00%	0.00%		
0.0279	-1.55439	0	0	0.00%	0.00%		
0.0343	-1.46470	0	0	0.00%	0.00%		
0.0421	-1.37571	0	0	0.00%	0.00%		
0.0517	-1.28450	0	0	0.00%	0.00%		
0.0635	-1.19722	0	0	0.00%	0.00%		
0.078	-1.10790	3	3	0.77%	0.77%		
0.0958	-1.01863	2	5	0.51%	1.28%		
0.118	-0.92811	5	10	1.28%	2.56%		
0.144	-0.84163	15	25	3.84%	6.39%		
0.177	-0.75202	13	38	3.32%	9.72%		
0.218	-0.66154	15	53	3.84%	13.55%	-1.09625	-0.64710
0.268	-0.57186	25	78	6.39%	19.95%	-0.84875	-0.56281
0.329	-0.48280	23	101	5.88%	25.83%	-0.65719	-0.49757
0.404	-0.39361	43	144	11.00%	36.83%	-0.34364	-0.39078
0.496	-0.30451	31	175	7.93%	44.76%	-0.13500	-0.31972
0.609	-0.21538	37	212	9.46%	54.22%	0.108566	-0.23676
0.747	-0.12667	52	264	13.30%	67.52%	0.462913	-0.11608
0.918	-0.03715	37	301	9.46%	76.98%	0.745803	-0.01974
1.13	0.053078	23	324	5.88%	82.86%	0.950857	0.050095
1.38	0.139879	29	353	7.42%	90.28%		
1.7	0.230448	16	369	4.09%	94.37%		
2.09	0.320146	9	378	2.30%	96.68%		
2.56	0.408239	5	383	1.28%	97.95%		
3.15	0.498310	5	388	1.28%	99.23%		
3.87	0.587710	3	391	0.77%	100.00%		
4.75	0.676693	0	391	0.00%	100.00%		
5.83	0.765668	0	391	0.00%	100.00%		
7.16	0.854913	0	391	0.00%	100.00%		
8.79	0.943988	0	391	0.00%	100.00%		
10.8	1.033423	0	391	0.00%	100.00%		
13.3	1.123851	0	391	0.00%	100.00%		

Regression Output:

Constant -0.27374
Std Err of Y Est 0.015257
R Squared 0.996587
No. of Observations 9
Degrees of Freedom 7

0.532421 = GEOM.MED.

1.166358 = 84.1 %

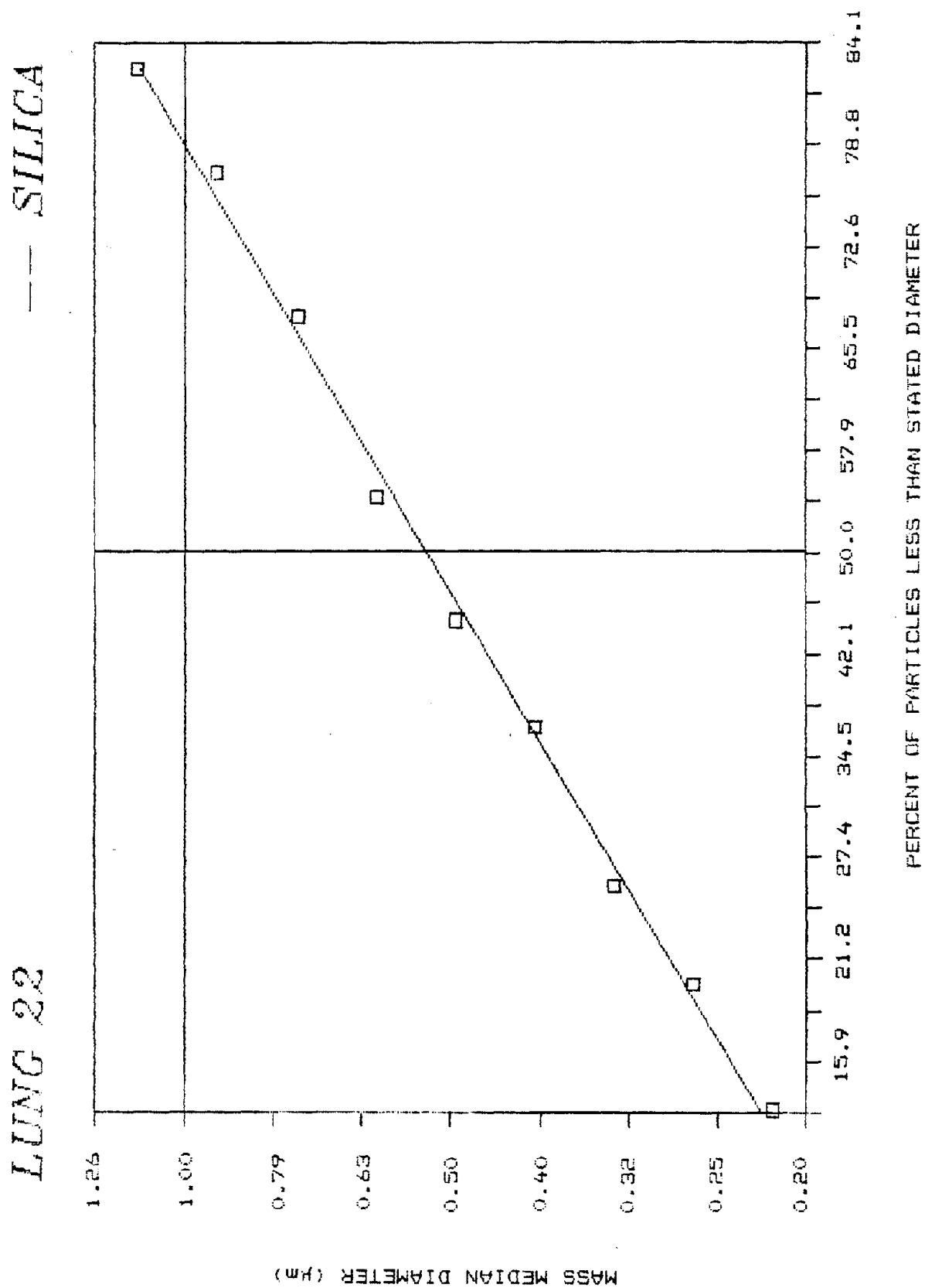
2.190668 = GEOM.STD.DEV.

X Coefficient(s) 0.340576
Std Err of Coef. 0.007532

3.369232 = MASS MED.DIAM.

2.7 = DENSITY

5.536214 = AERO.DIAM.



26-May-88

LUNG 22

--EXOGEN

268

DIAMETER	LOG.DIAM.	COUNT	CUM.COUNT	PERCENT	CUM.PERC.	PROB.	PRED.PROB
						CUM.PERC.	CUM.PREC.
0.0227	-1.54397	0	0	0.00%	0.00%		
0.0279	-1.55439	0	0	0.00%	0.00%		
0.0343	-1.46470	0	0	0.00%	0.00%		
0.0421	-1.37571	0	0	0.00%	0.00%		
0.0517	-1.28650	1	1	0.09%	0.09%		
0.0635	-1.19722	0	1	0.00%	0.09%		
0.078	-1.10790	7	8	0.61%	0.69%		
0.0958	-1.01863	5	13	0.43%	1.12%		
0.113	-0.92811	14	27	1.21%	2.33%		
0.144	-0.84163	27	54	2.33%	4.67%		
0.177	-0.75202	25	79	2.16%	6.83%		
0.218	-0.66154	45	124	3.89%	10.72%	-1.23038	-0.65132
0.268	-0.57186	74	198	6.40%	17.11%	-0.95170	-0.55916
0.329	-0.48280	75	273	6.48%	23.60%	-0.72721	-0.48493
0.404	-0.39361	99	372	8.56%	32.15%	-0.47213	-0.40058
0.496	-0.30451	108	480	9.33%	41.49%	-0.22008	-0.31723
0.609	-0.21538	113	593	9.77%	51.25%	0.032196	-0.23380
0.747	-0.12667	138	731	11.93%	63.18%	0.343893	-0.13072
0.918	-0.03715	128	859	11.06%	74.24%	0.659499	-0.02636
1.13	0.053078	86	945	7.43%	81.68%	0.906692	0.055382
1.38	0.139879	78	1023	6.74%	88.42%	1.187178	0.148135
1.7	0.230448	50	1073	4.32%	92.74%		
2.09	0.320146	34	1107	2.94%	95.68%		
2.56	0.408239	22	1129	1.90%	97.58%		
3.15	0.498310	13	1142	1.12%	98.70%		
3.87	0.587710	10	1152	0.86%	99.57%		
4.75	0.676693	3	1155	0.26%	99.83%		
5.83	0.765668	1	1156	0.09%	99.91%		
7.16	0.854913	1	1157	0.09%	100.00%		
8.79	0.943988	0	1157	0.00%	100.00%		
10.8	1.033423	0	1157	0.00%	100.00%		
13.3	1.123851	0	1157	0.00%	100.00%		
16.3	1.212187	0	1157	0.00%	100.00%		
20	1.301029	0	1157	0.00%	100.00%		

Regression Output:

Constant -0.24445
Std Err of Y Est 0.011324
R Squared 0.998434
No. of Observations 10
Degrees of Freedom 8

X Coefficient(s) 0.330688
Std Err of Coef. 0.004629

0.569572 = GEOM.MED.

1.219657 = 84.1 %

2.141355 = GEOM.STD.DEV.

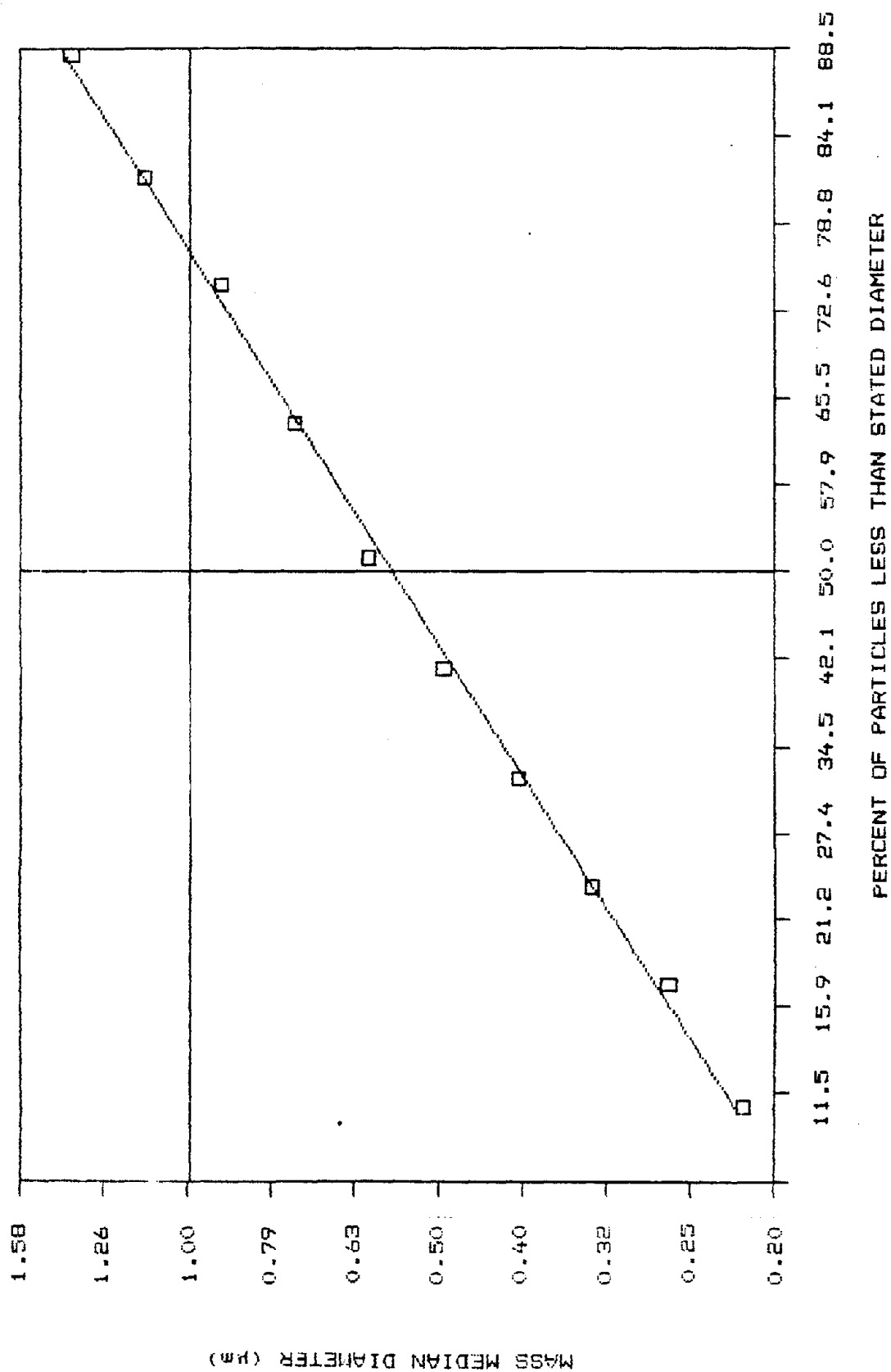
3.243200 = MASS MED.DIAM.

3 = DENSITY

5.617388 = AERO.DIAM.

LUNG 22

--EXOGEN



27-May-88

LUNG 22

-- SILICA

DIAMETER	LOG.DIAM.	COUNT	CUM.COUNT	PERCENT	CUM.PERC.	PROB.	PRED.PROB
0.0227	-1.64397	0	0	0.00%	0.00%		
0.0279	-1.55439	0	0	0.00%	0.00%		
0.0343	-1.46470	0	0	0.00%	0.00%		
0.0421	-1.37571	0	0	0.00%	0.00%		
0.0517	-1.28650	1	1	0.31%	0.31%		
0.0635	-1.19722	0	1	0.00%	0.31%		
0.078	-1.10790	0	1	0.00%	0.31%		
0.0958	-1.01863	2	3	0.62%	0.92%		
0.118	-0.92811	4	7	1.23%	2.15%		
0.144	-0.84163	8	15	2.46%	4.62%		
0.177	-0.75202	12	27	3.69%	8.31%		
0.218	-0.66154	15	42	4.62%	12.92%	-1.12434	-0.65938
0.268	-0.57186	27	69	8.31%	21.23%	-0.80483	-0.55110
0.329	-0.48280	22	91	6.77%	28.00%	-0.59182	-0.47892
0.404	-0.39361	27	118	8.31%	36.31%	-0.35770	-0.39958
0.496	-0.30451	27	145	8.31%	44.62%	-0.13866	-0.32535
0.609	-0.21538	36	181	11.08%	55.69%	0.146634	-0.22867
0.747	-0.12667	35	216	10.77%	66.46%	0.433455	-0.13147
0.918	-0.03715	29	245	8.92%	75.38%	0.694909	-0.04287
1.13	0.053078	34	279	10.46%	85.85%	1.070397	0.084367
1.38	0.139879	10	289	3.08%	88.92%	1.212120	0.132394
1.7	0.230448	11	300	3.38%	92.31%		
2.09	0.320146	13	313	4.00%	96.31%		
2.56	0.408239	4	317	1.23%	97.54%		
3.15	0.498310	2	319	0.62%	98.15%		
3.87	0.587710	3	322	0.92%	99.08%		
4.75	0.676693	2	324	0.62%	99.69%		
5.83	0.765668	0	324	0.00%	99.69%		
7.16	0.854913	1	325	0.31%	100.00%		
8.79	0.943988	0	325	0.00%	100.00%		
10.8	1.033423	0	325	0.00%	100.00%		
13.3	1.123851	0	325	0.00%	100.00%		
16.3	1.212187	0	325	0.00%	100.00%		
20	1.301029	0	325	0.00%	100.00%		

Regression Output:

Constant -0.27836
Std Err of Y Est 0.016537
R Squared 0.996661
No. of Observations 10
Degrees of Freedom 8

X Coefficient(s) 0.338877
Std Err of Coef. 0.006934

0.526786 = GEOM.MED.

1.149506 = 84.1 %

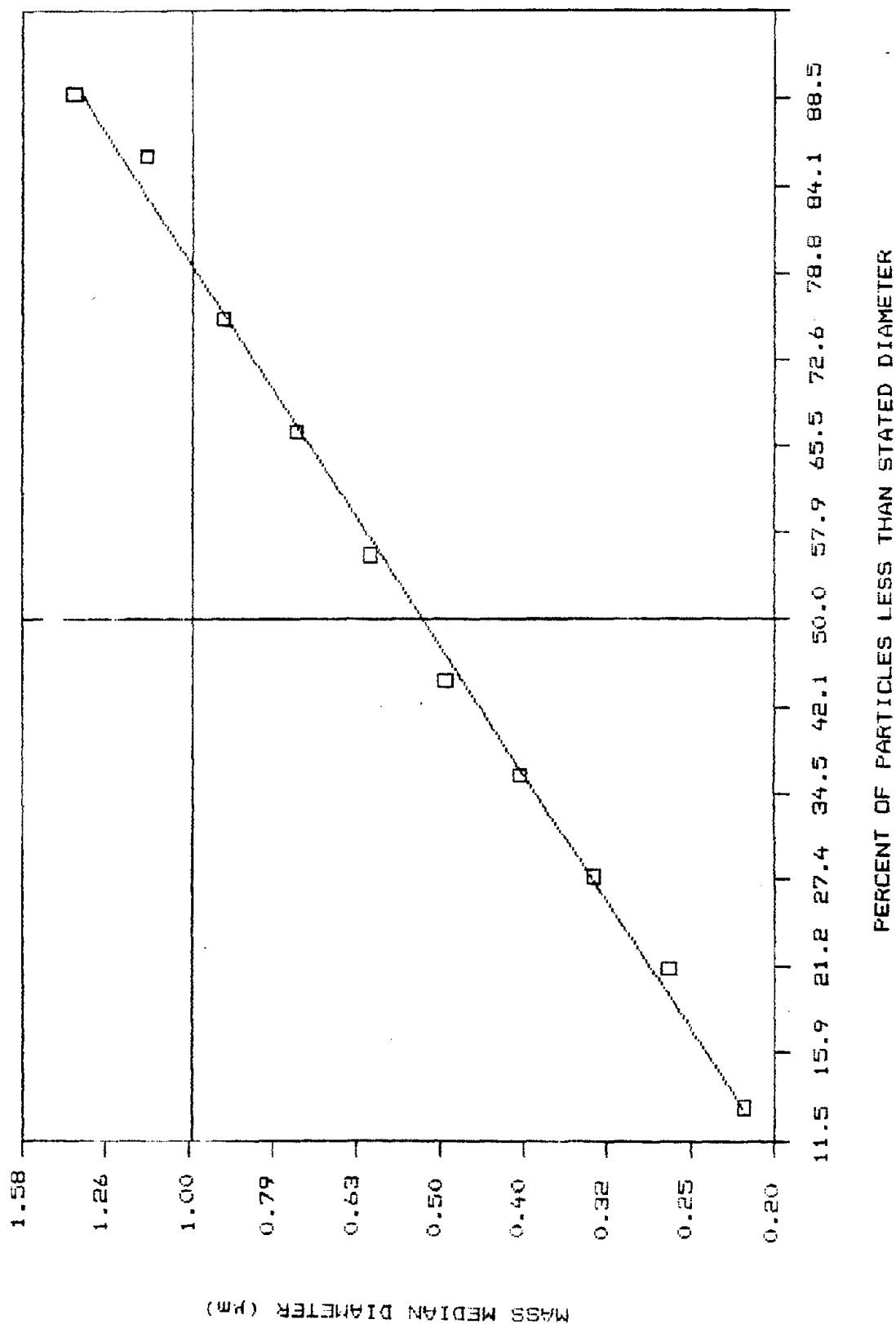
2.182112 = GEOM.STD.DEV.

3.272903 = MASS MED.DIAM.

2.7 = DENSITY

5.377929 = AERO.DIAM.

LUNG 22 --- SILICA



26-May-88

LUNG 22

--EXOGEN

272

DIAMETER	LOG.DIAM.	COUNT	CUM.COUNT	PERCENT	CUM.PERC.	PROB.	PRED.PROB
						CUM.PERC.	CUM.PREC.
0.0227	-1.64397	0	0	0.00%	0.00%		
0.0279	-1.55439	0	0	0.00%	0.00%		
0.0343	-1.46470	0	0	0.00%	0.00%		
0.0421	-1.37571	0	0	0.00%	0.00%		
0.0517	-1.28650	1	1	0.09%	0.09%		
0.0635	-1.19722	0	1	0.00%	0.09%		
0.078	-1.10790	1	2	0.09%	0.19%		
0.0953	-1.01863	5	7	0.47%	0.66%		
0.118	-0.92811	14	21	1.33%	1.99%		
0.144	-0.84163	21	42	1.99%	3.99%		
0.177	-0.75202	31	73	2.94%	6.93%		
0.218	-0.66154	50	123	4.75%	11.68%	-1.18236	-0.67480
0.268	-0.57186	70	193	6.65%	18.33%	-0.90649	-0.57460
0.329	-0.48280	76	269	7.22%	25.55%	-0.66596	-0.48723
0.404	-0.39361	113	382	10.73%	36.28%	-0.35852	-0.37556
0.496	-0.30451	87	469	8.26%	44.54%	-0.14063	-0.29641
0.609	-0.21538	93	562	8.83%	53.37%	0.086685	-0.21384
0.747	-0.12667	101	663	9.59%	62.96%	0.338036	-0.12255
0.918	-0.03715	97	760	9.21%	72.17%	0.597009	-0.02848
1.13	0.053078	75	835	7.12%	79.30%	0.822751	0.053513
1.38	0.139879	52	887	4.94%	84.24%	1.004114	0.119390
1.7	0.230448	65	952	6.17%	90.41%		
2.09	0.320146	42	994	3.99%	94.40%		
2.56	0.408239	28	1022	2.66%	97.06%		
3.15	0.498310	15	1037	1.42%	98.48%		
3.87	0.587710	9	1046	0.85%	99.34%		
4.75	0.676693	5	1051	0.47%	99.81%		
5.83	0.765668	1	1052	0.09%	99.91%		
7.16	0.854913	1	1053	0.09%	100.00%		
8.79	0.943988	0	1053	0.00%	100.00%		
10.8	1.033423	0	1053	0.00%	100.00%		
13.3	1.123851	0	1053	0.00%	100.00%		
16.3	1.212187	0	1053	0.00%	100.00%		
20	1.301029	0	1053	0.00%	100.00%		

Regression Output:

Constant -0.24533
 Std Err of Y Est 0.011775
 R Squared 0.998307
 No. of Observations 10
 Degrees of Freedom 8

0.568412 = GEOM.MED.

1.311885 = 84.1 %

2.307979 = GEOM.STD.DEV.

X Coefficient(s) 0.363231
 Std Err of Coef. 0.005288

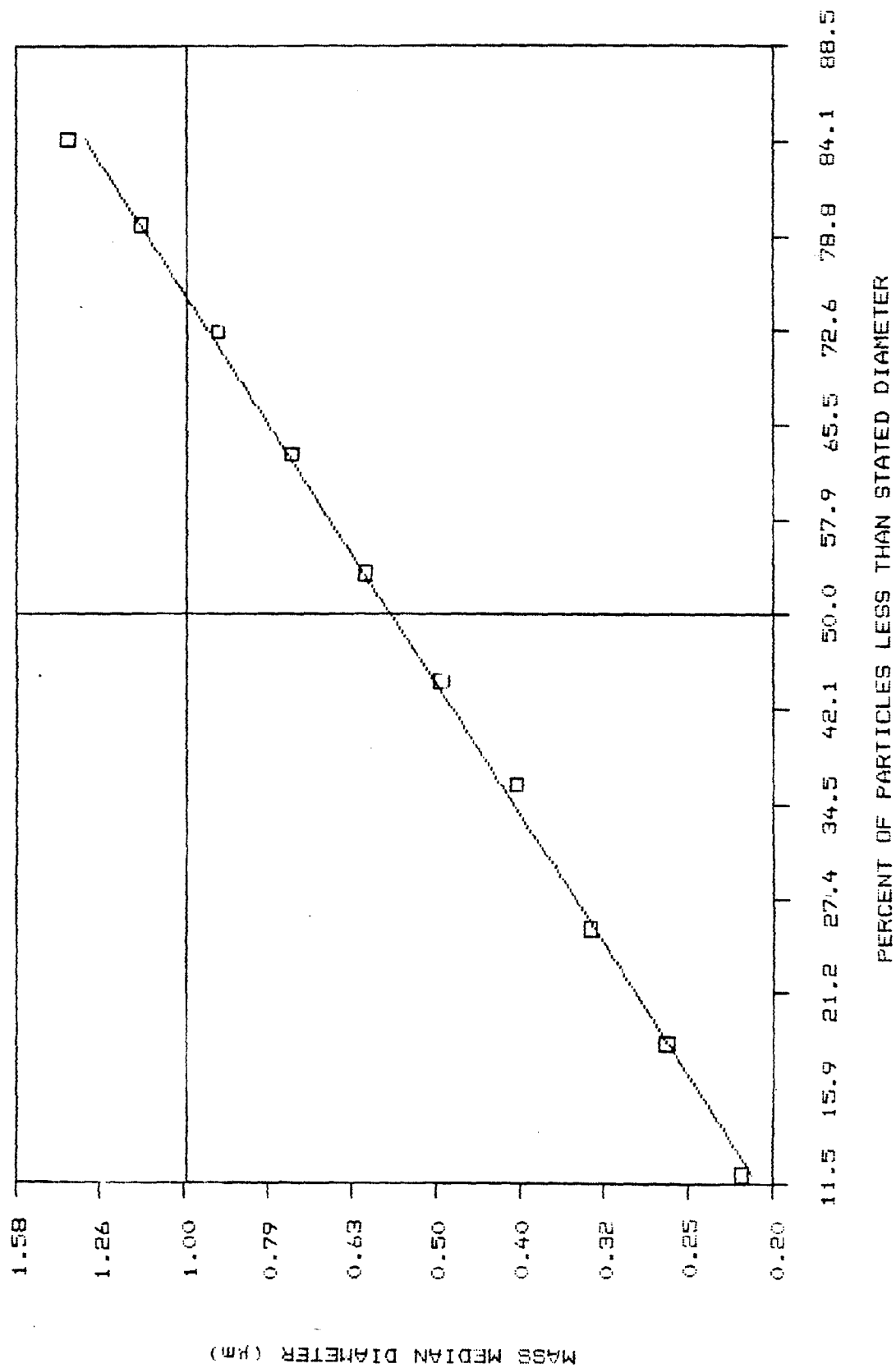
4.635405 = MASS MED.DIAM.

3 = DENSITY

8.028757 = AERO.DIAM.

---EXOGEN

LUNG 22



27-May-88

LUNG 22

--SILICA

274

DIAMETER	LOG.DIAM.	COUNT	CUM.COUNT	PERCENT	CUM.PERC.	PROB.	PRED.PROB
0.0227	-1.64397	0	0	0.00%	0.00%		
0.0279	-1.55439	0	0	0.00%	0.00%		
0.0343	-1.46470	0	0	0.00%	0.00%		
0.0421	-1.37571	0	0	0.00%	0.00%		
0.0517	-1.28650	2	2	0.77%	0.77%		
0.0635	-1.19722	0	2	0.00%	0.77%		
0.078	-1.10790	4	6	1.53%	2.30%		
0.0958	-1.01863	2	8	0.77%	3.07%		
0.118	-0.92811	3	11	1.15%	4.21%		
0.144	-0.84163	5	16	1.92%	6.13%		
0.177	-0.75202	11	27	4.21%	10.34%	-1.24977	-0.72505
0.218	-0.66154	9	36	3.45%	13.79%	-1.08588	-0.67147
0.268	-0.57186	20	56	7.66%	21.46%	-0.79726	-0.57711
0.329	-0.48280	22	78	8.43%	29.89%	-0.53669	-0.49192
0.404	-0.39361	31	109	11.88%	41.76%	-0.21286	-0.38604
0.496	-0.30451	20	129	7.66%	49.43%	-0.01476	-0.32127
0.609	-0.21538	26	155	9.96%	59.39%	0.243009	-0.23700
0.747	-0.12667	36	191	13.79%	73.18%	0.627113	-0.11142
0.918	-0.03715	22	213	8.43%	81.61%	0.904229	-0.02082
1.13	0.053078	14	227	5.36%	86.97%	1.119671	0.049616
1.38	0.139879	17	244	6.51%	93.49%		
1.7	0.230448	8	252	3.07%	96.55%		
2.09	0.320146	4	256	1.53%	98.08%		
2.56	0.408239	4	260	1.53%	99.62%		
3.15	0.498310	1	261	0.38%	100.00%		
3.87	0.587710	0	261	0.00%	100.00%		
4.75	0.676693	0	261	0.00%	100.00%		
5.83	0.765668	0	261	0.00%	100.00%		
7.16	0.854913	0	261	0.00%	100.00%		
8.79	0.943988	0	261	0.00%	100.00%		
10.8	1.033423	0	261	0.00%	100.00%		
13.3	1.123851	0	261	0.00%	100.00%		
16.3	1.212187	0	261	0.00%	100.00%		
20	1.301029	0	261	0.00%	100.00%		

Regression Output:

Constant -0.31645
Std Err of Y Est 0.016785
R Squared 0.996573
No. of Observations 10
Degrees of Freedom 8

X Coefficient(s) 0.326943
Std Err of Coef. 0.006777

0.482556 = GEOM.MED.

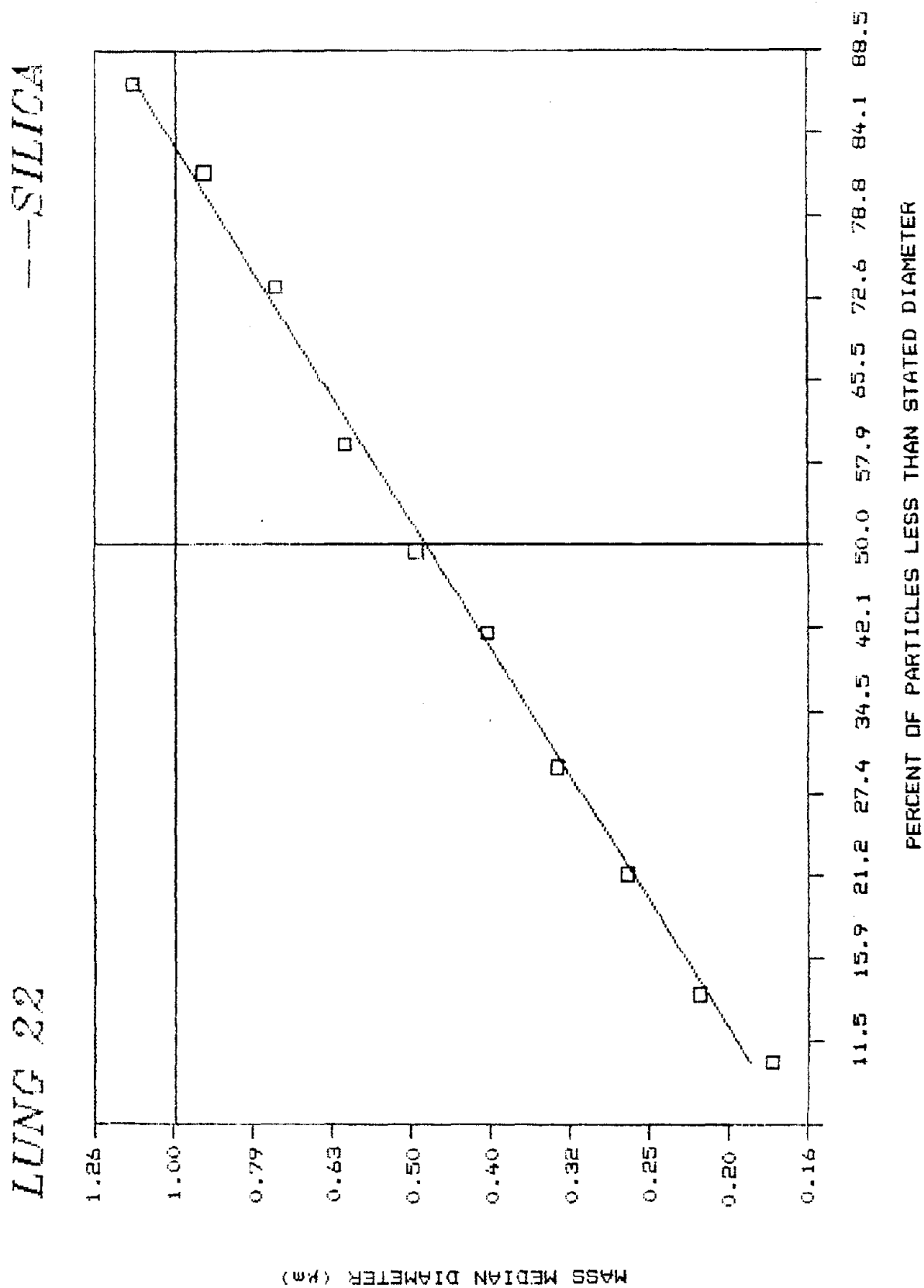
1.024450 = 84.1 %

2.122966 = GEOM.STD.DEV.

2.642143 = MASS MED.DIAM.

2.7 = DENSITY

4.341484 = AERO.DIAM.



26-May-88

LUNG 22

--EXOGEN

		PROB.				FRED.PROB	
DIAMETER	LOG.DIAM.	COUNT	CUM.COUNT	PERCENT	CUM.PERC.	CUM.PERC.	CUM.PREC.
0.0227	-1.64397	0	0	0.00%	0.00%		
0.0279	-1.55439	0	0	0.00%	0.00%		
0.0343	-1.46470	0	0	0.00%	0.00%		
0.0421	-1.37571	0	0	0.00%	0.00%		
0.0517	-1.22650	3	3	0.26%	0.26%		
0.0635	-1.19722	5	8	0.43%	0.69%		
0.078	-1.10790	8	16	0.69%	1.37%		
0.0958	-1.01863	10	26	0.86%	2.23%		
0.118	-0.92811	19	45	1.63%	3.86%		
0.144	-0.84163	36	81	3.08%	6.94%		
0.177	-0.75202	39	120	3.34%	10.28%	-1.25305	-0.76336
0.218	-0.66154	61	181	5.23%	15.51%	-1.01430	-0.67216
0.268	-0.57186	84	265	7.20%	22.71%	-0.75587	-0.57346
0.329	-0.48280	102	367	8.74%	31.45%	-0.49199	-0.47266
0.404	-0.39361	102	469	8.74%	40.19%	-0.25418	-0.38183
0.496	-0.30451	104	573	8.91%	49.10%	-0.02311	-0.29357
0.609	-0.21538	97	670	8.31%	57.41%	0.191318	-0.21167
0.747	-0.12667	108	778	9.25%	66.67%	0.439144	-0.11701
0.918	-0.03715	86	864	7.37%	74.04%	0.653128	-0.03527
1.13	0.053078	73	937	6.26%	80.29%	0.857150	0.042649
1.38	0.139879	66	1003	5.66%	85.95%	1.074696	0.125742
1.7	0.230448	53	1056	4.54%	90.49%		
2.09	0.320146	35	1091	3.00%	93.49%		
2.56	0.408239	31	1122	2.66%	96.14%		
3.15	0.498310	14	1136	1.20%	97.34%		
3.87	0.587710	11	1147	0.94%	98.29%		
4.75	0.676693	9	1156	0.77%	99.06%		
5.83	0.765668	7	1163	0.60%	99.66%		
7.16	0.854913	2	1165	0.17%	99.83%		
8.79	0.943988	2	1167	0.17%	100.00%		
10.8	1.033423	0	1167	0.00%	100.00%		
13.3	1.123851	0	1167	0.00%	100.00%		
16.3	1.212187	0	1167	0.00%	100.00%		
20	1.301029	0	1167	0.00%	100.00%		

Regression Output:

Constant -0.28474
Std Err of Y Est 0.010669
R Squared 0.998829
No. of Observations 11
Degrees of Freedom 9

X Coefficient(s) 0.381957
Std Err of Coef. 0.004358

0.519102 = GEOM.MED.

1.250867 = 84.1 %

2.409671 = GEOM.STD.DEV.

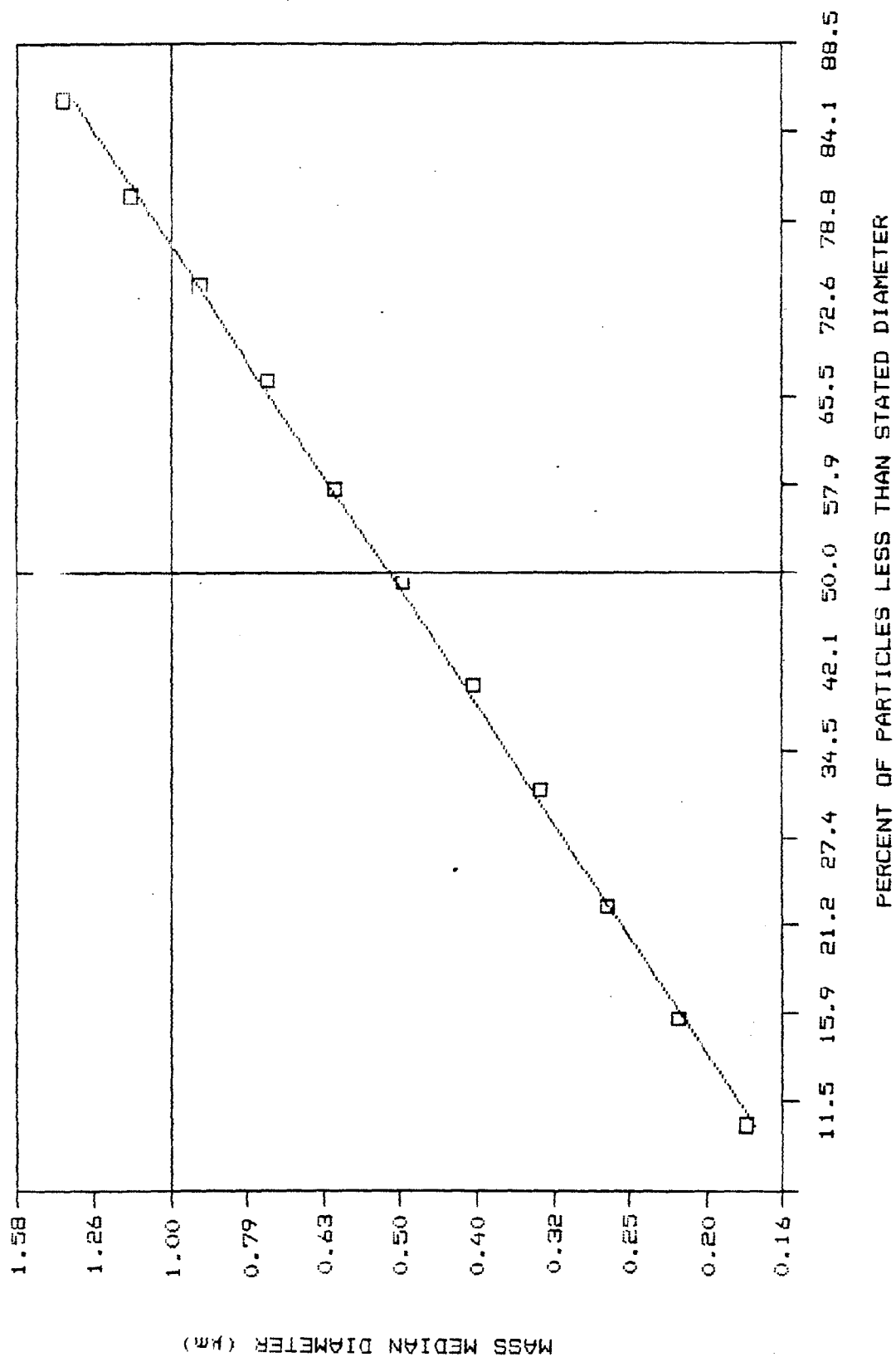
5.285358 = MASS MED.DIAM.

3 = DENSITY

9.154509 = AERO.DIAM.

LUNG 22

--EXOGEN



APPENDIX 3

LEMONT SUMMARY PARTICLE CONCENTRATION/COMPOSITION/SIZE DATA
FOR 35 COAL MINER LUNGS

LUNG SAMPLE: LUNG 1 - PREP 3389 1ML D-570

PARTICLE CLASS	NUMBER FOUND	NUMBER IN 100ML SOLUTION	NUMBER IN 100ML BLANK	NET TOTAL		NUMBER %	EXOGENOUS %	MEDIAN* AREA EQUI. DIAMETER	MASS MEDIAN* AREA EQUI. DIAMETER	AERO- DYNAMIC DIAMETER
		6-- X10	6-- X10	6-- X10	6-- X10					
SILICA	397.	132.3	0.0	132.3	1440.	28.27	28.81	0.66	2.01	3.28
ALUM. SILICATE	806.	268.6	0.0	268.6	2923.	57.40	58.48	0.80	4.69	7.70
-KAOLIN-LIKE	181.	60.3	0.0	60.3	656.	12.89	13.13	0.61	2.11	3.39
-K FELDSP./MICA	555.	184.9	0.0	184.9	2012.	39.52	40.27	0.89	4.70	7.51
-FE AL SILICATE	8.	2.7	0.0	2.7	29.	0.57	0.58	0.92	1.70	2.80
-CA AL SILICATE	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-ALBITE-LIKE	14.	4.7	0.0	4.7	51.	1.00	1.02	0.68	1.56	2.53
-NA CA AL SIL.	1.	0.3	0.0	0.3	4.	0.07	0.07	1.26	1.26	2.06
-NA FE AL SIL.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-CA FE AL SIL.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-AL SIL.--TR FE	16.	5.3	0.0	5.3	58.	1.14	1.16	0.79	1.80	2.96
-AL SIL.--PURE	3.	1.0	0.0	1.0	11.	0.21	0.22	0.64	0.68	1.11
-K(Fe) AL SIL.	13.	4.3	0.0	4.3	47.	0.93	0.94	1.02	2.45	4.03
TALC-LIKE	17.	5.7	0.0	5.7	62.	1.21	1.23	0.71	1.78	2.95
-PURE TALC	17.	5.7	0.0	5.7	62.	1.21	1.23	0.71	1.78	2.95
IRON OXIDE	9.	3.0	0.0	3.0	33.	0.64**	0.00	0.26	0.77	1.72
RUTILE-LIKE	58.	19.3	0.3	19.0	207.	4.06	4.14	0.42	3.28	7.34
ALUMINA-LIKE	3.	1.0	0.0	1.0	11.	0.21	0.22	0.55	1.00	1.56
COMBO-ENDOGEN.	15.	5.0	0.0	5.0	54.	1.07	1.02	0.45	2.74	4.74
-PURE ENDOGEN.	1.	0.3	0.0	0.3	4.	0.07**	0.00	0.30	0.30	0.52
-TRACE-ENDOGEN.	0.	0.0	0.0	0.0	0.	0.00**	0.00	*****	*****	*****
-SILICA-COMBO	1.	0.3	0.0	0.3	4.	0.07	0.07	0.37	0.37	0.60
-AL SIL.-ENDOG.	2.	0.7	0.0	0.7	7.	0.14	0.15	1.38	1.53	2.51
SILICON RICH	34.	11.3	0.3	11.0	120.	2.35	2.40	0.75	1.92	3.33
-FE SILICATE	3.	1.0	0.0	1.0	11.	0.21	0.22	1.26	1.84	3.18
IRON RICH	12.	4.0	0.6	3.4	37.	0.72	0.73	0.55	1.38	2.92
-SI FE BINARY	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-AL,SI--FE RICH	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
TITANIUM RICH	19.	6.3	0.0	6.3	69.	1.35	1.38	0.39	1.46	3.25
-TI FE BINARY	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-FE,SI TI RICH	1.	0.3	0.0	0.3	4.	0.07	0.07	0.13	0.13	0.28
-AL,SI TI RICH	4.	1.3	0.0	1.3	15.	0.28	0.29	0.50	0.79	1.59
OTHER AL SIL.	7.	2.3	0.0	2.3	25.	0.50	0.51	0.55	1.80	2.95
NO XRAYS	16.	5.3	0.0	5.3	58.	1.14**	0.00	0.83	2.21	2.21
ALUMINUM RICH	10.	3.3	0.0	3.3	36.	0.71	0.73	0.53	0.85	1.47
-PURE AL SIL.	5.	1.7	0.0	1.7	18.	0.36	0.36	0.37	1.00	1.73
-FE,SI--AL RICH	3.	1.0	0.0	1.0	11.	0.21	0.22	0.68	0.78	1.35
-FE AL BINARY	1.	0.3	0.0	0.3	4.	0.07	0.07	0.55	0.55	0.96
MISCELLANEOUS	5.	1.7	0.0	1.7	18.	0.36	0.36	0.30	0.65	1.13
TOT. EXOGENOUS	1382.	460.5	1.3	459.3	4997.	98.15	100.00	0.70	4.19	7.25
ALL TYPES	1408.	469.2	1.3	467.9	5092.	100.00	98.15	0.70	4.15	6.92

* PARTICLES IN BLANK ARE NOT SUBTRACTED

** ENDOGENOUS CLASS

SUMMARY OF PARTICLE ANALYSIS

BLANK SAMPLE: BLANK TO LUNG 1 - PREP 3390 1ML D-572

PARTICLE CLASS	NUMBER FOUND	NUMBER IN	NUMBER IN	NET TOTAL	NET TOTAL	NUMBER %	EXOGENOUS %	MEDIAN* AREA EQUI. DIAMETER	MASS MEDIAN* AREA EQUI. DIAMETER	AERO- DYNAMIC DIAMETER
		100ML SOLUTION	100ML BLANK	100ML SOLUTION	PER GRAM OF DRY TISSUE					
		----- 6----- X10	----- 6----- X10	----- 6----- X10	----- 6----- X10					
SILICA	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
ALUM. SILICATE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-KAOLIN-LIKE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-K FELDSP./MICA	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE AL SILICATE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-CA AL SILICATE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-ALBITE-LIKE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-NA CA AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-NA FE AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-CA FE AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL SIL.--TR FE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL SIL.--PURE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-K(FE) AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
TALC-LIKE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-PURE TALC	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
IRON OXIDE	0.	*	0.0	*	*	0.00**	0.00	*****	*****	*****
RUTILE-LIKE	1.	*	0.3	*	*	25.00	25.00	0.13	0.13	0.29
ALUMINA-LIKE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
COMBO-ENDOGEN.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-PURE ENDOGEN.	0.	*	0.0	*	*	0.00**	0.00	*****	*****	*****
-TRACE-ENDOGEN.	0.	*	0.0	*	*	0.00**	0.00	*****	*****	*****
-SILICA-COMBO	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL SIL.-ENDOG.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
SILICON RICH	1.	*	0.3	*	*	25.00	25.00	0.24	0.24	0.42
-FE SILICATE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
IRON RICH	2.	*	0.6	*	*	50.00	50.00	0.61	0.64	1.36
-SI FE BINARY	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL,SI--FE RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
TITANIUM RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-TI FE BINARY	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE,SI TI RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL,SI TI RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
OTHER AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
NO XRAYs	0.	*	0.0	*	*	0.00**	0.00	*****	*****	*****
ALUMINUM RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-PURE AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE,SI--AL RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE AL BINARY	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
MISCELLANEOUS	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
TOT. EXOGENOUS	4.	*	1.3	*	*	100.00	100.00	0.50	0.64	1.10
ALL TYPES	4.	*	1.3	*	*	100.00	100.00	0.50	0.64	1.34

* PARTICLES IN BLANK ARE NOT SUBTRACTED

** ENDOGENOUS CLASS

SUMMARY OF PARTICLE ANALYSES

LUNG SAMPLE: LUNG 2 - PREP 3480 1ML D-573,580

PARTICLE CLASS	NUMBER FOUND	NUMBER	NUMBER	NET TOTAL		NUMBER	EXOGENOUS	MEDIAN* AREA EQUI. DIAMETER	MASS MEDIAN* AREA EQUI. DIAMETER	AERO- DYNAMIC DIAMETER
		IN	IN	IN	NET TOTAL					
		100ML	100ML	100ML	PER GRAM OF					
		SOLUTION	BLANK	SOLUTION	DRY TISSUE					
-----	-----	6--	6--	6--	6--	-	-	-----	-----	-----
		X10	X10	X10	X10			(UM)	(UM)	(UM)
SILICA	89.	13.8	0.5	13.3	135.	4.03	8.23	0.81	2.55	4.17
ALUM. SILICATE	316.	49.0	0.9	48.0	488.	14.54	29.67	0.83	4.32	7.10
-KAOLIN-LIKE	48.	7.4	0.8	6.7	68.	2.02	4.11	0.72	2.51	4.05
-K FELDSP./MICA	72.	11.2	0.0	11.2	113.	3.38	6.89	1.04	4.20	6.71
-FE AL SILICATE	35.	5.4	0.0	5.4	55.	1.64	3.35	0.58	3.12	5.13
-CA AL SILICATE	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-ALBITE-LIKE	4.	0.6	0.0	0.6	6.	0.19	0.38	0.61	0.78	1.26
-NA CA AL SIL.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-NA FE AL SIL.	1.	0.2	0.0	0.2	2.	0.05	0.10	1.26	1.26	2.06
-CA FE AL SIL.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-AL SIL.--TR FE	47.	7.3	0.2	7.1	72.	2.16	4.40	0.93	1.83	3.00
-AL SIL.--PURE	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-K(FE) AL SIL.	52.	8.1	0.0	8.1	82.	2.44	4.98	0.71	5.88	9.66
TALC-LIKE	8.	1.2	0.0	1.2	13.	0.38	0.77	1.70	3.08	5.11
-PURE TALC	7.	1.1	0.0	1.1	11.	0.33	0.67	0.68	3.25	5.39
IRON OXIDE	17.	2.6	0.0	2.6	27.	0.80**	0.00	0.43	1.84	4.11
RUTILE-LIKE	30.	4.6	0.8	3.9	39.	1.17	2.39	0.33	2.30	5.14
ALUMINA-LIKE	5.	0.8	0.0	0.8	8.	0.23	0.48	0.47	0.78	1.21
COMBO-ENDOGEN.	1498.	232.2	0.0	232.2	2357.	70.26	45.17	0.58	3.07	5.32
-PURE ENDOGEN.	604.	93.6	0.0	93.6	950.	28.33**	0.00	0.44	1.86	3.22
-TRACE-ENDOGEN.	422.	65.4	0.0	65.4	664.	19.79**	0.00	0.67	2.70	4.68
-SILICA-COMBO	76.	11.8	0.0	11.8	120.	3.56	7.27	0.72	3.06	4.99
-AL SIL.-ENDOGEN.	363.	56.3	0.0	56.3	571.	17.03	34.74	0.81	3.32	5.45
SILICON RICH	27.	4.2	0.2	4.0	41.	1.22	2.49	0.49	1.99	3.44
-FE SILICATE	17.	2.6	0.0	2.6	27.	0.80	1.63	0.83	1.72	2.97
IRON RICH	23.	3.6	0.2	3.4	35.	1.03	2.11	0.38	1.04	2.21
-SI FE BINARY	7.	1.1	0.0	1.1	11.	0.33	0.67	0.37	1.17	2.49
-AL,SI--FE RICH	5.	0.8	0.0	0.8	8.	0.23	0.48	0.30	1.01	2.15
TITANIUM RICH	19.	2.9	0.0	2.9	30.	0.89	1.82	0.37	1.29	2.87
-TI FE BINARY	2.	0.3	0.0	0.3	3.	0.09	0.19	0.22	0.23	0.51
-FE,SI TI RICH	2.	0.3	0.0	0.3	3.	0.09	0.19	0.50	0.54	1.14
-AL,SI TI RICH	4.	0.6	0.0	0.6	6.	0.19	0.38	0.18	1.02	2.04
OTHER AL SIL.	13.	2.0	0.0	2.0	20.	0.61	1.24	0.45	1.41	2.32
NO X-RAYS	58.	9.0	2.2	6.8	69.	2.06**	0.00	0.56	2.28	2.28
ALUMINUM RICH	6.	0.9	0.3	0.6	6.	0.19	0.38	0.55	2.77	4.79
-PURE AL SIL.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-FE,SI--AL RICH	1.	0.2	0.0	0.2	2.	0.05	0.10	1.89	1.89	3.28
-FE AL BINARY	3.	0.5	0.2	0.3	3.	0.09	0.19	0.31	0.53	0.93
MISCELLANEOUS	55.	8.5	0.0	8.5	87.	2.58	5.26	1.02	4.14	7.18
TOT. EXOGENOUS	1063.	164.8	2.8	162.0	1644.	49.02	100.00	0.76	3.86	6.69
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ALL TYPES	2164.	335.4	5.0	330.4	3355.	100.00	49.02	0.61	3.33	5.71

* PARTICLES IN BLANK ARE NOT SUBTRACTED

** ENDOGENOUS CLASS

SUMMARY OF PARTICLE ANALYSIS

282

BLANK SAMPLE: BLANK TO LUNG 2 - PREP 3481 1ML D-573,580

PARTICLE CLASS	NUMBER FOUND	NUMBER	NUMBER	NET TOTAL	NET TOTAL	NUMBER %	EXOGENOUS %	MEDIAN*	MASS	AERO- DYNAMIC DIAMETER (UM)
		IN	IN	IN	PER GRAM OF			AREA EQUI.	MEDIAN*	
		100ML	100ML	100ML	DRY TISSUE			DIAMETER	AREA EQUI.	
		SOLUTION	BLANK	SOLUTION				DIAMETER	DIAMETER	
		6--	6--	6--	6--					
		X10	X10	X10	X10			(UM)	(UM)	
SILICA	3.	*	0.5	*	*	9.38	16.67	0.30	0.33	0.55
ALUM. SILICATE	6.	*	0.9	*	*	18.75	33.33	0.33	0.65	1.07
-KAOLIN-LIKE	5.	*	0.8	*	*	15.63	27.78	0.55	0.65	1.06
-K FELDSP./MICA	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE AL SILICATE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-CA AL SILICATE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-ALBITE-LIKE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-NA CA AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-NA FE AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-CA FE AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL SIL.--TR FE	1.	*	0.2	*	*	3.12	5.56	0.30	0.30	0.49
-AL SIL.--PURE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-K(FE) AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
TALC-LIKE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-PURE TALC	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
IRON OXIDE	0.	*	0.0	*	*	0.00**	0.00	*****	*****	*****
RUTILE-LIKE	5.	*	0.8	*	*	15.63	27.78	0.38	0.48	1.07
ALUMINA-LIKE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
COMBO-ENDOGEN.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-PURE ENDOGEN.	0.	*	0.0	*	*	0.00**	0.00	*****	*****	*****
-TRACE-ENDOGEN.	0.	*	0.0	*	*	0.00**	0.00	*****	*****	*****
-SILICA-COMBO	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL SIL.-ENDOG.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
SILICON RICH	1.	*	0.2	*	*	3.12	5.56	0.37	0.37	0.63
-FE SILICATE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
IRON RICH	1.	*	0.2	*	*	3.12	5.56	0.09	0.09	0.18
-SI FE BINARY	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL,SI--FE RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
TITANIUM RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-TI FE BINARY	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE,SI TI RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL,SI TI RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
OTHER AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
NO XRAY	14.	*	2.2	*	*	43.75**	0.00	0.39	1.06	1.06
ALUMINUM RICH	2.	*	0.3	*	*	6.25	11.11	1.13	1.25	2.17
-PURE AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE,SI--AL RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE AL BINARY	1.	*	0.2	*	*	3.12	5.56	0.24	0.24	0.42
MISCELLANEOUS	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
TOT. EXOGENOUS	18.	*	2.8	*	*	56.25	100.00	0.35	1.17	2.02
ALL TYPES	32.	*	5.0	*	*	100.00	56.25	0.37	1.09	1.82

* PARTICLES IN BLANK ARE NOT SUBTRACTED
 ** ENDOGENOUS CLASS

SUMMARY OF PARTICLE ANALYSES

LUNG SAMPLE: LUNG 3 - PREP 3395 3ML D-565,566

PARTICLE CLASS	NUMBER		NUMBER		NET TOTAL		NUMBER	EXOGENOUS	MEDIAN* AREA EQUI. DIAMETER	MASS MEDIAN* AREA EQUI. DIAMETER	AERO- DYNAMIC DIAMETER			
	NUMBER FOUND	IN 100ML SOLUTION	IN 100ML BLANK	IN 100ML SOLUTION	NET TOTAL PER GRAM OF DRY TISSUE									
						----						----	----	----
						6--						6--	6--	6--
	X10	X10	X10	X10			(UM)	(UM)	(UM)					
SILICA	62.	2.9	0.4	2.5	27.	1.36	10.56	0.76	1.51	2.46				
ALUM. SILICATE	269.	12.4	0.0	12.4	138.	6.91	53.59	0.95	3.75	6.17				
-KAOLIN-LIKE	3.	0.1	0.0	0.1	2.	0.08	0.60	0.68	1.22	1.97				
-K FELDSP./MICA	112.	5.2	0.0	5.2	57.	2.88	22.31	1.11	3.41	5.45				
-FE AL SILICATE	18.	0.8	0.0	0.8	9.	0.46	3.59	0.65	2.48	4.08				
-CA AL SILICATE	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****				
-ALBITE-LIKE	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****				
-NA CA AL SIL.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****				
-NA FE AL SIL.	3.	0.1	0.0	0.1	2.	0.08	0.60	0.68	2.85	4.68				
-CA FE AL SIL.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****				
-AL SIL--TR FE	19.	0.9	0.0	0.9	10.	0.49	3.78	0.71	5.14	8.45				
-AL SIL.--PURE	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****				
-K(Fe) AL SIL.	98.	4.5	0.0	4.5	50.	2.52	19.52	0.99	3.84	6.31				
TALC-LIKE	18.	0.8	0.0	0.8	9.	0.46	3.59	0.75	2.14	3.54				
-PURE TALC	15.	0.7	0.0	0.7	8.	0.39	2.99	1.02	2.14	3.55				
IRON OXIDE	21.	1.0	0.0	0.9	10.	0.51**	0.00	0.64	1.71	3.92				
RUTILE-LIKE	8.	0.4	0.6	-0.3	-3.	-0.15	-1.20	0.50	0.62	1.38				
ALUMINA-LIKE	1.	0.0	0.0	0.0	1.	0.03	0.20	0.55	0.55	0.86				
COMBO-ENDOGEN.	3471.	160.6	0.0	160.6	1779.	89.11	27.89	0.53	7.28	12.61				
-PURE ENDOGEN.	3184.	147.4	0.0	147.4	1632.	81.75**	0.00	0.52	6.63	11.49				
-TRACE-ENDOGEN.	147.	6.8	0.0	6.8	75.	3.77**	0.00	0.62	7.98	13.91				
-SILICA-COMBO	32.	1.5	0.0	1.5	16.	0.82	6.37	0.55	5.12	8.36				
-AL SIL.-ENDOG.	35.	1.6	0.0	1.6	18.	0.90	6.97	0.88	3.38	5.56				
SILICON RICH	7.	0.3	0.1	0.2	3.	0.13	1.00	0.79	2.75	4.77				
-FE SILICATE	5.	0.2	0.0	0.2	2.	0.10	0.80	0.55	0.81	1.41				
IRON RICH	6.	0.3	0.1	0.1	2.	0.08	0.60	1.38	2.13	4.52				
-SI FE BINARY	3.	0.1	0.0	0.1	1.	0.05	0.40	1.26	2.28	4.83				
-AL,SI--FE RICH	2.	0.1	0.0	0.1	1.	0.05	0.40	1.38	1.53	3.24				
TITANIUM RICH	15.	0.7	0.1	0.6	6.	0.31	2.35	0.39	0.80	1.79				
-TI FE BINARY	5.	0.2	0.0	0.2	2.	0.10	0.80	0.32	0.65	1.45				
-FE,SI TI RICH	6.	0.3	0.0	0.3	3.	0.15	1.20	0.40	0.97	2.05				
-AL,SI TI RICH	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****				
OTHER AL SIL.	2.	0.1	0.0	0.1	1.	0.05	0.40	0.33	0.36	0.60				
NO X-RAYS	44.	2.0	0.1	1.9	22.	1.08**	0.00	0.40	7.25	7.25				
ALUMINUM RICH	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****				
-PURE AL SIL.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****				
-FE,SI--AL RICH	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****				
-FE AL BINARY	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****				
MISCELLANEOUS	8.	0.4	0.1	0.2	3.	0.13	1.00	0.86	2.19	3.80				
TOT. EXOGENOUS	536.	24.8	1.6	23.2	257.	12.89	100.00	0.87	6.90	11.96				
ALL TYPES	3932.	182.0	1.7	180.3	1996.	100.00	12.89	0.55	6.88	11.85				

* PARTICLES IN BLANK ARE NOT SUBTRACTED

** ENDOGENOUS CLASS

SUMMARY OF PARTICLE ANALYSIS

284

BLANK SAMPLE: BLANK TO LUNG 3 - PREP 3396 3ML D-566

PARTICLE CLASS	NUMBER FOUND	NUMBER IN	NUMBER IN	NET TOTAL	NET TOTAL	NUMBER %	EXOGENOUS %	MEDIAN*	MASS	AERO- DYNAMIC DIAMETER (UM)
		100ML	100ML	IN	PER GRAM OF			AREA EQUI.	MEDIAN*	
		SOLUTION	BLANK	SOLUTION	DRY TISSUE			DIAMETER	DIAMETER	
		6--	-- 6--	6--	6--	-	-			
		X10	X10	X10	X10			(UM)	(UM)	(UM)
SILICA	9.	*	0.4	*	*	24.32	26.47	0.30	0.95	1.55
ALUM. SILICATE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-KAOLIN-LIKE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-K FELDSP./MICA	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE AL SILICATE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-CA AL SILICATE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-ALBITE-LIKE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-NA CA AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-NA FE AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-CA FE AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL SIL.--TR FE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL SIL.--PURE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-K(FE) AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
TALC-LIKE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-PURE TALC	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
IRON OXIDE	1.	*	0.0	*	*	2.70**	0.00	0.45	0.45	1.01
RUTILE-LIKE	14.	*	0.6	*	*	37.84	41.18	0.37	0.67	1.95
ALUMINA-LIKE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
COMBO-ENDOGEN.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-PURE ENDOGEN.	0.	*	0.0	*	*	0.00**	0.00	*****	*****	*****
-TRACE-ENDOGEN.	0.	*	0.0	*	*	0.00**	0.00	*****	*****	*****
-SILICA-COMBO	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL SIL.-ENDOG.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
SILICON RICH	2.	*	0.1	*	*	5.41	5.88	0.40	0.44	0.77
-FE SILICATE	1.	*	0.0	*	*	2.70	2.94	0.24	0.24	0.42
IRON RICH	3.	*	0.1	*	*	8.11	8.82	0.37	0.66	1.41
-SI FE BINARY	1.	*	0.0	*	*	2.70	2.94	0.37	0.37	0.78
-AL,SI--FE RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
TITANIUM RICH	3.	*	0.1	*	*	8.11	8.82	0.30	0.67	1.50
-TI FE BINARY	1.	*	0.0	*	*	2.70	2.94	0.68	0.68	1.52
-FE,SI TI RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL,SI TI RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
OTHER AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
NO X-RAYS	2.	*	0.1	*	*	5.41**	0.00	3.87	4.31	4.31
ALUMINUM RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-PURE AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE,SI--AL RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE AL BINARY	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
MISCELLANEOUS	3.	*	0.1	*	*	8.11	8.82	0.37	6.50	11.25
TOT. EXOGENOUS	34.	*	1.6	*	*	91.89	100.00	0.35	6.48	11.23
ALL TYPES	37.	*	1.7	*	*	100.00	91.89	0.38	6.29	10.97

* PARTICLES IN BLANK ARE NOT SUBTRACTED

** ENDOGENOUS CLASS

SUMMARY OF PARTICLE ANALYSES

LUNG SAMPLE: LUNG 4 - PREP 3401 IML D-17

PARTICLE CLASS	NUMBER FOUND	NUMBER IN	NUMBER IN	NET TOTAL		NUMBER %	EXOGENOUS %	MEDIAN* AREA EQUI. DIAMETER	MASS MEDIAN* AREA EQUI. DIAMETER	AERO- DYNAMIC DIAMETER
		100ML	100ML	IN	NET TOTAL					
		SOLUTION	BLANK	100ML	PER GRAM OF					
		6--	6--	6--	6--					
		X10	X10	X10	X10			(UM)	(UM)	(UM)
SILICA	312.	104.0	0.7	103.3	1078.	17.78	18.05	0.82	2.15	3.51
ALUM. SILICATE	1140.	379.9	0.3	379.6	3962.	65.31	66.34	0.74	2.66	4.36
-KAOLIN-LIKE	351.	117.0	0.3	116.6	1217.	20.07	20.38	0.62	2.30	3.71
-K FELDSP./MICA	583.	194.3	0.0	194.3	2028.	33.43	33.95	0.79	2.78	4.45
-FE AL SILICATE	1.	0.3	0.0	0.3	3.	0.06	0.06	0.45	0.45	0.74
-CA AL SILICATE	2.	0.7	0.0	0.7	7.	0.11	0.12	3.15	3.50	5.76
-ALBITE-LIKE	2.	0.7	0.0	0.7	7.	0.11	0.12	0.92	0.99	1.61
-NA CA AL SIL.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-NA FE AL SIL.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-CA FE AL SIL.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-AL SIL.--TR FE	30.	10.0	0.0	10.0	104.	1.72	1.75	0.61	0.94	1.55
-AL SIL.--PURE	11.	3.7	0.0	3.7	38.	0.63	0.64	0.68	1.59	2.61
-K(FE) AL SIL.	124.	41.3	0.0	41.3	431.	7.11	7.22	0.89	2.89	4.75
TALC-LIKE	18.	6.0	0.0	6.0	63.	1.03	1.05	0.85	2.29	3.79
-PURE TALC	16.	5.3	0.0	5.3	56.	0.92	0.93	0.80	1.73	2.86
IRON OXIDE	12.	4.0	0.7	3.3	35.	0.57**	0.00	0.68	4.28	9.57
RUTILE-LIKE	61.	20.3	1.7	18.7	195.	3.21	3.26	0.38	0.97	2.17
ALUMINA-LIKE	38.	12.7	0.0	12.7	132.	2.18	2.21	0.72	2.98	4.64
COMBO-ENDOGEN.	21.	7.0	0.0	7.0	73.	1.20	0.99	0.42	3.47	6.02
-PURE ENDOGEN.	3.	1.0	0.0	1.0	10.	0.17**	0.00	0.55	0.63	1.09
-TRACE-ENDOGEN.	1.	0.3	0.0	0.3	3.	0.06**	0.00	0.83	0.83	1.44
-SILICA-COMBO	3.	1.0	0.0	1.0	10.	0.17	0.17	0.30	0.54	0.88
-AL SIL.-ENDOG.	5.	1.7	0.0	1.7	17.	0.29	0.29	0.55	3.49	5.73
SILICON RICH	5.	2.0	0.3	1.7	17.	0.29	0.29	0.50	3.49	6.04
-FE SILICATE	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
IRON RICH	57.	19.0	0.0	19.0	198.	3.27	3.32	0.60	5.15	10.94
-SI FE BINARY	5.	2.0	0.0	2.0	21.	0.34	0.35	0.33	0.38	0.81
-AL,SI--FE RICH	3.	1.0	0.0	1.0	10.	0.17	0.17	0.45	1.54	3.26
TITANIUM RICH	48.	16.0	0.0	16.0	167.	2.75	2.80	0.39	0.92	2.06
-TI FE BINARY	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-FE,SI TI RICH	2.	0.7	0.0	0.7	7.	0.11	0.12	0.40	0.45	0.95
-AL,SI TI RICH	29.	9.7	0.0	9.7	101.	1.66	1.69	0.45	1.06	2.12
OTHER AL SIL.	6.	2.0	0.0	2.0	21.	0.34	0.35	0.61	1.15	1.89
NO X-RAYS	20.	6.7	2.3	4.3	45.	0.75**	0.00	0.66	5.20	5.20
ALUMINUM RICH	11.	3.7	0.0	3.7	38.	0.63	0.64	0.68	2.12	3.67
-PURE AL SIL.	6.	2.0	0.0	2.0	21.	0.34	0.35	1.13	2.14	3.70
-FE,SI--AL RICH	1.	0.3	0.0	0.3	3.	0.06	0.06	0.24	0.24	0.42
-FE AL BINARY	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
MISCELLANEOUS	13.	4.3	0.3	4.0	42.	0.69	0.70	0.45	9.77	16.92
TOT. EXOGENOUS	1727.	575.5	3.3	572.2	5972.	98.45	100.00	0.71	2.93	5.07
ALL TYPES	1763.	587.5	6.3	581.2	6066.	100.00	98.45	0.71	3.00	5.08

* PARTICLES IN BLANK ARE NOT SUBTRACTED

** ENDOGENOUS CLASS

SUMMARY OF PARTICLE ANALYSIS

BLANK SAMPLE: BLANK TO LUNG 4 - PREP 3402 1ML D-17

PARTICLE CLASS	NUMBER FOUND	NUMBER IN	NUMBER IN	NET TOTAL IN	NET TOTAL PER GRAM OF	NUMBER %	EXOGENOUS %	MEDIAN* AREA EQUI. DIAMETER	MASS MEDIAN* AREA EQUI. DIAMETER	AERO- DYNAMIC DIAMETER
		100ML SOLUTION	100ML BLANK	100ML SOLUTION	DRY TISSUE					
		----- 6-- X10	--- 6- X10	----- 6-- X10	----- 6-- X10					
SILICA	2.	*	0.7	*	*	10.53	20.00	0.33	0.35	0.56
ALUM. SILICATE	1.	*	0.3	*	*	5.26	10.00	0.45	0.45	0.74
-KAOLIN-LIKE	1.	*	0.3	*	*	5.26	10.00	0.45	0.45	0.72
-K FELDSP./MICA	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE AL SILICATE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-CA AL SILICATE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-ALBITE-LIKE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-NA CA AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-NA FE AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-CA FE AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL SIL.--TR FE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL SIL.--PURE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-K(FE) AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
TALC-LIKE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-PURE TALC	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
IRON OXIDE	2.	*	0.7	*	*	10.53**	0.00	0.40	0.45	1.00
RUTILE-LIKE	5.	*	1.7	*	*	26.32	50.00	0.45	0.49	1.10
ALUMINA-LIKE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
COMBO-ENDOGEN.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-PURE ENDOGEN.	0.	*	0.0	*	*	0.00**	0.00	*****	*****	*****
-TRACE-ENDOGEN.	0.	*	0.0	*	*	0.00**	0.00	*****	*****	*****
-SILICA-COMBO	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL SIL.-ENDOG.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
SILICON RICH	1.	*	0.3	*	*	5.26	10.00	0.45	0.45	0.78
-FE SILICATE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
IRON RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-SI FE BINARY	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL,SI--FE RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
TITANIUM RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-TI FE BINARY	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE,SI TI RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL,SI TI RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
OTHER AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
NO X-RAYS	7.	*	2.3	*	*	35.84**	0.00	0.45	0.97	0.97
ALUMINUM RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-PURE AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE,SI--AL RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE AL BINARY	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
MISCELLANEOUS	1.	*	0.3	*	*	5.26	10.00	0.68	0.68	1.17
TOT. EXOGENOUS	10.	*	3.3	*	*	52.63	100.00	0.44	0.61	1.06
ALL TYPES	19.	*	6.3	*	*	100.00	52.63	0.44	0.67	1.29

* PARTICLES IN BLANK ARE NOT SUBTRACTED

** ENDOGENOUS CLASS

SUMMARY OF PARTICLE ANALYSES

LUNG SAMPLE: LUNG 5 - PREP 3478 1ML D-569

PARTICLE CLASS	NUMBER		NUMBER		NET TOTAL		NUMBER	EXOGENOUS	MEDIAN*	MASS MEDIAN*	AERO- DYNAMIC
	NUMBER FOUND	IN	IN	IN	NET TOTAL						
		100ML	100ML	100ML	PER GRAM OF						
		SOLUTION	BLANK	SOLUTION	DRY TISSUE						
-----	-----	6--	-- 6--	-----	6--	-	-	-----	-----	-----	
		X10	X10	X10	X10			(UM)	(UM)	(UM)	
SILICA	226.	55.8	0.5	55.3	567.	20.22	20.70	0.63	2.34	3.82	
ALUM. SILICATE	768.	189.6	0.0	189.6	1942.	69.31	70.93	0.62	2.90	4.76	
-KAOLIN-LIKE	163.	40.2	0.0	40.2	412.	14.71	15.06	0.49	2.73	4.40	
-K FELDSP./MICA	554.	136.7	0.0	136.7	1401.	50.00	51.20	0.68	2.89	4.63	
-FE AL SILICATE	3.	0.7	0.0	0.7	8.	0.27	0.28	0.20	0.29	0.47	
-CA AL SILICATE	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****	
-ALBITE-LIKE	4.	1.0	0.0	1.0	10.	0.36	0.37	0.55	0.78	1.26	
-NA CA AL SIL.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****	
-NA FE AL SIL.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****	
-CA FE AL SIL.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****	
-AL SIL.--TR FE	12.	3.0	0.0	3.0	30.	1.08	1.11	0.45	0.77	1.27	
-AL SIL.--PURE	8.	2.0	0.0	2.0	20.	0.72	0.74	0.45	1.24	2.03	
-K(FE) AL SIL.	10.	2.5	0.0	2.5	25.	0.90	0.92	0.75	4.21	6.92	
TALC-LIKE	3.	0.7	0.0	0.7	8.	0.27	0.28	2.71	2.85	4.73	
-PURE TALC	3.	0.7	0.0	0.7	8.	0.27	0.28	2.71	2.85	4.73	
IRON OXIDE	3.	0.7	0.0	0.7	8.	0.27**	0.00	0.55	1.53	3.43	
RUTILE-LIKE	21.	5.2	0.0	5.2	53.	1.90	1.94	0.45	1.44	3.22	
ALUMINA-LIKE	1.	0.2	0.0	0.2	3.	0.09	0.09	0.37	0.37	0.57	
COMBO-ENDOGEN.	12.	3.0	0.0	3.0	30.	1.08	0.92	0.55	1.05	1.82	
-PURE ENDOGEN.	2.	0.5	0.0	0.5	5.	0.18**	0.00	0.50	0.55	0.95	
-TRACE-ENDOGEN.	0.	0.0	0.0	0.0	0.	0.00**	0.00	*****	*****	*****	
-SILICA-COMBO	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****	
-AL SIL.-ENDOG.	6.	1.5	0.0	1.5	15.	0.54	0.55	0.61	0.88	1.45	
SILICON RICH	14.	3.5	0.0	3.5	35.	1.26	1.29	0.46	2.27	3.93	
-FE SILICATE	1.	0.2	0.0	0.2	3.	0.09	0.09	2.33	2.33	4.03	
IRON RICH	2.	0.5	0.0	0.5	5.	0.18	0.18	1.13	1.25	2.65	
-SI FE BINARY	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****	
-AL,SI--FE RICH	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****	
TITANIUM RICH	20.	4.9	0.0	4.9	51.	1.81	1.85	0.55	1.07	2.39	
-TI FE BINARY	1.	0.2	0.0	0.2	3.	0.09	0.09	1.54	1.54	3.45	
-FE,SI TI RICH	1.	0.2	0.0	0.2	3.	0.09	0.09	0.20	0.20	0.42	
-AL,SI TI RICH	8.	2.0	0.0	2.0	20.	0.72	0.74	0.61	0.74	1.47	
OTHER AL SIL.	2.	0.5	0.0	0.5	5.	0.18	0.18	2.09	2.20	3.61	
NO XRAYS	21.	5.2	0.0	5.2	53.	1.90**	0.00	0.68	2.61	2.61	
ALUMINUM RICH	4.	1.0	0.0	1.0	10.	0.36	0.37	0.50	0.80	1.39	
-PURE AL SIL.	1.	0.2	0.0	0.2	3.	0.09	0.09	0.30	0.30	0.52	
-FE,SI--AL RICH	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****	
-FE AL BINARY	2.	0.5	0.0	0.5	5.	0.18	0.18	0.75	0.83	1.44	
MISCELLANEOUS	15.	3.7	0.5	3.2	33.	1.17	1.20	1.89	4.94	8.55	
TOT. EXOGENOUS	1086.	268.1	1.0	267.1	2736.	97.65	100.00	0.61	2.97	5.18	
ALL TYPES	1112.	274.5	1.0	273.5	2802.	100.00	97.65	0.61	2.97	4.96	

* PARTICLES IN BLANK ARE NOT SUBTRACTED

** ENDOGENOUS CLASS

SUMMARY OF PARTICLE ANALYSIS

BLANK SAMPLE: BLANK TO LUNG 5 - PREP 3479 1ML D-572

PARTICLE CLASS	NUMBER FOUND	NUMBER	NUMBER	NET TOTAL	NET TOTAL	NUMBER %	EXOGENOUS %	MEDIAN*	MASS	AERO- DYNAMIC DIAMETER
		IN	IN	IN	PER GRAM OF			AREA EQUI.	MEDIAN*	
		100ML	100ML	100ML	DRY TISSUE			DIAMETER	AREA EQUI.	
		SOLUTION	BLANK	SOLUTION						
		6--	6--	6--	6--	-	-			
		X10	X10	X10	X10			(UM)	(UM)	(UM)
SILICA	2.	*	0.5	*	*	50.00	50.00	0.50	0.54	0.37
ALUM. SILICATE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-KAOLIN-LIKE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-K FELDSP./MICA	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE AL SILICATE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-CA AL SILICATE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-ALBITE-LIKE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-NA CA AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-NA FE AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-CA FE AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL SIL.--TR FE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL SIL.--PURE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-K(FE) AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
TALC-LIKE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-PURE TALC	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
IRON OXIDE	0.	*	0.0	*	*	0.00**	0.00	*****	*****	*****
RUTILE-LIKE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
ALUMINA-LIKE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
COMBO-ENDOGEN.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-PURE ENDOGEN.	0.	*	0.0	*	*	0.00**	0.00	*****	*****	*****
-TRACE-ENDOGEN.	0.	*	0.0	*	*	0.00**	0.00	*****	*****	*****
-SILICA-COMBO	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL SIL.-ENDOG.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
SILICON RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE SILICATE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
IRON RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-SI FE BINARY	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL,SI--FE RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
TITANIUM RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-TI FE BINARY	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE,SI TI RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL,SI TI RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
OTHER AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
NO X-RAYS	0.	*	0.0	*	*	0.00**	0.00	*****	*****	*****
ALUMINUM RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-PURE AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE,SI--AL RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE AL BINARY	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
MISCELLANEOUS	2.	*	0.5	*	*	50.00	50.00	0.37	0.37	0.63
TOT. EXOGENOUS	4.	*	1.0	*	*	100.00	100.00	0.38	0.50	0.87
ALL TYPES	4.	*	1.0	*	*	100.00	100.00	0.38	0.50	0.84

* PARTICLES IN BLANK ARE NOT SUBTRACTED
 ** ENDOGENOUS CLASS

SUMMARY OF PARTICLE ANALYSES

LUNG SAMPLE: LUNG 6 - PREP 3409 IML D-2.9

PARTICLE CLASS	NUMBER FOUND	NUMBER IN 100ML SOLUTION	NUMBER IN 100ML BLANK	NET TOTAL		NUMBER %	EXOGENOUS %	MEDIAN# AREA EQUI. DIAMETER	MASS MEDIAN# AREA EQUI. DIAMETER	AERO- DYNAMIC DIAMETER
		6-	6-	IN 100ML SOLUTION	NET TOTAL PER GRAM OF DRY TISSUE					
		X10	X10	6- X10	6- X10					
SILICA	451.	143.1	0.3	142.8	946.	26.93	33.94	0.62	2.35	3.84
ALUM. SILICATE	560.	177.7	0.0	177.7	1178.	33.52	42.25	0.80	3.93	6.46
-KADOLIN-LIKE	98.	31.1	0.0	31.1	206.	5.87	7.39	0.62	2.98	4.80
-K FELDSP./MICA	243.	77.1	0.0	77.1	511.	14.55	18.33	0.77	8.84	14.14
-FE AL SILICATE	1.	0.3	0.0	0.3	2.	0.06	0.08	0.45	0.45	0.74
-CA AL SILICATE	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-ALBITE-LIKE	10.	3.2	0.0	3.2	21.	0.60	0.75	1.26	2.70	4.37
-NA CA AL SIL.	2.	0.6	0.0	0.6	4.	0.12	0.15	3.15	3.51	5.76
-NA FE AL SIL.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-CA FE AL SIL.	1.	0.3	0.0	0.3	2.	0.06	0.08	0.20	0.20	0.32
-AL SIL.-TR FE	11.	3.5	0.0	3.5	23.	0.66	0.83	0.83	2.51	4.13
-AL SIL.-PURE	4.	1.3	0.0	1.3	8.	0.24	0.30	0.50	0.79	1.30
-K(FE) AL SIL.	23.	7.3	0.0	7.3	48.	1.38	1.74	0.95	4.18	6.86
TALC-LIKE	14.	4.4	0.0	4.4	29.	0.84	1.06	1.26	2.06	3.42
-PURE TALC	11.	3.5	0.0	3.5	23.	0.66	0.83	1.26	2.16	3.59
IRON OXIDE	0.	0.0	0.3	-0.3	-2.	-0.06**	0.00	*****	*****	*****
ROUTILE-LIKE	19.	6.0	0.3	5.7	38.	1.07	1.35	0.37	0.94	2.09
ALUMINA-LIKE	5.	1.6	0.0	1.6	11.	0.30	0.38	0.37	1.18	1.84
COMBO-ENDOGEN.	549.	174.2	0.0	174.2	1153.	32.86	16.45	0.72	3.99	6.91
-PURE ENDOGEN.	240.	76.2	0.0	76.2	505.	14.37**	0.00	0.62	2.48	4.30
-TRACE-ENDOGEN.	91.	28.9	0.0	28.9	191.	5.45**	0.00	1.06	3.77	6.52
-SILICA-COMBO	8.	2.5	0.0	2.5	17.	0.48	0.60	0.55	1.14	1.85
-AL SIL.-ENDOG.	114.	36.2	0.0	36.2	240.	6.82	8.60	0.84	4.30	7.06
SILICON RICH	21.	6.7	0.0	6.7	44.	1.26	1.58	0.83	4.61	7.99
-FE SILICATE	2.	0.6	0.0	0.6	4.	0.12	0.15	3.87	4.27	7.40
IRON RICH	5.	1.6	1.0	0.6	4.	0.11	0.14	0.37	1.24	2.63
-SI FE BINARY	0.	0.0	0.3	-0.3	-2.	-0.06	-0.08	*****	*****	*****
-AL,SI-Fe RICH	1.	0.3	0.7	-0.3	-2.	-0.07	-0.08	0.24	0.24	0.51
TITANIUM RICH	13.	4.1	0.0	4.1	27.	0.78	0.98	0.58	3.36	7.51
-TI FE BINARY	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-FE,SI TI RICH	1.	0.3	0.0	0.3	2.	0.06	0.08	0.24	0.24	0.51
-AL,SI TI RICH	5.	1.6	0.0	1.6	11.	0.30	0.38	0.68	0.80	1.59
OTHER AL SIL.	5.	1.6	0.0	1.6	11.	0.30	0.38	0.31	0.63	1.03
NO X-RAYS	15.	4.8	0.0	4.8	32.	0.90**	0.00	0.55	1.76	1.76
ALUMINUM RICH	5.	1.6	0.3	1.3	8.	0.24	0.30	0.47	2.30	3.99
-PURE AL SIL.	1.	0.3	0.0	0.3	2.	0.06	0.08	0.45	0.45	0.78
-FE,SI-AL RICH	1.	0.3	0.0	0.3	2.	0.06	0.08	1.02	1.02	1.77
-FE AL BINARY	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
MISCELLANEOUS	18.	5.7	0.7	5.0	33.	0.95	1.20	0.50	4.15	7.19
TOT. EXOGENOUS	1334.	423.4	2.7	420.7	2788.	79.35	100.00	0.72	3.78	6.54
ALL TYPES	1680.	533.2	3.0	530.2	3513.	100.00	79.35	0.71	3.73	6.31

* PARTICLES IN BLANK ARE NOT SUBTRACTED

** ENDOGENOUS CLASS

SUMMARY OF PARTICLE ANALYSIS

BLANK SAMPLE: BLANK TO LUNG 6 - PREP 3410 1ML D-5

PARTICLE CLASS	NUMBER FOUND	NUMBER	NUMBER	NET TOTAL		NUMBER	EXOGENOUS	MASS		
		IN	IN	IN	NET TOTAL			MEDIAN* AREA EQUI. DIAMETER	MEDIAN* AREA EQUI. DIAMETER	AERO- DYNAMIC DIAMETER
		100ML	100ML	100ML	PER GRAM OF					
		SOLUTION	BLANK	SOLUTION	DRY TISSUE					
-----	-----	6--	-- 6-	----- 6--	----- 6--	-	-	-----	-----	-----
		X10	X10	X10	X10			(UM)	(UM)	(UM)
SILICA	1.	*	0.3	*	*	11.11	12.50	1.02	1.02	1.67
ALUM. SILICATE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-KAOLIN-LIKE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-K FELDSP./MICA	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE AL SILICATE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-CA AL SILICATE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-ALBITE-LIKE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-NA CA AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-NA FE AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-CA FE AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL SIL.--TR FE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL SIL.--PURE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-K(FE) AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
TALC-LIKE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-PURE TALC	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
IRON OXIDE	1.	*	0.3	*	*	11.11**	0.00	0.20	0.20	0.44
RUTILE-LIKE	1.	*	0.3	*	*	11.11	12.50	0.24	0.24	0.54
ALUMINA-LIKE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
COMBO-ENDOGEN.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-PURE ENDOGEN.	0.	*	0.0	*	*	0.00**	0.00	*****	*****	*****
-TRACE-ENDOGEN.	0.	*	0.0	*	*	0.00**	0.00	*****	*****	*****
-SILICA-COMBO	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL SIL.-ENDOG.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
SILICON RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE SILICATE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
IRON RICH	3.	*	1.0	*	*	33.33	37.50	0.21	0.22	0.46
-SI FE BINARY	1.	*	0.3	*	*	11.11	12.50	0.20	0.20	0.42
-AL,SI--FE RICH	2.	*	0.7	*	*	22.22	25.00	0.22	0.23	0.49
TITANIUM RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-TI FE BINARY	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE,SI TI RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL,SI TI RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
OTHER AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
NO X-RAYS	0.	*	0.0	*	*	0.00**	0.00	*****	*****	*****
ALUMINUM RICH	1.	*	0.3	*	*	11.11	12.50	0.37	0.37	0.63
-PURE AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE,SI--AL RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE AL BINARY	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
MISCELLANEOUS	2.	*	0.7	*	*	22.22	25.00	0.92	0.97	1.67
TOT. EXOGENOUS	8.	*	2.7	*	*	88.89	100.00	0.33	0.99	1.71
ALL TYPES	9.	*	3.0	*	*	100.00	88.89	0.26	0.99	1.75

* PARTICLES IN BLANK ARE NOT SUBTRACTED

** ENDOGENOUS CLASS

SUMMARY OF PARTICLE ANALYSES

LUNG SAMPLE: LUNG 7 - PREP 3415 1ML D-584

PARTICLE CLASS	NUMBER FOUND	NUMBER IN	NUMBER IN	NET TOTAL	NET TOTAL	NUMBER %	EXOGENOUS %	MEDIAN* AREA EQUI. DIAMETER	MASS MEDIAN* AREA EQUI. DIAMETER	AERO- DYNAMIC DIAMETER
		100ML	100ML	IN	PER GRAM OF					
		SOLUTION	BLANK	SOLUTION	DRY TISSUE					
		----- 6-- X10	6-- X10	----- 6-- X10	----- 6-- X10					
SILICA	436.	145.3	0.0	145.3	1100.	29.03	29.70	0.58	2.62	4.28
ALUM. SILICATE	892.	297.2	0.3	296.9	2248.	59.32	60.69	0.84	2.97	4.89
-KAOLIN-LIKE	296.	98.6	0.3	98.3	744.	19.64	20.10	0.66	1.98	3.20
-K FELDSP./MICA	462.	154.0	0.0	154.0	1165.	30.76	31.47	0.93	3.13	5.01
-FE AL SILICATE	6.	2.0	0.0	2.0	15.	0.40	0.41	1.13	1.24	2.03
-CA AL SILICATE	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-ALBITE-LIKE	2.	0.7	0.0	0.7	5.	0.13	0.14	1.38	1.50	2.42
-NA CA AL SIL.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-NA FE AL SIL.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-CA FE AL SIL.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-AL SIL.--TR FE	38.	12.7	0.0	12.7	96.	2.53	2.59	0.92	3.28	5.39
-AL SIL.--PURE	6.	2.0	0.0	2.0	15.	0.40	0.41	0.75	1.42	2.33
-K(FE) AL SIL.	44.	14.7	0.0	14.7	111.	2.93	3.00	1.20	3.48	5.71
TALC-LIKE	3.	1.0	0.0	1.0	8.	0.20	0.20	0.83	1.88	3.11
-PURE TALC	3.	1.0	0.0	1.0	8.	0.20	0.20	0.83	1.88	3.11
IRON OXIDE	14.	4.7	0.3	4.3	33.	0.87**	0.00	0.61	2.18	4.87
RUTILE-LIKE	59.	19.7	0.0	19.7	149.	3.93	4.02	0.46	1.60	3.58
ALUMINA-LIKE	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
COMBO-ENDOGEN.	20.	6.7	0.0	6.7	50.	1.33	1.36	0.31	0.57	0.79
-PURE ENDOGEN.	0.	0.0	0.0	0.0	0.	0.00**	0.00	*****	*****	*****
-TRACE-ENDOGEN.	0.	0.0	0.0	0.0	0.	0.00**	0.00	*****	*****	*****
-SILICA-COMBO	2.	0.7	0.0	0.7	5.	0.13	0.14	0.27	0.28	0.46
-AL SIL.-ENDOG.	5.	1.7	0.0	1.7	13.	0.33	0.34	0.37	0.54	0.89
SILICON RICH	11.	3.7	0.0	3.7	28.	0.73	0.75	0.95	5.25	9.09
-FE SILICATE	2.	0.7	0.0	0.7	5.	0.13	0.14	1.38	1.50	2.59
IRON RICH	8.	2.7	0.0	2.7	20.	0.53	0.54	0.68	0.80	1.69
-SI FE BINARY	1.	0.3	0.0	0.3	3.	0.07	0.07	0.30	0.30	0.63
-AL,SI--FE RICH	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
TITANIUM RICH	35.	11.7	0.0	11.7	88.	2.33	2.38	0.44	0.62	1.84
-TI FE BINARY	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-FE,SI TI RICH	1.	0.3	0.0	0.3	3.	0.07	0.07	0.83	0.83	1.77
-AL,SI TI RICH	16.	5.3	0.0	5.3	40.	1.07	1.09	0.44	0.63	1.27
OTHER AL SIL.	2.	0.7	0.0	0.7	5.	0.13	0.14	0.40	0.42	0.70
NO X-RAYS	21.	7.0	0.0	7.0	53.	1.40**	0.00	0.31	4.28	4.28
ALUMINUM RICH	1.	0.3	0.0	0.3	3.	0.07	0.07	0.37	0.37	0.63
-PURE AL SIL.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-FE,SI--AL RICH	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-FE AL BINARY	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
MISCELLANEOUS	2.	0.7	0.0	0.7	5.	0.13	0.14	0.61	0.66	1.14
TOT. EXOGENOUS	1469.	489.5	0.3	489.2	3703.	97.74	100.00	0.70	2.97	5.14
ALL TYPES	1504.	501.2	0.7	500.5	3789.	100.00	97.74	0.69	2.99	5.02

* PARTICLES IN BLANK ARE NOT SUBTRACTED

** ENDOGENOUS CLASS

SUMMARY OF PARTICLE ANALYSIS

BLANK SAMPLE: BLANK TO LUNG 7 - PREP 3416 1ML D-584

PARTICLE CLASS	NUMBER FOUND	NUMBER IN	NUMBER IN	NET TOTAL	NET TOTAL	NUMBER %	EXOGENOUS %	MEDIAN*	MASS MEDIAN*	AERO- DYNAMIC DIAMETER
		100ML	100ML	IN	PER GRAM OF			AREA EQUI.	AREA EQUI.	
		SOLUTION	BLANK	100ML	DRY TISSUE			DIAMETER	DIAMETER	
-----	-----	--- 6---	-- 6--	--- 6---	--- 6---	-	-	-----	-----	-----
		X10	X10	X10	X10			(UM)	(UM)	(UM)
SILICA	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
ALUM. SILICATE	1.	*	0.3	*	*	50.00	100.00	0.68	0.68	1.11
-KAOLIN-LIKE	1.	*	0.3	*	*	50.00	100.00	0.68	0.68	1.09
-K FELDSP./MICA	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE AL SILICATE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-CA AL SILICATE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-ALBITE-LIKE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-NA CA AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-NA FE AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-CA FE AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL SIL--TR FE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL SIL--PURE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-K(FE) AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
TALC-LIKE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-PURE TALC	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
IRON OXIDE	1.	*	0.3	*	*	50.00**	0.00	0.68	0.68	1.52
ROUTLE-LIKE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
ALUMINA-LIKE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
COMBO-ENDOGEN.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-PURE ENDOGEN.	0.	*	0.0	*	*	0.00**	0.00	*****	*****	*****
-TRACE-ENDOGEN.	0.	*	0.0	*	*	0.00**	0.00	*****	*****	*****
-SILICA-COMBO	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL SIL.-ENDOG.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
SILICON RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE SILICATE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
IRON RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-SI FE BINARY	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL,SI--FE RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
TITANIUM RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-TI FE BINARY	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE,SI TI RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL,SI TI RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
OTHER AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
NO XRAVS	0.	*	0.0	*	*	0.00**	0.00	*****	*****	*****
ALUMINUM RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-PURE AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE,SI--AL RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE AL BINARY	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
MISCELLANEOUS	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
TOT. EXOGENOUS	1.	*	0.3	*	*	50.00	100.00	0.68	0.68	1.17

ALL TYPES	2.	*	0.7	*	*	100.00	50.00	0.68	0.68	1.39

* PARTICLES IN BLANK ARE NOT SUBTRACTED

** ENDOGENOUS CLASS

SUMMARY OF PARTICLE ANALYSES

LUNG SAMPLE: LUNG 8 - PREP 3427 0.5ML D-4,5,9

PARTICLE CLASS	NUMBER		NUMBER		NET TOTAL		NUMBER	EXOGENOUS	MASS		AERO- DYNAMIC DIAMETER
	NUMBER FOUND	IN	IN	IN	NET TOTAL	MEDIAN* AREA EQUI. DIAMETER			MEDIAN* AREA EQUI. DIAMETER		
		100ML	100ML	100ML	PER GRAM OF						
		SOLUTION	BLANK	SOLUTION	DRY TISSUE						
-----	-----	6--	6-	6--	6--	-	-	(UM)	(UM)	(UM)	
		X10	X10	X10	X10						
SILICA	608.	405.2	0.0	405.2	2484.	24.65	24.87	0.74	2.27	3.70	
ALUM. SILICATE	1700.	1133.0	0.7	1132.3	6943.	68.87	69.49	0.84	3.85	6.32	
-KADLIN-LIKE	348.	231.9	0.0	231.9	1422.	14.11	14.23	0.58	2.61	4.21	
-K FELDSP./MICA	1085.	723.1	0.0	723.1	4434.	43.98	44.38	0.91	4.62	7.40	
-FE AL SILICATE	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****	
-CA AL SILICATE	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****	
-ALBITE-LIKE	121.	80.6	0.0	80.6	494.	4.90	4.95	0.80	3.35	5.42	
-NA CA AL SIL.	2.	1.3	0.0	1.3	8.	0.08	0.08	1.70	1.86	3.06	
-NA FE AL SIL.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****	
-CA FE AL SIL.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****	
-AL SIL.--TR FE	16.	10.7	0.0	10.7	65.	0.65	0.65	0.68	3.42	5.62	
-AL SIL.--PURE	4.	2.7	0.0	2.7	16.	0.16	0.16	0.50	0.62	1.01	
-K (FE) AL SIL.	93.	62.0	0.0	62.0	380.	3.77	3.80	1.12	3.24	5.33	
TALC-LIKE	4.	2.7	0.7	2.0	12.	0.12	0.12	1.13	4.29	7.11	
-PURE TALC	4.	2.7	0.0	2.7	16.	0.16	0.16	1.13	4.29	7.11	
IRON OXIDE	2.	1.3	1.3	0.0	0.	0.00**	0.00	0.50	0.55	1.23	
ROUTLE-LIKE	65.	43.3	1.3	42.0	257.	2.55	2.58	0.51	2.34	5.24	
ALUMINA-LIKE	5.	3.3	0.0	3.3	20.	0.20	0.20	1.02	2.80	4.35	
COMBO-ENDOGEN.	23.	15.3	0.0	15.3	94.	0.93	0.70	0.70	5.16	8.94	
-PURE ENDOGEN.	5.	3.3	0.0	3.3	20.	0.20**	0.00	0.83	1.43	2.48	
-TRACE-ENDOGEN.	1.	0.7	0.0	0.7	4.	0.04**	0.00	0.83	0.83	1.44	
-SILICA-COMBO	2.	1.3	0.0	1.3	8.	0.08	0.08	1.70	1.88	3.07	
-AL SIL.-ENDOG.	2.	1.3	0.0	1.3	8.	0.08	0.08	4.75	5.29	8.69	
SILICON RICH	7.	4.7	0.0	4.7	29.	0.28	0.29	0.58	2.27	3.93	
-FE SILICATE	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****	
IRON RICH	1.	0.7	0.0	0.7	4.	0.04	0.04	0.37	0.37	0.78	
-SI FE BINARY	1.	0.7	0.0	0.7	4.	0.04	0.04	0.37	0.37	0.78	
-AL ₂ SI--FE RICH	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****	
TITANIUM RICH	23.	15.3	0.0	15.3	94.	0.93	0.94	0.55	4.13	9.24	
-TI FE BINARY	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****	
-FE,SI TI RICH	1.	0.7	0.0	0.7	4.	0.04	0.04	0.37	0.37	0.78	
-AL ₂ SI TI RICH	12.	8.0	0.0	8.0	49.	0.49	0.49	0.50	2.14	4.29	
OTHER AL SIL.	9.	6.0	0.0	6.0	37.	0.36	0.37	0.71	2.72	4.47	
NO X-RAYS	16.	10.7	0.0	10.7	65.	0.65**	0.00	0.37	3.47	3.47	
ALUMINUM RICH	5.	4.0	0.0	4.0	25.	0.24	0.25	0.50	2.31	3.99	
-PURE AL SIL.	5.	3.3	0.0	3.3	20.	0.20	0.20	0.68	2.31	4.00	
-FE,SI--AL RICH	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****	
-FE AL BINARY	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****	
MISCELLANEOUS	4.	2.7	0.0	2.7	16.	0.16	0.16	1.13	2.28	3.95	
TOT. EXOGENOUS	2449.	1632.2	2.7	1629.5	9991.	99.11	100.00	0.80	3.60	6.23	
ALL TYPES	2473.	1648.2	4.0	1644.2	10081.	100.00	99.11	0.80	3.60	6.00	

* PARTICLES IN BLANK ARE NOT SUBTRACTED

** ENDOGENOUS CLASS

SUMMARY OF PARTICLE ANALYSIS

294

BLANK SAMPLE: BLANK TO LUNG 8 - PREP 3428 0.5ML D-5

PARTICLE CLASS	NUMBER FOUND	NUMBER	NUMBER	NET TOTAL	NET TOTAL	NUMBER %	EXOGENOUS %	MEDIAN* AREA EQUI. DIAMETER	MASS MEDIAN* AREA EQUI. DIAMETER	AERO- DYNAMIC DIAMETER
		IN	IN	IN	PER GRAM OF					
		100ML	100ML	100ML	DRY TISSUE					
		SOLUTION	BLANK	SOLUTION						
		6--	6--	6--	6--	-	-			
		X10	X10	X10	X10			(UM)	(UM)	(UM)
SILICA	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
ALUM. SILICATE	1.	*	0.7	*	*	16.67	25.00	0.55	0.55	0.91
-KAOLIN-LIKE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-K FELDSP./MICA	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE AL SILICATE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-CA AL SILICATE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-ALBITE-LIKE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-NA CA AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-NA FE AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-CA FE AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL SIL.--TR FE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL SIL.--PURE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-K(FE) AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
TALC-LIKE	1.	*	0.7	*	*	16.67	25.00	0.30	0.30	0.49
-PURE TALC	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
IRON OXIDE	2.	*	1.3	*	*	33.33**	0.00	0.27	0.30	0.67
RUTILE-LIKE	2.	*	1.3	*	*	33.33	50.00	0.40	0.45	1.00
ALUMINA-LIKE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
COMBO-ENDOGEN.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-PURE ENDOGEN.	0.	*	0.0	*	*	0.00**	0.00	*****	*****	*****
-TRACE-ENDOGEN.	0.	*	0.0	*	*	0.00**	0.00	*****	*****	*****
-SILICA-COMBO	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL SIL.-ENDOG.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
SILICON RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE SILICATE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
IRON RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-SI FE BINARY	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL,SI--FE RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
TITANIUM RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-TI FE BINARY	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE,SI TI RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL,SI TI RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
OTHER AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
NO XRAVS	0.	*	0.0	*	*	0.00**	0.00	*****	*****	*****
ALUMINUM RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-PURE AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE,SI--AL RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE AL BINARY	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
MISCELLANEOUS	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
TOT. EXOGENOUS	4.	*	2.7	*	*	66.67	100.00	0.40	0.51	0.89
ALL TYPES	6.	*	4.0	*	*	100.00	66.67	0.30	0.50	1.01

* PARTICLES IN BLANK ARE NOT SUBTRACTED

** ENDOGENOUS CLASS

SUMMARY OF PARTICLE ANALYSES

LUNG SAMPLE: LUNG 9 - PREP 3433 1ML D-7,8

PARTICLE CLASS	NUMBER		NUMBER		NET TOTAL		NUMBER	EXOGENOUS	MASS		
	NUMBER FOUND	IN	IN	IN	NET TOTAL	MEDIAN* AREA EQUI. DIAMETER			MEDIAN* AREA EQUI. DIAMETER	AERO- DYNAMIC DIAMETER	
		100ML	100ML	100ML	PER GRAM OF						
		SOLUTION	BLANK	SOLUTION	DRY TISSUE						
-----	-----	6--	-- 6-	--- 6--	----- 6---	-	-	-----	-----	-----	
		X10	X10	X10	X10			(UM)	(UM)	(UM)	
SILICA	705.	234.9	0.3	234.6	1795.	34.04	34.26	0.53	2.24	3.65	
ALUM. SILICATE	1218.	405.9	0.7	405.2	3100.	58.80	59.17	0.76	3.85	6.32	
-KAOLIN-LIKE	241.	80.3	0.3	80.0	612.	11.61	11.68	0.57	2.21	3.56	
-K FELDSP./MICA	820.	273.3	0.3	272.9	2088.	39.60	39.85	0.82	3.84	6.14	
-FE AL SILICATE	9.	3.0	0.0	3.0	23.	0.44	0.44	0.43	1.88	3.08	
-CA AL SILICATE	1.	0.3	0.0	0.3	3.	0.05	0.05	0.45	0.45	0.74	
-ALBITE-LIKE	26.	8.7	0.0	8.7	66.	1.26	1.27	0.75	4.19	6.78	
-NA CA AL SIL.	2.	0.7	0.0	0.7	5.	0.10	0.10	0.61	0.67	1.10	
-NA FE AL SIL.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****	
-CA FE AL SIL.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****	
-AL SIL.--TR FE	12.	4.0	0.0	4.0	31.	0.58	0.58	0.92	2.71	4.46	
-AL SIL.--PURE	7.	2.3	0.0	2.3	18.	0.34	0.34	0.45	0.58	0.95	
-K (FE) AL SIL.	78.	26.0	0.0	26.0	199.	3.77	3.80	1.07	4.10	6.73	
TALC-LIKE	14.	4.7	0.0	4.7	36.	0.68	0.68	0.80	4.01	6.64	
-PURE TALC	9.	3.0	0.0	3.0	23.	0.44	0.44	0.79	1.79	2.97	
IRON OXIDE	5.	1.7	0.7	1.0	8.	0.15**	0.00	0.26	0.53	1.19	
RU TILE-LIKE	50.	16.7	0.7	16.0	122.	2.32	2.34	0.40	4.22	9.44	
ALUMINA-LIKE	1.	0.3	1.0	-0.7	-5.	-0.10	-0.10	1.26	1.26	1.95	
COMBO-ENDOGEN.	24.	8.0	0.0	8.0	61.	1.16	0.88	0.64	7.90	13.68	
-PURE ENDOGEN.	5.	1.7	0.0	1.7	13.	0.24**	0.00	0.68	1.00	1.73	
-TRACE-ENDOGEN.	1.	0.3	0.0	0.3	3.	0.05**	0.00	0.55	0.55	0.96	
-SILICA-COMBO	8.	2.7	0.0	2.7	20.	0.39	0.39	0.61	7.93	12.93	
-AL SIL.-ENDOG.	2.	0.7	0.0	0.7	5.	0.10	0.10	0.50	0.54	0.89	
SILICON RICH	11.	3.7	0.0	3.7	28.	0.53	0.54	0.58	1.49	2.58	
-FE SILICATE	6.	2.0	0.0	2.0	15.	0.29	0.29	0.33	0.60	1.03	
IRON RICH	9.	3.0	0.0	3.0	23.	0.44	0.44	0.45	0.94	1.99	
-SI FE BINARY	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****	
-AL,SI--FE RICH	4.	1.3	0.0	1.3	10.	0.19	0.19	0.33	1.01	2.15	
TITANIUM RICH	24.	8.0	0.3	7.7	59.	1.11	1.12	0.38	1.86	4.15	
-TI FE BINARY	2.	0.7	0.0	0.7	5.	0.10	0.10	0.30	0.30	0.67	
-FE,SI TI RICH	4.	1.3	0.0	1.3	10.	0.19	0.19	0.40	0.65	1.37	
-AL,SI TI RICH	5.	1.7	0.0	1.7	13.	0.24	0.24	0.55	0.82	1.63	
OTHER AL SIL.	4.	1.3	0.0	1.3	10.	0.19	0.19	2.09	2.70	4.43	
NO X-RAYS	4.	1.3	0.0	1.3	10.	0.19**	0.00	0.27	0.34	0.34	
ALUMINUM RICH	10.	3.3	0.0	3.3	25.	0.48	0.49	0.50	1.07	1.84	
-PURE AL SIL.	5.	1.7	0.0	1.7	13.	0.24	0.24	0.83	1.14	1.98	
-FE,SI--AL RICH	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****	
-FE AL BINARY	2.	0.7	0.0	0.7	5.	0.10	0.10	0.75	0.83	1.44	
MISCELLANEOUS	5.	1.7	1.7	0.0	0.	0.00	0.00	0.26	1.54	2.67	
TOT. EXOGENOUS	2069.	689.5	4.7	684.8	5239.	99.37	100.00	0.65	3.83	6.64	
ALL TYPES	2084.	694.5	5.3	689.1	5273.	100.00	99.37	0.65	3.83	6.37	

* PARTICLES IN BLANK ARE NOT SUBTRACTED

** ENDUGENOUS CLASS

SUMMARY OF PARTICLE ANALYSIS

BLANK SAMPLE: BLANK TO LUNG 9 - PREP 3434 1ML D-10

PARTICLE CLASS	NUMBER FOUND	NUMBER IN	NUMBER IN	NET TOTAL IN	NET TOTAL PER GRAM OF	NUMBER %	EXOGENOUS %	MEDIAN* AREA EQUI. DIAMETER	MASS MEDIAN* AREA EQUI. DIAMETER	AERO- DYNAMIC DIAMETER
		100ML SOLUTION	100ML BLANK	100ML SOLUTION	DRY TISSUE					
		----- 6-- X10	-- 6-- X10	----- 6-- X10	----- 6-- X10					
SILICA	1.	*	0.3	*	*	6.25	7.14	0.37	0.37	0.60
ALUM. SILICATE	2.	*	0.7	*	*	12.50	14.29	0.61	0.66	1.08
-KADLIN-LIKE	1.	*	0.3	*	*	6.25	7.14	0.45	0.45	0.72
-K FELDSP./MICA	1.	*	0.3	*	*	6.25	7.14	0.68	0.68	1.08
-FE AL SILICATE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-CA AL SILICATE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-ALBITE-LIKE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-NA CA AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-NA FE AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-CA FE AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL SIL--TR FE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL SIL.--PURE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-K(FE) AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
TALC-LIKE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-PURE TALC	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
IRON OXIDE	2.	*	0.7	*	*	12.50**	0.00	0.75	0.81	1.81
ROUTLE-LIKE	2.	*	0.7	*	*	12.50	14.29	0.75	0.83	1.85
ALUMINA-LIKE	3.	*	1.0	*	*	18.75	21.43	0.68	2.32	3.60
COMBO-ENDOGEN.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-PURE ENDOGEN.	0.	*	0.0	*	*	0.00**	0.00	*****	*****	*****
-TRACE-ENDOGEN.	0.	*	0.0	*	*	0.00**	0.00	*****	*****	*****
-SILICA-COMBO	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL SIL.-ENDOG.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
SILICON RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE SILICATE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
IRON RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-SI FE BINARY	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL,SI--FE RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
TITANIUM RICH	1.	*	0.3	*	*	6.25	7.14	1.26	1.26	2.81
-TI FE BINARY	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE,SI TI RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL,SI TI RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
OTHER AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
NO X-RAYS	0.	*	0.0	*	*	0.00**	0.00	*****	*****	*****
ALUMINUM RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-PURE AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE,SI--AL RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE AL BINARY	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
MISCELLANEOUS	5.	*	1.7	*	*	31.25	35.71	1.02	2.23	3.86
TOT. EXOGENOUS	14.	*	4.7	*	*	87.50	100.00	0.70	2.24	3.88
ALL TYPES	16.	*	5.3	*	*	100.00	87.50	0.70	2.24	4.11

* PARTICLES IN BLANK ARE NOT SUBTRACTED

** ENDOGENOUS CLASS

SUMMARY OF PARTICLE ANALYSES

LUNG SAMPLE: LUNG 10 - PREP 3439 2ML D-585

PARTICLE CLASS	NUMBER FOUND	NUMBER	NUMBER	NET TOTAL	NET TOTAL PER GRAM OF DRY TISSUE	NUMBER %	EXOGENOUS %	MEDIAN*	MEDIAN*	AERO-
		IN	IN	IN				AREA EQUI.	AREA EQUI.	DYNAMIC
		100ML	100ML	100ML				DIAMETER	DIAMETER	DIAMETER
		SOLUTION	BLANK	SOLUTION				(UM)	(UM)	(UM)
-----	-----	--- 6---	--- 6---	--- 6---	----- 6-----	-	-			
		X10	X10	X10	X10					
SILICA	483.	64.4	0.0	64.4	489.	42.63	44.56	0.62	2.97	4.85
ALUM. SILICATE	395.	52.7	0.0	52.7	400.	34.86	36.44	0.92	5.67	9.32
-KAOLIN-LIKE	100.	13.3	0.0	13.3	101.	8.83	9.23	0.62	3.07	4.95
-K FELDSP./MICA	229.	30.5	0.0	30.5	232.	20.21	21.13	1.14	6.11	9.77
-FE AL SILICATE	6.	0.8	0.0	0.8	6.	0.53	0.55	0.57	1.85	3.04
-CA AL SILICATE	1.	0.1	0.0	0.1	1.	0.09	0.09	0.68	0.68	1.11
-ALBITE-LIKE	2.	0.3	0.0	0.3	2.	0.18	0.18	0.92	1.01	1.64
-NA CA AL SIL.	6.	0.8	0.0	0.8	6.	0.53	0.55	0.83	1.42	2.33
-NA FE AL SIL.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-CA FE AL SIL.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-AL SIL--TR FE	21.	2.8	0.0	2.8	21.	1.85	1.94	1.00	2.45	4.02
-AL SIL.-PURE	4.	0.5	0.0	0.5	4.	0.35	0.37	0.75	0.96	1.57
-K(FE) AL SIL.	12.	1.6	0.0	1.6	12.	1.06	1.11	1.13	6.06	9.95
TALC-LIKE	58.	7.7	0.0	7.7	59.	5.12	5.35	0.75	5.02	8.32
-PURE TALC	58.	7.7	0.0	7.7	59.	5.12	5.35	0.75	5.02	8.32
IRON OXIDE	13.	1.7	0.0	1.7	13.	1.15**	0.00	0.45	1.84	4.11
ROUTILE-LIKE	56.	7.5	0.1	7.3	56.	4.85	5.07	0.33	2.63	5.88
ALUMINA-LIKE	1.	0.1	0.0	0.1	1.	0.09	0.09	0.68	0.68	1.05
COMBO-ENDOGEN.	43.	5.7	0.0	5.7	44.	3.80	1.85	0.58	4.02	6.97
-PURE ENDOGEN.	19.	2.5	0.0	2.5	19.	1.68**	0.00	0.51	1.40	2.42
-TRACE-ENDOGEN.	4.	0.5	0.0	0.5	4.	0.35**	0.00	1.13	1.83	3.17
-SILICA-COMBO	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-AL SIL.-ENDOG.	7.	0.9	0.0	0.9	7.	0.62	0.65	0.58	1.12	1.84
SILICON RICH	26.	3.7	0.1	3.6	27.	2.38	2.49	0.85	3.45	5.97
-FE SILICATE	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
IRON RICH	5.	0.7	0.0	0.7	5.	0.44	0.46	0.28	0.42	0.89
-SI FE BINARY	1.	0.1	0.0	0.1	1.	0.09	0.09	0.30	0.30	0.63
-AL,SI--FE RICH	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
TITANIUM RICH	8.	1.1	0.0	1.1	8.	0.71	0.74	0.33	0.99	2.21
-TI FE BINARY	1.	0.1	0.0	0.1	1.	0.09	0.09	0.55	0.55	1.23
-FE,SI TI RICH	1.	0.1	0.0	0.1	1.	0.09	0.09	1.02	1.02	2.17
-AL,SI TI RICH	2.	0.3	0.0	0.3	2.	0.18	0.18	0.33	0.36	0.71
OTHER AL SIL.	7.	0.9	0.0	0.9	7.	0.62	0.65	0.37	1.14	1.88
NO X-RAYS	13.	1.7	0.0	1.7	13.	1.15**	0.00	0.43	2.10	2.10
ALUMINUM RICH	15.	2.0	0.1	1.9	14.	1.24	1.29	0.35	1.83	3.17
-PURE AL SIL.	6.	0.8	0.0	0.8	6.	0.53	0.55	0.50	1.84	3.19
-FE,SI--AL RICH	3.	0.4	0.0	0.4	3.	0.26	0.28	0.37	0.53	0.92
-FE AL BINARY	2.	0.3	0.0	0.3	2.	0.18	0.18	0.22	0.24	0.41
MISCELLANEOUS	11.	1.5	0.0	1.5	11.	0.97	1.01	2.71	5.85	10.13
TOT. EXOGENOUS	1087.	144.9	0.4	144.5	1097.	95.68	100.00	0.70	4.89	8.47

ALL TYPES	1136.	151.4	0.4	151.0	1147.	100.00	95.68	0.68	4.87	8.13

* PARTICLES IN BLANK ARE NOT SUBTRACTED

** ENDOGENOUS CLASS

SUMMARY OF PARTICLE ANALYSIS

298

BLANK SAMPLE: BLANK TO LUNG 10 - PREP 3440 ZML D-585

PARTICLE CLASS	NUMBER FOUND	NUMBER	NUMBER	NET TOTAL	NET TOTAL	NUMBER %	EXOGENOUS %	MEDIAN*	MASS	AERO- DYNAMIC DIAMETER
		IN	IN	IN	PER GRAM OF			AREA EQUI.	AREA EQUI.	
		100ML SOLUTION	100ML BLANK	100ML SOLUTION	DRY TISSUE			DIAMETER	DIAMETER	
		δ--	δ--	δ--	δ--	-	-			
		X10	X10	X10	X10			(UM)	(UM)	(UM)
SILICA	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
ALUM. SILICATE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-KAOLIN-LIKE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-K FELDSP./MICA	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE AL SILICATE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-CA AL SILICATE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-ALBITE-LIKE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-NA CA AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-NA FE AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-CA FE AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL SIL--TR FE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL SIL.--PURE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-K(FE) AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
TALC-LIKE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-PURE TALC	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
IRON OXIDE	0.	*	0.0	*	*	0.00**	0.00	*****	*****	*****
RUTILE-LIKE	1.	*	0.1	*	*	33.33	33.33	1.26	1.26	2.81
ALUMINA-LIKE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
COMBO-ENDOGEN.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-PURE ENDOGEN.	0.	*	0.0	*	*	0.00**	0.00	*****	*****	*****
-TRACE-ENDOGEN.	0.	*	0.0	*	*	0.00**	0.00	*****	*****	*****
-SILICA-COMBO	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL SIL.-ENDOGEN.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
SILICON RICH	1.	*	0.1	*	*	33.33	33.33	0.30	0.30	0.52
-FE SILICATE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
IRON RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-SI FE BINARY	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL,SI--FE RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
TITANIUM RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-TI FE BINARY	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE,SI TI RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL,SI TI RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
OTHER AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
NO X-RAYS	0.	*	0.0	*	*	0.00**	0.00	*****	*****	*****
ALUMINUM RICH	1.	*	0.1	*	*	33.33	33.33	0.45	0.45	0.78
-PURE AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE,SI--AL RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE AL BINARY	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
MISCELLANEOUS	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
TOT. EXOGENOUS	3.	*	0.4	*	*	100.00	100.00	0.45	1.25	2.16
ALL TYPES	3.	*	0.4	*	*	100.00	100.00	0.45	1.25	2.74

* PARTICLES IN BLANK ARE NOT SUBTRACTED

** ENDOGENOUS CLASS

SUMMARY OF PARTICLE ANALYSES

LUNG SAMPLE: LUNG 11 - PREP 3501 2ML D-576

PARTICLE CLASS	NUMBER		NUMBER		NET TOTAL		NUMBER	EXOGENOUS	MEDIAN*	MASS MEDIAN*	AERO- DYNAMIC
	FOUND	IN	IN	IN	NET TOTAL						
		100ML	100ML	100ML	PER GRAM OF						
		SOLUTION	BLANK	SOLUTION	DRY TISSUE						
-----	-----	6--	6--	6--	6--	-	-	DIAMETER	DIAMETER	DIAMETER	
		X10	X10	X10	X10			(UM)	(UM)	(UM)	
SILICA	403.	49.7	0.4	49.4	494.	37.66	39.14	0.54	2.17	3.54	
ALUM. SILICATE	384.	47.4	0.5	46.9	469.	35.78	37.18	0.62	2.32	3.82	
-KAOLIN-LIKE	85.	10.5	0.0	10.5	105.	8.00	8.32	0.67	1.28	2.07	
-K FELDSP./MICA	161.	19.9	0.0	19.9	199.	15.16	15.75	0.74	2.56	4.10	
-FE AL SILICATE	9.	1.1	0.0	1.1	11.	0.85	0.88	0.51	1.88	3.10	
-CA AL SILICATE	1.	0.1	0.0	0.1	1.	0.09	0.10	0.45	0.45	0.74	
-ALBITE-LIKE	9.	1.1	0.0	1.1	11.	0.85	0.88	0.68	1.78	2.89	
-NA CA AL SIL.	7.	0.9	0.0	0.9	9.	0.66	0.68	1.02	2.82	4.64	
-NA FE AL SIL.	1.	0.1	0.0	0.1	1.	0.09	0.10	0.45	0.45	0.74	
-CA FE AL SIL.	1.	0.1	0.0	0.1	1.	0.09	0.10	0.55	0.55	0.91	
-AL SIL--TR FE	43.	5.3	0.0	5.3	53.	4.05	4.21	0.57	3.21	5.27	
-AL SIL.--PURE	14.	1.7	0.0	1.7	17.	1.32	1.37	0.37	0.93	1.53	
-K(FE) AL SIL.	24.	3.0	0.2	2.7	27.	2.07	2.15	0.59	1.18	1.93	
TALC-LIKE	4.	0.5	0.0	0.5	5.	0.38	0.39	0.68	1.87	3.10	
-PURE TALC	4.	0.5	0.0	0.5	5.	0.38	0.39	0.68	1.87	3.10	
IRON OXIDE	4.	0.5	0.1	0.4	4.	0.28**	0.00	0.40	2.32	5.19	
RUTILE-LIKE	82.	10.1	0.9	9.3	93.	7.06	7.34	0.30	1.13	2.52	
ALUMINA-LIKE	2.	0.2	0.0	0.2	2.	0.19	0.20	2.56	2.85	4.44	
COMBO-ENDOGEN.	10.	1.2	0.1	1.1	11.	0.85	0.20	0.23	0.38	0.65	
-PURE ENDOGEN.	7.	0.9	0.0	0.9	9.	0.66**	0.00	0.21	0.35	0.61	
-TRACE-ENDOGEN.	0.	0.0	0.0	0.0	0.	0.00**	0.00	*****	*****	*****	
-SILICA-COMBO	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****	
-AL SIL.-ENDOG.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****	
SILICON RICH	58.	7.2	0.2	6.9	69.	5.27	5.46	0.92	2.87	4.98	
-FE SILICATE	9.	1.1	0.0	1.1	11.	0.85	0.88	0.88	2.80	4.85	
IRON RICH	9.	1.1	0.1	1.0	10.	0.75	0.78	0.68	0.96	2.08	
-SI FE BINARY	3.	0.4	0.1	0.2	2.	0.19	0.20	0.68	0.78	1.65	
-AL,SI--FE RICH	1.	0.1	0.0	0.1	1.	0.09	0.10	1.02	1.02	2.17	
TITANIUM RICH	63.	7.8	0.2	7.5	75.	5.74	5.97	0.46	5.05	11.29	
-TI FE BINARY	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****	
-FE,SI TI RICH	3.	0.4	0.0	0.4	4.	0.28	0.29	0.16	0.23	0.49	
-AL,SI TI RICH	8.	1.0	0.0	1.0	10.	0.75	0.78	0.18	1.02	2.04	
OTHER AL SIL.	2.	0.2	0.0	0.2	2.	0.19	0.20	1.38	1.54	2.53	
NO X-RAYS	30.	3.7	0.0	3.7	37.	2.82**	0.00	0.51	1.43	1.43	
ALUMINUM RICH	6.	0.7	0.0	0.7	7.	0.56	0.59	0.75	2.80	4.85	
-PURE AL SIL.	2.	0.2	0.0	0.2	2.	0.19	0.20	2.56	2.83	4.90	
-FE,SI--AL RICH	2.	0.2	0.0	0.2	2.	0.19	0.20	1.13	1.25	2.17	
-FE AL BINARY	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****	
MISCELLANEOUS	32.	3.9	0.7	3.2	32.	2.45	2.54	0.46	6.40	11.09	
TOT. EXOGENOUS	1048.	129.3	3.2	126.1	1261.	96.23	100.00	0.55	2.71	4.69	
ALL TYPES	1089.	134.4	3.3	131.1	1311.	100.00	96.23	0.54	2.68	4.70	

* PARTICLES IN BLANK ARE NOT SUBTRACTED

** ENDOGENOUS CLASS

SUMMARY OF PARTICLE ANALYSIS

BLANK SAMPLE: BLANK TO LUNG 11 - PREP 3502 2ML D-578

PARTICLE CLASS	NUMBER		NUMBER		NET TOTAL		NUMBER	EXOGENOUS	MASS		AERO- DYNAMIC DIAMETER			
	NUMBER FOUND	IN 100ML SOLUTION	IN 100ML BLANK	IN 100ML SOLUTION	NET TOTAL PER GRAM OF DRY TISSUE	MEDIAN* AREA EQUI. DIAMETER			MEDIAN* AREA EQUI. DIAMETER					
										6--		6--	6--	6--
		X10	X10	X10	X10			(UM)	(UM)	(UM)				
SILICA	3.	*	0.4	*	*	11.11	11.54	0.24	0.35	0.57				
ALUM. SILICATE	4.	*	0.5	*	*	14.81	15.98	1.38	1.53	2.51				
-KAOLIN-LIKE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****				
-K FELDSP./MICA	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****				
-FE AL SILICATE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****				
-CA AL SILICATE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****				
-ALBITE-LIKE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****				
-NA CA AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****				
-NA FE AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****				
-CA FE AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****				
-AL SIL--TR FE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****				
-AL SIL.--PURE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****				
-K(FE) AL SIL.	2.	*	0.2	*	*	7.41	7.69	1.54	1.54	2.53				
TALC-LIKE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****				
-PURE TALC	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****				
IRON OXIDE	1.	*	0.1	*	*	3.70**	0.00	0.45	0.45	1.01				
RUTILE-LIKE	7.	*	0.9	*	*	25.93	26.92	0.30	0.96	2.14				
ALUMINA-LIKE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****				
COMBO-ENDOGEN.	1.	*	0.1	*	*	3.70	3.85	0.83	0.83	1.44				
-PURE ENDOGEN.	0.	*	0.0	*	*	0.00**	0.00	*****	*****	*****				
-TRACE-ENDOGEN.	0.	*	0.0	*	*	0.00**	0.00	*****	*****	*****				
-SILICA-COMBO	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****				
-AL SIL.-ENDOG.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****				
SILICON RICH	2.	*	0.2	*	*	7.41	7.69	0.61	0.67	1.16				
-FE SILICATE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****				
IRON RICH	1.	*	0.1	*	*	3.70	3.85	0.20	0.20	0.42				
-SI FE BINARY	1.	*	0.1	*	*	3.70	3.85	0.20	0.20	0.42				
-AL,SI--FE RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****				
TITANIUM RICH	2.	*	0.2	*	*	7.41	7.69	0.22	0.24	0.53				
-TI FE BINARY	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****				
-FE,SI TI RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****				
-AL,SI TI RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****				
OTHER AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****				
NO X-RAYS	0.	*	0.0	*	*	0.00**	0.00	*****	*****	*****				
ALUMINUM RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****				
-PURE AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****				
-FE,SI--AL RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****				
-FE AL BINARY	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****				
MISCELLANEOUS	6.	*	0.7	*	*	22.22	23.08	0.50	3.38	5.86				
TOT. EXOGENOUS	26.	*	3.2	*	*	96.30	100.00	0.39	3.30	5.71				
ALL TYPES	27.	*	3.3	*	*	100.00	96.30	0.39	3.29	5.87				

* PARTICLES IN BLANK ARE NOT SUBTRACTED

** ENDOGENOUS CLASS

SUMMARY OF PARTICLE ANALYSES

LUNG SAMPLE: LUNG 12 - PREP 3497 2ML D-576

PARTICLE CLASS	NUMBER FOUND	NUMBER	NUMBER	NET TOTAL	NET TOTAL	NUMBER %	EXOGENOUS %	MEDIAN*	MASS	AERO-
		IN	IN	IN	PER GRAM OF			AREA EQUI.	MEDIAN*	DYNAMIC
		100ML	100ML	100ML	DRY TISSUE			DIAMETER	DIAMETER	DIAMETER
		SOLUTION	BLANK	SOLUTION						
		----- 6-----	----- 6-----	----- 6-----	----- 6-----					
		X10	X10	X10	X10			(UM)	(UM)	(UM)
SILICA	349.	48.5	0.7	47.8	484.	32.82	33.27	0.62	2.39	3.39
ALUM. SILICATE	569.	79.0	0.4	78.6	796.	54.01	54.74	0.66	3.90	6.40
-KAOLIN-LIKE	114.	15.8	0.3	15.6	158.	10.69	10.83	0.60	3.25	5.24
-K FELDSP./MICA	357.	49.6	0.0	49.6	502.	34.06	34.53	0.64	4.24	6.76
-FE AL SILICATE	1.	0.1	0.1	0.0	0.	0.00	0.00	0.37	0.37	0.50
-CA AL SILICATE	2.	0.3	0.0	0.3	3.	0.19	0.19	2.09	2.29	3.76
-ALBITE-LIKE	5.	0.7	0.0	0.7	7.	0.48	0.48	0.47	0.95	1.53
-NA CA AL SIL.	3.	0.4	0.0	0.4	4.	0.29	0.29	1.19	1.25	2.06
-NA FE AL SIL.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-CA FE AL SIL.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-AL SIL--TR FE	21.	2.9	0.0	2.9	30.	2.00	2.03	0.83	4.24	6.96
-AL SIL.--PURE	9.	1.2	0.0	1.2	13.	0.86	0.87	0.71	2.22	3.64
-K(FE) AL SIL.	24.	3.3	0.0	3.3	34.	2.29	2.32	0.99	2.72	4.47
TALC-LIKE	3.	0.4	0.0	0.4	4.	0.29	0.29	1.54	2.81	4.66
-PURE TALC	2.	0.3	0.0	0.3	3.	0.19	0.19	1.38	1.54	2.56
IRON OXIDE	6.	0.8	0.3	0.6	6.	0.38**	0.00	0.40	1.86	4.15
ROUTLE-LIKE	34.	4.7	0.3	4.4	45.	3.05	3.09	0.33	1.33	2.98
ALUMINA-LIKE	3.	0.4	0.0	0.4	4.	0.29	0.29	0.37	0.42	0.65
COMBO-ENDOGEN.	4.	0.6	0.1	0.4	4.	0.29	0.29	0.30	1.25	2.17
-PURE ENDOGEN.	0.	0.0	0.0	0.0	0.	0.00**	0.00	*****	*****	*****
-TRACE-ENDOGEN.	0.	0.0	0.0	0.0	0.	0.00**	0.00	*****	*****	*****
-SILICA-COMBO	1.	0.1	0.0	0.1	1.	0.10	0.10	0.24	0.24	0.40
-AL SIL.-ENDOG.	3.	0.4	0.0	0.4	4.	0.29	0.29	0.31	1.25	2.06
SILICON RICH	28.	3.9	0.0	3.9	39.	2.67	2.71	0.61	4.96	8.59
-FE SILICATE	3.	0.4	0.0	0.4	4.	0.29	0.29	0.30	0.43	0.74
IRON RICH	7.	1.0	0.1	0.8	8.	0.57	0.58	0.45	0.96	2.07
-SI FE BINARY	2.	0.3	0.0	0.3	3.	0.19	0.19	0.50	0.54	1.15
-AL,SI--FE RICH	1.	0.1	0.0	0.1	1.	0.10	0.10	0.20	0.20	0.42
TITANIUM RICH	30.	4.2	0.0	4.2	42.	2.86	2.90	0.40	3.44	7.70
-TI FE BINARY	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-FE,SI TI RICH	2.	0.3	0.0	0.3	3.	0.19	0.19	0.40	0.44	0.94
-AL,SI TI RICH	18.	2.5	0.0	2.5	25.	1.72	1.74	0.33	1.12	2.24
OTHER AL SIL.	3.	0.4	0.0	0.4	4.	0.29	0.29	0.37	0.42	0.69
NO X-RAYS	11.	1.5	0.1	1.4	14.	0.95**	0.00	0.45	3.39	3.39
ALUMINUM RICH	3.	0.4	0.0	0.4	4.	0.29	0.29	0.37	2.32	4.03
-PURE AL SIL.	1.	0.1	0.0	0.1	1.	0.10	0.10	0.06	0.06	0.10
-FE,SI--AL RICH	1.	0.1	0.0	0.1	1.	0.10	0.10	0.37	0.37	0.63
-FE AL BINARY	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
MISCELLANEOUS	16.	2.2	0.4	1.8	18.	1.24	1.26	0.99	2.48	4.30
TOT. EXOGENOUS	1049.	145.7	2.1	143.6	1455.	98.66	100.00	0.61	3.45	5.97
ALL TYPES	1066.	146.0	2.5	145.5	1474.	100.00	98.66	0.61	3.44	5.75

* PARTICLES IN BLANK ARE NOT SUBTRACTED

** ENDOGENOUS CLASS

SUMMARY OF PARTICLE ANALYSIS

302

BLANK SAMPLE: BLANK TO LUNG 12 - PREP 3498 2ML D-576

PARTICLE CLASS	NUMBER FOUND	NUMBER IN	NUMBER IN	NET TOTAL	NET TOTAL	NUMBER %	EXOGENOUS %	MEDIAN* AREA EQUI. DIAMETER	MASS MEDIAN* AREA EQUI. DIAMETER	AERO- DYNAMIC DIAMETER
		100ML	100ML	IN	PER GRAM OF					
		SOLUTION	BLANK	SOLUTION	DRY TISSUE					
		6--	6--	6--	6--	-	-	(UM)	(UM)	(UM)
		X10	X10	X10	X10					
SILICA	5.	*	0.7	*	*	27.78	33.33	0.55	0.65	1.07
ALUM. SILICATE	3.	*	0.4	*	*	16.67	20.00	1.02	1.18	1.95
-KAOLIN-LIKE	2.	*	0.3	*	*	11.11	13.33	1.13	1.19	1.91
-K FELDSP./MICA	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE AL SILICATE	1.	*	0.1	*	*	5.56	6.67	0.30	0.30	0.49
-CA AL SILICATE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-ALBITE-LIKE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-NA CA AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-NA FE AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-CA FE AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL SIL--TR FE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL SIL.--PURE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-K(FE) AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
TALC-LIKE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-PURE TALC	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
IRON OXIDE	2.	*	0.3	*	*	11.11**	0.00	0.37	0.37	0.82
RUTILE-LIKE	2.	*	0.3	*	*	11.11	13.33	0.40	0.42	0.95
ALUMINA-LIKE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
COMBO-ENDOGEN.	1.	*	0.1	*	*	5.56	6.67	0.83	0.83	1.44
-PURE ENDOGEN.	0.	*	0.0	*	*	0.00**	0.00	*****	*****	*****
-TRACE-ENDOGEN.	0.	*	0.0	*	*	0.00**	0.00	*****	*****	*****
-SILICA-COMBO	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL SIL.-ENDOG.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
SILICON RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE SILICATE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
IRON RICH	1.	*	0.1	*	*	5.56	6.67	0.37	0.37	0.78
-SI FE BINARY	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL,SI--FE RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
TITANIUM RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-TI FE BINARY	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE,SI TI RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL,SI TI RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
OTHER AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
NO X-RAYS	1.	*	0.1	*	*	5.56**	0.00	0.30	0.30	0.30
ALUMINUM RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-PURE AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE,SI--AL RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE AL BINARY	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
MISCELLANEOUS	3.	*	0.4	*	*	16.67	20.00	1.26	2.82	4.88
TOT. EXOGENOUS	15.	*	2.1	*	*	83.33	100.00	0.64	2.76	4.78
ALL TYPES	18.	*	2.5	*	*	100.00	83.33	0.50	2.76	4.82

* PARTICLES IN BLANK ARE NOT SUBTRACTED

** ENDOGENOUS CLASS

SUMMARY OF PARTICLE ANALYSES

LUNG SAMPLE: LUNG 13 - PREP 3499 3ML D-577

PARTICLE CLASS	NUMBER FOUND	NUMBER IN	NUMBER IN	NET TOTAL		NUMBER %	EXOGENOUS %	MEDIAN* AREA EQUI. DIAMETER	MASS MEDIAN* AREA EQUI. DIAMETER	AERO- DYNAMIC DIAMETER
		100ML	100ML	IN	NET TOTAL					
		SOLUTION	BLANK	SOLUTION	PER GRAM OF					
		----- 6-- X10	-- 6-- X10	----- 6-- X10	----- 6-- X10	-	-	----- (UM)	----- (UM)	----- (UM)
SILICA	705.	52.2	0.2	52.0	548.	50.25	52.70	0.50	1.91	3.11
ALUM. SILICATE	441.	32.7	0.0	32.7	344.	31.57	33.11	0.65	2.59	4.25
-KAOLIN-LIKE	65.	4.8	0.0	4.8	51.	4.65	4.88	0.54	2.69	4.34
-K FELDSP./MICA	215.	15.9	0.0	15.9	168.	15.39	16.14	0.69	2.72	4.36
-FE AL SILICATE	16.	1.2	0.0	1.2	12.	1.15	1.20	0.50	2.75	4.52
-CA AL SILICATE	6.	0.4	0.0	0.4	5.	0.43	0.45	0.68	1.77	2.90
-ALBITE-LIKE	11.	0.8	0.0	0.8	9.	0.79	0.83	0.88	1.97	3.19
-NA CA AL SIL.	11.	0.8	0.0	0.8	9.	0.79	0.83	1.07	2.39	3.92
-NA FE AL SIL.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-CA FE AL SIL.	3.	0.2	0.0	0.2	2.	0.21	0.23	0.38	1.54	2.53
-AL SIL--TR FE	51.	3.8	0.0	3.8	40.	3.65	3.83	0.62	1.85	3.04
-AL SIL.--PURE	15.	1.1	0.0	1.1	12.	1.07	1.13	0.31	0.82	1.35
-K(FE) AL SIL.	33.	2.4	0.0	2.4	26.	2.36	2.48	0.60	2.88	4.74
TALC-LIKE	8.	0.6	0.0	0.6	6.	0.57	0.60	1.13	1.28	2.13
-PURE TALC	8.	0.6	0.0	0.6	6.	0.57	0.60	1.13	1.28	2.13
IRON OXIDE	12.	0.9	0.2	0.7	7.	0.64**	0.00	0.38	0.70	1.57
RUTILE-LIKE	62.	4.6	0.4	4.2	44.	4.08	4.28	0.30	1.04	2.33
ALUMINA-LIKE	3.	0.2	0.0	0.2	2.	0.21	0.23	0.28	0.30	0.46
COMBO-ENDOGEN.	9.	0.7	0.1	0.5	5.	0.50	0.53	0.26	0.61	1.06
-PURE ENDOGEN.	2.	0.1	0.0	0.1	2.	0.14**	0.00	0.27	0.28	0.49
-TRACE-ENDOGEN.	0.	0.0	0.1	-0.1	-2.	-0.14**	0.00	*****	*****	*****
-SILICA-COMBO	1.	0.1	0.0	0.1	1.	0.07	0.08	0.20	0.20	0.32
-AL SIL.-ENDOG.	3.	0.2	0.0	0.2	2.	0.21	0.23	0.37	0.66	1.09
SILICON RICH	65.	4.8	0.1	4.7	50.	4.58	4.80	0.70	1.92	3.33
-FE SILICATE	2.	0.1	0.0	0.1	2.	0.14	0.15	0.61	0.67	1.16
IRON RICH	8.	0.6	0.0	0.6	6.	0.57	0.60	0.75	1.07	2.28
-SI FE BINARY	1.	0.1	0.0	0.1	1.	0.07	0.08	0.30	0.30	0.63
-AL,SI--FE RICH	1.	0.1	0.0	0.1	1.	0.07	0.08	0.63	0.83	1.77
TITANIUM RICH	18.	1.3	0.1	1.3	13.	1.22	1.28	0.34	1.50	3.37
-TI FE BINARY	1.	0.1	0.0	0.1	1.	0.07	0.08	0.37	0.37	0.82
-FE,SI TI RICH	3.	0.2	0.0	0.2	2.	0.21	0.23	0.45	0.52	1.10
-AL,SI TI RICH	4.	0.3	0.0	0.3	3.	0.29	0.30	0.40	0.50	1.00
OTHER AL SIL.	3.	0.2	0.0	0.2	2.	0.21	0.23	1.26	2.83	4.65
NO X-RAYS	59.	4.4	0.2	4.1	44.	4.01**	0.00	0.62	4.86	4.86
ALUMINUM RICH	4.	0.3	0.0	0.3	3.	0.29	0.30	1.38	1.73	3.00
-PURE AL SIL.	1.	0.1	0.0	0.1	1.	0.07	0.08	1.89	1.89	3.28
-FE,SI--AL RICH	2.	0.1	0.0	0.1	2.	0.14	0.15	1.38	1.54	2.67
-FE AL BINARY	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
MISCELLANEOUS	18.	1.3	0.0	1.3	14.	1.29	1.35	0.83	6.27	10.86
TOT. EXOGENOUS	1342.	99.4	0.7	98.6	1039.	95.35	100.00	0.54	2.50	4.33
ALL TYPES	1415.	104.8	1.3	103.5	1090.	100.00	95.35	0.54	2.58	4.29

* PARTICLES IN BLANK ARE NOT SUBTRACTED
 ** ENDOGENOUS CLASS

SUMMARY OF PARTICLE ANALYSIS

BLANK SAMPLE: BLANK TO LUNG 13 - PREP 3500 3ML D-577

PARTICLE CLASS	NUMBER FOUND	NUMBER	NUMBER	NET TOTAL		NUMBER %	EXOGENOUS %	MEDIAN* AREA EQUI. DIAMETER	MASS MEDIAN* AREA EQUI. DIAMETER	AERO- DYNAMIC DIAMETER
		IN	IN	IN	NET TOTAL					
		100ML SOLUTION	100ML BLANK	100ML SOLUTION	PER GRAM OF DRY TISSUE					
		----- 6-- X10	-- 6-- X10	----- 6-- X10	----- 6-- X10	-	-	----- (UM)	----- (UM)	----- (UM)
SILICA	3.	*	0.2	*	*	16.67	30.00	0.30	0.43	0.70
ALUM. SILICATE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-KADLIN-LIKE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-K FELDSP./MICA	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE AL SILICATE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-CA AL SILICATE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-ALBITE-LIKE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-NA CA AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-NA FE AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-CA FE AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL SIL.--TR FE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL SIL.--PURE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-K(FE) AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
TALC-LIKE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-PURE TALC	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
IRON OXIDE	3.	*	0.2	*	*	16.67**	0.00	0.37	2.32	5.20
RUTILE-LIKE	5.	*	0.4	*	*	27.78	50.00	0.24	0.53	1.18
ALUMINA-LIKE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
COMBO-ENDOGEN.	2.	*	0.1	*	*	11.11	0.00	1.70	1.79	3.10
-PURE ENDOGEN.	0.	*	0.0	*	*	0.00**	0.00	*****	*****	*****
-TRACE-ENDOGEN.	2.	*	0.1	*	*	11.11**	0.00	1.70	1.79	3.10
-SILICA-COMBO	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL SIL.-ENDOG.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
SILICON RICH	1.	*	0.1	*	*	5.56	10.00	0.68	0.68	1.17
-FE SILICATE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
IRON RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-SI FE BINARY	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL,SI--FE RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
TITANIUM RICH	1.	*	0.1	*	*	5.56	10.00	0.20	0.20	0.44
-TI FE BINARY	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE,SI TI RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL,SI TI RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
OTHER AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
NO X-RAYS	3.	*	0.2	*	*	16.67**	0.00	0.58	0.78	0.78
ALUMINUM RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-PURE AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE,SI--AL RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE AL BINARY	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
MISCELLANEOUS	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
TOT. EXOGENOUS	10.	*	0.7	*	*	55.56	100.00	0.27	0.59	1.02
ALL TYPES	18.	*	1.3	*	*	100.00	55.56	0.40	2.10	4.27

* PARTICLES IN BLANK ARE NOT SUBTRACTED

** ENDOGENOUS CLASS

SUMMARY OF PARTICLE ANALYSES

LUNG SAMPLE: LUNG 14 - PREP 3495 2.5ML D-575

PARTICLE CLASS	NUMBER FOUND	NUMBER IN	NUMBER IN	NET TOTAL		NUMBER %	EXOGENOUS %	MEDIAN* AREA EQUI. DIAMETER	MASS MEDIAN* AREA EQUI. DIAMETER	AERO- DYNAMIC DIAMETER
		100ML SOLUTION	100ML BLANK	IN	NET TOTAL					
		----- 6-- X10	-- 6-- X10	----- 6-- X10	----- 6-- X10	-	-	----- (UM)	----- (UM)	----- (UM)
SILICA	391.	37.2	0.4	36.8	362.	32.60	33.42	0.60	3.54	5.76
ALUM. SILICATE	504.	48.0	0.0	48.0	471.	42.46	43.52	0.70	4.04	6.63
-KAOLIN-LIKE	82.	7.8	0.0	7.8	77.	6.91	7.08	0.78	4.92	7.93
-K FELDSP./MICA	264.	25.1	0.0	25.1	247.	22.24	22.80	0.68	4.04	6.46
-FE AL SILICATE	12.	1.1	0.0	1.1	11.	1.01	1.04	0.75	4.13	6.79
-CA AL SILICATE	2.	0.2	0.0	0.2	2.	0.17	0.17	1.38	1.53	2.51
-ALBITE-LIKE	14.	1.3	0.0	1.3	13.	1.18	1.21	0.83	2.41	3.89
-NA CA AL SIL.	7.	0.7	0.0	0.7	7.	0.59	0.60	0.75	2.75	4.52
-NA FE AL SIL.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-CA FE AL SIL.	3.	0.3	0.0	0.3	3.	0.25	0.26	0.64	0.68	1.11
-AL SIL--TR FE	48.	4.6	0.0	4.6	45.	4.04	4.15	0.59	2.64	4.35
-AL SIL.--PURE	20.	1.9	0.0	1.9	19.	1.68	1.73	0.31	1.73	2.84
-K(FE) AL SIL.	16.	1.5	0.0	1.5	15.	1.35	1.38	1.07	1.75	2.88
TALC-LIKE	4.	0.4	0.0	0.4	4.	0.34	0.35	0.92	1.00	1.66
-PURE TALC	4.	0.4	0.0	0.4	4.	0.34	0.35	0.92	1.00	1.66
IRON OXIDE	5.	0.5	0.0	0.5	5.	0.42**	0.00	1.26	1.68	3.75
RUTILE-LIKE	70.	6.7	0.1	6.6	65.	5.81	5.96	0.32	0.96	2.19
ALUMINA-LIKE	3.	0.3	0.0	0.3	3.	0.25	0.26	0.38	0.52	0.81
COMBO-ENDOGEN.	7.	0.7	0.1	0.6	6.	0.51	0.52	0.55	0.72	1.24
-PURE ENDOGEN.	0.	0.0	0.0	0.0	0.	0.00**	0.00	*****	*****	*****
-TRACE-ENDOGEN.	0.	0.0	0.0	0.0	0.	0.00**	0.00	*****	*****	*****
-SILICA-COMBO	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-AL SIL.-ENDOG.	6.	0.6	0.0	0.6	6.	0.51	0.52	0.33	0.74	1.21
SILICON RICH	92.	8.8	0.0	8.8	86.	7.75	7.94	0.94	3.73	6.46
-FE SILICATE	6.	0.6	0.0	0.6	6.	0.51	0.52	0.61	6.48	11.22
IRON RICH	10.	1.0	0.0	1.0	9.	0.84	0.86	0.83	3.44	7.31
-SI FE BINARY	1.	0.1	0.0	0.1	1.	0.08	0.09	1.89	1.89	4.02
-AL,SI--FE RICH	1.	0.1	0.0	0.1	1.	0.08	0.09	0.68	0.68	1.44
TITANIUM RICH	53.	5.0	0.0	5.0	50.	4.47	4.58	0.31	3.41	7.63
-TI FE BINARY	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-FE,SI TI RICH	10.	1.0	0.0	1.0	9.	0.84	0.86	0.55	3.47	7.36
-AL,SI TI RICH	9.	0.9	0.0	0.9	8.	0.76	0.78	0.35	1.51	3.01
OTHER AL SIL.	1.	0.1	0.0	0.1	1.	0.08	0.09	0.20	0.20	0.32
NO XRAVS	24.	2.3	0.0	2.3	22.	2.02**	0.00	0.50	6.35	6.35
ALUMINUM RICH	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-PURE AL SIL.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-FE,SI--AL RICH	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-FE AL BINARY	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
MISCELLANEOUS	29.	2.8	0.0	2.8	27.	2.44	2.50	0.68	5.95	10.31
TOT. EXOGENOUS	1164.	110.8	0.6	110.3	1083.	97.56	100.00	0.61	4.03	6.97
ALL TYPES	1193.	113.6	0.6	113.0	1110.	100.00	97.56	0.61	4.12	6.99

* PARTICLES IN BLANK ARE NOT SUBTRACTED
 ** ENDOGENOUS CLASS

SUMMARY OF PARTICLE ANALYSIS

BLANK SAMPLE: BLANK TO LUNG 14 - PREP 3496 2.5ML D-575

PARTICLE CLASS	NUMBER FOUND	NUMBER	NUMBER	NET TOTAL		NUMBER %	EXOGENOUS %	MEDIAN* AREA EQUI. DIAMETER	MASS MEDIAN* AREA EQUI. DIAMETER	AERO- DYNAMIC DIAMETER
		IN	IN	IN	NET TOTAL					
		100ML SOLUTION	100ML BLANK	100ML SOLUTION	PER GRAM OF DRY TISSUE					
		6--	-- 6--	6--	6--	-	-			
		X10	X10	X10	X10			(UM)	(UM)	(UM)
SILICA	4.	*	0.4	*	*	66.67	66.67	0.92	3.49	5.70
ALUM. SILICATE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-KAOLIN-LIKE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-K FELDSP./MICA	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE AL SILICATE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-CA AL SILICATE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-ALBITE-LIKE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-NA CA AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-NA FE AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-CA FE AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL SIL.--TR FE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL SIL.--PURE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-K(FE) AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
TALC-LIKE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-PURE TALC	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
IRON OXIDE	0.	*	0.0	*	*	0.00**	0.00	*****	*****	*****
RUTILE-LIKE	1.	*	0.1	*	*	16.67	16.67	0.45	0.45	1.01
ALUMINA-LIKE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
COMBO-ENDOGEN.	1.	*	0.1	*	*	16.67	16.67	2.86	2.86	4.95
-PURE ENDOGEN.	0.	*	0.0	*	*	0.00**	0.00	*****	*****	*****
-TRACE-ENDOGEN.	0.	*	0.0	*	*	0.00**	0.00	*****	*****	*****
-SILICA-COMBO	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL SIL.-ENDOG.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
SILICON RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE SILICATE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
IRON RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-SI FE BINARY	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL,SI--FE RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
TITANIUM RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-TI FE BINARY	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE,SI TI RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL,SI TI RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
OTHER AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
NO X-RAYS	0.	*	0.0	*	*	0.00**	0.00	*****	*****	*****
ALUMINUM RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-PURE AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE,SI--AL RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE AL BINARY	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
MISCELLANEOUS	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
TOT. EXOGENOUS	6.	*	0.6	*	*	100.00	100.00	0.92	3.30	5.71
ALL TYPES	6.	*	0.6	*	*	100.00	100.00	0.92	3.30	5.54

* PARTICLES IN BLANK ARE NOT SUBTRACTED

** ENDOGENOUS CLASS

SUMMARY OF PARTICLE ANALYSES

LUNG SAMPLE: LUNG 15 - PREP 3503 1.5ML D-579

PARTICLE CLASS	NUMBER		NUMBER		NET TOTAL		NUMBER	EXOGENOUS	MASS		AERO- DYNAMIC DIAMETER
	NUMBER FOUND	IN	IN	IN	NET TOTAL	AREA EQUI. DIAMETER			AREA EQUI. DIAMETER		
		100ML	100ML	100ML	PER GRAM OF						
		SOLUTION	BLANK	SOLUTION	DRY TISSUE						
-----	-----	6--	-- 6--	----- 6--	----- 6--	-	-	-----	-----	-----	
		X10	X10	X10	X10			(UM)	(UM)	(UM)	
SILICA	466.	103.5	0.2	103.3	1070.	39.81	41.30	0.59	1.88	3.07	
ALUM. SILICATE	235.	52.2	0.0	52.2	541.	20.12	20.87	0.72	2.82	4.63	
-KAOLIN-LIKE	30.	6.7	0.0	6.7	69.	2.57	2.66	0.75	4.19	6.75	
-K FELDSP./MICA	138.	30.7	0.0	30.7	318.	11.82	12.26	0.67	2.47	3.95	
-FE AL SILICATE	2.	0.4	0.0	0.4	5.	0.17	0.18	0.40	0.45	0.74	
-CA AL SILICATE	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****	
-ALBITE-LIKE	9.	2.0	0.0	2.0	21.	0.77	0.80	1.62	2.04	3.29	
-NA CA AL SIL.	6.	1.3	0.0	1.3	14.	0.51	0.53	1.26	1.45	2.39	
-NA FE AL SIL.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****	
-CA FE AL SIL.	1.	0.2	0.0	0.2	2.	0.09	0.09	1.26	1.26	2.06	
-AL SIL.--TR FE	11.	2.4	0.0	2.4	25.	0.94	0.98	0.48	2.83	4.65	
-AL SIL.--PURE	7.	1.6	0.0	1.6	16.	0.60	0.62	0.55	1.23	2.02	
-K(FE) AL SIL.	8.	1.8	0.0	1.8	18.	0.68	0.71	0.61	1.42	2.33	
TALC-LIKE	13.	2.9	0.0	2.9	30.	1.11	1.15	0.79	4.20	6.97	
-PURE TALC	13.	2.9	0.0	2.9	30.	1.11	1.15	0.79	4.20	6.97	
IRON OXIDE	8.	1.8	0.2	1.6	16.	0.60**	0.00	0.61	1.11	2.47	
RUTILE-LIKE	298.	66.2	0.7	65.5	679.	25.26	26.20	0.32	0.63	1.41	
ALUMINA-LIKE	1.	0.2	0.0	0.2	2.	0.09	0.09	1.02	1.02	1.59	
COMBO-ENDOGEN.	20.	4.4	0.0	4.4	46.	1.71	1.15	0.48	2.16	3.73	
-PURE ENDOGEN.	5.	1.1	0.0	1.1	12.	0.43**	0.00	0.38	0.42	0.73	
-TRACE-ENDOGEN.	2.	0.4	0.0	0.4	5.	0.17**	0.00	0.92	1.02	1.77	
-SILICA-COMBO	1.	0.2	0.0	0.2	2.	0.09	0.09	0.37	0.37	0.60	
-AL SIL.-ENDOG.	3.	0.7	0.0	0.7	7.	0.26	0.27	0.83	0.96	1.57	
SILICON RICH	28.	6.2	0.0	6.2	64.	2.40	2.49	0.61	1.64	2.84	
-FE SILICATE	2.	0.4	0.0	0.4	5.	0.17	0.18	0.27	0.30	0.52	
IRON RICH	9.	2.0	0.0	2.0	21.	0.77	0.80	0.30	3.23	6.84	
-SI FE BINARY	4.	0.9	0.0	0.9	9.	0.34	0.36	1.70	2.77	5.88	
-AL,SI--FE RICH	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****	
TITANIUM RICH	25.	5.6	0.2	5.3	55.	2.05	2.13	0.32	0.58	1.29	
-TI FE BINARY	2.	0.4	0.0	0.4	5.	0.17	0.18	0.75	0.83	1.86	
-FE,SI TI RICH	5.	1.1	0.0	1.1	12.	0.43	0.44	0.34	0.36	0.77	
-AL,SI TI RICH	5.	1.1	0.0	1.1	12.	0.43	0.44	0.37	0.48	0.97	
OTHER AL SIL.	5.	1.1	0.0	1.1	12.	0.43	0.44	0.26	0.53	0.88	
NO X-RAYS	39.	8.7	2.4	6.2	64.	2.40**	0.00	0.71	6.35	6.35	
ALUMINUM RICH	3.	0.7	0.0	0.7	7.	0.26	0.27	0.88	0.91	1.58	
-PURE AL SIL.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****	
-FE,SI--AL RICH	1.	0.2	0.0	0.2	2.	0.09	0.09	1.02	1.02	1.77	
-FE AL BINARY	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****	
MISCELLANEOUS	38.	8.4	0.7	7.8	81.	3.00	3.11	0.57	5.11	8.86	
TOT. EXOGENOUS	1134.	251.9	1.8	250.1	2592.	96.40	100.00	0.47	2.66	4.60	

ALL TYPES	1188.	263.9	4.4	259.5	2689.	100.00	96.40	0.48	2.88	4.96	

* PARTICLES IN BLANK ARE NOT SUBTRACTED
 ** ENDOGENOUS CLASS

SUMMARY OF PARTICLE ANALYSIS

BLANK SAMPLE: BLANK TO LUNG 15 - PREP 3504 1.5ML D-579

PARTICLE CLASS	NUMBER FOUND	NUMBER	NUMBER	NET TOTAL		NUMBER %	EXOGENOUS %	MASS		AERO- DYNAMIC DIAMETER
		IN	IN	IN	NET TOTAL			MEDIAN*	MEDIAN*	
		100ML SOLUTION	100ML BLANK	100ML SOLUTION	PER GRAM OF DRY TISSUE			AREA EQUI. DIAMETER	AREA EQUI. DIAMETER	
		6--	6--	6--	6--					
		X10	X10	X10	X10			(UM)	(UM)	(UM)
SILICA	1.	*	0.2	*	*	5.00	12.50	0.37	0.37	0.60
ALUM. SILICATE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-KAOLIN-LIKE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-K FELDSP./MICA	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE AL SILICATE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-CA AL SILICATE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-ALBITE-LIKE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-NA CA AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-NA FE AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-CA FE AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL SIL--TR FE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL SIL.--PURE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-K(FE) AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
TALC-LIKE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-PURE TALC	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
IRON OXIDE	1.	*	0.2	*	*	5.00**	0.00	0.45	0.45	1.01
RUTILE-LIKE	3.	*	0.7	*	*	15.00	37.50	0.24	0.35	0.79
ALUMINA-LIKE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
COMBO-ENDOGEN.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-PURE ENDOGEN.	0.	*	0.0	*	*	0.00**	0.00	*****	*****	*****
-TRACE-ENDOGEN.	0.	*	0.0	*	*	0.00**	0.00	*****	*****	*****
-SILICA-COMBO	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL SIL.-ENDOG.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
SILICON RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE SILICATE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
IRON RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-SI FE BINARY	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL,SI--FE RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
TITANIUM RICH	1.	*	0.2	*	*	5.00	12.50	0.11	0.11	0.24
-TI FE BINARY	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE,SI TI RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL,SI TI RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
OTHER AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
NO X-RAYS	11.	*	2.4	*	*	55.00**	0.00	0.89	9.70	9.70
ALUMINUM RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-PURE AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE,SI--AL RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE AL BINARY	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
MISCELLANEOUS	3.	*	0.7	*	*	15.00	37.50	1.02	2.30	3.98
TOT. EXOGENOUS	8.	*	1.8	*	*	40.00	100.00	0.37	2.30	3.98
ALL TYPES	20.	*	4.4	*	*	100.00	40.00	0.75	9.69	11.20

* PARTICLES IN BLANK ARE NOT SUBTRACTED

** ENDOGENOUS CLASS

SUMMARY OF PARTICLE ANALYSES

LUNG SAMPLE: LUNG 16 - PREP 3243 1ML D-536

PARTICLE CLASS	NUMBER FOUND	NUMBER IN	NUMBER IN	NET TOTAL	NET TOTAL	NUMBER %	EXOGENOUS %	MEDIAN* AREA EQUI. DIAMETER	MASS MEDIAN* AREA EQUI. DIAMETER	AERO- DYNAMIC DIAMETER
		100ML	100ML	IN	PER GRAM OF					
		SOLUTION	BLANK	SOLUTION	DRY TISSUE					
-----	-----	--- 6---	-- 6--	--- 6---	--- 6---	-	-	-----	-----	-----
		X10	X10	X10	X10			(UM)	(UM)	(UM)
SILICA	385.	128.3	0.7	127.6	1351.	33.95	34.91	0.60	1.74	2.84
ALUM. SILICATE	605.	201.6	0.3	201.3	2130.	53.55	55.06	0.64	4.90	8.05
-KADLIN-LIKE	104.	34.7	0.3	34.3	363.	9.13	9.39	0.54	4.99	8.04
-K FELDSP./MICA	376.	125.3	0.0	125.3	1326.	33.33	34.28	0.70	5.34	8.54
-FE AL SILICATE	3.	1.0	0.0	1.0	11.	0.27	0.27	0.13	0.55	0.91
-CA AL SILICATE	1.	0.3	0.0	0.3	4.	0.09	0.09	0.20	0.20	0.32
-ALBITE-LIKE	43.	14.3	0.0	14.3	152.	3.81	3.92	0.57	2.19	3.55
-NA CA AL SIL.	10.	3.3	0.0	3.3	35.	0.89	0.91	0.75	1.72	2.82
-NA FE AL SIL.	1.	0.3	0.0	0.3	4.	0.09	0.09	1.26	1.26	2.06
-CA FE AL SIL.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-AL SIL--TR FE	17.	5.7	0.0	5.7	60.	1.51	1.55	0.45	1.29	2.12
-AL SIL.--PURE	17.	5.7	0.0	5.7	60.	1.51	1.55	0.34	2.27	3.72
-K(FE) AL SIL.	22.	7.3	0.0	7.3	78.	1.95	2.01	0.92	1.25	2.05
TALC-LIKE	1.	0.3	0.0	0.3	4.	0.09	0.09	1.89	1.89	3.14
-PURE TALC	1.	0.3	0.0	0.3	4.	0.09	0.09	1.89	1.89	3.14
IRON OXIDE	5.	1.7	0.0	1.7	18.	0.44**	0.00	0.45	1.21	2.71
RUTILE-LIKE	33.	11.0	0.3	10.7	113.	2.84	2.92	0.45	1.37	3.07
ALUMINA-LIKE	4.	1.3	0.0	1.3	14.	0.35	0.36	0.50	1.89	2.94
COMBO-ENDOGEN.	32.	10.7	0.0	10.7	113.	2.84	1.82	0.63	4.04	7.00
-PURE ENDOGEN.	1.	0.3	0.0	0.3	4.	0.09**	0.00	0.24	0.24	0.42
-TRACE-ENDOGEN.	11.	3.7	0.0	3.7	39.	0.98**	0.00	0.63	1.44	2.50
-SILICA-COMBO	1.	0.3	0.0	0.3	4.	0.09	0.09	0.30	0.30	0.49
-AL SIL.-ENDOG.	10.	3.3	0.0	3.3	35.	0.89	0.91	0.75	2.64	4.34
SILICON RICH	11.	3.7	0.0	3.7	39.	0.98	1.00	0.31	2.84	4.93
-FE SILICATE	3.	1.0	0.0	1.0	11.	0.27	0.27	0.30	0.54	0.93
IRON RICH	10.	3.3	0.0	3.3	35.	0.89	0.91	0.50	0.69	1.46
-SI FE BINARY	2.	0.7	0.0	0.7	7.	0.18	0.18	0.50	0.55	1.16
-AL,SI--FE RICH	5.	1.7	0.0	1.7	18.	0.44	0.46	0.38	0.62	1.31
TITANIUM RICH	17.	5.7	0.0	5.7	60.	1.51	1.55	0.38	1.05	2.35
-TI FE BINARY	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-FE,SI TI RICH	2.	0.7	0.0	0.7	7.	0.18	0.18	0.40	0.45	0.95
-AL,SI TI RICH	6.	2.0	0.0	2.0	21.	0.53	0.55	0.37	1.02	2.03
OTHER AL SIL.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
NO XRAVS	14.	4.7	0.0	4.7	49.	1.24**	0.00	0.14	0.42	0.42
ALUMINUM RICH	5.	1.7	0.0	1.7	18.	0.44	0.46	0.55	1.52	2.63
-PURE AL SIL.	1.	0.3	0.0	0.3	4.	0.09	0.09	1.54	1.54	2.67
-FE,SI--AL RICH	3.	1.0	0.0	1.0	11.	0.27	0.27	0.52	0.54	0.94
-FE AL BINARY	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
MISCELLANEOUS	11.	3.7	0.3	3.3	35.	0.89	0.91	0.45	4.28	7.41
TOT. EXOGENOUS	1102.	367.2	1.7	365.6	3868.	97.25	100.00	0.60	3.61	6.25
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ALL TYPES	1133.	377.6	1.7	375.9	3978.	100.00	97.25	0.60	3.60	6.03

* PARTICLES IN BLANK ARE NOT SUBTRACTED

** ENDOGENOUS CLASS

SUMMARY OF PARTICLE ANALYSIS

BLANK SAMPLE: BLANK TO LUNG 16 - PREP 3244 1ML D-536

PARTICLE CLASS	NUMBER FOUND	NUMBER	NUMBER	NET TOTAL	NET TOTAL	NUMBER %	EXOGENOUS %	MEDIAN*	MASS	AERO- DYNAMIC DIAMETER
		IN	IN	IN	PER GRAM OF			MEDIAN*	MEDIAN*	
		100ML	100ML	100ML	DRY TISSUE			AREA EQUI.	AREA EQUI.	
		----- 6--	-- 6-	----- 6--	----- 6--	-	-	DIAMETER	DIAMETER	DIAMETER
		X10	X10	X10	X10			(UM)	(UM)	(UM)
SILICA	2.	*	0.7	*	*	40.00	40.00	0.75	0.83	1.35
ALUM. SILICATE	1.	*	0.3	*	*	20.00	20.00	0.37	0.37	0.60
-KAOLIN-LIKE	1.	*	0.3	*	*	20.00	20.00	0.37	0.37	0.59
-K FELDSP./MICA	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE AL SILICATE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-CA AL SILICATE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-ALBITE-LIKE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-NA CA AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-NA FE AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-CA FE AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL SIL.--TR FE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL SIL.--PURE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-K(FE) AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
TALC-LIKE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-PURE TALC	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
IRON OXIDE	0.	*	0.0	*	*	0.00**	0.00	*****	*****	*****
RUTILE-LIKE	1.	*	0.3	*	*	20.00	20.00	0.13	0.13	0.29
ALUMINA-LIKE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
COMBO-ENDOGEN.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-PURE ENDOGEN.	0.	*	0.0	*	*	0.00**	0.00	*****	*****	*****
-TRACE-ENDOGEN.	0.	*	0.0	*	*	0.00**	0.00	*****	*****	*****
-SILICA-COMBO	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL SIL.-ENDOG.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
SILICON RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE SILICATE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
IRON RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-SI FE BINARY	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL,SI--FE RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
TITANIUM RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-TI FE BINARY	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE,SI TI RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL,SI TI RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
OTHER AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
NO XRAYS	0.	*	0.0	*	*	0.00**	0.00	*****	*****	*****
ALUMINUM RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-PURE AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE,SI--AL RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE AL BINARY	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
MISCELLANEOUS	1.	*	0.3	*	*	20.00	20.00	0.68	0.68	1.17
TOT. EXOGENOUS	5.	*	1.7	*	*	100.00	100.00	0.37	0.78	1.34
ALL TYPES	5.	*	1.7	*	*	100.00	100.00	0.37	0.78	1.30

* PARTICLES IN BLANK ARE NOT SUBTRACTED

** ENDOGENOUS CLASS

SUMMARY OF PARTICLE ANALYSES

LUNG SAMPLE: LUNG 17 - PREP 3365 2NL D-15,21

PARTICLE CLASS	NUMBER FOUND	NUMBER	NUMBER	NET TOTAL	NET TOTAL	NUMBER %	EXDGENOUS %	MEDIAN*	MEDIAN*	AERO-
		IN	IN	IN	PER GRAM OF			AREA EQUI.	AREA EQUI.	DYNAMIC
		100ML	100ML	100ML	DRY TISSUE			AREA EQUI.	AREA EQUI.	DYNAMIC
		SOLUTION	BLANK	SOLUTION	PER GRAM OF			DIAMETER	DIAMETER	DYNAMIC
		6--	6--	6--	6--	-	-	(UM)	(UM)	(UM)
		X10	X10	X10	X10					
SILICA	392.	65.3	0.2	65.1	626.	24.21	24.32	0.83	2.48	4.04
ALUM. SILICATE	1018.	169.6	0.2	169.4	1629.	62.97	63.25	0.85	4.17	6.85
-KAOLIN-LIKE	220.	36.7	0.2	36.5	351.	13.56	13.62	0.62	2.33	3.76
-K FELDSP./MICA	641.	106.8	0.0	106.8	1027.	39.69	39.86	0.88	4.25	6.81
-FE AL SILICATE	1.	0.2	0.0	0.2	2.	0.06	0.06	0.55	0.55	0.91
-CA AL SILICATE	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-ALBITE-LIKE	40.	6.7	0.0	6.7	64.	2.48	2.49	1.04	1.80	2.92
-NA CA AL SIL.	2.	0.3	0.0	0.3	3.	0.12	0.12	1.26	1.26	2.06
-NA FE AL SIL.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-CA FE AL SIL.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-AL SIL.-TR FE	10.	1.7	0.0	1.7	16.	0.62	0.62	1.13	2.67	4.38
-AL SIL.-PURE	12.	2.0	0.0	2.0	19.	0.74	0.75	0.75	1.43	2.34
-K(Fe) AL SIL.	60.	10.0	0.0	10.0	96.	3.72	3.73	1.13	5.52	9.07
TALC-LIKE	20.	3.3	0.2	3.2	30.	1.18	1.18	1.01	6.30	10.44
-PURE TALC	18.	3.0	0.2	2.8	27.	1.05	1.06	1.01	6.40	10.61
IRON OXIDE	5.	0.8	0.0	0.8	8.	0.31**	0.00	0.83	1.42	3.18
ROUTLE-LIKE	35.	5.8	0.5	5.3	51.	1.98	1.99	0.48	1.06	2.36
ALUMINA-LIKE	10.	1.7	0.3	1.3	13.	0.50	0.50	0.50	2.80	4.35
COMBO-ENDOGEN.	53.	8.8	0.0	8.8	85.	3.28	3.05	2.50	9.86	17.08
-PURE ENDOGEN.	2.	0.3	0.0	0.3	3.	0.12**	0.00	0.92	1.02	1.77
-TRACE-ENDOGEN.	2.	0.3	0.0	0.3	3.	0.12**	0.00	1.26	1.26	2.17
-SILICA-COMBO	2.	0.3	0.0	0.3	3.	0.12	0.12	1.38	1.54	2.51
-AL SIL.-ENDOG.	21.	3.5	0.0	3.5	34.	1.30	1.31	3.24	10.19	16.74
SILICON RICH	15.	2.5	0.2	2.3	22.	0.87	0.87	0.83	2.03	3.52
-FE SILICATE	3.	0.5	0.0	0.5	5.	0.19	0.19	0.58	1.88	3.26
IRON RICH	6.	1.0	0.0	1.0	10.	0.37	0.37	0.61	0.92	1.94
-SI FE BINARY	2.	0.3	0.0	0.3	3.	0.12	0.12	0.92	0.99	2.10
-AL,SI-Fe RICH	1.	0.2	0.0	0.2	2.	0.06	0.06	0.20	0.20	0.42
TITANIUM RICH	13.	2.2	0.3	1.8	18.	0.68	0.68	0.52	2.27	5.07
-TI FE BINARY	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-FE,SI TI RICH	0.	0.0	0.2	-0.2	-2.	-0.06	-0.06	*****	*****	*****
-AL,SI TI RICH	5.	0.8	0.0	0.8	8.	0.31	0.31	0.37	1.00	1.99
OTHER AL SIL.	22.	3.7	0.0	3.7	35.	1.36	1.37	2.56	3.67	6.03
NO X-RAYS	3.	0.5	0.6	-0.3	-3.	-0.12**	0.00	0.68	0.99	0.99
ALUMINUM RICH	12.	2.0	0.0	2.0	19.	0.74	0.75	0.68	0.98	1.71
-PURE AL SIL.	5.	0.8	0.0	0.8	8.	0.31	0.31	0.83	0.99	1.72
-FE,SI-AL RICH	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-FE AL BINARY	2.	0.3	0.0	0.3	3.	0.12	0.12	0.92	0.99	1.72
MISCELLANEOUS	32.	5.3	0.8	4.5	43.	1.67	1.68	2.09	4.13	7.15
TOT. EXOGENOUS	1624.	270.6	2.7	267.9	2576.	99.57	100.00	0.86	5.10	8.83
ALL TYPES	1636.	272.6	3.5	269.1	2587.	100.00	99.57	0.86	5.09	8.53

* PARTICLES IN BLANK ARE NOT SUBTRACTED

** ENDOGENOUS CLASS

SUMMARY OF PARTICLE ANALYSIS

ELANK SAMPLE: BLANK TO LUNG 17 - PREP 3366 2ML D-15,22

PARTICLE CLASS	NUMBER FOUND	NUMBER	NUMBER	NET TOTAL	NET TOTAL	NUMBER %	EXOGENOUS %	MEDIAN* AREA EQUI. DIAMETER	MASS MEDIAN* AREA EQUI. DIAMETER	AERO- DYNAMIC DIAMETER
		IN	IN	IN	PER GRAM OF					
		100ML	100ML	100ML	DRY TISSUE					
		SOLUTION	BLANK	SOLUTION						
-----	-----	--- 6---	--- 6---	--- 6---	--- 6---	-	-	-----	-----	-----
		X10	X10	X10	X10			(UM)	(UM)	(UM)
SILICA	1.	*	0.2	*	*	4.76	6.25	0.68	0.68	1.11
ALUM. SILICATE	1.	*	0.2	*	*	4.76	6.25	0.83	0.83	1.37
-KAOLIN-LIKE	1.	*	0.2	*	*	4.76	6.25	0.83	0.83	1.34
-K FELDSP./MICA	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE AL SILICATE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-CA AL SILICATE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-ALBITE-LIKE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-NA CA AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-NA FE AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-CA FE AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL SIL--TR FE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL SIL.--PURE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-K(FE) AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
TALC-LIKE	1.	*	0.2	*	*	4.76	6.25	0.63	0.83	1.38
-PURE TALC	1.	*	0.2	*	*	4.76	6.25	0.83	0.83	1.38
IRON OXIDE	0.	*	0.0	*	*	0.00**	0.00	*****	*****	*****
RUTILE-LIKE	3.	*	0.5	*	*	14.29	18.75	0.45	1.89	4.23
ALUMINA-LIKE	2.	*	0.3	*	*	9.52	12.50	0.27	0.29	0.45
COMBO-ENDOGEN.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-PURE ENDOGEN.	0.	*	0.0	*	*	0.00**	0.00	*****	*****	*****
-TRACE-ENDOGEN.	0.	*	0.0	*	*	0.00**	0.00	*****	*****	*****
-SILICA-COMBO	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL SIL.-ENDOG.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
SILICON RICH	1.	*	0.2	*	*	4.76	6.25	0.55	0.55	0.96
-FE SILICATE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
IRON RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-SI FE BINARY	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL,SI--FE RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
TITANIUM RICH	2.	*	0.3	*	*	9.52	12.50	1.38	1.54	3.45
-TI FE BINARY	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE,SI TI RICH	1.	*	0.2	*	*	4.76	6.25	0.20	0.20	0.42
-AL,SI TI RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
OTHER AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
NO X-RAYS	5.	*	0.8	*	*	23.81**	0.00	0.28	0.82	0.82
ALUMINUM RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-PURE AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE,SI--AL RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE AL BINARY	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
MISCELLANEOUS	5.	*	0.8	*	*	23.81	31.25	0.79	1.84	3.19
TOT. EXOGENOUS	16.	*	2.7	*	*	76.19	100.00	0.70	1.79	3.10

ALL TYPES	21.	*	3.5	*	*	100.00	76.19	0.63	1.76	3.60

* PARTICLES IN BLANK ARE NOT SUBTRACTED

** ENDOGENOUS CLASS

SUMMARY OF PARTICLE ANALYSES

LUNG SAMPLE: LUNG 18 - PREP 3371 3ML D-15,16

PARTICLE CLASS	NUMBER		NUMBER		NET TOTAL		NUMBER	EXOGENOUS	MEDIAN* AREA EQUI. DIAMETER	MASS MEDIAN* AREA EQUI. DIAMETER	AERO- DYNAMIC DIAMETER			
	NUMBER FOUND	IN 100ML SOLUTION	IN 100ML BLANK	IN 100ML SOLUTION	NET TOTAL PER GRAM OF DRY TISSUE									
						---						---	---	---
		6--	6--	6--	6--	-	-	(UM)	(UM)	(UM)				
		X10	X10	X10	X10									
SILICA	480.	53.3	0.0	53.3	533.	22.03	22.44	0.77	2.01	3.28				
ALUM. SILICATE	1295.	143.8	0.1	143.7	1437.	59.40	60.49	0.72	3.02	4.96				
-KAOLIN-LIKE	161.	17.9	0.0	17.9	179.	7.39	7.53	0.59	2.02	3.25				
-K FELDSP./MICA	909.	101.0	0.0	101.0	1010.	41.73	42.49	0.73	2.81	4.50				
-FE AL SILICATE	10.	1.1	0.1	1.0	10.	0.42	0.42	0.40	1.44	2.36				
-CA AL SILICATE	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****				
-ALBITE-LIKE	83.	9.2	0.0	9.2	92.	3.81	3.88	0.57	1.67	2.71				
-NA CA AL SIL.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****				
-NA FE AL SIL.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****				
-CA FE AL SIL.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****				
-AL SIL.--TR FE	16.	1.8	0.0	1.8	18.	0.73	0.75	0.47	2.52	4.15				
-AL SIL.--PURE	6.	0.7	0.0	0.7	7.	0.28	0.28	1.13	1.65	2.71				
-K(FE) AL SIL.	47.	5.2	0.0	5.2	52.	2.16	2.20	1.00	2.57	4.22				
TALC-LIKE	18.	2.0	0.0	2.0	20.	0.83	0.84	0.92	5.06	8.38				
-PURE TALC	16.	1.8	0.0	1.8	18.	0.73	0.75	0.92	5.14	8.53				
IRON OXIDE	6.	0.7	0.1	0.6	6.	0.23**	0.00	0.50	0.63	1.42				
ROUTLE-LIKE	42.	4.7	0.2	4.5	45.	1.84	1.87	0.57	2.52	5.63				
ALUMINA-LIKE	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****				
COMBO-ENDOGEN.	108.	12.0	0.0	12.0	120.	4.96	3.79	1.63	7.31	12.67				
-PURE ENDOGEN.	9.	1.0	0.0	1.0	10.	0.41**	0.00	0.83	2.18	3.77				
-TRACE-ENDOGEN.	18.	2.0	0.0	2.0	20.	0.83**	0.00	0.47	1.59	2.75				
-SILICA-COMBO	6.	0.7	0.0	0.7	7.	0.28	0.28	1.38	2.62	4.28				
-AL SIL.-ENDOGEN.	16.	1.8	0.0	1.8	18.	0.73	0.75	2.09	7.67	12.60				
SILICON RICH	52.	5.8	0.1	5.7	57.	2.34	2.39	1.27	2.04	3.54				
-FE SILICATE	3.	0.3	0.0	0.3	3.	0.14	0.14	1.26	1.82	3.15				
IRON RICH	39.	4.3	0.1	4.2	42.	1.75	1.78	0.59	4.10	8.70				
-SI FE BINARY	16.	1.8	0.0	1.8	18.	0.73	0.75	0.61	1.65	3.50				
-AL,SI--FE RICH	2.	0.2	0.0	0.2	2.	0.09	0.09	2.09	2.33	4.93				
TITANIUM RICH	24.	2.7	0.0	2.7	27.	1.10	1.12	0.35	1.31	2.94				
-TI FE BINARY	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****				
-FE,SI TI RICH	2.	0.2	0.0	0.2	2.	0.09	0.09	0.61	0.66	1.40				
-AL,SI TI RICH	10.	1.1	0.0	1.1	11.	0.46	0.47	0.45	1.12	2.24				
OTHER AL SIL.	34.	3.8	0.0	3.8	38.	1.56	1.59	1.28	4.74	7.79				
NO X-RAYS	7.	0.8	0.0	0.8	8.	0.32**	0.00	0.38	0.76	0.76				
ALUMINUM RICH	6.	0.7	0.0	0.7	7.	0.28	0.28	0.61	0.82	1.42				
-PURE AL SIL.	3.	0.3	0.0	0.3	3.	0.14	0.14	0.79	0.83	1.43				
-FE,SI--AL RICH	1.	0.1	0.0	0.1	1.	0.05	0.05	0.83	0.83	1.44				
-FE AL BINARY	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****				
MISCELLANEOUS	77.	8.6	0.4	8.1	81.	3.36	3.42	1.68	6.45	11.17				
TOT. EXOGENOUS	2148.	238.6	1.0	237.6	2376.	98.21	100.00	0.78	3.82	6.62				

ALL TYPES	2188.	243.0	1.1	242.0	2420.	100.00	98.21	0.77	3.81	6.45				

* PARTICLES IN BLANK ARE NOT SUBTRACTED

** ENDOGENOUS CLASS

SUMMARY OF PARTICLE ANALYSIS

BLANK SAMPLE: BLANK TO LUNG 18 - PREP 3372 3ML D-16

PARTICLE CLASS	NUMBER FOUND	NUMBER IN	NUMBER IN	NET TOTAL	NET TOTAL	NUMBER %	EXOGENOUS %	MEDIAN* AREA EQUI. DIAMETER	MASS MEDIAN* AREA EQUI. DIAMETER	AERO- DYNAMIC DIAMETER
		100ML	100ML	IN	PER GRAM OF					
		SOLUTION	BLANK	SOLUTION	DRY TISSUE					
-----	-----	6--	6--	6--	6--	-	-	-----	-----	-----
		X10	X10	X10	X10			(UM)	(UM)	(UM)
SILICA	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
ALUM. SILICATE	1.	*	0.1	*	*	10.00	11.11	0.68	0.68	1.11
-KADLIN-LIKE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-K FELDSP./MICA	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE AL SILICATE	1.	*	0.1	*	*	10.00	11.11	0.68	0.68	1.11
-CA AL SILICATE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-ALBITE-LIKE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-NA CA AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-NA FE AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-CA FE AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL SIL--TR FE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL SIL.--PURE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-K(FE) AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
TALC-LIKE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-PURE TALC	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
IRON OXIDE	1.	*	0.1	*	*	10.00**	0.00	1.02	1.02	2.29
RUTILE-LIKE	2.	*	0.2	*	*	20.00	22.22	0.61	0.67	1.51
ALUMINA-LIKE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
COMBO-ENDOGEN.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-PURE ENDOGEN.	0.	*	0.0	*	*	0.00**	0.00	*****	*****	*****
-TRACE-ENDOGEN.	0.	*	0.0	*	*	0.00**	0.00	*****	*****	*****
-SILICA-COMBO	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL SIL.-ENDOG.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
SILICON RICH	1.	*	0.1	*	*	10.00	11.11	1.02	1.02	1.77
-FE SILICATE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
IRON RICH	1.	*	0.1	*	*	10.00	11.11	0.68	0.68	1.44
-SI FE BINARY	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL,SI--FE RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
TITANIUM RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-TI FE BINARY	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE,SI TI RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL,SI TI RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
OTHER AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
NO X-RAYS	0.	*	0.0	*	*	0.00**	0.00	*****	*****	*****
ALUMINUM RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-PURE AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE,SI--AL RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE AL BINARY	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
MISCELLANEOUS	4.	*	0.4	*	*	40.00	44.44	0.92	2.29	3.96
TOT. EXOGENOUS	9.	*	1.0	*	*	90.00	100.00	0.73	2.25	3.90
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ALL TYPES	10.	*	1.1	*	*	100.00	90.00	0.75	2.23	4.18

* PARTICLES IN BLANK ARE NOT SUBTRACTED

** ENDOGENOUS CLASS

SUMMARY OF PARTICLE ANALYSES

LUNG SAMPLE: LUNG 19 - PREP 3377 4ML D-14

PARTICLE CLASS	NUMBER		NUMBER		NET TOTAL		NUMBER	EXOGENOUS	MEDIAN* AREA EQUI. DIAMETER	MASS MEDIAN* AREA EQUI. DIAMETER	AERO- DYNAMIC DIAMETER			
	NUMBER FOUND	IN 100ML SOLUTION	IN 100ML BLANK	IN 100ML SOLUTION	NET TOTAL PER GRAM OF DRY TISSUE									
						6--						6--	6--	6--
						X10						X10	X10	X10
								(UM)	(UM)	(UM)				
SILICA	250.	16.7	0.4	16.3	116.	21.16	22.72	0.67	11.68	19.04				
ALUM. SILICATE	465.	31.0	0.3	30.7	219.	39.98	42.92	0.61	2.97	4.87				
-KAOLIN-LIKE	128.	8.5	0.2	8.3	59.	10.84	11.64	0.50	2.62	4.22				
-K FELDSP./MICA	262.	17.5	0.0	17.5	124.	22.72	24.39	0.65	2.56	4.10				
-FE AL SILICATE	1.	0.1	0.0	0.1	0.	0.09	0.09	0.37	0.37	0.60				
-CA AL SILICATE	1.	0.1	0.0	0.1	0.	0.09	0.09	0.24	0.24	0.40				
-ALBITE-LIKE	18.	1.2	0.1	1.1	8.	1.47	1.58	0.48	4.15	6.71				
-NA CA AL SIL.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****				
-NA FE AL SIL.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****				
-CA FE AL SIL.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****				
-AL SIL.--TR FE	9.	0.6	0.0	0.6	4.	0.78	0.84	0.55	1.13	1.85				
-AL SIL.--PURE	4.	0.3	0.0	0.3	2.	0.35	0.37	0.37	0.65	1.07				
-K(Fe) AL SIL.	23.	1.5	0.0	1.5	11.	1.99	2.14	1.02	2.80	4.61				
TALC-LIKE	77.	5.1	0.0	5.1	37.	6.68	7.17	0.74	3.33	5.52				
-PURE TALC	64.	4.3	0.0	4.3	30.	5.55	5.96	0.75	3.67	5.09				
IRON OXIDE	24.	1.6	0.1	1.5	11.	1.99**	0.00	0.65	1.64	3.67				
ROUTILE-LIKE	17.	1.1	0.1	1.0	7.	1.30	1.40	0.31	1.14	2.55				
ALUMINA-LIKE	3.	0.2	0.0	0.2	1.	0.26	0.28	1.02	1.49	2.33				
COMBO-ENDOGEN.	242.	16.1	0.0	16.1	115.	20.99	19.46	1.88	6.37	11.03				
-PURE ENDOGEN.	30.	2.0	0.0	2.0	14.	2.60**	0.00	0.86	1.23	2.13				
-TRACE-ENDOGEN.	3.	0.2	0.0	0.2	1.	0.26**	0.00	1.02	2.84	4.91				
-SILICA-COMBO	26.	1.7	0.0	1.7	12.	2.25	2.42	0.68	4.18	6.82				
-AL SIL.-ENDOG.	35.	2.4	0.0	2.4	17.	3.12	3.35	2.86	5.74	9.42				
SILICON RICH	11.	0.7	0.1	0.6	4.	0.78	0.84	0.45	1.96	3.40				
-FE SILICATE	4.	0.3	0.1	0.2	1.	0.26	0.28	1.54	2.19	3.79				
IRON RICH	15.	1.1	0.1	1.0	7.	1.30	1.40	0.75	2.75	5.82				
-SI FE BINARY	9.	0.6	0.0	0.6	4.	0.78	0.84	0.55	2.68	5.68				
-AL,SI--FE RICH	0.	0.0	0.1	-0.1	-0.	-0.09	-0.09	*****	*****	*****				
TITANIUM RICH	8.	0.5	0.1	0.4	3.	0.52	0.56	0.50	1.24	2.77				
-TI FE BINARY	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****				
-FE,SI TI RICH	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****				
-AL,SI TI RICH	3.	0.2	0.0	0.2	1.	0.26	0.28	0.37	1.25	2.50				
OTHER AL SIL.	3.	0.2	0.0	0.2	1.	0.26	0.28	2.86	3.31	5.44				
NO X-RAYS	24.	1.6	0.1	1.5	11.	1.99**	0.00	0.40	1.64	1.64				
ALUMINUM RICH	5.	0.3	0.0	0.3	2.	0.43	0.47	0.47	0.58	1.00				
-PURE AL SIL.	2.	0.1	0.0	0.1	1.	0.17	0.19	0.61	0.66	1.14				
-FE,SI--AL RICH	1.	0.1	0.0	0.1	0.	0.09	0.09	0.55	0.55	0.96				
-FE AL BINARY	2.	0.1	0.0	0.1	1.	0.17	0.19	0.40	0.42	0.74				
MISCELLANEOUS	27.	1.8	0.0	1.8	13.	2.34	2.51	0.68	1.95	3.38				
TOT. EXOGENOUS	1091.	72.7	1.1	71.6	509.	93.15	100.00	0.73	5.96	10.33				
ALL TYPES	1172.	78.1	1.3	76.8	547.	100.00	93.15	0.73	5.90	10.13				

* PARTICLES IN BLANK ARE NOT SUBTRACTED

** ENDOGENOUS CLASS

SUMMARY OF PARTICLE ANALYSIS

316

BLANK SAMPLE: BLANK TO LUNG 19 - PREP 3378 4ML D-14

PARTICLE CLASS	NUMBER FOUND	NUMBER IN	NUMBER IN	NET TOTAL	NET TOTAL	NUMBER	EXOGENOUS	MEDIAN*	MASS	AERO- DYNAMIC DIAMETER
		100ML	100ML	IN	PER GRAM OF			AREA EQUI.	AREA EQUI.	
		SOLUTION	BLANK	SOLUTION	DRY TISSUE			DIAMETER	DIAMETER	
		6--	6--	6--	6--	%	%			
		X10	X10	X10	X10	-	-	(UM)	(UM)	(UM)
SILICA	6.	*	0.4	*	*	31.58	35.29	0.37	0.47	0.76
ALUM. SILICATE	4.	*	0.3	*	*	21.05	23.53	0.50	0.63	1.03
-KAOLIN-LIKE	3.	*	0.2	*	*	15.79	17.65	0.55	0.64	1.03
-K FELDSP./MICA	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE AL SILICATE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-CA AL SILICATE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-ALBITE-LIKE	1.	*	0.1	*	*	5.26	5.88	0.37	0.37	0.59
-NA CA AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-NA FE AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-CA FE AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL SIL--TR FE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL SIL.--PURE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-K(Fe) AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
TALC-LIKE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-PURE TALC	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
IRON OXIDE	1.	*	0.1	*	*	5.26**	0.00	0.45	0.45	1.01
RUTILE-LIKE	2.	*	0.1	*	*	10.53	11.76	0.33	0.36	0.81
ALUMINA-LIKE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
COMBO-ENDOGEN.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-PURE ENDOGEN.	0.	*	0.0	*	*	0.00**	0.00	*****	*****	*****
-TRACE-ENDOGEN.	0.	*	0.0	*	*	0.00**	0.00	*****	*****	*****
-SILICA-COMBO	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL SIL.-ENDOG.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
SILICON RICH	2.	*	0.1	*	*	10.53	11.76	0.75	0.82	1.42
-FE SILICATE	1.	*	0.1	*	*	5.26	5.88	0.45	0.45	0.78
IRON RICH	1.	*	0.1	*	*	5.26	5.88	0.37	0.37	0.78
-SI FE BINARY	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL,SI--FE RICH	1.	*	0.1	*	*	5.26	5.88	0.37	0.37	0.78
TITANIUM RICH	2.	*	0.1	*	*	10.53	11.76	0.50	0.55	1.23
-TI FE BINARY	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE,SI TI RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL,SI TI RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
OTHER AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
NO X-RAYS	1.	*	0.1	*	*	5.26**	0.00	0.09	0.09	0.09
ALUMINUM RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-PURE AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE,SI--AL RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE AL BINARY	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
MISCELLANEOUS	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
TOT. EXOGENOUS	17.	*	1.1	*	*	89.47	100.00	0.38	0.50	1.03
ALL TYPES	19.	*	1.3	*	*	100.00	89.47	0.38	0.59	1.10

* PARTICLES IN BLANK ARE NOT SUBTRACTED

** ENDOGENOUS CLASS

SUMMARY OF PARTICLE ANALYSES

LUNG SAMPLE: LUNG 20 - PREP 3492 1ML D-574

PARTICLE CLASS	NUMBER FOUND	NUMBER IN	NUMBER IN	NET TOTAL		NUMBER %	EXOGENOUS %	MEDIAN* AREA EQUI. DIAMETER	MASS MEDIAN* AREA EQUI. DIAMETER	AERO- DYNAMIC DIAMETER
		100ML	100ML	IN	NET TOTAL					
		SOLUTION	BLANK	SOLUTION	PER GRAM OF DRY TISSUE					
-----	-----	--- 6--	-- 6--	--- 6--	--- 6--	-	-	-----	-----	-----
		X10	X10	X10	X10			(UM)	(UM)	(UM)
SILICA	193.	64.3	1.0	63.3	636.	14.76	16.98	0.71	2.52	4.10
ALUM. SILICATE	751.	250.3	0.3	249.9	2512.	58.28	67.02	0.72	3.19	5.24
-KAOLIN-LIKE	70.	23.3	0.0	23.3	234.	5.44	6.26	0.76	2.49	4.01
-K FELDSP./MICA	499.	166.3	0.0	166.3	1671.	38.77	44.59	0.74	3.37	5.39
-FE AL SILICATE	27.	9.0	0.0	9.0	90.	2.10	2.41	0.73	2.73	4.49
-CA AL SILICATE	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-ALBITE-LIKE	9.	3.0	0.0	3.0	30.	0.70	0.80	0.45	1.42	2.29
-NA CA AL SIL.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-NA FE AL SIL.	2.	0.7	0.0	0.7	7.	0.16	0.18	0.75	0.83	1.36
-CA FE AL SIL.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-AL SIL--TR FE	37.	12.3	0.0	12.3	124.	2.87	3.31	0.57	1.77	2.91
-AL SIL.--PURE	10.	3.3	0.0	3.3	33.	0.78	0.89	0.61	1.83	3.01
-K(FE) AL SIL.	61.	20.3	0.0	20.3	204.	4.74	5.45	0.59	3.70	6.08
TALC-LIKE	4.	1.3	0.0	1.3	13.	0.31	0.36	2.09	3.39	5.63
-PURE TALC	4.	1.3	0.0	1.3	13.	0.31	0.36	2.09	3.39	5.63
IRON OXIDE	12.	4.0	0.3	3.7	37.	0.85**	0.00	1.13	2.64	5.90
RUTILE-LIKE	13.	4.3	0.0	4.3	44.	1.01	1.16	0.88	1.21	2.70
ALUMINA-LIKE	2.	0.7	0.0	0.7	7.	0.16	0.18	2.09	2.32	3.62
COMBO-ENDOGEN.	188.	62.6	0.0	62.6	630.	14.61	5.36	0.83	11.33	19.62
-PURE ENDOGEN.	82.	27.3	0.0	27.3	275.	6.37**	0.00	0.79	1.82	3.15
-TRACE-ENDOGEN.	46.	15.3	0.0	15.3	154.	3.57**	0.00	0.99	2.69	4.66
-SILICA-COMBO	10.	3.3	0.0	3.3	33.	0.78	0.89	0.79	1.32	2.15
-AL SIL.-ENDOG.	44.	14.7	0.0	14.7	147.	3.42	3.93	0.82	7.87	12.92
SILICON RICH	31.	10.3	0.0	10.3	104.	2.41	2.77	1.15	2.55	4.42
-FE SILICATE	7.	2.3	0.0	2.3	23.	0.54	0.63	0.83	2.14	3.71
IRON RICH	20.	6.7	0.0	6.7	67.	1.55	1.79	0.64	5.16	10.94
-SI FE BINARY	13.	4.3	0.0	4.3	44.	1.01	1.16	0.63	2.80	5.94
-AL,SI--FE RICH	4.	1.3	0.0	1.3	13.	0.31	0.36	1.70	5.26	11.16
TITANIUM RICH	17.	5.7	0.0	5.7	57.	1.32	1.52	0.52	1.66	3.70
-TI FE BINARY	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-FE,SI TI RICH	2.	0.7	0.0	0.7	7.	0.16	0.18	0.55	0.55	1.17
-AL,SI TI RICH	3.	1.0	0.0	1.0	10.	0.23	0.27	0.68	1.23	2.46
OTHER AL SIL.	20.	6.7	0.0	6.7	67.	1.55	1.79	0.61	1.41	2.31
NO X-RAYS	29.	9.7	0.0	9.7	97.	2.25**	0.00	0.31	2.21	2.21
ALUMINUM RICH	3.	1.0	0.0	1.0	10.	0.23	0.27	0.37	1.54	2.67
-PURE AL SIL.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-FE,SI--AL RICH	1.	0.3	0.0	0.3	3.	0.08	0.09	1.54	1.54	2.67
-FE AL BINARY	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
MISCELLANEOUS	9.	3.0	0.0	3.0	30.	0.70	0.80	1.02	3.37	5.83
TOT. EXOGENOUS	1123.	374.2	1.3	372.9	3748.	86.95	100.00	0.72	4.13	7.14
ALL TYPES	1292.	430.5	1.7	428.9	4310.	100.00	86.95	0.73	3.88	6.64

* PARTICLES IN BLANK ARE NOT SUBTRACTED
 ** ENDOGENOUS CLASS

SUMMARY OF PARTICLE ANALYSIS

BLANK SAMPLE: BLANK TO LUNG 20 - PREP 3493 1ML D-574

PARTICLE CLASS	NUMBER FOUND	NUMBER	NUMBER	NET TOTAL		NUMBER	EXOGENOUS	MEDIAN* AREA EQUI. DIAMETER	MASS MEDIAN* AREA EQUI. DIAMETER	AERO- DYNAMIC DIAMETER
		IN	IN	IN	NET TOTAL					
		100ML SOLUTION	100ML BLANK	100ML SOLUTION	PER GRAM OF DRY TISSUE					
-----	-----	6--	6--	6--	6--	-	-	-----	-----	-----
		X10	X10	X10	X10			(UM)	(UM)	(UM)
SILICA	3.	*	1.0	*	*	60.00	75.00	0.47	1.00	1.64
ALUM. SILICATE	1.	*	0.3	*	*	20.00	25.00	0.37	0.37	0.60
-KAOLIN-LIKE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-K FELDSP./MICA	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE AL SILICATE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-CA AL SILICATE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-ALBITE-LIKE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-NA CA AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-NA FE AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-CA FE AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL SIL.--TR FE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL SIL.--PURE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-K(Fe) AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
TALC-LIKE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-PURE TALC	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
IRON OXIDE	1.	*	0.3	*	*	20.00**	0.00	0.68	0.68	1.52
RUTILE-LIKE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
ALUMINA-LIKE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
COMBO-ENDOGEN.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-PURE ENDOGEN.	0.	*	0.0	*	*	0.00**	0.00	*****	*****	*****
-TRACE-ENDOGEN.	0.	*	0.0	*	*	0.00**	0.00	*****	*****	*****
-SILICA-COMBO	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL SIL.-ENDOG.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
SILICON RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE SILICATE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
IRON RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-SI FE BINARY	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL,SI--FE RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
TITANIUM RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-TI FE BINARY	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE,SI TI RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL,SI TI RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
OTHER AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
NO X-RAYS	0.	*	0.0	*	*	0.00**	0.00	*****	*****	*****
ALUMINUM RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-PURE AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE,SI--AL RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE AL BINARY	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
MISCELLANEOUS	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
TOT. EXOGENOUS	4.	*	1.3	*	*	80.00	100.00	0.45	1.00	1.73

ALL TYPES	5.	*	1.7	*	*	100.00	80.00	0.47	0.97	1.83

* PARTICLES IN BLANK ARE NOT SUBTRACTED

** ENDOGENOUS CLASS

SUMMARY OF PARTICLE ANALYSES

LUNG SAMPLE: LUNG 21 - PREP 3383 1ML D-569

PARTICLE CLASS	NUMBER FOUND	NUMBER	NUMBER	NET TOTAL		NUMBER	EXOGENOUS	MEDIAN*	MEDIAN*	AERO-
		IN	IN	IN	NET TOTAL					
		100ML	100ML	100ML	PER GRAM OF					
		SOLUTION	BLANK	SOLUTION	DRY TISSUE					
-----	-----	----- 6--	-- 6--	----- 6--	----- 6--	-	-	-----	-----	-----
		X10	X10	X10	X10			(UM)	(UM)	(UM)
SILICA	270.	90.0	0.0	90.0	1005.	23.36	24.35	0.73	3.17	5.17
ALUM. SILICATE	681.	226.9	0.0	226.9	2536.	58.91	61.41	0.70	3.90	6.41
-KADLIN-LIKE	136.	45.3	0.0	45.3	506.	11.76	12.26	0.50	1.83	2.96
-K FELDSP./MICA	450.	150.0	0.0	150.0	1675.	38.93	40.58	0.76	4.06	6.50
-FE AL SILICATE	8.	2.7	0.0	2.7	30.	0.69	0.72	0.61	1.10	1.80
-CA AL SILICATE	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-ALBITE-LIKE	18.	6.0	0.0	6.0	67.	1.56	1.62	0.86	3.23	5.23
-NA CA AL SIL.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-NA FE AL SIL.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-CA FE AL SIL.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-AL SIL--TR FE	21.	7.0	0.0	7.0	78.	1.82	1.89	0.68	2.39	3.92
-AL SIL.--PURE	20.	6.7	0.0	6.7	74.	1.73	1.80	0.43	2.78	4.56
-K(FE) AL SIL.	18.	6.0	0.0	6.0	67.	1.56	1.62	0.99	4.21	6.92
TALC-LIKE	10.	3.3	0.0	3.3	37.	0.87	0.90	0.61	1.82	3.02
-PURE TALC	10.	3.3	0.0	3.3	37.	0.87	0.90	0.61	1.62	3.02
IRON OXIDE	6.	2.0	0.0	2.0	22.	0.52**	0.00	0.40	0.60	1.35
RUTILE-LIKE	59.	19.7	0.3	19.3	216.	5.02	5.23	0.36	2.64	5.91
ALUMINA-LIKE	6.	2.0	0.0	2.0	22.	0.52	0.54	0.27	2.32	3.61
COMBO-ENDOGEN.	8.	2.7	0.0	2.7	30.	0.69	0.63	0.75	5.23	9.06
-PURE ENDOGEN.	1.	0.3	0.0	0.3	4.	0.09**	0.00	0.68	0.68	1.17
-TRACE-ENDOGEN.	0.	0.0	0.0	0.0	0.	0.00**	0.00	*****	*****	*****
-SILICA-COMBO	1.	0.3	0.0	0.3	4.	0.09	0.09	2.33	2.33	3.79
-AL SIL.-ENDOG.	1.	0.3	0.0	0.3	4.	0.09	0.09	0.55	0.55	0.91
SILICON RICH	37.	12.3	0.0	12.3	138.	3.20	3.34	0.71	1.90	3.29
-FE SILICATE	4.	1.3	0.0	1.3	15.	0.35	0.36	0.33	0.53	0.92
IRON RICH	9.	3.0	0.0	3.0	34.	0.78	0.81	0.43	1.16	2.45
-SI FE BINARY	1.	0.3	0.0	0.3	4.	0.09	0.09	0.20	0.20	0.42
-AL,SI--FE RICH	2.	0.7	0.0	0.7	7.	0.17	0.18	0.92	1.01	2.13
TITANIUM RICH	13.	4.3	0.0	4.3	48.	1.12	1.17	0.28	0.92	2.06
-TI FE BINARY	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-FE,SI TI RICH	1.	0.3	0.0	0.3	4.	0.09	0.09	0.06	0.06	0.12
-AL,SI TI RICH	3.	1.0	0.0	1.0	11.	0.26	0.27	0.55	1.00	2.00
OTHER AL SIL.	4.	1.3	0.0	1.3	15.	0.35	0.36	1.38	3.48	5.71
NO X-RAYS	40.	13.3	0.0	13.3	149.	3.46**	0.00	0.75	1.87	1.87
ALUMINUM RICH	7.	2.3	0.0	2.3	26.	0.61	0.63	0.52	1.51	2.61
-PURE AL SIL.	4.	1.3	0.0	1.3	15.	0.35	0.36	0.50	1.53	2.65
-FE,SI--AL RICH	1.	0.3	0.0	0.3	4.	0.09	0.09	0.55	0.55	0.96
-FE AL BINARY	2.	0.7	0.0	0.7	7.	0.17	0.18	0.61	0.67	1.17
MISCELLANEOUS	7.	2.3	0.0	2.3	26.	0.61	0.63	0.38	1.17	2.03
TOT. EXOGENOUS	1110.	369.9	0.3	369.6	4129.	95.93	100.00	0.67	3.77	6.53

ALL TYPES	1157.	385.6	0.3	385.2	4304.	100.00	95.93	0.67	3.72	6.20

* PARTICLES IN BLANK ARE NOT SUBTRACTED
 ** ENDOGENOUS CLASS

SUMMARY OF PARTICLE ANALYSIS

BLANK SAMPLE: BLANK TO LUNG 21 - PREP 3384 1ML D-572

PARTICLE CLASS	NUMBER FOUND	NUMBER	NUMBER	NET TOTAL		NUMBER %	EXOGENOUS %	MASS		AERO- DYNAMIC DIAMETER
		IN	IN	IN	NET TOTAL			MEDIAN*	MEDIAN*	
		100ML SOLUTION	100ML BLANK	100ML SOLUTION	PER GRAM OF DRY TISSUE			AREA EQUI. DIAMETER	AREA EQUI. DIAMETER	
		6--	6--	6--	6--					
		X10	X10	X10	X10			(UM)	(UM)	(UM)
SILICA	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
ALUM. SILICATE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-KAOLIN-LIKE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-K FELDSP./MICA	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE AL SILICATE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-CA AL SILICATE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-ALBITE-LIKE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-NA CA AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-NA FE AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-CA FE AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL SIL.--TR FE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL SIL.--PURE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-K(FE) AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
TALC-LIKE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-PURE TALC	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
IRON OXIDE	0.	*	0.0	*	*	0.00**	0.00	*****	*****	*****
RUTILE-LIKE	1.	*	0.3	*	*	100.00	100.00	0.30	0.30	0.67
ALUMINA-LIKE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
COMBO-ENDOGEN.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-PURE ENDOGEN.	0.	*	0.0	*	*	0.00**	0.00	*****	*****	*****
-TRACE-ENDOGEN.	0.	*	0.0	*	*	0.00**	0.00	*****	*****	*****
-SILICA-COMBO	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL SIL.-ENDOG.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
SILICON RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE SILICATE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
IRON RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-SI FE BINARY	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL,SI--FE RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
TITANIUM RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-TI FE BINARY	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE,SI TI RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL,SI TI RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
OTHER AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
NO X-RAYS	0.	*	0.0	*	*	0.00**	0.00	*****	*****	*****
ALUMINUM RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-PURE AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE,SI--AL RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE AL BINARY	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
MISCELLANEOUS	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
TOT. EXOGENOUS	1.	*	0.3	*	*	100.00	100.00	0.30	0.30	0.52
ALL TYPES	1.	*	0.3	*	*	100.00	100.00	0.30	0.30	0.67

* PARTICLES IN BLANK ARE NOT SUBTRACTED

** ENDOGENOUS CLASS

SUMMARY OF PARTICLE ANALYSES

LUNG SAMPLE: LUNG 22 - PREP 2711 U-1 6ML D-39E

PARTICLE CLASS	NUMBER FOUND	NUMBER	NUMBER	NET TOTAL	NET TOTAL	NUMBER	EXOGENOUS	MEDIAN* AREA EQUI. DIAMETER	MASS MEDIAN* AREA EQUI. DIAMETER	AERO- DYNAMIC DIAMETER
		IN	IN	IN	PER GRAM OF					
		100ML	100ML	100ML	DRY TISSUE					
		SOLUTION	BLANK	SOLUTION						
-----	-----	---- 6--	-- 6--	---- 6--	---- 6--	-	-	-----	-----	-----
		X10	X10	X10	X10			(UM)	(UM)	(UM)
SILICA	456.	19.5	0.1	19.3	5090.	27.53	41.55	0.54	2.47	4.03
ALUM. SILICATE	464.	19.8	0.0	19.8	5217.	28.22	42.58	0.59	2.93	4.81
-KAOLIN-LIKE	260.	11.1	0.0	11.1	2923.	15.81	23.86	0.52	2.82	4.54
-K FELDSP./MICA	110.	4.7	0.0	4.7	1237.	6.69	10.09	0.79	3.30	5.29
-FE AL SILICATE	21.	0.9	0.0	0.9	236.	1.28	1.93	0.54	1.54	2.53
-CA AL SILICATE	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-ALBITE-LIKE	2.	0.1	0.0	0.1	22.	0.12	0.18	3.15	3.51	5.68
-NA CA AL SIL.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-NA FE AL SIL.	1.	0.0	0.0	0.0	11.	0.06	0.09	1.26	1.26	2.06
-CA FE AL SIL.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-AL SIL--TR FE	31.	1.3	0.0	1.3	349.	1.89	2.84	0.55	2.40	3.94
-AL SIL.--PURE	9.	0.4	0.0	0.4	101.	0.55	0.83	0.45	2.31	3.79
-K(FE) AL SIL.	18.	0.8	0.0	0.8	202.	1.09	1.65	0.79	3.26	5.36
TALC-LIKE	2.	0.1	0.0	0.1	22.	0.12	0.18	1.36	1.54	2.55
-PURE TALC	2.	0.1	0.0	0.1	22.	0.12	0.18	1.36	1.54	2.55
IRON OXIDE	39.	1.7	0.1	1.6	414.	2.24**	0.00	0.51	2.13	4.77
ROUTLE-LIKE	34.	1.5	0.0	1.5	382.	2.07	3.12	0.40	2.14	4.79
ALUMINA-LIKE	12.	0.5	0.0	0.5	135.	0.73	1.10	0.45	1.80	2.80
COMBO-ENDOGEN.	7.	0.3	0.0	0.3	79.	0.43	0.55	1.02	4.16	7.21
-PURE ENDOGEN.	0.	0.0	0.0	0.0	0.	0.00**	0.00	*****	*****	*****
-TRACE-ENDOGEN.	1.	0.0	0.0	0.0	11.	0.06**	0.00	1.26	1.26	2.17
-SILICA-COMBO	3.	0.1	0.0	0.1	34.	0.18	0.28	1.02	2.84	4.64
-AL SIL.-ENDOG.	2.	0.1	0.0	0.1	22.	0.12	0.18	3.87	4.31	7.08
SILICON RICH	20.	0.9	0.0	0.9	225.	1.22	1.84	0.40	2.73	4.72
-FE SILICATE	17.	0.7	0.0	0.7	191.	1.03	1.56	0.36	2.73	4.73
IRON RICH	26.	1.1	0.0	1.1	292.	1.58	2.39	0.35	1.77	3.76
-SI FE BINARY	9.	0.4	0.0	0.4	101.	0.55	0.83	0.31	1.73	3.67
-AL,SI--FE RICH	4.	0.2	0.0	0.2	45.	0.24	0.37	0.50	0.63	1.33
TITANIUM RICH	14.	0.6	0.0	0.6	157.	0.85	1.28	0.27	0.99	2.20
-TI FE BINARY	2.	0.1	0.0	0.1	22.	0.12	0.18	0.33	0.36	0.81
-FE,SI TI RICH	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-AL,SI TI RICH	3.	0.1	0.0	0.1	34.	0.18	0.28	0.37	1.02	2.03
OTHER AL SIL.	6.	0.3	0.0	0.3	67.	0.36	0.55	0.61	0.92	1.51
NO X-RAYS	518.	22.1	0.0	22.1	5812.	31.43**	0.00	0.82	2.56	2.56
ALUMINUM RICH	22.	0.9	0.0	0.9	247.	1.34	2.02	0.57	1.55	2.68
-PURE AL SIL.	12.	0.5	0.0	0.5	135.	0.73	1.10	0.50	1.47	2.54
-FE,SI--AL RICH	4.	0.2	0.0	0.2	45.	0.24	0.37	0.68	0.96	1.66
-FE AL BINARY	2.	0.1	0.0	0.1	22.	0.12	0.18	1.70	1.89	3.28
MISCELLANEOUS	31.	1.3	0.0	1.3	349.	1.89	2.84	0.58	2.89	5.01
TOT. EXOGENOUS	1093.	46.7	0.1	46.6	12252.	66.27	100.00	0.54	2.77	4.80

ALL TYPES	1651.	70.5	0.3	70.3	18489.	100.00	66.27	0.60	2.66	4.26

* PARTICLES IN BLANK ARE NOT SUBTRACTED
 ** ENDOGENOUS CLASS

SUMMARY OF PARTICLE ANALYSIS

BLANK SAMPLE: BLANK TO LUNG 22-PREP 2715 U1-U2,U4-U5,CU1-CU6 6ML

PARTICLE CLASS	NUMBER FOUND	NUMBER	NUMBER	NET TOTAL	NET TOTAL	NUMBER %	EXOGENOUS %	MEDIAN*	MASS	AERO-
		IN	IN	IN	PER GRAM OF			AREA EQUI.	MEDIAN*	DYNAMIC
		100ML SOLUTION	100ML BLANK	100ML SOLUTION	DRY TISSUE			DIAMETER	AREA EQUI.	DIAMETER
-----	-----	6--	-- 6--	6--	6--	-	-	-----	-----	-----
		X10	X10	X10	X10			(UM)	(UM)	(UM)
SILICA	3.	*	0.1	*	*	50.00	100.00	0.68	1.53	2.49
ALUM. SILICATE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-KAOLIN-LIKE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-K FELDSP./MICA	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE AL SILICATE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-CA AL SILICATE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-ALBITE-LIKE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-NA CA AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-NA FE AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-CA FE AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL SIL.--TR FE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL SIL.--PURE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-K(FE) AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
TALC-LIKE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-PURE TALC	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
IRON OXIDE	2.	*	0.1	*	*	33.33**	0.00	0.92	1.01	2.25
RUTILE-LIKE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
ALUMINA-LIKE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
COMBO-ENDOGEN.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-PURE ENDOGEN.	0.	*	0.0	*	*	0.00**	0.00	*****	*****	*****
-TRACE-ENDOGEN.	0.	*	0.0	*	*	0.00**	0.00	*****	*****	*****
-SILICA-COMBO	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL SIL.-ENDOG.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
SILICON RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE SILICATE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
IRON RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-SI FE BINARY	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL,SI--FE RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
TITANIUM RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-TI FE BINARY	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE,SI TI RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL,SI TI RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
OTHER AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
NO X-RAYS	1.	*	0.0	*	*	16.67**	0.00	0.45	0.45	0.45
ALUMINUM RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-PURE AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE,SI--AL RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE AL BINARY	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
MISCELLANEOUS	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
TOT. EXOGENOUS	3.	*	0.1	*	*	50.00	100.00	0.68	1.53	2.54
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ALL TYPES	6.	*	0.5	*	*	100.00	50.00	0.61	1.47	2.83

* PARTICLES IN BLANK ARE NOT SUBTRACTED

** ENDOGENOUS CLASS

SUMMARY OF PARTICLE ANALYSES

LUNG SAMPLE: LUNG 22 - PREP 2712 U-2 6ML D-396

PARTICLE CLASS	NUMBER FOUND	NUMBER IN	NUMBER IN	NET TOTAL IN	NET TOTAL PER GRAM OF	NUMBER %	EXOGENOUS %	MEDIAN*	MASS MEDIAN*	AERO-
		100ML	100ML	100ML	DRY TISSUE			AREA EQUI.	AREA EQUI.	DYNAMIC
		SOLUTION	BLANK	SOLUTION	DRY TISSUE			DIAMETER	DIAMETER	DIAMETER
-----	-----	----- 6--	-- 6--	----- 6--	----- 6--	-	-	-----	-----	-----
		X10	X10	X10	X10			(UM)	(UM)	(UM)
SILICA	428.	19.8	0.1	19.7	6345.	29.05	41.63	0.58	3.36	5.48
ALUM. SILICATE	466.	21.6	0.0	21.6	6957.	31.85	45.64	0.59	2.80	4.60
-KAOLIN-LIKE	234.	10.8	0.0	10.8	3494.	15.99	22.92	0.55	2.84	4.58
-K FELDSP./MICA	123.	5.7	0.0	5.7	1836.	8.41	12.05	0.71	2.38	3.80
-FE AL SILICATE	27.	1.2	0.0	1.2	403.	1.85	2.64	0.45	2.75	4.51
-CA AL SILICATE	1.	0.0	0.0	0.0	15.	0.07	0.10	0.68	0.68	1.11
-ALBITE-LIKE	3.	0.1	0.0	0.1	45.	0.21	0.29	0.68	2.32	3.75
-NA CA AL SIL.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-NA FE AL SIL.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-CA FE AL SIL.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-AL SIL.-TR FE	33.	1.5	0.0	1.5	493.	2.26	3.23	0.55	3.40	5.59
-AL SIL.--PURE	12.	0.6	0.0	0.6	179.	0.82	1.18	0.37	1.12	1.84
-K(FE) AL SIL.	21.	1.0	0.0	1.0	314.	1.44	2.06	0.88	2.89	4.74
TALC-LIKE	3.	0.1	0.0	0.1	45.	0.21	0.29	0.68	0.76	1.26
-PURE TALC	3.	0.1	0.0	0.1	45.	0.21	0.29	0.68	0.76	1.26
IRON OXIDE	38.	1.8	0.1	1.7	537.	2.46**	0.00	0.57	3.18	7.11
RUTILE-LIKE	29.	1.3	0.0	1.3	433.	1.98	2.84	0.33	0.61	1.36
ALUMINA-LIKE	3.	0.1	0.0	0.1	45.	0.21	0.29	0.55	1.89	2.93
COMBO-ENDOGEN.	11.	0.5	0.0	0.5	164.	0.75	0.69	0.45	4.06	7.04
-PURE ENDOGEN.	2.	0.1	0.0	0.1	30.	0.14**	0.00	0.22	0.24	0.42
-TRACE-ENDOGEN.	2.	0.1	0.0	0.1	30.	0.14**	0.00	0.50	0.55	0.95
-SILICA-COMBO	2.	0.1	0.0	0.1	30.	0.14	0.20	3.87	4.31	7.02
-AL SIL.-ENDOG.	1.	0.0	0.0	0.0	15.	0.07	0.10	0.55	0.55	0.91
SILICON RICH	26.	1.2	0.0	1.2	388.	1.78	2.55	0.55	1.63	2.62
-FE SILICATE	19.	0.9	0.0	0.9	284.	1.30	1.86	0.45	1.50	2.59
IRON RICH	15.	0.7	0.0	0.7	224.	1.03	1.47	0.37	5.10	10.82
-SI FE BINARY	11.	0.5	0.0	0.5	164.	0.75	1.08	0.37	5.11	10.83
-AL,SI--FE RICH	1.	0.0	0.0	0.0	15.	0.07	0.10	0.55	0.55	1.17
TITANIUM RICH	13.	0.6	0.0	0.6	194.	0.89	1.27	0.31	0.75	1.68
-TI FE BINARY	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-FE,SI TI RICH	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-AL,SI TI RICH	6.	0.3	0.0	0.3	90.	0.41	0.59	0.24	0.41	0.83
OTHER AL SIL.	7.	0.3	0.0	0.3	105.	0.48	0.69	0.45	2.30	3.78
NO X-RAYS	403.	18.7	0.0	18.6	6002.	27.48**	0.00	0.76	2.90	2.90
ALUMINUM RICH	9.	0.4	0.0	0.4	134.	0.62	0.88	0.57	0.84	1.45
-PURE AL SIL.	5.	0.2	0.0	0.2	75.	0.34	0.49	0.58	0.72	1.25
-FE,SI--AL RICH	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-FE AL BINARY	1.	0.0	0.0	0.0	15.	0.07	0.10	1.02	1.02	1.77
MISCELLANEOUS	18.	0.8	0.0	0.8	269.	1.23	1.76	0.83	6.00	10.39
TOT. EXOGENOUS	1024.	47.4	0.1	47.3	15243.	69.79	100.00	0.56	3.40	5.89
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ALL TYPES	1467.	68.0	0.3	67.7	21842.	100.00	69.79	0.60	3.23	5.23

* PARTICLES IN BLANK ARE NOT SUBTRACTED

** ENDOGENOUS CLASS

SUMMARY OF PARTICLE ANALYSES

324

LUNG SAMPLE: LUNG 22 - PREP 2727 U-3 30ML D-401

PARTICLE CLASS	NUMBER FOUND	NUMBER IN	NUMBER IN	NET TOTAL		NUMBER %	EXOGENOUS %	MEDIAN* AREA EQUI. DIAMETER	MASS MEDIAN* AREA EQUI. DIAMETER	AERO- DYNAMIC DIAMETER
		100ML	100ML	IN	NET TOTAL					
		SOLUTION	BLANK	100ML	PER GRAM OF					
		----- 6--	-- 6--	----- 6--	----- 6--	-	-	-----	-----	-----
		X10	X10	X10	X10			(UM)	(UM)	(UM)
SILICA	531.	4.9	0.0	4.9	2222.	45.91	51.41	0.59	6.46	10.54
ALUM. SILICATE	336.	3.1	0.0	3.1	1414.	29.22	32.72	0.67	3.65	6.00
-KAOLIN-LIKE	156.	1.4	0.0	1.4	656.	13.57	15.19	0.57	4.54	7.33
-K FELDSP./MICA	101.	0.9	0.0	0.9	425.	8.78	9.83	0.93	2.55	4.07
-FE AL SILICATE	8.	0.1	0.0	0.1	34.	0.70	0.78	0.92	1.30	2.14
-CA AL SILICATE	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-ALBITE-LIKE	5.	0.0	0.0	0.0	21.	0.43	0.49	0.95	1.01	1.63
-NA CA AL SIL.	1.	0.0	0.0	0.0	4.	0.09	0.10	0.24	0.24	0.40
-NA FE AL SIL.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-CA FE AL SIL.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-AL SIL.--TR FE	22.	0.2	0.0	0.2	93.	1.91	2.14	0.61	1.74	2.66
-AL SIL.--PURE	7.	0.1	0.0	0.1	29.	0.61	0.68	0.43	1.01	1.66
-K(FE) AL SIL.	17.	0.2	0.0	0.2	72.	1.48	1.66	0.68	1.82	2.99
TALC-LIKE	2.	0.0	0.0	0.0	6.	0.17	0.19	1.70	1.89	3.14
-PURE TALC	1.	0.0	0.0	0.0	4.	0.09	0.10	0.45	0.45	0.75
IRON OXIDE	22.	0.2	0.0	0.2	93.	1.91**	0.00	0.57	2.21	4.94
RUTILE-LIKE	33.	0.3	0.0	0.3	135.	2.78	3.12	0.26	1.08	2.40
ALUMINA-LIKE	5.	0.0	0.0	0.0	21.	0.43	0.49	0.79	2.84	4.42
COMBO-ENDOGEN.	9.	0.1	0.0	0.1	34.	0.70	0.58	0.45	1.56	3.22
-PURE ENDOGEN.	2.	0.0	0.0	0.0	6.	0.17**	0.00	0.61	0.67	1.16
-TRADE-ENDOGEN.	1.	0.0	0.0	0.0	0.	0.00**	0.00	0.55	0.55	0.96
-SILICA-COMBO	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-AL SIL.-ENDOG.	1.	0.0	0.0	0.0	4.	0.09	0.10	0.45	0.45	0.74
SILICON RICH	32.	0.3	0.0	0.3	135.	2.78	3.12	0.43	4.20	7.27
-FE SILICATE	9.	0.1	0.0	0.1	36.	0.78	0.88	0.45	0.79	1.37
IRON RICH	32.	0.3	0.0	0.3	135.	2.78	3.12	0.35	2.56	5.42
-SI FE BINARY	14.	0.1	0.0	0.1	59.	1.22	1.36	0.30	1.51	3.21
-AL,SI--FE RICH	2.	0.0	0.0	0.0	8.	0.17	0.19	0.33	0.36	0.75
TITANIUM RICH	23.	0.2	0.0	0.2	97.	2.00	2.24	0.32	0.69	1.55
-TI FE BINARY	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-FE,SI TI RICH	6.	0.1	0.0	0.1	25.	0.52	0.58	0.27	0.31	0.65
-AL,SI TI RICH	4.	0.0	0.0	0.0	17.	0.35	0.39	0.50	0.61	1.23
OTHER AL SIL.	4.	0.0	0.0	0.0	17.	0.35	0.39	0.27	0.33	0.55
NO X-RAYS	100.	0.9	0.0	0.9	417.	8.61**	0.00	0.54	1.46	1.46
ALUMINUM RICH	5.	0.0	0.0	0.0	21.	0.43	0.49	0.52	0.60	1.04
-PURE AL SIL.	1.	0.0	0.0	0.0	4.	0.09	0.10	0.20	0.20	0.34
-FE,SI--AL RICH	1.	0.0	0.0	0.0	4.	0.09	0.10	0.68	0.68	1.17
-FE AL BINARY	2.	0.0	0.0	0.0	8.	0.17	0.19	0.50	0.55	0.95
MISCELLANEOUS	26.	0.2	0.0	0.2	93.	1.91	2.14	0.45	18.14	31.42
TOT. EXOGENOUS	1035.	9.6	0.1	9.5	4321.	89.30	100.00	0.56	16.66	28.85
ALL TYPES	1160.	10.7	0.1	10.6	4339.	100.00	89.30	0.56	16.63	28.00

* PARTICLES IN BLANK ARE NOT SUBTRACTED

** ENDOGENOUS CLASS

SUMMARY OF PARTICLE ANALYSIS

BLANK SAMPLE: BLANK TO LUNG 22 - PREP 2728 U-3 30ML D-401

PARTICLE CLASS	NUMBER FOUND	NUMBER IN	NUMBER IN	NET TOTAL	NET TOTAL	NUMBER %	EXOGENOUS %	MEDIAN* AREA EQUI. DIAMETER	MASS MEDIAN* AREA EQUI. DIAMETER	AERO- DYNAMIC DIAMETER
		100ML SOLUTION	100ML BLANK	100ML SOLUTION	PER GRAM OF DRY TISSUE					
		----- 6----- X10	----- 6----- X10	----- 6----- X10	----- 6----- X10					
SILICA	3.	*	0.0	*	*	30.00	37.50	0.37	0.82	1.35
ALUM. SILICATE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-KAOLIN-LIKE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-K FELDSP./MICA	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE AL SILICATE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-CA AL SILICATE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-ALBITE-LIKE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-NA CA AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-NA FE AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-CA FE AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL SIL.--TR FE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL SIL.--PURE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-K(FE) AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
TALC-LIKE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-PURE TALC	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
IRON OXIDE	0.	*	0.0	*	*	0.00**	0.00	*****	*****	*****
ROUTILE-LIKE	1.	*	0.0	*	*	10.00	12.50	0.45	0.45	1.01
ALUMINA-LIKE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
COMBO-ENDOGEN.	1.	*	0.0	*	*	10.00	0.00	0.37	0.37	0.63
-PURE ENDOGEN.	0.	*	0.0	*	*	0.00**	0.00	*****	*****	*****
-TRACE-ENDOGEN.	1.	*	0.0	*	*	10.00**	0.00	0.37	0.37	0.63
-SILICA-COMBO	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL SIL.-ENDOG.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
SILICON RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE SILICATE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
IRON RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-SI FE BINARY	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL,SI--FE RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
TITANIUM RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-TI FE BINARY	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE,SI TI RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL,SI TI RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
OTHER AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
NO X-RAYS	1.	*	0.0	*	*	10.00**	0.00	0.37	0.37	0.37
ALUMINUM RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-PURE AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE,SI--AL RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE AL BINARY	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
MISCELLANEOUS	4.	*	0.0	*	*	40.00	50.00	0.61	1.88	3.26
TOT. EXOGENOUS	8.	*	0.1	*	*	80.00	100.00	0.50	1.86	3.22
ALL TYPES	10.	*	0.1	*	*	100.00	80.00	0.40	1.86	3.24

* PARTICLES IN BLANK ARE NOT SUBTRACTED

** ENDOGENOUS CLASS

SUMMARY OF PARTICLE ANALYSES

326

LUNG SAMPLE: LUNG 22 - PREP 2714 U-4 7ML D-415

PARTICLE CLASS	NUMBER FOUND	NUMBER IN	NUMBER IN	NET TOTAL		NUMBER %	EXOGENOUS %	MEDIAN* AREA EQUI. DIAMETER	MASS MEDIAN* AREA EQUI. DIAMETER	AERO- DYNAMIC DIAMETER
		100ML	100ML	IN	NET TOTAL					
		SOLUTION	BLANK	SOLUTION	PER GRAM OF					
		6-- X10	6-- X10	6-- X10	6-- X10					
SILICA	442.	15.6	0.1	15.4	5941.	32.96	40.19	0.51	3.56	5.81
ALUM. SILICATE	502.	17.7	0.0	17.7	6808.	37.77	46.05	0.60	3.82	6.27
-KAOLIN-LIKE	241.	8.5	0.0	8.5	3269.	18.13	22.11	0.51	2.56	4.12
-K FELDSP./MICA	144.	5.1	0.0	5.1	1953.	10.83	13.21	0.68	5.92	9.47
-FE AL SILICATE	26.	0.9	0.0	0.9	353.	1.96	2.39	0.43	4.28	7.03
-CA AL SILICATE	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-ALBITE-LIKE	3.	0.1	0.0	0.1	41.	0.23	0.28	1.54	2.80	4.54
-NA CA AL SIL.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-NA FE AL SIL.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-CA FE AL SIL.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-AL SIL.--TR FE	32.	1.1	0.0	1.1	434.	2.41	2.94	0.64	2.51	4.12
-AL SIL.--PURE	11.	0.4	0.0	0.4	149.	0.83	1.01	0.43	2.30	3.79
-K(Fe) AL SIL.	29.	1.0	0.0	1.0	393.	2.18	2.66	1.07	3.89	6.39
TALC-LIKE	6.	0.2	0.0	0.2	81.	0.45	0.55	0.57	2.32	3.85
-PURE TALC	6.	0.2	0.0	0.2	81.	0.45	0.55	0.57	2.32	3.85
IRON OXIDE	24.	0.8	0.1	0.8	290.	1.61**	0.00	0.47	2.11	4.71
RUTILE-LIKE	29.	1.0	0.0	1.0	393.	2.18	2.66	0.45	1.25	2.80
ALUMINA-LIKE	9.	0.3	0.0	0.3	122.	0.68	0.83	0.36	1.86	2.85
COMBO-ENDOGEN.	16.	0.6	0.0	0.6	217.	1.20	1.10	0.43	2.74	4.74
-PURE ENDOGEN.	3.	0.1	0.0	0.1	41.	0.23**	0.00	0.30	0.34	0.59
-TRACE-ENDOGEN.	1.	0.0	0.0	0.0	14.	0.08**	0.00	0.45	0.45	0.78
-SILICA-COMBO	3.	0.1	0.0	0.1	41.	0.23	0.28	0.37	1.02	1.66
-AL SIL.-ENDOG.	3.	0.1	0.0	0.1	41.	0.23	0.28	0.45	1.54	2.53
SILICON RICH	29.	1.0	0.0	1.0	393.	2.18	2.66	0.52	4.02	6.96
-FE SILICATE	13.	0.5	0.0	0.5	176.	0.98	1.19	0.51	0.79	1.36
IRON RICH	26.	0.9	0.0	0.9	353.	1.96	2.39	0.50	1.55	3.30
-SI FE BINARY	12.	0.4	0.0	0.4	163.	0.90	1.10	0.33	0.77	1.64
-AL,SI--FE RICH	1.	0.0	0.0	0.0	14.	0.08	0.09	0.37	0.37	0.75
TITANIUM RICH	9.	0.3	0.0	0.3	122.	0.68	0.83	0.35	0.96	2.20
-TI FE BINARY	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-FE,SI TI RICH	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-AL,SI TI RICH	3.	0.1	0.0	0.1	41.	0.23	0.28	0.37	1.02	2.03
OTHER AL SIL.	11.	0.4	0.0	0.4	149.	0.83	1.01	0.37	0.59	0.97
NO X-RAYS	215.	7.6	0.0	7.5	2898.	16.08**	0.00	0.45	1.06	1.06
ALUMINUM RICH	3.	0.1	0.0	0.1	41.	0.23	0.28	0.68	0.78	1.36
-PURE AL SIL.	2.	0.1	0.0	0.1	27.	0.15	0.18	0.61	0.67	1.16
-FE,SI--AL RICH	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-FE AL BINARY	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
MISCELLANEOUS	16.	0.6	0.0	0.6	217.	1.20	1.47	0.43	9.76	16.70
TOT. EXOGENOUS	1094.	38.6	0.1	38.4	14784.	82.01	100.00	0.53	4.51	7.81
ALL TYPES	1337.	47.1	0.3	46.9	18026.	100.00	82.01	0.51	4.40	7.37

* PARTICLES IN BLANK ARE NOT SUBTRACTED

** ENDOGENOUS CLASS

SUMMARY OF PARTICLE ANALYSES

LUNG SAMPLE: LUNG 22 - PREP 2715 U-5 7ML D-397,481

PARTICLE CLASS	NUMBER FOUND	NUMBER	NUMBER	NET TOTAL	NET TOTAL PER GRAM OF DRY TISSUE	NUMBER %	EXOGENOUS %	MEDIAN*	MASS	AERO- DYNAMIC DIAMETER
		IN	IN	IN				AREA EQUI.	MEDIAN*	
		100ML	100ML	100ML				DIAMETER	AREA EQUI.	
		SOLUTION	BLANK	SOLUTION				DIAMETER	DIAMETER	
		----- 6-----	----- 6-----	----- 6-----						
		X10	X10	X10	X10			(UM)	(UM)	(UM)
SILICA	449.	13.8	0.1	13.7	5250.	22.71	43.73	0.54	3.28	5.34
ALUM. SILICATE	424.	13.0	0.0	13.0	5007.	21.67	41.71	0.54	2.65	4.35
-KAOCLIN-LIKE	217.	6.7	0.0	6.7	2563.	11.09	21.35	0.49	2.60	4.20
-K FELDSP./MICA	131.	4.0	0.0	4.0	1547.	6.69	12.89	0.59	2.70	4.35
-FE AL SILICATE	12.	0.4	0.0	0.4	142.	0.61	1.16	0.33	2.21	3.62
-CA AL SILICATE	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-ALBITE-LIKE	6.	0.2	0.0	0.2	71.	0.31	0.59	1.13	1.75	2.83
-NA CA AL SIL.	1.	0.0	0.0	0.0	12.	0.05	0.10	1.26	1.26	2.06
-NA FE AL SIL.	1.	0.0	0.0	0.0	12.	0.05	0.10	0.55	0.55	0.91
-CA FE AL SIL.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-AL SIL--TR FE	19.	0.6	0.0	0.6	224.	0.97	1.87	0.51	2.55	4.19
-AL SIL.--PURE	8.	0.2	0.0	0.2	95.	0.41	0.79	0.45	2.84	4.67
-K(FE) AL SIL.	14.	0.4	0.0	0.4	165.	0.72	1.38	1.02	4.17	6.65
TALC-LIKE	3.	0.1	0.0	0.1	35.	0.15	0.30	0.35	0.36	0.60
-PURE TALC	3.	0.1	0.0	0.1	35.	0.15	0.30	0.35	0.36	0.60
IRON OXIDE	89.	2.7	0.1	2.6	1016.	4.39**	0.00	0.42	2.93	6.56
RUTILE-LIKE	31.	1.0	0.0	1.0	366.	1.58	3.05	0.31	2.17	4.85
ALUMINA-LIKE	8.	0.2	0.0	0.2	95.	0.41	0.79	0.40	0.46	0.72
COMBO-ENDOGEN.	17.	0.5	0.0	0.5	201.	0.87	0.79	0.59	11.86	20.57
-PURE ENDOGEN.	7.	0.2	0.0	0.2	83.	0.36**	0.00	0.79	5.28	9.15
-TRACE-ENDOGEN.	2.	0.1	0.0	0.1	24.	0.10**	0.00	0.40	0.44	0.77
-SILICA-COMBO	1.	0.0	0.0	0.0	12.	0.05	0.10	2.86	2.86	4.66
-AL SIL.-ENDOG.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
SILICON RICH	24.	0.7	0.0	0.7	284.	1.23	2.36	0.38	1.46	2.52
-FE SILICATE	19.	0.6	0.0	0.6	224.	0.97	1.87	0.45	1.48	2.57
IRON RICH	31.	1.0	0.0	1.0	366.	1.58	3.05	0.40	4.19	8.88
-SI FE BINARY	7.	0.2	0.0	0.2	83.	0.36	0.69	0.55	2.29	4.87
-AL,SI--FE RICH	3.	0.1	0.0	0.1	35.	0.15	0.30	0.83	0.96	2.05
TITANIUM RICH	11.	0.3	0.0	0.3	130.	0.56	1.06	0.38	1.18	2.64
-TI FE BINARY	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-FE,SI TI RICH	4.	0.1	0.0	0.1	47.	0.20	0.39	0.33	0.36	0.77
-AL,SI TI RICH	3.	0.1	0.0	0.1	35.	0.15	0.30	0.55	1.24	2.45
OTHER AL SIL.	4.	0.1	0.0	0.1	47.	0.20	0.39	0.30	0.42	0.63
NO X-RAYS	847.	26.0	0.0	26.0	9987.	43.20**	0.00	0.60	2.23	2.23
ALUMINUM RICH	8.	0.2	0.0	0.2	95.	0.41	0.79	0.61	1.83	3.17
-PURE AL SIL.	5.	0.2	0.0	0.2	59.	0.26	0.49	0.68	1.85	3.21
-FE,SI--AL RICH	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-FE AL BINARY	2.	0.1	0.0	0.1	24.	0.10	0.20	0.75	0.61	1.40
MISCELLANEOUS	20.	0.6	0.0	0.6	236.	1.02	1.97	0.40	5.18	8.98
TOT. EXOGENOUS	1021.	31.4	0.1	31.2	12007.	51.94	100.00	0.51	5.43	9.41
ALL TYPES	1966.	60.4	0.3	60.1	23117.	100.00	51.94	0.54	4.07	6.69

* PARTICLES IN BLANK ARE NOT SUBTRACTED
 ** ENDOGENOUS CLASS

SUMMARY OF PARTICLE ANALYSES

328

LUNG SAMPLE: LUNG 22 - PREP 2716 U-6 7ML D-415,416

PARTICLE CLASS	NUMBER FOUND	NUMBER IN	NUMBER IN	NET TOTAL		NUMBER %	EXOGENOUS %	MEDIAN* AREA EQUI. DIAMETER	MASS MEDIAN* AREA EQUI. DIAMETER	AERO- DYNAMIC DIAMETER
		100ML	100ML	IN	NET TOTAL					
		SOLUTION	BLANK	100ML	PER GRAM OF					
		6--	6--	6--	6--					
		X10	X10	X10	X10			(UM)	(UM)	(UM)
SILICA	523.	18.4	0.1	18.3	2952.	41.39	46.30	0.66	2.14	3.45
ALUM. SILICATE	466.	16.4	0.0	16.4	2650.	37.16	41.57	0.66	2.73	4.49
-KAOLIN-LIKE	199.	7.0	0.0	7.0	1132.	15.87	17.75	0.58	2.71	4.37
-K FELDSP./MICA	164.	6.5	0.0	6.5	1047.	14.67	16.41	0.73	2.52	4.03
-FE AL SILICATE	11.	0.4	0.0	0.4	63.	0.88	0.98	0.52	1.48	2.43
-CA AL SILICATE	1.	0.0	0.0	0.0	6.	0.08	0.09	1.02	1.02	1.65
-ALBITE-LIKE	5.	0.2	0.0	0.2	28.	0.40	0.45	1.62	2.51	4.22
-NA CA AL SIL.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-NA FE AL SIL.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-CA FE AL SIL.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-AL SIL.--TR FE	26.	0.9	0.0	0.9	148.	2.07	2.32	0.63	0.86	1.45
-AL SIL.--PURE	5.	0.2	0.0	0.2	28.	0.40	0.45	0.30	1.22	2.00
-K(FE) AL SIL.	22.	0.8	0.0	0.8	125.	1.75	1.96	0.99	4.99	8.19
TALC-LIKE	5.	0.2	0.0	0.2	28.	0.40	0.45	0.79	2.83	4.70
-PURE TALC	5.	0.2	0.0	0.2	28.	0.40	0.45	0.79	2.83	4.70
IRON OXIDE	22.	0.8	0.1	0.7	110.	1.54**	0.00	0.55	5.10	11.42
ROUTILE-LIKE	32.	1.1	0.0	1.1	182.	2.55	2.65	0.39	2.20	4.91
ALUMINA-LIKE	6.	0.2	0.0	0.2	34.	0.48	0.54	0.33	0.49	0.77
COMBO-ENDOGEN.	13.	0.5	0.0	0.5	74.	1.04	0.98	0.32	0.66	1.14
-PURE ENDOGEN.	1.	0.0	0.0	0.0	6.	0.08**	0.00	0.37	0.37	0.63
-TRACE-ENDOGEN.	1.	0.0	0.0	0.0	6.	0.08**	0.00	0.55	0.55	0.56
-SILICA-COMBO	1.	0.0	0.0	0.0	6.	0.08	0.09	0.68	0.68	1.11
-AL SIL.-ENDOG.	2.	0.1	0.0	0.1	11.	0.16	0.18	0.27	0.26	0.46
SILICON RICH	15.	0.5	0.0	0.5	85.	1.20	1.34	0.37	2.22	3.84
-FE SILICATE	9.	0.3	0.0	0.3	51.	0.72	0.80	0.37	2.28	3.96
IRON RICH	19.	0.7	0.0	0.7	108.	1.52	1.69	0.51	3.40	7.23
-SI FE BINARY	3.	0.1	0.0	0.1	17.	0.24	0.27	0.24	1.02	2.17
-AL,SI--FE RICH	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
TITANIUM RICH	13.	0.5	0.0	0.5	74.	1.04	1.16	0.26	1.23	2.75
-TI FE BINARY	1.	0.0	0.0	0.0	6.	0.08	0.09	0.20	0.20	0.44
-FE,SI TI RICH	2.	0.1	0.0	0.1	11.	0.16	0.18	0.40	0.44	0.54
-AL,SI TI RICH	5.	0.2	0.0	0.2	28.	0.40	0.45	0.37	1.25	2.49
OTHER AL SIL.	10.	0.4	0.0	0.4	57.	0.80	0.89	0.50	1.00	1.64
NO X-RAYS	113.	4.0	0.0	3.9	635.	8.91**	0.00	0.61	2.10	2.10
ALUMINUM RICH	11.	0.4	0.0	0.4	63.	0.88	0.98	0.36	1.15	2.00
-PURE AL SIL.	7.	0.2	0.0	0.2	40.	0.56	0.62	0.30	1.00	1.73
-FE,SI--AL RICH	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-FE AL BINARY	3.	0.1	0.0	0.1	17.	0.24	0.27	0.45	1.25	2.16
MISCELLANEOUS	14.	0.5	0.0	0.5	80.	1.12	1.25	0.40	9.75	16.94
TOT. EXOGENOUS	1125.	39.7	0.1	39.5	6376.	89.39	100.00	0.63	2.98	5.17
ALL TYPES	1262.	44.5	0.3	44.2	7133.	100.00	89.39	0.63	3.04	5.20

* PARTICLES IN BLANK ARE NOT SUBTRACTED

** ENDOGENOUS CLASS

SUMMARY OF PARTICLE ANALYSES

LUNG SAMPLE: LUNG 22 - PREP 2773 CUI-CU6 70ML D-416,480

PARTICLE CLASS	NUMBER FOUND	NUMBER IN	NUMBER IN	NET TOTAL	NET TOTAL	NUMBER %	EXOGENOUS %	MEDIAN*	MASS MEDIAN*	AERO-
		100ML	100ML	IN	PER GRAM OF			AREA EQUI.	AREA EQUI.	DYNAMIC
		SOLUTION	BLANK	SOLUTION	DRY TISSUE			DIAMETER	DIAMETER	DIAMETER
		----- 6--	-- 6--	----- 6--	----- 6--	-	-	-----	-----	-----
		X10	X10	X10	X10			(UM)	(UM)	(UM)
SILICA	610.	1.8	0.1	1.8	600.	40.34	53.47	0.54	4.13	6.74
ALUM. SILICATE	144.	0.4	0.0	0.4	154.	10.34	13.70	0.65	8.87	14.56
-KAOLIN-LIKE	64.	0.2	0.0	0.2	68.	4.60	6.09	0.66	9.66	15.61
-K FELDSP./MICA	31.	0.1	0.0	0.1	33.	2.23	2.95	0.70	3.20	5.11
-FE AL SILICATE	3.	0.0	0.0	0.0	3.	0.22	0.29	0.45	0.81	1.33
-CA AL SILICATE	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-ALBITE-LIKE	2.	0.0	0.0	0.0	2.	0.14	0.19	2.09	2.31	3.75
-NA CA AL SIL.	1.	0.0	0.0	0.0	1.	0.07	0.10	0.24	0.24	0.40
-NA FE AL SIL.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-CA FE AL SIL.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-AL SIL--TR FE	8.	0.0	0.0	0.0	9.	0.57	0.76	0.37	1.22	2.00
-AL SIL.--PURE	11.	0.0	0.0	0.0	12.	0.79	1.05	0.43	0.67	1.10
-K(FE) AL SIL.	6.	0.0	0.0	0.0	6.	0.43	0.57	0.75	2.17	3.57
TALC-LIKE	19.	0.1	0.0	0.1	20.	1.36	1.81	0.60	6.29	10.43
-PURE TALC	15.	0.0	0.0	0.0	16.	1.08	1.43	0.56	6.29	10.43
IRON OXIDE	47.	0.1	0.1	0.0	16.	1.07**	0.00	0.44	7.88	17.61
ROUTILE-LIKE	65.	0.2	0.0	0.2	69.	4.67	6.19	0.27	0.60	1.33
ALUMINA-LIKE	26.	0.1	0.0	0.1	28.	1.87	2.47	0.50	8.83	13.74
COMBO-ENDOGEN.	5.	0.0	0.0	0.0	5.	0.36	0.19	0.64	0.74	1.25
-PURE ENDOGEN.	1.	0.0	0.0	0.0	1.	0.07**	0.00	0.20	0.20	0.34
-TRACE-ENDOGEN.	2.	0.0	0.0	0.0	2.	0.14**	0.00	0.75	0.79	1.36
-SILICA-COMBO	1.	0.0	0.0	0.0	1.	0.07	0.10	0.20	0.20	0.32
-AL SIL.-ENDOG.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
SILICON RICH	60.	0.2	0.0	0.2	64.	4.31	5.71	0.59	2.91	5.04
-FE SILICATE	16.	0.0	0.0	0.0	17.	1.15	1.52	0.75	1.07	1.85
IRON RICH	85.	0.2	0.0	0.2	91.	6.10	8.09	0.37	2.29	4.86
-SI FE BINARY	27.	0.1	0.0	0.1	29.	1.94	2.57	0.29	2.82	5.99
-AL,SI--FE RICH	2.	0.0	0.0	0.0	2.	0.14	0.19	0.61	0.68	1.44
TITANIUM RICH	37.	0.1	0.0	0.1	40.	2.66	3.52	0.24	1.69	3.78
-TI FE BINARY	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-FE,SI TI RICH	3.	0.0	0.0	0.0	3.	0.22	0.29	0.26	0.44	0.92
-AL,SI TI RICH	5.	0.0	0.0	0.0	5.	0.36	0.48	0.24	1.54	3.03
OTHER AL SIL.	7.	0.0	0.0	0.0	7.	0.50	0.67	1.02	6.47	10.63
NO X-RAYS	340.	1.0	0.0	0.9	346.	23.26**	0.00	0.54	1.64	1.64
ALUMINUM RICH	5.	0.0	0.0	0.0	5.	0.36	0.48	0.31	0.52	0.87
-PURE AL SIL.	1.	0.0	0.0	0.0	1.	0.07	0.10	0.30	0.30	0.52
-FE,SI--AL RICH	1.	0.0	0.0	0.0	1.	0.07	0.10	0.16	0.16	0.25
-FE AL BINARY	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
MISCELLANEOUS	39.	0.1	0.0	0.1	42.	2.80	3.71	0.51	9.77	16.71
TOT. EXOGENOUS	1099.	3.2	0.1	3.0	1123.	75.45	100.00	0.50	7.31	12.66
ALL TYPES	1489.	4.3	0.3	4.0	1488.	100.00	75.45	0.51	7.34	12.57

* PARTICLES IN BLANK ARE NOT SUBTRACTED

** ENDOGENOUS CLASS

SUMMARY OF PARTICLE ANALYSES

LUNG SAMPLE: LUNG 22 - PREP 2877 L-1 7ML D-452

PARTICLE CLASS	NUMBER FOUND	NUMBER IN	NUMBER IN	NET TOTAL		NUMBER %	EXOGENOUS %	MEDIAN* AREA EQUI. DIAMETER (UM)	MASS MEDIAN* AREA EQUI. DIAMETER (UM)	AERO- DYNAMIC DIAMETER (UM)
		100ML	100ML	IN	NET TOTAL					
		SOLUTION	BLANK	SOLUTION	PER GRAM OF DRY TISSUE					
		6-- X10	6-- X10	6-- X10	6-- X10					
SILICA	659.	31.4	0.1	31.3	12528.	33.35	44.91	0.53	2.25	3.66
ALUM. SILICATE	650.	30.9	0.0	30.9	12374.	32.94	44.36	0.56	2.79	4.58
-KAOLIN-LIKE	340.	16.2	0.0	16.2	6473.	17.23	23.20	0.51	2.18	3.52
-K FELDSP./MICA	227.	10.8	0.0	10.8	4323.	11.51	15.50	0.68	2.37	3.79
-FE AL SILICATE	5.	0.2	0.0	0.2	95.	0.25	0.34	0.37	1.52	2.51
-CA AL SILICATE	1.	0.0	0.0	0.0	19.	0.05	0.07	0.24	0.24	0.40
-ALBITE-LIKE	3.	0.1	0.0	0.1	57.	0.15	0.20	0.97	1.02	1.65
-NA CA AL SIL.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-NA FE AL SIL.	1.	0.0	0.0	0.0	19.	0.05	0.07	1.89	1.89	3.11
-CA FE AL SIL.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-AL SIL--TR FE	17.	0.8	0.0	0.8	324.	0.86	1.16	0.68	2.57	4.22
-AL SIL.--PURE	11.	0.5	0.0	0.5	209.	0.56	0.75	0.37	1.85	3.04
-K(FE) AL SIL.	19.	0.9	0.0	0.9	361.	0.96	1.29	1.32	5.84	9.59
TALC-LIKE	4.	0.2	0.0	0.2	75.	0.20	0.27	0.40	1.25	2.07
-PURE TALC	4.	0.2	0.0	0.2	76.	0.20	0.27	0.40	1.25	2.07
IRON OXIDE	20.	1.0	0.0	0.9	375.	1.00**	0.00	0.55	1.36	3.05
RUTILE-LIKE	44.	2.1	0.0	2.1	833.	2.22	2.99	0.33	1.37	3.07
ALUMINA-LIKE	0.	0.0	0.0	-0.0	-1.	-0.00	-0.00	*****	*****	*****
COMBO-ENDOGEN.	12.	0.6	0.0	0.6	229.	0.61	0.55	0.30	3.44	5.97
-PURE ENDOGEN.	4.	0.2	0.0	0.2	76.	0.20**	0.00	1.36	3.48	6.02
-TRACE-ENDOGEN.	0.	0.0	0.0	0.0	0.	0.00**	0.00	*****	*****	*****
-SILICA-COMBO	1.	0.0	0.0	0.0	19.	0.05	0.07	0.16	0.16	0.26
-AL SIL.-ENDOG.	4.	0.2	0.0	0.2	76.	0.20	0.27	0.24	1.54	2.53
SILICON RICH	9.	0.4	0.0	0.4	171.	0.46	0.61	0.55	1.41	2.44
-FE SILICATE	1.	0.0	0.0	0.0	19.	0.05	0.07	0.55	0.55	0.96
IRON RICH	19.	0.9	0.0	0.9	357.	0.95	1.28	0.43	0.95	2.07
-SI FE BINARY	1.	0.0	0.0	0.0	19.	0.05	0.07	1.02	1.02	2.17
-AL,SI--FE RICH	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
TITANIUM RICH	15.	0.7	0.0	0.7	284.	0.76	1.02	0.30	1.49	3.32
-TI FE BINARY	1.	0.0	0.0	0.0	19.	0.05	0.07	0.20	0.20	0.44
-FE,SI TI RICH	1.	0.0	0.0	0.0	19.	0.05	0.07	1.54	1.54	3.27
-AL,SI TI RICH	7.	0.3	0.0	0.3	133.	0.35	0.46	0.20	1.45	2.91
OTHER AL SIL.	11.	0.5	0.0	0.5	209.	0.56	0.75	0.52	0.76	1.24
NO X-RAYS	485.	23.1	0.0	23.0	9219.	24.54**	0.00	0.67	2.05	2.05
ALUMINUM RICH	10.	0.5	0.0	0.5	190.	0.51	0.68	0.33	1.78	3.08
-PURE AL SIL.	8.	0.4	0.0	0.4	152.	0.41	0.55	0.50	1.78	3.08
-FE,SI--AL RICH	2.	0.1	0.0	0.1	38.	0.10	0.14	0.22	0.24	0.41
-FE AL BINARY	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
MISCELLANEOUS	38.	1.8	0.0	1.8	722.	1.92	2.59	0.55	1.48	2.57
TOT. EXOGENOUS	1467.	69.8	0.1	69.7	27895.	74.26	100.00	0.53	2.52	4.36
ALL TYPES	1976.	94.1	0.2	93.9	37566.	100.00	74.26	0.56	2.37	3.81

* PARTICLES IN BLANK ARE NOT SUBTRACTED

** ENDOGENOUS CLASS

SUMMARY OF PARTICLE ANALYSIS

BLANK SAMPLE: BLANK TO LUNG 22 - PREP 2878 L1-L6,CL1-CL6 65ML

PARTICLE CLASS	NUMBER FOUND	NUMBER	NUMBER	NET TOTAL		NUMBER	EXOGENOUS	MASS		AERO- DYNAMIC
		IN	IN	IN	NET TOTAL			MEDIAN*	MEDIAN*	
		100ML SOLUTION	100ML BLANK	100ML SOLUTION	PER GRAM OF DRY TISSUE			AREA EQUI. DIAMETER	AREA EQUI. DIAMETER	
		----- 6--	-- 6--	----- 6--	----- 6--	-	-	-----	-----	-----
		X10	X10	X10	X10			(UM)	(UM)	(UM)
SILICA	25.	*	0.1	*	*	34.25	53.19	0.51	12.02	19.60
ALUM. SILICATE	4.	*	0.0	*	*	5.48	8.51	0.33	1.25	2.06
-KAOLIN-LIKE	2.	*	0.0	*	*	2.74	4.26	1.13	1.26	2.02
-K FELDSP./MICA	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE AL SILICATE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-CA AL SILICATE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-ALBITE-LIKE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-NA CA AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-NA FE AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-CA FE AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL SIL--TR FE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL SIL.--PURE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-K(FE) AL SIL.	1.	*	0.0	*	*	1.37	2.13	0.37	0.37	0.60
TALC-LIKE	1.	*	0.0	*	*	1.37	2.13	0.30	0.30	0.49
-PURE TALC	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
IRON OXIDE	7.	*	0.0	*	*	9.59**	0.00	0.26	0.34	0.76
RUTILE-LIKE	6.	*	0.0	*	*	8.22	12.77	0.22	0.34	0.75
ALUMINA-LIKE	1.	*	0.0	*	*	1.37	2.13	0.66	0.66	1.05
COMBO-ENDOGEN.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-PURE ENDOGEN.	0.	*	0.0	*	*	0.00**	0.00	*****	*****	*****
-TRACE-ENDOGEN.	0.	*	0.0	*	*	0.00**	0.00	*****	*****	*****
-SILICA-COMBO	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL SIL.-ENDOG.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
SILICON RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE SILICATE	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
IRON RICH	6.	*	0.0	*	*	8.22	12.77	0.27	0.81	1.72
-SI FE BINARY	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL,SI--FE RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
TITANIUM RICH	2.	*	0.0	*	*	2.74	4.26	0.22	0.24	0.54
-TI FE BINARY	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE,SI TI RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-AL,SI TI RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
OTHER AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
NO X-RAYS	19.	*	0.0	*	*	26.03**	0.00	0.37	2.82	2.82
ALUMINUM RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-PURE AL SIL.	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE,SI--AL RICH	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
-FE AL BINARY	0.	*	0.0	*	*	0.00	0.00	*****	*****	*****
MISCELLANEOUS	2.	*	0.0	*	*	2.74	4.26	0.16	0.16	0.28
TOT. EXOGENOUS	47.	*	0.1	*	*	64.38	100.00	0.34	12.02	20.82

ALL TYPES	73.	*	0.2	*	*	100.00	64.38	0.33	12.00	19.56

* PARTICLES IN BLANK ARE NOT SUBTRACTED

** ENDOGENOUS CLASS

SUMMARY OF PARTICLE ANALYSES

332

LUNG SAMPLE: LUNG 22 - PREF 2879 L-2 5ML D-453

PARTICLE CLASS	NUMBER FOUND	NUMBER IN	NUMBER IN	NET TOTAL		NUMBER %	EXOGENOUS %	MEDIAN* AREA EQUI. DIAMETER	MASS MEDIAN* AREA EQUI. DIAMETER	AERO- DYNAMIC DIAMETER
		100ML	100ML	IN	NET TOTAL					
		SOLUTION	BLANK	100ML	PER GRAM OF					
		----- 6-- X10	-- 6- X10	----- 6-- X10	----- 6-- X10	-	-	----- (UM)	----- (UM)	----- (UM)
SILICA	438.	24.3	0.1	24.3	11033.	33.23	39.67	0.50	2.24	3.65
ALUM. SILICATE	499.	27.7	0.0	27.7	12593.	37.93	45.51	0.53	2.68	4.40
-KAGLIN-LIKE	252.	14.0	0.0	14.0	6360.	19.15	22.98	0.48	2.63	4.24
-K FELDSP./MICA	177.	9.8	0.0	9.8	4468.	13.46	16.15	0.61	2.46	3.76
-FE AL SILICATE	6.	0.3	0.0	0.3	151.	0.46	0.55	0.33	0.46	0.79
-CA AL SILICATE	1.	0.1	0.0	0.1	25.	0.08	0.09	0.30	0.30	0.49
-ALBITE-LIKE	2.	0.1	0.0	0.1	50.	0.15	0.18	0.92	0.99	1.61
-NA CA AL SIL.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-NA FE AL SIL.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-CA FE AL SIL.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-AL SIL.--TR FE	12.	0.7	0.0	0.7	303.	0.91	1.09	0.61	1.50	2.46
-AL SIL.--PURE	9.	0.5	0.0	0.5	227.	0.68	0.82	0.32	0.73	1.17
-K(FE) AL SIL.	25.	1.4	0.0	1.4	630.	1.90	2.28	0.76	2.06	3.39
TALC-LIKE	2.	0.1	0.0	0.1	50.	0.15	0.18	0.83	0.83	1.38
-PURE TALC	2.	0.1	0.0	0.1	50.	0.15	0.18	0.83	0.83	1.38
IRON OXIDE	6.	0.3	0.0	0.3	145.	0.44**	0.00	0.43	0.47	1.05
RUTILE-LIKE	35.	1.9	0.0	1.9	876.	2.64	3.17	0.27	0.86	1.92
ALUMINA-LIKE	1.	0.1	0.0	0.1	24.	0.07	0.09	0.09	0.09	0.14
COMBO-ENDOGEN.	36.	2.0	0.0	2.0	909.	2.74	2.10	0.53	2.24	3.68
-PURE ENDOGEN.	10.	0.6	0.0	0.6	252.	0.76**	0.00	0.50	1.74	3.01
-TRACE-ENDOGEN.	3.	0.2	0.0	0.2	76.	0.23**	0.00	0.30	1.02	1.76
-SILICA-COMBO	2.	0.1	0.0	0.1	50.	0.15	0.18	0.50	0.52	0.85
-AL SIL.-ENDOG.	10.	0.6	0.0	0.6	252.	0.76	0.91	0.75	2.73	4.46
SILICON RICH	10.	0.6	0.0	0.6	252.	0.76	0.91	0.50	2.10	3.64
-FE SILICATE	1.	0.1	0.0	0.1	25.	0.08	0.09	0.24	0.24	0.42
IRON RICH	15.	0.8	0.0	0.8	373.	1.12	1.35	0.45	2.16	4.58
-SI FE BINARY	3.	0.2	0.0	0.2	76.	0.23	0.27	0.37	0.42	0.89
-AL,SI--FE RICH	2.	0.1	0.0	0.1	50.	0.15	0.18	0.40	0.42	0.90
TITANIUM RICH	11.	0.6	0.0	0.6	276.	0.83	1.00	0.22	1.00	2.23
-TI FE BINARY	1.	0.1	0.0	0.1	25.	0.08	0.09	0.06	0.06	0.13
-FE,SI TI RICH	4.	0.2	0.0	0.2	101.	0.30	0.36	0.22	0.24	0.50
-AL,SI TI RICH	1.	0.1	0.0	0.1	25.	0.08	0.09	0.11	0.11	0.21
OTHER AL SIL.	6.	0.3	0.0	0.3	151.	0.46	0.55	0.27	1.24	2.04
NO X-RAYS	201.	11.2	0.0	11.1	5056.	15.23**	0.00	0.42	2.06	2.06
ALUMINUM RICH	14.	0.8	0.0	0.8	353.	1.06	1.28	0.27	0.70	1.22
-PURE AL SIL.	5.	0.3	0.0	0.3	126.	0.38	0.46	0.24	0.78	1.35
-FE,SI--AL RICH	1.	0.1	0.0	0.1	25.	0.08	0.09	0.45	0.45	0.78
-FE AL BINARY	2.	0.1	0.0	0.1	50.	0.15	0.18	0.33	0.37	0.63
MISCELLANEOUS	44.	2.4	0.0	2.4	1109.	3.34	4.01	0.42	1.91	3.32
TOT. EXOGENOUS	1098.	61.0	0.1	60.9	27674.	83.35	100.00	0.50	2.44	4.23
ALL TYPES	1316.	73.2	0.2	73.0	30203.	100.00	83.35	0.49	2.41	3.99

* PARTICLES IN BLANK ARE NOT SUBTRACTED

** ENDOGENOUS CLASS

LUNG SAMPLE: LUNG 22 - PREP 2881 L-3 9ML 2-462

PARTICLE CLASS	NUMBER FOUND	NUMBER IN	NUMBER IN	NET TOTAL IN	NET TOTAL PER GRAM OF	NUMBER %	EXOGENOUS %	MEDIAN* AREA EQUI. DIAMETER	MASS MEDIAN* AREA EQUI. DIAMETER	AERO- DYNAMIC DIAMETER
		100ML SOLUTION	100ML BLANK	100ML SOLUTION	DRY TISSUE					
		----- 6----- X10	-- 6-- X10	----- 6----- X10	----- 6----- X10	-	-	----- (UM)	----- (UM)	----- (UM)
SILICA	489.	13.9	0.1	13.9	11563.	34.49	44.51	0.51	1.90	3.10
ALUM. SILICATE	467.	13.3	0.0	13.3	11077.	33.04	42.64	0.57	2.96	4.90
-KAOLIN-LIKE	204.	5.8	0.0	5.8	4838.	14.43	18.62	0.54	2.47	3.96
-K FELDSP./MICA	162.	4.6	0.0	4.6	3845.	11.47	14.80	0.65	3.51	5.62
-FE AL SILICATE	4.	0.1	0.0	0.1	95.	0.28	0.37	0.20	0.28	0.46
-CA AL SILICATE	1.	0.0	0.0	0.0	24.	0.07	0.09	0.55	0.55	0.91
-ALBITE-LIKE	3.	0.1	0.0	0.1	71.	0.21	0.27	1.99	2.69	4.35
-NA CA AL SIL.	1.	0.0	0.0	0.0	24.	0.07	0.09	0.66	0.66	1.11
-NA FE AL SIL.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-CA FE AL SIL.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-AL SIL--TR FE	18.	0.5	0.0	0.5	427.	1.27	1.64	0.61	0.99	1.63
-AL SIL.--PURE	25.	0.7	0.0	0.7	593.	1.77	2.28	0.31	2.76	4.53
-K(FE) AL SIL.	25.	0.7	0.0	0.7	592.	1.76	2.28	0.79	2.23	3.67
TALC-LIKE	16.	0.5	0.0	0.5	378.	1.13	1.46	0.64	3.44	5.71
-PURE TALC	14.	0.4	0.0	0.4	332.	0.99	1.28	0.64	3.44	5.71
IRON OXIDE	18.	0.5	0.0	0.5	415.	1.24**	0.00	0.55	0.94	2.11
RUTILE-LIKE	45.	1.3	0.0	1.3	1058.	3.15	4.07	0.25	1.72	3.84
ALUMINA-LIKE	2.	0.1	0.0	0.1	46.	0.14	0.18	1.38	1.53	2.39
COMBO-ENDOGEN.	9.	0.3	0.0	0.3	214.	0.64	0.73	0.38	3.44	5.97
-PURE ENDOGEN.	1.	0.0	0.0	0.0	24.	0.07**	0.00	0.30	0.30	0.52
-TRACE-ENDOGEN.	0.	0.0	0.0	0.0	0.	0.00**	0.00	*****	*****	*****
-SILICA-COMBO	4.	0.1	0.0	0.1	95.	0.28	0.37	0.40	0.81	1.32
-AL SIL.-ENDOG.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
SILICON RICH	11.	0.3	0.0	0.3	261.	0.78	1.00	0.78	3.45	5.98
-FE SILICATE	2.	0.1	0.0	0.1	47.	0.14	0.18	0.75	0.81	1.40
IRON RICH	22.	0.6	0.0	0.6	512.	1.53	1.97	0.35	7.97	16.91
-SI FE BINARY	3.	0.1	0.0	0.1	71.	0.21	0.27	0.21	0.22	0.46
-AL,SI--FE RICH	1.	0.0	0.0	0.0	24.	0.07	0.09	0.13	0.13	0.26
TITANIUM RICH	15.	0.4	0.0	0.4	353.	1.05	1.36	0.31	0.96	2.14
-TI FE BINARY	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-FE,SI TI RICH	2.	0.1	0.0	0.1	47.	0.14	0.18	0.92	1.02	2.17
-AL,SI TI RICH	5.	0.1	0.0	0.1	119.	0.35	0.46	0.26	0.66	1.32
OTHER AL SIL.	1.	0.0	0.0	0.0	24.	0.07	0.09	0.68	0.68	1.11
NO X-RAYS	301.	8.6	0.0	8.5	7111.	21.21**	0.00	0.84	1.89	1.89
ALUMINUM RICH	10.	0.3	0.0	0.3	237.	0.71	0.91	0.46	1.48	2.56
-PURE AL SIL.	5.	0.1	0.0	0.1	119.	0.35	0.46	0.45	0.59	1.03
-FE,SI--AL RICH	3.	0.1	0.0	0.1	71.	0.21	0.27	0.53	1.51	2.82
-FE AL BINARY	1.	0.0	0.0	0.0	24.	0.07	0.09	0.30	0.30	0.52
MISCELLANEOUS	12.	0.3	0.0	0.3	281.	0.84	1.08	0.38	5.20	9.01
TOT. EXOGENOUS	1098.	31.3	0.1	31.2	25979.	77.48	100.00	0.51	3.34	5.79
ALL TYPES	1418.	40.4	0.2	40.2	33528.	100.00	77.48	0.57	2.86	4.73

* PARTICLES IN BLANK ARE NOT SUBTRACTED

** ENDOGENOUS CLASS

SUMMARY OF PARTICLE ANALYSES

334

LUNG SAMPLE: LUNG 22 - PREP 2863 L-4 7ML D-463

PARTICLE CLASS	NUMBER FOUND	NUMBER	NUMBER	NET TOTAL	NUMBER	EXOGENOUS	MEDIAN* AREA EQUI. DIAMETER	MASS MEDIAN* AREA EQUI. DIAMETER	AERO- DYNAMIC DIAMETER		
		IN	IN	IN						NET TOTAL	
		100ML	100ML	100ML						PER GRAM OF	
		SOLUTION	BLANK	SOLUTION						DRY TISSUE	
-----	-----	6--	-- 6-	--- 6--	-----	6--	-	-	-----	-----	-----
		X10	X10	X10	X10			(UM)	(UM)	(UM)	
SILICA	375.	12.3	0.1	12.3	5330.	26.44	33.43	0.51	2.65	4.29	
ALUM. SILICATE	646.	21.2	0.0	21.2	9218.	45.72	57.81	0.56	3.47	5.70	
-KAOLIN-LIKE	300.	9.8	0.0	9.8	4280.	21.23	26.85	0.48	2.77	4.46	
-K FELDSP./MICA	256.	8.4	0.0	8.4	3654.	18.13	22.92	0.70	3.96	6.34	
-FE AL SILICATE	3.	0.1	0.0	0.1	43.	0.21	0.27	0.52	0.55	0.91	
-CA AL SILICATE	1.	0.0	0.0	0.0	14.	0.07	0.09	0.24	0.24	0.40	
-ALBITE-LIKE	4.	0.1	0.0	0.1	57.	0.28	0.36	0.75	2.31	3.74	
-NA CA AL SIL.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****	
-NA FE AL SIL.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****	
-CA FE AL SIL.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****	
-AL SIL--TR FE	9.	0.3	0.0	0.3	128.	0.64	0.81	0.68	3.27	5.37	
-AL SIL.--PURE	33.	1.1	0.0	1.1	471.	2.34	2.95	0.44	0.85	1.40	
-K(FE) AL SIL.	17.	0.6	0.0	0.6	242.	1.20	1.52	0.81	2.52	4.15	
TALC-LIKE	5.	0.2	0.0	0.2	70.	0.35	0.44	0.55	0.95	1.57	
-PURE TALC	5.	0.2	0.0	0.2	71.	0.35	0.45	0.55	0.95	1.57	
IRON OXIDE	8.	0.3	0.0	0.2	108.	0.53**	0.00	0.45	1.22	2.72	
RUTILE-LIKE	36.	1.2	0.0	1.2	508.	2.52	3.19	0.28	1.71	3.63	
ALUMINA-LIKE	4.	0.1	0.0	0.1	56.	0.28	0.35	0.61	0.67	1.04	
COMBO-ENDOGEN.	17.	0.6	0.0	0.6	243.	1.20	0.90	0.45	2.52	4.37	
-PURE ENDOGEN.	4.	0.1	0.0	0.1	57.	0.28**	0.00	0.40	2.32	4.02	
-TRACE-ENDOGEN.	3.	0.1	0.0	0.1	43.	0.21**	0.00	0.37	0.53	0.93	
-SILICA-COMBO	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****	
-AL SIL.-ENDOG.	1.	0.0	0.0	0.0	14.	0.07	0.09	0.83	0.63	1.37	
SILICON RICH	6.	0.2	0.0	0.2	86.	0.42	0.54	0.40	0.79	1.36	
-FE SILICATE	1.	0.0	0.0	0.0	14.	0.07	0.09	0.13	0.13	0.23	
IRON RICH	7.	0.2	0.0	0.2	94.	0.47	0.59	0.37	1.48	3.15	
-SI FE BINARY	1.	0.0	0.0	0.0	14.	0.07	0.09	0.37	0.37	0.78	
-AL,SI--FE RICH	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****	
TITANIUM RICH	11.	0.4	0.0	0.4	155.	0.77	0.97	0.21	1.69	4.22	
-TI FE BINARY	1.	0.0	0.0	0.0	14.	0.07	0.09	0.07	0.07	0.16	
-FE,SI TI RICH	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****	
-AL,SI TI RICH	5.	0.2	0.0	0.2	71.	0.35	0.45	0.30	0.44	0.86	
OTHER AL SIL.	4.	0.1	0.0	0.1	57.	0.28	0.36	0.61	0.77	1.27	
NO X-RAYS	282.	9.3	0.0	9.2	4008.	19.98**	0.00	0.80	1.82	1.82	
ALUMINUM RICH	7.	0.2	0.0	0.2	100.	0.50	0.63	0.55	1.47	2.55	
-PURE AL SIL.	5.	0.2	0.0	0.2	71.	0.35	0.45	0.37	1.00	1.73	
-FE,SI--AL RICH	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****	
-FE AL BINARY	1.	0.0	0.0	0.0	14.	0.07	0.09	0.68	0.68	1.17	
MISCELLANEOUS	9.	0.3	0.0	0.3	127.	0.63	0.79	0.30	0.98	1.69	
TOT. EXOGENOUS	1120.	36.8	0.1	36.7	15944.	79.09	100.00	0.52	3.22	5.58	

ALL TYPES	1417.	46.5	0.2	46.4	20160.	100.00	79.09	0.56	3.00	4.86	

* PARTICLES IN BLANK ARE NOT SUBTRACTED

** ENDOGENOUS CLASS

SUMMARY OF PARTICLE ANALYSES

LUNG SAMPLE: LUNG 22 - PREP 2885 1-5 7ML D-464

PARTICLE CLASS	NUMBER FOUND	NUMBER IN	NUMBER IN	NET TOTAL	NET TOTAL PER GRAM OF DRY TISSUE	NUMBER %	EXOGENOUS %	MEDIAN*	MASS MEDIAN*	AERO- DYNAMIC DIAMETER
		100ML	100ML	IN				AREA EQUI.	AREA EQUI.	
		SOLUTION	BLANK	SOLUTION				DIAMETER	DIAMETER	
		----- 6-----	----- 6-----	----- 6-----				----- 6-----	----- 6-----	
		X10	X10	X10	X10			(UM)	(UM)	(UM)
SILICA	391.	18.6	0.1	18.6	6187.	33.05	33.76	0.56	2.30	3.76
ALUM. SILICATE	680.	32.4	0.0	32.4	10788.	57.62	58.86	0.65	3.20	5.26
-KAOLIN-LIKE	298.	14.2	0.0	14.2	4727.	25.25	25.79	0.59	1.92	3.10
-K FELDSP./MICA	232.	11.0	0.0	11.0	3681.	19.66	20.09	0.71	3.67	5.88
-FE AL SILICATE	4.	0.2	0.0	0.2	63.	0.34	0.35	0.75	0.85	1.36
-CA AL SILICATE	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-ALBITE-LIKE	3.	0.1	0.0	0.1	48.	0.25	0.26	0.37	1.54	2.49
-NA CA AL SIL.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-NA FE AL SIL.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-CA FE AL SIL.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-AL SIL--TR FE	25.	1.2	0.0	1.2	397.	2.12	2.16	0.58	1.02	1.57
-AL SIL.--PURE	39.	1.9	0.0	1.9	619.	3.31	3.38	0.54	1.46	2.40
-K(FE) AL SIL.	37.	1.8	0.0	1.8	586.	3.13	3.20	0.87	5.02	3.24
TALC-LIKE	0.	0.0	0.0	-0.0	-1.	-0.00	-0.00	*****	*****	*****
-PURE TALC	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
IRON OXIDE	4.	0.2	0.0	0.2	59.	0.31**	0.00	0.61	0.78	1.73
RUTILE-LIKE	24.	1.1	0.0	1.1	377.	2.01	2.06	0.33	1.01	2.25
ALUMINA-LIKE	0.	0.0	0.0	-0.0	-1.	-0.00	-0.00	*****	*****	*****
COMBO-ENDOGEN.	10.	0.5	0.0	0.5	159.	0.85	0.52	0.75	1.64	2.84
-PURE ENDOGEN.	2.	0.1	0.0	0.1	32.	0.17**	0.00	0.92	0.97	1.67
-TRACE-ENDOGEN.	2.	0.1	0.0	0.1	32.	0.17**	0.00	0.40	0.45	0.78
-SILICA-COMBO	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-AL SIL.-ENDOG.	2.	0.1	0.0	0.1	32.	0.17	0.17	1.70	1.89	3.11
SILICON RICH	5.	0.2	0.0	0.2	79.	0.42	0.43	1.02	1.80	3.12
-FE SILICATE	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
IRON RICH	9.	0.4	0.0	0.4	139.	0.74	0.76	0.37	1.01	2.13
-SI FE BINARY	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-AL,SI--FE RICH	2.	0.1	0.0	0.1	32.	0.17	0.17	0.33	0.36	0.76
TITANIUM RICH	20.	1.0	0.0	0.9	316.	1.69	1.72	0.28	0.94	2.09
-TI FE BINARY	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-FE,SI TI RICH	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-AL,SI TI RICH	14.	0.7	0.0	0.7	222.	1.19	1.21	0.30	0.41	0.81
OTHER AL SIL.	7.	0.3	0.0	0.3	111.	0.59	0.61	0.37	1.23	2.02
NO X-RAYS	18.	0.9	0.0	0.8	272.	1.45**	0.00	0.80	3.43	3.43
ALUMINUM RICH	9.	0.4	0.0	0.4	143.	0.76	0.78	0.54	1.17	2.03
-PURE AL SIL.	3.	0.1	0.0	0.1	48.	0.25	0.26	0.13	0.55	0.95
-FE,SI--AL RICH	4.	0.2	0.0	0.2	63.	0.34	0.35	0.55	1.23	2.14
-FE AL BINARY	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
MISCELLANEOUS	6.	0.3	0.0	0.3	94.	0.50	0.51	0.24	0.78	1.35
TOT. EXOGENOUS	1157.	55.1	0.1	55.0	18327.	97.89	100.00	0.59	2.86	4.95
ALL TYPES	1183.	56.3	0.2	56.2	18721.	100.00	97.89	0.60	2.89	4.75

* PARTICLES IN BLANK ARE NOT SUBTRACTED

** ENDOGENOUS CLASS

SUMMARY OF PARTICLE ANALYSES

336

LUNG SAMPLE: LUNG 22 - PREP 2857 1-6 12ML D-465

PARTICLE CLASS	NUMBER FOUND	NUMBER	NUMBER	NET TOTAL		NUMBER %	EXOGENOUS %	MEDIAN* AREA EQUI. DIAMETER (UM)	MASS MEDIAN* AREA EQUI. DIAMETER (UM)	AERO- DYNAMIC DIAMETER (UM)
		IN	IN	IN	NET TOTAL					
		100ML	100ML	100ML	PER GRAM OF					
		SOLUTION	BLANK	SOLUTION	DRY TISSUE					
-----	-----	6--	6--	6--	6--	-	-	-----	-----	-----
		X10	X10	X10	X10			(UM)	(UM)	(UM)
SILICA	325.	6.4	0.1	6.4	6394.	29.87	30.76	0.55	3.82	6.23
ALUM. SILICATE	675.	13.4	0.0	13.4	13350.	62.50	64.37	0.60	2.53	4.32
-KAGLIN-LIKE	303.	6.0	0.0	6.0	6006.	28.05	28.85	0.45	2.42	3.90
-K FELDSP./MICA	217.	4.3	0.0	4.3	4304.	20.11	20.71	0.77	3.02	4.53
-FE AL SILICATE	5.	0.1	0.0	0.1	99.	0.46	0.48	0.64	1.51	2.49
-CA AL SILICATE	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-ALBITE-LIKE	3.	0.1	0.0	0.1	60.	0.28	0.29	0.71	1.68	3.04
-NA CA AL SIL.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-NA FE AL SIL.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-CA FE AL SIL.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-AL SIL.--TR FE	24.	0.5	0.0	0.5	476.	2.22	2.29	0.75	1.82	2.95
-AL SIL.--PURE	61.	1.2	0.0	1.2	1210.	5.65	5.82	0.42	1.18	1.54
-K(FE) AL SIL.	29.	0.6	0.0	0.6	573.	2.68	2.76	1.40	2.55	4.15
TALC-LIKE	1.	0.0	0.0	0.0	18.	0.08	0.09	0.37	0.37	0.61
-PURE TALC	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
IRON OXIDE	7.	0.1	0.0	0.1	124.	0.58**	0.00	0.45	1.88	4.20
ROUTILE-LIKE	15.	0.4	0.0	0.4	364.	1.70	1.75	0.37	0.71	1.58
ALUMINA-LIKE	0.	0.0	0.0	-0.0	-2.	-0.01	-0.01	*****	*****	*****
COMBO-ENDOGEN.	4.	0.1	0.0	0.1	79.	0.37	0.10	0.27	0.32	1.43
-PURE ENDOGEN.	3.	0.1	0.0	0.1	60.	0.28**	0.00	0.24	0.28	0.46
-TRACE-ENDOGEN.	0.	0.0	0.0	0.0	0.	0.00**	0.00	*****	*****	*****
-SILICA-COMBO	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-AL SIL.--ENDOG.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
SILICON RICH	6.	0.1	0.0	0.1	119.	0.56	0.57	0.50	2.27	3.92
-FE SILICATE	1.	0.0	0.0	0.0	20.	0.09	0.10	1.02	1.02	1.77
IRON RICH	8.	0.2	0.0	0.1	146.	0.68	0.70	0.33	0.61	1.25
-SI FE BINARY	2.	0.0	0.0	0.0	40.	0.19	0.19	0.27	0.30	0.63
-AL,SI--FE RICH	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
TITANIUM RICH	9.	0.2	0.0	0.2	174.	0.81	0.84	0.23	0.43	0.96
-TI FE BINARY	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-FE,SI TI RICH	1.	0.0	0.0	0.0	20.	0.09	0.10	0.30	0.30	0.63
-AL,SI TI RICH	3.	0.1	0.0	0.1	60.	0.28	0.29	0.20	0.44	0.85
OTHER AL SIL.	2.	0.0	0.0	0.0	40.	0.19	0.19	0.40	0.45	0.73
NO X-RAYS	24.	0.5	0.0	0.4	436.	2.04**	0.00	0.50	1.45	1.49
ALUMINUM RICH	3.	0.1	0.0	0.1	60.	0.28	0.29	0.83	0.97	1.67
-PURE AL SIL.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-FE,SI--AL RICH	1.	0.0	0.0	0.0	20.	0.09	0.10	1.02	1.02	1.77
-FE AL BINARY	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
MISCELLANEOUS	4.	0.1	0.0	0.1	75.	0.35	0.36	0.40	0.45	0.78
TOT. EXOGENOUS	1053.	20.9	0.1	20.8	20788.	77.10	100.00	0.57	2.88	4.79
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ALL TYPES	1087.	21.6	0.2	21.4	21406.	100.00	77.10	0.56	2.86	4.71

* PARTICLES IN BLANK ARE NOT SUBTRACTED

** ENDOGENOUS CLASS

SUMMARY OF PARTICLE ANALYSES

LUNG SAMPLE: LUNG 22 - PREP 2889 CL1-CL6 65ML D-465

PARTICLE CLASS	NUMBER FOUND	NUMBER	NUMBER	NET TOTAL	NET TOTAL PER GRAM OF DRY TISSUE	NUMBER %	EXOGENOUS %	MEDIAN* AREA EQUI. DIAMETER	MASS MEDIAN* AREA EQUI. DIAMETER	AERO- DYNAMIC DIAMETER
		IN	IN	IN						
		100ML	100ML	100ML						
		SOLUTION	BLANK	SOLUTION						
-----	-----	6--	6--	6--	6--	-	-	-----	-----	-----
		X10	X10	X10	X10			(UM)	(UM)	(UM)
SILICA	261.	0.5	0.1	0.5	150.	18.61	21.07	0.50	1.65	2.69
ALUM. SILICATE	258.	0.5	0.0	0.5	151.	20.02	22.68	0.46	6.42	10.54
-KADLIN-LIKE	121.	0.3	0.0	0.2	75.	9.38	10.63	0.44	4.94	7.95
-K FELDSP./MICA	50.	0.1	0.0	0.1	32.	3.94	4.46	0.48	2.58	4.13
-FE AL SILICATE	7.	0.0	0.0	0.0	4.	0.55	0.62	0.26	0.43	0.71
-CA AL SILICATE	1.	0.0	0.0	0.0	1.	0.08	0.07	1.54	1.54	2.53
-ALBITE-LIKE	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-NA CA AL SIL.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-NA FE AL SIL.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-CA FE AL SIL.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-AL SIL--TR FE	20.	0.0	0.0	0.0	13.	1.58	1.77	0.50	1.26	2.07
-AL SIL.--PURE	12.	0.0	0.0	0.0	8.	0.95	1.07	0.46	2.83	4.65
-K(FE) AL SIL.	3.	0.0	0.0	0.0	1.	0.16	0.18	1.54	1.78	2.93
TALC-LIKE	3.	0.0	0.0	0.0	1.	0.16	0.18	0.45	0.52	0.86
-PURE TALC	2.	0.0	0.0	0.0	1.	0.16	0.18	0.50	0.52	0.86
IRON OXIDE	21.	0.0	0.0	0.0	9.	1.10**	0.00	0.37	0.69	1.54
ROUTILE-LIKE	44.	0.1	0.0	0.1	24.	3.00	3.39	0.25	0.75	1.65
ALUMINA-LIKE	23.	0.0	0.0	0.0	14.	1.74	1.96	0.35	1.60	2.49
COMBO-ENDOGEN.	471.	1.0	0.0	1.0	299.	37.15	35.09	0.82	4.35	7.54
-PURE ENDOGEN.	59.	0.1	0.0	0.1	37.	4.65**	0.00	0.56	2.40	4.16
-TRACE-ENDOGEN.	19.	0.0	0.0	0.0	12.	1.50**	0.00	1.26	3.21	5.55
-SILICA-COMBO	30.	0.1	0.0	0.1	19.	2.37	2.68	0.55	1.15	1.88
-AL SIL.-ENDOG.	55.	0.1	0.0	0.1	35.	4.34	4.91	1.26	4.23	6.95
SILICON RICH	21.	0.0	0.0	0.0	13.	1.66	1.86	0.28	3.46	6.00
-FE SILICATE	7.	0.0	0.0	0.0	4.	0.55	0.62	0.30	0.66	1.15
IRON RICH	65.	0.1	0.0	0.1	37.	4.65	5.27	0.25	5.18	11.00
-SI FE BINARY	6.	0.0	0.0	0.0	4.	0.47	0.54	0.10	0.28	0.59
-AL,SI--FE RICH	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
TITANIUM RICH	15.	0.0	0.0	0.0	8.	1.03	1.16	0.24	0.54	1.20
-TI FE BINARY	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-FE,SI TI RICH	2.	0.0	0.0	0.0	1.	0.16	0.18	0.33	0.36	0.77
-AL,SI TI RICH	2.	0.0	0.0	0.0	1.	0.16	0.18	0.22	0.23	0.46
OTHER AL SIL.	7.	0.0	0.0	0.0	4.	0.55	0.62	0.43	0.58	0.96
NO X-RAYS	75.	0.2	0.0	0.1	36.	4.42**	0.00	0.32	4.66	4.66
ALUMINUM RICH	6.	0.0	0.0	0.0	4.	0.47	0.54	0.40	1.83	3.16
-PURE AL SIL.	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-FE,SI--AL RICH	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
-FE AL BINARY	0.	0.0	0.0	0.0	0.	0.00	0.00	*****	*****	*****
MISCELLANEOUS	71.	0.1	0.0	0.1	44.	5.44	6.16	0.33	4.02	6.97
TOT. EXOGENOUS	1167.	2.4	0.1	2.3	710.	88.33	100.00	0.51	4.71	8.15

ALL TYPES	1341.	2.6	0.2	2.7	304.	100.00	88.33	0.51	4.55	7.89

* PARTICLES IN BLANK ARE NOT SUBTRACTED

** ENDOGENOUS CLASS

