MASTER

COO-1826-36

URANIUM MINER LUNG CANCER STUDY

PROGRESS REPORT

For Period July 1, 1976 - July 1, 1977

Geno Saccomanno, Ph.D., M.D.

Pathologist

Contractor's Project Director

St. Mary's Hospital and Medical Center

Grand Junction, Colorado

9506217

NOTICE

This report was prepared as an account of work sponsored by the United States Government. Neither the United States nor the United States Energy Research and Development Administration, nor any of their employees, nor any of their contractors, subcontractors, or their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness or usefulness of any information, apparatus, product or process disclosed, or represents that its use would not infringe privately owned rights.

October 3, 1977

Prepared for

THE U. S. ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION

UNDER CONTRACT NO. EY-76-C-02-1826

DISTRIBUTION OF THIS DOCUMENT IS UNLIMITED

DISCLAIMER

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency Thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

DISCLAIMER

Portions of this document may be illegible in electronic image products. Images are produced from the best available original document.

URANIUM MINER LUNG CANCER STUDYPROGRESS REPORTAbstract

This study was initiated in 1957 by the U. S. Public Health and many facets of this project are reaching final objectives. Many new studies have developed in the course of this study and will continue. The projects supported by The Energy Research and Development Administration are of utmost importance and consist of: (a) Collection of material from uranium miners known to have cancer of the lung into a tumor registry; (b) Manual on pulmonary cytology; (c) Regression study of sputum cytological findings in uranium miners who showed marked atypical squamous cell metaplasia and have quit smoking cigarettes, mining, or both; (d) Continuation of sputum collection and collection of lungs from deceased miners; (e) Sensory development for localization of carcinoma in situ of the lung, and (f) Lung histology program. Since we have examined approximately 77,000 sputum samples over the last 20 years in cases that showed normal cytology at the inception of the study and some subsequently developed carcinoma of the lung, we have an accumulation of material that is worthy of study and presentation.

PROGRESS REPORT

October 3, 1977

URANIUM MINER LUNG CANCER STUDY

The progress made in the last nine and one-half years is substantial. A summary of the accomplishments on each project is as follows:

I. Main Research Accomplishments:A. Tumor Registry

Two hundred eighty-one cases have been accumulated and include the following items:

1. All of the smears made from sputum on each case are properly recorded and filed. Over 200 sputum slides are part of the registry for some cases.
2. Slides from all tissue sections, including biopsies, and the autopsy material, including the serial sections of lungs which are prepared by Dr. Oscar Auerbach, are filed with each case.
3. Complete hospital charts, exclusive of the nurse's notes, are available with each case.
4. Autopsy reports, including the gross and microscopic, are a part of each case.
5. The tracheobronchial tree has been studied and recorded in many of the uranium miners who are in this registry.

B. The Manual on Pulmonary Cytology

The manual was submitted to the American Society of Clinical Pathologists. It was presented to the board of this society, and they approved it in substance for publication, distribution, etc. We agreed to submit the manuscript to the Society for publication on December 1, 1977. It is expected, however, that some modifications, additions or deletions will be made and some additional work will have to be done in 1978.

C. The Regression Study (See Charts I, II, III, and IV)

Data is accumulated continuously for this study, and it is hoped that it should be completed by 1980. This study has become more and more important as more sputum studies are being done on private patients and on groups of government research projects. The Mining Division of the Department of Interior has made inquiry about this project and would like to add some effort in finalizing this study or phases thereof.

It is estimated that when this study is completed that it will embrace knowledge on about 1,500 to 2,000 miners who have been followed for varied periods of time. Many of the cases have been lost to the study because of death, migration, cessation of work or other changes in the habitat of the miners. The Interior Department would like to and has proposed with a "project proposal" to contribute to this study in the following dimensions: (a) The data we have available

will have to be planned, oriented, and designed for computer analysis. They would cover costs and personnel to conduct this phase of data preparation for analysis, (b) Many of the cases have been lost, and they would furnish the funds to hire at least two people to check records, files, communities of residents, and other agencies to find these lost people. If some of these patients were found but had not submitted sputum specimens for some time, they would collect and pay costs of processing these samples, and finally (c) they would furnish help for final analysis of the data collected.

The support and aid by this agency would certainly add to the value of the whole study. This data will be of great value since it will have predictive significance. For example: We will be able to predict the incidence of cancer from the state of premalignant cytology under certain conditions of exposure in the future.

D. Sputum Collection and Lung Collection

During the period July 1, 1976 to July 1, 1977, 2,174 sputum specimens have been collected and processed on uranium miners and mill workers. During this same period, 13 lungs were collected and processed. Twelve cases of malignancy and several suspicious cases have been diagnosed from sputum smears. This data is being evaluated as to findings of atypia in each category compared to house cases to determine if there are any significant differences in the findings of the uranium miners.

The comparative studies of the lung findings on all the autopsied cases and non-smoker and smoker population are being done. These slides have been randomized and read by Dr. Oscar Auerbach.

E. Sensory Development for Localization of Carcinoma in Situ

This work is being done in cooperation with Doctor Huth in Los Angeles, California, Doctor Profio in Santa Barbara, California, and Doctor Vincent at Roswell Park Memorial Hospital in Buffalo, New York. The scope has been designed and presently is being tested at Roswell Park. If it passes this phase of study, we will send cases to Roswell Park for study and after it passes this phase, then we will attempt to obtain an I.D. from the Pure Food and Drug Administration for use at St. Mary's Hospital and Medical Center in Grand Junction. In the meantime, Doctor King at Edmonton Elberta Hospital, in Edmonton, Canada, is also going to work on this modality of localization of small tumors utilizing hematoporphyrins and ultraviolet light fiberoptic bronchoscopy.

F. Lung Histology Study

The project, which was outlined on December 16, 1974, at Doctor Auerbach's office in East Orange, New Jersey, under advisement of Dr. Cuyler Hammond, Dr. Herman Lisco, and Mr. Lawrence Garfinkel, was finally computerized, the project was designed, and the slides were labeled and read by Doctor Auerbach. This resulted in a read-out of 44,000 slides. Doctor Auerbach selected a number of cases showing a

variety of lesions and these then were assessed by Doctors Kuschner, Saccomanno, Woolner, and Auerbach. We were in unanimous agreement on all tissues reviewed. This article was written and the manuscript has been submitted to "Cancer" journal for publication. A copy of this manuscript entitled "Histologic Findings in the Tracheobronchial Tree of Uranium Miners and Non-Miners with Lung Cancer" is included with this report.

II. Students Trained

Fifty-one students have been trained in our AMA Approved School of Cyto-technology, and eight students are currently enrolled.

III. Summary

These studies are being integrated and yielded new data and knowledge in the field of lung cancer that will ultimately relate to better patient care and treatment of this disease in man, which presently is the number one killer after heart disease.

CHART I

REGRESSION STUDY

The Uranium Miner List for the Regression Study (miners with marked stypia or higher sputum) was received from Dr. Victor Archer on January 14, 1969. The 415 miners on the original list were all reviewed, and some were reclassified.

1. Original population for study (Doctor Archer's list)	415
a. Total number of miners reviewed that met the criteria of study	246
b. Total number of miners discarded because they didn't meet the criteria of the study	169
c. Total number of miners fulfilling the criteria of the original population and added to the above miners (a) during 1969	<u>139</u>
d. This group was then considered to be the regression study group as of Dec. 31, 1969	385
e. Total number of miners currently followed	175
f. Total number of miners now inactive (no response, no address, inadequate information, etc., but worked up as much as possible and filed)	151
g. Total number of miners expired since the beginning of the study	<u>59</u>
Total	385

CHART II

REGRESSION STUDY

Irritant Status	Total # Active Cases	Improved Within Last Yr.	CIS & Invasive CA	Last Info. (Inactive)	Total Expired	Grand Total
UGU Mining Non-smoker	13	(0)	1	13	3	30
UGU Mining Smoker (Control)	34	(3)	1	46	13	94
Quit UGU Mining Quit Smoking	20	(3)	1	13	12	46
Quit UGU Still Smoking	39	(10)	4	22	17	82
Quit Smoking Still UGU Mining	24	(2)	1	17	8	50
Non-smoker Quit UGU Mining	6	(1)		9	3	18
O.P. U Miner Smoker (Control)	4	(0)		12	1	17
O.P. U Miner Non-smoker	0	(0)		1	1	2
Quit O.P. U Still Smoking	1	(1)		1		2
O.P. U Miner Quit Smoking	3	(1)				3
Miscellaneous (23)						
Smokers	12	(1)		10		22
Non-smokers	2	(1)		4	1	7
Qt. smoking	9	(1)		3		12
Grand Totals	167	(24)	8	151	59	385

The above group of uranium miners is the original group selected by Doctors Archer and Saccomanno during the year 1969. All of the above qualified for this study by sputum analysis, showing marked atypia or above.

CHART III

ADDITIONS 1970 TO PRESENT TIME

(Not Regression Study, but showing marked atypia and being followed on a three-month repeat basis.)

Total number of miners added 1970 to present, active 163

Total number of miners added 1970 to present, inactive 61
(No response, no address, inadequate information,
etc., but worked up as much as possible and filed.)

Total number of miners who have expired from this group 53

CHART IV

ADDITIONS 1970 TO PRESENT TIME

Irritant Status	Total # Active Cases	Improved Within Last Yr.	CIS & Invasive CA	Last Info. (Inactive)	Total Expired	Grand Total
UGU Mining Non-smoker	18	(3)	1	13 (1 CIS)	4	36
UGU Mining Smoker (Control)	41	(11)	2	19 (1 Inv. CA)	16	78
Quit UGU Mining Quit Smoking	11	(0)	3	4	12	30
Quit UGU Mining Still Smoking	15	(0)	4	3 (1 Inv. CA)	7	29
Quit Smoking Still UGU Mining	15	(2)	2	10	11	38
Non-smoker Quit UGU Mining	3	(0)	1	0	0	4
O.P. U Miner Smoker (Control)	10	(0)	1	4 (1 CIS)	0	15
O.P. U Miner Non-smoker	1	(1)	0	1	1	3
Quit O.P. U Still Smoking	1	(1)	0	0	0	1
O.P. U Miner Quit Smoking	3	(0)	0	1	0	4
Miscellaneous (29)						
Smokers	15	(0)	2	3	3	23
Non-smokers	3	(0)	0	0	0	3
Qt. Smoking	11	(3)	0	2	0	13
Grand Totals	147	(21)	16	60 (4 c CA)	54	277

The above group of uranium miners have been selected for follow-up because of sputum studies showing marked atypia or above. These miners do not qualify for the original Regression Study because they entered the study after 1969.

Figure 1

ANALYSIS OF SPUTUM REPORTS

A. Using multiple correlation analysis, analyze each type of sputum class.
(Selecting each man's most recent satisfactory sputum sample.) In relation to:

1. Cigarette group
2. Underground uranium group
3. Other hard rock group
4. Surface status group
5. Age group
6. Latency group
7. Work level group (for U.M. study group only)

B. Determine the average time for a person to reach a higher class or stage for each U.G.U. group and cigarette group (also W.L.M. group for U.M. study group only). Determine how many persons developed a higher class or stage. Determine how many persons did not develop a higher class or stage. Determine the average follow up and range time for persons who did not develop a higher class or stage.

Complete the above described analyses for each man whose first satisfactory sputum report is used as a starting point:

1. Class I
2. Class II Stage I
3. Class II Stage II
4. Class II Stage III
5. Class III Stage I
6. Class III Stage 0

Complete the above described analysis for each man whose first satisfactory sputum report, that is higher than a previous sputum report, is used as a starting point:

1. Class I
2. Class II Stage I
3. Class II Stage II
4. Class II Stage III
5. Class III Stage I
6. Class III Stage 0

C. Obtain age distribution, latency distribution, and mean age and mean latent period observed by:

1. Combined cigarette group and U.G.U. group
2. Combined cigarette group and surface group

Complete the above analysis at first satisfactory sputum:

1. Class II Stage I
2. Class II Stage II
3. Class II Stage III
4. Class III Stage 0
5. Class IV

D. Select cohorts of men who have had, and note date at which this class was first observed for each man:

<u>Class</u>	<u>Composition of Cohort</u>
IV	all
III-1	all
III-0	all
II-3	all
II-2	600 miners selected randomly from 1963, 1964, 1965 census samples
II-1	600 miners selected randomly from 1963, 1964, 1965 census samples
I	300 miners selected randomly from 1957-1962 census and exam samples
I	300 non-miners selected randomly from 1957-1962 census and exam samples
I	300 miners selected randomly from 1963-1965 census samples
I	300 non-miners selected randomly from 1963-1965 census samples

(The men in these cohorts are not mutually exclusive...a man might appear in several different cohorts, except the four Class I cohorts are mutually exclusive.)

All earlier sputum samples for each man (prior to the date of his selection into any of the above described cohorts) will be checked to see how many men had higher classifications prior to their selection. This information; however, will not be used to exclude them from any cohort. Class I, Class II-1 and Class II-2 will be selected only from field team collections. Higher classes may use follow-up samples as well as field team collections to qualify for selection.

E. The vital status of the men will be determined for all of the men selected in the above mentioned cohorts. This will be accomplished by sending lists of these men to various state governments and to the Social Security Administration.

F. Lung cancer mortality will be determined for each cohort using an existing mortality table system. Person years at risk will be calculated from the date when each man was first observed to have the sputum class which admitted him to the cohort through December 1974 or until his death date.

Information Sources for Analysis of Sputum Reports

- A. Sputum Master File
 - 1. Sputum class and stage
- B. Uranium Master File

1. Cigarette group
 - a. non-smoker
 - b. previous smoker
 - c. current smoker (1-19 cigarettes per day)
 - d. current smoker (20 cigarettes per day)
 - e. current smoker (> 20 cigarettes per day)
2. Underground uranium group
 - a. no exposure to U.G.U.
 - b. 12-59 months exposure to U.G.U.
 - c. 60-119 months exposure to U.G.U.
 - d. 120-179 months exposure to U.G.U.
 - e. 180-239 months exposure to U.G.U.
 - f. 240-299 months exposure to U.G.U.
 - g. 300-359 months exposure to U.G.U.
 - h. >359 months exposure to U.G.U.
3. Other hard rock group
 - a. no exposure to O.H.R.
 - b. 12-59 months exposure to O.H.R.
 - c. 60-119 months exposure to O.H.R.
 - d. 120-179 months exposure to O.H.R.
 - e. 180-239 months exposure to O.H.R.
 - f. 240-299 months exposure to O.H.R.
 - g. 300-359 months exposure to O.H.R.
 - h. >359 months exposure to O.H.R.
4. Latency (months since first sputum sample)
 - a. >12 months
 - b. 12-59 months
 - c. 60-119 months
 - d. 120-179 months
 - e. 180-239 months
 - f. 240-299 months
 - g. 300-359 months
 - h. >359 months
5. Surface status
 - a. surface only
 - b. part-time surface
6. Age at time sample was taken:
 - a. 15-19 years
 - b. 20-24 years
 - c. 25-29 years
 - d. 30-34 years
 - e. 35-39 years
 - f. 40-44 years
 - g. 45-49 years
 - h. 50-54 years
 - i. 55-59 years
 - j. 60-64 years
 - k. 65-69 years
 - l. 70-74 years
 - m. 75-79 years
 - n. 80-84 years
 - o. 85-89 years
 - p. 90-94 years
 - q. 95-99 years
 - r. >100 years

Figure 2 (See original copy for color)

Figure 3

BIBLIOGRAPHY

1. Kuntz, Albert and Saccomanno, Geno: Reflex Inhibition of Intestinal Motility Mediated through Decentralized Prevertebral Ganglia. J. Neurophysiol 7:163-170, 1944.
2. Kuntz, Albert and Saccomanno, Geno: Sympathetic Innervation of the Detrusor Muscle. The Journal of Urology 51:535-542, 1944.
3. Saccomanno, Geno; Van Bruggen, John; Minckler, Jeff and Klemme, Roland: Preparation and Storage of Autopsy Nerve Grafts. Science 100:436, 1944.
4. Saccomanno, Geno: The Components of the Thoracic Cardiac Nerves. Anatomical Record, 1945.
5. Saccomanno, Geno; Utterback, Robert A. and Klemme, Roland M.: Anatomic Data Regarding the Surgical Treatment of Angina Pectoris. Annals of Surgery 125:49-56, 1947.
6. Saccomanno, Geno; Kleinschmidt, C. C. and Murphy, Paul: A Case of "Lymphangitic Carcinoma" of the Lung Diagnosed by Sputum Smear Examination. Diseases of the Chest 17:273, 1950.
7. Saccomanno, Geno and Waldapfel, Richard: A Study of Tissue Implantations on Embryonated-Egg Membranes. AMA Archives of Pathology 52:529-545, 1951.
8. Waldapfel, Richard and Saccomanno, Geno: Clinico-Pathologic Studies of Obstructions of the Tear Passages. Transactions of the Pacific Coast Oto-Ophthalmological Society, 1953.

BIBLIOGRAPHY (CONTINUED)

9. Saccomanno, Geno; Saunders, Richard P.; Ellis, Harry; Archer, Victor E.; Wood, Blossom G. and Beckler, Patricia A.: Concentration of Carcinoma or Atypical Cells in Sputum. *Acta Cytologica* 7:305-310, 1963.
10. Saccomanno, Geno; Archer, V. E.; Saunders, R. P.; James, Lynn A. and Beckler, Patricia A.: Lung Cancer of Uranium Miners on the Colorado Plateau. *Health Physics* 10:1195-1201, 1964.
11. Archer, V.E.: Carrol, B. E.; Brinton, H. P. and Saccomanno, Geno: Epidemiological Studies of Some Nonfatal Effects of Uranium Mining. Radiological Health and Safety in Mining and Milling of Nuclear Materials 1:21-36, 1964.
12. Saccomanno, Geno; Saunders, Richard P.; Archer, Victor E.; Auerbach, Oscar; Kuschner, Marvin and Beckler, Patricia A.: Cancer of the Lung: the Cytology of Sputum Prior to the Development of Carcinoma. *Acta Cytologica* 9:413-423, 1965.
13. Archer, V. E.; Black, S. C. and Saccomanno, Geno: Urine and Tissue Content of ^{210}Pb and ^{210}Po in Uranium Miners. *Diagnosis and Treatment of Deposited Radionuclides*, 1967.
14. Saccomanno, Geno: Radiation Exposure of Uranium Miners. Hearings Joint Committee of Atomic Energy, Congress of the U.S., Ninetieth Congress, Part 1:619-627, 1967.
15. Saccomanno, Geno; Saunders, Richard P. and Scott, Jerry: Lung Cancer of Uranium Miners. *The Bulletin of Pathology*, August, 1967.
16. Black, Stuart C.; Archer, Victor E.; Dixon, Willard C. and Saccomanno, Geno: Correlation of Radiation Exposure and Lead-210 in Uranium Miners. *Health Physics* 14:81-93, 1968.

BIBLIOGRAPHY (CONTINUED)

17. Richins, C. and Saccomanno, G.: Anatomy of the Peripheral Nervous System. Pathology of the Nervous System 1: 1968.
18. Saccomanno, Geno: Uranium Miners' Health. Appendix 5, Hearings on Safety and Health Standards, Bureau of Labor Standards, U.S. Department of Labor, Joint Committee of Atomic Energy Congress, U.S. Ninety-first Congress: 301-316, 1969.
19. Blanchard, R. L.; Archer, V. E. and Saccomanno, Geno: Blood and Skeletal Levels of ^{210}Pb and ^{210}Po as a Measure of Exposure to Inhaled Radon Daughter Products. Health Physics 16:585-596, 1969.
20. Saccomanno, Geno; Saunders, Richard P.; Klein, M.G.; Archer, V. E. and Brennan, Lola: Cytology of the Lung in Reference to Irritant, Individual Sensitivity and Healing. Acta Cytologica 14:377-381, 1970.
21. Saccomanno, Geno; Saunders, Richard P.; Archer, Victor E.; Auerbach, Oscar, and Brennan, Lola: Metaplasia to Neoplasia, Proceedings Conference "Morphology of Experimental Respiratory Carcinogenesis", A.E.C., Gatlinburg, Tennessee, May 13-16, pp. 63-80, 1970.
22. Saccomanno, Geno; Archer, Victor E.; Auerbach, Oscar; Kuschner, Marvin; Saunders, Richard P. and Klein, M.G.: Histologic Types of Lung Cancer among Uranium Miners. Cancer 27:515-523, 1971.
23. Minckler, Jeff and Saccomanno, Geno, et al.: Exfoliative Cytopathology, Chapter in General Pathology, Pathobiology. The C. V. Mosby Company, 1971.

BIBLIOGRAPHY (CONTINUED)

24. Brandon, William F.; Saccomanno, Geno; Archer, Victor E.; Archer, Philip G. and Coors, Marilyn E.: Chromosome Aberrations in Uranium Miners Occupationally Exposed to ²²²Radon. Radiation Research 52:204-215, 1972.
25. Brandon, William F.; Saccomanno, Geno; Archer, P. G. and Archer, Victor E.: "The Cytogenetics of Uranium Miners Exposed to ²²²Radon". Radiation Research 55:598 (abstract), 1973.
26. Clinical Staging System for Carcinoma of the Lung: The American Joint Committee for Cancer Staging and End Results Reporting, September, 1973.
27. Saccomanno, Geno; Archer, Victor E.; Auerbach, Oscar and Saunders, Richard P.: Environmental Carcinogen Susceptibility and Resistance to the Development of Carcinoma of the Lung. Human Pathology 4: 487-495, 1973.
28. Saccomanno, Geno; Archer, Victor E.; Auerbach, Oscar; Saunders, Richard P., and Brennan, Lola M.: Development of Carcinoma of the Lung as Reflected in Exfoliated Cells. Cancer 33:256-270, 1974.
29. Saccomanno, Geno: Check Sample - Cytopathology, Carcinoma in Situ. American Society of Clinical Pathologists, No. C-8, 1974.
30. Schreiber, Hans; Saccomanno, Geno; Martin, Donald H., and Brennan, Lola: Sequential Cytological Changes during Development of Respiratory Tract Tumors Induced in Hamsters by Benzo(a)pyrene-Ferric Oxide. Cancer Research 34:689-698, 1974.

BIBLIOGRAPHY (CONTINUED)

31. Archer, Victor E.; Saccomanno, Geno, and Jones, James H.: Frequency of Different Histologic Types of Bronchogenic Carcinoma as Related to Radiation Exposure. *Cancer* 34:2056-2060, 1974.
32. Lemen, Richard A.; Johnson, William M.; Wagoner, Joseph K.; Archer, Victor E. and Saccomanno, Geno: Cytologic Observations and Cancer Incidence Following Exposure to BCME. *Annals of the New York Academy of Sciences* 271:71-80, 1976.
33. Newman, John A.; Archer, Victor E.; Saccomanno, Geno; Kuschner, Marvin; Auerbach, Oscar; Grondahl, Raymond D., and Wilson, John C.: Histologic Types of Bronchogenic Carcinoma Among Members of Copper-Mining and Smelting Communities. *Annals of the New York Academy of Sciences* 271:260-268, 1976.
34. Saccomanno, Geno; Archer, Victor E.; Saunders, Richard P.; Auerbach, Oscar and Klein, M.G.: Early Indices of Cancer Risk Among Uranium Miners with Reference to Modifying Factors. *Annals of the New York Academy of Sciences* 271:377-383, 1976.
35. Harris, Curtis C.; Cohen, Martin H.; Connor, Robert; Primack, Aron; Saccomanno, Geno, and Talamo, Richard C.: Serum Alpha₁-Antitrypsin in Patients with Lung Cancer or Abnormal Sputum Cytology. *Cancer* 38:1655-1657, 1976.
36. Saccomanno, Geno: Sputum Cytology: Collection, Fixation, and Concentration of Sputum, Bronchial Aspirates, and Bronchial Brushings. Technical Improvement Service, Commission on Continuing Education, No. 27, 1976.

BIBLIOGRAPHY (CONTINUED)

37. Auerbach, Oscar; Saccomanno, Geno; Brown, R. Dawson; and Garfinkel, Lawrence: Histologic Findings in the Tracheobronchial Tree of Uranium Miners and Non-Miners with Lung Cancer. Submitted for publication in Cancer, 1977.
38. Saccomanno, Geno: Atypical Metaplasia of the Bronchial Epithelium: Frequency and Significance. Submitted to Acta Cytologica, 1977.

Figure 4

WORKSHOPS AND EDUCATIONAL MEETINGS

July 1, 1976 through June 30, 1977

1. September 15-17, 1976 -- Lecture to Chest Physicians, Keystone, Colorado
2. October 8, 1976 -- ASMT Seminar, presented workshop on "Cytological Diagnosis of Lung Cancer", Seattle, Wash.
3. October 27, 1976 -- ASCP Fall Meeting, Workshop, Los Angeles, Calif.
4. November 4, 1976 -- Houston, Texas, Workshop for American Society of Cytology. Received Papanicolaou Award.
5. December 5, 1976 -- Lecture, VFW, Denver, Colorado
6. December 8, 1976 -- Veterans Administration Hospital Grand Rounds and Lecture
December 8, 1976 -- University of Utah Medical School -- Lecture
7. January 20-23, 1977 -- Interim Winter Meeting, ASCP, Tucson, Ariz.
8. March 9-11, 1977 -- Workshop on Medical Surveillance, Oak Ridge, Tenn.
9. March 15, 1977 -- St. Mary's Hospital Medical Staff -- "The Use of Sputum Cytology"
10. March 29, 1977 -- Attended Colorado Regional Cancer Conference, Denver, Colorado
11. April 16, 1977 -- Cytology Society of Indiana, South Bend, Indiana Workshop
12. April 22, 1977 -- Lecture, Biology Class, Wubben Hall, Mesa College
13. April 28-29, 1977 -- Early Lung Cancer Detection Project, Memorial Hospital, New York, New York
14. May 18, 1977 -- Johns-Manville, Lecture on Sputum Cytology, Denver, Colo.
15. May 19, 1977 -- "Telephone" Lecture to U.M. Workshop, Cancer Research and Treatment Center, Albuquerque, New Mexico
16. May 20, 1977 -- Cancer Education Seminar for Nurses, Grand Junction, Colo.
17. May 23, 1977 -- Workshop on Retinoids -- Hoffmann-La Roche, Nutley, N.J.
18. June 29, 1977 -- Union Carbide Corp. Asbestos Workers, Monterey, Calif.

Reprints & Preprints removed

Department of Energy
Technical Information Center
P.O. Box 62
Oak Ridge, Tennessee 37830

October 5, 1977

TM:PWR:10-1

Thomas B. Abernathy, Chief
Document Management Branch

DISTRIBUTION OF UKAEA REPORTS RECEIVED UNDER LMFBR EXCHANGE

We have been told that the British have complained that our distribution of their limited LMFBR reports has been too broad. Current negotiations seem to definitely indicate that distribution of such reports in the future will have to be scaled down considerably.

An acceptable list of recipients, apparently taken from UC-79 addresses, is to be furnished by DRDD. Meanwhile, we will be receiving British proprietary reports from DRDD with special distribution lists. One such group of reports is enclosed.

These special lists should be modified to assure that they do not violate the established principle of UC-79. For example, UC-79 specifies that copies are to be sent to the Associate Director for RRD Programs at ORNL, while the special list omits this attention line and names three individuals. These copies for ORNL should be sent through the UC-79 address, and so on for the other addresses.

These limited items should be abstracted in ALDR. I don't see how we can make any microfiche distribution, however, since the lists are special.

We will be going through a long and complicated transition period as the LMFBR exchanges swing over to the Working Group Arrangements. I'll keep you informed.

Phillip W. Rosser
Special Asst. to the Manager

Enclosures:

11 UK Reports w/Dist. List

cc: R. L. Shannon/W. M. Vaden
T. W. Laughlin
R. C. Dreyer
UC-79 Policy File