LABRADOR WEST DUST STUDY

Level I Report,
EXECUTIVE SUMMARY

Volume 2 — Scully Mines

Honourable J.W. Dinn
Minister of Labour and Manpower
Government of Newfoundland and Labrador
Beothuck Building
St. John's, Newfoundland.

Sir:

In early 1980, the Labrador Institute of Northern Studies was retained by your department to carry out a study of dust conditions and health related effects in the Labrador West iron ore mining industry. This study has now been completed, and the conclusions and recommendations are presented in the appended Executive Summary.

Detailed reports on specific points of the study are submitted under separate cover. These reports are as follows:

Point I - Study Organization and Administration
Point II - Inplant Dust Study
Point III - Engineering Audit
Point IV - Medical Assessment
Point V - Ambient Air Study
Point VI - Community Health Study

We thank the Government of Newfoundland and Labrador for the opportunity to carry out this study.

It is hoped that the study will be of benefit to the mining industry, the scientific community and, most importantly, the workforce and communities in western Labrador.

Yours truly,

I.E. Rusted, M.D., F.R.C.P.(C),
Chairman, Governing Committee,
Labrador Institute of Northern Studies.
LABRADOR INSTITUTE OF NORTHERN STUDIES  
LABRADOR WEST DUST STUDY  
LABRADOR WEST DUST STUDY  
LEVEL I REPORT - EXECUTIVE SUMMARY  
VOLUME II  
SCULLY MINES, WABUSH  
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1. SUMMARY

The pattern of development reflected in the iron ore mining and processing operations at Scully Mines in Wabush, Labrador, follows an emerging but distinct trend found in most mining communities - i.e. the early years of operations were marked by generally unsatisfactory environmental conditions; as the industry and its attendant townsite became established, there were commendable and effective efforts towards improvements; however, a thorough assessment of the present-day working environment, and the effect of past dust levels upon the health of the workforce reveals that matters are still not completely satisfactory.

That assessment has led to the identification of 14 cases of pneumoconiosis during an examination of the workforce. This diagnosis was based primarily on x-ray evaluations and dust exposure histories.

The appearance of pneumoconiosis at this relatively early point in the life of the mining operation, approximately 15 years, is a matter of concern.

Pneumoconiosis refers to "the accumulation of dust in the lungs and the non-cancerous tissue reaction to its presence." The clinical detection of these cases of pneumoconiosis justify the implementation of the recommendations of this report. In short, it is recommended that:

- dust control measures be enhanced;
- dust monitoring methods and practices be improved; and
- medical surveillance be continued and strengthened.
Finally, it was concluded that present health effects related to dust conditions were confined to occupational exposure. Community air quality as measured for a one-year period was within the yearly guidelines defined in provincial legislation although several short term "upset" conditions occurred. There is no evidence that the general respiratory health of the residents of Wabush has been affected by the mining, processing, or waste disposal operations at Scully Mines.
2. INTRODUCTION

The study into all aspects of potential health effects of dust from the Scully Mines operation in Wabush began in September, 1979. The study was carried out under the direction of the Labrador Institute of Northern Studies (L.I.N.S.), under contract with the Department of Labour and Manpower, Government of Newfoundland and Labrador. L.I.N.S. carried out, simultaneously, a similar study in Labrador City, three miles to the west of Wabush, where the Iron Ore Company of Canada has established an iron ore mining and processing operation. The complete study is referred to under the general title "The Labrador West Dust Study".

2.1 BACKGROUND AND TERMS OF REFERENCE

In the mid 1970s, reports of medical tests conducted on workers in Labrador West indicated the presence of a number of abnormal radiological patterns. Following intensive investigations by several task forces, the Government developed a seven-point program for an investigation of all aspects of the potential impact of dust upon the health of workers and the community in general. The seven-point program provided general guidelines relating to the organization and coordination of independent assessments of dust conditions and their effects, including dust monitoring techniques, engineering audits, medical assessments, ambient air surveys and a community health study.

During the course of the study, more detailed terms of reference evolved naturally out of the various assessments.
These terms of reference provided the direction and control of day-to-day operational activities for most of the professional group. These terms of reference are presented as an appendix to this volume (Appendix A.1.1).

2.2 STUDY METHODOLOGY

Several brief statements may be made regarding methods of operation. The Labrador West Dust Study, though undertaken under government contract, was completely independent of specific direction or control by government. The assessment methods were controlled by application of the generally accepted professional and scientific ethic - the independent investigation of truth.

The Labrador West Dust Study was a professionally-oriented study with the prime objective of assessing the medical well-being of the iron ore industry workforce and the residents of Labrador West, in relation to occupational and environmental dust conditions to which they were and are exposed.

Administrative and financial provisions were designed to comply with appropriate legislative requirements. Selection of consultants was entirely the prerogative of L.I.N.S. The rationale for selection was based on obtaining the best qualified person or firm, giving due consideration to certain stated preferences of the companies and the unions, and the very obvious need to develop in-province expertise. Identification of persons and firms contributing to the study is given in the Level II Report "Study Organization and Administration".
The complete report consists of six parts, each independently prepared by the individual consulting groups.

The findings, discussions and recommendations contained herein represent a summary and consensus of these individual reports.

3. FINDINGS AND DISCUSSIONS:

3.1 INPLANT DUST STUDY

3.1.1 HISTORICAL DUST LEVELS

Assessment of historical records indicates that inplant dust conditions during the period from plant start up in 1965, until recent times had been in excess of accepted industrial standards, such as those recommended by the American Conference of Government Industrial Hygienists (ACGIH). Beginning in 1972 and since that time, there has been an ongoing and effective effort to implement measures to improve and correct the situation. These efforts have resulted in a reduction in occupational dust levels in the majority of plant areas.

3.1.2 PRESENT DUST LEVELS

Intensive positional and personal sampling during the study period indicates that dust levels in the plant are generally low with only a few areas in violation of existing government regulations. Continued monitoring, control and analysis are required, due to the fact that dust levels can and do fluctuate very widely.

The primary hazardous respiratory element encountered in the one-year study period was quartz. Analysis of the ore body and
host rock characteristics indicates there is a possibility of fibrous particles being introduced into the present plant environment; however, the maximum levels detected during this study, using standard optical methods were low - i.e. in the range of 0.3 fibres per ml.

Levels of ionizing radiation and exposure to concentrations of toxic gases were found to be well below current occupational standards.

Beginning in 1965, the methods employed to sample dust conditions centred on the use of the midget impinger. This device, developed prior to the 1950s, is a short-period dust sampling instrument - it usually samples a cubic foot volume of air over a 10-minute period.

The device is useful in locating specific sources of dust, in giving a rough measure of the effectiveness of dust control systems and measuring dust collector efficiencies.

A major disadvantage of the midget impinger is in the short sampling period relative to the length of the work shift.

Assessment of historical evidence reveals that the shortcomings in the dust sampling methods were compounded by misuse of the equipment, and improperly trained dust monitoring personnel.

Government action on these deficiencies was hampered by lack of personnel and equipment.

During the study period, there was a transition from use of the midget impinger to the use of gravimetric methods by the company.
The recruitment, training and retention of qualified personnel by the government is a matter of particular concern.

3.2 ENGINEERING AUDIT

The following conditions contributed to occurrences of unnecessarily high dust levels within the workplace.

i) Maintenance, repair and operation of some of the existing dust control equipment were below acceptable standards.

ii) Housekeeping was not being accomplished in some plant areas in a manner consistent with the objective of maintaining low dust levels.

iii) Low stack heights were contributing to re-circulation of exhausted dust.

iv) There was a general lack of awareness and/or concern on the part of a number of supervisory personnel and workers as to the causes and effects of airborne dust.

3.3 MEDICAL ASSESSMENT OF THE WORKFORCE

3.3.1 PRESENT WORKFORCE

This program was designed to examine all workers with at least three months continuous employment as of January 1, 1980. Of the total work force of approximately 700, there were 617 employees who met this criteria. The number who actually participated during the on-site examination (Jan.-Feb. 1981) was 499.

Chest x-rays of this group of 499 were used to select employees who required more detailed examination.

Results of a detailed epidemiological study of the workforce is given in the Level II report "Medical Assessment".
A clinical evaluation of the 499 employees, by a panel of three physicians, found that there were 14 cases of pneumoconiosis.

Among this group of 14, there were 10 employees who had not been previously diagnosed or suspected of pneumoconiosis.

The average age of the diagnosed cases was less than 50 years, and average length of exposure was approximately 10 years.

Their dust exposure indices were significantly higher than a reference group of workers with comparable length of service, but who did not have pneumoconiosis.

The 14 workers with pneumoconiosis showed few signs of impairment that could be attributed to dust exposure. All were current members of the workforce.

3.3.2 PREVIOUS WORKFORCE

Considerable difficulty was encountered in identifying all employees who had left the workforce, particularly those who entered the workforce before 1965 and were not employed as of January 1, 1980.

318 former employees were identified, but only 129 could be traced; these agreed to a chest x-ray as part of this study. Only 6 of those x-ray showed small opacities, none greater than 1/0 on the International Labour Organization 1980 classification.

The possibility exists that a number of workers who had pneumoconiosis had left the employ of the company prior to January 1, 1980.
3.4 AMBIENT AIR STUDY

The average annual ambient air particle concentrations at the two stations monitored in the town of Wabush were acceptable, with an average annual value of 23 μg/m³, as compared with the provincial standard of 70 μg/m³. The allowable daily maximum of 120 μg/m³ was exceeded on six occasions over the full year study.

3.5 COMMUNITY HEALTH STUDY

No adverse respiratory health effects in the population examined could be attributed to the ambient air conditions.

4. CONCLUSIONS AND RECOMMENDATIONS

4.1 GENERAL

The co-operation of company, union, and government officials during the course of this study was excellent, and exemplified the unity of purpose so necessary to the successful implementation of any recommendations. The continuation of this co-operative effort in the reduction of dust levels will be the most important step in eliminating any future potential health effects due to dust exposure.

Dust monitoring control and medical surveillance require increased effort and new techniques. The best available expertise should be made available to all concerned with the health of the employees. This leads to the first recommendation:
RECOMMENDATION I - AN INDEPENDENT BOARD OF CONSULTANTS BE APPOINTED BY THE MINISTER TO PROVIDE QUALITATIVE ASSESSMENTS OF THE IMPLEMENTATION OF CORRECTIVE ACTIONS AND THEIR EFFECTS.

The equipment and supplies used for this study performed satisfactorily and are available for on-going monitoring. In order to insure consistency in monitoring, this equipment should be used to the maximum extent possible in future programs.

RECOMMENDATION II - ALL EQUIPMENT AND SUPPLIES ACQUIRED BY L.I.N.S. FOR THIS STUDY BE USED FOR ON-GOING MONITORING.

There appeared to be a lack of understanding of the causes and health effects of airborne dust and of the proper operation and maintenance of dust control equipment. This was particularly evident among hourly paid workers and lower levels of management. This indicates the need for an increased educational program.

RECOMMENDATION III - THE PRESENT EDUCATIONAL PROGRAMS BE REVISED AND EXPANDED TO INSURE THAT ALL EMPLOYEES ARE FULLY INFORMED OF THE POTENTIAL RISKS ASSOCIATED WITH WORKING IN AN ENVIRONMENT CONTAINING RESPIRABLE DUST AND IN THE PROPER MAINTENANCE AND UTILIZATION OF DUST CONTROL AND SUPPRESSION EQUIPMENT AND PRACTICES.

4.2 POINT II, INPLANT DUST STUDY

The respirable dust, although significantly reduced during the past few years, can, and should be further reduced.
Continual monitoring of dust levels should be accomplished, following a program mutually agreeable to management, unions and the government.

The acceptance of any dust monitoring program by the work force can only be achieved by their active participation in the monitoring process.

**RECOMMENDATION IV - UNION PERSONNEL SHOULD PARTICIPATE IN THE COMPANY'S DUST MONITORING PROGRAM.**

The monitoring programs conducted by the company during the period of the study were not sufficiently staffed nor equipped to achieve the desired objectives, i.e., to quantify the exposure of all workers to airborne dust, and to identify areas in which to concentrate efforts on dust control. This monitoring is the sole responsibility of the company, and should be acceptable to the government inspectorate. A program is required combining fixed station and personal sampling using instruments designed to capture the respirable portion of airborne dust. This program should also include provisions for monitoring of fibre levels, as well as total airborne dust and other potentially hazardous substances.

Particular emphasis should be placed on insuring that ore containing high fibre levels is not introduced into the process operation.
RECOMMENDATION V - A DUST SAMPLING PROGRAM WITH THE OBJECTIVE OF MEASURING WORKER EXPOSURE TO RESPIRABLE DUST BE INTRODUCED.

RECOMMENDATION VI - THE MEASUREMENT AND CONTROL OF DUST IS THE RESPONSIBILITY OF THE COMPANY.

RECOMMENDATION VII - PRESENT PROGRAMS TO EXCLUDE FIBRE FROM THE WORKPLACE BE CONTINUED AND STRENGTHENED.

* * *

Government monitoring of the company's procedures in dust measuring and control has been hampered by a lack of equipment, personnel and an established code of practice. A mutually agreed upon code of practice is essential in order for the Government inspectorate to fulfill their proper role, that of auditing the company's dust measurement and control procedures.

RECOMMENDATION VIII - THE GOVERNMENT SHOULD MAINTAIN AN INSPECTORATE BRANCH WITH THE RESPONSIBILITY OF AUDITING THE COMPANY'S DUST MONITORING AND CONTROL FUNCTION.

* * *

The development of worker exposure indices for this study was handicapped by lack of historical data and uniform records. Maintenance of an accurate worker exposure record is essential to an ongoing surveillance program, which has been identified as one of the basic needs in controlling the existing dust problem.

RECOMMENDATION IX - THE COMPANY SHOULD MAINTAIN RECORDS DOCUMENTING EACH WORKER'S EXPOSURE TO DUST.

* * *
4.3 POINT III, ENGINEERING AUDIT

The company has demonstrated an awareness of the need for additional dust control and suppression equipment. Consideration should be given to increasing stack heights if dust levels cannot be reduced by other means.

**RECOMMENDATION X - THE COMPANY'S PROPOSED DUST CONTROL PROGRAM BE IMPLEMENTED WITHOUT FURTHER DELAY.**

* * *

A significant reduction in dust levels can be achieved using existing equipment and procedures. The most significant conclusion of the Engineering Audit was that far greater efforts are required in continuous maintenance and repair of existing systems. Present housekeeping efforts are not satisfactory.

**RECOMMENDATION XI - THE COMPANY'S EFFORTS AT MAINTENANCE AND REPAIR OF EXISTING DUST CONTROL EQUIPMENT BE IMPROVED.**

**RECOMMENDATION XII - THE LEVEL OF HOUSE-KEEPING IN ALL AREAS BE IMPROVED.**

* * *

4.4 POINT IV, MEDICAL SURVEILLANCE

Pneumoconiosis caused by exposure to excessive dust levels has been demonstrated.

The findings of this study indicate that these occurrences will continue to be detected for the foreseeable future even if dust levels are reduced.

The L.I.N.S. study was cross-sectional, and not designed to give exact incidence rates of new cases. However, a review of all evidence, and comparison with other epidemiological studies, would indicate that from 1 to 3 new cases of pneumoconiosis each
year can be anticipated, if the workforce and dust conditions remain stable.

This projection can and should be re-evaluated on a yearly basis.

Early detection and continual monitoring is essential.

RECOMMENDATION XIII - MEDICAL SURVEILLANCE OF THE WORKFORCE SHOULD BE STANDARDIZED.

RECOMMENDATION XIV - EMPLOYEES CLINICALLY DIAGNOSED AS PNEUMOCONIOTIC SHOULD MINIMIZE THEIR EXPOSURE TO DUST.

RECOMMENDATION XV - THE GOVERNMENT SHOULD RE-EVALUATE PRESENT WORKERS COMPENSATION POLICIES TO INSURE THAT EMPLOYEES WITH PNEUMOCONIOSIS DO NOT SUFFER FINANCIAL OR OTHER LOSS.

* * *

No definitive conclusion can be made on the study of workers who had left the employ of the company prior to this study. This conclusion must be considered in light of the fact that this survey included only a limited number of individuals.

Other past employees may have developed pneumoconiosis and be unaware of this fact. It is therefore important that attempts be made to contact these people.

Employees who leave the workforce should be advised of the latency period associated with pneumoconiosis, and possible future effects.

RECOMMENDATION XVI - A COMPLETE LIST OF ALL INDIVIDUALS WHO WERE EMPLOYED BE DEVELOPED.
RECOMMENDATION XVII

EMPLOYEES LEAVING THE WORKFORCE BE ADVISED TO UNDERGO A CHEST X-RAY FIVE YEARS AND TEN YEARS AFTER TERMINATION.

* * *

4.5 POINT V, AMBIENT AIR STUDY

Short term air quality in the community, as measured by 24-hour suspended particulate levels, is not in full compliance with provincial air quality regulations; however, long term air quality, as measured by annual suspended particulate levels, does meet provincial requirements. Company road dust contributes significantly to frequent the occurrences of levels above the provincial 24-hour standard.

RECOMMENDATION XVIII - THE FINDINGS OF THE AMBIENT AIR STUDY BE REFERRED TO THE APPROPRIATE GOVERNMENT AGENCIES FOR INFORMATION AND ANY REQUIRED ACTION.

RECOMMENDATION XIX - AMBIENT AIR MONITORING BE CONTINUED UNTIL CONDITIONS LEADING TO NON-COMPLIANCE WITH THE 24-HOUR CRITERIA ARE CORRECTED.

* * *

4.6 COMMUNITY HEALTH STUDY

There are no obvious respiratory problems which can be associated with the ambient air quality as measured during the study period.

RECOMMENDATION XX - THE RESULTS OF THE COMMUNITY HEALTH STUDY SHOULD BE MADE AVAILABLE TO ALL RESIDENTS OF THE TOWN OF WABUSH.

* * *
5. IMPLEMENTATION

5.1 GENERAL

The recommendations contained in the preceding section are a summary and consensus of the individual sections of the complete study.

These recommendations are somewhat generalized. The following proposals for implementation are offered as a guideline for the discussions required to reach agreement on the final implementation.

5.2 PROPOSED IMPLEMENTATION

RECOMMENDATION I - AN INDEPENDENT BOARD OF CONSULTANTS BE APPOINTED BY THE MINISTER TO PROVIDE QUALITATIVE ASSESSMENTS OF THE IMPLEMENTATION OF CORRECTIVE ACTIONS AND THEIR EFFECTS.

The next several years should witness a transition to new methods of dust sampling and increased medical surveillance. Independent assistance and advice will assist in the implementation of new procedure, mediate any conflicts, and provide resources for personnel training.

This board should report directly to the Minister of Labour and Manpower and include at least the following positions:

A. An occupational lung disease Medical Consultant
B. Industrial Hygienist Consultant
C. Ambient Air Consultant
D. Industrial Ventilation Consultant
E. Statistical Analyst

* * *
RECOMMENDATION II - ALL EQUIPMENT AND SUPPLIES ACQUIRED BY L.I.N.S. FOR THIS STUDY BE USED FOR ON-GOING MONITORING.

The equipment used by L.I.N.S. should be made available for use in future monitoring. Equipment in excess of the Government's requirements should be turned over to the company.

* * *

RECOMMENDATION III - THE PRESENT EDUCATIONAL PROGRAMS BE EXPANDED TO INSURE THAT ALL EMPLOYEES ARE FULLY INFORMED OF THE POTENTIAL RISKS ASSOCIATED WITH WORKING IN AN ENVIRONMENT CONTAINING RESPIRABLE DUST AND IN THE PROPER MAINTENANCE AND UTILIZATION OF DUST CONTROL AND SUPPRESSION EQUIPMENT AND PRACTICES

In addition to the revision of present educational programs and use of standard training aids, an audio visual cassette describing pneumoconiosis and methods to minimize risk should be developed for viewing by all management and workers. This educational process should be supplemented by short courses, and special recognition should be given to workers taking such courses.

* * *

RECOMMENDATION IV - UNION PERSONNEL SHOULD PARTICIPATE IN THE COMPANY'S DUST MONITORING PROGRAM.

The role of the union should be to assist in all possible ways in the understanding and motivation of the workforce to the nature of occupational hazards of exposure to dust, and the ways to minimize such hazards.

Failure of any worker to observe government approved directives concerning exposure to dust should be recognized as
grounds for disciplinary action and the union should support such action.

The company's dust monitoring and control program should permit union participation. At least one union member should be employed as a full-time dust monitoring technician to work side by side with the company's technician(s).

This practice has several precedents in this province and elsewhere. These precedents should be used as guidelines to implement this recommendation.

* * *

RECOMMENDATION V - A DUST SAMPLING PROGRAM WITH THE OBJECTIVE OF MEASURING WORKER EXPOSURE TO RESPIRABLE DUST BE INTRODUCED.

Dust sampling should have the assessment of worker exposure as its primary objective. This can be achieved by a combination of fixed station and personal gravimetric sampling.

Equipment and methods meeting the following specifications are recommended for both personal and fixed station sampling.

PUMP - a portable battery operated constant flow pump capable of exhausting at least 2.5 litres per minute through a complete sampling train comprising cyclone, filter and pump for a 6 to 8 hour shift.

CYCLONE - a metal cyclone to approximate the American Conference of Government Industrial Hygienists (ACGIH) or the British Mining Research Council (BMRC) specifications.

FILTER ASSEMBLY - a leak-proof filter assembly.

FILTER - as required to meet the techniques of the selected testing laboratory.
CALIBRATION METER - a bubble type calibration meter. 

BALANCE - an balance capable of weighing to ± .01 milligrams. 

FREE SILICA DETERMINATION - by x-ray diffraction, or other recognized method. 

Further details on equipment, station location and recommended techniques are given in the Level II report "INPLANT DUST STUDY". 

The Level II report "INPLANT DUST STUDY" details the recommended dust "zones" within the work site, and suggested sampling frequency and procedures. Required "action" associated with each dust zone is also proposed. 

It should be the prerogative of the company to propose the actual areas to be used in following the "action level" concept. L.I.N.S. data is available to establish an initial 'dust zone' for any area selected. 

It is stressed that any sampling instrument conforming to ACGIH or BMRC criteria can be utilized, but if an instrument other than the H & H custom cyclone is selected, the quartz and total dust levels recommended should be adjusted in accordance with the correlation factors given. 

Periodic fibre test should be undertaken on a regular cycle, or at any time when new sections of the ore body are mined or as deemed necessary by the Government Inspectorate. 

The use of modern "quick measuring", dust sampling devices are encouraged for purposes of engineering control, and as a backup to the methods described above.
All sampling results should be furnished to the inspectorate, union health and safety committees, and should be posted in the work place for the information of all employees.

The general policy to be followed in reducing dust levels should be in accordance with the ALARA principle, that is As Low As Reasonably Achievable, economic and social factors being considered.

* * *

RECOMMENDATION VI - THE MEASUREMENT AND CONTROL OF AIRBORNE DUST SHOULD BE THE RESPONSIBILITY OF THE COMPANY.

This recommendation is made in the full recognition that airborne dust is an undesirable by-product of any mineral processing industry and therefore, the industry must bear full responsibility for the reduction in dust levels to the point where impact on worker health is minimal.

The company should provide, at least, one full-time qualified dust sampling technician, and ensure that he is provided with all necessary supplies and equipment to implement at least the program outlined in RECOMMENDATION V.

Graduation from a one-year post-secondary program in occupational hygiene, supplemented by three years' experience in dust sampling, or any comparable combination of training and experience, is recommended as the minimum qualification for the dust monitoring technician.

Failure of any employee to observe government approved directives concerning exposure to dust should be recognized as grounds for disciplinary action by the company.

* * *
RECOMMENDATION VII - PRESENT PROGRAMS TO EXCLUDE FIBRE FROM THE WORKPLACE BE CONTINUED AND STRENGTHENED.

The company has apparently succeeded in maintaining fibre levels at a low level, and should continue their surveillance of all material brought to the process operation. This should be a matter of continued surveillance, due to concerns that there are accelerated harmful effects caused by exposure to dust containing quartz in combination with fibre.

* * *

RECOMMENDATION VIII - THE GOVERNMENT SHOULD MAINTAIN AN INSPECTORATE BRANCH WITH THE RESPONSIBILITY OF AUDITING THE COMPANY'S DUST MONITORING AND CONTROL FUNCTION.

The government should provide at least one technician trained and adequately equipped to audit and approve all company programs.

The government technician should have at least the qualifications listed for the company technician(s).

It should be recognized that levels of remuneration and compensation for government personnel in this geographic location should be adequate to recruit and retain the required technical skills to perform a full audit function.

The government inspector should be furnished sufficient supplies and equipment to parallel sample with the company when and as required.

* * *

RECOMMENDATION IX - THE COMPANY SHOULD MAINTAIN A RECORD DOCUMENTING EACH WORKER'S EXPOSURE TO DUST.
A personal exposure record, based on the worker records initiated as part of the L.I.N.S. study, should be maintained by the company. This record should be updated yearly, and be available for examination by the employee or any physician responsible for medical surveillance.

**RECOMMENDATION X - THE COMPANY'S PROPOSED DUST CONTROL EQUIPMENT PROGRAM BE IMPLEMENTED WITHOUT FURTHER DELAY.**

As a very minimum, the proposed equipment mentioned in the Level II report "ENGINEERING AUDIT" should be installed and made operational in the earliest possible time frame.

**RECOMMENDATION XI - THE COMPANY'S EFFORTS AT MAINTENANCE AND REPAIR OF EXISTING DUST CONTROL EQUIPMENT BE IMPROVED.**

The company, in cooperation with the workplace health and safety committee, should establish a written program for regular maintenance for all dust control and suppression equipment. This program should be reviewed by the Government prior to acceptance.

This program should be developed in light of the findings of the Level II report "ENGINEERING AUDIT" which indicates that present practices are not satisfactory.

Repair of any malfunction in dust control and suppression equipment should be given immediate priority.
RECOMMENDATION XII - THE LEVEL OF HOUSE-KEEPING IN ALL AREAS BE IMPROVED.

The general level of house-keeping in the Scully Mines operation should be significantly increased as detailed in the Level II report "ENGINEERING AUDIT".

The company in cooperation with the workplace health and safety committee, should develop a written program for house-keeping and cleaning operation. This program should be reviewed by the Government prior to implementation.

* * *

RECOMMENDATION XIII - MEDICAL SURVEILLANCE OF THE WORKFORCE BE STANDARDIZED.

In the implementation of this recommendation, it must be recognized that new cases of pneumoconiosis can be anticipated. It is essential that these cases be identified at an early stage to permit appropriate action.

1. All records involved in the surveillance of workers should be standardized. The modified American Thoracic Society questionnaire and the physical examination form used during the L.I.N.S. study should be incorporated, permitting future comparisons with the baseline data collected during the study.

2. X-rays should be performed using a high K.V. technique on all employees, and quality control of x-rays should be stressed.

3. The periodic x-rays should be reviewed annually by a panel of x-ray readers with experience in reading x-rays for occupational lung disease side by side with the ILO standards films and the form used during the Labrador West Dust Study.
All x-rays which are read as suspicious of pneumoconiosis (profusion reading of 1/0 or greater) should be reviewed with all data including previous annual surveillance films, job descriptions, and work history and physical examination. Clinical evaluation of the worker should be undertaken by a panel of physicians.

4. The following recommendations have been based from the Summary of the Task Force Report on Occupational Respiratory Disease (Pneumoconiosis), chaired by Dr. G.L. Ostiguy, and are applicable to the Scully employees.

These recommendations for medical surveillance are summarized for pre-employment, during employment, and after observed abnormalities as follows:

A. Pre-employment

(i) An assessment should be undertaken to provide a complete medical history; this should be followed by a physical examination.

(ii) An assessment should be undertaken to provide an occupational history with specific attention to dust, fumes, and, in particular, exposure to asbestos.

(iii) A high KV PA chest x-ray obtained, and read in accordance with the ILO 1980 classification.

(iv) Spirometry tests should be performed to include at least forced vital capacity, forced expiratory volume/1 sec. (FEV/1) and maximum mid-expiratory flow rate.
B. During Employment

During the course of the worker's employment, the following review should be performed at least every two years until ten years exposure and then at yearly intervals thereafter.

(i) Abridged history and physical examination.

(ii) High KV PA chest x-ray.

(iii) Spirometry to include at least forced vital capacity, FEV/1 and maximum mid-expiratory flow rate.

C. Observed Abnormality

Should a chest x-ray of at least 1/0 profusion (1980 ILO classification) be confirmed, the worker should be referred to a consultant for evaluation.

5. Pulmonary function studies should be performed only by appropriately trained technicians using standard quality control techniques. Supervision should be by a physician with appropriate training and demonstrated expertise.

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RECOMMENDATION XIV: EMPLOYEES CLINICALLY DIAGNOSED AS PNEUMOCONIOTIC SHOULD MINIMIZE THEIR EXPOSURE TO DUST.

Diagnosed Pneumoconiosis should be considered on a case by case basis. The following guidelines regarding diagnosed pneumoconiosis are suggested:

1. Employees under the age of 40, with 10 years or less exposure to dust, but with no physical disability, should be given the option of being relocated to a zone 0 area (non-dust area),
(2) Employees over the age of 40, or with more than 10 years of dust exposure should be given the option of being relocated to a Zone 0 (non dust) or to a Zone 1 (low dust) area.

(3) Any employee, with clinically diagnosed pneumoconiosis, and evidence of a physical impairment associated with the disease should be immediately relocated to a Zone 0 (non-dust) area.

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RECOMMENDATION XV - THE GOVERNMENT SHOULD RE-EXAMINE PRESENT WORKERS COMPENSATION POLICIES TO INSURE THAT EMPLOYEES WITH PNEUMOCONIOSIS DO NOT SUFFER FINANCIAL OR OTHER LOSS.

It should be recognized that there is a potential for the occurrence of a number of future cases of clinically diagnosed pneumoconiots who are unwilling or unable to relocate to a non-dust area.

A clinical diagnosis of pneumoconiosis does not necessarily imply disability; however it does have significant implications for an employee and his family. Many of these employees will experience psychological and socio-economic problems, and relocation and/or re-employment opportunities will be limited.

Programs should be developed to permit these workers to be relocated and retrained at minimal expense to themselves.

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RECOMMENDATION XVI: A COMPLETE LIST OF ALL EMPLOYEES OF THE IRON ORE INDUSTRY IN LABRADOR BE DEVELOPED.

This list should attempt to identify all previous employees with six months or more exposure. This list could permit
information to be distributed to these individuals, in particular, data of the long latency period for pneumoconiosis, and the need for regular chest x-ray evaluation.

* * *

RECOMMENDATION XVII: EMPLOYEES LEAVING THE WORKFORCE BE ADVISED TO UNDERGO A CHEST X-RAY, AT 5 YEARS AND AT 10 YEARS AFTER TERMINATION OF EXPOSURE.

In addition to this practice, the individual's name should be added to the data bank recommended above.

* * *

RECOMMENDATION XVIII - FINDINGS OF THE AMBIENT AIR STUDY BE REFERRED TO THE APPROPRIATE GOVERNMENT AGENCIES FOR INFORMATION AND ANY REQUIRED ACTION.

This study has shown no direct correlation between ambient air dust levels and adverse respiratory health effects to the residents of Wabush; however, there are excursions above the legislated daily levels which are of concern. RECOMMENDATION XIX, is felt to be self-explanatory.

* * *

RECOMMENDATION XX - THE RESULTS OF THE COMMUNITY HEALTH STUDY SHOULD BE MADE AVAILABLE TO ALL RESIDENTS OF THE TOWN OF WABUSH.

The community health survey contains certain aspects which are of general interest to the community at large. Every effort
should be made to insure that this information is passed on to the residents.

The active participation of the Provincial Departments of Health and Education should be encouraged to assist in this regard.

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APPENDIX A.1.1.

STUDY TERMS OF REFERENCE (I.O.C.C. & SCULLY)

Point I

L.I.N.S. ADMINISTRATION:

1. To set up budget, schedules for the study.
2. To identify all internal and external consultants for the phases of the work leading to the report to the Minister of Labour and Manpower.
3. To provide administrative, and all other support assistance to participants in the study.
4. To control all disbursements made under the study.
5. To correlate and coordinate all individual reports generated as part of the study.
6. To present final conclusions and recommendations based on all acquired data.
7. To store all information gained from the study for a minimum period of five (5) years.

Point II

INPLANT DUST STUDY:

1. To evaluate present dust monitoring practices in the work place.
2. To evaluate all sources of airborne dust, including a geological evaluation of ore bodies.
3. To monitor dust levels in the work place, by occupation and location, for a full one (1) year period.
Point III

ENGINEERING AUDIT:

1. To evaluate existing and proposed dust control equipment and procedures.
2. To offer a professional opinion on the adequacy of these procedures and equipment in light of measured dust value.

Point IV

MEDICAL ASSESSMENT

Phase A: Reassessment:

1. To reassess cases referred to the Workers Compensation Board of Nfld. with a diagnosis of pneumoconiosis or suspected pneumoconiosis.

Phase B: Assessment of Present Work Force:

1. To conduct an examination on present workers, to include:
1) Physical Examination
2) Medical Questionnaire
3) Worker History
4) Pulmonary Function Test
5) Chest x-ray

2. To analyze all data collected to establish prevalences of occupational lung disease.

3. To correlate medical observations with exposure to dust.

4. To recommend, if necessary, measures for the early detection and prevention of occupational lung disease and procedures to be followed for those developing pneumoconiosis.

5. To follow established practice in informing individuals of the results of their examinations.

Phase C: Assessment of Previous Workers

1. To identify a statistically significant number of workers who have terminated exposure to iron ore dust.

2. To conduct a medical examination on this group to include:
   a) Medical Questionnaire
   b) Worker History
   c) Chest X-ray

3. To analyze all data collected to establish prevalence of occupational lung disease, and other respiratory disease.

4. To correlate medical observations with exposure to dust.

5. To follow established practice in notification of individuals of the results of their examinations.
Point V  
**AMBIENT AIR STUDY:**

1. To carry out a full one (1) year program to monitor ambient air conditions in the communities of Labrador City/Wabush.

2. To assemble and analyze the data collected to provide information for interpretation of the physiological effects of human exposure to dust levels in the ambient environment.

3. To use quantitative models to identify the most likely sources of contaminants during periods of peak ambient air loading.

Point VI  
**COMMUNITY HEALTH STUDY**

1. To identify a statistically significant sample of community residents not normally exposed to occupational dust.

2. To conduct a medical examination to include
   a) Medical questionnaire
   b) X-ray (in adults only)

3. To analyze all data collected to identify health effects of ambient air conditions.

4. To correlate medical observations with exposure to ambient air conditions.

5. To recommend, if necessary, measures to control detrimental health effects due to ambient air conditions.

6. To follow established practices in notification of individuals of the results of their examinations.
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