MAY 17 1977 EPJ

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MEMORANDUM

TO: H. H. Bode

FROM: M. R. Baker

DATE: May 11, 1977

SUBJECT: SAFETY AND HEALTH SUBCOMMITTEE

As of today, I am advised that the Kaiser and Alcoa Subcommittees have not met or received proposals from the Union. Yesterday, Schwartz called and we agreed to have no meetings this week and that I would call him near the end of the week.

We have received the Kaiser Medical Manual. This memorandum will try to condense this large book to its essentials.

1. Issued by Dr. James P. Hughes on April 7, 1977. Cover letter says Audiometry section will be issued later. Instruction to have into effect by July 1.

2. Divided into sections:

   Preplacement Exams
   Medical Surveillance Exams (including Potroom)
   Toxicology
   Salaried and Executive Exam Program
   Audiometry (not attached at this issue)

3. Preplacement:

   a. Specific standards and procedures very detailed
   b. Reach/strength hiring standard based on a descriptive paragraph of heaviest work in potroom--raising flexes, using sledge, etc.
   c. Sputum-cytology for baseline purposes.
   d. Pelvis X-ray for baseline for potroom to compare for fluoride absorption.
   e. No use of X-ray for congenital spine conditions.
   f. Standards for qualifying to use respirators.
   g. Quotations of handicapped regulations but no interpretations or specific standards.

4. Medical Surveillance Exams:

   a. "Policy. The Corporation will provide annual

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medical surveillance examinations of those workers exposed to toxic substances or defined physical hazards such as noise or heat stress."

b. Incorporated U.S. DOT regulations for physical exams every other year for regular vehicle drivers.

c. Potroom atmosphere (fluoride, PPOM, heat)
Noise (85 dBA for 8 hours)

MEDICAL SURVEILLANCE ANNUAL

Interval history
Physical exam (height, weight, blood pressure)
Laboratory (blood-hemoglobin or hematocrit; urine-screening test for sugar, protein, blood, fluoride)
Lung function
Chest X-ray
Smoking history
Complete blood count
Skin exam
Sputum cytology
Fluoride in urine
Electrocardiogram
Audiometry
AP X-ray of pelvis - every 6 years

d. A lengthy list of various chemical exposures such as acetone, fluorides, lead, nuisance dust and alumina have a specified annual exam procedure. Many only require an interval history but the rest have increasing levels of exams specified. For example, for lead exams, in addition to history, physical exam, laboratory exam, three others are listed of neurologic exam, CBC, and lead in blood/urine by laboratory approved by Hughes.

e. Sputum test is listed for potroom workers, asbestos, and PPOM/CTPV (particulate polycyclic organic matter and coal tar pitch volatiles).

f. A urinary pre-and post working shift analysis for fluorine is required annually for 1/4 of workers every 3 months exposed to fluorides.

g. An extensive charting of airborne contaminants and physical stresses is included. Several pages are reproduced and attached. This chart lists principal source of emission, health effect, medical surveillance required, threshhold limit values, sampling equipment required, and personal protection equipment. OSHA and MESA standards have been used where adopted but also incorporated are proposed standards--both federal and internal.

5. Toxicology

a. Various toxics or irritants are listed separately showing effect, treatment needed, and preventive considerations.

b. No one plant would have all of the above, but most listed chemicals appear in Reynolds plants. As a medical reference data sheet, this section would obviously be valuable to medical personnel and even by supervisors.

In conclusion, much of this manual material is well organized--although repetitive--and good reference guides. I believe most of our locations would like to have such a specific guide. However, these guides and standards would seem to go beyond the desire and recommendation of our hygene people in certain limited areas. These problem areas would seem to principally be the extensive use of hands-on physicals, use of sputum cytology and possibly threshhold value standards as released. Reynolds was told by Kaiser that this manual was given to the Union and it is evident that the program outlined is what is desired by Schwartz.

M. R. Baker

/bcm

Attachment -

cc: C. B. Rosser, Jr.
Dr. E. C. Irby

KAISER ALUMINUM & CHEMICAL CORPORATION

OCCUPATIONAL HEALTH SURVEILLANCE CHARTS

Summary of ALL AIRBORNE CONTAMINANTS AND PHYSICAL STRESSES in Corporate Operations

MEDICAL AND INDUSTRIAL HYGIENE CONSIDERATIONS

Airborne Contaminant	Principal Use or Source of Emission	HEALTH EFFECTS	MEDICAL SURVEILLANCE (1)	TLV	Air Sampling(2)	Respiratory Protection or Other Controls(3)
ACETONE	Solvent; present in fast drying paints or lacquers	Irritation of respiratory tract and mucous membranes; narcosis; dermatitis	Interval History	1000 ppm	Charcoal tubes Detector tubes	Air-purifying respirator with cartridge for organic vapors Rubber gloves
ALUMINA	Potrooms; materials handling areas; kilns; refractories	Lung overload; no fibrosis	Interval History	10 mg/m^3 (4)	Gelman VM-1 membrane filter; nuclepore 0.4 micron filter	Air-purifying respirator with filter for nuisance dust
AMMONIA	Spent pot relinings; cryolite recovery and pot repair; dross reclamation; cleaners; pretreatment of printed packaging	Irritation of respiratory tract and mucous membranes	Chest x-ray Lung function	25 ppm (50 ppm ceiling)	Detector tubes Impinged in acid	Air-purifying respirator with cartridge for ammonia
ANTIMONY PENTACHLORIDE	Catalyst	Gastro-intestinal and heart disorders; respiratory irritation	EKG Chest x-ray Lung function	0.5 mg/m^3	Millipore AA filter	Air-purifying respirator with filter for nuisance dust Stibine may be generated under reducing conditions

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KAISER ALUMINUM & CHEMICAL CORPORATION

OCCUPATIONAL HEALTH SURVEILLANCE CHARTS

Summary of ALL AIRBORNE CONTAMINANTS AND PHYSICAL STRESSES in Corporate Operations

MEDICAL AND INDUSTRIAL HYGIENE CONSIDERATIONS

Airborne Contaminant	Principal Use or Source of Emission	HEALTH EFFECTS	MEDICAL SURVEILLANCE (1)	TLV	Air Sampling (2)	Respiratory Protection or Other Controls (3)
ASBESTOS	Insulation; coverings; lagging materials; marinite; molten metal control; brake linings	Fibrosis of lung; bronchogenic carcinoma; mesothelioma; cancer of stomach, colon, and rectum	Chest x-ray Lung function Sputum cytology (OSHA requirement-Annual medical surveillance)	2 fibers per ml >5 microns, with a ceiling of 10 fibers/cc not to exceed 15 min per hr up to 5 hrs per 8 hr day	Millipore AA filter (OSHA requirement-Semiannual sampling)	Dependent upon concentration Positive pressure respirator Power filtered respirator Filter respirator Vacuum sweeping Local exhaust ventilation
BAUXITE (May contain silica)	Materials handling	Lung overload	Chest x-ray Lung function	10 mg/m^3 (4)	Gelman VM-1 filter	Air-purifying respirator with filter for nuisance dust
BERYLLIUM	Metal alloying	Fibrosis of lung; dermatitis	Chest x-ray Lung function Skin inspection	0.002 mg/m^3	Millipore AA filter ESP	Full-face respirators - positive pressure; Air-purifying with filter for highly toxic particulate and fume
BUTANOL	Solvent; present in fast drying paints or lacquers	Irritation of respiratory tract and mucous membranes; narcosis; dermatitis	Interval History	1000 ppm	Charcoal tubes Detector tubes	Air-purifying respirator with cartridge for organic vapors Rubber gloves

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KAISER ALUMINUM & CHEMICAL CORPORATION

OCCUPATIONAL HEALTH SURVEILLANCE CHARTS

Summary of ALL AIRBORNE CONTAMINANTS AND PHYSICAL STRESSES in Corporate Operations

MEDICAL AND INDUSTRIAL HYGIENE CONSIDERATIONS

Airborne Contaminant	Principal Use or Source of Emission	HEALTH EFFECTS	MEDICAL SURVEILLANCE (1)	TLV	Air Sampling(2)	Respiratory Protection or Other Controls(3)
BUTYL CELLOSOLVE (2-BUTOXY ETHANOL)	Solvent; present in fast drying paints or lacquers	Irritation of respiratory tract and mucous membranes; narcosis; dermatitis; red cell hemolysis	CBC	50 ppm	Charcoal tubes Detector tubes	Air-purifying respirator with cartridge for organic vapors Rubber gloves
CADMIUM OXIDE	Silver soldering and brazing	Pulmonary edema; fibrosis of lung; kidney damage	Chest x-ray Lung function *Cadmium and protein in urine Urinalysis	0.05 mg/m^3 (ceiling)	Impinger Millipore AA filter Nuclepore 0.45 micron filter	Air-supplied respirator or hood Air-purifying respirator with filter for highly toxic particulate/fume Local exhaust ventilation
CARBON DIOXIDE	Potrooms; anode baking pits; combustion sources; kilns	Asphyxiation	None	5000 ppm	Detector tubes	Air-supplied respirators Local exhaust ventilation General dilution ventilation
CARBON MONOXIDE	By-product of incomplete combustion in: potrooms, furnaces, internal combustion engines; inert gas furnaces; kilns; enclosed spaces, tanks & silos	Asphyxiation; disturbed consciousness	Interval Exam *Carboxyhemoglobin if intoxication suspected	50 ppm	Detector tubes Direct reading instrument	Air-supplied respirator or hood Universal canister gas mask

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KAISER ALUMINUM & CHEMICAL CORPORATION

OCCUPATIONAL HEALTH SURVEILLANCE CHARTS

Summary of ALL AIRBORNE CONTAMINANTS AND PHYSICAL STRESSES in Corporate Operations

MEDICAL AND INDUSTRIAL HYGIENE CONSIDERATIONS

Airborne Contaminant	Principal Use or Source of Emission	HEALTH EFFECTS	MEDICAL SURVEILLANCE (1)	TLV	Air Sampling(2)	Respiratory Protection or Other Controls(3)
CARBON TETRACHLORIDE	Fluorocarbon plant; laboratory reagent	Narcosis; liver and kidney injury	Liver function Urinalysis	10 ppm	Charcoal tubes Detector tubes Halide meter Gas chromatography	Air-supplied respirator or hood Air-purifying respirator with filter for organic vapors
CELLOSOLVE ACETATE (2-ETHOXY-ETHYL ACETATE)	Solvent; present in fast drying paints or lacquers	Irritation of respiratory tract and mucous membranes; narcosis; dermatitis	Interval history	100 ppm	Charcoal tubes Detector tubes	Air-purifying respirator with cartridge for organic vapors Rubber gloves
CHLORINE and CHLORIDES	Fluxing in casting operations; water treatment	Irritation of respiratory tract and mucous membranes; eye and skin burns	Chest x-ray Lung function	1 ppm	Detector tubes Impinger	Air-supplied hood Air-purifying respirator with cartridge for acid gases
CHLOROFORM	Fluorocarbon plant; laboratory reagent	Narcosis; liver and kidney injury	Liver function Urinalysis	50 ppm	Charcoal tubes Detector tubes Halide meter Gas chromatography	Air-supplied respirator or hood Air-purifying respirator with filter for organic vapors

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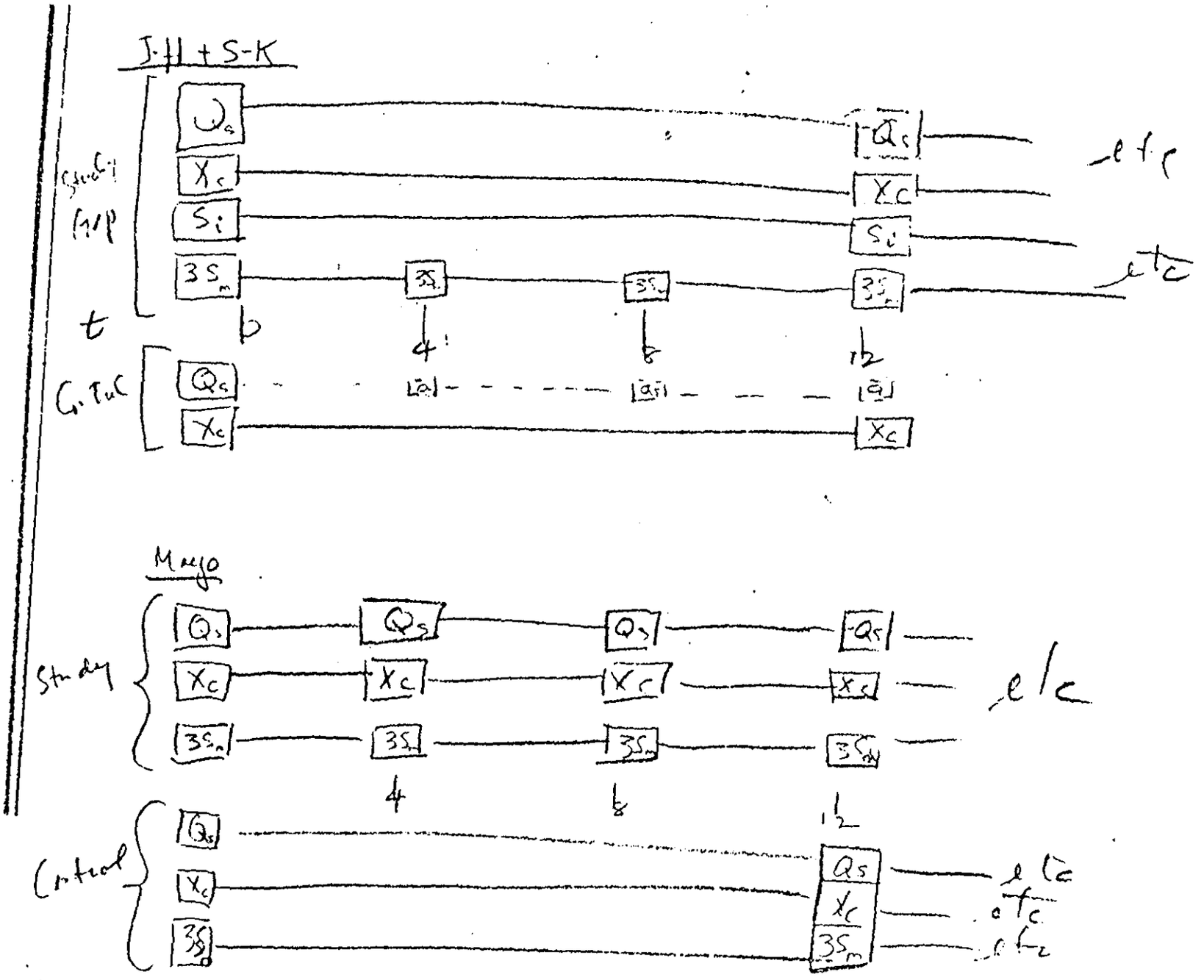
DESIGN OF HOPKINS-MAYO-SLOAN-KETTERING EARLY LUNG CANCER GROUP STUDY

I. Aims
   A. Can lung cancer detection be improved by adding sputum cytology to X-ray periodic exams?
   B. Can death rate be significantly reduced by cytology and X-ray followed by newer localizing methods?

II. Study Design
   A. Study population - persons at high risk (>20 cig./day)
      males ≥ 45 years
      females ≥ 55 years
      1. Mayo - general clinical exam program
         Sloan-Kettering } attendees of cancer clinics, periodic
         Hopkins } exams, etc. + certain occupationally defined group
   B. Time frames
      1. Program - five years minimum from time of entry
      2. Frequency of sputa + X-ray + questionnaire
         (a) Mayo - S+X+Q every four months
         (b) Sloan-Kettering } S every four months
         (c) Hopkins } X-ray every 12 months
   C. Controls
      1. Mayo - entry S+X+Q, suggested stop smoking, recommend annual X-ray + sputa for high risk
      2. J-H - } entry X-ray + questionnaire
      3. S-K - } entry X-ray + questionnaire

III. Other Questions Addressed
   A. Relative efficacy and concordance of X-ray & cytology
      1. Proportion dx by cytology with negative radiography?
      2. Proportion dx by radiography found cytology benign?
      3. Proportion dx simultaneous by x-ray & cytology?
      4. Relation of cell type to above proportions
   B. Proportion dx by cytology with negative X-ray that can be localized
   C. Survival efficacy
      1. With radiography negative and cytology dx and subsequently localized, what is 3-5 years survival study vs. control experience?
   D. Predictors of Adherence with Program
      1. Determinants = age? race? sex? smoking habits? symptoms? others?
   E. Problem of False Positives
      1. Proportion F-P as defined by surgical pathology, i.e., no tumor found
   F. False Positives and reproducibility
      1. Proportion of F-P as defined by non-malignant pathology or cytology, when read by same or other readers


J·H + S-K
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APPENDIX 4

INSTRUCTIONS FOR
SPUTUM INDUCTION BY AEROSOL INHALATION

Instructions: It is advisable not to eat for at least 4 hours prior to test.

A small quantity of sputum is normally produced in the bronchial tubes and lungs. The sputum contains cells which can be examined under a microscope. We do not want saliva, or spit, which accumulates in the mouth or postnasal drip from the nose and sinuses. To increase the quantity of sputum that you cough up, you will breathe moist air.

- You will be instructed and guided by a trained person.
- Remove any dental appliances before starting the test.
- Clear the back of your throat of mucus and rinse your mouth with water to remove saliva and any retained food particles.

A. Ultrasonic Isotonic Technique:

1. Set the timer for 1 minute.
2. Insert the mouthpiece into your mouth and breathe gently and normally.
3. After 1 minute of normal breathing of mist:

   3-Breath Deep-Cough Routine

   a. Breathe in through the mouthpiece as deeply as you can.
   b. Hold your breath for a moment.
   c. Remove the mouthpiece from your mouth.
   d. Place a tissue over your mouth.
   e. Breathe out forcefully through your mouth against the tissue.
4. Repeat this procedure (3a-e) one more time.
5. a. Breathe in deeply through the mouthpiece a third time.
   b. Hold your breath for a moment.

c. Cover your mouth with a tissue.

d. Cough forcefully and deeply.

6. Spit out everything from your mouth into the sample cup provided.

B. Heated-Mist Hypertonic Techniques

1. Insert mouthpiece in mouth and breathe deeply in and out through the mouthpiece. After a moment or two a rhythmic pattern of breathing is established.

2. The heated mist (15% saline and 20% propylene Glycol) is inhaled for 2 to 3 minutes (flexible timing).

3. At that time, or earlier if a desire to cough is indicated during the breathing period, inhalation is stopped and the subject is encouraged to cough until material is produced.

4. Regardless of whether a productive cough is achieved or not, this procedure is repeated several times more for a 10- to 15-minute period depending on the quality and quantity of the sample obtained.

During the test the subject is advised to keep his mouth tightly about the mouthpiece to prevent admixture of room air that lowers the efficiency of cough induction. The subject is also likely to breathe through his nose, and the technician, who is in attendance through-out the procedure, either compresses the subject's nostrils with his/her left hand, instructs the subject to compress his nostrils, or provides nose clips. The technician adjusts the flow of the nebulizer and the mouthpiece when necessary.

IV. BRONCHOSCOPY (ENDOSCOPY)

A. Introduction

1. When the chest roentgenograms identify a definite abnormality, diagnostic and therapeutic efforts can be directed to that local portion of the tracheobronchial tree.

2. Bronchography may indicate specific areas of abnormality or suspicion toward which attention should be focused.

3. If the radiographic studies are not diagnostic, but the cytopathologist reports that the sputum contains either markedly (gravely) atypical cells suspected of being cancerous or cells diagnostic of cancer, one is faced with the challenge of identifying their origin accurately.

B. Prebronchoscopic Routine or Preparation

1. Excessive bronchial secretions tend to interfere with accurate evaluations and create a special problem in the meticulous search for subtle mucosal changes.

2. Every effort should be made to reduce or eliminate bronchitis and bronchorrhea prior to endoscopy.

   a. Smoking should be discontinued and other respiratory irritants avoided for as long as possible prior to examination, preferably for at least 24 hours prior to examination.

   b. Patients may require antibiotic therapy in selected situations, e.g., in bronchitis with copious infected sputum.

   c. Preoperative use of bronchodilators and heated aerosols may be helpful, and postural drainage and chest physiotherapy should be utilized where it is anticipated that the presence of bronchial secretions may interfere with optimal bronchoscopy.

3. Atropine or scopolamine in therapeutic doses (from 0.6 to 2.0 mg) is essential as part of the preoperative medication. Atropine has been a more frequent choice.

C. Preoperative (Preanesthesia) Medical Evaluation

1. Since this localization effort and subsequent surgical treatment constitutes formidable procedures under general anesthesia, evaluation of the patient's general medical status is imperative.

2. Similar requirements are mentioned under Section V, paragraph D related to preoperative testing of pulmonary function.

3. Emphasis will naturally be placed on other significant illnesses or health hazards including cardiovascular disease, pulmonary disease and respiratory reserve, and known allergies.

4. Physical examination of head, neck, and thorax should be performed.

D. Examination of the Upper Respiratory Tract

1. Preliminary examination of the oral cavity, nasopharynx, oropharynx, and larynx by a larynogoligist or similarly trained observer is essential to identify any possible lesions in these areas.

2. The examination of the upper airway may be done as a separate procedure or at the same time as bronchoscopy.

E. Initial Bronchoscopic Examination

1. While topical anesthesia generally cannot provide sufficient patient comfort for a lengthy procedure, it has been found very satisfactory for cursory inspection of the main airway and larger bronchial segments.

2. The option of performing a brief initial examination of this sort will be at the discretion of the endoscopist, and will be based upon clinical assessment and patient acceptance.

F. Utilization of General Anesthesia

1. The duration and complexity of the comprehensive localization studies usually require general anesthesia.

2. Close cooperation between endoscopist and anesthesiologist is vital, and the anesthesiologist must be fully cognizant of the goals of the examination.

3. When it is desirable alternately to eliminate and to reestablish the cough reflex for the initial collection of secretions, sodium thiopental with high concentrations of oxygen and intermittent succinylcholine may be satisfactory. Otherwise, general inhalation anesthesia of the larynx and trachea plus adequate muscle relaxation may be used for this portion of the study.

4. Subsequent anesthesia for the completion of the study

will be administered as determined by the anesthesiologist with special attention to adequacy of ventilation.

5. Serial arterial blood gas determinations may help assess the adequacy of ventilation during the phase.

6. Postoperatively the patient is susceptible to bronchospasm and further respiratory acidosis. Observation in a postoperative recovery area, and appropriate treatment when necessary, should continue until the patient has fully recovered from the procedure.

G. Collect of Differential Bronchial Secretions

1. Before other instrumentation occurs, bronchial washings should be collected in such a manner that separation of specimens from the left and right sides can be assured. Currently, use of a rigid bronchoscope fitted with an inflatable cuff at the distal end is recommended.

2. Simultaneous irrigation and aspiration should be repeated 2-4 times on each side. Election of either intact cough reflex or muscle relaxation techniques shall be at the discretion of the anesthesiologist and endoscopist. After initial sampling from the left main bronchus the cuff is deflated. After an interval for ventilation in the trachea, the bronchoscope is repositioned in the right main bronchus, the cuff is reinflated, and the procedure repeated with clean lavage equipment.

3. Pulsatile-flow irrigation may be helpful but needs confirmation as to ultimate usefulness.

4. Currently available techniques are inadequte for accurate differential irrigation of upper and lower lobes but may be improved in the future.

H. Inspection of Tracheobronchial Tree and Documentation of Observations

1. The rigid bronchoscope is withdrawn following completion of the differential bronchial lavage, and a cuffed endotracheal tube with "T" adapter or a tracheoscope is inserted.

2. All accessible areas of the bronchial tree are then carefully inspected with a fiberbronchoscope. This examination will be recorded in its entirety on color videotape for documentation and later comparison. Simultaneous audiorecording is essential for orientation and later correlation.

3. Any mucosal lesions or suspicious areas should be documented by still photography as well.

4. In every case, visualization and recording should be extended to include at least the fourth generation bronchi, if possible.

I. Fluorescence Detection of Cancer

1. In those patients in whom hematoporphyrin derivative (Hp-D) has been injected (Mayo Group), endoscopic examination will include inspection with violet "activating" light using a fiberbronchoscope containing a special violet light carrier.

2. If characteristic fluorescence is encountered, its location should be recorded for subsequent detailed study.

3. Biopsies will be deferred until the entire bronchial tree has been examined for fluorescence.

J. Collection of Specimens for Cytologic and Histologic Study

1. Gross Abnormality Indentified

a. As a localized carcinoma becomes visible, it should be brushed first to secure material for cytologic examination.

b. Following this, biopsy material is obtained for histologic confirmation.

c. Equally important is collection of brushings and curettings, and biopsy of adjacent mucosal areas. This will assist the surgeon in planning subsequent resection. The bronchial spur proximal to the lesion is particularly critical in this regard.

d. Recognition of a specific lesion must not deter inspection of all other segments of both sides of the bronchial tree. The possibility of multiple or multifocal neoplasia must not be overlooked.

2. No Abnormality Visualized

a. This problem presents one of the greatest endoscopic challenges, demanding thorough visual examination and meticulous collection and labeling of material for cytologic and histologic examination.

b. Bronchial brushes should be guided under direct vision into each bronchial segment and into as many subdivision bronchi as possible.

c. The bronchoscope is withdrawn after each brushing in order that the brush retain as much material as possible.

d. Each brush is applied to glass slides which are immersed immediately in fixative. (An alternate approach is to dislodge the specimen into Hank's solution for laboratory processing as soon as possible.)

e. The advent of disposable brushes offers the possibility of cutting off the entire brush for subsequent processing, thus minimizing loss of cellular material.

f. The operator may also obtain curettings from the segmental bronchi.

g. "Spur" biopsies from various sites should be obtained in a specific predetermined pattern, employing either antegrade- or retrograde-loaded flexible forceps. These biopsies are particularly important since carcinoma in situ can be more accurately localized by biopsy than by brush sampling.

K. Correlation of Bronchoscopic Observations with Other Diagnostic Studies

1. Accurate assessment of all available data requires close surveillance by all members of the team involved in lung cancer detection and localization. The radiologist, cytopathologist, endoscopist, and surgeon must all participate in evaluating results and planning treatment.

2. Hopefully, the detailed localization procedure will enable initiation of specific treatment at this point in the sequence of investigations, but in selected circumstances, it may be necessary to repeat portions of the examination. The choice, sequence, and timing of additional procedures must be determined on an individual basis depending on review of all earlier studies and correlation with other clinical data.

VI. PATIENT MANAGEMENT

A. Management of Persons with Negative Chest Radiograms According to Results of Sputum Cytologic Testing: (see Chart 1 Sputum Cytologic Result Flow Chart)

1. Persons with sputum specimens that are either negative (NEG) for cancer cells or exhibit only slight cellular atypia (SLI) will submit the appropriate follow-up specimen in 4 months.

2. All those with moderately atypical cells (MOD) in the sputum will submit more specimens for cytologic examination at once. The additional material obtained will include a 3-morning "pooled" spontaneous-cough specimen, and, if possible, induced sputum specimens.

   a. If moderately atypical cells (MOD) are again encountered, the cytopathologist will review all previous specimens, and based on all specimens a summary classification will be made to serve as the basis for further decision making.

   b. If the next two sputum examinations are negative (NEG) for cancer cells or show only slight (SLI) cellular atypia, the regular 4-month follow-up schedule will be resumed.

3. Those whose sputum is found to contain cells exhibiting marked (grave) atypia (GRA) or suspicions of carcinoma (SUS) will be reevaluated at once. Whenever possible, the reevaluation will include examination of induced sputum.

   a. If the reevaluation confirms the finding of marked (grave) atypia (GRA) or suspicions of carcinoma (SUS) or reveals cancer cells (CAN), a full localization workup will commence, as described in Section IV, Bronchoscopy. If a cancer is not found during this workup, the individual will be placed under continuing reevaluation with further localization studies on a frequently recurring basis or as dictated by subsequent findings until his situation is resolved.

   b. If the reevaluation discloses only a moderate degree of cellular atypia (MOD) or less, multiple sputum cytologic examinations and evaluations will be required to resolve the problems.

4. Any person whose sputum contains frankly cancerous cells (CAN) will be immediately recalled for induced sputum studies and for comprehensive localization workups on a frequently recurring basis, until the site of the cancer is identified.

B. Management of Persons with Negative Sputum Cytology Tests According to Results of Chest Radiographic Examinations

1. Persons whose chest radiographs are deemed to be negative will continue with follow-up.

2. Patients whose chest radiographs are deemed unsatisfactory will have repeat radiographs at once.

3. Patients whose radiographs are determined to be suspect (SUS OR SN_1) will have a review of all the patient's previous radiographs and sputum cytology tests, as well as clinical history and physical examination.

   a. Repeat radiographs may be taken to aid in the decision.

   b. If the results are deemed to indicate a negative status, the patient will continue with follow-up.

   c. If the results are considered to be suspicious but probably not cancer, the patient will be seen in 2 months (approximately).

   d. If the results are considered to indicate cancer, the patient will receive appropriate confirmatory and localizing studies.

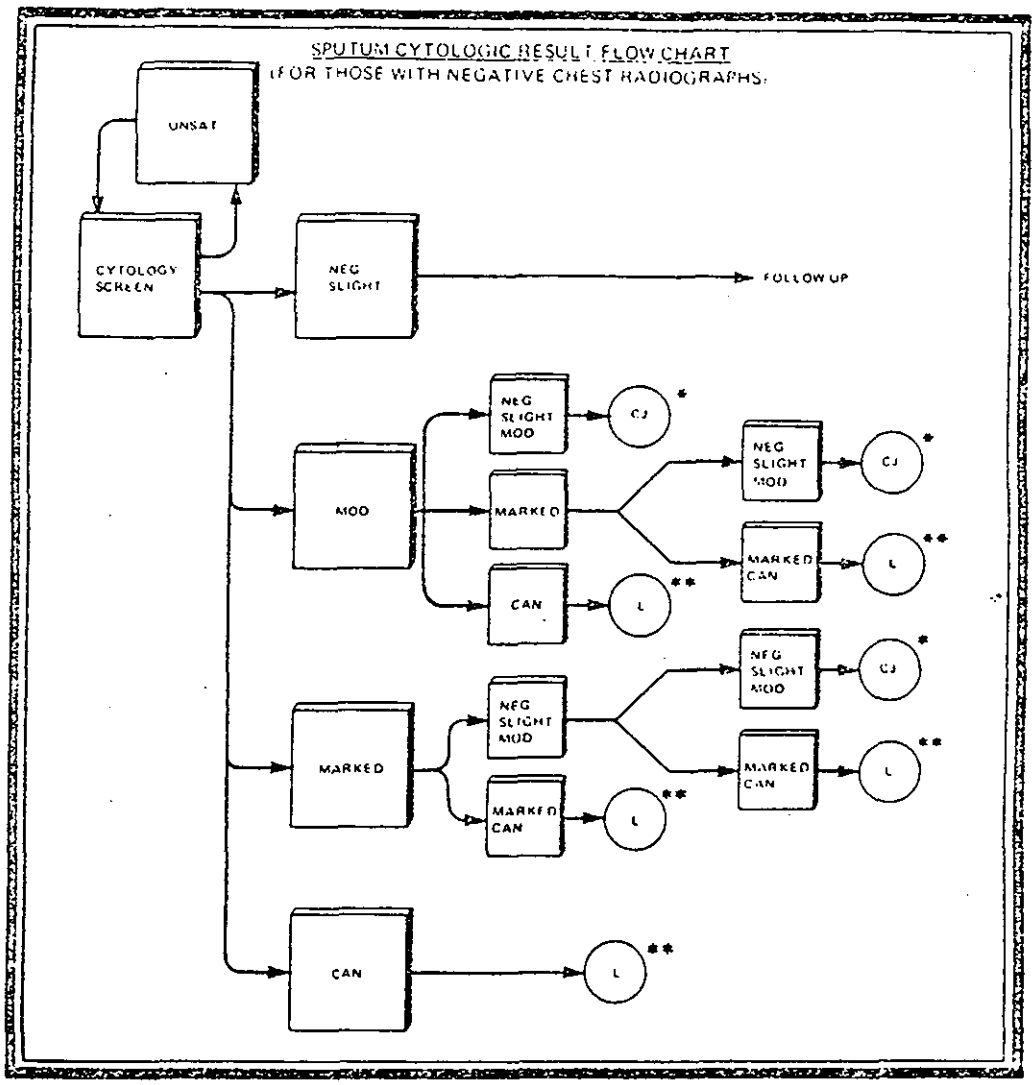
4. Patients whose radiographs are considered to be indicative of cancer (CAN or SN_2) will receive additional diagnostic studies as indicated.

C. Management of Persons with Negative Cytologic and Radiologic Examinations According to Results of Clinical Information

1. Patients whose history is suggestive of cancer will have a thorough history and physical examination and will receive such additional diagnostic studies as may be indicated.

2. All information available can be used in reaching a decision in this particular group of patients (Group C).

CHART I



* CJ = CLINICAL JUDGEMENT - APPLIES [illegible] OF ALL [illegible] PHYSICAL EXAMINATION WILL BE DONE.

** L = LOCALIZATION INCLUDES PHYSICAL EXAMINATION AND IS USUALLY CALLED FOR BY ANY 1 CANCER SPECIMEN OR ANY 2 "MARKED" SPECIMENS

Kaiser Aluminum & Chemical Corp.
Oakland, CA 94643
J.P. Hughes, M.D., Medical Director
N.H. Proctor, Ph.D., Toxicologist

Category 3
(Reduction Plants - Hourly)

GUIDE TO PLANT MEDICAL SURVEILLANCE EXAMINATION

POLICY

The Corporation will provide annual medical surveillance examinations of those workers exposed to toxic substances or defined physical hazards such as noise and heat stress.

PURPOSE

To judge whether or not the health of the worker is being adversely affected by the work and conditions of work.

SCOPE OF EXAMINATION

Scope is determined by the nature of exposure to chemical or physical hazards for specific jobs by means of industrial hygiene assessment.

See KACC Medical Surveillance Requirements, pages C-3 to C-6 following, for scope of periodic examination listed by chemical and physical stress exposures.

For all employees who regularly drive KACC vehicles of 10,000 pounds GVW or greater on public roads or who drive KACC vehicles that carry hazardous materials on public roads, the scope of their examination has been determined by the U.S. Department of Transportation, and is reproduced on KACC 6706 (See at end of this Section.)

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EXAMPLES OF MEDICAL SURVEILLANCE

Example 1. No chemical or physical stress exposure
No driving of KACC vehicles on public roads
(See page C-1)

MEDICAL SURVEILLANCE = None

Example 2. Driver of certain KACC vehicles on public roads
(See page C-1)

MEDICAL SURVEILLANCE = Department of Transportation exam
EVERY OTHER YEAR

Example 3. Exposure: potroom atmosphere (fluoride, PPOM, heat)
noise (85 dBA for 8 hours)

MEDICAL SURVEILLANCE = Interval history
ANNUAL
- Physical exam (height, weight, blood pressure)
- Laboratory (blood - hemoglobin or hematocrit; urine - screening test of sugar, protein, blood, fluoride)
- Lung function
- Chest X-ray
- Smoking history
- Complete blood count
- Skin exam
- Sputum cytology
- Fluoride in urine
- Electrocardiogram
- Audiometry
- AP X-ray of pelvis - every 6 years (See page B-10)

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KACC MEDICAL SURVEILLANCE REQUIREMENTS

I. By Chemical Exposure:

NIOSH RECOMMENDATION - prior to assignment to a work area where exposure to the chemicals named below will be above 0.5 times the 8-hour time-weighted TLV, additional tests as listed below, if not already being performed, are required before exposure occurs and at yearly intervals. (Note: Asbestos exposure at 0.1 fiber/cc or greater requires tests listed below for asbestos.) Use KACC 560 and 567 for preplacement exams and forms listed below for annual exams.

Substance	Medical Tests
Acetone	1
Alumina	1
Ammonia	1, 2, 3
Antimony pentachloride.	1, 2, 3, 4
Asbestos	1, 2, 3, sputum cytology
Bauxite (may contain silica) .	1, 2, 3
Beryllium	1, 2, 3, skin exam
Butanol	1
Butyl cellosolve . . .	1, 2, Complete Blood Count (CBC)
Cadmium oxide	1, 2, 3, cadmium in urine
Carbon monoxide	1, 2, carboxyhemoglobin if intoxication suspected
Carbon tetrachloride .	1, 2, liver function

1	KACC 564	Interval history
2	KACC 568	Physical exam - describe by systems
	KACC 561	Height, weight, blood pressure, vision;
	" "	Laboratory - blood: hemoglobin or hematocrit
	" "	urine: sugar, protein, blood (screening test)
3	KACC 561	Lung function (FVC, FEV-1.0 sec)
		Chest X-ray
	KACC 567	Smoking history
4		Electrocardiogram

Substance	Medical Tests
Cellosolve acetate	1
Chlorine and chlorides	1, 2, 3
Chloroform	1, 2, liver function
Chromates (lead & zinc)	1, 2, CBC
Chromic acid	1, 2, 3, CBC
Chromite ore	1, 2, 3
Coke and calcined coal	1
Copper fume and dust	1
Cyanide	1, 2
Epoxy resin	1, 2, skin inspection
Ethyl acetate	1
Fluorides	1, 2, 3, Fluoride in urine; AP X-ray of pelvis - every 6 years (see page B-10)
Fluorocarbons	1
Hexane	1, 2, neurologic exam
Hydrogen chloride	1, 2, 3
Hydrogen sulfide	1, 2, 3
Graphite	1, 2, 3
Isophorone	1
Lead	1, 2, neurologic exam, CBC, lead in blood/urine
Lime (Hydrated)	1

1	KACC 564	Interval history
2	KACC 568	Physical exam - describe by systems
	KACC 561	Height, weight, blood pressure, vision;
	" "	Laboratory - blood: hemoglobin or hematocrit
	" "	urine: sugar, protein, blood (screening test)
3	KACC 561	Lung function (FVC, FEV-1.0 sec)
		Chest X-ray
	KACC 567	Smoking history
4		Electrocardiogram

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Substance	Medical Tests
Lime (Quicklime)	1, 2, 3, skin exam
Magnesium oxide	1
Manganese fume	1, 2, 3, neurologic exam, CBC
Mercury	1, 2, neurologic exam, mercury in blood/urine
Methanol	1
Methyl chloroform	1
Methyl ethyl ketone	1
Methyl isobutyl ketone	1
Nitric acid	1, 2, 3
Nitric oxide/ Nitrogen dioxide	1, 2, 3
Nuisance dust	1
Oil mist particulate	1
Ozone	1, 2, 3
PPOM/CTPV	1, 2, 3, CBC, skin exam, sputum cytology
Perchloroethylene	1, 2, liver function
Phosgene	1, 2, 3
Phosphine	1
Phosphoric acid	1
Polychlorinated biphenyls	1, 2, liver function, skin exam

1	KACC 564	Interval history
2	KACC 568	Physical exam - describe by systems
	KACC 561	Height, weight, blood pressure, vision;
	" "	Laboratory - blood: hemoglobin or hematocrit
	" "	urine: sugar, protein, blood (screening test)
3	KACC 561	Lung function (FVC, FEV-1.0 sec)
		Chest X-ray
	KACC 567	Smoking history
4		Electrocardiogram

Substance	Medical Tests
Silica	1, 2, 3, tuberculin skin test
Sodium hydroxide mist	1, 2, 3
Sodium silicate	1
Stoddard solvent	1
Sulfur dioxide	1, 2, 3
Sulfuric acid	1, 2, 3
Toluene	1, urinalysis for hippuric acid
Trichloroethylene	1
Vinyl chloride	1, 2, 3, serum: total bilirubin, alkaline phosphatase, SGOT, SGPT, gamma glutamyl transpeptidase, etc.
Welding fume	1, 2, 3
Wood dust	1, 2, 3, skin exam
Xylene	1, 2, CBC, liver function

By Physical Stress Exposure

Stress	Medical Tests
Noise (85 dBA for 8 hours)	Audiometry
Heat	1, 2, 4
Radiation	1, 2
Vibration	1, 2

1	KACC 564	Interval history
2	KACC 568	Physical exam - describe by systems
	KACC 561	Height, weight, blood pressure, vision;
	" "	Laboratory - blood: hemoglobin or hematocrit
	" "	urine: sugar, protein, blood (screening test)
3	KACC 561	Lung function (FVC, FEV-1.0 sec)
		Chest X-ray
	KACC 567	Smoking history
4		Electrocardiogram

*Biologic Monitoring for F:

Urinary postshift F analysis shall be made available at an interval not exceeding every 3 months to at least one-fourth of all workers subject to occupational exposure to inorganic fluorides. Participating workers shall be rotated to provide all exposed workers the opportunity for urinalysis every year. Spot urine samples shall be collected at the conclusion of the workshift after 4 or more consecutive days of exposure. Urinary preshift F analysis shall be made available to all exposed workers at least annually. Preshift spot samples shall be collected at the start of the workshift at least 48 hours after a previous occupational exposure. Results shall be corrected for a specific gravity of 1.024.

If an individual's postshift urinary F level exceeds 7.0 mg/liter, preshift spot urine samples shall be collected within 2 weeks at the start of a workshift at least 48 hours after a previous occupational exposure and a repeat postshift spot sample shall be collected at the conclusion of the workshift. This shall be done at the end of the workweek in which the preshift sample is collected. If the F level of the second sample is above either the preshift limit of 4.0 mg/liter or the postshift limit of 7.0 mg/liter, steps shall be taken to evaluate dietary sources, personal hygiene, basic work practices, and environmental controls.

In case the group (job classification) median postshift urinary F levels exceed 7.0 mg/liter, the working environment shall be evaluated through an industrial hygiene survey and steps shall be taken to ensure compliance with the environmental limit. Urinary F analyses shall be performed monthly until the cause of elevated urinary F has been corrected as demonstrated by a return of the group median to a value not exceeding 7.0 mg/liter. The primary method of control will be engineering and work practices. Use of administrative controls for the individual or group can also be considered.

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*National Institute for Occupational Safety and Health, U.S. Department of Health, Education, and Welfare: Criteria for a recommended Standard....Occupational Exposure to Inorganic Fluorides, HEW Publication No. (NIOSH) 76-103, U.S. Government Printing Office, Washington, D.C., 1975.

*Schedule for Sputum Cytology

Potroom, Carbon Plant, Rodding, Pot Repair, Casting
(Ravenswood Casting not included)

For all employees who are employed in the above areas or who are otherwise exposed to Particulate Polycyclic Organic Matter/Coal Tar Pitch Volatiles for at least 30 days per year, the Corporation will provide the opportunity for a cytologic examination of sputum at the time of job placement. Thereafter, sputum cytology examinations shall be conducted annually for employees with five or more years of exposure to PPOM/CTPV or who are 45 years of age or older. Specimens are to be collected only by personnel trained for this purpose. Selection of pathology laboratory will be made by James P. Hughes, M.D., Corporate Medical Director.

Any employee who refuses the sputum cytology examination shall be informed of the possible health consequences, and may be asked to sign a statement indicating that he/she understands the risk involved in the refusal to be examined.

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*The above schedule for sputum cytology is adapted from the Coke Oven Emission Standard, Federal Register, Vol. 41, No. 206 - Friday, October 22, 1976, pp. 46742-46790.