JUL 28 1986

Northwestern University Medical School
DEPARTMENT OF MEDICINE
W. G. KRUMMRICH STUDY

July 24, 1986

James H. Spraul, M.D.
Monsanto World Headquarters
Building G
800 N. Lindbergh Blvd.
St. Louis, MO 63167

Dear Dr. Spraul:

Enclosed, is an interim report summarizing our recent progress in the Northwestern University project concerning worker health among former and current employees of the Monsanto W.G. Krummrich plant.

Sincerely,

Warren H. Wallace, M.D.
Principal Investigator

WHW:adw

Copy to: Dr. Roush
[redacted]
Gary Smythe

DSW 476038.1353

215 E. CHICAGO AVENUE, SUITE #801, CHICAGO, IL 60611 • (312) 908-7373

Northwestern University

Department of Medicine

W.G. Krummrich Study

Interim Report

Submitted by

Warren H. Wallace, M.D.

Principal Investigator

July 1, 1986

DSW 476038.1354

STLCOPCB4043505

The purpose of this interim report is to summarize the progress of the Department of Medicine of Northwestern University in the conduct of the "Epidemiologic investigation of the health status of Monsanto employees with past exposure to chlorophenols, chlorophenoxy acids, and their dioxin contaminants at the W.G. Krummrich plant in Sauget, Illinois."

The data collection phase is nearly complete. The health examination component was conducted from February 27, 1986 to May 16, 1986 in Collinsville, Illinois at the Hilton Hotel. One wing of the second floor of this hotel was reconverted into an examination facility. One small meeting room on the first floor of the hotel, near the lobby, served as a room for registration and was re-set during the day by hotel staff into a breakfast area, lunch room, and check-out area according to a pre-established daily schedule. In addition, an X-ray van leased from St. Louis University was parked in close proximity to the entrance of the examination floor and a screened walkway to protect study subjects from the weather was constructed by hotel staff. Appendix A summarizes the specific laboratory and clinical evaluations conducted on participating subjects.

A total of 827 randomly selected individuals who were eligible for the study were examined. Of these, 95% were males and 5% were females. With respect to race, 86.% were white. Of the examined eligible sample, 24% were less than 45 years of age, 31% were between 45-59 years of age, and 45% were 60 years old or over. The employment status of the examined group were as follows: active worker, 30%; transferred, 7%; terminated, 41%; and retired 22%. Nearly 9% worked less than one year for Monsanto.

When evaluating the characteristics of the examined eligible group, 485 (59%) were in the "exposed" group and 343 (41%) were in the "non-exposed" group. The examined exposed group was 89% white and 97% male. Five percent worked less than one year for Monsanto. The age distribution of the "exposed" group was as follows: 15%, less than 45 years of age; 35% were between 45-59 years of age, 50% were 60 years old or over. The "non-exposed" examined group was 82% white and 92% male. Fourteen percent worked less than one year for Monsanto. The age distribution was as follows: 35%, less than 45 years of age; 26%, 45-59 years of age; and 39% were 60 years old or over. The examined, eligible "exposed" and "non-exposed" group were comparable in terms of employment status for the active and transferred categories. The two groups differed in terms of the proportion terminated and retired ("exposed": 30% terminated, 33% retired; "non-exposed": 57% terminated, 7% retired). A similar difference existed between the two groups in the overall worker population from which the sample was drawn. These factors will require statistical adjustment in the data analysis.

Activity at the Northwestern University Statistical Center in Chicago focuses on data coding and entry, and computerized checks of data entered (See Appendix B which summarizes the organization of the data). To date, the following data sets have been entered onto the computer by the Center's data entry staff: Internal medicine, dermatology, and neurology examinations; blood pressure results, T & B cell evaluations, urinary porphyrin data and intake interviews. Sampling procedures indicate that less than a .1% keypunch error rate exists, which is well within accepted standards for quality control of data entry. In addition to local data entry efforts, data

received from other labs or computer stored in other forms are being merged into a master data set on a large mainframe (IBM 4341). Data on magnetic tape have been received for the pulmonary function tests (Northwestern Memorial Hospital, Chicago) and subject blood and routine urine tests (Smith-Kline Bioscience Laboratory, St. Louis). Data entered at the exam site or at an external reference laboratory on floppy or hard disks (neurobehavioral exams, thermal and vibration sensitivity testing, apoprotein values from Washington University) are being uploaded onto the same mainframe for evaluation and storage.

Coding of diet diaries,(Northwestern University and University of Illinois, Chicago), chest X-rays (Northwestern University), and portions of the medical history and occupational/environmental history forms are in process. Coding of electrocardiograms by the University of Minnesota, Minneapolis has recently been completed. Interviews of spouses and partners of eligible examined subjects continues by the Survey Research Laboratory (University of Illinois, Champaign-Urbana). Approximately 700 of these interviews have been completed. The hospitalization records of the examined eligible workers are being obtained by Northwestern University staff to verify reported medical conditions. Concurrently, the birth records of the offspring born to these individuals also is underway.

Verification of select data from plant records, namely work history, exposure levels, and the presence of chloracne will proceed over the next three to four months.

APPENDIX A

LABORATORY AND CLINICAL EVALUATIONS PERFORMED

BLOOD TESTS:

Albumin
Alkaline phosphatase
Bilirubin, total
Creatinine
GGT
LD
SGOT
SGPT
BUN
Protein, total
Glucose
Uric Acid
Calcium
Phosphorus
Sodium
Potassium
Chloride
Immunoglobulins
    Immunoglobulin A
    Immunoglobulin G
    Immunoglobulin M
Follicle stimulating hormone
Luteinizing hormone

Complete blood count with differential

Creatinine kinase

Triglycerides
Cholesterol
LDL-Cholesterol
Chylomicrons
HDL-Cholesterol

Prothrombin time

Testosterone

T3 Uptake
Thyroxine (T4)
Thyroid-stimulating hormone

Lymphocyte stimulation by multiple mitogens (PHA, Con-A, Pokeweed)

BLOOD TESTS (CONT'D)

T and B cell evaluation (Leu 12, Leu 4, Leu 3, Leu 2)

Ferritin

Apoproteins: AI, AII, E, B

URINE TESTS:

Creatinine

Routine (specific gravity, pH, protein, glucose, ketones, bilirubin, blood, color, appearance, microscopic)

D-glucaric acid (random)

Porphyrins

OTHER:

Electrocardiogram

Chest X-ray (AL)

Pulmonary function test

Thermal and vibration sensivity test

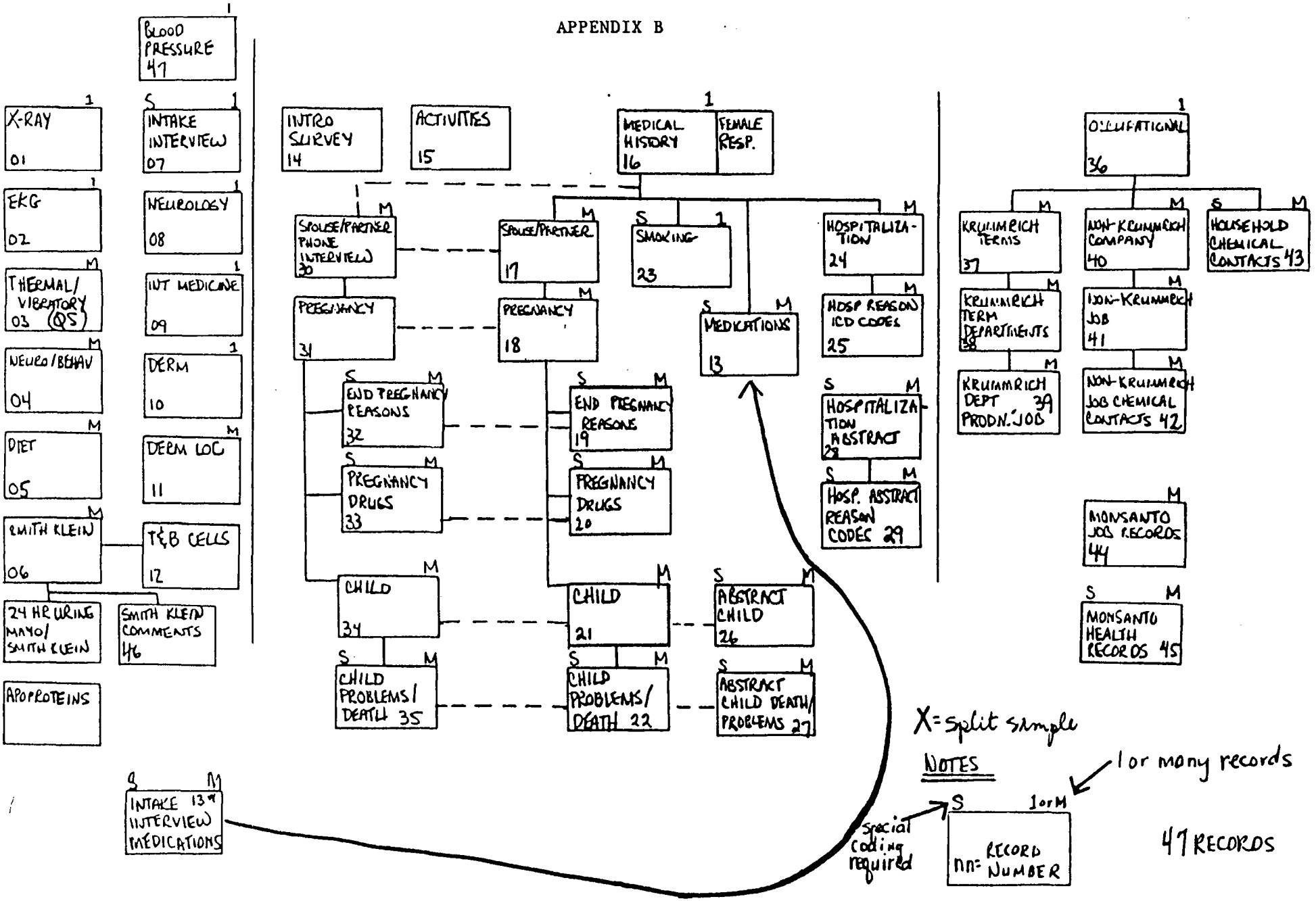
Neurology exam

Dermatology exam

Internal Medicine exam

Northwestern University
W.G. Krummrich Study
Organization of Computerized Data Base

APPENDIX B



DSW 476038.1360
STLCOPCB4043511