

TABLE 1
Selection and study participation frequencies
among families with husbands never exposed
or potentially exposed to dioxins during
production operations at the Dow Chemical
Company Michigan Division Site,
Midland, Michigan, 1939-1975

Status	Exposed group	Unexposed group
Male employees identified as being unexposed or potentially exposed to dioxins	930	930
Employee deceased	125	119*
Employee widower or single	97	84
Family residing outside area	95	126
* No address available (presumed living)	27	42
Wife eligible for interview	586	559
No response	18	19
Refused	198	194
Interviewed	370	345*

* It was discovered during the interviews that one woman was widowed, and two others thought to have unexposed husbands were misclassified. Interviews from the two latter were not used, so only 345 of the control interviews were analyzed.

centrated mainly within a caustic insoluble oil layer. The sodium trichlorophenolate then was acidified and the resulting 2,4,5-trichlorophenol distilled. In late 1963, a change was made in this process and shortly thereafter a number of employees contracted chloracne. Operations were then modified to minimize exposures. In 1966, 2,4,5-trichlorophenol production was transferred to a new building where new equipment and controls, including automated oil layer dumping, greatly reduced the potential for exposures.

Estimation of exposures was made by an industrial hygienist who was familiar with the processes described above. Based on his experience, information provided by production personnel and surface contamination data, the industrial hygienist estimated exposure potential of jobs within each building in the 2,4,5-trichlo-

rophenol or pentachlorophenol processes. Surface contamination data consisted of wipe tests analyzed by rabbit ear bioassay prior to 1964 and by gas chromatography and mass spectroscopy since 1964. It was presumed that most exposures would have been by skin contact.

Each job was assigned an exposure potential on a scale of low to high for TCDD, for all other dioxins, or for mixed exposures. Jobs involving drying, grinding and packaging of pentachlorophenol and its salt were considered to have had exposure to dioxins other than TCDD. Jobs categorized as low TCDD exposure included 2,4,5-trichlorophenol packers and most 2,4,5-trichlorophenol production operators. The category of moderate TCDD exposures was assigned to mechanics and janitors and to certain operators in 2,4,5-trichlorophenol production and to still operators in the 2,4,5-trichlorophenol distillation area. High potential TCDD exposure was assigned to all jobs involved in the 2,4,5-trichlorophenol process area in late 1963 through 1964, which was when the cases of chloracne occurred (25, 26).

Collection and analysis of data

After cooperation of the local labor union had been obtained, a letter explaining the purpose of the study and requesting a personal interview was mailed to the residence of each living exposed and control population member residing in Midland or adjacent counties. Appointments were made with those women willing to be interviewed. If an employee was a widower or single, or if the response indicated the wife did not wish to be interviewed, no further action was taken. However, if there was no response after several days, a phone call was made to re-explain the intent of the study and to encourage participation. Arrangements were made with those who agreed to be interviewed. No deliberate attempt was made to determine why women did not