PLAINTIFF'S EXHIBIT
DOW-172

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APPENDIX F

VALIDATION OF DOW WORK HISTORIES OBTAINED FROM INTERVIEWS

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This study provided a rare opportunity to validate work histories obtained from interviewing subjects or their next-of-kin. Respondents were asked to provide a complete history of the subject's job assignments at Dow, Texas Division and any chemical or physical agents encountered on those jobs. This was in addition to information requested about jobs and exposures outside of Dow. The work histories obtained from interviews were coded using the same system used to code documented work histories and were then compared with the records of job assignments maintained by the company. Chemical and physical agent exposures listed by the respondents were compared with the exposure profiles developed by the industrial hygienists.

Respondents listed 248 separate departments, 242 different job titles and 96 chemical or physical agent exposures for the 734 subjects on whom interview data were available. This compared with the 417 departments, and 542 job titles listed in company records and 175 different chemical or physical agent exposures catalogued by the industrial hygienist for those same subjects. It is obvious from this, that the respondents were not able to provide the same level of detail that exists in the company records and as the industrial hygienist was able to provide. Even so, such detail may

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not be required to correctly classify the exposures of subjects. To investigate this further, departments listed by the respondents were grouped into the 50 work areas described in Chapter III (and listed as Appendix D). Whether a subject had been classified as having worked in each of the 50 work areas was then checked between the two sources using the company record as the gold standard. False positives, wherein the respondent reported exposure, but there was no evidence of exposure in the record, were exceedingly rare and thus the specificity of the interview data can be regarded as nearly 100 percent. However, false negatives, wherein the respondent failed to list an assignment in the record, were quite common. Overall, the sensitivity of the interviews was 43.5 percent. This varied little between the case and control groups: cases = 44.2 percent; control Series 1 = 41.5 percent and Control Series 2 = 44.7 percent. There was considerable variation by work area, however. For instance, job assignments in Magnesium were recalled quite well (64.8%), whereas job assignments in Maintenance were recalled poorly (23.2%).

It was suspected that recall of work histories might be influenced by such factors as the type of respondent (self, spouse or other), elapsed time from the date of last employment at Dow to the date of the interview (<10 years, 10-19.9 years, and 20 or more years) and the duration of assignment to the work area (<1 year, 1-4.9 years, and 5 or more years). The effect of each of those factors on the sensitivity rate was then explored.

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Respondent type had some effect, although not to the degree that was suspected a priori. When the respondent was the subject himself, 47.3 percent of work area assignments were recalled. This compared with 42.4 percent and 42.5 percent among spouses and other types of respondents, respectively. Elapsed time since last job assignment had no material effect, whatsoever: <10 years = 44.7 percent, 10-19.9 years = 41.5 percent, and 20 or more years = 44.2 percent. The most important determinant of successful recall was the duration of the assignment, <1 year = 25 percent, 1-4.9 years = 49 percent and 5 or more years = 57.9 percent. When the respondent was the subject himself, and the jobs assignments were of 5 years duration or longer, recall improved to 65.0 percent.

As might be expected, reporting of chemical and physical agent expsoures was abysmal. Overall, recall of past exposures was only 2.6 percent sensitive, meaning that the respondents failed to report the overwhelming majority of chemical and physical agent exposures. There was some variation in recall between the case and control groups with control Series 2 having recalled 4.2 percent of exposures whereas the cases and control Series 1 recalled 2.4 percent and 1.2 percent, respectively. Many of those exposures were trivial, of course, and the respondents were able to recall some better than others. For instance, 8.6 percent of asbestos exposures were recalled successfully, and recall of chlorine exposure was 10.6 percent. Among the more poorly recalled exposures were carbon tetrachloride (2.6 percent), and sulfur

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dioxide (0.7 percent). There were 11 respondents who misclassified unexposed subjects as having been exposed to asbestos (specificity = 98.1 percent). Some of the exposures listed by respondents were quite interesting. For instance, two respondents reported exposure to "Agent Orange". "Agent Orange" was never produced or formulated at the Texas Division and thus, it must be presumed that the recall of the respondents was influenced by the extensive media coverage associating Dow with "Agent Orange".

Recall of chemical and physical agent exposures was influenced by type of respondent (self = 4.9%, spouse = 1.5%, other relative = 1.8%), duration of exposure (<1 year = 0.8%, 1-4.9 years = 2.1%, and 5 or more years = 4.2%) and by the elapsed time from last job at Dow to interview (<10 years = 4.4%, 10-19 years - 1.5%, and 20 or more years = 2.5%).

The degree to which respondents failed to successfully recall past job assignments and exposures was not unexpected. There have been few attempts to validate work histories obtained in the context of health studies. Steenland and Beaumont (1984) recently compared the known occupation and industry of 3,789 individuals with information on their death certificates. They focused their analysis on 2,198 long-term workers who had 10 or more years of work experience and found that the probability of the known occupation being listed on their death certificate was 64.7 percent.

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Baumgarten et al (1983) compared names of reported employers with those recorded in the data bank of the Canadian government-run quasi-universal Pension Plan for 297 subjects interviewed between 1979 and 1981 in the context of a case-control study on occupational factors and cancer. Employee names were validated for a 13-year period, 1966-1978. The authors found 64.3 percent agreement in employer names from the two sources for the entire 13-year period.

The present validation differs in important ways from those undertaken in the two studies just discussed. Firstly, instead of validating only usual occupation, an attempt was made to validate all jobs held at Dow. It could be expected that some jobs will have been overlooked by the respondent, especially if many jobs had been held. Secondly, in addition to validating job titles, departmental assignments and chemical and physical agent exposures were also included. The more detail that is requested of respondents, the greater the likelihood that some details are forgotten or were not known to begin with. Finally, an attempt was made to assess the impact of exposure misclassification by measuring the sensitivity of recall as it is related to two exposure variables used in this case-control study, work area and chemical and physical agent exposure.

There were several characteristics peculiar to the interview process employed in this investigation which may have adversely

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affected recall of respondents. A telephone interview was done. By necessity, telephone interviews are brief, and it may not be possible to obtain the respondents undivided attention. The respondent is less able to consult with records or other sources to stimulate his or her memory. A face-to-face interview may have been able to provide a more satisfactory recall.

The questionnaire itself included a series of open-ended questions designed to elicit a chronologic listing of all jobs, departments, and agent exposures relating to the subject's Dow career. Prior to beginning the interview, the respondent was reminded that the subject had worked at Dow, and the dates of first and last employment were given. This had to be done in order to confirm the identity of the subject and to solicit cooperation. Respondents were prompted to list chemical and physical agent exposures; however, at no time did the interviewers suggest job titles, departments, or specific agents. The use of closed-ended questions, similar to the list of non-Dow occupations and agents included with the questionnaires, may have stimulated recall and improved the performance of the respondents. Future investigations should investigate the influence of different interview formats and of closed-ended questions.

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