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September 13, 1993 RE: ETI #90227

Mr. Dennis Reich
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Attorneys at Law
4265 San Felipe, Suite 1000
Houston, Texas 77027

SUBJECT: Richard

Dear Mr. Reich:

I appreciate the opportunity to review this interesting case. My opinions are based on the information and records supplied by your office, my tour of the Ethyl facility, the scientific literature and other references generally relied upon by members of my profession and my experience.

Based on our discussions, I have focused my efforts on the following areas:

- Mr. Richard's exposure to various chemicals within his work areas.
- Warnings and training provided to Mr. Richard.
- Industrial Hygiene practices of Ethyl.

Mr. Richard's records indicate he was hired by Ethyl in January 1969 as a laborer in the maintenance section. It appears he progressed through machinist trainee to his final classification of outside machinist, which he held until mid 1985, when he was placed on extended disability leave.

The record does not provide a complete picture of all the places Mr. Richard worked during his employment at Ethyl. However, at least the following areas have been identified from a variety of sources on the record:

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- Specialties Area (CHA)
  - Offload Rail Cars
- SAS
- Ship Dock Area
  - Blockhouse
- Tank Farm
- Terminal & Utilities (T&U)
  - Brine Pumps
- HB-2 Operating Area
- All Over/All Plant

The record also does not provide a clear picture as to the tasks he performed during his employment. One of Mr. Richard's coworkers, Mr. K. Atkinson, in his deposition, describes the tasks an outside machinist would do included fixing everything that broke, except anything electrical. This included taking in and out of service pumps, valves, lines, hydraulic systems and conveyors, as well as repairing or maintaining them in place. Another coworker, Mr. Greenwell, described the duties of a machinist to include substantially the same tasks.

Likewise, there are no clear records as to the chemicals to which Mr. Richard was exposed. However, a 1988 Houston Plant Chemical list identifies some 360 chemicals used in the plant for which a Material Safety Data Sheet (MSDS) is available. A cursory review indicates these materials fall into three broad categories:

- Purchased Products
- Ethyl Products
- Waste Products

There seems to be little, if any, information on intermediate products produced within the plant during its normal operations. Mr. Richard was most likely also exposed to these intermediates during his routine work tasks.

Based on where he worked and his coworker's deposition (Mr. Greenwell), it is suspected Mr. Richard worked in close proximity to at least the following chemicals:

Ethylene Dichloride
Hydrogen Chloride
Vinyl Chloride

Tetraethyl Lead (TEL)
Brine
Benzene
Ethyl Chloride
Aluminum Chloride
Ortho-Toluidine
Dichloroanaline

The record includes no information on his exposure levels or the exposure frequency. He was not identified as part of any ongoing industrial hygiene surveillance program even though exposure standards existed throughout his employment. In fact, starting in the mid 1970's, a specific OSHA standard (*29 CFR 1910.1017*) was promulgated for vinyl chloride which specifically required, among other things, exposure level monitoring.

Lacking clear exposure data, one must rely on other indicators of exposure. First, there is no evidence that Mr. Richard was ever acutely overcome by exposures to chemicals. This would tend to define an upper boundary of possible exposures of 1,000 - 2,000 ppm for most of the chemicals so far identified. On the other extreme the exposures were likely to be zero on those days when he performed no work that brought him into contact with any chemicals. Finally, on those days he worked on equipment containing chemicals or their residues, he most likely was exposed to levels in the 1's to 100's of ppms, depending on the circumstances.

The record has no indication that direct reading instruments were provided to or used by Mr. Richard to measure levels of chemicals in his work area. Consequently, he was required to rely on his senses to tell him when he was being or about to be exposed so he could don his protective equipment. The primary source of self defense was his sense of smell. Table I. sets out the average odor threshold for the chemicals so far identified to have been in his work areas.

Table I.

Chemical	Odor Threshold[1] (ppm)	Texas PEL[2] 1969 - 1972	OSHA[3] 1972-1986
Ethylene Dichloride	26 (d) 87 (r)	NE	50 ppm
Hydrogen Chloride	0.255 - 10.06	5 ppm	5 (c) ppm
Vinyl Chloride	10 - 20	500 ppm	1 (TWA); 5 (c) ppm
Tetraethyl lead.	NE	0.2 mg/m³	0.075 mg/m³
Dichloroaniline	NE	NE	NE
Methylene Chloride	160 (d) 230 (r)	500 ppm	500 ppm
Benzene	61 (d) 97 (r)	25 ppm	10 (TWA); 25 (c) ppm
Ethyl Chloride	NE	1000 ppm	1000 ppm
Aluminum Alkyl	NE	NE	NE
Ortho-Toluidine	0.025 - 6.6	5 ppm	5 ppm

d - Detected.
r - Recognized.
NE - Not established.
1 - Odor Thresholds for Chemicals With Established Occupational Health Standards, American Industrial Hygiene Association, 1989.
2 - Occupational Health Regulations, Maximum Permissible Concentrations of Atmospheric Contaminants in Places of Employment, Texas State Department of Health, 1958.
3 - OSHA Safety and Health Standards (*29 CFR 1910*), U. S. Department of Labor, 1981.

For chemicals such as Ethylene Dichloride and Benzene the average recognizable odor is well above the OSHA PEL. The reported odor threshold for Vinyl Chloride is 10 times the current OSHA Standard and for Benzene some 4 to 10 times. Obviously, the sense of smell can be useless in preventing exposures in excess of the standards. Therefore, Mr. Richard was most likely unknowingly exposed to these chemicals and lacking any other method to detect their presence was helpless to defend himself from them.

The other major source of evidence of exposure occurring to Mr. Richard, regardless of protective equipment available, is Mr. Richard's medical history, documenting his exposure to organic lead.

The history of the occupational hazards of Tetra Ethyl Lead (TEL) and Ethyl Corporation are synonymous. Starting after World War II, Ethyl developed a relatively sophisticated program for its customers and employees to prevent exposure to TEL. By the late 1960's it was well recognized that exposure monitoring, training, and medical monitoring along with personal protective equipment and engineering controls were required in order to prevent exposures and protect worker health.

How then could Mr. Richard have elevated blood levels of lead? The only explanation is that Ethyl's management practices were inadequate to prevent his exposure to TEL. If they were inadequate to prevent TEL exposure then, more likely than not, they were inadequate to prevent exposure to the myriad of other volatile chemicals present in Mr. Richard's work place.

There are no records indicating that he received warnings on the hazards of the materials he worked with or training in the use of personal protective equipment.

In conclusion, it is my opinion that Ethyl Corporation failed to provide Mr. Richard with a reasonably safe environment by:

- Exposing Mr. Richard to hazardous chemicals over the period of his work life. Such exposures ranged from zero to at least several hundred parts per million. At those times when he was exposed to the real material or residues remaining in equipment, he, more likely than not, was exposed in excess of contemporary standards.
- There is no evidence that Mr. Richard was adequately warned about the hazards of the materials to which he was required to be exposed.
- There is no evidence Mr. Richard received adequate safety training to equip him to safely execute his duties in the presence of all of these hazardous chemicals .
- Ethyl's industrial hygiene practices were inadequate, in that they never attempted to quantify Mr. Richard's exposure levels to the many hazardous chemicals present in his work place. There is also no evidence that he was included in a medical surveillance program for exposure to hazardous materials other than TEL.

Sincerely,

Frank M. Parker, III-CIH,CSP,DHE

FMP/cs