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To: Dioxin/PCB Nerds

Re: Early industry knowledge of dioxin

(see attached Monsanto memos: 6/12/56 Elmer P. Wheeler to R. Emmet Kelly, notes of meeting with BASF scientists [C15579-C15581]; attached undated Elmer P. Wheeler notes of meeting with Raymond Suskind, L.C. Weger [Monsanto], and H. Oettel [BASF] titled "Conference at Kettering Laboratory" [C15582-C15586])

Many of us have suspected for some time that the chemical industry was aware of chlorinated dioxins and furans earlier than has been acknowledged. The attached documents confirm that suspicion for Monsanto, BASF, and Dow.

To our knowledge, these documents -- or related materials from the same time period -- have not been produced in either PCB cases or the Agent Orange litigation (alert us, please, if you know otherwise!). These two memos came to light only in cases brought against Monsanto by its Nitro, W.Va. workers (Bogges, Adkins, et al) and by people exposed to the Sturgeon, Mo., railroad spill of Monsanto's orthochlorophenol (e.g., Kemner, et al).

These documents set back Monsanto's and BASF's -- and probably Dow's -- knowledge not only of the identity, structure, and extreme toxicity of chlorinated dioxins and furans, but also of their probable presence as contaminants of PCBs, chlorinated naphthalenes, and all chlorophenol products (e.g., Agent Orange).

The significance of the memos may have been overlooked previously because they refer to dioxins and furans by their archaic names: "chlorinated diphenylene dioxide" (chlorinated dioxin) and "chlorinated diphenylene oxide" (chlorinated furan). The crude drawing of a PCDF on page C15580 is unmistakable. References to the diphenylene oxides (furans) occur in the literature back to 1934, and to the diphenylene dioxides (dioxins, 2,6-DCDD) back to 1941; after 1957, the word "dioxin" replaced "diphenylene dioxide". (Huff, J.E., & J.S. Wassom, "Chlorinated Dibenzodioxins and Dibenzofurans" (1973) Environmental Health Perspectives #5, pp. 283-312) (cross-referencing modern and archaic nomenclatures for various dioxins and furans).

Monsanto has repeatedly asserted that it had no reason to suspect dioxin or furan contamination of PCB products until the late 1960s and early '70s. The first memo, however, put Monsanto on notice in 1956 that these impurities "can show up in the production of any chlorinated phenols and is probably responsible for any chloracne which has been due allegedly to chlornaptha-

lenes, pentachlorophenol, chlorinated biphenyls [PCBs], etc." (p. C15580) The same paragraph refers to "the most potent chloracnogen" as a compound similar to chlorinated diphenyl oxide (furan) "but probably with additional oxygen atoms in the molecules" -- i.e., dioxin -- and refers to a similar conclusion by Don Irish at Dow and communications with him.

The 1956 memo notes Wheeler's recommendation that further exchange of information be conducted directly with Dr. Suskind (subsequent author of published studies of Nitro workers) with carbon copies of any correspondence sent to Monsanto. (There is also a tantalizing reference to "Mr. Weger's excellent 'History of Chloracne'" with covering memo dated May 15, 1956.)

The second memo, apparently also written by E.P. Wheeler, is an undated record of a conference at Kettering Laboratory (Suskind's lab) attended by Suskind, Oettel (BASF), Wheeler, and Weger (both of Monsanto). It appears to have been produced as an attachment to the 1956 memo, although there is some controversy over its date of origin (Dr. Roush, Monsanto medical director, testified that it is a 1956 memo; Dr. Suskind, however, claimed in testimony that he had correspondence suggesting the meeting took place in 1960. Given the nomenclature of the dioxins and furans discussed in the memo, and Suskind's well-documented contradictions on other matters, Roush's testimony on this point is probably the more accurate, particularly as it is unlikely that Oettel would have waited four years after the first memo to communicate with Suskind; the human experiments discussed in the memo were done by Suskind in 1955).

Of interest in the second memo is the recognition by both Suskind and Oettel that chloracne "may be systemic in origin," and Suskind's statement that "in the Monsanto cases the skin problem was not disabling but the many other symptoms such as vertigo, aching muscles, dyspnea [labored breathing] and headaches were." (pp. C15584-85) Also significant is that at this meeting, BASF reported acutely lethal toxicity to rabbits of TCDF (tetrachloro diphenylene oxide) at 0.1 mg per kilogram and TCDD (tetrachloro diphenylene dioxide) at 0.005 mg per kilogram (100 and 5 parts per billion respectively), as well as evidence that Dow's rabbit ear patch test was an unreliable indicator of TCDD contamination.

These discoveries predate by a year Kimmig & Schulz's report of TCDD's apparently independent discovery. The primary importance, beyond demonstrating a cover-up of dioxin and furan contamination of PCBs for more than a decade by Monsanto, is that the documents provide a basis for imputing the companies knowledge of horrendous effects in trichlorophenol workers to a broad class of chlorinated chemicals, an important fact for failure to warn, failure to test, fraud, and punitive damage legal theories of recovery. (For example, Monsanto did not attempt to analyze its PCB products for dioxins or furans until the 1970s, sixteen years after the 1956 meeting with BASF.)