THE DOW CHEMICAL ROLE IN ADVANCING THE TRACE CHEMISTRIES OF FIRE HYPOTHESIS

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The foundations for the initial hypothesis that trace chemical reactions could be an unexpected by-product of common combustion can be found in the published work of Olie, Vermeulen and Hutzinger. In their 1977 publication entitled: "Chlorodibenzo-p-dioxins and Chlorodibenzofurans Are Trace Components of Fly Ash and Flue Gas of Some Municipal *Incinerators in the Netherlands*," these scientists set the stage for environmental studies which would span more than a decade and would lead to controversy regarding the source of PCDD/PCDF pollutants in the environment. It would be less than a year from the time of this publication before The Dow Chemical Company Michigan Division plant site would become the target of intense scrutiny regarding the source of PCDDs that were discovered in fish collected from the Tittabawassee River which flows adjacent to this industrial facility. Historical Dow involvement in the production of chlorinated phenolics and chlorinated phenoxy herbicides at the Midland facility appeared to be the obvious source of the PCDD pollution to the river. However, analytical findings did not support this conclusion and ultimately led to our involvement in furthering the Trace Chemistries of Fire (TCOF) hypothesis.

PCDDs at the Midland plant site were ultimately traced to fly ash emissions from an industrial hazardous waste incinerator rather than the obvious "leak" from one of the chlorophenolics production facilities. Because this finding was contrary to the current beliefs of many within the scientific community at that time, Dow set about to collect additional data to test the TCOF hypothesis. Included in these studies were examinations of fly ash from a variety of incineration devices, soils collected from various rural and urban locations, volcanic ash samples from the early eruptions of Mt. St. Helens in Washington, dried municipal sewage sludge (modern and preserved retainers predating use of chlorophenolics), and laboratory studies involving potential "de novo" synthetic routes which could lead to the trace level generation of PCDDs/PCDFs during combustion.