

HISTORICAL SUMMARY

The attached chronology and supporting documentation outlines the history of generation of dioxin-contaminated wastes at a plant in Verona, Missouri and its subsequent dispersal to several sites in southwest Missouri, central Missouri, and eastern Missouri. The problem first came to the attention of state and federal officials in 1971 when a child was hospitalized after playing in a horse arena where numerous horses and other animals had become ill and died.

Between 1971 and 1974 officials of the Missouri Division of Health and the federal Centers for Disease Control (CDC) conducted an investigation to determine the cause of these problems. In the investigation, it was discovered that some additional people were ill and several stables had been sprayed in 1971, as a dust control measure, by a waste oil hauler from St. Louis. It was not until July of 1974 that it was determined that a toxic form of dioxin (2,3,7,8-tetra-chlorodibenzo-p-dioxin, TCDD) was the causative agent in the oily wastes. Until that time, there was no reason to suspect that TCDD was involved.

Meanwhile, the contaminated soil at the horse arenas had been removed by the owners of the arenas and disposed of in various locations. Some of the contaminated soil from the Bubbling Springs arena in Fenton was used as fill material at the Minker and Stout residences in Jefferson County.

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On August 2, 1974, the CDC informed the Missouri Division of Health (DOH) of the findings on dioxin in the samples collected at the Shenandoah Arena (31.8 to 33 ppm) and the CDC accepted the invitation of Dr. Denny Donnell, state epidemiologist, to participate in a renewed investigation. Dr. Patrick Phillips, of the Division of Health, and Drs. Coleman Carter and Matthew Zack (CDC) began an intensive investigation of the problem.

On August 11, 1974, Dr. Phillips met with Judy Piatt, owner of the Shenandoah Arena, and explained the toxic effects of TCDD and referred the exposed persons to family physicians for evaluations. On August 13, Phillips learned that Bubbling Springs Ranch had also experienced similar horse illnesses. On August 14, 1974, Dr. Phillips interviewed persons connected with Bubbling Springs Ranch and obtained information on animal and human illnesses; he also obtained information on the subsequent disposal sites of the excavated arena soil (Minker and Stout residences). Phillips interviewed Vern Stout and Valarie Minker on August 14 concerning soil excavated from the Bubbling Springs Ranch arena and learned that the soil was deposited at the Minker residence in March 1973. He informed both persons of probable dioxin contamination and obtained samples of soil for analysis which later showed contamination of the soil at the Minker residence of 0.74 ppm and at the Stout residence of 0.44 ppm.

The investigation continued in August and September 1974 and traced the wastes to the Syntex plant in Verona. It was also learned that a tank containing approximately 4300 gallons of wastes contaminated by high concentrations (343 parts per million) of dioxin still existed at the plant.

On September 11, 1974, Dr. Phillips informed Dr. Herbert Domke, Director of the Division of Health, of the preliminary results of the dioxin investigation.

On October 2, 1974, Dr. Clark W. Heath, Jr., Director of the Cancer and Birth Defects Division, Bureau of Epidemiology, CDC wrote a letter to Dr. Denny Donnell, Jr. at the Missouri Division of Health, emphasizing the definite hazard of the wastes at the tank in Verona and stating: "...it is important for the public safety that this material be promptly and safely destroyed." This letter apparently served to focus the attention of state officials on the potential hazard of the wastes in the tank at Verona. Heath recommended incineration of wastes from the tank and deep burial of the tank itself.

The final CDC report of March 1975 on the investigation pointed out that the expected half-life of dioxin was 1 year and recommended: a) that inaccessible contaminated soil remain undisturbed; b) that soil in residential fills be removed to a landfill; c) that the contents of the storage tank (at Verona) be properly incinerated; d) that the tank be marked and deep buried; and e) that symptomatic persons be followed up. This report was reviewed by the DOH and transmitted to DNR. Because of earlier CDC advice, Missouri officials focused on Items c) and d). All symptomatic persons were known to be under medical care.

The recommendation to remove contaminated soil from residential locations was discussed by DNR and DOH. In light of the knowledge of the expected half-life of dioxin in soil in 1975 levels approaching minimum detectable limits at that time and the apparent stability of the sites it appears that the decision was reached not to remove the soil but to resample in an effort to confirm the anticipated degradation rate of dioxin. Dr. Phillips visited the residential sites in September 1976, confirmed that the soil was not eroding and that vegetation had been established and took additional samples which were sent to CDC lab. (Results were obtained in a phone conversation between Dr. Phillips and Dr. John Liddle, Head of CDC Lab on November 22, 1982.)

From October 1974 to August 1977, there were many frustrating attempts to find a method of incineration of the wastes from the tank in Verona. In August of 1977, Syntex officials reported on a new photolysis process which could detoxify dioxin. Continued investigation showed this to be a preferable method of destruction and in September of 1979 a final decision was made to use the photolysis method. The project was completed in August 1980. Almost immediately EPA received an anonymous call alleging that other sites in southwest Missouri had received wastes from the Verona plant. This led to discovery of the Denney Farm site, Baldwin Park, the Water and Wastewater Management School (Neosho), the Crider, Erwin, Ray and Rusha farm sites near Verona, and the potential dioxin contamination of the Spring River.

Beginning in October 1979, attention was focused on the Denney Farm clean-up. The actual clean-up, conducted by Syntex with EPA approval, began in September 1980 and was completed in the summer of 1981.

In November of 1981, Ron Crunkilton of the Missouri Department of Conservation and Dan Harris of EPA collected fish from the Spring River to be tested for dioxin. Preliminary test results received in February 1982 indicated the presence of dioxin in the fish tissue. The Missouri Department of Natural Resources, Division of Health, Department of Conservation and the EPA conducted public meetings in March of 1982 to announce the fish sample results and issued an advisory to limit fish consumption from the Spring River.

Also, in early 1982, EPA officials announced their intention to resample the horse arenas and the associated sites where excavated soil had been placed. This sampling took place in May and June of 1982 and the results were obtained in August and made public on August 18. Subsequent events leading to intensive sampling of numerous sites in eastern Missouri are well known.

Overall, the 11 year long investigation of dioxin had several phases of activity:

May 1971-Aug. 1974

Phase I: First appearance of animal and human health problems at horse arenas and investigation determining that dioxin in wastes from the plant at Verona was the cause.

October 1974-October 1979

Phase II: Concentration of attention on the highly contaminated wastes in a tank at the Verona plant and the search for methods of destroying the dioxin in the tank.

October 1979-April 1982

Phase III: Discovery and investigation of numerous sites in southwest Missouri including Denney Farm site and Spring River.

May 1982-present

Phase IV: Resampling of horse arenas and associated sites and investigation of new leads in eastern Missouri.

In Phase I, the investigation was primarily conducted by the Missouri Division of Health and the Centers for Disease Control.

As a result of state reorganization, the Missouri Department of Natural Resources was established on July 1, 1974. DNR established a hazardous waste project in January 1975 and initiated a major survey of hazardous waste generators in the state in order to determine the type and quantity of waste being generated.

DNR, DOH and EPA cooperated during the Phase II efforts to find a method of destroying the wastes in the tank at Verona. From January of 1975 through June of 1977, DNR's primary emphasis, however, was on research and legislative activities leading to the passage of the Missouri Hazardous Waste Management Law in 1977 and later amendments in the Special Session of 1980.

From July 1977 to the present, DNR's primary activity in hazardous waste has focused on the development and implementation of regulations to prevent mismanagement of currently generated hazardous wastes. However, DNR has also been increasing its assistance to EPA in the investigation and clean-up of abandoned and uncontrolled hazardous wastes sites, particularly since the 1980 amendments to the state law where authority for clean-up and some funding were provided. In fact, a 1980 report to the Governor prepared to support the legislation indicated there were approximately 100 such sites in Missouri.

In Phase III, the EPA was clearly in the lead in the investigation of newly discovered sites in southwest Missouri and EPA continues as the lead agency in Phase IV with assistance from state agencies and other federal agencies. The passage of the "Superfund" Law in December of 1980 greatly augmented the EPA's ability to respond to the investigation and clean-up of abandoned and uncontrolled hazardous waste sites.

Some controversy has resulted from the March 31, 1975 CDC memo which, among other things, recommended excavation of fills at Minker and Stout sites. Although the records are not definitive and most of the personnel involved are no longer with state government, it is inferable from the facts at hand that state officials chose to concentrate their rather limited staff resources on the Verona tank wastes for several reasons:

1. The very high levels of dioxin in the tank at Verona.
2. The assumption that the TCDD in the tank would never degrade.
3. The advice from CDC and other sources that TCDD in the soil at other sites would degrade relatively quickly with probable half-life between 0.24 and 1.0 years.

4. The lack of a disposal or detoxification method for large volumes of soil.
5. The lack of clearly defined clean-up authority.
6. Lack of clean-up funds and staff for investigation and follow-up.
7. An assumption that the contaminated soil of Minker/Stout was stabilized and would not erode onto neighboring properties. Thus, as far as state and federal officials knew, all relevant parties had been notified when the Minker and Stout families were notified in 1974.
8. Less precise methods of measuring TCDD than are now available.
9. At Verona, a private party (Syntex) existed who was willing to provide money and expertise.

Overall, the history shows the clear need for the statutes which were developed in the later part of the 1970's and early 1980's. Preventing the development of new problems from mismanagement of hazardous wastes were first addressed; then statutes dealing with the clean-up of problems which developed prior to the enactment of the preventive statutory measures were enacted. Unfortunately these statutes were not enacted in time to prevent these problems. However, with the passage of the federal superfund some of these problems can be addressed and hopefully with adequate enforcement, problems such as this can be prevented in the future.