

Death of a Town The Times Beach Evacuation

The Jingle Bells of 1982 did not bring in a Merry Christmas for the residents of Times Beach, Missouri, a small town of some 1400 people. During the annual town Christmas dinner the residents finally received the news that they had hoped would never come. The residents of Times Beach were to be relocated and the town would be bought out by the federal government. This was the first time such a thing was done since the founding of the nation. The buyout of Times Beach and some 50 other sites in Missouri by the government beginning in 1983 was prompted by the largest civilian exposure to dioxin in the United States.

Dioxin is a member of the family of organic compounds known as aromatics. Dioxin is the shorthand that refers to a family of polychlorinated dibenzodioxins or PCDDs. Their general structure is that of two chlorinated benzene rings joined by two oxygens, hence dioxin. Dioxin is not made intentionally, but is usually formed as by-products in many large scale chemical processes such as paper pulp bleaching with chlorine and most significantly, the manufacture of chlorophenol chemicals.

This last process is significant not only because it brought dioxin the current notoriety but it also is a chemical process used to make products that were used, and are still being used, in many applications. These applications include pesticides, herbicides, defoliating agents such as Agent Orange, cleaning agents and electrical insulation. Consequently, human exposure to dioxin is not a recent phenomenon, and the total dangers of dioxin are not yet known. Only in recent years, especially after the Vietnam War, has the media concentrated on the dangers and impact of dioxin.

The physical effect of exposure to dioxin was first seen in skin diseases developed by chemical plant workers in 1895. The exposure to dioxin results in a type of skin disease like acne, called "*chloroacne*," since its cause was initially and incorrectly linked to chlorine gas. In 1957, in Germany, Dr. Karl Schulz of the University of Hamburg identified chloroacne in several workers from a Boehringer chemical plant. The disease in its mildest form resembles teen-age acne but differs in that the blackheads and cyst cluster in two locations: appearing in a crescent shape outside of and under the eyes and ears. In more pronounced cases, pus-containing spots erupt and spread across the rest of the face, neck, shoulder and down to the rest of the body. In severe cases the spots from chloroacne leave scars and result in permanent disfigurement. Dr. Schulz and the plant chemist George Sorge later traced the cause of chloroacne to the contaminant dioxin in the chemicals made at the plant.

The development of chloroacne is only one symptom of dioxin exposure. Other long term effects may include birth defects of offsprings and an increased rate of cancer in exposed population. These long term effects are not yet proven since no systematic study of dioxin exposure has been done or will ever be done on humans. Despite this, in 1995, the EPA concluded that dioxin is likely to increase human cancer rates and led to developmental abnormalities.

The danger of dioxin exposure is directly associated with the environmental level of dioxin, usually measured in parts per billion (PPB), and the length of exposure. The generally accepted level of dioxin was established by the Center for Disease Control during the Times Beach crisis. The "safe" level was calculated to be one part per billion. It is deemed to be so low because lab test has show that the 50% lethal dosage (LD₅₀) of dioxin to be 0.6 micrograms per kilogram of body mass in guinea pigs. And it was known that dioxin exposure can come by contact with contaminated soil, air and water even for a brief period. While this says nothing about the actual toxicity to humans, such a low LD₅₀ value makes us aware of hazards of dioxin.

The story of Times Beach and the contamination of the entire state of Missouri began in 1970 at the Northeastern Pharmaceutical and Chemical Company (NEPACCO) in Verona, Missouri. The primary product was hexachlorophene a bactericidal chemical that brings to mind the kind of cleanliness associated with

hospital surgical rooms. Most consumers associate it with products used to clean wounds, burns, acne and infants; it is also an ingredient in pHisoDerm, which is still marketed today, although it no longer contains hexachlorophene. Hexachlorophene was made from trichlorophenol, which has been shown to contain dioxin as a contaminant. The production of this chemical stopped in 1972 due to an FDA ban; ironically it did not involve dioxin.

During the two years of production NEPACCO had entered into a partnership with its neighbor Hoffman-Taff that had manufactured Agent Orange – also from trichlorophenol. Both companies had shared facilities and personnel – they were taken over by Syntex Agribusiness in 1972. To the credit of NEPACCO, they produced a quite "clean" final product that virtually had an undetectable level of dioxin. According to John Lee, the vice president, the company started with 3-5 PPM of dioxin and reduced it to 0.1 PPM in the product. Dioxin removed from hexachlorophene production, which reached as much as 1 million pounds of hexachlorophene, went into dioxin-containing water, clay and "*still bottom*" – a thick, smelly residue that contained highly concentrated dioxin from the processes.

Disposal of these dioxin contaminated materials was a huge problem to the company. They initially sent the "*still bottoms*" to Louisiana for incineration – the best way to destroy dioxin – but it was expensive. It then contracted its chemical supplier, Independent Petrochemical Corporation, for disposal. Independent then subcontracted Russell Bliss to haul the waste away. Later, during the Times Beach investigations, it was revealed that NEPACCO knew of the dioxins in the waste, but somehow this information was not passed on to Independent or to Bliss. The investigation also found that the contaminated clay and water had also mysteriously found their way into the local environment.

The contaminated clay was the easiest to trace. Most of them were buried on location in the plant itself. Some were disposed in a dump that was later transformed into a park, and the rest was sold to unsuspecting farmers to spread on the ground under the assumption that it would prevent hoof rot in cattle. Some of these contaminated clays were subsequently washed into the nearby Spring River in a flood in 1982. This however was not the first time that dioxin had entered the local food chain.

The contaminated water from the NEPACCO plant had also leaked into the river from the inadequate Hoffman-Taff water treatment facility. The treatment facility was eventually shut down because the state officials had detected the contamination in the river. The substantial amount of waste water still had to be disposed of, so the company came up with a brilliant idea — send the 225,000 gallons of waste water to the nearby Water and Wastewater Technical School in Neosho. The company paid the school 2.5 cent per gallon to accept the waste water. The school also did not know what the water contained and simply dumped into a basin in a school operated water treatment plant. The water was still there when the city took over operation in 1974, and in 1977 began filling it by dumping asphalt, dirt and gravel into the basin. Much of the contaminated water splashed on to the adjoining land and nearby workers. The school still kept some 1000 gallons of the water and used it for students to practice using valves. Finally, in 1980 the head of the school examined the content of the water and sent a sample for testing. The dioxin level was 2 PPM, about the amount in Agent Orange used during Vietnam. The next year, EPA removed the water, the tank and surrounding soil for secure burial.

One would think the State of Missouri and the EPA would have at least investigated the cause of the river contamination and the source of the waste water at the technical school. However, neither investigated or asked questions. They all believed the incidents to be isolated and never thought that the culprit was the company. This lack of action delayed the discovery of a far more serious dioxin contamination in the state.

When NEPACCO asked Russell Bliss to take away the "*still bottoms*" in his truck, no one wondered about the fate of these "*still*" and some 50 pounds of dioxin found their way around the sta

Bliss had a passion for breeding championship show horses and had sprayed waste oil in his barn to control dust. This worked so well that one application kept dust down for months. Others then hired him to spray their barns and horse arenas. In March 1971, he sprayed the Shenandoah Stables, and the oil was unusually thick and smelly. Bliss had mixed the "*still bottom*" with other waste oils, but was not aware of the dioxin in the "*still*

bottom" from NEPACCO. Immediately after the spraying, horses and other animals in and around the arena became ill and died. According to Judy Piatt, the owner of the arena, 62 horses eventually died and many birds fell from rafters — hours had to be spent to rake them up. The children and adults of the Piatt family also became sick and had to be hospitalized.

The Piatts suspected the oil was the cause and confronted Bliss, who assured them that it was just engine oil. They disposed of the top 18 inches of the soil in a land fill, but horses still became sick months later. The Piatts' sickness had alerted the CDC to possible chemical intoxication and they visited the stable to see the sick animals and to take soil samples. However, their investigation was not conclusive and did not pinpoint the cause. Similar fate fell on other stables that hired Bliss to spray for dust control. This time chloroacne was reported on affected people and animals. However, it would be another two years before the CDC verified the claim and found trichlorophenol and dioxin in the soil samples from the stables.

By this time Agent Orange and dioxin had become famous and the CDC wasted no time in informing the state of Missouri. They finally began to trace the source of dioxin in these stables and track down NEPACCO and Bliss as the source. A great deal of information that helped the CDC came from Piatt, who followed Bliss and recorded his activities. Their information proved invaluable as the CDC pieced together the fate of much of the rest of "*still bottom*".

Even as the CDC investigation proceeded, the EPA still did not participate. It was not until late 1979 when a former employee at NEPACCO told the local EPA officials of the sloppy practice of the company concerning their control of toxic waste did the EPA begin to enter the investigation. In 1980, the EPA found 90 leaky drums containing "*still bottom*" with 2000 PPM of dioxin. Subsequently the government sued NEPACCO and its officers, E. Michaels and John Lee. The case was a first in the State of Missouri.

In mid-1982, EPA using the Piatts' information began to visit the sites that Bliss had been spraying. The first site was Times Beach because it encompasses the greatest number of people. The Piatts' record showed that Bliss sprayed Times Beach's 23 miles of dirt road periodically between 1972 and 1976. He had also dumped oil in the town. As samples got underway, the residents of the town were confronted with sights of "*moon-suited*" investigators taking samples. The last sample was taken on December 3, 1982, just days before the flood that hit Times Beach. Twenty days later, the test results came back and showed 300 PPB of dioxin in the soil of Times Beach. The CDC immediately recommended to the state that the town be evacuated.

The decision was made public during the town's annual Christmas dinner. At the same time White House interest grew as the public pressure mounted. President Reagan formed a Dioxin Task Force that included CDC, EPA, FEMA and the Army Corps of Engineers. Events moved quickly thereafter, and the buyout of the town began in early 1983. In 1985 it was completed except for one elderly couple who refused to leave. The town and other sites were brought under federal management and sealed off.

The residents filed thousands of lawsuits against Bliss, NEPACCO, Syntex, and their officers. However, since there were not laws regulating the disposal of hazardous waste at the time, the lawsuits are likely to be dismissed.

The impact on the residents was more than the constant worrying about their long term health. As they moved to other towns, Times Beach residents were being shunned by many other residents who feared contamination. The children of Times Beach were in the greatest danger, because they remembered playing in the purplish puddles left after the spraying, and suddenly they were being isolated in their new homes.

The tragedy in Times Beach brought dioxin national attention and brought EPA to the forefront of dioxin control activities. The Times Beach evacuation began EPA's continuing action nationwide to locate and clean-up dioxin and other toxic wastes. Much of the plans were based on what the EPA learned at Times Beach. The Times Beach evacuation had also provided the push to pass a string of environmental laws that regulated waste disposal and requiring "cradle to grave" accounting for hazardous chemicals. The "Superfund" bill was passed,

providing the money to clean up toxic waste sites, and came just in time to provide money for the residents of Times Beach. The "Superfund" was used to buy out the town and monitor residents for their health.

The short term effect at Times Beach and other contaminated sites in Missouri is that they were quarantined and access was only granted to EPA personnel that were conducting tests on the soil and water. The long term effect on the exposed residents is still unknown; the CDC does have a database of the residents and their health is periodically examined and tracked. Unfortunately, the dioxin released into the river cannot be recovered, and since dioxin is fat soluble it will remain in the bodies of the animals that ingest it. This means that the entire local ecosystem now contains dioxin; its levels would be relatively high in animals in the upper layers of the food chain. Humans are not immune to this, and since we are at the top of the food chain, we risk the chance to have the highest level of dioxin in our bodies.

The cause of the dioxin exposure was due in part to Russell Bliss' spraying and dumping of oil mixed with contaminated "still bottom". The majority of the blame rests on the company itself and its officers. They knew of the dioxin in the raw material and the wastes generated, but they did not inform Bliss of the danger in the wastes that he was handling. Even worse, the company hired Bliss because of the high cost associated with the proper treatment of dioxins – i.e., incineration. The company had also contaminated the nearby river because they did not bother to create an adequate and operable treatment facility. The sloppy safety practice at NEPACCO and its negligence toward its hazardous wastes lead to the distribution of dioxin contaminated wastes to unsuspecting individuals who also failed to properly handle industrial wastes. The government deserves part of the blame for not acting quickly after finding dioxin in non-industrial areas. The regulations concerning the disposal of wastes were also unclear, and many of them were not yet written when the contamination occurred at Times Beach.

Times Beach provided the citizens and the government the reason to pass laws concerning the safety practices involving chemical manufacturing and waste disposal. The passage of "Superfund" bill provided the funds to clean up contaminated sites and for the monitoring of affected individuals. Thanks to Times Beach we now have laws that govern every aspect of an industrial operation and its impacts.

Although a company now would never do what NEPACCO did in the 1970s that contaminated Times Beach and Missouri with 50 pounds of dioxin, the risk of dioxin contamination from industrial accidents still remains. Another potential source of dioxins is, ironically, from incinerators. Since dioxin has become such a focal point, the public and government pressures are enough to force a company to employ strict safety procedures. What companies and government need to do is to make sure that dioxin is contained in plants and that none is released accidentally or intentionally.

Hazardous Wastes are solid, liquid, or gas wastes that can cause death, illness, or injury to people or destruction of the *environment* if improperly treated, stored, transported, or discarded. Substances are considered hazardous wastes if they are *ignitable* (capable of burning or causing a fire), *corrosive* (able to corrode steel or harm organisms because of extreme acidic or basic properties), *reactive* (able to explode or produce toxic cyanide or sulfide gas), or *toxic* (containing substances that are poisonous). Mixtures, residues, or materials containing hazardous wastes are also considered hazardous wastes.

Effects of Hazardous Wastes

Hazardous wastes may pollute soil, air, surface water, or underground water. Pollution of soil may affect people who live on it, plants that put roots into it, and animals that move over it. In **Times Beach, Missouri**, in 1983, oil contaminated with polychlorinated biphenyls (PCBs) was spread on roads to keep dust down; thus, residents were exposed to high levels of PCBs. Sludge from **municipal sewage disposal** may contain toxic elements if industrial waste is mixed with domestic sewage. If the sludge is used as a **fertilizer**, these elements may contaminate fields. Toxic substances that do not break down or bind tightly to the soil may be taken up by growing plants; the toxic substances may later appear in animals that eat crops grown there and possibly in people who do so.

River and lake pollution, if it is toxic enough, may kill animal and plant life immediately, or it may injure slowly. For example, fluoride concentrates in teeth and bone, and too much fluoride in water may cause dental and bone problems. Compounds such as dichlorodiphenyltrichloroethane (DDT), PCBs, and **Dioxins** are more soluble in fats than in water and therefore tend to build up in the fats within plants and animals. These substances may be present in very low concentrations in water, but accumulate to higher concentrations within algae and insects, and builds up to even higher levels in fish. Birds or people that feed on these fish are then exposed to very high levels of hazardous substances. In birds, these substances can interfere with egg production and bone formation.

Even pollution that is not toxic can kill. Phosphates and nitrates, usually harmless, can fertilize the algae that grow in lakes or rivers. When algae grow, in the presence of sunlight, they produce oxygen. But if algae grow too much, or too fast, they consume great amounts of oxygen, both when the sun is not shining and when the algae die and begin to decay. Lack of oxygen eventually suffocates other life; some living things may be poisoned by **toxins** contained in the algae. This process of algal overgrowth, called **eutrophication**, can kill life in lakes and rivers. In some cases, particular algae can also poison the drinking water of people and livestock.