PC # 2

ILPCB, 100 W. Randolph, Suite 11-500, Chicago, IL 60601, Case PCB 2010-103 / 104

In an effort to evaluate the extent of hydrogen sulfide injury from living adjacent to the Cortland Landfill a study of copper depletion was conducted. Hair samples of adults living within ¼ mile of the landfill were compared with a similar group living 3 ½ miles away. All near neighbors were asked, while the far adults were selected at random and in a way to match the near-neighbors demographics.

The results are:

	Landfill	Far living
Average age	69	69
Average copper, ug/g	9.7+1.5	29 +11
Average copper limits ug/g		11 to 78

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Zinc was also analyzed and there was no significant difference between the groups. Unusually high zinc can inhibit copper. Average zinc values for the landfill were 167 + 33 versus 148 + 24 for non-, with 180 being 50 percentile. Hair analysis was performed by Brookside Laboratory, Ohio.

A summary of the conclusions from this sampling is:

1. Landfill adults were 3 times lower in copper than far-adults

2. Landfill adults copper values are in the lower 1 percentile of expected values

3. Copper values in the lower 10 percentile are an acute deterioration condition.

4. All of the landfill adults have serious cardiovascular conditions

5. All of the non-tested landfill adults have serious cardiovascular conditions

6. All of the far-adults have average copper values

7. None of the far-adults have serious cardiovascular problems.

Cardiovascular problems originate from hydrogen sulfide depleted copper because low copper prevents proper collagen formation and cross-linking, especially in cardiac tissue. Hydrogen sulfide is also known as a neurotoxin. Drs. Dreisback and Robertson in the 1987 Edition of their Handbook of Poisoning recognize this and expanded it to the central nervous system as well. The US EPA, in the 2003 Hydrogen Sulfide Toxicology Review determined the lower limit for nasal neural lesions at .00147 ppm in rats. This was extended to humans by computer modeling to .018 ppm as the lowest level at which neural attack could occur. However, in its susceptibility section, 4.7.1, it cites a case study that children may be more susceptible than adults. A 20 month old suffered deviation of the eyes and progressive involuntary movement at 0.6 ppm. for several months while adult symptoms were not obvious. Even though rat and human levels of tissue insult are parallel, it is difficult to judge the level dose-response in humans. Blood response to the severity of the dose is variable and only biopsy of the liver is definitive. A careful copper analysis of hair is the next best measure of the toxic insult, however it may manifest.

With such a proven health risk from hydrogen sulfide it is foolish to trust the good will of a company that in the past 19 years has been a poor steward to their operation. It is a further disgrace to trust the health of our children to a company that insists on a maximum exposure through a loop-hole in the law while half the nation is following a more limited medically proven guide line. One only need look to national records to know that negligent management is standard practice with the company.

All of the ¼ mile neighbors have been in residence at these sites for over 20 years. It is obvious and proven that a landfill run by Waste Management is a danger to healthy living and it would be a disaster to allow a landfill ¼ mile from a school of young children.

There is over 80 years of scientific analysis that has established that hydrogen sulfide produces stroke in man and animals. "Sudden Death Falling Disease" was diagnosed by Bennetts and Hall in 1939 as a result of low copper in the animal and in the pasture. In 1962 Shields found that swine fed on a milk diet were deficient in copper and produced cardiac infarctions and low blood pressure, even greater than from iron anemia. Klevay in his symposium in 2000 mentions 35 anatomical changes produced by copper deficiency, including high cholesterol and triglycerides.

Children have an additional difficulty. Those fed cow's milk diets are more prone to develop copper deficiency because of the low copper content of cow's milk. In contrast, breast-fed infants absorb more copper because there is 100% more present and human milk enhances copper absorption as Dorner observed in 1989.

While high copper can certainly have instances of toxicity, according to a 2001 study, the majority of Americans have a copper intake below the USDA guide and many substantially so. In fact, copper levels in food have declined in industrial nations over the course of the 20th century. Most recent studies of copper deficiency have been by restriction trial. In a 4 month trial 3 of 12 women developed heart problems and increased clotting. In another 11 weeks study in which the copper was reduced from .57ug/kcal to .36ug, 4 out of 23 subjects had heart problems including one heart attack.

Copper is stored in the liver and the brain. There is no copper in blood plasma and the best method for testing is liver biopsy. Conveniently, though, hair analysis is an acceptable site and it does reflect long term body composition. The range of typical reading is from 11 to 78 ug/g. A study of rats fed a milk diet combined with hydrogen sulfide, for eight weeks, was used to establish the correlation between medical cause and disease. In this Hall and Mac Howell testing (1969) the average liver copper values for control rats was 14.4 ug. While the rats that were dying and bleeding with dead litters was 10.8 ug.

Dr. Aubrey J. Serewicz, PhD, Retired Dept. Chemistry, NIU Dekalb, IL 403 S. 2nd St.

Aubrey J. Serewicz July 7, 2010