

Rachel's Environment & Health News

#539 - History of Precaution -- Part 1

March 26, 1997

U.S. Environmental Protection Agency (EPA) has issued a major new report about hormone-disrupting chemicals. The report concludes that no action is needed to protect public health or the environment from the dangers of such chemicals.[1] Instead, more study is needed, the report says.

In birds, fish, amphibians, reptiles, and mammals, including humans, the body regulates itself by sending hormones through the blood stream. Hormones are natural chemicals, present in very low concentrations (measured in parts per trillion), that carry messages to turn on and off many essential bodily processes. In recent years a large number of studies has shown that vertebrates (animals with a backbone) can confuse some common industrial chemicals with hormones, thus disrupting normal chemical messages.

As a result of hormone disruption, many bodily functions can be turned on or off at the wrong time, resulting in birth defects, cancers, deformed sex organs, sterility, reduced mental capacity, immune system damage and other serious health problems.[2]

How can scientists learn about these effects? Because of international laws developed during the WW II Nuremberg Trials, controlled experiments on humans are no longer permitted. Therefore, evidence of hormone disruption must be gathered by observing effects in wildlife, by experimenting on laboratory animals, and by observing "natural experiments," which occur when workers are exposed to chemicals on the job, or when large numbers of people are exposed to pharmaceuticals that are mistakenly thought to be safe.

To prepare its latest report, EPA reviewed 300 scientific studies of hormone disruption. Dr. Robert Huggett, EPA's assistant administrator for research, told the NEW YORK TIMES that these 300 studies "demonstrate that exposure to certain endocrine [hormone] disrupting chemicals can lead to disturbing health effects in animals, including cancer, sterility, and developmental problems." [3]

One might reasonably ask, if 300 studies show that exposure to certain hormone-disrupting chemicals can cause cancer, sterility and developmental problems in animals, shouldn't public health authorities take precautionary action to prevent further exposures while studies continue? With 300 studies indicating serious problems, wouldn't it be reasonable to limit further exposure to these chemicals?

Historical evidence indicates that this is not how the public health system operates in the U.S. The principle of precautionary action was rejected by U.S. political and public health authorities 70 years ago. The historical record is very clear on this point.

The issue 70 years ago was whether General Motors (GM), Standard Oil of New Jersey, and the DuPont corporation should begin putting tetraethyl lead into gasoline. At that time, the toxicity of lead had been well-established for 100 years,[4,pg.76] but a new gasoline additive was needed by the automobile and petroleum corporations and lead suited their purposes.[4,pg.6]

In 1923, the automobile industry was booming. In 1916, 3.6 million cars were registered; in 1920 the number was 9.2 million and by 1925 it would be 17.5 million.[5] Prior to 1920, Ford had grabbed the lion's share of the market by mass producing the standardized Model T but General Motors developed a successful strategy for overtaking Ford. In the words of GM chairman Alfred Sloan, GM created demand "not for basic transportation but for progress in new cars for comfort, convenience, power and style." [6,pg.344] In the search for greater horsepower, GM developed higher-compression engines. However, with ordinary gasoline, high-compression engines developed an annoying "knock" because the gasoline burned explosively. So GM chemists searched systematically for a gasoline additive that would make gasoline burn evenly in high-compression engines, eliminating "knock." On February 1, 1923, in

Dayton, Ohio, leaded gasoline went on sale for the first time.[4,pg.90]

Leaded gasoline was produced by the Ethyl Corporation --a joint venture of GM, Standard Oil of New Jersey, and DuPont.[4,pg.105] Tetraethyl lead is at least as toxic as normal metallic lead, but with this difference: tetraethyl lead is a volatile liquid, readily absorbed through the lungs and skin. Almost immediately, workers began to be poisoned. At Standard Oil's Bayway, N.J., facility, 5 workers died and 35 suffered severe palsy, tremors, hallucinations and other serious symptoms of nerve damage. Several of these workers spent the rest of their lives confined in insane asylums. One of the supervisors at the Bayway facility told the NEW YORK TIMES that "these men probably went insane because they worked too hard." [6,pg.345] At DuPont's Deepwater, N.J., plant, more than 300 workers were poisoned by tetraethyl lead. DuPont workers dubbed the plant "The House of Butterflies" because so many workers had hallucinations of insects. The NEW YORK TIMES reported that 80% of the workers at DuPont's lead plant were poisoned.[6,pg.347]

These industrial poisonings created headlines nationwide and public health officials became apprehensive about the prospect of treating billions of gallons of gasoline with tons of tetraethyl lead, which would be released into the air along with the exhaust fumes.

In 1924, General Motors and DuPont paid the federal Bureau of Mines to investigate the hazards of lead from automobile exhausts.[4,pg.25] The Bureau of Mines agreed to investigate and accepted a stipulation by Charles Kettering, president of the Ethyl Corporation: "...the Bureau [shall] refrain from giving out the usual press and progress reports during the course of the work, as [Ethyl Corporation] feels that the newspapers are apt to give scare headlines and false impressions before we definitely know what the influence of the material will be." [6,pg.345] Further, the Bureau agreed never to mention the word "lead" in its reports but to use only the trade name "Ethyl." Further, Ethyl Corporation insisted that "all manuscripts, before publication, will be submitted to the Company for comment, criticism, and approval." [6,pg.345] The Bureau of Mines agreed. During an 8-month period, the Bureau exposed monkeys, dogs, rabbits, guinea pigs, and pigeons to automobile exhaust on 188 occasions, half for 3 hours at a time and half for 6.

The Bureau reported finding no evidence of lead poisoning, and no accumulation of lead, in any of the animals.[4,pg.27] The NEW YORK TIMES reported the Bureau's results November 1, 1924, with this headline: "No Peril to Public Seen in Ethyl Gas/ Bureau of Mines Reports After Long Experiments with Motor Exhausts/ More Deaths Unlikely." [6,pg.346] The TIMES also reported that "the investigation carried out indicates the danger of sufficient lead accumulation in the streets through the discharging of scale from automobile motors to be seemingly remote." [6,pg.346]

Despite this reassuring news, public health authorities remained concerned about the prospect of putting millions of pounds of toxic lead in the form of a fine dust into the streets of every American city and town.

Therefore, the U.S. Public Health Service convened a conference May 20, 1925 to discuss the issue. Just before the conference, Standard Oil announced it was temporarily suspending the sale of leaded gasoline.

Here in summary is what the conference revealed:

** Charles F. Kettering, president of the Ethyl Corporation, pointed to the unique properties of tetraethyl lead as an anti-knock additive. Other additives gummed up the engine, but the lead compounds passed out through the exhaust, leaving the engine clean, he said.[4,pg.8]

** Mr. Kettering said American automobiles would burn 15 billion

gallons of gasoline in 1926.[4,pg.9]

** Lt. Col. E.B. Vedder, chief of the U.S. Chemical War Service, said lead is a cumulative poison.[4,pg.31]

** Robert Kehoe, a medical consultant to GM and to the Ethyl Corporation, confirmed that "in sublethal dose, lead is cumulative." [4,pg.50]

** Joseph C. Aub of Harvard University emphasized that "lead is an accumulative poison". [4,pg.72]

** Robert Kehoe established that lead passed through the placenta of a rabbit, contaminating unborn rabbits with lead if the pregnant mother were exposed.[4,pg.52]

** Robert Kehoe established that pregnant rabbits exposed to lead had abortions, miscarriages, and premature births.[4,pg.54]

** Robert Kehoe, the industry's consultant, acknowledged that poisoning by tetraethyl lead is the same as other lead poisoning: "In those cases in which absorption is present over a long period of time the symptoms do not differ strikingly from the symptoms in chronic lead poisoning....," Kehoe said.[4,pg.80]

** Alice Hamilton of Harvard University --one of the country's acknowledged experts on lead poisoning --said, "...lead is a slow and cumulative poison and... it does not usually produce striking symptoms that are easily recognized." [4,pg.98]

** E.R. Hayhurst from Ohio State University made the point that serious lead poisoning "is most apt to occur in cases using lead in the form of a dust." [4,pg.89]

** R.R. Sayers of the U.S. Bureau of Mines described experiments in which 5 times the normal amount of tetraethyl lead was added to gasoline and animals were forced to breathe the exhaust fumes. "The dust from the floor of the test chamber contained 10.5% of lead within six months without cleaning," Sayers said.[4,pg.27]

** Joseph Aub of Harvard calculated that 15 billion gallons of leaded gasoline would release 50 thousand tons of lead dust each year. [4,pg.72]

** David Edsall, dean of the Harvard School of Public Health, summarized as follows:

"The only conclusion that I can draw from the data presented here to-day is that in the question of the exhaust... I can not escape feeling that a hazard is perfectly clearly shown thus far by what has been reported here to-day, that it appears to be a hazard of considerable moment, and that the only way that it could be said that it is a safe thing to continue with that hazard would be after very careful and prolonged and devoted study as to how great the hazard is." [4,pg.77]

The conference resolved unanimously that the Surgeon General should appoint a seven-member panel to determine the dangers of leaded gasoline by January 1, 1926, and, until then, the sale of leaded gasoline should remain suspended. At the time, it seemed like a great victory for the principle of precautionary action. But it was not to be.

[To be continued]

--Peter Montague (National Writers Union, UAW Local 1981/AFL-CIO)

=====

[1] Thomas M. Crisp and others, SPECIAL REPORT ON ENVIRONMENTAL ENDOCRINE DISRUPTION: AN EFFECTS ASSESSMENT AND ANALYSIS [EPA/630/R-96/012] (Washington, D.C.: Environmental Protection Agency, Risk Assessment Forum, February, 1997). Available via the internet: <http://www.epa.gov/ORD/webpubs/endocrine/>.

[2] See RACHEL'S #249, #263, #264, #279, #323, #334, #372, #377, #380, #390, #393, #405, #438, #441, #446, #447, #448, #453, #457, #462, #471, #475, #477, #485, #486, #487, #490, #491, #498, #499, #512, #536.

[3] Associated Press, "Hormone Disruptors Require Additional Study, EPA Says," NEW YORK TIMES March 14, 1997, pg. A26.

[4] Treasury Department, United States Public Health Service, PROCEEDINGS OF A CONFERENCE TO DETERMINE WHETHER OR NOT THERE IS A PUBLIC HEALTH QUESTION IN THE MANUFACTURE, DISTRIBUTION OR USE OF TETRAETHYL LEAD GASOLINE [PUBLIC HEALTH BULLETIN NO. 158] (Washington, D.C.: Treasury Department, United States Public Health Service, 1925). Available from William Davis at the National Archives in Washington, D.C.: (202) 501-5350. [National Archives Record Group No. 287; T27.12:158/3S1 [possibly 351?] 24/2316 Box T777. RG 287.]

[5] U.S. Bureau of the Census, HISTORICAL STATISTICS OF THE UNITED STATES, COLONIAL TIMES TO 1970, BICENTENNIAL EDITION, PART 2 (Washington, D.C.: U.S. Government Printing Office, 1975), Series Q- 153, pg. 716.

[6] David Rosner and Gerald Markowitz, "A 'Gift of God?': The Public Health Controversy over Leaded Gasoline during the 1920s," AMERICAN JOURNAL OF PUBLIC HEALTH Vol. 75, No. 4 (April 1985), pgs. 344-352.

Descriptor terms: lead; precautionary principle; general motors; dupont; ethyl corporation; standard oil of new jersey; endocrine disruptors; hormone disruptors; hormones; tetraethyl lead; gasoline; public health; epa; robert kehoe; joseph aub; automobiles; oil industry; alice hamilton; e.r. hayhurst; r.r. sayers; bureau of mines; david edsall; principle of precautionary action;