

Rachel's Environment & Health News

#169 - Toxicological Profiles Of Chemicals

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As part of the Superfund amendments of 1986, Congress told ATSDR (the Agency for Toxic Substances and Disease Registry, which is part of the U.S. Public Health Service) to produce a series of studies of the 100 toxic chemicals found most often at Superfund sites. Between them, ATSDR and EPA (U.S. Environmental Protection Agency) came up with a list of 100 chemicals, which they published in the FEDERAL REGISTER April 17, 1987 (pgs. 1286612874) [see RHWN #27].

Now the first batch of Toxicological Profiles on these chemicals has been published. If you are engaged in a fight that involves common toxic chemicals, you may find useful ammunition here. These reports are intended for ordinary people. They do use some scientific jargon, but if you keep a dictionary handy, you will be able to read them from cover to cover. Let's look at the report on the toxic metal, cadmium, to see what all the reports in this series contain (they all have identical section titles).

1) Public health statement on cadmium (6 pgs.). This is a quick summary of information about the toxic metal, cadmium, in the form of questions and answers. Here we learn, for example, that "The largest source of cadmium release to the general environment is the burning of fossil fuels [coal, oil, etc.] or the incineration of municipal waste materials." (pg. 1) And: "Cadmium is not known to have any beneficial effects, but can cause a number of adverse health effects." (pg. 2) And: "Studies in humans also suggest that long-term inhalation of cadmium can result in increased risk of lung cancer." And: "Other tissues reported to be injured by cadmium exposure in animals or humans include the liver, the testes, the immune system, the nervous system and the blood."

From this, you can see that even the first few pages of the document tell you something useful: cadmium in the environment gives you no benefits; it offers you the possibility of many unhappy consequences if you are exposed to it; and the major sources of exposure are coal burning and trash burning.

2) Health effects summary (22 pgs.). Here we get into more detail about the health effects of cadmium on humans. Unfortunately, this section seems to have been written for doctors; it uses terms like "parenteral administration" and the glossary at the back does not define "parenteral," which usually means "by needle injection under the skin or into the muscle." (You'll need a medical dictionary.)

This section has one particularly valuable part: a graph demonstrating the adequacy (or inadequacy) of the information that scientists have gathered about the toxicity of cadmium. There is one graph for "animal data" (meaning laboratory animals, not wildlife) and "human data." There are three measures of the adequacy of the information available: no information, some information, and adequate information. There are five big categories of information: lethality (the ability of cadmium to kill quickly); systemic poisoning (meaning, poisoning of one or more of the body's systems, such as liver, kidneys, etc.); developmental toxicity (cadmium's ability to interfere with growth of young people or animals); reproductivity toxicity (ability to interfere with conception, growth of the fetus, or birth); and carcinogenicity (ability to cause cancer). The category "systemic toxicity" is subdivided into three categories: acute [high-dose for a short time], intermediate, and chronic [low dose for a long time].

It is interesting to note that, for humans exposed to cadmium, there is "sufficient information" in only two of the seven categories: lethality and acute systemic toxicity. For three other categories (intermediate and chronic systemic toxicity, and carcinogenicity), there is "some information," but for developmental toxicity and reproductive toxicity there is "no information." So someone who exposes a pregnant woman to cadmium (via an incinerator, for example) is subjecting her to a crap shoot--they can't know what the effects might be because there is no information available.

3) Chemical and physical information (3 pgs.). As the name implies,

this is standard information on the melting point, density (weight of a cubic centimeter [cc] of the stuff; one cc of water weighs 1 gram), color, and so forth, of the various forms that cadmium can take (cadmium oxide, cadmium nitrate, etc.)

4) Toxicological data (22 pgs.). This is a rundown on the various bodily systems that are affected by cadmium (skeleton, brain, kidney, etc.) and what is known about the mechanisms by which cadmium interferes with your bodily functions.

5) Manufacture, import, use, and disposal (2 pgs.). This describes the commercial sources and uses of cadmium.

6) Environmental fate (3 pgs.). This tells you how cadmium moves through the environment once it gets loose. It also describes where cadmium gets loose from (combustion of coal and oil release 100 tons per year; municipal solid waste combustion releases 90 tons per year but "the number of municipal solid waste incineration units is expected to triple in the next ten years." (pg. 59) And, we are told, "Cadmium is strongly accumulated by all organisms, both through food and water. Cadmium accumulates in freshwater and marine organisms at concentrations hundreds to thousands of times higher than it is in water." (This is why clams and oysters often contain high levels of cadmium.)

7) Potential for human exposure (4 pgs.). This brief discussion just scratches the surface, but does say that people particularly likely to be affected by cadmium include those with kidney disease, genetic susceptibility (sensitivity they were born with), inadequate diet and extreme youth (babies are more prone to absorb cadmium from the stomach than are adults).

8) Analytical methods (4 pgs.). This discusses proper laboratory methods for measuring cadmium.

9) Regulatory and advisory status (8 pgs.). This tells what regulations and advisory warning have been published for cadmium. This gives you something to compare against when someone discovers cadmium in your water supply or your town's air supply.

10) References and bibliography (24 pgs.).

11) Glossary (2 pgs.).

These are useful reports despite their failure to consider anything except human beings. They are also a little too technical in vocabulary to suit us, but if you work at it, you can understand everything they contain. Unfortunately, they are not cheap. For example, the TOXICOLOGICAL PROFILE FOR CADMIUM costs \$21.95 plus \$3.00 shipping from National Technical Information Service (NTIS), 5285 Port Royal Rd., Springfield, VA 22161; phone (703) 487-4650; request NTIS item number PB89-194476.

Other reports issued in this Toxicological Profile series so far include: 2,3,7,8-TETRACHLORODIBENZO-P-DIOXIN [PB89-214522; \$21.95]; SELECTED PCBS (POLYCHLORINATED BIPHENYLS) (AROCHLOR-1260, -1254, 1248, -1242, -1232, -1221 AND -1016) [PB89225403; \$21.95]; VINYL CHLORIDE [PB90-103870; \$21.95]; CHLOROFORM [PB89-160360; \$21.95]; NICKEL [PB- 160378; \$21.95]; BERYLLIUM [PB89-148233; \$15.95]; N-NITROSODIPHENYLAMINE [PB89-154090; \$15.95]; ARSENIC [PB89185706; \$21.95]; METHYLENE CHLORIDE [PB89-194468; \$21.95]; DI (2-ETHYLHEXYL) PHTHALATE [PB89-194484; \$21.95]; HEPTACHLOR/HEPTACHLOR EPOXIDE [PB89194492; \$21.95]. BENZENE [PB89-209464; \$21.95].

New reports are appearing all the time; to keep abreast you must write asking to be put on the mailing list to receive the monthly

FACT SHEET from the office with responsibility for this series of Toxicological Profiles: c/o Ed Skowronski, Division of Toxicology, ATSDR, 1600 Clifton Road -Mail Stop E-29, Atlanta, GA 30333; phone (404) 639-0730.

Mr. Skowronski's office publishes drafts of these reports, which are free; write asking for the ones that are available; they won't take your request over the phone.

--Peter Montague

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Descriptor terms: superfund; water supply; toxicity; atsd; cadmium; heavy metals; incineration; health effects; liver disease; nervous system; blood; reproductive hazards; systemic toxicity; developmental disorders; infants;