STATE OF CALIFORNIA—HEALTH AND WELFARE AGENCY

GEORGE DEUKMEJIAN, Governor

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September 8, 1988

Robert P. Ghirelli, D.Env.
California Regional Water Quality
Control Board
107 South Broadway, Suite 4027
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Dear Dr. Ghirelli:

Thank you for holding the August 31, 1988 meeting between our two agencies concerning the issue of auto shredder wastes. I found the meeting informative and productive. As we discussed, both of our agencies have worked together with this waste problem for a number of years. Due to this extensive history, along with the technical expertise within both of our groups, I feel confident that we can quickly and positively resolve the current issues before us.

The primary issue of concern is the applicability to auto shredder waste of the Total Threshold Level Concentration (TTLC) criteria as contained in California Code of Regulations (CCR), Title 22, Division 4, Chapter 30, Article 11, Section 66699. A secondary issue is the basis of the 50 mg/l criteria for the Soluble Threshold Level Concentration (STLC) for lead.

As I stated at our meeting, the Department has, since 1984, been aware of the TTLC values associated with auto shredder waste. These values for lead and occasionally for copper, zinc and other metals exceed the hazardous waste classification criteria contained in Section 66699 of the above referenced regulations. However, during the extensive research phase the Department conducted on this waste stream, the Department determined that the basis behind applying the TTLC criteria for the inorganic constituents contained in auto shredder fluff was inappropriate. The reason used by the Department in coming to this conclusion can be found in the Statement of Reasons filed with the regulation package R-45-78 that promulgated the hazardous waste classification procedures, tests, and criteria. Specifically, the Department views the TTLC values as a means to assess public health risks that the handlers of wastes, and the general public, are exposed to through the inhalation pathway (see enclosed exerpt from the Statement of Reasons, R-45-78). We rigorously use the TTLC criteria on a waste if it contains inorganics which are 10 microns or less in size. This size value is used because particles greater than 10 microns are not inhalable and thus do not pose a risk through this exposure pathway.

The Department has a long established history of classifying wastes nonhazardous even though they contain metals at a concentration greater than the established TTLC values contained in regulation. Such waste include many mining wastes, solidified wastes, and auto shredder wastes to name a few. In making such determinations, the Department relies upon CCR, Title 22, Division 4, Chapter 30, Article 2, Section 66305(e). This section gives the Department the authority to waive a criterion (i.e., TTLC values) if there are mitigating physical or chemical characteristics associated with the waste. The Department views auto shredder wastes as qualifying under Section 66305(e) and has so stated in each of the nonhazardous waste classification determinations we have made. Furthermore, the Department has received periodic analyses of auto shredder wastes generated by the various facilities located in your region and has not found a significant variation in metal or organic concentrations over time. Therefore, based on the above, as well as from independent analyses conducted by the Department, we do not feel evoking Section 66305(i) of Article 2 is appropriate at this time.

In regards to the secondary issue facing us, the Department over two years ago extensively researched the sorptive and desorptive properties of low electron state lead compounds and concluded that the 5 mg/l STLC value contained in regulations is not appropriate. This conclusion is strengthened by the fact that the Department uses citric acid as its extractant liquid and that citric acid is more aggresive toward lead than the other metals of concern. Therefore, the Department has drafted a regulatory amendment which will raise the STLC criteria for lead to 50 mg/l as long as the EP Toxicity test shows the lead value below 5 mg/l. This amendment will be part of our RCRA authorization regulatory package scheduled for release by the end of the year.

Again, the Department has over two years of history of classifying wastes with lead STLC values above 5 mg/l, but below 50 mg/l as nonhazardous. This includes auto shredder wastes from many of the generators.

I hope the above provides you with the information you need regarding the Regional Water Quality Control Board's position on Order #88-081. The Department will strongly support a recommendation to drop the TTLC requirements for metals contained in the Table on page 4 of your Order #88-081 (File #63-31) dated July 25, 1988. Please note, however, we also strongly support retaining the TTLC value for PCBs.

If you need further information on this issue, please contact me at (916) 322-2822.

Sincerely,

David J. Leu

David J. Leu, Ph.D., Chief
Alternative Technology Section
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Enclosure

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situation cannot be duplicated in a laboratory batch extraction test. The concentrations seen in laboratory-derived extracts, using low waste-to-liquid ratios, will have no bearing on concentrations existing at any instance within the landfills.

In order to avoid the arbitrary effects resulting from low waste-to-liquid ratios, the Department has chosen to measure the quantity of extractable metals in the waste itself, expressing that quantity in milligrams per kilogram of waste. Within the waste-to-liquid ratios normally used in laboratory extraction tests, researchers have demonstrated that the ratio has little effect on the quantity of metal extracted.

Thus, it is assumed that in an actual landfill, the concentration of extracted metals in the leachate will be at least equal to the concentration of extractable metals in the waste during the active leaching period for the waste. Accordingly, it is believed that measurement of soluble concentration of metals in milligrams per kilogram of waste provides a more reliable prediction of potential environmental hazard of a waste, since it is independent of artificial laboratory variables in the extraction procedure.

Rationale for Total Threshold Limit Concentration

The instances described earlier establish the need to control the disposal of certain wastes containing toxic persistent and bioaccumulative substances. However, very few studies or data are available to aid in establishing a TTLC value. It is expected that the environmental behavior of toxic substances contained in particles will be very different from those that occur in solution. Utilization of even a rudimentary mathematical model to predict attenuation or mobility of particulate toxics from improperly disposed wastes is not valid.

TABLE IX

Basis for STLC Values of Persistent and Bioaccumulative Toxic Substances

Substance	Basis	96-hr LC_{50} (mg/l)	Species	Reference	STLC mg/kg
Aldrin	5xLC_{50}	0.028	FM a/	NAS/NAE 1973	0.14
Antimony	5xLC_{50}	20	FM	NAS/NAE 1973	100
Beryllium	5xLC_{50}	0.15	FM	McKee & Wolf 1963	0.75
Chlordan	5xLC_{50}	0.05	FM	NAS/NAE 1973	0.25
Chromium (III)	5xLC_{50}	112	FM	DFG 1983	560
Cobalt	5xlethal conc	15 d/	Stickle-back	McKee & Wolf 1963	75
Copper	5xLC_{50}	0.5	FM	Horning & Neihesel 1979	25
DDT	5xLC_{50}	0.02	FM	NAS/NAE 1973	0.1
DDD	5xLC_{50}	0.02	FM	NAS/NAE 1973	0.1
DDE	DDT STLC	--	--	--	0.1
Dieldrin	5xLC_{50}	0.016	FM	McKee & Wolf 1963	0.8
Dioxin	b/	0.056 g/1	Coho Salmon	EPA (draft)	0.001 mg/kg
Heptachlor	5xLC_{50}	0.094	FM	EPA 1976	0.47
Kepone	5xLC_{50}	0.42	FM	Buckler et al. 1980	2.1
Lead, Organic	c/	--	--	--	13
Mirex	Kepone STLC	--	--	--	2.1
Molybdenum	5xLC_{50}	70	FM	NAS/NAE 1973	350
Nickel	5xLC_{50}	4	FM	NAS/NAE 1973	20
PCB	5xLC_{50} (Arochlor 1260)	0.05 (30 day)	Rainbow Trout	Mayer et al. 1977	5
PBB	PCB STLC	--	--	--	1.2
Pentachorophenol	5x LC_{50}	0.35	FM	McKee & Wolf 1963	1.7
Trichloroethylene	5xLC_{50}	40.7	FM	Spehar et al. 1980	204

TABLE IX (continued)

Basis for STLC Values of Persistent and Bioaccumulative Toxic Substances

Substance	Basis	96-hr LC_{50} mg/l	Species	Reference	STLC (mg/kg)
Thallium	$5xLC_{50}$	1.4	Salmon	Zitko et al. 1975	7.0
Vanadium	$5xLC_{50}$	4.8	FM	NAS/NAE 1973	24
Zinc	~~50~~ $5xLC_{50}$	4.9	FM	NAS/NAE 1973	250

a/ Fathead Minnow

b/ Due to extremely low aquatic LC_{50}, the calculated STLC is 0.28 µg/kg. The STLC is accordingly raised to 1.0 µg/kg or 0.001 mg/kg.

c/ Based on the tetraethyl lead (TEL) study reported in ~~reference-143~~ DOHS 1976 in which sludge containing 77 mg/kg of organic lead produced organic lead vapors 6-fold in excess of the 8-hour TLV for TEL. Hazard threshold level = 76÷6 = 13 mg/kg.

d/ Lethal concentration.

Based on the case histories and discussions covered earlier, the Department is concerned about several potential routes of dissemination and exposure to particulate toxics. They are as follows:

a. Surface run-off and contamination of land and water.

b. Direct discharge into waterways.

c. Volatilization of organics.

d. Airborne dispersal before, during, and after disposal.

e. Direct on-site land contamination.

f. Long-term solubilization.

It was decided to consider the potential impacts on land, resulting from improper disposal of particulate toxic wastes, in establishing TTLC values. The most direct impact of indiscriminate disposal is contamination of the land and the attendant potential impact on organisms which contact the land. These can include persons, animals, or plants. Inorganic and organic persistent and bioaccumulative substances were considered separately because the inorganic substances (i.e., metals and fluoride) are natural soil and rock constitutents and, in some cases, essential human nutrients at low levels. The organic substances on the other hand are largely artificial, highly toxic, and bioaccumulative; few, if any, are formed by nonanthropogenic processes.

It was decided that the STLC values would be used as a starting point to develop TTLC values. The STLC values, derived on the basis of potential chronic toxicity of the substance, reflect the approximate relative toxicity of the substance. On the basis of earlier discussions on safety and uncertainty factors, it was decided that application of an uncertainty factor was valid to take into account the likelihood that not all of a particulate persistent and bioaccumulative toxic substances placed in the environment would be available for ingestion or uptake by organisms.

The STLC values were, accordingly, multiplied by 100 to yield the initial TTLC values. The factor can be viewed as a reverse factor; that is, one assumes that the overall toxicological hazard posed by a particulate inorganic toxic substance will be no greater than 1/100 times the hazard posed by its immediately soluble counterpart. The initial TTLC values are listed in Table X on page 106. Additionally, the table

commentator provided a large ammount of data showing various pesticide levels on croplands across the nation. (Ex-12, C-22)

Response: The commentator is apparently arguing that the TTLC values for various pesticides listed in this section should be reconsidered because in most cases the proposed TTLC values fall within the ranges reported in the literature. The means reported, however, consistently fall below the proposed TTLC values. In the Statement of Reasons (pages 102 and 109), the Department noted that the proposed TTLC values for pesticides fall below reported means for the compounds on the croplands in order to demonstrate that the TTLC values were not excessively high. The Department believes that its position is reinforced by the data provided by the commentator.

The Department cannot agree that the proposed TTLC values should fall above the maximum cropland values reported, as these levels represent the upper extremes of contamination and they cannot be assumed necessarily to be safe or acceptable levels. The Department believes that the mean values, which represent more typical background levels for croplands, are the most meaningful for comparing with proposed TTLC values. It should also be pointed out that the TTLC value are usually one or two orders of magnitude greater than mean background levels, indicating that they fall consistently on the higher side of background ranges.

No change is proposed on the basis of this comment.

Comment: It should also be noted that the hapless vitamin pill failed the TTLC for zinc by a wide margin. Each pill contains enough zinc individually to fail the test by nearly a factor of four. Nickels, pennies, and other metallic objects would obviously fail the test as well. (Ex-2)

Response: The Department recognizes that many household materials such as some vitamins would fail the criteria. The fact that a material has common household use, and perhaps is even injested in small quantities by humans, cannot exempt the material or substance (e.g., zinc compound, in the example) from scrutiny as a possible hazardous waste when large quantities are to be disposed of into the environment. Although zinc compounds are minimally toxic to humans, they are very toxic to many aquatic life forms. The Department has provided adequate justification for calling zinc compounds hazardous in an earlier document (DHS 1983d).

Metallic objects would not fail the test because they are explicitly exempted from the STLC and TTLC criteria unless they occur in a friable, powdered, or finely divided state.