TABLE 1.—Measured Metals Levels in CKD 1—Continued

[Mg/kg (parts per million), total basis]

Metal	No. of sam- ples	Min.	Mean	Max.
Cadmium	61	0.065	9.7	44.9
Chromium	61	3.9	31.2	105
Lead <sup>2</sup>	63	3.1	287	2,620
Mercury	57	0.003	0.33	2.9
Nickel	45	3	19.9	55
Selenium	52	0.1	12.2	103
Silver	56	0.25	5.9	40.7
Thallium	57	0.44	33.6	450

<sup>1</sup>Metals data sources include 1992 APCA survey, EPA sampling data, and public comments on the RTC.

<sup>2</sup> The median value for lead is 113 mg/kg.

For many of the toxic metals, the concentrations detected in kiln dust were not significantly different whether the dust is generated from kilns that burn or do not burn hazardous waste. However, for lead, cadmium, and chromium, the mean concentration found in CKD generated by kilns that burn hazardous waste is measurably higher than in CKD from those kilns that do not burn hazardous waste; conversely, thallium and barium concentrations are measurably higher in CKD from kilns that do not burn hazardous waste.<sup>3 4</sup>

With respect to organics, volatile and semi-volatile compounds were generally not found in CKD. However, levels of 2,3,7,8-substituted dioxin, and 2,3,7,8substituted dibenzofuran were detected, although the concentrations were generally low—ranging from 0.5 to 20 ppt for dioxin and non-detected to 470 ppt for furan. The calculated 2,3,7,8-TCDD TEQ values for the facilities sampled by EPA ranged from nondetected to 9 ppt.

**Note:** EPA sampling data for one cement plant reported a total dioxins concentration in CKD as high as 16 ppb, with a TEQ value for the managed CKD of 195 ppt. The total dioxins level measured for this plant were at least 2½ times higher than those found at any of the other plants sampled by EPA.

In terms of potential constituent solubility and release, leach test results show that no significant distinction can be made between CKD generated from kilns that burn hazardous waste and those that do not burn hazardous waste. (This finding was corroborated for metals in CKD by leachate test results submitted to the Agency by the cement industry.) For example, laboratory analysis of CKD using the Toxicity Characteristic Leaching Procedure (TCLP) shows that trace metal concentrations rarely exceed RCRA toxicity limits, whether or not the CKD is generated at kilns that burn hazardous waste.<sup>5</sup>

## E. Documented Evidence of Damage

Migration of potentially hazardous constituents, including metals, has occurred from CKD waste sites. In the RTC and subsequent NODA, EPA identified 14 cases of damage (10 documented and 4 potential) to surface water and ground water and 36 cases of documented damage to air from CKD waste.<sup>6</sup> By damage, the Agency means that metal constituents have contaminated ground water and/or surface water, and/or air above a federal or state standard (e.g., a maximum concentration limit). Constituents of concern that have been released to ground and surface waters include arsenic, chromium, and lead, among others. When ground water and surface water exceedances do occur, the magnitude of the exceedance is variable, going as high as two orders of magnitude above the standard. Environmental damage generally affects the area in the immediate vicinity of the waste disposal site. However, in some cases, nearby wetlands and streams that

are off-site were also affected. For example, excessive discharges from two facilities in Mason City, Iowa caused severe degradation of the aquatic habitat in nearby Calmus Creek. Observed releases are commonly chronic at sites at which exceedances have been documented. However, most of the documented surface water damage cases occurred prior to 1991, which was before implementation of NPDES general stormwater permits.

Information on environmental quality, on which this evidence is based, is limited by available data from each of the 127 sites evaluated. For those sites for which data were available. files contained information on releases, but little human exposure data. Significantly, releases to ground water were observed at all sites for which EPA has received ground water monitoring data; if there had been additional ground water monitoring data from other sites, further evidence of leaching and contamination would likely have been found. While the Agency has no documented data on contaminant transport off-site, or documented data on human exposure and risk at the point of drinking water use, this is because the drinking water wells at these sites are currently located far enough away, and/or tap aquifers are isolated enough, to be unlikely to intersect contaminated ground water. To the extent that wells would be drilled closer to the sites or the contamination spreads, there is potential that the wells would tap CKDcontaminated ground water. Waste disposal practices at sites where water damages have been documented include management in waste piles, abandoned guarries, or landfills, all of which were unlined. Air damages are cited as primarily due to mechanical failure of dust handling equipment.

<sup>&</sup>lt;sup>3</sup>The differences cited are those discernible at a 95 percent confidence level.

<sup>&</sup>lt;sup>4</sup>While lead, cadmium, and chromium were observed to be higher in CKD from facilities that burn hazardous waste, generally the difference in mean constituent concentrations by themselves are not enough (i.e., do not differ by more than a factor of about 2) to result in discernible risk estimates between facilities that do and do not burn hazardous waste, after considering other sitespecific factors affecting exposure (e.g., proximity of exposure points, topography). The concentrations of barium, chromium, and nickel in CKD are within the typical range found in U.S. soils.

<sup>&</sup>lt;sup>5</sup> A separate issue raised by commenters is whether the TCLP adequately depicts the potential for metals to leach from CKD. See the background document to this Notice entitled *Summary of and Response to Comments on the Report to Congress* in the RCRA docket for a discussion of this issue.

<sup>&</sup>lt;sup>6</sup>EPA received many comments on the specific damage cases described in both the RTC and subsequent NODA. Based on review of the damage cases, except for only one reassessment, the Agency believes the information received does not contradict the Agency's basic conclusions regarding any of the damage cases.