

TABLE 1.—CANDIDATE POLLUTANTS FOR EXPOSURE AND HAZARD SCREENING—Continued

Chemical	CASRN
Chlorobenzilate	510-15-6
Chlorpyrifos	2921-88-2
Cresol, o-; 2-Methylphenol	95-48-7
Diazinon	333-41-5
Dichloroethene, 1,2-trans-	156-60-5
Dichloromethane; Methylene chloride	75-09-2
Dioxane, 1,4-	123-91-1
Endrin	72-20-8
Ethyl p-nitrophenyl phenylphosphorothioate; EPN; Santox	2104-64-5
Fluoranthene	206-44-0
Hexachlorocyclohexane, alpha-	319-84-6
Hexachlorocyclohexane, beta-	319-85-7
Isobutyl alcohol	78-83-1
Manganese	7439-96-5
Methyl ethyl ketone	78-93-3
Methyl isobutyl ketone (MIBK); Methyl-2-pentanone, 4-	108-10-1
Naled	300-76-5
Nitrate	14797-55-8
Nitrite	14797-65-0
N-Nitrosodiphenylamine	86-30-6
Phenol	108-95-2
Pyrene	129-00-0
Silver	7440-22-4
Trichlorofluoromethane	75-69-4
Trichlorophenoxy propionic acid, 2,2,4,5-; Silvex	93-72-1
Trichlorophenoxyacetic acid, 2,4,5-; 2,4,5-T	93-76-5
Trifluralin	1582-09-8
Xylenes (mixture)	1330-20-7

Data collection and evaluation, along with the results for determining sufficiency of data to proceed with an exposure and hazard screening assessment for a pollutant, are available in detail in appendix O of the TBD (USEPA, 2003b).

As described by Figure 1, EPA did not include pollutants for which the scientific basis for the HHBs is currently being reassessed. This applied to certain chemicals with HHBs in IRIS or OPP's IREs and REDs. EPA has not included these chemicals in the list of chemicals to consider for exposure and hazard screening assessment at this time because these HHBs are critical to determining whether, and at what level, pollutants might be of potential hazard in sewage sludge. Because, under section 405(d)(2)(C), EPA is required to review the sewage sludge regulations for identification of additional toxic pollutants every two years, EPA has deferred chemicals with ongoing health assessments for a future review when the assessment is complete. EPA believes that the HHB reassessments will provide valuable information relevant to possible further regulation of sewage sludge once they are complete

and that it would be premature to include these pollutants in a hazard screening process at this time.

At the same time, EPA recognizes that some of the chemical pollutants which are undergoing HHB reevaluation may be of concern in sewage sludge, and that it may be prudent to include such pollutants in the planned targeted survey (*i.e.*, section VII.B, Project 5) so that concentration values in sewage sludge may be obtained and used in future section 405(d)(2)(C) reviews. Therefore, EPA used a simple estimate of potential hazard to prioritize chemicals with ongoing health assessments for possible inclusion in the targeted survey.

The simple estimate involved calculating a theoretical hazard quotient (THQ) for each of the 20 chemicals with ongoing IRIS or OPP health assessments using existing oral human health benchmarks. The THQ is the ratio of the theoretical average daily intake (TADI), for a 1-3 year old child, one of the most highly exposed population groups on a kg body weight basis, to the oral critical dose (OCD), where the OCD (in milligrams/kilograms/day, or mg/kg/day) is the lowest of the reference dose, population adjusted dose, or dose for 10⁻⁵ cancer risk.¹ On this basis, a prioritization scale was established for the 20 chemicals with ongoing IRIS or OPP health assessments, which have existing oral human health benchmarks. Using this priority scale and results of the exposure screening assessment, EPA decided which chemicals to consider high priority for potential health concern and, subject to the availability of adequate budgetary resources, to include in the targeted survey to be initiated in FY 2005. These are benzo[a]pyrene, PCB congeners and Aroclors (excluding coplanar PCB congeners already included in the 2001 dioxins survey), di(2-ethylhexyl) phthalate, thallium, antimony, carbon tetrachloride and fluoride. This prioritization strategy is further described in appendix O of the Technical Background Document (USEPA, 2003b). These pollutants are

¹ The NRC recommended that EPA evaluate risks based on "reasonable maximum exposure" (RME). Therefore, in the hazard screening assessment, EPA uses a risk level of 1E-5 to calculate the RME to a subpopulation of highly exposed individuals, rather than a 1E-6 risk level to calculate risk to the general population. A risk level of 1E-5 is consistent with setting such a risk level for, and being protective of, the RME in the sewage sludge regulations. Members of the subpopulation defined as subject to RME are farm families assumed to live on a farm and consume farm-raised foods where land-applied sewage sludge is used as fertilizer or a soil amendment and, therefore, are more highly exposed to sewage sludge than the general population.

not being identified at this time for purposes of further regulatory consideration as part of EPA's current review under section 405(d)(2)(C).

As mentioned above, the 40 pollutants listed as a result of the selection process depicted in Figure 1 were next analyzed through an exposure and hazard screening process. The principal objective was to evaluate whether the Agency should consider any of these as additional toxic pollutants for regulation in sewage sludge under section 405(d) of the CWA. As discussed in section X, the screening assessment identified 15 pollutants with hazard quotient (HQ) values equal to or greater than one.

IX. Hazard-Based Screening Assessment

EPA used a probabilistic hazard assessment model with appropriately conservative assumptions to analyze the 40 pollutants identified as a result of the data evaluation and pollutant selection process. This section describes the data and analyses EPA used in this screen for the 40 pollutants listed in Table 1. The two major questions addressed in this assessment were:

- Which environmental pathways are of concern?
- What is the potential hazard associated with each pollutant?

The Technical Background Document (TBD) (USEPA, 2003b) contains the rationale behind the relationships addressed and the methods, data gaps, and uncertainties associated with the data and models. The TBD also contains details about properties of sewage sludge, regional climate, soil characteristics, farm size, exposure routes and pathways, toxicity values, source models and other modeling parameters and assumptions related to the screening assessment.

A. Sewage Sludge Management Practices Modeled

The exposure and hazard screening assessment evaluated the 40 chemicals for three sewage sludge management practices:

- Disposal in sewage sludge lagoons (surface disposal units),
- Application of sewage sludge to pastureland and cropland, and
- Sewage sludge fired in a sewage sludge incinerator.

Below is a summary description of the screening scenarios and key assumptions for the three sewage sludge management practices.

1. Sewage Sludge Lagoon Scenario

The lagoon scenario was the surface disposal unit chosen for the model