

Attachment 6

Portland's Approach to Biosolids Dioxin Management

Background

In late April 1990, the City of Portland learned that dioxin furans measured in the City's domestic wastewater treatment facility solids products (discovered under EPA's National Sewage Sludge Survey) were higher than levels found in most other solids surveyed nationwide. As a consequence, the City, EPA Region 10, the Oregon Department of Human Resources Health Division, and Oregon Department of Environmental Quality (DEQ) concluded a scientific assessment to evaluate the potential impact of Portland's solids products advisable.

Portland retained Limno-Tech., Inc. and ICF/Clement-K.S Crump Division in early May 1990 to work with agencies mentioned above on the development of a human health implications risk assessment which recognized dioxin and furan levels in Portland solids, solids manufacturing processes and solids use practices, including land application and compost preparation and use. No attempt was made to conduct comparative risk assessments for alternative solids managing practices (e.g., incineration), although variations on practices that were in effect at the time were examined. The risk assessment attempted to: (1) determine whether an imminent and immediate health hazard was represented by solids management practices in effect at that time and a provide regulatory authorities opportunity to make recommendations that might minimize whatever hazard(s) was deemed present (e.g. via limits, prohibitions, warnings, etc; (2) guide future investigations recognizing that routes of greatest exposure and areas of uncertainty were identified; and (3) support future risk assessments of regional or national scale related to sludge management practices and comparative risk assessments.

Populations of concern were defined to represent identifiable populations theoretically exposed to dioxins and furans observed in solids. Seven populations of concern were identified. Their human health risks were characterized. The intent was to realistically characterize the risk that might exist to an actual population rather than an extreme case that likely does not exist. The risk assessment neither represented a worst nor a best case scenario.

Comments from parties participating in the risk assessment were made an appendix to an October 19, 1990 publication entitled *'Compendium of Documents Regarding A Risk Assessment of Dioxins and Furans in Sludge'* prepared by Limno-Tech, Inc. and ICF/Clement-K.S Crump Division.

The risk assessment provided a quantitative assessment of the estimated incremental risk of cancer over a 70 year lifetime based on an upper bound estimate of carcinogenic potency and the exposure scenarios developed and documented. It included a table of action levels (in sludge and compost) given selected risk targets considered.

Regulatory Response

As a result of the risk assessment, on January 15, 1991, the Oregon Health Division advised the Oregon DEQ on uses of sludge and compost produced at Portland's Columbia Boulevard Wastewater Treatment Plant. In its advisory, the Health Division recommended:

1. The City continue in its efforts to identify possible dioxin contamination sources to incoming sewage and eliminate or reduce to the largest extent possible all such contamination.
2. The City continue to monitor, on a quarterly basis, dioxin levels in new compost or solids produced.
3. The City be allowed to apply solids to range and pasture land used for grazing beef animals in north central Oregon provided:
 - ? The total TCDD TEF concentration in land applied solids not exceed 285 ppt.
 - ? The proportional contribution of each homologue to the TEF remained within 20% of the values used in the October 1990 risk assessment. If the contribution changed more than 20%, it was recommended the risk assessment be recalculated using the newly observed concentration for all homologues. Sludge with significantly different homologue concentration patterns could be applied provided the calculated risk did not exceed 1×10^{-6} .
 - ? Sludge with a TEF in excess of 285 ppt could be applied to grazing land under special procedures designed to assure that the amount of dioxin ingested by the animals to be slaughtered for beef did not exceed that estimated for the application described above. This could include procedures such as plowing the solids into the soil or postponing grazing on the land for several years. Such procedures would require DEQ approval.
4. Sludge could not be applied to land used for raising hay, or forage for dairy cattle unless the product dioxin/furan TEF was less than 21.5 ppt.
5. Compost could be used for landscape purposes according to the following:
 - ? If the dioxin TEF content was less than 285 ppt, both retail and bulk sales could occur. The retail package must contain the statement, "Although this product meets all standards set by federal and state agencies, compost should not be used for vegetable gardening to avoid incidental ingestion. Compost is for ornamental gardens only, such as flowers, shrubs, lawns, indoor and outdoor potted plants, planter boxes and trees." The invoice for every bulk sale of compost was required to be accompanied by this statement.

- ? If the compost dioxin TEF were between 285 and 600 ppt, all marketing and distribution of product would be limited to bulk sales. The invoice for every bulk sale would have to be accompanied by the caveat stated above. Maximum effort would need to be made to distribute this material to public sector markets, including landfill cover materials markets, parks, golf courses, and limited access landscape areas. All bulk users would be required to sign a statement that they would use the compost for landscape purposes only. City employees and contract employees in regular contact with compost would be required to wear gloves. Commercial buyers for compost would need to be informed that they should provide their workers with gloves.

- ? All distribution of compost would be suspended if the dioxin TEF exceeded 600 ppt.

The Health Division also discouraged the use of compost or sludge on land used for raising vegetables for human consumption.

As a consequence of the advisory, the Oregon Department of Environmental Quality imposed quarterly sludge and sludge-derived compost dioxin/furan monitoring requirements in The City's Columbia Boulevard Wastewater Treatment Plant NPDES Permit. That permit also recognized the City's solids products would be managed under a DEQ authorized biosolids management plan which was an enforceable codicil to the permit by reference and under Oregon Administrative rule (OAR Chapter 340, Division 50). The biosolids management plan, in part required regular quantification of dioxin content in land applied biosolids and biosolids compost. It also required the City to maintain records of all compost sales (indicating the amount sold, and name and address of the purchaser) and required the City or its contract compost vendor to provide compost customers with a statement (signed by the customer) acknowledging appropriate product uses. Further, the management plan required the City, via its contract applier, to account for the date, location and mass of biosolids that were land applied at the City's north central Oregon pasture operation. In addition, the site authorization letter issued by DEQ enabling the land application of biosolids in north central Oregon, also an enforceable codicil to the NPDES permit by reference and under Oregon Administrative rule (OAR Chapter 340, Division 50), required the site to be managed in accord with limits and management practices established under the Oregon State Health Division's January 15, 1991 advisory to DEQ (discussed above). These provisions have continued to be imposed in subsequent NPDES permits issued to the Columbia Boulevard Wastewater Treatment facility and they are likely to remain, pending the promulgation of 503 regulations covering this issue.

Data and a statistical analysis of biosolids dioxin and furan levels are required by DEQ Portland's annual biosolids management program report. This report also details soils levels and site management practices related to dioxin management during the reporting period.