

GCI TECH NOTES[®]

Volume 05, Number 03

A [Gossman Consulting, Inc.](http://www.gossmanconsulting.com) Publication

March, 1999

Restricting Highly Toxic Wastes at Hazardous Waste Fuel Facilities

by
David Gossman

Introduction

Over the last 20 years, hazardous waste fuel (HWF) facilities at cement plants and blenders have developed various means and rationale for restricting highly toxic wastes. Those steps are usually taken outside any specific regulatory frame work or rationale, generally in order to protect facility employees and associated corporate liability.

Reasons for Restrictions

While a handful of HWF facilities restrict certain highly toxic wastes out of concern for off-site fugitive emissions, the dominant reason is employee protection. It is generally recognized that personal protective equipment is used as a last resort and has inherent limits. Engineering controls to prevent exposure are the first line of defense and these engineering controls can include restriction on HWF component toxicity. Even with these types of controls, shipment sampling and analysis still poses some risks because of potential unknowns. For this reason, most facilities require organic cartridge respirators and other PPE during sampling and the handling of lab samples in operating fume hoods.

Criteria Used for Restriction

There are three basic types of criteria used to establish limits on highly toxic compounds. The first of these is arbitrary, meaning a limit on one or more toxicity parameters is set beyond which that compound will not be accepted. Such parameters are frequently based on national or internationally recognized thresholds for "high" toxicity. An example is the oral rat LD50 limit of 50 mg/kg. A facility simply designates that compounds with an oral rat LD50 of D50 mg/kg will not be accepted above a certain concentration, typically 0.1% or 1.0%.

A second type of criteria is based on actual exposure data. Employees are monitored for both short and long term exposure in various work environments. That data can then be used to establish a threshold for compound and/or waste stream rejection based on TLVs and relative vapor pressures.

A third type of criteria that is used is based on reasonable worst case risk scenarios. This type of criteria is particularly valuable for setting limits on compounds that present acute dermal exposures.

This exercise also frequently results in an increased level of PPE use to prevent potential exposure routes instead of overly restricting HWF receipts.



It should be noted that some facilities have historically used a combination of all three of these types of criteria and in doing so have developed rather sophisticated compound/waste stream evaluation models.

Sources of Compound Toxicity Evaluation Data

Whether limited data, such as oral rat LD50's, or a more expansive list, including dermal, inhalation, ingestion and chronic toxicity data is needed, the single best source is the "Registry of Toxic Effects of Chemical Substances". This database is available on-line or in CD-ROM format and is cross referenced to CAS numbers. For more limited choices of data on relatively common compounds, "The MERCK Index" is a good choice. In many circumstances, specific types of data for selected compounds may not be available. In these circumstances, an "experienced" chemist or toxicologist can look for surrogate compounds with similar functionality for which the needed data is available.

Results

As a result of these exercises to restrict highly toxic waste, facilities have developed compound lists. These lists generally break down into three categories. First are those compounds acceptable at any concentration in a waste stream. Second is a list of compounds that are restricted in some manner. Restriction can include concentration limits in waste streams and/or special handling procedures such as special use PPE. The third list would be compounds considered unacceptable, either at any concentration or more often at some arbitrary threshold such as 0.1%.

Conclusion

The HWF management industry has historically gone beyond regulatory requirements to protect workers by developing criteria to restrict highly toxic wastes. Some of these systems are complex toxicity/exposure evaluation models which represent cutting edge developments in controlling employee exposure and limiting corporate liability.