

in their community, in that facilities handling chemicals not on the EHS list could be as hazardous as those handling EHSs.

## 1. Regulatory Background

The EHS list and their TPQs are codified in 40 CFR part 355, appendices A & B. EPA's explanation for the methodologies used to determine whether to list a substance as an EHS and for deriving the TPQs is found in preambles to the **Federal Register** notices which promulgated these rules and in technical support documents in the rulemaking records. The relevant notices were published in the **Federal Register** on November 17, 1986 (51 FR 41570) and April 22, 1987 (52 FR 13378).

EPA first published the EHS list and TPQs along with the methodology for determining TPQ in the November 17, 1986 interim final rule. In the April 22, 1987 final rule, EPA made a number of revisions. Among other things, the April 1987 rule republished the EHS list, with the addition of four new chemicals and revised the methodology for determining some TPQs. EPA has since received several petitions to amend the EHS list.

## 2. Summary of October 1994 Proposed Rulemaking

In the October 12, 1994 (59 FR 51816) proposed rulemaking, EPA responded to seven petitions requesting action on substances listed as EHSs. Among these petitions, Hüls America Inc. petitioned EPA to delist isophorone diisocyanate (IPDI) (CAS No. 4098-71-9). EPA denied the petition to delist IPDI because it meets the criteria for an EHSs. However, in considering this petition, EPA noted that the TPQ had been determined based on a mistaken assumption that IPDI is a reactive solid at standard temperature, when in fact it is a liquid and not highly reactive. Accordingly, using the methodology for calculating TPQs for liquids, EPA proposed in 1994 to raise the TPQ for IPDI from 100 to 1,000 pounds, even though Hüls America did not request this change in their petition.

As a result of EPA's action, Hüls America filed a lawsuit in federal court challenging EPA's denial of the delisting petition for IPDI. The Agency's decision not to delist IPDI was upheld by the United States Court of Appeals for the District of Columbia Circuit (DC Cir.) in *Hüls America v. Browner*, 83 F.3d 445 (1996). Accordingly, today's rulemaking does not address any issues regarding whether IPDI should be removed from the EHS list under EPCRA, but is

limited solely to the appropriateness of the TPQ for IPDI.

## II. EPA's Methodology for Establishing TPQs for Liquids

The TPQs developed for EHSs are based on a ranking of the EHSs according to their potential to become airborne and disperse and their toxicological properties, with adjustments based on chemical reactivity and other factors. The Immediately Dangerous to Life and Health (IDLH) level developed by the National Institute of Occupational Safety and Health (NIOSH), or an approximation of the IDLH based on animal toxicity data, is used as an index of toxicity while the physical state and volatility of the substance are used to derive an index of the chemical's potential to become airborne and disperse. These two indices are combined to produce an overall risk score or "ranking factor" defined as IDLH/V, where V is the index of potential to become airborne and disperse. TPQs are then assigned to groups of EHSs according to their relative ranking. The lowest rank (highest concern) is assigned low quantities and the highest rank (lowest concern) is assigned high quantities.

The index of potential to become airborne and disperse (V) is derived using the physical state of the substance and a measure of its volatility. For EHSs that are gases at ambient conditions and powdered solids with a particle size less than 100 micron, V is assumed to have a value of 1, indicating that in an accidental release, the chemical could easily become airborne and disperse. Solids in non-powdered form are assigned the highest TPQ meaning that chemicals in this physical state are not likely to become airborne and disperse.

For liquid EHSs, V is derived from the rate of volatilization expected from a spill of the liquid at its boiling point. The rate of volatilization is driven by the molecular weight of the substance and its boiling point temperature as in the following equation:

$$V = 1.6M^{0.67}/(T + 273)$$

where M is the molecular weight of the substance and T is the boiling temperature (°C). Note that for liquids with low boiling points (volatile liquids), V will approach 1 (more like a gas), while high boiling liquids have a V much less than 1.

The Agency could have evaluated the rate of volatilization from a spill of the liquid at ambient conditions rather than at the liquid's boiling point. Typically, to calculate the rate of volatilization of a liquid at ambient conditions, an

ambient temperature must be chosen and the liquid's vapor pressure at that ambient temperature must be known. Chemical reference books often publish the vapor pressure for many common substances at 20 or 25 °C. However, some of the liquids on the EHS list either have a vapor pressure at a different temperature or they have no published vapor pressure. The Agency could have estimated or calculated vapor pressures for these substances but the accuracy of such estimates or calculations could be questioned. A more critical question is the choice of an appropriate ambient temperature. Ambient temperatures vary widely across the United States and an accidental release scenario could involve heat from, for example, a loss of reactor cooling or from a fire. The choice of an appropriate ambient temperature would be influenced by site-specific or release scenario specific factors. Since the Agency needed to apply a methodology uniformly to all liquid EHSs rather than chemical-by-chemical or site-by-site, the Agency therefore chose to evaluate the rate of volatilization using the substance's boiling point. All of the liquids on the EHS list have a published boiling point.

As noted above, once V is determined, the "ranking factor" is calculated from IDLH/V. If an IDLH value is not available, as is the case for most of the EHSs, EPA uses an IDLH equivalent value estimated from acute animal toxicity data. Data such as the lowest lethal airborne concentration ( $LC_{LO}$ ), lethal airborne concentration for 50% of the test animals ( $LC_{50}$ ), lowest lethal dose ( $LD_{LO}$ ), or lethal dose for 50% of the test animals ( $LD_{50}$ ) are used. NIOSH has indicated that the IDLH is most similar to the  $LC_{LO}$ ; the other toxicity data needs to be adjusted and converted to an airborne dose comparable to an IDLH as follows: (1) Estimated IDLH =  $LC_{50} \times 0.1$ ; (2) estimated IDLH =  $LD_{50} \times 0.01$ ; and (3) estimated IDLH =  $LD_{LO} \times 0.1$ .

So, for each liquid, gas, and solid on the EHS list, EPA calculates the ranking factor as described above. Once all the chemicals are ranked, they are grouped by orders of magnitude of ranking factor and threshold quantities are assigned to these groups. The table below shows the ranking factor and the threshold quantities assigned to them. (Source: Threshold Planning Quantities Technical Support Document, April 7, 1987).