
QUESTION: **A laboratory has a 10-gallon container of 30% hydrochloric acid that feeds a larger neutralization tank. Can the acid be screened out based on the fact that it's less than 5 gallons of HCl? If the lab were to start with a 5-gallon container instead, and dilute it in the larger vessel, they'd have more than 5 gallons of solution again. Would they then screen it back in because the 5-gallon threshold has been exceeded? If they dilute it enough, it will eventually drop below the vapor pressure threshold. The basic question is the following: When dealing with a mixture, does the "easily and safely manipulated by one person" quantity make sense only if it's based upon the amount of hazardous material in the mixture?**

ANSWER:

Generally, this question deals with two basic issues. The first issue involves the basis for the "easily and safely manipulated by one person" threshold quantity. The second issue addresses the health hazard rating for materials "as found." The additional comment added at the end of the discussion specifically addresses the special example presented above.

Issue 1: Basis for the "easily and safely manipulated by one person" threshold quantity.

The Order requires further analysis in an Emergency Planning Hazards Assessment (EPHA) for hazardous materials with Health Hazard rating of 3 or 4 in quantities greater than a quantity "easily and safely manipulated by one person". The reasoning behind that choice of words to describe what is, in effect, the lower threshold of emergency management concern is consistent with the following:

1. Quantities of the size described in the question have long been handled and used throughout DOE and in industry, business and educational institutions and there is no strong evidence that such quantities have caused or are causing significant harm to people outside the immediate workplaces where they are stored or used. In short, there appeared to be no compelling need for hazard-specific planning and preparedness to protect people outside the workplace from the effects of releases involving small (end-user-scale) quantities.
2. Operations involving small quantities of hazardous chemicals are subject to DOE- and OSHA-mandated workplace hazard controls and safety programs. Those controls and programs are specifically created to protect the health and safety of the worker who performs operations with hazardous chemicals, as well as other people in the same workplace. Setting the minimum screening quantities at the amount "easily and safely manipulated by one person" was seen as a way of limiting the degree to

which emergency management programs would overlap (and perhaps conflict) with the workplace safety program controls that are generally considered to be quite effective (as evidenced by the fact that DOE's occupational injury and fatality rates are consistently well below those for comparable labor categories in industry and commerce).

3. For small quantities of hazardous materials, the emergency management "toolbox" approach of hazard-specific analysis, planning and preparedness measures simply doesn't add much value. As the material quantity and the potentially affected area get smaller and smaller, the benefits of hazard-specific analysis, planning and preparedness measures also become smaller. At some point, hazard-specific analysis, planning and preparedness measures simply do not produce any improvement in our ability to protect human health and safety, beyond what is provided by general chemical safety controls, worker training, and standard HazMat response practices.
4. Summary: A quantitative measure of hazard at distance was not part of the rationale for setting the minimum screening threshold. Any adjustment of quantities of toxic materials during the screening process to account for concentrations less than 100% would suggest otherwise and would not be consistent with the reasoning used to set the minimum quantities. Some diluents, carriers, or adjuvants may actually change the release potential or alter the toxicity of a substance of concern, and those effects should be examined quantitatively (see issue 2 below). The Order intended that the toxic effects of materials not eliminated from further consideration by the screening process be examined quantitatively to determine the need for hazard-specific planning. The EPHA is the appropriate vehicle for that quantitative examination.

Issue 2: Health hazard rating for materials "as found."

Toxic chemicals in mixtures or solutions should be subjected to the screening process in the quantities, concentrations and forms that they are used and/or stored in a facility. One step in the screening process is to determine if the material is sufficiently hazardous to human health to warrant consideration in emergency planning. For mixtures or solutions containing toxic chemicals, the true health hazard rating may be different from that of any of the individual constituents. Whenever possible, a health hazard rating developed for the specific concentration and form of the material that exists in the facility should be used in screening, rather than the ratings for any individual component(s).

Additional Comment: The specific example given in the question might be a true laboratory scale operation and the 10 gallons are probably within the "reasonable" range for site-specific interpretations of the Order intent. The rationale presented above is

focused primarily on materials in containers "as delivered". There may be rare exceptions, but it really doesn't make a lot of sense to screen out 5 gallons of a concentrated material and then require it to be screened back in because it is diluted for use. Consider the following approach when the diluted material has a Health Hazard rating of 3 or 4 (or is not determined) and the quantity only nominally exceeds the screening threshold:

1. Screen it in, regardless of concentration/dilution; and
2. Perform a simplified "EPHA" analysis that demonstrates quantitatively, using a simple comparison of the volumes (and corresponding puddle sizes) and the respective vapor pressures, that the diluted substance represents an airborne source no greater than would result from a quantity of the concentrated material that could be screened out using the “easily and safely manipulated by one person” threshold. This simplified approach would be reasonable if evaporation is the only plausible release mechanism, but would not be appropriate if, for example, the diluted solution is pumped at high enough pressure to present the potential for a spray release.
3. Although some documentation of this simple treatment will be necessary, a full EPHA analysis is not required. If the facility in question has other materials requiring EPHA analysis that could potentially result in Operational Emergencies (OEs) requiring classification, the simplified analysis/comparison can be included in the EPHA document. However, if a formal EPHA for the facility is not required, then the results may be incorporated directly into the Hazards Survey or documented in some other form, such as an annex to the Hazards Survey.