

Determining Limits for Liquid Hazardous Materials (LA-UR 99-2600)

Dennis R. Armstrong
Los Alamos National Laboratory, Security and Safeguards Division, Emergency Management
and Response (S-8)
Box 1663 MS K496
505-667-6211
Armstrong@lanl.gov

Objective of work: This paper outlines that process and uses standard dispersion equations for a continuous release of vapors to the environment and rapidly calculates the “acceptable” quantity of material for 434 liquid chemicals selected from the DOE Subcommittee on Consequence Assessments and Protective Actions (SCAPA) Temporary Emergency Exposure Limit (TEEL) list, Revision 15.

Relationship to Workshop Theme (especially Accident and Consequence Analysis) : This provides facility managers with a simple tool to “look up” quantities of chemicals that the facility can have “on hand” without the need to consider process flow information for emergency planning.

Brief Description of the Work: This paper describes a method for calculating the volume of liquid hazardous material necessary to exceed protective action limits (e.g., Emergency Response Planning Guidelines-2 [ERPG-2] or the Temporary Emergency Exposure Limit-2 [TEEL-2]) at 30 meters from the release point. A basic dispersion equation is used to determine the release or evaporation rate for 434 liquid chemicals found on the DOE Subcommittee on Consequence Assessments and Protective Actions (SCAPA) TEEL list, Revision 15. These release rates are used in the formulas provided with the EPIcode and the ALOHA model to calculate the radius of the pool necessary to generate this rate of evaporation. The volume necessary to generate a pool with the calculated radius and one millimeter deep is presented in tables. Concentrations for selected chemicals are checked with the respective codes using a flat and an urban terrain scenario. The concentrations from the ALOHA model with the urban terrain scenario are approximately 6.1 greater than the ERPG-2 or TEEL-2 limits for all chemicals checked. A major difference between the models appears to be the method used to calculate the sigma in the dispersion equation for each process.

Results of the work: Paper provides attachments that list the physical parameters for the chemicals used for this process, the calculated release or evaporation rates for those chemicals, and the volumes for flat and urban terrain scenarios necessary to generate an ERPG-2 or TEEL-2 at 30 meters from the release site.

Benefits to Others : This paper provides emergency planners with a screening tool to identify when a facility exceeds quantities of material that could potentially generate a concentration above specified limits at 30 meters from the point of release and potentially require a hazard assessment in accordance with DOE Order 151.1.