

Rood, A.S., P.D. McGavran, J.W. Aanenson, and J.E. Till. 2001. "Stochastic Estimates of Exposure and Cancer Risk from Carbon Tetrachloride Released to the Air from the Rocky Flats Plant." Risk Analysis, Vol. 21 (4) pp 675-695.

**ABSTRACT:** Carbon tetrachloride is a degreasing agent that was used at the Rocky Flats Plant (RFP) in Colorado to clean product components and equipment. The chemical is considered a volatile organic compound and a probable human carcinogen. During the time the plant operated (1953-1989), most of the carbon tetrachloride was released to the atmosphere through building exhaust ducts. A smaller amount was released to the air via evaporation from open-air burn pits and ground-surface discharge points. Airborne releases from the plant were conservatively estimated to be equivalent to the amount of carbon tetrachloride consumed annually by the plant, which was estimated to be between 3.6 and 180 Mg per year. This assumption was supported by calculations that showed that most of the carbon tetrachloride discharged to the ground surface would subsequently be released to the atmosphere. Atmospheric transport of carbon tetrachloride from the plant to the surrounding community was estimated using a Gaussian Puff dispersion model (RATCHET). Time-integrated concentrations were estimated for nine hypothetical but realistic exposure scenarios that considered variation in lifestyle, location, age, and gender. Uncertainty distributions were developed for cancer slope factors and atmospheric dispersion factors. These uncertainties were propagated through to the final risk estimate using Monte Carlo techniques. The geometric mean risk estimates varied from  $5.2 \times 10^{-6}$  for a hypothetical rancher or laborer working near the RFP to  $3.4 \times 10^{-9}$  for an infant scenario. The distribution of incremental lifetime cancer incidence risk for the hypothetical rancher was between  $1.3 \times 10^{-6}$  (5% value) and  $2.1 \times 10^{-5}$  (95% value). These estimates are similar to or exceed estimated cancer risks posed by releases of radionuclides from the site.