



State of New Jersey

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TO: Gary Buchanan, Ph.D., Manager

THROUGH: Alan Stern, Dr.P.H., DABT

FROM: Gloria Post, Ph.D., DABT, Research Scientist

SUBJECT: Interim Ground Water Quality Criterion for 1-Chloro-1,1-Difluoroethane (HCFC-142b)

DATE: April 26, 2012

I have reviewed the USEPA IRIS assessment for 1-chloro-1,1-difluoroethane (HCFC-142b) and conclude that it is appropriate to derive the Interim Specific Ground Water Criterion for this chemical based on route-to-route (inhalation-to-oral) extrapolation of the NOAEL of (20,000 ppm) used as the basis for the IRIS inhalation Reference Concentration (5 mg/m^3) to derive a Reference Dose. This NOAEL is based on the lack of observed adverse effects at the highest exposure concentration in a 2 year (chronic) rat inhalation study (Seckar et al., 1986).

This conclusion is in agreement with the recommendation presented in the Interim Criterion Support Document submitted by Dr. Randy Shuler of ERM on 1/5/12. The Interim Specific Ground Water Criterion derived below, $100,000 \text{ } \mu\text{g/L}$, is also in agreement with the recommendation of Dr. Shuler of ERM. It should be noted that this value is also in agreement with the Tapwater Screening Level for this compound provided on the USEPA Regional Screening Level Table (November, 2011; http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/pdf/master_sl_table_run_NOV2011.pdf).

As you know, it is NJDEP policy to use the oral IRIS Reference Dose, if available, as the basis for Interim Specific Ground Water Criteria, contingent on review by the Office of Science concluding that the IRIS assessment is scientifically defensible. In the case of 1-chloro-1,1-difluoroethane, IRIS does not provide an oral Reference Dose, and no oral data which could be used to derive a Reference Dose are available.

As is the case for the two other related chemicals for which Interim Specific Ground Water Criteria were simultaneously developed at the request of Solvey Solexis (1,1-dichloro-1-fluoroethane and 1,1,1-trifluoroethane), the endpoints of concern for 1-dichloro-1,1-fluoroethane are not related to the point of entry (e.g. these endpoints are not specific to the inhalation route), and no data are available to suggest that absorption, metabolism, distribution, or excretion differ between inhalation or oral exposure.

Therefore, it is appropriate to convert the inhalation LOAEL to an oral LOAEL by multiplying by the default daily inhalation volume, 20 m³/day and body weight, 70 kg, and adjusting for the fact that exposure occurred for 6 hours per day, as follows:

The Reference Dose is derived from the NOAEL of 20,000 ppm in the chronic rat inhalation study (Seckar et al., 1986) as follows:

$$20,000 \text{ ppm} = 82,620 \text{ mg/m}^3$$

$$\frac{82,620 \text{ mg/m}^3 \times 20 \text{ m}^3/\text{day} \times 6 \text{ hrs}/24 \text{ hrs} \times 5/7 \text{ days per week}}{70 \text{ kg}} = 4215 \text{ mg/kg/day}$$

The uncertainty factors applied to derive the Reference Dose from the chronic inhalation NOAEL are:

- 10 – Interspecies, to account for animal-to-human variability
- 10 – Intraspecies variability, to protect sensitive subpopulations
- 3 – Database insufficiency - to account for the lack of a two-generation reproductive study

The total uncertainty factor is 300.

$$\text{RfD} = 4215 \text{ mg/kg/day}/300 = 14 \text{ mg/kg/day.}$$

Derivation of Interim Specific Ground Water Criterion

New Jersey ground water criteria are based on the assumptions for chronic drinking water exposure.

The interim specific criterion is derived as follows:

$$\frac{14 \text{ mg/kg/day} \times 70 \text{ kg} \times 0.2}{2 \text{ L}} = 100 \text{ mg/L (rounded to one significant figure)} = 100,000 \text{ } \mu\text{g/L}$$

Where:

$$14 \text{ mg/kg/day} = \text{RfD}$$

70 kg = assumed body weight of adult

2 L/day = assumed daily drinking water ingestion volume

0.2 = Relative Source Contribution factor to account for non-drinking water exposures