(8)

provided. Parameter values for application in more complex kinetic models would need to be selected on a case by case basis.

Table 4.2. Tentative guideline half-lives for ammonium biodegradation (nitrification) in different lithologies.

Lithology†	Ammonium half-life (years)††	Comments
Sands and gravels	1 - 6	Based on range of literature-derived values (<1-6 years) in unsaturated subsoil and aquifers
Unfissured Chalk and other strata with mean pore size of <1 µm	∞	No degradation – pore size excludes entry of bacteria
Strata with mean pore size of >1 µm or showing a significant degree of fissure flow†††	5 - 10	No kinetic data exist but attenuation has been demonstrated to take place. Suggested range is considered reasonably conservative.
Landfill liners	∞	No data but assume no degradation to ensure liner design suitably conservative. Pore size may exclude entry of bacteria

† Values are considered to apply equally to both the unsaturated and saturated zones.
†† Where a range is given a uniform distribution is recommended for probabilistic modelling.
††† Where mean pore sizes in the matrix of dual porosity media are less than 1 □m (e.g. fissured Chalk) care should be taken that only the fraction of contaminant flowing in the fractures is degraded by the model used.

* Extreme caution is recommended in the application of the values provided in Table 4.2. With the present state of knowledge, it is not possible to provide better guidance, nor to distinguish between aerobic and anaerobic processes. Although the rates of nitrification are slow, the long travel times applying in many assessments means that indigenous nitrifiers have the opportunity to achieve significant mass removal of ammonium (Robinson 1992).

* It is essential that the risk assessor provides justification for the values applied in a specific case. Further, although subsurface nitrification appears relatively insensitive to environmental conditions, it is essential that the assessment demonstrates due account of potential inhibitory effects on nitrification in conceptual and numerical models, for example due to the effects of acidic leachate or short-term salinity changes.

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