Appendix D: Abbreviations, Conversions, Examples and Formulas

Abbreviations

ALARA – As Low As Reasonably Achievable
Bq – Becquerel
Ci – Curie
cpm – counts per minute
DRS – Division of Research Safety
dpm – disintegration per minute
GM – Geiger-Mueller
Gy – Gray (unit of absorbed dose)
HPLC – High Performance Liquid Chromatography
IEMA – Illinois Emergency Management Agency (formerly Illinois Department of Nuclear Safety (IDNS))
LDPE – low density poly ethylene
LSC – liquid scintillation count or liquid scintillation counter
mCi – millicurie
NaI – sodium iodide
PI – Principal Investigator
μCi – microcurie
R – Roentgen
Rad – radiation absorbed dose
Rem – Roentgen equivalent man
Sv – Sievert

Conversions

2.22×10^6 dpm = 1 microcurie
1000 mirocuries = 1 millicurie
1000 millicuries = 1 Curie
1 Bequerel = 1 disintegration per second (dps)
37 GBq = 1 Ci = 10^9 disintegrations per second (dps)

Formulas and examples

For determination of meter or wipe survey results, use:

$$\text{Activity (dpm)} = \frac{\text{(gross count rate – background count rate)}}{\text{instrument efficiency}}$$

Example: The GM meter response on a benchtop scan was 150 cpm. The background count rate was 40 cpm.

For P-32, the GM efficiency is approximately 50%. What is the amount of activity on the benchtop?

$$\text{Activity (dpm)} = \frac{(150 \text{ cpm} - 40\text{cpm})}{(0.50)} = 220 \text{ dpm}$$

A survey instrument's efficiency can be determined for an individual radionuclide using a known standard (decay-corrected, if necessary) of the radionuclide. The standard is counted in a fixed geometry and the instrument count rate observed. The efficiency is then determined by the formula:

$$\text{Efficiency (\%)} = \frac{(\text{gross count rate} - \text{background count rate}) \times 100}{\text{Activity of standard (dpm)}}$$