File with back-up Documents

Mason + Hanger - Silas Mason Co., Inc.
14-24479-01 (Facility Calculations)

Location ①:

Distance source to outer ring = 1.82 Meters = 5.9ft
Concrete shield = 50.8 cm = 1.7 ft.
Lead shield = .58 ft.
Co-60 = 14000 R/hr/1000 ci at 1ft

$$I = I_o \times e^{-\mu x}$$

$$I = \frac{14000 \times e^{-\frac{.693}{.041}(.58)}}{(5.9)^2}$$

I = 22 mR/hr. with Lead shield only at outside ring.

$$I = \frac{22 \times e^{-\frac{.693}{.2}(1.7ft)}}{(5.9)^2}$$

I = .002 mR/hr — Location 1 ✓OK

Location ④:

Distance source to outside shield = 10.5ft
Concrete shield = 96.5 cm = 38" = 3.2ft
Lead shield =
Cobalt-60 = 14000 R/hr/1600 ci at 1ft

B-1

(over)

$$I = \frac{I_0 \times e^{-\frac{.693}{12}(3.2)}}{(10.5')^2}$$

$$I = \frac{14000 \times e^{-\frac{.693}{.2}(3.2)}}{(10.5')^2}$$

$I = 2$ mR/hr = Location (4)

Bldg. 3A-05-2 Location (1)

Distance to outside shield = 12ft
Concrete = 4ft
Cobalt-60 = 14000 R/hr/1000 Ci/ at 1ft
Attenuation for Concrete = .2

$$I = \frac{14000 \times e^{-\frac{.693}{.2}(4')}}{(12)^2}$$

$I = .0001$ R/hr $= .1$ mR/hr ✓OK

Bldg. 3A-100

Location (1)

Distance source to outside shield = 7.9 ft
Concrete shield = 66 cm = 2.2 ft
Pb shield = 10.16 cm = .33 ft
Co-60 = 14000 R/hr/1000 Ci/ft
Cobalt-60 = .2 ft attenuation Pb attenuation = .041 ft

$$I = \frac{14000 \times e^{-\frac{.693}{.2}(2.2)}}{(7.9)^2} \quad 62.4$$

I = .11 R/hr through Concrete or 110 mR/hr

$$= \frac{110\,mR/hr \times e^{-\frac{.693}{.041}(.33)}}{(7.9)^2} \quad 32.5$$

= .007 mR/hr ✓OK

Location (3)

distance to outside shield = 26.3 ft
Pb shield = 1 ft
attenuation = .041 ft

$$I = \frac{14000 \times e^{-\frac{.693}{.041}(1ft)}}{(26.3)^2}$$

I = .0009 mR/hr ✓OK