CONAM

QSL Plus Quality Services Laboratories, Inc.

MHG SERVICES

P.8

DATE: 11-1-05 FROM: BILL JOHNSTON

TO: JUDY

COMPANY: NRC

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Pg. 1

[redacted] INCIDENT OF 10/27/05

EXPOSURE CALCULATIONS

IR 192 5.2R/HR AT 1FT WITH 1CURIE

DOSE TO THE HAND

20.8R/HR AT 6"; 83.2R/HR AT 3"; 332.8R/HR AT 1½"
1331.2R/HR AT ¾"; 5324.8R/HR AT ⅜"

21.8 CURIES

SO WITH 21.8ci = 116,080.64 R/HR
1934.67 R/MIN
32.24 R/SEC X 10SEC = 322.4REm

DOSE TO THE WHOLE BODY

$\frac{5.2\text{R/HR}}{X} = \frac{.667^2}{1^2}$ X = 11.71R/HR AT A DISTANCE OF 8"

SO WITH 21.8ci = 255.28 R/HR, 4.25R/MIN, .07R/SEC
OR 70mR/SEC SO 70mR X 10SEC = 700 mR

[redacted]

PLUS

USING 11 FEET DISTANCE AS AN AVERAGE FOR THE REMAINING 50 SECONDS.

$\frac{X}{113360\text{mR/HR}} = \frac{1^2}{11^2}$ SO $\frac{X}{113360} = \frac{1}{121}$ SO $121X = 113360$
$X = 936.9\text{mR/HR}$

OR 15.6 mR/MIN OR .26 mR/SEC SO .26 X 50SEC = 13 mR

TOTAL ESTIMATED WHOLE BODY DOSE — 700mR + 13mR = 713 mR

B. H JOHNSTON RSm Bill R. Johnston

21.8c: 10-31-05 EXPOSURE CALCULATIONS BASED ON RE-INACTMENT WITH [redacted] WITH NRC PRESENT

EXTREMITIES

HANDS IN CONTACT WITH GUIDETUBE FOR 7 SECONDS

225.7REm

WHOLE BODY

DISTANCE OF 20" TO THIGH ABOVE THE KNEE FOR 7SEC

5.2 R/HR

$$\frac{X}{113360\ mR/HR} = \frac{1^2}{1.667^2}$$

$$\frac{X}{113360} = \frac{1}{2.78}$$

$$2.78X = 113360$$

$$X = 40{,}777\ mR/HR$$

680 mR/min

11.3 mR/sec X 7SEC = 79 mR

USING THE SAME AVERAGE OF 11 FEET FOR THE REMAINING

53 SECONDS = .26 mR/SEC X 53 = 14 mR

SO TOTAL WHOLE BODY EXPOSURE = (93 mR) $\frac{79}{+14}$ $\frac{}{93}$