OFFSITE DOSE ASSESSMENT MANUAL
for
GASEOUS AND LIQUID EFFLUENTS

Duane Arnold Energy Center

Iowa Electric Light and Power Company

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1.0 Introduction

This Manual describes acceptable methods of calculating radioactivity concentrations in the environment and the potentially resultant personal doses offsite** that are associated with LWR liquid and gaseous effluents. The radioactivity concentrations and dose estimates are used to demonstrate compliance with Environmental Technical Specifications required by 10 CFR 50.36. The methodology stated in this Manual is acceptable for use in demonstrating operational compliance with 10 CFR 20.106, 10 CFR 50 Appendix I, and 40 CFR 190. Only the dose attributable to the Duane Arnold Energy Center is considered in demonstrating compliance with 40 CFR 190 since no other nuclear facility exists within 50 miles of the Center.

Calculations are made monthly to assess the potential doses to air offsite and to a nearby resident in order to guide the management of station effluents. The receptor is described such that the dose to any resident near the Station is unlikely to be underestimated. Calculations made to assess the radioactive noble gas dose to air are based on the location offsite that could be occupied by a person where the maximum air dose is expected. For these monthly accumulated dose calculations, atmospheric dispersion and deposition of gaseous effluents is based on reference meteorological conditions.*** More conservative conditions (e.g., location and/or exposure pathways expected to yield higher computed doses) than appropriate for the maximally exposed person may be assumed in the dose estimated.

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* Dose is commonly used to mean personal dose equivalent commitment.

** Offsite means outside of the boundary of property owned or controlled by IELP on which DAEC is sited, ie., outside the exclusion area.

*** Reference meteorological conditions are 1971, 1974, and 1975 data composited as discussed in "Duane Arnold Energy Center, Evaluation of Liquid and Gaseous Effluent Releases in Accordance with 10 CFR 50 Appendix I," submitted to NRC June 3, 1976.

Calculations of dose committed from radioactive releases over extended time (3 and 12 months) are also made for the purpose of verifying compliance with regulatory limits on offsite dose. For these calculations the receptor is selected on the basis of the combination of applicable exposure pathways identified in the land use census and the maximum ground level X/Q at a residence, or on the basis of more conservative conditions such that the dose to any resident near the Station is unlikely to be underestimated.

2.0 Liquid Effluent

2.1 Radioactivity In Liquid Waste

The concentration of radionuclides in liquid waste is determined by sampling and analysis in accord with Table 4.14-2 of the Technical Specifications. When a radionuclide concentration is below the LLD for the analysis, it is not reported as being present in the sample.

2.2 Aqueous Concentration

Radioactive material in liquid effluent is diluted successively by water flowing in the discharge canal and in the River. The diluted concentration of radionuclide i in a receiving stream is estimated with the equation

$$C_{zi} = C_i \frac{F_1}{F_2}$$

where C_i = concentration of radionuclide i in liquid radwaste released (μCi/ml)

C_{zi} = concentration of radionuclide i in the receiving stream (μCi/ml)

F_1 = release rate of liquid radwaste (ml/sec)*

F_2 = dilution flow of receiving stream of water (ml/sec)*

* F_1, F_2 and F_c may have any convenient units of flow (i.e., volume/time) provided the units of all are identical.

For the purpose of calculating the radioactivity concentration in water at the restricted area boundary (section 2.4), the flow in the discharge canal, F_c, is assigned to F_2.

In the River immediately beyond the discharge canal and the restricted area boundary, the effective dilution is

$$F_2 = F_c * M$$

where F_c = discharge canal flow (ml/sec)*

M = factor of additional mixing in the River

A near field mixing ratio from the canal into the near field of the River, M = 5, is assigned when estimating maximum potential individual doses involving exposure by eating fish. For drinking water taken from the River the value of 10 is assigned to M. In the event water is drawn from the River downstream of the Station, F_2 represents the portion of the River flow into which the liquid effluent from the Station is effectively mixed.

2.3 Method of Establishing Alarm Setpoints

Liquid waste effluent monitors are connected to alarms which provide automatic indication when 10 CFR Part 20 Appendix B, Table 2, Column 2 concentrations are being exceeded offsite. With prompt action to reduce radioactive releases following an alarm, the liquid release limit of 10 CFR Part 20.106 and the limits provided by 10 CFR Part 50 Appendix I, Section IV should not be exceeded after the alarm.

The alarm setpoint for the liquid effluent radiation monitor is derived from the concentration limit provided in 10 CFR Part 20 Appendix B Table 2 Column 2 applied at the restricted area boundary where the discharge canal flows into the river. The alarm setpoint does not consider dilution, dispersion, or decay of radioactive material beyond the site boundary. That is, the alarm setpoint is based on a concentration limit at the end of the discharge canal. The radiation monitoring and isolation points are located in each line through which radioactive waste effluent is eventually discharged into the discharge canal.

The alarm setpoint for each liquid effluent monitor is based upon measurement, according to Table 4.14-2, of radioactivity in a batch of liquid to be released or in the continuous aqueous discharge. Alternately,

the alarm setpoint may be based upon gross β-γ activity analysis of the liquid waste provided the unrestricted area MPC for unidentified emitters, 1×10^{-7} μCi/ml, is observed.

2.3.1 Setpoint for a Batch Release. A sample of each batch of liquid radwaste is analyzed for I-131 and other principal gamma emitters, or for total activity concentration prior to release. The ratio, $FMPC_b$, of the activity concentration in the tank to the unrestricted area MPC (10 CFR Part 20, Appendix B, Table 2, Column 2) is calculated with the equation

$$FMPC_b = \left(\sum_i \frac{C_{bi}}{MPC_i} \right)$$

where $FMPC_b$ = fraction of unrestricted area MPC in batch derived from activity measured prior to release.

C_{bi} = concentration of radionuclide i (including I-131 and principal gamma emitters) in batch sample taken prior to release (μCi/ml)

In the event total or gross β-γ analysis alone is used to determine the radioactivity in a batch prior to release, the fraction of the unrestricted area MPC in the batch is just

$$FMPC_b = \frac{C_b}{1 \times 10^{-7}}$$

where C_b = the total or gross β-γ activity measured in the batch sample (μCi/ml)

1×10^{-7} = the unrestricted area MPC for unidentified radionuclides (μCi/ml)

Whether radioiodine and primary gamma emitters are identified prior to a batch release or not, the liquid radwaste effluent line radiation monitor alarm setpoint is determined with the equation

$$S = \frac{A}{FMPC_b} \times \frac{F_{S2}}{F_{S1}} \times g$$

where S = radiation monitor alarm setpoint (cpm)

A = counting rate (cpm/ml) or activity concentration (μCi/ml) of sample in laboratory (ie, $A = \sum_i C_{bi}$ or C_b).

g = ratio of effluent radiation monitor counting rate to laboratory counting rate or activity concentration in a given batch of liquid (cpm per cpm/l or cpm per μCi/ml)

F_{S1} = flow in the batch release line (gal/min).* Value not greater than the discharge line flow alarm maximum setpoint.

F_{S2} = minimum flow in the discharge canal (gal/min).* Value not less than the discharge canal flow alarm minimum setpoint.

Note that $A/FMPC_b$ represents the counting rate of a solution having the same radionuclide distribution as the sample and having the maximum permissible concentration of that mixture.

2.3.2 Setpoint for a Continuous Release. Continuous aqueous discharges are sampled and analyzed according to the schedule in Table 4.14-2. The ratio, $FMPC_c$, of the activity concentration in each of the continuous release streams to the unrestricted area MPC is calculated with the equations

$$FMPC_c = \left(\sum_i \frac{C_{ci}}{MPC_i} \right)$$

where $FMPC_{cw}$ = fraction of unrestricted area MPC in continuous release based upon activity measured in weekly composite

C_{ci} = concentration of radionuclide i (including I-131 and principal gamma emitters) in weekly composite sample (μCi/ml)

In the event the total or gross β-γ analysis alone is used to determine the radioactivity, the fraction of the unrestricted area MPC in the continuous release is

$$FMPC_c = \frac{C_c}{1 \times 10^{-7}}$$

where C_c = the total or gross β-γ activity measured in the continuous release sample (μCi/ml)

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* Any suitable but identical units of flow (volume/time)

The alarm setpoint of the radiation monitor on a continuous radioactive discharge line is determined with the equation

$$S = \frac{A}{FMPC_c} * \frac{F_{S2}}{F_{S1}} * g$$

where A = activity concentration (μCi/ml) or counting rate (cpm/ml) in laboratory of weekly composite sample.

F_{S1} = flow in the liquid discharge line (ml/sec)* Value not greater than discharge line flow alarm maximum setpoint.

F_{S2} = flow in the discharge canal (ml/sec)* Value not less than discharge canal flow alarm minimum setpoint.

In the event the concentration of radioactive material in the sample from the continuous release is below measurable levels (ie, less than the lower limit of detection), the value of 1×10^{-7} μCi/ml or the equivalent counting rate (cpm/ml) may be substituted for the factor $\frac{A}{FMPC_c}$ (ie, $\frac{A}{FMPC_c} = 1 \times 10^{-7}$).

2.4 Radioactivity Concentration in Water at the Restricted Area Boundary

Technical Specification 4.14.2 requires, that measured radioactivity concentrations in liquid releases be evaluated to determine whether the radioactivity concentration of the restricted area boundary complies with Specification 3.14.2. As long as the total or gross activity concentration, measured as required in Specification 4.14.2, does not exceed 1×10^{-7} μCi/ml after dilution in the discharge canal, Specification 3.14.2 is satisfied and an MPC calculation based on individual radionuclides is not required. Furthermore, demonstration of compliance with Specification 3.14.3 as specified in Specification 4.14.3 is deemed to verify compliance with Specification 3.14.2.

*Any suitable but identical units of flow (volume/time).

Otherwise, the quarterly average radionuclide concentration in the discharge canal, expressed as a fraction of MPC, shall be computed quarterly from the following six components:

1) the average fraction of MPC of the nuclides measured by analyses prior to each batch release
2) the average fraction of MPC of the nuclides measured by the monthly composite analyses of the batch releases (H-3, P-32, alpha emitters)
3) the average fraction of MPC of the nuclides measured by the quarterly composite analysis of the batch releases (Sr-89, Sr-90, and Fe-55)
4) the average fraction of MPC of the nuclides measured by the weekly composite analyses of the continuous releases
5) the average fraction of MPC of the nuclides measured by the monthly composite analyses of the continuous releases (H-3, and alpha emitters)
6) the average fraction of MPC of the nuclides measured by the quarterly composite analysis of the continuous releases (Sr-89, Sr-90, and Fe-55).

This may be expressed by the following equation:

$$\overline{FMPC} = \frac{1}{t} \times \left(\sum_{p} FMPC_{bp} \, \Delta t_{bp} + \sum_{m} FMPC_{bm} \, \Delta t_{bm} + \sum_{q} FMPC_{bq} \, \Delta t_{bq} \right.$$
$$\left. \sum_{w} FMPC_{cw} \, \Delta t_{cw} + \sum_{m} FMPC_{cm} \, \Delta t_{cm} + \sum_{q} FMPC_{cq} \, \Delta t_{cq} \right)$$

where t is the number of hours in the averaging period (a quarter in this case, 2190 hours).

t_{bp} is the duration of the p-th batch release (hours)

t_{bm} is the sum of the durations of the batch releases which are included in the m-th monthly batch composite analysis (hours)

t_{bq} is the sum of the durations of the durations of the batch releases which are included in the q-th quarterly composite analysis (hours)

t_{cw} is the duration of the continuous release for the w-th weekly composite analysis (hours)

t_{cm} is the duration of the continuous release for the m-th monthly composite analysis (hours)

t_{cq} is the duration of the continuous release for the q-th quarterly analysis (hours)

FMPC is the fraction of unrestricted area MPC in the discharge canal. Modifying subscripts are:

- b, batch release
- c, continuous release
- p, the batch analysis index
- w, the weekly composite analysis index
- m, the monthly composite analysis index
- q, the quarterly composite analysis index.

2.5 Accumulated Personal Maximum Dose

Technical Specification 4.14.3 requires an assessment to be performed at least once every 31 days in any quarter in which radioactive effluent is discharged which determines whether the dose or dose commitment to a person offsite due to radioactive material released in liquid effluent calculated on a cumulative basis exceeds Specification 3.14.3. The requirement is satisfied by computing the accumulated dose commitment to the most exposed organ and to the total body of a hypothetical person exposed by eating fish and drinking water taken from the river offsite near the discharge canal.

The accumulated dose commitment is computed at least once every 31 days but may be computed as analyses become available. The computation is made in the following way.

$$\Delta D_{ank} = 3.785 \times 10^{-3} \sum_i A_{eani} C_{ik} \sum_j \Delta t_j \frac{F_{1j}}{F_{2j}}$$

$$D_{an} = \sum_k \Delta D_{ank}$$

where ΔD_{ank} = the dose commitment (mrem) to organ n of age group a due to the isotopes identified in analysis k, where the analyses are those required by Table 4.14-2 of the Technical Specifications. Thus the contribution to the dose from gamma emitters become available on a batch basis for batch releases and on a weekly basis for continuous releases. Similarly the contributions from H-3 is available on a monthly basis and the contributions from Sr-89 and Sr-90 become available on a quarterly basis.

D_{an} = the dose commitment during the quarter-to-date to organ n, including total body, of the maximally exposed person in age group a (mrem).

A_{eani} = transfer factor relating a unit release of radionuclide i (Ci) in a unit stream flow (gal/min) to dose commitment to organ n, or total body, of an exposed person in age group a $\left(\frac{\text{mrem}}{\frac{\text{Ci}}{\text{gal/min}}}\right)$

C_{ik} = the concentration of radionuclide i in the undiluted liquid waste to be discharged (μCi/ml)

Δt_j = the period of time (minutes) during the release that F_1/F_2 is the ratio of the discharge flow to the dilution flow.

3.785×10^{-3} = conversion constant (3785 ml/gal * 10^{-6} Ci/μCi)

Pathway-to-dose transfer factors, A_{eani}, for use in calculating the dose commitment arising from radioactive material released in aqueous effluents are tabulated in Appendix A. Appropriate ones of the tables representing applicable environmental pathways of exposure and most exposed age group(s) are selected and used in calculating the dose commitment. The pathway(s) and/or age group(s) selected may vary by season.

Variables F_1 and F_2 are defined in section 2.2. In the river offsite near the discharge canal, $F_2 = 5\ F_c$ for the fish pathway and $F_2 = 10\ F_c$ for the drinking water pathway.

2.6 Projected Personal Maximum Dose

The dose commitment to a person offsite due to radioactive material released in liquid effluent may be projected by calculating the extrapolated total body and most exposed organ dose commitments to a hypothetical person exposed by eating fish and drinking water taken from the River offsite near the discharge canal. The potential dose commitments to organs and to the total body are computed separately.

The dose commitment to a maximally exposed hypothetical person will be projected by calculating the doses accumulated during the most recent three months (according to the method described in section 2.5) and by assuming the result represents the projected doses during the current quarter.

Alternatively, the quarterly dose commitment may be projected by using the equation:

$$P_{an} = \frac{91\ D}{X}an$$

where P_{an} = projected dose commitment (mrem) to organ n (including total body) of age group a for the current quarter

91 = number of days in a quarter

X = number of days to date in current quarter

3.0 Gaseous Effluent

3.1 Introduction

The Station discharges gaseous effluent through a stack and discharges ventilation air from the reactor and radwaste buildings through the reactor building vents. Ventilation air from the Turbine Building may be discharged through the Turbine Building vents or through the Reactor Building vent. These gaseous effluent streams, radioactivity monitoring points, and effluent discharge points are shown schematically in Figure 3-1. Gaseous release point locations and elevations at the Station are described in Table 3-1. Gaseous discharges from the stack are treated as an elevated release while discharges via the building vents are assumed to be ground-level releases.

3.2 Radioactivity in Gaseous Effluent

For the purpose of estimating offsite radionuclide concentrations and radiation doses, measured radionuclide concentrations in gaseous effluent and in ventilation air exhausted from the Station are relied upon. Table 4.15-2 in the Technical Specifications identifies specific radionuclides in gaseous discharges for which sampling and analysis is done.

When a radionuclide concentration is below the LLD for the analysis, it is not reported as being present in the sample.

3.3 Deleted.

3.4 Effluent Noble Gas Monitor Alarm Setpoint

Instrumentation is provided to monitor gamma radiation from radioactive materials released from the Station in gaseous effluents. Each monitor includes an alarm that is set to report when the radioactive noble gas in gaseous effluent from a monitored stack or vent is expected to cause a noble gas concentration at ground level offsite equal to or greater than specified in 10 CFR Part 20 Appendix B Table 2 Column 1 for the mixture.

The unrestricted area concentration specified by 10 CFR Part 20.106 and the limits of 10 CFR Part 50 Appendix I Section IV should not be exceeded after an alarm provided prompt action is taken after alarm initiation to reduce radioactive releases.

The distribution of radioactive noble gases in a gaseous effluent stream is determined by gamma spectrum analysis of identifiable radionuclides in effluent gas sample(s). Results of one or more previous analyses may be averaged to obtain a representative spectrum. In the event the distribution is unobtainable from measured data, the distribution of radioactive noble gases based on past data or computed by the BWR-GALE code and appearing in Table 3-2 herein may be assumed.

The gross activity concentration of noble gas corresponding to the 10 CFR Part 20 Appendix B Table 2 Column 1 limit is calculated from the distribution with the equation

$$MPC = \sum_i C_i \div \sum_i \frac{C_i}{MPC_i}$$

where MPC = gross activity concentration of noble gas mixture corresponding to 10 CFR 20 Appendix B Table 2 Column 1 limit ($\mu Ci/cm^3$)

C_i = relative concentration of noble gas radionuclide i in gaseous release ($\mu Ci/cm^3$)

MPC_i = 10 CFR Part 20 Appendix B Table 2 Column 1 value.

Note that this is simply the aggregate of the concentrations of radionuclide i in a sample divided by the fraction of MPC constituted by radionuclide i in the same sample.

Alternatively, the total activity concentration of the noble gases may be used with the MPC value of Kr-88 (2×10^{-8} $\mu Ci/cm^3$) for the purpose of conservatively determining an activity concentration of noble gases that will be less than the 10 CFR 20 Appendix B, Table 2, Column 1 limit. If this approach is used, the value of MPC is simply 2×10^{-8} $\mu Ci/cm^3$.

The alarm setpoint for the effluent noble gas monitor is then calculated with the equation

$$S = \frac{MPC * h}{4.7 \times 10^{-4} * F * \frac{X}{Q}}$$

where S = alarm counting rate setpoint (cpm) or (mR/hr)

h = effluent noble gas monitor counting rate response $\left(\frac{cpm}{\mu Ci/cm^3}\right)$ or calibration $\left(\frac{mR/hr}{\mu Ci/cm^3}\right)$ for noble gas gamma radiation

F = discharge rate of gaseous effluent (ft^3/min)

X/Q = minimum atmospheric dispersion from release point to unrestricted area ($\mu Ci/cm^3$ per $\mu Ci/sec$)

4.7×10^{-4} = conversion constant $\left(\frac{1\ m^3}{35.31\ ft^3} * \frac{1\ min}{60\ sec}\right)$

MPC = maximum permissible concentration for the effluent noble gas mixture as determined above

The value of X/Q adopted in a setpoint calculation will be based either on prevailing meteorological conditions or on reference meteorological conditions. Minimum atmospheric dispersion offsite derived from reference meteorological conditions at the site boundary 1260 meters NNW of the Station are:

$$\left(\frac{X}{Q}\right)_{stack} = 2.8 \times 10^{-7}\ sec/m^3$$

$$\left(\frac{X}{Q}\right)_{vent} = 4.3 \times 10^{-6}\ sec/m^3$$

3.5 Noble Gas Gamma Radiation Dose Accumulated in Air

Technical Specification 3.15.3 requires that the offsite air dose during any calendar quarter not exceed 5 mrad from noble gas gamma radiation. Specification 4.15.3.1 requires a monthly calculational assessment to verify that the cumulative air dose due to gamma radiation from radioactive noble gas released in gaseous effluents during the quarter does not exceed Specification 3.15.3.

The distribution of radioactive noble gases in gaseous releases is determined by gamma spectrum analysis of gaseous effluent samples in accord with Technical Specification Table 4.15-2. In the event the radioactive noble gas distribution is not obtainable from sample(s) taken during the current period the distribution will be obtained from the most recently available data or from Table 3-2.

The quantity of radioactive noble gas discharged during an interval of time is determined by integrating the release rate measurement of each effluent noble gas monitor. In the event an integration digital counter is used, the total measured radioactivity discharged via a stack or vent during a counting interval is determined by the relation

$$\Delta Q_j = \frac{2.83 \times 10^4 \, NF}{h}$$

where ΔQ_j = total measured gaseous radioactivity release via a stack or vent during counting interval j (μCi)

2.83×10^4 = conversion constant (cm^3/ft^3)

N = counts accumulated during counting interval j

F = discharge rate of gaseous effluent stream (ft^3/min)

h = effluent noble gas monitor calibration or counting rate response for noble gas gamma radiation $\left(\frac{cpm}{\mu Ci/cm^3}\right)$

If g_i represents the fraction of radionuclide i in the distribution of radioactive gases in a given effluent stream, then the quantity of radionuclide i released in a given gaseous effluent stream during counting interval j is estimated by the relation

$$\Delta Q_{ij} = \Delta Q_j \cdot g_i$$

The gamma radiation dose to air offsite as a consequence of noble gas discharged from DAEC is calculated with the

$$D_\gamma = \sum_i \sum_j \left(\Delta Q_j \cdot g_i \cdot A\gamma_i\right)_s + \sum_i A\gamma_v \sum_i \left(\Delta Q_j \cdot g_i \cdot \frac{X}{Q}\right)_v$$

where D_γ = noble gas gamma dose to air due to effluent from stack and vent (mrad)

$A\gamma_{s_i}$ = factor converting unit release of noble gas radionuclide i from the stack to air dose at ground-level received from gamma radiation from the overhead plume (mrad/μCi)

$A\gamma_{v_i}$ = factor converting time integrated, ground-level concentration of noble gas to air dose from gamma radiation $\left(\frac{\text{mrad}}{(\mu\text{Ci sec})/\text{m}^3}\right)$

$(X/Q)_v$ = atmospheric dispersion factor for a vent (ground-level or building wake) discharge (sec/m^3)

Specification 4.15.3.1 is satisfied by calculating the noble gas gamma radiation dose to air at the offsite location identified in Figure 3-2. At that location, 1260 meters NNW of the Station, the reference* atmospheric dispersion factor to be used is

$$\left(\frac{X}{Q}\right)_{cv} = 4.3 \times 10^{-6} \text{ sec/m}^3$$

Values of $A\gamma_{s_i}$ and $A\gamma_{v_i}$ appropriate for use at that location, assuming reference meteorological conditions, are listed in Table 3-3.

3.5.1 Alternate Method of Evaluating Compliance with Gamma Air Dose Limits

Alternatively, the gamma radiation dose to air offsite may be calculated with the equation

$$D_\gamma = \frac{1}{0.8} \sum_j \left(\Delta Q_j \cdot A\gamma_{seff}\right)_s + \frac{1}{0.8} \sum_j \left(\Delta Q_j \cdot \frac{X}{Q} \cdot A\gamma_{veff}\right)_v$$

where $A\gamma_{seff}$ = an effective dose conversion factor based on the typical radionuclide distribution in stack releases converting unit release of radioactive noble gases from the stack to air dose at ground level at a specific location (mrad/μCi).

*Reference atmospheric conditions are summarized and discussed in "Duane Arnold Energy Center, Evaluation of Liquid and Gaseous Effluent Releases in Accordance with 10 CFR 50 Appendix I," submitted to NRC June 3, 1976, Reference atmospheric dispersion factors tabulated therein, also appear in Appendix C herein.

$A\gamma_{veff}$ = an effective dose conversion factor based on the typical radionuclide distribution in vent releases converting a time integrated, ground level concentration of noble gases to air dose from gamma radiation $\left(\frac{\text{mrad}}{(\mu\text{Ci.sec/m}^3)}\right)$

0.8 = a factor of conservatism which compensates for variability in radionuclide distribution

The derivation and basis of the effective gamma air dose conversion factor are provided in Appendix B. Values of the effective factors are tabulated in Table 3-4. By inserting the appropriate values for DY (5 mrads/quarter γ-air dose) and for $A\gamma_{seff}$ (1.6×10^{-11} mrad/μCi) or $A\gamma_{veff}$ (6.4×10^{-5} mrad/(μCi . sec/m^3)) into the equation above and solving for either $(\Delta Q_j)_s$ or $(\Delta Q_j)_v$, respectively, release quantities of noble gases from either the stack or vent corresponding to the technical specification limit of 5 mrads/quarter may be determined. At the location, 1260 meters NNW of the station, (which is the controlling location based on reference meteorology) the quarterly release limits are individually

250,000 Ci/quarter, from stack release

12,700 Ci/quarter, from vent release

For evaluating compliance on a quarterly basis for both the stack and vent releases, the following equation may be used

$$\frac{\sum_j (\Delta Q_j)_s}{250{,}000} + \frac{\sum_j (\Delta Q_j)_v}{12{,}700} \leq 1$$

or, on a monthly rate basis

$$\frac{\sum_j (\Delta Q_j)_s}{250{,}000} + \frac{\sum_j (\Delta Q_j)_v}{12{,}700} \leq \frac{1}{3}$$

As long as these relations are satisfied for both stack and vent releases of noble gases, no additional calculations are needed to verify compliance with the gamma-air dose limits of Technical Specification 3.15.3. Calculations of beta air doses per Section 3.6 may be omitted as discussed in Appendix B.

3.6 Noble Gas Beta Radiation Dose Accumulated in Air

Technical Specification 3.15.3 requires that the offsite air dose during any calendar quarter not exceed 10 mrad from noble gas beta radiation. Specification 4.15.3.1 requires a monthly assessment to verify that the cumulative air dose due to beta radiation from radioactive noble gas released gaseous effluents during the quarter not exceed specification 3.15.3.

The radioactive noble gas distribution and activity discharged are determined as described in § 3.5 herein.

The beta radiation dose to air offsite as a consequence of noble gas released from the Station is calculated with the equation:

$$D_\beta = \sum_i A\beta_i \sum_j \left(\Delta Q_j \, g_i \, \frac{X}{Q}\right)_s + \sum_i A\beta_i \sum_j \left(\Delta Q_j \, g_i \, \frac{X}{Q}\right)_v$$

where D_β = noble gas beta dose to air due to stack and vent releases (mrad)

$A\beta_i$ = factor converting time-integrated, ground-level concentration of noble gas radionuclide i to air dose from beta radiation $\left(\frac{\text{mrad}}{(\mu\text{Ci sec})/\text{m}^3}\right)$

$(X/Q)_s$ = atmospheric dispersion factor for a discharge via the stack (sec/m^3)

$(X/Q)_v$ = atmospheric dispersion factor for a vent (ground level or building wake) discharge (sec/m^3).

Specification 4.15.3.1 is satisfied by calculating the noble gas beta radiation dose to air at the location identified on Figure 3-2. At that location, 1260 meters NNW of the reactor, the reference atmospheric dispersion factors to be used are

$$\left(\frac{X}{Q}\right)_s = 2.8 \times 10^{-7}$$

$$\left(\frac{X}{Q}\right)_v = 4.3 \times 10^{-6}$$

Beta radiation-to-air dose conversion factors, $A\beta_i$, for noble gas radionuclides are listed in Table 3-3.

3.7 Dose Due to Iodine and Particulates in Gaseous Effluents*

Technical Specification 3.15.4 requires that radioiodine and radioactive material in particulate form having half-lives greater than 8 days in gaseous effluents released to the area offsite cause no more than 7.5 mrem to any organ of a member of the public during a calendar quarter. Specification 4.15.4.2 requires an assessment at least once every month to verify that the cumulative dose commitment during the quarter does not exceed Specification 3.15.4.

Radionuclides other than noble gases in gaseous effluents that are measured by the sampling and analysis program described in Technical Specification Table 4.15-2 are used as the release term in dose calculations. Airborne releases are discharged either via a stack as an elevated release or via building vents and treated as a ground level or split wake release. For each of these release combinations, samples are analyzed weekly, monthly, quarterly, or for a specific release according to Table 4.15-2.

Each sample provides a measure of the concentration of specific radionuclides, C_i, in gaseous effluent discharged at flow, F_a, during a time increment Δt. Thus, each release is quantified according to the relation.

$$\Delta Q_{ijk} = C_{ik} F_{aj} \Delta t_j$$

$$Q_{ik} = \sum_j C_{ik} F_{aj} \Delta t_j$$

where Q_{ik} = the quantity of radionuclide i released in a given effluent stream based on analysis k (Ci)

C_{ik} = concentration of radionuclide i in gaseous effluent identified by analysis k (μCi/ml or Ci/m^3)

F_{aj} = effluent stream discharge rate during time increment Δt_j (m^3/sec)

Δt_j = time increment during which radionuclide i at concentration C_{ik} is being discharged (sec)

A person may be exposed directly to an airborne concentration of radioactive material discharged in effluent and indirectly via pathways involving deposition of radioactive material onto the ground. Dose estimates account for the separate exposure pathways. The dose commitment to a person offsite associated with a gaseous release, Q_{ik}, of radioactive material other than noble gas is calculated with the appropriate one(s) of the following equations

*The dose to any organ of a person arising from radioactive iodine-131 and radioactive material in particulate form having half-lives greater than 8 days. Noble gases not considered.

for a stack release:

$$D_{ansk} = 10^{-6}\ Q_{iks}\left[\sum_i TA_{ani}\left(\frac{X}{Q}\right)_s + \sum_i TG_{ani}\left(\frac{D}{Q}\right)_s\right]$$

for a vent release

$$D_{anvk} = 10^{-6}\ Q_{ikv}\left[\sum_i TA_{ani}\left(\frac{X}{Q}\right)_v + \sum_i TG_{ani}\left(\frac{D}{Q}\right)_v\right]$$

where D_{ansk} = the dose commitment (mrem) to organ n of a person in age group a due to radionuclides identified in analysis k of a stack release where the analysis is required by Technical Specification Table 4.15-2.

D_{anvk} = the dose commitment from a vent release (mrem)

TA_{ani} = factor converting airborne concentration of radionuclide i to dose commitment to organ n of a person in age group a where exposure is directly to airborne material $\left(\frac{\text{mrem}}{(\text{Ci sec})/\text{m}^3}\right)$

TG_{ani} = factor converting ground deposition of radionuclide i to dose commitment to organ n of a person in age group a where exposure is directly or indirectly to radioactive material that has been deposited on the ground $\left(\frac{\text{mrem}}{\text{Ci}/\text{m}^2}\right)$

Q_{ik} = quantity of radionuclide i releases in a given effluent stream based on analysis k (μCi)

10^{-6} = conversion factor (Ci/μCi)

The analysis index k may represent either

p, analysis of a grab sample

w, a weekly composite analysis

m, a monthly composite analysis

q, a quarterly composite analysis

The dose commitment accumulated by a person offsite is computed at least every 31 days to satisfy Specification 4.15.4.2 but may be calculated as analytical results of effluent measurements, performed as specified in Table 4.15-2 in the Technical Specification, become available.

The dose accumulated as a result of stack discharge is computed with

$$D_{ans} = \sum_{p} D_{ansp} + \sum_{w} D_{answ} + \sum_{m} D_{ansm} + \sum_{q} D_{ansq}$$

and the dose accumulated as a result of vent discharge is computed with

$$D_{anv} = \sum_{w} D_{anvw} + \sum_{m} D_{anvm} + \sum_{q} D_{anvq}$$

Doses committed during the same time period due to discharges from the stack and vents are additive, thus

$$D_{an} = D_{ans} + \sum_{v} D_{anv}$$

where D_{an} = the dose commitment accumulated during the quarter to date as a result of all measured radioactive gaseous discharges except noble gases to any organ n, including total body, of a person offsite in age group a (mrem).

When the dose to a person from iodine and particulates discharged in gaseous effluents is calculated as required by Specification 4.15.4.2, appropriate environmental pathways (from among those for which dose transfer factors are provided in Appendix A) will be evaluated. The dose calculated is to a receptor at the location identified in Figure 3-2 where reference atmospheric dispersion and deposition factors are:

$$\frac{X}{Q}_s = 3.1 \times 10^{-7} \text{ sec/m}^3 \qquad \frac{D}{Q}_s = 7.2 \times 10^{-9} \text{ m}^{-2}$$

$$\frac{X}{Q}_v = 3.9 \times 10^{-6} \text{ sec/m}^3 \qquad \frac{D}{Q}_v = 1.3 \times 10^{-8} \text{ m}^{-2}$$

Food pathways are evaluated with reference meteorology applicable at the location of food production. Seasonal appropriateness of pathways is considered.

The air-grass (fresh or stored)-cow-milk-man pathway is evaluated where a cow is located, 2650 m WNW of DAEC, and reference meteorological data are

$$\left(\frac{D}{Q}\right)_s = 2.1 \times 10^{-9}\ m^{-2} \qquad \left(\frac{D}{Q}\right)_v = 4.28 \times 10^{-9}\ m^{-2}$$

3.7.1 Alternate Method of Evaluating Doses Due to Iodine and Particulates in Gaseous Effluents

Alternatively, the dose commitment to a maximally exposed, hypothetical individual may be calculated by the equation.

$$D_{inf\text{-}thy} = \frac{1}{0.8} \cdot 10^{-6} \sum_i (Q_i \cdot TG_{inf\text{-}thy\text{-}I\text{-}131} \cdot D/Q)_s + \frac{1}{0.8} \cdot 10^{-6} \sum_i (Q_i \cdot TG_{inf\text{-}thy\text{-}I\text{-}131} \cdot D/Q)_y$$

where $D_{inf\text{-}thy}$ = the dose commitment accumulated during the quarter to date to a hypothetical infant's thyroid as a result of the releases of I-131 (mrem)

Q_i = the measured quantity of I-131 released in a given effluent stream, stack or vent (μCi)

$TG_{inf\text{-}thy\text{-}I\text{-}131}$ = the dose transfer factor for the infant thyroid from the cow-milk pathway for I-131 measured in the effluent stream $\left(\frac{mrem}{Ci/m^2}\right)$

$\frac{1}{0.8}$ = a factor of conservatism which accounts for the dose contribution for releases of particulate radioactive material other than I-131

10^{-6} = a conversion factor (Ci/μCi)

When the maximum organ dose is evaluated by using the equation above, analyses of other organ doses via other pathways are not needed to demonstrate compliance within the dose limits of Technical Specification 3.15.4.

The rationale for only evaluating the dose contribution of I-131 is derived from an evaluation of the radioactive material releases and the environmental pathways. The air-grass-cow-milk-man pathway is by far the controlling pathway and the infant's thyroid is the limiting organ. This pathway typically contributes greater than 90% of the total calculated dose to the infant's thyroid and I-131 contributes essentially all of this dose (~95%). Therefore, it is possible to demonstrate compliance with the dose limits of Technical Specification 3.15.4 by the conservative calculational method presented above.

3.8 Dose to a Person from Noble Gases

Technical Specification 4.16.1 requires the calculation of the dose or dose commitment to a person offsite exposed to 12 consecutive months of radioactive liquid and gaseous effluents from the Station. One component of personal dose is total body irradiation by gamma rays from noble gases. Another is irradiation of skin by beta and gamma radiation from noble gases. The methods of calculating these doses are presented in sections 3.8.1 and 3.8.2.

The amount of radioactive noble gas discharged is determined in the manner described in section 3.5.

3.8.1 Gamma Dose to Total Body The gamma radiation dose to the whole body of a member of the public as a consequence of noble gas released from the Station is calculated with the equation:

$$D_\gamma = \sum_i \left(Q_i * PY_i\right)_s + \sum_i \left(Q_i * \frac{X}{Q} * PY_i\right)_v$$

where D_γ = noble gas gamma dose to total body (mrem)

PY_{s_i} = factor converting unit noble gas nuclide i stack release to total body dose at ground level received from the overhead plume (mrem/μCi)

PY_{v_i} = factor converting time integrated, ground level concentration of noble gas nuclide i to air dose from gamma radiation $\left(\frac{\text{mrem}}{(\mu\text{Ci sec})/\text{m}^3}\right)$

When the total body dose due to gamma radiation from noble gas is computed as required by Technical Specification 4.16.1, the nearby resident exposed to maximal ground-level noble gas concentrations (maximum X/Q) is selected as the receptor. Alternatively, the total body dose to a maximally exposed, hypothetical individual may be calculated at location 1260 meters NNW of the reactor.

Noble gas plume gamma-to-total body dose factors, PY_{s_i}, are calculated with the RABFIN program. Noble gas semi-infinite cloud gamma-to-total body dose factors (PY_{v_i}) and finite plume gamma-to-total body dose factors, PY_{s_i} for the location 1260 meters NNW are listed in Table 3-4.

3.8.2 Dose to Skin The beta radiation dose to the skin of a member of the public due to beta radiation from noble gas released from the Station may be calculated with the equation

$$D_\beta = \sum_i S\beta_i \left(Q_i * \frac{X}{Q}\right)_s + \sum_i S\beta_i \left(Q_i * \frac{X}{Q}\right)_v$$

where D_β = noble gas beta dose to skin (mrem)

$S\beta_i$ = factor converting time integrated ground level concentration of noble gas to skin dose from beta radiation $\left(\frac{\text{mrem}}{\mu\text{Ci}\ \frac{\text{sec}}{\text{m}^3}}\right)$

When the skin dose due to noble gas beta radiation is computed as required by Specification 4.16.1, the receptor selected is the nearby resident exposed to maximal ground-level concentrations (maximum X/Q).

The total dose to the skin from noble gases is approximately equal to the beta radiation dose to the skin plus the gamma radiation dose to the total body.

3.9 Projected Air Doses due to Gaseous Effluent

Technical Specification 4.15.5.2 requires air doses due to radioactive material in gaseous effluent to be projected over a quarter during each month in which radioactive material is released in gaseous effluent without treatment. The purpose is to guide plant personnel in operating the Waste Gas System.

The projected doses are based on radioactive noble gas effluent measurements made according to Technical Specification 4.15-2 and/or derived as outlined in ODAM sections 3.5 and 3.7.

The air doses are projected by calculating the air doses accumulated during the most recent three months according to the methods described in sections 3.5 and 3.6 and by assuming the result represents the projected doses during the current quarter.

Alternately, the quarterly air dose may be projected by using the equation:

$$PD_\gamma = \frac{91}{X} D_\gamma$$

or

$$PD_\beta = \frac{91}{X} D_\beta$$

where PD_γ = projected air dose due to noble gas gamma radiation during the current quarter (mrad)

PD_β = projected air dose due to noble gas beta radiation during the current quarter (mrad)

91 = number of days in a quarter

X = number of days to date during current quarter

D_γ = air dose due to noble gas gamma radiation during the quarter-to-date (mrad)

D_β = air dose due to noble gas beta radiation during the quarter-to-date (mrad)

4.0 Dose Commitment from Releases over Extended Time

4.1 Releases during a Quarter

Technical Specification 6.11.1.e requires an assessment of radiation doses arising from liquid and gaseous effluents from the Station during each calendar quarter. The assessment includes the following calculations of dose as described by equations for

1. total body and maximally exposed organ doses due to liquid effluent via drinking water and eating fish from the River as in § 2.6
2. total body dose due to noble gas γ as in § 3.8.1
3. skin dose due to noble gas β as in § 3.8.2
4. total body and maximally exposed organ doses due to gaseous effluents* other than noble gases as in § 3.7
5. doses to air offsite due to noble gas γ as in § 3.5 and due to noble gas β as in § 3.6.

The dose calculations are based on liquid and gaseous effluents from the Station during each calendar quarter determined in accord with Technical Specification Tables 4.14-2 and 4.15-2.

Aqueous concentration is estimated according to § 2.2 on the basis of quarterly averaged stream flow. If practical, quarterly averaged meteorological conditions concurrent with the quarterly gaseous release being evaluated will be used to estimate atmospheric dispersion and deposition. Otherwise, the quarterly dose commitment due to gaseous effluents will be calculated using reference meteorological data.

The receptor of the dose is described such that the dose to any resident near the Station is unlikely to be underestimated. That is, the receptor is selected on the basis of the combination of applicable pathways of exposure to gaseous effluent identified in the annual land use census and maximum ground level X/Q at the residence. Conditions (i.e. location, X/Q, and/or pathways) more conservative (i.e. expected to yield higher calculated doses) than appropriate for the maximally exposed individual may be assumed in the dose assessment.

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*Radioactive iodine-131, and radioactive material in particulate form having half-lives greater than 8 days.

Seasonal appropriateness of exposure pathways may be considered. Exposure by eating fresh vegetation or drinking milk from cows or goats fed fresh forage is an inappropriate assumption during the first or fourth calendar quarter; rather consumption of stored vegetation and stored forage is assumed during those quarters. Otherwise, during the second and third calendar quarters, exposure by eating fresh vegetation and/or drinking milk from cows or goats fed fresh forage is assumed where those pathways exist. Similarly, the liquid effluent-river-fish-man pathway is not assumed during the winter quarter.

Factors converting stack-released noble gas to gamma radiation dose from the overhead plume are calculated on the basis of reference meteorological data for the receptor location. Other environmental pathway-to-dose transfer factors used in the dose calculations are provided in Appendix A.

4.2 Releases during 12 Months

The regulation governing the maximum allowable dose or dose commitment to a member of the public from all uranium fuel cycle sources of radiation and radioactive material in the environment is stated in 40 CFR Part 190. It requires that the dose or dose commitment to a member of the public from all sources not exceed 25 mrem/yr to any organ or 75 mrem/yr to the thyroid. Technical Specification 4.16.1 requires calculation of the dose at least once every year to assess compliance with the regulation. More frequent calculations may be performed if higher than normal releases are experienced (twice the design objective rates in a single quarter).

Fuel cycle sources or nuclear power reactors other than the Station itself do not measurably or significantly increase the radioactivity concentration in the vicinity of the Station; therefore, only radiation and radioactivity in the environment attributable to the Station itself are considered in the assessment of compliance with 40 CFR Part 190.

Contributions to the dose due to liquid and gaseous effluent are calculated as described by the equations for:

1. total body and maximally exposed organ doses due to liquid effluent via drinking water and eating fish from the River as in § 2.6
2. total body dose due to noble gas γ as in § 3.8.1

3. skin dose due to noble gas β as in § 3.8.2
4. total body and maximally exposed organ doses due to gaseous effluents* other than noble gases as in § 3.7.

The doses are calculated on the basis of liquid and gaseous effluents from the Station during 12 consecutive months, determined in accord with Technical Specification Tables 4.14-2 and 4.15-2. For the purpose of the Annual Radiological Environmental Report, doses are based upon release during a calendar year.

Aqueous radioactive material concentrations are estimated according to § 2.2 on the basis of annual averaged stream flow. Annual averaged meteorological conditions concurrent with gaseous releases being evaluated used to estimate atmospheric dispersion, deposition, and elevated plume gamma exposure.

The receptor of the dose is described such that the dose to any resident near the Station is not likely to be underestimated, although conditions more conservative than appropriate for the maximally exposed person may be assumed in the dose assessment. Ordinarily, the receptor is selected on the basis of the applicable combination of existing pathways of exposure to gaseous effluent identified in the annual land use census and the maximum ground level X/Q at the residence.

When assessing compliance with 40 CFR 190, Radiological Environmental Monitoring Program results may be used to indicate actual radioactivity levels in the environmental attributable to the DAEC. These measured levels may be used to supplement the evaluation of doses to real persons for assessing compliance with 40 CFR 190.

Factors converting stack-released noble gas to gamma radiation dose from the overhead plume are calculated on the basis of annual averaged meteorological data for the receptor location. Other environmental pathway-to-dose transfer factors used in the dose calculations appear in Appendix A.

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*Radioactive iodine-131 and radioactive material in particulate form having half-lives greater than 8 days.

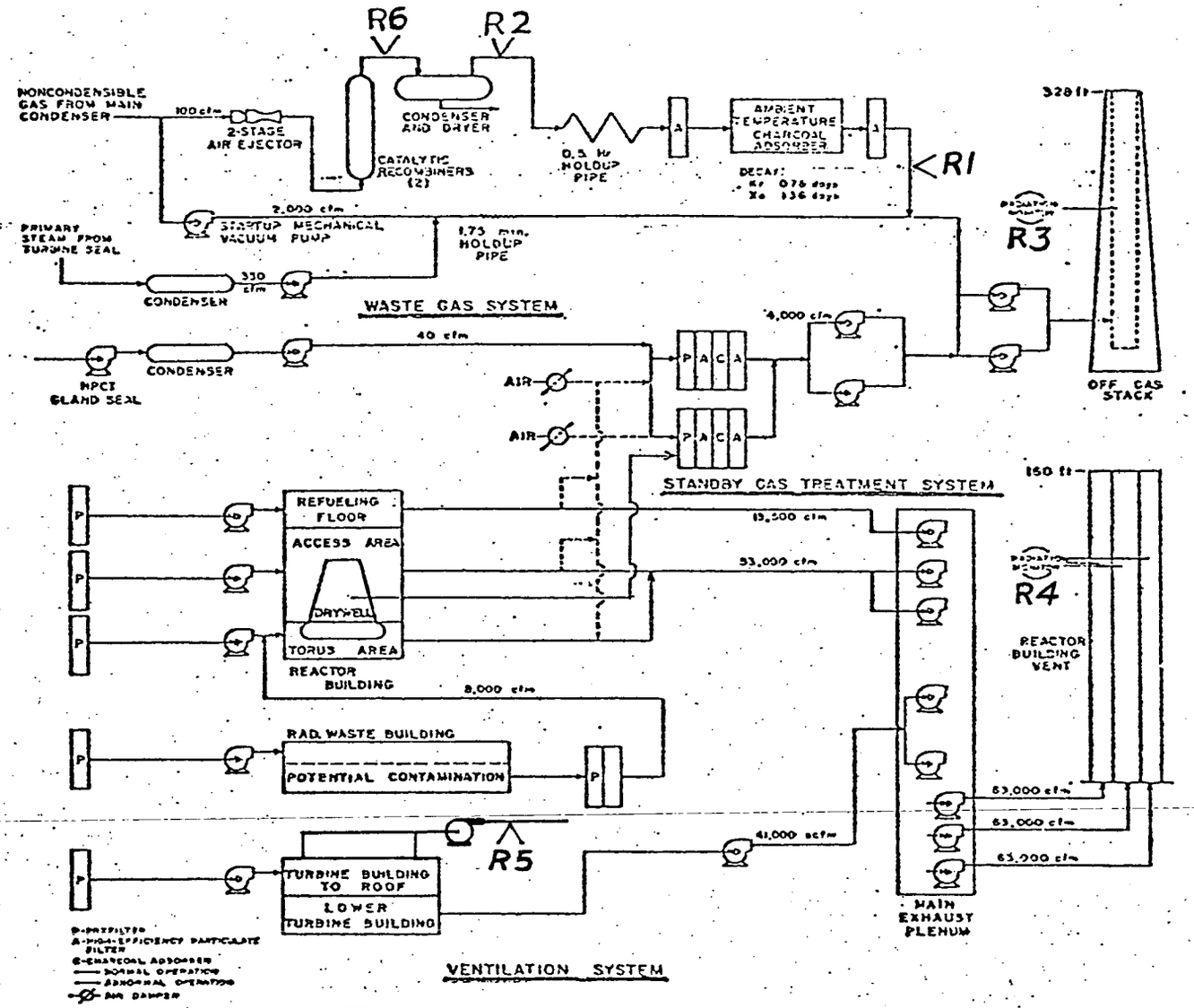

Figure 3-1. Gaseous Radioactive Waste Flow Diagram

R1 SJAE Offgas Post-treatment Noble Gas Activity Monitor
R2 SJAE Offgas Hydrogen Monitor
R3 Offgas Stack Radiation Monitoring System
R4 Reactor Building Exhaust Vent Monitoring System
R5 Turbine Building Exhaust Vent Monitoring System
R6 SJAE Offgas Pretreatment Radiation Monitor

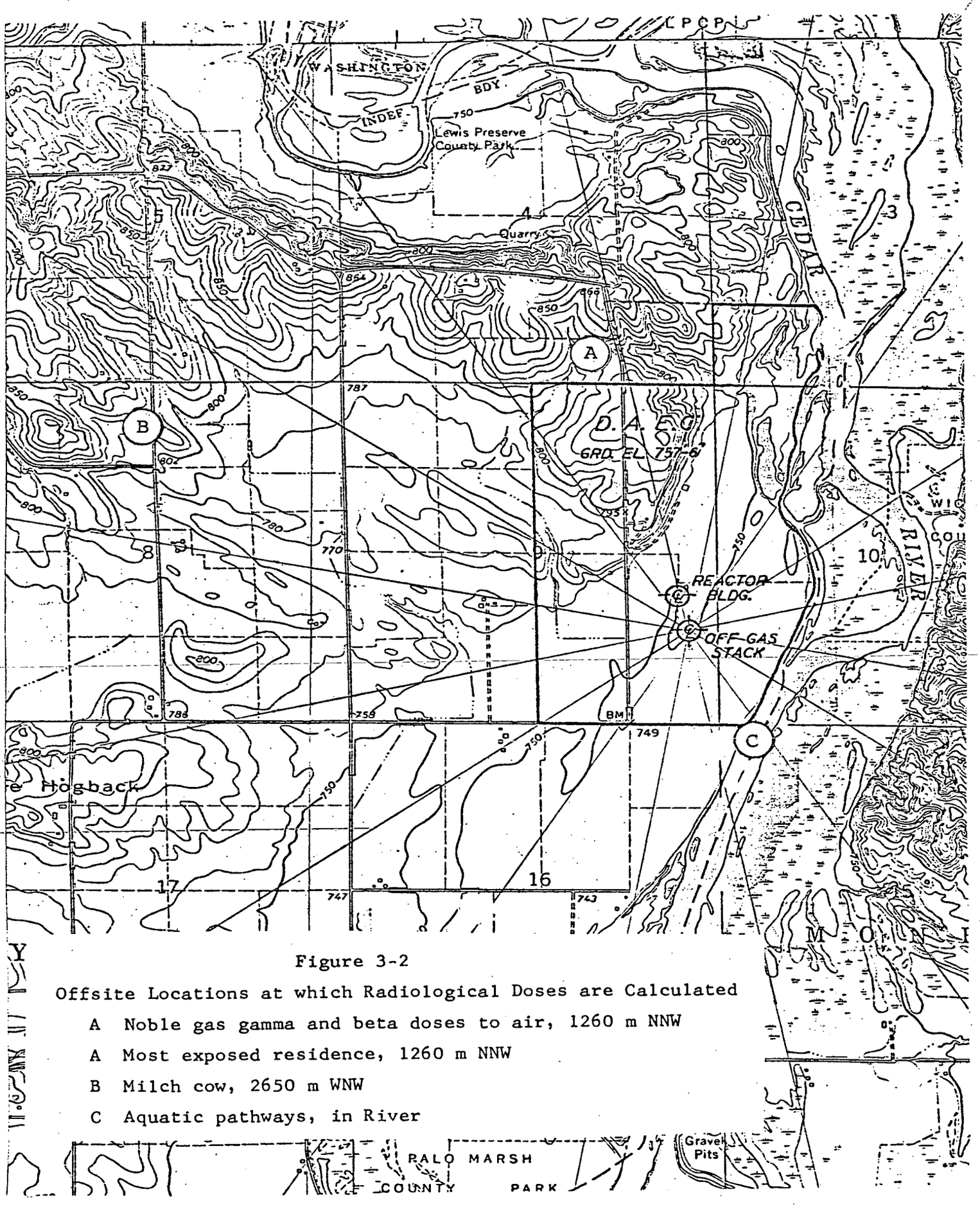

Figure 3-2

Offsite Locations at which Radiological Doses are Calculated

A Noble gas gamma and beta doses to air, 1260 m NNW

A Most exposed residence, 1260 m NNW

B Milch cow, 2650 m WNW

C Aquatic pathways, in River

Table 3-1

Atmospheric Gaseous Release Points
at the Duane Arnold Energy Center

Parameter	Release Point		
	Offgas Stack	Reactor Bldg Vent	Turbine Bldg Vent
Release Height	328 ft	154 ft	60 ft
Release Mode	elevated	wake-split	wake-split
Effluent Source	Waste Gas System Standby Gas Treatment System	Reactor Bldg Radwaste Bldg Lower Turbine Bldg	Upper Turbine Bldg

Table 3-2

Computed Releases of Radioactive Noble Gases in Gaseous Effluent from Duane Arnold Energy Center

Nuclide	Stack Release		Plant Vents Release	
	(Ci/yr)[a]	fraction[b]	(Ci/yr)[a]	fraction[b]
Kr-83m	4.90E+01	2.53E-03	0	0
Kr-85m	2.34E+03	1.21E-01	7.40E+01	1.98E-02
Kr-85	1.40E+02	7.23E-03	0	0
Kr-87	1.56E+02	8.06E-03	1.36E+02	3.64E-02
Kr-88	1.65E+03	8.52E-02	2.36E+02	6.32E-02
Kr-89	6.40E+02	3.31E-02	0	0
Xe-131m	4.80E+01	2.48E-03	0	0
Xe-133m	3.50E+01	1.81E-03	0	0
Xe-133	1.24E+04	6.41E-01	3.92E+02	1.05E-01
Xe-135m	1.80E+01	9.30E-04	7.42E+02	1.99E-01
Xe-135	5.10E+02	2.63E-02	7.43E+02	1.99E-01
Xe-137	7.80E+02	4.03E-02	0	0
Xe-138	5.90E+02	3.05E-02	1.41E+03	3.78E-01
	19356.	1.0	3733.	1.0

a Releases computed by BWR-GALE for DAEC Base Case gaseous radwaste treatment. Computed releases are included only to show the basis of the radionuclide distribution.

b This is the calculated distribution of radionuclides in gaseous effluents in each release pathway. To estimate radionuclide concentrations in a sample in which only the total activity concentration has been measured, multiply the total activity concentration by the fraction of respective radionuclides listed above.

Table 3-3

Transfer Factors for Maximum Offsite Air Dose
Based on Reference Meteorology

Radionuclide	Air Dose Transfer Factors		
	$A\gamma_{s_i}$ [a,b] $\left(\frac{\text{mrad}}{\mu\text{Ci}}\right)$	$A\gamma_{v_i}$ $\left(\frac{\text{mrad}}{\mu\text{Ci sec/m}^3}\right)$	$A\beta_i$ $\left(\frac{\text{mrad}}{\mu\text{Ci sec/m}^3}\right)$
Kr-83m	4.3E-14	6.1E-7	9.1E-6
Kr-85m	6.0E-12	3.9E-5	6.2E-5
Kr-85	8.4E-14	5.4E-7	6.2E-5
Kr-87	2.3E-13	2.0E-4	3.3E-4
Kr-88	6.4E-11	4.8E-4	9.3E-5
Kr-89	3.0E-11	5.5E-4	3.4E-4
Kr-90	—	5.2E-4	2.5E-4
Xe-131m	1.8E-14	4.9E-6	3.5E-5
Xe-133m	1.4E-14	1.0E-5	4.7E-5
Xe-133	1.5E-12	1.1E-5	3.3E-5
Xe-135m	1.1E-11	1.1E-4	2.3E-5
Xe-135	9.5E-12	6.1E-5	7.8E-5
Xe-137	2.6E-12	4.8E-5	4.0E-4
Xe-138	3.6E-11	2.9E-4	1.5E-4
Ar-41	4.4E-11	2.9E-4	1.0E-4

[a] Based on reference meteorology at DAEC

[b] Receptor located 1260 meters NNW of Station

Table 3-4

Total Body Dose Transfer Factors

(To be developed)

APPENDIX A

PATHWAY-DOSE TRANSFER FACTORS

Environmental pathway transfer factors, usage factors, and dose commitment factors appropriate for each exposure pathway, age, and organ are combined into integrated environmental concentration-to-dose factors for each radionuclide. This appendix includes tables of values of the transfer factors calculated in accord with equations and values recommended in Regulatory Guide 1.109, Revision 0 except as noted below. Appropriate transfer factors from Appendix A are used in performing dose assessment calculations prescribed in the ODAM.

Quantities used in calculating pathway to dose transfer factors which differ from values recommended in Regulatory Guide 1.109, Rev. 0 are:

1. factor converting inhaled Fe-59 to adult liver dose
2. bioaccumulation factor for tellurium in fish and shellfish
3. stable element transfer factor for Pa in meat.

DOSE FACTORS FOR LIQUID DISCHARGES BASED ON 1 CI/YR RELEASE OF EACH ISOTOPE IN DISCHARGE FLOW OF 1 GPM WITH NO ADDITIONAL DILUTION

PATHWAY - POTABLE WATER

AGE GROUP - ADULT

NUCLIDE	ORGAN DOSE (MREM)							
	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	SKIN	TOTAL BODY
H----3	0.	4.92E+01	4.92E+01	4.92E+01	4.92E+01	4.92E+01	0.	4.92E+01
P---32	6.91E+04	4.33E+03	0.	0.	0.	7.77E+03	0.	2.06E+03
CR--51	0.	0.	5.76E-01	2.13E-01	1.28E+00	2.42E+02	0.	9.64E-01
MN--54	0.	1.68E+03	0.	4.98E+02	0.	5.13E+03	0.	3.20E+02
FE--55	2.27E+03	1.02E+04	0.	0.	1.19E+04	4.00E+03	0.	2.69E+03
FE--59	1.58E+03	3.75E+03	0.	0.	1.04E+03	1.24E+04	0.	1.43E+03
CO--58	0.	2.72E+02	0.	0.	0.	5.51E+03	0.	6.10E+02
CO--60	0.	7.89E+02	0.	0.	0.	1.48E+04	0.	1.73E+03
ZN--65	1.78E+03	5.64E+03	0.	3.77E+03	0.	3.55E+03	0.	2.55E+03
RB--86	0.	7.60E+03	0.	0.	0.	1.50E+03	0.	3.54E+03
SR--89	1.13E+05	0.	0.	0.	0.	1.80E+04	0.	3.23E+03
SR--90	2.79E+06	0.	0.	0.	0.	4.20E+04	0.	6.82E+05
Y---91	5.14E+01	0.	0.	0.	0.	2.83E+04	0.	1.38E+00
ZR--95	1.11E+01	3.57E+00	0.	5.63E+00	0.	1.12E+04	0.	2.41E+00
ZR--97	3.91E-01	7.95E-02	0.	1.19E-01	0.	2.36E+04	0.	3.63E-02
NB--95	2.26E+00	1.26E+00	0.	1.25E+00	0.	7.63E+03	0.	4.94E-01
MO--99	5.67E-02	1.40E+03	0.	3.17E+03	7.86E-02	3.33E+03	0.	2.60E+02
RU-103	6.73E+01	0.	0.	2.57E+02	0.	7.86E+03	0.	2.90E+01
RU-106	1.01E+03	0.	0.	1.95E+03	0.	6.53E+04	0.	1.28E+02
AG110M	5.86E+01	5.42E+01	0.	1.07E+02	0.	2.21E+04	0.	3.22E+01
SB-124	1.03E+03	1.93E+01	2.48E+00	0.	7.95E+02	2.90E+04	0.	4.05E+02
SB-125	8.19E+02	9.25E+00	1.10E+00	5.00E+00	8.55E+04	7.23E+03	0.	1.04E+02
TE125M	9.77E+02	3.55E+02	2.94E+02	3.98E+03	0.	3.90E+03	0.	1.31E+02
TE127M	2.50E+03	8.75E+02	6.50E+02	1.02E+04	0.	1.02E+04	0.	3.07E+02
TE129M	4.19E+03	1.56E+03	1.45E+03	1.74E+04	0.	2.10E+04	0.	6.64E+02
TE131M	5.34E+02	3.13E+02	2.64E+04	2.50E+03	0.	2.31E+04	0.	2.40E+02
TE-132	8.41E+03	7.20E+02	2.42E+04	5.50E+03	0.	2.54E+04	0.	5.69E+02
I--131	1.46E+03	2.10E+03	6.85E+05	3.59E+03	0.	5.52E+02	0.	1.20E+03
I--133	3.93E+02	6.12E+02	1.18E+05	1.07E+03	0.	5.38E+02	0.	1.87E+02
CS-134	2.28E+04	5.43E+04	0.	1.76E+04	5.83E+03	9.50E+02	0.	4.44E+04
CS-136	2.33E+03	9.18E+03	0.	5.11E+03	7.00E+02	1.04E+03	0.	6.61E+03
CS-137	2.93E+04	4.00E+04	0.	1.30E+04	4.51E+03	7.71E+02	0.	2.62E+04
BA-140	7.25E+03	9.20E+00	0.	3.10E+00	5.21E+00	2.12E+04	0.	4.79E+02
LA-140	7.46E-01	3.76E-01	0.	0.	0.	2.76E+04	0.	3.96E-02
CE-141	3.40E+00	2.30E+00	0.	1.07E+00	0.	8.79E+03	0.	2.61E-01
CE-143	5.46E+01	3.48E+02	0.	1.70E-01	0.	1.33E+04	0.	4.22E-02
CE-144	1.79E+02	7.48E+01	0.	4.43E+01	0.	6.05E+04	0.	9.60E+00
NP-239	3.90E-01	3.88E-02	0.	1.17E-01	0.	7.60E+03	0.	2.07E-02

DOSE FACTORS FOR LIQUID DISCHARGES BASED ON 1 CI/YR RELEASE OF EACH ISOTOPE IN DISCHARGE FLOW OF 1 GPM WITH NO ADDITIONAL DILUTION

PATHWAY - FRESH WATER FISH

AGE GROUP - ADULT

NUCLIDE	ORGAN DOSE (MREM)							
	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	SKIN	TOTAL BODY
H----3	0.	1.27E+00	1.27E+00	1.27E+00	1.27E+00	1.27E+00	0.	1.27E+00
P---32	1.94E+08	1.22E+07	0.	0.	0.	2.10E+07	0.	7.51E+06
CR--51	0.	0.	3.27E+00	1.21E+00	7.27E+00	1.38E+03	0.	5.48E+00
MN--54	0.	1.93E+04	0.	5.73E+03	0.	5.90E+04	0.	3.66E+03
FE--55	6.54E+03	2.94E+04	0.	0.	3.41E+04	1.15E+04	0.	7.73E+03
FE--59	4.51E+03	1.07E+04	0.	0.	2.97E+03	3.53E+04	0.	4.07E+03
CO--58	0.	3.90E+02	0.	0.	0.	7.89E+03	0.	8.73E+02
CO--60	0.	1.13E+03	0.	0.	0.	2.12E+04	0.	2.49E+03
ZN--65	1.02E+05	3.24E+05	0.	2.17E+05	0.	2.04E+05	0.	1.47E+05
RB--86	0.	4.29E+05	0.	0.	0.	8.46E+04	0.	2.00E+05
SR--89	9.65E+04	0.	0.	0.	0.	1.54E+04	0.	2.76E+03
SR--90	2.41E+06	0.	0.	0.	0.	3.84E+04	0.	5.89E+03
Y---91	3.68E+01	0.	0.	0.	0.	2.02E+04	0.	9.80E-01
ZR--95	3.89E+01	2.13E+01	0.	2.13E+01	0.	1.28E+05	0.	8.48E+00
ZR--97	6.72E+00	1.69E+00	0.	1.98E+00	0.	7.62E+03	0.	6.20E-01
NB--95	1.93E+03	1.07E+03	0.	1.07E+03	0.	6.52E+06	0.	4.22E+02
MO--99	2.77E-02	3.55E+02	0.	8.05E+02	3.84E-02	8.69E+02	0.	5.85E+01
RU-103	1.92E+01	0.	0.	7.33E+01	0.	2.24E+03	0.	8.28E+00
RU-106	2.90E+02	0.	0.	5.61E+02	0.	1.88E+04	0.	3.67E+01
AG110M	3.87E+00	3.58E+00	0.	7.05E+00	0.	1.46E+03	0.	2.13E+00
SB-124	2.93E+01	5.53E-01	7.09E-02	0.	2.28E+01	8.30E+02	0.	1.16E+01
SB-125	5.17E+01	1.05E+01	8.52E+00	1.15E+02	2.46E+03	3.21E+02	0.	8.51E+00
TE125M	1.12E+04	4.06E+03	3.37E+03	4.55E+04	0.	4.40E+04	0.	1.50E+03
TE127M	2.88E+04	1.01E+04	7.54E+03	1.17E+05	0.	1.25E+05	0.	3.54E+03
TE129M	4.77E+04	1.78E+04	1.64E+04	2.00E+05	0.	2.40E+05	0.	7.90E+03
TE131M	4.17E+03	2.07E+03	2.24E+04	2.04E+04	0.	1.99E+05	0.	1.71E+03
TE-132	8.63E+04	5.66E+03	1.56E+04	5.40E+04	0.	2.63E+05	0.	5.25E+03
I--131	6.04E+02	8.66E+02	2.83E+05	1.48E+03	0.	2.28E+02	0.	4.95E+02
I--133	1.03E+02	1.78E+02	3.42E+04	3.11E+02	0.	1.50E+02	0.	5.43E+01
CS-134	1.31E+06	3.12E+06	0.	1.01E+06	3.35E+05	5.46E+04	0.	2.55E+05
CS-136	1.30E+05	5.14E+05	0.	2.86E+05	3.92E+04	5.84E+04	0.	3.70E+05
CS-137	1.68E+06	2.30E+06	0.	7.83E+05	2.60E+05	4.43E+04	0.	1.91E+05
BA-140	8.12E+02	1.13E+00	0.	3.47E-01	5.84E-01	9.71E+03	0.	5.39E+01
LA-140	4.36E-01	2.20E-01	0.	0.	0.	1.61E+04	0.	5.65E-02
CE-141	9.68E-02	6.55E-02	0.	3.04E-02	0.	2.50E+02	0.	7.42E-03
CE-143	1.05E-01	7.82E+00	0.	2.51E-02	0.	7.02E+02	0.	5.52E-03
CE-144	5.16E+00	2.15E+00	0.	1.27E+00	0.	1.74E+03	0.	2.70E-01
NP-239	9.02E-02	9.53E-03	0.	2.89E-02	0.	1.09E+03	0.	9.13E-03

DOSE FACTORS FOR LIQUID DISCHARGES BASED ON 1 CI/YR RELEASE OF EACH ISOTOPE IN DISCHARGE FLOW OF 1 GPM WITH NO ADDITIONAL DILUTION

PATHWAY - POTABLE WATER — AGE GROUP - TEENAGER

NUCLIDE	ORGAN DOSE (MREM)							
	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	SKIN	TOTAL BODY
H----3	0.	2.72E+01	2.72E+01	3.44E+01	2.72E+01	2.72E+01	0.	2.72E+01
P---32	4.83E+04	3.03E+03	0.	0.	0.	5.43E+03	0.	1.87E+03
CR--51	0.	0.	4.03E-01	1.49E-01	8.94E-01	1.69E+02	0.	8.73E-01
MN--54	0.	1.17E+03	0.	3.48E+02	0.	3.59E+03	0.	2.24E+02
FE--55	1.59E+03	7.15E+03	0.	0.	8.28E+03	2.79E+03	0.	1.80E+03
FE--59	1.10E+03	2.62E+03	0.	0.	7.28E+02	8.65E+03	0.	9.97E+02
CO--58	0.	2.53E+02	0.	0.	0.	3.42E+03	0.	5.77E+02
CO--60	0.	7.07E+02	0.	0.	0.	8.48E+03	0.	1.62E+03
ZN--65	1.24E+03	3.94E+03	0.	2.64E+03	0.	2.48E+03	0.	1.78E+03
RB--86	0.	5.31E+03	0.	0.	0.	1.05E+03	0.	2.48E+03
SR--89	1.17E+05	0.	0.	0.	0.	1.27E+04	0.	3.35E+03
SR--90	2.67E+06	0.	0.	0.	1.17E+03	5.98E+04	0.	6.59E+05
Y---91	5.00E+01	0.	0.	0.	0.	1.92E+04	0.	1.33E+00
ZR--95	9.51E+00	3.17E+00	0.	3.94E+00	0.	6.87E+03	0.	2.22E+00
ZR--97	2.73E-01	5.55E-02	0.	8.31E-02	0.	1.65E+04	0.	2.53E-02
NB--95	1.84E+00	1.11E+00	0.	8.71E-01	0.	4.52E+03	0.	6.24E-01
MO--99	3.96E-02	9.70E+02	0.	2.21E+03	5.49E-02	2.53E+03	0.	1.87E+02
RU-103	6.02E+01	0.	0.	1.80E+02	0.	4.70E+03	0.	2.69E+01
RU-106	1.02E+03	0.	0.	1.35E+03	0.	4.64E+04	0.	1.29E+02
AG110M	4.10E+01	3.79E+01	0.	7.45E+01	0.	1.55E+04	0.	2.25E+01
SB-124	7.16E+02	1.35E+01	1.73E+00	0.	5.56E+02	2.03E+04	0.	2.83E+02
SB-125	5.72E+02	6.59E+00	8.53E-01	3.50E+00	5.97E+04	5.05E+03	0.	1.15E+02
TE125M	9.76E+02	3.49E+02	2.75E+02	2.78E+03	0.	2.73E+03	0.	1.29E+02
TE127M	1.75E+03	6.14E+02	4.57E+02	7.10E+03	0.	7.62E+03	0.	2.10E+02
TE129M	4.22E+03	1.56E+03	1.36E+03	1.22E+04	0.	1.47E+04	0.	6.64E+02
TE131M	3.87E+02	2.37E+02	2.14E+04	1.75E+03	0.	1.01E+04	0.	1.80E+02
TE-132	8.05E+02	6.37E+02	1.70E+04	3.84E+03	0.	1.84E+04	0.	5.29E+02
I--131	1.37E+03	1.93E+03	5.57E+05	2.50E+03	0.	3.06E+02	0.	1.15E+03
I--133	3.50E+02	5.93E+02	1.08E+05	7.47E+02	0.	4.31E+02	0.	1.83E+02
CS-134	2.06E+04	4.97E+04	0.	1.23E+04	6.02E+03	5.74E+02	0.	2.32E+04
CS-136	1.03E+03	6.41E+03	0.	3.57E+03	4.89E+02	7.29E+02	0.	4.62E+03
CS-137	2.74E+04	3.09E+04	0.	9.51E+03	4.90E+03	4.92E+02	0.	1.29E+04
BA-140	7.05E+03	8.76E+00	0.	2.17E+00	5.81E+00	5.51E+03	0.	4.54E+02
LA-140	7.25E-01	3.59E-01	0.	0.	0.	1.98E+04	0.	9.48E-02
CE-141	3.20E+00	2.15E+00	0.	7.40E-01	0.	5.81E+03	0.	2.40E-01
CE-143	3.81E-01	2.43E+02	0.	1.19E-01	0.	9.31E+03	0.	2.99E-02
CE-144	1.85E+02	7.58E+01	0.	3.10E+01	0.	4.55E+04	0.	9.81E+00
NP-239	2.74E-01	2.73E-02	0.	8.14E-02	0.	5.31E+03	0.	1.45E-02

DOSE FACTORS FOR LIQUID DISCHARGES BASED ON 1 CI/YR RELEASE OF EACH ISOTOPE IN DISCHARGE FLOW OF 1 GPM WITH NO ADDITIONAL DILUTION

PATHWAY = FRESH WATER FISH

AGE GROUP = TEENAGER

NUCLIDE	ORGAN DOSE (MREM)							
	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	SKIN	TOTAL BODY
H----3	0.	7.67E-01	7.67E-01	9.70E-01	7.67E-01	7.67E-01	0.	7.67E-01
P---32	1.48E+08	9.27E+06	0.	0.	0.	1.60E+07	0.	5.72E+06
CR--51	0.	0.	2.49E+00	9.21E-01	5.54E+00	1.05E+03	0.	4.17E+00
MN--54	0.	1.47E+04	0.	4.37E+03	0.	4.49E+04	0.	2.80E+03
FE--55	4.98E+03	2.24E+04	0.	0.	2.60E+04	8.76E+03	0.	5.89E+03
FE--59	3.44E+03	8.16E+03	0.	0.	2.27E+03	2.69E+04	0.	3.10E+03
CO--58	0.	3.95E+02	0.	0.	0.	5.34E+03	0.	9.00E+02
CO--60	0.	1.11E+03	0.	0.	0.	1.33E+04	0.	2.53E+03
ZN--65	7.78E+04	2.47E+05	0.	1.65E+05	0.	1.56E+05	0.	1.12E+05
RB--86	0.	3.27E+05	0.	0.	0.	6.45E+04	0.	1.53E+05
SR--89	1.10E+05	0.	0.	0.	0.	1.19E+04	0.	3.14E+03
SR--90	2.51E+06	0.	0.	0.	1.72E+03	5.81E+04	0.	6.20E+05
Y---91	3.89E+01	0.	0.	0.	0.	1.50E+04	0.	1.04E+03
ZR--95	3.45E+01	2.04E+01	0.	1.63E+01	0.	8.29E+04	0.	1.10E+01
ZR--97	5.13E+00	1.29E+00	0.	1.51E+00	0.	5.81E+03	0.	4.73E-01
NB--95	1.71E+03	1.03E+03	0.	8.11E+02	0.	4.21E+06	0.	5.82E+02
MO--99	2.11E-02	2.70E+02	0.	6.14E+02	2.93E-02	6.62E+02	0.	5.22E+01
RU-103	1.87E+01	0.	0.	5.59E+01	0.	1.46E+03	0.	8.38E+00
RU-106	3.21E+02	0.	0.	4.27E+02	0.	1.45E+04	0.	4.04E+01
AG110M	2.95E+00	2.73E+00	0.	5.37E+00	0.	1.11E+03	0.	1.82E+00
SB-124	2.23E+01	4.21E-01	5.40E-02	0.	1.73E+01	6.32E+02	0.	8.82E+00
SB-125	4.86E+01	1.12E+01	8.68E+00	8.74E+01	1.87E+03	2.44E+02	0.	7.68E+00
TE125M	1.22E+04	4.36E+03	3.43E+03	3.47E+04	0.	3.40E+04	0.	1.62E+03
TE127M	2.21E+04	7.71E+03	5.80E+03	8.91E+04	0.	1.05E+05	0.	2.72E+03
TE129M	9.24E+04	1.94E+04	1.68E+04	1.51E+05	0.	1.83E+05	0.	8.25E+03
TE131M	3.19E+03	1.59E+03	1.94E+04	1.56E+04	0.	1.52E+05	0.	1.32E+03
TE-132	9.25E+03	5.82E+03	1.33E+04	4.12E+04	0.	2.08E+05	0.	5.48E+03
I--131	6.17E+02	8.71E+02	2.51E+05	1.13E+03	0.	1.65E+02	0.	5.19E+02
I--133	1.11E+02	1.88E+02	3.41E+04	2.37E+02	0.	1.37E+02	0.	5.79E+01
CS-134	1.29E+06	3.12E+06	0.	7.71E+05	3.78E+05	3.60E+04	0.	1.40E+05
CS-136	9.93E+04	3.92E+05	0.	2.18E+05	2.93E+04	4.45E+04	0.	2.82E+05
CS-137	1.72E+06	2.32E+06	0.	5.97E+05	3.07E+05	3.09E+04	0.	8.16E+05
BA-140	8.62E+02	1.17E+00	0.	2.65E-01	7.10E-01	6.41E+03	0.	5.55E+01
LA-140	4.63E-01	2.29E-01	0.	0.	0.	1.20E+04	0.	6.05E-02
CE-141	9.92E-02	6.06E-02	0.	2.31E-02	0.	1.80E+02	0.	7.64E-03
CE-143	7.96E-02	5.96E+00	0.	1.92E-02	0.	5.36E+02	0.	4.21E-03
CE-144	9.80E+00	2.38E+00	0.	9.72E-01	0.	1.30E+03	0.	3.07E-01
NP-239	7.37E-02	7.32E-03	0.	2.21E-02	0.	1.44E+03	0.	3.91E-03

DOSE FACTORS FOR LIQUID DISCHARGES BASED ON 1 CI/YR RELEASE OF EACH ISOTOPE IN DISCHARGE FLOW OF 1 GPM WITH NO ADDITIONAL DILUTION

PATHWAY - POTABLE WATER AGE GROUP - CHILD

NUCLIDE	ORGAN DOSE (MREM)							
	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	SKIN	TOTAL BODY
H----3	0.	5.20E+01	5.20E+01	3.44E+01	5.20E+01	5.20E+01	0.	5.20E+01
P---32	4.83E+04	3.03E+03	0.	0.	0.	5.43E+03	0.	1.87E+03
CR--51	0.	0.	4.03E-01	1.49E-01	8.94E-01	1.69E+02	0.	6.73E-01
MN--54	0.	1.17E+03	0.	3.48E+02	0.	3.59E+03	0.	2.24E+02
FE--55	1.59E+03	7.15E+03	0.	0.	8.28E+03	2.79E+03	0.	1.86E+03
FE--59	1.10E+03	2.62E+03	0.	0.	7.28E+02	8.65E+03	0.	9.97E+02
CO--58	0.	4.72E+02	0.	0.	0.	2.81E+03	0.	1.42E+03
CO--60	0.	1.33E+03	0.	0.	0.	7.33E+03	0.	3.97E+03
ZN--65	1.24E+03	3.94E+03	0.	2.64E+03	0.	2.48E+03	0.	1.78E+03
RB--86	0.	5.31E+03	0.	0.	0.	1.05E+03	0.	2.48E+03
SR--89	3.51E+05	0.	0.	0.	0.	1.31E+04	0.	1.01E+04
SR--90	4.41E+06	0.	0.	0.	0.	6.24E+04	0.	1.12E+06
Y---91	1.49E+02	0.	0.	0.	0.	1.98E+04	0.	3.98E+00
ZR--95	2.65E+01	6.19E+00	0.	3.94E+00	0.	6.41E+03	0.	5.63E+00
ZR--97	2.73E-01	5.55E-02	0.	8.31E-02	0.	1.65E+04	0.	2.56E-02
NB--95	4.95E+00	2.11E+00	0.	8.71E-01	0.	3.66E+03	0.	1.55E+00
MO--99	3.96E-02	9.76E+02	0.	2.21E+03	5.49E-02	2.33E+03	0.	1.87E+02
RU-103	1.72E+02	0.	0.	1.80E+02	0.	4.52E+03	0.	6.96E+01
RU-106	3.05E+03	0.	0.	1.36E+03	0.	4.74E+04	0.	5.79E+02
AG110M	4.10E+01	3.79E+01	0.	7.45E+01	0.	1.55E+04	0.	2.25E+01
SB-124	7.16E+02	1.35E+01	1.73E+00	0.	5.50E+02	2.03E+04	0.	2.80E+02
SB-125	5.75E+02	7.14E+00	1.54E+00	3.50E+00	5.97E+04	5.05E+03	0.	1.15E+02
TE125M	2.91E+03	7.87E+02	8.15E+02	2.78E+03	0.	2.80E+03	0.	3.87E+02
TE127M	1.80E+03	6.24E+02	4.88E+02	7.10E+03	0.	8.66E+03	0.	2.29E+02
TE129M	1.26E+04	3.50E+03	4.02E+03	1.22E+04	0.	1.51E+04	0.	1.94E+03
TE131M	4.87E+02	3.18E+02	5.08E+04	1.75E+03	0.	1.61E+04	0.	2.55E+02
TE-132	2.40E+03	1.17E+03	1.80E+04	3.84E+03	0.	1.82E+04	0.	1.29E+03
I--131	4.00E+03	4.10E+03	1.33E+06	2.50E+03	0.	3.51E+02	0.	3.09E+03
I--133	1.03E+03	1.27E+03	3.07E+05	7.47E+02	0.	5.10E+02	0.	5.00E+02
CS-134	5.74E+04	9.66E+04	0.	1.23E+04	1.07E+04	5.23E+02	0.	2.06E+04
CS-135	1.63E+03	6.41E+03	0.	3.57E+03	4.83E+02	7.29E+02	0.	4.02E+03
CS-137	8.00E+04	7.74E+04	0.	9.51E+03	9.07E+03	4.72E+02	0.	1.15E+04
BA-140	2.06E+04	1.83E+01	0.	2.17E+00	1.08E+01	5.78E+03	0.	1.21E+03
LA-140	2.11E+00	7.54E-01	0.	0.	0.	2.08E+04	0.	2.48E-01
CE-141	9.54E+00	4.77E+00	0.	7.45E-01	0.	5.99E+03	0.	7.10E-01
CE-143	3.81E-01	2.43E+02	0.	1.19E-01	0.	9.31E+03	0.	2.95E-02
CE-144	5.48E+02	1.72E+02	0.	3.10E+01	0.	4.46E+04	0.	2.92E+01
NP-239	2.77E-01	2.76E-02	0.	8.14E-02	0.	5.31E+03	0.	1.40E-02

DOSE FACTORS FOR LIQUID DISCHARGES BASED ON 1 CI/YR RELEASE OF EACH ISOTOPE IN DISCHARGE FLOW OF 1 GPM WITH NO ADDITIONAL DILUTION

PATHWAY - FRESH WATER FISH

AGE GROUP - CHILD

NUCLIDE	ORGAN DOSE (MREM)							
	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	SKIN	TOTAL BODY
H----3	0.	6.34E-01	6.34E-01	4.18E-01	6.34E-01	6.34E-01	0.	6.34E-01
P---32	6.38E+07	4.00E+06	0.	0.	0.	7.17E+06	0.	2.47E+06
CR--51	0.	0.	1.08E+00	3.97E-01	2.39E+00	4.53E+02	0.	1.80E+00
MN--54	0.	6.33E+03	0.	1.88E+03	0.	1.94E+04	0.	1.21E+03
FE--55	2.15E+03	9.67E+03	0.	0.	1.12E+04	3.78E+03	0.	2.54E+03
FE--59	1.48E+03	3.52E+03	0.	0.	9.77E+02	1.16E+04	0.	1.34E+03
CO--58	0.	3.18E+02	0.	0.	0.	1.89E+03	0.	9.50E+02
CO--60	0.	8.96E+02	0.	0.	0.	4.96E+03	0.	2.69E+03
ZN--65	3.35E+04	1.07E+05	0.	7.12E+04	0.	6.71E+04	0.	4.82E+04
RB--86	0.	1.41E+05	0.	0.	0.	2.78E+04	0.	6.56E+04
SR--89	1.42E+05	0.	0.	0.	0.	5.29E+03	0.	4.05E+03
SR--90	1.79E+06	0.	0.	0.	0.	2.62E+04	0.	4.54E+05
Y---91	5.01E+01	0.	0.	0.	0.	6.66E+03	0.	1.34E+00
ZR--95	4.01E+01	1.69E+01	0.	7.00E+00	0.	2.90E+04	0.	1.24E+01
ZR--97	2.21E+00	5.57E-01	0.	6.51E-01	0.	2.50E+03	0.	2.04E-01
NB--95	1.99E+03	8.49E+02	0.	3.50E+02	0.	1.47E+06	0.	6.23E+02
MO--99	9.12E-03	1.17E+02	0.	2.64E+02	1.23E-02	2.85E+02	0.	2.62E+01
RU-103	2.31E+01	0.	0.	2.41E+01	0.	6.07E+02	0.	9.34E+00
RU-106	4.12E+02	0.	0.	1.84E+02	0.	6.40E+03	0.	5.16E+01
AG110M	1.27E+00	1.18E+00	0.	2.32E+00	0.	4.81E+02	0.	7.00E-01
SB-124	9.63E+00	1.82E-01	2.33E-02	0.	7.47E+00	2.73E+02	0.	5.81E+00
SB-125	4.71E+01	1.08E+01	1.11E+01	3.77E+01	8.08E+02	1.06E+02	0.	6.81E+00
TE125M	1.56E+04	4.24E+03	4.39E+03	1.49E+04	0.	1.51E+04	0.	2.08E+03
TE127M	9.85E+03	3.41E+03	2.73E+03	3.84E+04	0.	5.31E+04	0.	1.25E+03
TE129M	6.73E+04	1.88E+04	2.15E+04	6.54E+04	0.	8.10E+04	0.	1.04E+04
TE131M	1.42E+03	7.14E+02	1.86E+04	6.73E+03	0.	6.54E+04	0.	5.92E+02
TE-132	1.14E+04	5.06E+03	1.05E+04	1.77E+04	0.	8.84E+04	0.	6.09E+03
I--131	7.78E+02	7.97E+02	2.59E+05	4.87E+02	0.	6.63E+01	0.	6.01E+02
I--133	1.41E+02	1.74E+02	4.19E+04	1.02E+02	0.	7.04E+01	0.	6.83E+01
CS-134	1.55E+06	2.61E+06	0.	3.33E+05	2.90E+05	1.41E+04	0.	5.95E+05
CS-136	4.28E+04	1.69E+05	0.	9.40E+04	1.23E+04	1.92E+04	0.	1.22E+05
CS-137	2.16E+06	2.10E+06	0.	2.57E+05	2.40E+05	1.28E+04	0.	5.12E+05
BA-140	1.09E+03	1.05E+00	0.	1.14E-01	5.63E-01	2.92E+03	0.	6.37E+01
LA-140	5.79E-01	2.02E-01	0.	0.	0.	5.73E+03	0.	6.82E-02
CE-141	1.28E-01	6.38E-02	0.	9.98E-03	0.	8.01E+01	0.	9.51E-03
CE-143	3.44E-02	2.57E+00	0.	8.27E-03	0.	2.31E+02	0.	1.81E-03
CE-144	7.40E+00	2.32E+00	0.	4.20E-01	0.	6.02E+02	0.	3.94E-01
NP-239	3.21E-02	3.18E-03	0.	9.90E-03	0.	6.20E+02	0.	1.70E-03

DOSE FACTORS FOR LIQUID DISCHARGES BASED ON 1 CI/YR RELEASE OF EACH ISOTOPE IN DISCHARGE FLOW OF 1 GPM WITH NO ADDITIONAL DILUTION

PATHWAY - POTABLE WATER AGE GROUP - INFANT

NUCLIDE	ORGAN DOSE (MREM)							
	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	SKIN	TOTAL BODY
H----3	0.	7.87E+01	7.87E+01	3.44E+01	7.87E+01	7.87E+01	0.	7.87E+01
P---32	4.83E+04	3.03E+03	0.	0.	0.	5.43E+03	0.	1.87E+03
CR--51	0.	0.	4.03E-01	1.49E-01	8.94E-01	1.69E+02	0.	0.73E-01
MN--54	0.	1.17E+03	0.	3.48E+02	0.	3.59E+03	0.	2.24E+02
FE--55	1.59E+03	7.15E+03	0.	0.	8.28E+03	2.79E+03	0.	1.88E+03
FE--59	1.10E+03	2.62E+03	0.	0.	7.29E+02	8.65E+03	0.	9.97E+02
CO--58	0.	9.64E+02	0.	0.	0.	2.50E+03	0.	2.30E+03
CO--60	0.	2.74E+03	0.	0.	0.	0.77E+03	0.	6.50E+03
ZN--65	1.24E+03	3.94E+03	0.	2.64E+03	0.	2.48E+03	0.	1.70E+03
RB--86	0.	5.31E+03	0.	0.	0.	1.05E+03	0.	2.48E+03
SR--89	7.46E+05	0.	0.	0.	0.	1.40E+04	0.	2.14E+04
SR--90	6.43E+06	0.	0.	0.	0.	6.63E+04	0.	1.64E+05
Y---91	3.19E+02	0.	0.	0.	0.	2.11E+04	0.	8.49E+03
ZR--95	5.39E+01	1.36E+01	0.	3.94E+00	0.	6.10E+03	0.	9.67E+00
ZR--97	2.73E-01	5.55E-02	0.	8.31E-02	0.	1.65E+04	0.	2.93E-02
NB--95	9.87E+00	4.44E+00	0.	8.71E-01	0.	3.55E+03	0.	2.61E+00
MO--99	3.96E-02	9.76E+02	0.	2.21E+03	5.49E-02	2.53E+03	0.	1.87E+02
RU-103	3.58E+02	0.	0.	1.80E+02	0.	4.47E+03	0.	1.23E+02
RU-106	6.51E+03	0.	0.	1.35E+03	0.	5.05E+04	0.	7.99E+02
AG110M	4.10E+01	3.79E+01	0.	7.45E+01	0.	1.55E+04	0.	2.29E+01
SB-124	7.16E+02	1.35E+01	1.73E+00	0.	5.56E+02	2.03E+04	0.	2.85E+02
SB-125	5.79E+02	8.78E+00	3.08E+00	3.50E+00	5.97E+04	5.05E+03	0.	1.16E+02
TE125M	6.19E+03	2.09E+03	2.04E+03	2.78E+03	0.	2.98E+03	0.	8.26E+02
TE127M	1.87E+03	6.54E+02	5.58E+02	7.10E+03	0.	9.18E+03	0.	2.42E+02
TE129M	2.66E+04	9.16E+03	1.00E+04	1.22E+04	0.	1.61E+04	0.	4.00E+03
TE131M	6.53E+02	5.41E+02	1.22E+05	1.75E+03	0.	1.61E+04	0.	3.57E+02
TE-132	4.96E+03	2.55E+03	2.01E+04	3.84E+03	0.	1.86E+04	0.	2.29E+03
I--131	8.40E+03	9.99E+03	3.22E+06	2.50E+03	0.	3.76E+02	0.	5.84E+03
I--133	2.17E+03	3.17E+03	7.50E+05	7.47E+02	0.	5.64E+02	0.	9.63E+02
CS-134	1.17E+05	2.11E+05	0.	1.23E+04	2.41E+04	5.02E+02	0.	1.79E+04
CS-136	1.63E+03	6.41E+03	0.	3.57E+03	4.89E+02	7.29E+02	0.	4.62E+03
CS-137	1.67E+05	1.67E+05	0.	9.51E+03	2.20E+04	4.85E+02	0.	1.08E+04
BA-140	4.34E+04	4.41E+01	0.	2.17E+00	2.67E+01	6.02E+03	0.	2.24E+03
LA-140	4.42E+00	1.74E+00	0.	0.	0.	2.17E+04	0.	4.50E-01
CE-141	2.03E+01	1.29E+01	0.	7.40E-01	0.	6.04E+03	0.	1.40E+00
CE-143	3.81E-01	2.43E+02	0.	1.19E-01	0.	9.31E+03	0.	2.99E-02
CE-144	1.15E+03	4.53E+02	0.	3.10E+01	0.	4.74E+04	0.	6.20E+01
NP-239	2.82E-01	2.82E-02	0.	8.14E-02	0.	5.31E+03	0.	1.47E-02

DOSE FACTORS FOR GASEOUS DISCHARGES

BASED ON 1 CI/YR RELEASE OF EACH ISOTOPE AND A VALUE OF UNITY FOR X/Q, DEPLETED X/Q AND RELATIVE DEPOSITION

PATHWAY - INHALATION

AGE GROUP - ADULT

NUCLIDE	ORGAN DOSE (MREM)							
	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	SKIN	TOTAL BODY
H----3	0.	3.10E+01	3.10E+01	3.10E+01	3.10E+01	3.10E+01	0.	3.10E+01
C---14	5.28E+02	9.88E+01	9.88E+01	9.88E+01	9.88E+01	9.88E+01	0.	9.88E+01
P---32	3.82E+04	2.23E+03	0.	0.	0.	2.50E+03	0.	1.45E+03
AR--41	0.	0.	0.	0.	0.	0.	0.	0.
MN--54	0.	1.15E+03	0.	2.85E+02	4.05E+04	2.24E+03	0.	1.82E+02
FE--59	3.40E+02	8.03E+05	0.	0.	2.94E+04	5.44E+03	0.	3.06E+02
CO--58	0.	4.58E+01	0.	0.	2.69E+04	3.08E+03	0.	6.00E+01
CO--60	0.	3.33E+02	0.	0.	1.73E+05	8.24E+03	0.	4.28E+02
ZN--65	9.38E+02	2.99E+03	0.	2.00E+03	2.52E+04	1.55E+03	0.	1.35E+03
KR-83M	0.	0.	0.	0.	0.	0.	0.	0.
KR-85M	0.	0.	0.	0.	0.	0.	0.	0.
KR--85	0.	0.	0.	0.	0.	0.	0.	0.
KR--87	0.	0.	0.	0.	0.	0.	0.	0.
KR--88	0.	0.	0.	0.	0.	0.	0.	0.
KR--89	0.	0.	0.	0.	0.	0.	0.	0.
KR--90	0.	0.	0.	0.	0.	0.	0.	0.
RB--86	0.	3.91E+03	0.	0.	0.	4.82E+02	0.	1.71E+03
SR--89	8.80E+03	0.	0.	0.	4.05E+04	1.01E+04	0.	2.52E+02
SR--90	2.87E+06	0.	0.	0.	2.78E+05	2.09E+04	0.	1.76E+05
Y---91	1.34E+04	0.	0.	0.	4.93E+04	1.11E+04	0.	3.59E+02
ZR--95	3.10E+03	9.95E+02	0.	1.57E+03	5.14E+04	4.35E+03	0.	6.74E+02
NB--95	4.07E+02	2.26E+02	0.	2.24E+02	1.46E+04	3.01E+03	0.	1.22E+02
RU-103	4.42E+01	0.	0.	1.69E+02	1.40E+04	3.19E+03	0.	1.91E+01
RU-106	2.00E+03	0.	0.	3.87E+03	2.73E+05	2.64E+04	0.	2.52E+02
AG110M	3.13E+02	2.09E+02	0.	5.69E+02	1.34E+05	8.75E+03	0.	1.72E+02
CD115M	0.	5.69E+03	0.	4.58E+03	4.07E+04	1.11E+04	0.	1.84E+02
SN-123	6.99E+03	1.54E+02	1.31E+02	0.	6.67E+04	9.07E+03	0.	2.27E+02
SN-125	3.66E+04	9.60E+02	2.85E+02	0.	2.71E+05	3.68E+03	0.	1.39E+03
SB-124	9.03E+02	1.70E+01	2.19E+00	0.	7.18E+04	1.18E+04	0.	3.59E+02
SB-125	1.91E+03	2.06E+01	1.70E+00	0.	6.37E+04	2.92E+03	0.	3.84E+02
TE127	3.66E+02	1.63E+02	9.51E+01	1.32E+03	2.78E+04	4.33E+03	0.	4.54E+01
TE129M	2.82E+02	1.35E+02	9.95E+01	1.05E+03	3.36E+04	1.11E+04	0.	4.58E+01
I--131	7.29E+02	1.04E+03	3.45E+05	1.78E+03	0.	1.02E+02	0.	5.93E+02
I--133	2.50E+02	4.31E+02	8.47E+04	7.52E+02	0.	2.52E+02	0.	1.31E+02
XE131M	0.	0.	0.	0.	0.	0.	0.	0.
XE133M	0.	0.	0.	0.	0.	0.	0.	0.
XE-133	0.	0.	0.	0.	0.	0.	0.	0.
XE135M	0.	0.	0.	0.	0.	0.	0.	0.
XE-135	0.	0.	0.	0.	0.	0.	0.	0.
XE-137	0.	0.	0.	0.	0.	0.	0.	0.
XE-138	0.	0.	0.	0.	0.	0.	0.	0.
CS-134	1.08E+04	2.45E+04	0.	8.33E+03	2.82E+03	3.01E+02	0.	2.11E+04
CS-136	1.13E+03	4.24E+03	0.	2.48E+03	3.47E+02	3.38E+02	0.	3.22E+03
CS-137	1.38E+04	1.80E+04	0.	6.44E+03	2.18E+03	2.43E+02	0.	1.24E+04
BA-140	1.13E+03	1.42E+00	0.	4.84E-01	3.08E+04	6.32E+03	0.	7.43E+01
CE-141	5.76E+02	3.91E+02	0.	1.81E+02	1.05E+04	3.47E+03	0.	4.42E+01
CE-144	9.93E+04	4.14E+04	0.	2.45E+04	2.25E+05	2.36E+04	0.	5.32E+03

DOSE FACTORS FOR GASEOUS DISCHARGES
BASED ON 1 CI/YR RELEASE OF EACH ISOTOPE AND A VALUE OF UNITY FOR X/Q, DEPLETED X/Q AND RELATIVE DEPOSITION

PATHWAY - GROUND PLANE DEPOSITION

AGE GROUP - ADULT

NUCLIDE	ORGAN DOSE (MREM)							
	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	SKIN	TOTAL BODY
H----3	0.	0.	0.	0.	0.	0.	0.	0.
C---14	0.	0.	0.	0.	0.	0.	0.	0.
P---32	0.	0.	0.	0.	0.	0.	0.	0.
AR--41	0.	0.	0.	0.	0.	0.	0.	0.
MN--54	4.39E+07	4.39E+07	4.39E+07	4.39E+07	4.39E+07	4.39E+07	5.14E+07	4.39E+07
FE--59	8.73E+06	8.73E+06	8.73E+06	8.73E+06	8.73E+06	8.73E+06	1.03E+07	8.73E+06
CO--58	1.21E+07	1.21E+07	1.21E+07	1.21E+07	1.21E+07	1.21E+07	1.41E+07	1.21E+07
CO--60	6.80E+08	6.80E+08	6.80E+08	6.80E+08	6.80E+08	6.80E+08	8.00E+08	6.80E+08
ZN--65	2.36E+07	2.36E+07	2.36E+07	2.36E+07	2.36E+07	2.36E+07	2.71E+07	2.36E+07
KR-83M	0.	0.	0.	0.	0.	0.	0.	0.
KR-85M	0.	0.	0.	0.	0.	0.	0.	0.
KR--85	0.	0.	0.	0.	0.	0.	0.	0.
KR--87	0.	0.	0.	0.	0.	0.	0.	0.
KR--88	9.90E+03	9.90E+03	9.90E+03	9.90E+03	9.90E+03	9.90E+03	1.13E+04	9.90E+03
KR--89	8.08E+02	8.08E+02	8.08E+02	8.08E+02	8.08E+02	8.08E+02	9.70E+02	8.08E+02
KR--90	6.16E-03	6.16E-03	6.16E-03	6.16E-03	6.16E-03	6.16E-03	7.29E-03	6.15E-03
RB--86	2.86E+05	2.86E+05	2.86E+05	2.86E+05	2.86E+05	2.86E+05	3.26E+05	2.86E+05
SR--89	6.87E+02	6.87E+02	6.87E+02	6.87E+02	6.87E+02	6.87E+02	7.97E+02	6.87E+02
SR--90	1.70E+05	1.70E+05	1.70E+05	1.70E+05	1.70E+05	1.70E+05	2.01E+05	1.70E+05
Y---91	3.43E+04	3.43E+04	3.43E+04	3.43E+04	3.43E+04	3.43E+04	3.86E+04	3.43E+04
ZR--95	1.59E+07	1.59E+07	1.59E+07	1.59E+07	1.59E+07	1.59E+07	1.86E+07	1.59E+07
NB--95	4.33E+06	4.33E+06	4.33E+06	4.33E+06	4.33E+06	4.33E+06	5.09E+06	4.33E+06
RU-103	3.49E+06	3.49E+06	3.49E+06	3.49E+06	3.49E+06	3.49E+06	4.07E+06	3.49E+06
RU-106	1.33E+07	1.33E+07	1.33E+07	1.33E+07	1.33E+07	1.33E+07	1.59E+07	1.33E+07
AG110M	1.13E+08	1.13E+08	1.13E+08	1.13E+08	1.13E+08	1.13E+08	1.32E+08	1.13E+08
CD115M	0.	0.	0.	0.	0.	0.	0.	0.
SN-123	0.	0.	0.	0.	0.	0.	4.35E+04	0.
SN-126	1.64E+09	1.64E+09	1.64E+09	1.64E+09	1.64E+09	1.64E+09	1.83E+09	1.64E+09
SB-124	1.90E+07	1.90E+07	1.90E+07	1.90E+07	1.90E+07	1.90E+07	2.19E+07	1.90E+07
SB-125	7.27E+07	7.27E+07	7.27E+07	7.27E+07	7.27E+07	7.27E+07	8.21E+07	7.27E+07
TE127M	2.79E+04	2.79E+04	2.79E+04	2.79E+04	2.79E+04	2.79E+04	3.09E+04	2.79E+04
TE129M	1.22E+06	1.22E+06	1.22E+06	1.22E+06	1.22E+06	1.22E+06	1.43E+06	1.22E+06
I--131	2.73E+05	2.73E+05	2.73E+05	2.73E+05	2.73E+05	2.73E+05	3.32E+05	2.73E+05
I--133	3.92E+04	3.92E+04	3.92E+04	3.92E+04	3.92E+04	3.92E+04	4.77E+04	3.92E+04
XE131M	0.	0.	0.	0.	0.	0.	0.	0.
XE133M	0.	0.	0.	0.	0.	0.	0.	0.
XE-133	0.	0.	0.	0.	0.	0.	0.	0.
XE135M	0.	0.	0.	0.	0.	0.	0.	0.
XE-135	0.	0.	0.	0.	0.	0.	0.	0.
XE-137	8.69E+01	8.69E+01	8.69E+01	8.69E+01	8.69E+01	8.69E+01	1.01E+02	8.69E+01
XE-138	6.01E+03	6.01E+03	6.01E+03	6.01E+03	6.01E+03	6.01E+03	6.87E+03	6.01E+03
CS-134	2.22E+08	2.22E+08	2.22E+08	2.22E+08	2.22E+08	2.22E+08	2.58E+08	2.22E+08
CS-136	4.73E+06	4.73E+06	4.73E+06	4.73E+06	4.73E+06	4.73E+06	5.36E+06	4.73E+06
CS-137	3.27E+08	3.27E+08	3.27E+08	3.27E+08	3.27E+08	3.27E+08	3.81E+08	3.27E+08
BA-140	5.30E+06	5.30E+06	5.30E+06	5.30E+06	5.30E+06	5.30E+06	6.02E+06	5.30E+06
CE-141	4.33E+05	4.33E+05	4.33E+05	4.33E+05	4.33E+05	4.33E+05	4.88E+05	4.33E+05
CE-144	3.59E+06	3.59E+06	3.59E+06	3.59E+06	3.59E+06	3.59E+06	4.15E+06	3.59E+06

DOSE FACTORS FOR GA[illegible] DISCHARGES

BASED ON 1 CI/YR RELEASE OF EACH ISOTOPE AND A VALUE OF UNITY FOR X/Q, DEPLETED X/Q AND RELATIVE DEPOSITION

PATHWAY - FRESH FRUITS AND VEGETABLES

AGE GROUP - ADULT

NUCLIDE	ORGAN DOSE (MREM)							
	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	SKIN	TOTAL BODY
H----3	0.	6.80E+00	6.80E+00	6.80E+00	6.80E+00	6.80E+00	0.	6.80E+00
C---14	3.96E+03	7.94E+02	7.94E+02	7.94E+02	7.94E+02	7.94E+02	0.	7.94E+02
P---32	3.59E+07	2.25E+06	0.	0.	0.	4.03E+06	0.	1.39E+06
AR--41	0.	0.	0.	0.	0.	0.	0.	0.
MN--54	0.	1.52E+06	0.	4.52E+05	0.	4.66E+06	0.	2.90E+05
FE--59	1.13E+06	2.68E+06	0.	0.	7.45E+05	8.86E+06	0.	1.06E+05
CO--58	0.	2.13E+05	0.	0.	0.	4.31E+06	0.	4.76E+05
CO--60	0.	7.53E+05	0.	0.	0.	1.41E+07	0.	1.65E+06
ZN--65	2.05E+06	6.49E+06	0.	4.34E+06	0.	4.09E+06	0.	2.94E+06
KR-83M	0.	0.	0.	0.	0.	0.	0.	0.
KR-85M	0.	0.	0.	0.	0.	0.	0.	0.
KR--85	0.	0.	0.	0.	0.	0.	0.	0.
KR--87	0.	2.93E-08	0.	0.	0.	1.37E-09	0.	1.02E-08
KR--88	0.	5.25E-01	0.	0.	0.	0.	0.	2.78E-01
KR--89	3.64E+03	0.	0.	0.	0.	5.82E+02	0.	1.04E+02
KR--90	1.09E+02	0.	0.	0.	0.	2.56E+00	0.	2.69E+01
RB--86	0.	4.15E+06	0.	0.	0.	8.18E+05	0.	1.93E+06
SR--89	8.29E+07	0.	0.	0.	0.	1.33E+07	0.	2.38E+05
SR--90	2.99E+09	0.	0.	0.	0.	7.08E+07	0.	7.30E+08
Y---91	3.89E+04	0.	0.	0.	0.	2.14E+07	0.	1.04E+03
ZR--95	9.02E+03	3.01E+03	0.	4.59E+03	0.	1.02E+07	0.	1.96E+03
NB--95	1.52E+03	8.46E+02	0.	8.39E+02	0.	5.13E+06	0.	3.53E+02
RU-103	4.72E+04	0.	0.	1.80E+05	0.	5.51E+06	0.	2.04E+04
RU-106	9.46E+05	0.	0.	1.83E+06	0.	6.12E+07	0.	1.20E+05
AG110M	5.78E+04	5.35E+04	0.	1.05E+05	0.	2.18E+07	0.	3.18E+04
CD115M	0.	4.99E+05	0.	3.96E+05	0.	2.10E+07	0.	1.59E+04
SN-123	3.18E-07	5.27E-09	4.47E-09	0.	0.	6.46E-07	0.	7.76E-08
SN-126	2.96E+07	5.86E+05	1.72E+05	0.	1.55E+05	2.91E+07	0.	9.25E+05
SB-124	7.80E+05	1.47E+04	1.88E+03	0.	6.05E+05	2.21E+07	0.	3.08E+05
SB-125	1.54E+06	2.90E+05	2.35E+05	3.16E+06	7.99E+07	9.86E+06	0.	2.58E+05
TE127M	3.05E+06	1.07E+06	8.02E+05	1.24E+07	0.	1.39E+07	0.	3.75E+05
TE129M	3.32E+06	1.24E+06	1.15E+06	1.38E+07	0.	1.67E+07	0.	5.20E+05
I--131	1.23E+06	1.77E+06	5.78E+08	3.03E+06	0.	4.66E+05	0.	1.01E+05
I--133	3.37E+04	5.85E+04	1.13E+07	1.02E+05	0.	5.14E+04	0.	1.79E+04
XE131M	0.	0.	0.	0.	0.	0.	0.	0.
XE133M	0.	0.	0.	0.	0.	0.	0.	0.
XE-133	0.	0.	0.	0.	0.	0.	0.	0.
XE135M	1.11E-04	1.03E-04	0.	3.88E-05	1.17E-05	2.40E-06	0.	4.50E-05
XE-135	3.83E-03	3.54E-03	0.	1.34E-03	4.03E-04	8.27E-05	0.	1.57E-03
XE-137	7.85E+00	1.07E+01	0.	3.65E+00	1.21E+00	2.07E-01	0.	7.03E+00
XE-138	0.	0.	0.	0.	0.	0.	0.	0.
CS-134	2.11E+07	5.01E+07	0.	1.63E+07	5.38E+06	8.77E+05	0.	4.10E+07
CS-136	1.05E+06	4.15E+06	0.	2.31E+06	3.17E+05	4.71E+05	0.	2.99E+05
CS-137	2.95E+07	4.03E+07	0.	1.37E+07	4.54E+06	7.76E+05	0.	2.64E+07
BA-140	3.25E+06	4.28E+03	0.	1.39E+03	2.34E+03	2.11E+07	0.	2.14E+05
CE-141	2.24E+03	1.52E+03	0.	7.03E+02	0.	5.78E+06	0.	1.72E+02
CE-144	1.58E+05	6.58E+04	0.	3.90E+04	0.	5.32E+07	0.	8.45E+03

DOSE FACTORS FOR G[illegible] DISCHARGES

BASED ON 1 CI/YR RELEASE OF EACH ISOTOPE AND A VALUE OF UNITY FOR X/Q, DEPLETED X/Q AND RELATIVE DEPOSITION

PATHWAY - STORED FRUITS AND VEGETABLES — AGE GROUP - ADULT

NUCLIDE	ORGAN DOSE (MREM)							
	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	SKIN	TOTAL BODY
H----3	0.	5.47E+01	5.47E+01	5.47E+01	5.47E+01	5.47E+01	0.	5.47E+01
C---14	3.22E+04	6.45E+03	6.45E+03	6.45E+03	6.45E+03	6.45E+03	0.	6.45E+03
P---32	1.67E+07	1.05E+06	0.	0.	0.	1.88E+06	0.	6.46E+05
AR--41	0.	0.	0.	0.	0.	0.	0.	0.
MN--54	0.	1.08E+07	0.	3.22E+06	0.	3.32E+07	0.	2.07E+06
FE--59	3.70E+06	8.79E+06	0.	0.	2.44E+06	2.90E+07	0.	3.35E+05
CO--58	0.	9.72E+05	0.	0.	0.	1.97E+07	0.	2.18E+05
CO--60	0.	5.99E+06	0.	0.	0.	1.12E+08	0.	1.32E+07
ZN--65	1.40E+07	4.46E+07	0.	2.98E+07	0.	2.81E+07	0.	2.02E+07
KR-83M	0.	0.	0.	0.	0.	0.	0.	0.
KR-85M	0.	0.	0.	0.	0.	0.	0.	0.
KR--85	0.	0.	0.	0.	0.	0.	0.	0.
KR--87	0.	2.38E-07	0.	0.	0.	1.11E-08	0.	8.27E-08
KR--88	0.	0.	0.	0.	0.	0.	0.	0.
KR--89	1.32E+04	0.	0.	0.	0.	2.11E+03	0.	3.78E+02
KR--90	8.78E+02	0.	0.	0.	0.	2.21E+01	0.	2.15E+02
RB--86	0.	3.78E+06	0.	0.	0.	7.46E+05	0.	1.70E+06
SR--89	3.00E+08	0.	0.	0.	0.	4.80E+07	0.	8.60E+05
SR--90	2.42E+10	0.	0.	0.	0.	6.08E+08	0.	5.91E+09
Y---91	1.58E+05	0.	0.	0.	0.	8.70E+07	0.	4.24E+03
ZR--95	4.50E+04	1.64E+04	0.	2.32E+04	0.	6.41E+07	0.	9.80E+05
NB--95	3.05E+03	2.14E+03	0.	2.12E+03	0.	1.30E+07	0.	8.40E+02
RU-103	1.38E+05	0.	0.	5.27E+05	0.	1.61E+07	0.	5.95E+04
RU-106	6.87E+06	0.	0.	1.33E+07	0.	4.45E+08	0.	8.70E+05
AG110M	4.02E+05	3.72E+05	0.	7.30E+05	0.	1.52E+08	0.	2.21E+05
CD115M	0.	1.57E+06	0.	1.24E+06	0.	6.59E+07	0.	5.01E+04
SN-123	0.	0.	0.	0.	0.	0.	0.	0.
SN-126	2.41E+08	4.79E+06	1.40E+06	0.	2.12E+06	3.51E+08	0.	8.05E+05
SB-124	3.21E+06	6.06E+04	7.76E+03	0.	2.49E+06	9.09E+07	0.	1.27E+05
SB-125	1.28E+07	2.55E+06	2.08E+06	2.79E+07	6.23E+08	8.01E+07	0.	2.12E+06
TE127M	1.68E+07	5.87E+06	4.42E+06	6.81E+07	0.	7.62E+07	0.	2.07E+05
TE129M	8.10E+06	3.03E+06	2.79E+06	3.38E+07	0.	4.07E+07	0.	1.29E+05
I--131	6.23E+04	8.93E+04	2.92E+07	1.53E+05	0.	2.35E+04	0.	5.11E+04
I--133	0.	0.	0.	0.	0.	0.	0.	0.
XE131M	0.	0.	0.	0.	0.	0.	0.	0.
XE133M	0.	0.	0.	0.	0.	0.	0.	0.
XE-133	0.	0.	0.	0.	0.	0.	0.	0.
XE135M	9.06E-04	8.36E-04	0.	3.17E-04	9.53E-05	1.96E-05	0.	3.72E-04
XE-135	3.13E-02	2.89E-02	0.	1.09E-02	3.29E-03	6.75E-04	0.	1.28E-02
XE-137	6.35E+01	8.60E+01	0.	2.95E+01	9.79E+00	1.67E+00	0.	5.69E+01
XE-138	0.	0.	0.	0.	0.	0.	0.	0.
CS-134	1.62E+08	3.86E+08	0.	1.25E+08	4.15E+07	6.70E+06	0.	3.16E+08
CS-136	3.68E+05	1.45E+06	0.	8.07E+05	1.11E+05	1.65E+05	0.	1.04E+05
CS-137	2.39E+08	3.20E+08	0.	1.11E+08	3.68E+07	6.28E+06	0.	2.14E+08
BA-140	1.08E+06	1.44E+03	0.	4.62E+02	7.78E+02	7.90E+06	0.	7.14E+04
CE-141	5.17E+03	3.50E+03	0.	1.62E+03	0.	1.34E+07	0.	3.90E+02
CE-144	1.11E+06	4.63E+05	0.	2.75E+05	0.	3.75E+08	0.	5.95E+04

01/18/79

DOSE FACTORS FOR GASEOUS DISCHARGES
BASED ON 1 CI/YR RELEASE OF EACH ISOTOPE AND A VALUE OF UNITY FOR X/Q, DEPLETED X/Q AND RELATIVE DEPOSITION

PATHWAY - MEAT (CONTAMINATED FORAGE) AGE GROUP - ADULT

NUCLIDE	ORGAN DOSE (MREM)							
	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	SKIN	TOTAL BODY
H----3	0.	6.99E+00	6.99E+00	6.99E+00	6.99E+00	6.99E+00	0.	6.99E+00
C---14	1.06E+04	2.12E+03	2.12E+03	2.12E+03	2.12E+03	2.12E+03	0.	2.12E+03
P---32	1.36E+08	8.50E+06	0.	0.	0.	1.53E+07	0.	5.25E+06
AR--41	0.	0.	0.	0.	0.	0.	0.	0.
MN--54	0.	2.17E+05	0.	6.46E+04	0.	6.65E+05	0.	4.15E+04
FE--59	6.77E+06	1.61E+07	0.	0.	4.46E+06	5.30E+07	0.	6.12E+06
CO--58	0.	4.50E+05	0.	0.	0.	9.11E+06	0.	1.01E+06
CO--60	0.	1.77E+06	0.	0.	0.	3.32E+07	0.	3.89E+06
ZN--65	9.56E+06	3.04E+07	0.	2.03E+07	0.	1.91E+07	0.	1.37E+07
KR-83M	0.	0.	0.	0.	0.	0.	0.	0.
KR-85M	0.	0.	0.	0.	0.	0.	0.	0.
KR--85	0.	0.	0.	0.	0.	0.	0.	0.
KR--87	0.	1.14E-07	0.	0.	0.	5.32E-09	0.	3.95E-08
KR--88	0.	0.	0.	0.	0.	0.	0.	0.
KR--89	3.35E+02	0.	0.	0.	0.	5.36E+01	0.	9.59E+00
KR--90	1.12E+01	0.	0.	0.	0.	1.30E+00	0.	2.74E+00
RB--86	0.	1.35E+07	0.	0.	0.	2.65E+06	0.	6.28E+05
SR--89	7.63E+06	0.	0.	0.	0.	1.22E+06	0.	2.18E+05
SR--90	3.08E+08	0.	0.	0.	0.	3.58E+07	0.	7.54E+07
Y---91	2.83E+04	0.	0.	0.	0.	1.56E+07	0.	7.58E+02
ZR--95	8.79E+04	3.80E+04	0.	4.64E+04	0.	1.85E+08	0.	1.91E+04
NB--95	5.96E+04	3.31E+04	0.	3.28E+04	0.	2.01E+08	0.	1.30E+04
RU-103	2.73E+06	0.	0.	1.04E+07	0.	3.19E+08	0.	1.18E+05
RU-106	6.68E+07	0.	0.	1.29E+08	0.	4.33E+09	0.	8.46E+05
AG110M	1.66E+05	1.54E+05	0.	3.02E+05	0.	6.27E+07	0.	9.14E+04
CD115M	0.	3.80E+04	0.	3.02E+04	0.	1.60E+06	0.	1.22E+03
SN-123	0.	0.	0.	0.	0.	0.	0.	0.
SN-126	4.31E+08	8.55E+06	2.51E+06	0.	1.47E+05	1.44E+08	0.	1.24E+07
SB-124	4.94E+05	9.32E+03	1.19E+03	0.	3.83E+05	1.40E+07	0.	1.95E+05
SB-125	5.27E+06	1.72E+06	1.42E+06	1.92E+07	5.81E+07	2.37E+07	0.	7.44E+05
TE127M	3.28E+07	1.15E+07	8.64E+06	1.33E+08	0.	1.49E+08	0.	4.05E+05
TE129M	3.22E+07	1.20E+07	1.11E+07	1.34E+08	0.	1.61E+08	0.	5.09E+06
I--131	1.57E+05	2.25E+05	7.36E+07	3.83E+05	0.	5.92E+04	0.	1.29E+05
I--133	6.51E-03	1.13E-02	2.17E+00	1.97E-02	0.	9.93E-03	0.	3.49E-03
XE131M	0.	0.	0.	0.	0.	0.	0.	0.
XE133M	0.	0.	0.	0.	0.	0.	0.	0.
XE-133	0.	0.	0.	0.	0.	0.	0.	0.
XE135M	7.59E-05	7.01E-05	0.	2.66E-05	7.98E-06	1.64E-06	0.	3.12E-05
XE-135	2.62E-03	2.42E-03	0.	9.17E-04	2.76E-04	5.66E-05	0.	1.08E-03
XE-137	5.57E+00	7.01E+00	0.	2.59E+00	8.58E-01	1.47E-01	0.	4.99E+00
XE-138	0.	0.	0.	0.	0.	0.	0.	0.
CS-134	1.54E+07	3.65E+07	0.	1.19E+07	3.92E+06	6.39E+05	0.	2.99E+07
CS-136	3.34E+05	1.32E+06	0.	7.35E+05	1.01E+05	1.50E+05	0.	9.50E+05
CS-137	2.09E+07	2.86E+07	0.	9.73E+06	3.23E+06	5.51E+05	0.	1.88E+07
BA-140	8.15E+05	1.02E+03	0.	3.48E+02	5.80E+02	1.95E+06	0.	5.38E+04
CE-141	3.67E+02	2.48E+02	0.	1.15E+02	0.	9.47E+05	0.	2.81E+01

DOSE FACTORS FOR GASEOUS DISCHARGES
BASED ON 1 CI/YR RELEASE OF EACH ISOTOPE AND A VALUE OF UNITY FOR X/Q, DEPLETED X/Q AND RELATIVE DEPOSITION

PATHWAY - MEAT (CONTAMINATED FEED) AGE GROUP - ADULT

NUCLIDE	ORGAN DOSE (MREM)							
	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	SKIN	TOTAL BODY
H----3	0.	6.89E+00	6.89E+00	6.89E+00	6.89E+00	6.89E+00	0.	6.89E+00
C---14	1.06E+04	2.12E+03	2.12E+03	2.12E+03	2.12E+03	2.12E+03	0.	2.12E+03
P---32	7.19E+05	4.51E+04	0.	0.	0.	8.09E+04	0.	2.78E+04
AR--41	0.	0.	0.	0.	0.	0.	0.	0.
MN--54	0.	8.20E+04	0.	2.44E+04	0.	2.51E+05	0.	1.57E+04
FE--59	7.25E+05	1.72E+06	0.	0.	4.78E+05	5.68E+06	0.	6.55E+05
CO--58	0.	8.20E+04	0.	0.	0.	1.66E+06	0.	1.84E+05
CO--60	0.	8.09E+05	0.	0.	0.	1.51E+07	0.	1.78E+05
ZN--65	3.86E+06	1.23E+07	0.	8.20E+05	0.	7.73E+06	0.	5.55E+05
KR-83M	0.	0.	0.	0.	0.	0.	0.	0.
KR-85M	0.	0.	0.	0.	0.	0.	0.	0.
KR--85	0.	0.	0.	0.	0.	0.	0.	0.
KR--87	0.	7.79E-08	0.	0.	0.	3.65E-09	0.	2.71E-08
KR--88	0.	0.	0.	0.	0.	0.	0.	0.
KR--89	4.22E+01	0.	0.	0.	0.	6.75E+00	0.	1.21E+00
KR--90	5.55E+00	0.	0.	0.	0.	6.46E-01	0.	1.36E+00
RB--86	0.	1.94E+05	0.	0.	0.	3.83E+04	0.	9.07E+04
SR--89	9.61E+05	0.	0.	0.	0.	1.54E+05	0.	2.75E+04
SR--90	1.53E+08	0.	0.	0.	0.	1.78E+07	0.	3.74E+07
Y---91	4.27E+03	0.	0.	0.	0.	2.35E+06	0.	1.15E+02
ZR--95	2.72E+04	1.33E+04	0.	1.47E+04	0.	7.32E+07	0.	5.92E+03
NB--95	4.23E+03	2.35E+03	0.	2.33E+03	0.	1.43E+07	0.	9.24E+02
RU-103	2.46E+05	0.	0.	9.38E+05	0.	2.87E+07	0.	1.06E+05
RU-106	2.65E+07	0.	0.	5.12E+07	0.	1.71E+09	0.	3.35E+06
AG110M	6.32E+04	5.85E+04	0.	1.15E+05	0.	2.39E+07	0.	3.48E+04
CD115M	0.	3.92E+03	0.	3.11E+03	0.	1.65E+05	0.	1.25E+02
SN-123	0.	0.	0.	0.	0.	0.	0.	0.
SN-126	2.01E+08	4.00E+06	1.17E+06	0.	8.56E+04	6.92E+07	0.	5.78E+06
SB-124	7.64E+04	1.44E+03	1.85E+02	0.	5.93E+04	2.16E+06	0.	3.02E+04
SB-125	4.95E+06	1.71E+06	1.42E+06	1.92E+07	2.54E+07	2.10E+07	0.	6.80E+05
TE127M	9.83E+06	3.44E+06	2.59E+06	3.98E+07	0.	4.46E+07	0.	1.21E+05
TE129M	2.38E+06	8.89E+05	8.20E+05	9.93E+06	0.	1.20E+07	0.	3.78E+05
I--131	2.58E+01	3.70E+01	1.21E+04	6.33E+01	0.	9.74E+00	0.	2.12E+01
I--133	0.	0.	0.	0.	0.	0.	0.	0.
XE131M	0.	0.	0.	0.	0.	0.	0.	0.
XE133M	0.	0.	0.	0.	0.	0.	0.	0.
XE-133	0.	0.	0.	0.	0.	0.	0.	0.
XE135M	3.83E-05	3.54E-05	0.	1.34E-05	4.03E-06	8.28E-07	0.	1.57E-05
XE-135	1.32E-03	1.22E-03	0.	4.63E-04	1.39E-04	2.86E-05	0.	5.43E-04
XE-137	2.68E+00	3.66E+00	0.	1.25E+00	4.13E-01	7.05E-02	0.	2.40E+00
XE-138	0.	0.	0.	0.	0.	0.	0.	0.
CS-134	6.56E+06	1.56E+07	0.	5.06E+05	1.68E+06	2.73E+05	0.	1.28E+07
CS-136	1.08E+03	4.27E+03	0.	2.38E+03	3.20E+02	4.05E+02	0.	3.07E+03
CS-137	1.01E+07	1.38E+07	0.	4.68E+06	1.55E+06	2.05E+05	0.	9.02E+06
BA-140	2.44E+03	3.08E+00	0.	1.04E+00	1.76E+00	5.83E+03	0.	1.61E+02
CE-141	2.26E+01	1.53E+01	0.	7.09E+00	0.	5.83E+04	0.	1.73E+00
CE-144	1.25E+04	5.21E+03	0.	3.09E+03	0.	4.21E+06	0.	6.63E+02

DOSE FACTORS FOR GASEOUS DISCHARGES
BASED ON 1 CI/YR RELEASE OF EACH ISOTOPE AND A VALUE OF UNITY FOR X/Q, DEPLETED X/Q AND RELATIVE DEPOSITION

PATHWAY - COWS MILK (CONTAMINATED FORAGE) AGE GROUP - ADULT

NUCLIDE	ORGAN DOSE (MREM)							
	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	SKIN	TOTAL BODY
H-----3	0.	1.65E+01	1.65E+01	1.65E+01	1.65E+01	1.65E+01	0.	1.65E+01
C---14	1.15E+04	2.31E+03	2.31E+03	2.31E+03	2.31E+03	2.31E+03	0.	2.31E+03
P---32	4.97E+08	3.12E+07	0.	0.	0.	5.59E+07	0.	1.92E+07
AR--41	0.	0.	0.	0.	0.	0.	0.	0.
MN--54	0.	1.99E+05	0.	5.92E+04	0.	6.09E+05	0.	3.80E+04
FE--59	7.55E+05	1.79E+06	0.	0.	4.98E+05	5.92E+06	0.	6.82E+05
CO--58	0.	1.16E+05	0.	0.	0.	2.35E+06	0.	2.60E+05
CO--60	0.	3.87E+05	0.	0.	0.	7.24E+06	0.	8.50E+05
ZN--65	3.69E+07	1.17E+08	0.	7.83E+07	0.	7.38E+07	0.	5.30E+07
KR-83M	0.	0.	0.	0.	0.	0.	0.	0.
KR-85M	0.	0.	0.	0.	0.	0.	0.	0.
KR--85	0.	0.	0.	0.	0.	0.	0.	0.
KR--87	0.	3.10E-07	0.	0.	0.	1.45E-08	0.	1.08E-07
KR--88	0.	0.	0.	0.	0.	0.	0.	0.
KR--89	1.61E+03	0.	0.	0.	0.	2.58E+02	0.	4.61E+01
KR--90	4.21E+01	0.	0.	0.	0.	5.71E-01	0.	1.03E+01
RB--86	0.	7.15E+07	0.	0.	0.	1.41E+07	0.	3.34E+07
SR--89	3.67E+07	0.	0.	0.	0.	5.86E+06	0.	1.05E+05
SR--90	1.15E+09	0.	0.	0.	0.	1.58E+07	0.	2.84E+08
Y---91	2.14E+02	0.	0.	0.	0.	1.18E+05	0.	5.74E+00
ZR--95	5.80E+02	3.17E+02	0.	3.18E+02	0.	1.90E+06	0.	1.27E+02
NB--95	2.14E+03	1.19E+03	0.	1.18E+03	0.	7.22E+06	0.	4.67E+02
RU-103	2.63E+01	0.	0.	1.01E+02	0.	3.07E+03	0.	1.13E+01
RU-106	4.87E+02	0.	0.	9.42E+02	0.	3.15E+04	0.	6.17E+01
AG110M	1.45E+06	1.34E+06	0.	2.63E+06	0.	5.46E+08	0.	7.95E+05
CD115M	0.	3.24E+04	0.	2.57E+04	0.	1.37E+06	0.	1.04E+03
SN-123	0.	0.	0.	0.	0.	0.	0.	0.
SN-126	3.81E+07	7.56E+05	2.22E+05	0.	9.86E+04	2.41E+07	0.	1.14E+05
SB-124	6.43E+05	1.21E+04	1.55E+03	0.	4.99E+05	1.82E+07	0.	2.54E+05
SB-125	7.85E+05	7.54E+04	5.77E+04	7.73E+05	9.22E+07	6.02E+06	0.	1.45E+05
TE127M	1.35E+06	4.74E+05	3.56E+05	5.50E+06	0.	6.15E+06	0.	1.67E+05
TE129M	1.69E+06	6.35E+05	5.06E+05	7.09E+06	0.	8.53E+06	0.	2.69E+05
I--131	4.31E+06	6.18E+06	2.02E+09	1.06E+07	0.	1.63E+06	0.	3.53E+05
I--133	5.92E+04	1.03E+05	1.97E+07	1.79E+05	0.	9.02E+04	0.	3.13E+04
XE131M	0.	0.	0.	0.	0.	0.	0.	0.
XE133M	0.	0.	0.	0.	0.	0.	0.	0.
XE-133	0.	0.	0.	0.	0.	0.	0.	0.
XE135M	6.42E-04	5.93E-04	0.	2.25E-04	6.75E-05	1.39E-05	0.	2.63E-04
XE-135	2.22E-02	2.05E-02	0.	7.75E-03	2.33E-03	4.79E-04	0.	9.09E-03
XE-137	4.71E+01	6.44E+01	0.	2.19E+01	7.27E+00	1.24E+00	0.	4.22E+01
XE-138	0.	0.	0.	0.	0.	0.	0.	0.
CS-134	1.32E+08	3.14E+08	0.	1.02E+08	3.37E+07	5.49E+06	0.	2.57E+08
CS-136	7.30E+06	2.91E+07	0.	1.62E+07	2.22E+06	3.31E+06	0.	2.10E+07
CS-137	1.77E+08	2.42E+08	0.	8.24E+07	2.73E+07	4.66E+06	0.	1.59E+08
BA-140	7.61E+05	9.56E+02	0.	3.25E+02	5.47E+02	1.61E+06	0.	5.02E+04
CE-141	7.59E+02	5.13E+02	0.	2.38E+02	0.	1.96E+06	0.	5.81E+01
CE-144	5.03E+04	2.10E+04	0.	1.25E+04	0.	1.70E+07	0.	2.70E+03

DOSE FACTORS FOR GASEOUS DISCHARGES
BASED ON 1 CI/YR RELEASE OF EACH ISOTOPE AND A VALUE OF UNITY FOR X/Q, DEPLETED X/Q AND RELATIVE DEPOSITION

PATHWAY - COWS MILK (CONTAMINATED FEED) AGE GROUP - ADULT

NUCLIDE	ORGAN DOSE (MREM)							
	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	SKIN	TOTAL BODY
H----3	0.	1.62E+01	1.62E+01	1.62E+01	1.62E+01	1.62E+01	0.	1.62E+01
C---14	1.15E+04	2.31E+03	2.31E+03	2.31E+03	2.31E+03	2.31E+03	0.	2.31E+03
P---32	2.64E+06	1.65E+05	0.	0.	0.	2.96E+05	0.	1.02E+05
AR--41	0.	0.	0.	0.	0.	0.	0.	0.
MN--54	0.	7.52E+04	0.	2.24E+04	0.	2.30E+05	0.	1.44E+04
FE--59	8.09E+04	1.92E+05	0.	0.	5.33E+04	6.34E+05	0.	7.31E+04
CO--58	0.	2.12E+04	0.	0.	0.	4.29E+05	0.	4.75E+04
CO--60	0.	1.76E+05	0.	0.	0.	3.30E+06	0.	3.87E+05
ZN--65	1.49E+07	4.73E+07	0.	3.15E+07	0.	2.98E+07	0.	2.14E+07
KR-83M	0.	0.	0.	0.	0.	0.	0.	0.
KR-85M	0.	0.	0.	0.	0.	0.	0.	0.
KR--85	0.	0.	0.	0.	0.	0.	0.	0.
KR--87	0.	2.13E-07	0.	0.	0.	9.96E-09	0.	7.40E-08
KR--88	0.	0.	0.	0.	0.	0.	0.	0.
KR--89	2.03E+02	0.	0.	0.	0.	3.24E+01	0.	5.81E+00
KR--90	2.09E+01	0.	0.	0.	0.	2.83E-01	0.	5.11E+00
RB--86	0.	1.03E+06	0.	0.	0.	2.04E+05	0.	4.82E+05
SR--89	4.62E+06	0.	0.	0.	0.	7.38E+05	0.	1.32E+05
SR--90	5.76E+08	0.	0.	0.	0.	7.80E+06	0.	1.41E+08
Y---91	3.23E+01	0.	0.	0.	0.	1.78E+04	0.	8.67E-01
ZR--95	5.45E+02	3.02E+02	0.	3.00E+02	0.	1.83E+06	0.	1.19E+02
NB--95	1.52E+02	8.45E+01	0.	8.37E+01	0.	5.13E+05	0.	3.32E+01
RU-103	2.36E+00	0.	0.	9.03E+00	0.	2.76E+02	0.	1.02E+00
RU-106	1.93E+02	0.	0.	3.73E+02	0.	1.25E+04	0.	2.44E+01
AG110M	5.50E+05	5.08E+05	0.	1.00E+06	0.	2.08E+08	0.	3.02E+05
CD115M	0.	3.34E+03	0.	2.65E+03	0.	1.41E+05	0.	1.07E+02
SN-123	0.	0.	0.	0.	0.	0.	0.	0.
SN-126	1.79E+07	3.55E+05	1.04E+05	0.	9.52E+04	1.78E+07	0.	5.61E+05
SB-124	9.93E+04	1.87E+03	2.40E+02	0.	7.71E+04	2.81E+06	0.	3.92E+04
SB-125	4.64E+05	7.66E+04	6.15E+04	8.27E+05	2.72E+07	3.11E+06	0.	7.97E+04
TE127M	4.05E+05	1.41E+05	1.07E+05	1.65E+06	0.	1.85E+06	0.	5.00E+04
TE129M	1.25E+05	4.70E+04	4.34E+04	5.24E+05	0.	6.31E+05	0.	1.99E+04
I--131	7.09E+02	1.02E+03	3.32E+05	1.74E+03	0.	2.68E+02	0.	5.81E+02
I--133	0.	0.	0.	0.	0.	0.	0.	0.
XE131M	0.	0.	0.	0.	0.	0.	0.	0.
XE133M	0.	0.	0.	0.	0.	0.	0.	0.
XE-133	0.	0.	0.	0.	0.	0.	0.	0.
XE135M	3.24E-04	2.99E-04	0.	1.13E-04	3.41E-05	7.00E-06	0.	1.33E-04
XE-135	1.12E-02	1.03E-02	0.	3.91E-03	1.18E-03	2.41E-04	0.	4.59E-03
XE-137	2.27E+01	3.10E+01	0.	1.05E+01	3.50E+00	5.97E-01	0.	2.05E+01
XE-138	0.	0.	0.	0.	0.	0.	0.	0.
CS-134	5.04E+07	1.34E+08	0.	4.35E+07	1.44E+07	2.35E+06	0.	1.10E+08
CS-136	2.39E+04	9.42E+04	0.	5.24E+04	7.19E+03	1.07E+04	0.	6.78E+04
CS-137	8.52E+07	1.16E+08	0.	3.95E+07	1.31E+07	2.24E+06	0.	7.63E+07
BA-140	2.28E+03	2.86E+00	0.	9.74E-01	1.04E+00	4.84E+03	0.	1.50E+02
CE-141	4.67E+01	3.16E+01	0.	1.47E+01	0.	1.21E+05	0.	3.58E+00
CE-144	1.84E+04	7.66E+03	0.	4.55E+03	0.	6.20E+06	0.	9.04E+02

DOSE FACTORS FOR GASEOUS DISCHARGES
BASED ON 1 CI/YR RELEASE OF EACH ISOTOPE AND A VALUE OF UNITY FOR X/Q, DEPLETED X/Q AND RELATIVE DEPOSITION

PATHWAY - GOATS MILK (CONTAMINATED FORAGE) AGE GROUP - ADULT

NUCLIDE	ORGAN DOSE (MREM)							
	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	SKIN	TOTAL BODY
H----3	0.	3.36E+01	3.36E+01	3.36E+01	3.36E+01	3.36E+01	0.	3.36E+01
C---14	1.15E+04	2.31E+03	2.31E+03	2.31E+03	2.31E+03	2.31E+03	0.	2.31E+03
P---32	6.41E+08	4.02E+07	0.	0.	0.	7.21E+07	0.	2.48E+07
AR--41	0.	0.	0.	0.	0.	0.	0.	0.
MN--54	0.	2.39E+04	0.	7.13E+03	0.	7.34E+04	0.	4.57E+03
FE--59	1.01E+04	2.39E+04	0.	0.	6.62E+03	7.87E+04	0.	9.08E+03
CO--58	0.	1.42E+04	0.	0.	0.	2.87E+05	0.	3.17E+04
CO--60	0.	4.65E+04	0.	0.	0.	8.69E+05	0.	1.02E+05
ZN--65	4.45E+06	1.41E+07	0.	9.44E+06	0.	8.89E+06	0.	6.39E+06
KR-83M	0.	0.	0.	0.	0.	0.	0.	0.
KR-85M	0.	0.	0.	0.	0.	0.	0.	0.
KR--85	0.	0.	0.	0.	0.	0.	0.	0.
KR--87	0.	3.72E-08	0.	0.	0.	1.74E-09	0.	1.29E-08
KR--88	0.	3.75E-10	0.	0.	0.	0.	0.	1.99E-10
KR--89	3.45E+03	0.	0.	0.	0.	5.52E+02	0.	9.89E+01
KR--90	8.85E+01	0.	0.	0.	0.	1.19E+00	0.	2.16E+01
RB--86	0.	9.07E+06	0.	0.	0.	1.79E+06	0.	4.23E+06
SR--89	7.86E+07	0.	0.	0.	0.	1.26E+07	0.	2.25E+05
SR--90	2.44E+09	0.	0.	0.	0.	3.27E+07	0.	5.96E+08
Y---91	2.62E+01	0.	0.	0.	0.	1.44E+04	0.	7.01E-01
ZR--95	6.30E+01	3.43E+01	0.	3.46E+01	0.	2.06E+05	0.	1.37E+01
NB--95	2.65E+02	1.47E+02	0.	1.46E+02	0.	8.92E+05	0.	5.78E+01
RU-103	3.24E+00	0.	0.	1.24E+01	0.	3.78E+02	0.	1.40E+00
RU-106	5.86E+01	0.	0.	1.13E+02	0.	3.80E+03	0.	7.42E+00
AG110M	1.74E+05	1.61E+05	0.	3.17E+05	0.	6.57E+07	0.	9.58E+04
CD115M	0.	3.99E+03	0.	3.17E+03	0.	1.60E+05	0.	1.28E+02
SN-123	1.61E-02	2.68E-04	2.27E-04	0.	0.	3.28E-02	0.	3.94E-04
SN-126	4.57E+06	9.08E+04	2.66E+04	0.	1.09E+04	2.76E+06	0.	1.36E+05
SB-124	7.85E+04	1.48E+03	1.90E+02	0.	6.03E+04	2.22E+06	0.	3.10E+04
SB-125	9.45E+04	9.12E+03	6.99E+03	9.35E+04	7.47E+06	7.24E+05	0.	1.75E+04
TE127M	1.65E+05	5.74E+04	4.31E+04	6.65E+05	0.	7.43E+05	0.	2.03E+04
TE129M	2.11E+05	7.86E+04	7.25E+04	8.77E+05	0.	1.06E+06	0.	3.33E+04
I--131	5.89E+06	8.43E+06	2.76E+09	1.44E+07	0.	2.22E+06	0.	4.83E+05
I--133	2.33E+05	4.04E+05	7.77E+07	7.06E+05	0.	3.55E+05	0.	1.23E+05
XE131M	0.	0.	0.	0.	0.	0.	0.	0.
XE133M	0.	0.	0.	0.	0.	0.	0.	0.
XE-133	0.	0.	0.	0.	0.	0.	0.	0.
XE135M	1.93E-03	1.78E-03	0.	6.74E-04	2.02E-04	4.16E-05	0.	7.90E-04
XE-135	6.65E-02	6.14E-02	0.	2.33E-02	6.99E-03	1.44E-03	0.	2.73E-02
XE-137	1.41E+02	1.93E+02	0.	6.50E+01	2.18E+01	3.72E+00	0.	1.27E+02
XE-138	7.10E-05	1.40E-04	0.	1.03E-04	1.02E-05	5.98E-10	0.	6.96E-05
CS-134	3.96E+08	9.43E+08	0.	3.06E+08	1.01E+08	1.65E+07	0.	7.71E+08
CS-136	2.40E+07	9.47E+07	0.	5.27E+07	7.22E+06	1.08E+07	0.	6.82E+07
CS-137	5.31E+08	7.26E+08	0.	2.47E+08	8.19E+07	1.40E+07	0.	4.78E+08
BA-140	9.90E+04	1.24E+02	0.	4.23E+01	7.12E+01	2.09E+05	0.	6.54E+03
CE-141	9.40E+01	6.36E+01	0.	2.95E+01	0.	2.43E+05	0.	7.20E+00
CE-144	6.06E+03	2.53E+03	0.	1.50E+03	0.	2.04E+06	0.	3.25E+02

DOSE FACTORS FOR GASEOUS DISCHARGES
BASED ON 1 CI/YR RELEASE OF EACH ISOTOPE AND A VALUE OF UNITY FOR X/Q, DEPLETED X/Q AND RELATIVE DEPOSITION

PATHWAY - GOATS MILK (CONTAMINATED FEED) AGE GROUP - ADULT

NUCLIDE	ORGAN DOSE (MREM)							
	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	SKIN	TOTAL BODY
H----3	0.	3.31E+01	3.31E+01	3.31E+01	3.31E+01	3.31E+01	0.	3.31E+01
C---14	1.15E+04	2.31E+03	2.31E+03	2.31E+03	2.31E+03	2.31E+03	0.	2.31E+03
P---32	3.40E+06	2.13E+05	0.	0.	0.	3.83E+05	0.	1.32E+05
AR--41	0.	0.	0.	0.	0.	0.	0.	0.
MN--54	0.	9.05E+03	0.	2.69E+03	0.	2.77E+04	0.	1.73E+03
FE--59	1.08E+03	2.56E+03	0.	0.	7.09E+02	8.43E+03	0.	9.72E+02
CO--58	0.	2.58E+03	0.	0.	0.	5.23E+04	0.	5.78E+03
CO--60	0.	2.12E+04	0.	0.	0.	3.96E+05	0.	4.65E+04
ZN--65	1.80E+06	5.70E+06	0.	3.81E+06	0.	3.59E+06	0.	2.58E+06
KR-83M	0.	0.	0.	0.	0.	0.	0.	0.
KR-85M	0.	0.	0.	0.	0.	0.	0.	0.
KR--85	0.	0.	0.	0.	0.	0.	0.	0.
KR--87	0.	2.55E-08	0.	0.	0.	1.20E-09	0.	8.88E-09
KR--88	0.	0.	0.	0.	0.	0.	0.	0.
KR--89	4.35E+02	0.	0.	0.	0.	6.95E+01	0.	1.25E+01
KR--90	4.39E+01	0.	0.	0.	0.	5.88E-01	0.	1.07E+01
RB--86	0.	1.31E+05	0.	0.	0.	2.58E+04	0.	6.11E+04
SR--89	9.90E+06	0.	0.	0.	0.	1.58E+06	0.	2.84E+05
SR--90	1.21E+09	0.	0.	0.	0.	1.62E+07	0.	2.95E+08
Y---91	3.95E+00	0.	0.	0.	0.	2.17E+03	0.	1.06E-01
ZR--95	6.60E+01	3.66E+01	0.	3.62E+01	0.	2.21E+05	0.	1.44E+01
NB--95	1.88E+01	1.04E+01	0.	1.04E+01	0.	6.34E+04	0.	4.10E+00
RU-103	2.91E-01	0.	0.	1.11E+00	0.	3.40E+01	0.	1.26E-01
RU-106	2.32E+01	0.	0.	4.49E+01	0.	1.50E+03	0.	2.94E+00
AG110M	6.62E+04	6.12E+04	0.	1.20E+05	0.	2.50E+07	0.	3.64E+04
CD115M	0.	4.11E+02	0.	3.26E+02	0.	1.73E+04	0.	1.31E+01
SN-123	0.	0.	0.	0.	0.	0.	0.	0.
SN-126	2.15E+06	4.26E+04	1.25E+04	0.	1.15E+04	2.14E+06	0.	6.74E+04
SB-124	1.21E+04	2.29E+02	2.93E+01	0.	9.41E+03	3.43E+05	0.	4.79E+03
SB-125	5.61E+04	9.33E+03	7.48E+03	1.01E+05	3.27E+06	3.76E+05	0.	9.61E+03
TE127M	4.91E+04	1.72E+04	1.29E+04	1.99E+05	0.	2.23E+05	0.	6.05E+03
TE129M	1.55E+04	5.82E+03	5.42E+03	6.49E+04	0.	7.81E+04	0.	2.47E+03
I--131	9.68E+02	1.39E+03	4.54E+05	2.37E+03	0.	3.65E+02	0.	7.93E+02
I--133	0.	0.	0.	0.	0.	0.	0.	0.
XE131M	0.	0.	0.	0.	0.	0.	0.	0.
XE133M	0.	0.	0.	0.	0.	0.	0.	0.
XE-133	0.	0.	0.	0.	0.	0.	0.	0.
XE135M	9.72E-04	8.98E-04	0.	3.40E-04	1.02E-04	2.10E-05	0.	3.99E-04
XE-135	3.35E-02	3.10E-02	0.	1.17E-02	3.53E-03	7.24E-04	0.	1.38E-02
XE-137	6.80E+01	9.29E+01	0.	3.15E+01	1.05E+01	1.79E+00	0.	6.10E+01
XE-138	0.	0.	0.	0.	0.	0.	0.	0.
CS-134	1.69E+08	4.03E+08	0.	1.31E+08	4.33E+07	7.05E+06	0.	3.30E+08
CS-136	7.76E+04	3.06E+05	0.	1.70E+05	2.34E+04	3.48E+04	0.	2.20E+05
CS-137	2.56E+08	3.49E+08	0.	1.19E+08	3.94E+07	6.73E+06	0.	2.29E+08
BA-140	2.97E+02	3.73E-01	0.	1.27E-01	2.13E-01	6.30E+02	0.	1.96E+01
CE-141	5.79E+00	3.92E+00	0.	1.82E+00	0.	1.50E+04	0.	4.44E-01
CE-144	2.21E+03	9.23E+02	0.	5.48E+02	0.	7.47E+05	0.	1.19E+02

DOSE FACTORS FOR GASEOUS DISCHARGES
BASED ON 1 CI/YR RELEASE OF EACH ISOTOPE AND A VALUE OF UNITY FOR X/Q, DEPLETED X/Q AND RELATIVE DEPOSITION

PATHWAY - INHALATION

AGE GROUP - TEENAGER

NUCLIDE	ORGAN DOSE (MREM)							
	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	SKIN	TOTAL BODY
H----3	0.	1.71E+01	1.71E+01	2.17E+01	1.71E+01	1.71E+01	0.	1.71E+01
C---14	9.15E+01	9.15E+01	9.15E+01	6.91E+01	9.15E+01	9.15E+01	0.	9.15E+01
P---32	2.67E+04	1.56E+03	0.	0.	0.	1.75E+03	0.	1.01E+03
AR--41	0.	0.	0.	0.	0.	0.	0.	0.
MN--54	0.	8.01E+02	0.	1.99E+02	2.83E+04	1.56E+03	0.	1.27E+02
FE--59	2.38E+02	5.61E+05	0.	0.	2.05E+04	3.80E+03	0.	2.14E+02
CO--58	0.	3.56E+00	0.	0.	2.77E+04	1.92E+03	0.	4.74E+00
CO--60	0.	2.51E+01	0.	0.	1.73E+05	4.76E+03	0.	3.33E+01
ZN--65	6.55E+02	2.09E+03	0.	1.39E+03	1.76E+04	1.00E+03	0.	9.41E+02
KR-83M	0.	0.	0.	0.	0.	0.	0.	0.
KR-85M	0.	0.	0.	0.	0.	0.	0.	0.
KR--85	0.	0.	0.	0.	0.	0.	0.	0.
KR--87	0.	0.	0.	0.	0.	0.	0.	0.
KR--88	0.	0.	0.	0.	0.	0.	0.	0.
KR--89	0.	0.	0.	0.	0.	0.	0.	0.
KR--90	0.	0.	0.	0.	0.	0.	0.	0.
RB--86	0.	2.73E+03	0.	0.	0.	3.36E+02	0.	1.19E+03
SR--89	7.83E+02	0.	0.	0.	5.06E+04	7.15E+03	0.	2.25E+01
SR--90	2.39E+05	0.	0.	0.	3.35E+05	1.46E+04	0.	1.45E+04
Y---91	1.09E+03	0.	0.	0.	5.77E+04	7.55E+03	0.	2.91E+01
ZR--95	2.20E+02	7.34E+01	0.	1.10E+03	5.18E+04	2.69E+03	0.	5.13E+01
NB--95	2.75E+01	1.67E+01	0.	1.56E+02	1.45E+04	1.78E+03	0.	9.35E+00
RU-103	3.30E+00	0.	0.	1.18E+02	1.52E+04	1.91E+03	0.	1.48E+00
RU-106	1.70E+02	0.	0.	2.70E+03	3.32E+05	1.88E+04	0.	2.14E+01
AG110M	2.18E+02	2.02E+02	0.	3.98E+02	9.38E+04	6.11E+03	0.	1.20E+02
CD115M	0.	3.98E+03	0.	3.20E+03	2.85E+04	7.76E+03	0.	1.29E+02
SN-123	5.64E+02	1.24E+01	9.95E+00	0.	7.91E+04	6.32E+03	0.	1.86E+01
SN-125	2.56E+04	6.76E+02	1.99E+02	0.	1.89E+05	2.57E+03	0.	9.70E+02
SB-124	6.31E+02	1.19E+01	1.53E+00	0.	5.01E+04	8.22E+03	0.	2.51E+02
SB-125	1.34E+03	1.44E+01	1.19E+00	0.	4.45E+04	2.04E+03	0.	2.69E+02
TE127M	2.56E+02	1.14E+02	6.65E+01	9.25E+02	1.94E+04	3.02E+03	0.	3.17E+01
TE129M	2.41E+01	1.14E+01	7.89E+00	7.39E+02	4.11E+04	7.76E+03	0.	3.88E+00
I--131	6.81E+02	9.54E+02	2.81E+05	1.24E+03	0.	1.21E+02	0.	5.69E+02
I--133	2.49E+02	4.17E+02	7.75E+04	5.25E+02	0.	2.02E+02	0.	1.28E+02
XE131M	0.	0.	0.	0.	0.	0.	0.	0.
XE133M	0.	0.	0.	0.	0.	0.	0.	0.
XE-133	0.	0.	0.	0.	0.	0.	0.	0.
XE135M	0.	0.	0.	0.	0.	0.	0.	0.
XE-135	0.	0.	0.	0.	0.	0.	0.	0.
XE-137	0.	0.	0.	0.	0.	0.	0.	0.
XE-138	0.	0.	0.	0.	0.	0.	0.	0.
CS-134	9.77E+03	2.23E+04	0.	5.82E+03	2.91E+03	1.81E+02	0.	1.10E+04
CS-136	7.91E+02	2.96E+03	0.	1.73E+03	2.43E+02	2.36E+02	0.	2.25E+03
CS-137	1.30E+04	1.67E+04	0.	4.50E+03	2.38E+03	1.55E+02	0.	6.13E+03
BA-140	1.07E+02	9.80E-02	0.	3.38E-01	4.09E+04	4.29E+02	0.	6.91E+00
CE-141	4.59E+01	3.07E+01	0.	1.27E+02	1.18E+04	2.30E+03	0.	3.53E+00
CE-144	8.47E+03	3.51E+03	0.	1.71E+04	2.78E+05	1.70E+04	0.	4.93E+02

DOSE FACTORS FOR GASEOUS DISCHARGES
BASED ON 1 CI/YR RELEASE OF EACH ISOTOPE AND A VALUE OF UNITY FOR X/Q, DEPLETED X/Q AND RELATIVE DEPOSITION

PATHWAY - GROUND PLANE DEPOSITION

AGE GROUP - TEENAGER

NUCLIDE	ORGAN DOSE (MREM)							
	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	SKIN	TOTAL BODY
H----3	0.	0.	0.	0.	0.	0.	0.	0.
C---14	0.	0.	0.	0.	0.	0.	0.	0.
P---32	0.	0.	0.	0.	0.	0.	0.	0.
AR--41	0.	0.	0.	0.	0.	0.	0.	0.
MN--54	4.39E+07	4.39E+07	4.39E+07	4.39E+07	4.39E+07	4.39E+07	5.14E+07	4.39E+07
FE--59	8.73E+06	8.73E+06	8.73E+06	8.73E+06	8.73E+06	8.73E+06	1.03E+07	8.73E+06
CO--58	1.21E+07	1.21E+07	1.21E+07	1.21E+07	1.21E+07	1.21E+07	1.41E+07	1.21E+07
CO--60	6.80E+08	6.80E+08	6.80E+08	6.80E+08	6.80E+08	6.80E+08	8.00E+08	6.80E+08
ZN--65	2.36E+07	2.36E+07	2.36E+07	2.36E+07	2.36E+07	2.36E+07	2.71E+07	2.36E+07
KR-83M	0.	0.	0.	0.	0.	0.	0.	0.
KR-85M	0.	0.	0.	0.	0.	0.	0.	0.
KR--85	0.	0.	0.	0.	0.	0.	0.	0.
KR--87	0.	0.	0.	0.	0.	0.	0.	0.
KR--88	9.90E+03	9.90E+03	9.90E+03	9.90E+03	9.90E+03	9.90E+03	1.13E+04	9.90E+03
KR--89	8.08E+02	8.08E+02	8.08E+02	8.08E+02	8.08E+02	8.08E+02	9.70E+02	8.08E+02
KR--90	6.16E-03	6.16E-03	6.16E-03	6.16E-03	6.16E-03	6.16E-03	7.29E-03	6.16E-03
RB--86	2.86E+05	2.86E+05	2.86E+05	2.86E+05	2.86E+05	2.86E+05	3.26E+05	2.86E+05
SR--89	6.87E+02	6.87E+02	6.87E+02	6.87E+02	6.87E+02	6.87E+02	7.97E+02	6.87E+02
SR--90	1.70E+05	1.70E+05	1.70E+05	1.70E+05	1.70E+05	1.70E+05	2.01E+05	1.70E+05
Y---91	3.43E+04	3.43E+04	3.43E+04	3.43E+04	3.43E+04	3.43E+04	3.86E+04	3.43E+04
ZR--95	1.59E+07	1.59E+07	1.59E+07	1.59E+07	1.59E+07	1.59E+07	1.86E+07	1.59E+07
NB--95	4.33E+06	4.33E+06	4.33E+06	4.33E+06	4.33E+06	4.33E+06	5.09E+06	4.33E+06
RU-103	3.49E+06	3.49E+06	3.49E+06	3.49E+06	3.49E+06	3.49E+06	4.07E+06	3.49E+06
RU-106	1.33E+07	1.33E+07	1.33E+07	1.33E+07	1.33E+07	1.33E+07	1.59E+07	1.33E+07
AG110M	1.13E+08	1.13E+08	1.13E+08	1.13E+08	1.13E+08	1.13E+08	1.32E+08	1.13E+08
CD115M	0.	0.	0.	0.	0.	0.	0.	0.
SN-123	0.	0.	0.	0.	0.	0.	4.35E+04	0.
SN-126	1.64E+09	1.64E+09	1.64E+09	1.64E+09	1.64E+09	1.64E+09	1.83E+09	1.64E+09
SB-124	1.90E+07	1.90E+07	1.90E+07	1.90E+07	1.90E+07	1.90E+07	2.19E+07	1.90E+07
SB-125	7.27E+07	7.27E+07	7.27E+07	7.27E+07	7.27E+07	7.27E+07	8.21E+07	7.27E+07
TE127M	2.79E+04	2.79E+04	2.79E+04	2.79E+04	2.79E+04	2.79E+04	3.09E+04	2.79E+04
TE129M	1.22E+06	1.22E+06	1.22E+06	1.22E+06	1.22E+06	1.22E+06	1.43E+06	1.22E+06
I--131	2.73E+05	2.73E+05	2.73E+05	2.73E+05	2.73E+05	2.73E+05	3.32E+05	2.73E+05
I--133	3.92E+04	3.92E+04	3.92E+04	3.92E+04	3.92E+04	3.92E+04	4.77E+04	3.92E+04
XE131M	0.	0.	0.	0.	0.	0.	0.	0.
XE133M	0.	0.	0.	0.	0.	0.	0.	0.
XE-133	0.	0.	0.	0.	0.	0.	0.	0.
XE135M	0.	0.	0.	0.	0.	0.	0.	0.
XE-135	0.	0.	0.	0.	0.	0.	0.	0.
XE-137	8.69E+01	8.69E+01	8.69E+01	8.69E+01	8.69E+01	8.69E+01	1.01E+02	8.69E+01
XE-138	6.01E+03	6.01E+03	6.01E+03	6.01E+03	6.01E+03	6.01E+03	6.87E+03	6.01E+03
CS-134	2.22E+08	2.22E+08	2.22E+08	2.22E+08	2.22E+08	2.22E+08	2.53E+08	2.22E+08
CS-136	4.73E+06	4.73E+06	4.73E+06	4.73E+06	4.73E+06	4.73E+06	5.36E+06	4.73E+06
CS-137	3.27E+08	3.27E+08	3.27E+08	3.27E+08	3.27E+08	3.27E+08	3.81E+08	3.27E+08
BA-140	5.30E+06	5.30E+06	5.30E+06	5.30E+06	5.30E+06	5.30E+06	6.02E+06	5.30E+06
CE-141	4.33E+05	4.33E+05	4.33E+05	4.33E+05	4.33E+05	4.33E+05	4.88E+05	4.33E+05
CE-144	3.59E+06	3.59E+06	3.59E+06	3.59E+06	3.59E+06	3.59E+06	4.15E+06	3.59E+06

DOSE FACTORS FOR GASEOUS DISCHARGES
BASED ON 1 CI/YR RELEASE OF EACH ISOTOPE AND A VALUE OF UNITY FOR X/Q, DEPLETED X/Q AND RELATIVE DEPOSITION

PATHWAY - FRESH FRUITS AND VEGETABLES — AGE GROUP - TEENAGER

NUCLIDE	ORGAN DOSE (MREM)							
	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	SKIN	TOTAL BODY
H----3	0.	3.53E+00	3.53E+00	4.46E+00	3.53E+00	3.53E+00	0.	3.53E+00
C---14	6.91E+02	6.91E+02	6.91E+02	5.21E+02	6.91E+02	6.91E+02	0.	6.91E+02
P---32	2.35E+07	1.48E+06	0.	0.	0.	2.65E+06	0.	9.11E+05
AR--41	0.	0.	0.	0.	0.	0.	0.	0.
MN--54	0.	9.97E+05	0.	2.97E+05	0.	3.06E+06	0.	1.91E+05
FE--59	7.42E+05	1.76E+06	0.	0.	4.89E+05	5.82E+06	0.	6.70E+05
CO--58	0.	1.86E+05	0.	0.	0.	2.51E+06	0.	4.23E+05
CO--60	0.	6.34E+05	0.	0.	0.	7.61E+06	0.	1.45E+06
ZN--65	1.34E+06	4.26E+06	0.	2.85E+05	0.	2.68E+06	0.	1.93E+06
KR-83M	0.	0.	0.	0.	0.	0.	0.	0.
KR-85M	0.	0.	0.	0.	0.	0.	0.	0.
KR--85	0.	0.	0.	0.	0.	0.	0.	0.
KR--87	0.	1.92E-08	0.	0.	0.	8.99E-10	0.	6.68E-09
KR--88	0.	3.45E-01	0.	0.	0.	0.	0.	1.83E-01
KR--89	3.56E+03	0.	0.	0.	0.	3.86E+02	0.	1.02E+02
KR--90	9.73E+01	0.	0.	0.	2.69E-01	2.84E+00	0.	2.41E+01
RB--86	0.	2.72E+06	0.	0.	0.	5.37E+05	0.	1.27E+05
SR--89	8.10E+07	0.	0.	0.	0.	8.79E+06	0.	2.33E+05
SR--90	2.68E+09	0.	0.	0.	7.40E+06	7.82E+07	0.	6.62E+08
Y---91	3.55E+04	0.	0.	0.	0.	1.36E+07	0.	9.47E+02
ZR--95	7.23E+03	2.51E+03	0.	3.02E+03	0.	5.85E+06	0.	1.72E+03
NB--95	1.16E+03	7.00E+02	0.	5.50E+02	0.	2.86E+06	0.	3.95E+02
RU-103	3.97E+04	0.	0.	1.18E+05	0.	3.10E+06	0.	1.78E+04
RU-106	9.03E+05	0.	0.	1.20E+06	0.	4.09E+07	0.	1.14E+05
AG110M	3.80E+04	3.51E+04	0.	6.90E+04	0.	1.43E+07	0.	2.09E+04
CD115M	0.	3.27E+05	0.	2.60E+05	0.	1.38E+07	0.	1.05E+04
SN-123	2.93E-07	4.84E-09	3.87E-09	0.	0.	4.23E-07	0.	7.24E-09
SN-126	1.94E+07	3.85E+05	1.13E+05	0.	1.02E+05	1.91E+07	0.	6.07E+05
SB-124	5.12E+05	9.65E+03	1.24E+03	0.	3.97E+05	1.45E+07	0.	2.02E+05
SB-125	1.23E+06	2.66E+05	2.06E+05	2.08E+06	5.24E+07	6.47E+06	0.	1.98E+05
TE127M	2.01E+06	7.04E+05	5.33E+05	8.12E+06	0.	1.01E+07	0.	2.49E+05
TE129M	3.14E+06	1.16E+06	1.00E+06	9.09E+06	0.	1.10E+07	0.	4.94E+05
I--131	1.08E+06	1.53E+06	4.42E+08	1.93E+05	0.	2.90E+05	0.	9.13E+05
I--133	3.14E+04	5.33E+04	9.68E+06	6.70E+04	0.	3.87E+04	0.	1.64E+04
XE131M	0.	0.	0.	0.	0.	0.	0.	0.
XE133M	0.	0.	0.	0.	0.	0.	0.	0.
XE-133	0.	0.	0.	0.	0.	0.	0.	0.
XE135M	7.29E-05	6.73E-05	0.	2.55E-05	7.66E-06	1.57E-06	0.	2.99E-05
XE-135	2.51E-03	2.32E-03	0.	8.79E-04	2.64E-04	5.43E-05	0.	1.03E-03
XE-137	6.91E+00	9.29E+00	0.	2.39E+00	1.23E+00	1.24E-01	0.	3.26E+00
XE-138	0.	0.	0.	0.	0.	0.	0.	0.
CS-134	1.79E+07	4.31E+07	0.	1.07E+07	5.22E+06	4.90E+05	0.	2.01E+07
CS-136	6.90E+05	2.72E+06	0.	1.52E+06	2.08E+05	3.09E+05	0.	1.96E+06
CS-137	2.59E+07	3.49E+07	0.	8.99E+06	4.65E+06	4.66E+05	0.	1.22E+07
BA-140	2.97E+06	3.83E+03	0.	9.11E+02	2.45E+03	1.01E+07	0.	1.91E+05
CE-141	1.98E+03	1.33E+03	0.	4.61E+02	0.	3.59E+06	0.	1.52E+02
CE-144	1.53E+05	6.27E+04	0.	2.56E+04	0.	3.60E+07	0.	8.11E+03

DOSE FACTORS FOR GASEOUS DISCHARGES
BASED ON 1 CI/YR RELEASE OF EACH ISOTOPE AND A VALUE OF UNITY FOR X/Q, DEPLETED X/Q AND RELATIVE DEPOSITION

PATHWAY - STORED FRUITS AND VEGETABLES — AGE GROUP - TEENAGER

NUCLIDE	ORGAN DOSE (MREM)							
	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	SKIN	TOTAL BODY
H----3	0.	5.25E+01	5.25E+01	6.63E+01	5.25E+01	5.25E+01	0.	5.25E+01
C---14	1.04E+04	1.04E+04	1.04E+04	7.82E+03	1.04E+04	1.04E+04	0.	1.04E+04
P---32	2.02E+07	1.27E+06	0.	0.	0.	2.27E+06	0.	7.83E+05
AR--41	0.	0.	0.	0.	0.	0.	0.	0.
MN--54	0.	1.31E+07	0.	3.91E+06	0.	4.02E+07	0.	2.51E+06
FE--59	4.49E+06	1.07E+07	0.	0.	2.96E+06	3.52E+07	0.	4.05E+06
CO--58	0.	1.57E+06	0.	0.	0.	2.12E+07	0.	3.57E+06
CO--60	0.	9.31E+06	0.	0.	0.	1.12E+08	0.	2.13E+07
ZN--65	1.70E+07	5.40E+07	0.	3.61E+07	0.	3.40E+07	0.	2.45E+07
KR-83M	0.	0.	0.	0.	0.	0.	0.	0.
KR-85M	0.	0.	0.	0.	0.	0.	0.	0.
KR--85	0.	0.	0.	0.	0.	0.	0.	0.
KR--87	0.	2.88E-07	0.	0.	0.	1.35E-08	0.	1.00E-07
KR--88	0.	0.	0.	0.	0.	0.	0.	0.
KR--89	2.38E+04	0.	0.	0.	0.	2.58E+03	0.	6.83E+02
KR--90	1.45E+03	0.	0.	0.	4.60E+00	4.42E+01	0.	3.59E+02
RB--86	0.	4.58E+06	0.	0.	0.	9.04E+05	0.	2.14E+05
SR--89	5.42E+08	0.	0.	0.	0.	5.87E+07	0.	1.55E+07
SR--90	4.00E+10	0.	0.	0.	1.27E+08	1.22E+09	0.	9.90E+09
Y---91	2.66E+05	0.	0.	0.	0.	1.02E+08	0.	7.10E+03
ZR--95	6.62E+04	2.52E+04	0.	2.81E+04	0.	6.75E+07	0.	1.67E+04
NB--95	5.42E+03	3.26E+03	0.	2.57E+03	0.	1.33E+07	0.	1.84E+03
RU-103	2.14E+05	0.	0.	6.39E+05	0.	1.67E+07	0.	9.58E+04
RU-106	1.21E+07	0.	0.	1.61E+07	0.	5.48E+08	0.	1.52E+06
AG110M	4.07E+05	4.50E+05	0.	8.85E+05	0.	1.84E+08	0.	2.68E+05
CD115M	0.	1.90E+06	0.	1.51E+06	0.	7.98E+07	0.	6.06E+04
SN-123	0.	0.	0.	0.	0.	0.	0.	0.
SN-126	2.92E+08	5.81E+06	1.71E+06	0.	2.57E+06	4.26E+08	0.	9.72E+05
SB-124	3.89E+06	7.34E+04	9.40E+03	0.	3.02E+06	1.10E+08	0.	1.54E+05
SB-125	1.91E+07	4.33E+06	3.36E+05	3.38E+07	7.55E+08	9.70E+07	0.	3.03E+05
TE127M	2.04E+07	7.16E+06	5.41E+06	8.25E+07	0.	1.03E+08	0.	2.53E+06
TE129M	1.41E+07	5.24E+06	4.53E+06	4.09E+07	0.	4.93E+07	0.	2.23E+06
I--131	1.01E+05	1.43E+05	4.12E+07	1.85E+05	0.	2.71E+04	0.	8.51E+04
I--133	0.	0.	0.	0.	0.	0.	0.	0.
XE131M	0.	0.	0.	0.	0.	0.	0.	0.
XE133M	0.	0.	0.	0.	0.	0.	0.	0.
XE-133	0.	0.	0.	0.	0.	0.	0.	0.
XE135M	1.10E-03	1.01E-03	0.	3.84E-04	1.15E-04	2.37E-05	0.	4.50E-04
XE-135	3.79E-02	3.50E-02	0.	1.33E-02	3.98E-03	8.18E-04	0.	1.55E-02
XE-137	1.03E+02	1.39E+02	0.	3.58E+01	1.84E+01	1.85E+00	0.	4.87E+01
XE-138	0.	0.	0.	0.	0.	0.	0.	0.
CS-134	2.54E+08	6.13E+08	0.	1.52E+08	7.43E+07	7.08E+06	0.	2.86E+08
CS-136	4.45E+05	1.76E+06	0.	9.78E+05	1.34E+05	2.00E+05	0.	1.27E+06
CS-137	3.88E+08	5.22E+08	0.	1.34E+08	6.92E+07	6.96E+06	0.	1.83E+08
BA-140	1.83E+06	2.30E+03	0.	5.60E+02	1.50E+03	7.31E+06	0.	1.17E+05
CE-141	8.42E+03	5.65E+03	0.	1.97E+03	0.	1.53E+07	0.	6.48E+02
CE-144	1.99E+06	8.14E+05	0.	3.33E+05	0.	4.68E+08	0.	1.05E+05

DOSE FACTORS FOR GASEOUS DISCHARGES
BASED ON 1 CI/YR RELEASE OF EACH ISOTOPE AND A VALUE OF UNITY FOR X/Q, DEPLETED X/Q AND RELATIVE DEPOSITION

PATHWAY - MEAT (CONTAMINATED FORAGE) AGE GROUP - TEENAGER

NUCLIDE	ORGAN DOSE (MREM)							
	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	SKIN	TOTAL BODY
H----3	0.	3.27E+00	3.27E+00	4.13E+00	3.27E+00	3.27E+00	0.	3.27E+00
C---14	1.66E+03	1.66E+03	1.66E+03	1.25E+03	1.66E+03	1.66E+03	0.	1.66E+03
P---32	8.01E+07	5.02E+06	0.	0.	0.	9.01E+06	0.	3.10E+05
AR--41	0.	0.	0.	0.	0.	0.	0.	0.
MN--54	0.	1.28E+05	0.	3.82E+04	0.	3.93E+05	0.	2.45E+04
FE--59	4.00E+06	9.50E+06	0.	0.	2.64E+06	3.13E+07	0.	3.61E+05
CO--58	0.	3.54E+05	0.	0.	0.	4.78E+06	0.	8.06E+05
CO--60	0.	1.35E+06	0.	0.	0.	1.61E+07	0.	3.07E+05
ZN--65	5.65E+06	1.80E+07	0.	1.20E+07	0.	1.13E+07	0.	8.12E+06
KR-83M	0.	0.	0.	0.	0.	0.	0.	0.
KR-85M	0.	0.	0.	0.	0.	0.	0.	0.
KR--85	0.	0.	0.	0.	0.	0.	0.	0.
KR--87	0.	6.71E-08	0.	0.	0.	3.14E-09	0.	2.34E-08
KR--88	0.	0.	0.	0.	0.	0.	0.	0.
KR--89	2.95E+02	0.	0.	0.	0.	3.20E+01	0.	8.46E+00
KR--90	9.04E+00	0.	0.	0.	2.50E-01	9.17E-01	0.	2.24E+00
RB--86	0.	7.95E+06	0.	0.	0.	1.57E+06	0.	3.71E+06
SR--89	6.71E+06	0.	0.	0.	0.	7.28E+05	0.	1.93E+05
SR--90	2.49E+08	0.	0.	0.	6.08E+06	2.53E+07	0.	6.16E+07
Y---91	2.32E+04	0.	0.	0.	0.	8.93E+06	0.	6.20E+02
ZR--95	6.21E+04	2.83E+04	0.	2.75E+04	0.	9.41E+07	0.	1.75E+04
NB--95	4.09E+04	2.46E+04	0.	1.94E+04	0.	1.01E+08	0.	1.39E+04
RU-103	2.07E+06	0.	0.	6.17E+05	0.	1.61E+08	0.	9.25E+05
RU-106	5.74E+07	0.	0.	7.64E+07	0.	2.60E+09	0.	7.22E+06
AG110M	9.82E+04	9.08E+04	0.	1.79E+05	0.	3.71E+07	0.	5.40E+04
CD115M	0.	2.25E+04	0.	1.78E+04	0.	9.46E+05	0.	7.18E+02
SN-123	0.	0.	0.	0.	0.	0.	0.	0.
SN-126	2.55E+08	5.05E+06	1.48E+06	0.	8.66E+04	8.47E+07	0.	7.30E+05
SB-124	2.92E+05	5.51E+03	7.06E+02	0.	2.27E+05	8.26E+06	0.	1.15E+05
SB-125	4.31E+06	1.42E+06	1.12E+06	1.13E+07	3.43E+07	1.40E+07	0.	5.94E+05
TE127M	1.95E+07	6.83E+06	5.17E+06	7.88E+07	0.	9.80E+07	0.	2.42E+06
TE129M	2.75E+07	1.01E+07	8.77E+06	7.93E+07	0.	9.55E+07	0.	4.31E+06
I--131	1.24E+05	1.76E+05	5.06E+07	2.27E+05	0.	3.32E+04	0.	1.05E+05
I--133	5.46E-03	9.26E-03	1.60E+00	1.17E-02	0.	6.73E-03	0.	2.85E-03
XE131M	0.	0.	0.	0.	0.	0.	0.	0.
XE133M	0.	0.	0.	0.	0.	0.	0.	0.
XE-133	0.	0.	0.	0.	0.	0.	0.	0.
XE135M	4.49E-05	4.14E-05	0.	1.57E-05	4.72E-06	9.69E-07	0.	1.84E-05
XE-135	1.55E-03	1.43E-03	0.	5.42E-04	1.63E-04	3.35E-05	0.	6.36E-04
XE-137	4.41E+00	5.94E+00	0.	1.53E+00	7.88E-01	7.92E-02	0.	2.08E+00
XE-138	0.	0.	0.	0.	0.	0.	0.	0.
CS-134	1.17E+07	2.03E+07	0.	7.00E+06	3.43E+06	3.27E+05	0.	1.32E+07
CS-136	1.98E+05	7.80E+05	0.	4.34E+05	5.92E+04	8.86E+04	0.	5.62E+05
CS-137	1.66E+07	2.23E+07	0.	5.75E+06	2.90E+06	2.90E+05	0.	7.83E+05
BA-140	6.71E+05	8.28E+02	0.	2.05E+02	5.53E+02	2.60E+05	0.	4.32E+04
CE-141	2.91E+02	1.96E+02	0.	6.80E+01	0.	5.30E+05	0.	2.24E+01
CE-144	2.98E+04	1.22E+04	0.	5.00E+03	0.	7.02E+06	0.	1.58E+03

DOSE FACTORS FOR GASEOUS DISCHARGES
BASED ON 1 CI/YR RELEASE OF EACH ISOTOPE AND A VALUE OF UNITY FOR X/Q, DEPLETED X/Q AND RELATIVE DEPOSITION

PATHWAY - MEAT (CONTAMINATED FEED) AGE GROUP - TEENAGER

NUCLIDE	ORGAN DOSE (MREM)							
	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	SKIN	TOTAL BODY
H----3	0.	3.22E+00	3.22E+00	4.07E+00	3.22E+00	3.22E+00	0.	3.22E+00
C---14	1.66E+03	1.66E+03	1.66E+03	1.23E+03	1.66E+03	1.66E+03	0.	1.66E+03
P---32	4.25E+05	2.67E+04	0.	0.	0.	4.78E+04	0.	1.65E+04
AR--41	0.	0.	0.	0.	0.	0.	0.	0.
MN--54	0.	4.85E+04	0.	1.44E+04	0.	1.49E+05	0.	9.26E+03
FE--59	4.29E+05	1.02E+06	0.	0.	2.83E+05	3.36E+06	0.	3.87E+05
CO--58	0.	6.45E+04	0.	0.	0.	8.71E+05	0.	1.47E+05
CO--60	0.	6.13E+05	0.	0.	0.	7.36E+06	0.	1.40E+05
ZN--65	2.28E+06	7.25E+06	0.	4.85E+06	0.	4.57E+06	0.	3.20E+06
KR-83M	0.	0.	0.	0.	0.	0.	0.	0.
KR-85M	0.	0.	0.	0.	0.	0.	0.	0.
KR--85	0.	0.	0.	0.	0.	0.	0.	0.
KR--87	0.	4.61E-08	0.	0.	0.	2.16E-09	0.	1.60E-08
KR--88	0.	0.	0.	0.	0.	0.	0.	0.
KR--89	3.71E+01	0.	0.	0.	0.	4.03E+00	0.	1.07E+00
KR--90	4.49E+00	0.	0.	0.	1.2+E-01	4.55E-01	0.	1.11E+00
RB--86	0.	1.15E+05	0.	0.	0.	2.26E+04	0.	5.36E+04
SR--89	8.45E+05	0.	0.	0.	0.	9.17E+04	0.	2.43E+04
SR--90	1.24E+08	0.	0.	0.	3.41E+06	1.25E+07	0.	3.05E+07
Y---91	3.51E+03	0.	0.	0.	0.	1.35E+06	0.	9.37E+01
ZR--95	1.89E+04	9.90E+03	0.	8.64E+03	0.	3.68E+07	0.	5.84E+03
NB--95	2.91E+03	1.75E+03	0.	1.38E+03	0.	7.15E+06	0.	9.87E+02
RU-103	1.86E+05	0.	0.	5.54E+05	0.	1.45E+07	0.	8.31E+04
RU-106	2.27E+07	0.	0.	3.02E+07	0.	1.03E+09	0.	2.86E+06
AG110M	3.73E+04	3.45E+04	0.	6.79E+04	0.	1.41E+07	0.	2.05E+04
CD115M	0.	2.32E+03	0.	1.84E+03	0.	9.75E+04	0.	7.40E+01
SN-123	0.	0.	0.	0.	0.	0.	0.	0.
SN-126	1.19E+08	2.36E+06	6.93E+05	0.	5.06E+04	4.10E+07	0.	3.42E+05
SB-124	4.51E+04	8.51E+02	1.09E+02	0.	3.50E+04	1.28E+06	0.	1.78E+04
SB-125	4.12E+06	1.42E+06	1.12E+06	1.13E+07	1.50E+07	1.24E+07	0.	5.57E+05
TE127M	5.85E+06	2.04E+06	1.55E+06	2.36E+07	0.	2.93E+07	0.	7.25E+05
TE129M	2.02E+06	7.51E+05	6.49E+05	5.87E+05	0.	7.07E+06	0.	3.19E+05
I--131	2.04E+01	2.89E+01	8.32E+03	3.74E+01	0.	5.46E+00	0.	1.72E+01
I--133	0.	0.	0.	0.	0.	0.	0.	0.
XE131M	0.	0.	0.	0.	0.	0.	0.	0.
XE133M	0.	0.	0.	0.	0.	0.	0.	0.
XE-133	0.	0.	0.	0.	0.	0.	0.	0.
XE135M	2.27E-05	2.09E-05	0.	7.92E-06	2.38E-06	4.89E-07	0.	9.29E-05
XE-135	7.82E-04	7.21E-04	0.	2.73E-04	8.22E-05	1.69E-05	0.	3.21E-04
XE-137	2.12E+00	2.86E+00	0.	7.36E-01	3.79E-01	3.81E-02	0.	1.00E+00
XE-138	0.	0.	0.	0.	0.	0.	0.	0.
CS-134	5.02E+06	1.21E+07	0.	2.99E+06	1.47E+06	1.40E+05	0.	5.65E+05
CS-136	6.39E+02	2.52E+03	0.	1.40E+03	1.92E+02	2.87E+02	0.	1.82E+03
CS-137	7.97E+06	1.07E+07	0.	2.77E+06	1.42E+06	1.43E+05	0.	3.79E+05
BA-140	2.01E+03	2.48E+00	0.	6.17E-01	1.65E+00	7.78E+02	0.	1.29E+02
CE-141	1.79E+01	1.21E+01	0.	4.19E+00	0.	3.26E+04	0.	1.38E+00
CE-144	1.09E+04	4.46E+03	0.	1.83E+03	0.	2.50E+06	0.	5.78E+02

DOSE FACTORS FOR GASEOUS DISCHARGES
BASED ON 1 CI/YR RELEASE OF EACH ISOTOPE AND A VALUE OF UNITY FOR X/Q, DEPLETED X/Q AND RELATIVE DEPOSITION

PATHWAY - COWS MILK (CONTAMINATED FORAGE) AGE GROUP - TEENAGER

NUCLIDE	ORGAN DOSE (MREM)							
	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	SKIN	TOTAL BODY
H----3	0.	1.68E+01	1.68E+01	2.12E+01	1.68E+01	1.68E+01	0.	1.68E+01
C---14	3.95E+03	3.95E+03	3.95E+03	2.98E+03	3.95E+03	3.95E+03	0.	3.95E+03
P---32	6.41E+08	4.02E+07	0.	0.	0.	7.21E+07	0.	2.48E+07
AR--41	0.	0.	0.	0.	0.	0.	0.	0.
MN--54	0.	2.57E+05	0.	7.64E+04	0.	7.86E+05	0.	4.90E+04
FE--59	9.75E+05	2.31E+06	0.	0.	6.42E+05	7.64E+06	0.	8.80E+05
CO--58	0.	2.00E+05	0.	0.	0.	2.70E+06	0.	4.55E+05
CO--60	0.	6.41E+05	0.	0.	0.	7.69E+06	0.	1.46E+05
ZN--65	4.76E+07	1.51E+08	0.	1.01E+08	0.	9.52E+07	0.	6.84E+07
KR-83M	0.	0.	0.	0.	0.	0.	0.	0.
KR-85M	0.	0.	0.	0.	0.	0.	0.	0.
KR--85	0.	0.	0.	0.	0.	0.	0.	0.
KR--87	0.	4.00E-07	0.	0.	0.	1.87E-08	0.	1.39E-07
KR--88	0.	0.	0.	0.	0.	0.	0.	0.
KR--89	3.09E+03	0.	0.	0.	0.	3.36E+02	0.	8.88E+01
KR--90	7.43E+01	0.	0.	0.	2.84E-03	1.58E+00	0.	1.84E+01
RB--86	0.	9.23E+07	0.	0.	0.	1.82E+07	0.	4.30E+07
SR--89	7.05E+07	0.	0.	0.	0.	7.64E+06	0.	2.02E+06
SR--90	2.05E+09	0.	0.	0.	7.83E+04	4.35E+07	0.	5.06E+08
Y---91	3.84E+02	0.	0.	0.	0.	1.48E+05	0.	1.03E+01
ZR--95	8.72E+02	5.15E+02	0.	4.10E+02	0.	2.08E+06	0.	2.93E+02
NB--95	3.21E+03	1.93E+03	0.	1.52E+03	0.	7.89E+06	0.	1.09E+03
RU-103	4.35E+01	0.	0.	1.30E+02	0.	3.39E+03	0.	1.94E+01
RU-106	9.14E+02	0.	0.	1.22E+03	0.	4.14E+04	0.	1.15E+02
AG110M	1.87E+06	1.73E+06	0.	3.39E+06	0.	7.04E+08	0.	1.03E+06
CD115M	0.	4.19E+04	0.	3.32E+04	0.	1.76E+06	0.	1.34E+03
SN-123	0.	0.	0.	0.	0.	0.	0.	0.
SN-126	4.92E+07	9.76E+05	2.86E+05	0.	1.27E+05	3.11E+07	0.	1.46E+06
SB-124	8.29E+05	1.56E+04	2.00E+03	0.	6.43E+05	2.35E+07	0.	3.28E+05
SB-125	1.12E+06	1.33E+05	9.95E+04	9.97E+05	8.03E+07	7.77E+06	0.	2.01E+05
TE127M	1.76E+06	6.14E+05	4.65E+05	7.09E+06	0.	8.82E+06	0.	2.18E+05
TE129M	3.16E+06	1.17E+06	1.01E+06	9.15E+06	0.	1.10E+07	0.	4.97E+05
I--131	7.45E+06	1.05E+07	3.04E+09	1.36E+07	0.	1.99E+06	0.	6.27E+06
I--133	1.00E+05	1.84E+05	3.34E+07	2.31E+05	0.	1.34E+05	0.	5.66E+04
XE131M	0.	0.	0.	0.	0.	0.	0.	0.
XE133M	0.	0.	0.	0.	0.	0.	0.	0.
XE-133	0.	0.	0.	0.	0.	0.	0.	0.
XE135M	8.28E-04	7.65E-04	0.	2.90E-04	8.71E-05	1.79E-05	0.	3.40E-04
XE-135	2.86E-02	2.64E-02	0.	1.00E-02	3.01E-03	5.18E-04	0.	1.17E-02
XE-137	8.16E+01	1.10E+02	0.	2.83E+01	1.46E+01	1.46E+00	0.	3.85E+01
XE-138	0.	0.	0.	0.	0.	0.	0.	0.
CS-134	2.20E+08	5.31E+08	0.	1.31E+08	6.43E+07	6.13E+06	0.	2.46E+08
CS-136	9.53E+06	3.76E+07	0.	2.03E+07	2.87E+06	4.27E+06	0.	2.71E+07
CS-137	3.07E+08	4.12E+08	0.	1.05E+08	5.47E+07	5.50E+06	0.	1.45E+08
BA-140	1.37E+06	1.68E+03	0.	4.20E+02	1.13E+03	2.58E+05	0.	8.80E+04
CE-141	1.32E+03	8.84E+02	0.	3.07E+02	0.	2.39E+06	0.	1.01E+02
CE-144	9.99E+04	3.93E+04	0.	1.01E+04	0.	2.26E+07	0.	5.00E+03

DOSE FACTORS FOR GASEOUS DISCHARGES
BASED ON 1 CI/YR RELEASE OF EACH ISOTOPE AND A VALUE OF UNITY FOR X/Q, DEPLETED X/Q AND RELATIVE DEPOSITION

PATHWAY - COWS MILK (CONTAMINATED FEED) AGE GROUP - TEENAGER

NUCLIDE	ORGAN DOSE (MREM)							
	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	SKIN	TOTAL BODY
H----3	0.	1.66E+01	1.66E+01	2.10E+01	1.66E+01	1.66E+01	0.	1.66E+01
C---14	3.95E+03	3.95E+03	3.95E+03	2.98E+03	3.95E+03	3.95E+03	0.	3.95E+03
P---32	3.40E+06	2.13E+05	0.	0.	0.	3.83E+05	0.	1.32E+05
AR--41	0.	0.	0.	0.	0.	0.	0.	0.
MN--54	0.	9.70E+04	0.	2.89E+04	0.	2.97E+05	0.	1.85E+04
FE--59	1.04E+05	2.48E+05	0.	0.	6.88E+04	8.18E+05	0.	9.43E+04
CO--58	0.	3.64E+04	0.	0.	0.	4.91E+05	0.	8.29E+04
CO--60	0.	2.92E+05	0.	0.	0.	3.51E+06	0.	6.67E+05
ZN--65	1.92E+07	6.10E+07	0.	4.08E+07	0.	3.85E+07	0.	2.76E+07
KR-83M	0.	0.	0.	0.	0.	0.	0.	0.
KR-85M	0.	0.	0.	0.	0.	0.	0.	0.
KR--85	0.	0.	0.	0.	0.	0.	0.	0.
KR--87	0.	2.74E-07	0.	0.	0.	1.28E-08	0.	9.54E-08
KR--88	0.	0.	0.	0.	0.	0.	0.	0.
KR--89	3.90E+02	0.	0.	0.	0.	4.23E+01	0.	1.12E+01
KR--90	3.69E+01	0.	0.	0.	1.54E-03	7.84E-01	0.	9.11E+00
RB--86	0.	1.33E+06	0.	0.	0.	2.63E+05	0.	6.22E+05
SR--89	8.87E+06	0.	0.	0.	0.	9.62E+05	0.	2.55E+05
SR--90	1.02E+09	0.	0.	0.	4.24E+04	2.16E+07	0.	2.51E+08
Y---91	5.80E+01	0.	0.	0.	0.	2.23E+04	0.	1.55E+00
ZR--95	8.18E+02	4.91E+02	0.	3.88E+02	0.	2.00E+06	0.	2.77E+02
NB--95	2.28E+02	1.37E+02	0.	1.08E+02	0.	5.61E+05	0.	7.75E+01
RU-103	3.91E+00	0.	0.	1.17E+01	0.	3.05E+02	0.	1.75E+00
RU-106	3.62E+02	0.	0.	4.81E+02	0.	1.64E+04	0.	4.55E+01
AG110M	7.09E+05	6.56E+05	0.	1.29E+06	0.	2.68E+08	0.	3.90E+05
CD115M	0.	4.32E+03	0.	3.42E+03	0.	1.82E+05	0.	1.38E+02
SN-123	0.	0.	0.	0.	0.	0.	0.	0.
SN-126	2.31E+07	4.58E+05	1.34E+05	0.	1.23E+05	2.30E+07	0.	7.23E+05
SB-124	1.28E+05	2.42E+03	3.10E+02	0.	9.94E+04	3.63E+06	0.	5.06E+04
SB-125	7.11E+05	1.38E+05	1.06E+05	1.07E+06	3.51E+07	4.02E+06	0.	1.17E+05
TE127M	5.25E+05	1.84E+05	1.39E+05	2.12E+06	0.	2.64E+06	0.	6.51E+04
TE129M	2.34E+05	8.67E+04	7.49E+04	6.77E+05	0.	8.16E+05	0.	3.68E+04
I--131	1.23E+03	1.73E+03	4.99E+05	2.24E+03	0.	3.28E+02	0.	1.03E+03
I--133	0.	0.	0.	0.	0.	0.	0.	0.
XE131M	0.	0.	0.	0.	0.	0.	0.	0.
XE133M	0.	0.	0.	0.	0.	0.	0.	0.
XE-133	0.	0.	0.	0.	0.	0.	0.	0.
XE135M	4.18E-04	3.86E-04	0.	1.46E-04	4.40E-05	9.03E-06	0.	1.72E-04
XE-135	1.44E-02	1.33E-02	0.	5.05E-03	1.52E-03	3.12E-04	0.	5.92E-03
XE-137	3.92E+01	5.28E+01	0.	1.36E+01	7.00E+00	7.04E-01	0.	1.85E+01
XE-138	0.	0.	0.	0.	0.	0.	0.	0.
CS-134	9.42E+07	2.27E+08	0.	5.61E+07	2.75E+07	2.62E+06	0.	1.06E+08
CS-136	3.08E+04	1.22E+05	0.	6.75E+04	9.27E+03	1.38E+04	0.	8.72E+04
CS-137	1.47E+08	1.98E+08	0.	5.11E+07	2.63E+07	2.65E+06	0.	6.96E+07
BA-140	4.10E+03	5.04E+00	0.	1.25E+00	3.37E+00	7.97E+02	0.	2.64E+02
CE-141	8.11E+01	5.44E+01	0.	1.89E+01	0.	1.47E+05	0.	6.24E+00
CE-144	3.50E+04	1.44E+04	0.	5.87E+03	0.	8.24E+06	0.	1.85E+03

DOSE FACTORS FOR GASEOUS DISCHARGES
BASED ON 1 CI/YR RELEASE OF EACH ISOTOPE AND A VALUE OF UNITY FOR X/Q, DEPLETED X/Q AND RELATIVE DEPOSITION

PATHWAY - GOATS MILK (CONTAMINATED FORAGE) AGE GROUP - TEENAGER

NUCLIDE	ORGAN DOSE (MREM)							
	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	SKIN	TOTAL BODY
H----3	0.	3.43E+01	3.43E+01	4.33E+01	3.43E+01	3.43E+01	0.	3.43E+01
C---14	3.95E+03	3.95E+03	3.95E+03	2.98E+03	3.95E+03	3.95E+03	0.	3.95E+03
P---32	8.28E+08	5.19E+07	0.	0.	0.	9.30E+07	0.	3.20E+07
AR--41	0.	0.	0.	0.	0.	0.	0.	0.
MN--54	0.	3.09E+04	0.	9.19E+03	0.	9.47E+04	0.	5.90E+03
FE--59	1.30E+04	3.08E+04	0.	0.	8.55E+03	1.02E+05	0.	1.17E+04
CO--58	0.	2.43E+04	0.	0.	0.	3.28E+05	0.	5.54E+04
CO--60	0.	7.70E+04	0.	0.	0.	9.23E+05	0.	1.75E+05
ZN--65	5.74E+06	1.82E+07	0.	1.22E+07	0.	1.15E+07	0.	8.24E+05
KR-83M	0.	0.	0.	0.	0.	0.	0.	0.
KR-85M	0.	0.	0.	0.	0.	0.	0.	0.
KR--85	0.	0.	0.	0.	0.	0.	0.	0.
KR--87	0.	4.80E-08	0.	0.	0.	2.25E-09	0.	1.67E-08
KR--88	0.	4.84E-10	0.	0.	0.	0.	0.	2.57E-10
KR--89	6.63E+03	0.	0.	0.	0.	7.19E+02	0.	1.90E+02
KR--90	1.56E+02	0.	0.	0.	3.12E-04	3.30E+00	0.	3.86E+01
RB--86	0.	1.17E+07	0.	0.	0.	2.31E+06	0.	5.46E+05
SR--89	1.51E+08	0.	0.	0.	0.	1.64E+07	0.	4.33E+06
SR--90	4.30E+09	0.	0.	0.	8.60E+03	9.09E+07	0.	1.06E+09
Y---91	4.69E+01	0.	0.	0.	0.	1.80E+04	0.	1.25E+00
ZR--95	9.46E+01	5.58E+01	0.	4.43E+01	0.	2.25E+05	0.	3.17E+01
NB--95	3.97E+02	2.39E+02	0.	1.88E+02	0.	9.76E+05	0.	1.35E+02
RU-103	5.35E+00	0.	0.	1.60E+01	0.	4.10E+02	0.	2.39E+00
RU-106	1.10E+02	0.	0.	1.45E+02	0.	4.98E+03	0.	1.38E+01
AG110M	2.25E+05	2.08E+05	0.	4.09E+05	0.	8.48E+07	0.	1.24E+05
CD115M	0.	5.15E+03	0.	4.08E+03	0.	2.17E+05	0.	1.65E+02
SN-123	2.93E-02	4.83E-04	3.87E-04	0.	0.	4.22E-02	0.	7.22E-04
SN-126	5.89E+06	1.17E+05	3.43E+04	0.	1.41E+04	3.57E+06	0.	1.75E+05
SB-124	1.01E+05	1.91E+03	2.45E+02	0.	7.85E+04	2.86E+06	0.	4.00E+04
SB-125	1.35E+05	1.62E+04	1.21E+04	1.21E+05	9.64E+06	9.34E+05	0.	2.41E+04
TE127M	2.13E+05	7.45E+04	5.63E+04	8.58E+05	0.	1.06E+06	0.	2.64E+04
TE129M	3.91E+05	1.45E+05	1.26E+05	1.13E+06	0.	1.36E+06	0.	6.16E+04
I--131	1.02E+07	1.44E+07	4.15E+09	1.86E+07	0.	2.72E+06	0.	8.56E+05
I--133	4.27E+05	7.23E+05	1.31E+08	9.11E+05	0.	5.26E+05	0.	2.23E+05
XE131M	0.	0.	0.	0.	0.	0.	0.	0.
XE133M	0.	0.	0.	0.	0.	0.	0.	0.
XE-133	0.	0.	0.	0.	0.	0.	0.	0.
XE135M	2.49E-03	2.29E-03	0.	8.69E-04	2.61E-04	5.36E-05	0.	1.02E-03
XE-135	8.58E-02	7.92E-02	0.	3.00E-02	9.02E-03	1.85E-03	0.	3.52E-02
XE-137	2.45E+02	3.29E+02	0.	8.48E+01	4.37E+01	4.39E+00	0.	1.16E+02
XE-138	9.17E-05	1.81E-04	0.	1.33E-04	1.32E-05	7.72E-10	0.	8.98E-05
CS-134	6.62E+08	1.60E+09	0.	3.95E+08	1.93E+08	1.84E+07	0.	7.45E+08
CS-136	3.10E+07	1.22E+08	0.	6.80E+07	9.32E+06	1.39E+07	0.	8.80E+07
CS-137	9.19E+08	1.24E+09	0.	3.19E+08	1.64E+08	1.65E+07	0.	4.34E+08
BA-140	1.78E+05	2.19E+02	0.	5.46E+01	1.47E+02	3.30E+04	0.	1.15E+04
CE-141	1.63E+02	1.10E+02	0.	3.81E+01	0.	2.96E+05	0.	1.25E+01

DOSE FACTORS FOR GASEOUS DISCHARGES

BASED ON 1 CI/YR RELEASE OF EACH ISOTOPE AND A VALUE OF UNITY FOR X/Q, DEPLETED X/Q AND RELATIVE DEPOSITION

PATHWAY - GOATS MILK (CONTAMINATE) FEED

AGE GROUP - TEENAGER

NUCLIDE	ORGAN DOSE (MREM)							
	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	SKIN	TOTAL BODY
H----3	0.	3.30E+01	3.38E+01	4.27E+01	3.38E+01	3.38E+01	0.	3.38E+01
C---14	3.95E+03	3.95E+03	3.95E+03	2.98E+03	3.95E+03	3.95E+03	0.	3.95E+03
P---32	4.39E+06	2.75E+05	0.	0.	0.	4.94E+05	0.	1.70E+05
AR--41	0.	0.	0.	0.	0.	0.	0.	0.
MN--54	0.	1.17E+04	0.	3.48E+03	0.	3.58E+04	0.	2.23E+03
FE--59	1.39E+03	3.30E+03	0.	0.	9.15E+02	1.09E+04	0.	1.26E+03
CO--58	0.	4.43E+03	0.	0.	0.	5.98E+04	0.	1.01E+04
CO--60	0.	3.51E+04	0.	0.	0.	4.21E+05	0.	8.01E+04
ZN--65	2.32E+06	7.36E+06	0.	4.92E+06	0.	4.63E+06	0.	3.33E+06
KR-83M	0.	0.	0.	0.	0.	0.	0.	0.
KR-85M	0.	0.	0.	0.	0.	0.	0.	0.
KR--85	0.	0.	0.	0.	0.	0.	0.	0.
KR--87	0.	3.29E-08	0.	0.	0.	1.54E-09	0.	1.15E-08
KR--88	0.	0.	0.	0.	0.	0.	0.	0.
KR--89	8.35E+02	0.	0.	0.	0.	9.06E+01	0.	2.40E+01
KR--90	7.74E+01	0.	0.	0.	1.78E-04	1.64E+00	0.	1.91E+01
RB--86	0.	1.69E+05	0.	0.	0.	3.33E+04	0.	7.89E+04
SR--89	1.90E+07	0.	0.	0.	0.	2.06E+06	0.	5.46E+05
SR--90	2.13E+09	0.	0.	0.	4.90E+03	4.51E+07	0.	5.27E+08
Y---91	7.09E+00	0.	0.	0.	0.	2.72E+03	0.	1.89E-01
ZR--95	9.90E+01	5.94E+01	0.	4.68E+01	0.	2.42E+05	0.	3.36E+01
NB--95	2.82E+01	1.70E+01	0.	1.34E+01	0.	6.93E+04	0.	9.58E+00
RU-103	4.81E-01	0.	0.	1.44E+00	0.	3.76E+01	0.	2.15E-01
RU-106	4.36E+01	0.	0.	5.73E+01	0.	1.97E+03	0.	5.48E+00
AG110M	8.54E+04	7.90E+04	0.	1.55E+05	0.	3.23E+07	0.	4.70E+04
CD115M	0.	5.31E+02	0.	4.21E+02	0.	2.23E+04	0.	1.70E+01
SN-123	0.	0.	0.	0.	0.	0.	0.	0.
SN-126	2.76E+06	5.50E+04	1.61E+04	0.	1.48E+04	2.77E+06	0.	8.69E+04
SB-124	1.57E+04	2.95E+02	3.78E+01	0.	1.21E+04	4.43E+05	0.	6.18E+03
SB-125	8.61E+04	1.67E+04	1.29E+04	1.30E+05	4.22E+06	4.85E+05	0.	1.42E+04
TE127M	6.37E+04	2.23E+04	1.68E+04	2.57E+05	0.	3.20E+05	0.	7.88E+03
TE129M	2.90E+04	1.07E+04	9.36E+03	8.37E+04	0.	1.01E+05	0.	4.55E+03
I--131	1.67E+03	2.36E+03	6.82E+05	3.06E+03	0.	4.47E+02	0.	1.41E+03
I--133	0.	0.	0.	0.	0.	0.	0.	0.
XE131M	0.	0.	0.	0.	0.	0.	0.	0.
XE133M	0.	0.	0.	0.	0.	0.	0.	0.
XE-133	0.	0.	0.	0.	0.	0.	0.	0.
XE135M	1.26E-03	1.16E-03	0.	4.39E-04	1.32E-04	2.71E-05	0.	5.15E-04
XE-135	4.33E-02	4.00E-02	0.	1.51E-02	4.55E-03	9.35E-04	0.	1.78E-02
XE-137	1.18E+02	1.58E+02	0.	4.08E+01	2.10E+01	2.11E+00	0.	5.55E+01
XE-138	0.	0.	0.	0.	0.	0.	0.	0.
CS-134	2.83E+08	6.82E+08	0.	1.69E+08	8.26E+07	7.87E+06	0.	3.18E+08
CS-136	1.00E+05	3.95E+05	0.	2.20E+05	3.01E+04	4.49E+04	0.	2.84E+05
CS-137	4.42E+08	5.95E+08	0.	1.53E+08	7.89E+07	7.93E+06	0.	2.09E+08
BA-140	5.33E+02	6.56E-01	0.	1.64E-01	4.39E-01	1.04E+02	0.	3.43E+01
CE-141	1.00E+01	6.74E+00	0.	2.34E+00	0.	1.83E+04	0.	7.73E-01
CE-144	4.22E+03	1.73E+03	0.	7.46E+02	0.	9.93E+05	0.	2.24E+02

DOSE FACTORS FOR GASEOUS DISCHARGES
BASED ON 1 CI/YR RELEASE OF EACH ISOTOPE AND A VALUE OF UNITY FOR X/Q, DEPLETED X/Q AND RELATIVE DEPOSITION

PATHWAY - INHALATION

AGE GROUP - CHILD

NUCLIDE	ORGAN DOSE (MREM)							
	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	SKIN	TOTAL BODY
H----3	0.	1.74E+01	1.74E+01	1.15E+01	1.74E+01	1.74E+01	0.	1.74E+01
C---14	1.45E+02	1.45E+02	1.45E+02	3.66E+01	1.45E+02	1.45E+02	0.	1.45E+02
P---32	1.41E+04	8.26E+02	0.	0.	0.	9.25E+02	0.	5.37E+02
AR--41	0.	0.	0.	0.	0.	0.	0.	0.
MN--54	0.	4.24E+02	0.	1.05E+02	1.50E+04	8.28E+02	0.	6.74E+01
FE--59	1.26E+02	2.97E+03	0.	0.	1.09E+04	2.01E+03	0.	1.13E+02
CO--58	0.	3.52E+00	0.	0.	2.60E+04	8.37E+02	0.	6.19E+00
CO--60	0.	2.48E+01	0.	0.	1.60E+05	2.17E+03	0.	4.34E+01
ZN--65	3.47E+02	1.10E+03	0.	7.38E+02	9.33E+03	5.72E+02	0.	4.98E+02
KR-83M	0.	0.	0.	0.	0.	0.	0.	0.
KR-85M	0.	0.	0.	0.	0.	0.	0.	0.
KR--85	0.	0.	0.	0.	0.	0.	0.	0.
KR--87	0.	0.	0.	0.	0.	0.	0.	0.
KR--88	0.	0.	0.	0.	0.	0.	0.	0.
KR--89	0.	0.	0.	0.	0.	0.	0.	0.
KR--90	0.	0.	0.	0.	0.	0.	0.	0.
RB--86	0.	1.45E+03	0.	0.	0.	1.78E+02	0.	6.32E+02
SR--89	1.24E+03	0.	0.	0.	5.19E+04	3.90E+03	0.	3.56E+01
SR--90	3.79E+05	0.	0.	0.	3.43E+05	7.97E+03	0.	2.31E+04
Y---91	1.72E+03	0.	0.	0.	5.91E+04	4.13E+03	0.	4.59E+01
ZR--95	3.26E+02	7.59E+01	0.	5.80E+02	4.90E+04	1.33E+03	0.	6.89E+01
NB--95	3.94E+01	1.68E+01	0.	8.28E+01	1.35E+04	7.67E+02	0.	1.23E+01
RU-103	5.00E+00	0.	0.	6.24E+01	1.40E+04	9.76E+02	0.	2.02E+00
RU-106	2.67E+02	0.	0.	1.43E+03	3.37E+05	1.01E+04	0.	3.32E+01
AG110M	1.16E+02	1.07E+02	0.	2.11E+02	4.97E+04	3.24E+03	0.	6.36E+01
CD115M	0.	2.11E+03	0.	1.70E+03	1.51E+04	4.11E+03	0.	6.81E+01
SN-123	8.90E+02	1.49E+01	1.58E+01	0.	8.10E+04	3.45E+03	0.	2.94E+01
SN-126	1.35E+04	3.58E+02	1.05E+02	0.	1.00E+05	1.36E+03	0.	5.14E+02
SB-124	3.34E+02	6.30E+00	8.08E-01	0.	2.65E+04	4.35E+03	0.	1.33E+02
SB-125	7.07E+02	7.63E+00	6.28E-01	0.	2.35E+04	1.08E+03	0.	1.42E+02
TE127M	1.35E+02	6.01E+01	3.52E+01	4.90E+02	1.03E+04	1.60E+03	0.	1.68E+01
TE129M	3.80E+01	1.35E+01	1.25E+01	3.91E+02	4.17E+04	4.22E+03	0.	6.02E+03
I--131	1.05E+03	1.07E+03	3.56E+05	6.57E+02	0.	6.14E+01	0.	8.11E+02
I--133	3.88E+02	4.74E+02	1.16E+05	2.78E+02	0.	1.28E+02	0.	1.86E+02
XE131M	0.	0.	0.	0.	0.	0.	0.	0.
XE133M	0.	0.	0.	0.	0.	0.	0.	0.
XE-133	0.	0.	0.	0.	0.	0.	0.	0.
XE135M	0.	0.	0.	0.	0.	0.	0.	0.
XE-135	0.	0.	0.	0.	0.	0.	0.	0.
XE-137	0.	0.	0.	0.	0.	0.	0.	0.
XE-138	0.	0.	0.	0.	0.	0.	0.	0.
CS-134	1.44E+04	2.30E+04	0.	3.08E+03	2.75E+03	8.73E+01	0.	5.15E+03
CS-136	4.19E+02	1.57E+03	0.	9.15E+02	1.28E+02	1.25E+02	0.	1.19E+03
CS-137	2.00E+04	1.85E+04	0.	2.38E+03	2.32E+03	7.89E+01	0.	2.89E+03
BA-140	1.65E+02	1.08E-01	0.	1.79E-01	4.02E+04	2.30E+02	0.	9.76E+00
CE-141	7.25E+01	3.03E+01	0.	6.70E+01	1.19E+04	1.26E+03	0.	5.39E+00
CE-144	1.34E+04	4.20E+03	0.	9.08E+03	2.04E+05	9.25E+03	0.	7.17E+02

DOSE FACTORS FOR GASEOUS DISCHARGES
BASED ON 1 CI/YR RELEASE OF EACH ISOTOPE AND A VALUE OF UNITY FOR X/Q, DEPLETED X/Q AND RELATIVE DEPOSITION

PATHWAY - GROUND PLANE DEPOSITION AGE GROUP - CHILD

NUCLIDE	ORGAN DOSE (MREM)							
	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	SKIN	TOTAL BODY
H----3	0.	0.	0.	0.	0.	0.	0.	0.
C---14	0.	0.	0.	0.	0.	0.	0.	0.
P---32	0.	0.	0.	0.	0.	0.	0.	0.
AR--41	0.	0.	0.	0.	0.	0.	0.	0.
MN--54	4.39E+07	4.39E+07	4.39E+07	4.39E+07	4.39E+07	4.39E+07	5.14E+07	4.39E+07
FE--59	8.73E+06	8.73E+06	8.73E+06	8.73E+06	8.73E+06	8.73E+06	1.03E+07	8.73E+05
CO--58	1.21E+07	1.21E+07	1.21E+07	1.21E+07	1.21E+07	1.21E+07	1.41E+07	1.21E+07
CO--60	6.80E+08	6.80E+08	6.80E+08	6.80E+08	6.80E+08	6.80E+08	8.00E+08	6.80E+08
ZN--65	2.36E+07	2.36E+07	2.36E+07	2.36E+07	2.36E+07	2.36E+07	2.71E+07	2.36E+07
KR-83M	0.	0.	0.	0.	0.	0.	0.	0.
KR-85M	0.	0.	0.	0.	0.	0.	0.	0.
KR--85	0.	0.	0.	0.	0.	0.	0.	0.
KR--87	0.	0.	0.	0.	0.	0.	0.	0.
KR--88	9.90E+03	9.90E+03	9.90E+03	9.90E+03	9.90E+03	9.90E+03	1.13E+04	9.90E+03
KR--89	8.08E+02	8.08E+02	8.08E+02	8.08E+02	8.08E+02	8.08E+02	9.70E+02	8.08E+02
KR--90	6.16E-03	6.16E-03	6.16E-03	6.16E-03	6.16E-03	6.16E-03	7.29E-03	6.16E-03
RB--86	2.86E+05	2.86E+05	2.86E+05	2.86E+05	2.86E+05	2.86E+05	3.26E+05	2.86E+05
SR--89	6.87E+02	6.87E+02	6.87E+02	6.87E+02	6.87E+02	6.87E+02	7.97E+02	6.87E+02
SR--90	1.70E+05	1.70E+05	1.70E+05	1.70E+05	1.70E+05	1.70E+05	2.01E+05	1.70E+05
Y---91	3.43E+04	3.43E+04	3.43E+04	3.43E+04	3.43E+04	3.43E+04	3.86E+04	3.43E+04
ZR--95	1.59E+07	1.59E+07	1.59E+07	1.59E+07	1.59E+07	1.59E+07	1.86E+07	1.59E+07
NB--95	4.33E+06	4.33E+06	4.33E+06	4.33E+06	4.33E+06	4.33E+06	5.09E+06	4.33E+05
RU-103	3.49E+06	3.49E+06	3.49E+06	3.49E+06	3.49E+06	3.49E+06	4.07E+06	3.49E+05
RU-106	1.33E+07	1.33E+07	1.33E+07	1.33E+07	1.33E+07	1.33E+07	1.59E+07	1.33E+07
AG110M	1.13E+08	1.13E+08	1.13E+08	1.13E+08	1.13E+08	1.13E+08	1.32E+08	1.13E+08
CD115M	0.	0.	0.	0.	0.	0.	0.	0.
SN-123	0.	0.	0.	0.	0.	0.	4.35E+04	0.
SN-126	1.64E+09	1.64E+09	1.64E+09	1.64E+09	1.64E+09	1.64E+09	1.83E+09	1.64E+09
SB-124	1.90E+07	1.90E+07	1.90E+07	1.90E+07	1.90E+07	1.90E+07	2.19E+07	1.90E+07
SB-125	7.27E+07	7.27E+07	7.27E+07	7.27E+07	7.27E+07	7.27E+07	8.21E+07	7.27E+07
TE127M	2.79E+04	2.79E+04	2.79E+04	2.79E+04	2.79E+04	2.79E+04	3.09E+04	2.79E+04
TE129M	1.22E+06	1.22E+06	1.22E+06	1.22E+06	1.22E+06	1.22E+06	1.43E+06	1.22E+06
I--131	2.73E+05	2.73E+05	2.73E+05	2.73E+05	2.73E+05	2.73E+05	3.32E+05	2.73E+05
I--133	3.92E+04	3.92E+04	3.92E+04	3.92E+04	3.92E+04	3.92E+04	4.77E+04	3.92E+04
XE131M	0.	0.	0.	0.	0.	0.	0.	0.
XE133M	0.	0.	0.	0.	0.	0.	0.	0.
XE-133	0.	0.	0.	0.	0.	0.	0.	0.
XE135M	0.	0.	0.	0.	0.	0.	0.	0.
XE-135	0.	0.	0.	0.	0.	0.	0.	0.
XE-137	8.69E+01	8.69E+01	8.69E+01	8.69E+01	8.69E+01	8.69E+01	1.01E+02	8.69E+01
XE-138	6.01E+03	6.01E+03	6.01E+03	6.01E+03	6.01E+03	6.01E+03	6.87E+03	6.01E+03
CS-134	2.22E+08	2.22E+08	2.22E+08	2.22E+08	2.22E+08	2.22E+08	2.58E+08	2.22E+08
CS-136	4.73E+06	4.73E+06	4.73E+06	4.73E+06	4.73E+06	4.73E+06	5.36E+06	4.73E+05
CS-137	3.27E+08	3.27E+08	3.27E+08	3.27E+08	3.27E+08	3.27E+08	3.81E+08	3.27E+08
BA-140	5.30E+06	5.30E+06	5.30E+06	5.30E+06	5.30E+06	5.30E+06	6.02E+06	5.30E+06
CE-141	4.33E+05	4.33E+05	4.33E+05	4.33E+05	4.33E+05	4.33E+05	4.80E+05	4.33E+05
CE-144	3.59E+06	3.59E+06	3.59E+06	3.59E+06	3.59E+06	3.59E+06	4.15E+06	3.59E+05

DOSE FACTORS FOR GASEOUS DISCHARGES
BASED ON 1 CI/YR RELEASE OF EACH ISOTOPE AND A VALUE OF UNITY FOR X/Q, DEPLETED X/Q AND RELATIVE DEPOSITION

PATHWAY - FRESH FRUITS AND VEGETABLES — AGE GROUP - CHILD

NUCLIDE	ORGAN DOSE (MREM)							
	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	SKIN	TOTAL BODY
H----3	0.	4.18E+00	4.18E+00	2.76E+00	4.18E+00	4.18E+00	0.	4.18E+00
C---14	1.28E+03	1.28E+03	1.28E+03	3.23E+02	1.28E+03	1.28E+03	0.	1.28E+03
P---32	1.46E+07	9.13E+05	0.	0.	0.	1.64E+06	0.	5.64E+05
AR--41	0.	0.	0.	0.	0.	0.	0.	0.
MN--54	0.	6.17E+05	0.	1.84E+05	0.	1.89E+06	0.	1.18E+05
FE--59	4.60E+05	1.09E+06	0.	0.	3.03E+05	3.60E+06	0.	4.15E+05
CO--58	0.	2.14E+05	0.	0.	0.	1.28E+06	0.	6.47E+05
CO--60	0.	7.36E+05	0.	0.	0.	4.07E+06	0.	2.21E+05
ZN--65	8.31E+05	2.64E+06	0.	1.76E+06	0.	1.66E+06	0.	1.19E+05
KR-83M	0.	0.	0.	0.	0.	0.	0.	0.
KR-85M	0.	0.	0.	0.	0.	0.	0.	0.
KR--85	0.	0.	0.	0.	0.	0.	0.	0.
KR--87	0.	1.19E-08	0.	0.	0.	5.57E-10	0.	4.14E-09
KR--88	0.	2.13E-01	0.	0.	0.	0.	0.	1.13E-01
KR--89	6.61E+03	0.	0.	0.	0.	2.47E+02	0.	1.89E+02
KR--90	9.96E+01	0.	0.	0.	0.	1.86E+00	0.	2.53E+01
RB--86	0.	1.69E+06	0.	0.	0.	3.32E+05	0.	7.85E+05
SR--89	1.50E+08	0.	0.	0.	0.	5.61E+06	0.	4.31E+05
SR--90	2.74E+09	0.	0.	0.	0.	5.12E+07	0.	6.96E+08
Y---91	6.56E+04	0.	0.	0.	0.	8.71E+06	0.	1.75E+03
ZR--95	1.25E+04	3.03E+03	0.	1.87E+03	0.	3.31E+06	0.	2.71E+03
NB--95	1.94E+03	8.26E+02	0.	3.41E+02	0.	1.43E+06	0.	6.07E+02
RU-103	7.03E+04	0.	0.	7.33E+04	0.	1.85E+06	0.	2.84E+04
RU-106	1.66E+06	0.	0.	7.44E+05	0.	2.59E+07	0.	2.07E+05
AG110M	2.35E+04	2.17E+04	0.	4.27E+04	0.	8.87E+06	0.	1.29E+04
CD115M	0.	2.03E+05	0.	1.61E+05	0.	8.53E+06	0.	6.48E+03
SN-123	5.43E-07	6.80E-09	7.17E-09	0.	0.	2.70E-07	0.	1.34E-08
SN-126	1.20E+07	2.38E+05	6.98E+04	0.	6.29E+04	1.18E+07	0.	3.76E+05
SB-124	3.17E+05	5.97E+03	7.65E+02	0.	2.46E+05	8.96E+06	0.	1.25E+05
SB-125	1.65E+06	3.67E+05	3.77E+05	1.28E+06	3.25E+07	4.05E+06	0.	2.41E+05
TE127M	1.30E+06	4.47E+05	3.66E+05	5.03E+06	0.	7.48E+06	0.	1.66E+05
TE129M	5.79E+06	1.61E+06	1.85E+06	5.63E+06	0.	6.97E+06	0.	8.95E+05
I--131	1.96E+06	2.01E+06	6.54E+08	1.23E+06	0.	1.72E+05	0.	1.52E+05
I--133	5.73E+04	7.07E+04	1.71E+07	4.15E+04	0.	2.87E+04	0.	2.78E+04
XE131M	0.	0.	0.	0.	0.	0.	0.	0.
XE133M	0.	0.	0.	0.	0.	0.	0.	0.
XE-133	0.	0.	0.	0.	0.	0.	0.	0.
XE135M	4.51E-05	4.16E-05	0.	1.58E-05	4.74E-06	9.74E-07	0.	1.85E-05
XE-135	1.56E-03	1.44E-03	0.	5.44E-04	1.64E-04	3.36E-05	0.	6.39E-04
XE-137	1.25E+01	1.21E+01	0.	1.48E+00	1.41E+00	7.35E-02	0.	1.80E+00
XE-138	0.	0.	0.	0.	0.	0.	0.	0.
CS-134	3.08E+07	5.19E+07	0.	6.60E+06	5.76E+06	2.81E+05	0.	1.10E+07
CS-136	4.27E+05	1.69E+05	0.	9.38E+05	1.23E+05	1.92E+05	0.	1.21E+05
CS-137	4.68E+07	4.53E+07	0.	5.57E+06	5.31E+06	2.76E+05	0.	6.75E+06
BA-140	5.37E+06	4.93E+03	0.	5.64E+02	2.81E+03	6.58E+06	0.	3.15E+05
CE-141	3.65E+03	1.83E+03	0.	2.85E+02	0.	2.29E+06	0.	2.72E+02
CE-144	2.30E+05	8.78E+04	0.	1.53E+04	0.	2.28E+07	0.	1.49E+04

01/18/79

DOSE FACTORS FOR GASEOUS DISCHARGES
BASED ON 1 CI/YR RELEASE OF EACH ISOTOPE AND A VALUE OF UNITY FOR X/Q, DEPLETED X/Q AND RELATIVE DEPOSITION

PATHWAY - STORED FRUITS AND VEGETABLES — AGE GROUP - CHILD

NUCLIDE	ORGAN DOSE (MREM)							
	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	SKIN	TOTAL BODY
H----3	0.	8.29E+01	8.29E+01	5.47E+01	8.29E+01	8.29E+01	0.	8.29E+01
C---14	2.56E+04	2.56E+04	2.56E+04	6.45E+03	2.56E+04	2.56E+04	0.	2.56E+04
P---32	1.67E+07	1.05E+06	0.	0.	0.	1.88E+06	0.	6.46E+05
AR--41	0.	0.	0.	0.	0.	0.	0.	0.
MN--54	0.	1.08E+07	0.	3.22E+06	0.	3.32E+07	0.	2.07E+05
FE--59	3.70E+06	8.79E+06	0.	0.	2.44E+06	2.90E+07	0.	3.35E+05
CO--58	0.	2.41E+06	0.	0.	0.	1.43E+07	0.	7.27E+05
CO--60	0.	1.44E+07	0.	0.	0.	7.97E+07	0.	4.32E+07
ZN--65	1.40E+07	4.46E+07	0.	2.98E+07	0.	2.81E+07	0.	2.02E+07
KR-83M	0.	0.	0.	0.	0.	0.	0.	0.
KR-85M	0.	0.	0.	0.	0.	0.	0.	0.
KR--85	0.	0.	0.	0.	0.	0.	0.	0.
KR--87	0.	2.38E-07	0.	0.	0.	1.11E-08	0.	8.27E-08
KR--88	0.	0.	0.	0.	0.	0.	0.	0.
KR--89	5.89E+04	0.	0.	0.	0.	2.20E+03	0.	1.69E+03
KR--90	1.99E+03	0.	0.	0.	0.	3.86E+01	0.	5.03E+02
RB--86	0.	3.78E+06	0.	0.	0.	7.46E+05	0.	1.76E+05
SR--89	1.34E+09	0.	0.	0.	0.	5.00E+07	0.	3.84E+07
SR--90	5.47E+10	0.	0.	0.	0.	1.06E+09	0.	1.39E+10
Y---91	6.56E+05	0.	0.	0.	0.	8.71E+07	0.	1.75E+05
ZR--95	1.51E+05	4.02E+04	0.	2.32E+04	0.	4.91E+07	0.	3.47E+04
NB--95	1.20E+04	5.14E+03	0.	2.12E+03	0.	8.89E+06	0.	3.77E+03
RU-103	5.06E+05	0.	0.	5.27E+05	0.	1.33E+07	0.	2.04E+05
RU-106	2.97E+07	0.	0.	1.33E+07	0.	4.62E+08	0.	3.70E+06
AG110M	4.02E+05	3.72E+05	0.	7.30E+05	0.	1.52E+08	0.	2.21E+05
CD115M	0.	1.57E+06	0.	1.24E+06	0.	6.59E+07	0.	5.01E+04
SN-123	0.	0.	0.	0.	0.	0.	0.	0.
SN-126	2.41E+08	4.79E+06	1.40E+06	0.	2.12E+06	3.51E+08	0.	8.05E+06
SB-124	3.21E+06	6.06E+04	7.76E+03	0.	2.49E+06	9.09E+07	0.	1.27E+05
SB-125	3.52E+07	7.97E+06	8.20E+06	2.79E+07	6.23E+08	8.09E+07	0.	5.09E+05
TE127M	1.76E+07	6.06E+05	4.97E+06	6.81E+07	0.	1.02E+08	0.	2.24E+06
TE129M	3.48E+07	9.70E+06	1.11E+07	3.38E+07	0.	4.19E+07	0.	5.38E+05
I--131	2.44E+05	2.50E+05	8.14E+07	1.53E+05	0.	2.14E+04	0.	1.89E+05
I--133	0.	0.	0.	0.	0.	0.	0.	0.
XE131M	0.	0.	0.	0.	0.	0.	0.	0.
XE133M	0.	0.	0.	0.	0.	0.	0.	0.
XE-133	0.	0.	0.	0.	0.	0.	0.	0.
XE135M	9.06E-04	8.36E-04	0.	3.17E-04	9.53E-05	1.96E-05	0.	3.72E-04
XE-135	3.13E-02	2.89E-02	0.	1.09E-02	3.29E-03	6.75E-04	0.	1.28E-02
XE-137	2.48E+02	2.40E+02	0.	2.95E+01	2.82E+01	1.47E+00	0.	3.58E+01
XE-138	0.	0.	0.	0.	0.	0.	0.	0.
CS-134	5.84E+08	9.83E+08	0.	1.25E+08	1.03E+08	5.32E+06	0.	2.09E+08
CS-135	3.68E+05	1.45E+06	0.	8.07E+05	1.11E+05	1.65E+05	0.	1.04E+05
CS-137	9.33E+08	9.03E+08	0.	1.11E+08	1.06E+08	5.50E+06	0.	1.35E+08
BA-140	4.40E+06	4.08E+03	0.	4.62E+02	2.30E+03	8.35E+06	0.	2.58E+05
CE-141	2.07E+04	1.04E+04	0.	1.62E+03	0.	1.30E+07	0.	1.54E+03
CE-144	4.86E+06	1.52E+06	0.	2.73E+05	0.	3.95E+08	0.	2.59E+05

DOSE FACTORS FOR GASEOUS DISCHARGES
BASED ON 1 CI/YR RELEASE OF EACH ISOTOPE AND A VALUE OF UNITY FOR X/Q, DEPLETED X/Q AND RELATIVE DEPOSITION

PATHWAY - MEAT (CONTAMINATED FORAGE) AGE GROUP - CHILD

NUCLIDE	ORGAN DOSE (MREM)							
	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	SKIN	TOTAL BODY
H----3	0.	3.95E+00	3.95E+00	2.61E+00	3.95E+00	3.95E+00	0.	3.95E+00
C---14	3.13E+03	3.13E+03	3.13E+03	7.88E+02	3.13E+03	3.13E+03	0.	3.13E+03
P---32	5.05E+07	3.17E+06	0.	0.	0.	5.68E+06	0.	1.96E+06
AR--41	0.	0.	0.	0.	0.	0.	0.	0.
MN--54	0.	8.09E+04	0.	2.41E+04	0.	2.48E+05	0.	1.55E+04
FE--59	2.52E+06	5.99E+06	0.	0.	1.66E+06	1.98E+07	0.	2.20E+06
CO--58	0.	4.16E+05	0.	0.	0.	2.47E+06	0.	1.25E+06
CO--60	0.	1.59E+06	0.	0.	0.	8.80E+06	0.	4.77E+05
ZN--65	3.57E+06	1.13E+07	0.	7.57E+06	0.	7.13E+06	0.	5.12E+05
KR-83M	0.	0.	0.	0.	0.	0.	0.	0.
KR-85M	0.	0.	0.	0.	0.	0.	0.	0.
KR--85	0.	0.	0.	0.	0.	0.	0.	0.
KR--87	0.	4.23E-08	0.	0.	0.	1.98E-09	0.	1.47E-08
KR--88	0.	0.	0.	0.	0.	0.	0.	0.
KR--89	5.58E+02	0.	0.	0.	0.	2.08E+01	0.	1.60E+01
KR--90	9.43E+00	0.	0.	0.	0.	6.30E-01	0.	2.39E+00
RB--86	0.	5.02E+06	0.	0.	0.	9.89E+05	0.	2.34E+05
SR--89	1.27E+07	0.	0.	0.	0.	4.74E+05	0.	3.63E+05
SR--90	2.60E+08	0.	0.	0.	0.	1.74E+07	0.	6.59E+07
Y---91	4.38E+04	0.	0.	0.	0.	5.81E+06	0.	1.17E+03
ZR--95	1.08E+05	3.44E+04	0.	1.73E+04	0.	4.99E+07	0.	2.77E+04
NB--95	6.95E+04	2.97E+04	0.	1.22E+04	0.	3.13E+07	0.	2.18E+04
RU-103	3.73E+06	0.	0.	3.89E+06	0.	9.80E+07	0.	1.51E+06
RU-106	1.08E+08	0.	0.	4.82E+07	0.	1.68E+09	0.	1.34E+07
AG110M	6.20E+04	5.73E+04	0.	1.13E+05	0.	2.34E+07	0.	3.41E+04
CD115M	0.	1.42E+04	0.	1.13E+04	0.	5.96E+05	0.	4.53E+02
SN-123	0.	0.	0.	0.	0.	0.	0.	0.
SN-126	1.61E+08	3.19E+06	9.35E+05	0.	5.46E+04	5.34E+07	0.	4.60E+05
SB-124	1.84E+05	3.47E+03	4.45E+02	0.	1.43E+05	5.21E+06	0.	7.28E+04
SB-125	7.68E+06	2.03E+06	2.10E+05	7.15E+06	2.17E+07	9.04E+06	0.	1.04E+05
TE127M	1.29E+07	4.42E+06	3.63E+06	4.97E+07	0.	7.41E+07	0.	1.64E+05
TE129M	5.14E+07	1.43E+07	1.64E+07	5.00E+07	0.	6.19E+07	0.	7.96E+05
I--131	2.29E+05	2.35E+05	7.64E+07	1.44E+05	0.	2.01E+04	0.	1.77E+05
I--133	1.02E-02	1.25E-02	3.02E+00	7.35E-03	0.	5.08E-03	0.	4.92E-03
XE131M	0.	0.	0.	0.	0.	0.	0.	0.
XE133M	0.	0.	0.	0.	0.	0.	0.	0.
XE-133	0.	0.	0.	0.	0.	0.	0.	0.
XE135M	2.83E-05	2.61E-05	0.	9.90E-06	2.98E-06	6.11E-07	0.	1.15E-05
XE-135	9.77E-04	9.02E-04	0.	3.42E-04	1.03E-04	2.11E-05	0.	4.01E-04
XE-137	8.12E+00	7.86E+00	0.	9.65E-01	9.21E-01	4.79E-02	0.	1.17E+00
XE-138	0.	0.	0.	0.	0.	0.	0.	0.
CS-134	2.06E+07	3.47E+07	0.	4.42E+06	3.80E+06	1.88E+05	0.	7.38E+05
CS-136	1.25E+05	4.92E+05	0.	2.74E+05	3.75E+04	5.59E+04	0.	3.54E+05
CS-137	3.05E+07	2.95E+07	0.	3.63E+06	3.46E+06	1.80E+05	0.	4.40E+05
BA-140	1.24E+06	1.08E+03	0.	1.30E+02	0.46E+02	1.71E+05	0.	7.25E+04
CE-141	5.48E+02	2.74E+02	0.	4.23E+01	0.	3.44E+05	0.	4.08E+01
CE-144	5.57E+04	1.79E+04	0.	3.15E+03	0.	4.53E+06	0.	2.97E+03

DOSE FACTORS FOR GASEOUS DISCHARGES
BASED ON 1 CI/YR RELEASE OF EACH ISOTOPE AND A VALUE OF UNITY FOR X/Q, DEPLETED X/Q AND RELATIVE DEPOSITION

PATHWAY - MEAT (CONTAMINATED FEED) AGE GROUP - CHILD

NUCLIDE	ORGAN DOSE (MREM)							
	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	SKIN	TOTAL BODY
H----3	0.	3.89E+00	3.89E+00	2.57E+00	3.89E+00	3.89E+00	0.	3.89E+00
C---14	3.13E+03	3.13E+03	3.13E+03	7.88E+02	3.13E+03	3.13E+03	0.	3.13E+03
P---32	2.68E+05	1.68E+04	0.	0.	0.	3.02E+04	0.	1.04E+04
AR--41	0.	0.	0.	0.	0.	0.	0.	0.
MN--54	0.	3.06E+04	0.	9.10E+03	0.	9.36E+04	0.	5.84E+03
FE--59	2.70E+05	6.42E+05	0.	0.	1.78E+05	2.12E+06	0.	2.44E+05
CO--58	0.	7.50E+04	0.	0.	0.	4.51E+05	0.	2.29E+05
CO--60	0.	7.25E+05	0.	0.	0.	4.01E+06	0.	2.17E+05
ZN--65	1.44E+06	4.57E+06	0.	3.06E+06	0.	2.88E+06	0.	2.07E+05
KR-83M	0.	0.	0.	0.	0.	0.	0.	0.
KR-85M	0.	0.	0.	0.	0.	0.	0.	0.
KR--85	0.	0.	0.	0.	0.	0.	0.	0.
KR--87	0.	2.91E-08	0.	0.	0.	1.36E-09	0.	1.01E-08
KR--88	0.	0.	0.	0.	0.	0.	0.	0.
KR--89	7.02E+01	0.	0.	0.	0.	2.62E+00	0.	2.01E+00
KR--90	4.68E+00	0.	0.	0.	0.	3.12E-01	0.	1.19E+00
RB--86	0.	7.25E+04	0.	0.	0.	1.43E+04	0.	3.38E+04
SR--89	1.60E+06	0.	0.	0.	0.	5.97E+04	0.	4.58E+04
SR--90	1.29E+08	0.	0.	0.	0.	8.61E+06	0.	3.27E+07
Y---91	6.61E+03	0.	0.	0.	0.	8.78E+05	0.	1.76E+02
ZR--95	3.25E+04	1.20E+04	0.	5.45E+03	0.	1.91E+07	0.	9.19E+03
NB--95	4.94E+03	2.11E+03	0.	8.68E+02	0.	3.65E+06	0.	1.55E+03
RU-103	3.35E+05	0.	0.	3.50E+05	0.	8.80E+06	0.	1.36E+05
RU-106	4.27E+07	0.	0.	1.91E+07	0.	6.63E+08	0.	5.31E+06
AG110M	2.36E+04	2.18E+04	0.	4.28E+04	0.	8.89E+06	0.	1.30E+04
CD115M	0.	1.46E+03	0.	1.16E+03	0.	6.15E+04	0.	4.67E+01
SN-123	0.	0.	0.	0.	0.	0.	0.	0.
SN-126	7.51E+07	1.49E+06	4.36E+05	0.	3.19E+04	2.58E+07	0.	2.16E+06
SB-124	2.85E+04	5.37E+02	6.88E+01	0.	2.21E+04	8.06E+05	0.	1.13E+04
SB-125	7.56E+06	2.03E+06	2.10E+06	7.14E+06	9.48E+06	8.01E+06	0.	1.01E+05
TE127M	3.85E+06	1.32E+06	1.08E+06	1.48E+07	0.	2.22E+07	0.	4.90E+05
TE129M	3.81E+06	1.06E+06	1.22E+06	3.70E+06	0.	4.58E+06	0.	5.89E+05
I--131	3.77E+01	3.86E+01	1.26E+04	2.36E+01	0.	3.31E+00	0.	2.91E+01
I--133	0.	0.	0.	0.	0.	0.	0.	0.
XE131M	0.	0.	0.	0.	0.	0.	0.	0.
XE133M	0.	0.	0.	0.	0.	0.	0.	0.
XE-133	0.	0.	0.	0.	0.	0.	0.	0.
XE135M	1.43E-05	1.32E-05	0.	5.00E-06	1.50E-06	3.09E-07	0.	5.80E-06
XE-135	4.93E-04	4.55E-04	0.	1.72E-04	5.18E-05	1.06E-05	0.	2.02E-04
XE-137	3.90E+00	3.78E+00	0.	4.64E-01	4.43E-01	2.30E-02	0.	5.63E-01
XE-138	0.	0.	0.	0.	0.	0.	0.	0.
CS-134	8.81E+06	1.48E+07	0.	1.89E+06	1.65E+06	8.02E+04	0.	3.15E+05
CS-136	4.03E+02	1.59E+03	0.	8.85E+02	1.21E+02	1.81E+02	0.	1.15E+03
CS-137	1.47E+07	1.42E+07	0.	1.74E+06	1.66E+06	8.65E+04	0.	2.12E+05
BA-140	3.70E+03	3.26E+00	0.	3.89E-01	1.94E+00	5.11E+02	0.	2.17E+02
CE-141	3.38E+01	1.69E+01	0.	2.64E+00	0.	2.12E+04	0.	2.52E+00
CE-144	2.04E+04	6.37E+03	0.	1.15E+03	0.	1.66E+06	0.	1.08E+03

DOSE FACTORS FOR GASEOUS DISCHARGES
BASED ON 1 CI/YR RELEASE OF EACH ISOTOPE AND A VALUE OF UNITY FOR X/Q, DEPLETED X/Q AND RELATIVE DEPOSITION

PATHWAY - COWS MILK (CONTAMINATED FORAGE) AGE GROUP - CHILD

NUCLIDE	ORGAN DOSE (MREM)							
	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	SKIN	TOTAL BODY
H----3	0.	2.65E+01	2.65E+01	1.75E+01	2.65E+01	2.65E+01	0.	2.65E+01
C---14	9.76E+03	9.76E+03	9.76E+03	2.46E+03	9.76E+03	9.76E+03	0.	9.76E+03
P---32	5.29E+08	3.32E+07	0.	0.	0.	5.95E+07	0.	2.05E+07
AR--41	0.	0.	0.	0.	0.	0.	0.	0.
MN--54	0.	2.12E+05	0.	6.30E+04	0.	6.49E+05	0.	4.04E+04
FE--59	8.04E+05	1.91E+06	0.	0.	5.30E+05	6.30E+06	0.	7.26E+05
CO--58	0.	3.07E+05	0.	0.	0.	1.83E+06	0.	9.26E+05
CO--60	0.	9.91E+05	0.	0.	0.	5.48E+06	0.	2.97E+05
ZN--65	3.93E+07	1.25E+08	0.	8.34E+07	0.	7.85E+07	0.	5.64E+07
KR-83M	0.	0.	0.	0.	0.	0.	0.	0.
KR-85M	0.	0.	0.	0.	0.	0.	0.	0.
KR--85	0.	0.	0.	0.	0.	0.	0.	0.
KR--87	0.	3.30E-07	0.	0.	0.	1.54E-08	0.	1.15E-07
KR--88	0.	0.	0.	0.	0.	0.	0.	0.
KR--89	7.66E+03	0.	0.	0.	0.	2.86E+02	0.	2.19E+02
KR--90	1.01E+02	0.	0.	0.	0.	1.36E+00	0.	2.57E+01
RB--86	0.	7.61E+07	0.	0.	0.	1.50E+07	0.	3.55E+07
SR--89	1.74E+08	0.	0.	0.	0.	6.51E+06	0.	4.99E+05
SR--90	2.79E+09	0.	0.	0.	0.	3.74E+07	0.	7.08E+08
Y---91	9.46E+02	0.	0.	0.	0.	1.26E+05	0.	2.52E+01
ZR--95	1.95E+03	8.11E+02	0.	3.39E+02	0.	1.39E+06	0.	5.99E+02
NB--95	7.14E+03	3.04E+03	0.	1.23E+03	0.	5.27E+06	0.	2.24E+03
RU-103	1.03E+02	0.	0.	1.07E+02	0.	2.69E+03	0.	4.15E+01
RU-106	2.24E+03	0.	0.	1.00E+03	0.	3.49E+04	0.	2.79E+02
AG110M	1.54E+06	1.42E+06	0.	2.80E+06	0.	5.81E+08	0.	8.46E+05
CD115M	0.	3.45E+04	0.	2.74E+04	0.	1.45E+06	0.	1.10E+03
SN-123	0.	0.	0.	0.	0.	0.	0.	0.
SN-126	4.06E+07	8.05E+05	2.36E+05	0.	1.05E+05	2.56E+07	0.	1.21E+06
SB-124	6.84E+05	1.29E+04	1.65E+03	0.	5.31E+05	1.94E+07	0.	2.70E+05
SB-125	1.50E+06	2.40E+05	2.43E+05	8.23E+05	6.62E+07	6.43E+06	0.	2.42E+05
TE127M	1.51E+06	5.21E+05	4.26E+05	5.84E+06	0.	8.72E+06	0.	1.93E+05
TE129M	7.76E+06	2.16E+06	2.48E+06	7.55E+05	0.	9.34E+06	0.	1.20E+05
I--131	1.80E+07	1.84E+07	5.99E+09	1.13E+07	0.	1.58E+06	0.	1.39E+07
I--133	2.64E+05	3.25E+05	7.84E+07	1.91E+05	0.	1.32E+05	0.	1.28E+05
XE131M	0.	0.	0.	0.	0.	0.	0.	0.
XE133M	0.	0.	0.	0.	0.	0.	0.	0.
XE-133	0.	0.	0.	0.	0.	0.	0.	0.
XE135M	6.83E-04	6.31E-04	0.	2.39E-04	7.18E-05	1.48E-05	0.	2.80E-04
XE-135	2.36E-02	2.18E-02	0.	8.25E-03	2.48E-03	5.10E-04	0.	9.68E-03
XE-137	1.96E+02	1.90E+02	0.	2.33E+01	2.23E+01	1.16E+00	0.	2.83E+01
XE-138	0.	0.	0.	0.	0.	0.	0.	0.
CS-134	5.06E+08	8.51E+08	0.	1.08E+08	9.46E+07	4.61E+06	0.	1.81E+08
CS-136	7.86E+06	3.10E+07	0.	1.73E+07	2.37E+06	3.53E+06	0.	2.23E+07
CS-137	7.37E+08	7.14E+08	0.	8.77E+07	8.36E+07	4.35E+06	0.	1.06E+08
BA-140	3.30E+06	2.89E+03	0.	5.45E+02	1.72E+03	2.19E+05	0.	1.93E+05
CE-141	3.24E+03	1.62E+03	0.	2.53E+02	0.	2.03E+06	0.	2.41E+02
CE-144	2.34E+05	7.34E+04	0.	1.33E+04	0.	1.91E+07	0.	1.25E+04

DOSE FACTORS FOR GASEOUS DISCHARGES
BASED ON 1 CI/YR RELEASE OF EACH ISOTOPE AND A VALUE OF UNITY FOR X/Q, DEPLETED X/Q AND RELATIVE DEPOSITION

PATHWAY - COWS MILK (CONTAMINATED FEED) AGE GROUP - CHILD

NUCLIDE	ORGAN DOSE (MREM)							
	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	SKIN	TOTAL BODY
H----3	0.	2.62E+01	2.62E+01	1.73E+01	2.62E+01	2.62E+01	0.	2.62E+01
C---14	9.76E+03	9.76E+03	9.76E+03	2.46E+03	9.76E+03	9.76E+03	0.	9.76E+03
P---32	2.81E+06	1.76E+05	0.	0.	0.	3.16E+05	0.	1.09E+05
AR--41	0.	0.	0.	0.	0.	0.	0.	0.
MN--54	0.	8.00E+04	0.	2.38E+04	0.	2.45E+05	0.	1.53E+04
FE--59	8.61E+04	2.04E+05	0.	0.	5.68E+04	6.75E+05	0.	7.78E+04
CO--58	0.	5.60E+04	0.	0.	0.	3.33E+05	0.	1.69E+05
CO--60	0.	4.52E+05	0.	0.	0.	2.50E+06	0.	1.35E+05
ZN--65	1.59E+07	5.04E+07	0.	3.37E+07	0.	3.17E+07	0.	2.28E+07
KR-83M	0.	0.	0.	0.	0.	0.	0.	0.
KR-85M	0.	0.	0.	0.	0.	0.	0.	0.
KR--85	0.	0.	0.	0.	0.	0.	0.	0.
KR--87	0.	2.26E-07	0.	0.	0.	1.06E-08	0.	7.87E-08
KR--88	0.	0.	0.	0.	0.	0.	0.	0.
KR--89	9.65E+02	0.	0.	0.	0.	3.60E+01	0.	2.76E+01
KR--90	5.03E+01	0.	0.	0.	0.	6.73E-01	0.	1.27E+01
RB--86	0.	1.10E+06	0.	0.	0.	2.17E+05	0.	5.13E+05
SR--89	2.20E+07	0.	0.	0.	0.	8.20E+05	0.	6.29E+05
SR--90	1.39E+09	0.	0.	0.	0.	1.85E+07	0.	3.51E+08
Y---91	1.43E+02	0.	0.	0.	0.	1.90E+04	0.	3.81E+00
ZR--95	1.81E+03	7.73E+02	0.	3.19E+02	0.	1.33E+06	0.	5.68E+02
NB--95	5.07E+02	2.16E+02	0.	8.91E+01	0.	3.74E+05	0.	1.59E+02
RU-103	9.22E+00	0.	0.	9.61E+00	0.	2.42E+02	0.	3.73E+00
RU-106	8.88E+02	0.	0.	3.97E+02	0.	1.38E+04	0.	1.11E+02
AG110M	5.85E+05	5.41E+05	0.	1.06E+06	0.	2.21E+08	0.	3.22E+05
CD115M	0.	3.56E+03	0.	2.83E+03	0.	1.50E+05	0.	1.14E+02
SN-123	0.	0.	0.	0.	0.	0.	0.	0.
SN-126	1.91E+07	3.78E+05	1.11E+05	0.	1.01E+05	1.89E+07	0.	5.97E+05
SB-124	1.06E+05	1.99E+03	2.56E+02	0.	8.20E+04	2.99E+06	0.	4.18E+04
SB-125	1.20E+06	2.53E+05	2.59E+05	8.81E+05	2.90E+07	3.34E+06	0.	1.79E+05
TE127M	4.52E+05	1.55E+05	1.27E+05	1.75E+06	0.	2.61E+06	0.	5.77E+04
TE129M	5.74E+05	1.60E+05	1.83E+05	5.59E+05	0.	6.92E+05	0.	8.89E+04
I--131	2.96E+03	3.03E+03	9.85E+05	1.85E+03	0.	2.59E+02	0.	2.29E+03
I--133	0.	0.	0.	0.	0.	0.	0.	0.
XE131M	0.	0.	0.	0.	0.	0.	0.	0.
XE133M	0.	0.	0.	0.	0.	0.	0.	0.
XE-133	0.	0.	0.	0.	0.	0.	0.	0.
XE135M	3.45E-04	3.19E-04	0.	1.21E-04	3.63E-05	7.45E-06	0.	1.42E-04
XE-135	1.19E-02	1.10E-02	0.	4.15E-03	1.25E-03	2.57E-04	0.	4.88E-03
XE-137	9.44E+01	9.13E+01	0.	1.12E+01	1.07E+01	5.57E-01	0.	1.36E+01
XE-138	0.	0.	0.	0.	0.	0.	0.	0.
CS-134	2.16E+08	3.64E+08	0.	4.63E+07	4.04E+07	1.97E+06	0.	7.74E+07
CS-136	2.54E+04	1.00E+05	0.	5.58E+04	7.65E+03	1.14E+04	0.	7.22E+04
CS-137	3.55E+08	3.43E+08	0.	4.22E+07	4.02E+07	2.09E+06	0.	5.11E+07
BA-140	9.87E+03	8.67E+00	0.	1.04E+00	5.10E+00	6.75E+02	0.	5.80E+02
CE-141	2.00E+02	9.98E+01	0.	1.55E+01	0.	1.25E+05	0.	1.49E+01
CE-144	8.56E+04	2.68E+04	0.	4.84E+03	0.	6.96E+06	0.	4.50E+03

DOSE FACTORS FOR GASEOUS DISCHARGES
BASED ON 1 CI/YR RELEASE OF EACH ISOTOPE AND A VALUE OF UNITY FOR X/Q, DEPLETED X/Q AND RELATIVE DEPOSITION

PATHWAY - GOATS MILK (CONTAMINATED FORAGE) AGE GROUP - CHILD

NUCLIDE	ORGAN DOSE (MREM)							
	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	SKIN	TOTAL BODY
H-----3	0.	5.42E+01	5.42E+01	3.58E+01	5.42E+01	5.42E+01	0.	5.42E+01
C---14	9.76E+03	9.76E+03	9.76E+03	2.46E+03	9.76E+03	9.76E+03	0.	9.76E+03
P---32	6.83E+08	4.28E+07	0.	0.	0.	7.68E+07	0.	2.64E+07
AR--41	0.	0.	0.	0.	0.	0.	0.	0.
MN--54	0.	2.55E+04	0.	7.59E+03	0.	7.81E+04	0.	4.87E+03
FE--59	1.07E+04	2.54E+04	0.	0.	7.05E+03	8.38E+04	0.	9.66E+03
CO--58	0.	3.74E+04	0.	0.	0.	2.22E+05	0.	1.13E+05
CO--60	0.	1.19E+05	0.	0.	0.	6.58E+05	0.	3.57E+05
ZN--65	4.73E+06	1.50E+07	0.	1.01E+07	0.	9.46E+06	0.	6.80E+05
KR-83M	0.	0.	0.	0.	0.	0.	0.	0.
KR-85M	0.	0.	0.	0.	0.	0.	0.	0.
KR--85	0.	0.	0.	0.	0.	0.	0.	0.
KR--87	0.	3.96E-08	0.	0.	0.	1.85E-09	0.	1.38E-08
KR--88	0.	4.00E-10	0.	0.	0.	0.	0.	2.12E-10
KR--89	1.64E+04	0.	0.	0.	0.	6.13E+02	0.	4.70E+02
KR--90	2.13E+02	0.	0.	0.	0.	2.83E+00	0.	5.40E+01
RB--86	0.	9.66E+06	0.	0.	0.	1.90E+06	0.	4.50E+06
SR--89	3.74E+08	0.	0.	0.	0.	1.40E+07	0.	1.07E+07
SR--90	5.86E+09	0.	0.	0.	0.	7.81E+07	0.	1.49E+09
Y---91	1.16E+02	0.	0.	0.	0.	1.53E+04	0.	3.08E+00
ZR--95	2.10E+02	8.78E+01	0.	3.67E+01	0.	1.51E+05	0.	6.49E+01
NB--95	8.82E+02	3.76E+02	0.	1.55E+02	0.	6.51E+05	0.	2.76E+02
RU-103	1.26E+01	0.	0.	1.32E+01	0.	3.32E+02	0.	5.11E+00
RU-106	2.70E+02	0.	0.	1.21E+02	0.	4.20E+03	0.	3.35E+01
AG110M	1.85E+05	1.72E+05	0.	3.37E+05	0.	7.00E+07	0.	1.02E+05
CD115M	0.	4.25E+03	0.	3.37E+03	0.	1.79E+05	0.	1.36E+02
SN-123	7.23E-02	9.05E-04	9.55E-04	0.	0.	3.59E-02	0.	1.78E-03
SN-126	4.87E+06	9.66E+04	2.83E+04	0.	1.16E+04	2.94E+06	0.	1.45E+05
SB-124	8.35E+04	1.58E+03	2.02E+02	0.	6.48E+04	2.36E+06	0.	3.30E+04
SB-125	1.80E+05	2.90E+04	2.93E+04	9.96E+04	7.96E+06	7.74E+05	0.	2.92E+04
TE127M	1.03E+05	6.31E+04	5.16E+04	7.08E+05	0.	1.05E+06	0.	2.34E+04
TE129M	9.61E+05	2.68E+05	3.08E+05	9.34E+05	0.	1.16E+06	0.	1.48E+05
I--131	2.46E+07	2.52E+07	8.18E+09	1.54E+07	0.	2.15E+06	0.	1.90E+07
I--133	1.04E+06	1.28E+06	3.09E+08	7.51E+05	0.	5.19E+05	0.	5.05E+05
XE131M	0.	0.	0.	0.	0.	0.	0.	0.
XE133M	0.	0.	0.	0.	0.	0.	0.	0.
XE-133	0.	0.	0.	0.	0.	0.	0.	0.
XE135M	2.05E-03	1.89E-03	0.	7.17E-04	2.15E-04	4.43E-05	0.	8.41E-04
XE-135	7.08E-02	6.54E-02	0.	2.48E-02	7.44E-03	1.53E-03	0.	2.90E-02
XE-137	5.89E+02	5.70E+02	0.	7.00E+01	6.68E+01	3.47E+00	0.	8.49E+01
XE-138	7.56E-05	1.49E-04	0.	1.10E-04	1.09E-05	6.37E-10	0.	7.41E-05
CS-134	1.52E+09	2.56E+09	0.	3.25E+08	2.84E+08	1.58E+07	0.	5.44E+08
CS-136	2.55E+07	1.01E+08	0.	5.61E+07	7.09E+06	1.15E+07	0.	7.26E+07
CS-137	2.21E+09	2.14E+09	0.	2.63E+08	2.51E+08	1.30E+07	0.	3.19E+08
BA-140	4.29E+05	3.76E+02	0.	4.51E+01	2.28E+02	2.79E+04	0.	2.52E+04
CE-141	4.01E+02	2.81E+02	0.	3.14E+01	0.	2.52E+05	0.	2.99E+01
CE-144	2.82E+04	8.84E+03	0.	1.60E+03	0.	2.30E+06	0.	1.50E+03

DOSE FACTORS FOR GASEOUS DISCHARGES
BASED ON 1 CI/YR RELEASE OF EACH ISOTOPE AND A VALUE OF UNITY FOR X/Q, DEPLETED X/Q AND RELATIVE DEPOSITION

PATHWAY - GOATS MILK (CONTAMINATED FEED) AGE GROUP - CHILD

NUCLIDE	ORGAN DOSE (MREM)							
	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	SKIN	TOTAL BODY
H----3	0.	5.34E+01	5.34E+01	3.53E+01	5.34E+01	5.34E+01	0.	5.34E+01
C---14	9.76E+03	9.76E+03	9.76E+03	2.46E+03	9.76E+03	9.76E+03	0.	9.76E+03
P---32	3.62E+06	2.27E+05	0.	0.	0.	4.07E+05	0.	1.40E+05
AR--41	0.	0.	0.	0.	0.	0.	0.	0.
MN--54	0.	9.63E+03	0.	2.87E+03	0.	2.95E+04	0.	1.84E+03
FE--59	1.15E+03	2.72E+03	0.	0.	7.55E+02	8.98E+03	0.	1.04E+03
CO--58	0.	6.82E+03	0.	0.	0.	4.05E+04	0.	2.06E+04
CO--60	0.	5.42E+04	0.	0.	0.	3.00E+05	0.	1.63E+05
ZN--65	1.91E+06	6.07E+06	0.	4.05E+06	0.	3.82E+06	0.	2.75E+06
KR-83M	0.	0.	0.	0.	0.	0.	0.	0.
KR-85M	0.	0.	0.	0.	0.	0.	0.	0.
KR--85	0.	0.	0.	0.	0.	0.	0.	0.
KR--87	0.	2.72E-08	0.	0.	0.	1.27E-09	0.	9.45E-09
KR--88	0.	0.	0.	0.	0.	0.	0.	0.
KR--89	2.07E+03	0.	0.	0.	0.	7.72E+01	0.	5.92E+01
KR--90	1.06E+02	0.	0.	0.	0.	1.41E+00	0.	2.68E+01
RB--86	0.	1.40E+05	0.	0.	0.	2.75E+04	0.	6.51E+04
SR--89	4.71E+07	0.	0.	0.	0.	1.76E+06	0.	1.35E+06
SR--90	2.91E+09	0.	0.	0.	0.	3.87E+07	0.	7.37E+08
Y---91	1.75E+01	0.	0.	0.	0.	2.32E+03	0.	4.65E-01
ZR--95	2.20E+02	9.35E+01	0.	3.87E+01	0.	1.61E+05	0.	6.87E+01
NB--95	6.27E+01	2.67E+01	0.	1.10E+01	0.	4.63E+04	0.	1.96E+01
RU-103	1.14E+00	0.	0.	1.18E+00	0.	2.98E+01	0.	4.59E-01
RU-106	1.07E+02	0.	0.	4.78E+01	0.	1.66E+03	0.	1.33E+01
AG110M	7.05E+04	6.52E+04	0.	1.28E+05	0.	2.66E+07	0.	3.88E+04
CD115M	0.	4.38E+02	0.	3.47E+02	0.	1.84E+04	0.	1.40E+01
SN-123	0.	0.	0.	0.	0.	0.	0.	0.
SN-126	2.28E+06	4.54E+04	1.33E+04	0.	1.22E+04	2.28E+06	0.	7.17E+04
SB-124	1.29E+04	2.44E+02	3.12E+01	0.	1.00E+04	3.65E+05	0.	5.10E+03
SB-125	1.45E+05	3.08E+04	3.15E+04	1.07E+05	3.48E+06	4.02E+05	0.	2.17E+04
TE127M	5.48E+04	1.89E+04	1.54E+04	2.12E+05	0.	3.16E+05	0.	6.99E+03
TE129M	7.11E+04	1.98E+04	2.30E+04	6.91E+04	0.	8.56E+04	0.	1.10E+04
I--131	4.04E+03	4.14E+03	1.35E+06	2.53E+03	0.	3.54E+02	0.	3.12E+03
I--133	0.	0.	0.	0.	0.	0.	0.	0.
XE131M	0.	0.	0.	0.	0.	0.	0.	0.
XE133M	0.	0.	0.	0.	0.	0.	0.	0.
XE-133	0.	0.	0.	0.	0.	0.	0.	0.
XE135M	1.04E-03	9.55E-04	0.	3.62E-04	1.09E-04	2.24E-05	0.	4.25E-04
XE-135	3.57E-02	3.30E-02	0.	1.25E-02	3.75E-03	7.71E-04	0.	1.47E-02
XE-137	2.83E+02	2.74E+02	0.	3.37E+01	3.21E+01	1.67E+00	0.	4.08E+01
XE-138	0.	0.	0.	0.	0.	0.	0.	0.
CS-134	6.49E+08	1.09E+09	0.	1.39E+08	1.22E+08	5.91E+06	0.	2.33E+08
CS-136	8.26E+04	3.26E+05	0.	1.81E+05	2.49E+04	3.70E+04	0.	2.39E+05
CS-137	1.06E+09	1.03E+09	0.	1.27E+08	1.21E+08	6.27E+06	0.	1.53E+08
BA-140	1.28E+03	1.13E+00	0.	1.35E-01	6.72E-01	8.79E+01	0.	7.54E+01
CE-141	2.47E+01	1.24E+01	0.	1.93E+00	0.	1.55E+04	0.	1.04E+00
CE-144	1.03E+04	3.23E+03	0.	5.83E+02	0.	8.38E+05	0.	5.49E+02

DOSE FACTORS FOR GASEOUS DISCHARGES
BASED ON 1 CI/YR RELEASE OF EACH ISOTOPE AND A VALUE OF UNITY FOR X/Q, DEPLETED X/Q AND RELATIVE DEPOSITION

PATHWAY - INHALATION

AGE GROUP - INFANT

NUCLIDE	ORGAN DOSE (MREM)							
	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	SKIN	TOTAL BODY
H----3	0.	1.85E+01	1.85E+01	8.07E+00	1.85E+01	1.85E+01	0.	1.85E+01
C---14	2.17E+02	1.84E+02	1.84E+02	2.57E+01	1.84E+02	1.84E+02	0.	1.84E+02
P---32	9.94E+03	5.81E+02	0.	0.	0.	6.51E+02	0.	3.78E+02
AR--41	0.	0.	0.	0.	0.	0.	0.	0.
MN--54	0.	2.98E+02	0.	7.41E+01	1.05E+04	5.83E+02	0.	4.74E+01
FE--59	8.86E+01	2.09E+03	0.	0.	7.65E+03	1.42E+03	0.	7.95E+01
CO--58	0.	5.06E+00	0.	0.	3.78E+04	5.22E+02	0.	7.23E+00
CO--60	0.	3.62E+01	0.	0.	2.40E+05	1.41E+03	0.	5.05E+01
ZN--65	2.44E+02	7.77E+02	0.	5.19E+02	6.57E+03	4.03E+02	0.	3.51E+02
KR-83M	0.	0.	0.	0.	0.	0.	0.	0.
KR-85M	0.	0.	0.	0.	0.	0.	0.	0.
KR--85	0.	0.	0.	0.	0.	0.	0.	0.
KR--87	0.	0.	0.	0.	0.	0.	0.	0.
KR--88	0.	0.	0.	0.	0.	0.	0.	0.
KR--89	0.	0.	0.	0.	0.	0.	0.	0.
KR--90	0.	0.	0.	0.	0.	0.	0.	0.
RB--86	0.	1.02E+03	0.	0.	0.	1.25E+02	0.	4.45E+02
SR--89	1.86E+03	0.	0.	0.	9.94E+04	2.93E+03	0.	5.33E+01
SR--90	5.69E+05	0.	0.	0.	6.57E+05	5.96E+03	0.	3.47E+04
Y---91	2.57E+03	0.	0.	0.	1.13E+05	3.09E+03	0.	6.87E+01
ZR--95	4.66E+02	1.18E+02	0.	4.08E+02	7.77E+04	6.09E+02	0.	8.38E+01
NB--95	5.52E+01	2.48E+01	0.	5.83E+01	2.05E+04	5.22E+02	0.	1.45E+01
RU-103	7.29E+00	0.	0.	4.39E+01	2.43E+04	6.81E+02	0.	2.52E+00
RU-106	4.01E+02	0.	0.	1.01E+03	6.45E+05	7.59E+03	0.	4.92E+01
AG110M	8.13E+01	7.53E+01	0.	1.48E+02	3.49E+04	2.28E+03	0.	4.48E+01
CD115M	0.	1.48E+03	0.	1.19E+03	1.06E+04	2.89E+03	0.	4.79E+01
SN-123	1.34E+03	2.78E+01	2.78E+01	0.	1.55E+05	2.58E+03	0.	4.40E+01
SN-126	9.52E+03	2.52E+02	7.41E+01	0.	7.05E+04	9.58E+02	0.	3.62E+02
SB-124	2.35E+02	4.43E+00	5.69E-01	0.	1.87E+04	3.06E+03	0.	9.34E+01
SB-125	4.98E+02	5.37E+00	4.42E-01	0.	1.66E+04	7.59E+02	0.	1.00E+02
TE127M	9.52E+01	4.23E+01	2.48E+01	3.45E+02	7.23E+03	1.13E+03	0.	1.18E+01
TE129M	5.69E+01	2.49E+01	2.19E+01	2.75E+02	7.89E+04	3.15E+03	0.	8.85E+00
I--131	1.56E+03	1.84E+03	6.09E+05	4.62E+02	0.	4.62E+01	0.	1.08E+03
I--133	5.76E+02	8.31E+02	2.01E+05	1.95E+02	0.	9.82E+01	0.	2.52E+02
XE131M	0.	0.	0.	0.	0.	0.	0.	0.
XE133M	0.	0.	0.	0.	0.	0.	0.	0.
XE-133	0.	0.	0.	0.	0.	0.	0.	0.
XE135M	0.	0.	0.	0.	0.	0.	0.	0.
XE-135	0.	0.	0.	0.	0.	0.	0.	0.
XE-137	0.	0.	0.	0.	0.	0.	0.	0.
XE-138	0.	0.	0.	0.	0.	0.	0.	0.
CS-134	2.07E+04	3.55E+04	0.	2.17E+03	4.35E+03	5.90E+01	0.	3.15E+03
CS-136	2.95E+02	1.10E+03	0.	6.45E+02	9.04E+01	8.80E+01	0.	8.38E+02
CS-137	2.95E+04	3.15E+04	0.	1.68E+03	4.07E+03	5.69E+01	0.	1.90E+03
BA-140	2.45E+02	1.84E-01	0.	1.25E-01	7.05E+04	1.67E+02	0.	1.27E+01
CE-141	1.08E+02	6.69E+01	0.	4.72E+01	2.25E+04	8.06E+02	0.	7.77E+00
CE-144	2.01E+04	7.83E+03	0.	6.39E+03	5.45E+05	6.93E+03	0.	1.07E+03

DOSE FACTORS FOR GASEOUS DISCHARGES
BASED ON 1 CI/YR RELEASE OF EACH ISOTOPE AND A VALUE OF UNITY FOR X/Q, DEPLETED X/Q AND RELATIVE DEPOSITION

PATHWAY - GROUND PLANE DEPOSITION

AGE GROUP - INFANT

NUCLIDE	ORGAN DOSE (MREM)							
	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	SKIN	TOTAL BODY
H----3	0.	0.	0.	0.	0.	0.	0.	0.
C---14	0.	0.	0.	0.	0.	0.	0.	0.
P---32	0.	0.	0.	0.	0.	0.	0.	0.
AR--41	0.	0.	0.	0.	0.	0.	0.	0.
MN--54	4.39E+07	4.39E+07	4.39E+07	4.39E+07	4.39E+07	4.39E+07	5.14E+07	4.39E+07
FE--59	8.73E+06	8.73E+06	8.73E+06	8.73E+06	8.73E+06	8.73E+06	1.03E+07	8.73E+06
CO--58	1.21E+07	1.21E+07	1.21E+07	1.21E+07	1.21E+07	1.21E+07	1.41E+07	1.21E+07
CO--60	6.80E+08	6.80E+08	6.80E+08	6.80E+08	6.80E+08	6.80E+08	8.00E+08	6.80E+08
ZN--65	2.36E+07	2.36E+07	2.36E+07	2.36E+07	2.36E+07	2.36E+07	2.71E+07	2.36E+07
KR-83M	0.	0.	0.	0.	0.	0.	0.	0.
KR-85M	0.	0.	0.	0.	0.	0.	0.	0.
KR--85	0.	0.	0.	0.	0.	0.	0.	0.
KR--87	0.	0.	0.	0.	0.	0.	0.	0.
KR--88	9.90E+03	9.90E+03	9.90E+03	9.90E+03	9.90E+03	9.90E+03	1.13E+04	9.90E+03
KR--89	8.08E+02	8.08E+02	8.08E+02	8.08E+02	8.08E+02	8.08E+02	9.70E+02	8.08E+02
KR--90	6.16E-03	6.16E-03	6.16E-03	6.16E-03	6.16E-03	6.16E-03	7.29E-03	6.16E-03
RB--86	2.86E+05	2.86E+05	2.86E+05	2.86E+05	2.86E+05	2.86E+05	3.26E+05	2.86E+05
SR--89	6.87E+02	6.87E+02	6.87E+02	6.87E+02	6.87E+02	6.87E+02	7.97E+02	6.87E+02
SR--90	1.70E+05	1.70E+05	1.70E+05	1.70E+05	1.70E+05	1.70E+05	2.01E+05	1.70E+05
Y---91	3.43E+04	3.43E+04	3.43E+04	3.43E+04	3.43E+04	3.43E+04	3.86E+04	3.43E+04
ZR--95	1.59E+07	1.59E+07	1.59E+07	1.59E+07	1.59E+07	1.59E+07	1.86E+07	1.59E+07
NB--95	4.33E+06	4.33E+06	4.33E+06	4.33E+06	4.33E+06	4.33E+06	5.09E+06	4.33E+06
RU-103	3.49E+06	3.49E+06	3.49E+06	3.49E+06	3.49E+06	3.49E+06	4.07E+06	3.49E+06
RU-106	1.33E+07	1.33E+07	1.33E+07	1.33E+07	1.33E+07	1.33E+07	1.59E+07	1.33E+07
AG110M	1.13E+08	1.13E+08	1.13E+08	1.13E+08	1.13E+08	1.13E+08	1.32E+08	1.13E+08
CD115M	0.	0.	0.	0.	0.	0.	0.	0.
SN-123	0.	0.	0.	0.	0.	0.	4.35E+04	0.
SN-126	1.64E+09	1.64E+09	1.64E+09	1.64E+09	1.64E+09	1.64E+09	1.83E+09	1.64E+09
SB-124	1.90E+07	1.90E+07	1.90E+07	1.90E+07	1.90E+07	1.90E+07	2.19E+07	1.90E+07
SB-125	7.27E+07	7.27E+07	7.27E+07	7.27E+07	7.27E+07	7.27E+07	8.21E+07	7.27E+07
TE127M	2.79E+04	2.79E+04	2.79E+04	2.79E+04	2.79E+04	2.79E+04	3.09E+04	2.79E+04
TE129M	1.22E+06	1.22E+06	1.22E+06	1.22E+06	1.22E+06	1.22E+06	1.43E+06	1.22E+06
I--131	2.73E+05	2.73E+05	2.73E+05	2.73E+05	2.73E+05	2.73E+05	3.32E+05	2.73E+05
I--133	3.92E+04	3.92E+04	3.92E+04	3.92E+04	3.92E+04	3.92E+04	4.77E+04	3.92E+04
XE131M	0.	0.	0.	0.	0.	0.	0.	0.
XE133M	0.	0.	0.	0.	0.	0.	0.	0.
XE-133	0.	0.	0.	0.	0.	0.	0.	0.
XE135M	0.	0.	0.	0.	0.	0.	0.	0.
XE-135	0.	0.	0.	0.	0.	0.	0.	0.
XE-137	8.69E+01	8.69E+01	8.69E+01	8.69E+01	8.69E+01	8.69E+01	1.01E+02	8.69E+01
XE-138	6.01E+03	6.01E+03	6.01E+03	6.01E+03	6.01E+03	6.01E+03	6.87E+03	6.01E+03
CS-134	2.22E+08	2.22E+08	2.22E+08	2.22E+08	2.22E+08	2.22E+08	2.58E+08	2.22E+08
CS-136	4.73E+06	4.73E+06	4.73E+06	4.73E+06	4.73E+06	4.73E+06	5.30E+06	4.73E+06
CS-137	3.27E+08	3.27E+08	3.27E+08	3.27E+08	3.27E+08	3.27E+08	3.81E+08	3.27E+08
BA-140	5.30E+06	5.30E+06	5.30E+06	5.30E+06	5.30E+06	5.30E+06	6.02E+06	5.30E+06
CE-141	4.33E+05	4.33E+05	4.33E+05	4.33E+05	4.33E+05	4.33E+05	4.88E+05	4.33E+05

DOSE FACTORS FOR GASEOUS DISCHARGES
BASED ON 1 CI/YR RELEASE OF EACH ISOTOPE AND A VALUE OF UNITY FOR X/Q, DEPLETED X/Q AND RELATIVE DEPOSITION

PATHWAY - COWS MILK (CONTAMINATED FORAGE) AGE GROUP - INFANT

NUCLIDE	ORGAN DOSE (MREM)							
	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	SKIN	TOTAL BODY
H----3	0.	4.01E+01	4.01E+01	1.75E+01	4.01E+01	4.01E+01	0.	4.01E+01
C---14	2.08E+04	2.08E+04	2.08E+04	2.46E+03	2.08E+04	2.08E+04	0.	2.08E+04
P---32	5.29E+08	3.32E+07	0.	0.	0.	5.95E+07	0.	2.05E+07
AR--41	0.	0.	0.	0.	0.	0.	0.	0.
MN--54	0.	2.12E+05	0.	6.30E+04	0.	6.49E+05	0.	4.04E+04
FE--59	8.04E+05	1.91E+06	0.	0.	5.30E+05	6.30E+06	0.	7.26E+05
CO--58	0.	6.27E+05	0.	0.	0.	1.62E+06	0.	1.54E+06
CO--60	0.	2.05E+06	0.	0.	0.	5.06E+06	0.	4.91E+05
ZN--65	3.93E+07	1.25E+08	0.	8.34E+07	0.	7.85E+07	0.	5.64E+07
KR-83M	0.	0.	0.	0.	0.	0.	0.	0.
KR-85M	0.	0.	0.	0.	0.	0.	0.	0.
KR--85	0.	0.	0.	0.	0.	0.	0.	0.
KR--87	0.	3.30E-07	0.	0.	0.	1.54E-08	0.	1.15E-07
KR--88	0.	0.	0.	0.	0.	0.	0.	0.
KR--89	1.63E+04	0.	0.	0.	0.	3.04E+02	0.	4.67E+02
KR--90	1.40E+02	0.	0.	0.	0.	1.44E+00	0.	3.77E+01
RB--86	0.	7.61E+07	0.	0.	0.	1.50E+07	0.	3.55E+07
SR--89	3.70E+08	0.	0.	0.	0.	6.92E+06	0.	1.06E+07
SR--90	4.07E+09	0.	0.	0.	0.	3.96E+07	0.	1.04E+09
Y---91	2.02E+03	0.	0.	0.	0.	1.34E+05	0.	5.38E+01
ZR--95	3.87E+03	1.70E+03	0.	3.39E+02	0.	1.35E+06	0.	1.01E+03
NB--95	1.42E+04	6.40E+03	0.	1.26E+03	0.	5.12E+06	0.	3.77E+03
RU-103	2.13E+02	0.	0.	1.07E+02	0.	2.66E+03	0.	7.34E+01
RU-106	4.79E+03	0.	0.	1.00E+03	0.	3.72E+04	0.	5.88E+02
AG110M	1.54E+06	1.42E+06	0.	2.80E+06	0.	5.81E+08	0.	8.46E+05
CD115M	0.	3.45E+04	0.	2.74E+04	0.	1.45E+06	0.	1.10E+03
SN-123	0.	0.	0.	0.	0.	0.	0.	0.
SN-126	4.06E+07	8.05E+05	2.36E+05	0.	1.05E+05	2.56E+07	0.	1.21E+05
SB-124	6.84E+05	1.29E+04	1.65E+03	0.	5.31E+05	1.94E+07	0.	2.70E+05
SB-125	2.46E+06	6.25E+05	6.05E+05	8.23E+05	6.62E+07	6.48E+06	0.	3.72E+05
TE127M	1.62E+06	5.62E+05	5.22E+05	5.84E+05	0.	9.44E+06	0.	2.16E+05
TE129M	1.65E+07	5.06E+06	6.19E+06	7.55E+06	0.	9.92E+06	0.	2.51E+05
I--131	3.77E+07	4.49E+07	1.45E+10	1.13E+07	0.	1.69E+06	0.	2.63E+07
I--133	5.55E+05	8.11E+05	1.92E+08	1.91E+05	0.	1.44E+05	0.	2.46E+05
XE131M	0.	0.	0.	0.	0.	0.	0.	0.
XE133M	0.	0.	0.	0.	0.	0.	0.	0.
XE-133	0.	0.	0.	0.	0.	0.	0.	0.
XE135M	6.83E-04	6.31E-04	0.	2.39E-04	7.18E-05	1.48E-05	0.	2.80E-04
XE-135	2.36E-02	2.18E-02	0.	8.25E-03	2.48E-03	5.10E-04	0.	9.68E-03
XE-137	4.11E+02	4.60E+02	0.	2.33E+01	5.54E+01	1.19E+00	0.	2.64E+01
XE-138	0.	0.	0.	0.	0.	0.	0.	0.
CS-134	1.03E+09	1.86E+09	0.	1.08E+08	2.13E+08	4.43E+06	0.	1.57E+08
CS-136	7.86E+06	3.10E+07	0.	1.73E+07	2.37E+06	3.53E+06	0.	2.23E+07
CS-137	1.54E+09	1.73E+09	0.	8.77E+07	2.06E+08	4.47E+06	0.	9.92E+07
BA-140	6.94E+06	6.98E+03	0.	3.46E+02	4.27E+03	2.30E+05	0.	3.59E+05
CE-141	6.89E+03	4.23E+03	0.	2.53E+02	0.	2.05E+06	0.	4.98E+02
CE-144	4.92E+05	1.94E+05	0.	1.33E+04	0.	2.03E+07	0.	2.65E+04

DOSE FACTORS FOR GASEOUS DISCHARGES
BASED ON 1 CI/YR RELEASE OF EACH ISOTOPE AND A VALUE OF UNITY FOR X/Q, DEPLETED X/Q AND RELATIVE DEPOSITION

PATHWAY - COWS MILK (CONTAMINATED FEED) AGE GROUP - INFANT

NUCLIDE	ORGAN DOSE (MREM)							
	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	SKIN	TOTAL BODY
H----3	0.	3.96E+01	3.96E+01	1.73E+01	3.96E+01	3.96E+01	0.	3.96E+01
C---14	2.00E+04	2.08E+04	2.08E+04	2.45E+03	2.08E+04	2.08E+04	0.	2.08E+04
P---32	2.01E+06	1.76E+05	0.	0.	0.	3.16E+05	0.	1.09E+05
AR--41	0.	0.	0.	0.	0.	0.	0.	0.
MN--54	0.	8.00E+04	0.	2.38E+04	0.	2.45E+05	0.	1.53E+04
FE--59	8.61E+04	2.04E+05	0.	0.	5.68E+04	6.75E+05	0.	7.78E+04
CO--58	0.	1.14E+05	0.	0.	0.	2.96E+05	0.	2.80E+05
CO--60	0.	9.35E+05	0.	0.	0.	2.31E+06	0.	2.24E+05
ZN--65	1.59E+07	5.04E+07	0.	3.37E+07	0.	3.17E+07	0.	2.28E+07
KR-83M	0.	0.	0.	0.	0.	0.	0.	0.
KR-85M	0.	0.	0.	0.	0.	0.	0.	0.
KR--85	0.	0.	0.	0.	0.	0.	0.	0.
KR--87	0.	2.26E-07	0.	0.	0.	1.06E-08	0.	7.87E-08
KR--88	0.	0.	0.	0.	0.	0.	0.	0.
KR--89	2.05E+03	0.	0.	0.	0.	3.83E+01	0.	5.89E+01
KR--90	7.34E+01	0.	0.	0.	0.	7.14E-01	0.	1.87E+01
RB--86	0.	1.10E+06	0.	0.	0.	2.17E+05	0.	5.13E+05
SR--89	4.66E+07	0.	0.	0.	0.	8.72E+05	0.	1.34E+06
SR--90	2.02E+09	0.	0.	0.	0.	1.97E+07	0.	5.15E+08
Y---91	3.05E+02	0.	0.	0.	0.	2.02E+04	0.	8.13E+00
ZR--95	3.63E+03	1.63E+03	0.	3.19E+02	0.	1.30E+06	0.	9.58E+02
NB--95	1.01E+03	4.55E+02	0.	8.91E+01	0.	3.64E+05	0.	2.68E+02
RU-103	1.92E+01	0.	0.	9.61E+00	0.	2.39E+02	0.	6.59E+00
RU-106	1.90E+03	0.	0.	3.97E+02	0.	1.47E+04	0.	2.33E+02
AG110M	5.85E+05	5.41E+05	0.	1.06E+06	0.	2.21E+08	0.	3.22E+05
CD115M	0.	3.56E+03	0.	2.83E+03	0.	1.50E+05	0.	1.14E+02
SN-123	0.	0.	0.	0.	0.	0.	0.	0.
SN-126	1.91E+07	3.78E+05	1.11E+05	0.	1.01E+05	1.89E+07	0.	5.97E+05
SB-124	1.06E+05	1.99E+03	2.56E+02	0.	8.20E+04	2.99E+06	0.	4.18E+04
SB-125	2.24E+06	6.65E+05	6.46E+05	8.81E+05	2.90E+07	3.40E+06	0.	3.18E+05
TE127M	4.83E+05	1.68E+05	1.56E+05	1.75E+06	0.	2.83E+06	0.	6.45E+04
TE129M	1.22E+06	4.19E+05	4.59E+05	5.59E+05	0.	7.35E+05	0.	1.80E+05
I--131	6.20E+03	7.38E+03	2.38E+06	1.85E+03	0.	2.78E+02	0.	4.32E+03
I--133	0.	0.	0.	0.	0.	0.	0.	0.
XE131M	0.	0.	0.	0.	0.	0.	0.	0.
XE133M	0.	0.	0.	0.	0.	0.	0.	0.
XE-133	0.	0.	0.	0.	0.	0.	0.	0.
XE135M	3.45E-04	3.19E-04	0.	1.21E-04	3.63E-05	7.45E-06	0.	1.42E-04
XE-135	1.19E-02	1.10E-02	0.	4.15E-03	1.25E-03	2.57E-04	0.	4.88E-03
XE-137	1.98E+02	2.21E+02	0.	1.12E+01	2.67E+01	5.72E-01	0.	1.27E+01
XE-138	0.	0.	0.	0.	0.	0.	0.	0.
CS-134	4.42E+08	7.95E+08	0.	4.63E+07	9.09E+07	1.89E+06	0.	6.75E+07
CS-136	2.54E+04	1.00E+05	0.	5.58E+04	7.65E+03	1.14E+04	0.	7.22E+04
CS-137	7.42E+08	8.31E+08	0.	4.22E+07	1.00E+08	2.15E+06	0.	4.77E+07
BA-140	2.08E+04	2.09E+01	0.	1.04E+00	1.20E+01	7.08E+02	0.	1.07E+03
CE-141	4.25E+02	2.61E+02	0.	1.55E+01	0.	1.26E+05	0.	3.05E+01
CE-144	1.80E+05	7.08E+04	0.	4.84E+03	0.	7.40E+06	0.	9.68E+03

DOSE FACTORS FOR GASEOUS DISCHARGES
BASED ON 1 CI/YR RELEASE OF EACH ISOTOPE AND A VALUE OF UNITY FOR X/Q, DEPLETED X/Q AND RELATIVE DEPOSITION

PATHWAY - GOATS MILK (CONTAMINATED FORAGE) AGE GROUP - INFANT

NUCLIDE	ORGAN DOSE (MREM)							
	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	SKIN	TOTAL BODY
H----3	0.	8.19E+01	8.19E+01	3.58E+01	8.19E+01	8.19E+01	0.	8.19E+01
C---14	2.08E+04	2.08E+04	2.08E+04	2.46E+03	2.08E+04	2.08E+04	0.	2.08E+04
P---32	6.83E+08	4.28E+07	0.	0.	0.	7.68E+07	0.	2.64E+07
AR--41	0.	0.	0.	0.	0.	0.	0.	0.
MN--54	0.	2.55E+04	0.	7.59E+03	0.	7.81E+04	0.	4.87E+03
FE--59	1.07E+04	2.54E+04	0.	0.	7.05E+03	8.30E+04	0.	9.66E+03
CO--58	0.	7.64E+04	0.	0.	0.	1.98E+05	0.	1.07E+05
CO--60	0.	2.46E+05	0.	0.	0.	6.08E+05	0.	5.89E+05
ZN--65	4.73E+06	1.50E+07	0.	1.01E+07	0.	9.46E+06	0.	6.80E+06
KR-83M	0.	0.	0.	0.	0.	0.	0.	0.
KR-85M	0.	0.	0.	0.	0.	0.	0.	0.
KR--85	0.	0.	0.	0.	0.	0.	0.	0.
KR--87	0.	3.96E-08	0.	0.	0.	1.85E-09	0.	1.38E-08
KR--88	0.	4.00E-10	0.	0.	0.	0.	0.	2.12E-10
KR--89	3.49E+04	0.	0.	0.	0.	6.52E+02	0.	1.00E+03
KR--90	3.11E+02	0.	0.	0.	0.	3.01E+00	0.	7.92E+01
RB--86	0.	9.66E+06	0.	0.	0.	1.90E+06	0.	4.50E+05
SR--89	7.94E+08	0.	0.	0.	0.	1.48E+07	0.	2.28E+07
SR--90	8.56E+09	0.	0.	0.	0.	8.20E+07	0.	2.18E+09
Y---91	2.47E+02	0.	0.	0.	0.	1.63E+04	0.	6.58E+00
ZR--95	4.20E+02	1.85E+02	0.	3.67E+01	0.	1.46E+05	0.	1.10E+02
NB--95	1.76E+03	7.92E+02	0.	1.55E+02	0.	6.33E+05	0.	4.66E+02
RU-103	2.63E+01	0.	0.	1.32E+01	0.	3.28E+02	0.	9.04E+00
RU-106	5.76E+02	0.	0.	1.21E+02	0.	4.47E+03	0.	7.08E+01
AG110M	1.05E+05	1.72E+05	0.	3.37E+05	0.	7.00E+07	0.	1.02E+05
CD115M	0.	4.25E+03	0.	3.37E+03	0.	1.79E+05	0.	1.36E+02
SN-123	1.54E-01	2.39E-03	2.39E-03	0.	0.	3.81E-02	0.	3.79E-03
SN-126	4.87E+06	9.66E+04	2.83E+04	0.	1.16E+04	2.94E+06	0.	1.45E+05
SB-124	8.35E+04	1.58E+03	2.02E+02	0.	6.48E+04	2.36E+06	0.	3.30E+04
SB-125	2.98E+05	7.56E+04	7.32E+04	9.95E+04	7.96E+06	7.80E+05	0.	4.49E+04
TE127M	1.96E+05	6.80E+04	6.31E+04	7.08E+05	0.	1.14E+06	0.	2.61E+04
TE129M	2.04E+06	7.00E+05	7.67E+05	9.34E+05	0.	1.23E+06	0.	3.10E+05
I--131	5.15E+07	6.13E+07	1.97E+10	1.54E+07	0.	2.31E+06	0.	3.59E+07
I--133	2.19E+06	3.19E+06	7.55E+08	7.51E+05	0.	5.67E+05	0.	9.68E+05
XE131M	0.	0.	0.	0.	0.	0.	0.	0.
XE133M	0.	0.	0.	0.	0.	0.	0.	0.
XE--133	0.	0.	0.	0.	0.	0.	0.	0.
XE135M	2.05E-03	1.89E-03	0.	7.17E-04	2.16E-04	4.43E-05	0.	8.41E-04
XE-135	7.08E-02	6.54E-02	0.	2.48E-02	7.44E-03	1.53E-03	0.	2.90E-02
XE-137	1.23E+03	1.38E+03	0.	7.00E+01	1.66E+02	3.57E+00	0.	7.92E+01
XE-138	7.56E-05	1.49E-04	0.	1.10E-04	1.09E-05	6.37E-10	0.	7.41E-05
CS-134	3.11E+09	5.59E+09	0.	3.26E+08	6.39E+08	1.33E+07	0.	4.73E+08
CS-136	2.55E+07	1.01E+08	0.	5.61E+07	7.69E+06	1.15E+07	0.	7.26E+07
CS-137	4.63E+09	5.18E+09	0.	2.63E+08	6.25E+08	1.34E+07	0.	2.98E+08
BA-140	9.03E+05	9.09E+02	0.	4.51E+01	5.56E+02	2.93E+04	0.	4.67E+04
CE-141	8.54E+02	5.24E+02	0.	3.14E+01	0.	2.54E+05	0.	6.14E+01
CE-144	5.92E+04	2.34E+04	0.	1.60E+03	0.	2.44E+06	0.	3.19E+03

DOSE FACTORS FOR GASEOUS DISCHARGES
BASED ON 1 CI/YR RELEASE OF EACH ISOTOPE AND A VALUE OF UNITY FOR X/Q, DEPLETED X/Q AND RELATIVE DEPOSITION

PATHWAY - GOATS MILK (CONTAMINATED FEED) AGE GROUP - INFANT

NUCLIDE	ORGAN DOSE (MREM)							
	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	SKIN	TOTAL BODY
H----3	0.	8.08E+01	8.08E+01	3.53E+01	8.08E+01	8.08E+01	0.	8.08E+01
C---14	2.08E+04	2.08E+04	2.08E+04	2.46E+03	2.08E+04	2.08E+04	0.	2.08E+04
P---32	3.62E+06	2.27E+05	0.	0.	0.	4.07E+05	0.	1.40E+05
AR--41	0.	0.	0.	0.	0.	0.	0.	0.
MN--54	0.	9.63E+03	0.	2.87E+03	0.	2.95E+04	0.	1.84E+03
FE--59	1.15E+03	2.72E+03	0.	0.	7.55E+02	8.98E+03	0.	1.04E+03
CO--58	0.	1.39E+04	0.	0.	0.	3.61E+04	0.	3.41E+04
CO--60	0.	1.12E+05	0.	0.	0.	2.77E+05	0.	2.69E+05
ZN--65	1.91E+06	6.07E+06	0.	4.06E+06	0.	3.82E+06	0.	2.75E+06
KR-83M	0.	0.	0.	0.	0.	0.	0.	0.
KR-85M	0.	0.	0.	0.	0.	0.	0.	0.
KR--85	0.	0.	0.	0.	0.	0.	0.	0.
KR--87	0.	2.72E-08	0.	0.	0.	1.27E-09	0.	9.45E-09
KR--88	0.	0.	0.	0.	0.	0.	0.	0.
KR--89	4.39E+03	0.	0.	0.	0.	8.21E+01	0.	1.26E+02
KR--90	1.54E+02	0.	0.	0.	0.	1.49E+00	0.	3.93E+01
RB--86	0.	1.40E+05	0.	0.	0.	2.75E+04	0.	6.51E+04
SR--89	9.99E+07	0.	0.	0.	0.	1.87E+06	0.	2.87E+05
SR--90	4.24E+09	0.	0.	0.	0.	4.11E+07	0.	1.08E+09
Y---91	3.73E+01	0.	0.	0.	0.	2.47E+03	0.	9.93E-01
ZR--95	4.39E+02	1.97E+02	0.	3.87E+01	0.	1.57E+05	0.	1.16E+02
NB--95	1.25E+02	5.62E+01	0.	1.10E+01	0.	4.50E+04	0.	3.31E+01
RU-103	2.36E+00	0.	0.	1.18E+00	0.	2.95E+01	0.	8.12E-01
RU-106	2.20E+02	0.	0.	4.78E+01	0.	1.77E+03	0.	2.80E+01
AG110M	7.05E+04	6.52E+04	0.	1.28E+05	0.	2.66E+07	0.	3.88E+04
CD115M	0.	4.38E+02	0.	3.47E+02	0.	1.84E+04	0.	1.40E+01
SN-123	0.	0.	0.	0.	0.	0.	0.	0.
SN-126	2.28E+06	4.54E+04	1.33E+04	0.	1.22E+04	2.28E+06	0.	7.17E+04
SB-124	1.29E+04	2.44E+02	3.12E+01	0.	1.00E+04	3.65E+05	0.	5.10E+03
SB-125	2.72E+05	8.09E+04	7.87E+04	1.07E+05	3.48E+06	4.09E+05	0.	3.80E+04
TE127M	5.86E+04	2.04E+04	1.89E+04	2.12E+05	0.	3.42E+05	0.	7.82E+03
TE129M	1.51E+05	5.18E+04	5.73E+04	6.91E+04	0.	9.09E+04	0.	2.30E+04
I--131	8.47E+03	1.01E+04	3.25E+06	2.53E+03	0.	3.79E+02	0.	5.90E+03
I--133	0.	0.	0.	0.	0.	0.	0.	0.
XE131M	0.	0.	0.	0.	0.	0.	0.	0.
XE133M	0.	0.	0.	0.	0.	0.	0.	0.
XE-133	0.	0.	0.	0.	0.	0.	0.	0.
XE135M	1.04E-03	9.55E-04	0.	3.62E-04	1.09E-04	2.24E-05	0.	4.25E-04
XE-135	3.57E-02	3.30E-02	0.	1.25E-02	3.75E-03	7.71E-04	0.	1.47E-02
XE-137	5.93E+02	6.63E+02	0.	3.37E+01	8.00E+01	1.72E+00	0.	3.81E+01
XE-138	0.	0.	0.	0.	0.	0.	0.	0.
CS-134	1.33E+09	2.39E+09	0.	1.39E+08	2.73E+08	5.68E+06	0.	2.02E+08
CS-136	8.26E+04	3.26E+05	0.	1.81E+05	2.49E+04	3.70E+04	0.	2.35E+05
CS-137	2.23E+09	2.49E+09	0.	1.27E+08	3.00E+08	6.44E+06	0.	1.43E+08
BA-140	2.71E+03	2.72E+00	0.	1.35E-01	1.66E+00	9.22E+01	0.	1.40E+02
CE-141	5.26E+01	3.23E+01	0.	1.93E+00	0.	1.57E+04	0.	3.78E+00
CE-144	2.16E+04	8.53E+03	0.	5.83E+02	0.	8.91E+05	0.	1.17E+03

APPENDIX B

Technical Bases for Effective Dose Factors

Overview

The evaluation of doses due to releases of radioactive material to the atmosphere can be simplified by the use of effective dose transfer factors instead of using dose factors which are radionuclide specific. These effective factors, which are based on the typical radionuclide distribution in the releases, can be applied to the total radioactivity released to approximate the dose in the environment, ie, instead of having to sum the isotopic distribution multiplied by the isotope specific dose factor only a single multiplication times the total quantity of radioactive material released would be needed. This approach provides a reasonable estimate of the actual dose while eliminating the need for a detailed calculational technique.

Determination of Effective Dose Factors

The effective dose transfer factors are based on past operating data. The radioactive effluent distribution for the past years can be used to derive single effective factors by the following equations.

$$A\gamma_{s\ eff} = \sum_i A\gamma_i \cdot f_i \qquad \text{(B-1)}$$

where $A\gamma_{s\ eff}$ = the effective gamma-air dose factor due to stack releases of noble gases

$A\gamma_i$ = the gamma-air dose factor due to stack releases of each noble gas radionuclide i

f_i = the fraction of noble gas radioactivity constituted by radionuclide i

$$A\gamma_{v\,eff} = \sum_i A\gamma_{vi} \cdot f_i \qquad \text{(B-2)}$$

where $A\gamma_{v\,eff}$ = the effective gamma-air dose factor due to vent releases of all noble gases

$A\gamma_{vi}$ = the gamma-air dose factor due to vent releases of each noble gas radionuclide i

$$A\beta_{eff} = \sum_i A\beta_i \cdot f_i \qquad \text{(B-3)}$$

where $A\beta_{eff}$ = the effective beta-air dose factor due to either vent of stack releases of all noble gases

$A\beta_i$ = the beta air dose factor due to either vent or stack releases of each noble gas radionuclide i

To determine the appropriate effective factors to be used and to evaluate the degree of variability, the atmospheric radioactive effluents for the past 3 years have been evaluated.

Table B-1 presents the radionuclide distribution for stack and vent releases as measured by isotopic analysis of periodic grab samples from the respective effluent release points. Table B-2 presents the effective dose factors (gamma-air and beta-air) derived on the basis of the radionuclide distribution.

Except for the year 1981, the variability of the effective factors is minor. For 1981, Xe-138 contributes significantly to the derivation of the effective factors for stack releases. The Xe-138 contribution for the years 1979 and 1980 is not so significant. This increase in Xe-138 from 1981 results in a larger variability of the yearly values from the average than what is considered typical. Therefore, in order to assure adequate conservatism, the effective dose factors for stack releases will be based on the radionuclide distribution for the year 1981. Because this is considered an atypical distribution resulting in higher doses, use of these data will provide dose estimates which are conservative. As more data become available to further establish a typical radionuclide distribution, the effective dose factors for stack releases may be reevaluated.

To provide an additional degree of conservatism, a factor of 0.8 is introduced into the dose calculational process when the effective dose transfer factor is used. This added conservatism provides additional assurance that the evaluation of doses by the use of a single effective factor will not significantly underestimate any actual doses in the environment.

By evaluating doses using these effective dose factors, maximum allowable releases of noble gases for any calendar quarter may be determined. As discussed in Section 3.5.1, the maximum allowable releases based on the gamma-air effective dose factor have been determined to be 250,000 Ci/quarter for stack releases and 12,700 Ci/quarter for vent releases.

For the beta air effective dose factors, the releases of noble gases corresponding to the quarterly limit of 10 mrads corresponds to 307,000 Ci/quarter for stack releases and 29,600 Ci/quarter for vent releases. Comparing these valves for allowable releases with the values based on the gamma-air effective dose factors, it is demonstrated that the gamma-air doses are more restrictive that the beta-air doses. In other words, the doses calculated by using the gamma-air effective dose factors represent a larger fraction of the allowable dose than does the dose calculated by using the beta-air effective dose factors. Therefore, when using the effective dose factors for evaluating compliance with the quarterly dose limits of Technical Specification 3.15.3, only the gamma-air dose need be evaluated; compliance with the gamma-air dose limit represents a de facto compliance with the beta-air dose limit.

Reevaluation

The doses due to the gaseous effluents are evaluated by the more detailed calculational methods (ie, use of nuclide specific dose factors) on a yearly basis. At that time, a comparison can be made between the simplified method and the detailed method to assure the overall reasonableness of this limited analysis approach. If the comparison indicates that the radionuclide distribution has changed significantly, thereby causing the simplified method to underestimate the doses the value of the effective factors will need to be reexamined to assure the overall acceptability of this approach. However, this reexamination will only be needed if the doses as calculated by the detailed analysis exceed 50% of the design bases doses (ie, greater than 50% of 10 mrads gamma air dose or 20 mrads beta air dose).

Table B-1

Radionuclide Distribution of Stack and Vent Releases

Radionuclide	Fraction of Total Releases					
	Stack			Vent		
	1979	1980	1981	1979	1980	1981
Kr-85m	.11	.05	.09	.02	--	--
Kr-87	.01	--	.02	--	.01	--
Kr-88	.07	.04	.08	--	--	--
Xe-133	.76	.82	.45	.24	.24	.14
Xe-135	.01	.02	.03	.72	.50	.59
Xe-135m	--	.02	.08	.02	.22	.21
Xe-138	.02	.06	.25	--	.03	.05

Table B-2

Effective Dose Factors

Noble Gases-Air Doses

Year	Stack Releases		Vent Releases	
	Gamma-Air Effective Dose Factor $A\gamma_{s\ eff}$ (mrad/uCi)	Beta-Air Effective Dose Factor $A\beta_{s\ eff}$ $\left(\frac{\text{mrad}}{\text{uCi sec/m}^3}\right)$	Gamma-Air Effective Dose Factor $A\gamma_{v\ eff}$ $\left(\frac{\text{mrad}}{\text{uCi sec/m}^3}\right)$	Beta-Air Effective Dose Factor $A\beta_{v\ eff}$ $\left(\frac{\text{mrad}}{\text{uCi sec/m}^3}\right)$
1979	7.0×10^{-12}	5.9×10^{-5}	5.0×10^{-5}	6.5×10^{-5}
1980	6.7×10^{-12}	5.3×10^{-5}	6.7×10^{-5}	6.0×10^{-5}
1981	1.6×10^{-11}	9.3×10^{-5}	6.4×10^{-5}	6.3×10^{-5}
Avg.	9.9×10^{-12}	6.8×10^{-5}	6.4×10^{-5}	6.3×10^{-5}

APPENDIX C

Reference Atmospheric Dispersion and Deposition Factors for Duane Arnold Energy Center

Annual Averaged Atmospheric Dispersion and Deposition to DAEC Site Boundaries (Reference Meteorology)

Sector	Distance (meters)	Stack Release			Vent Release		
		X/Q (sec/m^3)	Depleted X/Q (sec/m^3)	D/Q (m^{-2})	X/Q (sec/m^3)	Depleted X/Q (sec/m^3)	D/Q (m^{-2})
N	1176	2.7E-7	2.6E-7	1.4E-8	3.3E-6	3.2E-6	3.1E-8
NNE	1203	1.2E-7	1.1E-7	9.0E-9	7.5E-7	7.1E-7	1.4E-8
NE	695	1.3E-7	1.3E-7	1.1E-8	5.3E-7	4.9E-7	1.8E-8
ENE	642	7.7E-8	7.6E-8	6.1E-9	3.9E-7	3.6E-7	1.4E-8
E	535	2.1E-7	2.0E-7	1.4E-8	1.3E-6	1.2E-6	3.9E-8
ESE	455	1.1E-7	1.1E-7	9.3E-9	9.9E-7	9.0E-7	3.4E-8
SE	588	1.4E-7	1.3E-7	1.1E-8	9.5E-7	9.0E-7	3.6E-8
SSE	481	2.0E-7	2.0E-7	1.7E-8	1.3E-6	1.2E-6	5.1E-8
S	455	8.8E-8	8.7E-8	7.5E-9	7.5E-7	6.8E-7	2.6E-8
SSW	535	4.2E-8	4.1E-8	3.2E-9	4.4E-7	3.9E-7	1.6E-8
SW	668	2.3E-8	2.2E-8	1.7E-9	4.3E-7	4.0E-7	1.3E-8
WSW	749	2.7E-8	2.6E-8	2.0E-9	4.5E-7	4.2E-7	1.1E-8
W	668	4.1E-8	4.0E-8	3.1E-9	5.4E-7	5.1E-7	1.4E-8
WNW	722	6.0E-8	5.8E-8	5.2E-9	8.6E-7	8.0E-7	2.1E-8
NW	936	9.7E-8	9.3E-8	6.4E-9	1.3E-6	1.2E-6	1.7E-8
NNW	1257	2.8E-7	2.7E-7	9.1E-9	4.3E-6	4.0E-6	2.1E-8

Table

ATMOSPHERIC DISPERSION FACTORS FOR-DUANE ARNOLD VF[illegible]K SEASON-ANNUAL REQ-DX-2 3YR

RUN TYPE- X/Q SEC/M3 DISTANCE (METERS)

IN DIRECTION SECTOR	455	2413	4022	5631	7240	12067	24135	40225	56315	72405
N	2.99E-07	2.78E-07	1.48E-07	1.01E-07	1.04E-07	5.08E-08	1.59E-08	8.39E-09	5.56E-09	4.06E-09
NNE	2.25E-07	9.84E-08	8.51E-08	6.39E-08	5.02E-08	3.44E-08	1.09E-08	5.80E-09	3.86E-09	2.84E-09
NE	1.60E-07	8.54E-08	6.30E-08	5.01E-08	3.64E-08	2.88E-08	9.08E-09	4.77E-09	3.17E-09	2.33E-09
ENE	9.00E-08	1.40E-07	6.66E-08	4.13E-08	3.04E-08	1.84E-08	6.42E-09	3.61E-09	2.46E-09	1.84E-09
E	2.19E-07	1.51E-07	9.50E-08	5.75E-08	4.18E-08	2.01E-08	6.90E-09	3.85E-09	2.61E-09	1.95E-09
ESE	1.10E-07	1.07E-07	9.39E-08	5.41E-08	4.08E-08	2.46E-08	8.44E-09	4.69E-09	3.18E-09	2.37E-09
SE	1.52E-07	1.23E-07	7.45E-08	4.80E-08	3.54E-08	2.49E-08	8.32E-09	4.59E-09	3.09E-09	2.29E-09
SSE	2.04E-07	1.05E-07	6.04E-08	4.70E-08	3.69E-08	3.04E-08	1.04E-08	5.81E-09	3.94E-09	2.93E-09
S	8.87E-08	7.16E-08	4.71E-08	3.28E-08	3.20E-08	1.99E-08	6.92E-09	3.92E-09	2.67E-09	1.99E-09
SSW	4.04E-08	6.66E-08	4.35E-08	2.95E-08	2.88E-08	1.95E-08	6.40E-09	3.47E-09	2.32E-09	1.70E-09
SW	2.16E-08	6.74E-08	4.75E-08	3.47E-08	2.54E-08	1.79E-08	5.73E-09	3.07E-09	2.04E-09	1.49E-09
WSW	2.08E-08	7.58E-08	4.75E-08	3.34E-08	2.53E-08	1.70E-08	5.33E-09	2.81E-09	1.86E-09	1.35E-09
W	3.31E-08	9.49E-08	5.44E-08	5.40E-08	3.71E-08	1.54E-08	4.76E-09	2.50E-09	1.63E-09	1.18E-09
WNW	5.64E-08	1.41E-07	9.87E-08	5.78E-08	4.42E-08	2.58E-08	7.78E-09	4.00E-09	2.61E-09	1.89E-09
NW	1.12E-07	2.33E-07	1.17E-07	6.89E-08	5.71E-08	3.17E-08	9.73E-09	5.04E-09	3.31E-09	2.41E-09
NNW	2.24E-07	2.40E-07	1.19E-07	7.29E-08	5.26E-08	4.26E-08	1.29E-08	6.61E-09	4.35E-09	3.17E-09

RUN TYPE- DEPLETED X/Q SEC/M3 DISTANCE (METERS)

IN DIRECTION SECTOR	455	2413	4022	5631	7240	12067	24135	40225	56315	72405
N	2.94E-07	2.67E-07	1.41E-07	9.47E-08	9.64E-08	4.56E-08	1.31E-08	6.18E-09	3.75E-09	2.56E-09
NNE	2.21E-07	9.41E-08	8.06E-08	6.00E-08	4.68E-08	3.09E-08	9.03E-09	4.33E-09	2.65E-09	1.82E-09
NE	1.58E-07	8.17E-08	5.96E-08	4.71E-08	3.40E-08	2.58E-08	7.26E-09	3.32E-09	1.96E-09	1.32E-09
ENE	8.87E-08	1.34E-07	6.32E-08	3.90E-08	2.86E-08	1.71E-08	5.70E-09	3.04E-09	1.99E-09	1.43E-09
E	2.14E-07	1.45E-07	8.96E-08	5.40E-08	3.91E-08	1.86E-08	6.16E-09	3.31E-09	2.17E-09	1.57E-09
ESE	1.08E-07	1.02E-07	8.81E-08	5.24E-08	3.78E-08	2.24E-08	7.22E-09	3.73E-09	2.38E-09	1.69E-09
SE	1.50E-07	1.18E-07	7.04E-08	4.49E-08	3.28E-08	2.27E-08	7.34E-09	3.90E-09	2.55E-09	1.83E-09
SSE	2.01E-07	1.01E-07	6.58E-08	4.40E-08	3.41E-08	2.76E-08	9.16E-09	4.98E-09	3.29E-09	2.39E-09
S	8.74E-08	6.92E-08	4.49E-08	3.09E-08	2.96E-08	1.83E-08	6.29E-09	3.55E-09	2.40E-09	1.76E-09
SSW	3.97E-08	6.46E-08	4.15E-08	2.77E-08	2.64E-08	1.74E-08	5.45E-09	2.80E-09	1.79E-09	1.27E-09
SW	2.12E-08	6.55E-08	4.52E-08	3.23E-08	2.34E-08	1.59E-08	4.90E-09	2.52E-09	1.62E-09	1.15E-09
WSW	2.05E-08	7.34E-08	4.50E-08	3.10E-08	2.31E-08	1.48E-08	4.40E-09	2.19E-09	1.37E-09	9.61E-10
W	3.25E-08	9.14E-08	5.31E-08	4.89E-08	3.32E-08	1.35E-08	3.99E-09	2.01E-09	1.27E-09	8.95E-10
WNW	5.55E-08	1.35E-07	9.22E-08	5.31E-08	4.00E-08	2.21E-08	5.99E-09	2.71E-09	1.59E-09	1.06E-09
NW	1.10E-07	2.23E-07	1.10E-07	6.40E-08	5.22E-08	2.77E-08	7.64E-09	3.46E-09	2.04E-09	1.36E-09
NNW	2.19E-07	2.30E-07	1.12E-07	6.85E-08	4.90E-08	3.66E-08	9.75E-09	4.27E-09	2.46E-09	1.62E-09

RUN TYPE- DEPOSITION D/Q M-2 DISTANCE (METERS)

IN DIRECTION SECTOR	455	2413	4022	5631	7240	12067	24135	40225	56315	72405
N	2.20E-08	5.59E-09	1.78E-09	8.52E-10	5.28E-10	2.07E-10	5.52E-11	2.68E-11	1.72E-11	1.14E-11
NNE	1.83E-08	3.47E-09	1.24E-09	5.96E-10	3.68E-10	1.36E-10	3.50E-11	1.68E-11	1.07E-11	7.14E-12
NE	1.34E-08	2.52E-09	8.44E-10	4.02E-10	2.47E-10	1.22E-10	3.63E-11	1.53E-11	8.71E-12	5.41E-12
ENE	7.17E-09	1.78E-09	5.22E-10	2.39E-10	1.46E-10	4.78E-11	1.10E-11	5.20E-12	3.51E-12	2.53E-12
E	1.54E-08	2.87E-09	8.80E-10	4.00E-10	2.42E-10	7.88E-11	1.77E-11	7.95E-12	5.13E-12	3.64E-12
ESE	9.33E-09	2.86E-09	1.02E-09	4.65E-10	2.82E-10	9.46E-11	2.22E-11	1.04E-11	6.80E-12	4.64E-12
SE	1.25E-08	3.85E-09	1.31E-09	6.31E-10	3.90E-10	1.27E-10	2.78E-11	1.21E-11	7.61E-12	5.32E-12
SSE	1.72E-08	4.33E-09	1.57E-09	7.81E-10	4.87E-10	1.63E-10	3.55E-11	1.51E-11	9.30E-12	6.43E-12
S	7.53E-09	2.30E-09	8.47E-10	4.27E-10	2.75E-10	9.20E-11	1.99E-11	8.21E-12	4.88E-12	3.41E-12
SSW	3.35E-09	1.63E-09	6.23E-10	3.18E-10	2.09E-10	6.74E-11	1.44E-11	6.17E-12	3.92E-12	2.72E-12
SW	1.85E-09	1.55E-09	6.18E-10	3.22E-10	2.01E-10	6.63E-11	1.38E-11	5.57E-12	3.39E-12	2.33E-12
WSW	2.06E-09	1.56E-09	5.97E-10	3.09E-10	1.94E-10	6.34E-11	1.33E-11	5.51E-12	3.41E-12	2.32E-12
W	3.33E-09	2.01E-09	7.44E-10	4.01E-10	2.44E-10	7.65E-11	1.60E-11	6.51E-12	3.92E-12	2.69E-12
WNW	5.73E-09	3.14E-09	1.19E-09	5.63E-10	3.51E-10	1.44E-10	3.81E-11	1.52E-11	8.55E-12	5.22E-12
NW	[illegible]	3.56E-09	1.14E-09	5.32E-10	3.24E-10	1.54E-10	4.44E-11	1.83E-11	1.03E-11	6.32E-12
NNW	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	8.10E-12

Table

ATMOSPHERIC DISPERSION FACTORS FOR-DUANE ARNOLD VENT[illegible]R BUILDING SEASON-ANNUAL REQ-DX-4 3YR JOINT

RUN TYPE- X/Q SEC/M3

IN SECTION SECTOR	DISTANCE (METERS) 455	2413	4022	5631	7240	12067	24135	40225	56315	72405
N	1.74E-06	2.12E-06	9.19E-07	6.20E-07	7.44E-07	3.17E-07	9.29E-08	4.66E-08	3.07E-08	2.25E-08
NNE	1.16E-06	5.33E-07	4.12E-07	3.41E-07	3.00E-07	2.21E-07	6.62E-08	3.34E-08	2.21E-08	1.63E-08
NE	7.84E-07	4.59E-07	3.06E-07	3.02E-07	2.25E-07	1.75E-07	5.22E-08	2.62E-08	1.74E-08	1.28E-08
ENE	5.44E-07	1.02E-06	4.17E-07	2.44E-07	1.73E-07	8.95E-08	2.73E-08	1.40E-08	9.28E-09	6.85E-09
E	1.28E-06	8.77E-07	4.86E-07	2.67E-07	1.81E-07	7.42E-08	2.23E-08	1.14E-08	7.54E-09	5.54E-09
ESE	9.79E-07	5.60E-07	3.90E-07	2.10E-07	1.41E-07	6.18E-08	1.80E-08	8.98E-09	5.87E-09	4.27E-09
SE	1.27E-06	7.06E-07	3.08E-07	1.74E-07	1.21E-07	7.09E-08	2.06E-08	1.03E-08	6.73E-09	4.87E-09
SSE	1.40E-06	4.84E-07	2.21E-07	1.28E-07	9.27E-08	6.31E-08	1.84E-08	9.27E-09	6.04E-09	4.37E-09
S	7.47E-07	3.80E-07	1.80E-07	1.10E-07	1.04E-07	5.63E-08	1.68E-08	8.57E-09	5.61E-09	4.08E-09
SSW	5.05E-07	3.95E-07	1.98E-07	1.26E-07	1.49E-07	1.09E-07	3.23E-08	1.63E-08	1.08E-08	7.91E-09
SW	4.09E-07	5.07E-07	2.72E-07	1.98E-07	1.48E-07	1.69E-07	5.21E-08	2.68E-08	1.78E-08	1.32E-08
WSW	3.40E-07	4.47E-07	2.11E-07	1.51E-07	1.32E-07	2.04E-07	6.40E-08	3.31E-08	2.21E-08	1.64E-08
W	4.75E-07	6.17E-07	2.96E-07	4.67E-07	3.29E-07	1.46E-07	4.62E-08	2.42E-08	1.62E-08	1.20E-08
WNW	7.46E-07	8.58E-07	5.10E-07	2.98E-07	2.60E-07	1.58E-07	4.61E-08	2.30E-08	1.51E-08	1.10E-08
NW	9.54E-07	1.62E-06	7.25E-07	4.16E-07	3.72E-07	1.77E-07	5.16E-08	2.57E-08	1.69E-08	1.23E-08
NNW	1.77E-06	2.24E-06	9.34E-07	5.49E-07	3.92E-07	2.68E-07	7.77E-08	3.87E-08	2.54E-08	1.86E-08

RUN TYPE- DEPLETED X/Q SEC/M3

IN SECTION SECTOR	DISTANCE (METERS) 455	2413	4022	5631	7240	12067	24135	40225	56315	72405
N	1.62E-06	2.04E-06	8.82E-07	5.93E-07	6.15E-07	2.13E-07	5.33E-08	2.25E-08	1.29E-08	8.48E-09
NNE	1.08E-06	5.08E-07	3.93E-07	3.27E-07	2.86E-07	1.52E-07	3.88E-08	1.65E-08	9.49E-09	6.27E-09
NE	7.36E-07	4.36E-07	2.92E-07	2.90E-07	2.14E-07	1.10E-07	2.76E-08	1.16E-08	6.71E-09	4.44E-09
ENE	5.12E-07	9.56E-07	3.92E-07	2.29E-07	1.60E-07	6.94E-08	1.83E-08	7.92E-09	4.56E-09	3.02E-09
E	1.20E-06	8.26E-07	4.33E-07	2.35E-07	1.57E-07	5.87E-08	1.54E-08	6.64E-09	3.81E-09	2.51E-09
ESE	9.03E-07	5.22E-07	3.40E-07	1.81E-07	1.19E-07	4.23E-08	1.05E-08	4.43E-09	2.52E-09	1.65E-09
SE	1.17E-06	6.60E-07	2.86E-07	1.61E-07	1.11E-07	5.38E-08	1.35E-08	5.77E-09	3.28E-09	2.13E-09
SSE	1.28E-06	4.51E-07	2.04E-07	1.17E-07	8.36E-08	4.78E-08	1.22E-08	5.21E-09	2.96E-09	1.93E-09
S	6.86E-07	3.59E-07	1.69E-07	1.02E-07	9.50E-08	4.69E-08	1.24E-08	5.44E-09	3.15E-09	2.08E-09
SSW	4.65E-07	3.76E-07	1.87E-07	1.19E-07	1.41E-07	8.09E-08	2.07E-08	8.85E-09	5.08E-09	3.34E-09
SW	3.77E-07	4.83E-07	2.57E-07	1.86E-07	1.39E-07	1.34E-07	3.60E-08	1.57E-08	9.07E-09	6.01E-09
WSW	3.16E-07	4.24E-07	1.97E-07	1.40E-07	1.23E-07	1.60E-07	4.34E-08	1.89E-08	1.10E-08	7.31E-09
W	4.43E-07	5.85E-07	2.78E-07	4.27E-07	2.98E-07	1.22E-07	3.40E-08	1.51E-08	8.78E-09	5.84E-09
WNW	6.89E-07	8.04E-07	4.73E-07	2.76E-07	2.36E-07	1.01E-07	2.49E-08	1.04E-08	5.97E-09	3.91E-09
NW	8.99E-07	1.54E-06	6.83E-07	3.91E-07	3.23E-07	1.13E-07	2.78E-08	1.17E-08	6.67E-09	4.37E-09
NNW	1.67E-06	2.16E-06	9.01E-07	5.29E-07	3.75E-07	1.60E-07	3.88E-08	1.62E-08	9.30E-09	6.10E-09

RUN TYPE- DEPOSITION D/Q M-2

IN SECTION SECTOR	DISTANCE (METERS) 455	2413	4022	5631	7240	12067	24135	40225	56315	72405
N	6.09E-08	7.50E-09	2.03E-09	9.87E-10	9.99E-10	4.05E-10	8.71E-11	3.22E-11	1.64E-11	1.01E-11
NNE	4.52E-08	4.30E-09	1.27E-09	6.00E-10	4.12E-10	2.32E-10	5.04E-11	1.86E-11	9.47E-12	5.84E-12
NE	3.00E-08	3.11E-09	8.88E-10	4.52E-10	2.89E-10	1.60E-10	3.33E-11	1.23E-11	6.22E-12	3.86E-12
ENE	2.15E-08	2.55E-09	7.03E-10	3.51E-10	2.30E-10	1.06E-10	2.53E-11	9.51E-12	4.92E-12	3.01E-12
E	4.51E-08	3.43E-09	1.06E-09	5.28E-10	3.38E-10	1.30E-10	3.11E-11	1.17E-11	6.08E-12	3.72E-12
ESE	3.47E-08	4.18E-09	1.35E-09	6.59E-10	4.13E-10	1.62E-10	3.46E-11	1.28E-11	6.52E-12	4.03E-12
SE	4.75E-08	5.70E-09	1.58E-09	7.13E-10	4.24E-10	2.13E-10	4.91E-11	1.84E-11	9.57E-12	5.88E-12
SSE	5.37E-08	5.93E-09	1.75E-09	8.04E-10	4.85E-10	2.20E-10	5.01E-11	1.89E-11	9.84E-12	6.06E-12
S	2.61E-08	3.40E-09	1.01E-09	4.69E-10	2.85E-10	1.38E-10	3.53E-11	1.36E-11	7.24E-12	4.41E-12
SSW	1.76E-08	2.69E-09	8.03E-10	3.73E-10	2.29E-10	1.43E-10	3.36E-11	1.25E-11	6.45E-12	3.94E-12
SW	1.57E-08	3.22E-09	9.88E-10	4.58E-10	2.76E-10	1.63E-10	4.04E-11	1.52E-11	7.88E-12	4.77E-12
WSW	1.36E-08	2.73E-09	8.16E-10	3.78E-10	2.27E-10	1.31E-10	3.14E-11	1.18E-11	6.07E-12	3.69E-12
W	1.71E-08	3.07E-09	8.93E-10	5.30E-10	3.47E-10	1.40E-10	3.58E-11	1.35E-11	7.08E-12	4.28E-12
WNW	2.78E-08	4.78E-09	1.40E-09	6.32E-10	4.31E-10	1.93E-10	4.03E-11	1.48E-11	7.53E-12	4.67E-12
NW	3.14E-08	4.49E-09	1.23E-09	5.94E-10	4.72E-10	2.05E-10	4.29E-11	1.58E-11	8.02E-12	4.97E-12
NNW	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2.25E-11	1.14E-11	7.09E-12